

“What is it in the territory that gets onto the map?” We know the territory does not get onto the map. ... Now, if the territory were uniform, nothing would get onto the map except its boundaries, which are the points at which it ceases to be uniform against some larger matrix. What gets onto the map, in fact, is difference, be it a difference in altitude, a difference in vegetation, a difference in population structure, difference in surface, or whatever. Differences are the things that get onto a map.”

(Bateson G cited in Hensel, Hight & Menges, 2009:9)

# COMPLEXCITY:

## A NETWORK OF RELATIONS BETWEEN DIFFERENTIALS.

Research field: Housing and urban environments

Minette Teessen

Course coordinator: Dr. Jacques Laubscher (February - July 2012)

Prof. Arthur Barker (1 August – November 2012)

Study leader: Carin Combrinck

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To Carin and Arthur

who experienced the emergence of this scheme over the years and let me see it through in my way.

This thesis was not done in isolation. It is the product of support by family and friends whom, although being neglected through the duration of my studies, were always there.

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# ABSTRACT

“The world of supermodernity does not exactly match the one in which we believe we live, for we live in a world that we have not yet learned to look at. We have to relearn to think about space.”

(Augé, 1995:35)

The dissertation postulates that the main issue when working in the contemporary urban environment is not how to repair the damage caused to the traditional city form as we know (or think about) it, but a realization that the idea of “city” has changed. Failure of intervention strategies such as geographical unification and planning programmes should rather be ascribed to incomprehension of this “new” city form.

Cities are human organisations and as such complex systems made up of interdependent elements showing signs of emergence, uncertainty in behaviour, adaptation, self-organisation, feedback loops and non-linearity (phenomena that do not adhere to order, reductionism, predictability and determinism). This necessitates a new architectural response with which to define the city as well as a new way of analysis and representation in built form, since the traditional designer’s tools have proven to be inadequate.

Resulting from investigation steered by SPACELAB Research Laboratory for the Contemporary City at Delft University of Technology, a new threshold with which to define the new city and study area is recommended, one grounded in movement. Furthermore, the technique of “Disfiguring the urban” (developed by the same laboratory) is applied to do an alternative reading and representation of the study area, one which will explain the processes responsible for the transformation visible in the morphological landscape.

The deductions made from this analysis are used to inform a “processes framework for Salvokop” and guide the candidate in terms of client and programme, towards establishing parameters for physical manifestation.

# ABSTRAK

“The world of supermodernity does not exactly match the one in which we believe we live, for we live in a world that we have not yet learned to look at. We have to relearn to think about space.”

(Augé, 1995:35)

Die verhandeling maak daarop aanspraak dat die fokus van hernuwingsprojekte wat in die huidige stedelike omgewing aangepak word nie is op hoe om skade aan die tradisionele stadsvorm soos wat ons dit ken (of daaroor dink) te herstel nie, maar eerder ‘n besef dat die konsep van “stad” verander het. Wanneer ingrypings soos geografiese verenigings of voorafbeplande programmering misluk, moet dit eerder toegeskryf word aan ‘n wanbegrip van hierdie “nuwe” stadsvorm.

Stede is menslike organisasies en as sodanig komplekse sisteme wat bestaan uit onderlinge afhanklikheid tussen die onderskeie elemente, en tekens toon van verrysing (emergence), onsekerheid van gedrag, aanpassing, self-organisasie, terugkering (“feedback loops”), en non-lineariteit (verskynsels wat nie voldoen aan orde, reduksie, voorspelbaarheid en determinasie nie). Dit vereis ‘n nuwe argitektoniese reaksie waarmee die stad gedefinieer kan word sowel as a nuwe manier van analisering en voorstelling

op morfologiese vlak, aangesien die ontwerper se tradisionele metodes van analisering en voorstelling in onbruik verval het.

Voortvloeiend uit ondersoek deur SPACELAB Research Laboratory for the Contemporary City by die Delft Universiteit van Tegnologie, is ‘n nuwe drumpel, wat eerder op bewegingspatrone gebaseer is, voorgestel om die nuwe stad, en die studiegebied te definieer. Verder, is die tegniek “Disfiguring the urban”, (deur dieselfde laboratorium), toegepas om ‘n alternatiewe vertolking van die studiegebied te doen: een wat die prosesse verantwoordelik vir die gedaanteverwisseling van die morfologiese omgewing, sal kan verduidelik.

Die afleidings wat deur hierdie analise gemaak word, word dan gebruik as inligting vir besluitneming vir ‘n “prosesse raamwerk vir Salvokop”. Dit word ook gebruik om leiding te verskaf i.v.m. kliënt en program, en vir die bepaling van grense vir fisiese manifestasie.

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# CHAPTER 1

## INTRODUCTION

“Buried under all the mute experiences are those unseen that give our life its form, colour and its melody. Buried under all the mute places are those unseen that give our life its form, colour and its melody”

(Amadue Inacio de Almeida Prado cited in Mercier P, 2007:23)

An architectural dissertation can be approached in one of two ways:

A theme (architectural issue) is chosen and then a program and site to act as a vehicle for this investigation. (Jooste-Smit P, 2008) This process is predominantly linear in nature.

A site is initially chosen for which a specific condition prevails, and then the designer aims, through a process of investigation, to identify what the problem is associated with and causing this condition. The man-

ner in which the project engages with the problem is an example of an architectural design process with a circular nature – “In contrast to a linear process, it allows one to encircle a problem and understand and confront it in all its relationships – in other words, it is a kind of exploration.” (Cornelissen H, cited in Vyzoviti S, 2009:6)

This dissertation is an example of the latter implying that the process to identify the problem was an exploration.

The global devastating effect of modernist urban planning on the traditional city as we know it has been widely covered in literature. From developed to developing countries the emphasis placed on infrastructure as well as phenomena such as metropolitisation and urban sprawl have changed the idea of a compact, dense city forever.

Equipped with evidence of loss in spatial connectivity, breakdown of the traditional fine grain, fragmentation of areas and terminology such as mono-functional usage; all of which result from a proper site analysis,

architects and urban planners often believe the current “state” to be “resolved or healed” by introducing intervention strategies such as planning programmes and geographical unifications. Even though the planners’ tools or intervention strategies may be of the best intentions, Bruyns (2005:2) observes; the products often “remain typological in nature, isolated and adrift in urban fields of activities, operating at various scale levels above or below one another”.

An introduction to the site displays a physical landscape fragmented by transport infrastructure, dividing

the separated areas (the inner city of Pretoria and its neighbouring suburb Salvokop) into three parcels. The focus of the dissertation is presented as a pedestrian bridge that spans between these two areas. A site analysis is conducted consisting of looking at the site's history, context, characteristics such as density, grain and nature and functional usage (zoning) revealing how these areas have, as a result of the fragmentation and a lack of accessibility into Salvokop, over time developed very differently: in terms of density, grain, and overall nature. It also reveals how the suburb has become dilapidated, almost forgotten in its isolation over a period of over forty years.

Over the years several frameworks have been proposed

for the area, trying to “repair the damage”, by means of urban interventions that aim to restore the connection between Salvokop and the city, increase accessibility and introduce multi functionality (an attempt to economic upheaval of the suburb), but none seem to have solved the real issue at hand.

In Chapter Three, a different perspective of the site is explored - one in which the viewpoint changes from “above” (seeing the suburb from afar) and classifying Salvokop as mono functional due to its predominantly residential character. This viewpoint gradually moves down to ground floor level where the real activities happening there become visible. The conclusion is that there are activities taking place, which

are not necessarily identifiable from zoning certificates and other tools used by urban practitioners to conduct a site analysis. In a similar exercise the bridge, from afar, seems to simply provide a link connecting two areas on either side of the railway, while a closer investigation from below at the different connection points proves that there are indeed more going on than is visible to the eye. The fact that certain important information is overlooked during the site analysis procedure highlights the shortcomings of the tools used to analyse the urban environment.

Through their research at Spacelab Research Laboratory at Delft University of Technology in the Netherlands on the manifestation of Complexity in

Cities Bruyns G (2005) comments that whether one approaches the environment from a perspective of a city or urban landscape, and from whatever possible scales, one is always faced with the following problematic: one questioning what the city or landscape really is, the other questioning how this city can and should be interpreted and analysed to better equip the decision makers in intervention strategies.

In Chapter Four the city is presented as a system that shows signs of Complex Systems, i.e. things that cannot be fully assessed or controlled, human systems that are intricate, involved, complicated, dynamic or multi-dimensional: “Complex Structures use interwoven components that introduce mutual

dependencies and produce more than the sum of the parts” (according to Rveski 2010:62). A short introduction to the Theory of Complexity marks a distinct paradigm shift from a focus on the architectural object to space as operational device, affecting social and natural sciences alike, and also manifesting in the built environment.

The initial Problem Statement of Chapter Two is reviewed: the main issue when working in the contemporary urban environment is not how to repair the damage caused to the traditional city form as we know it, but a realization that the idea of “city” as we know it, has changed and the failure of our interven-

tion strategies is rather a failure of our understanding of this “new” city form, and how to react towards it. A parti diagram emerges which embodies the different characteristics of Complex Systems. The chapter continues to demonstrate how this complexity manifests in the morphological environment: in the shape of social, economic and political challenges, modernist urbanist planning theories and integrated development frameworks (IDFs) as well as the issue of sustainability.

Building on the research conducted by Spacelab, the dissertation hypothesizes that instead of trying to account for shortfalls in the perceived “order” we still

believe to exist in the world; we should rather seek new proposals which will account for these better. This requires for planners and designers to:

- Rethink the idea of city.
- Find an alternative way of analysing the contemporary landscape to represent and interpret this new landscape.

By applying the two methods of “disfiguring the urban” and “the urban machine” (developed by Spacelab) an additional site analysis is performed in Chapter Five - different to the one performed in

Chapter Two. The research objective is to remove the analysis from the distanced view to an understanding of the processes at work within the study area with the aim to identify the actual reasons for the transformations (the visible “disorder” that we see around us) and then react to these through a design intervention. The “urban machine” accomplishes this by making visible the conditions that favour the emergence of certain activities, allowing a degree of expectancy. A framework based in “processes” can implement this information to facilitate or address these emerging activities, resulting in an intervention that is inspired from the bottom up, not from the top down.

An intervention reacting to a Complex System should not only seek proposals which will account for these better, but also realise that in a Complex System there are two types of structures involved:

- A formal designed structure which embodies relationships of power (such as property owners and local government) and
- An informal structure which represent the system's aliveness and creativity (in this case the users, inhabitants and activities taking place on the bridge) on the other.

Both these parties have their own visions and needs

that may be very different and can lead to tension between the two: however, both are needed. Skilful planners understand this interdependence between these two structures and know that in today's complex world, the challenge is to find the right balance between the creativity of emergence and the stability of design (Capra, 2002:121).

The design objective of this study will be to propose a design solution that acknowledges the complexity within the city and consequently understands that the bridge not only functions simply as a connection point, but is appropriated in various spontaneous ways. Therefore a design intervention should allow

for and celebrate these appropriations.

In Chapter Seven, the normative position of Embracing Complexity is implemented to propose a framework for the study area found in flows of movement (called processes). Understanding the interdependency between formal and informal structures, the challenge is to align the visions of formal structures (local government/planned city) for the larger area around Salvokop with the needs of the informal or unplanned city - which were made visible by applying the "Urban Machine" in Chapter Five. The aim is to arrive, by means of a processes framework at an experience of the landscape where time, dereliction and beauty are

interwoven, and which addresses to the visions and needs of the site in all its different scales - City Scale, Suburban Scale and Site-Specific Scale.

In this chapter, these layers of Time, Dereliction and Beauty will be used in conjunction with the activities that are already taking place on the site to inform client & programme for the study.

Two local precedents – Warwick Junction in Durban and Bosduif Pedestrian and Cycling Route in Cape Town are chosen to inform part of the client and programme, due to their generous approach towards the informal economy (by acknowledging, integrating and facilitating them into the design). The chapter

also investigates the concept of “Urban Wasteland Walks” as possible informant for programme to add to a living experience of the heritage and other activities happening spontaneous on the site. Incorporating the information gained from “the urban machine” a loose framework built upon the existing activities around the site is drawn up, to use as guideline in terms of needs.

In “Thinking Architecturally” Paul Righini (2009:166) identifies two ways of defining an architectural problem: one being essentially rational and the other being more intuitive in nature.

While Chapter Five took a dominantly rational approach Chapter Nine looks at ways in which the Theory of Complexity can be translated into a conceptual architectural response, in a dominantly intuitive manner. The objective is to express the characteristics of Complexity, as explained in Chapter Four, amidst a normative position which acknowledges complexity in the city and seeks proposals to account for it better, as explained in Chapter Six. Together with the proposals for client and programme that has identified in Chapter Eight, it will be used to translate conceptual into architectural form in Chapters Ten and Eleven.

In this chapter a comparison is drawn between the Theory of Complexity and the Theory of Field Conditions. Stan Allen (1997:24) terms the physical manifestation of the paradigm shift from a focus on the architectural object to the spatial field in which it exists, Field Conditions, and as such the architectural issue of this dissertation - Complexity in Cities - can be seen as an example of a Field Condition. Drawing inspiration from this comparison, the definition of Field Condition and the normative position adopted in Chapter Six, the concept for this dissertation is defined as: “A network of relations between differentials”, which implies a design response acknowledging

the interconnectedness of different smaller parts into an indeterminate whole.

From the characteristics identified for both Complex Systems as well as Field Conditions, a list of design guidelines is generated to inform the design process from concept phase in Chapter Nine through to Sketchplan and Design Development phase in Chapter Ten through to physical manifestation and technical resolution in Chapter Eleven.

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City of Pretoria

Sir Herbert Baker Main  
Railway Station

Gautrain Station

Existing Pedestrian  
Bridge

The "Island"

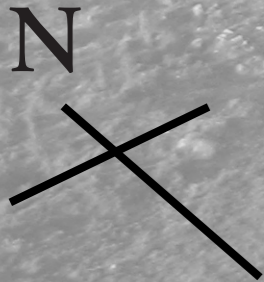
PRASA Railway Line

POP-Up People Upliftment Programme  
and Training Facility

Transnet Capital Projects  
(TCP) Site Office

Salvokop

Remains of Original Maintenance Yard  
of the South African Railways



Skierpoort Avenue  
Only Vehicular Entrance into Salvokop

1st Street



City of Pretoria

Long Distance Bus Terminal

Pop-Up People Upliftment Programme and Training Facility

## CHAPTER 2

### THE SITE

The "Island"

"Working with and not against a site, something new is produced by registering the complexity of the given."  
(Allen, 1999:115)

Salvokop

TCP Site Office

N

Existing pedestrian bridge

The global devastating effect of modernist urban planning on the traditional city as we know it has been widely covered in literature. From developed to developing countries the emphasis placed on infrastructure as well as phenomena such as metropolisation and urban sprawl have changed the idea of a compact, dense city forever.

50 Fig.2.2 The devastating effect of infrastructure dividing the area west of the study area.



Fig.2.3 South Africa within the continent of Africa, indicating Site Location.

Fig.2.4 The province of Gauteng within South Africa, indicating Site Location.

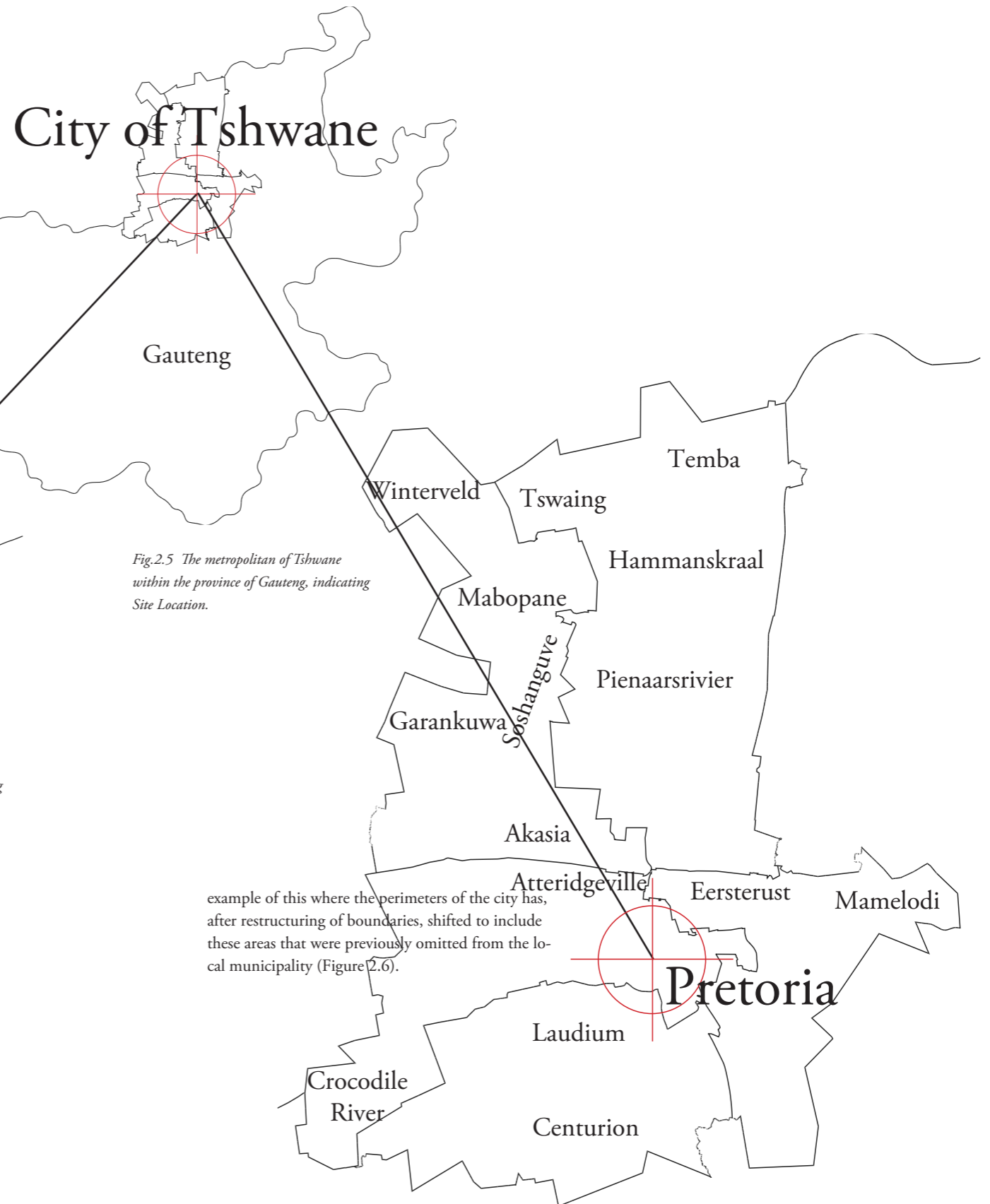


Fig.2.5 The metropolitan of Tshwane within the province of Gauteng, indicating Site Location.

example of this where the perimeters of the city has, after restructuring of boundaries, shifted to include these areas that were previously omitted from the local municipality (Figure 2.6).

Fig.2.6 The city of Pretoria within the Tshwane metropolitan, indicating Site Location.

## 2.1 SITE LOCATION

In South Africa (Figure 2.3) the effect thereof was visible in its unique Apartheid policies (advocating segregated communities), through an approach in which town planning schemes pushed non-white residential areas to the outskirts of town with limited access points in order to ensure as little integration between different racial groups as possible.

With changeover in government in 1994, the professional challenge has had largely to do with an endeavour to reconstruct a “damaged society”

(Harrison, 2001:69). Concepts such as the compact cities approach and integrated development planning resulted in previously separated areas such as those mentioned earlier as well as the traditional homelands of the indigenous people being drawn into larger metropolitans with centralised municipalities responsible for hierarchical decision-making processes.

Pretoria, the administrative capital of the country, located within the province of Gauteng (Figure 2.4) and the metropolitan of Tshwane (Figure 2.5), is an



In Figure 2.7, a *noli map* of the city centre of Pretoria makes visible the emphasis placed on infrastructure: wide arterials criss-cross the city while further to the south, the railway system forms a distinct scar in the landscape, cutting off the suburb of Salvokop directly to its south.

Fort Schanskop

Fig.2.7 A *noli map* of the City of Pretoria indicating the damaging effect of infrastructure on the originally dense city form. The location of the site is shown within its surroundings.

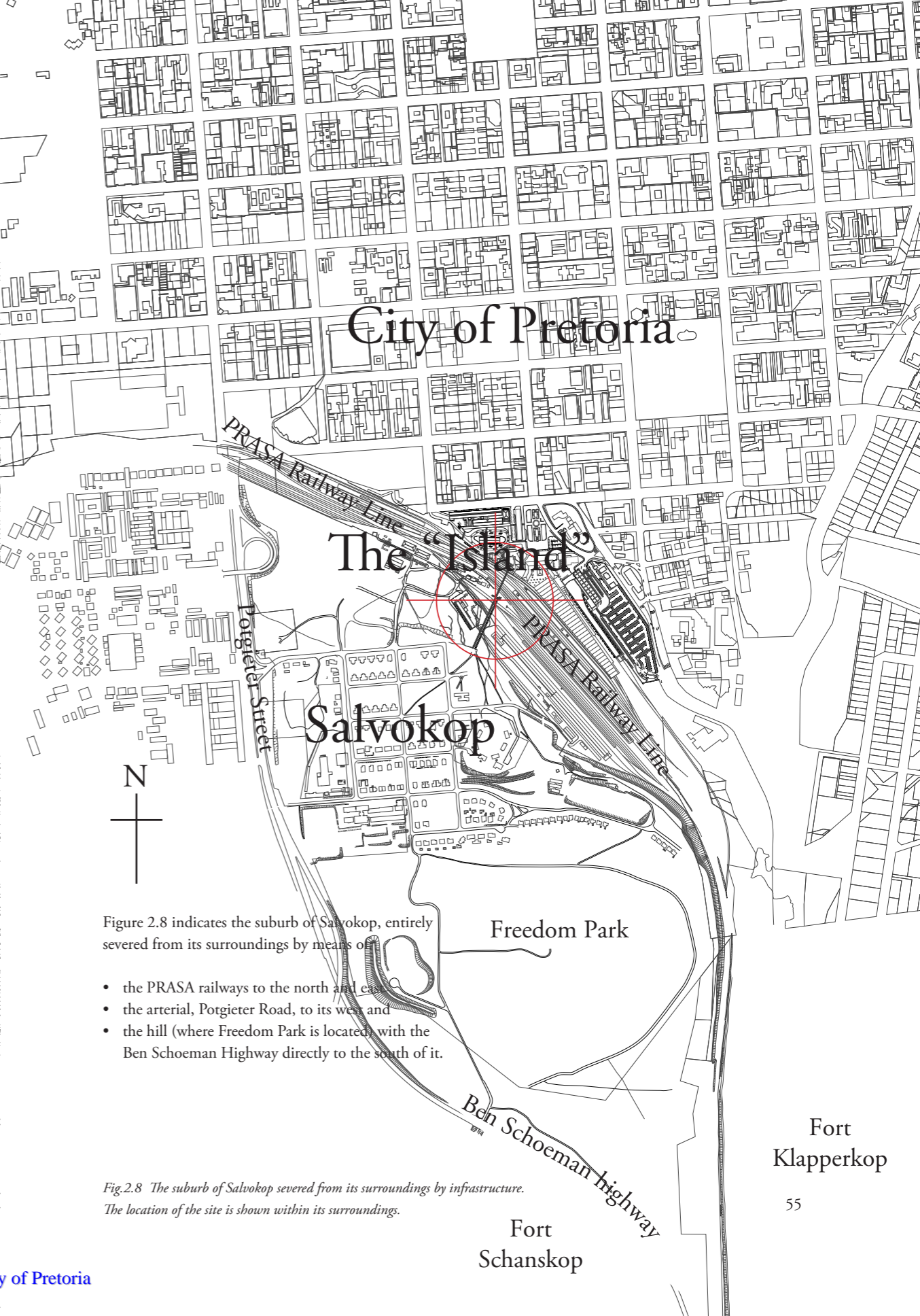


Figure 2.8 indicates the suburb of Salvokop, entirely severed from its surroundings by means of

- the PRASA railways to the north and east,
- the arterial, Potgieter Road, to its west, and
- the hill (where Freedom Park is located) with the Ben Schoeman Highway directly to the south of it.

Freedom Park

Ben Schoeman highway  
Fort Schanskop

Fig.2.8 The suburb of Salvokop severed from its surroundings by infrastructure. The location of the site is shown within its surroundings.

Fort Klapperkop

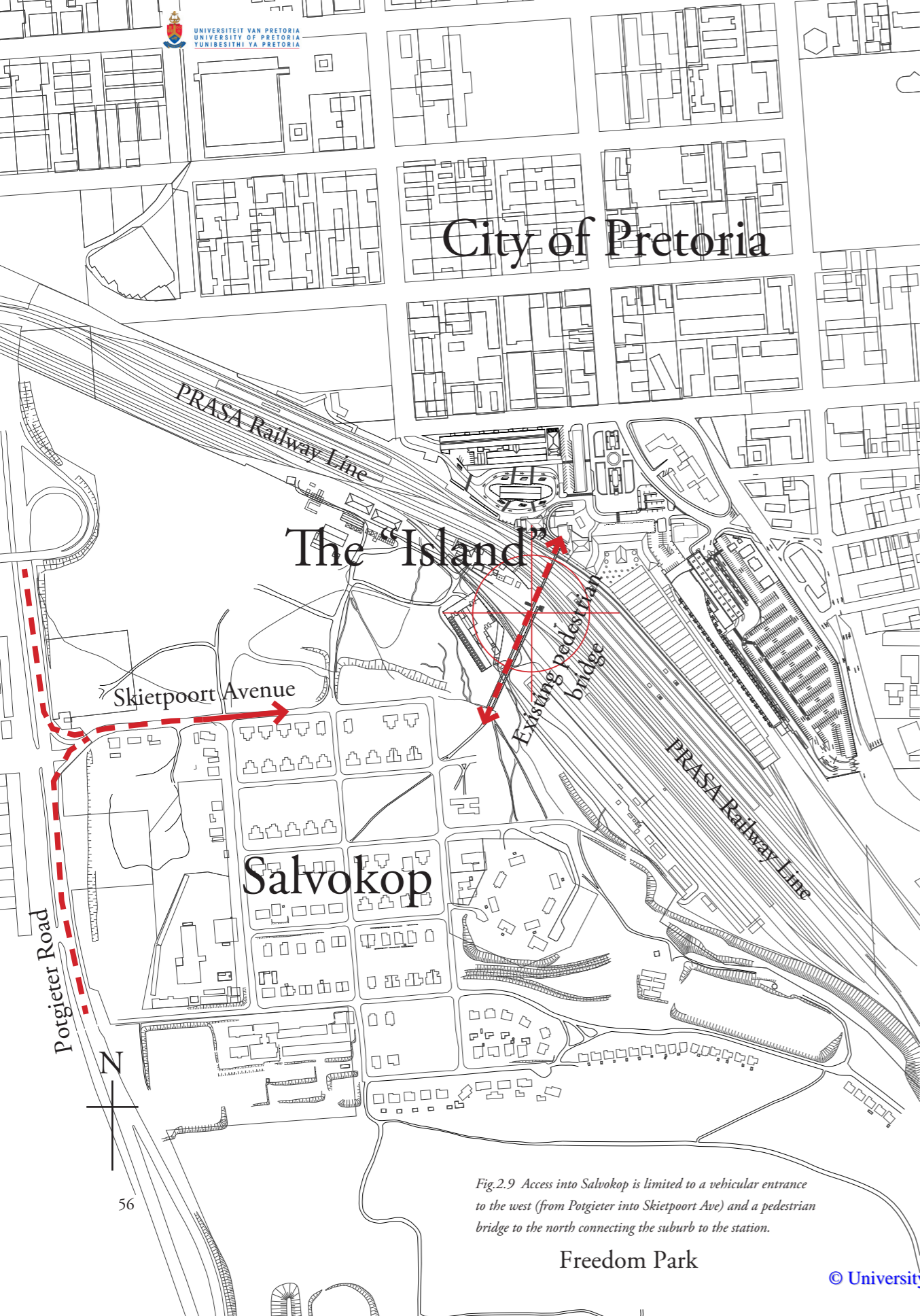


Fig.2.9 Access into Salvokop is limited to a vehicular entrance to the west (from Potgieter into Skietpoort Ave) and a pedestrian bridge to the north connecting the suburb to the station.

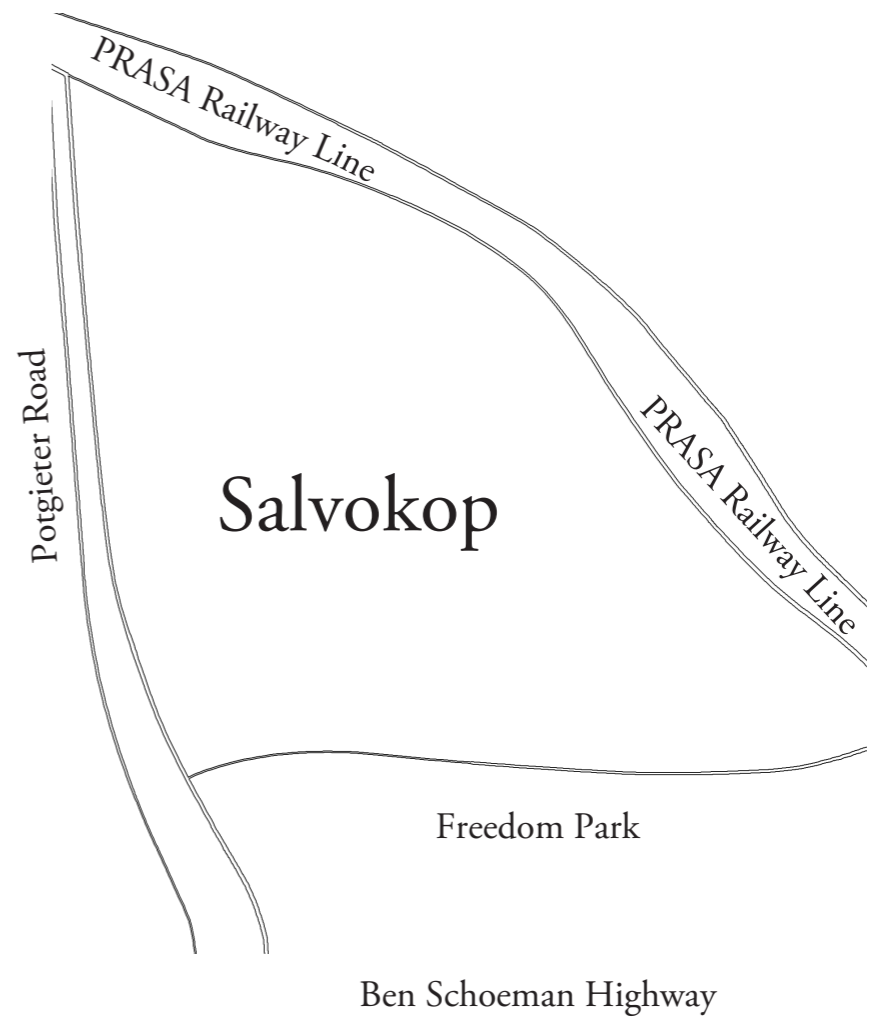


Fig.2.10 Diagrammatic representation of the fragmented nature of the urban landscape in Salvokop caused by infrastructure.

## 2.2 ACCESS INTO SALVOKOP

Currently, the only way of bridging this spatial loss in connectivity is by means of one vehicular entrance to the west - entering from Potgieter Road - and a pedestrian bridge to the north of the suburb (the focus of this dissertation), connecting the suburb to the station beyond the precinct on the city side (Figure 2.9).

The diagrammatic representation in Figure 2.10 indicates how this limited accessibility into Salvokop together with the spatial loss in connectivity, has resulted in a fragmented landscape with Salvokop isolated to the south, and the rest of the city, beyond the infrastructure dividing it.



Fig.2.11 The pedestrian bridge occupies a space which is physically defined by a level difference of 7 metres between Salvokop and the city, spanning over 220 metres.

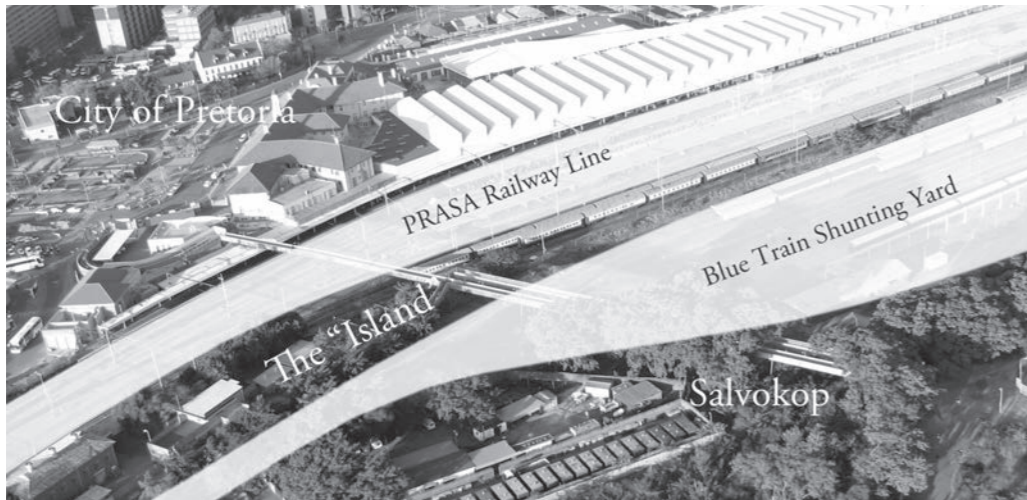
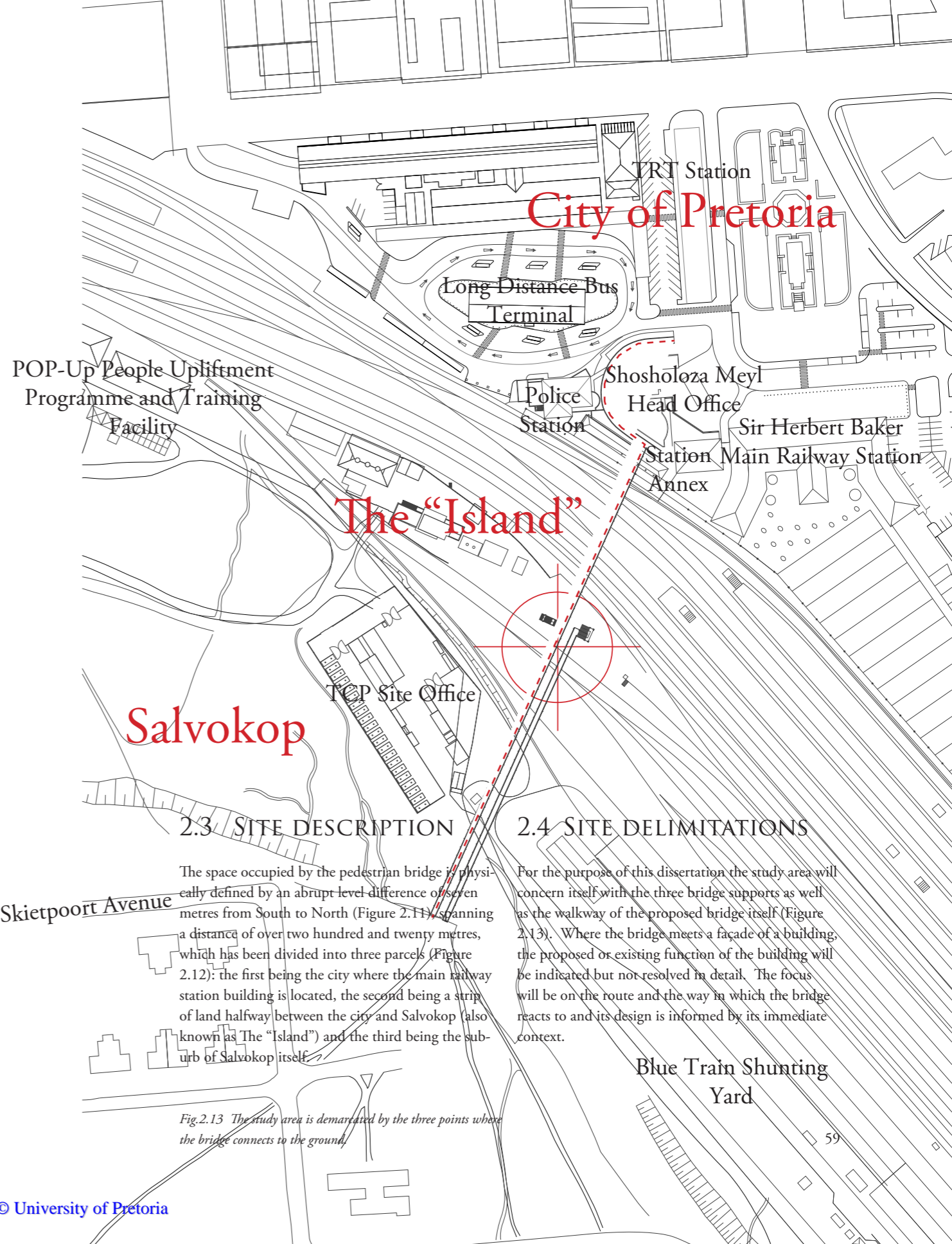


Fig.2.12 The site spans an area that has, by means of the PRASA railway lines and the Blue Train shunting yard, been divided into three parcels: City of Pretoria, The "Island" and Salvokop.



### 2.3 SITE DESCRIPTION

The space occupied by the pedestrian bridge is physically defined by an abrupt level difference of seven metres from South to North (Figure 2.11), spanning a distance of over two hundred and twenty metres, which has been divided into three parcels (Figure 2.12): the first being the city where the main railway station building is located, the second being a strip of land halfway between the city and Salvokop (also known as The "Island") and the third being the suburb of Salvokop itself.

### 2.4 SITE DELIMITATIONS

For the purpose of this dissertation the study area will concern itself with the three bridge supports as well as the walkway of the proposed bridge itself (Figure 2.13). Where the bridge meets a façade of a building, the proposed or existing function of the building will be indicated but not resolved in detail. The focus will be on the route and the way in which the bridge reacts to and its design is informed by its immediate context.

Fig.2.13 The study area is demarcated by the three points where the bridge connects to the ground.

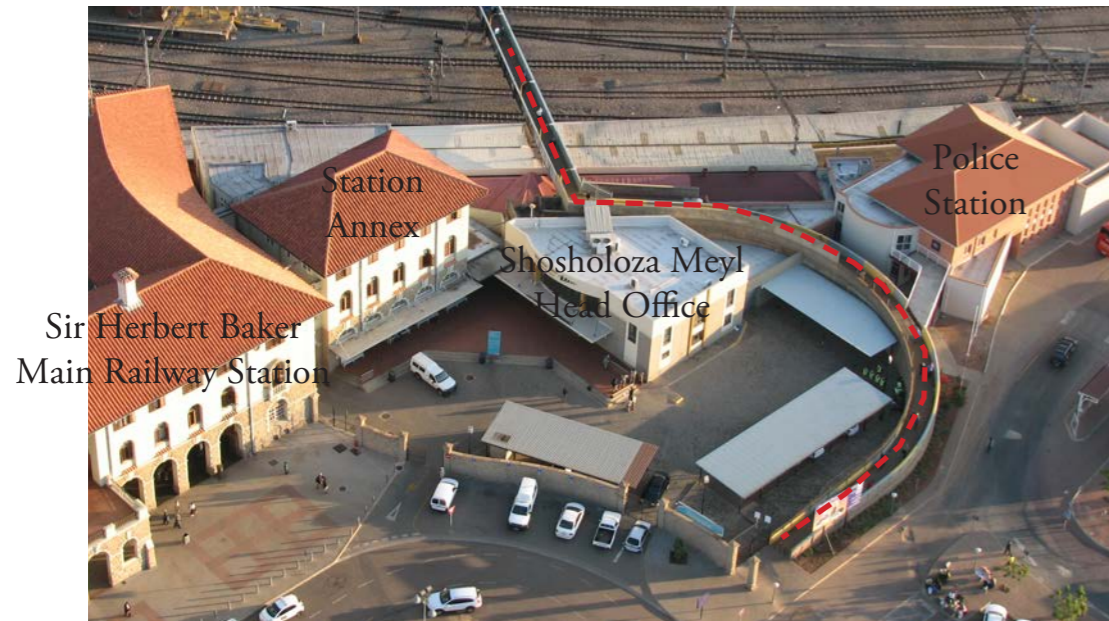


Fig.2.14 On the city's side, the existing pedestrian bridge terminates in a ramp which embraces the head office of the Shosholoza Meyl. Viewed from the north east, the Sir Herbert Baker station and annex can be seen to the left and the police station to the right.

## 2.5 ACCESS ONTO THE SITE

Access onto the site is currently limited to the three connection points mentioned above:

### 2.5.1 CITY OF PRETORIA

Where the existing bridge connects to the city (Figures 2.14 & 2.15) it terminates in a ramp that touches the ground immediately to the northwest of the forecourt of the main station building. To its

west it is bordered by a new Bosman station police station building and to the east, an annex building of the main station. Currently the ramp embraces the headquarters of the Shosholoza Mile long distance train service. This office building overlooks a courtyard currently used as parking facility for the Shosholoza Mile employees. The ground floor of the annex building is used as waiting area for passengers for the Shosholoza Mile.

The administrative offices of the police station are located on ground floor level while the charge office is situated on first floor, and accessible from the ramp.

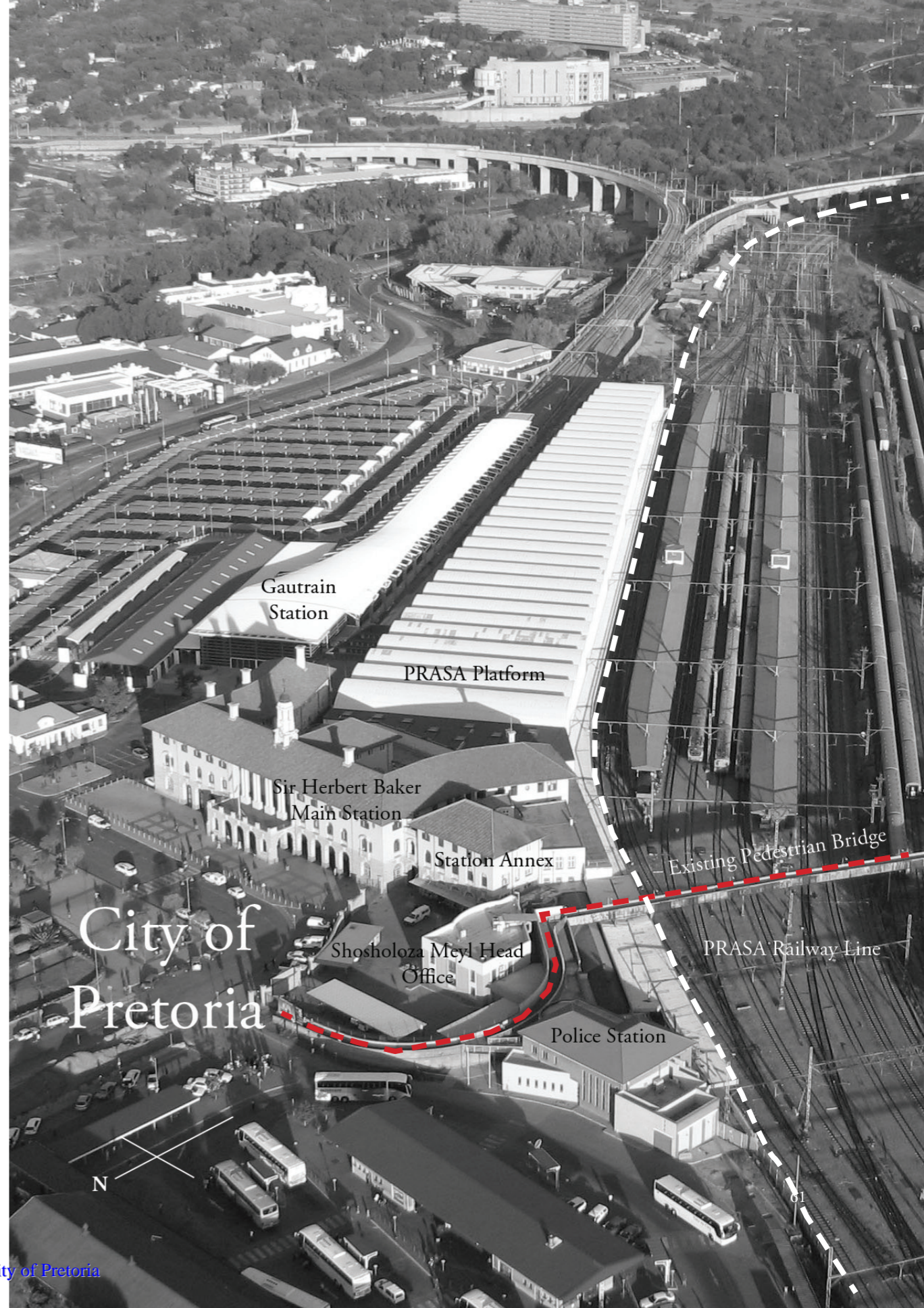


Fig.2.15 The city connection viewed from the north west.

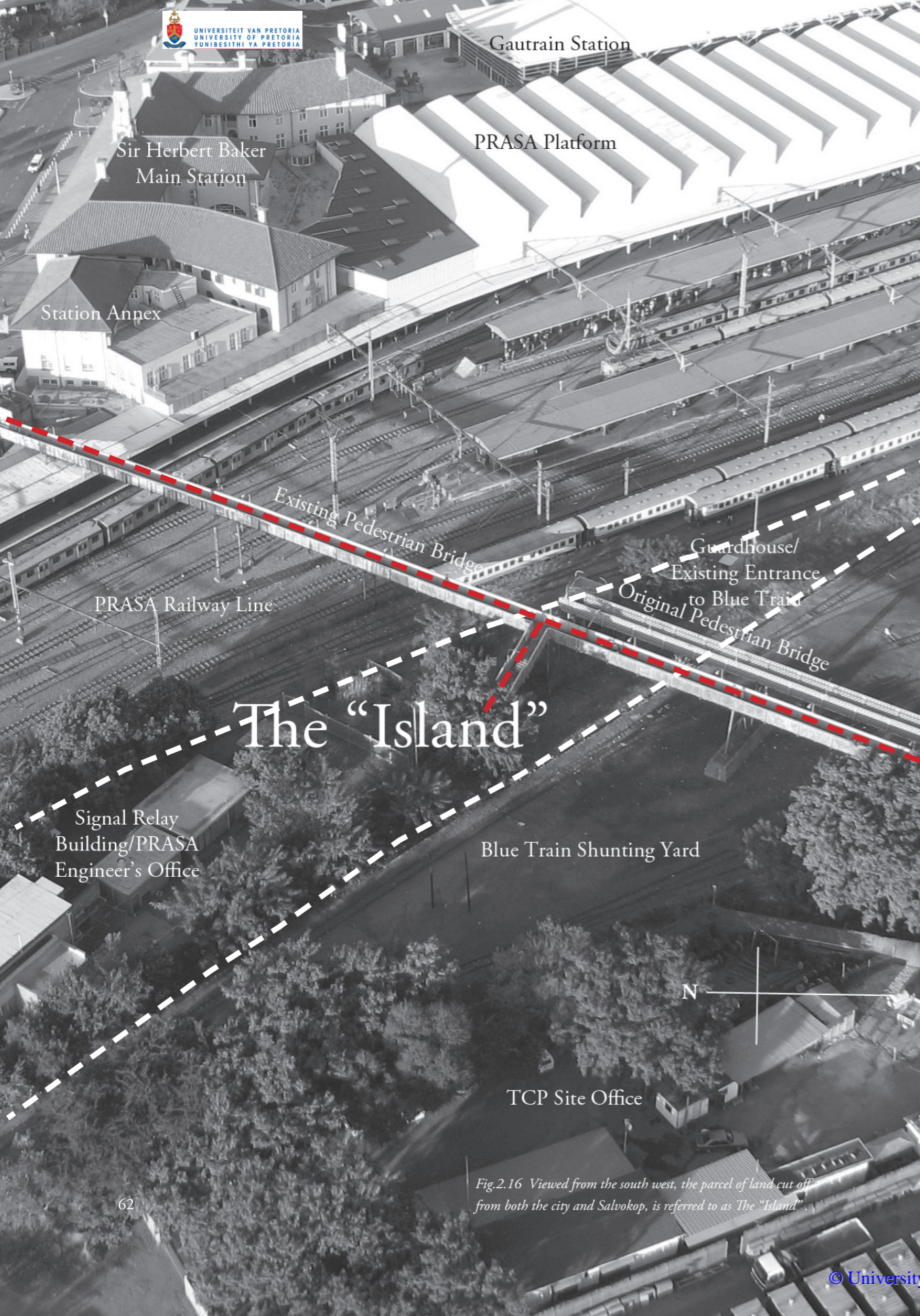


Fig.2.16 Viewed from the south west, the parcel of land cut off from both the city and Salvokop, is referred to as The "Island".



Fig.2.17 The "Island", viewed from the railway lines of the Blue Train Shunting Yard to the south east, indicating the position of the existing staircase and guardhouse.

### 2.5.2 THE ISLAND

This strip of land halfway between the city and Salvokop (Figures 2.16 & 2.17) has been separated from the city by the railway lines of the Passenger Railway Agency of South Africa (PRASA), and from Salvokop by means of the railway lines of the Blue Train shunting yard (a dedicated depot for cleaning, storing and refurbishing of coaches).

Access onto the island is limited to a vehicular entrance to the south (which implies crossing the railway lines of the shunting yard). Furthermore, in an interview conducted with Ms P. Nyikila, business manager at Transnet, on 2010-04-10, mention was made that the staircase exiting from the bridge onto the island, is used by 75% of the Blue Train employees as entrance to the shunting yard. Due to

the manner in which the piece of land has literally been cut off from both sides, it is referred to as The "Island".

The only inhabited building on the island is the double storey Signal Relay Building, which is office to the railway engineer responsible for the relaying of the railway tracks. The remainder of buildings are currently used as store rooms. To the complexes' immediate west, the Steam Hammer Workshop, currently also used as a storage facility, has been vacant since the railway activities were relocated to Koedoespoort to the north of Pretoria around the early seventies. A prefabricated building suffices as guardhouse for security on duty.



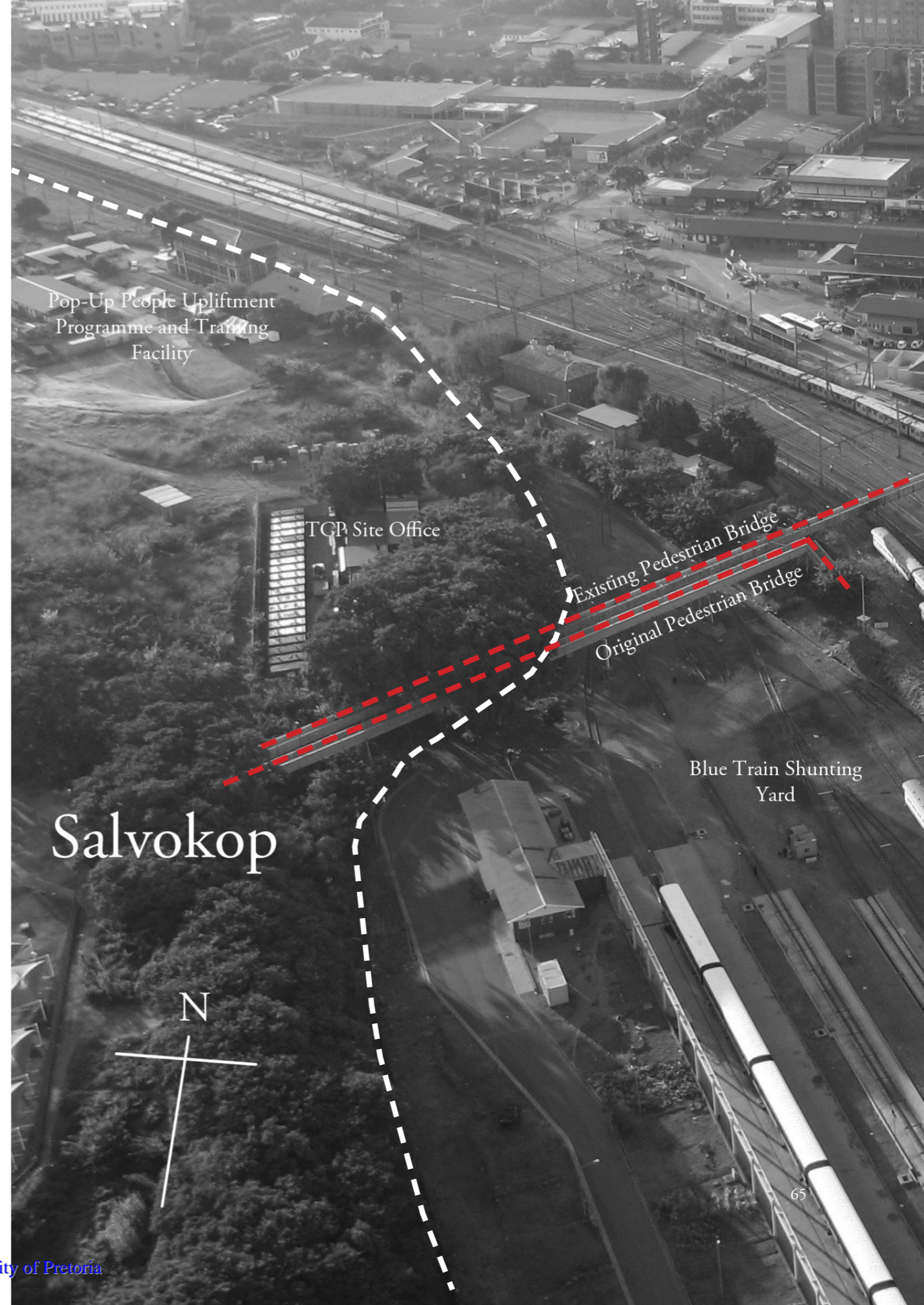
Fig.2.18 The bridge on Salvokop's side viewed from the south of the TCP office.

### 2.5.3 SALVOKOP

After entering a canopy of trees, the bridge meets Salvokop (Figures 2.18 & 2.19) at ground level (more or less on the corners of Koch and Skietpoort Streets) on an open piece of veld seven metres above the railway tracks. There is a distinct difference in urban fabric in terms of scale, grain, density and character (which will be discussed at a later stage) distinguishing this side of the railway line from that of the city. This exit point is also a popular place of commerce for informal traders.

The three connection points is a clear indication of the fragmented nature of the area between the city and the suburb of Salvokop.

Fig.2.19 On the southern side the bridge connects to Salvokop; crossing The "Island", TCP Site Office and Blue Train Shunting Yard along the way.





Freedom Park

Blue Train Shunting  
Yard

Salvokop

Gautrain  
StationPRASA  
PlatformPRASA Railway  
LineExisting Pedestrian  
BridgeTCP Site  
OfficeSir Herbert Baker  
Main Station  
Building

Station Annex

The "Island"

Signal Relay Building

Shosholoza Meyl  
Head Office

Police Station

Transformer Room

City of Pretoria

Landscaped  
TerraceSteam Hammer  
WorkshopLong Distance Bus  
Terminal

## 2.6 IMMEDIATE CONTEXT

Where the bridge reaches the city, it terminates into a ramp; which is bordered by the police station to its west and the station annex building to its east (Figure 2.20).

A high balustrade wall to the immediate north of the bridge is obscuring a full view of the city, with the head office of the Shosholoza Mile located within the courtyard space defined by the pedestrian ramp. The luxury bus terminus and a formalised street vendor market facing Bosman Street located to the north-east.

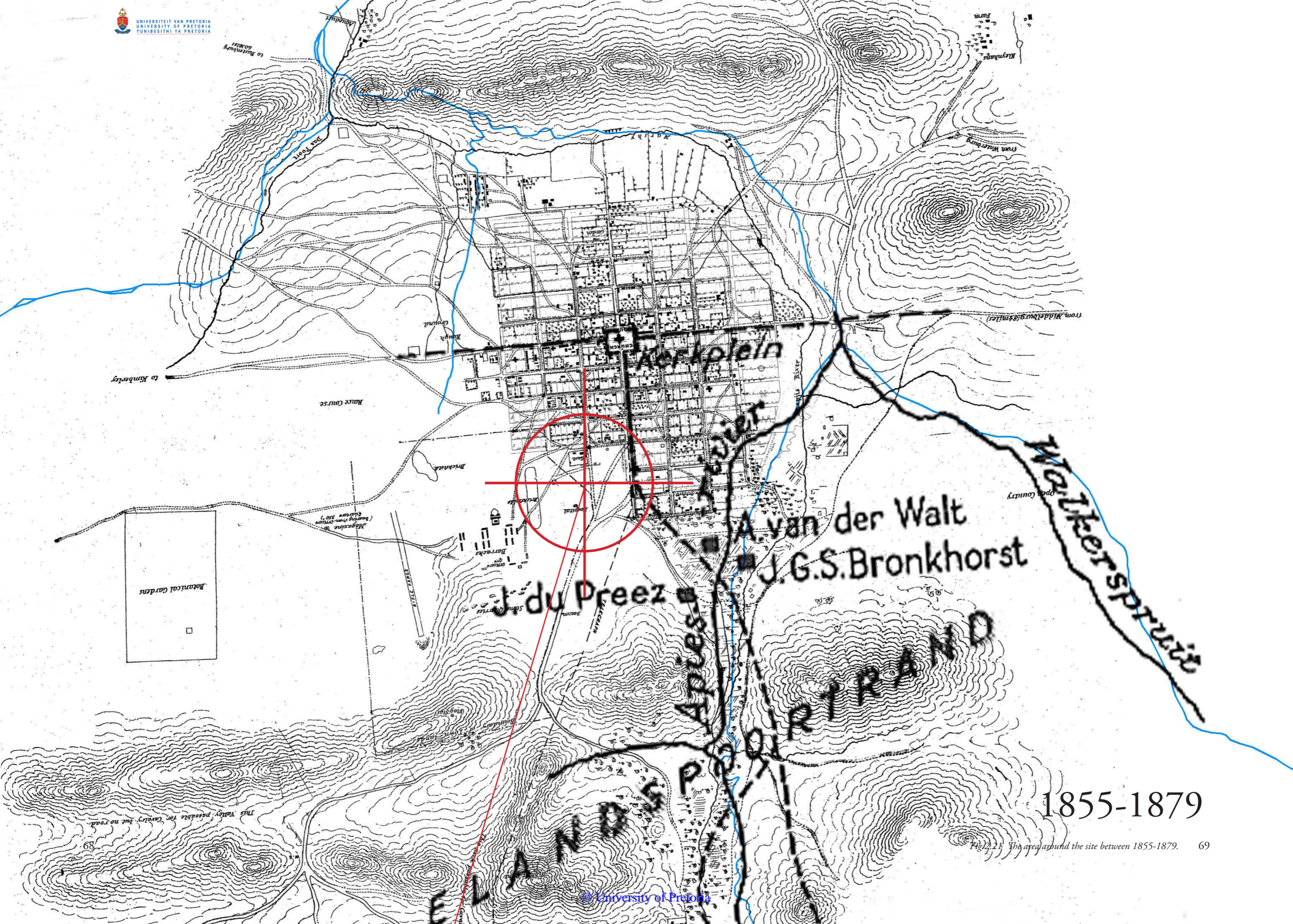
A landscaped terrace is located in the forecourt of the main station building. The bridge passes the railway tracks of PRASA below up to the point where the Blue Train Shunting Yard (which is also used by the Shosholoza Mile) is located to the southeast.

To the south west, the site office of Transnet Capital Projects (TCP) is located. To its immediate west the bridge passes The "Island" where the railway engineer's office (Signal Relay building) is located within a complex of Modernist buildings. The Transformer

Room, as well as Steam Hammer Workshop is located further west, also on The "Island".

Within the larger context, the bridge is located en route between the recently completed Freedom Park development on the Salvokop hill and the Gautrain station located north east of the main station building.

Bosman Street  
Market



Botanical Gardens

Magnazine in  
barracks from 1857

J. du Preez

A. van der Walt  
J.G.S. Bronkhorst

1855-1879

Fig. 2.21 The area around the site between 1855-1879.

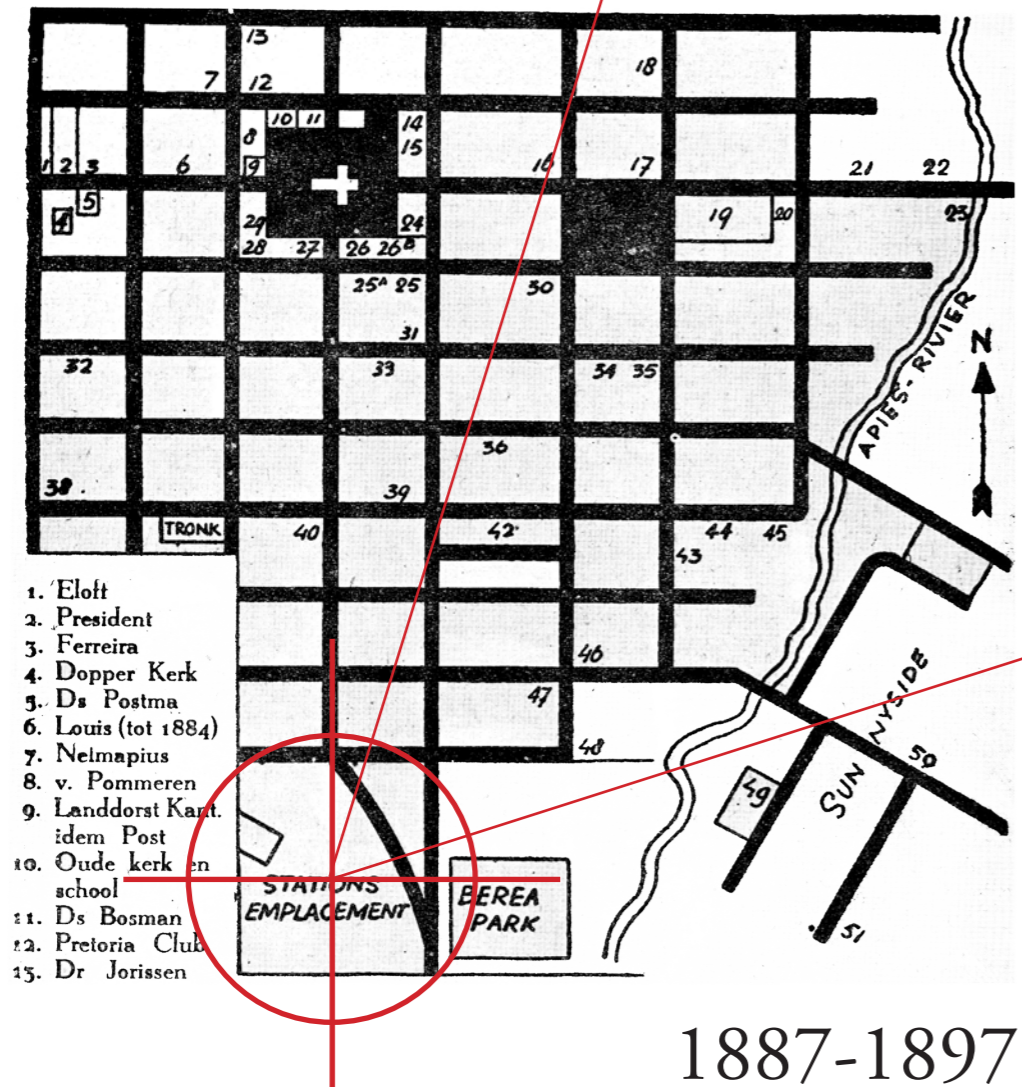


Fig.2.22 The area around the site between 1887-1897.

## 2.7 HISTORY OF THE SITE

Around 1887 the railway maintenance yard was already demarcated as "Stations Emplacement" (Figure 2.22) for the envisaged railways that were to be constructed by 1893 (Agar-Hamilton et al.,1955:28).

In 1901 the layout appeared as indicated in Figure 2.23. This included the original station buildings (Figure 2.24) before the Sir Herbert Baker station was constructed in 1910.

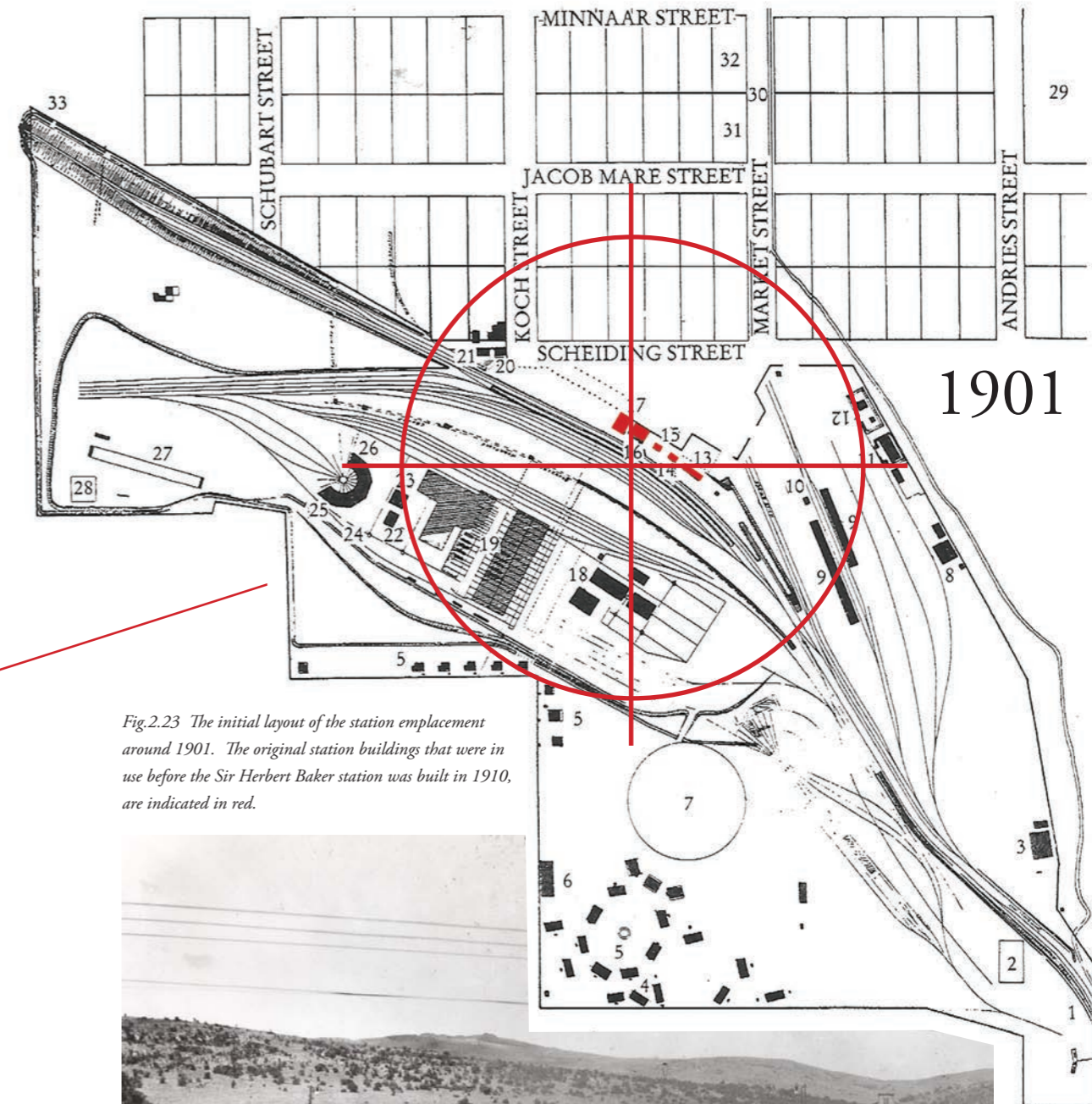


Fig.2.23 The initial layout of the station emplacement around 1901. The original station buildings that were in use before the Sir Herbert Baker station was built in 1910, are indicated in red.

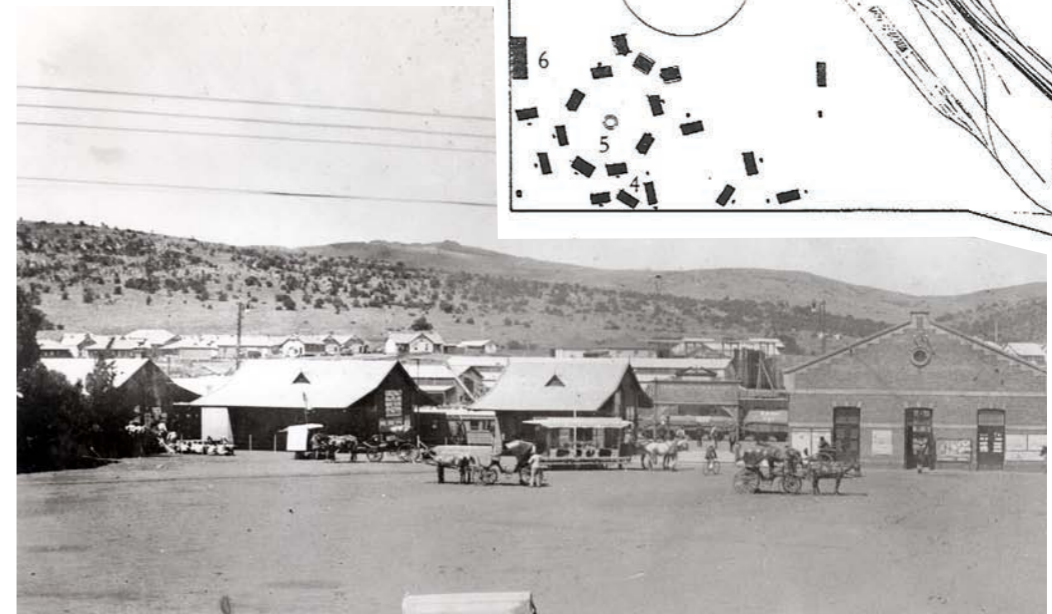


Fig.2.24 The original station buildings between 1901-1909.

1937

1  
Original Engineers' Office

3  
Original Pedestrian Bridge

2  
The Roundhouse



The railway activities necessitated a connection between the city and Salvokop. Between 1909 and the 1930s three pedestrian bridges were erected to facilitate this need. The first was constructed at the same time as the original Engineers' Offices (the location of the POP-UP offices today), to provide a connection between the city and the office (Cultmatrix, 2003:16). The second was constructed around 1911 (Cultmatrix (2003:17) during the construction of the Roundhouse, allowing access between the southern and northern areas of the Roundhouse. Around the 1930s the existig bridge was erected, having only the one

Fig.2.25 The suburb of Salvokop and surroundings around 1937.

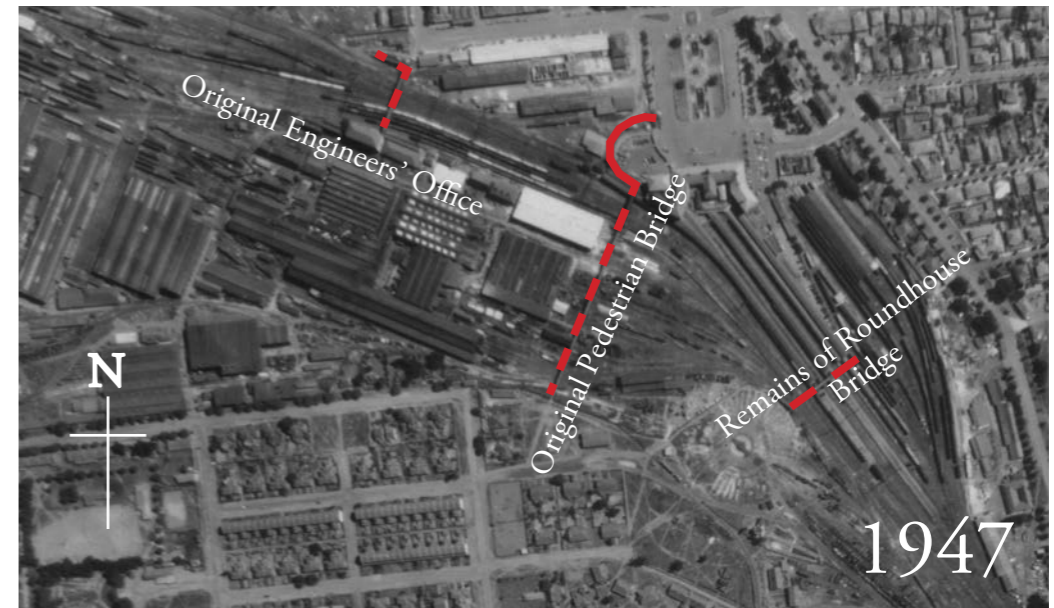


Fig.2.26 The suburb of Salvokop and surroundings around 1947.

walkway with the open-plated balustrade. Before the circular ramp's construction, the bridge terminated by means of a double staircase next to the station building. The adjacent 1937 aerial photograph (Figure 2.25) shows the three bridges intact.

By the second half of the 1940s, the mechanical workshops reached their maximum capacity and future requirements required the maintenance yard to relocate to a larger facility at Koedoespoort, north of Pretoria (Agar-Hamilton et al.,1955:204). Although all three bridges are still visible, Figure 2.26 shows

the Roundhouse already demolished and the circular ramp of the existing bridge constructed by 1947.

Immediately west of the bridge, a white-roofed building is visible which sufficed as an Apprentice Workshop (according to personal communication with a former Railways employee).

Original Kirkness  
Quarry

Salvokop

City of Pretoria

NZASM Hof

Original Position of  
Roundhouse

Original Railway  
Maintenance Yard

Original Coach Washing Shed  
(now location of Gautrain Station)

Original Pedestrian Bridge (one walkway only)

Sir Herbert Baker Railway  
Station Building

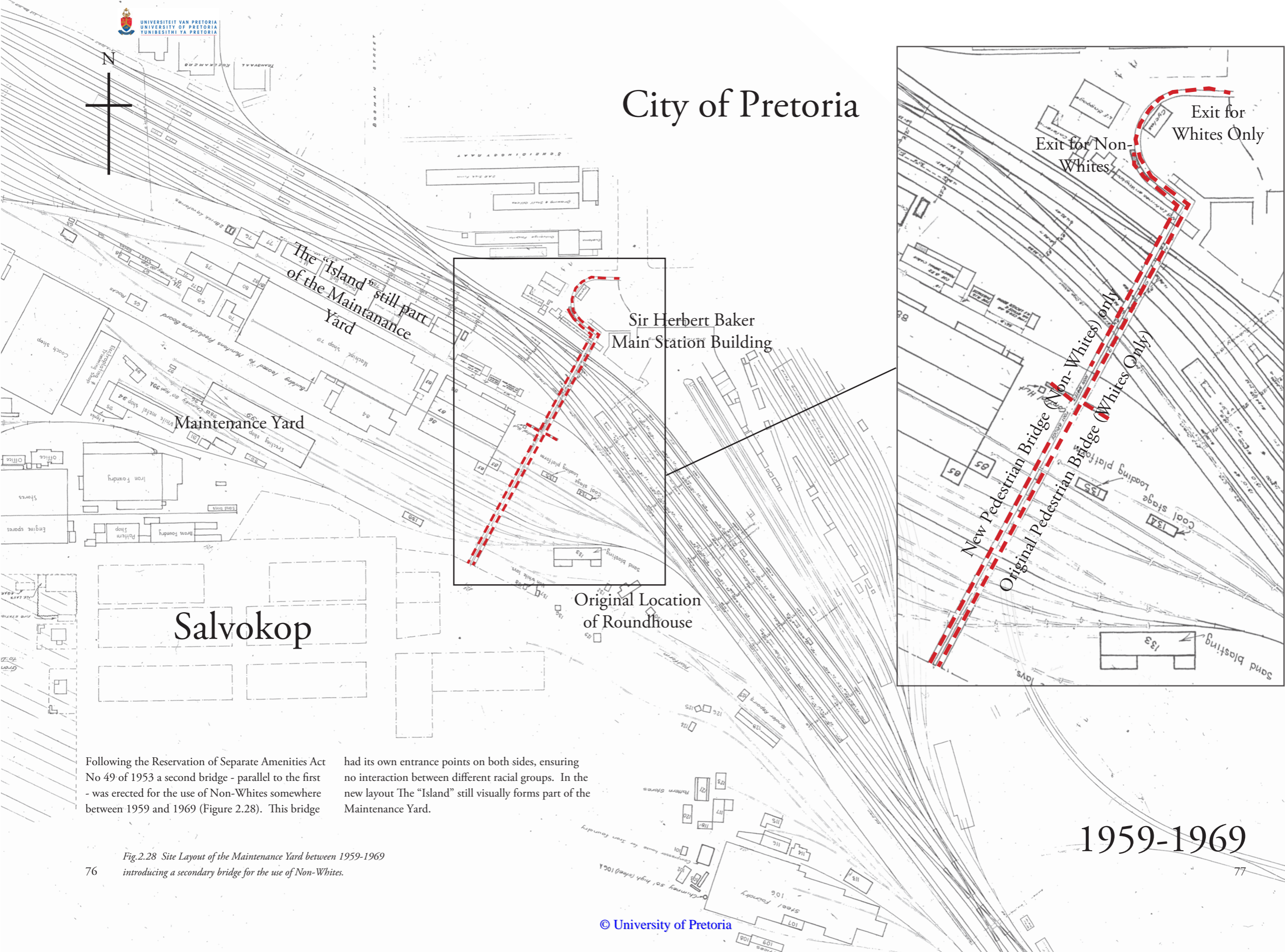
New Signal Relay Building  
(Replacing Original Apprentice  
Shop)

By 1958 this building was replaced by the Modernist Signal Relay building and outhouses, still in existence today (Figure 2.27). By this time traces of the Roundhouse have practically disappeared, as has the western bridge that originally connected the northern and southern sides of the Roundhouse. The aerial photograph shows the existing pedestrian bridge still consisting of only one walkway and the majority of the Maintenance Yard buildings still there.

1958

Fig.2.27 The suburb of Salvokop and the area around the station around 1958, viewed from the north. The pedestrian bridge can be seen, still consisting out of one walkway only.

# City of Pretoria



Following the Reservation of Separate Amenities Act No 49 of 1953 a second bridge - parallel to the first - was erected for the use of Non-Whites somewhere between 1959 and 1969 (Figure 2.28). This bridge

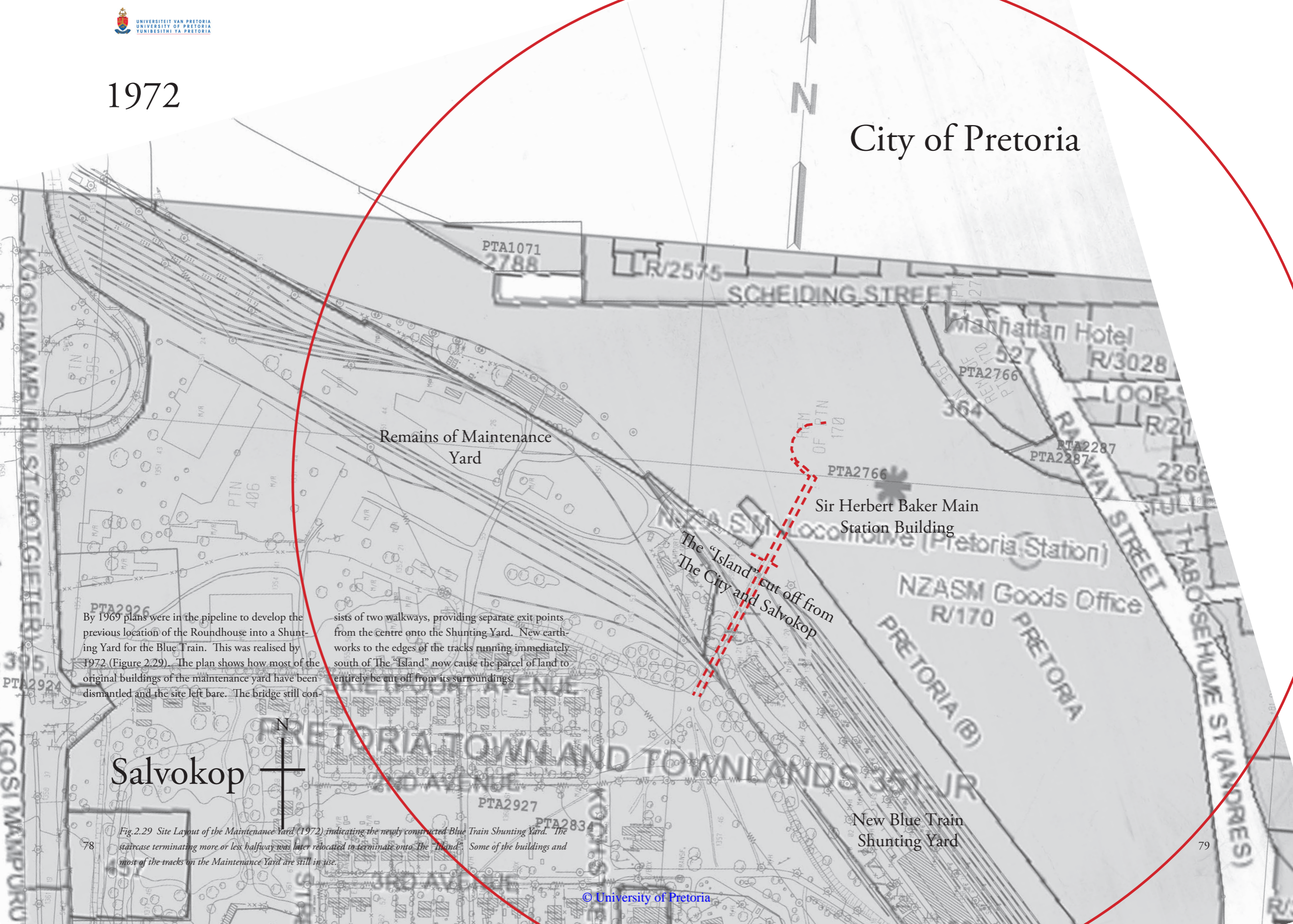
had its own entrance points on both sides, ensuring no interaction between different racial groups. In the new layout The "Island" still visually forms part of the Maintenance Yard.

1959-1969

Fig.2.28 Site Layout of the Maintenance Yard between 1959-1969 introducing a secondary bridge for the use of Non-Whites.

1972

City of Pretoria



Remains of Maintenance Yard

Sir Herbert Baker Main Station Building

The "Island" cut off from The City and Salvokop

By 1969 plans were in the pipeline to develop the previous location of the Roundhouse into a Shunting Yard for the Blue Train. This was realised by 1972 (Figure 2.29). The plan shows how most of the original buildings of the maintenance yard have been dismantled and the site left bare. The bridge still con-

sists of two walkways, providing separate exit points from the centre onto the Shunting Yard. New earthworks to the edges of the tracks running immediately south of The "Island" now cause the parcel of land to entirely be cut off from its surroundings.

Salvokop

New Blue Train Shunting Yard

Fig.2.29 Site Layout of the Maintenance Yard (1972) indicating the newly constructed Blue Train Shunting Yard. The staircase terminating more or less halfway was later relocated to terminate onto The "Island". Some of the buildings and most of the tracks on the Maintenance Yard are still in use.

2012

# City of Pretoria

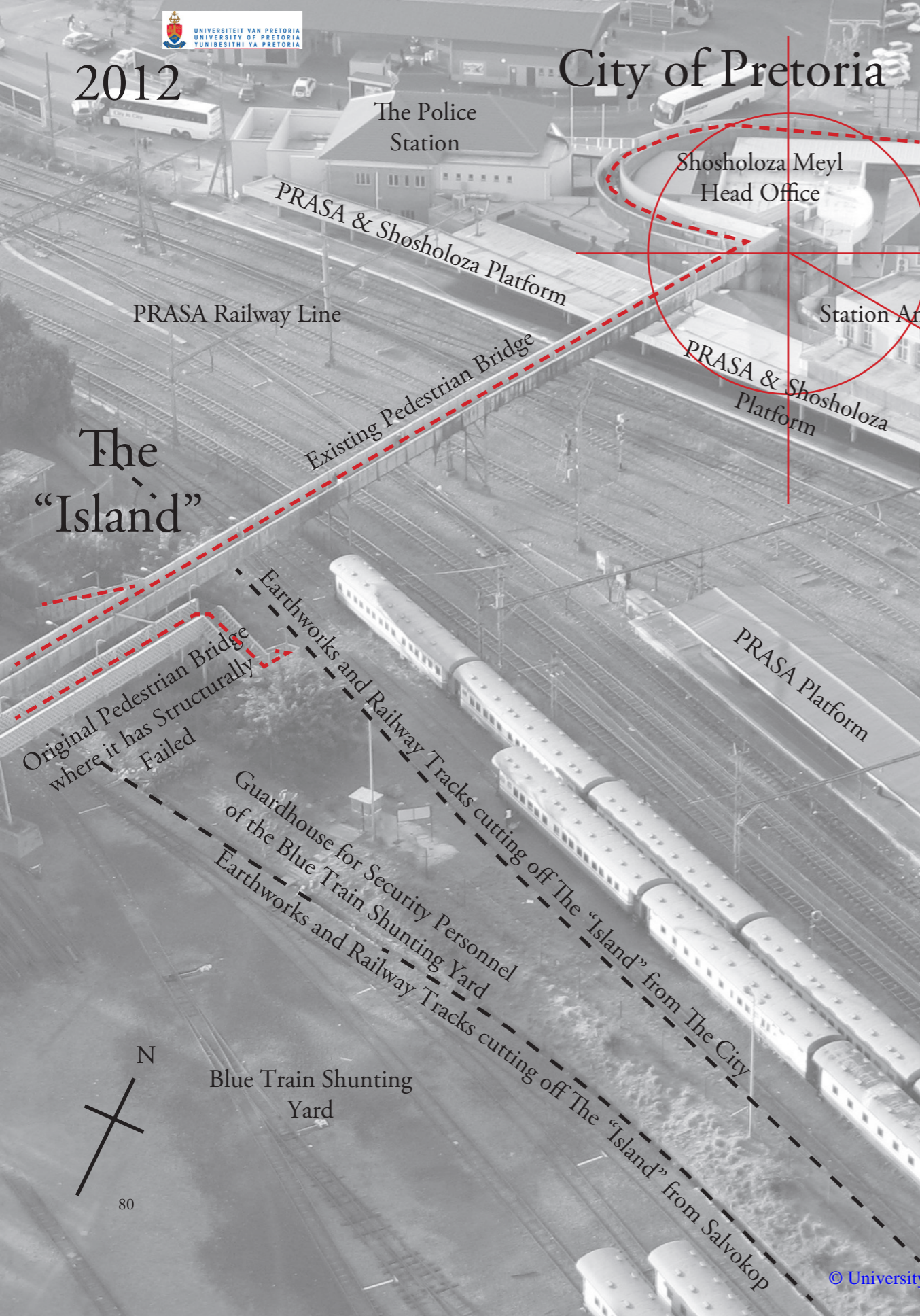


Fig.2.31 The structural support of the original bridge is still visible on the city's side.

During 2001, the original bridge structurally failed leaving only half a bridge spanning between Salvokop to the island (Figure 2.30) and its original support still visible on the city's side (Figure 2.31). Since then, only the second, "Non-White" bridge has been in use, providing a single, 2,3m wide connection spanning over two hundred and twenty metres between Salvokop and the city.

The site where the original Maintenance Yard used to be, has since the location of the Blue Train Shunting Yard, become derelict, with signs of the original tracks still to be found buried in the ground.

In 1994, Transnet Capital Projects (TCP) signed a lease agreement for the area immediately west of the bridge, to the south of the island (Figure 2.1). What was supposed to be a temporary site office has now been in operation for nearly twenty years.

Fig.2.30 The "Island" in 2012, showing the existing bridge, as well as the position where the original bridge structurally failed.



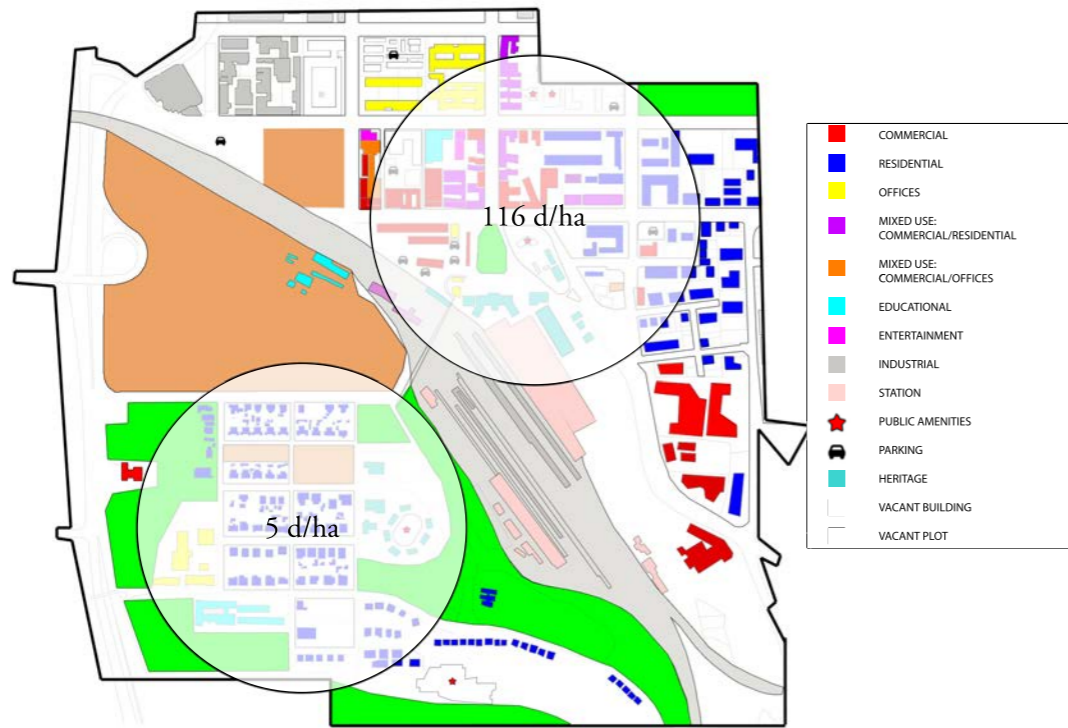


Fig.2.32 A diagrammatic representation (2010) indicating the differences in usage and densities between the city and Salvokop.

Despite several proposals for design interventions aiming to reunify the city with Salvokop, the suburb - the residential area as well as the original site of the maintenance yard - has fallen into a state of decline over the past forty years.

One of the beliefs for this happening is that initially, the southern part of the suburb was mainly developed for residential use with only the necessary institutions such as schools, places of worship and clinics. (Figure 2.32, comparing the functional layout of the two areas). The economic contribution was limited to the Railways to the northern side, providing an income to its employees living close to their workplace.

This isolated state caused the suburb to develop remarkable different characteristics compared to that of the city in terms of densities, grain and overall nature (Figure 2.33).

Recent renewal strategies acknowledging the significance of the suburb in terms of location and heritage value have been focused on introducing multifunctional zoning (to ignite economic growth in the area) in their planning programmes as part of the reunification strategies.

Fig.2.33 Imagery showing the difference in Density, Grain and overall Nature between the city and Salvokop.



Salvokop

City of Pretoria

PRASA Railway  
Line

Existing Pedestrian Bridge

Sir Herbert Baker  
Main Station Building



PRASA Platform

## Gautrain Station & Platform

Gautrain Station (previously  
Coach Washing Shed)

Gautrain Parking  
Area

### 2.8 SIGNIFICANCE

#### 2.8.1 IMMEDIATE CONTEXT

##### 2.8.1.1 THE GAUTRAIN STATION

The Gautrain Pretoria station (Figures 1.34 & 1.35) marks an important point of arrival in the capital. The station is located immediately to the south-east of the Pretoria Main Station (with its historic Sir Herbert Baker station building an important landmark in the city). It is furthermore situated south of the Pretoria Central Business District (CBD) to which the Gautrain provides access to and from.

The Gautrain station has an important tourism role by being a starting point for the CBD from where tourist attractions (such as Freedom Park) within and

beyond the city can be visited and from where connections to regional tourist destinations can be made. In addition to the above, one of the aims of the Gautrain development is to stimulate urban renewal in Pretoria's CBD by providing an improved living and working environment for local users. The latter is integrated with local authority's vision to create proper linkages, provide pedestrian pathways, cleaning the environment and counter-acting urban decay (<http://www.gautrain.co.za>).

Fig.2.34 The location of the Gautrain Station and Platform within the station precinct (viewed from the south east).



Fig.2.35 The entrance to the Gautrain Station viewed from the north. The original Coach Washing Shed can be seen to the left.

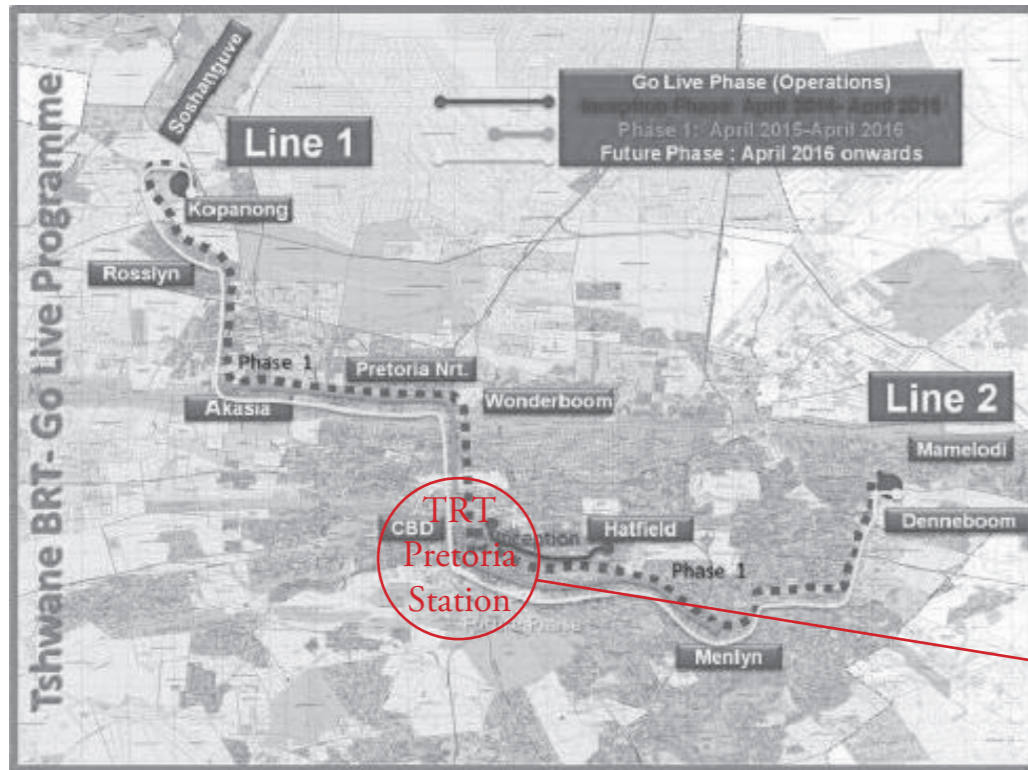


Fig.2.36 Route map of the Tshwane Rapid Transport (TRT) System indicating the location of the Pretoria Station.

### 2.8.1.2 TSHWANE RAPID TRANSPORT SYSTEM

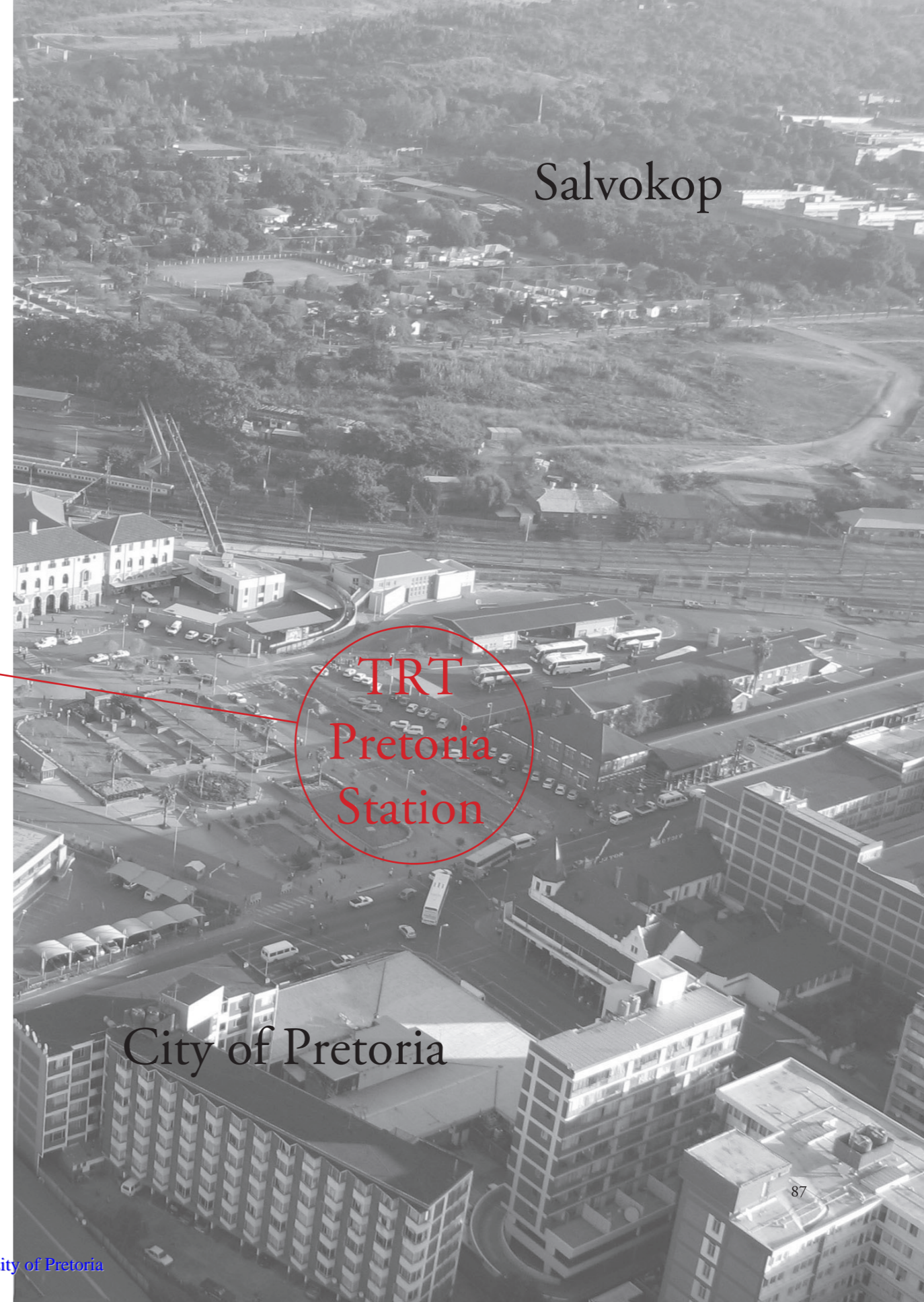
The Tshwane Bus Rapid Transit (TRT) is part of the City of Tshwane (CoT)'s proposal to improve public transport within the city (ARCUS GIBB, 2012:1-2). It is aligned with the CoT's Integrated Rapid Public Transport Network (IRPTN) Strategy which describes the overall vision for rapid mass public transport systems integration for the city and is characterised by amongst other things:

- Integration with rail services such as the Gautrain and PRASA and

- Maximising the facilities for Non-Motorised Transport (NMT) (i.e. cycling and walking) along the entire route supplementing mass public transport services.

The location of the TRT station (Figures 2.36 & 2.37) on the premises of the Pretoria Station (to the north east of the main station building) makes it ideal for the implementation of this vision.

Fig.2.37 The position of the TRT station within the premises of the Pretoria Station.



Salvokop

TRT  
Pretoria  
Station

City of Pretoria



Fig.2.38 Freedom Park viewed from the south west.

Fig.2.39 The location of Freedom Park in relation to Salvokop, the existing pedestrian bridge and the city.



## Salvokop

### 2.8.1.3 FREEDOM PARK

Freedom Park (Figures 2.38 & 2.39), an initiative by the Department of Arts and Culture in 2009, was developed as a heritage destination which would reflect South Africa's collective pre-colonial, colonial, apartheid and post-apartheid histories (<http://www.southafrica.info/about/history/freedom-voortrekker.htm#.Uazevhj8Iy8>).

Constructed on the hill of Salvokop, the development forms part of a larger urban framework (as proposed by GAPP Architects and Urban Designers in association with Cultmatrix Heritage Practitioners) envisaged for the area. The existing bridge plays an important role as a gateway to and from the city and Salvokop as well as a physical connection point to establish Freedom Park as a major tourist attraction (<http://www.gautrain.co.za>).



#### 2.8.1.4 PROPOSED DEVELOPMENTS FOR THE AREA

A number of frameworks have been proposed for the area around Salvokop. Some of these include:

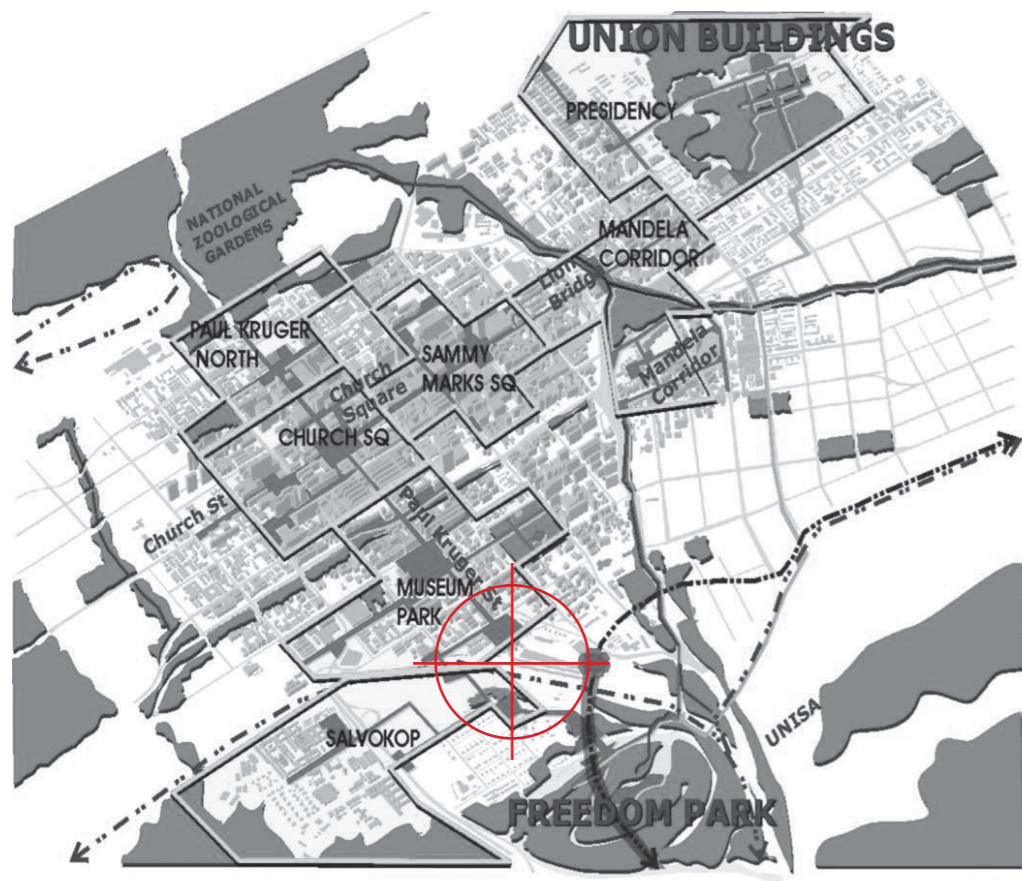
##### A. SALVOKOP DEVELOPMENT FRAMEWORK (FIGURE 1.40)

The framework originated around 2000 from a collaborated effort between GAPP Architects and Urban Designers, Cultmatrix Heritage Practitioners, Aurecon Engineering Consultants (then Africon), Newtown Landscape Architects (NLA) and MMA Architects.

At a broader scale the vision is to create a unique redevelopment area focusing on heritage tourism, commercial, housing and recreation activity, creating a core exemplary heritage and environmental

conservation and creating a new civic cultural and tourist spine. At site scale this vision includes creating new accessibility to the suburb and developing a civic cultural and tourism spine and a series of squares (Salvokop Development Framework Steering Committee, PowerPoint presentation).

The framework has been designed to be responsive to the demands of the heritage analysis – (including connections, typology, scale, grain, movement and relationships) as well as to existing frameworks. It aims to conserve the heritage resources in the area through use or redevelopment – the heritage resources are both town and railway-industrial related.



## B. RE-KGABISA TSHWANE PROGRAMME (RKTP) FUTURE GOVERNMENT PRECINCT

Re-Kgabisa Tshwane (2005) is a programme steered by the Department of Public Works, Public Service & Administration together with the City of Tshwane. The main purpose of this programme is “to ensure a long term accommodation solution of an acceptable standard for national government department head offices and agencies within the inner city of Tshwane” ([http://www.rekgabisatshwane.gov.za/content/content\\_about.html](http://www.rekgabisatshwane.gov.za/content/content_about.html)).

In October 1997 (and confirmed in February 2001), a cabinet decision determined that the headquarters of national government departments (which involves over 40 government departments) were to remain in

Fig.2.41 Graphic representation of the vision for the Re-Kgabisa Tshwane Programme (RKTP) Government Precinct.

the inner city of Tshwane in order to prevent inner city deterioration and promote inner city urban renewal (ibid.).

The project’s driving force is a holistic approach to integrating two matters: to improve government’s physical accommodation in the city as well as to provide the public with better access to government buildings and departments and henceforth increasing citizens’ access to government facilities and public services (the “Batho Pele” principle). For both government employees and the public, the vision was established:

“to create a more pleasant environment in a cohesive interlinked inner city precinct of revitalised buildings, open spaces and a binding infrastructure” ([http://www.gapp.net/images/pdf/ud\\_re\\_kgabisa.pdf](http://www.gapp.net/images/pdf/ud_re_kgabisa.pdf)). Accordingly, a Spatial Development Framework (SDF) was designed informed by the following factors:

- Maximise use of existing government property and Inner City infrastructure
- Incorporating cultural & heritage sites
- Integration with municipal initiatives e.g. Mandela Corridor, housing, transport planning and open space developments

The SDF was formulated to identify and develop the essential corridors and precincts that will define the location and nature for a series of precincts within which the various government departments and agencies will be clustered. This comprises seven precincts in the inner city along the Paul Kruger Street and Church Street corridors, namely The Presidency, the Mandela Corridor, Sammy Marks Square, Paul Kruger Street North, Museum Park and Salvokop. Each of these precincts will develop its own character, and each will be linked to a dedicated pedestrian and public transport route along Paul Kruger Street and Church Street, from Freedom Park to the Union Buildings (Figures 2.41 & 2.42).

Part of the RKTP included the acquisition of the Salvokop and Freedom Park land parcels by the Department of Public Works (DPW) in partnership with the City of Tshwane (CoT) and other National Departments in 2009 (Department: Public Works, 2008/9:23).

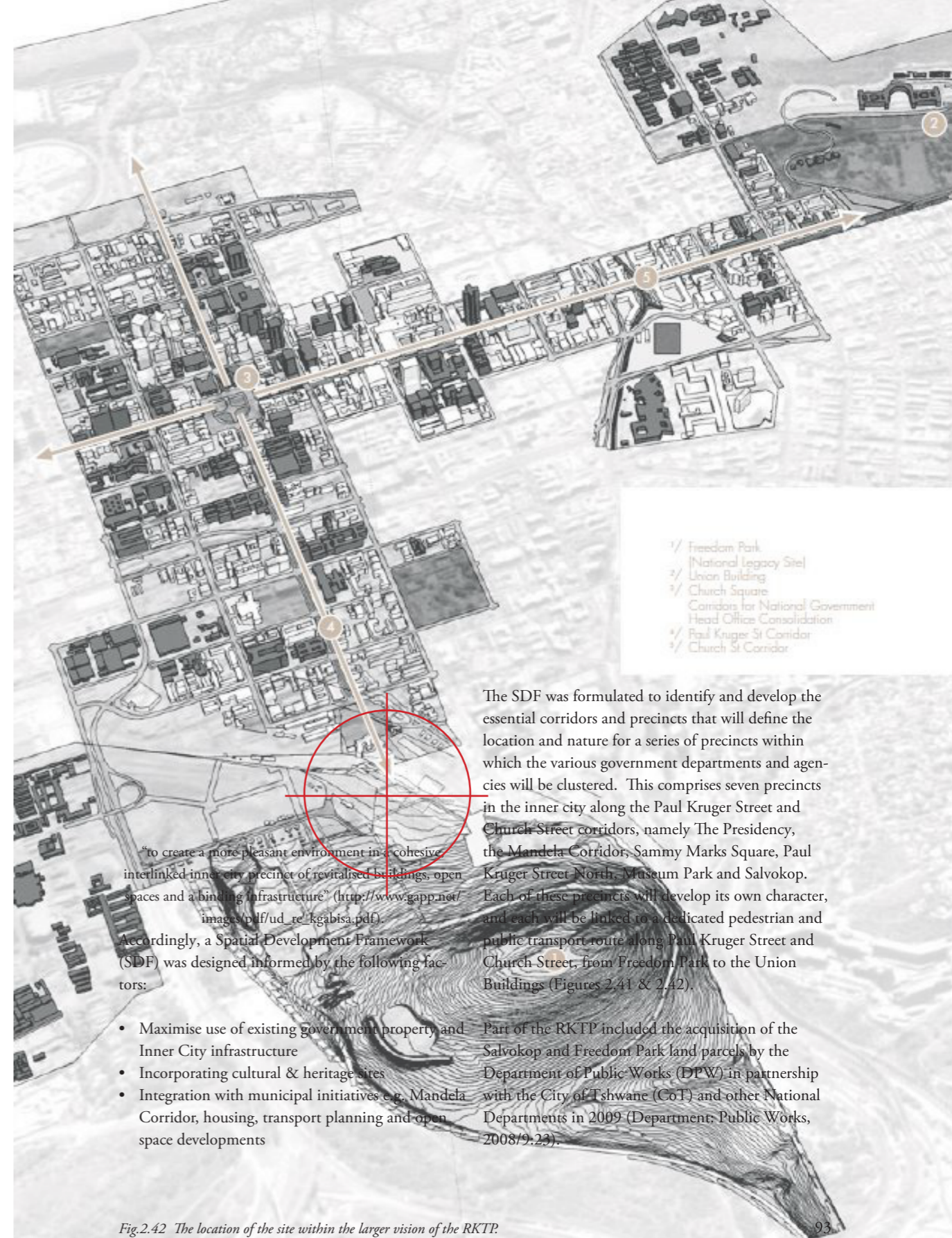
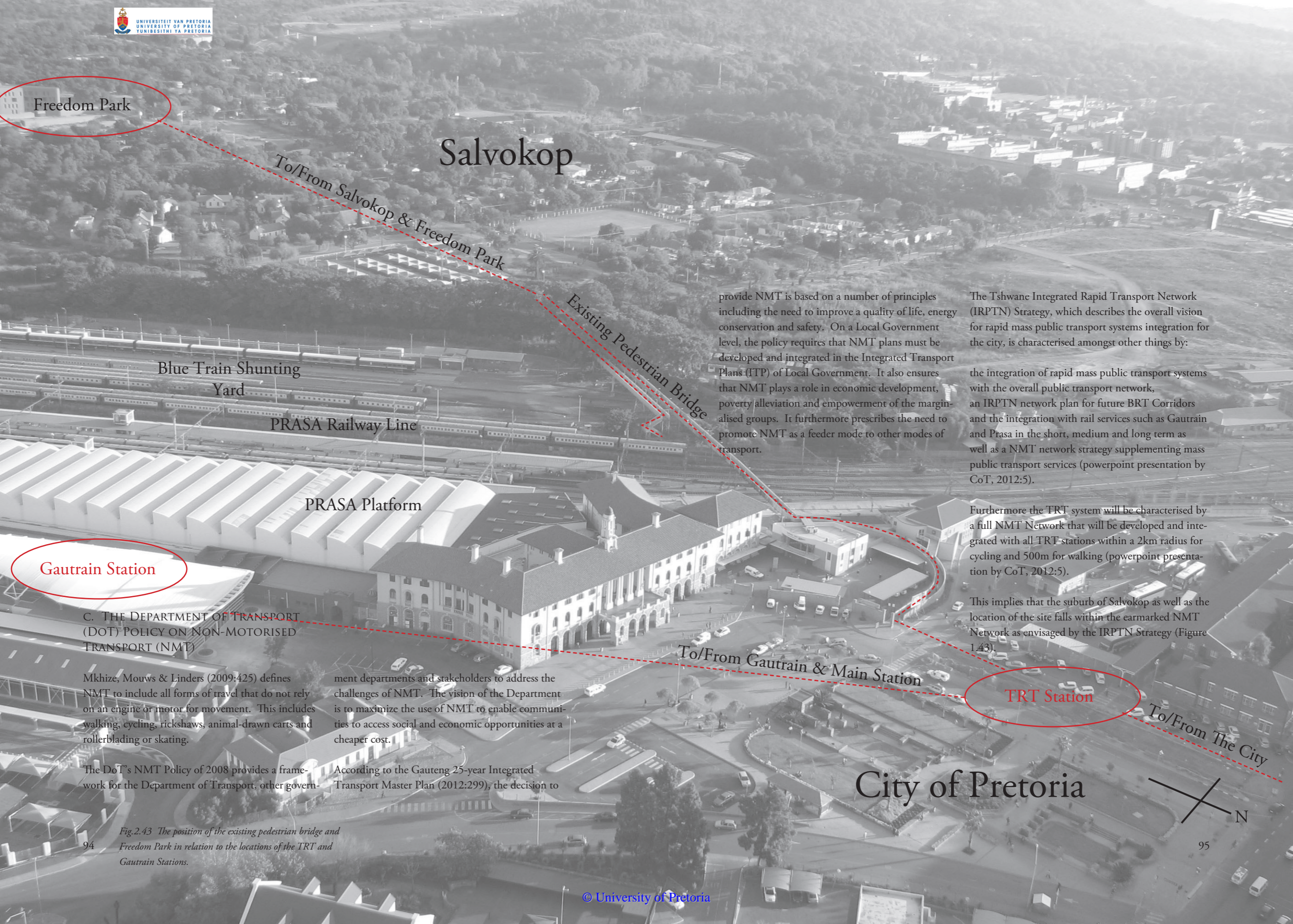


Fig.2.42 The location of the site within the larger vision of the RKTP.



Freedom Park

Salvokop

To/From Salvokop & Freedom Park

Existing Pedestrian Bridge

Blue Train Shunting Yard

PRASA Railway Line

PRASA Platform

Gautrain Station

provide NMT is based on a number of principles including the need to improve a quality of life, energy conservation and safety. On a Local Government level, the policy requires that NMT plans must be developed and integrated in the Integrated Transport Plans (ITP) of Local Government. It also ensures that NMT plays a role in economic development, poverty alleviation and empowerment of the marginalised groups. It furthermore prescribes the need to promote NMT as a feeder mode to other modes of transport.

The Tshwane Integrated Rapid Transport Network (IRPTN) Strategy, which describes the overall vision for rapid mass public transport systems integration for the city, is characterised amongst other things by:

the integration of rapid mass public transport systems with the overall public transport network, an IRPTN network plan for future BRT Corridors and the integration with rail services such as Gautrain and Prasa in the short, medium and long term as well as a NMT network strategy supplementing mass public transport services (powerpoint presentation by CoT, 2012:5).

Furthermore the TRT system will be characterised by a full NMT Network that will be developed and integrated with all TRT stations within a 2km radius for cycling and 500m for walking (powerpoint presentation by CoT, 2012:5).

This implies that the suburb of Salvokop as well as the location of the site falls within the earmarked NMT Network as envisaged by the IRPTN Strategy (Figure 1.43).

C. THE DEPARTMENT OF TRANSPORT (DOT) POLICY ON NON-MOTORISED TRANSPORT (NMT)

Mkhize, Mouws & Linders (2009:425) defines NMT to include all forms of travel that do not rely on an engine or motor for movement. This includes walking, cycling, rickshaws, animal-drawn carts and rollerblading or skating.

The DoT's NMT Policy of 2008 provides a framework for the Department of Transport, other govern-

ment departments and stakeholders to address the challenges of NMT. The vision of the Department is to maximize the use of NMT to enable communities to access social and economic opportunities at a cheaper cost.

According to the Gauteng 25-year Integrated Transport Master Plan (2012:299), the decision to

City of Pretoria



Fig.2.43 The position of the existing pedestrian bridge and Freedom Park in relation to the locations of the TRT and Gautrain Stations.



Freedom Park

Voortrekker Monument  
(Fort Schanskop)

## Salvokop

### D. SALVOKOP AND THE EXISTING BRIDGE

Due to its location, the suburb of Salvokop played a significant role in the history of the South African Railways and consequently the history of Pretoria as capital of the Zuid-Afrikaansche Republiek (ZAR).

A heritage analysis conducted by Cultmatrix in 2003, yielded the realisation of the high value of the heritage resources within the suburb, and concluded that, if combined with the Station precinct, the site could be of national importance (Salvokop Development Framework Steering Committee, PowerPoint presentation).

The suburb's strategic location (see Figure 2.44) adjacent to an important transport hub (station, TRT, Gautrain and other public transport) is the main attraction to redevelop it into multi-use office, residential, commercial and tourism facilities; which includes Freedom Park (Department: Public Works, 2008/9:23).

Within the suburb, the existing pedestrian bridge provides a vital link between a major transport node on the northern side of the railway lines and the southern side at Salvokop (Figure 1.44), especially with Freedom Park as a major tourist attraction. The current inaccessibility and disconnectedness from its surroundings reinforces the importance of the bridge as connection point.

On a bigger scale, the bridge forms part of a continuation of a heritage route which commences at the Voortrekker Monument on top of Skanskop, continuing through Freedom Park, across the bridge to the station precinct down Paul Kruger Street and terminating at Church Square (Figure 2.45).

Gautrain Station

Sir Herbert Baker Main Station Building

City of Pretoria

Fig.2.44 The location of Salvokop in relation to the Voortrekker Monument and Station Precinct.

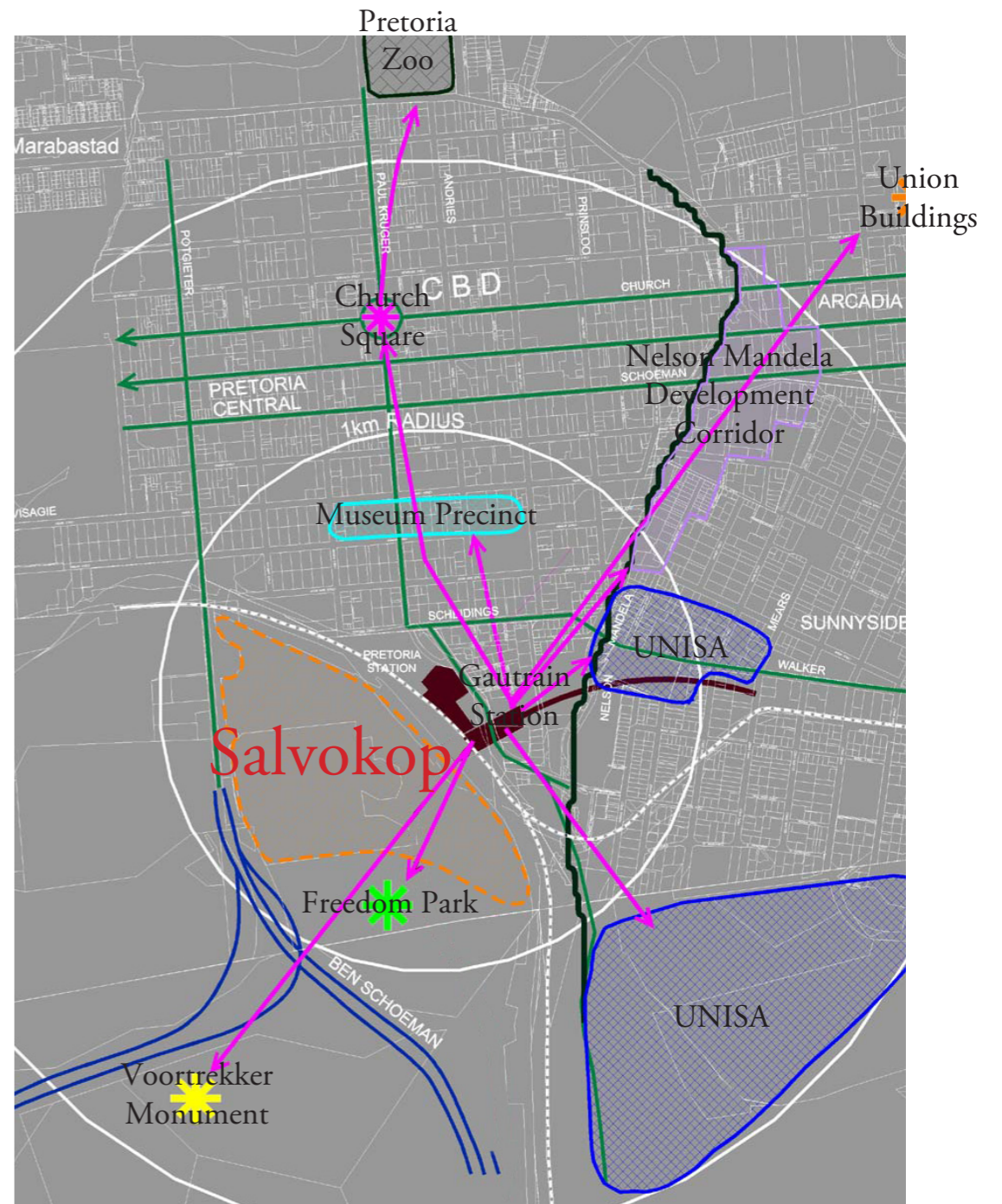
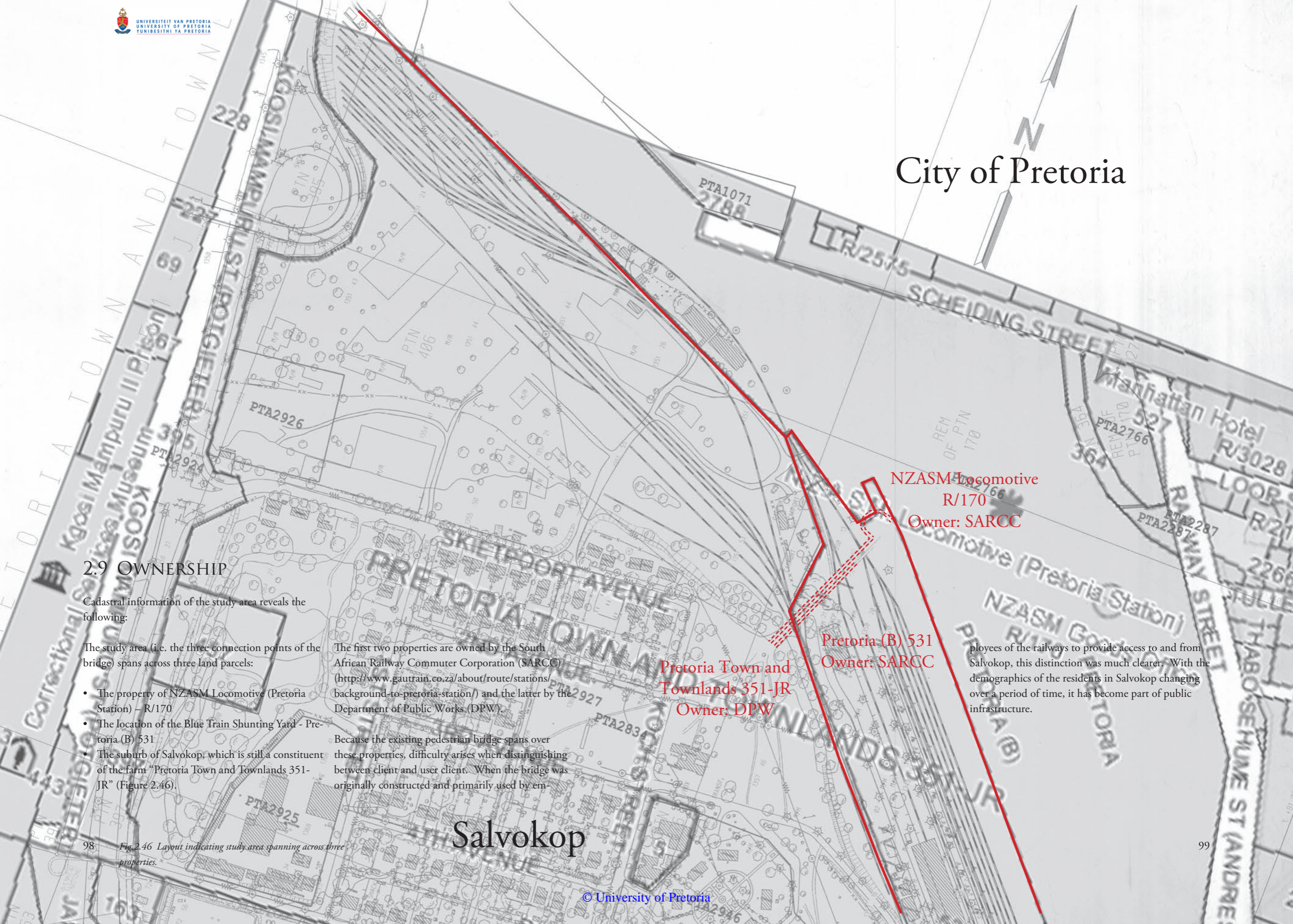


Fig.2.45 The location of Salvokop in relation to important tourist attractions and precincts.



City of Pretoria



NZASM Locomotive  
R/170  
Owner: SARCC

Pretoria Town and  
Townlands 351-JR  
Owner: DPW

Pretoria (B) 531  
Owner: SARCC

ployees of the railways to provide access to and from Salvokop, this distinction was much clearer. With the demographics of the residents in Salvokop changing over a period of time, it has become part of public infrastructure.

## 2.9 OWNERSHIP

Cadastral information of the study area reveals the following:

The study area (i.e. the three connection points of the bridge) spans across three land parcels:

- The property of NZASM Locomotive (Pretoria Station) – R/170
- The location of the Blue Train Shunting Yard - Pretoria (B) 531
- The suburb of Salvokop, which is still a constituent of the farm "Pretoria Town and Townlands 351-JR" (Figure 2.46).

The first two properties are owned by the South African Railway Commuter Corporation (SARCC) (<http://www.gautrain.co.za/about/route/stations/background-to-pretoria-station/>) and the latter by the Department of Public Works (DPW).

Because the existing pedestrian bridge spans over these properties, difficulty arises when distinguishing between client and user client. When the bridge was originally constructed and primarily used by em-

98 Fig. 2.46 Layout indicating study area spanning across three properties.

Salvokop



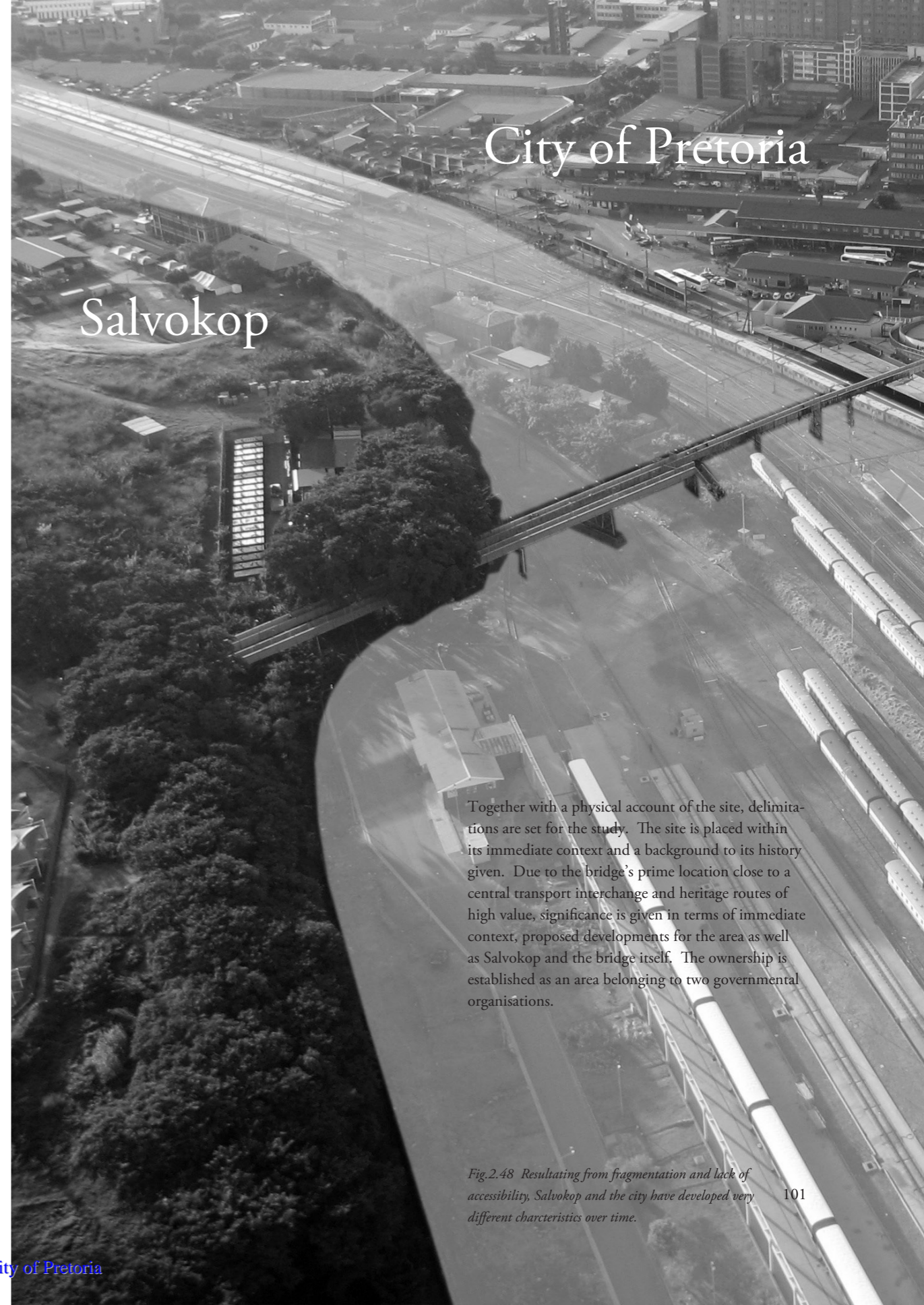
Fig.2.47 The existing pedestrian bridge providing the only physical link between Salvokop and the city, viewed from the original pedestrian bridge.

## 2.10 CONCLUSION

Modernist urban planning techniques have had a profound effect on the traditional city form as we know it. In South Africa the effect thereof was visible in local government policies that segregated different racial communities into separate areas, and pushing the areas of Non-Whites to the outskirts of town supporting limited ingress to encourage as little integration between the groups as possible. Another example includes the “homelands of the indigenous people” principle. With change of government in 1994 these areas have been consolidated into the borders of the local municipality giving rise to centralised governance and the birth of metropolitans. An additional effect on traditional compact city form includes the way in which infrastructure has been placed in the

environment, dividing areas and “disfiguring” the landscape. This dissertation is an example of the latter.

An introduction to the site displays a physical landscape fragmented by transport infrastructure, dividing the separated areas (the inner city of Pretoria and its neighbouring suburb Salvokop) into three parcels. The focus of the dissertation is presented as a pedestrian bridge that spans between these two areas. A site analysis reveals how these areas have, as a result of the fragmentation and a lack of accessibility into Salvokop, over time developed very differently: in terms of density, grain, and overall nature (Figure 2.48).



Together with a physical account of the site, delimitations are set for the study. The site is placed within its immediate context and a background to its history given. Due to the bridge’s prime location close to a central transport interchange and heritage routes of high value, significance is given in terms of immediate context, proposed developments for the area as well as Salvokop and the bridge itself. The ownership is established as an area belonging to two governmental organisations.

Fig.2.48 Resulting from fragmentation and lack of accessibility, Salvokop and the city have developed very different characteristics over time.

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# CHAPTER 3

## ARCHITECTURAL ISSUE

“Everything is not as it appears to be”  
(Anonymous)

In Chapter Two the site was introduced as a pedestrian bridge connecting the inner city of Pretoria with the neighbouring suburb of Salvokop – two areas that have been fragmented due to infrastructure placed in it. It indicated how this fragmentation, coupled with lack of accessibility into the suburb, isolated Salvokop nearly completely and over time lead to the suburb developing characteristics very different to that of its urban counterpart: in terms of grain, density, functionality and nature. It also revealed how the suburb has become dilapidated, almost forgotten in its isolation over a period of over forty years. It finally

presented how several frameworks have been proposed for the area, trying to “repair the damage”, by means of urban interventions that aim to restore the connection between Salvokop and the city, increase accessibility and introduce multi functionality (an attempt to economic upheaval of the suburb).

Figures 3.1 to 3.4 presents two different perspectives of the suburb of Salvokop. With the focus on the highlighted property, Figure 3.1 shows a perspective “from above”, that classifies Salvokop as predominantly residential in nature.

# Salvokop

Pretoria Town and Townlands  
351-JR  
zoned “Residential”

Fig.3.1 A “from above” perspective of the urban fabric of Salvokop. According to this view, Salvokop is predominantly mono-functional, and zoned as “residential-only”, implying that the highlighted property would automatically be labelled as such.



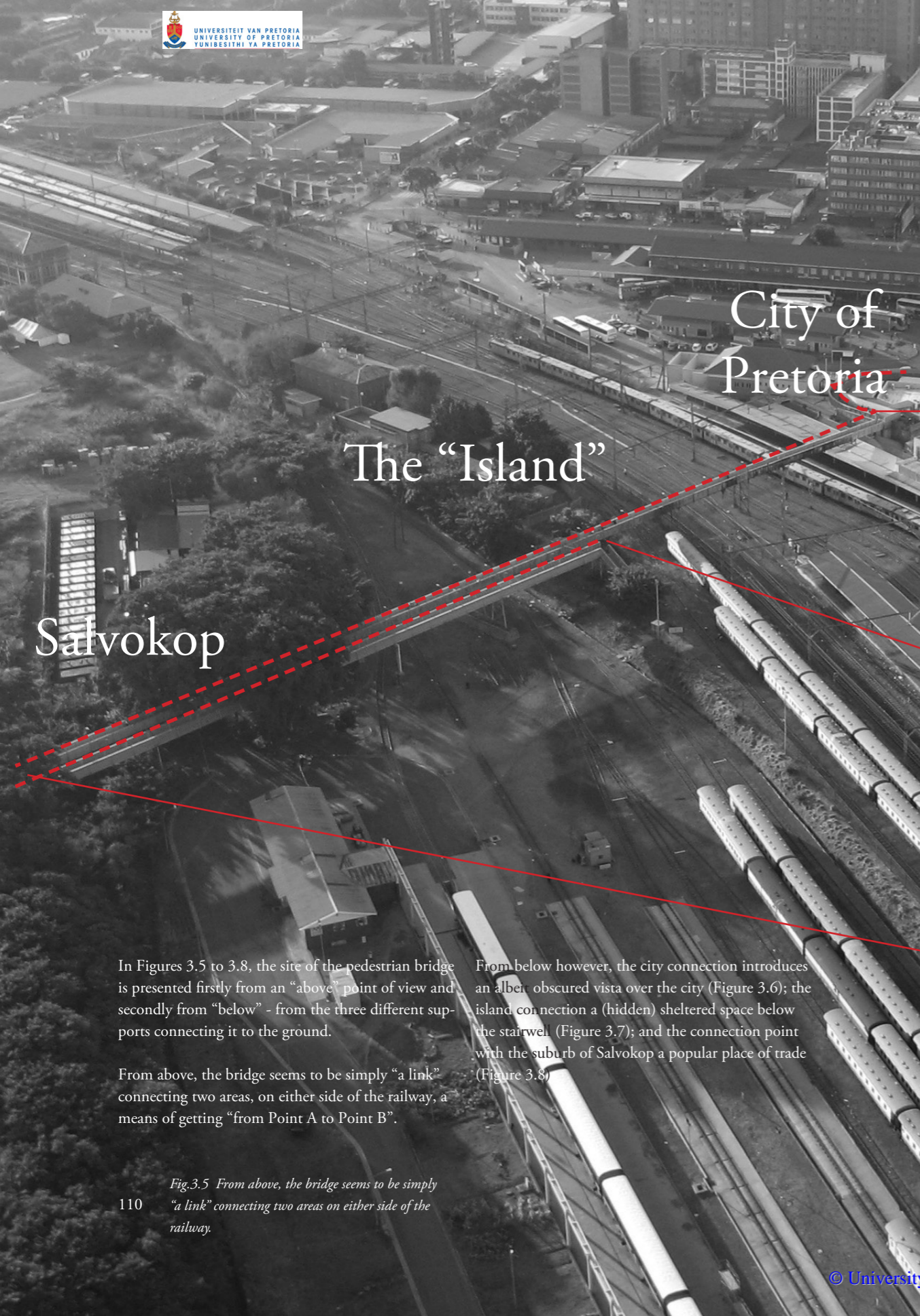
Fig.3.3 The house on the property operates as a shebeen during night time and over weekends.



Fig.3.4 The discarded glass from the shebeen is collected and supplied to a glass recycling company.

As the viewpoint gradually adjusts (Figure 3.2) to ground level in Figures 3.3 and 3.4 a second type of activity is disclosed - the highlighted property not only functions as a residence, but also as a shebeen during night time and over weekends. After hours, the owners gain profit from collecting the discarded glass and supplying it in return to a glass recycling plant.

This shebeen/glass recycling enterprise is not unique in its kind. Personal interviews with some of the residents have indicated that there are at least twenty-seven of these shebeens operating in the suburb. By changing the viewpoint, a second “from below” perspective is introduced which proves to be a more accurate representation of the activities happening in the suburb.



City of  
Pretoria

The "Island"

Salvokop

In Figures 3.5 to 3.8, the site of the pedestrian bridge is presented firstly from an "above" point of view and secondly from "below" - from the three different supports connecting it to the ground.

From above, the bridge seems to be simply "a link" connecting two areas, on either side of the railway, a means of getting "from Point A to Point B".

From below however, the city connection introduces an albeit obscured vista over the city (Figure 3.6); the island connection a (hidden) sheltered space below the stairwell (Figure 3.7); and the connection point with the suburb of Salvokop a popular place of trade (Figure 3.8).

*Fig.3.5 From above, the bridge seems to be simply "a link" connecting two areas on either side of the railway.*



*Fig.3.6 The city connection introduces an obscured vista over the city due to a high balustrade wall blocking the view.*



*Fig.3.7 On The "Island", the space below the stairwell functions as shelter for the homeless.*



*Fig.3.8 The point where the bridge terminates at Salvokop proves a popular place of trade.*



Fig.3.9 Urban Development Framework for Salvokop, as proposed by GAPP Architects and Urban Planners in association with Cultmatrix.

Whether one approaches the environment from a perspective of a city or urban landscape, and from whatever possible scales, one is faced with a first problematic; of questioning **what the city or landscape really is**. Bruyns (2005:4) formulates it as follows:

- “Is the environment a single territorial landscape that encloses and envelopes all objects, structures and parts, to be interpreted from high scales of distances above the surface or
- Is the landscape a compositional construction of smaller parts (known as cities, neighbourhoods and

blocks) in which we could only fully comprehend, once we have seen and understood all its smaller constructive components at an individual level?”

Equipped with evidence of loss in spatial connectivity, breakdown of the traditional fine grain, fragmentation of areas and terminology such as mono-functional usage; all of which result from a proper site analysis such as the one conducted in Chapter Two, architects and urban planners often believe the current “state” to be “resolved or healed” by introducing intervention strategies such as:



Fig.3.10 The Olympic Sculpture Park (2007) - Seattle, WA by Weiss/Manfredi Architecture/Landscape/Urbanism.

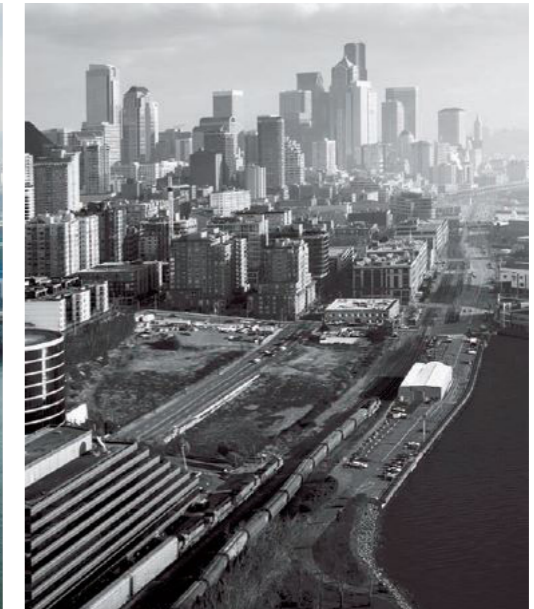


Fig.3.11 The original industrial brownfield site before applying a strategy of geographical unification.

- Planning programmes. Figure 3.9 shows an example of an intervention strategy for Salvokop as proposed by the Salvokop Steering Committee, relying on planned programming for the area to introduce multi-functionality (informed by a comprehensive heritage analysis).
- Geographical unifications. Figures 3.10 & 3.11 show how the Seattle Art Museum applied a strategy of geographical unification to restore a lost connection between the city and its waterfront (Huber, 2008:3).

Even though the planners’ tools or intervention strategies may be of the best intention, Bruyns (2005:2) observes; the products often “remain typological in nature, isolated and adrift in urban fields of activities, operating at various scale levels above or below one another”, leaving one with a second problematic; of **how this city can and should be interpreted and analysed** to better equip the decision makers in intervention strategies.





Fig.3.12 The existing and original pedestrian bridges viewed from below from the Blue Train Shunting Yard.

The next chapter will address these two matters from a perspective that presents the city as a system which shows signs and characteristics of complexity and therefore requires a new way of analysis and interpretation different to the way the city of the past was addressed.

This calls for a new definition with which to define “city” as well as appreciating the different levels and scales at which it operates. Only then can one really come to understand what it really is that one is dealing with and support the practice of designing sustainable cities in a developing world.

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Fig.3.13 The two walkways of the existing and original pedestrian bridges viewed from below from the Blue Train Shunting Yard.

# CHAPTER 4

## COMPLEX CITIES EXPLAINED

“The world of supermodernity does not exactly match the one in which we believe we live, for we live in a world that we have not yet learned to look at. We have to relearn to think about space.”

(Augé, 1995:35)

In the 1980s, the Theory of Complexity emerged as an alternative to the classic, linear thought that has dominated the way scientists and philosophers saw the world for the past five centuries. This chapter highlights the major differences in thought between the paradigms of order and that of complexity followed by an explanation of how this complexity has manifested in the built environment. The chapter

postulates that the main issue when working in the contemporary urban environment is not how to repair the damage caused to the traditional city form as we know it, but a realization that the idea of “city” as we know it, has changed (Figures 4.1 & 4.2) and the failure of our intervention strategies is rather a failure of our understanding of this “new” city form, and how to react towards it.

*Fig.4.1 An informal settlement between Atteridgeville and Laudium (part of the Tshwane Metropolitan).*



### 4.1 FROM A PARADIGM OF ORDER TO A PARADIGM OF COMPLEXITY

To understand the Theory of Complexity it is necessary to view it in context with the theories that preceded it. Table 4.1 provides a summary of the key philosophical ideas and thinkers within a Western Philosophic time line.

*Fig.4.2 A security estate in Midrand.*

TABLE 4.1 A summary of key philosophical ideas and thinkers in Western Philosophy.

PERIOD	DATE	PHILOSOPHY	IDEAS	KEY THINKERS
Archaic Greek	650BC-400BC	Natural Philosophy "Pre-Socratic Philosophy"	Rational understanding of nature Refusal to accept various supernatural, religious or mythological explanations for natural phenomena. All natural phenomena had a natural cause	Anaximander, Pythagoras
Classical Greek	400BC-300BC	Provided the basic categories of philosophy: Metaphysics Epistemology Ethics	Metaphysics: what is the world made of (idealism vs materialism) Epistemology: the philosophy of knowledge (empiricism vs rationalism) Ethics: the philosophical understanding of good & bad, right & wrong (hedonism vs cynicism)	Socrates, Plato, Aristotle
Medieval	1100-1400	Christian Philosophy	Use of logic, dialectic & analysis to discover the truth Respect for insight of ancient philosophers (esp. Aristotle) Obligation to co-ordinate the insights of philosophy with theological teaching & revelation	Augustine, Boethius, Hildegard, John of Salisbury, Francis of Assisi, Thomas Aquinas
Renaissance	1400-1600	Humanism	The potential for individual achievement. Humans are rational beings capable of truth & goodness. Celebrate works of ancient Greeks & Romans for their own sake, rather than for their relevance to Church doctrine	Bacon, Copernicus, Boyle, da Vinci
Reformation/ Age of reason	1625-1700	Rationalism Natural Science	Noble savage Knowledge through acquisition of logic & science Emphasis on particular rather than general, observable facts rather than principles, experience rather than rational speculation	Descartes, Newton
<b>Enlightenment</b>	<b>1700-1800</b>		<b>Human reason can: discover natural laws of the universe, determine the natural rights of mankind, thereby unending progress in knowledge, technical achievement and moral values would be realised. Main stimulus was scientific discoveries of natural laws.</b>	<b>Kant, Locke, de Montesquieu, Voltaire, Rousseau, Diderot</b>
Modern	1800-1980	Positivism Utilitarianism Idealism Pragmatism Evolutionism Psychoanalysis Existentialism Intuitionism Phenomenology Critical Rationalism Objectivism	Modernity is fundamentally about order: about rationality and rationalization, creating order out of chaos. Assumption: Creating more rationality is conducive to creating more order, and the more ordered a society is, the better & rationally it will function. Modern societies against anything which might disrupt order. Assert superiority of "order". "Disorder" becomes "the other", and has to be eliminated from the ordered, rational modern society. Aim: To achieve stability within a system. Wholeness/Completeness of a system. Mass production Large scale solutions Aesthetic standardisation & prefabricated design solutions. Failure to recognise differences, aim towards homogenous landscapes.	Kierkegaard, Nietzsche, Sartre, Heidegger, Husserl
Postmodern	1980-1990	Critical Theory Structuralism Postmodernism Deconstructivism	Rejection of totality & the idea that planning could be "comprehensive". Dispersal, dissemination, networked, distributed knowledge. Theories that embrace & aim to create diversity. Social & cultural pluralism & heightened awareness of social differences. Unclear bases for social/national/ethnic unity.	John Barth, Umberto Eco, Jean-Francois Lyotard, Charles Jencks, Jacques Derrida, Gilles Deleuze, Felix Guattari, Jean Baudrillard, Roland Barthes, Guy Debord, Michel Foucault, René Thom, Robert Venturi
<b>Contemporary</b>	<b>1990-today</b>	<b>Architectural Curvilinearity, New Urbanism, Complexity, Field Conditions, Green Architecture, Sustainable Architecture, Boundaries &amp; Networks, Future City, Emergence, Complex cities</b>	<b>Focus on Process over Product. Rejection of totalizing theories. Pursuit of localising and contingent theories. Indeterminacy Subverted control, loss of centralized control, fragmentation. Disruption of dominance of high culture by popular culture.</b>	<b>Deleuze, Capra, Hamdi, Bruyns &amp; Read</b>

FOCUS ON ARCHITECTURAL OBJECT

SPACE AS OPERATIONAL DEVICE

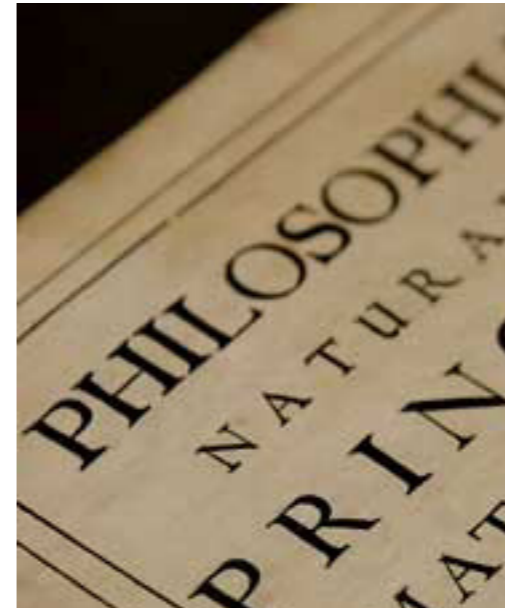


Fig.4.3 Newton's "Mathematical Principles of Natural Philosophy" was published in 1687.

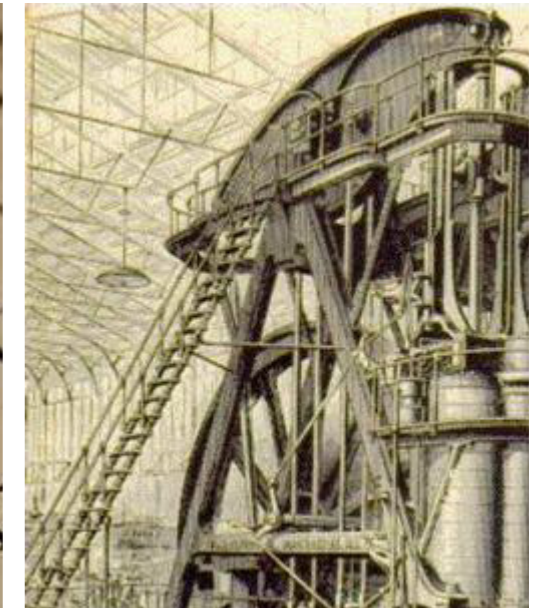


Fig.4.4 The success of the Industrial Revolution was greatly ascribed to the underlying determinism and linearity of the Newtonian framework.

#### 4.1.1 A PARADIGM OF ORDERLY NATURAL SCIENCES

Following the so-called "Dark Ages", the period of "Enlightenment" in Europe was characterised by intellectual, technical and economic transformation (Geyer, 2003:2). Following years of repression by the Church, Science was liberated from centuries of control by religious stipulations and ancient philosophies. On the forefront was René Descartes (1596-1650) advocating rationalism, followed by Sir Isaac Newton (1642-1727) who set a collection of fundamental laws (Figure 4.3).

These discoveries set the scene for a flood of other

discoveries which led to a heightened sense in the power of reason. This new scientific approach and underlying determinism and linearity of the Newtonian framework was also the base to which the success of the Industrial Revolution could be ascribed to. Fundamentally, many scientists believed that there were few things that remained to be discovered, with the expectation that over time the orderly nature of all phenomena would eventually be discovered. Science became the search for hidden order (Geyer, 2003:2), affecting all sectors of human activity and disciplines (Figure 4.4).

TABLE 4.2 Simplified, the “Paradigm of Orderly Natural Sciences” was based on the following four golden rules.

## FOUR GOLDEN RULES

Order	Given causes lead to known effects at all times and places
Reductionism	The behaviour of a system could be understood, clockwork fashion, by observing the behaviour of its parts. There are no hidden surprises; the whole is the sum of the parts, no more and no less
Predictability	Once global behaviour is defined, the future course of events could be predicted by application of the appropriate inputs to the model
Determinism	Processes flow along orderly and predictable paths that have clear beginnings and rational ends

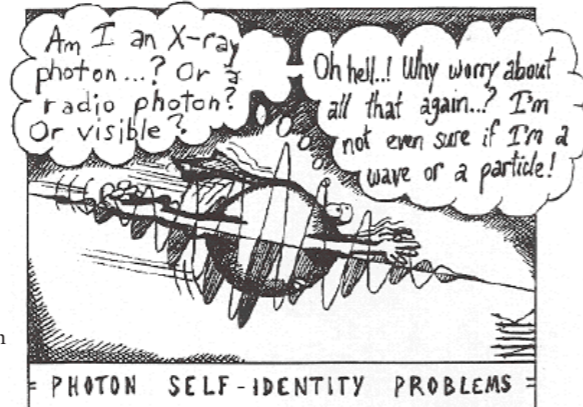


## PICTURE OF REALITY

Disorder

p.e. Unknown or not fully understood phenomena

To simplify drastically, this “Paradigm of Orderly Natural Science” was founded on four golden rules (Geyer, 2003:2), which can be viewed in Table 4.2. From these golden rules a simple picture of reality emerged as shown in Figure 4.5, and given the golden rules and picture of reality, several expectations emerged (Geyer, 2003:3):



a. This cartoon comments upon the fact that certain phenomena such as the nature of a light particle could not be explained within a Paradigm of Natural Orderly Science.



**Gravity.**  
It's not just a good idea.  
It's the Law.

$$F = G \frac{m_1 m_2}{d^2}$$

F = gravitational force  
G = gravitational constant  
 $m_1$  = mass of first object  
 $m_2$  = mass of second object  
d = distance between masses

b. A cartoon which appeared on the website of “Filipino Freethinkers” allude to the notion that certain phenomena should be accepted as undeniable truths based on the fact that it can be proven using fundamental laws of nature.

Time

Order

p.e. Gravity, Motion in a vacuum

## EXPECTATIONS

- Over time, as human knowledge increases, phenomena will shift from the disorderly to the orderly side.
- Knowledge equals order. Hence, greater knowledge equals greater order.
- With greater knowledge/order humans can increasingly predict and control more and more phenomena.
- There is an endpoint to phenomena and hence knowledge.

Fig.4.5 A diagrammatic representation of the Picture of Reality as viewed from a Paradigm of Natural Orderly Sciences.

TABLE 4.3 Simplified, the “Paradigm of Orderly Social Sciences” was based on the following four golden rules.

## FOUR GOLDEN RULES

Order	Given causes lead to known effects at all times and places
Reductionism	The behaviour of a system could be understood, clockwork fashion, by observing the behaviour of its parts. There are no hidden surprises; the whole is the sum of the parts, no more and no less
Predictability	Once global behaviour is defined, the future course of events could be predicted by application of the appropriate inputs to the model
Determinism	Processes flow along orderly and predictable paths that have clear beginnings and rational ends



## PICTURE OF REALITY

Disorder —————> Order

Time

p.e. Unknown or not fully understood phenomena

p.e. Gravity, Motion in a vacuum

### 4.1.2 A PARADIGM OF ORDERLY

#### SOCIAL SCIENCES

The success of the orderly linear paradigm in the natural sciences had a profound effect in all sectors of human activity, spreading over to the social sciences (Geyer, 2003:9), although, even at its peak countervailing tendencies survived which questioned the mechanistic view and nature of society. Still, the traditional Newtonian approach was clearly expressed in the modernisation theories of the Third World development and reached a high point in the 1950s and 60s with the rational plans of public policy experts and urban planners. Figure 4.7 is an example of how this manifested in the layout of Pretoria during

Apartheid. Suburbs for Non-Whites were relocated to remove it from the ordered, rational (White) modern society.

Using the Newtonian frame of reference modern social scientists unjustifiably assumed that physical and social phenomena were primarily linear and therefore predictable (Geyer, 2003:10). The “Paradigm of orderly social science” (Figure 4.6) rested on the same foundation as orderly natural science (Table 4.3), treating human beings like orderly atomistic objects:



Fig.4.6 A layout of Pretoria during Apartheid.

—————> EXPECTATIONS

- Over time as human knowledge increases, phenomena will shift from the disorderly to the orderly side. Social scientists are able to understand more and more about society and humanity.
- Knowledge equals order. Hence, greater knowledge equals greater order. Thus, history is progressive, leading to greater order.
- With greater knowledge humans can increasingly predict and control more and more phenomena. Those with greater knowledge can know more and thus should be in control.
- There is an endpoint to phenomena and hence knowledge. Once this endpoint is reached history stops and societal change comes to an end.
- There is a hierarchy of scientific knowledge and methods with the orderly natural sciences at the zenith. Duplicating this knowledge and methods is the justification of orderly social science (Geyer, 2003:11).

## IMPLICATIONS

- Researchers look for rational foundations to all phenomena.
- There are no inherent limits to human knowledge. The only constraints are effort and technology.
- Researchers can obtain predictable and repeatable experimental results.
- Duplicating orderly natural science methods is the primary methodological strategy.
- The creation of universal social laws is the ultimate goal (Geyer, 2003:12).

Fig.4.7 A diagrammatic representation of the Picture of Reality as viewed from a Paradigm of Natural Social Sciences.



**“I can calculate the motion of heavenly bodies, but not the madness of people.”**  
-- Isaac Newton

COMPLICATED

VS

COMPLEX

*Fig.4.8 Already in the 17th Century, there were some phenomena that could not be explained by applying fundamental laws of nature. These were however brushed aside with the belief that, at some point, it would be resolved by another set of fundamental laws.*

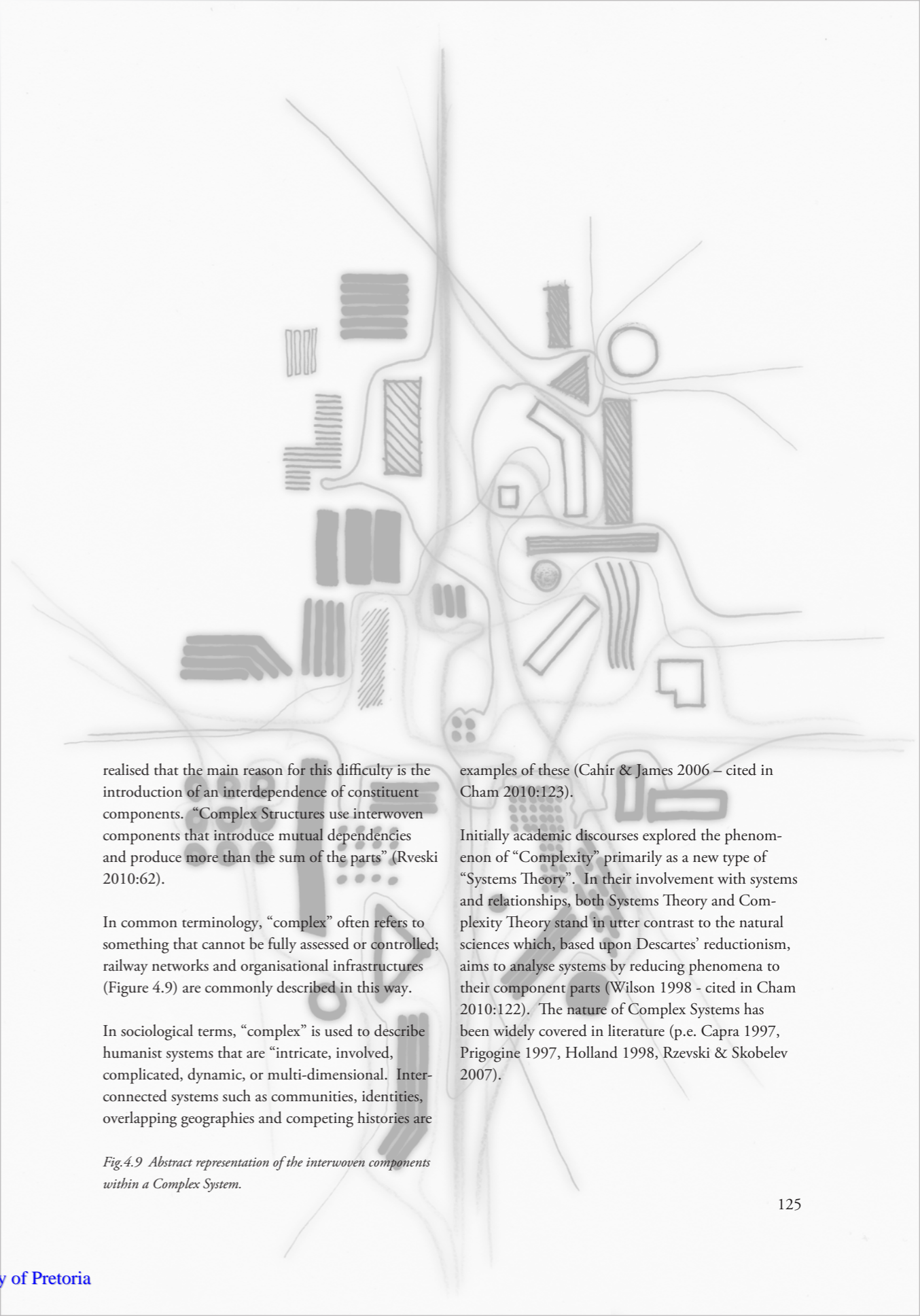
### 4.1.3 A PARADIGM OF COMPLEXITY

Nonetheless, already in the 17<sup>th</sup> century, there were some phenomena which scientists like Newton and Christiaan Huygens could not agree upon, such as the nature of light - was it a particle or a wave (Figure 4.5a)? Initially, unexplained phenomena such as these were brushed aside with the belief that at some point, it would be resolved by another set of fundamental laws. Yet, by early 20<sup>th</sup> century, these phenomena could no longer be ignored (Figure 4.8), and scientists such as Henry Poincaré (1854-1912) started questioning some contemporary scientific beliefs. This was soon followed by other theories such as Einstein’s (1879-1955) theory of relativity, theories

on quantum physics (Neils Bohr, Erwin Schrodinger and Paul A.M. Dirac), Werner Heisenberg’s (1901-1976) uncertainty principle, and Coveney & Highfield’s theory of chaos (1996) to push natural sciences beyond the Newtonian limits (Geyer, 2003:4).

### 4.1.4 COMPLEXITY THEORY EXPLAINED

Rveski (2010:62) draws a comparison between the terms “Complicated” and “Complexity”. “Complicated” is explained as the opposite of “simple”, while “complex” is the opposite of “independence”. While the term “complexity” intuitively suggest something which is “difficult to understand”, it should be



realised that the main reason for this difficulty is the introduction of an interdependence of constituent components. “Complex Structures use interwoven components that introduce mutual dependencies and produce more than the sum of the parts” (Rveski 2010:62).

In common terminology, “complex” often refers to something that cannot be fully assessed or controlled; railway networks and organisational infrastructures (Figure 4.9) are commonly described in this way.

In sociological terms, “complex” is used to describe humanist systems that are “intricate, involved, complicated, dynamic, or multi-dimensional. Inter-connected systems such as communities, identities, overlapping geographies and competing histories are

examples of these (Cahir & James 2006 – cited in Cham 2010:123).

Initially academic discourses explored the phenomenon of “Complexity” primarily as a new type of “Systems Theory”. In their involvement with systems and relationships, both Systems Theory and Complexity Theory stand in utter contrast to the natural sciences which, based upon Descartes’ reductionism, aims to analyse systems by reducing phenomena to their component parts (Wilson 1998 - cited in Cham 2010:122). The nature of Complex Systems has been widely covered in literature (p.e. Capra 1997, Prigogine 1997, Holland 1998, Rzevski & Skobelev 2007).

*Fig.4.9 Abstract representation of the interwoven components within a Complex System.*

TABLE 4.4 A classification of Systems, which places Complex Systems between Random and Stable Systems

CLASSES	RANDOM SYSTEMS	COMPLEX SYSTEMS	STABLE SYSTEMS
Predictability	Total uncertainty	Considerable uncertainty	No uncertainty
Behaviour	Random	Emergent	Planned
Norms of behaviour	Total freedom of behaviour	Some external guidance is essential	Governed by laws and regulations
Degree of organisation	None	Self-organisation	Organised
Degree of control	None	Self-control by self-organisation	Centralised control
Irreversible changes	Random changes	Co-evolves with environment	Small temporary deviations possible
Operating point	None	Operates far from equilibrium	Operates at an equilibrium

#### 4.1.5 COMPLEX SYSTEMS

For the purpose of this study “Complex Systems” will be the general term used to describe those systems:

- Which are diverse and made up of multiple **inter-dependent elements**.
- **Decision making** amongst these elements are **distributed** rather than centralised.
- Which have a variety of possible behaviours and **uncertainty** about which **behaviour** will be executed. The **degree of freedom** given to the decision makers determines the system’s **ability to self-organise and evolve**.
- Global behaviour emerges from the interaction

of local behaviours of its components (Prigogine 2003). Capra (1997:7) explains how every living system occasionally encounters points of instability, at which some of its structures break down and new structures, or new forms of behaviour, emerge. The spontaneous emergence of order – of new structures and new forms of behaviour, is a phenomenon simply called “**emergence**” and has been recognised as the basis for development, learning and evolution.

- Which involve **feedback loops**, which is the tendency to bring the system back into balance whenever there is a deviation from the norm due to changing environmental conditions.
- Which are **non-linear** in nature, i.e. phenomena

## EXPECTATIONS

- Over time human knowledge may increase, but phenomena will not necessarily shift from the disorderly to the orderly.
- Knowledge does not always equal order. Greater knowledge may mean the increasing recognition of the limits of order/knowledge.
- Greater knowledge does not necessarily impart greater prediction and control. Greater knowledge may indicate increasing limitations to prediction and control.
- There is no universal structure/endpoint to phenomena/knowledge.

that do not adhere to order, reductionism, predictability and/or determinism (Prigogine 2003).

- Which shows an “**adaptation**” to changing environments, in that they have the capacity to change and learn from events (Robertson 2010:178 & Johnson 2007 – cited in Cham 2010:125).

To position Complex Systems on a map of predictability, Rzevski (2008) designed a system classification, in which Complex Systems are placed between Random and Stable Systems, as illustrated in Table 4.4.

From this classification and the key elements listed to explain complex systems, the above-mentioned

expectations emerge.

Complexity Theory does not disprove the Rationalist Paradigm. Rather, it draws attention to the fact that even at the most fundamental level some phenomena do conform to the Classical Newtonian framework, others do not. Thus, not all phenomena were orderly, reducible, predictable and/or determined. Orderly science was simply expanded to add complex phenomena, to those already in place.

From the definition of a System of Complexity, the following *parti diagram* (Figure 4.10) on the following page could be derived based on the different elements prevalent in Complex Systems:

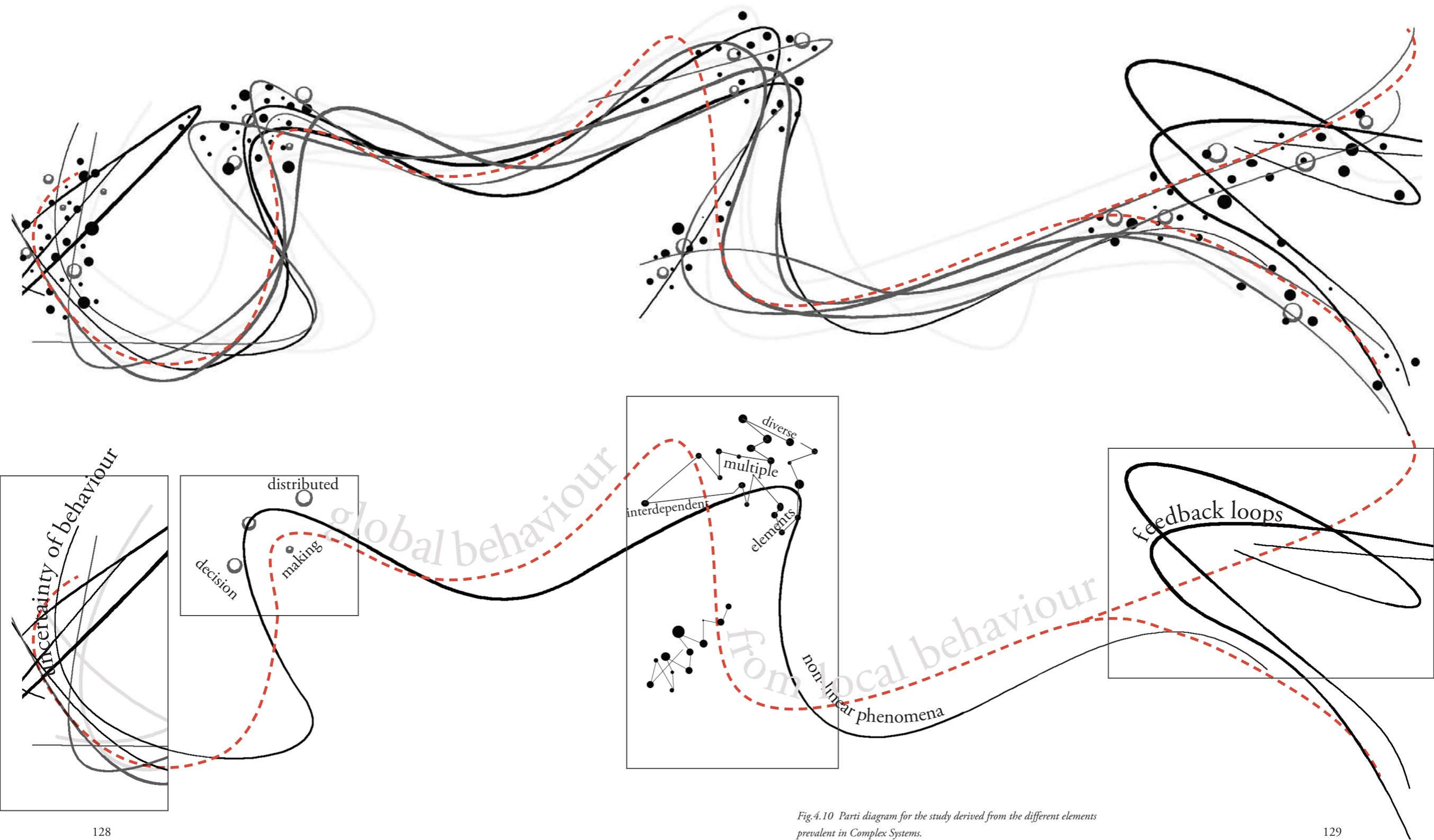


Fig.4.10 Parti diagram for the study derived from the different elements prevalent in Complex Systems.





## 4.2 THE COMPLEXITY OF COMPLEX CITIES

### 4.2.1 CHALLENGES

In the morphological environment, social, economic, and political challenges backed by this shift in paradigm in science and philosophy have resulted in a new territorial spatial configuration of the city (Figure 4.11), detached from historical models or constraints.

Locally, urban planning in South Africa is taking place within a context of unparalleled social, political and economic changes (Mchunu 2007:121), visible in Figure 4.12. Social challenges include high levels of unemployment and poverty, increase in crime and

*Fig.4.11 Social, economic and political challenges backed by a shift in paradigm in science and philosophy have resulted in a new territorial spatial configuration of the city, detached from historical models or constraints which saw the city as a contained unit.*

concern for personal and property safety, as well as significant changes in the demographic profile of urban areas, while politically; challenges include balancing the need for a decentralised system of governance from national to municipal and eventually to the local level of neighbourhood/ward, with more centralised and hierarchical decision-making processes (the latter tending to be more favourable to the needs of government or vested interests). The economic challenges have to do with the implications for the increased insertion of South-Africa into the global economic

*Fig.4.12 Photo collage of how social, political and economic challenges have affected the appearance of the urban landscape in South Africa.*



a. The Brook Street Market at Warwick Junction, Durban



b. Menlyn Shopping Mall, Pretoria.



c. Homeless person at Long Distance Bus Terminus, Pretoria Station.



d. Homeless person at Long Distance Bus Terminus, Pretoria Station.



e. The Traditional Medicine Market at Warwick Junction, Durban.



f. Franchise in shopping mall.



Fig.4.13 A "Gated Community" in Pretoria.

## 4.2.2 PHYSICAL MANIFESTATION IN MORPHOLOGICAL ENVIRONMENT

### 4.2.2.1 SOCIAL CHALLENGES

Examples of how social challenges impacted the built environment include:

- Gated communities (Figure 4.13) and "Edge cities" (Figure 4.20) - a new type of settlement developed far from the original town centre, p.e. Silver Lakes or Mooikloof Estate to the east of Pretoria, which represent new forms of fragmentation along class and ethnic lines respectively, in contrast to the official policy of IDPs.
- Spontaneous emergence of informal settlements (Figure 4.14) due to the government's inability to keep up with its housing policy. This is exacerbated by the influx of illegal immigrants from neighbouring countries.

Fig.4.14 The effect of social challenges can be seen in the emergence of this informal settlement between Atteridgeville and Laudium (part of the Tshwane Metropolitan).





*Fig.4.15 Economic challenges have the effect that the urban footprint is largely dictated by developers.*



*Fig.4.16 An increasingly marked shift towards consumption can be seen the form of pervasive shopping malls, such as Menlyn Shopping Mall in Pretoria.*

#### 4.2.2.2 ECONOMIC CHALLENGES

Examples of how economic challenges have impacted the built environment include:

- The policy of GEAR highlighted a shift towards a productive and profiteering motive driven by global capitalism (Mchunu 2007:121). Within the built environment, planning has served to facilitate the process of market penetration as represented by an increasingly marked shift towards consumption

in the form of pervasive shopping malls (Figure 4.16) and gated communities (Bremner 2002). As a result, the urban footprint is largely dictated by developers (Dewar 2000), visible in Figure 4.15.

- There was the birth of the “global city” (globalization of architectural styles, building technologies and urban space and the effects thereof on especially the developing world).

CENTURION

### 4.2.2.3 POLITICAL CHALLENGES

Political changes which favours centralized decision making:

- Has led to the birth of metropolitans (Figure 4.17), such as the case of Tshwane which now includes the previous traditional homelands such as the old Bophutatswana, as well as the formal town of Verwoerdburg (Centurion). After the 2011 local government elections several new municipalities were incorporated into the City. With a population of 2.5 million people Tshwane now covers an area of 6 368<sup>2</sup> km – making it the largest metropolitan municipality in South Africa and the third largest in the world (SOURCE??).
- One of the results of metropolitisation can be seen in urban corridors (Figure 4.18); which lie along

- the intercity highways for kilometres on end, making it impossible to determine any borders – such as the seamless boundary between Pretoria/Centurion/Midrand/Johannesburg.
- Attempts by local government of total control of the informal economies sector by specific stipulations in local policies. In Pretoria for example, this is done by identifying specific hours and places of trade for these informal economies, closing certain “on street” taxi ranks and closing down specific streets for pedestrian traffic only in an attempt to “clean up the city” (Figure 4.19 - Notice 364 of 2012 COT).

NOORDWYK

MIDRAND

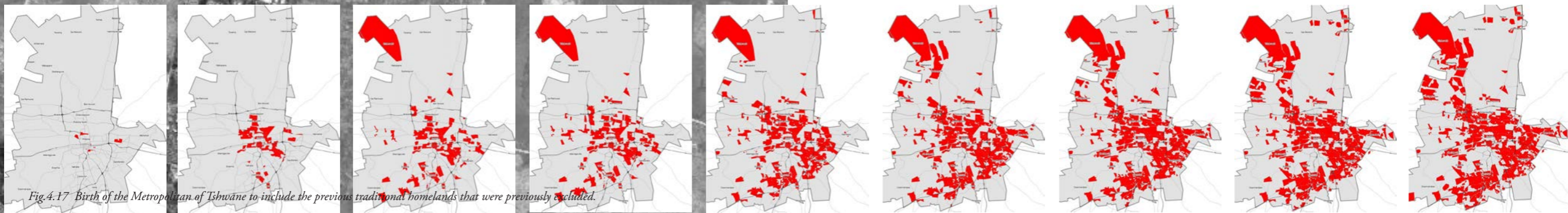


Fig.4.17 Birth of the Metropolitan of Tshwane to include the previous traditional homelands that were previously excluded.

Fig.4.18 An urban corridor between Midrand/Centurion and Pretoria.



#### CITY OF TSHWANE METROPOLITAN MUNICIPALITY

**CLOSURE OF CERTAIN STREETS AND THE CLOSURE AND RELOCATION OF CERTAIN TAXI RANKS IN TERMS OF SECTIONS 66 AND 65bis OF THE LOCAL GOVERNMENT ORDINANCE, 1939 (ORDINANCE 17 OF 1939), RESPECTIVELY, AND THE INTENTION TO DECLARE CERTAIN STREETS AND AREAS WITHIN THE TSHWANE JURISDICTIONAL AREA AS PROHIBITED AREAS OF TRADING IN TERMS SECTION 6A OF THE BUSINESS ACT, 1991 (ACT 71 OF 1991), IN THE CENTRAL BUSINESS DISTRICT**

The City of Tshwane Metropolitan Municipality hereby, in terms of Section 66 of the Local Government Ordinance, 1939 (Ord. 17 of 1939), read with Sections 3 and 4 of the Promotion of Administrative Justice Act, 2000 (Act 3 of 2000), and Section 21(3) read with Section 21A of the Local Government: Municipal Systems Act, 2000 (Act 32 of 2000) publishes its intention to permanently close the streets for all traffic other than those categories indicated in Schedule “A”, provided that should no objection be received the closure of the streets will become effective on **01 October 2012**, and

The City of Tshwane Metropolitan Municipality hereby, in terms of Section 65bis of the Local Government Ordinance, 1939 (Ord. 17 of 1939), and Section 21(3) read with Section 21A of the Local Government: Municipal Systems Act, 2000 (Act 32 of 2000), publishes its intention to the close and to relocate the taxi ranks and to establish a new holding facility and pick up point as indicated in Schedule “B”; provided that should no objection be received, the relocation, the establishment of the new holding facility and pick up point shall come into operation on **01 October 2012**; and

The City of Tshwane Metropolitan Municipality hereby, in terms of in terms of Section 6A of the Businesses Act, 1991 (Act No 71 of 1991), publishes its intention to declare the places as indicated in Schedule “C”, as prohibited areas for the carrying on the business of street vendor, pedlar or hawker.

Fig.4.19 An attempt by local government of total control of the informal economies sector by specific stipulations in local policies.

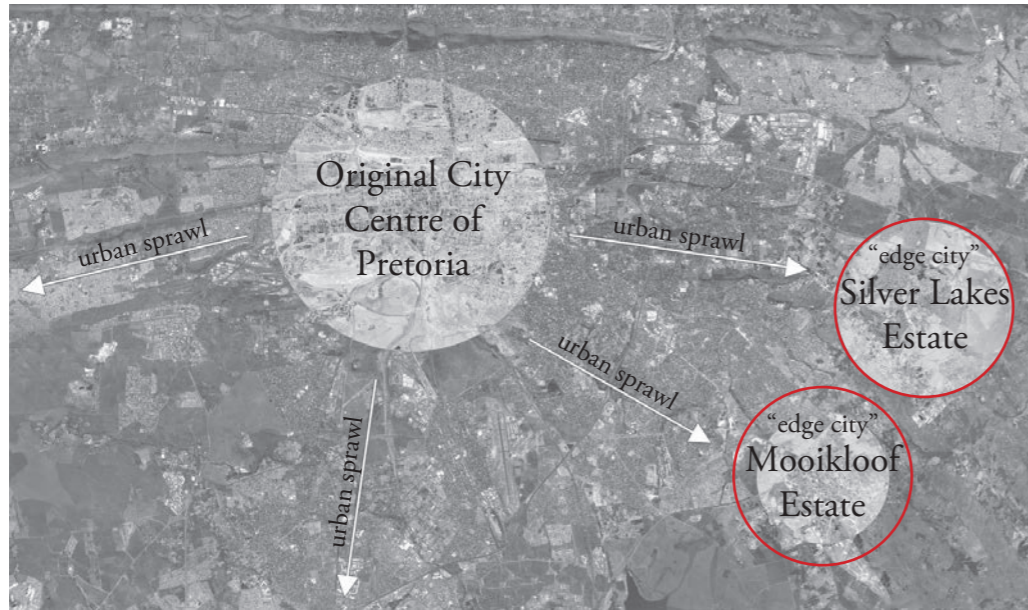


Fig.4.20 Urban sprawl has led to the development of “edge cities” such as Silver Lakes and Mooikloof Estates on the outskirts of Pretoria.

#### 4.2.2.4 MODERNIST URBANIST PLANNING THEORIES

Apart from these factors, the effect of modernist urban planning theories, led to

- Urban sprawl (Figure 4.22) - a process of large-scale real-estate development resulting in low-density, scattered, discontinuous car-dependent construction (p.e. extended developments to the east of Pretoria).
- Fragmentation and consequent destruction of original compact, dense city fabric (Figure 4.23), mainly by movement and communications infra-

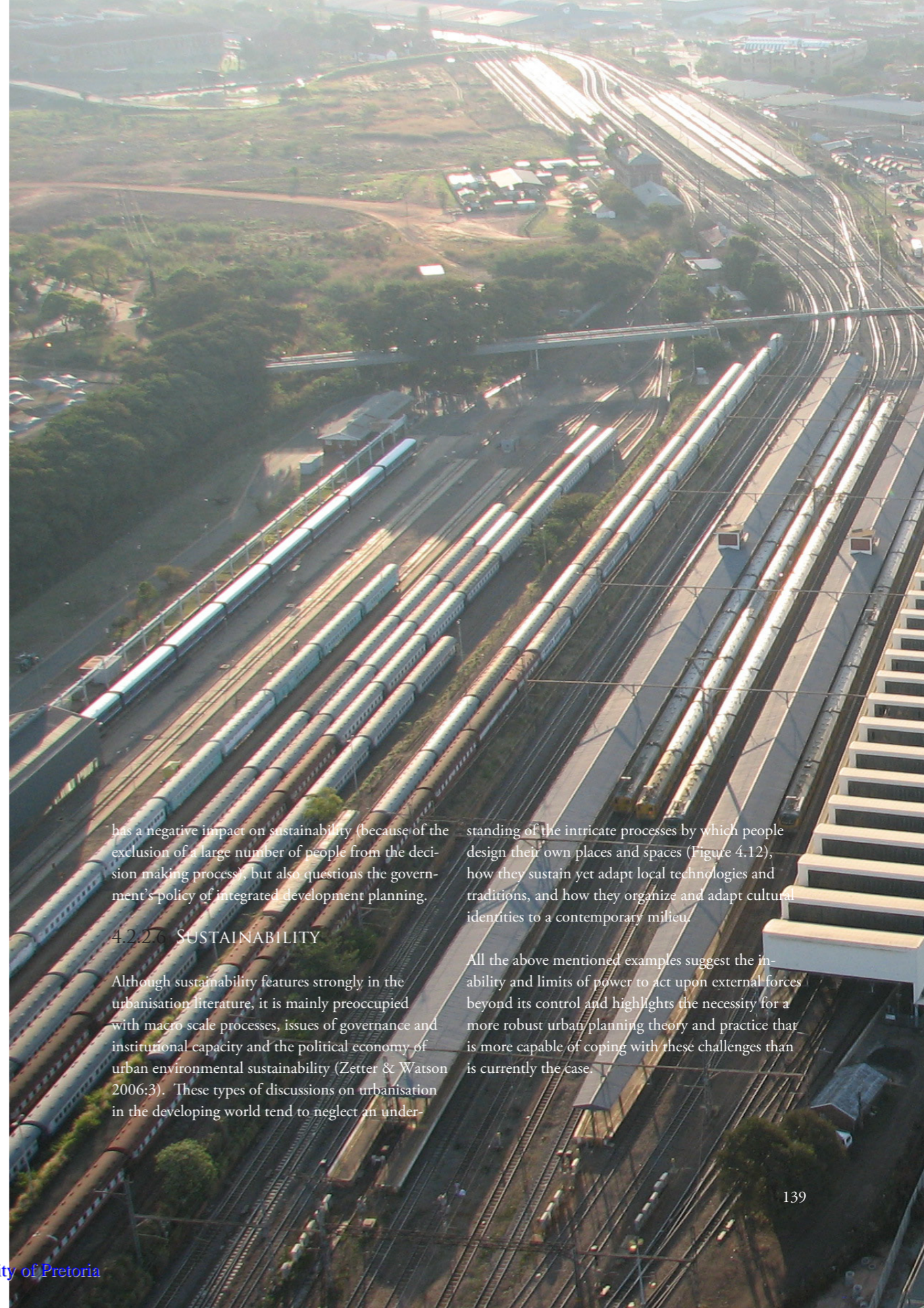
structures (as in the example of Salvokop and its surroundings).

- Loss of spatial connection between areas as a result of the fragmentation (Figure 4.23) - again, the example of Salvokop.

#### 4.2.2.5 INTEGRATED DEVELOPMENT FRAMEWORKS

It is not only the new types of fragmentation that stand in stark contrast to the official policy of IDFs. Both modernist urban planning theories and global capital support hierarchical and centralised decision making processes (Mchunu 2007:122). This not only

Fig.4.21 Modernist urban planning theories, such as extensive emphasis placed on infrastructure led to destruction of original compact, dense city fabric and the fragmentation of neighbouring suburbs as can be seen in the area between Salvokop and the city.



has a negative impact on sustainability (because of the exclusion of a large number of people from the decision making process), but also questions the government’s policy of integrated development planning.

#### 4.2.2.6 SUSTAINABILITY

Although sustainability features strongly in the urbanisation literature, it is mainly preoccupied with macro scale processes, issues of governance and institutional capacity and the political economy of urban environmental sustainability (Zetter & Watson 2006:3). These types of discussions on urbanisation in the developing world tend to neglect an under-

standing of the intricate processes by which people design their own places and spaces (Figure 4.12), how they sustain yet adapt local technologies and traditions, and how they organize and adapt cultural identities to a contemporary milieu.

All the above mentioned examples suggest the inability and limits of power to act upon external forces beyond its control and highlights the necessity for a more robust urban planning theory and practice that is more capable of coping with these challenges than is currently the case.



Fig.4.22 The area originally occupied by the Maintenance Yard has now been vacant for nearly forty years, turning it into a place of seeming disorder.

### 4.2.3 PROBLEMATICS IN APPROACHES TOWARDS THE CONTEMPORARY ENVIRONMENT

“...industrial ruins are largely understood – especially by bureaucrats, city promoters and planners – as offensive to the character and aesthetics of the city. The sooner these scars on the landscape are demolished and swept away, effaced in the name of civic order, the better...Imagined as sites of urban disorder, dens into which deviant characters – drug-users, gang-members, vandals and the homeless – are drawn, the imperative is to extinguish their decaying features from the urban backdrop” (Edensor 2002:1).

Bruyns (2005:1) is of the opinion that our present perception of the built environment let us to believe that our physical environment is a morphological figure that is constantly being “disfigured” from the traditional city as we know it (or think about it), into a place of chaos and disorder (see Figure 4.22).

Despite the number of developments in science and philosophy as described earlier, which made authors such as Marshall Berman (All that is solid melts into air – the experience of modernity) question the self-evidence of the world as being an unproblematic and controllable entity, we still seem to go on with our

lives as if all is indeed exactly the way it seems (Bruyns & Read 2004:1).

Due to its evident concreteness and apparent stability, in our minds we still hold the image of the traditional city centre as an isolated unit within protected borders (Figure 4.23). Design interventions are focused on stability, equilibrium and its loss and in an attempt to make sense of this loss any anomalies are ascribed to processes of disorder, chaos and degeneration which we try to control by the securing and defence of places.

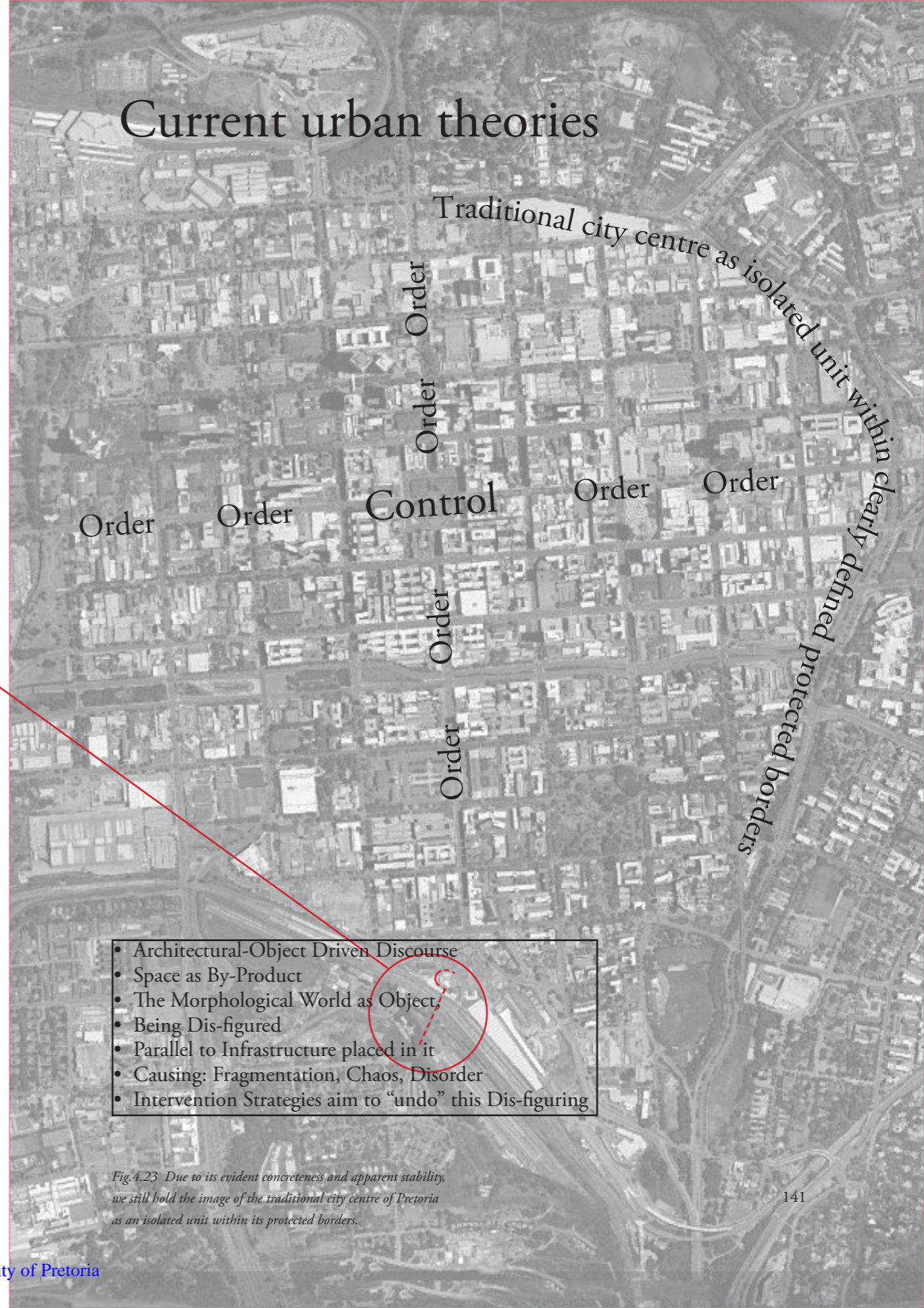


Fig.4.23 Due to its evident concreteness and apparent stability, we still hold the image of the traditional city centre of Pretoria as an isolated unit within its protected borders.

# Problematic 1

## What is this “New City”?

Although these design interventions and strategies for reunifications might be drawn up with the best intentions, (geographical unifications, design alliances, planning programmes), the products of these interventions become “typological of nature, isolated and adrift in urban fields of activities, operating at various scale levels above or below one another” (Bruyns 2005:1). Harrison (cited in Mchunu

2001:121) remarks: “post-urban planning has fallen prey to standardised concepts and formulae; and to new doctrines enclosed in legislation, manuals and government regulation.”

Bruyns (2005:3) identifies two problematics when trying to make sense of this complex world - first of all, when we question the city through our traditional

way of looking at the city, and see urban transformations as process and its effects. According to him the failures of our design interventions and strategies are largely due to the fact that we superimpose our concept of the old city while trying to make sense of the new. We attempt to design the new landscape with old sets of ideas, perceptions and parameters “ensuring a position of conflict between the form of

old, as city, and to that of the process that in actual fact structure and supports the landscape of new” (Bruyns 2005:2). The once apparent borders of the medieval city has now moved beyond edge developments causing the definition and boundaries of the city to become blurry and confusing designers on how to approach not only the city as such, but also the notion of space (Figure 4.24).

*Fig.4.24 The definition and boundaries of the city of Pretoria as we know it has become blurry and confusing.*

## Problematic 2 How does one Represent & Interpret “The New City”?



*Fig.4.25 In the past, analysis of the built environment were based on distanced observations from where models of settlement and functional processes were generated.*



*Fig.4.26 An entrepreneur uses the battery of his car in an inventive way to generate power for his hair cutting equipment.*



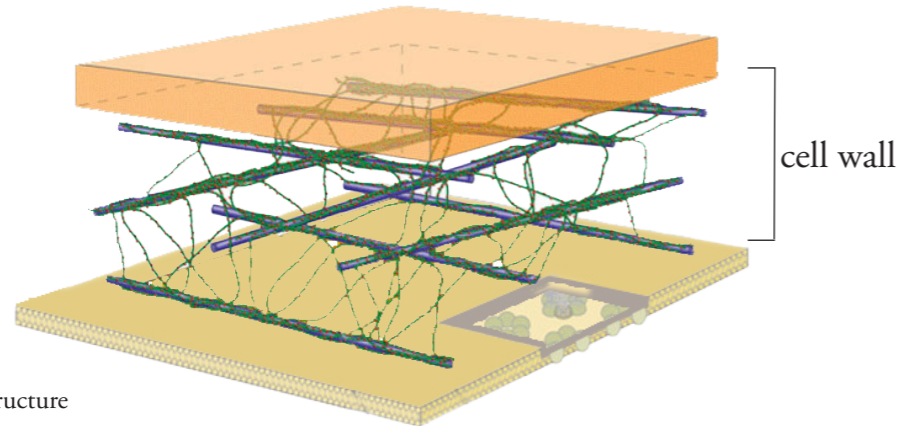
*Fig.4.27 The spot where the bridge terminates on Salvokop's side is a popular place for business for informal traders.*

A second problematic appears on a representational and interpretational level of this “new” city, where “urban process” meets “urban space”, “street space” and “public realm”, as manifested in the physical body or character of the environment. In the past, understandings, classifications and analysis of the built environment were based on distanced observations (Figure 4.25) to generate models of settlement and functional processes that reflected an exceedingly

“objectivist, zenith viewed” reality, neglecting the explanations of “process” within itself (Bruyns 2004:1).

This type of analysis can be seen in the manner the site analysis has been conducted in chapter one. Our understanding of the landscape as being chaotic shows the inadequacy of our tools and their inability to relate the morphology to activities and the way people inhabit place (Figures 4.26 and 4.27).





- rigid structure

Fig.4.28 According to Capra we still view the world as a closed reality similar to that of a cell wall: a rigid structures, incapable of change.

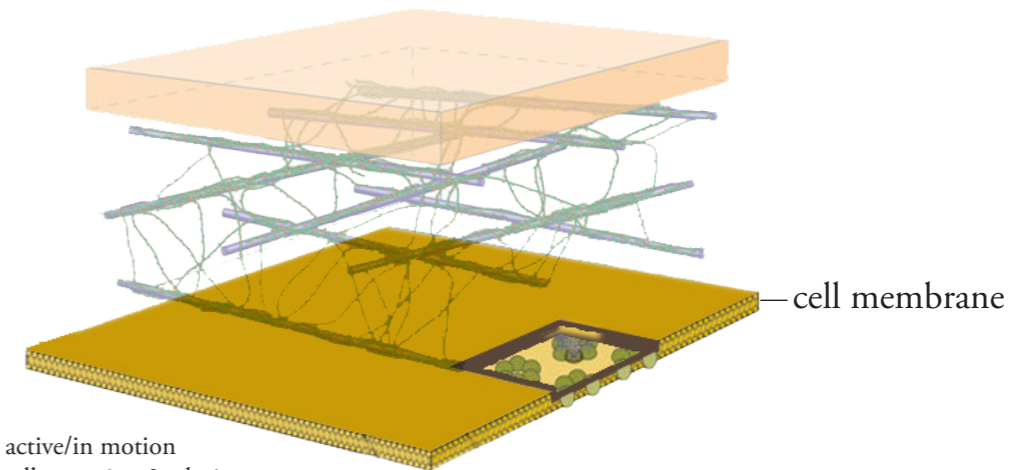
## 4.2.4 THE REALITY

The fact of the matter is; we live in a world which is changing, and in this time of accelerating change we have constructed an urbanism that has difficulties understanding its object as a process, and has difficulties dealing with the nature of the city as a dynamic system consisting of multiple interdependent elements (Bruyns 2004:2). Characteristics of this “new city form” include:

### 4.2.4.1 CLOSED VS. OPEN SYSTEMS: THE EMERGENCE OF FORMS

We still view the world as a closed reality whose objective truths may be revealed through fundamental laws of natural science. Instead, we should see it as something which is radically open, constantly changing, in the same way that Capra (2004:8) describes a cell membrane (Figures 4.28 & 4.29):

“A membrane is very different from a cell wall. Whereas cell walls are rigid structures, membranes are



- always active/in motion
- continually opening & closing
- keeping certain substances out, letting others in
- continuously produced, broken down & produced again

Fig.4.29 Capra compares the new city form to that of a cell membrane: something which is always active and constantly changing and reacting to impetus from the environment.

always active, opening and closing continually, keeping certain substances out and letting others in... The cell itself does not contain several distinct membranes, but rather one single, interconnected membrane system. This so-called “endomembrane system” is always in motion, wrapping itself around all the organelles and going out to the edge of the cell. It is a moving “conveyor belt” that is continuously produced, broken down and produced again.”

It was French philosophers Gilles Deleuze and Felix Guattari (1994) who drew attention to the fact that “neither the world, nor its constituents as it appears are closed, independent entities. Before human intervention of the creative shaping of it, there was only a flux of pure material, vectors and forces, and an as yet unknown arrangement of movements and intensities”.

#### 4.2.4.2 CHANGING BOUNDARIES: THE FIRST SPACE OF THE CITY

Bruyns (2005:8) draws attention to the fact that our terminology reflects an underlying basis for our conception of the world. What we are still referring to as “city”, has according to Berber (2009:591) for a while already been replaced by concepts such as edge cities, urban corridors, urban sprawl, metropolitans etc.

The reason for us still clinging to the concept of “city” might be due to the fact that where in the past, the city wall or a type of visual boundary was the first “filter” with which to divide the “city” from “non-city” (for example the separation between city centre and suburb or even between different suburbs); this border has now become increasingly “fuzzy”. This is mainly due to accumulating urban degeneration and loss of place, coherence, connectivity (such as in

the example of Salvokop) and identity. There is an increasing need for another space with which to frame the city – one which will account better for the city in the way that it is ordered and organised today (Figure 4.30).

### 4.3 ARGUMENT

#### 4.3.1 ARCHITECTURAL ISSUE

The architectural issue of this dissertation is not the obliteration to our traditional cities and city structure, and how to react to that, but rather the notion that cities should be seen as complex systems and be analysed and reacted to as such. In this complex system there is a shift in paradigm from an architectural-object discourse to a discourse that uses another means of framing and defining the concept of city (Bruyns, 2005:1).

#### 4.3.2 RESEARCH PROBLEM

The perceived disorder of the world around us is not the “dis-figuring” of the “architectural-object”, but rather failure in our understanding of the nature of this complexity of the city and how to represent and interpret it.

#### 4.3.3 HYPOTHESIS

Bruyns and Read (2004:3) are of the opinion that instead of trying to account for shortfalls in the perceived “order” we still believe to exist in the world; we should rather seek new proposals which will account for these better. This requires for planners and designers to:

- Rethink the idea of city. That implies identifying a new border which will define “city” better. It also

implies seeing the world as an open system which is constantly changing.

- Find an alternative way of analysing the contemporary landscape to represent and interpret this new landscape. According to Bruyns (2004:1), only by moving away from the “zenith view” of analysing the city, is a new observational field possible which will understand the processes responsible for transformations in the morphological environment.

SPACELAB Research Laboratory for the contemporary city, at Delft University of Technology in The Netherlands has developed two methods, namely “disfiguring the urban” and “the urban machine” as alternative ways of analysing the contemporary landscape and defining a new boundary with which to define the concept of “city”.

*Fig.4.30 There is an increasing demand for another space with which to frame the city in which it is ordered and organised today.*

#### 4.3.4 RESEARCH OBJECTIVE

The study will apply these methods of “Disfiguring” and “The Urban Machine” in Chapter Five to compile a reading of the city - alternative to the one performed in Chapter One. The objective is to remove the analysis from the distanced view to an understanding of the study area from within. The aim is to identify the actual reasons for the transformations we see in the morphological environment and then react to these through a design intervention. The result of the findings in Chapter Five will then be incorporated into an urban framework for the study area in Chapter Seven, and ideally inform the design intervention in terms of client, programme and building morphology.

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# CHAPTER 5

## A RATIONAL PROCESS

“The urban object has in fact always been founded in its relations with the rest of the world, and grounded by the flows which pass through it”

(Read, 2004)

In the preceding chapters Three and Four the architectural issue was identified as being the manifestation of “complexity” in the contemporary city. Furthermore, the research problem was highlighted that planners and designers find it difficult to understand, analyse, represent and react to this complexity, and that this is mainly the reason for failure of design interventions that aim to repair/fix areas that have been fragmented or where a spatial loss in connectivity has occurred (such as the study area between the City of Pretoria and Salvokop).

Since the original site analysis only provided what Amin (cited in Bruyns, 2005) refers to as a “sus-

pended frozen spatial view in a non-active spatiality, a ‘masterplanner-from-atop-view’ - removed from events at the lower levels”, in this chapter, two mapping tools developed by SPACELAB to analyse and represent the complex environment will be explained and applied to the site as an alternative research method.

In Chapter Seven the results of these two mapping techniques will then be incorporated into an urban framework for the study area. The results will also be used as design informant for a possible client and programme in Chapter Eight as well as the design intervention itself (from Chapter Nine onwards).

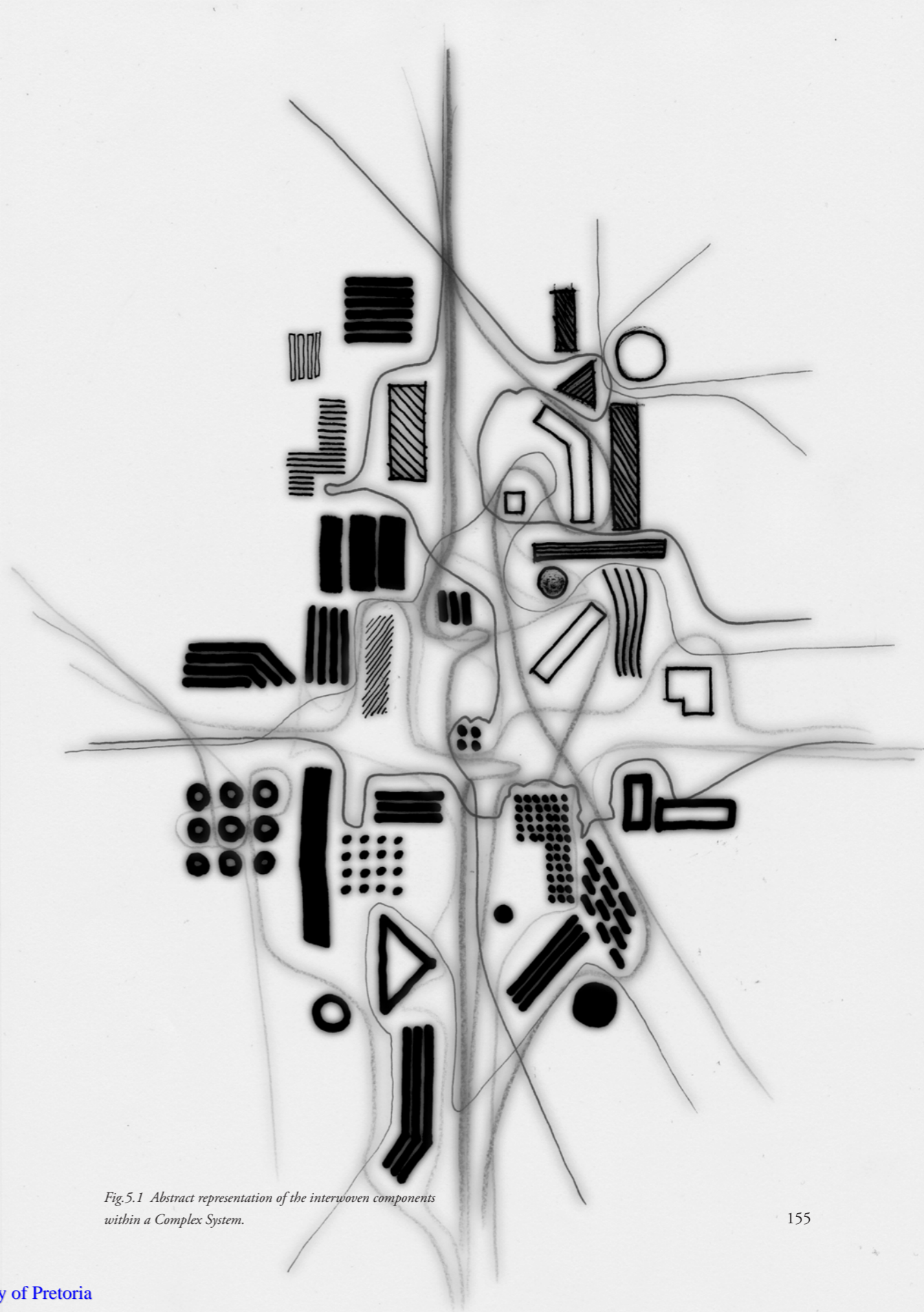


Fig.5.1 Abstract representation of the interwoven components within a Complex System.

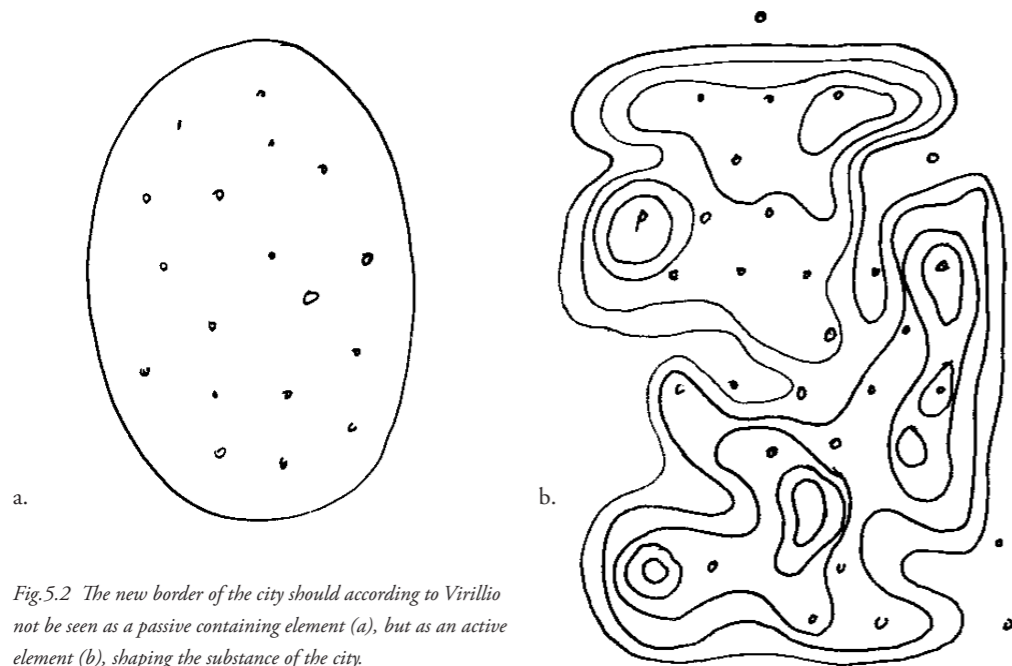


Fig.5.2 The new border of the city should according to Virillio not be seen as a passive containing element (a), but as an active element (b), shaping the substance of the city.

## 5.1 THE BORDER OF THE NEW CITY

“...city’...may be not an entity identified by being ‘not-coutryside’ or ‘not-periphery’, but rather an everywhere local effect emergent within an ultimately global extension of sorted and stratified movement and communication.”

(Bruyns G & Read S, 2004:1)

Through their research, SPACELAB hypothesized that a space with which to frame the city; which will account for the city as it is ordered and organised today, as well as for the city of the past will be able to account for the transformations experienced in the city today in relation to that city of the past (Bruyns & Read 2004:5). Virillio (cited in Bruyns & Read

2004:6) goes beyond seeing the border as a passive containing element (Figure 5.2a), and sees it rather as an active element (Figure 5.2b), shaping the substance of the city with the substance he proposes, being the movement and traffic of the city. The urban object is consequently a network - the result of various movements and flows through it. (Figure 5.3)



Fig.5.3 The urban object represented as a network - the result of various movements of flows through it.



Fig.5.4 Networks are abstractions becoming real only once they are performed.

Networks, nevertheless, are abstractions. They have no inherent or forceful reality in themselves; they become real to the extent that they are performed. And performed, Bruyns (2004:6) says,

“...they become pathways traversed by stuff already constituted and meaningful, and in durations and at speeds and frequencies, and not the abstract, instantaneous node and edge relations we often use to represent them” (Figure 5.5).

This highlights a shift in paradigm away from an architectural-object driven discourse to that of a “spatial-driven discourse” where space is the “device mobile” that acts as the unifying operational system which produces effects, responsible for the “visible” landscape and environment we see as being self-evident (Bruyns G, 2005:1).

The summary to the right highlights the main differences in approach between an architectural-object driven discourse and a spatial discourse.

## ARCHITECTURAL-OBJECT-DRIVEN DISCOURSE

Space as by-product  
The world as object  
Being disfigured  
By infrastructure we put in it.  
Visible to us: Effect: fragmentation, chaos, disorder etc.  
Interventions try to repair this disfiguring

### RESULT

What we perceived as “traditional city” - enclosed, orderly, controllable, has developed into a “modern industrial city”, confined by peripheral & edge developments

### PROBLEMATICS

Our mental comprehension of the city (as ordered, controllable, contained, isolated unit) is disturbed - what is the new city?



## SPATIAL-DRIVEN DISCOURSE

Space as unifying operational device  
Producing effects  
Responsible for the visible landscape  
Replace normal analysis procedures by “making visible of the spatial”

### WHEN “MAKING VISIBLE” THE SPATIAL

The discourse that deals with fragmentation, is replaced by A coherent program of transformation & spatial coherences

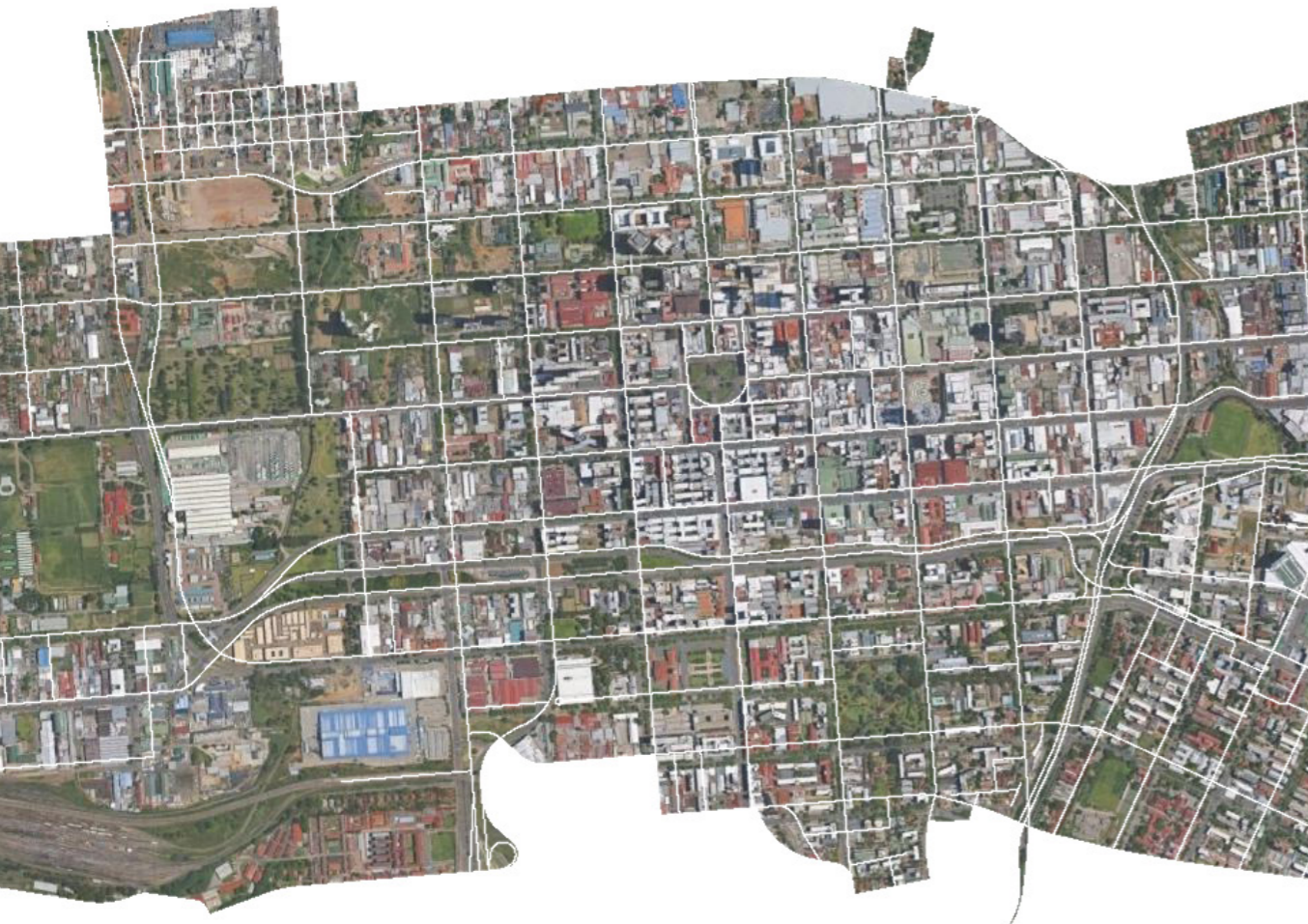


Fig.5.5 A “zenith viewed” reality of the City of Pretoria, sees the city from an “above”, distanced point of view, neglecting the explanations of “process” within itself.

## 5.2 REPRESENTING & ANALYSING THE NEW CITY

The previous chapter highlighted the difficulty of representing this “new city”. Bruyns & Read mainly ascribe this to the planners using “old set of tools”. Previous analysis of the built environment was based on pure typological notions which generated models of settlement and functional processes that reflected an overly ‘objectivist’ ‘zennith viewed’ reality (Figure 5.5), neglecting the explanations of ‘process’ within itself (Bruyns G, 2004:1).

Attempts to intervene on an urban scale consequently saw and treated the reality as such; controllable from a distanced, ‘objective’ point of view, neglecting the explanations of “process” within itself (ibid.).

According to Bruyns (2004:1), representational difficulties arise where “urban space” (the morphological environment) meets “urban processes” (Figures 5.6 & 5.7), manifested in the physical body and character of the environment, which is experienced as “chaotic” and “disordered”.

Bruyns is of the opinion that only by moving away from this “zenith view”, a new “observational field” is possible that will allow us to understand the processes that are responsible from transformations.



Fig.5.6 Urban space - the way the morphological environment is structured to allow for certain activities.







Fig.5.7 Urban process - the way in which this morphological environment is actually being appropriated.





“Disfiguring the urban” is a method of mapping and reading the environment by means of visualizing, representing and analysing both the morphological and spatial environment. It entails unravelling certain “chaotic” activities and laws of daily life, as reflected in the landscape, and then seeking relations between the formal and spatial mechanisms detached from pre-established frameworks and ideas. The method therefore takes into account both the planned and unplanned city.

“Disfiguring” involves an initial empirical survey on the morphological form of the city which is set up to establish the formal aspects of the city – such as objects, networks and used urban plots. Following this initial survey is an inquiry into the processes; for example images and interviews of the study area. The data collected in this manner is then superimposed onto one another and by means of the “urban machine” used to propose mechanisms that affect the ways/degree in which urban elements relate.



# Disfiguring the Urban: Where Urban Space...

-  Objects (Built Environment)
-  Used Plots
-  Vacant Plots
-  Non-Pedestrian Movement Networks

-  Main pedestrian route - fast
-  Main pedestrian route - stroll
-  Short cut (employees) - fast
-  No dedicated route - signs of usage

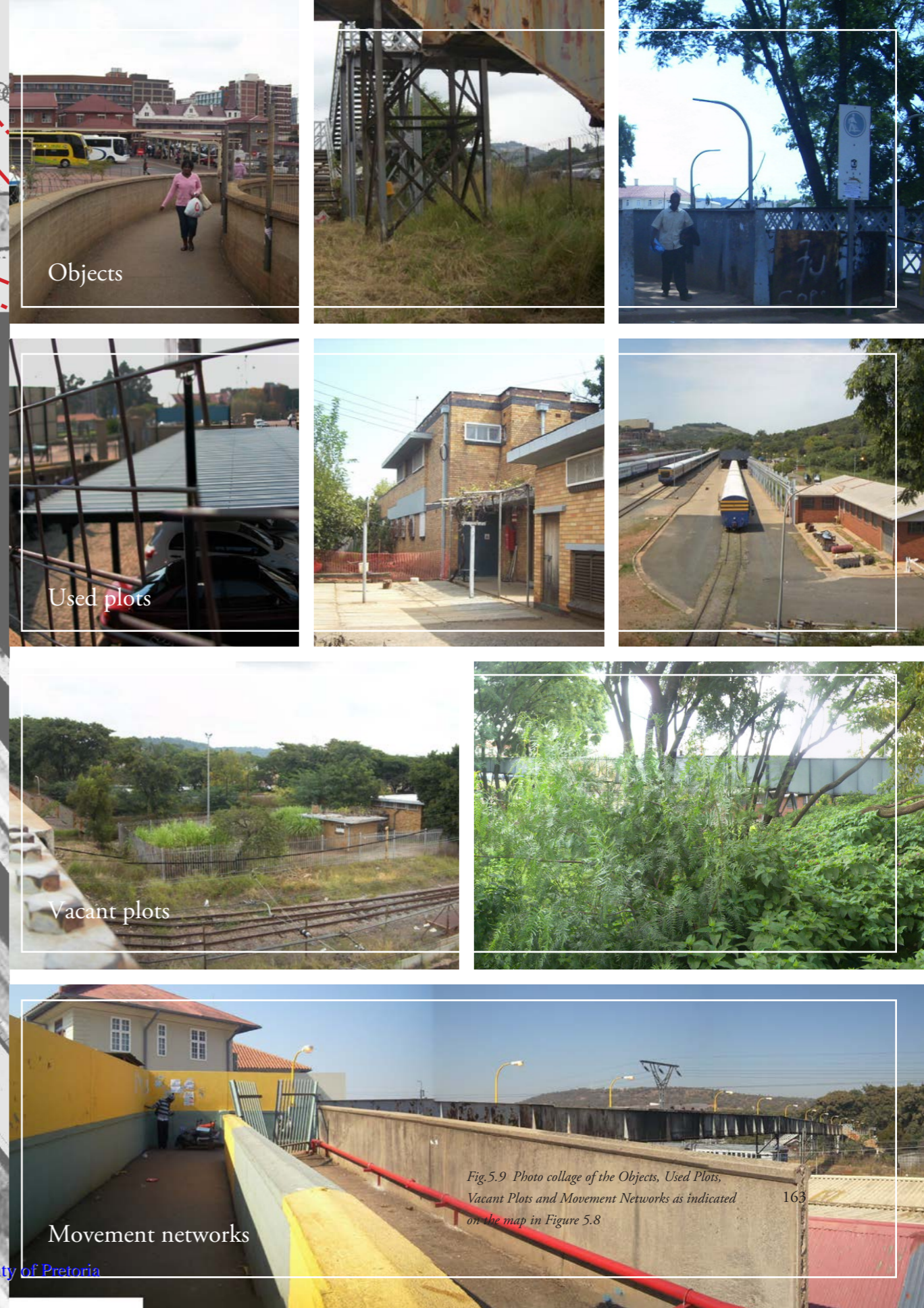
## 5.3 DISFIGURING THE URBAN

### 5.3.1 WHERE URBAN SPACE...

In Figure 5.8 an empirical survey (using GIS to indicate transport networks, and a CAD drawing - from which a *noli map* was generated) of the morphological environment of the study area was completed. Additionally the different speeds of movement around the study area were recorded and mapped.

Figure 5.9 is a collective documentation of the different objects, used and vacant plots as well as movement networks around the study area.

*Fig.5.8 A graphical representation of the morphological environment of the study area onto which different speeds of movement were recorded and mapped.*



Objects

Used plots

Vacant plots

Movement networks

*Fig.5.9 Photo collage of the Objects, Used Plots, Vacant Plots and Movement Networks as indicated on the map in Figure 5.8*

# ...meets Urban Process

TABLE 5.1 A summary of the responses given during the interview, provides insight into the way that the respondents attend to some of the basic human needs as identified by Manfred Max Neef.

<p><b>1. PLACE OF SHELTER</b></p> <ul style="list-style-type: none"> <li>• Depends on weather.</li> <li>• Bus stops on benches, but get chased away.</li> <li>• Any open space - not enclosed (pavements, grass, under a tree).</li> <li>• Buildings are "trespass" - will only pick up problems there - trapped.</li> </ul>	<p><b>4. ECONOMIC SURVIVAL</b></p> <ul style="list-style-type: none"> <li>• Begging.</li> <li>• Car guard, car wash.</li> <li>• Collect paper, scrap.</li> <li>• Fix appliances.</li> <li>• Piece job.</li> <li>• Carry luggage.</li> <li>• Steal trolleys.</li> </ul>
<p><b>2. PROVISION FOR FOOD</b></p> <ul style="list-style-type: none"> <li>• Rubbish bins.</li> <li>• Buy food at Erics.</li> <li>• Eat at friends that live in Salvokop.</li> <li>• Buy alcohol at liquor store/shebeen.</li> <li>• Soup at clinic in Salvokop.</li> <li>• Sundays at Pop-Up.</li> <li>• Church every 2 weeks/Private institutions.</li> </ul>	<p><b>5. SOCIAL INTERACTION</b></p> <ul style="list-style-type: none"> <li>• Network of homeless. Look out for each other. Safer.</li> <li>• Move around in groups 2-3. More than that gives impression of gangs. Work on their own though.</li> <li>• Share with friends.</li> <li>• Competition amongst some activities, p.e. car guard/wash.</li> <li>• Pop-Up &amp; clinic in Salvokop - illness &amp; safety.</li> </ul>
<p><b>3. SANITATION</b></p> <ul style="list-style-type: none"> <li>• Public toilets (esp. at bus stop)</li> <li>• Apies River.</li> <li>• At Fountains Circle (in the fountains).</li> <li>• I feel excluded when I'm dirty.</li> </ul>	<p><b>6. OTHER</b></p> <ul style="list-style-type: none"> <li>• You have to adapt to your circumstances.</li> <li>• You have to be creative to survive.</li> <li>• There are different supportive structures in place to aid survival (Pop-Up, Clinics, Churches, Police to a certain extent, other homeless, Shebeens).</li> </ul>

## 5.3.2 ...MEETS URBAN PROCESS

The enquiry into Urban Process involved documenting random activities taking place on, around and under the bridge, to establish how the spaces around the bridge are being appropriated, spontaneously. The documentation was performed partly by the author, partly by three homeless respondents which were chosen on the base that they fit the profile of what Sophia Vyzoviti calls "urban groups without a place" (2002:1). These are described as people who spontaneously appropriate urban spaces but are not acknowledged for in mainstream urban planning and design - socially excluded and marginal groups (2002:3). The respondents also had to be regular users of the bridge.

The documentation entailed a personal interview followed by a request to record a normal day in their own lives over a period of 24 hours making use of a

disposable camera which was handed over to them after the interview. The focus of the interview and visual documentation was based on the Max-Neef Matrix of Needs<sup>1</sup>. From the pictures taken, activities were identified which were grouped into five categories or needs. Together with the interviews these would establish how each respondent provide for:

- Place of shelter (Protection)
- Provision for Food (Subsistence)
- Sanitation (where they wash, use the toilet etc.)
- Economic Survival (Subsistence)
- Social Interaction (Affection, Understanding, Participation, Leisure, Identity and Freedom)

While Table 5.1 gives a summary of the responses to the interviews, Figure 5.10 provides a visual summary of how each of the five needs is being attended to.

<sup>1</sup> Arthur Manfred Max Neef is a Chilean economist and environmentalist who, together with Antonio Elizalde and Martin Hopenhayn, were the creators of a "Human Needs and Human-Scale Development Model" based on fundamental human needs. According to this model, these needs can be classified into the following categories: subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom.

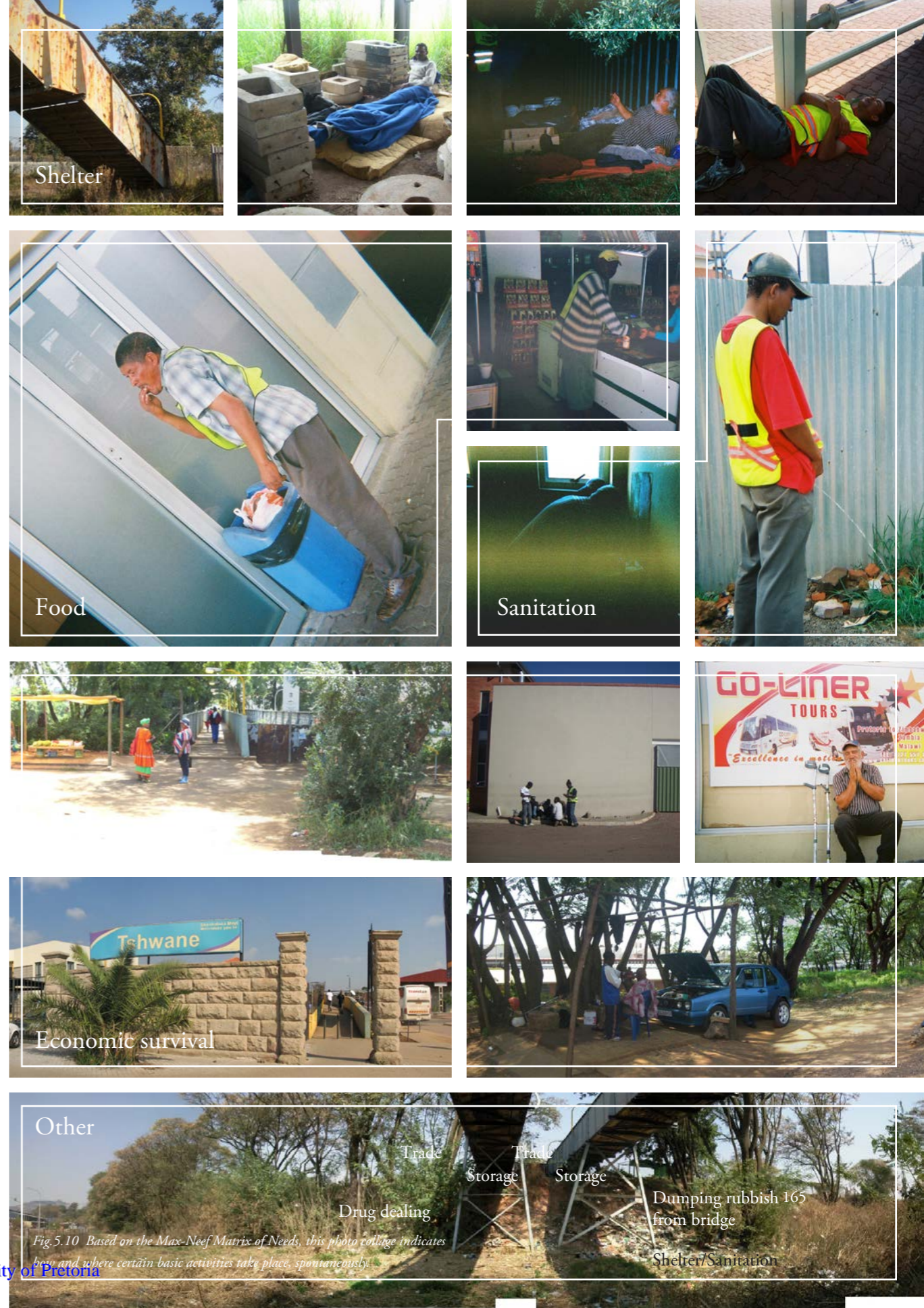


Fig. 5.10 Based on the Max-Neef Matrix of Needs, this photo collage indicates how and where certain basic activities take place, spontaneously.



From the interviews and visual documentation, the economic activities that were identified were categorised into three main groups:

- Legal informal economic activities (p.e. vendors, carwashers and -guards)
- Semi-legal economic activities (p.e. she-beens and other home enterprises operating without licences)
- Illegal activities (p.e. theft, drug dealing etc.).

- Main pedestrian route - fast
- - - Main pedestrian route - stroll
- ..... Short cut (employees) - fast
- ..... No dedicated route - signs of usage

## 5.4 THE URBAN MACHINE

“(The city of today) is not a distribution of objects or arrangement of bounded zones (anymore)... It is more a framework for locating the distribution of effects arising out of the superposition of...different space-times held in movement grids and produced in movements.” (Bruyns G & Read S, 2006:11)

Fig.5.11 By overlaying the urban processes as identified in section 5.3.2 onto the map generated in Figure 5.8 certain observations were made by means of “The Urban Machine”.

## Visible city (high level of visibility)

Activity	Comments	Element of Complexity
trade	• Main routes carrying fast and slower moving traffic favours trade.	emergence/adaptation
social interaction	• Informal traders on Salvokop’s side of bridge, not city, due to the fact that informal traders are not allowed to trade there, but only in dedicated areas during specific times. This has caused the majority of informal trade to move across to Salvokop’s side at the exit of the bridge.	emergence
food	• Anywhere close to economic activity. • Anywhere in the vicinity of people - rubbish bins.	emergence
sanitation	• Anywhere in the vicinity of people. • If no public facilities, will relieve themselves in public. • Where ever there are signs of life (shelter).	emergence
drug dealing		part uncertainty behaviour
theft	• Not too far from people, but invisible enough to hide. • Not on the main route. • Close to secondary routes - intersection of secondary and “invisible routes”	part uncertainty behaviour
shelter	• If chased away from public eye, seek most private zones away from the public. • Not enclosed, but with roof of some kind overhead. • Do not want to be trapped.	emergence/adaptation/ part uncertainty in behaviour

## Invisible city (low level of visibility)

Fig.5.12 Certain activities have a higher degree of visibility than others. Different speeds of movement also favours different types of activities. “The Urban Machine” makes visible the true mechanisms that produce these effects in the visible landscape around us.

“The urban machine” is a tool for making visible the possible effects or places that arise from superimposing multiple layers of speed and movement where other effects or activities are already emerging from. An example of this would be traders who will always shift activity to spots where exposure and acknowledgement are at its highest (Bruyns 2005:7).

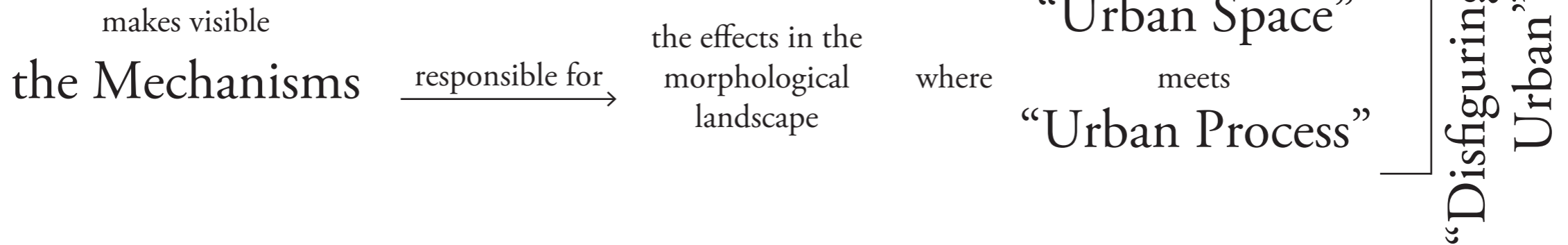
By overlaying the “Urban Processes” in Figure 5.10 onto the “Urban Space” map in Figure 5.8, certain observations were made by means of “The Urban Machine”. It would seem that certain conditions (see “Comments” in Figure 5.12) and speeds of move-

ment are favourable to particular activities taking place there, as illustrated in Figure 5.11.

In Figure 5.12 the different activities were ordered according to their degree of visibility. Certain activities are also more prone to take place where the speed of movement is higher, other activities are more likely to take place where the speed of movement is lower.

Through “The Urban Machine” it is consequently possible to make visible the true mechanisms that produce the effects, responsible for the “visible” landscape and environment we see around us.

## “The Urban Machine”



Following the difficulty arising in the previous chapter surrounding the nature, definition and border of the “new” contemporary city, this chapter highlights a change in train of thought.

Firstly, the border of the new city is not a contained element, but an ever shifting, everywhere “effect” – the result of flows of movement through it. This highlights a shift in paradigm that sees the city as an isolated architect-object to one that sees space as the main ordering device, producing certain effects, visible in the morphological landscape as we see it.

There is however a need to understand the urban landscape in all its different scales as well as levels in order to understand the true mechanisms that are the driving force behind these processes.

An alternative site analysis is performed, different to the analysis conducted in Chapter Two, by introducing and applying two methods of analysing and interpreting the new city (developed by Spacelab Research Laboratory of the Contemporary City at TUD in The Netherlands). By means of “Disfiguring the Urban” an empirical survey of the site, showing urban

space as well as speed of pedestrian movement across it, is layered by a documentation of “Urban Process” which are the activities causing the urban landscape to appear as “chaotic” and “disordered”. Consequently the analysis includes the planned and unplanned city. “The Urban Machine” is then used to make visible relationships between patterns of different speeds of movements and activities that currently take place there. This aids in establishing the real mechanisms at play, causing the processes and consequently the effects in the visible landscape as we see it.

The urban machine thus makes visible the conditions that favours the emergence of certain activities, allowing a degree of expectancy. A framework based in “processes” can implement this information to facilitate or address these emerging activities, resulting in an intervention that is inspired from the bottom up, not from the top down. In Chapter Seven, the findings of this approach will be implemented to propose a processes framework for the study area.

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# CHAPTER 6

## EMBRACING COMPLEXITY

“Cities are built from the bottom up. They are the product of millions of individual decisions on many spatial scales and over different time-intervals, affecting both the functioning and the form of the city with respect to how it is structured and how it evolves. It is impossible to conceive of any organization that can control such complexity, and thus the very question of the extent to which the city might be “planned” is thrown into new light.”

(Batty, 2010:1)

In the previous chapters attention was drawn to the shortcomings of conventional site analysis tools. The alternative reading of the site proved that there is indeed a lot more happening on and around the bridge than is visible to the eye when performing a normal site analysis.

By applying the “urban machine” it was possible to identify the actual driving mechanisms that are responsible for the effects visible in the contemporary urban landscape. The mechanisms reiterate the nature of Complex Systems given in Chapter Four: that they are emergent, adaptive and involve feedback loops. But there is also an interdependency that will be elaborated on in this chapter.

*Fig.6.1 Evidence that the space under the bridge is being appropriated as a place of shelter.*





## 6.1 SUB-ECONOMIES AND A POLICY FOR SUB-ECONOMIES THE INVISIBLE WORLD

For the purpose of this study the term “sub-economies” will be used to include both the informal sector (p.e. street vendors) and that marginalised part of society referred to in the previous chapter (the homeless and unemployed). Max-Neef (1991:65) generally refers to this group as “the invisible world”.

During 2012, the city of Tshwane was overtaken with strikes by angry hawkers (see Figure 6.2) following the council’s announcement of its CBD renewal project in an attempt to regenerate the inner city. This involves a clean-up programme where certain streets in the inner city are pedestrianized and consequently relieved from taxis and hawkers trading and operating anywhere.

In June 2002 the International Labour Organisation (ILO) discussed the situation of informal workers and suggested resolutions on “decent work” (work which gives enough money for the working person and their family to live decently) and the informal economy (ILO, 2003:1) following research conducted on this branch of the economy. The object of the study was to establish a way in which local government could deal with the informal economy.

The reason for this concern was that the number of informal traders has since 1994 increased significantly. This was mainly due to the new government being less repressive and not preventing street trading in the same way as the apartheid government, which saw trading mainly as an obstruction to traffic, not as a business (ILO, 2003:4). Secondly, the shortage of other jobs has forced many people to try to earn money through street trading (ILO, 2003:4). While five metropolitan councils’ policies towards informal economies were compared, there were mainly two approaches that were identified:

Fig.6.2 Angry hawkers participate in a strike after the Tshwane’s Municipality’s announcement of its plans to clean up the inner city.



Fig.6.3 An attempt by the Tshwane Council to formalise trade by relocating informal traders to the Bosman Street Market, away from the main pedestrian flow.

- i. One tries to clean up the streets and remove all traders and relocate them to operate from dedicated market areas (Figure 6.3).
- ii. One believes in the inclusion of informal economies into their larger economy (Figure 6.4).

From these two classifications, Johannesburg and Pretoria falls under the first category while Durban, which has according to the ILO the most progressive policy on street trading in the country, falls into the second.

The main reason for Durban being so progressive in its policy may be ascribed to the fact that local government has tried to address the informal economy for many years, spending a lot of money on building markets (ILO 2003:3). It always tried to talk to street traders and their organisations when making and implementing its street trade policy, through government's main negotiating partner in Durban, the Informal Trade Management Board (ITMB). The ITMB was formed in 1995 when several street vendor organizations decided to have "one voice" to represent them at the local government (ILO 2003:10).



Fig.6.4 At Warwick Junction in Durban, the eThekweni Municipality has adopted a policy which includes the informal economies into the larger economy. Existing places of trade are being facilitated by not only acknowledging, but also improving the current conditions.

In Johannesburg and Pretoria though, government has not planned as carefully for street trading. Here the Metropolitan Council has listened more to the voice of formal business than to that of informal economy workers (ILO, 2003:4). The Council's aim seems to be to remove all street traders from the streets of the CBD, justifying this by saying that the traders clog up pavements, obstructing pedestrians and vehicles, and making the city dirty and dangerous.

The Council wants all traders to operate from markets, during specific hours. Traders do not agree with this policy. They are of the opinion that the success of their business depends on the number of people who passes by and to them markets do not have enough "passing feet" (ILO, 2003:7) - which is also affected by particular times during the day.

Ever since the different smaller organizations in Durban self-organized to form one representative, several feats have been achieved by the ITMB (Dobson & Skinner, 2009:47). Some of these include:





Fig.6.5 Traders Against Crime (TAC) is an initiative in collaboration with the South African Police to address crime in Warwick.

i. Tackling crime. The establishment of a good working relationship with the South African Police Service and the Central Business District Community Policing Forum, has proved to address the issue of crime successfully. Traders Against Crime (TAC) (Figure 6.5) is an initiative by the ITMB to make the streets of Durban safer (Dobson & Skinner, 2009:112).

ii. Cooperating to keep Warwick clean. In the Keep Durban Clean campaign (Figure 6.6), ITMB worked together with Durban Unicity to reduce dirt and waste in the streets, and thereby creating a healthier environment (ibid.).



Fig.6.6 In the Keep Durban Clean campaign, the ITMB work together with Durban Unicity to create a cleaner, healthier environment.

iii. Transforming toilet and water facilities. A Trader Representative Forum has been set up to bargain trading sites, storage facilities, and patrolling sites to monitor crime (ibid.).

iv. Managing pavement sleeping. The city's Housing Department has been managing pavement sleeping around the Warwick Junction area by establishing Strollers - a very low cost hotel charging R30 a night with showers for R3. Although this service has proved very popular not only amongst residents but also other people in the city, some are still complaining that R30 is too expensive. Consequently the possible conversion of a public transport rank into



a rough sleeper's facility at night is currently under discussion (ibid.).

The reason for Durban's policy towards the informal economy to be so successful seems to be the realisation from the city council's side that the city is a complex system. Involving the informal economy (Figure 6.7) in decision making processes shows an understanding of the interdependence between design and emergence (Capra 2002:121).

Fig.6.7 On the Umhlanga Promenade, allocation have been made for informal traders to run their business alongside the main pedestrian flow.



Fig.6.8 Deficiencies in the designed urban landscape include a deficit in urban furniture.

## 6.2 EMBRACING COMPLEXITY IN DESIGN

The alternative analysis in Chapter Five did not only point out the activities around the bridge and the driving forces responsible for these; it also highlighted a number of deficiencies in the designed urban landscape (Figures 6.8 & 6.9). Some of these deficits include:

- ample accessible and safe public ablutions
- urban furniture (benches, rubbish bins, water points, ample lighting by night, storage space for traders)
- Inaccessibility onto and off the bridge for people with disabilities, cyclists and pushcart trolley owners.

The lack of these facilities is evidence that there is a large group of users and activities that exist, but which is not being accounted for in the design of urban space.

### 6.2.1 RESEARCH/DESIGN

#### PROBLEM

The effect of this ungenerous outlook towards sub-economies is a testimony of local government not apprehending the complex nature of the contemporary city. In the past it perceived (and still do) the city as an entity where the appearance of the city as “leading



Fig.6.9 Inaccessibility onto and off the bridge for people with disabilities, cyclists and pushcart trolley owners.

African capital” can be predicted years in advance because the activities within can be controlled and managed in an orderly fashion. Such a perception sees a bridge as simply a piece infrastructure put in place to provide a connection from one point to another. It fails to see that a bridge provides much more – as a place of shelter, storage and ablution facility as well as being a place for trade.

### 6.2.2 NORMATIVE POSITION: EMBRACING COMPLEXITY IN DESIGN

This dissertation supports the viewpoint that instead of accounting for shortfalls in the “order” that is still believed to exist in the world, one should rather acknowledge that signs of chaos and degeneration all form part of the complexity of the contemporary city and should be analysed and reacted to in a different way.



An intervention reacting to such a system should not only seek proposals which will account for these better, but also realise that in a Complex System there are two types of structures involved:

- A formal designed structure which embodies relationships of power (such as property owners and local government) and
- an informal structure which represent the system's aliveness and creativity (in this case the users, inhabitants and activities taking place on the bridge) on the other.

Both these parties have their own vision and needs that may be very different and can lead to tension between the two: however, both are needed. Skilful planners understand this interdependence between these two structures and know that in today's complex world the challenge is to find the right balance between the creativity of emergence and the stability of design (Capra, 2002:121).

### 6.2.3 DESIGN OBJECTIVE

The design objective of this study will be to propose a design solution that acknowledges the complexity within the city and consequently understands that the bridge not only functions simply as a connection point, but is appropriated in various spontaneous ways. Therefore a design intervention should allow for and celebrate these appropriations.

Not only will this objective be used as base for a proposed framework in the following chapter and to inform the design in terms of client and programme in chapter seven; it will also guide the design in terms of concept, through to physical manifestation.

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*Fig.6.10 A design intervention for the pedestrian bridge should not only function as a mere connection point but allow for the spontaneous appropriation of space.*

# CHAPTER 7

## A PROCESSES FRAMEWORK

“Places that happen, and happen to work; places that are made and don’t work”

(Hamdi, 2009:58).

In Chapter Four Complex Systems was described to be made up of multiple interdependent elements which include both formal and informal structures. In Chapter Five the idea of a “processes framework” was presented in which the morphological landscape appears the way it does due to the effect of movement and flows through it, not the other way round.

Understanding the interdependency between formal and informal structures, the challenge is to align the visions of formal structures (local government/planned city) with the needs of the informal (the unplanned city - resulting from the alternative analysis) to arrive at a workable framework proposal for the study area.

This chapter commences by presenting the broad visions of local government for the larger area around Salvokop as opposed to the needs of the informal, which were made visible by applying the “Urban Machine” in Chapter Five. It then views the urban landscape in all its different scales from top to ground level.

The aim is to arrive, by means of a processes framework at an experience of the landscape where time, dereliction and beauty are interwoven (Armstrong H, 2006:117).

Fig.7.1 The site within its larger context showing the Voortrekker Monument and Freedom Park in the background.

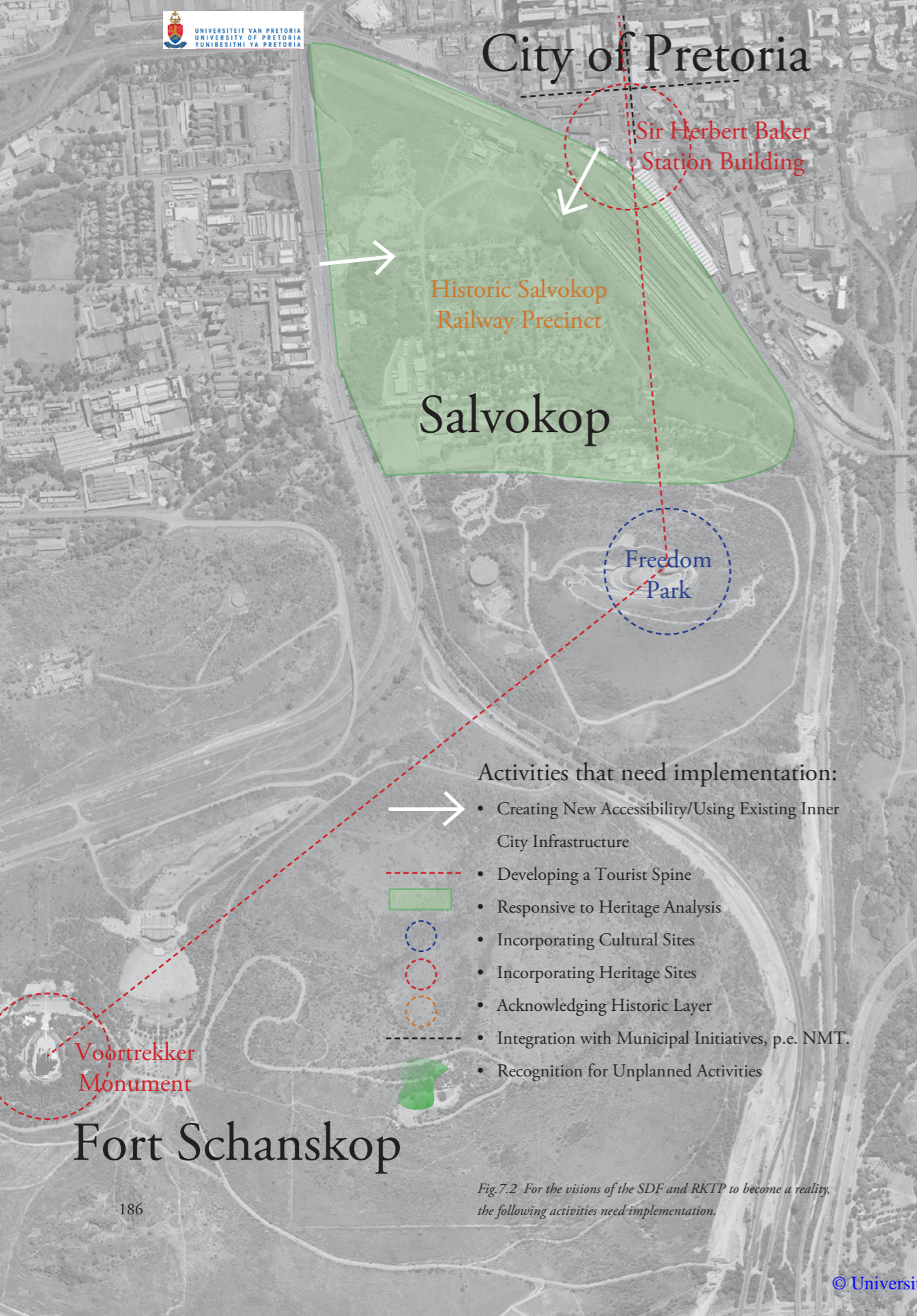


Fig.7.2 For the visions of the SDF and RKTP to become a reality, the following activities need implementation.



Fig.7.3 Supporting livelihoods.



Fig.7.4 Shelter and safety



Fig.7.5 Water and sanitation

## 7.1 AN INTERDEPENDENCY

### 7.1.1 VISIONS OF FORMAL

Chapter Two identified the following visions as part of the Salvokop Development Framework (SDF) as well as the Re-Kgabisa Tshwane Programme (RKTP):

- To create a cultural and tourist spine (Salvokop Development Framework)
- To create a more cohesive interlinked inner city precinct of re-used buildings, open spaces and a binding infrastructure.

For these visions to become a reality, the following activities as indicated in Figure 7.2, need implementation.

### 7.1.2 NEEDS OF INFORMAL

Chapters Five and Six highlighted a number of deficiencies that were made visible through the process of disfiguring. From the interviews that were conducted, one of the most important issues that were highlighted was:

“Acknowledging my existence and recognizing that I am part of society.”

Proof that the municipality of Durban comprehends and respects this can be seen in the city’s Informal Economy Policy, which states clearly:

“The interests of local government will be best served when there are strong and stable partners to negotiate with” (ILO, 2003:7)

This implies recognition for:

- Supporting livelihoods (Figure 7.3)
- Shelter and safety (Figure 7.4)
- Water and sanitation (Figure 7.5).

# City of Pretoria



## 7.2 ALL LEVELS OF SCALES

Bruyns (date, p?) explains that a framework reacting to contemporary landscapes (read complexity), should comprehend the operation of the landscapes and the metropolitan condition in all its scales, infrastructures and intricate patterns.

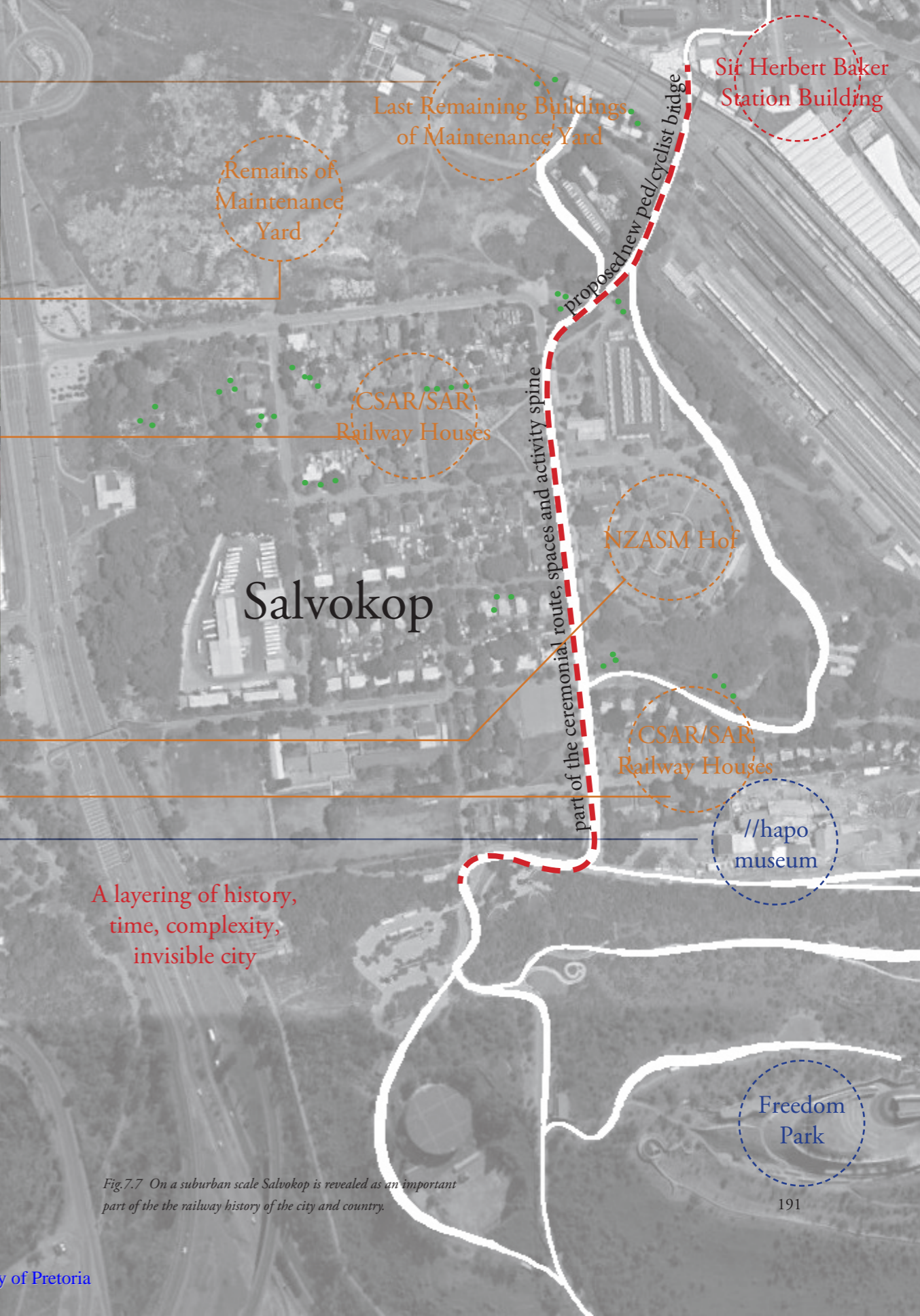
heritage sites of national importance: the Voortrekker Monument at Schanskop, Freedom Park at Salvokop and the station precinct to the north of the railway tracks. The development of an NMT network is proposed that will act as unifying device linking the heritage sites. The proposed intervention will form part of this NMT network.

### 7.2.1 CITY SCALE - TOURIST & CULTURAL SPINE

Therefore, on a city scale a tourist and cultural spine is created (Figure 7.6) which connects the following

The potential exists to link it furthermore with other ridges in the area, p.e. Klapperkop to the east, and to extend the route to the north to connect with the heritage walk down Paul Kruger Street, eventually up to the Union Buildings.

Fig.7.6 On a city scale a tourist and cultural spine is created which connects the Voortrekker Monument, Freedom Park and the station precinct using a proposed NMT network as unifying device.



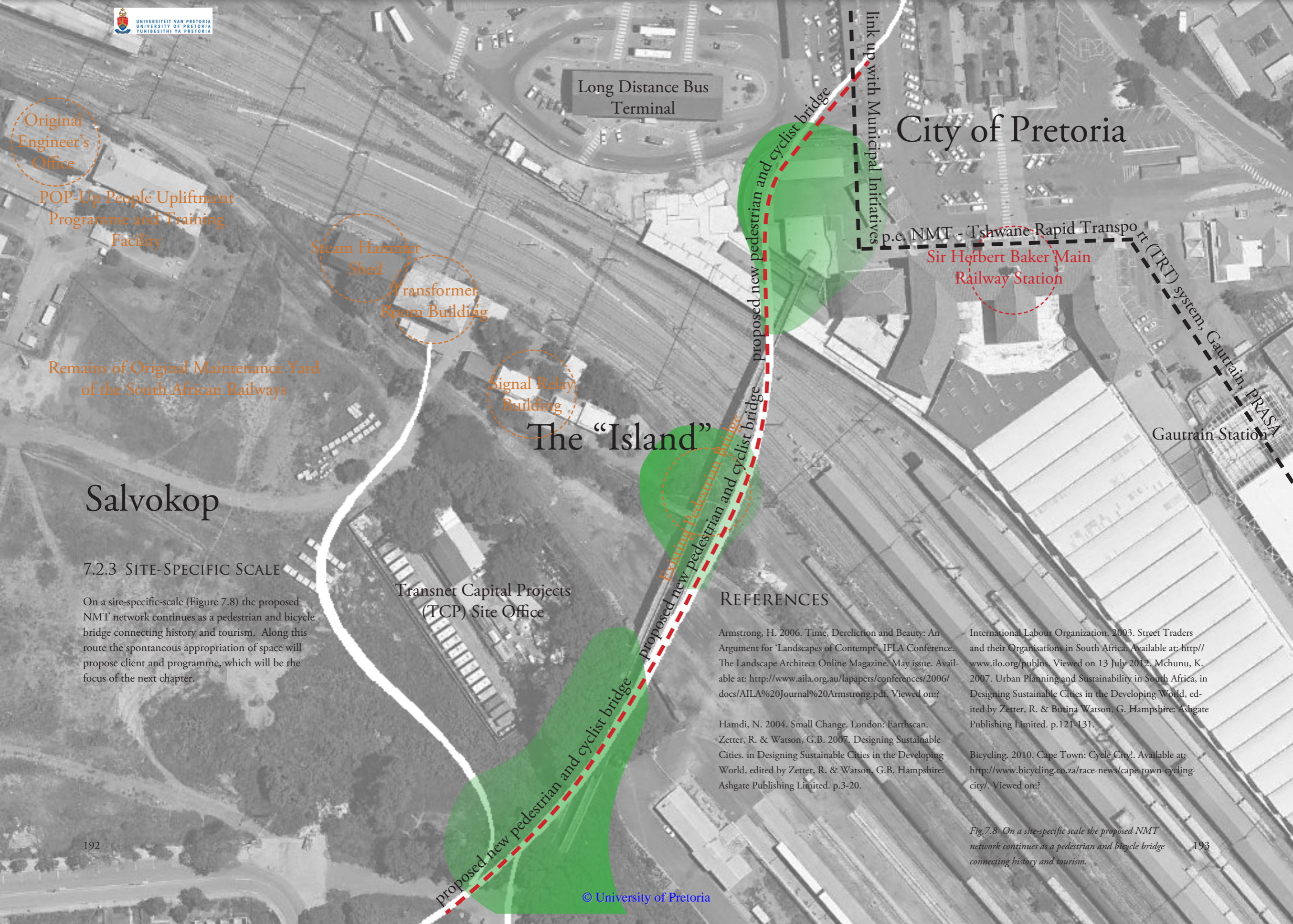
## 7.2.2 SUBURBAN SCALE - TIME, DERELICTION & BEAUTY

On a suburban scale the urban fabric becomes a tangible history (Figure 7.7). Salvokop is revealed as an important part of the railway history of the city and country. Yet, the signs of dereliction also becomes noticeable as does the natural beauty of the surroundings.

While establishing a continuation of the ceremonial route as envisaged by local government the proposed intervention will unveil these layers of history (time), dereliction and beauty.

A layering of history, time, complexity, invisible city

Fig.7.7 On a suburban scale Salvokop is revealed as an important part of the the railway history of the city and country.



# City of Pretoria

Original Engineer's Office

POP-Up People Upliftment Programme and Training Facility

Steam Hammer Shed  
Transformer Room Building

Remains of Original Maintenance Yard of the South African Railways

Signal Relay Building

The "Island"

Transnet Capital Projects (TCP) Site Office

Link up with Municipal Initiatives  
p.e. NMT - Tshwane Rapid Transport (TRT) system, Gautrain, PRASA  
Sir Herbert Baker Main Railway Station  
Gautrain Station

## Salvokop

### 7.2.3 SITE-SPECIFIC SCALE

On a site-specific-scale (Figure 7.8) the proposed NMT network continues as a pedestrian and bicycle bridge connecting history and tourism. Along this route the spontaneous appropriation of space will propose client and programme, which will be the focus of the next chapter.

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Fig.7.8 On a site-specific scale the proposed NMT network continues as a pedestrian and bicycle bridge connecting history and tourism.



# CHAPTER 8

## CONSIDERATION OF CLIENT AND PROGRAMME

“If you are curious enough and observe what is going on closely, there will be a design response to accommodate activities”  
- Project Leader, Warwick Junction

(Dobson R & Skinner C, 2009:129)

In her article “Time, Dereliction and Beauty: an Argument for ‘Landscapes of Content’ Helen Armstrong criticises contemporary urban landscapes for being so extensively programmed that there are few places where one can withdraw to wander and reflect (reference). Especially heritage sites, she remarks, are often marketed with a pseudo sense of place with few real memories, instead turning “memories” into just another commodity.

Unfortunately bureaucrats, city developers and planners very seldom understand that “from an urbanist

point of view, the most attractive parts of the city are precisely those areas where nobody has ever done anything” (Wenders W cited in Simeoforidis Y, 2006:118). Rather, there seems to be a perception that these places are empty, ugly and unpleasant spaces waiting for a better use.

Nearly twenty years ago the Barcelonian urbanist Ignasi De Sola-Morales drew attention to the concept of “Terrains Vagues” – those strange and undefined empty spaces that tell of former times and uses (De Sola-Morales, 1995:119). He highlighted the special

qualities of vacant spaces – hidden places where the absence of use can create a sense of freedom and expectancy of the unknown. Moreover, they suggest an impression of disorder, surprise & sensuality. These special qualities should be understood & respected.

In his book “Industrial Ruins” Edensor (2005) warns against doing predictable designs for such places because it is precisely the fragmentary nature & lack of fixed meaning that reduces ruins & wastelands to deeply meaningful places.

Wastelands and voids epitomise an indeterminate landscape where the different layers of time, dereliction & beauty add depth to our lived experience of the urban landscape and allow for innovative temporary use.

In this chapter, these layers of Time (Figure 8.2), Dereliction (Figure 8.3) and Beauty (Figure 8.4) will be used in conjunction with the activities that are already taking place on the site to inform client & programme for the study.

Fig.8.1 The existing pedestrian bridge viewed from the Blue Train Shunting Yard.



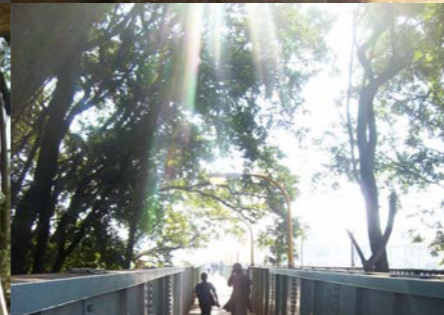
STRICTLY PRIVATE  
STRENG PRIVAAT

# Time

*Fig.8.2 Time is embodied in the railway history of Salvokop still partially visible and partially hidden.*

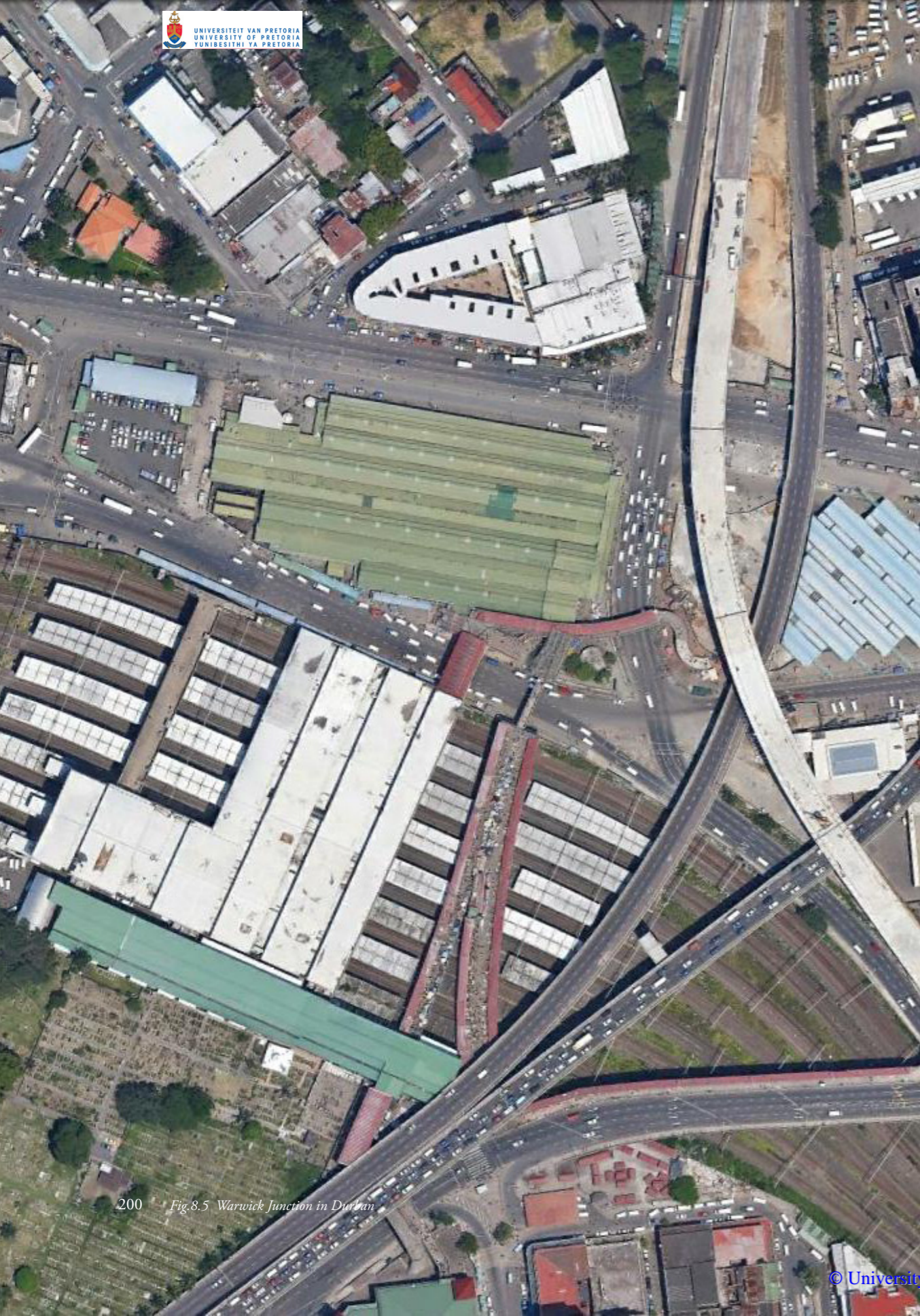
# Dereliction

Fig.8.3 Dereliction is evident in the signs of urban disorder drawing deviant characters such as drug-users, criminals, the informal economy and the homeless.



# Beauty

Fig.8.4 The natural beauty of one of the sensitive ridges that constitutes Pretoria's sense of place (Mare 2006) is apparent on the site.



200 Fig.8.5 Warwick Junction in Durban



Fig.8.6 In Durban street trading is acknowledged as an important part of the city, contributing to its economy and employment.

## 8.1 PRECEDENT STUDIES

### 8.1.1 THE WARWICK JUNCTION

#### URBAN: FACILITATING THE CREATIVE USE OF PUBLIC SPACE

Warwick Junction in Durban (Figure 8.5) is one of the very few examples locally and internationally where the informal economy is incorporated into

urban planning. Historically South African local authorities kept street traders away from city centres and tourist areas and generally regarded them as a nuisance rather than an asset (Dobson R & Skinner C 2009:1). This project however, recognised that street trading was an important part of the city (Figure 8.6), contributing to its economy and to employment (ibid.).

#### 8.1.1.1 HISTORY

Following a long period of oppression and exclusion during the apartheid years the more liberal Progressive



Fig.8.7 Traditional medicine trading conditions before the Warwick Junction Project interventions.

Federal Party (PFP) took over the local government of Durban from the National Party (NP) in the early 1980s. The new council commissioned a survey on street traders in the inner city. The results of this hawker report made the council recognise the allowance that needs to be made for the informal economy.

Not only were traders now acknowledged as a permanent part of the city but also for their economic contribution. By the early 1990s this new attitude led to the relaxation of national laws restricting “black” economic activity, causing thousands of people to flock to the city (especially the Warwick area), inhabiting pavement space available to trade informally where business was favourable (Figure

8.7). Unfortunately lack of management of these activities as well as the provision of facilities created a real threat of slums developing (Figure 8.8). The city council addressed this by forming a sub-committee to draw up recommendations for a new policy. In 1991 it established the Department of Informal Trade and Small Business Opportunities (DITSBO) to manage and facilitate this process.

During this period National Government gave local governments the power to pass street trading bylaws, aiming to ensure that that these bylaws should regulate rather than inhibit inner city trading. While most SA cities adopted the approach of declaring some of the most viable trading areas as prohibited

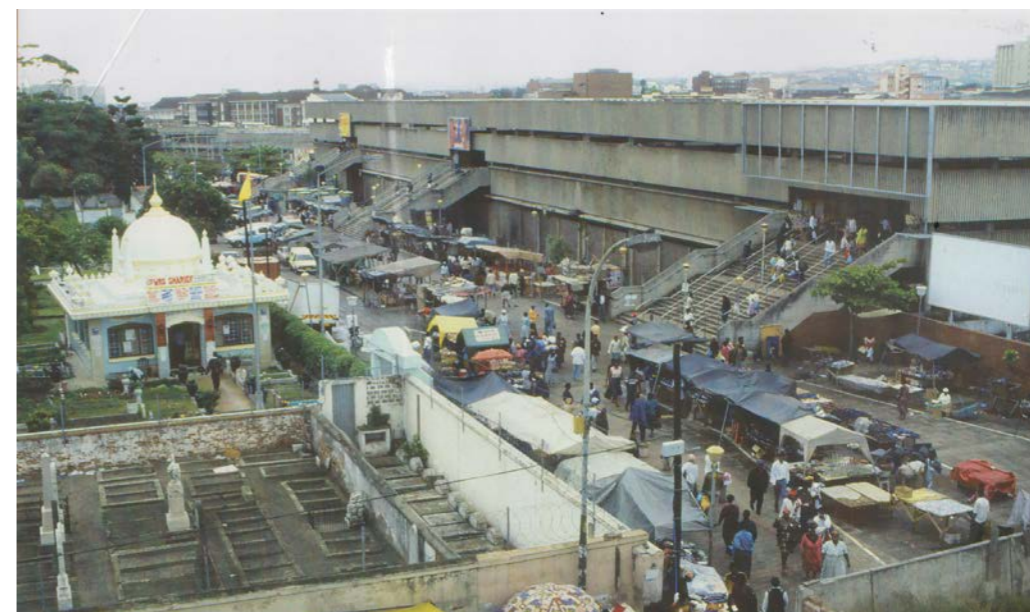


Fig.8.8 Brook Street trading conditions before the Warwick Junction Project interventions.

trade zones, Durban City Council passed bylaws allowing street traders to operate in most of the inner city with the exception of prohibiting trading in some zones and restricting it in others.

#### 8.1.1.2 COMPLEXITY OF CONTEXT

Within its context (Figure 8.8) the Warwick Junction Urban Renewal Project faced a number of difficulties:

- Initial poorly designed area. Years of apartheid town planning aiming to separate different race groups caused the area to be poorly designed.
- Congestion and overtrading. Due to an ever-increasing number of traders the area became

increasingly congested.

- Crime.
- Politic & economic division, following political violence between the ANC & IFP during the early 1990s, causing many of the traders to distrust one another. Given the apartheid history they also distrusted government officials.
- Politic and administrative restructuring. As is the case with Pretoria and the surrounding homelands that were consolidated into Tshwane, the 48 racially separate local authorities around Durban were combined into the larger metropolitan of eThekweni in the mid-1990s, causing the project to face an ever-changing institutional environment.



Fig.8.9 The Brook Street Market today facilitates different sectors in terms of storage, display, water and electricity.

### 8.1.1.3 ADDRESSING URBAN MANAGEMENT ISSUES THROUGH A COOPERATIVE EFFORT

“It was not an entity; it was a series of tasks that had to be done and had to achieve a set of outcomes. This was the catalyst to interlink departments” (Dobson R & Skinner C, 2009:52).

Through a concerted effort between different local government departments and the people using the area, the following issues were tackled:

- Facilitating different sectors in terms of storage, display, water & electricity (Figure 8.9)
- Tackling Crime (Figure 8.10c)
- Keeping the area clean (Figure 8.10a)
- Providing toilet and water facilities (Figure 8.10b)
- Managing pavement sleeping by providing very

low cost accommodation (R30/night) and showers (R3) at Strollers hotel. With its unique security system, this hotel provides separate floors for women, men and couples. Although proved popular among not only residents but also other people in the city, some are still complaining that R30 is too expensive, leading to the design of a public transport rank converted into a rough sleeper’s facility currently under way.

For each activity a task team was appointed consisting of officials from relevant departments in the local council.

### 8.1.1.4 APPROACH TOWARDS COMPLEXITY

The initial survey paved the way for a major reversal



Fig.8.10 Through a concerted effort between different local government departments and the different users of the area (a) the area is kept clean, (b) toilet and water facilities are provided, and (c) crime is tackled, in this case by increasing the visibility from the walkways.

in the municipality’s approach towards the informal economy – one that:

“works with rather than against, the interests of street traders, and the subsequent incorporation of this approach into plans for the Warwick area” (Dobson R & Skinner C, 2009:47).

This approach is visible in:

- Combining the efforts of designed and emergent structures. The city’s health department set up health and safety training to introduce minimum health requirements. They also set up a preliminary database of the street traders and their activities to document what infrastructure they need.
- Signs of self-organisation. Street traders started to become better organised.

- Distributed rather than centralised decision making.

In 1995 the Informal Traders Management Board (ITMB) was established to serve as umbrella body for a number of street trader organisations that were active during the 1980s and early 1990s, and to represent these trader organisations in any negotiations with the council.

“Our approach was the opposite of a hierarchical process where decisions are made at the top without taking into account the knowledge and requirements of those – both traders but also officials – working in the area. This top-down approach is neither viable nor sustainable.” (Dobson R & Skinner C, 2009:59).



Fig.8.11 (a-c) The Bosduif pedestrian and cycling route is part of a series of non-motorised transport projects undertaken in Cape Town.

## 8.1.2 NMT TRANSPORT – BOSDUIF – PEDESTRIAN & CYCLING ROUTE (JAKUPA ARCHITECTS & URBAN DESIGNERS)

Together with the Liesbeek and Spine Road projects, the Bosduif Pedestrian and Cycling Route (Figures 8.11 & 8.12) form part of a series of non-motorised transport projects undertaken by Jakupa Architects and Urban Planners in Cape Town.

Other than common approaches towards NMT that are generally shaped by a-contextual concerns, Jakupa attempts to marry spatial integration and people-consciousness with mobility infrastructure. The design principles therefore think beyond simply bicycle paths to find a workable medium between cyclists, pedestrians, the wheelchair bound etc. particularly in places of conflicting use (<http://www.jakupa.co.za/completed-work/non-motorised-transport-nmt-bosduif/bosduif-route-plan.jpg/>).

Passing through the area of Bridgetown - a poor quality environment - the project aims to enhance the area by contributing to the spatial restructuring and functional reorganization of its context. This is achieved by doing the following:

Fig.8.12 A layout map of the Bosduif pedestrian and cycling route indicating the positions of Primrose Island (detail figure 8.13) and Appledene Road (detail figure 8.14).



## Bosduif Rd/Appledene Rd

- At points where different movement routes intersect it provides infrastructure that also supports public space making.
- By drawing on site specific clues, the legibility of the NMT system is built into the proposal.

- The project builds on economic opportunity for micro enterprises through either the provision of employment (through the construction contract) or the provision of facilities for existing businesses alongside the route or at nodes of interchange. These tended to include the like of sales of car tyres, silencer installations, and second hand furniture.

In a simple way, the project makes a strong and direct connection between a new shopping centre and the old CBD (Figure 8.12), providing continuity for shoppers and traders alike.



Fig.8.13 The design provides facilities for existing businesses alongside the route or at nodes of interchange, and by doing so builds on economic opportunity for micro enterprises.

## Bosduif Rd/Primrose Island

in situ cast concrete planes that provide surfaces for graffiti and skate-board ramps, as well as create windbreaks and viewing amphitheatres.

street trees and hard paved sidewalks

middle island planted with street trees and low maintenance flowering plants.

Primrose Island

BMX track, loose earth berms to act as wind break jumps and informal seating. Clumps of hedge trees along windbreaks, there's a lot to be up the space.

STREET TREES  
Ekebergia capensis (cape ash)  
Olea europaea subsp. africana (wild olive)  
Syzygium cordatum (waterberry)

HEDGE TREES  
Brachylaena discolor (coastal silver oak)  
Tarchonanthus camphoratus (camphor tree)  
Pedicularis virginatus (breede river yellow)



Fig.8.14 At points where different movement routes intersect it provides infrastructure that also supports public space making.





*Fig.8.15 By using the act of walking as subject, "time" can be used to work with wastelands and derelict sites in open-ended and experimental ways.*



*Fig.8.16 Redundant railway tracks dating from the period when the area around the site still operated as the maintenance yard, are hidden in the overgrown landscape found when strolling through the site.*

### 8.1.3 URBAN WASTELAND

#### WALK

In the previous chapter some urban designs solutions were criticized as making significant contributions to urban public space - while being aesthetically resolved and functionally satisfying, their industrial past exist only as "frozen set-pieces" (Armstrong H, 2006:121). Nevertheless, there are other designers who are using time as a factor to work with wastelands and derelict sites in open-ended and experimental ways.

An increasing number of architects, artists and other groups are investigating the exploration of the city through the act of walking (figures 8.15 & 8.16).

The "Walking Exchange" (an online discussion) that runs parallel to the "Walking as Knowing as Making" symposium are two examples of these.

Walking Exchange's intention is to engage groups who employ the act of walking as a tool to investigate the notion of place and landscape. Both the symposium and the online exchange are experimental attempts to creatively unite numerous dissimilar contexts and to recombine theoretical and practised approaches using walking as the subject (<http://www.walkinginplace.org/converge/exchange.htm>).



Fig.8.17 The Buro für Städtereisen is a city travel agency operating in the capacity of a hiker's guide from where they organise walks through city outskirts, concentrating on wastelands and empty lots.

### 8.1.3.1 THE BURO FÜR STÄDTEREISEN, COLOGNE

The Buro für Städtereisen in Cologne (Figure 8.17) is a city travel agency which was established by architect and artist Boris Sieverts in 1997. Considering urban wastelands as one of the last urban adventures, he operates the agency in the capacity of a hikers' guide, from where he organizes walks in city outskirts. During these walks he notes every situation and encounter in detail and then analyses the sensations emerging from there. Sieverts focuses and concentrates on wastelands and empty lots - areas which are "in-

trinsically strong in the expression of the absence of preconceived form and appropriation" (<http://www.walkinginplace.org/converge/exchange.htm>). Sieverts points out how a new way of looking at things arises where the wild aspect apparent in wastelands (a phenomenon without projects, which nobody has appropriated) is invariably juxtaposed with the preconceived and the appropriated.



Fig.8.18 A hairdresser operates its business from the boot of his car at the entrance to the bridge on Salvokop's side.

### 8.1.3.2 TEMPORARY LAND-USES FOR URBAN WASTELAND (POST-IT CITY)

The concept of "Post-it City" (also referred to as Insurgent Public Space or Guerrilla Urbanism/Occasional Cities/Instant Cities) is a term that was coined by Giovanni la Varra In Koolhaas (2001:424) to refer to different temporary occupations of public space.

Multiple uses, subversions, transformations and re-appropriations are just some of the activities that take place outside of the constraints of formal planning.

A local example of this can be seen in Figure 8.18, where a hairdresser operates his business from the boot of his car. Other examples include Nomadic techno-discos (raves) and other temporary activities which transform leftover urban spaces in a few hours, creating extraordinary impact with minimum permanent change. These urban experiments require little financial investment and occasionally acting as catalysts for more permanent use (Armstrong H, 2006:123).



Fig.8.19 A mapping undertaken of the living conditions of the homeless in Magliana, Rome.

### 8.1.3.3 STALKER – A REVERSE READING OF THE CITY THROUGH MAPPING

“Stalker” is a collection of Italian activist architects/artists who undertakes numerous projects in abandoned and disused spaces and waste areas, which have long been disregarded or considered a problem in traditional architectural practice (<http://www.spatialagency.net/database/why/political/stalkerosservatorio.nomade>).

Through a specific methodology of urban research they propose experimental strategies for intervention that are based on the exploration of an environment, its inhabitants and their local culture. This methodology consists of a mapping process that captures the

complexity and dynamics of the territory. The results thereof are then used as catalyst for self-organising processes where basic necessities are lacking (<http://www.osservatorionomade.net/>).

One of the projects Stalker was involved in looked at the living conditions of the homeless in Magliana, Rome. The mapping process resulting from the walk through these areas (Figure 8.19) add to a living experience of the “the wild, the non-planned and nomadic” within the profound heart of the city (Armstrong H, 2006:123).

## 8.2 PROPOSED CLIENT AND PROGRAMME

The Warwick Junction Renewal process established two Project fundamentals that added to the success of the project: an area-based and inter-departmental project structure and a commitment to participation and consultation (Dobson R. & Skinner C, 2009:59). This meant that the planning and management of public resources was decentralised to a geographical area and that the various departments responsible for managing the area would work together rather in isolation. Area-based development also allows for participation of the citizens of the area in all aspects of development planning (ibid).

This implies working with a facilitator client (local government) and a client that is being facilitated or user client. It is proposed that this study uses the same project structure. Using the mapping techniques of Stalker’s Magliana Project as well as Warwick Junction as guidelines, the following map of existing activities as well as ancillary activities that might develop from the existing, was drawn up for the study area (Figure 8.20):

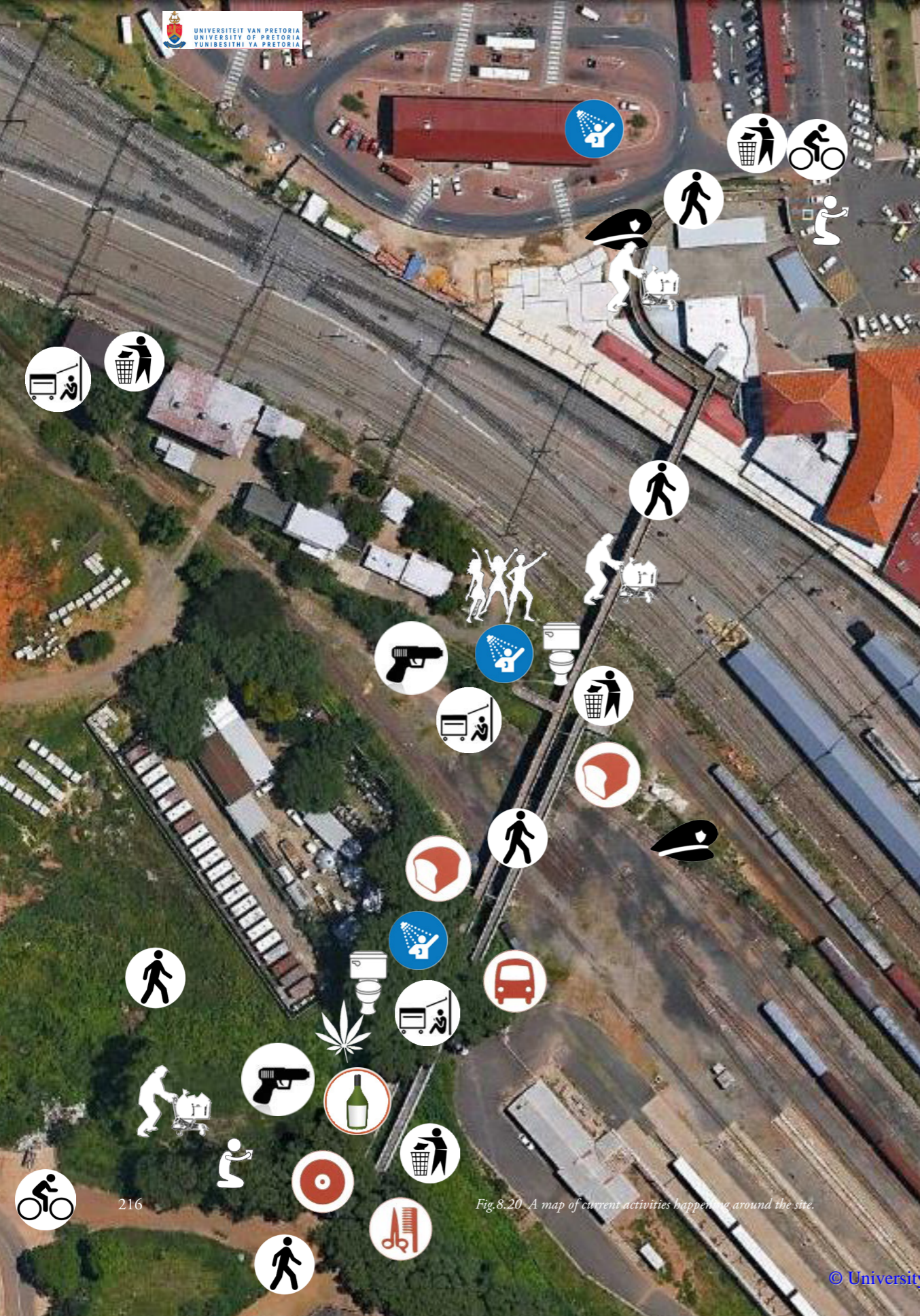


Fig.8.20 A map of current activities happening around the site.



Fig.8.21 Legend: Activity Map

1. The route which will consist of a pedestrian and bicycle route will form part of the larger proposed NMT network for the area as described in Chapter Seven. Provision of facilities for existing businesses will be made alongside the route or at nodes of interchange which will include water points, bicycle lock up space, lookout points and seating.
2. By making the railway history of the site part of a wasteland walk the indeterminate qualities of site will be reserved. This will be incorporated as part of the pedestrian route.
3. The following existing activities that have been identified (Figures 8.20 & 8.21):

- Shebeens
- Security guard
- Push cart trolleys
- Crime (incl. illegal selling of liquor & drug dealing)
- Beggars
- Homeless sleeping/shelter
- Informal toilets
- Storage
- Rubbish dumping
- Pedestrians
- Cycling
- Parties
- Sanitation facilities

All the above activities may be viewed as examples of the Post-It City as described in Section 8.1.3.2. A proposal is made to facilitate these mostly indeterminate temporary activities that happen spontaneously.

- Car wash
- Informal trader (cds, fruit)
- Hairdresser

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# CHAPTER 9

## AN INTUITIVE PROCESS

“The overall form is an elaboration of conditions established locally.”

(Kwinter S cited in Allen 1999:92)

In “Thinking Architecturally” Paul Righini (2009:166) identifies two ways of defining an architectural problem: one being essentially rational and the other being more intuitive in nature.

While Chapter Five took a dominantly rational approach this chapter looks at ways in which the Theory of Complexity can be translated into a conceptual architectural response, in a dominantly intuitive manner (Figure 9.1). The objective will be to express the characteristics of Complexity, as explained in Chapter Four, amidst a normative position which acknowledges complexity in the city and seeks proposals to account for it better, as explained in Chapter Six.

While Chapter Five was an investigation of the question “What is the bridge currently (to its users)?” to arrive at client and programme in Chapter Eight; this chapter will respond intuitively to the question “What does this bridge need to be?” to translate the before mentioned knowledge into architectural form.

This chapter has been divided into two sections: the first part (Section 9.1) drawing a comparison between the Theory of Complexity and the concept of “Field Conditions”, the second part (Section 9.2) applying a number of theoretical approaches towards complexity as premise to arrive at conceptual form.

*Fig.9.1 Concept Model 6b indicating The “Island” Connection.*





Fig.9.2 A focus on the architectural object.

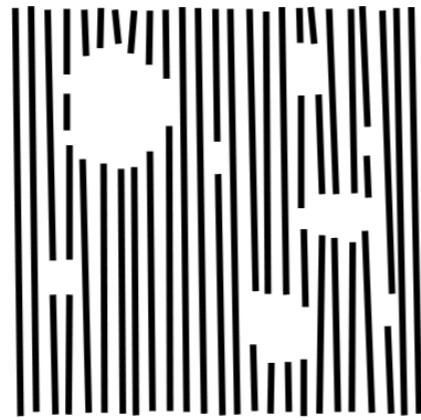


Fig.9.3 A focus on the spatial field in which the architectural object exists.

## 9.1 FROM OBJECT TO FIELD

### 9.1.1 FIELD CONDITIONS VS. COMPLEX SYSTEMS

The timeline in Table 4.1 of Chapter 4 indicated a distinct shift in recent theoretical and visual practices from a focus on the architectural *object* (Figure 9.2) to the spatial *field* (Figure 9.3) in which it exists. Stan Allen (1997:24) terms the physical manifestation of this paradigm shift - which emerged not only in the natural but social sciences too - Field Conditions - which are visible in:

- Recent technologies – A shift from analogue object to digital field
- Visual arts – the abstract paintings of Mondrian to Minimalist and post-Minimalist sculptures of the 1960s (Figure 9.4)
- Music – from the restrictions of a fixed series of notes (serialism) to “statistical music” where complex acoustical events cannot be broken down into their constituent elements (p.e. the work of composer Iannis Xenakis).
- Infrastructural elements of city, linked by their very nature by means of open ended networks.



Allen defines Field Conditions as: “any formal/spatial matrix capable of unifying diverse elements while respecting the identity of each” (1997:24). Referring back to the *parti diagram* introduced in Chapter 4 (Figure 9.5), and viewing Table 9.1 in which the characteristics of Field Conditions are compared to those of Complex Systems, the architectural issue investigated in this study – Complexity in Cities - can be seen as an example of a Field Condition.

Fig.9.4 Large Reclining Figure by Henry Moore, 1984.

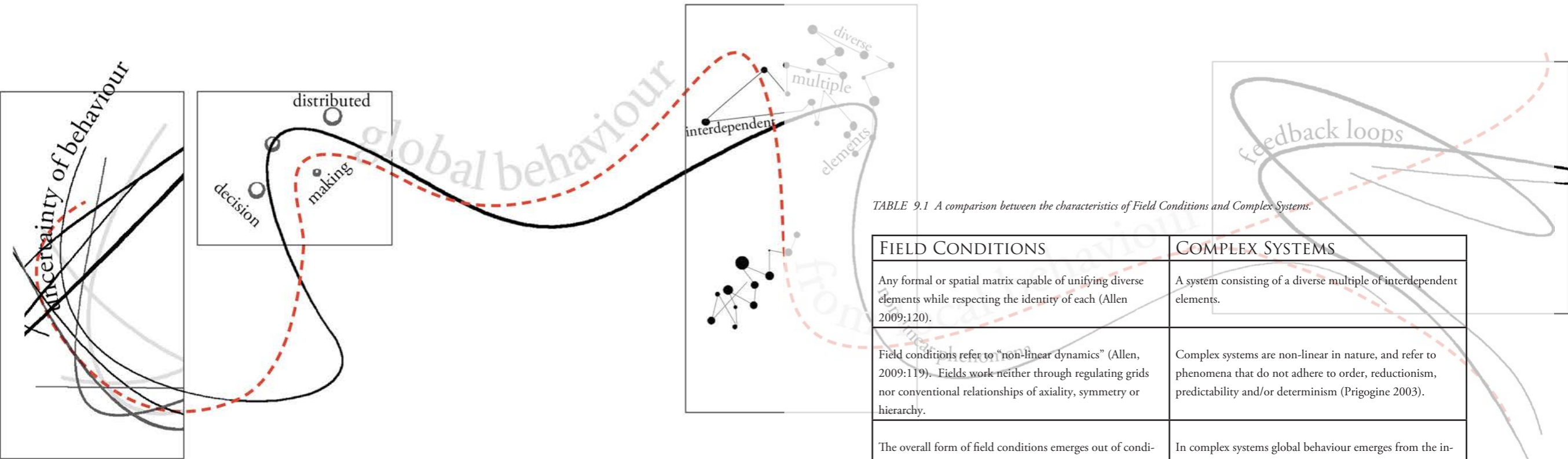


TABLE 9.1 A comparison between the characteristics of Field Conditions and Complex Systems.

FIELD CONDITIONS	COMPLEX SYSTEMS
Any formal or spatial matrix capable of unifying diverse elements while respecting the identity of each (Allen 2009:120).	A system consisting of a diverse multiple of interdependent elements.
Field conditions refer to “non-linear dynamics” (Allen, 2009:119). Fields work neither through regulating grids nor conventional relationships of axiality, symmetry or hierarchy.	Complex systems are non-linear in nature, and refer to phenomena that do not adhere to order, reductionism, predictability and/or determinism (Prigogine 2003).
The overall form of field conditions emerges out of conditions established locally (Allen 2009:140) and are less important than the internal relationships of parts, which determine the behaviour of the field (Allen 2009:120). Parts are not fragments of wholes, but simply parts.	In complex systems global behaviour emerges from the interaction of local behaviours of its components (Prigogine 2003).
Bottom-up phenomena, defined not by overarching “master plans” but by intricate local connections (Allen 2009:120)	Decision making amongst elements are distributed rather than centralised.
Recognise the interdependency between the architectural object and its environment – (showing the city and defining the architectural object as a porous system of flows.	Open systems that adapts to changes in the environment, by means of a capacity to change and learn from events (Prigogine 2003).
Movement as expressed by the infrastructural elements of the modern city, by their nature linked together in open-ended networks, is not also a good example of a field condition in the urban context (Allen 2009:120),	but also an example of a complex system – something that cannot be fully assessed or controlled (Cahir & James 2006 – cited in Cham 2010:123).

Fig.9.5 Parti diagram for the study derived from the different elements prevalent in Complex Systems.

Field Conditions cannot, according to Allen (1997:24), claim to produce a systematic theory of architectural form or composition. Rather, it introduces working concepts, derived from experimentation by being in contact with the real. The assumption follows that architectural theory does not rise in a vacuum, but always in complex dialogue with practical work.

Therefore Field Conditions implies acceptance of the real in all its messiness and unpredictability. It also treats constraints as opportunity and moves away from a modernist ethic of indiscretion. It operates









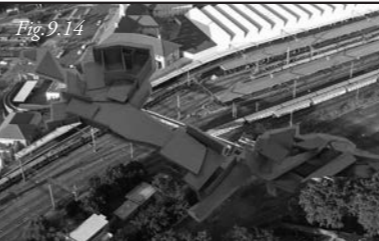
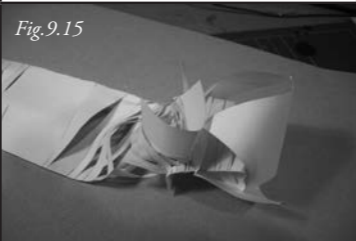
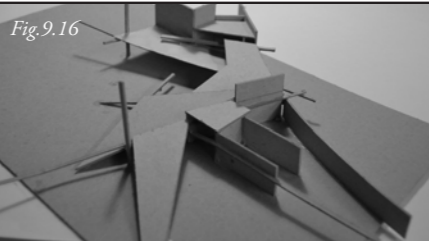
from the viewpoint that when working with the site and not against, something new is produced by registering the complexity of the given (ibid.).

### 9.1.2 DEVELOPMENT OF FORM

The paradigm shift from architectural object to space as operational device, manifested in architecture and visual arts in the following ways (Table 9.2):



TABLE 9.2 The manifestation of the paradigm shift from architectural object to space as operational device in architecture and visual arts.

THEORETICAL & VISUAL PRACTICE	CLASSICAL ARCHITECTURE	CUBISM	MINIMALISM	POST-MINIMALISM	HETEROGENEITY/ FOLD	FIELD CONDITIONS
IDEAS	Completeness: “Beauty is the consonance of parts such that nothing can be added or taken away”, i.e. closed unity (Alberti, cited in Allen S, 1997:24).	Composition of parts (Allen S, 1997:25).	Consolidation into a single shape, not partial & scattered, no connections, no transitional parts (Allen S, 1997:25).	Displacement of control to a series of intricate local rules for combination (Allen S, 1997:26).	Integration of disparate elements into a “heterogeneous yet continuous system” (Vyzoviti S, 2003:12).	Indeterminacy: Independent elements combined additively to form indeterminate whole (Allen S, 1997:25).
CHARACTERISTICS	Dictate proportions of individual elements as well as the relationships between individual elements (Allen S, 1997:24).  Parts form ensembles forming larger wholes (Allen S, 1997:24).  Precise rules of axiality, symmetry or formal sequence govern organisation of whole (Allen S, 1997:24).	Parts still add up to determinate whole.	Work of art is emptied of figurative or decorative character in order to foreground its architectural condition (Allen S, 1997:25).  Meaning is displaced from object to spatial field between viewer and object (Allen S, 1997:25).  Unitary forms (Allen S, 1997:26).  Develops in sequence but rarely in fields (Allen S, 1997:26).	Chance & contingency is introduced into the work of art (Allen S, 1997:26).  Generation of form through sequence of events and not by means of an overall formal configuration (Allen S, 1997:26).  Local relationships of points and configurations are more important than overall form (Allen S, 1997:26).  A move away from the discrete object to a record of its making in the field (Allen S, 1997:26).  Related to material choices – cannot exercise precise control over the material (Allen S, 1997:27).  Artist establishes conditions within which the material will be deployed, and then proceeds to direct its flows (Allen S, 1997:27).	Experimental: agnostic, non-linear and bottom-up (Vyzoviti S, 2003:8).  Interest lies in the sequence of transformations that affect the design object (Vyzoviti S, 2003:8).  Not concerned with creating new style, rather with searching for links (Vyzoviti S, 2003:6).	Parts are not fragments of determinate wholes, but simply parts (Allen S, 1997:25).  Inherently expandable without substantial morphological transformation (Allen S, 1997:25).  Form emerges from the individual joint outwards. Joint is not an occasion to articulate the intersection of two materials (as p.e. Carlo Scarpa) – instead a locus of an intensive design energy that proceeds outwards to condition the form of the whole (Allen, 1997:27).  The figure is not a demarcated object anymore but rather an effect emerging from the field itself (Allen S, 1997:28).  No overarching geometric scaffolding. Rather, overall form is an elaboration of conditions established locally (Allen S, 1997:25).
EXAMPLE						
	St Peter's Basilica Rome, Bramante, Michelangelo, Maderno, Bernini, 1506-1626	Wotruba Church, Fritz Wotruba, 1974-1976	Reclining Figure, Henry Moore, 1951	Distributions, Barry le Va, 1960s	Bus station El Casar de Cacaes, Justo Garcia Rubio, 2003	Venice Hospital, Le Corbusier, 1965
CONCEPT DEVELOPMENT MODELS (SECTION 9.2)						

### 9.1.3 CONCEPT

One of modern architecture's most evident failings according to Allen (1997:30) has been its inability to address adequately the complexities of urban context. Historically aligned with technical rationality and committed to the production of legible functional relationships, architecture and planning have had tremendous difficulty thinking their roles apart from the exercise of control (ibid.).

The challenge is to engage with Complexity in all its dimensions, i.e. dealing with diversity as well as phenomena not adhering to determinacy, predictability and order through the methodologies of a discipline so committed to control, separation and unitary thinking. In his contribution to the above issue, Greg Lynn (1993) identified three approaches

towards "complex and disparate cultural and formal contexts" – also referred to as "heterogeneous space" (Hensel, Hight & Menges 2009):

- Covering over the difference between old and new by means of unity and reconstruction (Contextualism/New Urbanism).
- A forceful rejection of context (Deconstructivism).
- Integration of difference within a heterogeneous yet continuous system (Fold).

This study will add "Field Conditions" as a fourth approach to dealing with Complexity when intervening in urban contexts. While acknowledging the distinct capabilities of new construction, Field Conditions aims to recognise a valid desire for diversity and

coherence in the city (Allen 1997:30). A complete examination of the implications of field conditions in architecture would necessarily reflect the complex and dynamic behaviours of architecture's users and speculate on new methodologies to model programme and space (Allen, 1997:24), which could already be seen in the alternative site analysis conducted in Chapter Five.

In this thesis, the process of arriving at conceptual form is an example of an architectural design process of a circular nature. In contrast to a linear process, it allows one to encircle a problem and understand and confront it in all its relationships (Vyzoviti S, 2003:6), in other words it is a kind of exploration. The exploration in this study proceeded in two stages:

- An attempt to address the architectural issue by means of a global, over arching design intervention (Section 9.2.1), which developed into
- A recognition of diversities or differentials as a sequence of events that are interconnected, and reacting to these from the point, outwards (Section 9.2.2).

### 9.2 EXECUTION

Although different in approach, all the explorations introduce concepts to arrive at form aimed at establishing what the bridge needs to be, derived from experimentation by being in contact with the real.

Fig.9.17 One of the early concept models applying an over arching design intervention.



Fig.9.19 The bridge as a scab acknowledging the necessity of a proper functioning infrastructure while providing a temporary protective barrier restoring the link between the city and Salvokop.

## 9.2.1 OVERARCHING

### GEOMETRICAL FORM

#### 9.2.1.1 CONCEPT MODEL 1: THE BRIDGE AS A LINK

Following the original Site Analysis of Chapter Two, the initial concept considered the bridge as a link to be restored (Figure 9.18) in an attempt to repair the damage caused to the traditional city form by modernist town planning practices. During this stage the following theoretical concepts were reviewed: the concept of Fragmentation, Collage City and Border Conditions, Drosscapes and Landscape Urbanism.

#### 9.2.1.2 CONCEPT MODEL 2: THE BRIDGE AS A SCAB

This concept of the bridge as a scab (Figure 9.19) acknowledged the different edge conditions of the site (the city vs. Salvokop). Whilst criticizing the emphasis of modernist town planning practices on infrastructure as mentioned before, it acknowledged the necessity of a proper functioning infrastructure in the operation of any urban environment. An overarching vision is proposed where the condition of the one edge gradually transforms into the other. The discourse of heterogeneous space is investigated, as well as different approaches to dealing with heterogeneous space.

Fig.9.18 (left) The bridge as a link to restore the fragmented state of the area between the city and Salvokop.



### 9.2.1.3 CONCEPT MODEL 3: A BRIDGE IN TRANSFORMATION

This concept is a continuation of the investigation into heterogeneous space. Fold is used as generator of form due to its essentially investigative and experimental nature and the fact that it liberates the design thought process from preconceptions and any existing architectonic images (Vyzoviti S, 2003:6).

The transformation from one condition to another is investigated by using different foldable materials which includes paper and grey board (Figure 9.20), copper and tin foil as well as pottery clay (Figure 9.21).

Fold is more important for the development of techniques to derive at new architecture than for the development of an individual architectural form. It is therefore, as Gilles Deleuze claims, an “absolute internalization.” (Deleuze cited in Vyzoviti S, 2003:6).

Although Concept Models One to Three in principle acknowledged the idea of diversity and heterogeneity, the end result tended to communicate the exact opposite: the three types succeeded only in arriving at an over arching, unitary shape, placing too much emphasis on the form of the whole and not effectively

*Fig.9.20 Paper as well as grey board are employed in the investigation into the morphogenetic process, through the technique of Fold.*



addressing the differences at ground floor level.

With Field Conditions, the intention rather is close attention to the production of difference at the local scale, while maintaining a relative indifference to the form of the whole. Authentic and productive social differences according to Allen (1997:24) thrive at the local level, and not in the form of large-scale semiotic messages.

Allen (1997:30) also suggests that architecture should shift its attention from its traditional top-down forms of control and begin to investigate the possibilities of a more fluid, bottom-up approach. Similar to the way that the analysis of the site required a different

way of looking and defining the urban environment, the design intervention for this project necessitates a response to address the dynamics of use, behaviour of crowds and the complex geometries of masses in motion. It would also address the problem of human scale which often emerges with Fold models as they can unconsciously display monumental characteristics (Vyzoviti S, 2003:6).

Therefore in the following section, the focus shifted to addressing the activities around bridge at its different connection points, as identified by The Urban Machine, treating these rather as a sequence of events, linked by means of movement.

*Fig.9.21 Pottery clay is employed in the investigation into the morphogenetic process, through the technique of Fold.*





Fig.9.22 The underside of the bridge seen from the Blue Train Shunting Yard.



Fig.9.23 A place of storage and ablution



Fig.9.24 A place of trade as well as social interaction.



Fig.9.25 A place of shelter.

## 9.2.2 A SEQUENCE OF EVENTS

By shifting the focus from an overall form to the various existing interconnected activities already taking place around the bridge, an approach is adopted in which the existing bridge is embodied as a network - not merely a connection between points A and B. But a network is an abstraction which only becomes a reality to the extent that they are performed (Bruyns G, 2004:6). And performed they become pathways traversed with activities already constituted and meaningful such as the ones identified by The Urban Machine:

- The termination points of the existing bridge serving as popular places of trade and social interaction (Figures 9.23 & 9.24).
- The area below the bridge serving as a popular

place of shelter (Figure 9.22 & 9.25) for the “invisible world” - the homeless who seek safety and privacy off the main routes.

### 9.2.2.1 WHAT DOES THE BRIDGE NEED TO BE?

The Field Condition implies an architecture that admits change, accident and improvisation, one that leaves space for the uncertainty of the real (Allen S, 1999:102). This necessitated an appreciation for the nature of each connection point which was expressed by means of:

- Diagrams (Figures 9.26 to 9.31) with
- Emotive responsive sketches and photographs alongside (Figures 9.32 to 9.38).

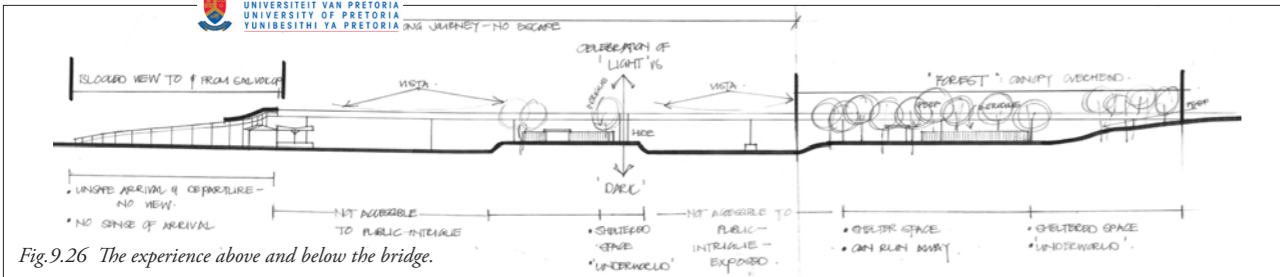


Fig.9.26 The experience above and below the bridge.

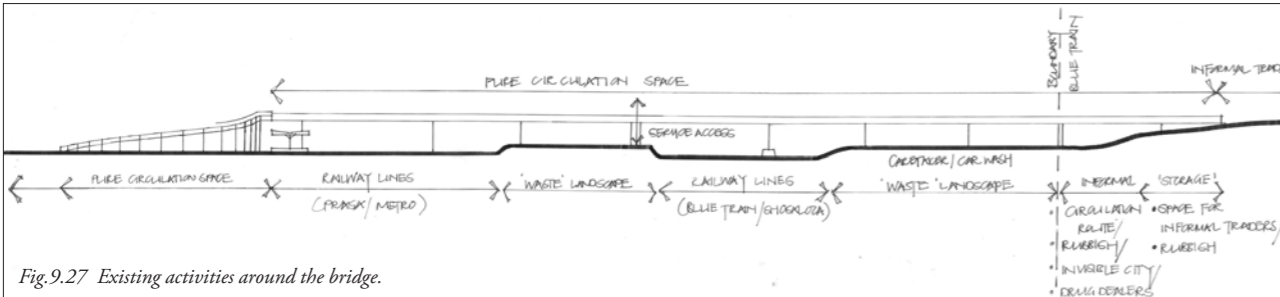


Fig.9.27 Existing activities around the bridge.

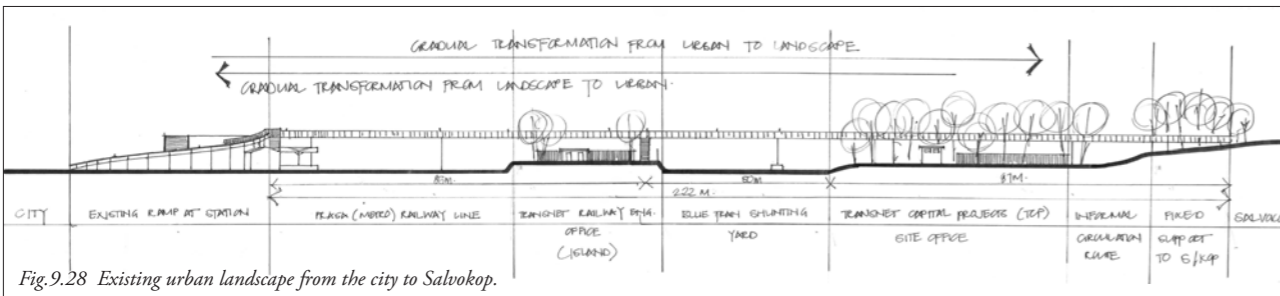


Fig.9.28 Existing urban landscape from the city to Salvokop.

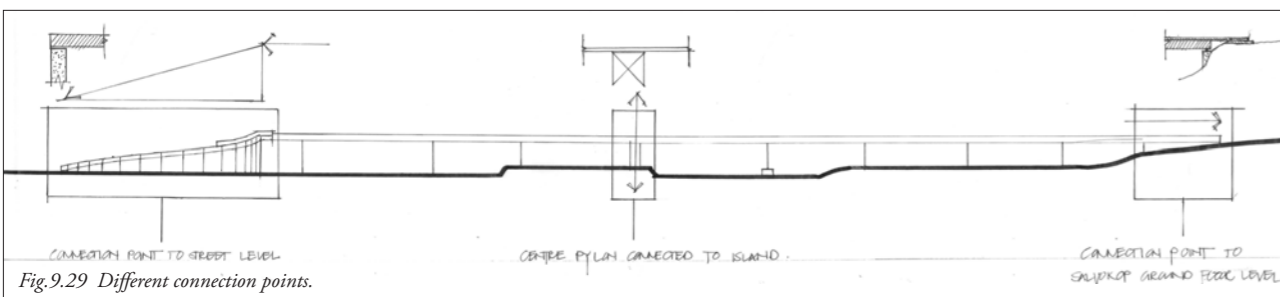


Fig.9.29 Different connection points.

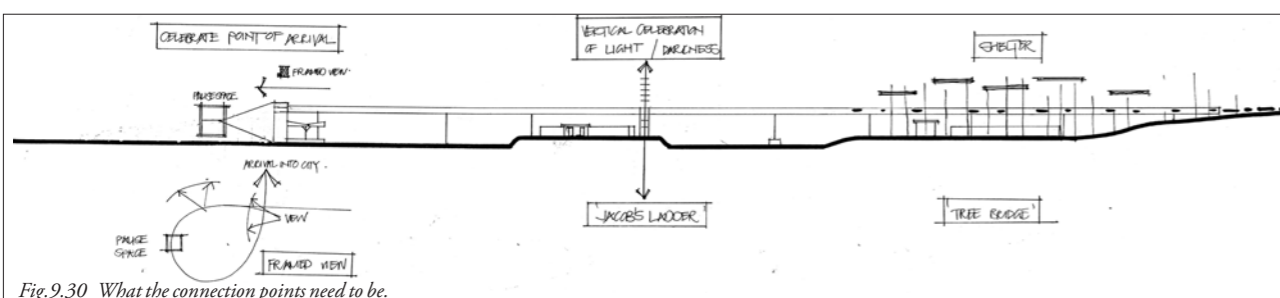


Fig.9.30 What the connection points need to be.

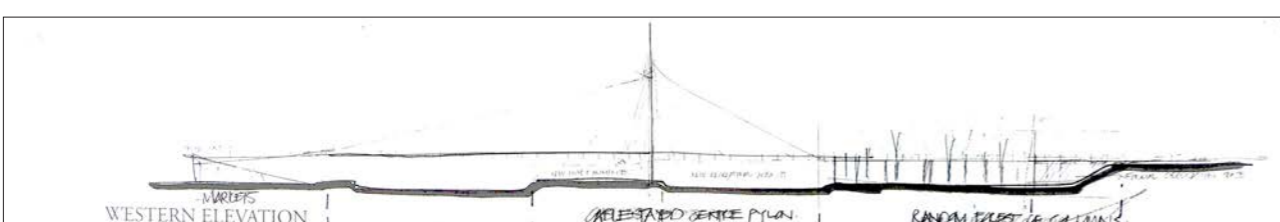


Fig.9.31 Proposed support conditions at every connection point.

# The City Connection:

## A Vista over the City



Fig.9.32 The view of the city from the bridge, looking north.

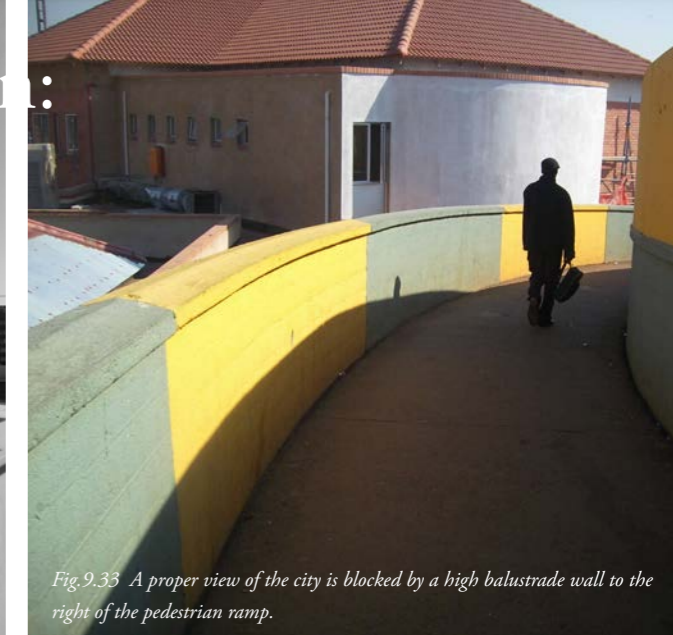


Fig.9.33 A proper view of the city is blocked by a high balustrade wall to the right of the pedestrian ramp.

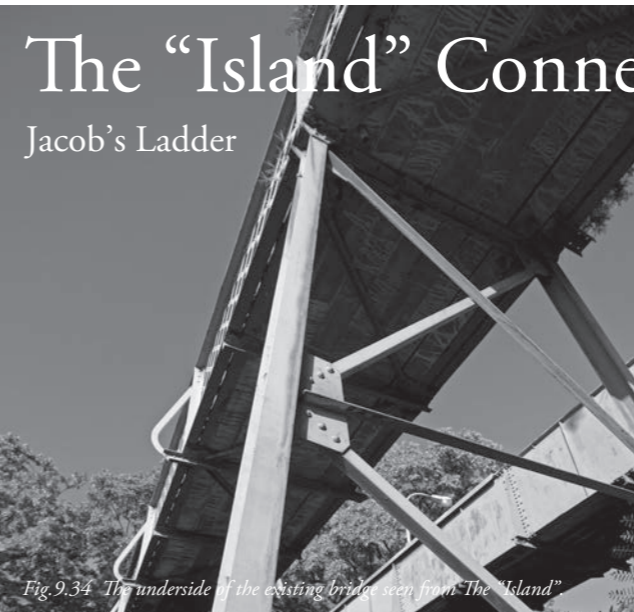


Fig.9.34 The underside of the existing bridge seen from 'The Island'.

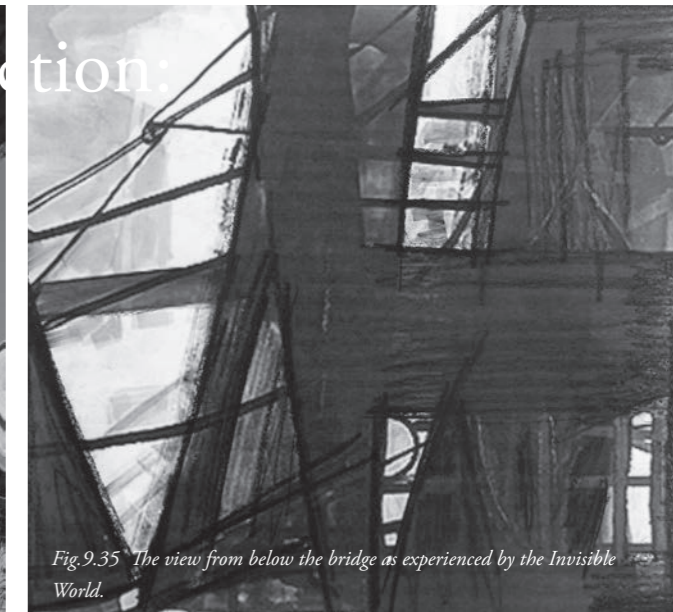


Fig.9.35 The view from below the bridge as experienced by the Invisible World.

# Salvokop Connection:

## A Canopy/Shelter

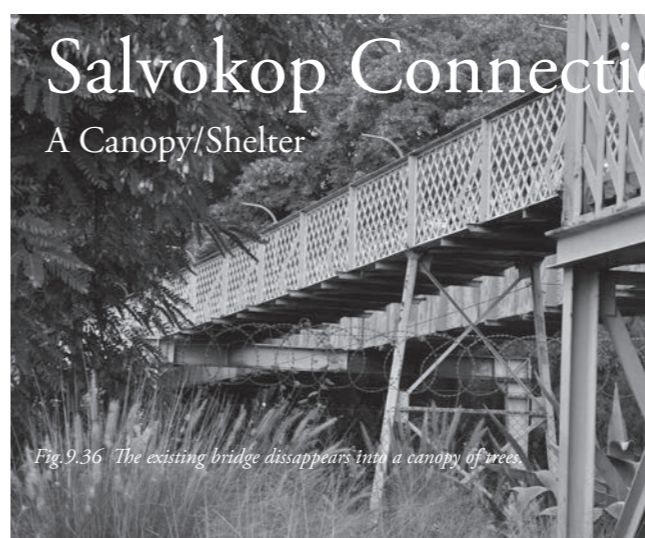


Fig.9.36 The existing bridge disappears into a canopy of trees.

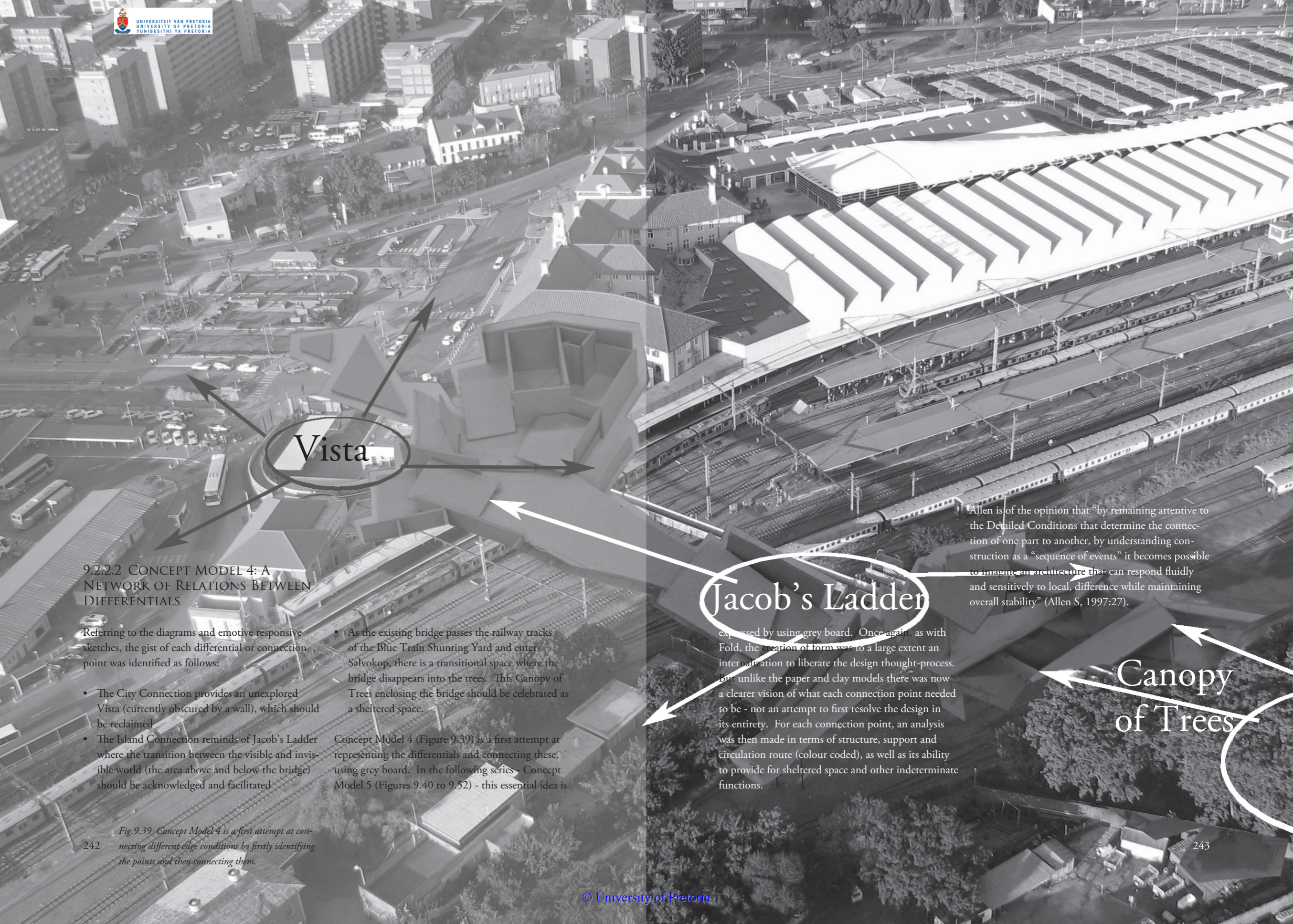


Fig.9.37 The moment the bridge reaches Salvokop it is enclosed by a canopy of trees.



*Fig.9.38 The Salvokop Connection represented as a Canopy of Trees.*





Vista

Jacob's Ladder

Canopy of Trees

### 9.2.2.2 CONCEPT MODEL 4: A NETWORK OF RELATIONS BETWEEN DIFFERENTIALS

Referring to the diagrams and emotive responsive sketches, the gist of each differential or connection point was identified as follows:

- The City Connection provides an unexplored Vista (currently obscured by a wall), which should be reclaimed
- The Island Connection reminds of Jacob's Ladder where the transition between the visible and invisible world (the area above and below the bridge) should be acknowledged and facilitated

- As the existing bridge passes the railway tracks of the Blue Train Shunting Yard and enters Salvokop, there is a transitional space where the bridge disappears into the trees. This Canopy of Trees enclosing the bridge should be celebrated as a sheltered space.

Concept Model 4 (Figure 9.39) is a first attempt at representing the differentials and connecting these, using grey board. In the following series - Concept Model 5 (Figures 9.40 to 9.52) - this essential idea is

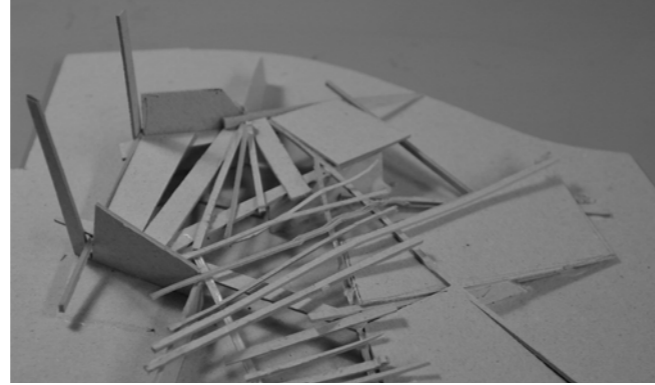
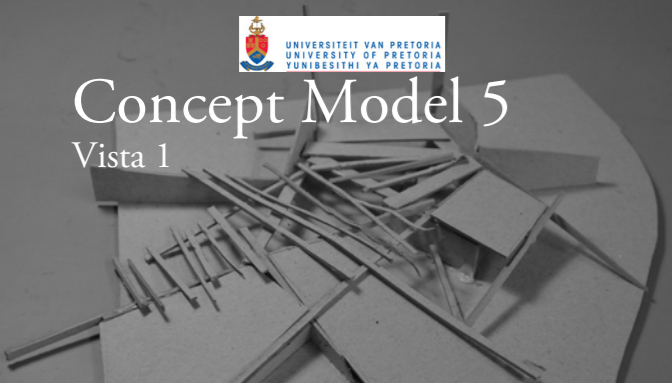
Allen is of the opinion that "by remaining attentive to the Detailed Conditions that determine the connection of one part to another, by understanding construction as a "sequence of events" it becomes possible to imagine an architecture that can respond fluidly and sensitively to local, difference while maintaining overall stability" (Allen S, 1997:27).

expressed by using grey board. Once again, as with Fold, the creation of form was to a large extent an internalization to liberate the design thought-process. But unlike the paper and clay models there was now a clearer vision of what each connection point needed to be - not an attempt to first resolve the design in its entirety. For each connection point, an analysis was then made in terms of structure, support and circulation route (colour coded), as well as its ability to provide for sheltered space and other indeterminate functions.

Fig.9.39 Concept Model 4 is a first attempt at connecting different edge conditions by firstly identifying the points and then connecting them.

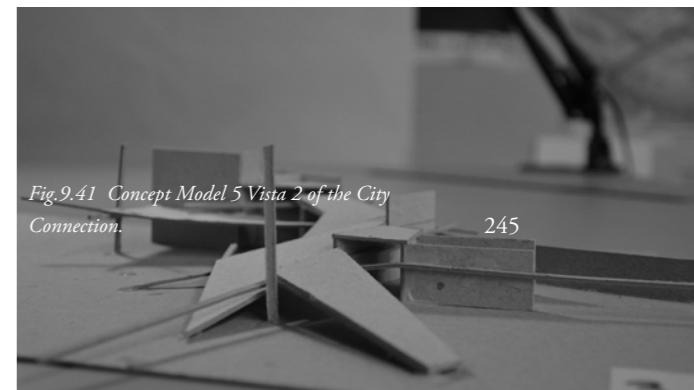
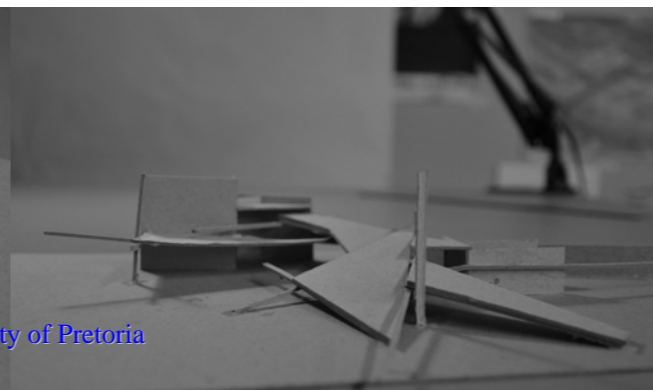
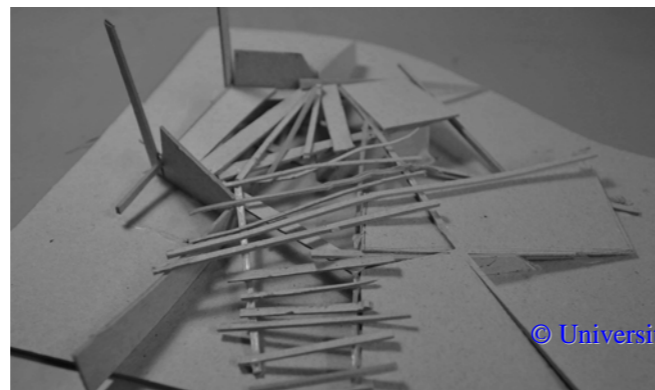
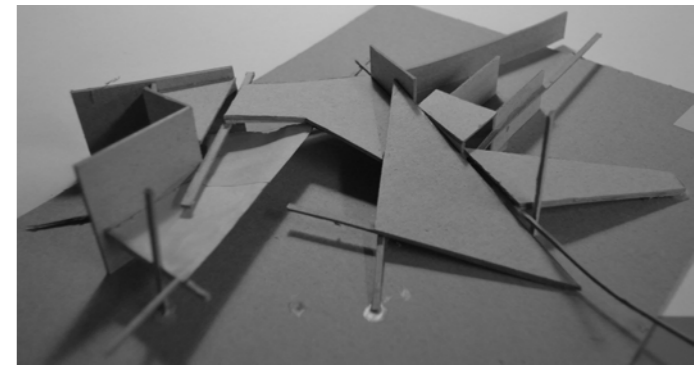
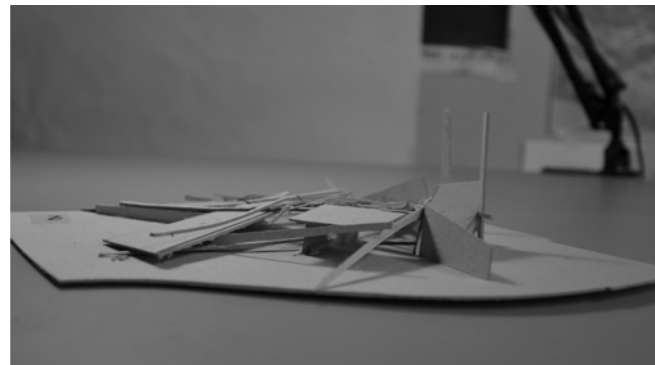
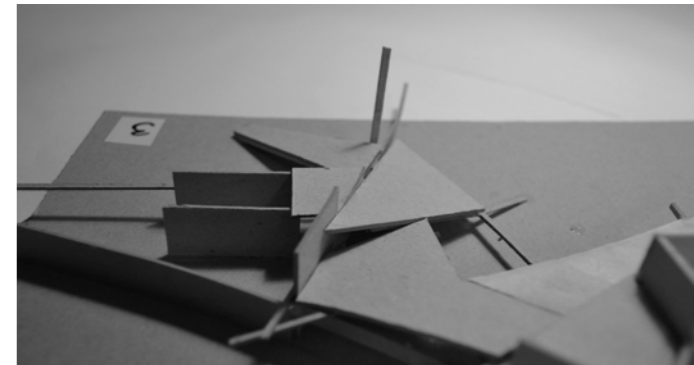
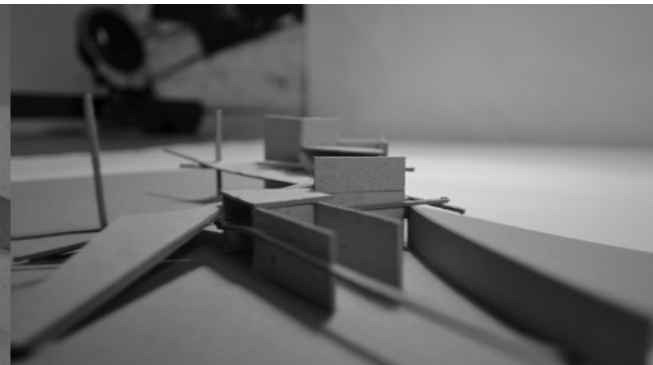
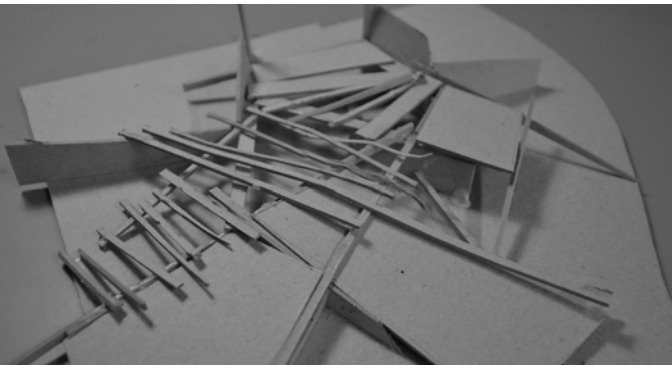
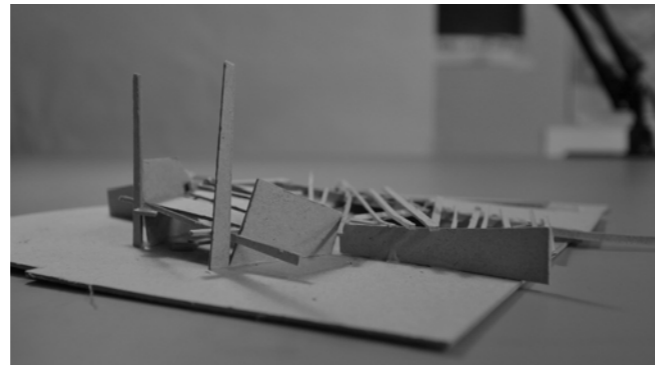
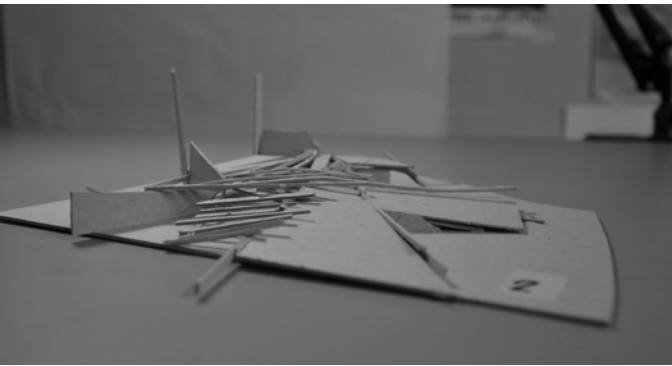
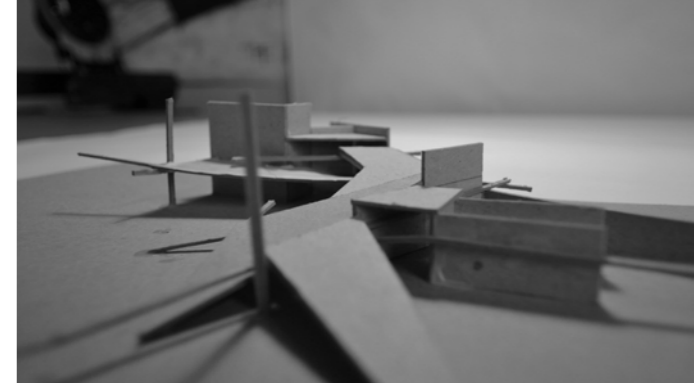
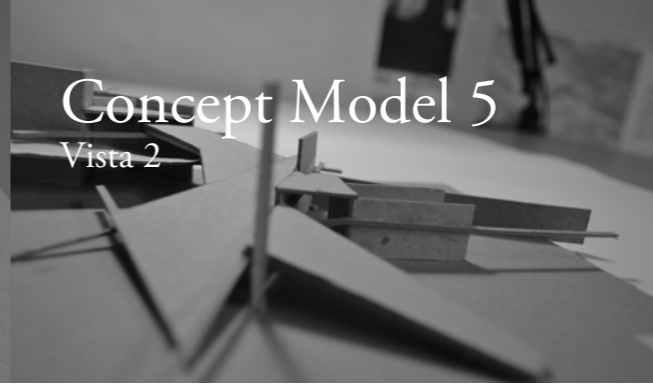
# Concept Model 5

Vista 1



# Concept Model 5

Vista 2

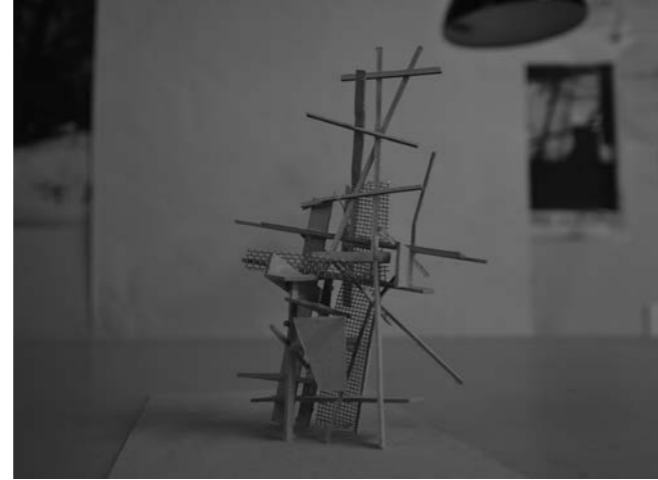
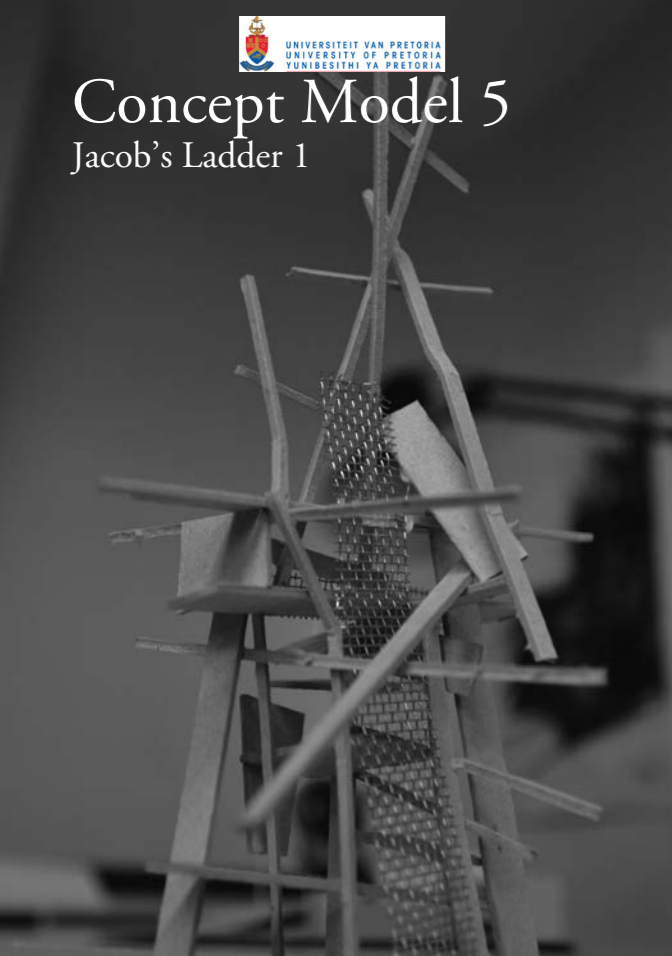


244 *Fig.9.40 Concept Model 5 Vista 1 of the City Connection.*

*Fig.9.41 Concept Model 5 Vista 2 of the City Connection.* 245

# Concept Model 5

## Jacob's Ladder 1



# Concept Model 5

## Jacob's Ladder 2

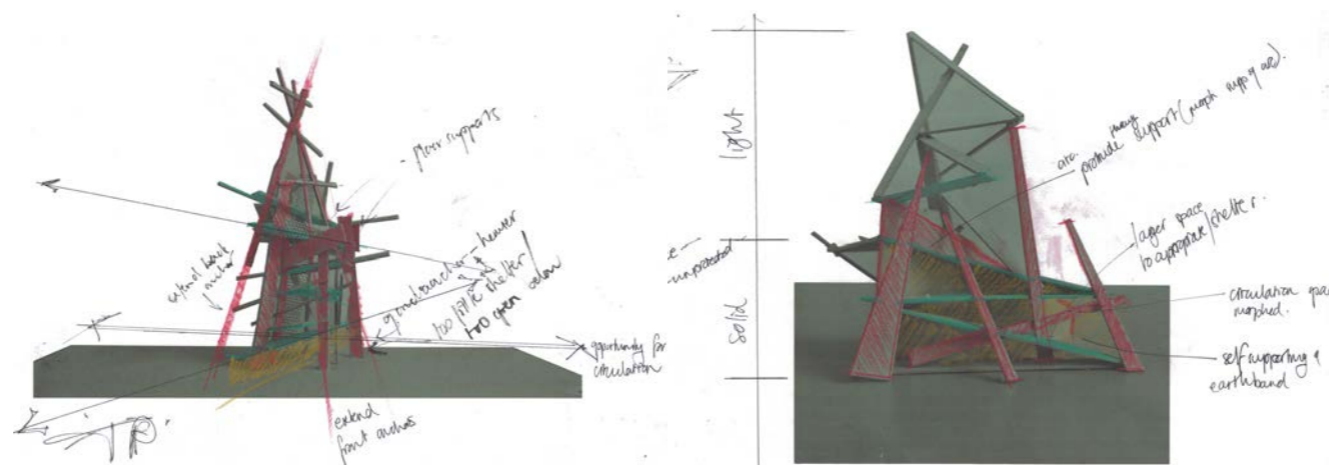
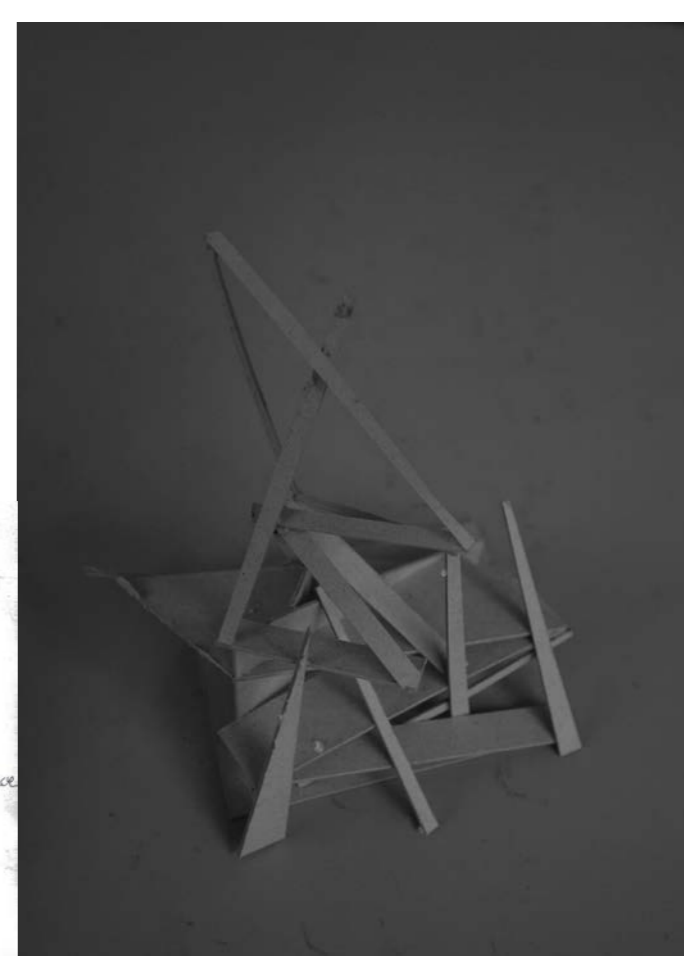


Fig.9.42 Concept Model 5 Jacob's Ladder 1 of The "Island" Connection.

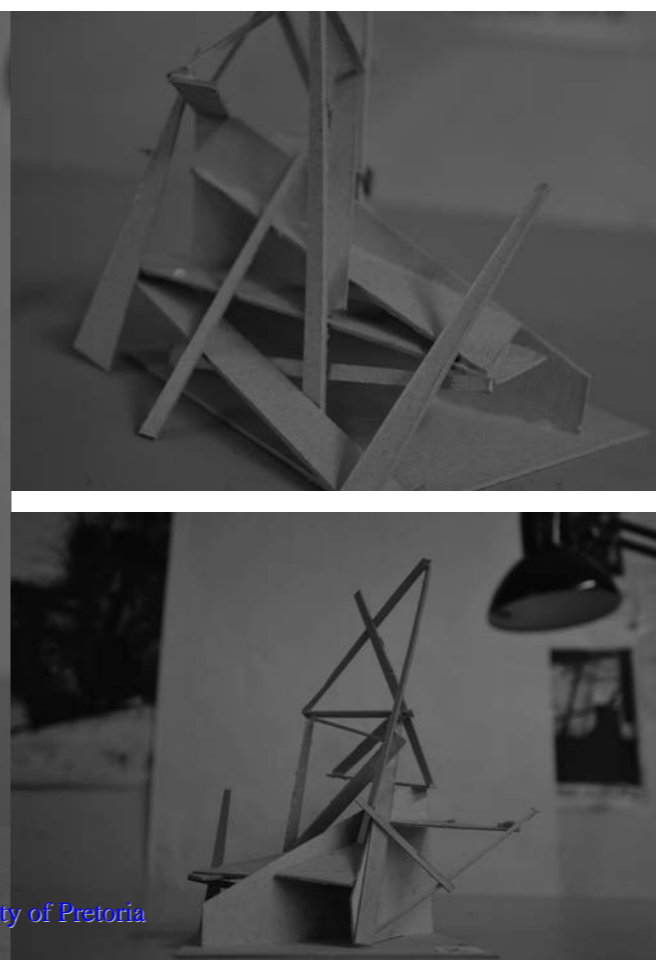


Fig.9.43 Concept Model 5 Jacob's Ladder 2 of The "Island" Connection.

# Concept Model 5

## Jacob's Ladder 3



# Concept Model 5

## Jacob's Ladder 4

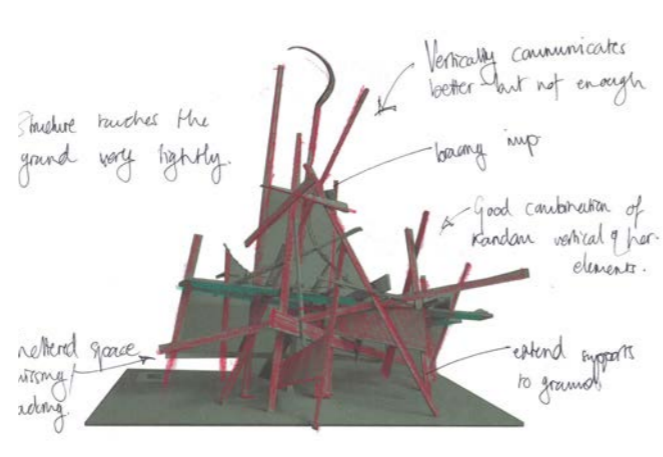
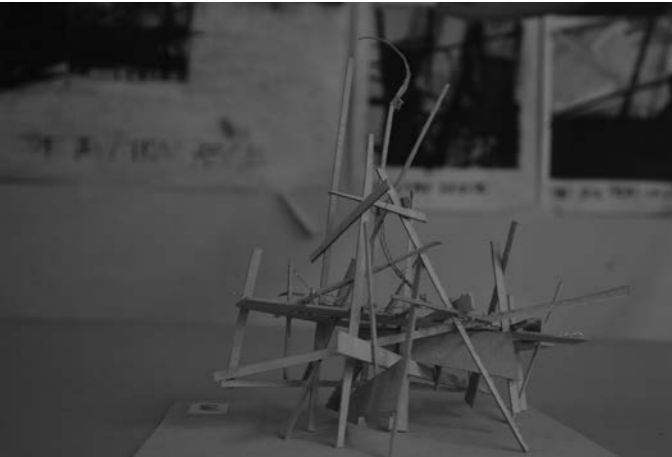


Fig.9.44 Concept Model 5 Jacob's Ladder 3 of The "Island" Connection.

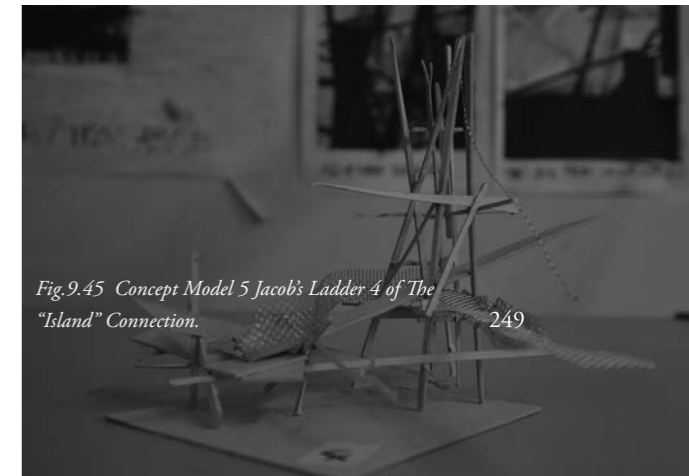
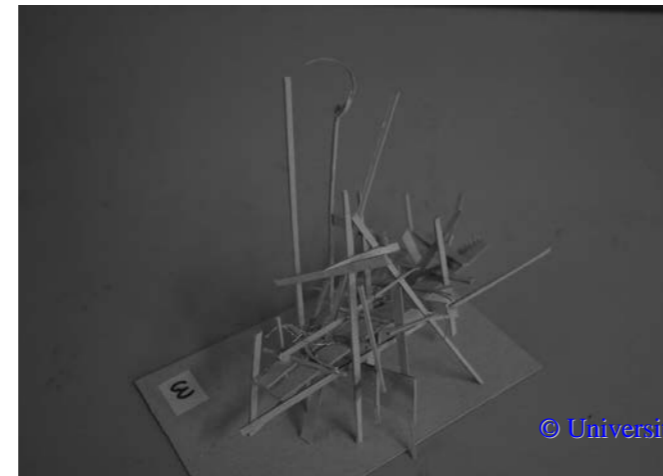
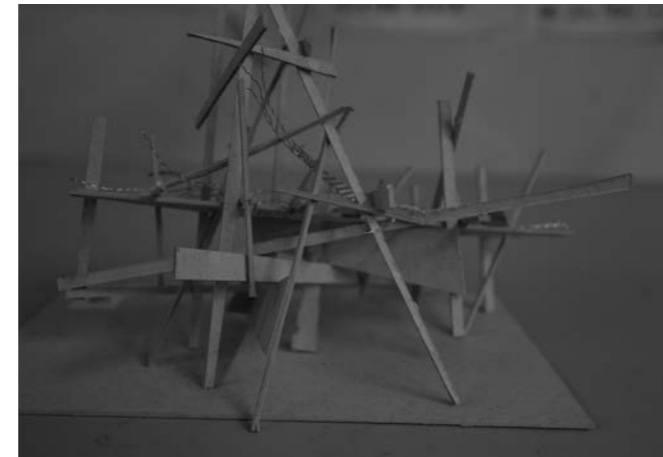


Fig.9.45 Concept Model 5 Jacob's Ladder 4 of The "Island" Connection.

# Concept Model 5

## Jacob's Ladder 5

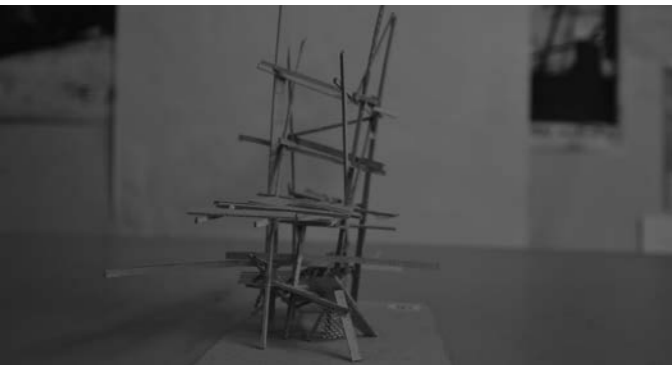
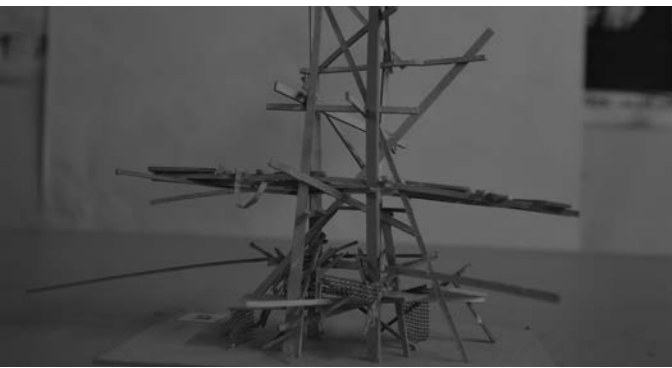
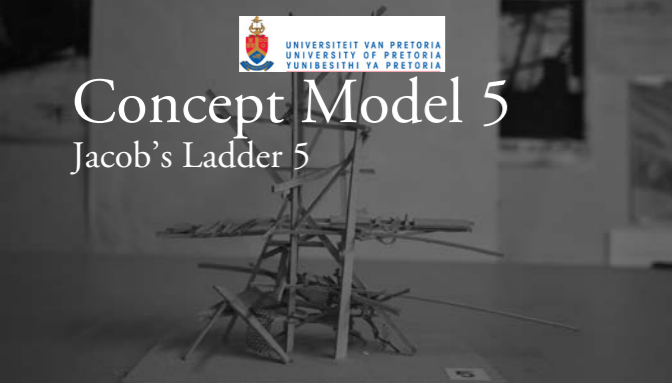
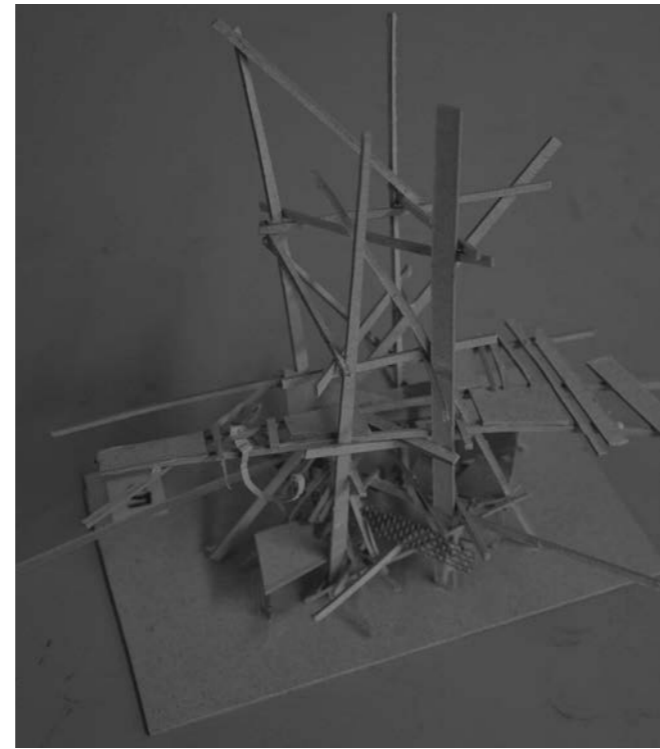
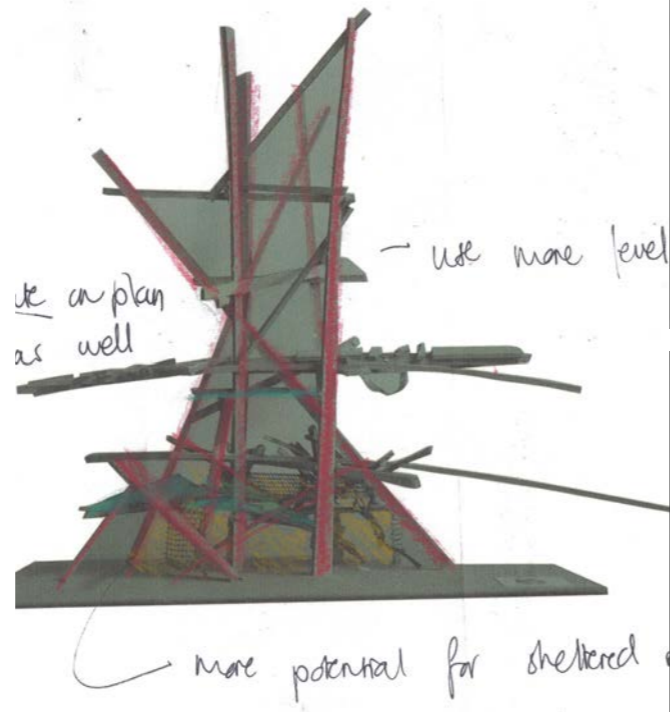


Fig.9.46 Concept Model 5 Jacob's Ladder 5 of The "Island" Connection.



# Concept Model 5

## Jacob's Ladder 6

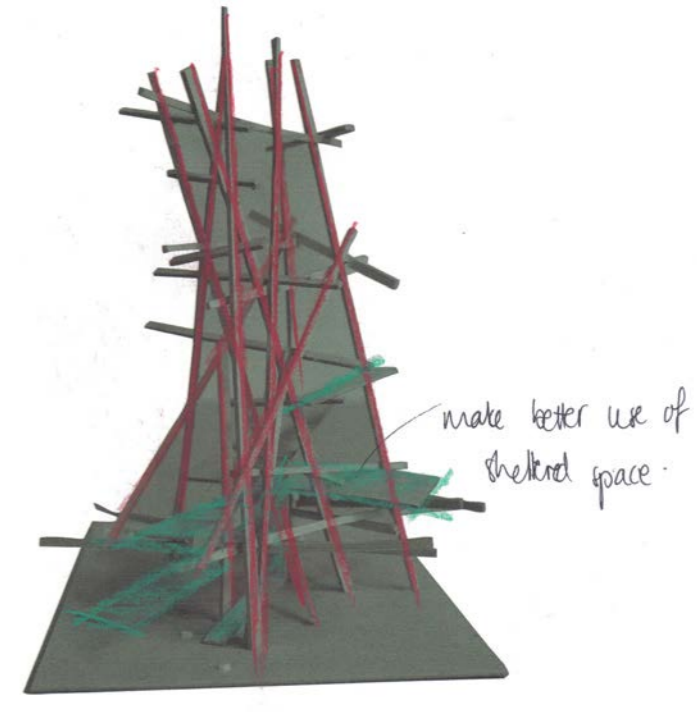
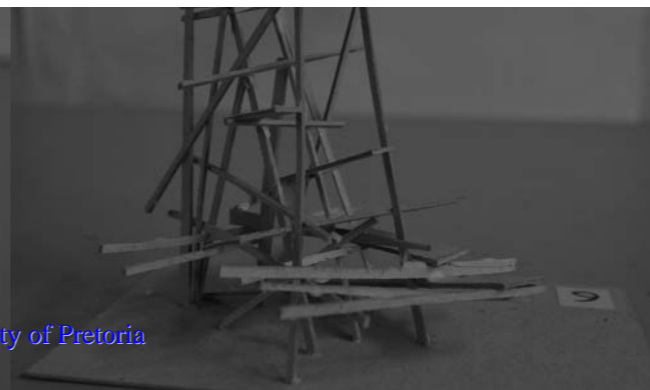


Fig.9.47 Concept Model 5 Jacob's Ladder 6 of The "Island" Connection.

# Concept Model 5

## Canopy of Trees 1

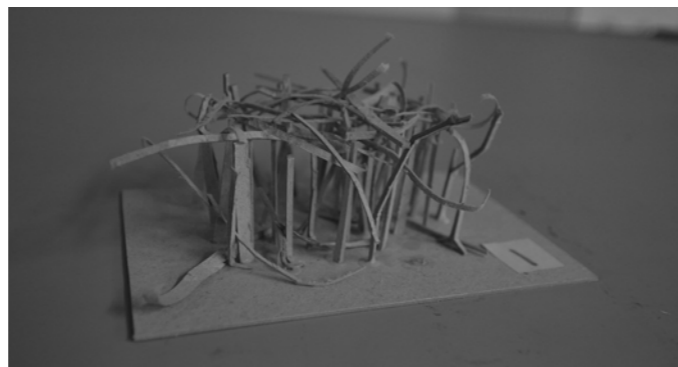
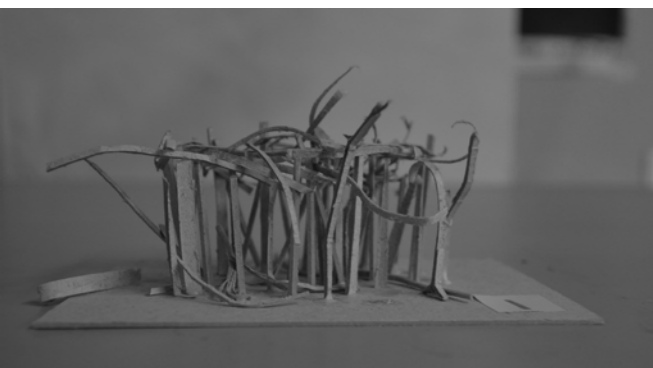
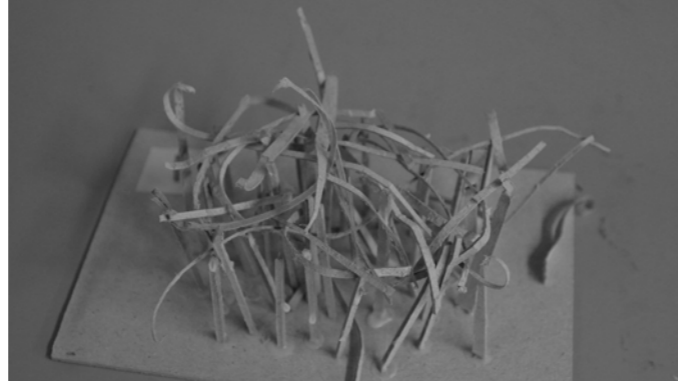


Fig. 9.48 Concept Model 5 Canopy of Trees 1 of the Salvokop Connection.

# Concept Model 5

## Canopy of Trees 2

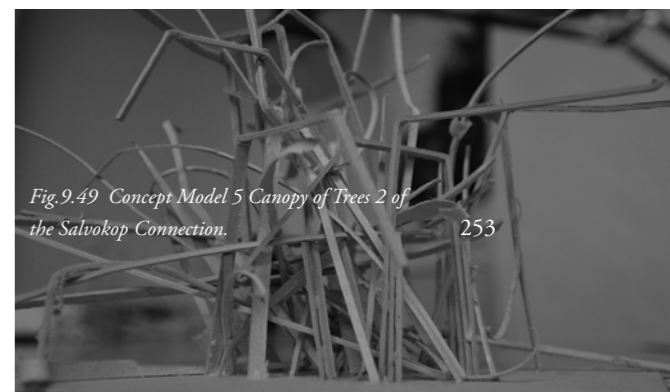
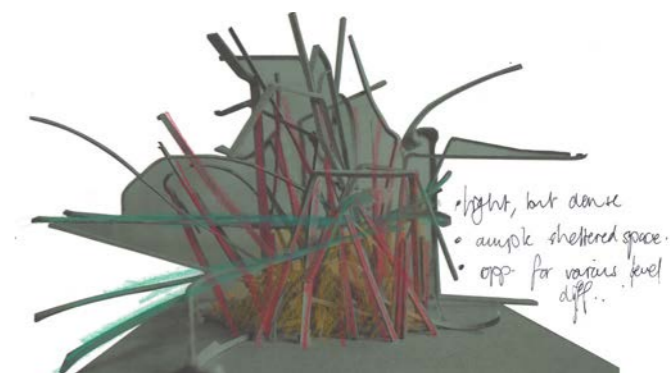
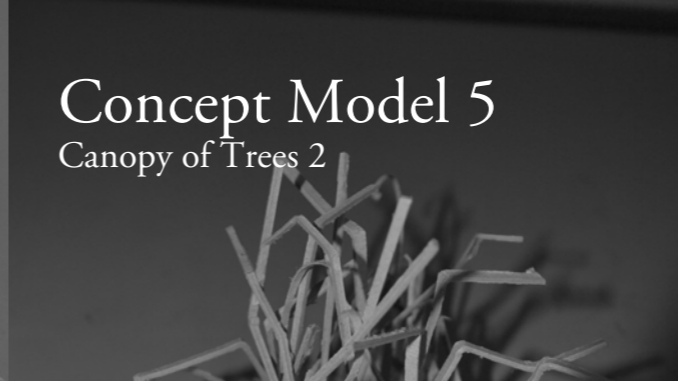
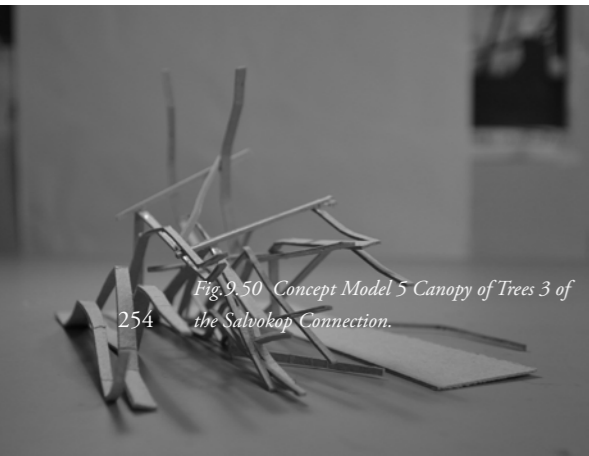
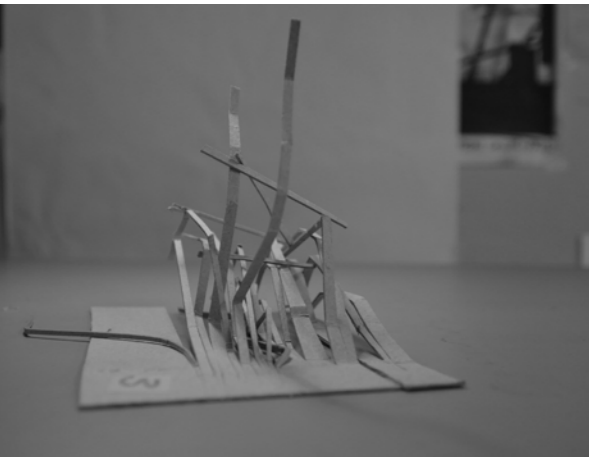


Fig. 9.49 Concept Model 5 Canopy of Trees 2 of the Salvokop Connection.

# Concept Model 5

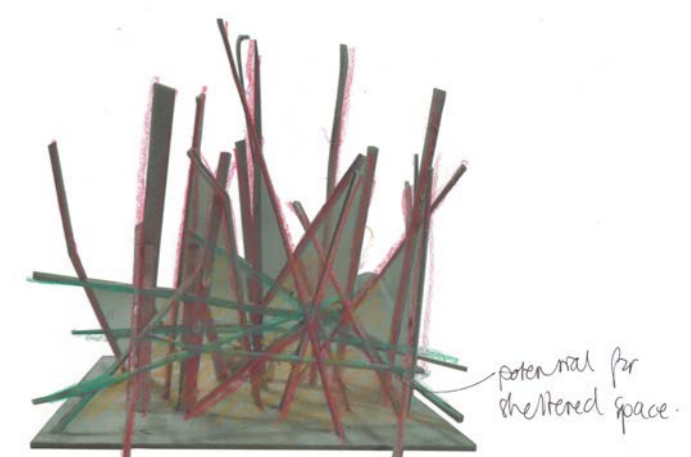
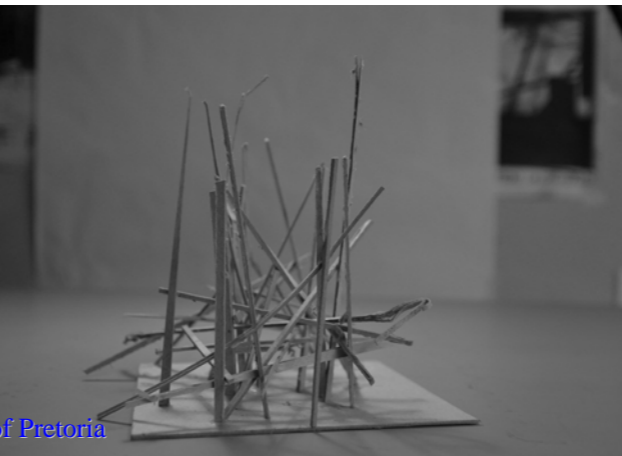
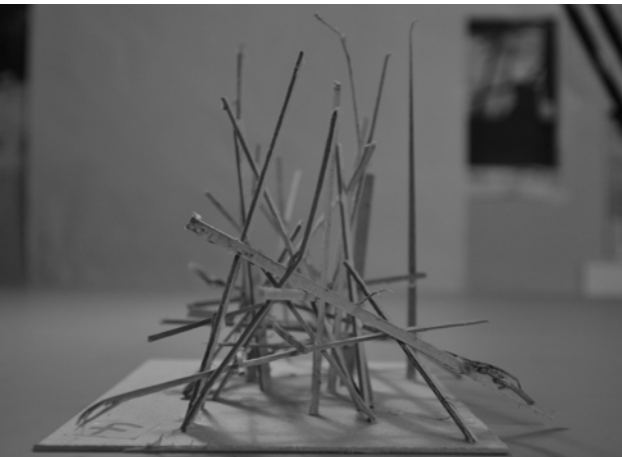
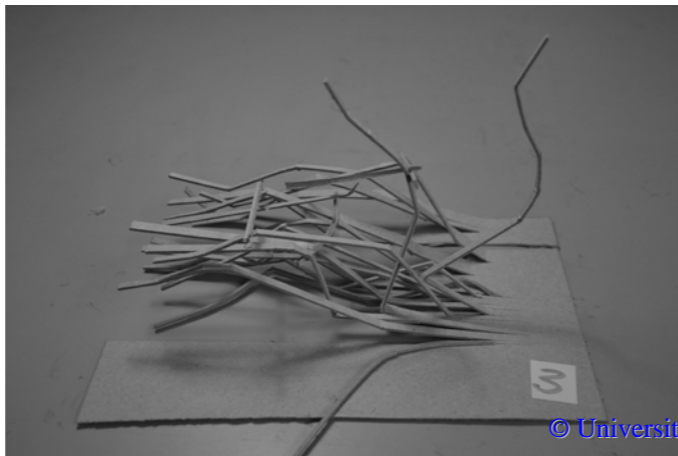
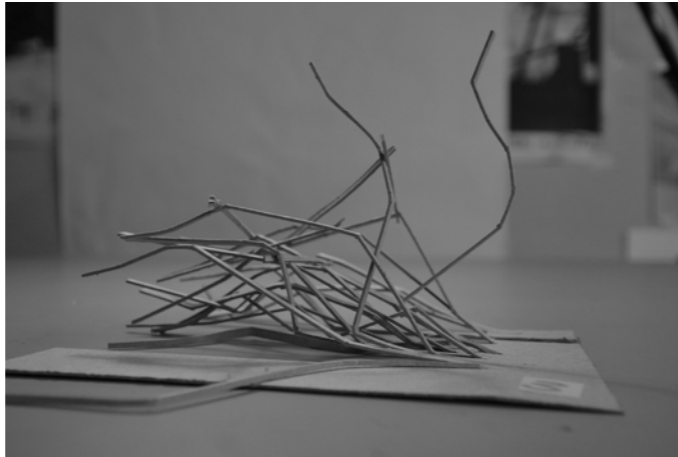
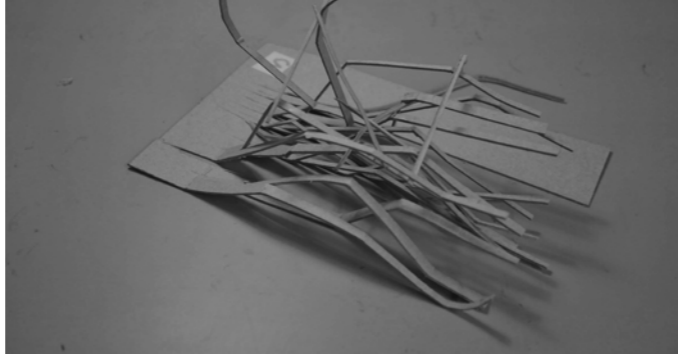
## Canopy of Trees 3



254 *Fig.9.50 Concept Model 5 Canopy of Trees 3 of the Salvokop Connection.*

# Concept Model 5

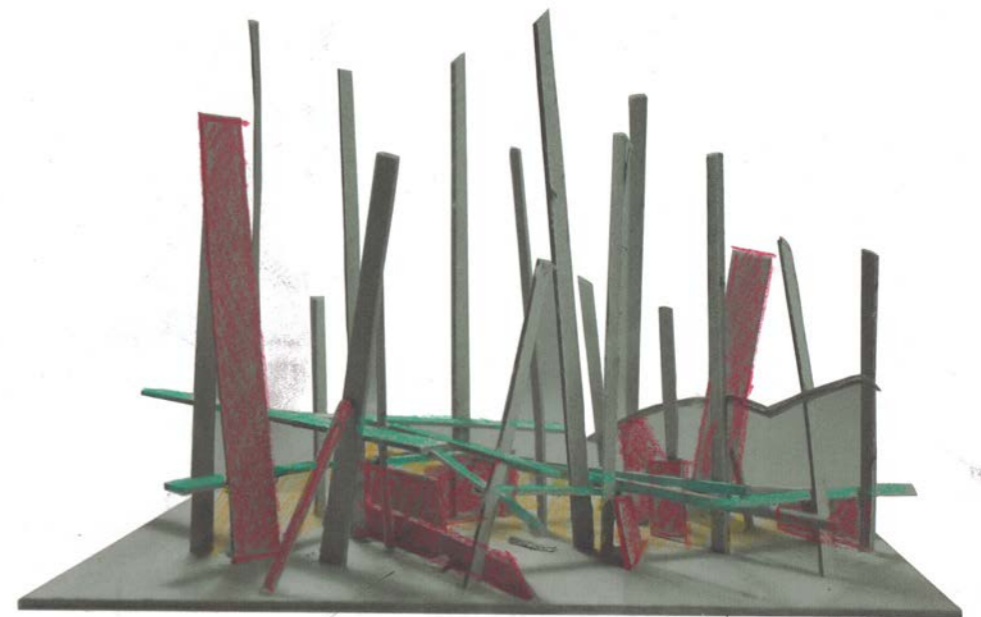
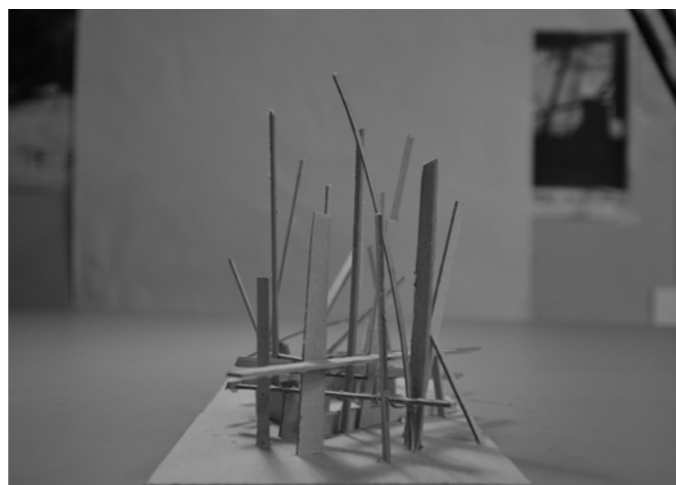
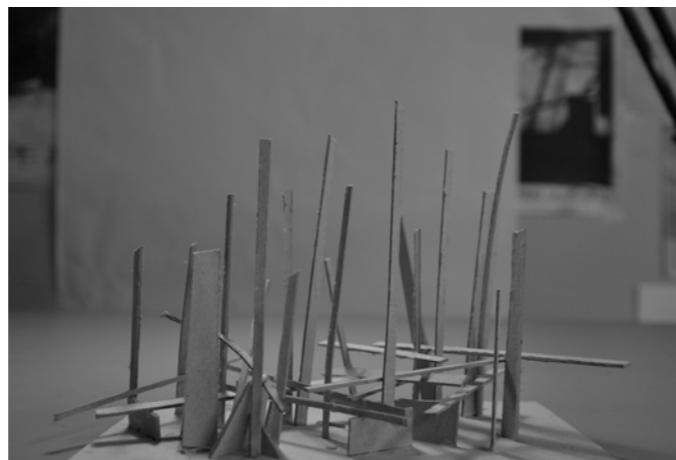
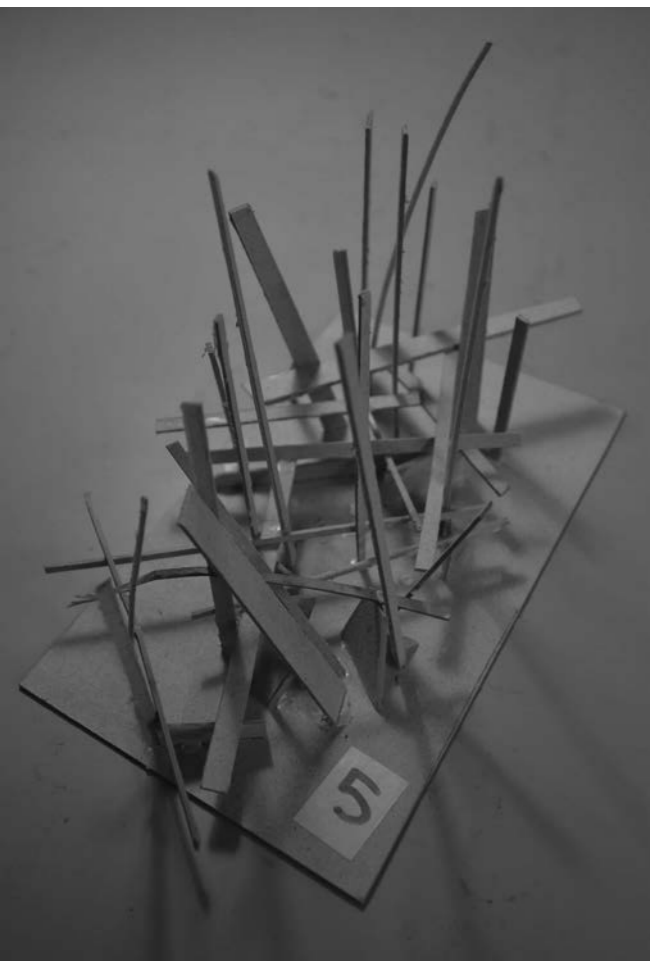
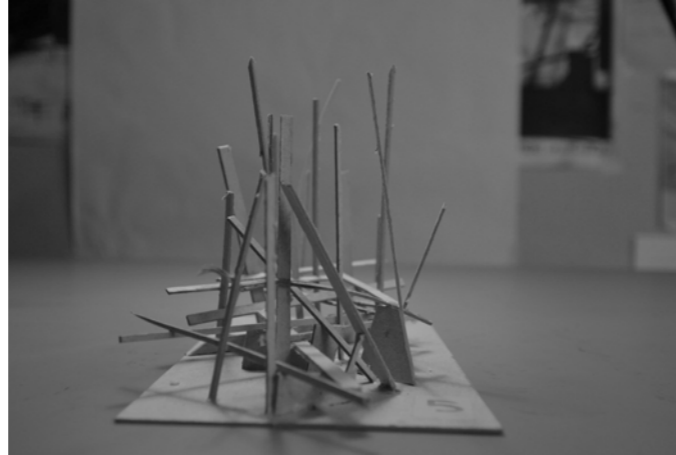
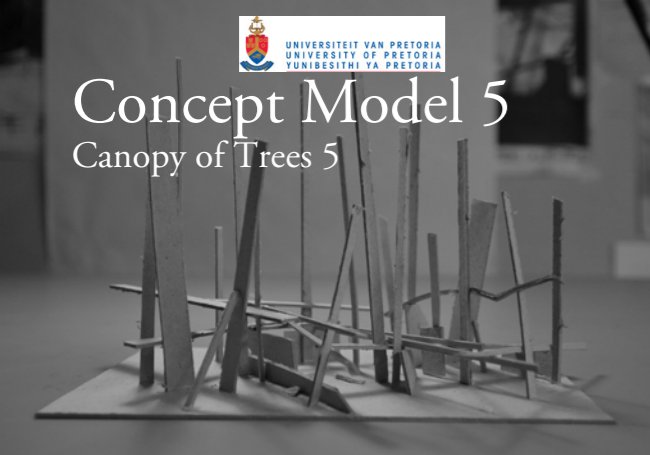
## Canopy of Trees 4



255 *Fig.9.51 Concept Model 5 Canopy of Trees 4 of the Salvokop Connection.*

# Concept Model 5

## Canopy of Trees 5



light weight dense structure  
+ earthbound.

The conceptual models investigated in this series is an affirmation of the characteristics of field conditions:

- field conditions are bottom-up phenomena
- that moves from the one to the many
- parts are not fragments of wholes but simply parts
- chance and contingency is introduced into the work - due to its materiality there cannot be precise control over the shape
- a shift from the discrete object to a record of the process of its making
- defined not by overarching geometrical schemas but by intricate local connections
- independent elements are combined additively to form an indeterminate whole
- the overall form is an elaboration of conditions
- established locally
- displacement of control to a series of intricate local rules for combination or as a sequence of events but not as an overall formal configuration
- the figure is not a demarcated object read against a stable field but rather an effect emerging from the field itself - as moments of intensity
- authentic and productive social differences thrive at the local level and not in the form of large scale semiotic messages or sculptural forms

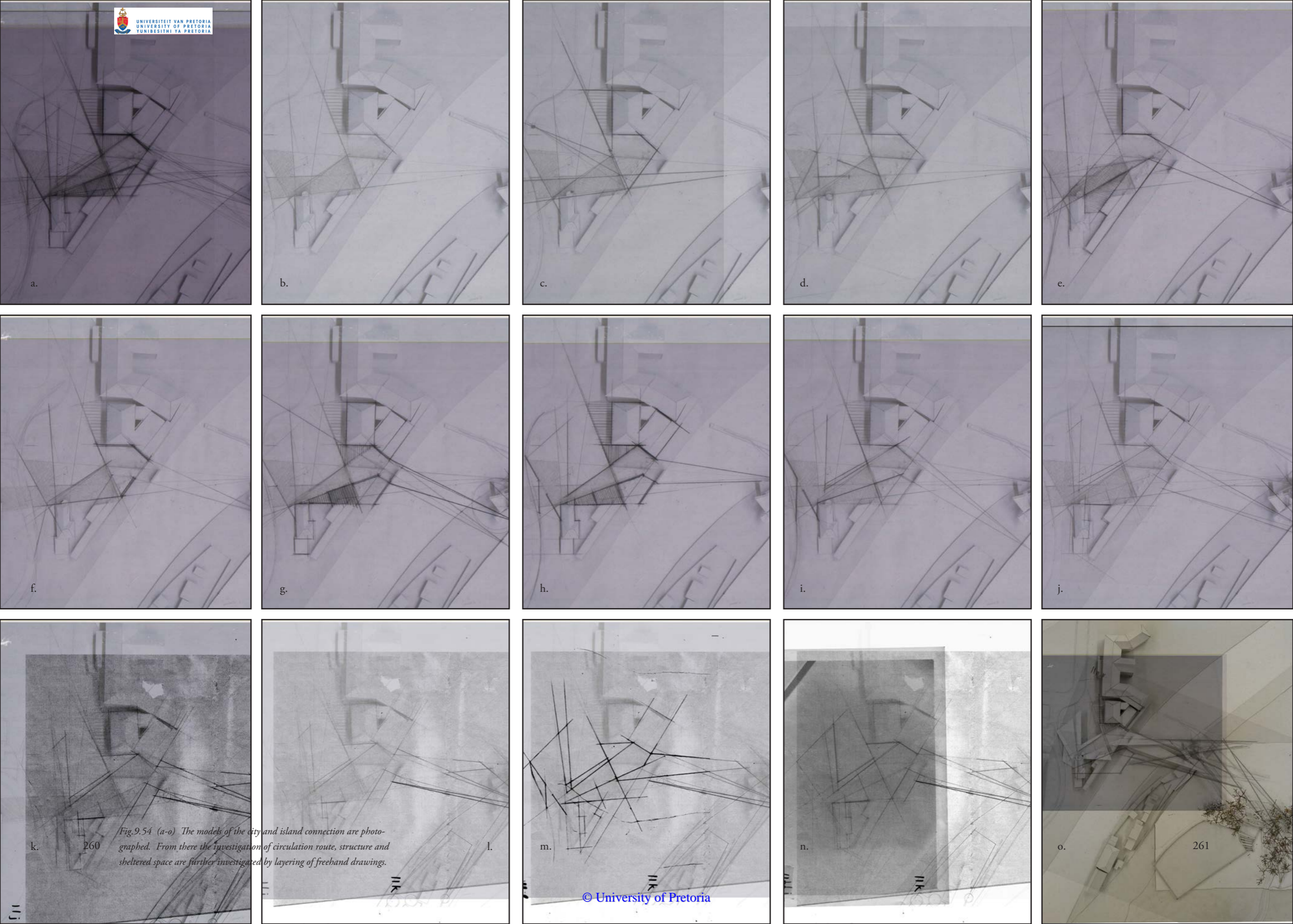
Concept Model 6a (Figure 9.53) is a first attempt at connecting the various differentials into a network.

Fig.9.52 Concept Model 5 Canopy of Trees 5 of the Salvokop Connection.





*Fig.9.53 In Concept Model 6a the various differentials are connected as a sequence of events.*



a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

n.

o.

260

261

*Fig.9.54 (a-o) The models of the city and island connection are photographed. From there the investigation of circulation route, structure and sheltered space are further investigated by layering of freehand drawings.*

# Concept Model 6b



*Fig.9.55 The differentials are connected into a network, which is a development of Concept Model 6a.*

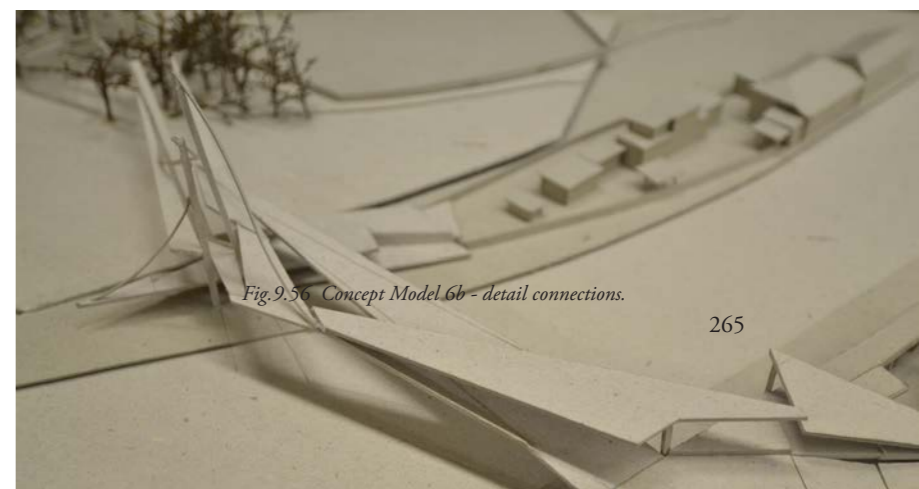
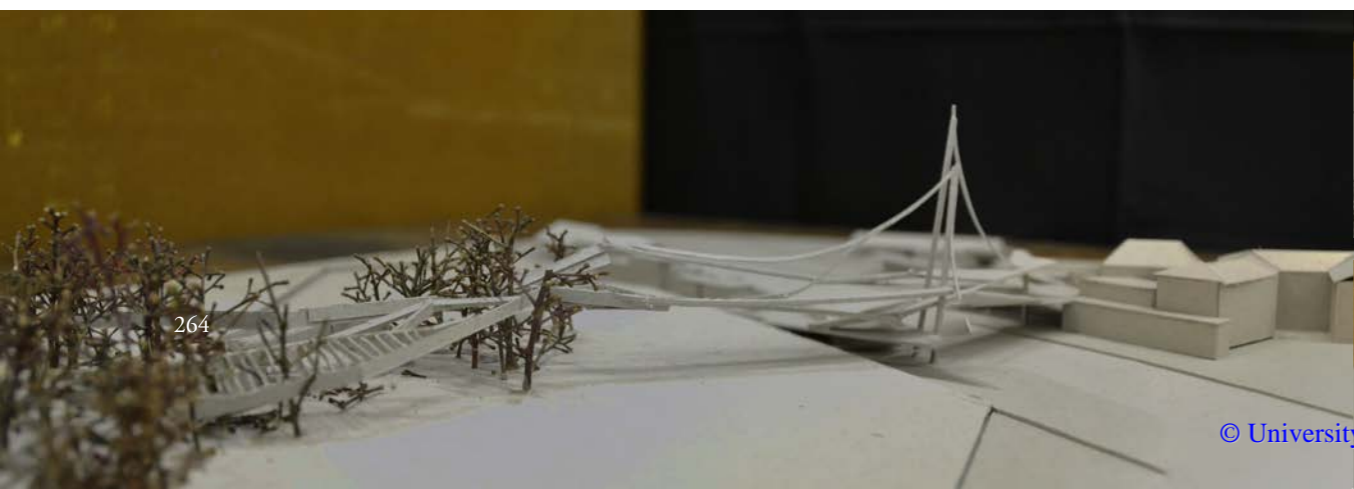
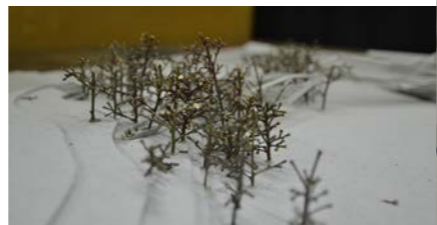
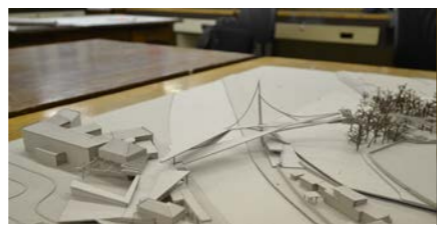
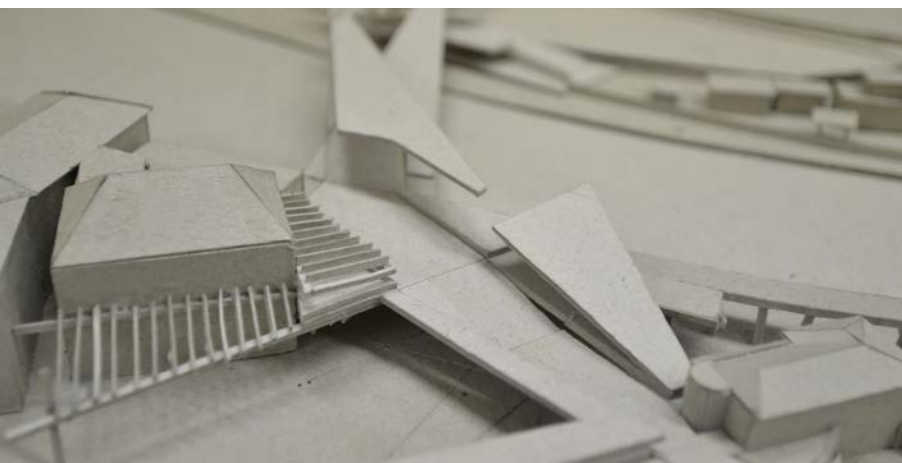
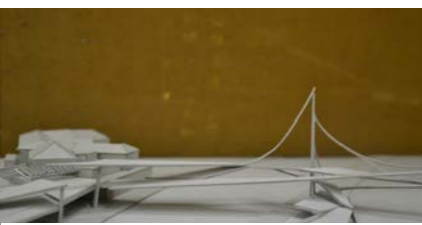
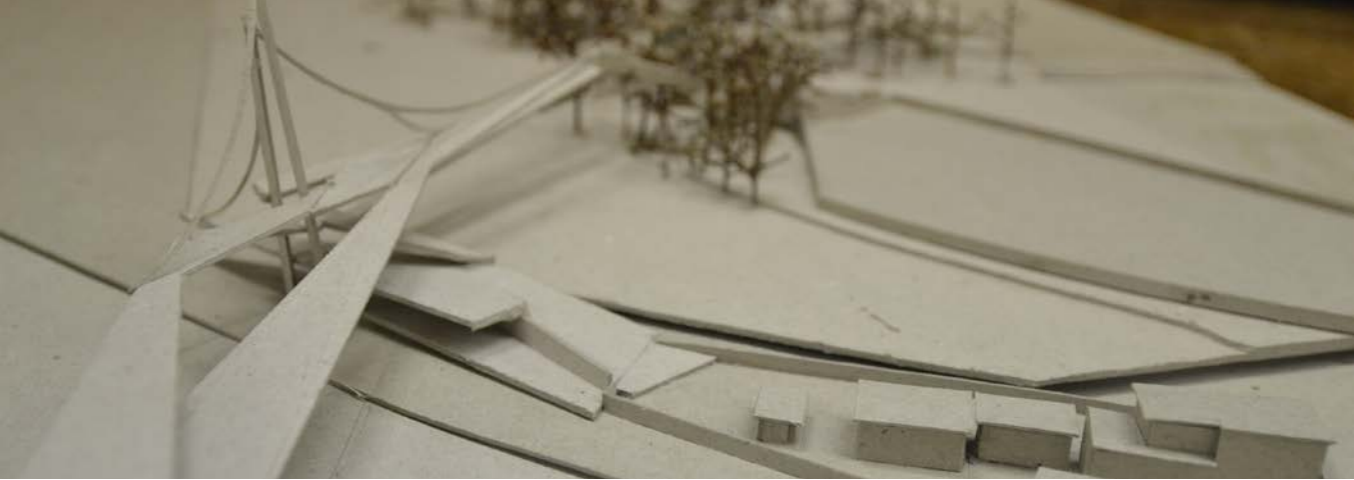
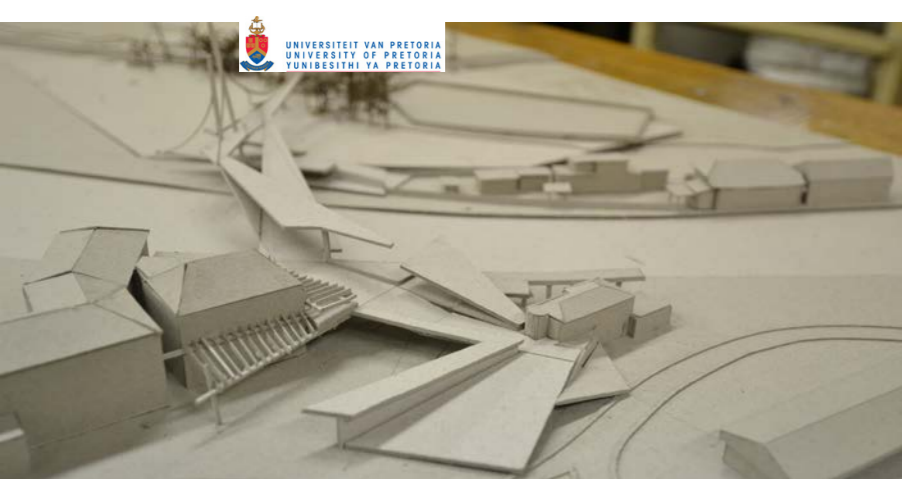
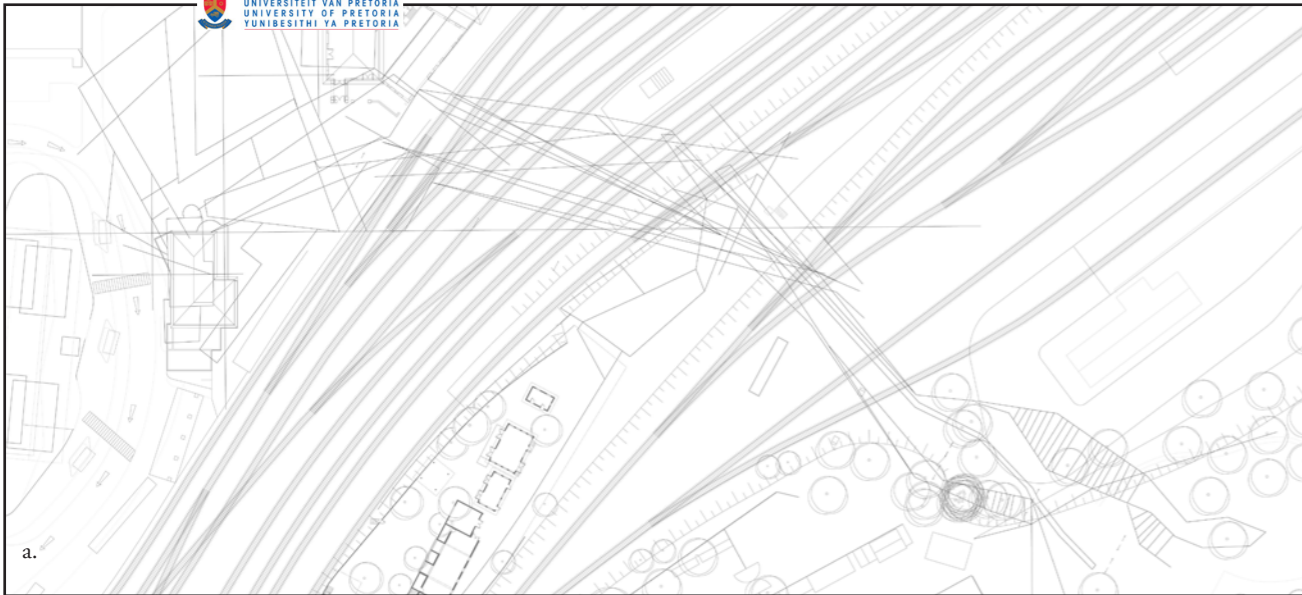
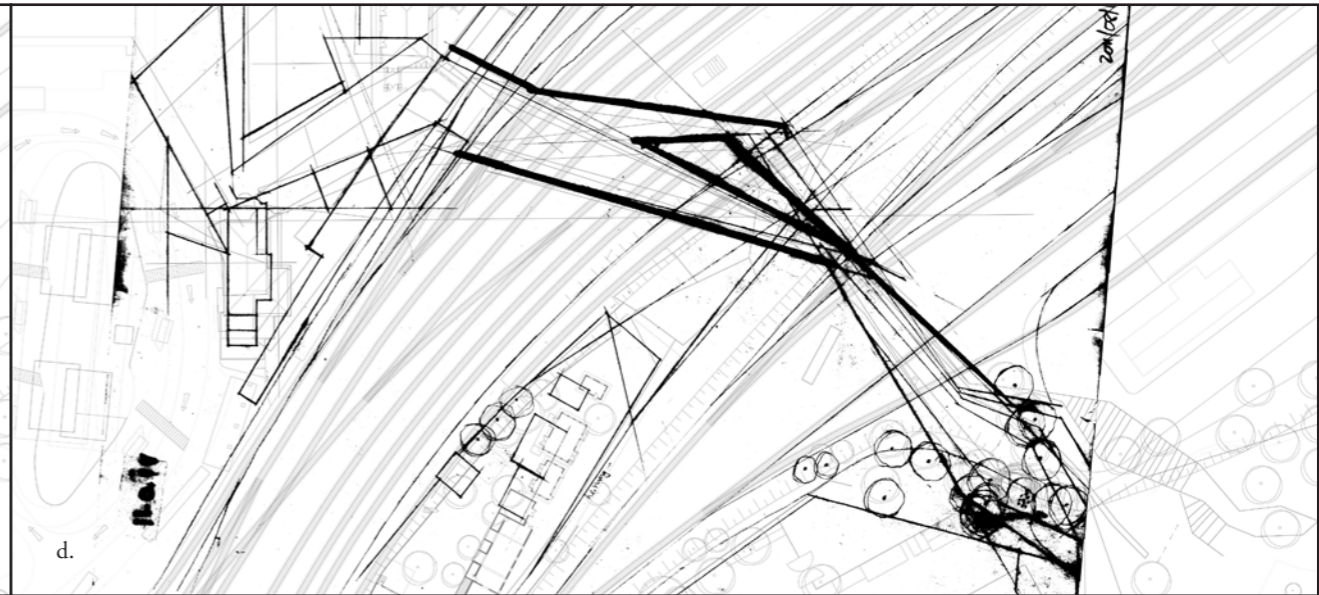


Fig.9.56 Concept Model 6b - detail connections.

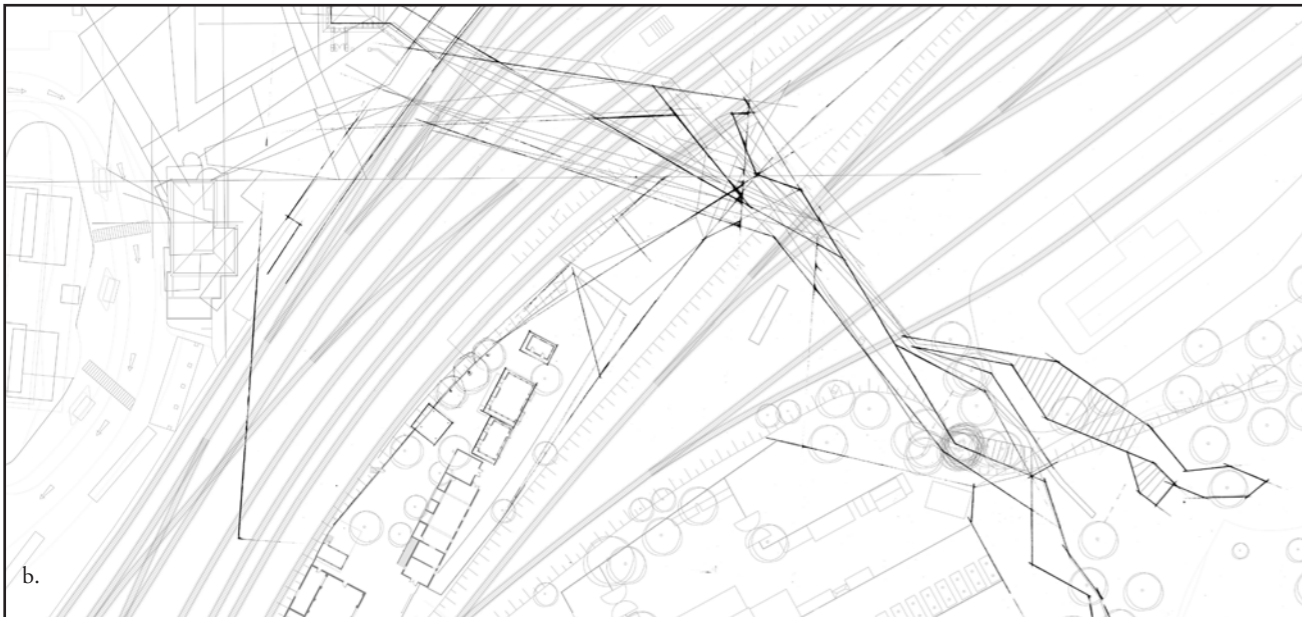




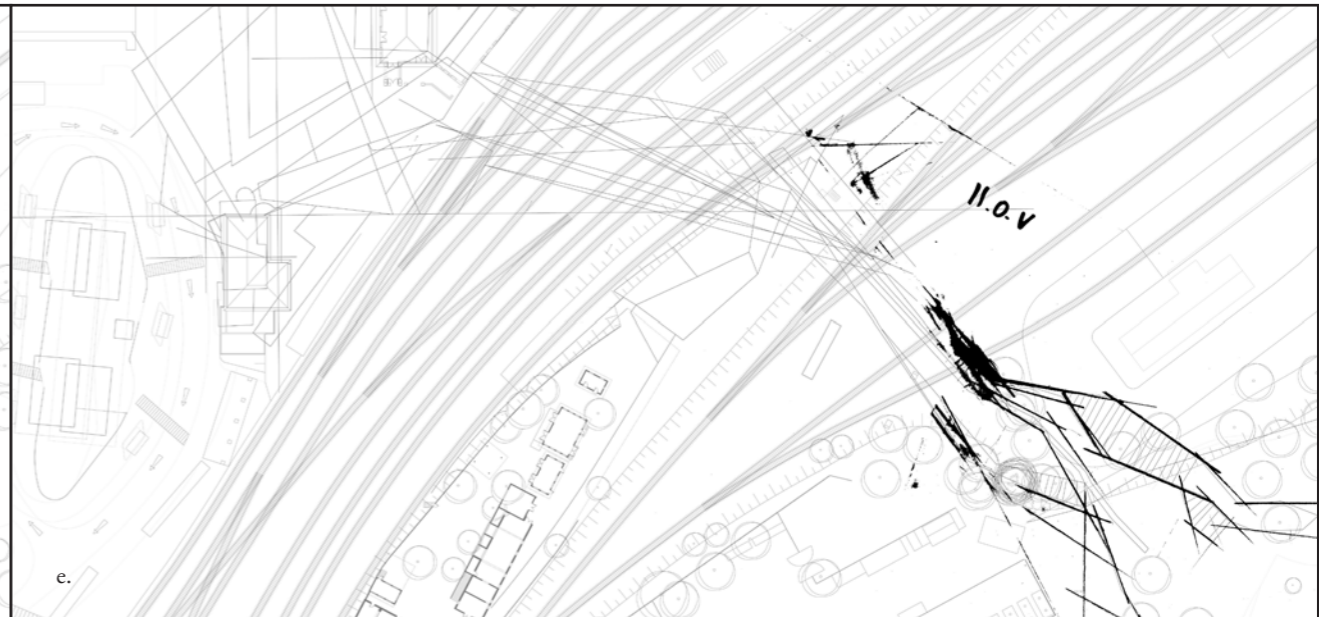
a.



d.



b.



e.

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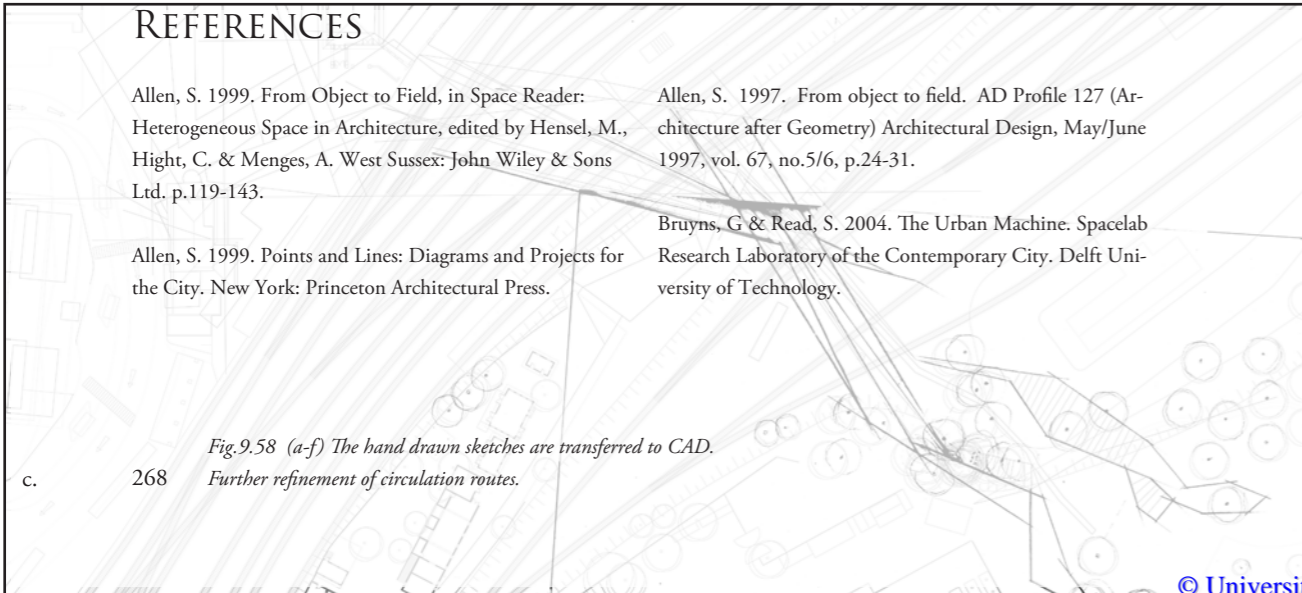
Cham, K. 2010. The Art of Complex Systems Science. in Embracing Complexity in Design, edited by Alexiou, K., Johnson, J. & Zamenopoulos, T. London & NY: Routledge. p. 121-142.

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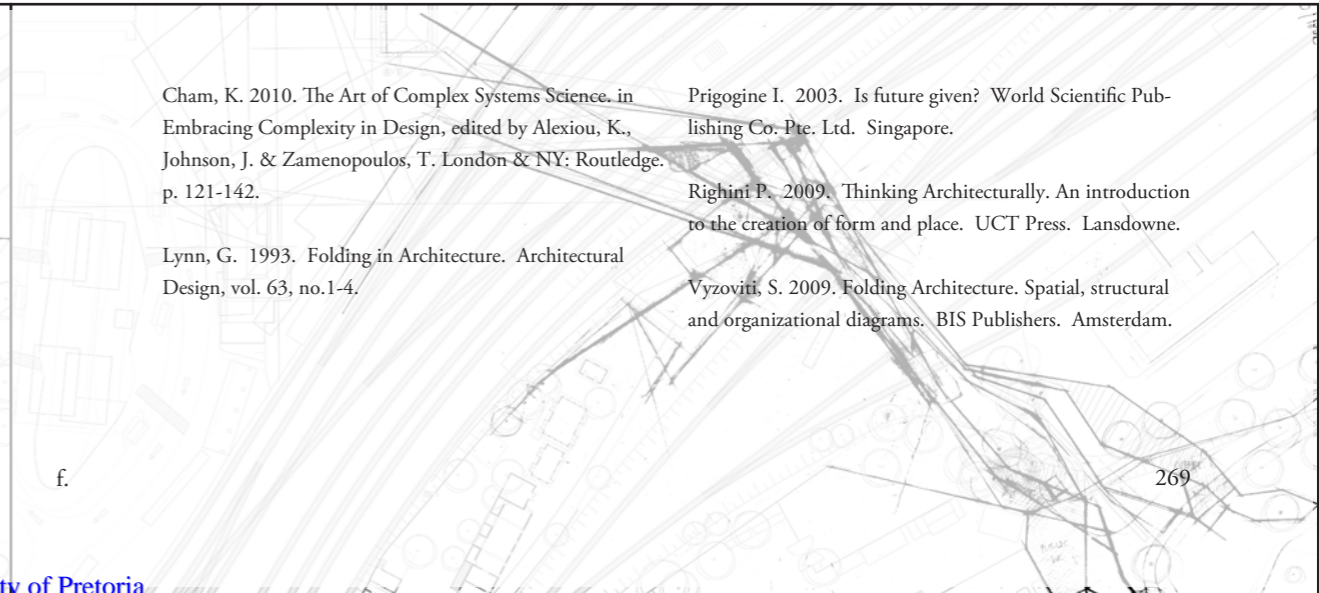
Vyzoviti, S. 2009. Folding Architecture. Spatial, structural and organizational diagrams. BIS Publishers. Amsterdam.



c.

Fig.9.58 (a-f) The hand drawn sketches are transferred to CAD.

268 Further refinement of circulation routes.



f.

269

# CHAPTER 10

## SKETCHPLAN AND DESIGN DEVELOPMENT

“More than a formal configuration, the field condition implies an architecture that admits change, accident, and improvisation. It is an architecture not invested in durability, stability, and certainty, but an architecture that leaves space for the uncertainty of the real.”  
(Allen S, 1999:102)

The comparison drawn between the characteristics of Field Conditions and Complex Systems in Chapter Nine (Table 9.1) resulted in a list of Design Guidelines used to direct decision making during the design process (Table 10.1).

The previous chapter suggested the need to recognise the limits of architecture’s ability to order the city, whilst acknowledging the complex self-regulating (albeit informal) orders already present. This implies paying close attention to existing conditions, which have been addressed in both the rational and intuitive processes (Chapters Five and Nine).

Within the concept formulation it suggests a network of relations capable of accommodating difference yet “robust enough to incorporate change without destroying its internal coherence” (Allen 1997:30).

During the creation of functional space making which forms part of this design development chapter, areas are identified in terms of function. This however do not represent “fixed” functions as such. Rather it suggests the facilitation of activities either already taking place or that are likely to take place there following the pointers obtained from “The Urban Machine” in Chapter Five and identified as potential client and programme in Chapter Eight.

TABLE 10.1 Design Guidelines for the interventions based on the characteristics of Complex Systems and Field Conditions.

DESIGN GUIDELINES
Non-linearity of structure: horizontally and vertically. Different floors and roofs do not fit exactly on top of each other; rather fold over each other.
Indeterminacy & unpredictability of behaviour: walls would protrude through roof space to become parapet wall or balustrade above.
A network of relations: independent elements are combined to form an indeterminate whole. Spaces are connected by means of walls, floors and balustrades, but from the differentials outward, and never the same anywhere.
Permeability allowing for allowance and appropriation, but also acknowledging fragmentation. As is the case with a membrane the degree of permeability also varies.
Non-reductionism: Detailed design cannot be reduced to being a part representative of the whole. Rather, the form of the whole results from relating different elements. “Complex structures use interwoven components that introduce mutual dependencies and produce more than the sum of the parts”
The form of things is not as essential as the form between things.
Inhabitable space - stereotomic structure, non-enclosed spaces: tectonic structure
Border between public & private addressed by using a shared border as “spine” onto which different functions plug on both sides.
While the built structure might be “fixed”, it is the spontaneous appropriation thereof that allows for flexibility & turns it into a dynamic system.
Partial order: some functions can be determined to a certain degree & be catered for, while others can not.
Why a cable stay bridge? “It represents pure movement as opposed to solid stasis, a distributed intensity as opposed to a delimited bounded centrality.” (Bruyns 2004:7).

In this chapter the exploration of a circular design process is continued via six design stages, each consisting of:

- Building a model of a connection point,
- photographing the model,
- free hand sketches onto the photograph to identify and investigate circulation routes and functional spaces

- projecting the free hand sketches onto CAD and then
- viewing the result in totality, and repeating it once again.

The resulting architectural form has therefore emerged from an elaboration of conditions established locally - from every connection point - outward.

City

The Island

Salvokop

Fig.10.1 Design Development 1 of all three connection points: The City, The "Island" and Salvokop, as projected from Concept Model 6b.

Legend:

Pedestrian Walkway



Cycling Route



# Design Development

Stage 1 (2011/08/01-2011/12/14)



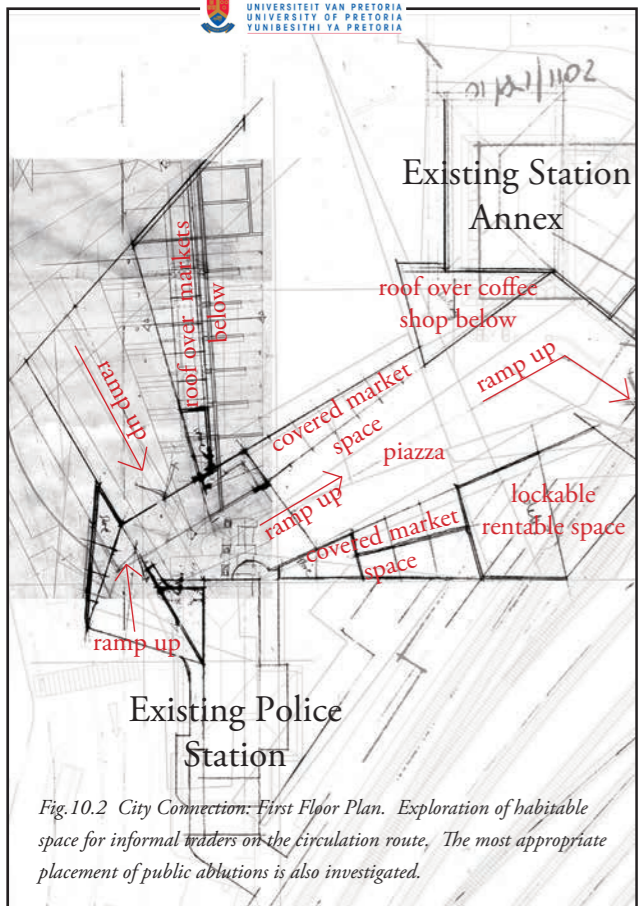


Fig.10.2 City Connection: First Floor Plan. Exploration of habitable space for informal traders on the circulation route. The most appropriate placement of public ablutions is also investigated.

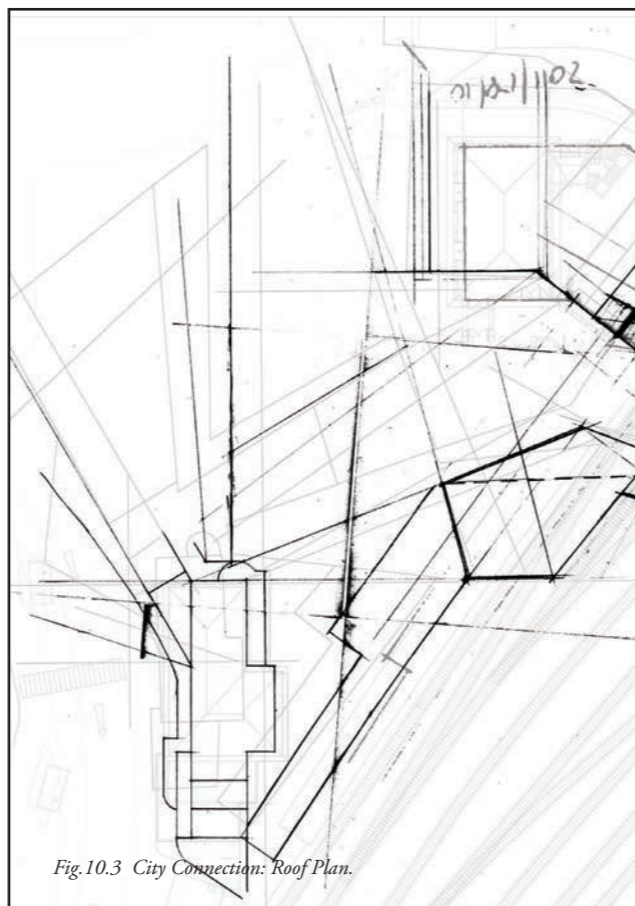


Fig.10.3 City Connection: Roof Plan.

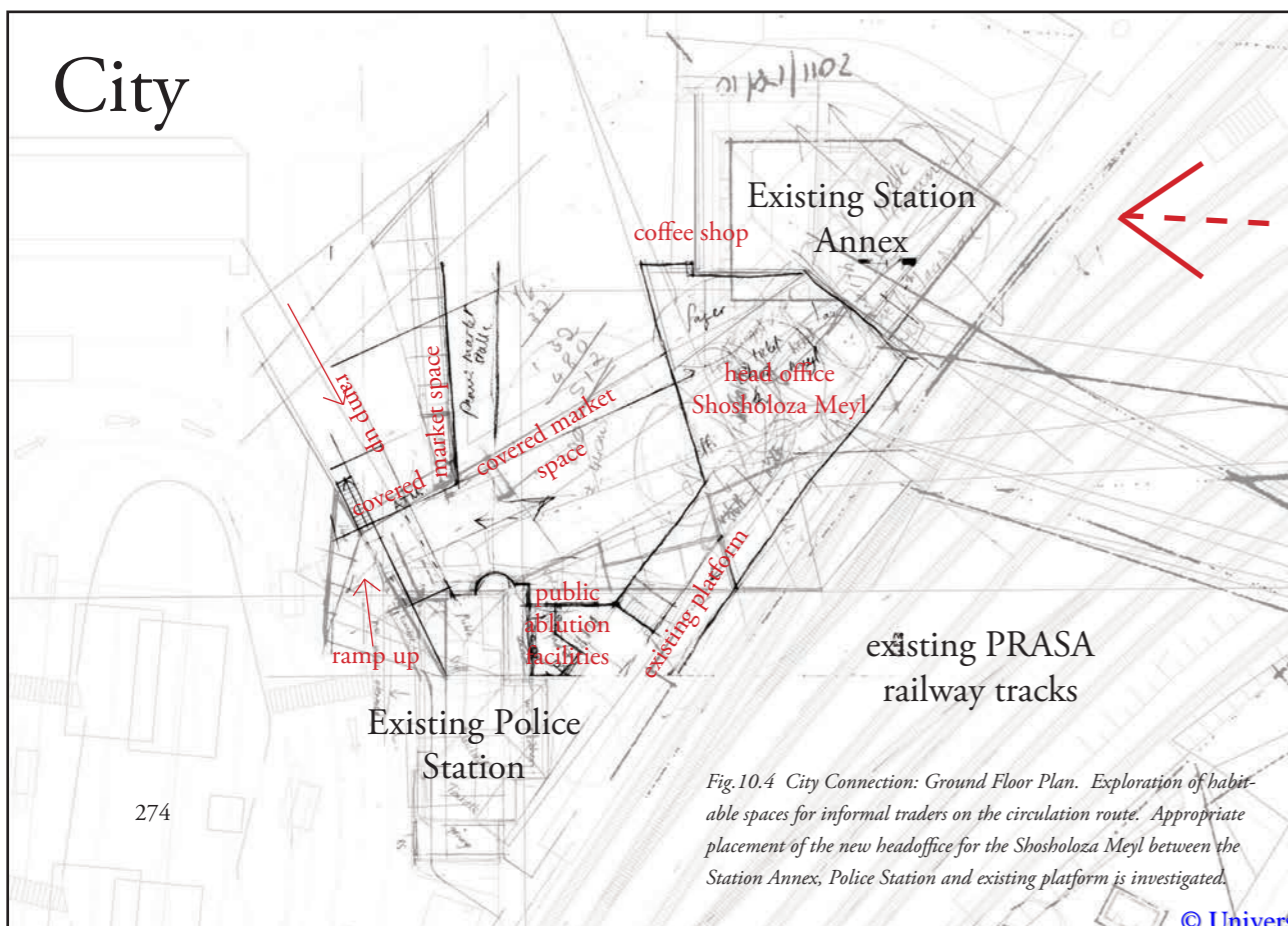


Fig.10.4 City Connection: Ground Floor Plan. Exploration of habitable spaces for informal traders on the circulation route. Appropriate placement of the new headoffice for the Shosholozza Meyl between the Station Annex, Police Station and existing platform is investigated.

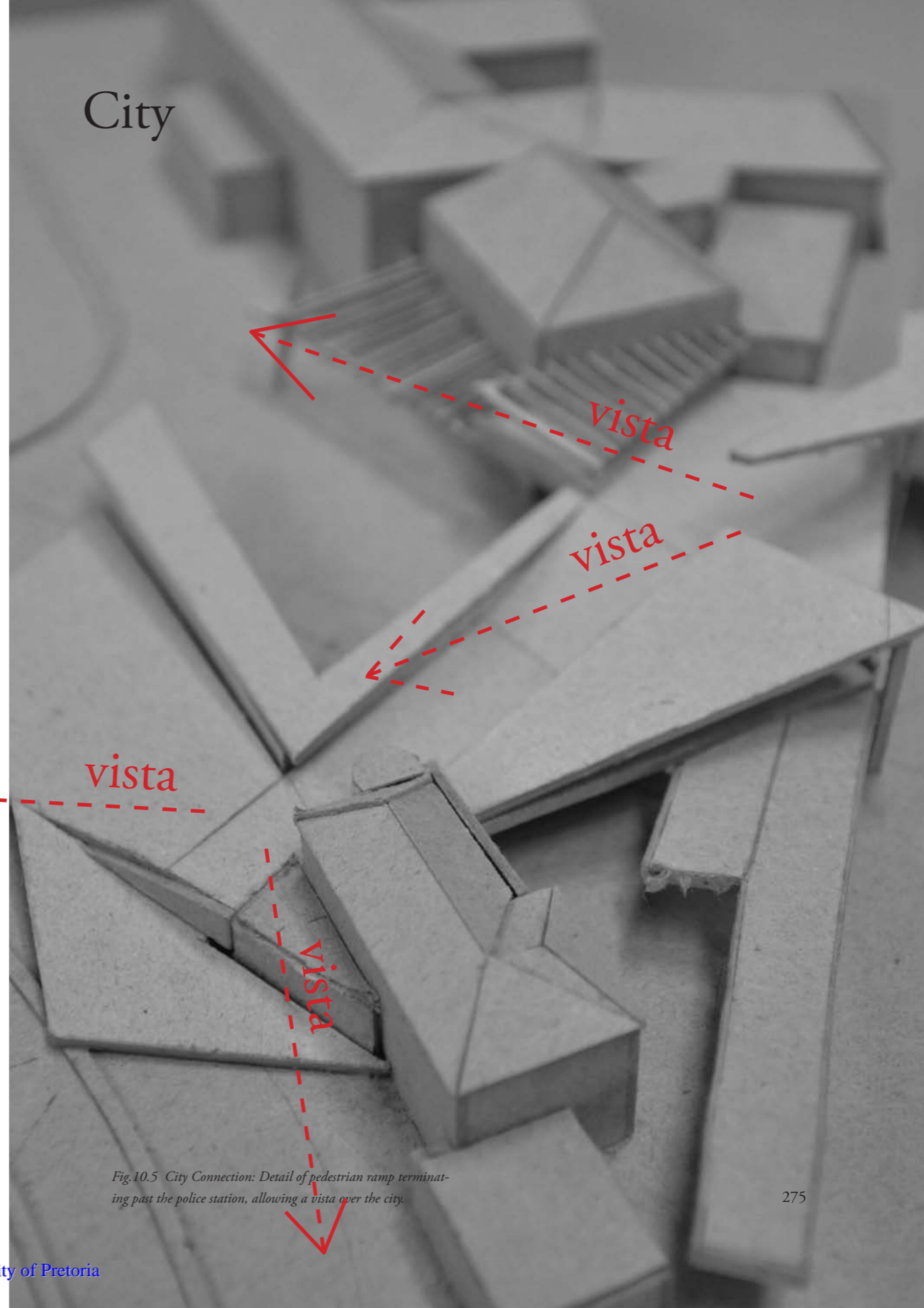
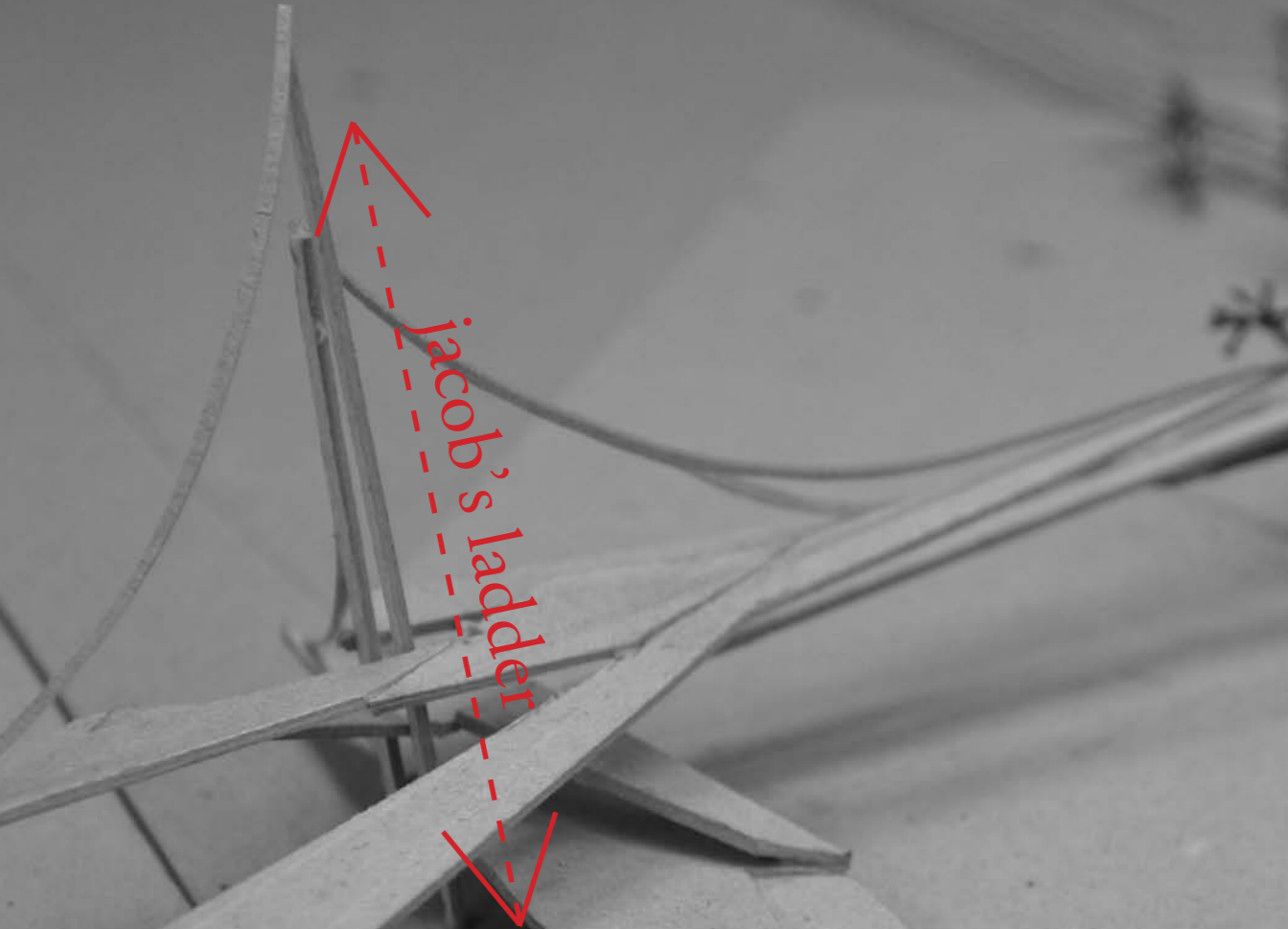


Fig.10.5 City Connection: Detail of pedestrian ramp terminating past the police station, allowing a vista over the city.

# Island



The Island connection is not a destination and should not be treated as such. Initially provision was made, (as with the City connection where trade is popular at the termination points of bridges) for informal traders to operate market stalls.

This approach is visible in this preliminary sketch in design of the centre connection. Rather, the analysis has proven that it's a place where the activities run concurrently to that of the visible world, on top of the walkway. This is a place of shelter, away from the buzz, a place for unplanned activities, such as those mentioned in "Post-It" city, and should be acknowledged as such and facilitated for in that way.

The model and resulting intervention needed to communicate the difference in light conditions (coming the dark below and entering the light above) achieved when viewing the bridge from below, not from above, from the "visible city". Therefore random openings to allow for light to filter through and address the issue of dark, unsafe places was an important design consideration.

How to create a safe haven for those who have nowhere to go, whilst addressing the safety aspect as well.

Fig.10.6 The Island Connection: Detail of level change from the walkway of the bridge to the ground floor level of The Island.

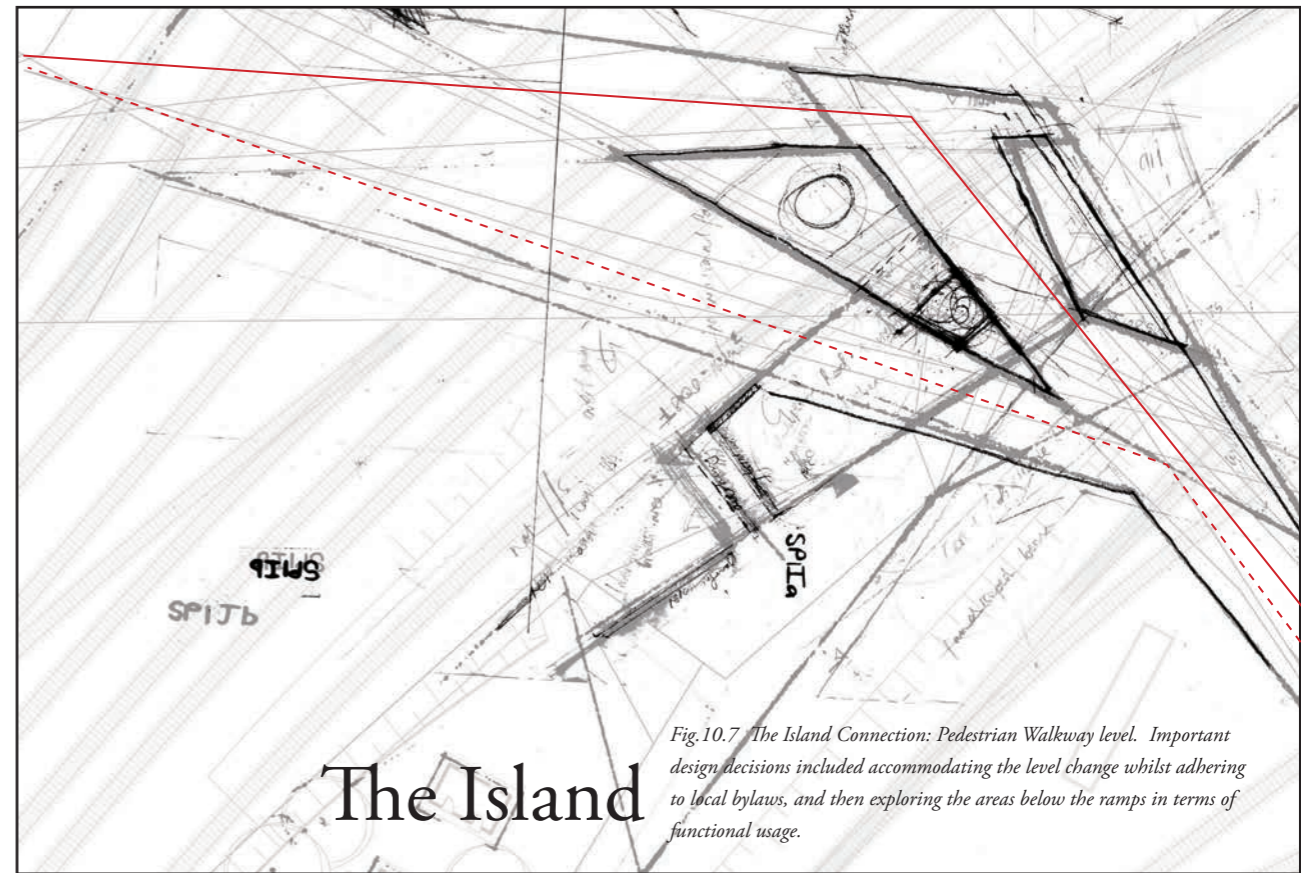


Fig.10.7 The Island Connection: Pedestrian Walkway level. Important design decisions included accommodating the level change whilst adhering to local bylaws, and then exploring the areas below the ramps in terms of functional usage.

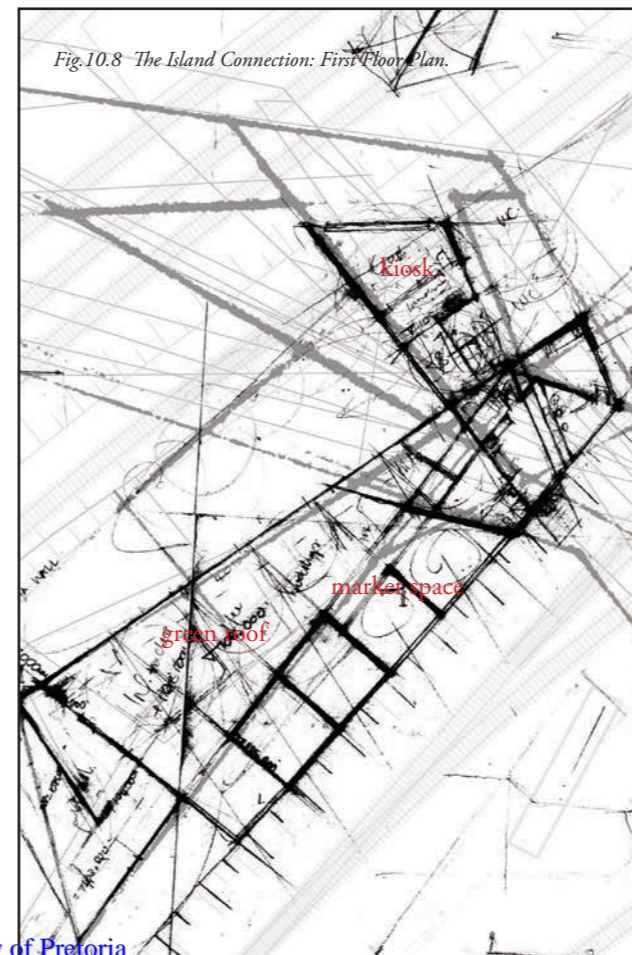


Fig.10.8 The Island Connection: First Floor Plan.

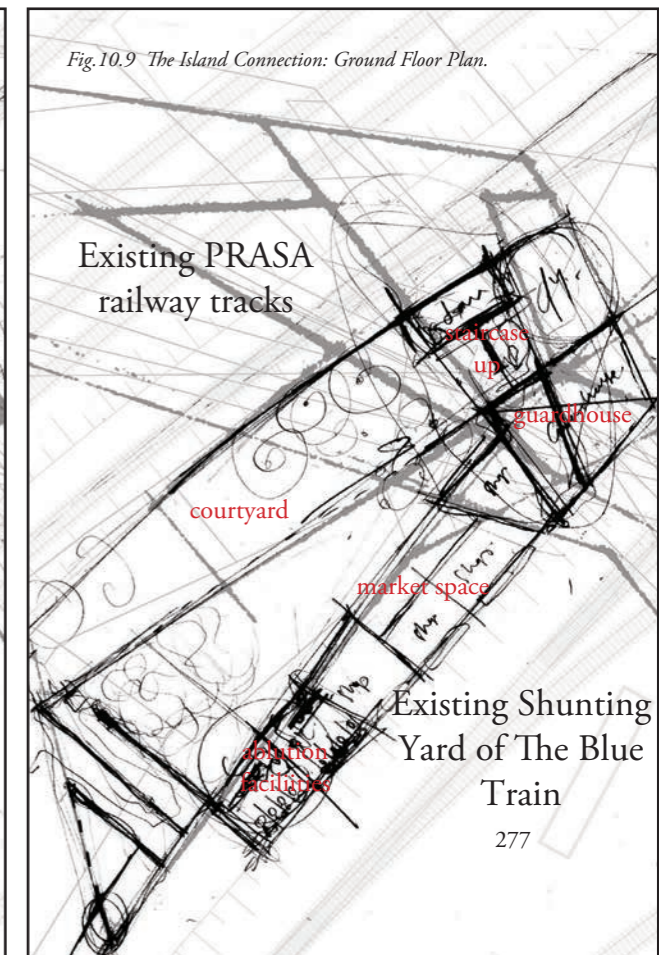


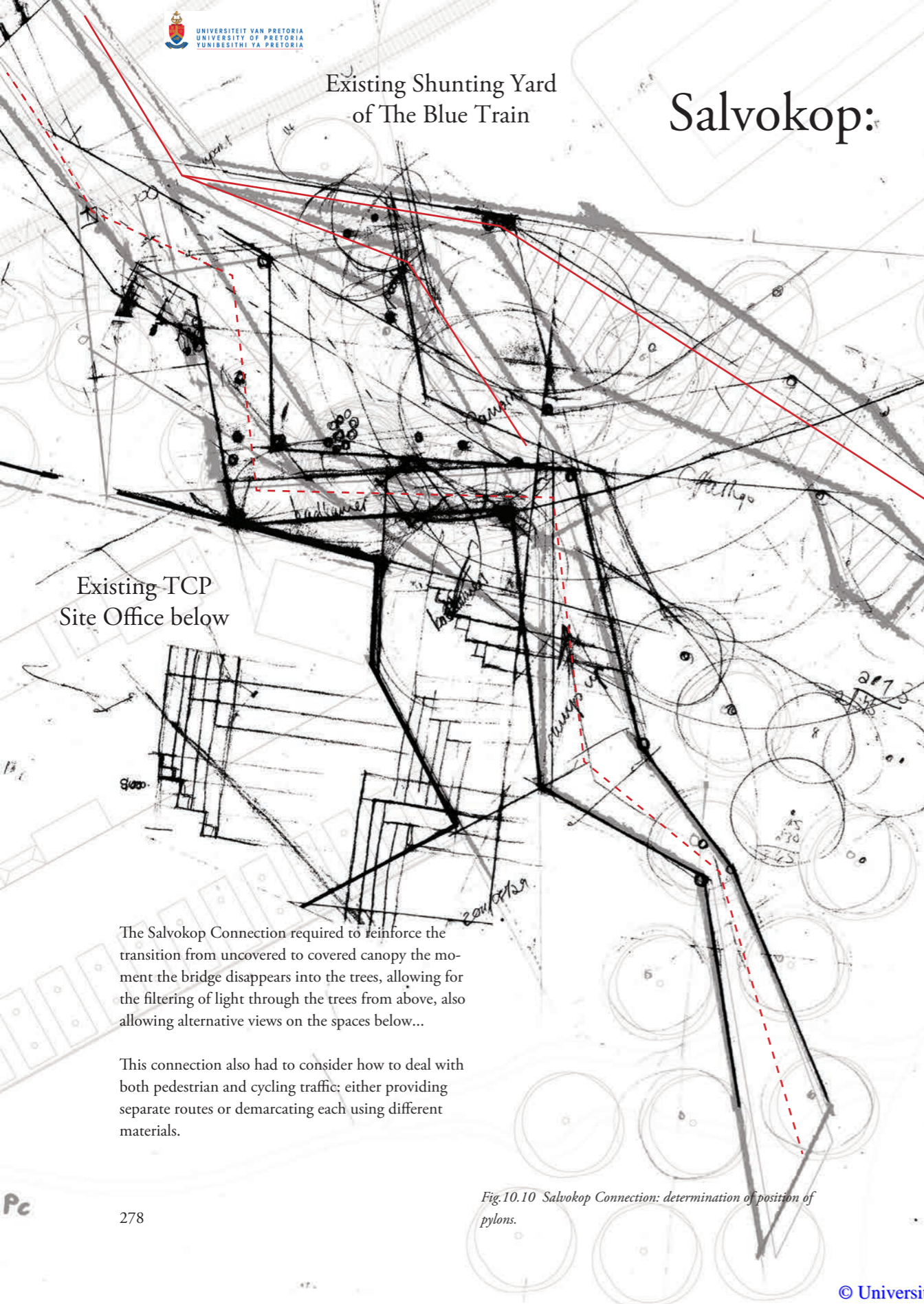
Fig.10.9 The Island Connection: Ground Floor Plan.

Existing Shunting Yard  
of The Blue Train

# Salvokop:

# a canopy of trees

Existing TCP  
Site Office below



The Salvokop Connection required to reinforce the transition from uncovered to covered canopy the moment the bridge disappears into the trees, allowing for the filtering of light through the trees from above, also allowing alternative views on the spaces below...

This connection also had to consider how to deal with both pedestrian and cycling traffic; either providing separate routes or demarcating each using different materials.

Fig.10.10 Salvokop Connection: determination of position of pylons.

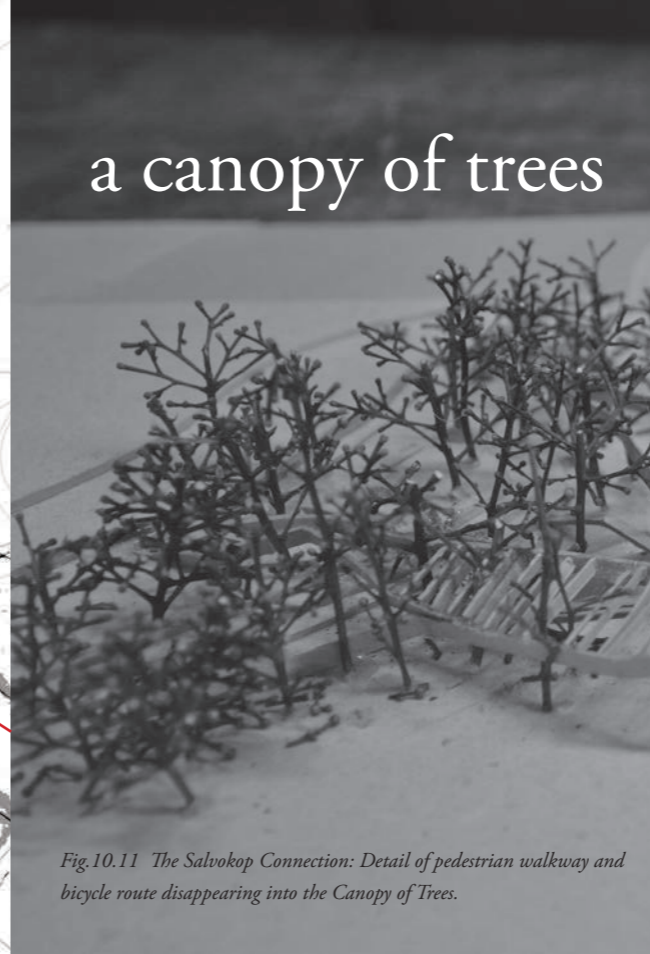


Fig.10.11 The Salvokop Connection: Detail of pedestrian walkway and bicycle route disappearing into the Canopy of Trees.



Fig.10.12 The transition from The Island Connection to The Salvokop Connection by means of the pedestrian walkway and cycling route.



Fig.10.13 The random distribution of trees on Salvokop's side proves clues on the placement and type of structural support required - allowing the bridge to span from tree to tree, like a spiderweb..

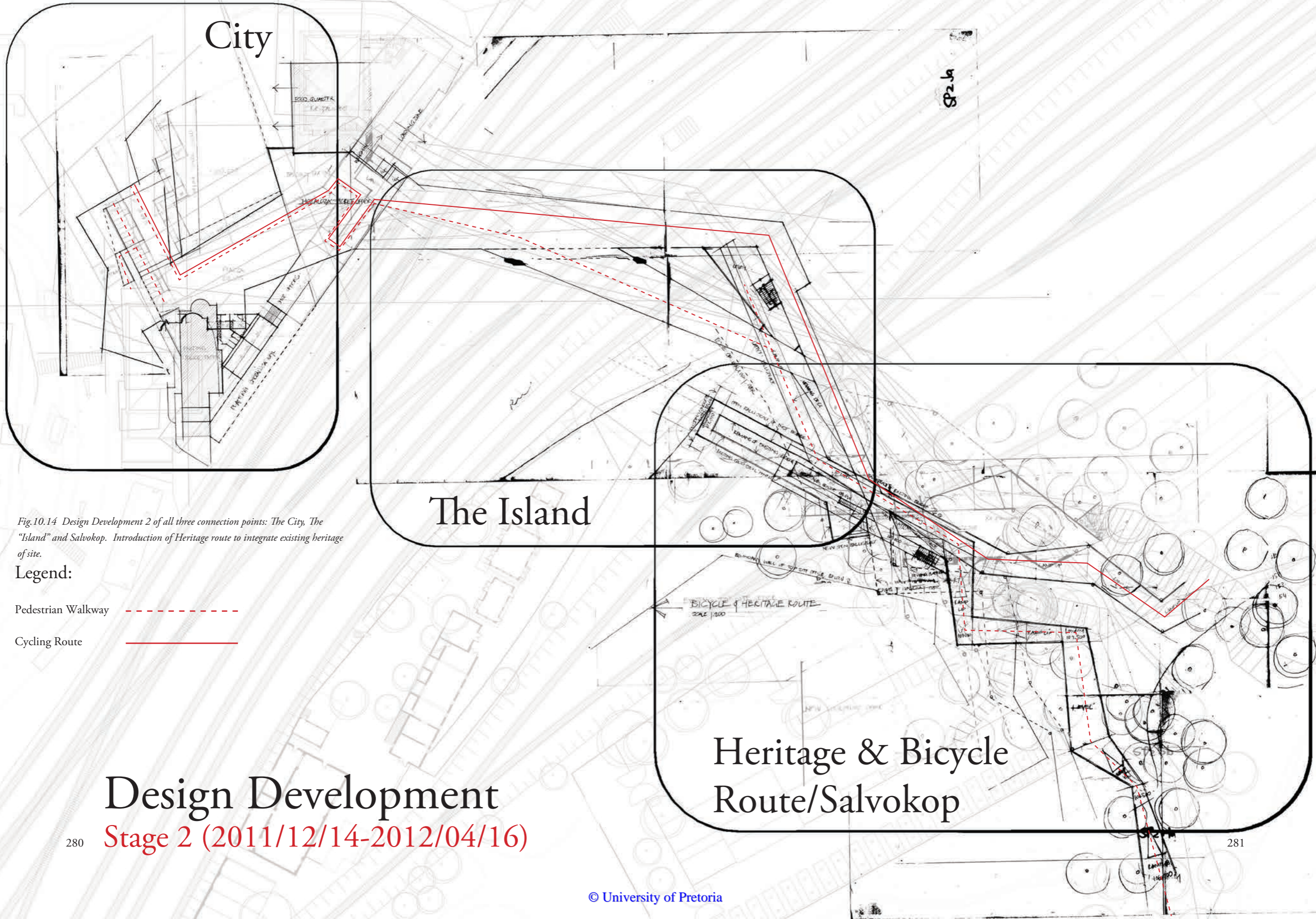


Fig.10.14 Design Development 2 of all three connection points: The City, The "Island" and Salvokop. Introduction of Heritage route to integrate existing heritage of site.

Legend:

Pedestrian Walkway - - - - -

Cycling Route —————

**Design Development**  
**Stage 2 (2011/12/14-2012/04/16)**

# City

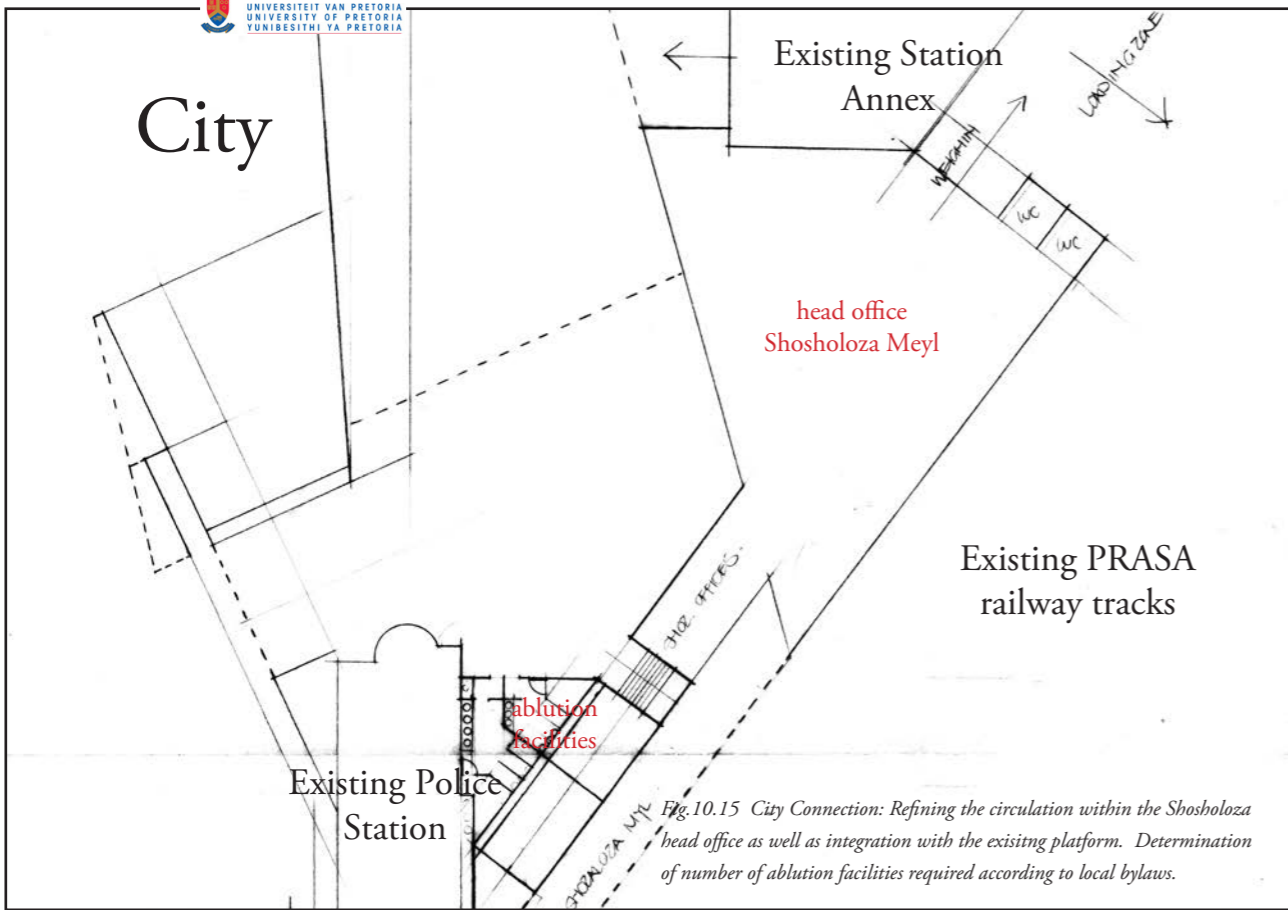


Fig.10.15 City Connection: Refining the circulation within the Shosholoza head office as well as integration with the existing platform. Determination of number of ablution facilities required according to local bylaws.

# The Island

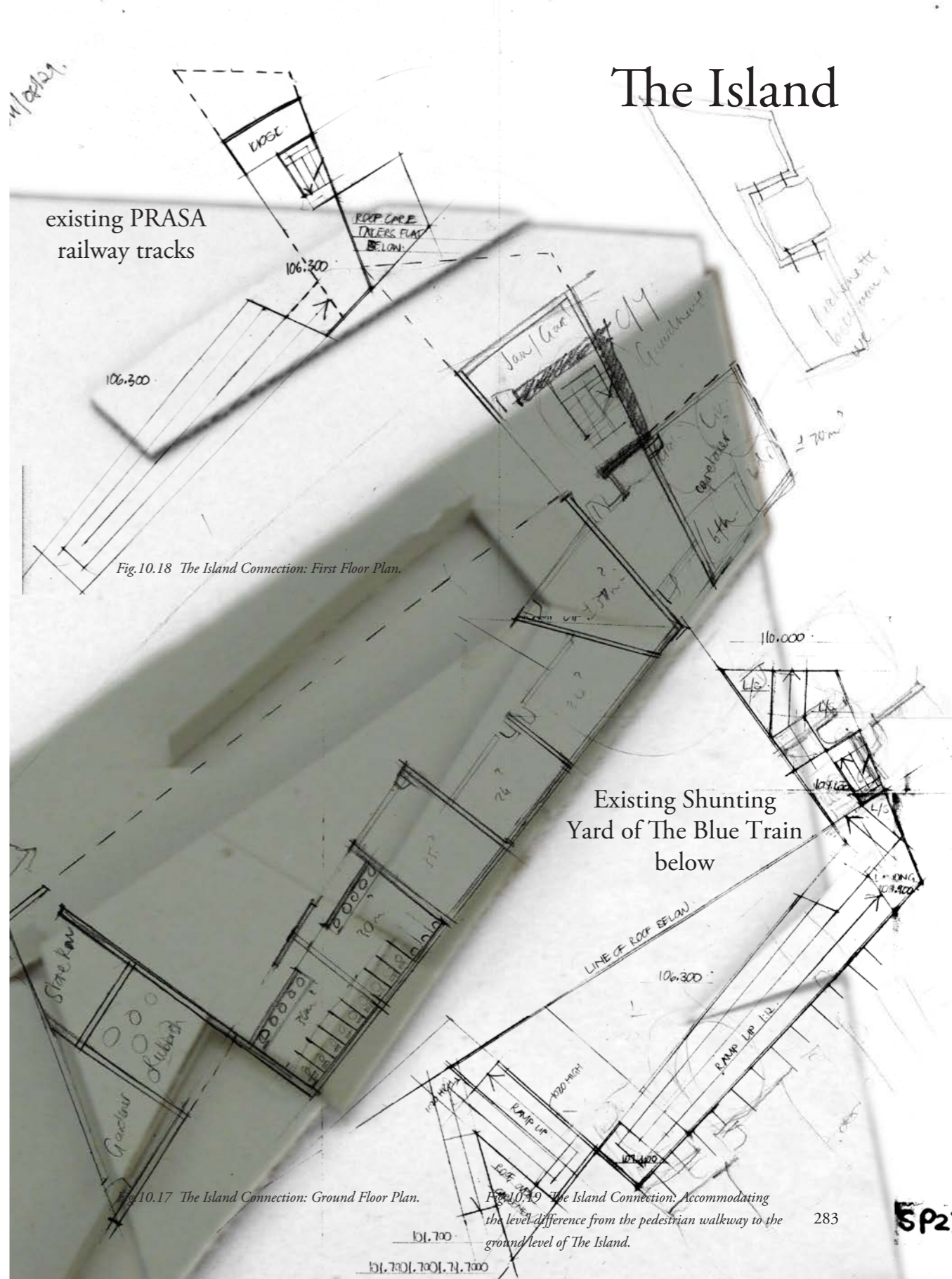


Fig.10.18 The Island Connection: First Floor Plan.

Fig.10.17 The Island Connection: Ground Floor Plan.

Fig.10.19 The Island Connection: Accommodating the level difference from the pedestrian walkway to the ground level of The Island.

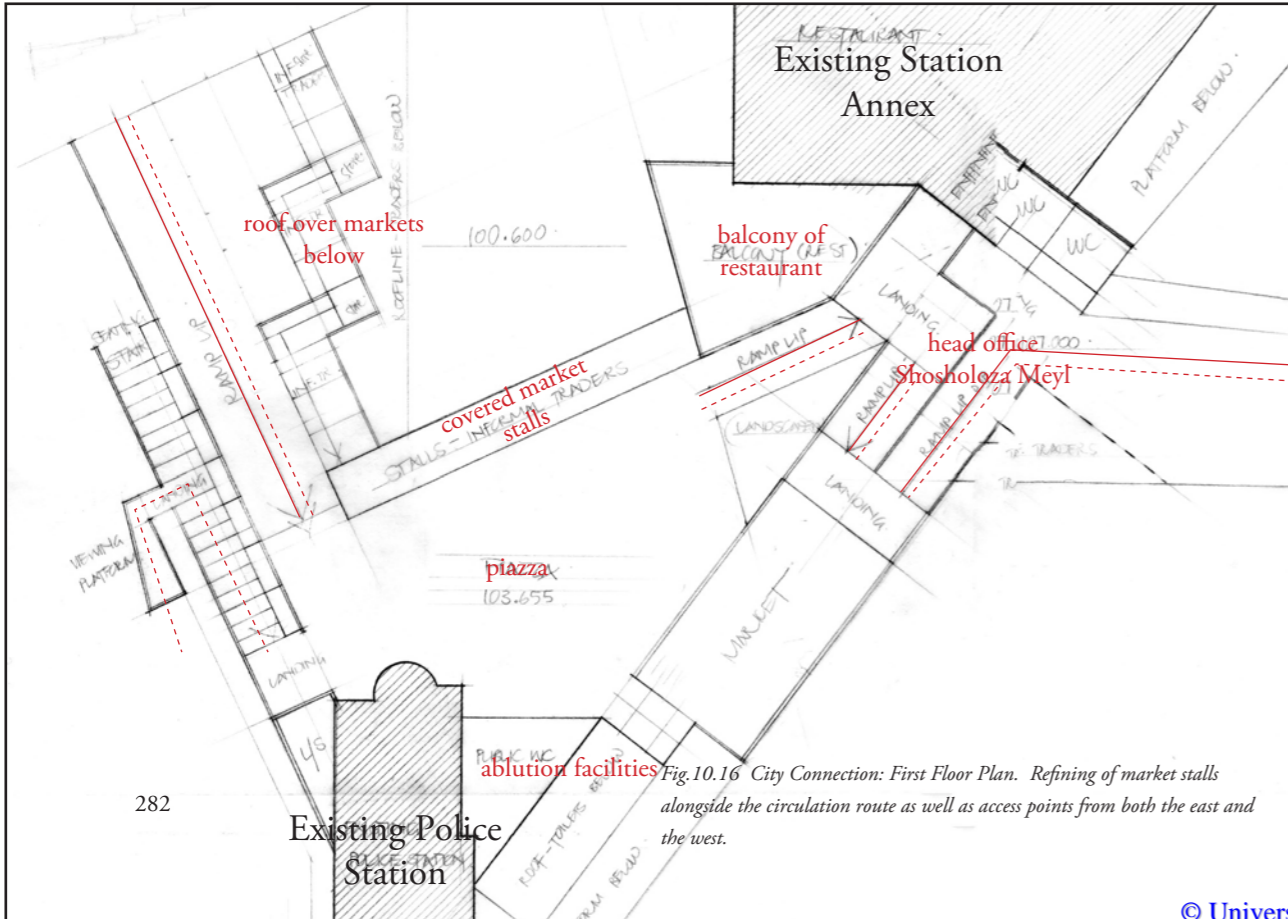


Fig.10.16 City Connection: First Floor Plan. Refining of market stalls alongside the circulation route as well as access points from both the east and the west.

Legend:

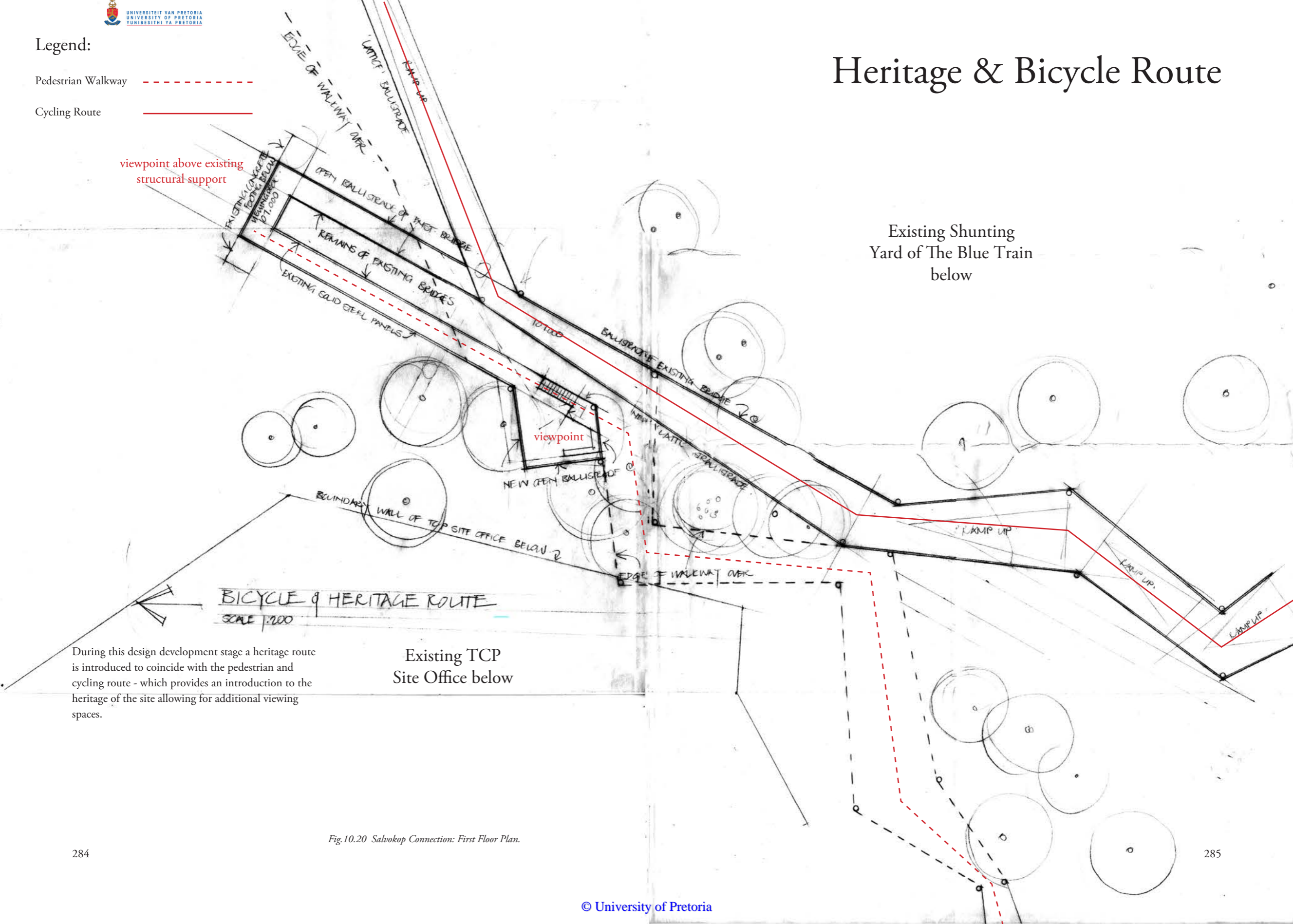
Pedestrian Walkway - - - - -

Cycling Route —————

# Heritage & Bicycle Route

viewpoint above existing structural support

Existing Shunting Yard of The Blue Train below

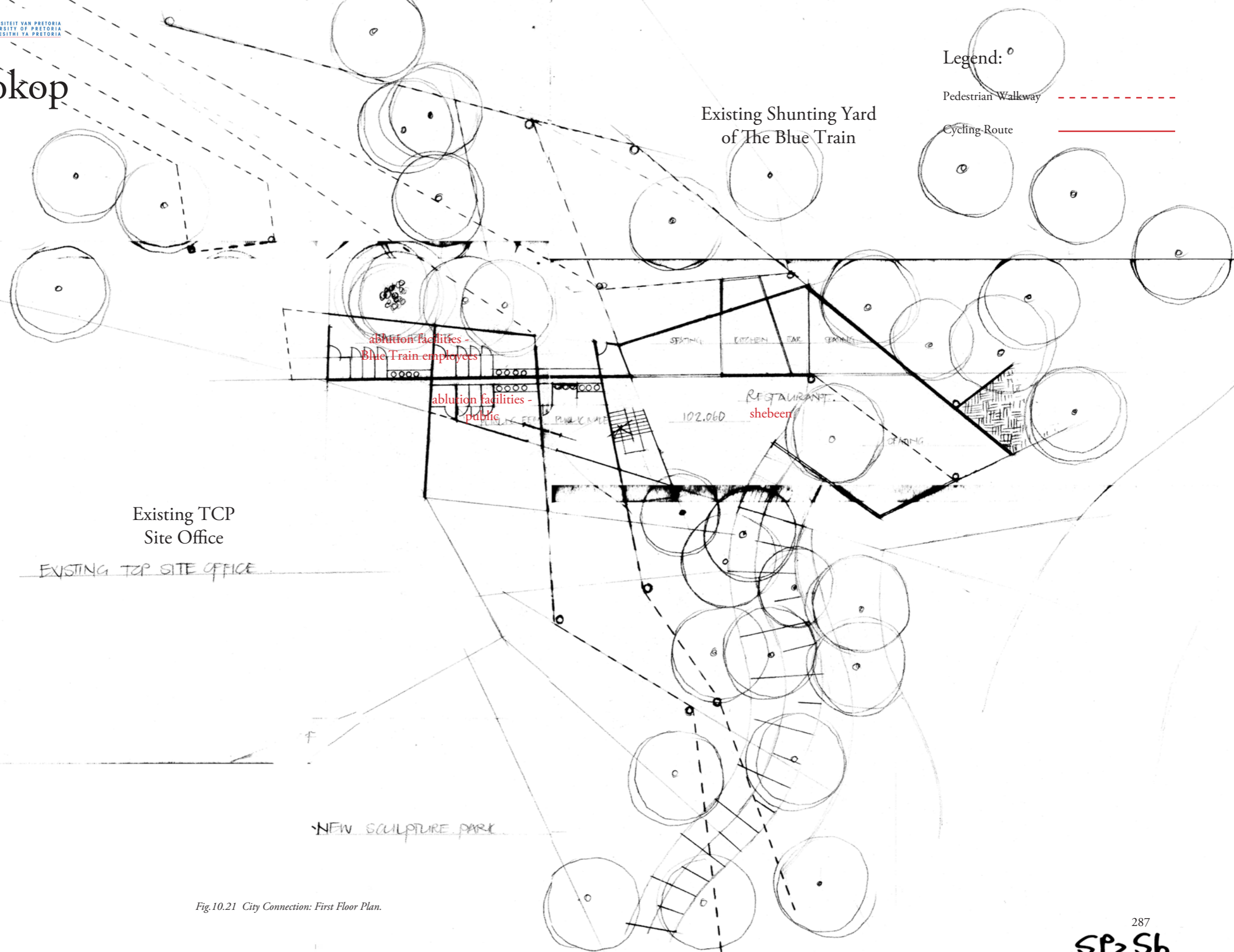




During this design development stage a heritage route is introduced to coincide with the pedestrian and cycling route - which provides an introduction to the heritage of the site allowing for additional viewing spaces.

Existing TCP Site Office below

Fig.10.20 Salvokop Connection: First Floor Plan.

# Salvokop



Legend:  
Pedestrian Walkway   
Cycling-Route 

Existing TCP  
Site Office

EXISTING TCP SITE OFFICE

NEW SCULPTURE PARK

Existing Shunting Yard  
of The Blue Train

ablution facilities -  
Blue Train employees

ablution facilities -  
public

RESTAURANT  
shebeen

SEATING KITCHEN BAR SEATING

102.060

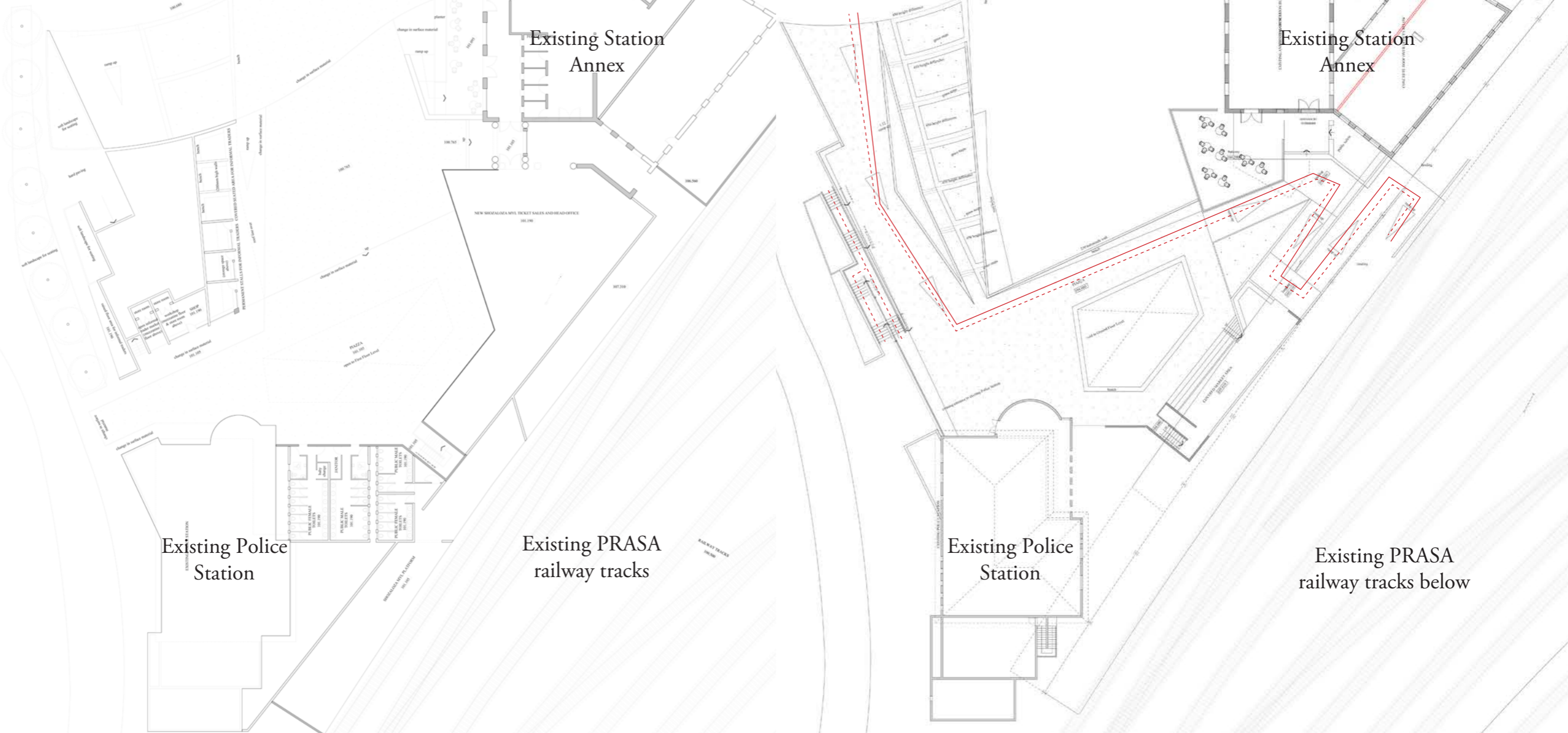
Fig.10.21 City Connection: First Floor Plan.

Legend:

Pedestrian Walkway 

Cycling Route 

Fig.10.22 City Connection: Ground Floor Plan.



# Design Development

## Stage 3 (2012/04/16 - 2012/06/31)

Fig.10.23 City Connection: First Floor Plan.



Legend:

Pedestrian Walkway

Cycling Route

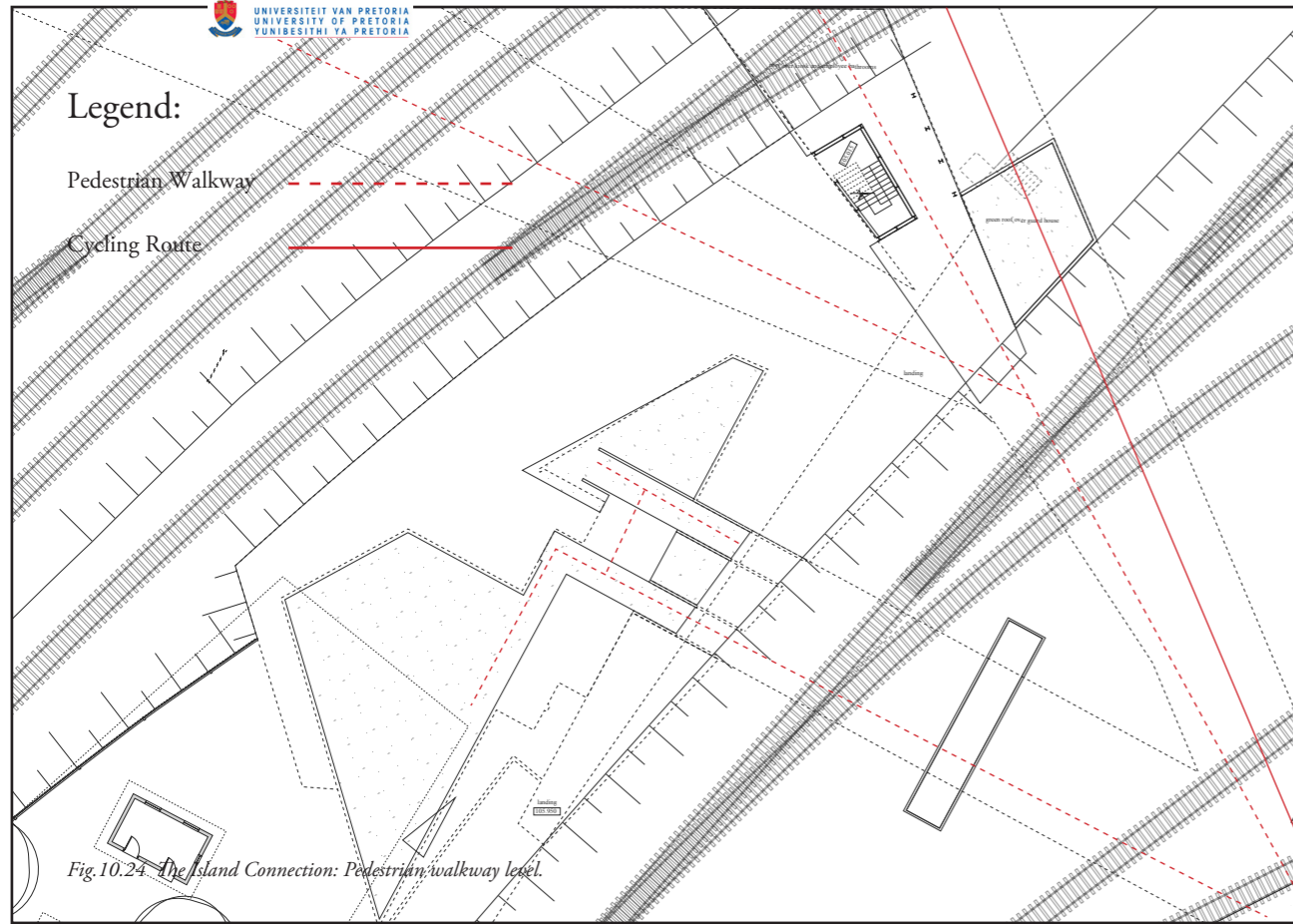


Fig.10.24 The Island Connection: Pedestrian walkway level.

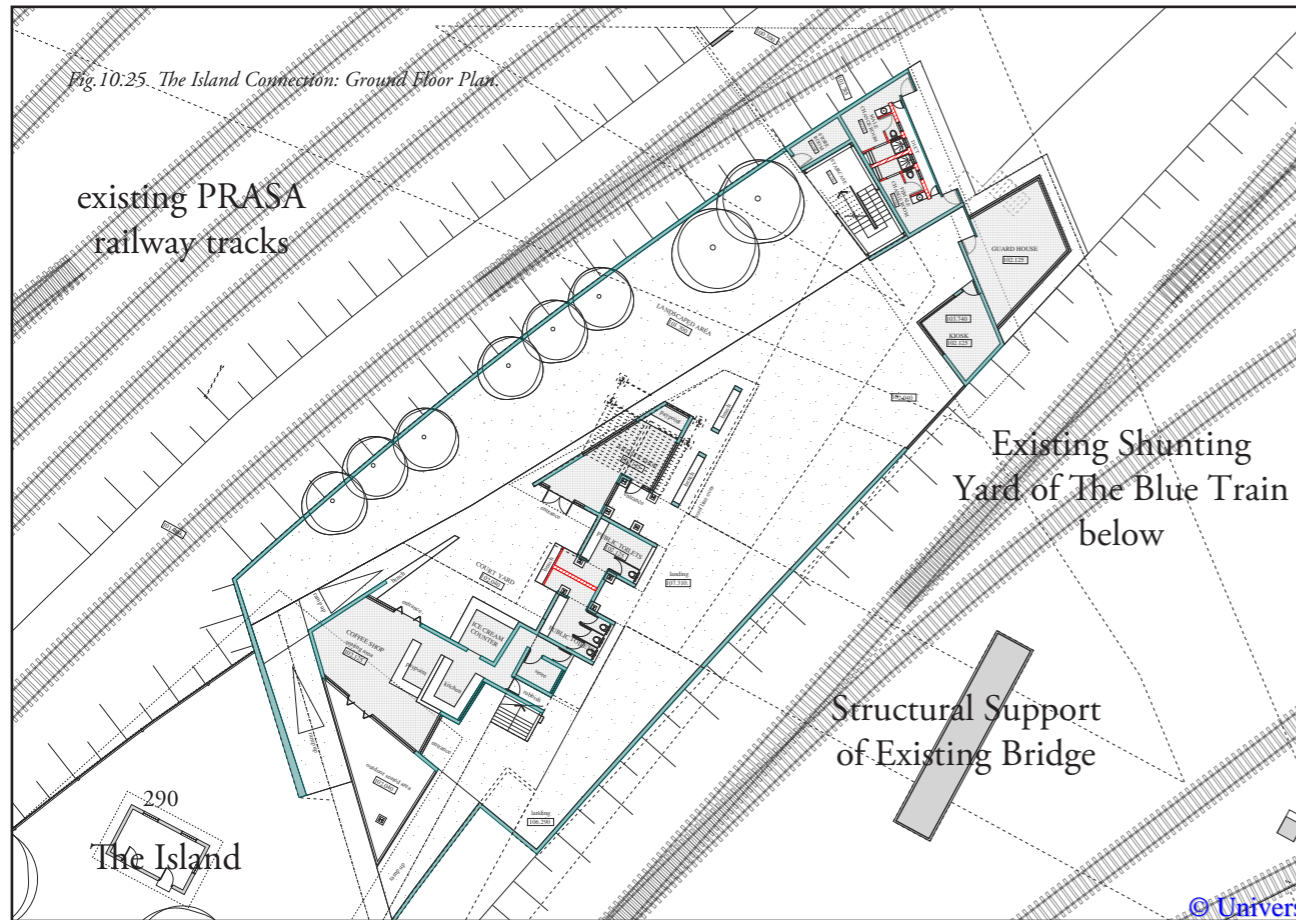
Fig.10.25 The Island Connection: Ground Floor Plan.

existing PRASA  
railway tracks

Existing Shunting  
Yard of The Blue Train  
below

Structural Support  
of Existing Bridge

290  
The Island



# Island

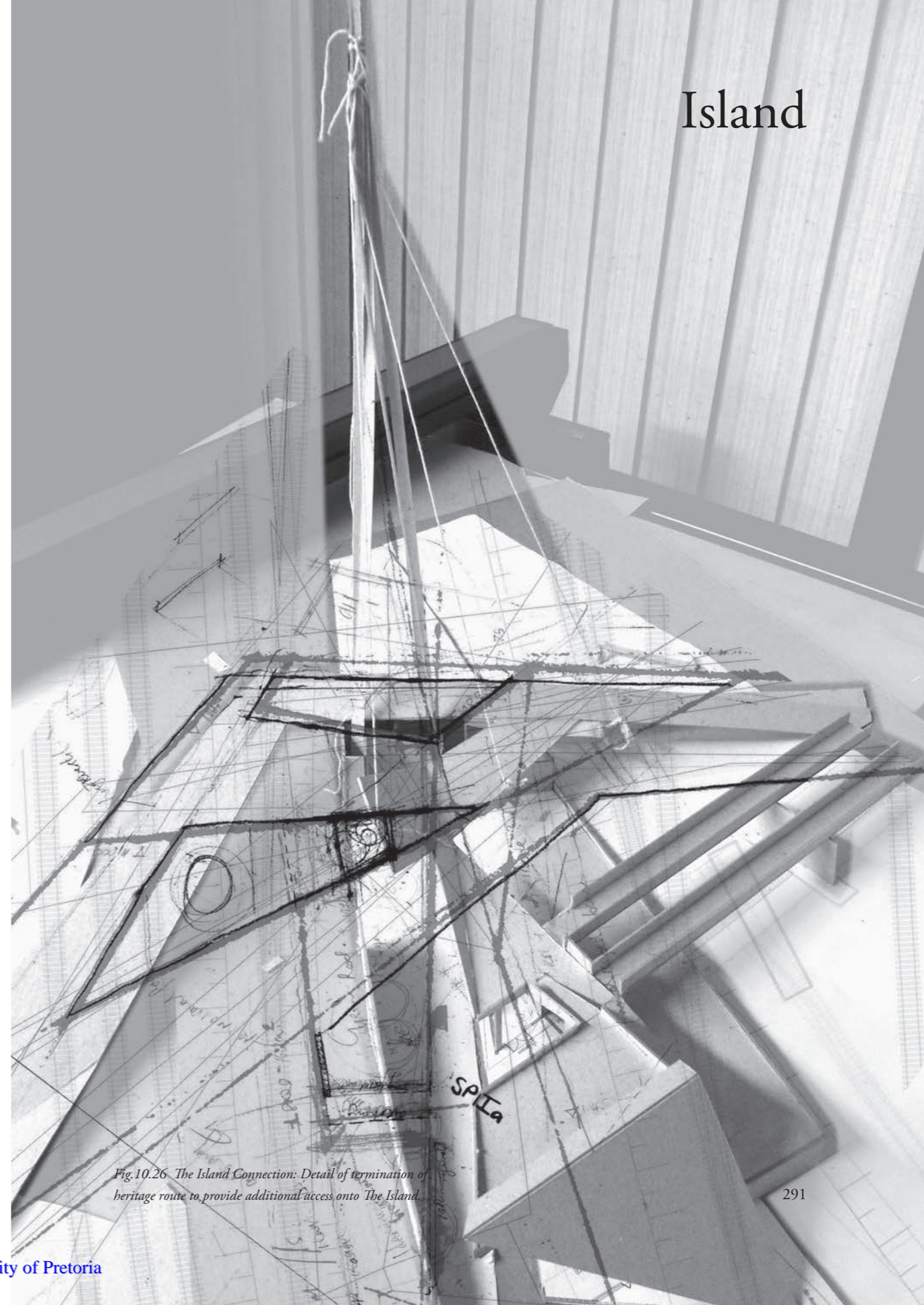


Fig.10.26 The Island Connection: Detail of termination of heritage route to provide additional access onto The Island.

# Bicycle & Heritage/ Pedestrian Route

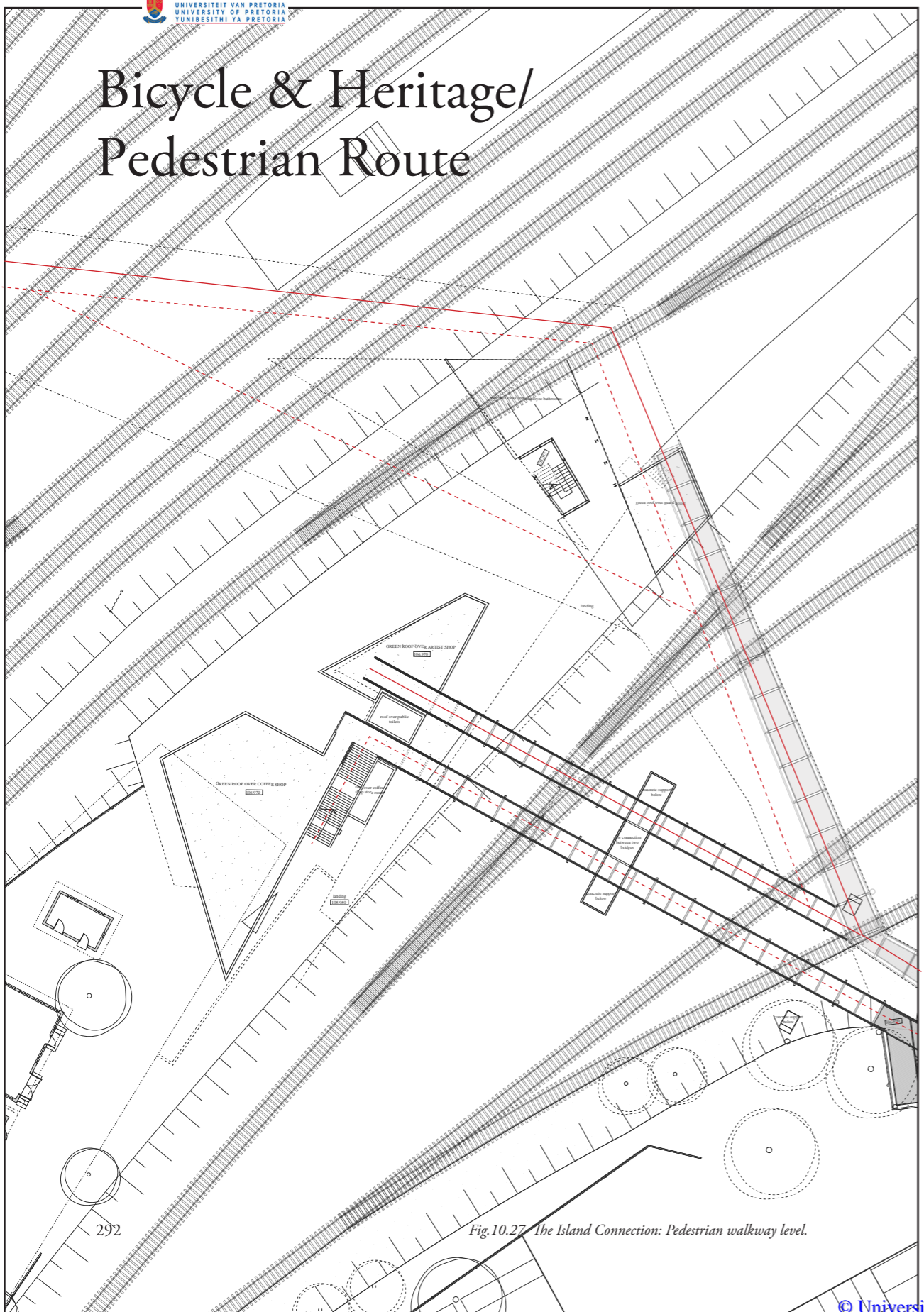


Fig.10.27 The Island Connection: Pedestrian walkway level.

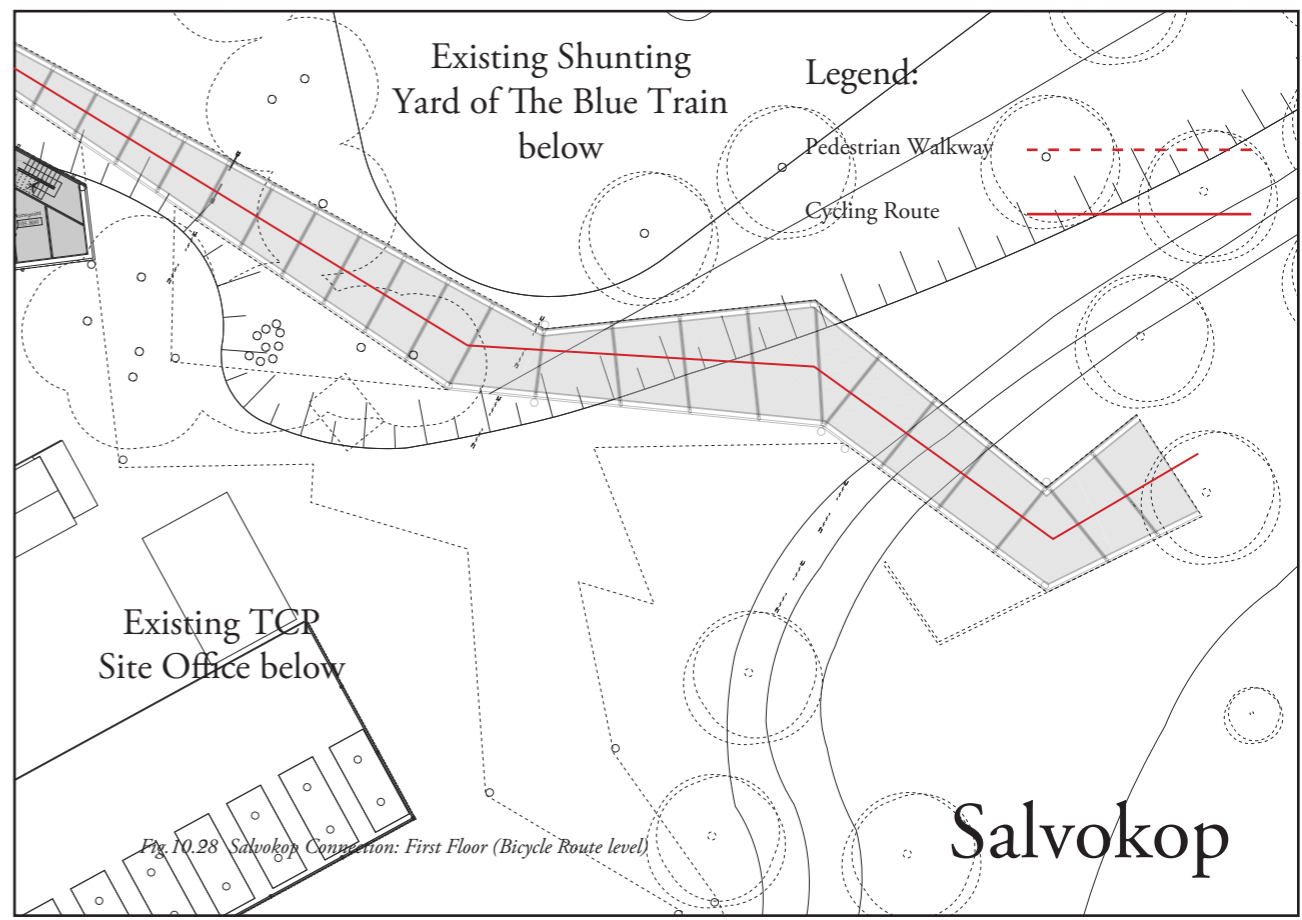


Fig.10.28 Salvokop Connection: First Floor (Bicycle Route level)



Fig.10.29 Salvokop Connection: Pedestrian walkway level.

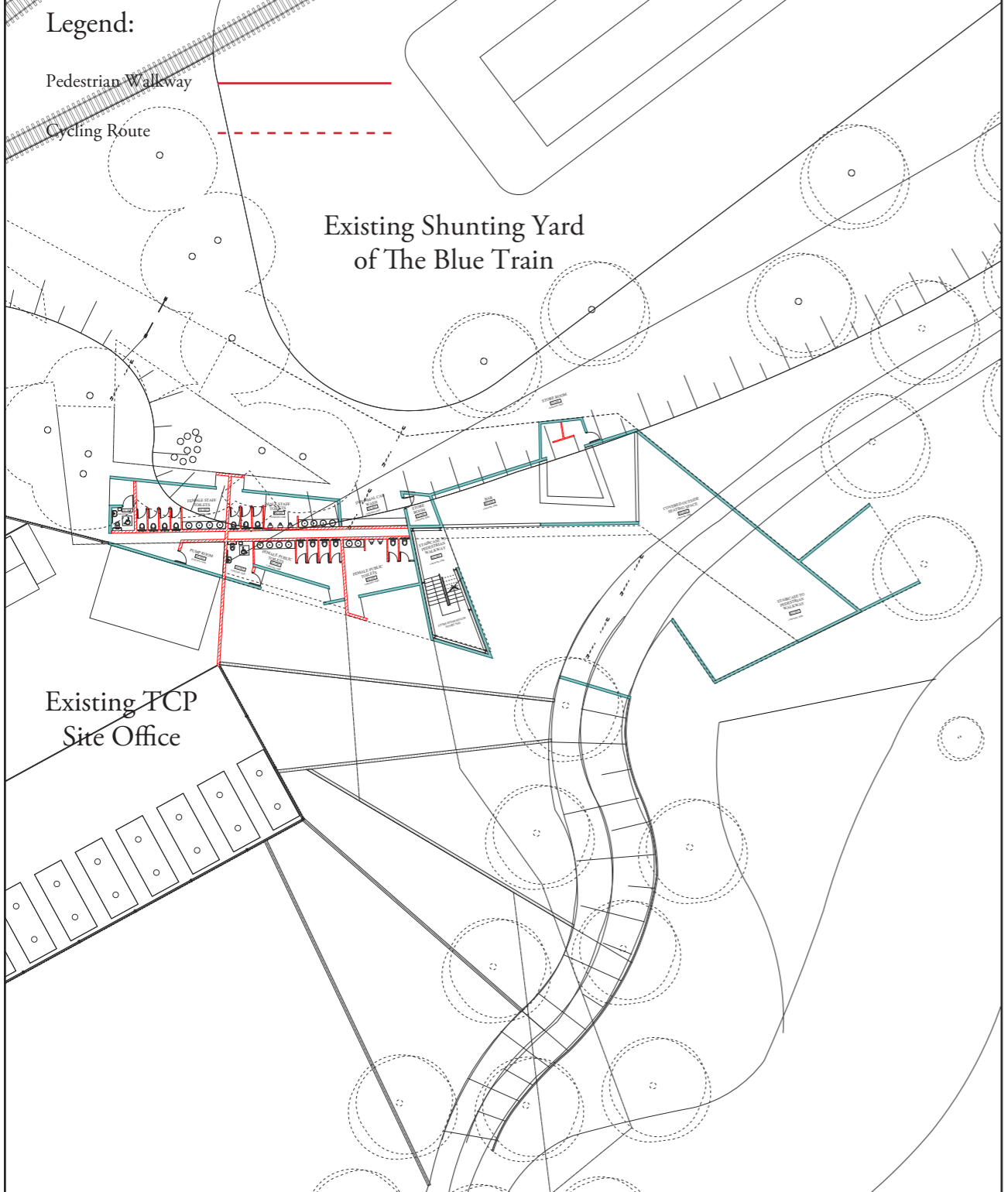


Fig.10.30 Salvokop Connection: Ground Floor Plan.

# Salvokop

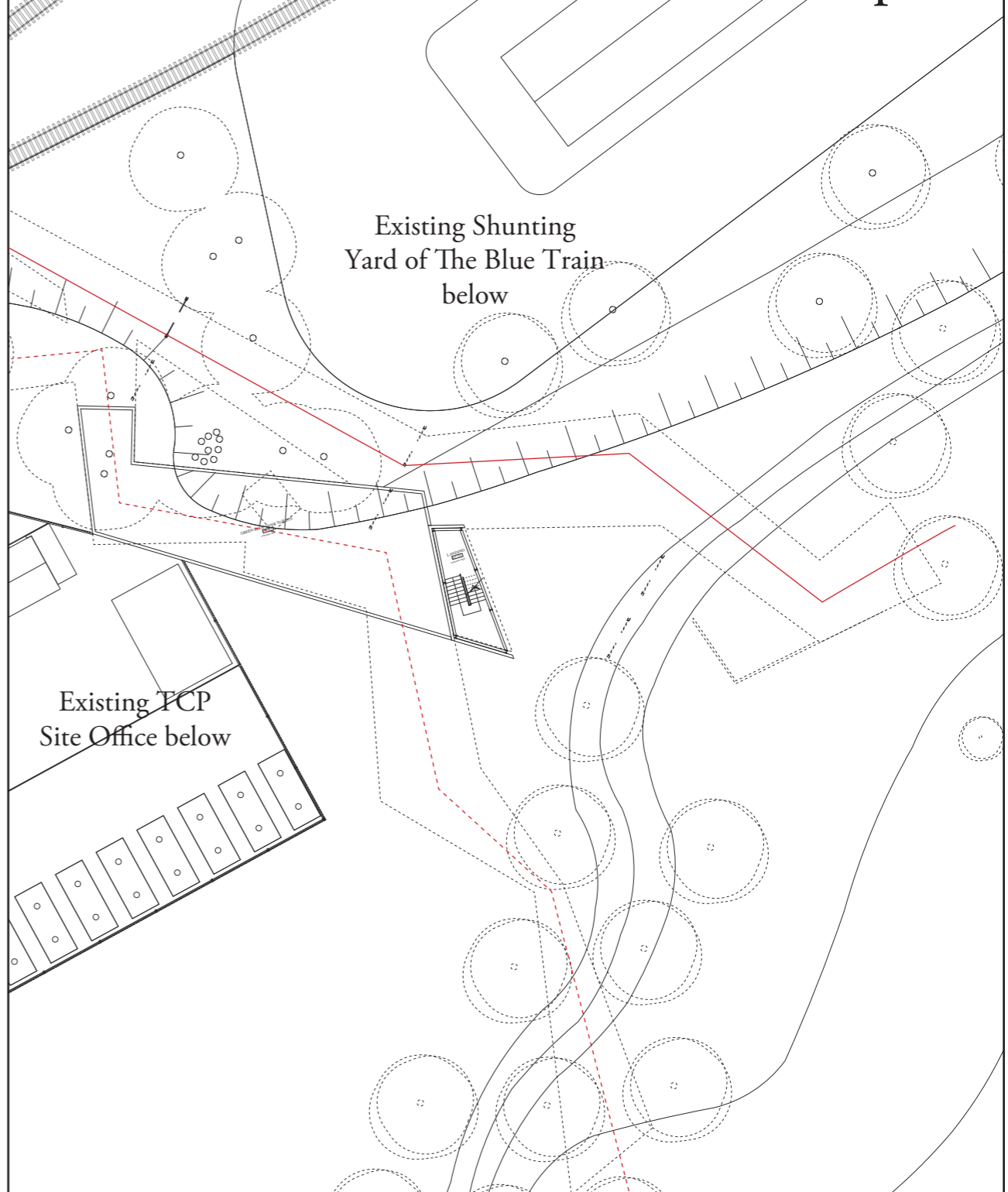


Fig.10.31 Salvokop Connection: First Floor Plan.

Fig.10.32 City Connection: Investigation of functional space and circulation on First Floor.

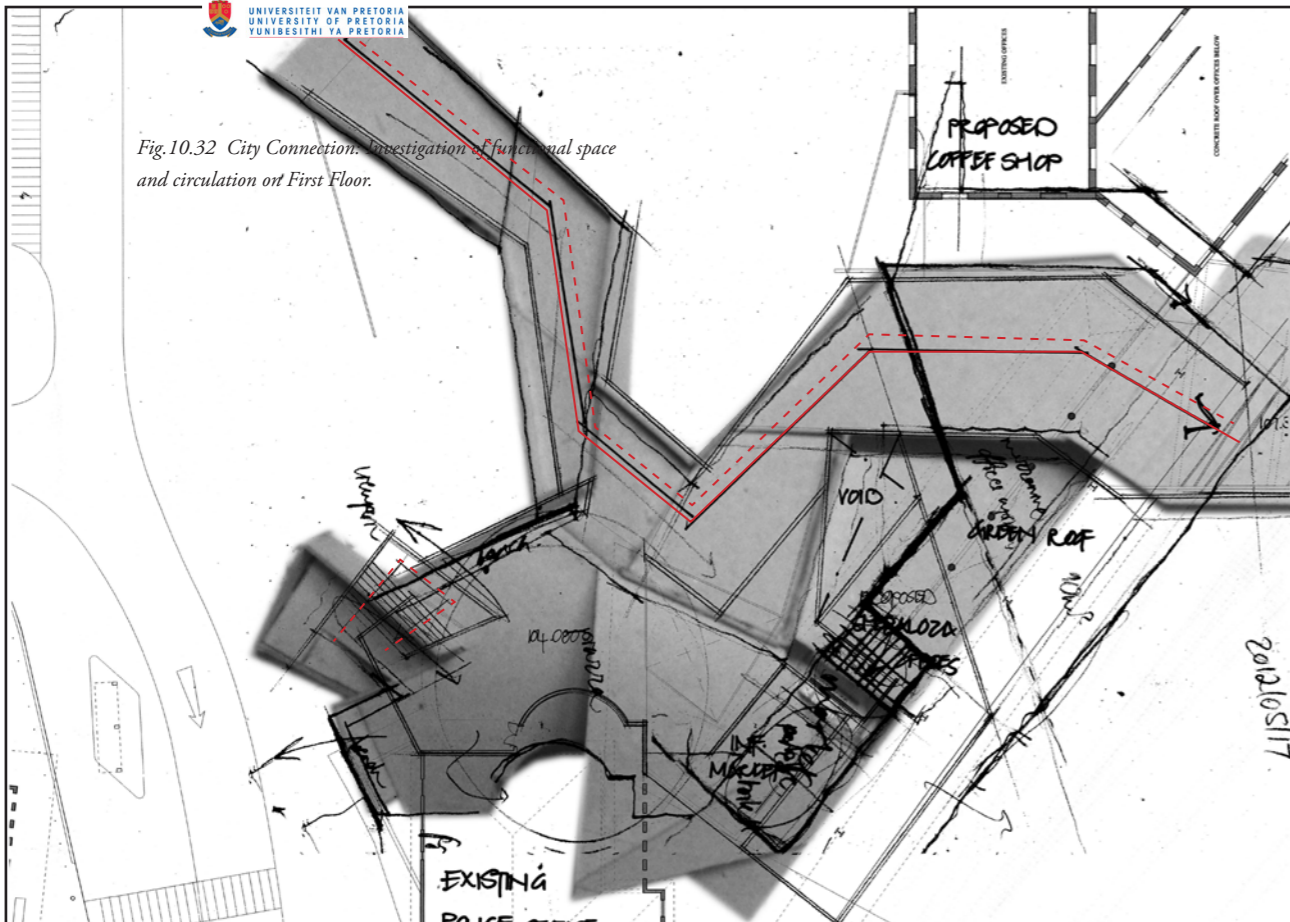
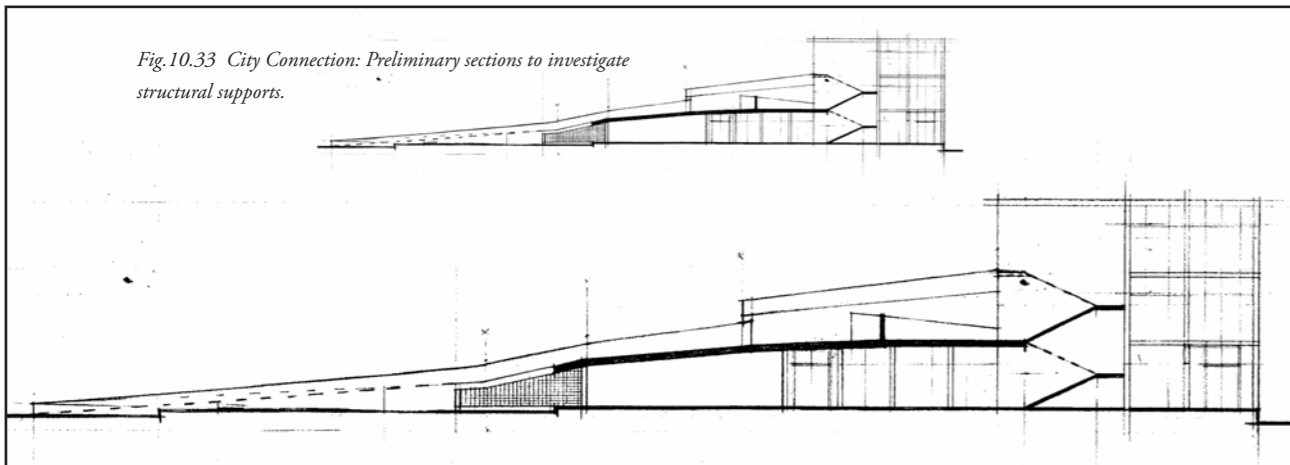


Fig.10.33 City Connection: Preliminary sections to investigate structural supports.



# Design Development

Stage 4 (2012/06/31-2013/07/31)

## Legend:

- Pedestrian Walkway - - - - -
- Cycling Route —————

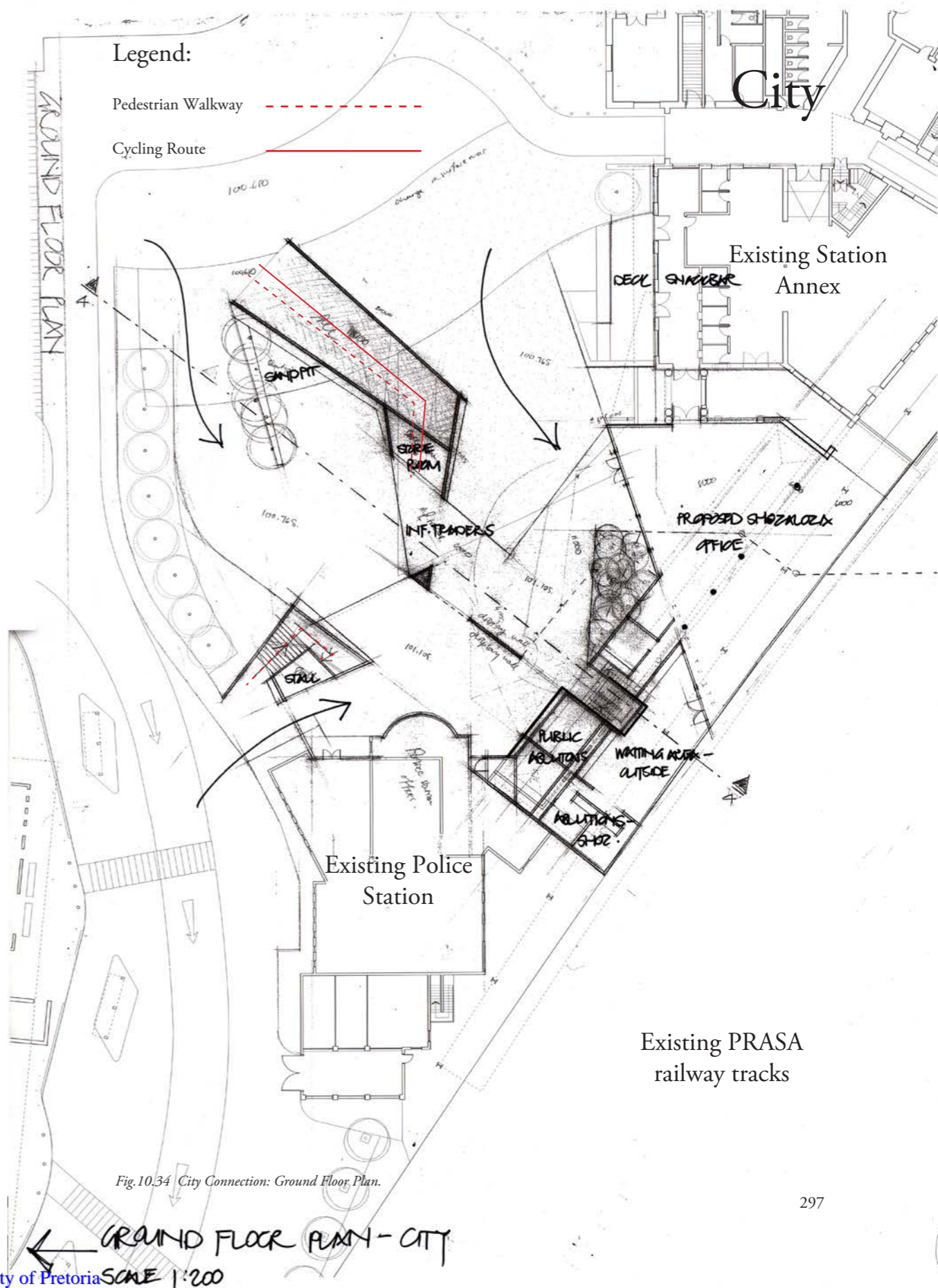


Fig.10.34 City Connection: Ground Floor Plan.



Existing Shunting Yard  
of The Blue Train

# Salvokop

Legend:

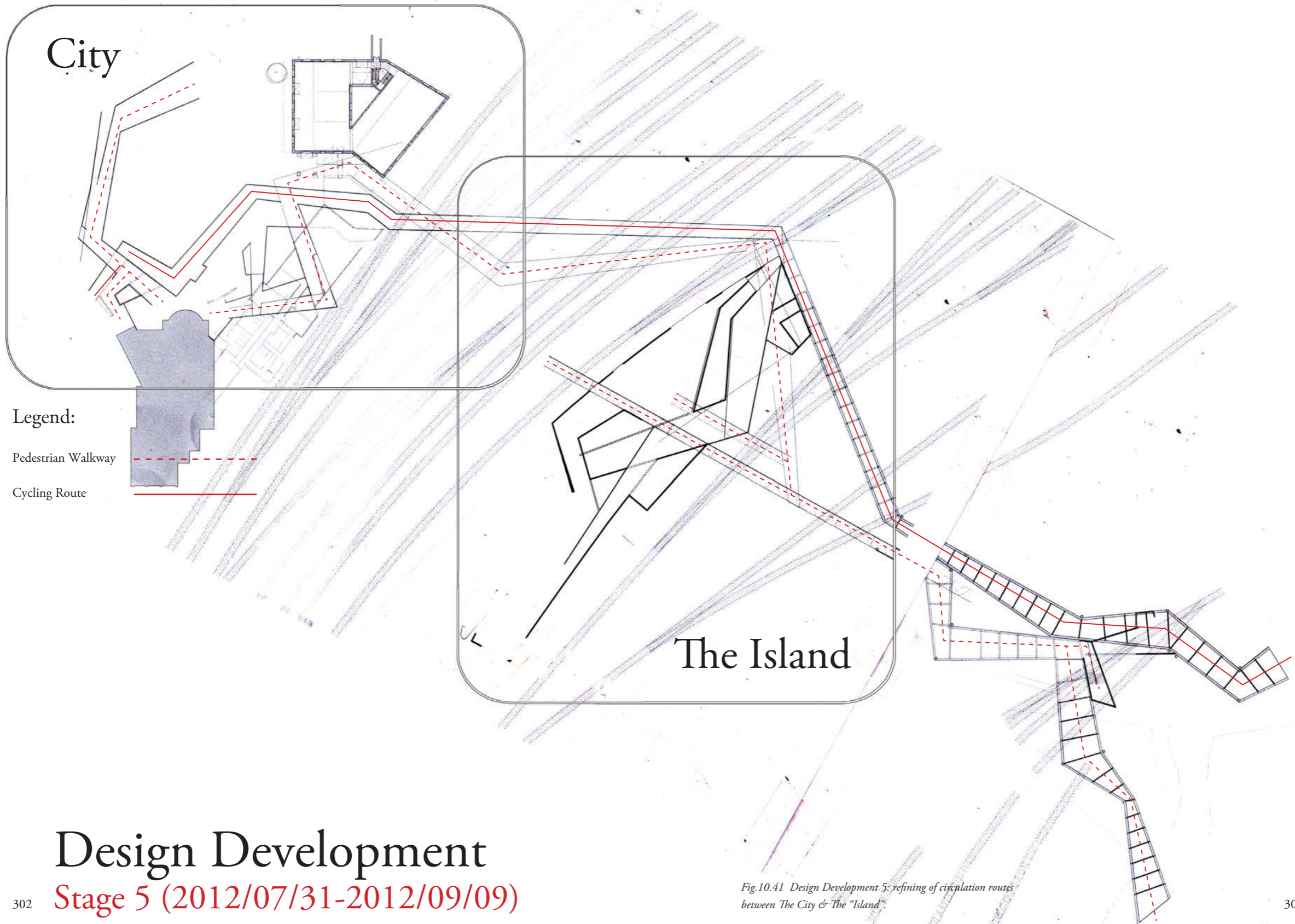
Pedestrian Walkway 

Cycling Route 

Existing TCP  
Site Office

Remains of Original  
Maintenance Yard

Fig.10.40 Salvokop Connection: Ground Floor overlaid by First Floor Plan to investigate structural support and circulation routes.



# Design Development

302 Stage 5 (2012/07/31-2012/09/09)

Fig.10.41 Design Development 5: refining of circulation routes between The City & The "Island".

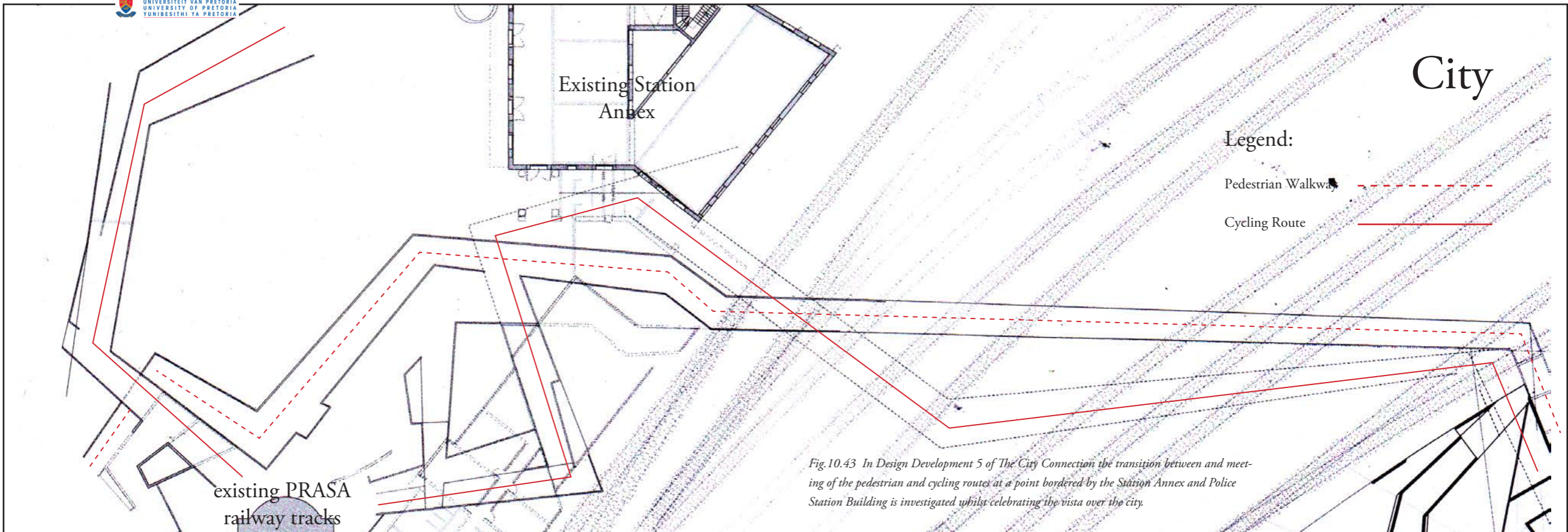


Fig.10.43 In Design Development 5 of The City Connection the transition between and meeting of the pedestrian and cycling routes at a point bordered by the Station Annex and Police Station Building is investigated whilst celebrating the vista over the city.

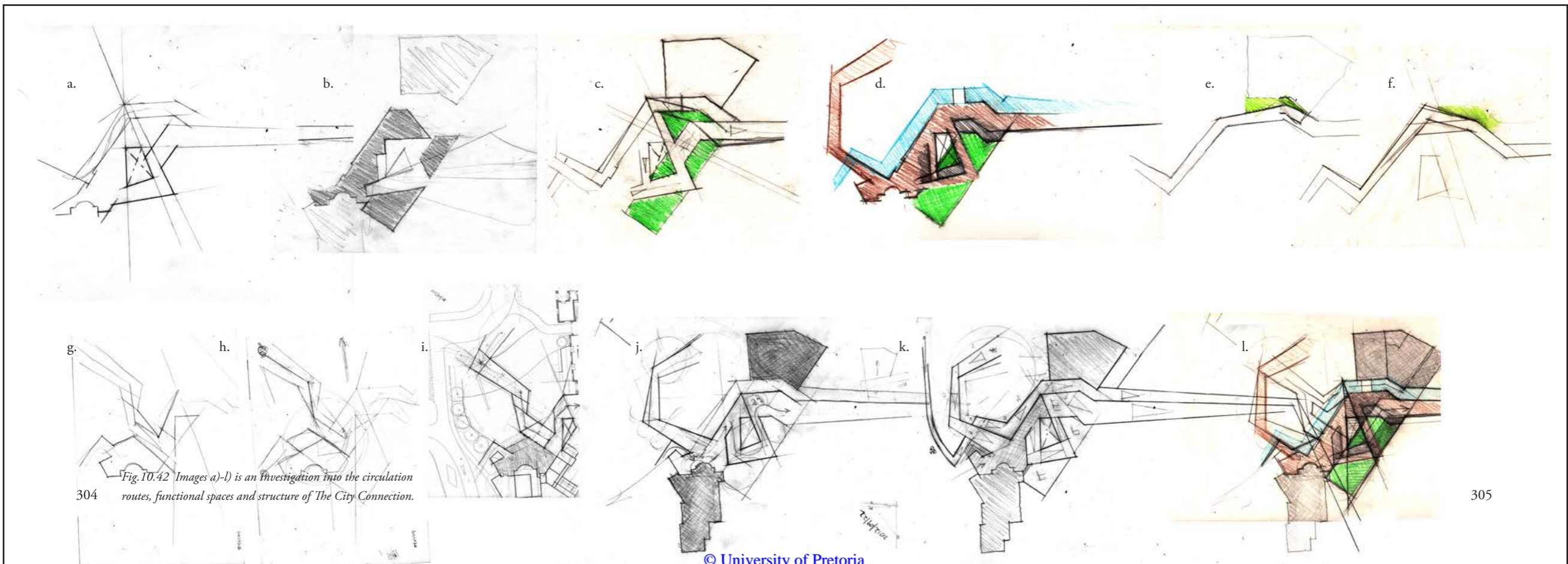
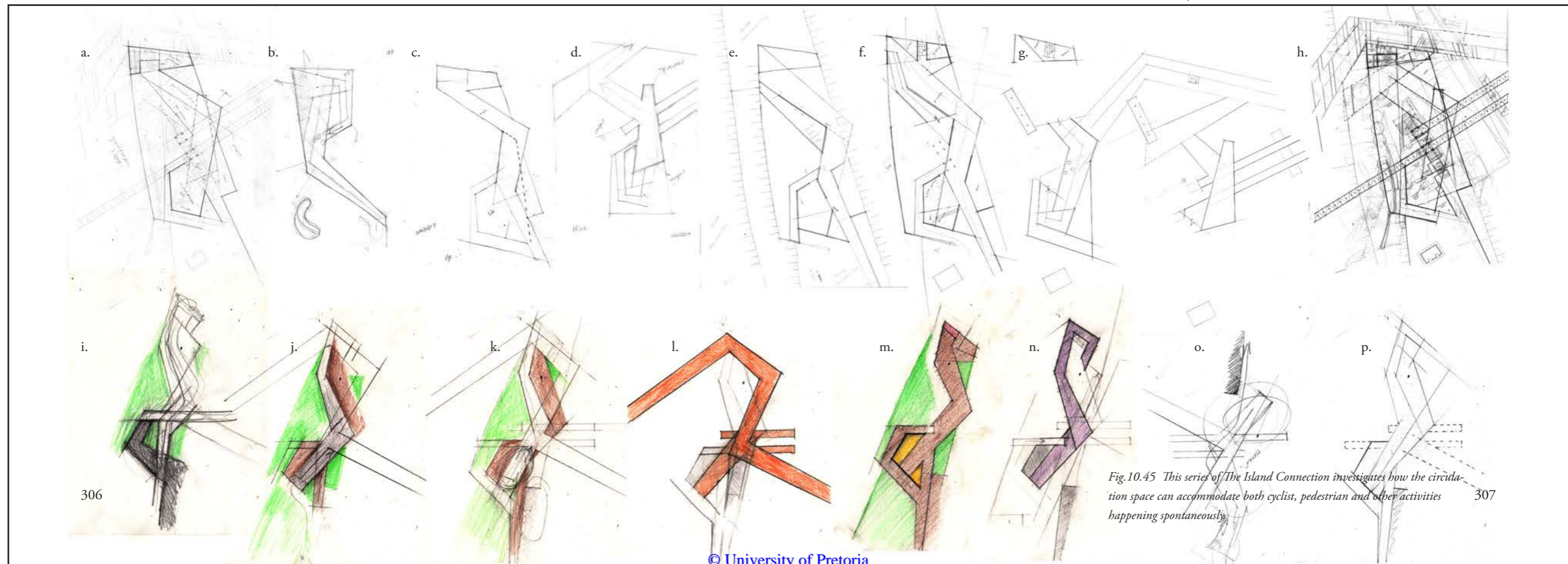
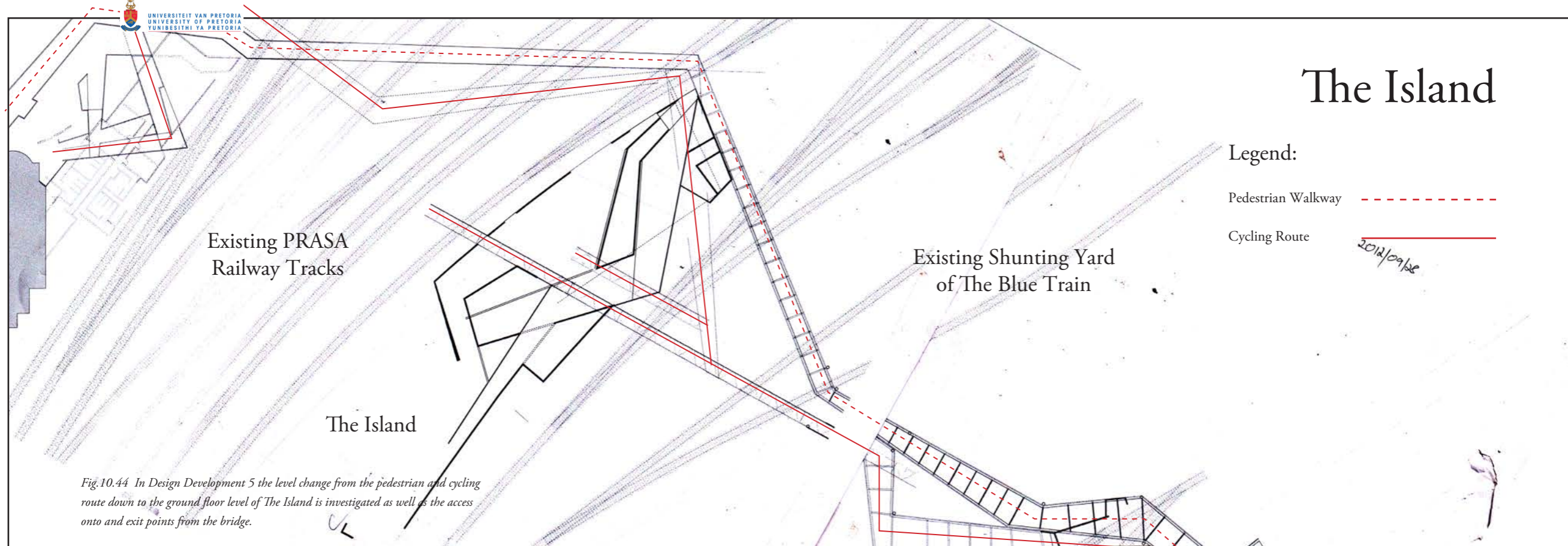


Fig.10.42 Images a-l) is an investigation into the circulation routes, functional spaces and structure of The City Connection.



# The Island



Legend:

- Pedestrian Walkway ———
- Cycling Route - - - - -

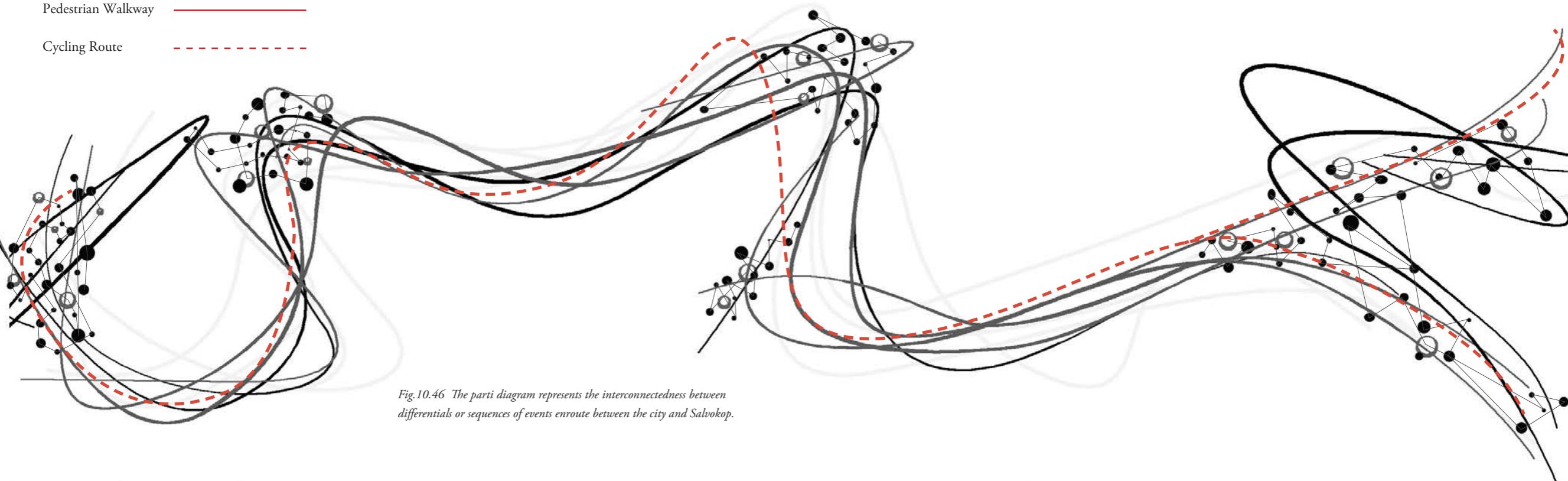


Fig.10.46 The parti diagram represents the interconnectedness between differentials or sequences of events enroute between the city and Salvokop.

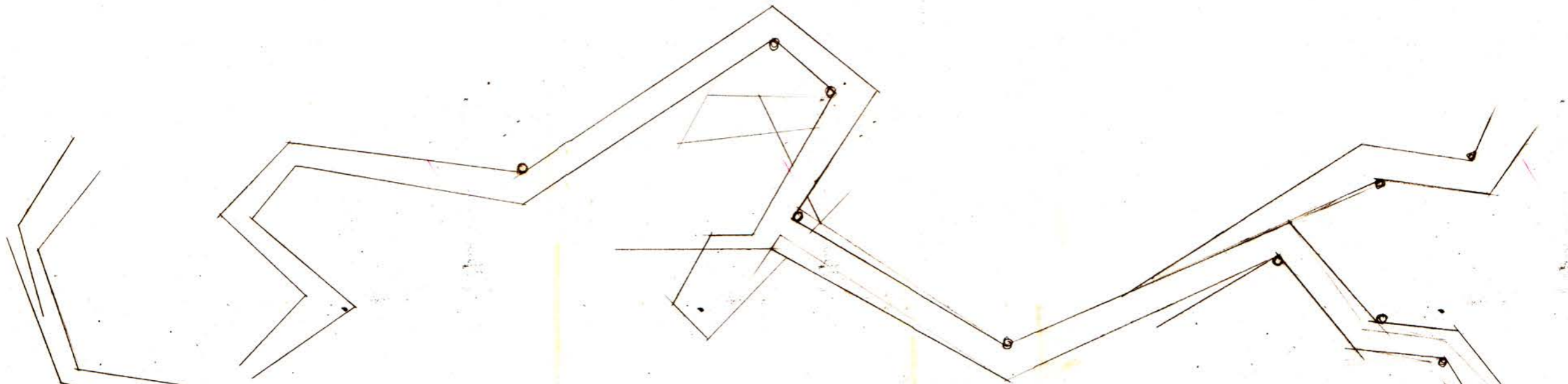


Fig.10.47 The resulting shape of the bridge consequently emerges not from a whole made up of smaller related parts, but simply parts...connected to each other to form a network.

# Design Development

Stage 6 (2012/09/09-2012/10/10)

# Bridge in totality

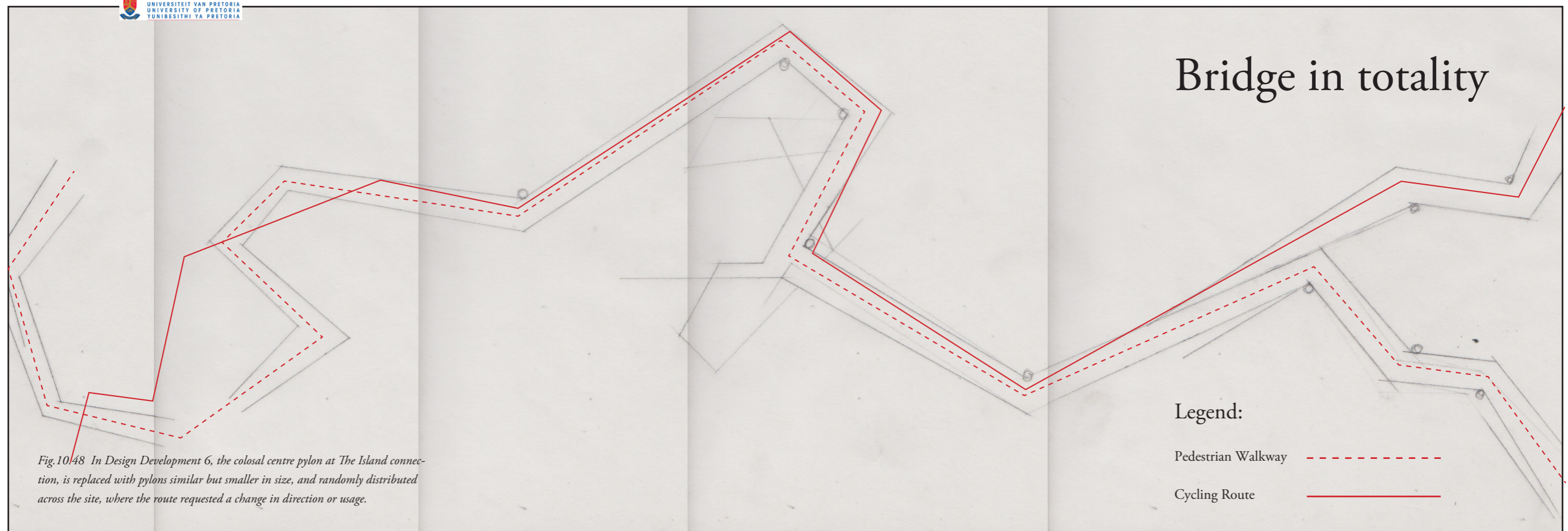


Fig.10.48 In Design Development 6, the colossal centre pylon at The Island connection, is replaced with pylons similar but smaller in size, and randomly distributed across the site, where the route requested a change in direction or usage.

Legend:  
Pedestrian Walkway - - - - -  
Cycling Route —————

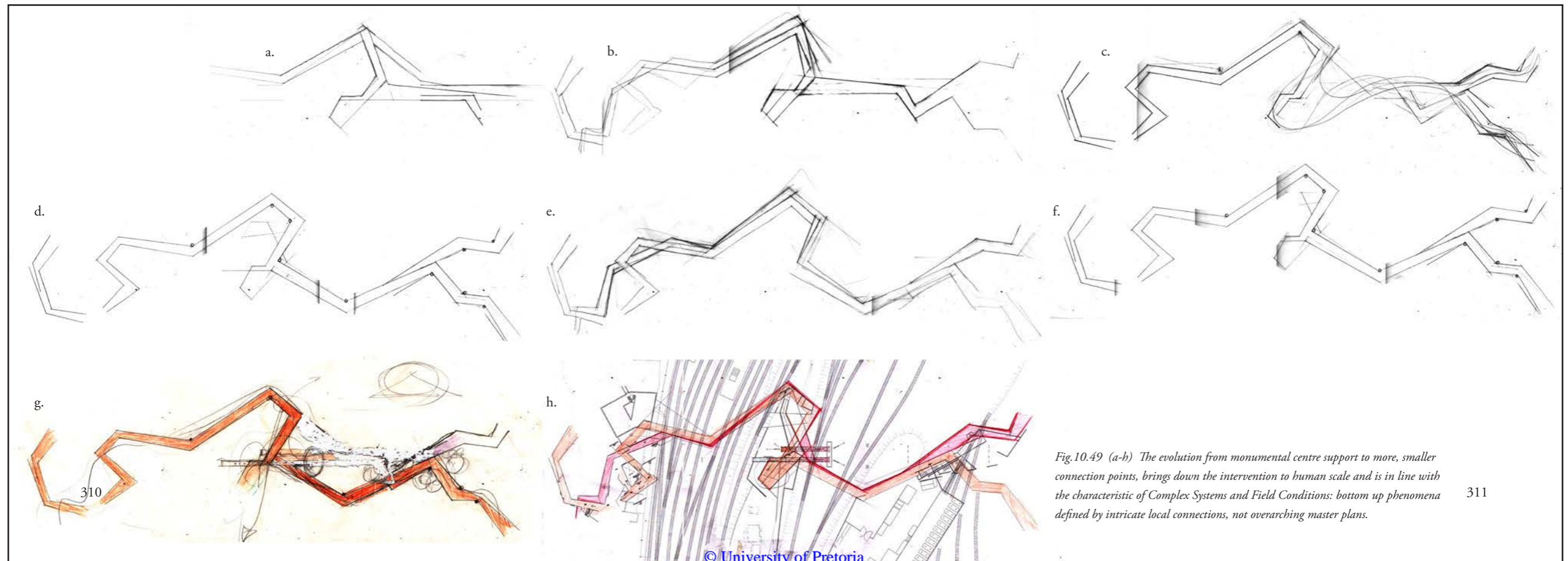


Fig.10.49 (a-h) The evolution from monumental centre support to more, smaller connection points, brings down the intervention to human scale and is in line with the characteristic of Complex Systems and Field Conditions: bottom up phenomena defined by intricate local connections, not overarching master plans.

# Salvokop - Pedestrian/ Bicycle Route

Legend:

Pedestrian Walkway - - -

Cycling Route \_ \_ \_

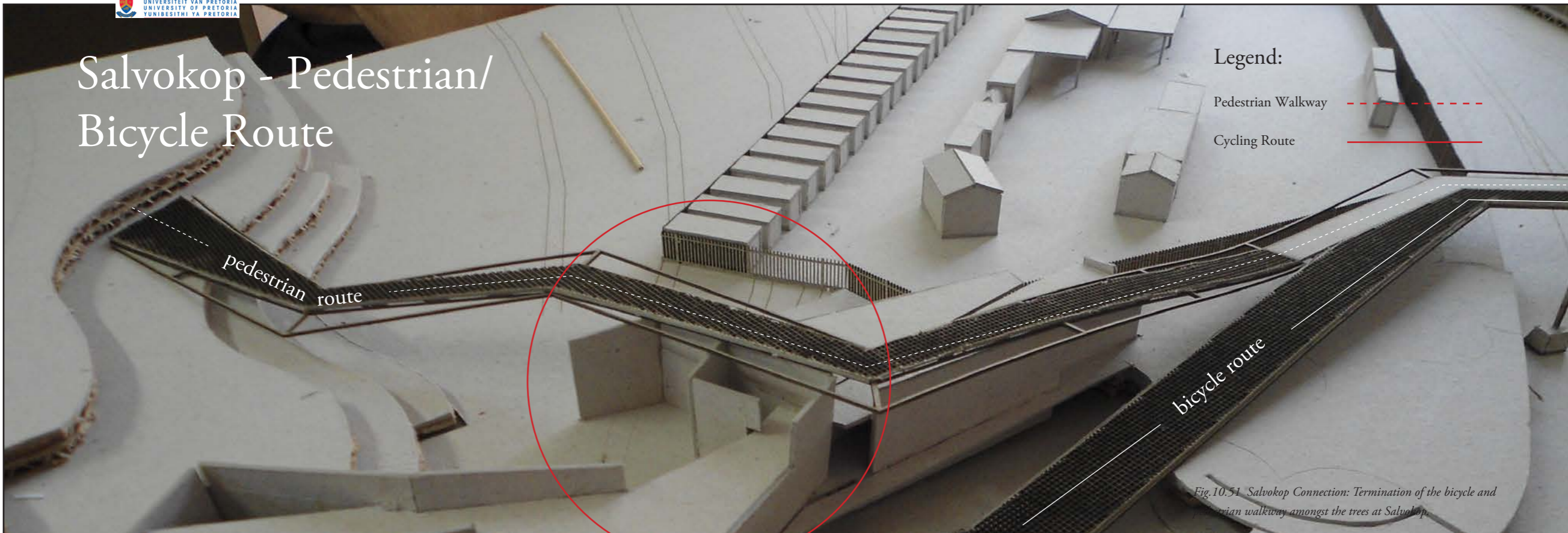


Fig.10.51 Salvokop Connection: Termination of the bicycle and pedestrian walkway amongst the trees at Salvokop.

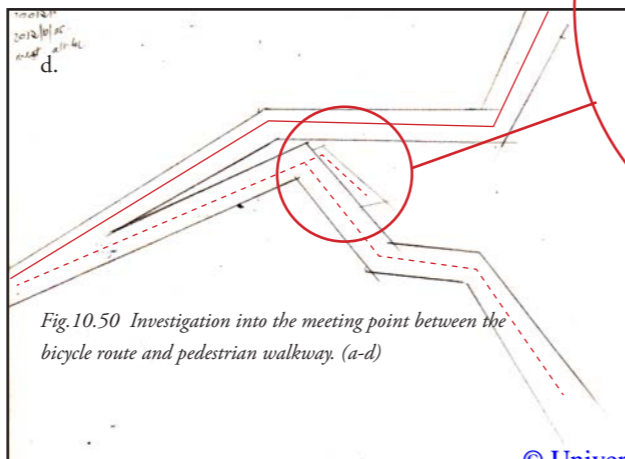
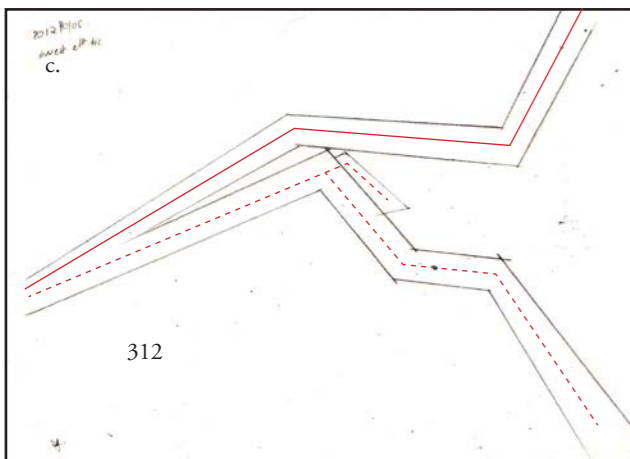
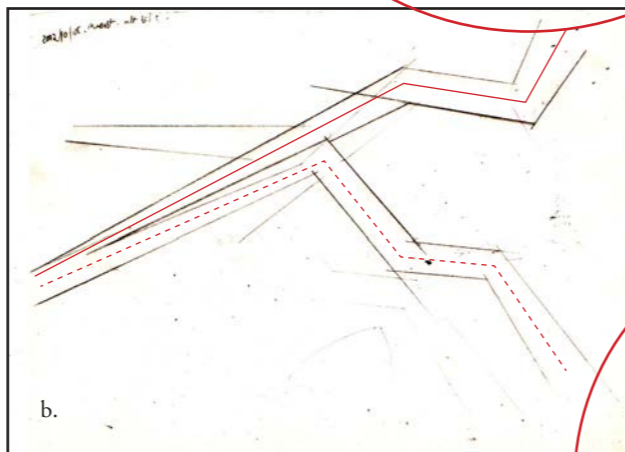
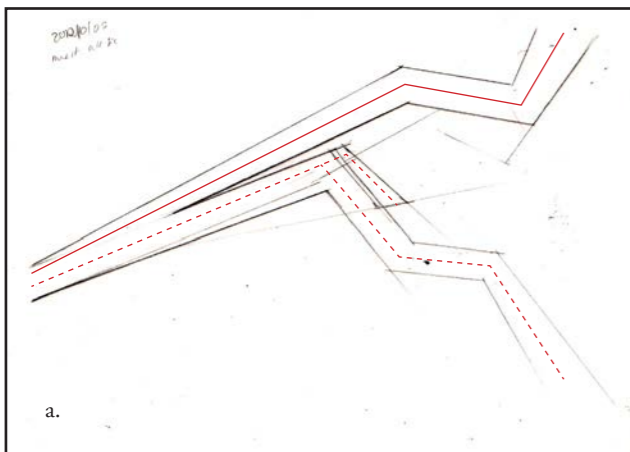


Fig.10.50 Investigation into the meeting point between the bicycle route and pedestrian walkway. (a-d)

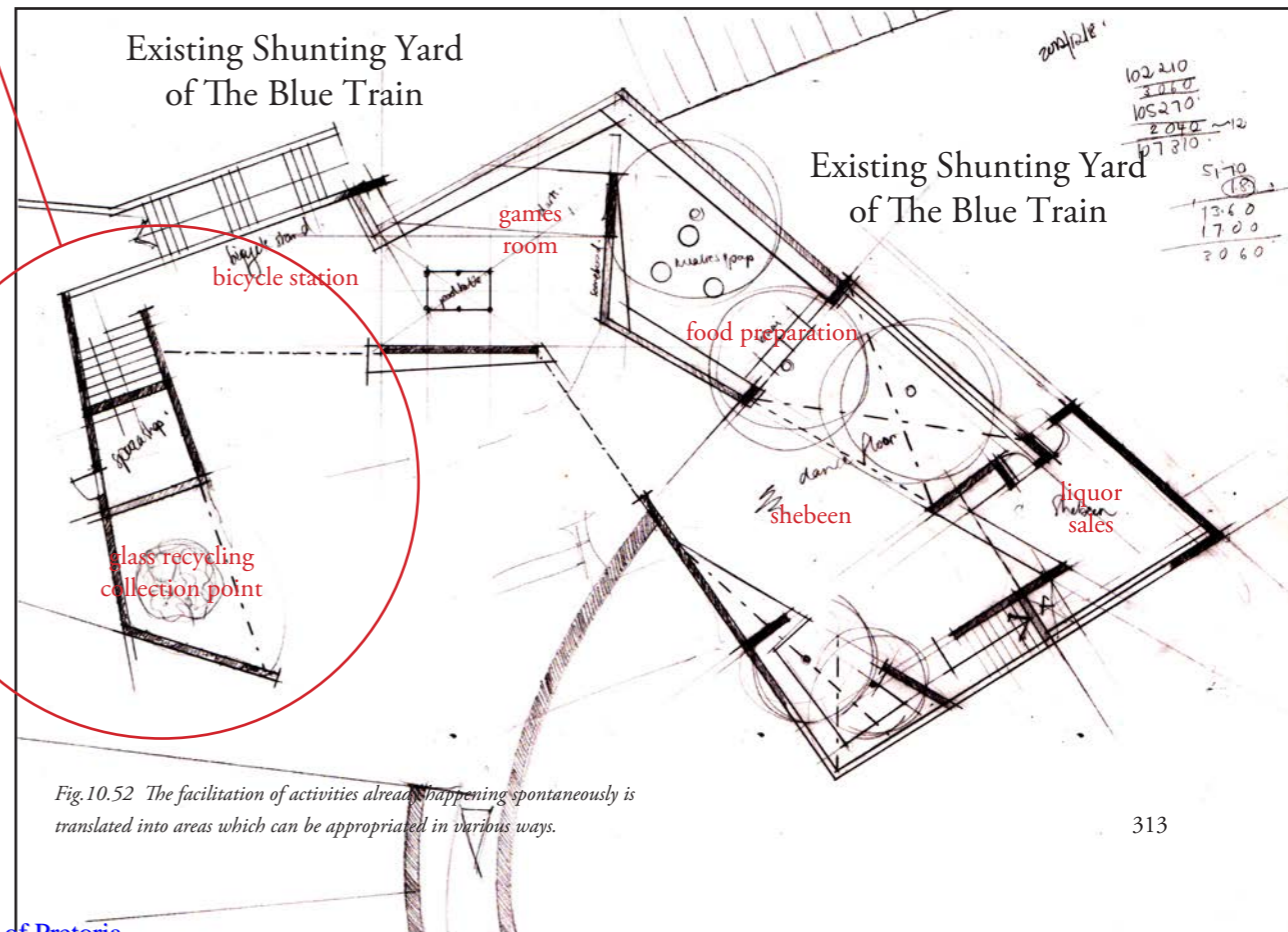


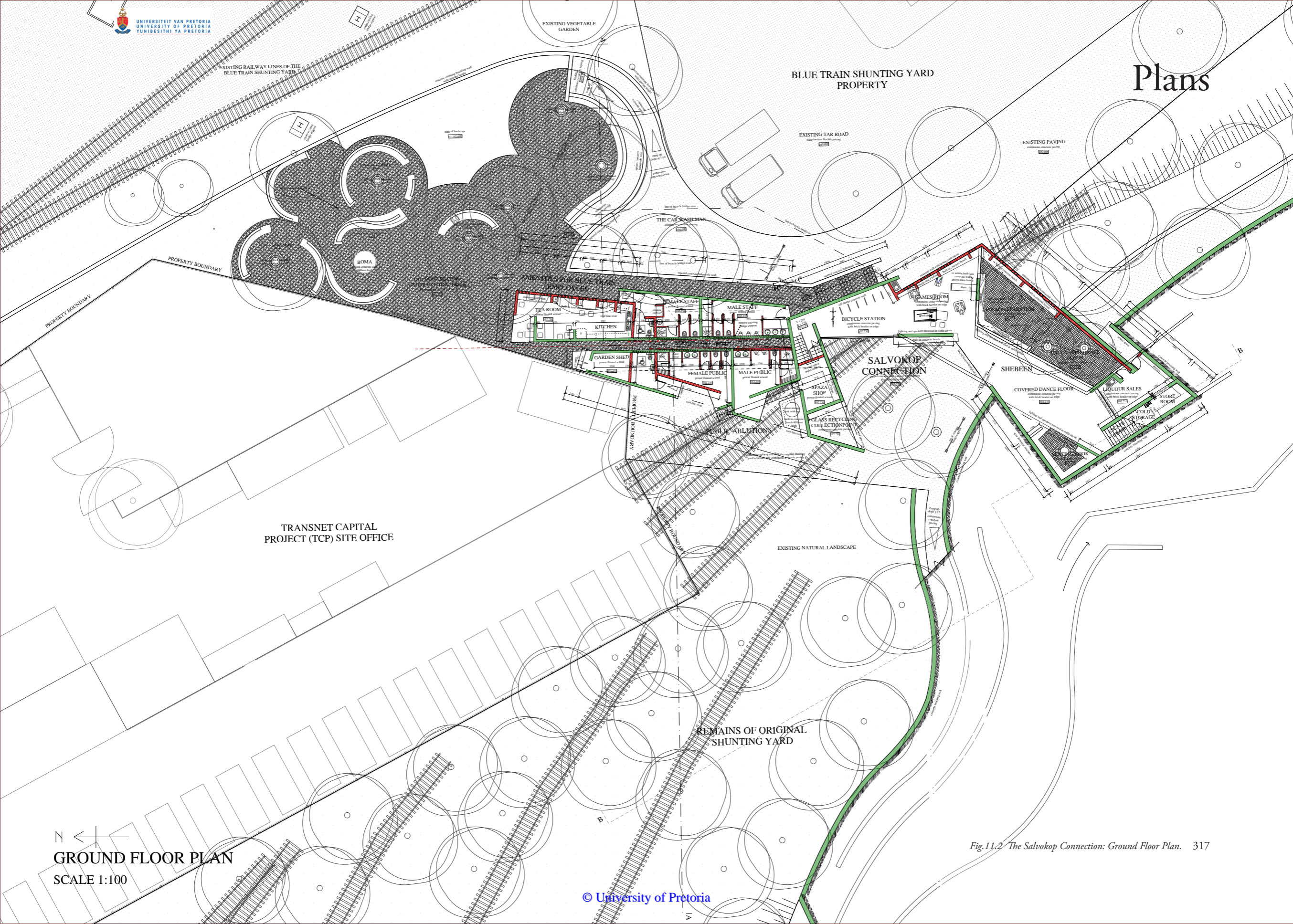
Fig.10.52 The facilitation of activities already happening spontaneously is translated into areas which can be appropriated in various ways.

# CHAPTER 11

## TECHNICAL RESOLUTION

"Friendship isn't a big thing. It is a million small things."  
(Ben Mpho Petelele, 2011)

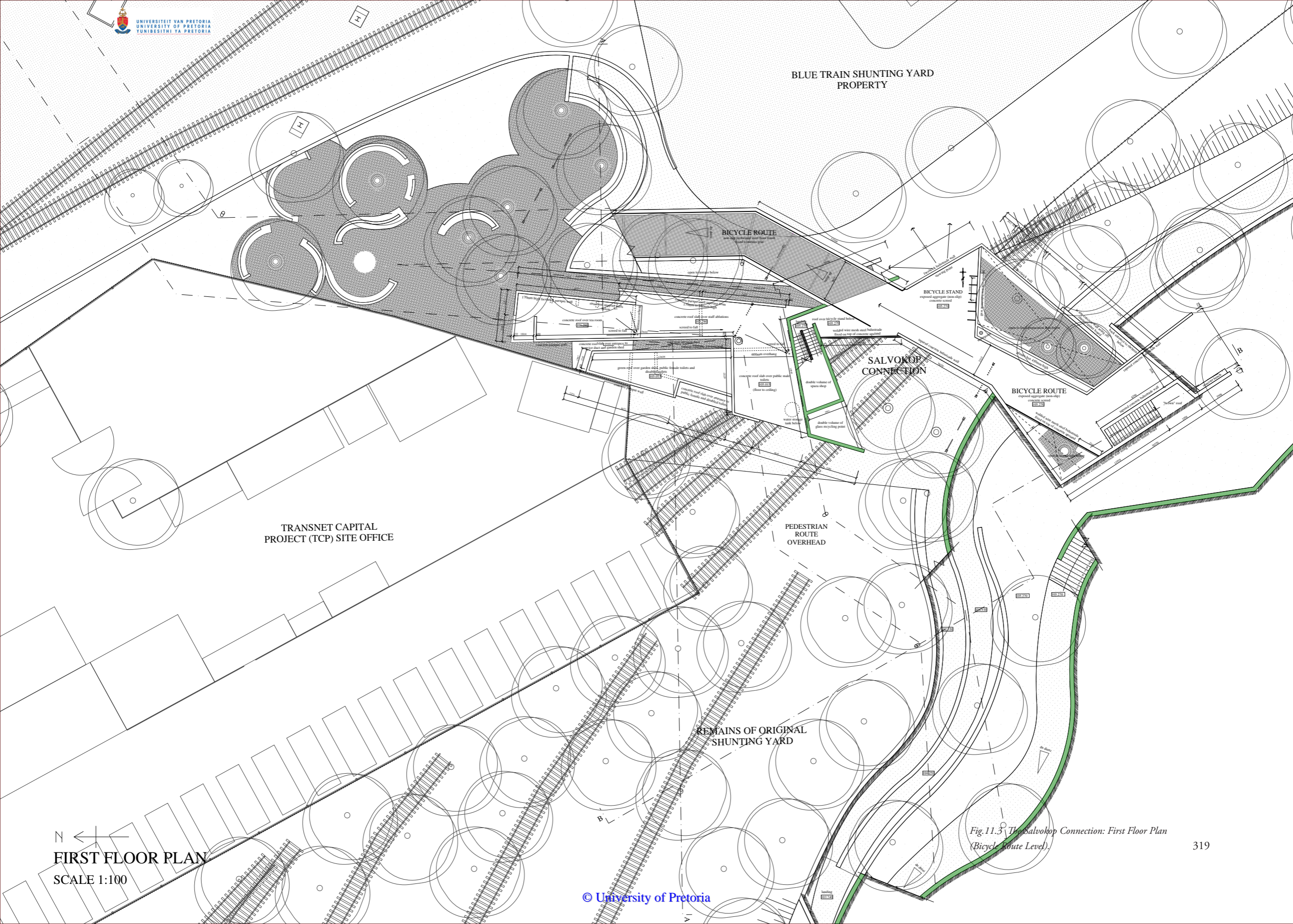
*Fig.11.1 Final presentation model indicating The Salvokop Connection.*



TRANSNET CAPITAL  
PROJECT (TCP) SITE OFFICE

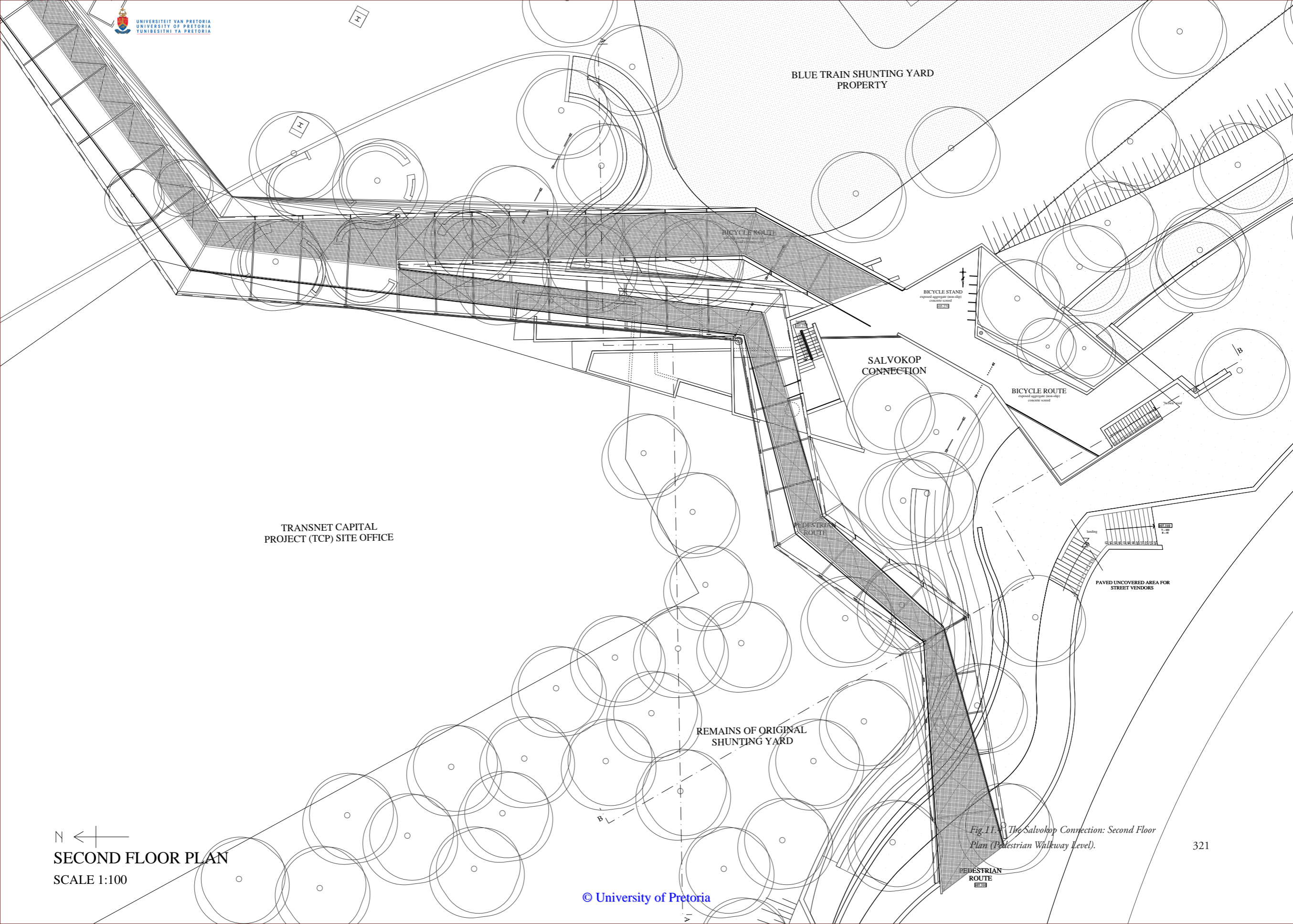
N ←  
GROUND FLOOR PLAN  
SCALE 1:100

Fig.11.2 The Salvokop Connection: Ground Floor Plan. 317



N  
FIRST FLOOR PLAN  
SCALE 1:100

Fig. 11.3 The Salvokop Connection: First Floor Plan (Bicycle Route Level).



TRANSNET CAPITAL  
PROJECT (TCP) SITE OFFICE

BLUE TRAIN SHUNTING YARD  
PROPERTY

SALVOKOP  
CONNECTION

REMAINS OF ORIGINAL  
SHUNTING YARD

PAVED UNCOVERED AREA FOR  
STREET VENDORS

Fig. 11.4 The Salvokop Connection: Second Floor  
Plan (Pedestrian Walkway Level).

N ←  
SECOND FLOOR PLAN  
SCALE 1:100



# Structural System

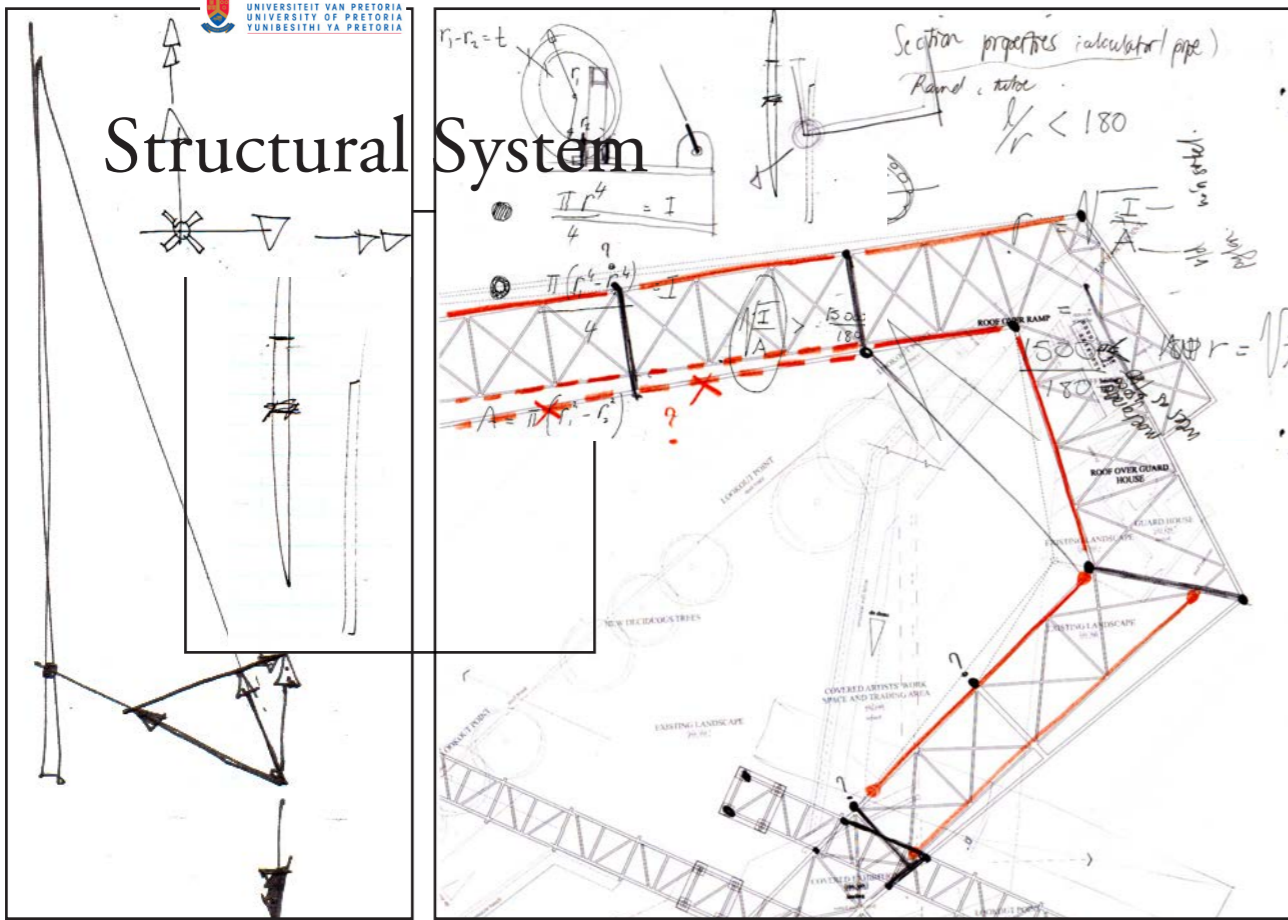


Fig.11.6 South Quay foot bridge, London by Chris Wilkinson with Jan Bobrowicz & Partners (1997).

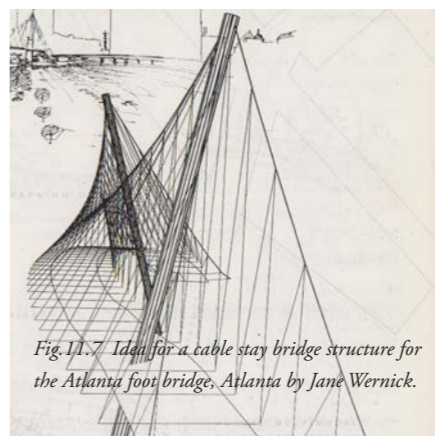


Fig.11.7 Idea for a cable stay bridge structure for the Atlanta foot bridge, Atlanta by Jane Wernick.

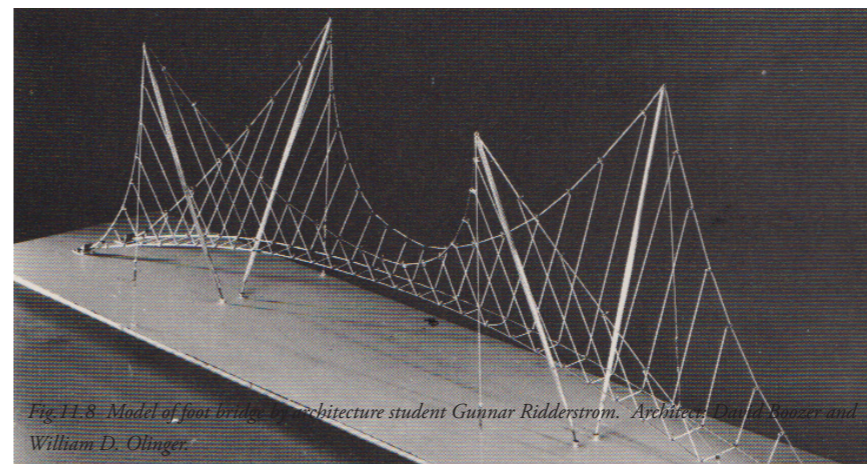


Fig.11.8 Model of foot bridge by architecture student Gunnar Ridderstrom. Architects: David Booser and William D. Olinger.

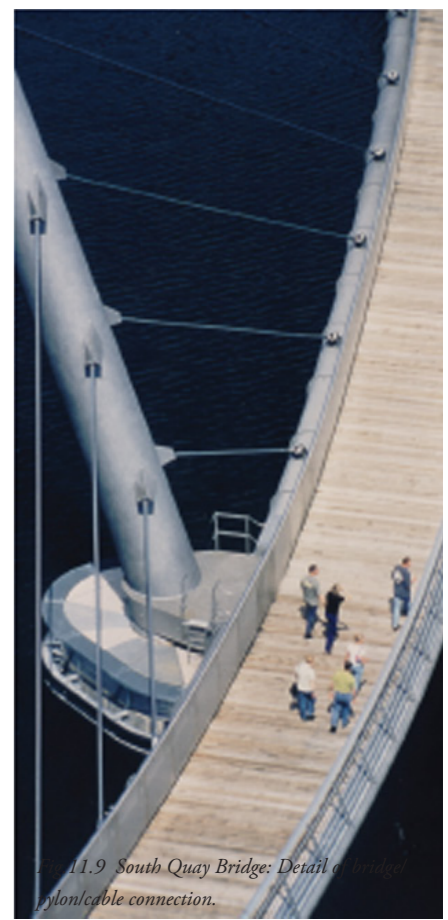


Fig.11.9 South Quay Bridge: Detail of pylon/cable connection.

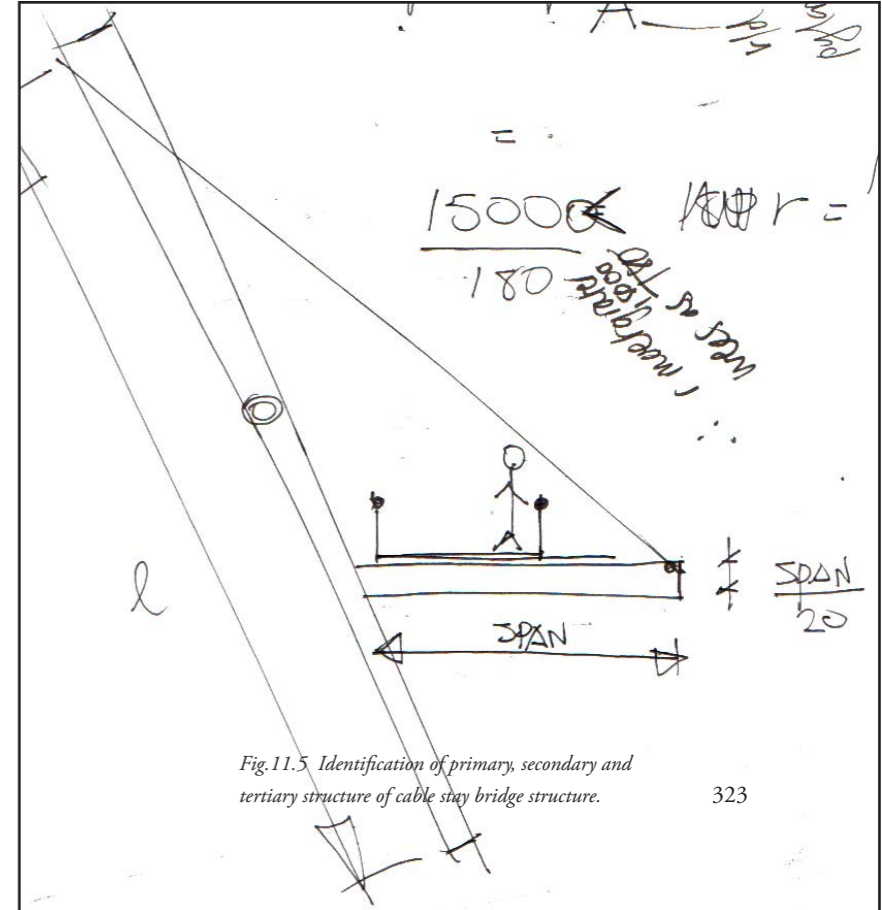
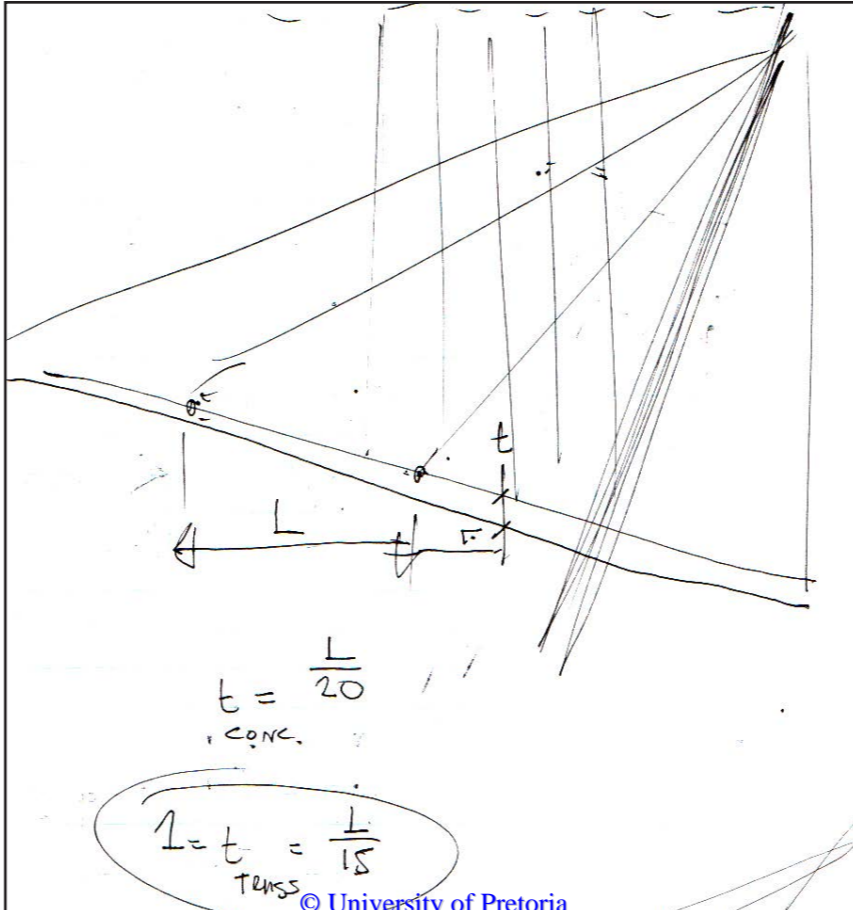
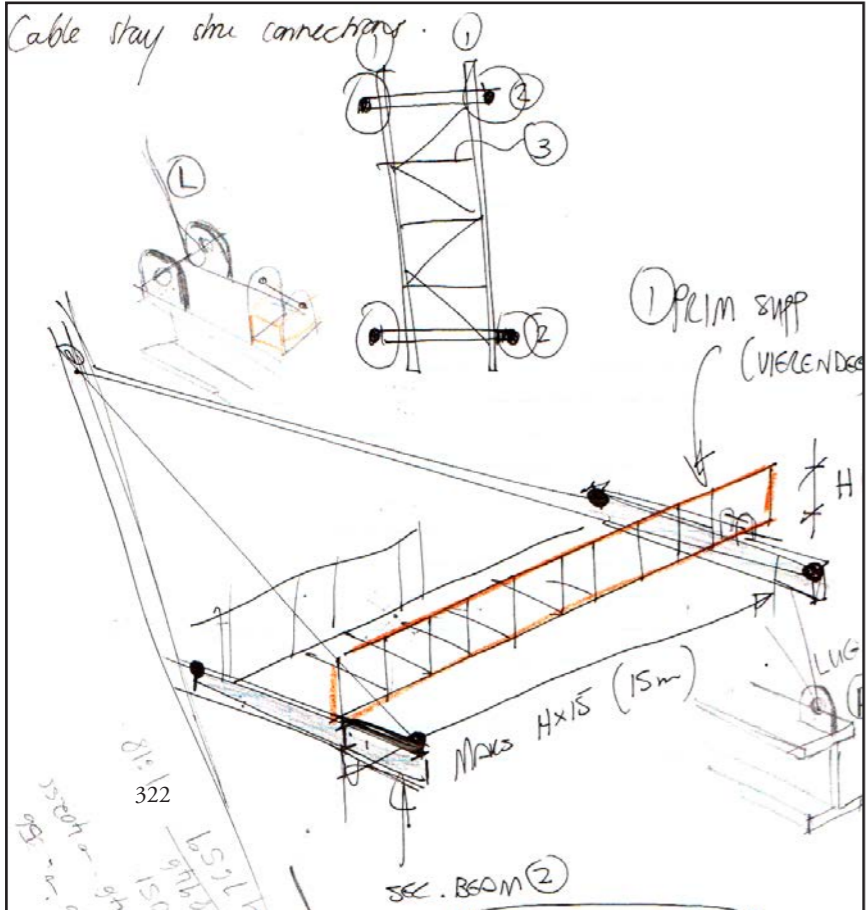
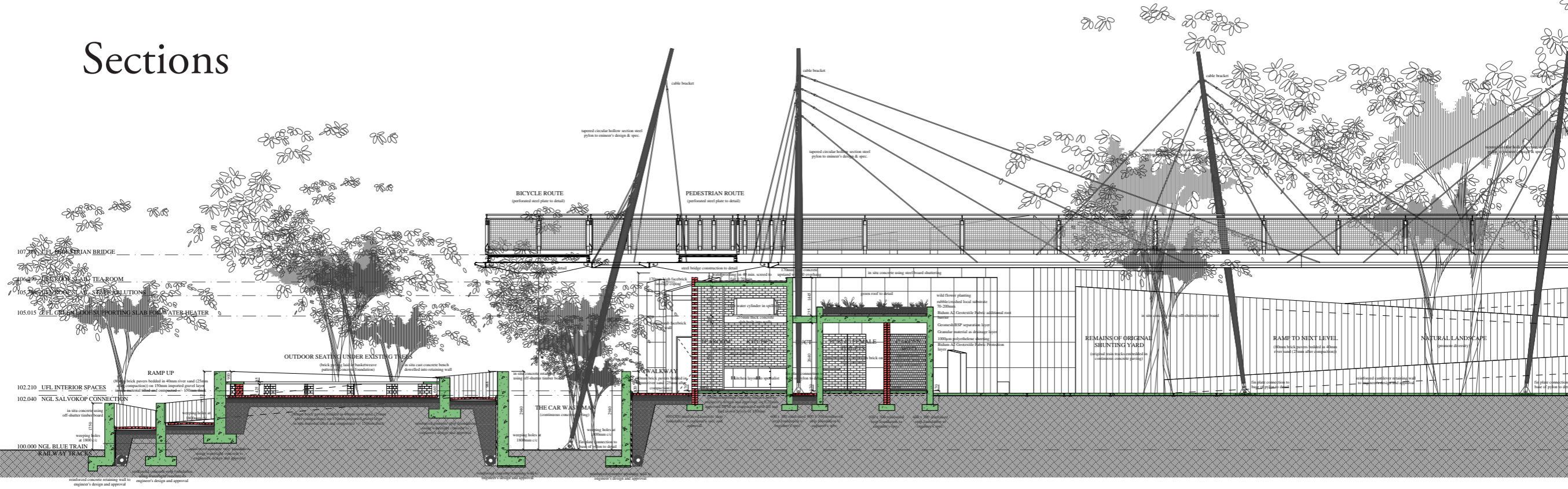


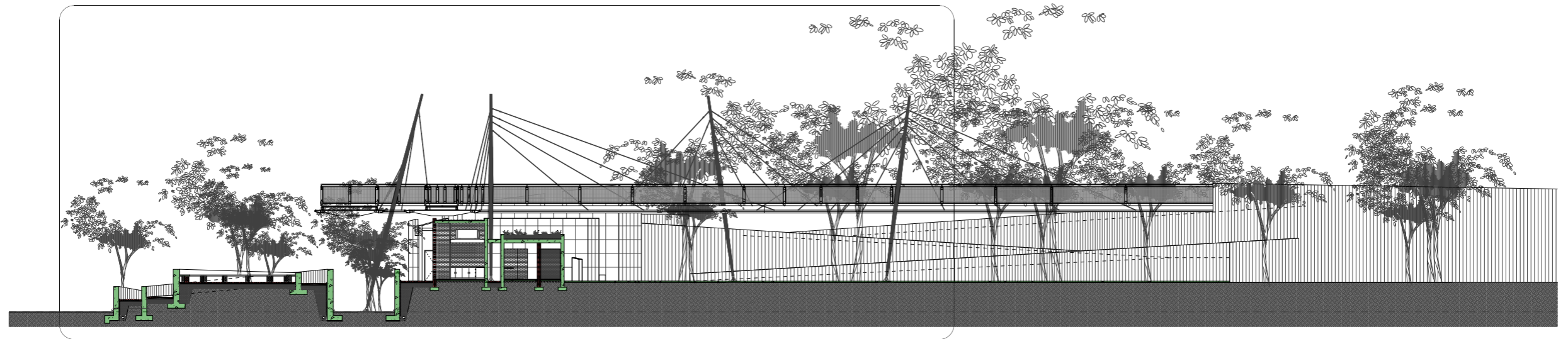
Fig.11.5 Identification of primary, secondary and tertiary structure of cable stay bridge structure.

# Sections



## SECTION A-A / WEST ELEVATION

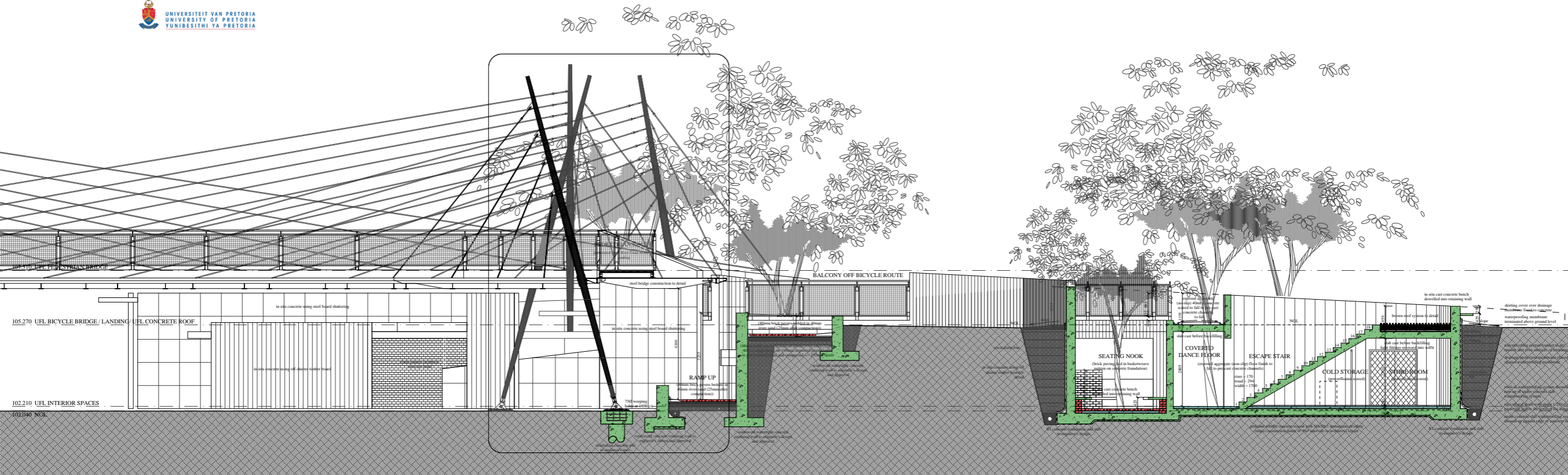
SCALE 1:50



## SECTION A-A / WEST ELEVATION

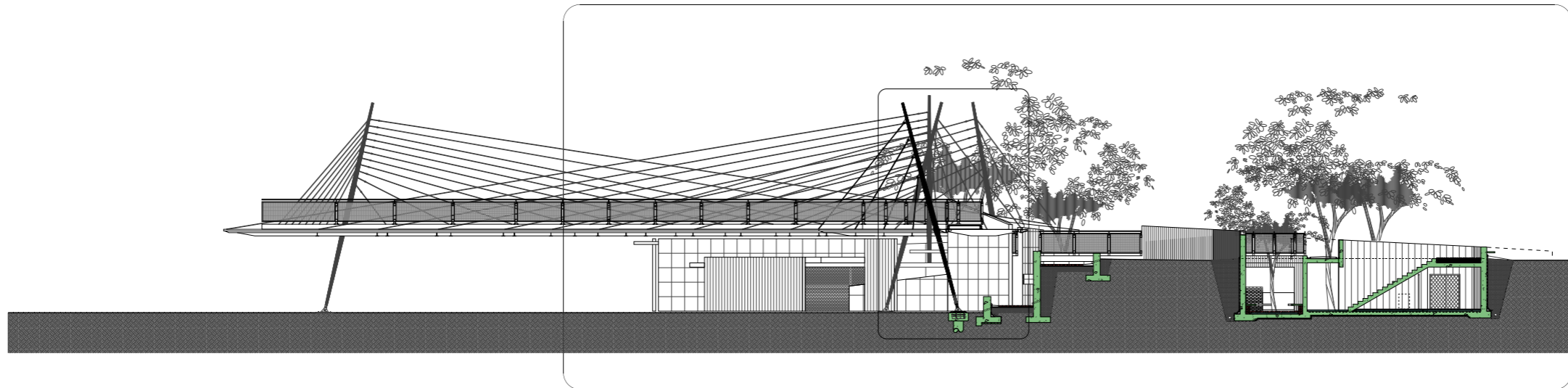
SCALE 1:100

Fig.11.10 The Salvokop Connection: Section A-A.



SECTION B-B SOUTH ELEVATION

SCALE 1:50

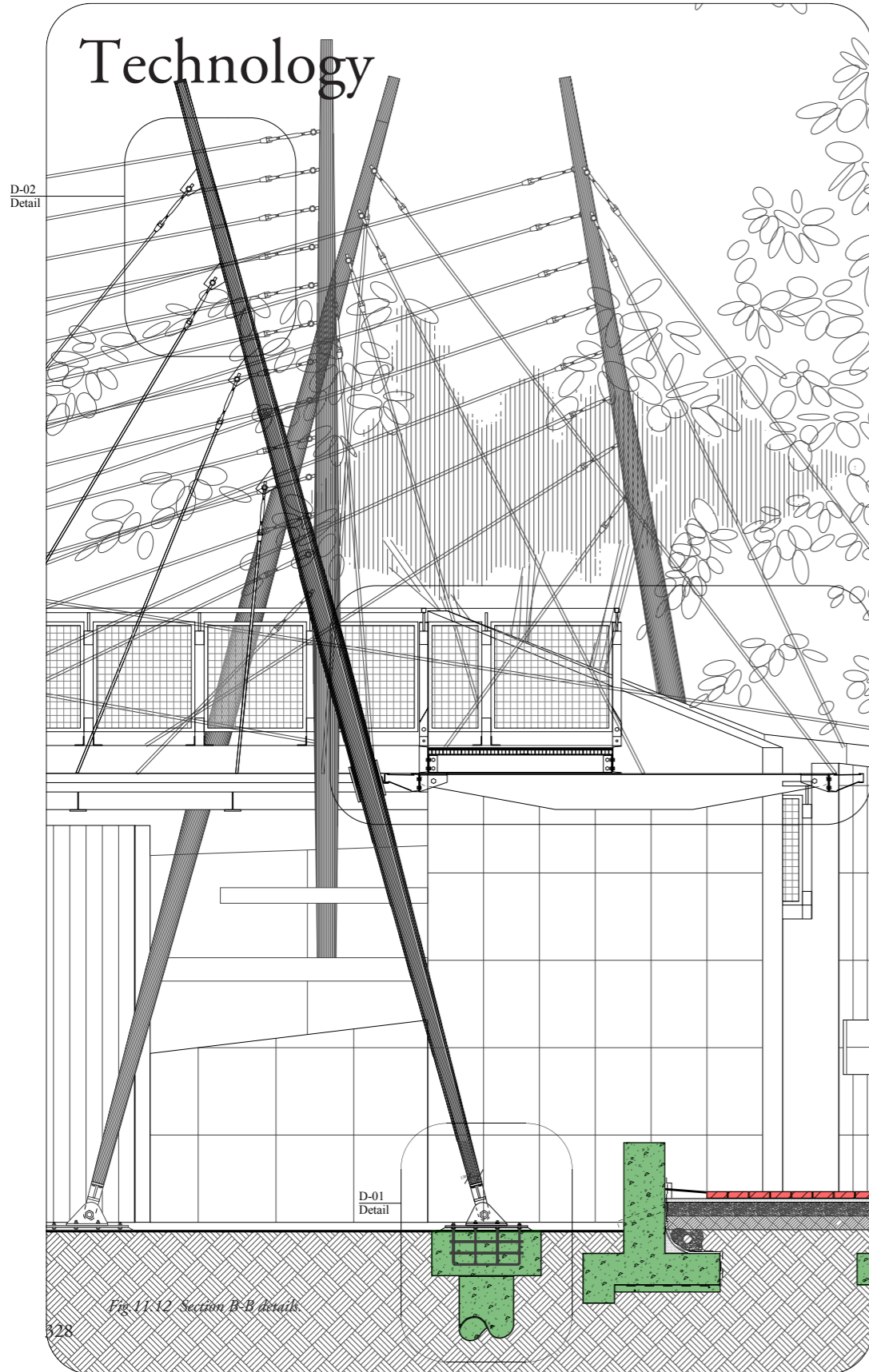


SECTION B-B / SOUTH ELEVATION

SCALE 1:100

Fig.11.11 The Salvokop Connection: Section B-B.

# Technology



D-03  
Detail

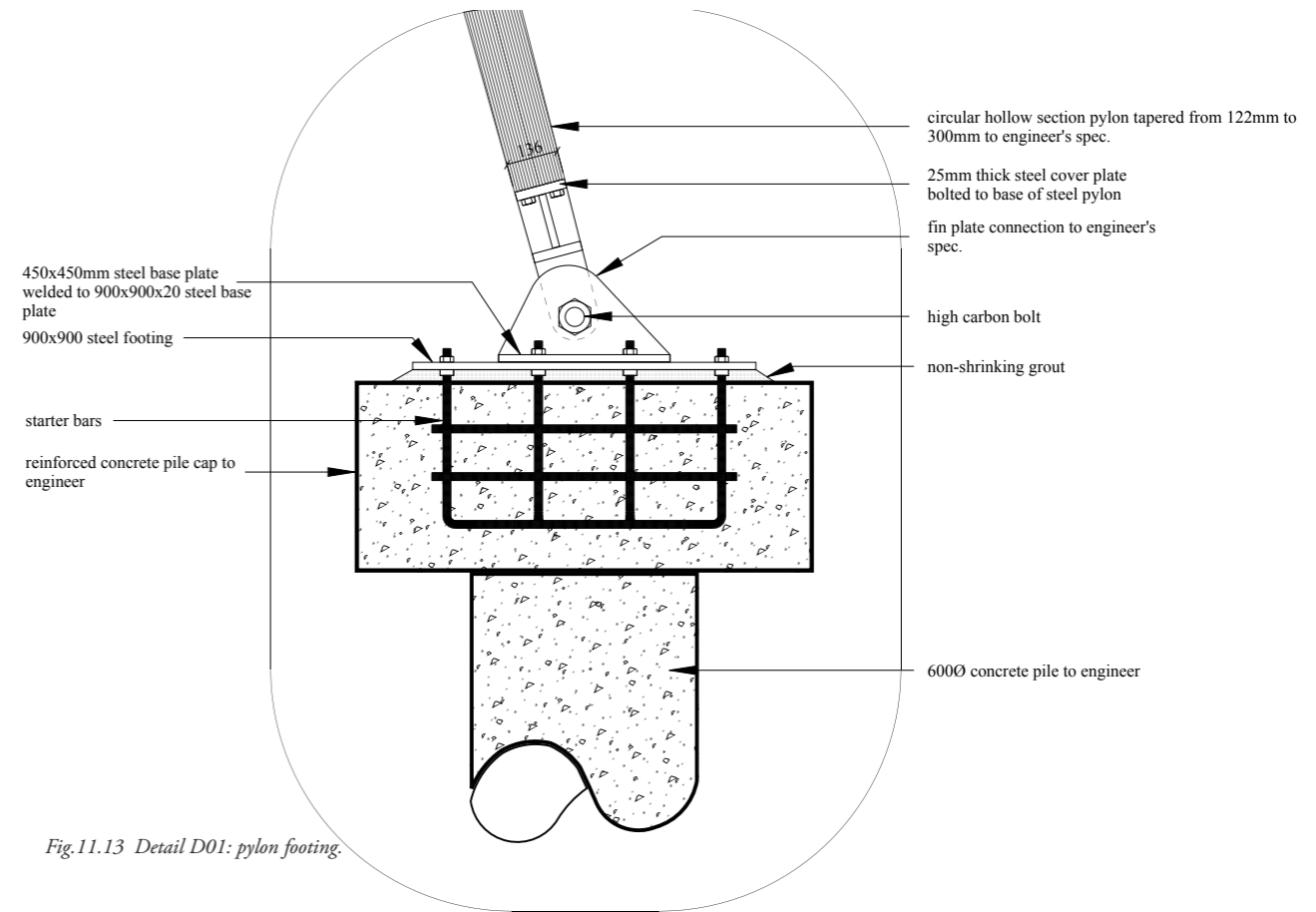
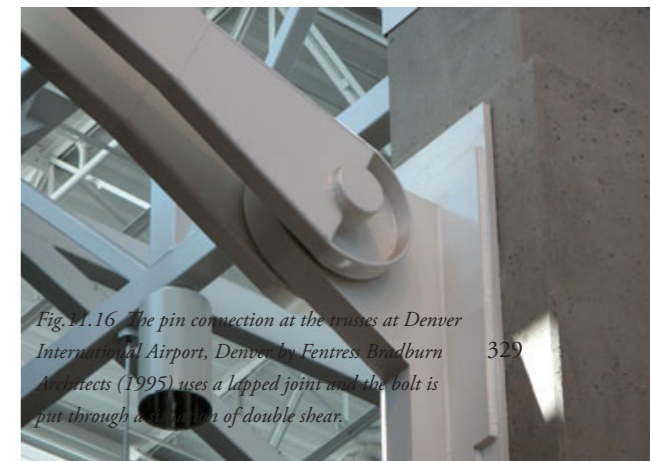
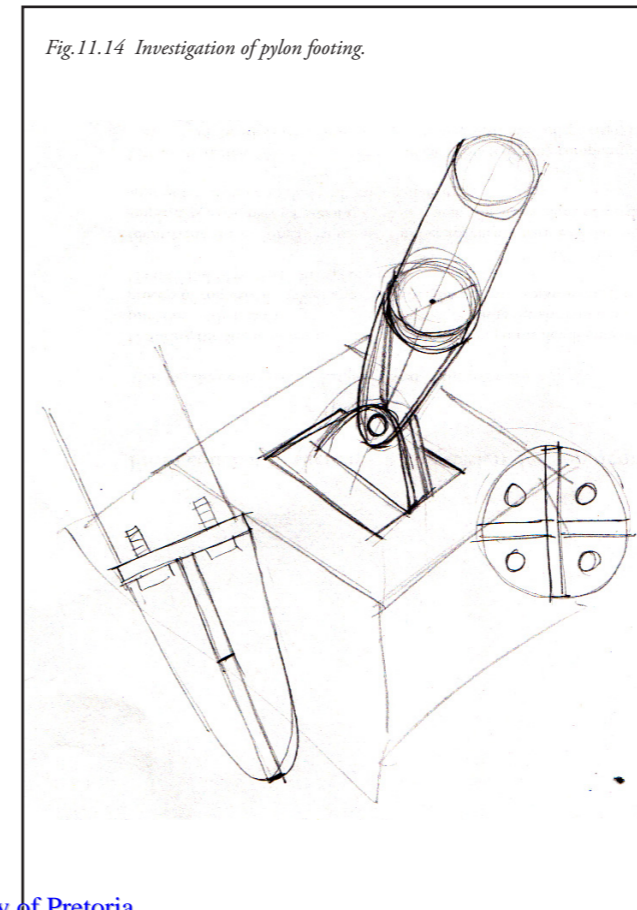


Fig. 11.14 Investigation of pylon footing.



# Materiality

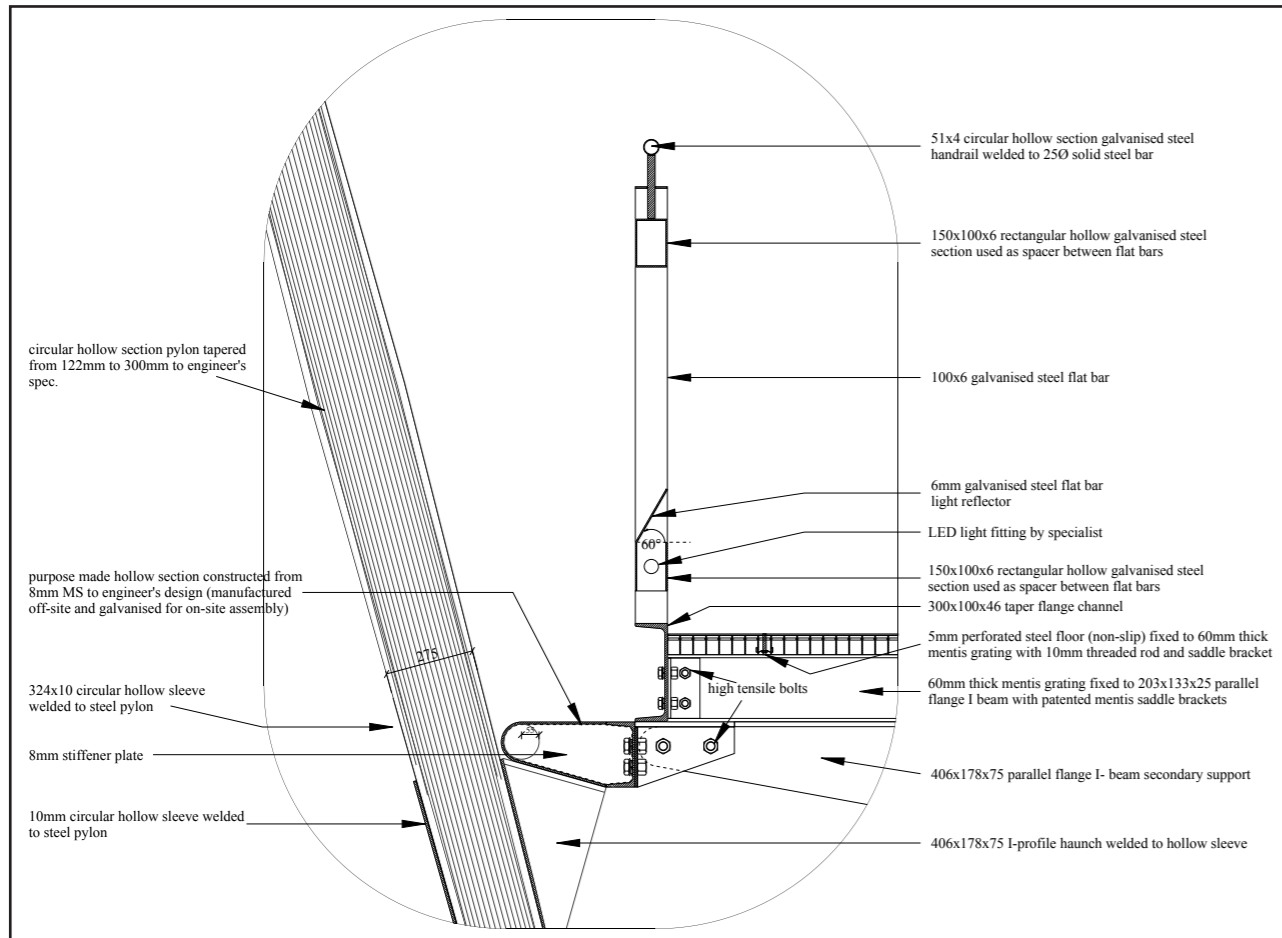


Fig.11.17 Detail D03: Structural detail of walkway of bridge.

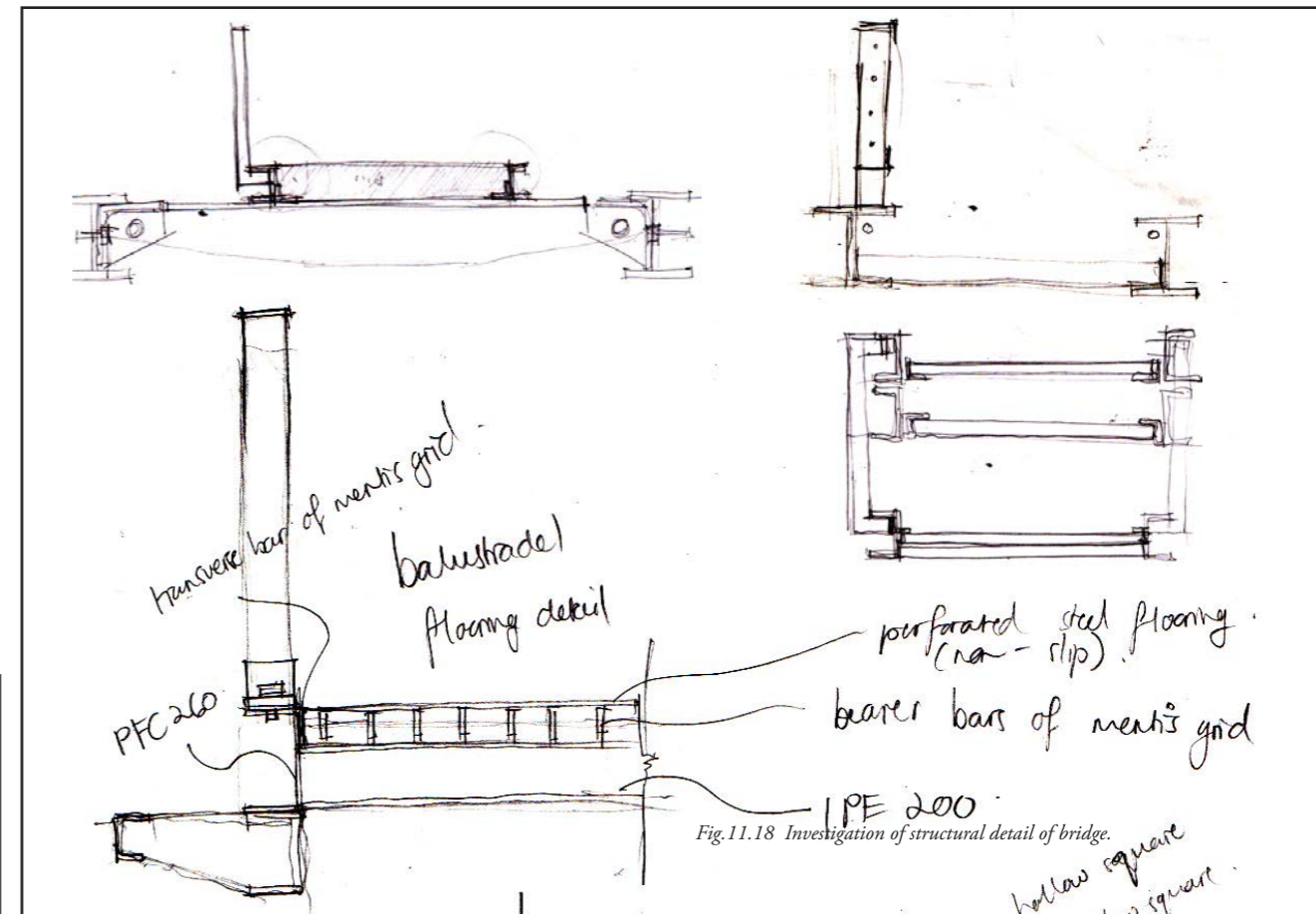


Fig.11.18 Investigation of structural detail of bridge.

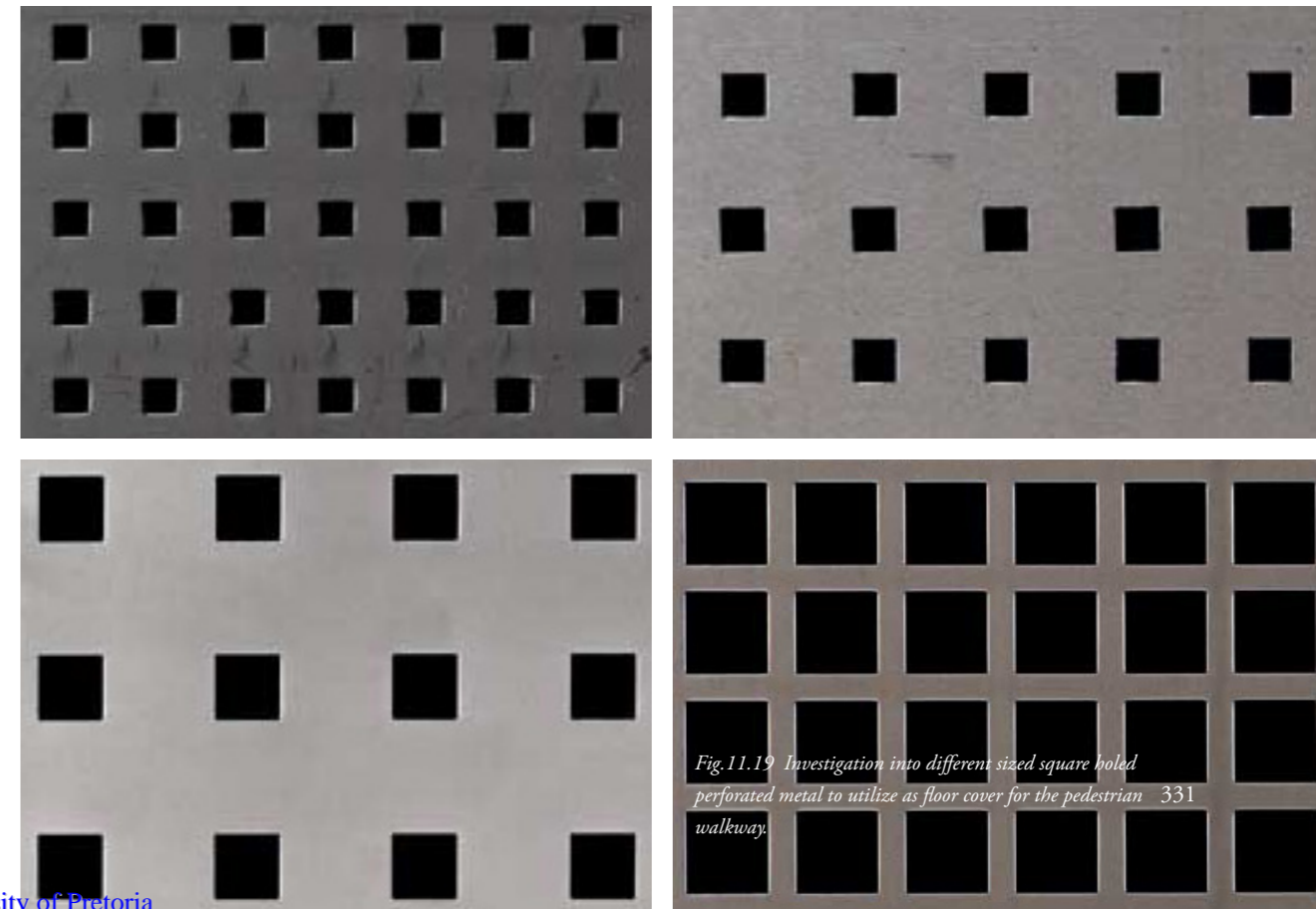


Fig.11.19 Investigation into different sized square holed perforated metal to utilize as floor cover for the pedestrian walkway.

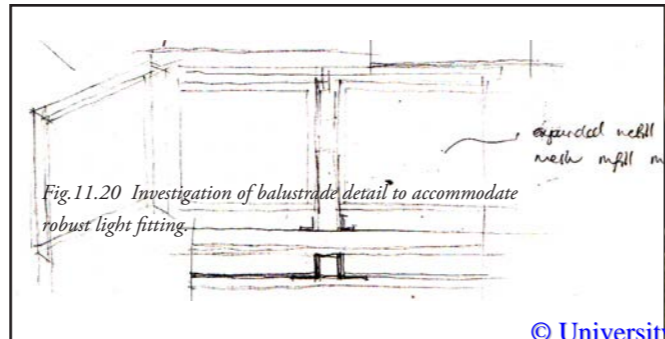
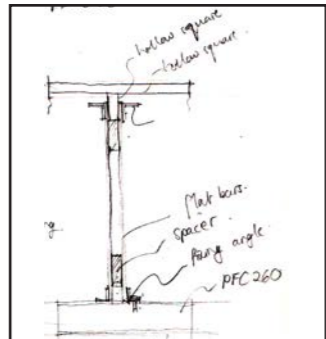
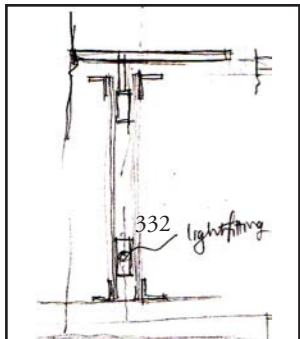
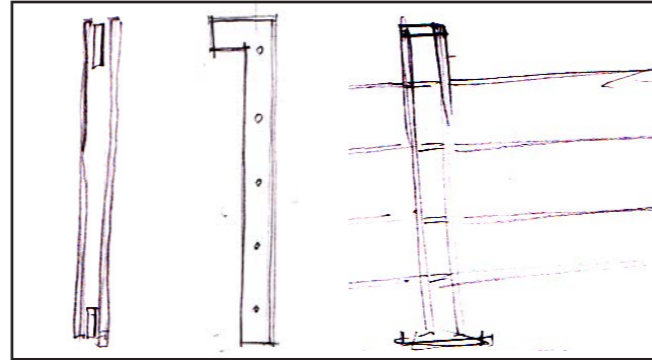
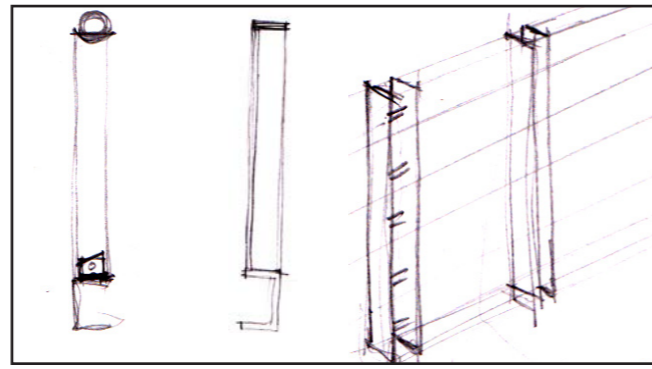
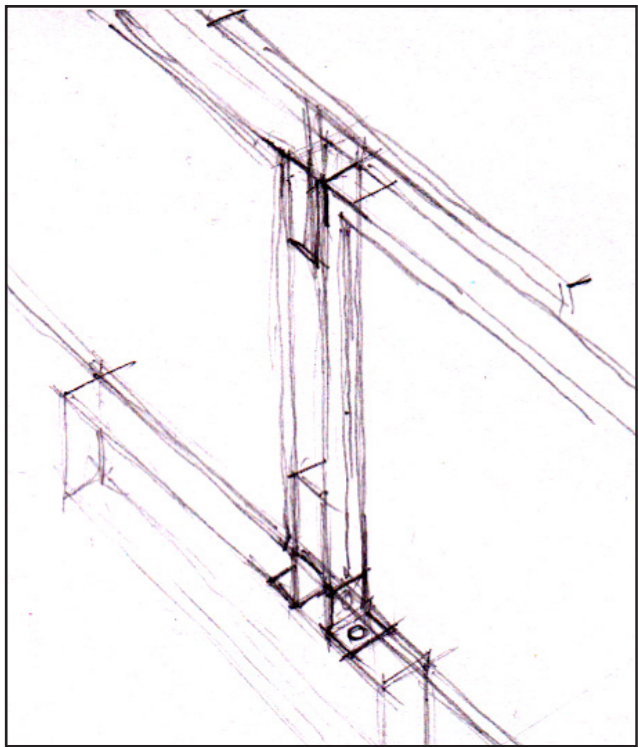
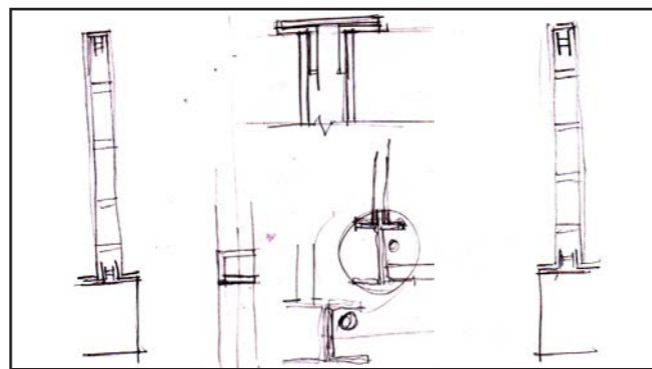
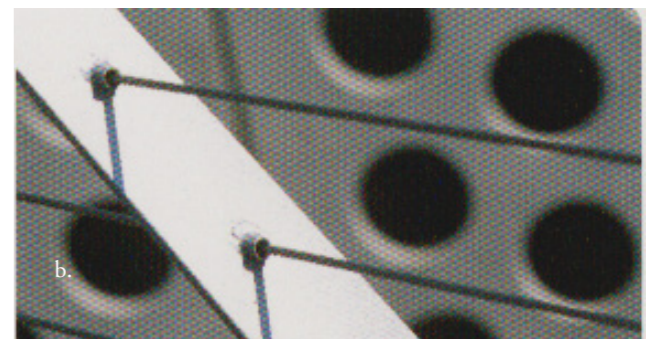
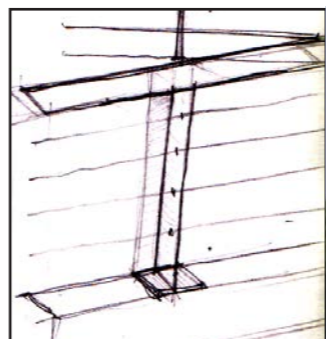
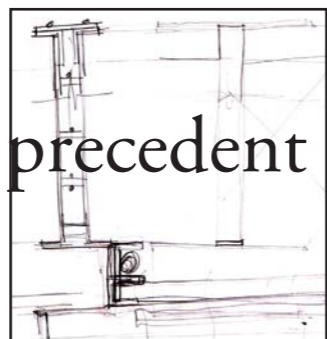
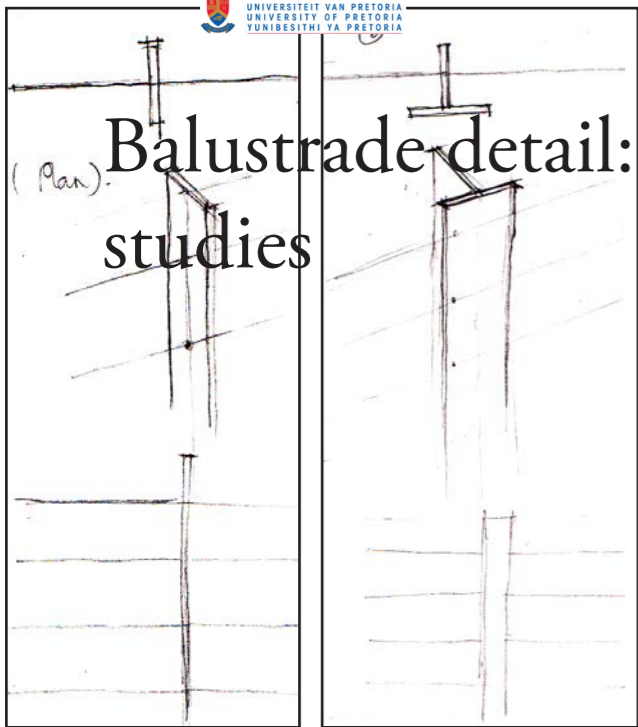


Fig.11.20 Investigation of balustrade detail to accommodate robust light fitting.

Fig.11.21 Precedent studies: balustrade detail.

# Connection primary structure/ cable: precedent studies

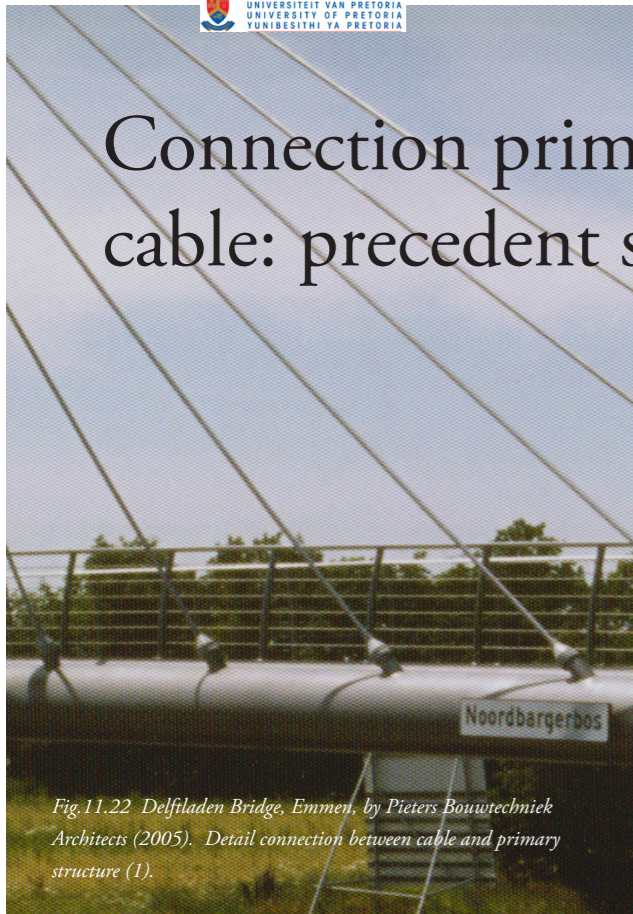


Fig.11.22 Delfiladen Bridge, Emmen, by Pieters Bouwtechniek Architects (2005). Detail connection between cable and primary structure (1).

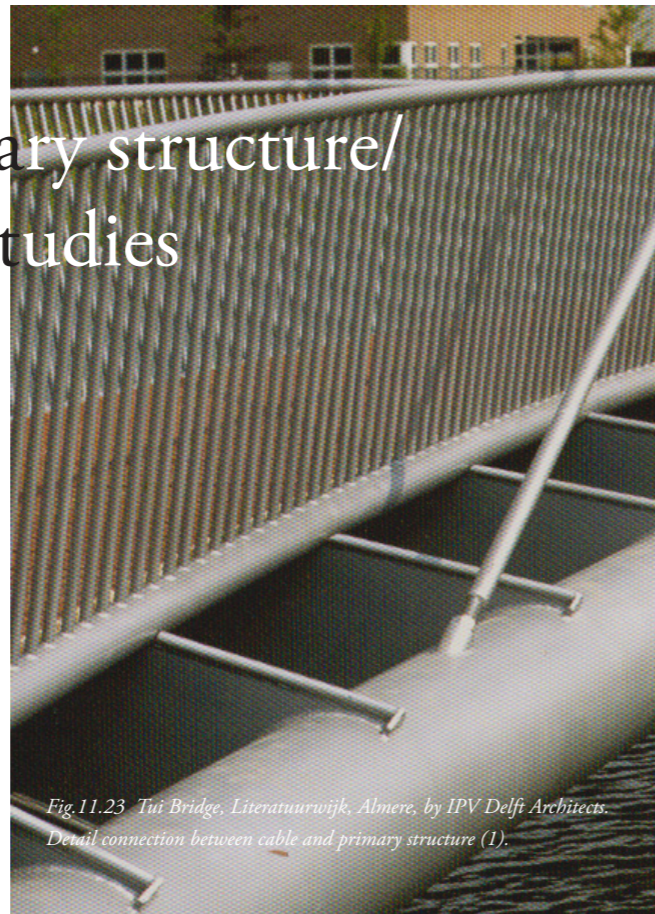
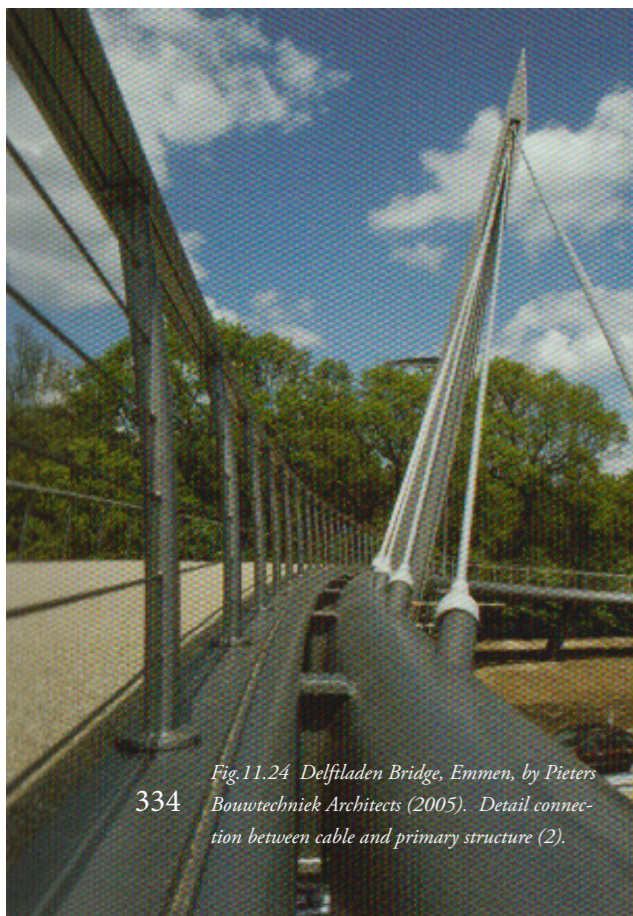
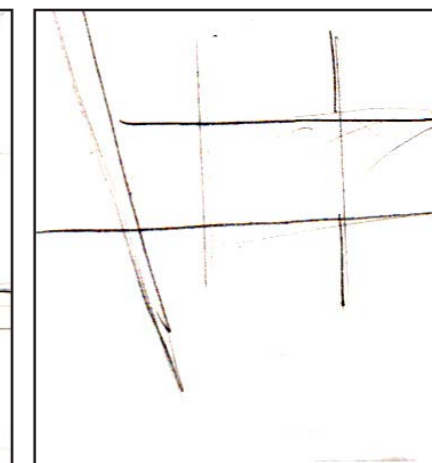
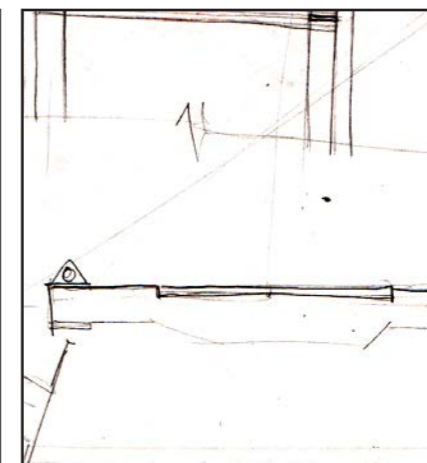
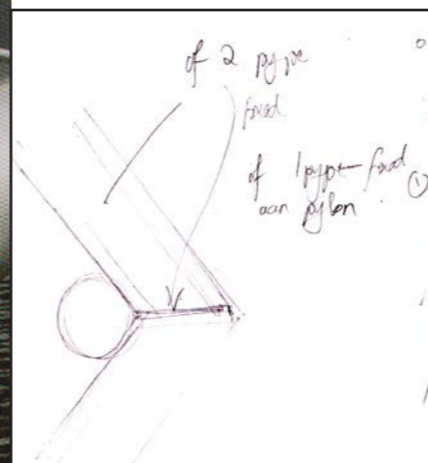
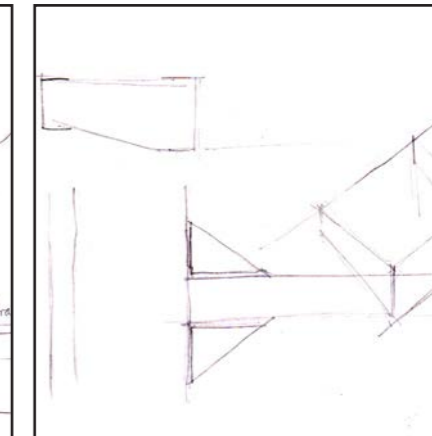
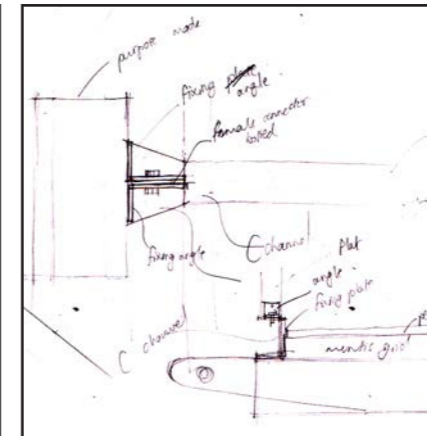
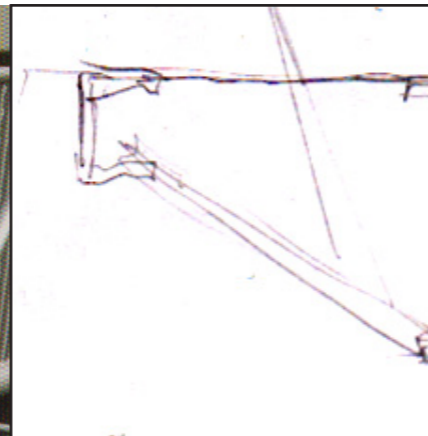


Fig.11.23 Tui Bridge, Literatuurwijk, Almere, by IPV Delft Architects. Detail connection between cable and primary structure (1).



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Fig.11.24 Delfiladen Bridge, Emmen, by Pieters Bouwtechniek Architects (2005). Detail connection between cable and primary structure (2).



Fig.11.25 Tui Bridge, Literatuurwijk, Almere, by IPV Delft Architects. Detail connection between cable and primary structure (2).

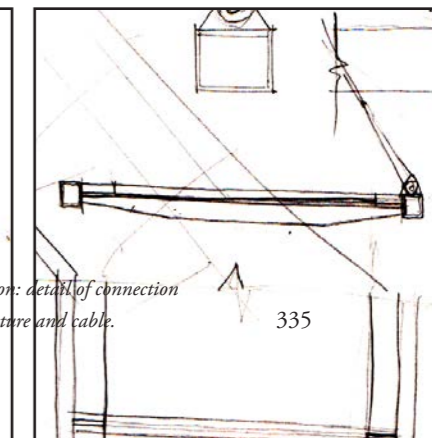
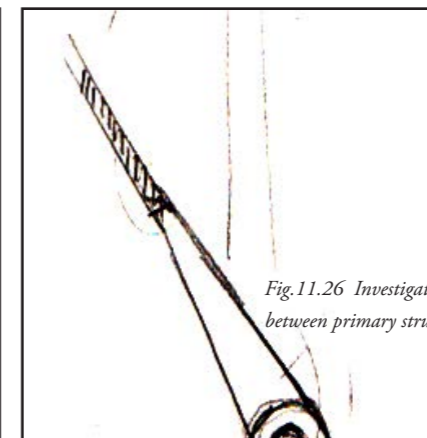
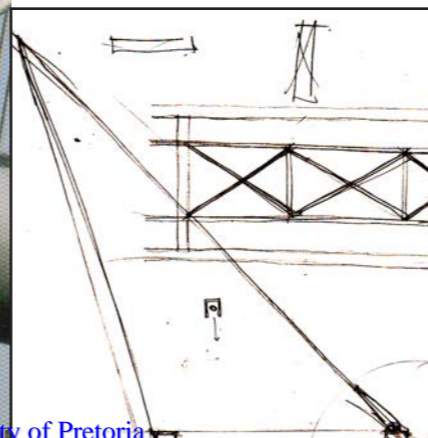
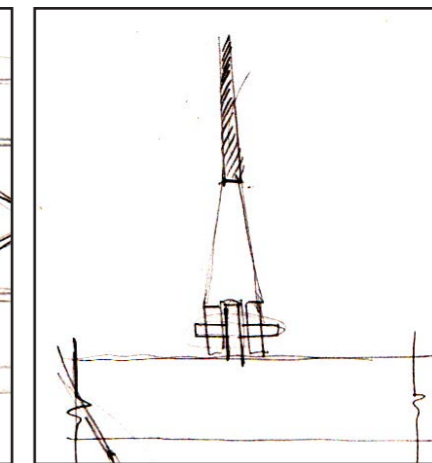
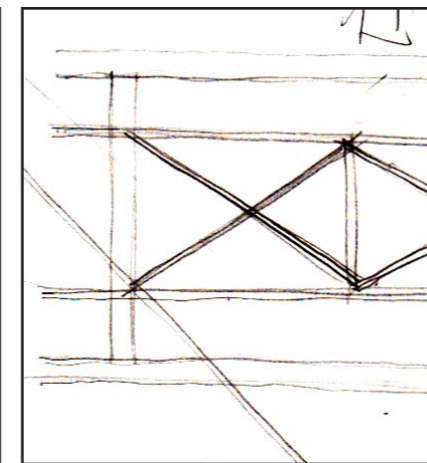
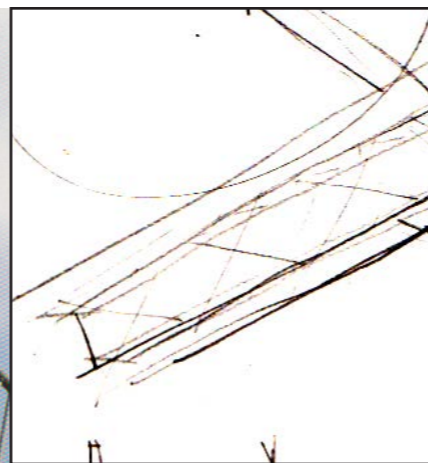
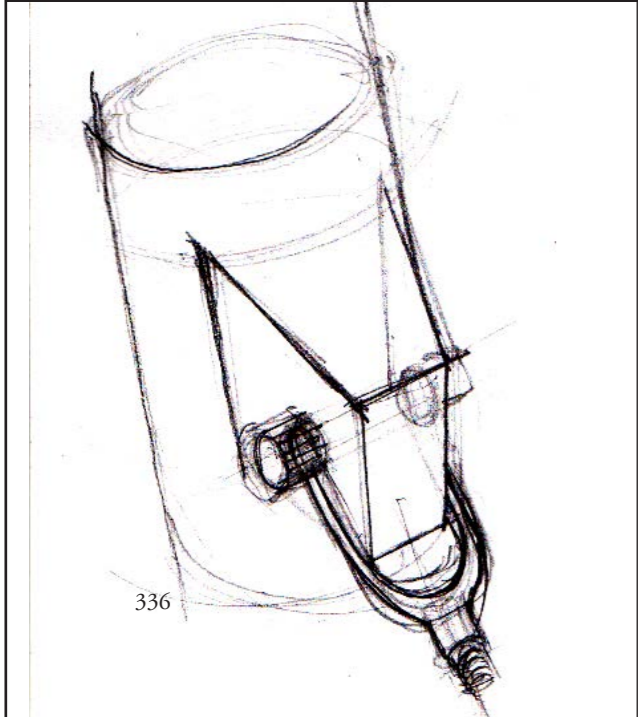
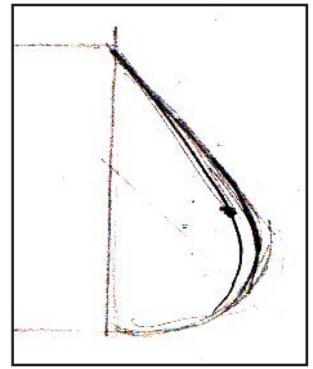
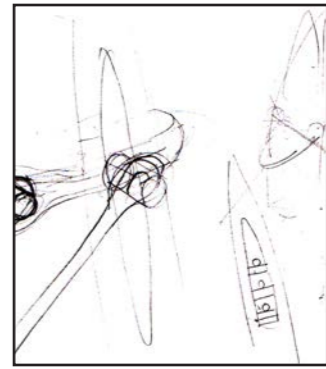
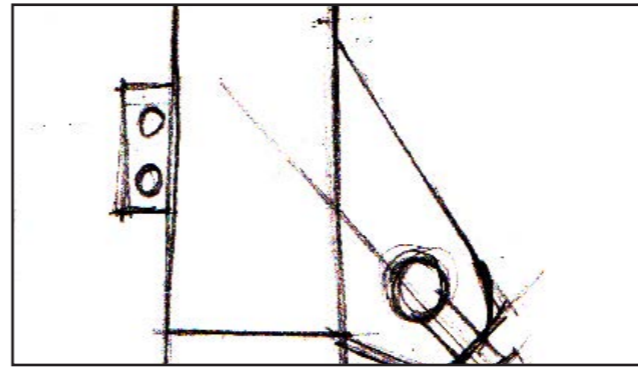
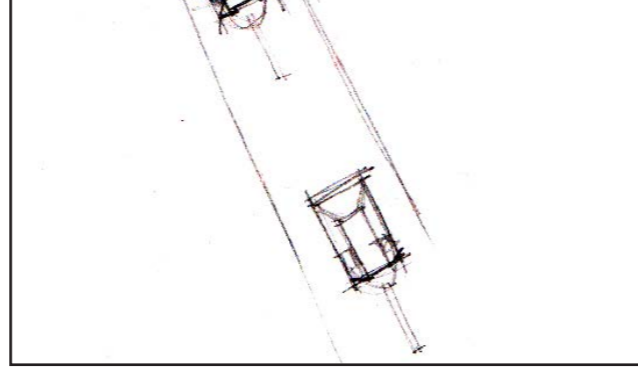
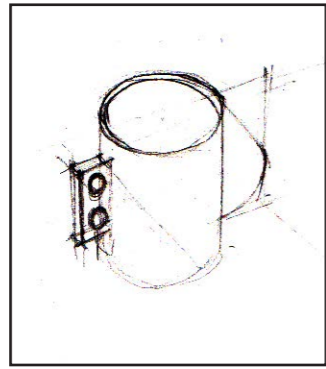
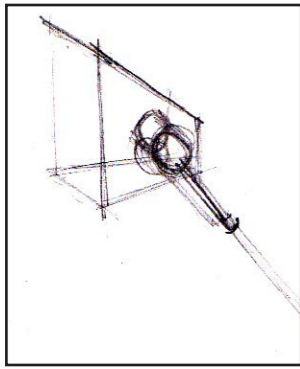
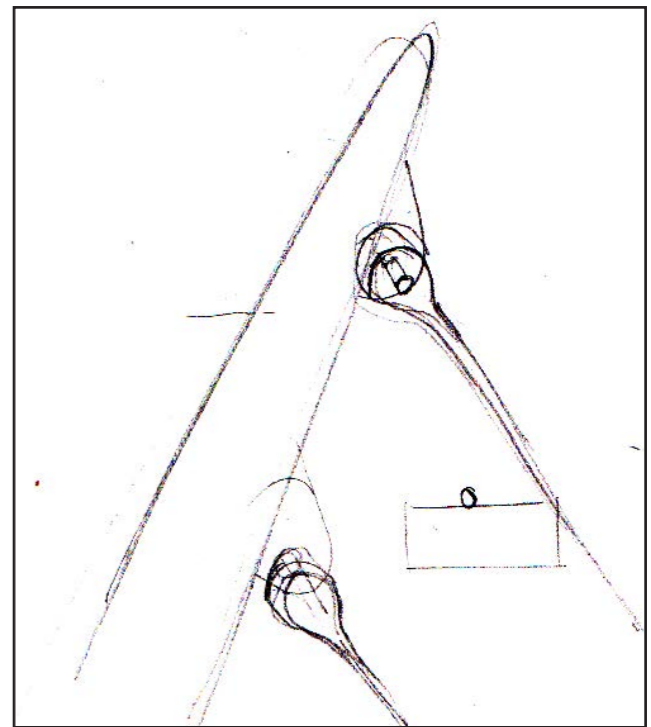
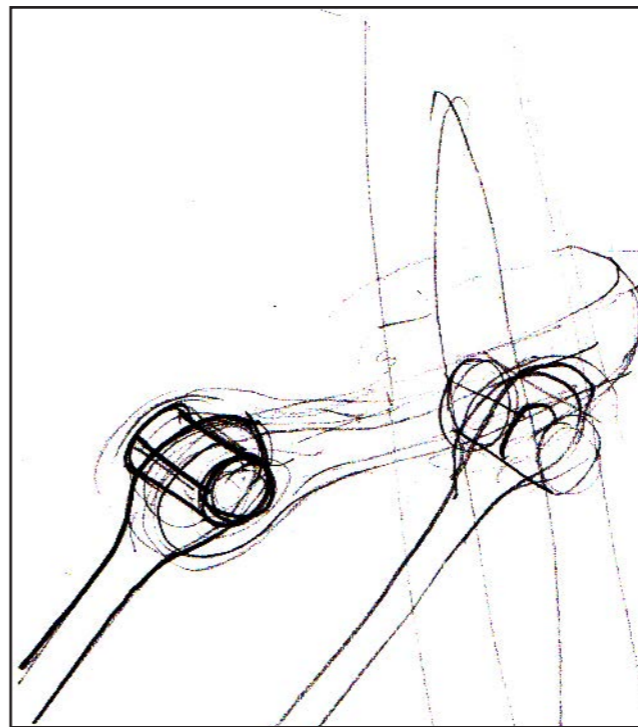
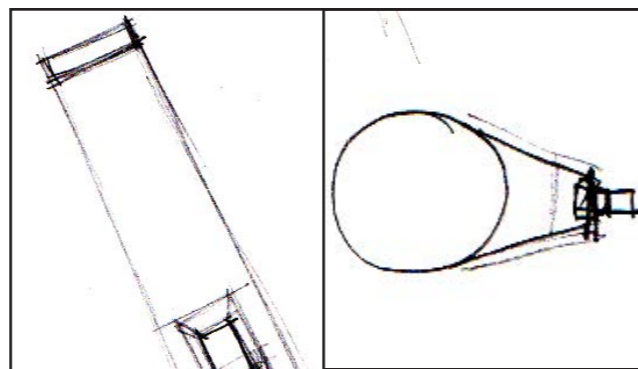
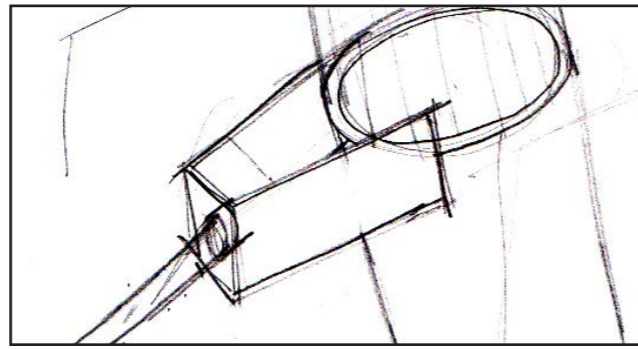
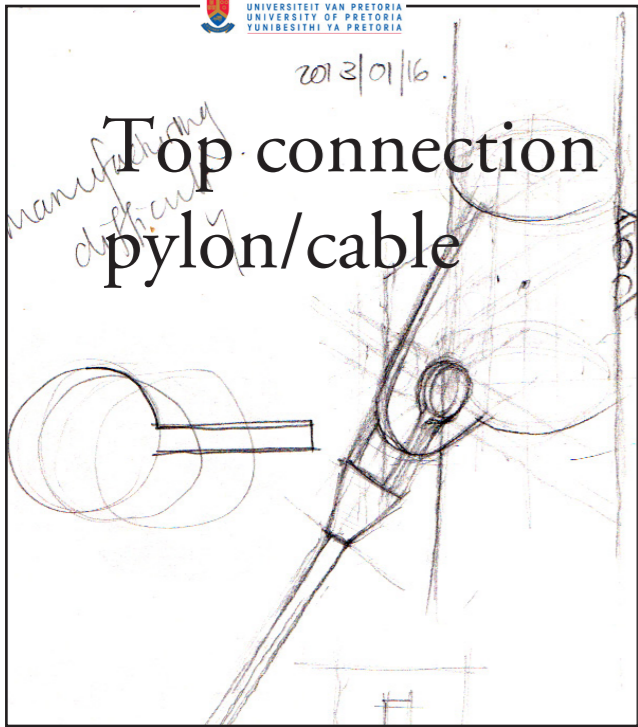


Fig.11.26 Investigation: detail of connection between primary structure and cable.

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2013/01/16

manufacturing  
difficult  
Top connection  
pylon/cable



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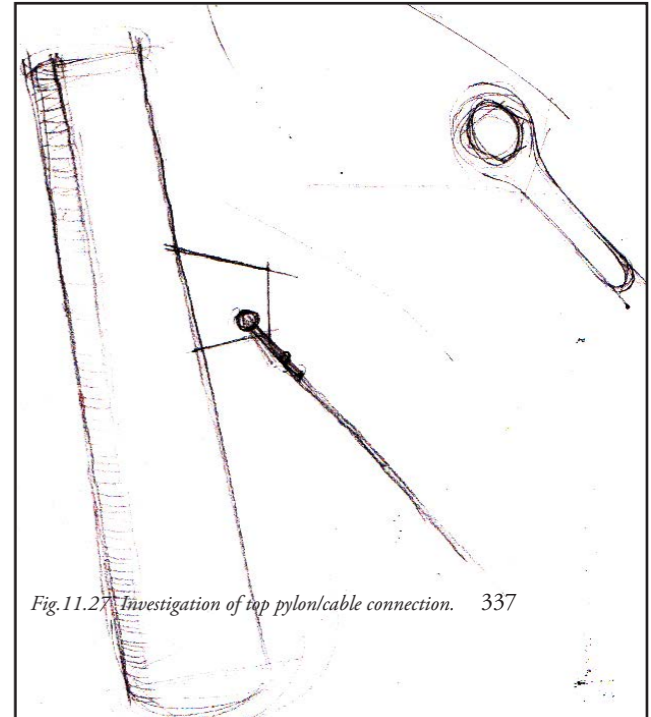
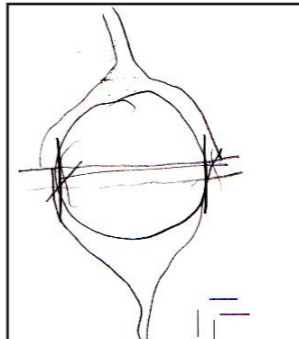
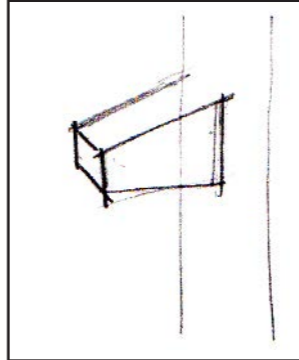
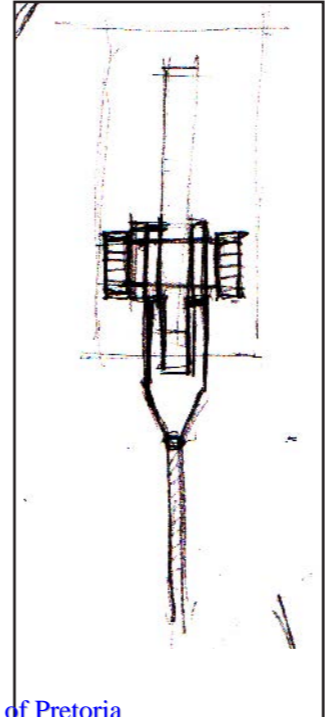
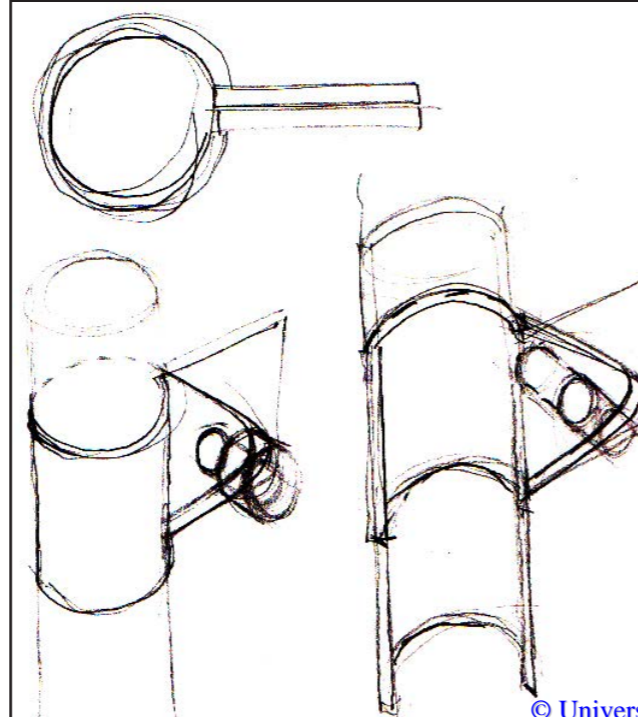


Fig.11.27 Investigation of top pylon/cable connection. 337



# Top connection pylon/cable: precedent studies

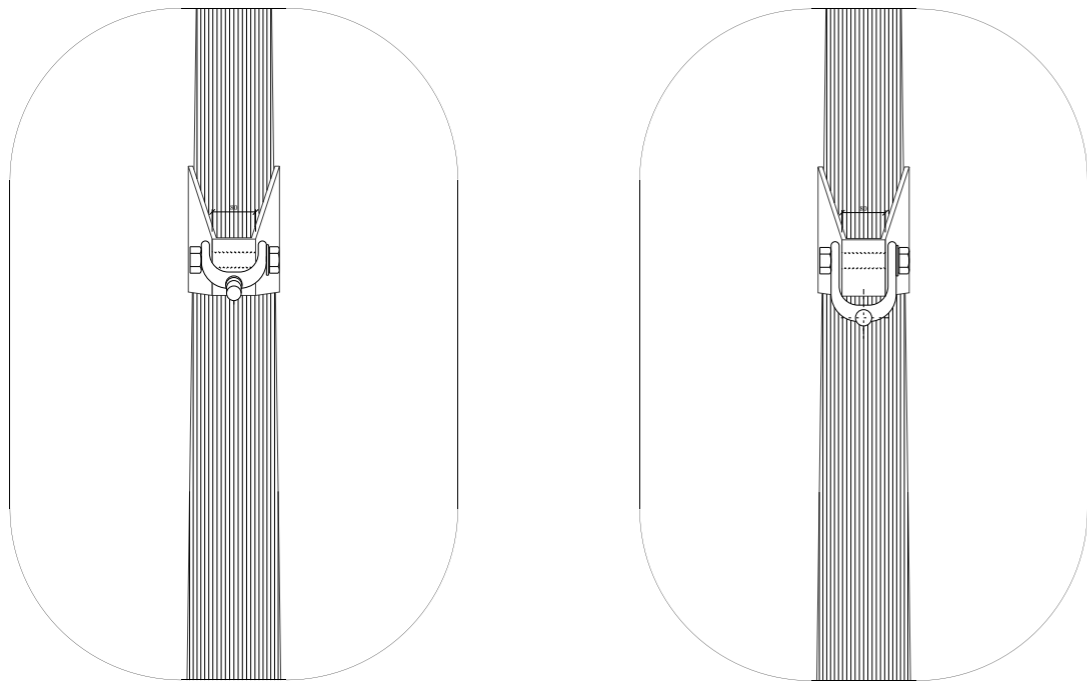
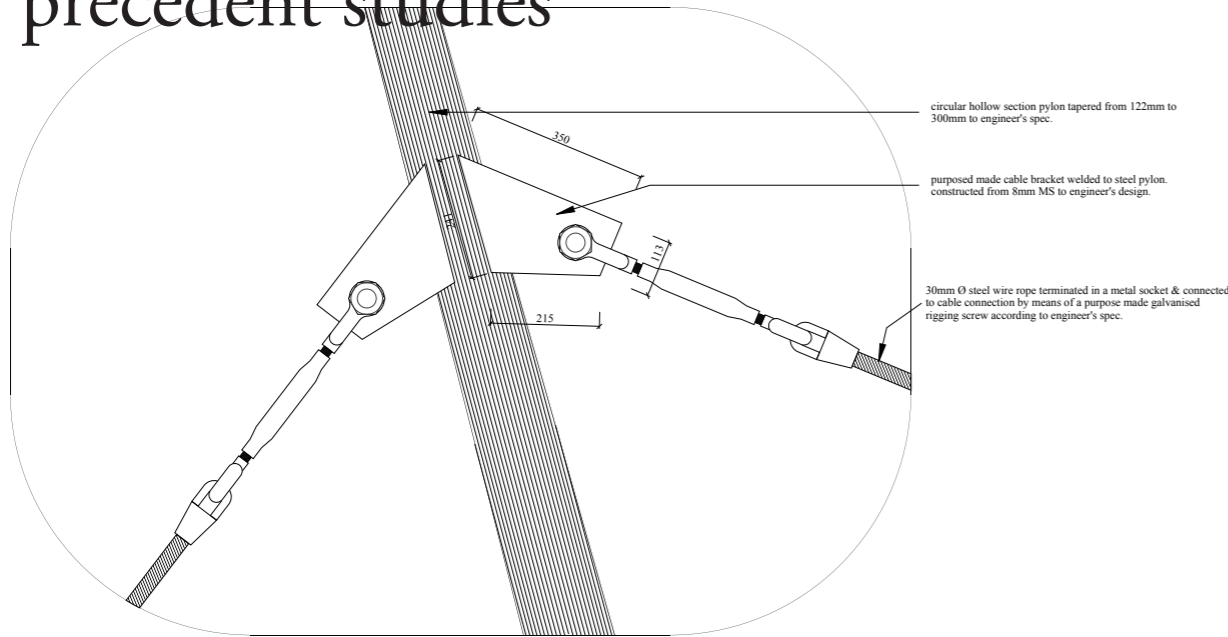


Fig.11.28 Detail D02: Detail of top pylon/cable connection.



Fig.11.29 South Quay foot bridge, London by Chris Wilkinson with Jan Bobrowski & Partners (1997). Detail of top pylon/cable connection.

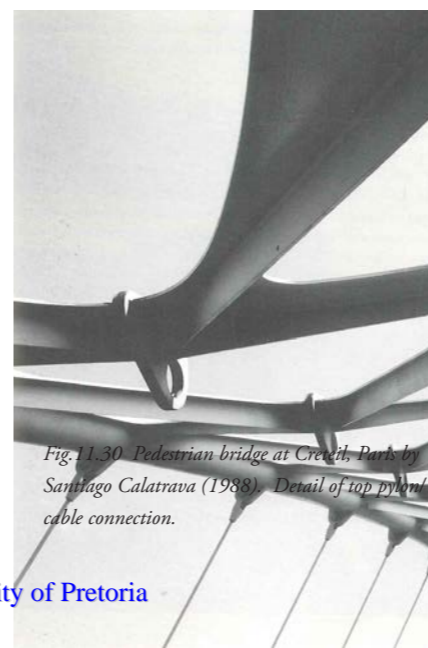


Fig.11.30 Pedestrian bridge at Credit, Paris by Santiago Calatrava (1988). Detail of top pylon/cable connection.



Fig.11.31 Delflandse Brug, Emmen, by Pieters Bouwtechniek Architects (2005). Detail of top pylon/cable connection.

# CHAPTER 12

## CONCLUSION

“Buried under all the mute experiences are those unseen that give our life its form, colour and its melody. Buried under all the mute places are those unseen that give our life its form, colour and its melody”

(Amadue Inacio de Almeida Prado cited in Mercier P, 2007:23)

The dissertation commences with an initial problem statement on the fragmented state of the study area within its vicinity following a site analysis using normal urban designers and planners’ tools.

The disruptive effect of modern urbanist planning techniques on traditional form as we know it, is criticised and various intervention strategies to repair the damage done considered.

However, an alternative site analysis viewing the study area from a different perspective highlights some shortcomings in these planning tools when certain

important information regarding activities in the area proves to have been overlooked during the initial analysis.

Following investigation on the matter, the city is presented as a system that shows signs of Complexity, i.e. things that cannot be fully assessed or controlled, human systems that are intricate, involved, complicated, dynamic or multi-dimensional. A short introduction to the Theory of Complexity marks a distinct paradigm shift from a focus on the architectural object to space as operational device, affecting social and natural sciences alike, and also manifesting in the

built environment. This new knowledge is depicted in a parti diagram summarizing the characteristics of Complex Systems.

The dissertation consequently hypothesizes that the main issue when working in the contemporary urban environment is not how to repair the damage caused to the traditional city form as we know it, but a recognition that the idea of “city” as we know it, has changed and the failure of our intervention strategies is rather a failure of our understanding of this “new” city form, and how to react towards it.

Two methods developed by Spacelab Research Laboratory at Delft University of Technology in the Netherlands, namely “Disfiguring the Urban” and “The Urban Machine” are applied to perform a new site analysis to investigate this complex nature.

The research objective is to remove the analysis from the distanced view to an understanding of the processes at work within the study area with the aim to identify the actual reasons for the transformations (the visible “disorder” that we see around us) and then react to these through a design intervention.

Using the Theories of Complexity and Field Conditions design guidelines are drawn up to guide the project in terms of normative position, framework, client and programme and design.

The conceptual response embodies the definition of a field condition: a network of relations between differentials. This is incorporated into the emergence of a design response that do not develop from an overarching intervention down to its related parts, but rather from unrelated, different parts, outward, that are interconnected via a network to form an indeterminate whole.