



## tAXI tRANSIT pARK

### THE RELATIONSHIP BETWEEN MOVEMENT AND TIME

G. S. Buys 22083040

Jacques Laubscher [Course coordinator and Study  
Leader]

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All is possible through Him that strengthens you.

Thanks to my  
Father, Mother  
and family for all their support.  
To Sarel for standing by my side through this year,  
and to Schalk & Jacques  
for your enthusiasm, effort and commitment.



### *EKSERP*

Die doel van die studie was om 'n nuwe plekorde vir taxi's in die vervoerhiërargie te bepaal, deur middel van 'n ontwerp wat binne die stedelike konteks aanpas. Die ontwerp poog om taxi's en hul aanverwante fasiliteite vir stadsgebruiker en omstander aanvaarbaar te maak. Die verhouding tussen tyd en beweging is bestudeer om 'n ontwerp te genereer wat vir die gebruiker 'n ondervinding van gemak en gerief sal inhou.

'n Kwantitatiewe, sowel as kwalitatiewe metodiek is gevolg. Die studie behels die navorsing van bestaande taxistaanplekke deur middel van gevallestudies, terrein besoeke, onderhoude en gesprekvoering met belanghebbendes. Die versamelde inligting is geïnterpreteer en verwerk binne die stedelike konteks.

Die gedefinieerde stedelike taxifasiliteit is verkry deur 'n proses van oorweging en uitskakeling van verskillende ontwerp moontlikhede. Voorkeur is verleen aan vereistes wat gemak is op 'n volhoubare multi-funksionele fasiliteit, met die gebruiker as primêre fokus. Die studie beklemtoon verantwoordelikheid van argitekte teenoor die omgewing. Die gevolgtrekking is 'n nuwe tipologie vir taxifasiliteite.

### *ABSTRACT*

The purpose of the study was to establish a new place order in the transport grain for taxis through a design that will suit the urban context. It attempts to render taxis and their associated facilities preferable and acceptable for the city user and bystander. The relationship between time and movement was studied to generate a design concept that depicts the path of the user as an experience of comfort and convenience.

A quantitative and qualitative method was applied. The study examined current taxi ranks through case studies, site visits, interviews and discussions. This information was interpreted within an urban scope.

The process of elimination defined the urban taxi facility. Certain requirements gained prominence to achieve the aim of a sustainable multi-functional facility with the user as primary focus. The main conclusion was that architects have a responsibility towards the environment, and should design spaces that display a relationship between human and nature thereby creating a new typology for taxi facilities.





**FIGURE LIST**

**RESEARCH METHODOLOGY\_CONTENT 6**

Figure 1. COLLAGE OF KEY USERS. www.flickr.com. Edited by Author. 2009 7  
 Figure 2. THE TAXI IN THE URBAN CONTEXT. http://www.flickr.com. Edited Author. 2009 8  
 Figure 3. CLAREMONT PUBLIC TRANSPORT INTERCHANGE. NM and Associates. 2008 9  
 Figure 4. BARAGWANATH TAXI RANK. Urban Solution Architects. 2008 9  
 Figure 5. MAHUBE VALLEY. Author. 2009 9  
 Figure 6. TAXI RANKS IN PRETORIA. Author. 2009 10  
 Figure 7. PEDESTRIAN\_SHOPPER. www.flickr.com. Wong8341. 2008 12  
 Figure 8. TAXI RANK. www.flickr.com. Annanomsa. 2008 12  
 Figure 9. TAXI. Author. 2009 12  
 Figure 10. TRADER. www.flickr.com. Taki Tone. 2008 12

**CHAPTER 02 BACKGROUND\_AIMS & OBJECTIVES 13**

Figure 11. EXISTING TAXI RANKS AND ROUTES. Author. 2009 14  
 Figure 12. NUMBER OF PEOPLE TRAVELLING TO PTA CBD. City of Tshwane. 2006 14  
 Figure 13. BUS ROUTE MAP INDICATING PROPOSED BRT SYSTEM AND INNER CITY DISTRIBUTION SYSTEM. Author. 2009 15  
 Figure 14. TRANSPORT HIERARCHY PYRAMID. Author. 2009 16  
 Figure 15. RAIL ROUTE MAP INDICATING GAUTRAIN CURRENTLY UNDER CONSTRUCTION AND EXISTING METRO RAIL. Author. 2009 16  
 Figure 16. REDEFINING TAXI AND ITS PURPOSE. Author. 2009 17

**CHAPTER 03 THEORY 18**

Figure 17. TIME AND MOVEMENT. www.flickr.com. Edited by Author. 2009 19  
 Figure 18. THE TWO VIEWS OF TIME. Author. 2009 20  
 Figure 19. ANIMATION TIME & MOVEMENT\_MYSTERIOUS GEOGRAPHIC EXPLORATIONS OF JASPER MORELLO. Author. 2009 21  
 Figure 20. SCHUBART PARK. Donovan. Edited by Author. 2009 22

**CHAPTER 04 CONTEXT & SITE CONCLUSION 23**

Figure 21. CONTEXT\_CITY OF TSHWANE. Author. 2009 24  
 Figure 22. CONTEXT\_PRETORIA. Author. 2009 24  
 Figure 23. PROPOSED SITE. Author. 2009 24  
 Figure 24. PROPOSED SITE IN CONTEXT. Author. 2009 25  
 Figure 25. SITE PLAN MARKING VISUAL CONTEXT. Author. 2009. 26  
 Figure 26. VISUAL CONTEXT\_KRUGER PARK. Author. 2009. 26  
 Figure 27. VISUAL CONTEXT\_SCHUBART PARK. Author. 2009. 26  
 Figure 28. VISUAL CONTEXT\_DAERAAL FLATS. Author. 2009. 27  
 Figure 29. VISUAL CONTEXT\_JET SET PARK. Author. 2009. 27  
 Figure 30. VISUAL CONTEXT\_VERMEULEN STREET HOUSES. Author. 2009. 27  
 Figure 31. COLLAGE OF EXISTING CONTEXT TEXTURES. Author. 2009. 28  
 Figure 32. COLLAGE OF EXISTING CONTEXT BRANDING. Author. 2009. 29  
 Figure 33. STUDY AREA: EXISTING SITE AERIAL PHOTOGRAPH. www.googleearth.com. 2009. 30  
 Figure 34. STUDY AREA: EXISTING FIGURE GROUND PLAN. Author. 2009. 30  
 Figure 35. STUDY AREA: EXISTING CONTOURS & ERF NUMBERS PLAN. Author. 2009. 30  
 Figure 36. STUDY AREA: EXISTING SEWERAGE PLAN. Author. 2009. 31  
 Figure 37. STUDY AREA: EXISTING VEGETATION PLAN. Author. 2009. 31  
 Figure 38. STUDY AREA: EXISTING VOLUMES OF VEHICULAR MOVEMENT. Author. 2009. 31  
 Figure 39. STUDY AREA: CURRENT LAND USE. Author. 2009. 32  
 Figure 40. STUDY AREA: PROPOSED BUS SYSTEMS. Author. 2009. 32  
 Figure 41. CONDENSED STUDY AREA: PROPOSED FRAMEWORK PLAN. Author. 2009. 32

Figure 42. CONDENSED STUDY AREA: WINTER MORNING SHADE ON SITE\_22 JUNE 09:00. Author. 2009. 33  
 Figure 43. CONDENSED STUDY AREA: WINTER AFTERNOON SHADE ON SITE\_22 JUNE 15:00. Author. 2009. 33  
 Figure 44. CONDENSED STUDY AREA: SUMMER MORNING SHADE ON SITE\_22 DECEMBER 09:00. Author. 2009. 33  
 Figure 45. CONDENSED STUDY AREA: SUMMER AFTERNOON SHADE ON SITE\_22 DESEMBER 15:00. Author. 2009. 33  
 Figure 46. PROPOSED FRAMEWORK SKETCH. Author. 2009. 34  
 Figure 48. SITE TRANSITION AXIS SKETCH. Author. 2009. 35  
 Figure 47. SITE CONCLUSION SKETCH. Author. 2009. 35

**CHAPTER 05 CASE STUDIES\_PRECEDENT STUDIES 36**

Figure 49. TAXI RANK CASE STUDIES.www.flickr.com. Edited by Author. 2009. 37  
 Figure 50. MAHUBE VALLEY INTERCHANGE PLAN. Illustration reproduced by Author. 2009. 38  
 Figure 51. MAHUBE VALLEY INTERCHANGE MOVEMENT DIAGRAM. Author. 2009. 38  
 Figure 52. COSMO CITY TRANSPORT FACILITY PLAN. Illustration reproduced by Author. 2009. 38  
 Figure 53. COSMO CITY TRANSPORT FACILITY MOVEMENT DIAGRAM. Author. 2009. 38  
 Figure 54. EKURHULENI TAXI RANK PLAN. Illustration reproduced by Author. 2009. 38  
 Figure 55. EKURHULENI TAXI RANK MOVEMENT DIAGRAM. Author. 2009. 38  
 Figure 56. BARAGWANATH TRANSPORT FACILITY PLAN. Illustration reproduced by Author. 2009. 39  
 Figure 57. BARAGWANATH TRANSPORT FACILITY MOVEMENT DIAGRAM. Author. 2009. 39  
 Figure 58. SKINNER STREET TAXI RANK AERIAL. Geography and Informatics. 2009. 39  
 Figure 59. SCHUBART PARK TAXI RANK AERIAL. Geography and Informatics. 2009. 39  
 Figure 60. SKINNER STREET TAXI RANK MOVEMENT DIAGRAM. Geography and Informatics. 2009. 39  
 Figure 61. SCHUBART PARK TAXI RANK MOVEMENT DIAGRAM. Geography and Informatics. 2009. 39  
 Figure 62. MAHUBE VALLEY SURROUNDING LANDUSE. Author. 2009. 40  
 Figure 63. MAHUBE VALLEY USER FACILITIES PROVIDED. Author. 2009. 40  
 Figure 64. COSMO CITY TRANSPORT FACILITY SURROUNDING LANDUSE. Author. 2009. 40  
 Figure 65. COSMO CITY TRANSPORT USERS FACILITIES PROVIDED. Author. 2009. 40  
 Figure 66. EKURHULENI TAXI RANK SURROUNDING LANDUSE. Author. 2009. 40  
 Figure 67. EKURHULENI TAXI RANK USER FACILITIES PROVIDED. Author. 2009. 40  
 Figure 68. BARAGWANATH TRANSPORT FACILITY SURROUNDING LANDUSE. Author. 2009. 41  
 Figure 69. SKINNER STREET TAXI RANK SURROUNDING LANDUSE. Author. 2009. 41  
 Figure 70. SCHUBART PARK INFORMAL TAXI RANK SURROUNDING LANDUSE. Author. 2009. 41  
 Figure 71. BARAGWANATH TRANSPORT FACILITY USER FACILITIES PROVIDED. Author. 2009. 41  
 Figure 72. SKINNER STREET TAXI RANK USER FACILITIES PROVIDED. Author. 2009. 41  
 Figure 73. SCHUBART PARK INFORMAL TAXI RANK USER FACILITIES PROVIDED. Author. 2009. 41  
 Figure 74. MAHUBE VALLEY VEHICLE- VS PEDESTRIAN MOVEMENT. Author. 2009. 42  
 Figure 75. COSMO CITY TRANSPORT VEHICLE- VS PEDESTRIAN MOVEMENT. Author. 2009. 42  
 Figure 76. EKURHULENI TAXI RANK VEHICLE- VS PEDESRIAN MOVEMENT. Author. 2009. 42  
 Figure 77. BARAGWANATH TRANSPORT FACILITY VEHICLE- VS PEDESTRIAN MOVEMENT. Author. 2009. 43  
 Figure 78. SKINNER STREET TAXI RANK VEHICLE- VS PEDESTRIAN MOVEMENT. Author. 2009. 43  
 Figure 79. SCHUBART PARK INFORMAL TAXI RANK VEHICLE- VS PEDESTRIAN MOVEMENT. Author. 2009. 43  
 Figure 80. MANDELA'S YARD MUSEUM. Urban Solutions. http://www.southafrica.info/pls/procs. 2005. 44  
 Figure 81. MANDELA'S YARD MUSEUM PLAN. Rich. 2003. 44  
 Figure 82. MANDELA'S YARD MUSEUM FRONT FACADE.http://www.southafrica.info. 2005. 44  
 Figure 83. TAXI RANK INFORMATION PAVILIION. Paragon. 2002. 44  
 Figure 84. TAXI RANK INFORMATION PAVILION PLAN. SA Architects vol 2000. 2000. 44  
 Figure 85. NEW STREET STATION BIRMINGHAM. UN Studio. 2008 45

**CHAPTER 06 DESIGN DEVELOPMENT 46**

Figure 86. TAXI FACILITY DESIGN DEVELOPMENT. www.flickr.com. Edited by Author. 2009 47  
 Figure 87. FIRST OPTION: CIRCULATION PLAN DIAGRAM. Author. 2009 48  
 Figure 88. FIRST OPTION: CIRCULATION PLAN. Author. 2009 48



Figure 89. FIRST DESIGN ROUTE PLAN DIAGRAMS. Author. 2009	48
Figure 90. FIRST DESIGN ROUTE SPATIAL EXPLORATIONS. Author. 2009	49
Figure 91. SECOND DESIGN ROUTE PLAN DIAGRAMS. Author. 2009	50
Figure 92. SECOND DESIGN ROUTE SPATIAL EXPLORATIONS. Author. 2009	50
Figure 93. THIRD DESIGN ROUTE PLAN DIAGRAMS. Author. 2009	51
Figure 94. THIRD DESIGN ROUTE SPATIAL EXPLORATIONS. Author. 2009	51
Figure 95. TAXI RANK CIRCULATION PLANNING DAIGRAM. Author. 2009	52
Figure 96. SECOND OPTION CIRCULATION PLAN DIAGRAM. Author. 2009	52
Figure 97. SECOND OPTION:CIRCULATION PLAN. Author. 2009	52
Figure 98. FOURTH DESIGN ROUTE PLAN DIAGRAMS. Author. 2009	53
Figure 99. FOURTH DESIGN ROUTE SPATIAL EXPLORATIONS. Author. 2009	53
Figure 100. TAXI ROUTE HAND SIGNALS. Author. 2009	54
Figure 101. 3D EXPLORATION OF BUILDING IN CONTEXT. Author. 2009	55
Figure 102. DESIGN SOLUTION. www.flickr.com. Edited by Author. 2009	56
<b>CHAPTER 07 DESIGN SOLUTION</b>	<b>57</b>
Figure 103. TAXI TRANSIT PARK TYPOLOGY EXPLANATION. Author. 2009	58
Figure 104. TRANSIT TAXI PARK ACCOMODATION SIGNAGE DIAGRAM. Author. 2009	59
Figure 105. TAXI TRANSIT PARK DIAGRAM PLAN. Author. 2009	60
Figure 106. VEGETATION PULLED OVER AND THROUGH TRANSIT PARK. Author. 2009	61
Figure 107. BUILDING AS EXTENSION OF KRUGER & SCHUBART PARK PODIUM. Author. 2009	61
Figure 108. 3D EXPLORATION OF TAXI TRANSIT PARK STREET FACADE. Author. 2009	61
Figure 109. CIRCULATION / MOVEMENT DIAGRAM. Author. 2009	62
Figure 110. 3D EXPLORATION OF TAXI TRANSIT PARK. Author. 2009	63
Figure 111. INSIDE 3D EXPLORATION OF TAXI TRANSIT PARK. Author. 2009.	64
Figure 112. 3D EXPLORATION OF WATER POINT. Author. 2009	65
Figure 113. TRADER BOOTH JEWELLERY BOX IN WAITING AREA. Author. 2009.	65
Figure 114. TRADER BOOTH JEWELLERY BOX IN WAITING AREA. Author. 2009	66
<b>CHAPTER 08 MATERIALS TECHNICAL REPORT</b>	<b>67</b>
Figure 115. ATTERIDGEVILLE TAXIS CARBON TRADE. Author. 2009	68
Figure 116. MABOPANE TAXIS CARBON TRADE. Author. 2009	68
Figure 117. CITY CBD TAXIS CARBON TRADE. Author. 2009	69
Figure 118. RIVER BUSHWILLOW AND WILD OLIVE TREES. Author. 2009	69
Figure 119. RUBBER SIDEWALKS. Www.rubbersidewalks.com. 2009	70
Figure 120. G BLOCKS PAVING. Www.infraset.com. 2009	70
Figure 121. SITE MATERIALS DIAGRAM. Author. 2009	70
Figure 122. BUILDING MATERIALS DIAGRAM. Author. 2009	71
Figure 123. 3D BUILDING MATERIALS DIAGRAM. Author. 2009	72
Figure 124. 3D BUILDING MATERIALS DIAGRAM. Author. 2009	72
Figure 125. FIRE STAIRCASES. Author. 2009	73
Figure 126. VERTICAL SERVICE SHAFTS. Author. 2009	73
Figure 127. MODEL PRESENTATION. Schalk & Author. 2009	74
Figure 128. DETAIL ROUTE DIAGRAM. Author. 2009	89
Figure 129. FUEL OF PROJECT. www.flickr.com. Edited by Author. 2009	101



110	Content
120	Introduction
121	Design Problem Statement
122	Review of Similar Projects
123	Design Intent
124	Context
130	Methodology
131	Research Method
132	Ethical Consideration
133	Analysis
134	Limitations

# 01



<b>Chapter 00]</b>				
000	Title Page	001		
010	Abstract	003		
020	List of Figures	004		
<b>Chapter 01]</b>				
110	Content	007		
120	Introduction	008		
130	Research Methodology	011		
<b>Chapter 02]</b>				
210	Background	014		
220	Aims and Objectives	017		
<b>Chapter 03]</b>				
310	Theory	019		
320	Conclusion	021		
<b>Chapter 04]</b>				
410	Context & Site	024		
420	Framework	034		
430	Conclusion	035		
<b>Chapter 05]</b>				
510	Case Studies	038		
520	Conclusion	043		
530	Precedent Studies	044		
<b>Chapter 06]</b>				
610	Design Development	047		
620	Major Discoveries	054		
<b>Chapter 07]</b>				
710	Design Solution	058		
720	Accommodation	059		
730	Final Design	060		
<b>Chapter 08]</b>				
810	Materials	068		
820	Technical Report	075		
<b>Chapter 09]</b>				
910	Addendum	102		
920	Bibliography	106		



## INTRODUCTION

30 200 people, representing approximately a sixth of the commuters to the Pretoria CBD, are reliant on minibus taxis (Department of Transport, 2006c: 2). The minibus taxi has a major role in the public transport sector of this country. A misconstrued view however exists around the existing use of minibus taxis as a means of public transportation. The taxi driver's methods are seen as unconventional and often resort to riot and violence to state their case and reach their goals. An article in the Mail and Guardian (BYRNE, 2008) claims that the majority of the taxi drivers only know how to operate in an informal sector.

Minibus taxis are to be excluded in the FIFA 2010 world cup organization as a means of transport in and around the CBD's; they will be replaced by the Bus Rapid Transportation (BRT) system (SANTACO, 2008b). Aims of the BRT are to rejuvenate the cities' ailing transport networks by quickening commuting in and out the CBD, and in part, address the transport congestion and chaos (Donnelly, 2009). Traditional communal transport would be severely affected or reduced due to the introduction of this new transport system. As a result a well defined South African cultural legacy would not be available for experience by overseas tourists. In addition, the livelihood

of the taxi owners and drivers as well as the community would be affected. For example informal traders along the routes and in the taxi ranks could be out of business.

## DESIGN PROBLEM STATEMENT

The Gautrain concession includes the provision of Feeder and Distribution Bus services, and their two key market segments are existing motorists and airport passengers (Gauteng Provincial Government, 2004). Koenderman (2009) indicates that 59,3% people household income per month is under R5 000, which means that a large part of the working commuters are excluded from the category of the Gautrain concession design. The need for the taxi industry with its supporting social and business sector remains for a large part of the South Africa society. Furthermore, no provision is made for the informal traders at the Gautrain stations (Otto, 2009). Whilst modal integration is of the utmost importance to the Department of Transport, there is an underlying problem with incorporating the taxi industry, because of its unfriendly persona towards the bystander and the environment (Steer, 2009). This should be addressed and designed for, and the role of taxis into the Modal sector should be re evaluated. Taxis could be seen as reliable, comfortable, convenient and true to their legacy – social.



FIG.2. THE TAXI IN THE URBAN CONTEXT



### REVIEW OF SIMILAR PROJECTS

Structures built accommodating taxi ranks do not really communicate improvement, but rather stagnate the industry in its current state. Various initiatives by the government exists to organise taxis into a more formal public transport system by erecting new taxi ranks and trading facilities. The Blood Street Taxi Rank in Pretoria serves as an example. However taxi ranks do not mature as envisioned by government. There remains an extent of disorganisation and own mindedness displayed by taxi drivers and traders alike. They are hesitant to familiarise with their surroundings. In addition the facilities are often overdesigned, not adapting to the personal creative needs of the users. On the contrary, there is no design contribution whatsoever when the taxis just acts on his own initiative and parks on an open urban erf. A transformation charter is required, redefining the taxi industry into its correct place in the transport grain. It should move away from an unorganised transport system to one that is more organised and fitting to its purpose. When designing the

taxi rank facilities it should be positioned in between the two extremes, leaving room for the users' own initiative.

Projects trying to achieve these goals are the Claremont Public Transport Interchange in Cape Town, the Baragwanath Taxi Rank in Johannesburg CBD and Mahube Valley in Mamelodi amongst others. The following issues surface when studying the success or failure of these projects:

- What is the scale of the project?
- What is the surrounding land use; are there other functions that can be incorporated?
- What is the reason for establishing the Taxi Rank;
  - is it a place of origin
  - destination
  - or a just a holding area?
- Are there sufficient infrastructure and facilities provided for the key users?
- Circulation and coherency of the user:
  - taxis,
  - pedestrians
  - traders

- Is there sufficient access for all users?
  - Is the design in a place where they can relate and acclimatise to with the all the users' needs in mind?
  - What is the personal experience for each user?
  - Is there a sense of place and ownership?
  - Is there focus on the design of the structure, robustness of materials, sustainability and its resource efficiency?
- Rather than trying to erode the business of taxis and the participating community involvement, all parties should be incorporated into a viable and sustainable transport system for the city of Tshwane to serve the best interests of everyone.

A city and its inhabitants represent a growing organism of cultural, economic, ecological and geopolitical intricacies. These can be translated into space and form. , it consists of physical dimensions and attributes with key installations and linkages that are dominated by high speed, connectivity, structures and control. However, the dweller still inhabits an essential part of the space and form. A design proposal should be a place for people, the user and bystander.

FIG.3. CLAREMONT PUBLIC TRANSPORT INTERCHANGE



FIG.4. BARAGWANATH TAXI RANK



FIG.5. MAHUBE VALLEY





FIG.6. TAXI RANKS IN PRETORIA

The project theme establishes itself within this realm: finding a relationship between time and movement through experience. The Taxi Transit Park is a project where the transport system has a symbiotic relationship with the community and nature.

#### *CLIENT*

South African National Taxi Council, SANTACO.

#### *BRIEF*

A taxi rank service that integrates the taxi, trader / retail and commuter.

In addition offices for the South African National Taxi Council and the Metropolitan Police Officials have to be accommodated in the complex.

#### *CONTEXT*

Erf number R/1/30.18

The proposed site is situated in the North Western part of Pretoria CBD, between Struben -, Potgieter - and Vermeulen Streets opposite Kruger Park Residential units and Schubart Residential units.

#### *DESIGN INTENT*

The transport facility should enhance the everyday journey. Conflicts of users are to be eliminated, stipulating the path of comfort for the dweller. The main function of the building complex is to act as a public service area providing comfort and convenience to its users. Although the taxis are the generator of the activities the design should respond toward nature and the user, creating a social place for people.

#### *THE USER*

##### • TAXIS

The taxi persona, in particular the space it inhabits, should be unpacked, rethought and then put together again enabling a new identity in the environment which it operates. There should be designated and demarcated areas allocated to taxis, with shelter and sufficient facilities, so that the facility becomes a preferred destination along their daily route.

##### • PEDESTRIAN: Commuter

There should be a quick route to his/her destination, avoiding any confusion or conflict on his path.

##### • PEDESTRIAN: Lingerer

He/she should be lured into the structure, distracting him/her to dwell into his/her own experience. The senses should be activated through the use of vegetation, light, water, textures. Branding could be employed to highlight the present.

##### • TRADER

He/she should be situated to optimised position in relation to their clientele. The trader should form part of the experience along the journey.



## *METHODOLOGY*

During the project the status of pedestrian and vehicular movements within the study area was investigated with the aim of creating a place for all the users. The project makes use of extrapolated figures based on case- and precedent studies. Existing transportation trends is used to assess the feasibility of the proposed Taxi Transit Facility. The theory component investigates the relationship between time and movement.

Cultural protocols are taken into consideration by recognising underlying relationship. The everyday experience of the commuters and the opinion of the taxi industry reveals antagonism towards decision makers in respect of the BRT system.

## *RESEARCH METHOD*

The study makes use of a combination of quantitative and qualitative methods of research in evaluating the project problem statement and establishing the project theme. The quantitative research method consists of documentary analysis of relevant books, Government proposals and similar projects as published in journals.

The qualitative focuses on group discussions and interviews with parties involved, engineers and architects. It should be noted that assessment is conducted whilst the policy regarding the proposed BRT system is enforced. The taxi industry is opposing the proposals and this could affect any evaluation research.

However, this research contributes by proposing an integrated form of transport modes. In addition, the proposal reduces conflict and enhances the commuters' experience of the everyday.

## *ETHICAL CONSIDERATION*

The project focuses on integrating the community through the merging of the taxi industry into the transport grain. The social goal is to upgrade a public transportation system that caters for the majority of the population. If successful the misconstrued perception of taxis and taxi ranks would be altered through addressing current issues relating to taxi ranks by responding to nature and the user.

## *ANALYSIS*

A design outcome is sought that enhances the everyday

experience, this is done through utilising the raw and documented data retrieved and exploring through text sketches and diagrams. Site analysis is informed by the group site framework (See Addendum B). The analytical data and raw data from site visits in conjunction with theory component are amalgamated resulting in a design proposal that responds to the user and the surrounding context. This will enhance and the transport system that supports and contributes to the economic growth of Tshwane.

## *LIMITATIONS*

Due to the partially unorganised and unapproachable current status of the taxi industry, cooperation from relevant sources is restricted. In addition the following aspects proved challenging:

- Use and cost of materials
- Defining the exact compared to income group that the project design is for
- Structuring the current informal, unstructured system allows for subjective interpretation
- Adapting the design proposals according to the users' needs.
- To overcome the current perception of taxis and what taxi rank should be.



FIG.7. PEDESTRIAN\_SHOPPER

FIG.8. TAXI RANK

FIG.9. TAXI

FIG.10. TRADER



210 Background  
220 Aims & Objectives

# 02

BACKGROUND

The birth of the taxi industry is a result of various processes. The industrialisation in the 1950's and black South Africans leaving their traditional homestead to look for work in the mines were important contributors. Due to the apartheid land act people were relocated from their tribal land into homelands and 'labour reservoirs' on the fringes of cities (Fisher, 1998: 163). This fragmentation within the urban landscape created an opportunity for a new transport mode: the taxi. The deregulation of the industry unleashed uncontrolled and haphazard growth in the 1980's. Taxi drivers started to compete for allocations resulting in violent confrontations. A Taxi Council was established in 1994. This organisation, now called the South African National Taxi Council (SANTACO), is recognised by government as the only legitimate industry representative.

The minibus type taxi is an unscheduled public passenger road transport service that operates on a specific route or routes, or where applicable, within a particular area by means of minibus or midibus (Department of Public Transport, Road and Works, 2001). The minibus taxi industry is a critical part of the public transport sector, operating and competing with the subsidised bus industry. As illustrated in figure 12 (Department of Transport,

2006c) 15% of the people travelling to the CBD in peak hour commute by minibus taxis. Approximately 10 000 more passengers prefer taxis rather than buses. The Gauteng Household Travel Survey (Department of Transport, 2006b) undertaken in 2002/03 estimated 176 400 passengers travelling via mini-bus taxi daily.

Minibus taxis continuously adapt to the needs of the commuters. Taxis represent a pragmatic solution to the transport problem whilst supporting a community. This reality could hardly be dismissed from the South African society. Mini-bus taxis are the fastest and cheapest way to travel in the city (City of Johannesburg Transport Road and Rail, 2009). However, the continuous use of unconventional methods has resulted in an industry that is labeled as offensive, selfish and unsafe. In part this perception of minibus taxis resulted in them being discarded from the FIFA 2010 World Cup public transportation plans (SANTACO, 2008c).



FIG.11. EXISTING TAXI RANKS AND ROUTES

No of people in am peak travelling to CBD		
Mode	%	No of people
Minibus Taxi	15,1	30 200
Bus	9,5	19 000
Train	6,5	13 000
Car	33,0	66 000
Walk	33,0	66 000
Other (Bicycle, motorbike)	2,8	5 600

FIG.12. NUMBER OF PEOPLE TRAVELLING TO PTA CBD



Tshwane traffic is increasingly being characterised by congestion, with a negative result on city growth and inaccessibility contributes to urban sprawl of business and associated inefficiencies. Furthermore, the quality of life of citizens is influenced adversely. Commuters spend more time whilst travelling and public transport doesn't flow (Department of Transport, 2006a). The alone factors led to the introduction of the Bus Rapid Transit (BRT) system. The role of the BRT system is to support corridor development, leading to a more efficient city. An additional aim is to promote public transport as preferred mode. The BRT system is also an initiative to provide support for the Gautrain Development (Department of Transport, 2006a).

The BRT lacks the more personal aspect of interaction and convenience for the commuters, ignoring the informal traders' existence.

The proposed system for phase 1 with the identified BRT is as follows:

- BRT route between Mabopane and Pretoria Station
- BRT route between Bell Ombre Station and Mamelodi
- Enhanced bus corridor on Church Street between

Atteridgeville and Hatfield

- Enhanced bus corridor on Church Street between DF Malan and Mamelodi
  - Feeder routes
- This is indicated on the route map figure 12 (Advanced Logistic Group, 2008).

Layered approach to the transport network planning should rather be adopted, with the Gautrain (under construction) representing the bottom of the hierarchy of modes, the coarser grain of the public transportation system. Next is the existing rail system followed by the proposed BRT system, enhanced bus corridors and then backed up by feeder or distribution systems that are the finer grain of the public transportation system. Minibus taxis should be redefined as part of this hierarchy rather than being an independent, informal transport mode. Their position is in the finer grain of the hierarchy supporting the coarser levels of the transport system, has never been acknowledged.

FIG. 13. BUS ROUTE MAP INDICATING PROPOSED BRT SYSTEM AND INNER CITY DISTIRBUTION SYSTEM

Government claims that the initiative of the BRT forms part of the transformation of the taxi industry. According to an article in the Mail & Guardian (28 December 2008) taxi owners are the majority shareholders in the companies (that would be contracted by the cities to run this new service). SANTACO remains sceptical. The resulting effect on the taxi industry and its operators is unclear. Attempts to integrate the BRT into the public transport system have been met with resistance from the taxi associations (Damon, 2009: 1). With a redefinition of the Taxi transport system, designed into the hierarchy of an overall transport system, taxis could benefit from being part of an organised transport system playing the role of a more flexible and personal transport mode. By merging the taxi and the BRT system they could complement each other, enabling a symbiotic relationship in support of the community.

The opportunity to reintroduce this facelift of the minibus taxi is the 2010 FIFA World Cup, giving tourist exposure to a unique South African experience. Taxis give a distinct feel in terms of mixture of cultures. There is certain warmth in travelling in taxis that personify Africa and South Africa. By utilising this transport mode the perception of South Africans would be changed. This redefinition could be communicated in the design of the Taxi Transit Park. An architecture of sustainability could render the taxi as preferred transport mode.

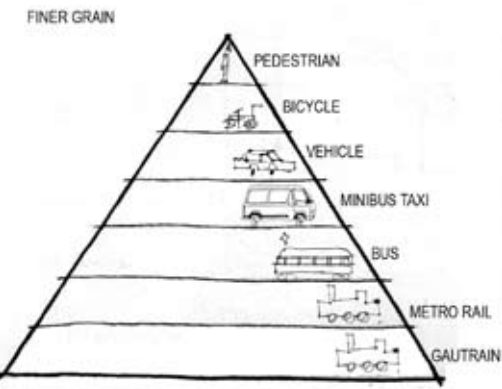


FIG.14. TRANSPORT HIERARCHY PYRAMID.



FIG.15. RAIL ROUTE MAP INDICATING GAUTRAIN CURRENTLY UNDER CONSTRUCTION AND EXISTING METRO RAIL

### AIMS AND OBJECTIVES OF THE STUDY

- 01] Using data obtained to find a suitable solution for the design problem. The data originates from the questionnaire (see Addendum A) and case studies.
- 02] Designing according to the needs of the key users of the facility:
  - taxi
  - pedestrian and
  - trader.
- 03] Exploring the opportunities of minibus taxis as a communication tool with the possibilities of advertisement and branding.
- 04] That the transport facility becomes a public service centre with the foremost focus on convenience for the user.
- 05] Supporting the city of Pretoria by generating collective social, interactive space that can be allied with.
- 06] Creating a sense of place and allowing users to take ownership of the building.
- 07] Initiating a paradigm shift away from the misconstrued view of minibus taxis and taxi ranks, to a more sustainable approach.
- 08] Creating a platform on which to base design decisions and generate future possibilities.
- 09] The theory of experience should investigate the relationship between time and movement. This should be evident in the planning diagram.



FIG.16. REDEFINING TAXI AND ITS PURPOSE



310	Theory
320	Conclusion

# 03



### *ARCHITECTURE — TIME AND MOVEMENT*

Architecture (space, structure and enclosure) is experienced through the movement in space and time (Ching, 2007: X). It is difficult to define what time is? Time is a reality known to mankind, although we can't see it, touch it or even feel it - it remains obvious. One experiences time, but can't comprehend it; it is both evident and mysterious.

To be is to be in time, because time alone persists; either you continue or you cease to exist. Time is perceived as being primarily the sequence of past, present and future. Since the past is no longer, and the future is not yet, time is only the moment, now. With present it should be understood that it is meant only that 'moment by moment' lived by, being erased by time itself. It is otherwise described by Miralles (Futagawa, 1999b: 99) as experiential, because one experiences the instant.

FIG.17. TIME AND MOVEMENT

What is called the present, is in reality only the disappearance of the future into the past (COMTE-SPONVILLE, 2004: 116). Therefore real time is only in the present, because the past is no longer, and the future is not yet. There is a consciousness of time only because it remembers the past and anticipates the future. This is perhaps the cause of the day planner and the recording of every day in a diary. Time that is measured or imagined is composed predominantly of the past and future, meaning that for the most part time only exists in our minds (HEIDEGGER, 1996: 457). Time becomes referential because the present experience is referring to previous or future events, thus bringing together different moments in time.

This indicates the existence of two different times, two different ways of thinking about time. Comte-Sponville (2004: 118) suggested that the first variation of time is objective time, the sequence of 'nows' arising and passing

away. The sequence of 'nows' is uninterrupted and has no gaps, but it changes instantly. The second variation is time as it pertains to the consciousness and the mind, part of the collective memories, merely the sum of the past and the future. The first variation of time could be named experiential time and the second referential time, duration (Figure 18). They are the same thing, only considered from two different viewpoints. Time is present both experientially and referentially and cannot exist in isolation from one another.

Time is 'intuited' becoming, that is to say, it is a transition which does not get thought but which simply tenders itself in the series of 'nows' (Heidegger, 1996:483). Experiential time is concerned with the present, the actual events that take place while moving through a space (Quiros, Makenzie, McMurray :2). It is the sensory experience that the user undergoes that relate to the instant just lived. Experiential architecture is about that path unfolding through movement.

The other instants in time are past and future made present. Where past, present and future are never the same, time consists of duration. It is possible to replay an occurrence in your mind, but the future never influences the past. By recollecting memories, the past does influence the future. Life is an incessant timeline that indicates the progress of present to future, establishing a past (Heidegger, 1996:473). Referential time is how memories and meanings are brought to the present moment. Referential Architecture is made of instants and images that bring back memories and significance to the actual experience. It is a way to escape from reality to memory, through the process of thinking and then reacting (Quiros, Makenzie, McMurray : 3). Everything undergoes change over a certain length of time, rather than trying to change time, architecture should evolve with its ever changing characteristics. Miralles stated that 'to be permanent is contrary to existence, things are forever changing' (Futagawa, 1999a: 102).

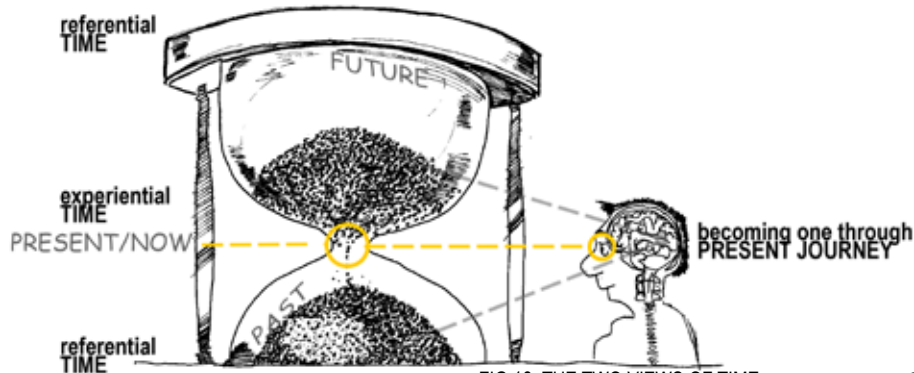


FIG.18. THE TWO VIEWS OF TIME



During the process of animation the relationship between movement and time is accepted as fact (Banchoff, Cervone', 1992:274). Animation translates the static to dynamic, making a lifeless body alive. Such a relationship could be explained through a scene from the animation Jaspore Morello (Figure 19), where a city character staggers because he is contaminated with a fatal disease that is eradicating the city's population. Exposing individual moments in the course of time, a narrative is shaped that can be related to movement and time. Architecture of time is composed of various and diverse ways of experiencing the layers of time, enabling it to act freely both in form and time.

'Nobody has ever noticed a place, except at a time, or a time except at a place' (Cajori, 1926: 405).

'Since we move in time, through a sequence of spaces, we experience a space in relation to where we've been and where we anticipate going' (Ching, 2007: 240).

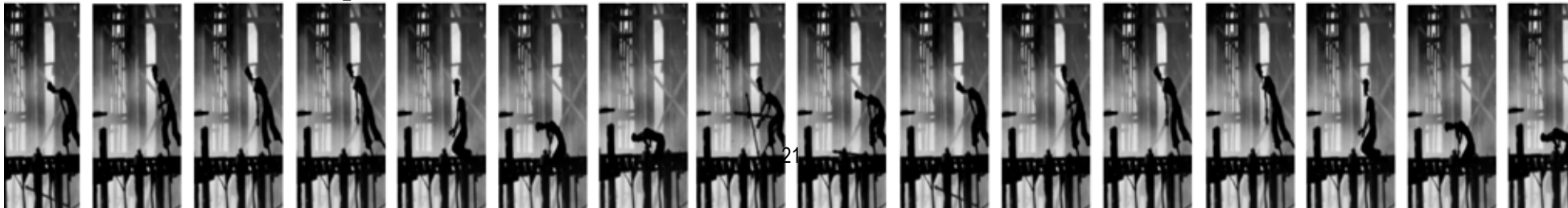
The path of our movement can be concealed as the perceptual thread that links the spaces of a building, or any series of interior and exterior spaces together (Rahim, 2001a: 19). Ching argues that all paths have a starting point from which there is movement through a sequence of spaces to the destination (2007: 264). The contour of the path depends on the mode of transportation. While a pedestrian can turn, pause, stop and rest at will, a motor vehicle has less freedom. A car can be tailored tightly to its dimensions, whilst a pedestrian that tolerate abrupt changes in direction, requires a certain amount of freedom to effect these changes. Life is a journey; in this voyage everybody is free to take their own path, creating an individual experience. Two things always remain present: space and time (Futagawa, 1999b: 32). Experiential- and referential time become one through the present journey.

### CONCLUSION

In designing the new Taxi Transit Park it is important to consider the experience of the users. The movement through space and time should be staged. Referential architecture requires that certain elements are acknowledged in a taxi rank. These should remain to gain the traders' facilities significance, the taxis and spaces for a social gathering. The design should be adaptable according to the user's needs. Within the taxi industry there is a cultural identity that warrants investigation. In addition the carbon footprint that is exerted by the industry has to be addressed.

Experiential architecture represents movement through space. The transition between pedestrian and vehicle should be investigated during the design process, as well as the relationship between nature and man.

FIG.19. ANIMATION TIME & MOVEMENT\_MYSTERIOUS GEOGRAPHIC EXPLORATIONS OF JASPER MORELLO





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410	Context
411	Site
412	Visual Context
413	Contextual Analysis
414	Site Climate
415	Framework
420	Conclusion

# 04

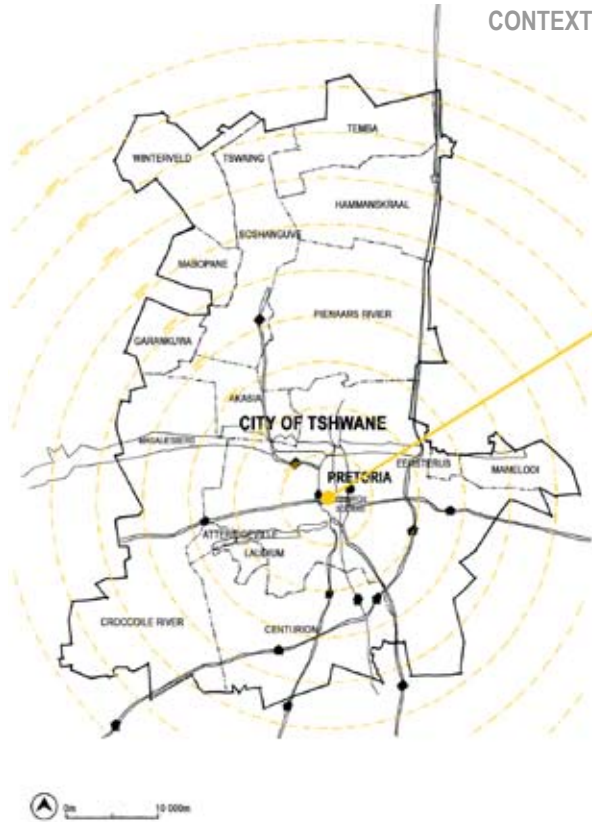


FIG.21. CONTEXT\_CITY OF TSHWANE

**CITY OF TSHWANE**

Tshwane is located in Gauteng Province and includes Pretoria which is the governmental capital of the country.



FIG.22. CONTEXT\_PRETORIA

**PRETORIA**

Pretoria is based on the Roman 'urbs Quadrata', the town is quartered by the intersecting cross of the 'Kardo' that is the North-South Axis, and 'Decumanus' the East-West Axis (Fisher, 1998: 62). The intersection forms the centre of the town, Church Square.

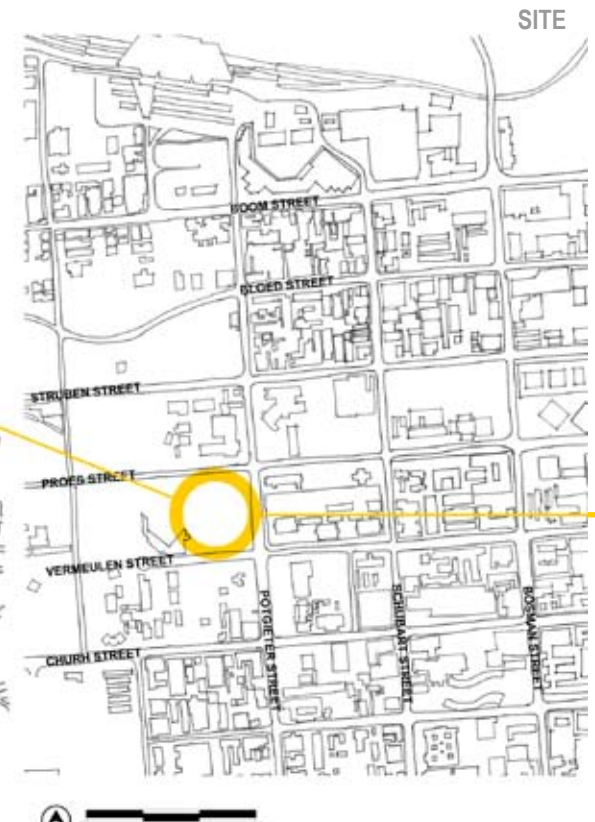


FIG.23. PROPOSED SITE

**PROJECT SITE**

The proposed site is situated in the North West Quadrant of Pretoria, between Proes-, Potgieter- and Vermeulen Streets. Erf number R/1/30.18.



### *PROPOSED SITE*

The suitability of various sites was investigated. The positioning of the minibus taxi within the transport industry determined the site selection to a large extent (Addendum B). The site is situated opposite the Kruger Park Residential Unit that is currently vacant. Approximately 200m from the site there is an informal taxi rank on a vacant erf with no facilities. This further emphasised the need for a transport facility. The proposed site is situated in between Bell-Ombre station to the North, and Pretoria station to the South. The needs assessment established that most commuters travel from Atteridgeville, west of Pretoria and Mabopane, north of Pretoria, making the site an ideal location for a transit park.



FIG.24. PROPOSED SITE IN CONTEXT



FIG.25. SITE PLAN MARKING VISUAL CONTEXT



1] KRUGER PARK  
FIG.26. VISUAL CONTEXT\_KRUGER PARK



2] SCHUBART PARK  
FIG.27. VISUAL CONTEXT\_SCHUBART PARK



3] DAERAAL FLATS  
FIG.28. VISUAL CONTEXT\_DAERAAL FLATS



4] JET SET PARK  
FIG.29. VISUAL CONTEXT\_JET SET PARK



5&6] VERMEULEN STREET HOUSES  
FIG.30. VISUAL CONTEXT\_VERMEULEN STREET HOUSES





FIG.32. COLLAGE OF EXISTING CONTEXT BRANDING



AERIAL PHOTOGRAPH

FIG.33. STUDY AREA: EXISTING SITE AERIAL PHOTOGRAPH



FIGURE GROUND

FIG.34. STUDY AREA: EXISTING FIGURE GROUND PLAN



CONTOURS & ERF NUMBERS

FIG.35. STUDY AREA: EXISTING CONTOURS & ERF NUMBERS PLAN



0 50 100 200  
SERVICES

FIG.36. STUDY AREA: EXISTING SEWERAGE PLAN



0 50 100 200  
VEGETATION

FIG.37. STUDY AREA: EXISTING VEGETATION PLAN



0 50 100 200  
VEHICULAR MOVEMENT

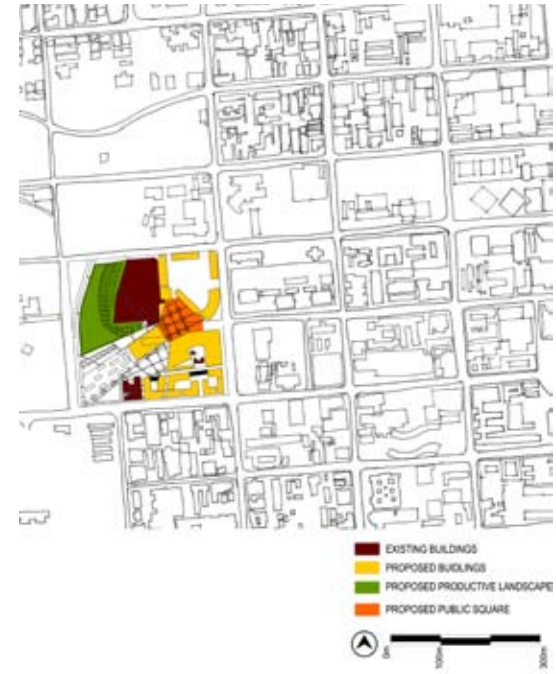
FIG.38. STUDY AREA: EXISTING VOLUMES OF VEHICULAR MOVEMENT.



**CURRENT LANDUSE**  
FIG.39. STUDY AREA: CURRENT LAND USE



**PROPOSED BUS SYSTEMS**  
FIG.40. STUDY AREA: PROPOSED BUS SYSTEMS



**PROPOSED FRAMEWORK**  
FIG.41. CONDENSED STUDY AREA: PROPOSED FRAMEWORK PLAN

### SITE CLIMATE

The site climate conditions have to be considered during the design process. This was necessary in order to achieve environmental comfort for the users. It also enables the project to become resource efficient by making use of natural ventilation and water harvesting.

### TEMPERATURE

Lowest min.: -5,5°C ; Average of 12,1°C  
Highest max.: 36,3°C ; Average of 24,8°C

### RAINFALL

Summer rainfall area, with an average of 674mm rainfall per year.

### SHADOWS

A shadow study indicated minimal shade coverage on the site. This might cause a micro climate heat island in the event of overusing hard landscaping.

WINTER MORNING SHADE



FIG.42. CONDENSED STUDY AREA: WINTER MORNING SHADE ON SITE \_ 22 JUNE 09:00

WINTER AFTERNOON SHADE



FIG.43. CONDENSED STUDY AREA: WINTER AFTERNOON SHADE ON SITE \_ 22 JUNE 15:00

SUMMER MORNING SHADE



FIG.44. CONDENSED STUDY AREA: SUMMER MORNING SHADE ON SITE \_ 22 DECEMBER 09:00

SUMMER AFTERNOON SHADE



FIG.45. CONDENSED STUDY AREA: SUMMER AFTERNOON SHADE ON SITE \_ 22 DECEMBER 15:00

### STUDENT FRAMEWORK

*The following problem statement emerged after numerous site visits:*

Pretoria as a city is a consumer. The city functions on a linear influx and output of energy and waste. The city is fed by surrounding rural environment, but also expects this environment to absorb its waste. In order for the city to protect its dwellers in the future it needs to start providing for them. The city should start to function on energy from circular motion, not just producing waste but recycling it too.

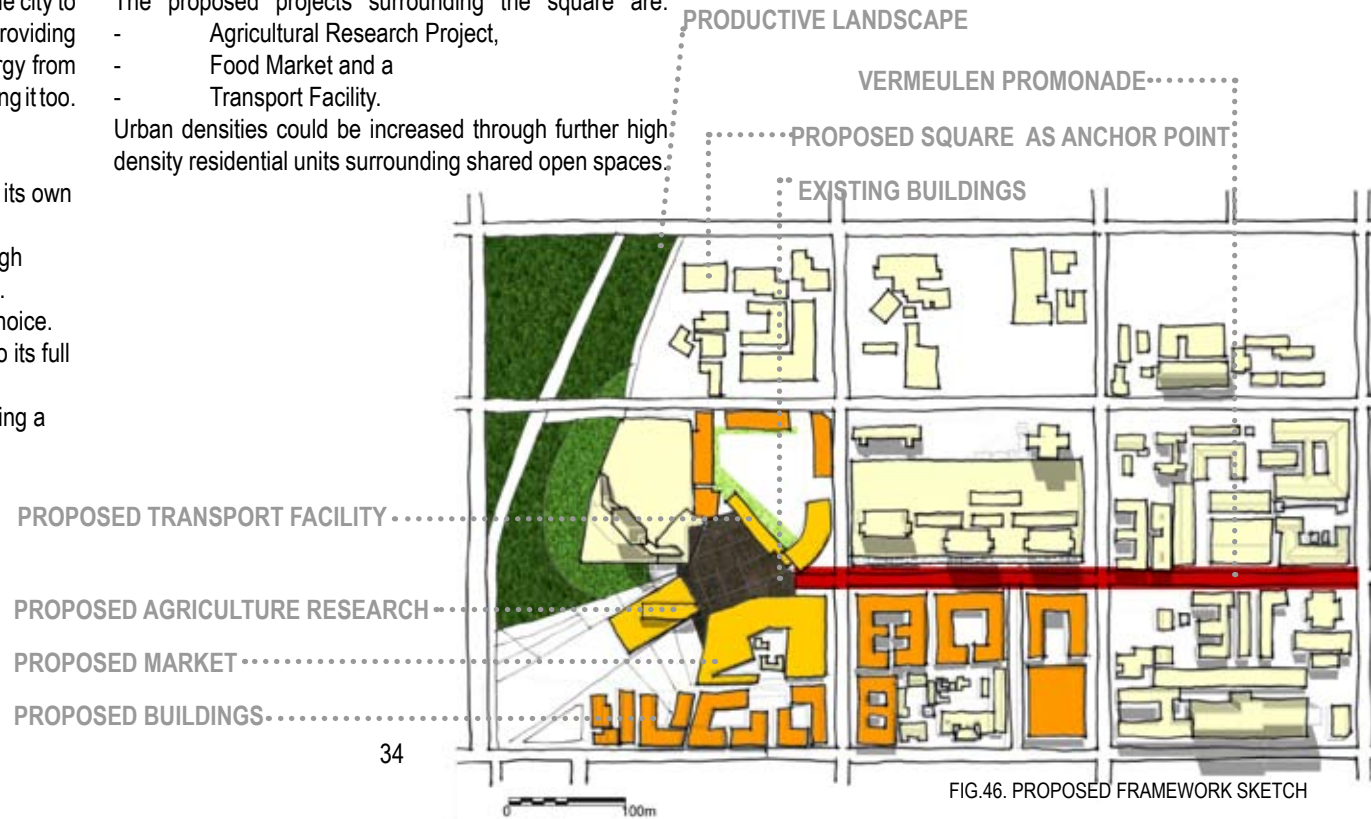
*Project objective as a response to the above are:*

- To create a sustainable Borough in the city with its own identity in the city.
- Focussing on the needs of the pedestrian through densification and providing shared public space.
- Providing dwellers with adequate access and choice.
- Utilising existing fabric natural and man-made to its full potential.
- Reconnecting the city with the landscape, creating a productive system.

The predominately pedestrian orientated Vermeulen Promenade acts as an anchoring in conjunction with the Steenhoven Spruit. Between Kruger Park and the Steenhoven Spruit a productive landscape is proposed with fruit bearing trees reconnecting nature with the man-made. The Public Square, serves as the anchoring point of the framework. The proposed projects surrounding the square are:

- Agricultural Research Project,
- Food Market and a
- Transport Facility.

Urban densities could be increased through further high density residential units surrounding shared open spaces.



## CONCLUSION

Key issues that should be addressed in the proposed Project:

- The Public Square will serve as an anchoring point: therefore the boundaries of the square should be clearly defined.
- Waste should be recycled through a closed loop system.
- The transition through space forms a path for the user that establishes his/her experience. The understanding of these paths by the user determine the success of the design.
- Axis defining paths should be incorporated and communicated as visual references.
- Conflict between transport modes should be avoided ensuring fluent circulation for both vehicle and pedestrian, this could be established by designating specific areas for both.
- Incorporating a transport node into urban fabric is economically viable. Taxis as the generator serve various activities. The facility should act as magnet for people and opportunity within the urban scope.
- The height of the surrounding buildings and the plinths of Kruger Park and Schubart Park should be acknowledged.
- Climate and Services should be considered from the onset of the designing process.

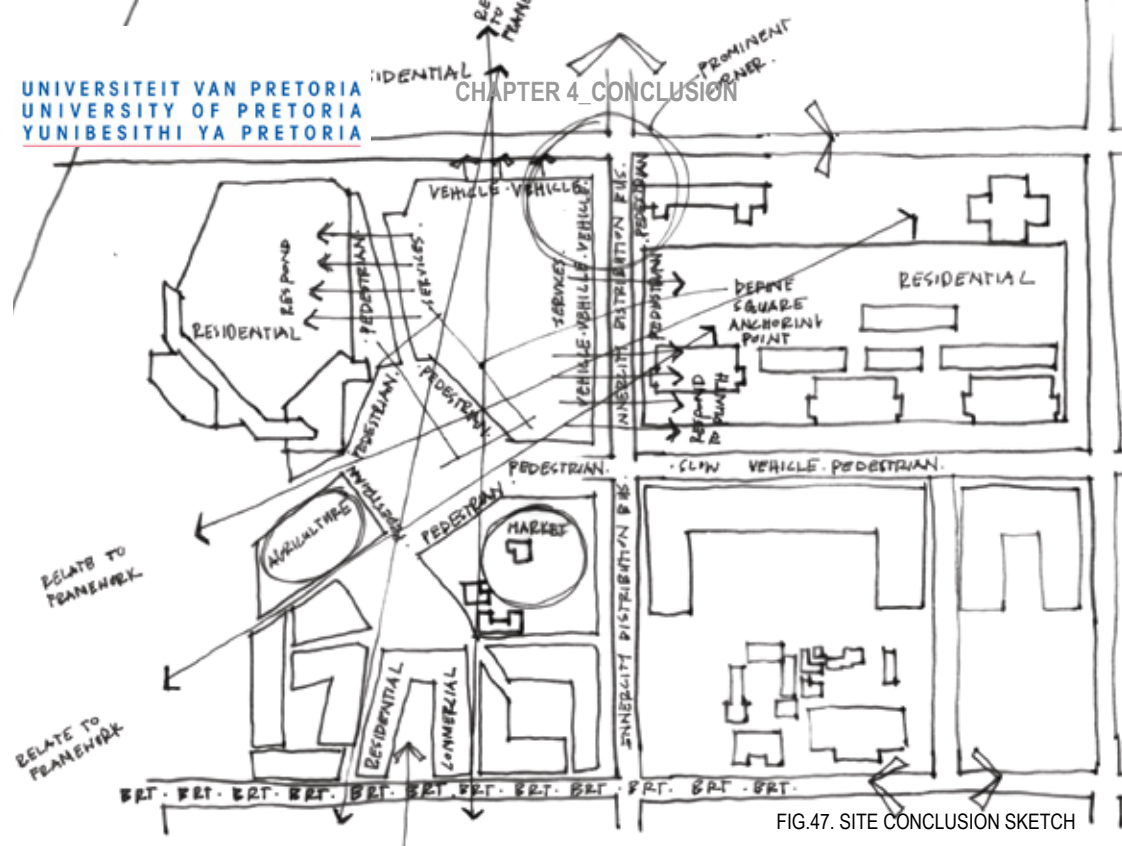


FIG.47. SITE CONCLUSION SKETCH

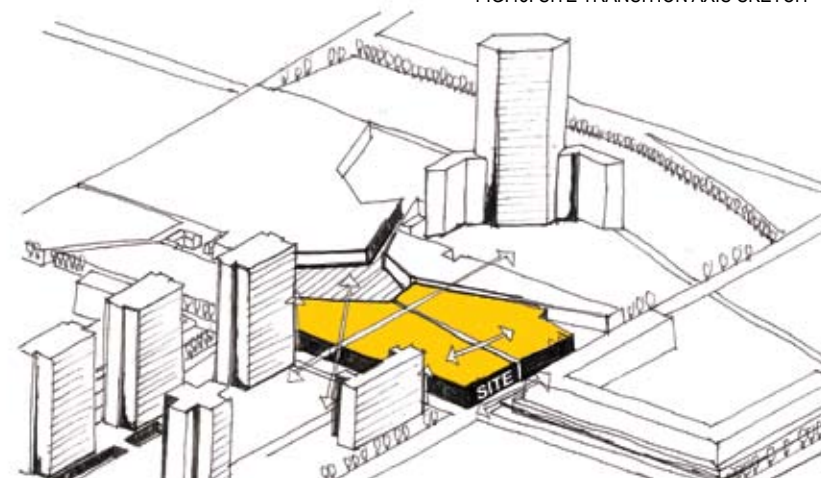


FIG.48. SITE TRANSITION AXIS SKETCH



510	Case Studies
511	Mahube Valley, Mamelodie
512	Cosmo City, Johannesburg
513	Ekurhuleni, Kempton Park
514	Baragwanath, Johannesburg
515	Skinner & Bosman Street, Pretoria
516	Existing Schubart Park
517	Conclusion
520	Precedent Studies
521	Taxi Info Pavilion, Paragon Architects
522	Mandela's Yard Museum, Peter Rich
523	New Street Station, UNStudio
524	Igualada Cemetery, Enric Miralles

# 05



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FIG.49. TAXI RANK CASE STUDIES



Mahube Valley Multi Purpose centre and  
Commuter Interchange.  
Pretoria, Mamelodi  
ARTech Architects  
Completed 2008

Cosmo City Public Transport Facility  
Johannesburg, Cosmo City  
Africon Engineers  
Completed 2009

Ekurhuleni, Kempton Park Station Taxi Rank  
Kempton Park, Ekurhuleni  
Africon Engineers  
Under Construction

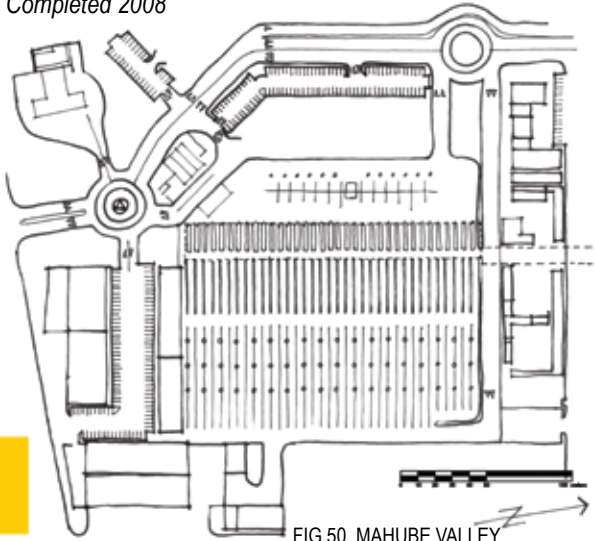


FIG.50. MAHUBE VALLEY  
INTERCHANGE PLAN

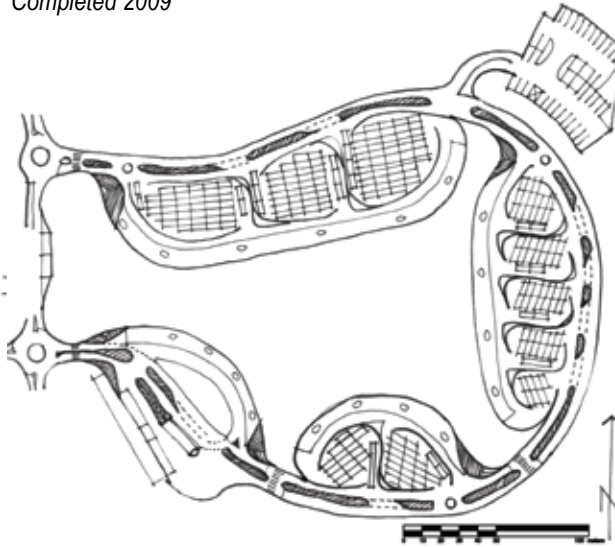


FIG.52. COSMO CITY TRANSPORT  
FACILITY PLAN

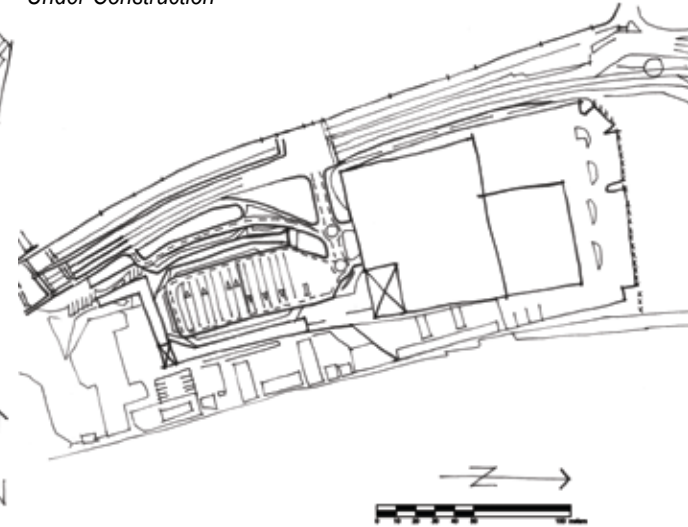


FIG.54. EKURHULENI TAXI RANK PLAN

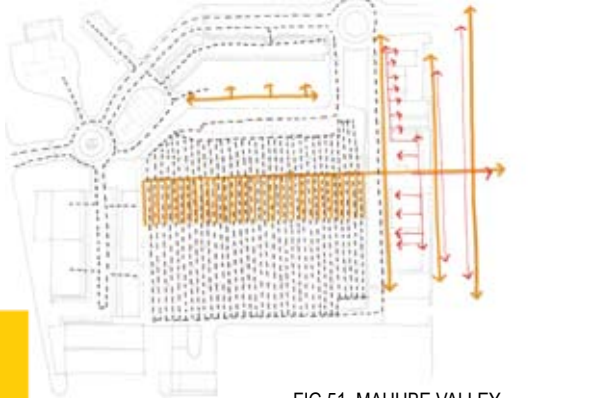


FIG.51. MAHUBE VALLEY  
INTERCHANGE MOVEMENT  
DIAGRAM



FIG.53. COSMO CITY TRANSPORT FACILITY  
MOVEMENT DIAGRAM

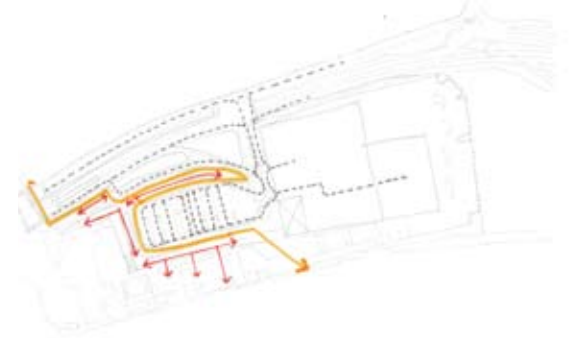


FIG.55. EKURHULENI TAXI RANK  
MOVEMENT DIAGRAM

1

2



Baragwanath Transport Facility and Traders Market Block B Johannesburg Completed 2007

Skinner Street Taxi rank Pretoria, CBD Anon Circa 2000

Schubart Park Informal Taxi rank Pretoria, CBD Occupation of vacant land by taxis. Circa 2004

### 1. PLAN

- With the plan the following aspects were investigated:
- the journey of the key users
  - the surrounding land use
  - facilities provided for the key users
  - and vehicle movement vs. pedestrian movement

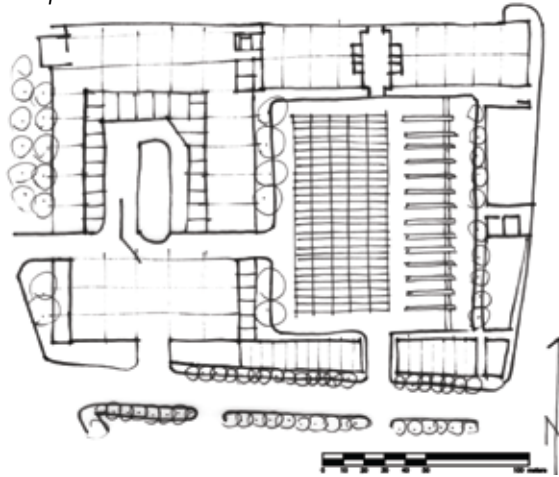


FIG.56. BARAGWANATH TRANSPORT FACILITY PLAN



FIG.58. SKINNER STREET TAXI RANK AERIAL PLAN



FIG.59. SCHUBART PARK TAXI RANK AERIAL PLAN

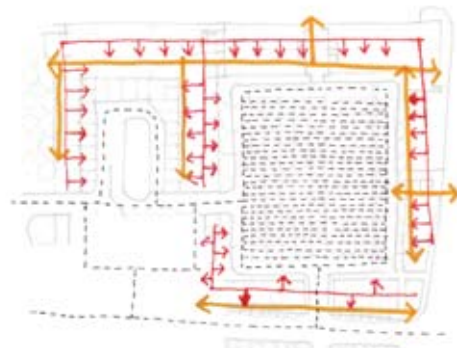


FIG.57. BARAGWANATH TRANSPORT FACILITY MOVEMENT DIAGRAM

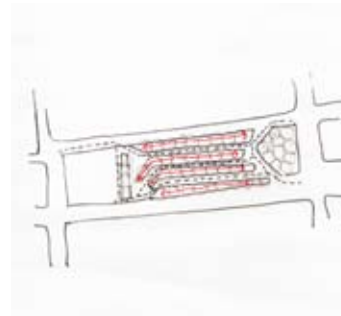


FIG.60. SKINNER STREET TAXI RANK MOVEMENT DIAGRAM

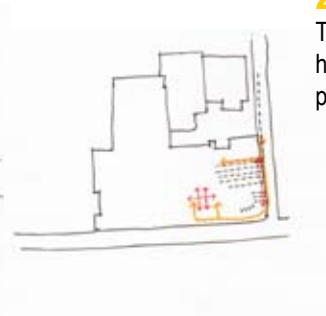


FIG.61. SCHUBART PARK TAXI RANK MOVEMENT DIAGRAM

### 2. JOURNEY OF

Through the journey of the user conflicts were highlighted that should be avoided in a design proposal.

- Taxi
- Pedestrian
- Trader

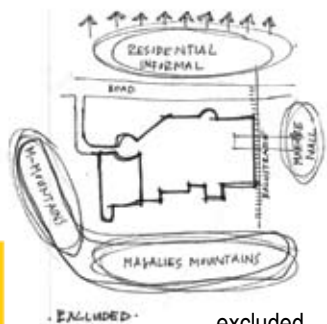


Mahube Valley Multi Purpose centre and  
Commuter Interchange.  
Pretoria, Mamelodi  
ARTech Architects  
Completed 2008

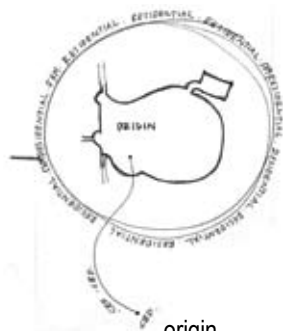
Cosmo City Public Transport Facility  
Johannesburg, Cosmo City  
Africon Engineers  
Completed 2009

Ekurhuleni, Kempton Park Station Taxi Rank  
Kempton Park, Ekurhuleni  
Africon Engineers  
Under Construction

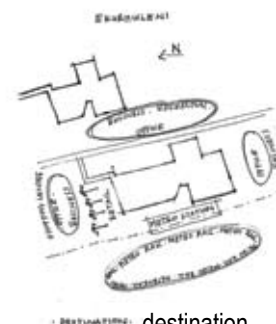
3



excluded  
FIG.62. MAHUBE VALLEY SURROUNDING LANDUSE

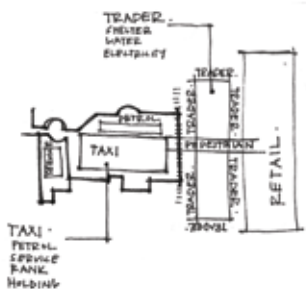


origin  
FIG.64. COSMO CITY TRANSPORT FACILITY  
SURROUNDING LANDUSE

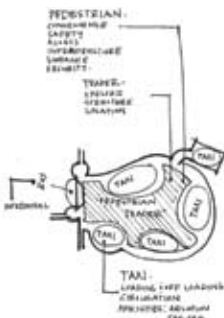


destination  
FIG.66. EKURHULENI TAXI RANK SURROUNDING LANDUSE

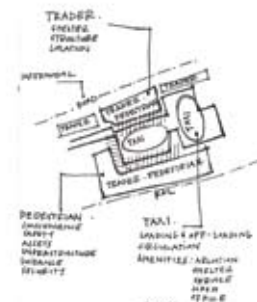
4



sufficient  
FIG.63. MAHUBE VALLEY USER FACILITIES PROVIDED



sufficient  
FIG.65. COSMO CITY TRANSPORT USERS FACILITIES  
PROVIDED



sufficient  
FIG.67. EKURHULENI TAXI RANK USER FACILITIES  
PROVIDED

Baragwanath Transport Facility and Traders Market  
Block B  
Johannesburg  
Completed 2007

Skinner Street Taxi rank  
Pretoria, CBD  
Anon  
Circa 2000

Schubart Park Informal Taxi rank  
Pretoria, CBD  
Occupation of vacant land by taxis.  
Circa 2004

### 3. SURROUNDING LAND USE

The surrounding land use serves as generator for the taxi rank. Various different uses were identified in associated with the respect function of:

Initiating factor	Function of taxi rank
- Residential	- Origin
- Other transport modes, business, commercial	- Destination
- Just point of commuting from	- Holding area

### 4. FACILITIES PROVIDED FOR KEY USERS

Aspects that need to be addressed for the facility design includes:

#### Taxis

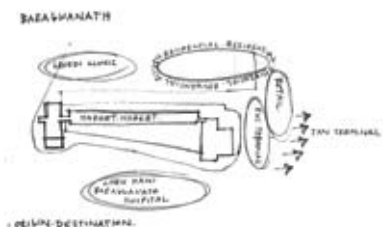
- Loading and off loading area
- Circulation to and from facility
- Amenities: Ablutions, wash bays, service bays, shelter, office, security and refuse
- Access: Capacity, location, control and delay
- Holding area: Location, capacity, structure

#### Pedestrian

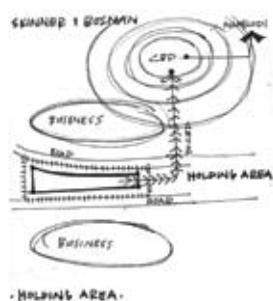
- Convenience: Walking distance, shelter, amenities, proximity to other facilities and public service points
- Accommodation for people with disabilities
- Safety: Conflict, guidance, protection
- Access: Location, guidance, capacity
- Infrastructure: Walkways, waiting and holding areas and continuity
- Guidance: Information, signage and a public announcement system
- Security: Lighting, visibility, management and fire extinguishers etc.

#### Informal traders

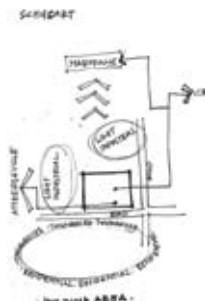
- Facilities that provide economic opportunity through its' placement, shelter and structure.



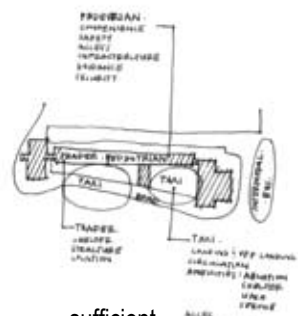
origin.destination  
FIG.68. BARAGWANATH TRANSPORT FACILITY  
SURROUNDING LANDUSE



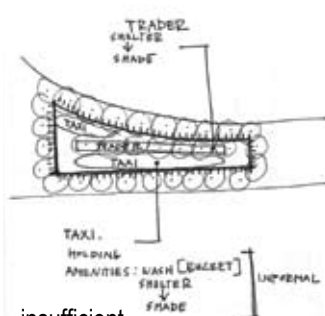
holding area  
FIG.69. SKINNER STREET TAXI RANK  
SURROUNDING LANDUSE



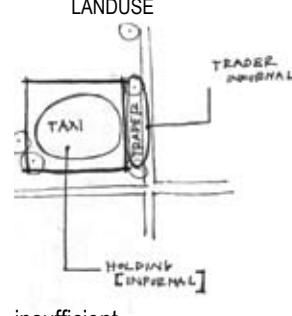
holding area  
FIG.70. SCHUBART PARK  
INFORMAL TAXI RANK  
SURROUNDING  
LANDUSE



sufficient  
FIG.71. BARAGWANATH TRANSPORT FACILITY  
USER FACILITIES PROVIDED..



insufficient  
FIG.72. SKINNER STREET TAXI RANK USER  
FACILITIES PROVIDED



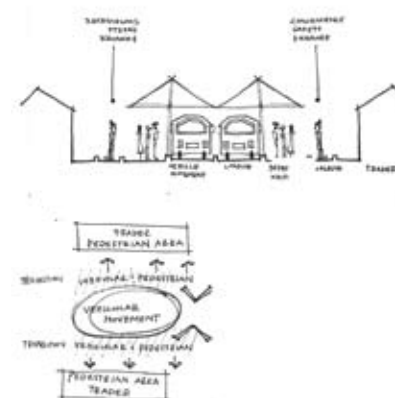
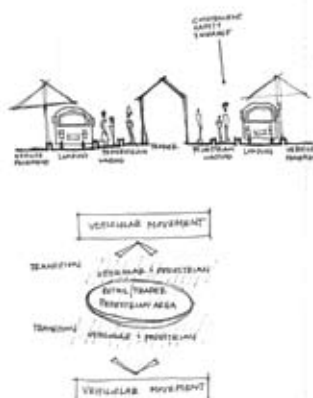
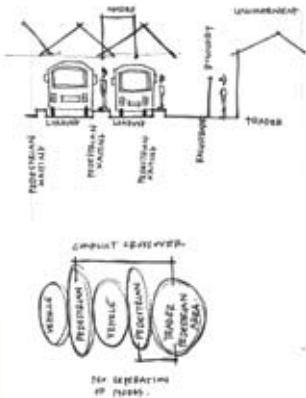
insufficient  
FIG.73. SCHUBART PARK  
INFORMAL TAXI RANK  
USER FACILITIES  
PROVIDED



Mahube Valley Multi Purpose centre and  
Commuter Interchange.  
Pretoria, Mamelodi  
ARTech Architects  
Completed 2008

Cosmo City Public Transport Facility  
Johannesburg, Cosmo City  
Africon Engineers  
Completed 2009

Ekurhuleni, Kempton Park Station Taxi Rank  
Kempton Park, Ekurhuleni  
Africon Engineers  
Under Construction



conflict  
FIG.74. MAHUBE VALLEY VEHICLE- VS PEDESTRIAN  
MOVEMENT

convenient  
FIG.75. COSMO CITY TRANSPORT VEHICLE- VS  
PEDESTRIAN MOVEMENT

convenient  
FIG.76. EKURHULENI TAXI RANK VEHICLE- VS  
PEDESTRIAN MOVEMENT

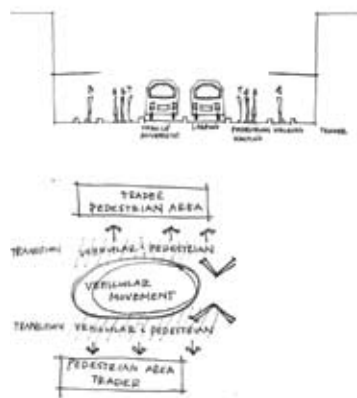
Baragwanath Transport Facility and Traders Market  
Block B  
Johannesburg  
Completed 2007

Skinner Street Taxi rank  
Pretoria, CBD  
Anon  
Circa 2000

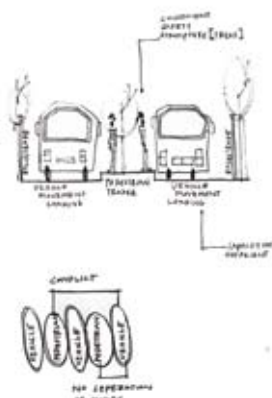
Schubart Park Informal Taxi rank  
Pretoria, CBD  
Occupation of vacant land by taxis.  
Circa 2004

## 5. VEHICLE MOVEMENT VS. PEDESTRIAN MOVEMENT

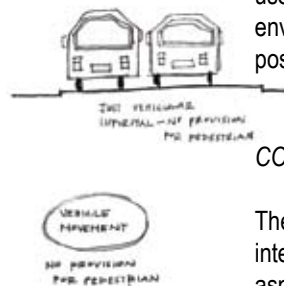
The vehicle movement versus pedestrian movement is investigated on plan and section. Potential conflict between users should be minimised. By defining the path for different users, the individual experience is protected. Within this environment convenient interaction between all users is possible.



convenient  
FIG.77. BARAGWANATH TRANSPORT FACILITY  
VEHICLE- VS PEDESTRIAN MOVEMENT



conflict  
FIG.78. SKINNER STREET TAXI RANK  
VEHICLE- VS PEDESTRIAN  
MOVEMENT



conflict  
FIG.79. SCHUBART PARK  
INFORMAL TAXI  
RANK VEHICLE- VS  
PEDESTRIAN MOVEMENT

### CONCLUSION

The case studies of different taxi ranks together with personal interviews at the current taxi ranks highlighted certain critical aspects for the proposed facility. Skinner Street Taxi rank has a sense of place. It is surrounded with Ficus trees providing shade all through the year. Small designated areas under the trees allow taxi drivers, traders and users to gather. The trees make the space more desirable than the over-designed taxi rank in Mamelodi, Mahube Valley. Although the Skinner Street Taxi rank has no ablution facilities (or other services) the taxi drivers and traders referred to the rank as their second home. The social aspects and vegetation of a new taxi facility are important aspects of the design proposal.

### Mandela's Yard Museum

Johannesburg  
Architect: Peter Rich  
Year completed 2005

The museum is one of the elements of the Alexandra Heritage Route. It is located across the streets in which Nelson Mandela lived upon his arrival in Johannesburg in the 1940's. The structure is a steel frame, on a grid that represents a typical Alexandra single room. Concrete block infill panels were built by die local community. The materials together with corrugated iron and recycled beer bottles, echo the neighbourhood (Rich, 2003: 26).

The building programme host community spaces and other facilities rather than the programme of a monument. The complex represents a landmark of vigorous sculptural form, whilst remaining unpretentious and familiar.

The building is about public space that is a hierarchy of spaces that connect to the street and the broader environment. The bridge over the road contains a library, exhibition space and offices. A gateway is created from one part of the city to another representing a memorable destination along the Heritage Route (Rich, 2003: 27).

This precedent study represents a creative approach to community owned facilities. The imaginative use of waste, rigid manufactured materials and urban recycling permits the building to interact with the environment and its users. The building has a modest presence, but a strong South African character to it.

#### Relevant Aspects:

- Material selection
- Character of complex
- Connection to the environment
- The idea of a gateway



FIG.83. TAXI RANK INFORMATION PAVILION

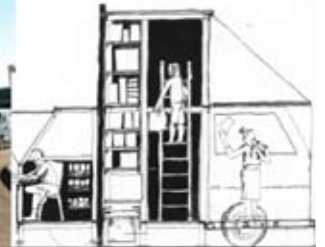
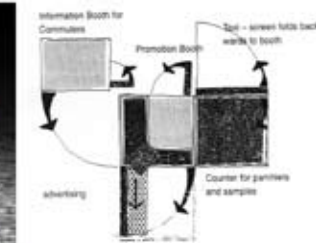


FIG.84. TAXI RANK INFORMATION PAVILION PLAN



FIG.80. MANDELA'S YARD MUSEUM  
FIG.81. MANDELA'S YARD MUSEUM PLAN  
FIG.82. MANDELA'S YARD MUSEUM FRONT FACADE

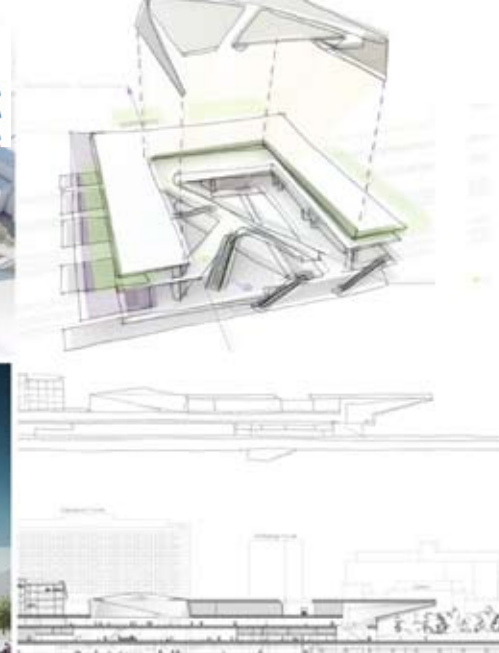


FIG.85. NEW STREET STATION BIRMINGHAM

**Taxi Information booth for Taxi Ranks.**

Architect: Paragon Architects

Awarded SA Institute Project Award 2001

Our city draws its life from the extreme concentrations of energy and exchange at the pulse points of movement, against the slow death of deficiency of urban amenity. The ubiquitous minibus taxi is and represents all the failure and liability of the old, with that chaotic and forceful reassertion of the new order of society (Anon, 2000: 28). The project represented here is made as a folly between the opportunity of commercial exploitation and the necessity for basic amenity. It is a work of architecture located in a context of extremes. It is an investigation into realities and possibilities of practicing in a space of contrasts. The product is an interstitial element that has been carefully considered in terms of versatility and space efficiency and that conveys a multifaceted urban quality. Aspects relating to public/private and service/interactive spaces have been well resolved (Anon, 2000: 28).

The structure is essentially a vandal proof steel folly representing the 'taxi'.

*Relevant aspects:*

- Identity of trading kiosk
- Energetic and creative solution to a pragmatic requirement
- Exploration of branding requirements



**New Street Station Birmingham,**

England

Architects: UNStudio

Year completed 2008

The design is an interaction of materials and structure geometry, creating a sense of reflection vs. transparency. The two main considerations in the design of the new street station are the station as a part of the urban fabric and as a node of the travelling network (UN Studio, 2008).

The building is constructed through separate paths that allow access and movement in and around the building. The journey of exploration is enhanced by the geometry and material use. In addition, it responds to the public square, inviting possible users to enter.

*Relevant aspects:*

- Material selection
- Connection to public square
- Staging of movement utilising circulation diagrams.



610	Design Process
611	Design Route
620	Major Discoveries from Process

# 06



### DESIGN PROCESS

The dissertation started with the idea of cooperation in a community. The city was defined as a growing organism of cultural, economic, ecological and geopolitical intricacies within space and form. Existing dimensions and attributes along with key installations and linkages are dominated by high speed, connectivity, structures and control. However the primordial relationship between man and nature can not be negated within this artificial environment. The project theme establishes itself within these extremes. It's the author's opinion that design can contribute positively to the experience of the user. The implications are far reaching. Architects should not respond to a brief without taking responsibility for the eventual experience. The intention of this design is to encourage social contact and conversation possibly a 'playscape' that captures and provides.

Through a process of elimination the design developed into a Taxi Transit Park. The initial focus was on the necessity of a paradigm shift of current misconstrued views of taxis. Whilst defining a minibus taxi and its role within the South African road scope the necessity for creating a communal facility that acts as a service centre came to the fore.

FIG.86. TAXI FACILITY DESIGN DEVELOPMENT



**MAY**

The movement paths of the users were gaining importance. It was initiated on a pedestrian level focussing on the shopper and commuter. The time lapse of the typical route was investigated. How paths change according from slow lingering, to fast convenience to functional requirements. The experience of the taxi, pedestrian and trader was investigated. On Ground Floor level this proposal provided in the needs of all these users. First Floor level was defined as a holding area for taxis with offices above that.

**CRITIQUE:**

- Economical considerations:
  - Is it viable to have taxis on a First Floor level?
  - How will the building pay for itself?
- Do the building and its functions propose urban upliftment to the area and how is it achieved?
- Problems associated with the divorce between served and servant were explored.

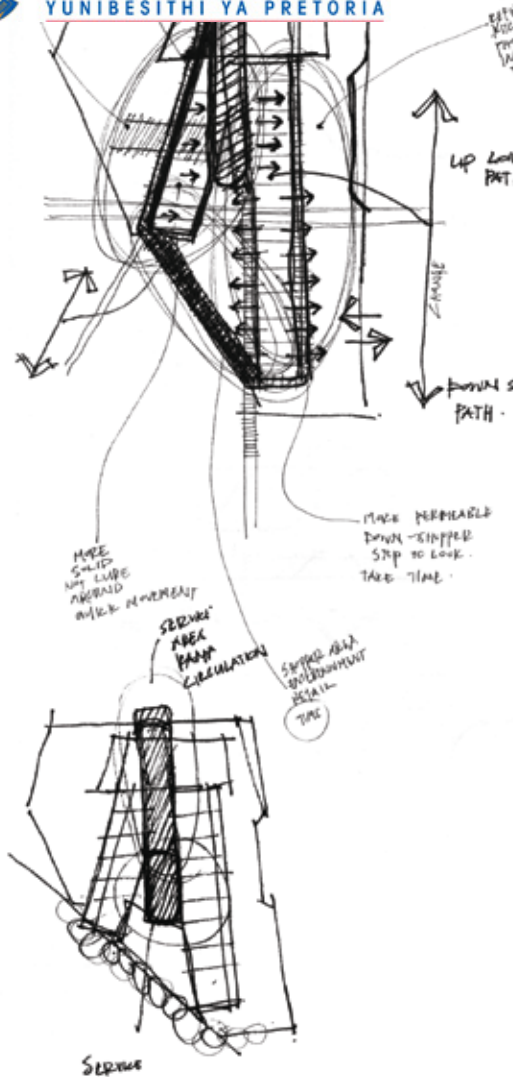


FIG.89. FIRST DESIGN ROUTE PLAN DIAGRAMS

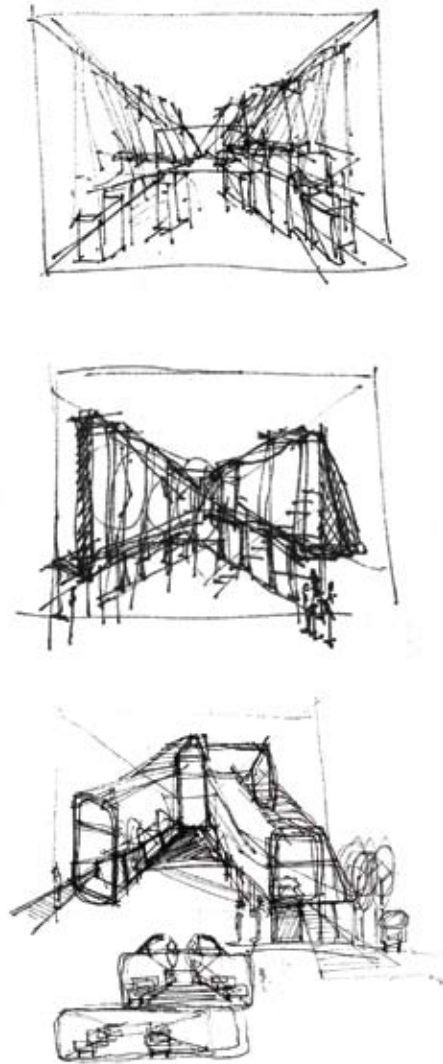


FIG.90. FIRST DESIGN ROUTE SPATIAL EXPLORATIONS



## JULY

The third design aimed to simplify the previous form. A logical design order was established.

## CRITIQUE:

- The circulation plan is both logical and complex. This adds to the complexity of the design.
- The question regarding the economic viability of a taxi rank as part of the urban fabric remained largely unanswered?
- The sea of parking surrounding the building did not make a positive contribution to the environment. In addition it was not utilised at night.
- Does the design conform to a day and night life cycle?
- Security of the building was a problem that had to be addressed. The movement through axis the building perpetuated this aspect.
- The building form is enclosing and it was difficult to puncture it.
- Shelter for the users was not addressed adequately. The original goal of creating a place for people rather than a place for taxis was not entirely achieved.

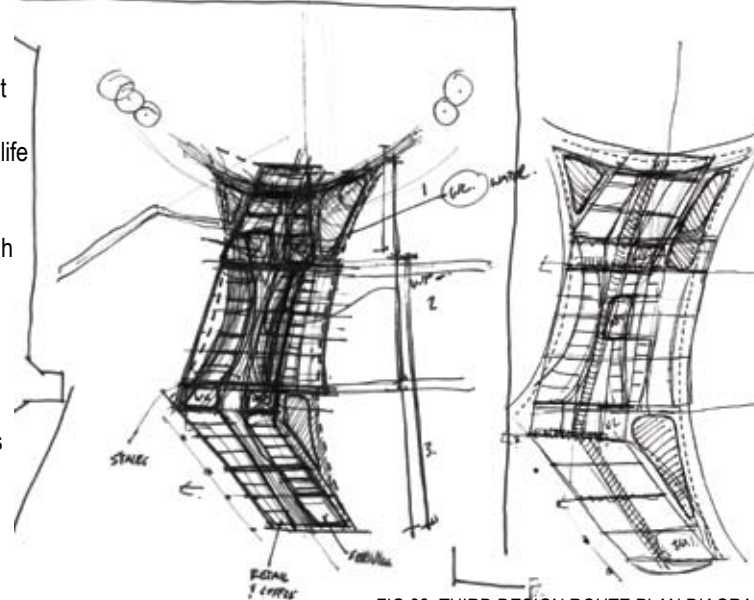
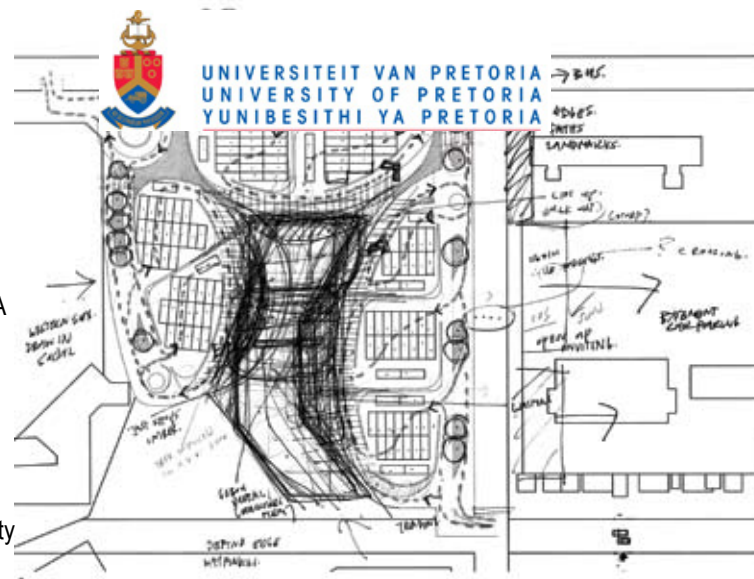


FIG.93. THIRD DESIGN ROUTE PLAN DIAGRAMS

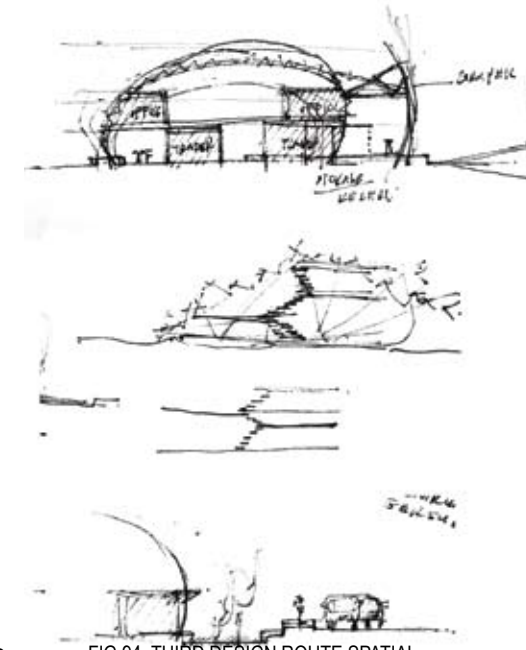


FIG.94. THIRD DESIGN ROUTE SPATIAL EXPLORATIONS



## AUGUST

This design proposal explores the taxi circulation plan derived from Ekurhuleni Kempton Park Station Taxi Rank.

In the previous design the surrounding vehicle circulation alienated the building from the city and context. Here the invert of the previous is investigated. The circulation approach results in an urban fabric that read as buildings surrounding a courtyard. Street fronts are activated through the buildings that define the edges, thus contributing to urban upliftment.

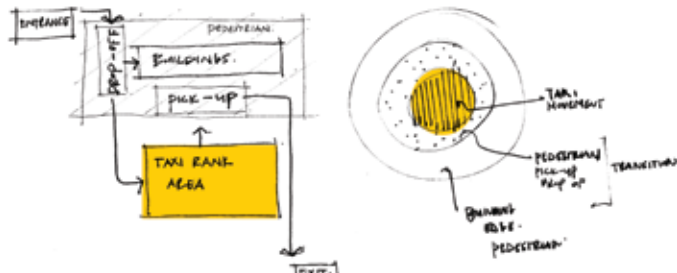
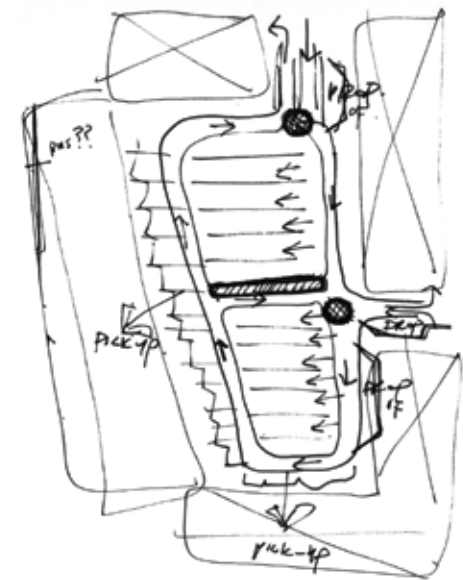


FIG.95. TAXI RANK CIRCULATION PLANNING DIAGRAM

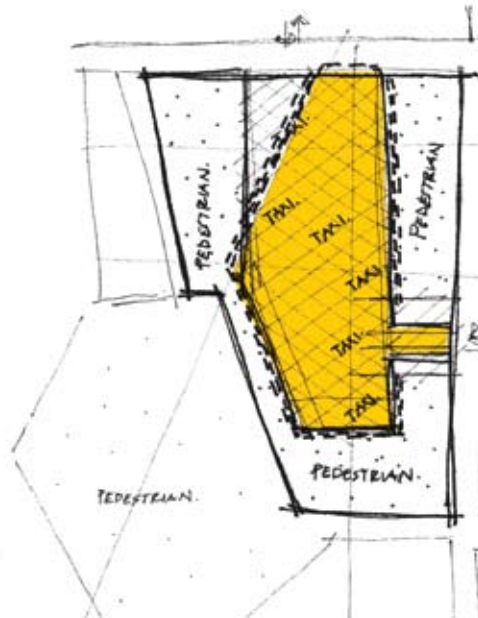


FIG.96. SECOND OPTION: CIRCULATION PLAN DIAGRAM

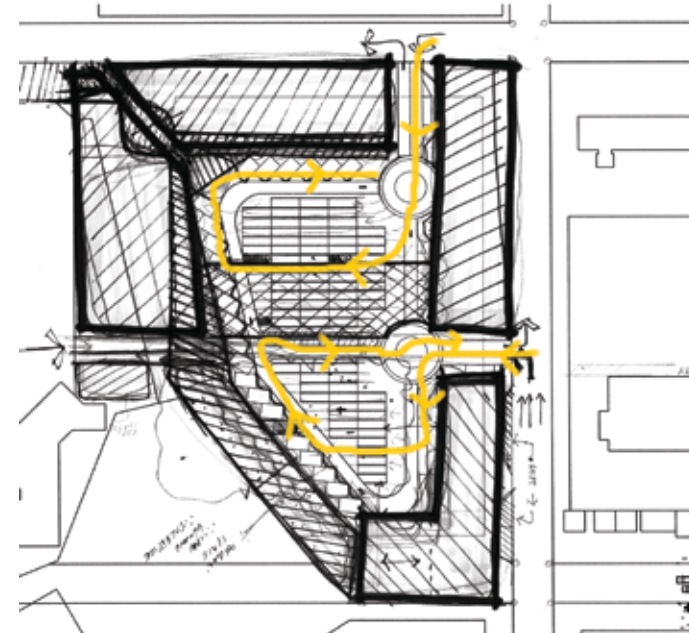


FIG.97. SECOND OPTION CIRCULATION PLAN





MAJOR DISCOVERIES FROM THE PROCESS:

- 01] The initial idea was to establish a relationship with nature, and by doing so to create a social communal space for people. Return to initial idea.
- 02] The project is about function and placement.
- 03] There are certain issues that need to be addressed for a taxi rank to be viable in an urban context.
- 04] The design should promote pedestrian activity during day and night.
- 05] Interface transition represents a connection to a larger environment (the city).
- 06] Movement through, and the sequence of spaces should be legible throughout building.
- 07] The design should manifest as a sustainable multi-functional facility with the focus on the users, rather than only the taxis.



FIG.100. TAXI ROUTE HAND SIGNALS

TOWN/CITY /ATTERIDGEVILLE LOCAL/ AROUND HERE MARRASTAD TOWN STATION / MAMELOK STRAIGHT MIDRAND

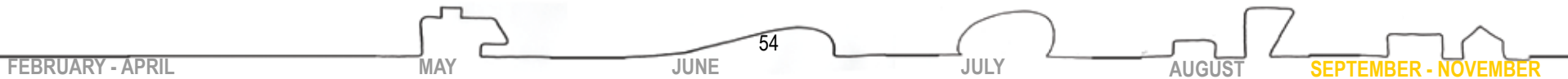
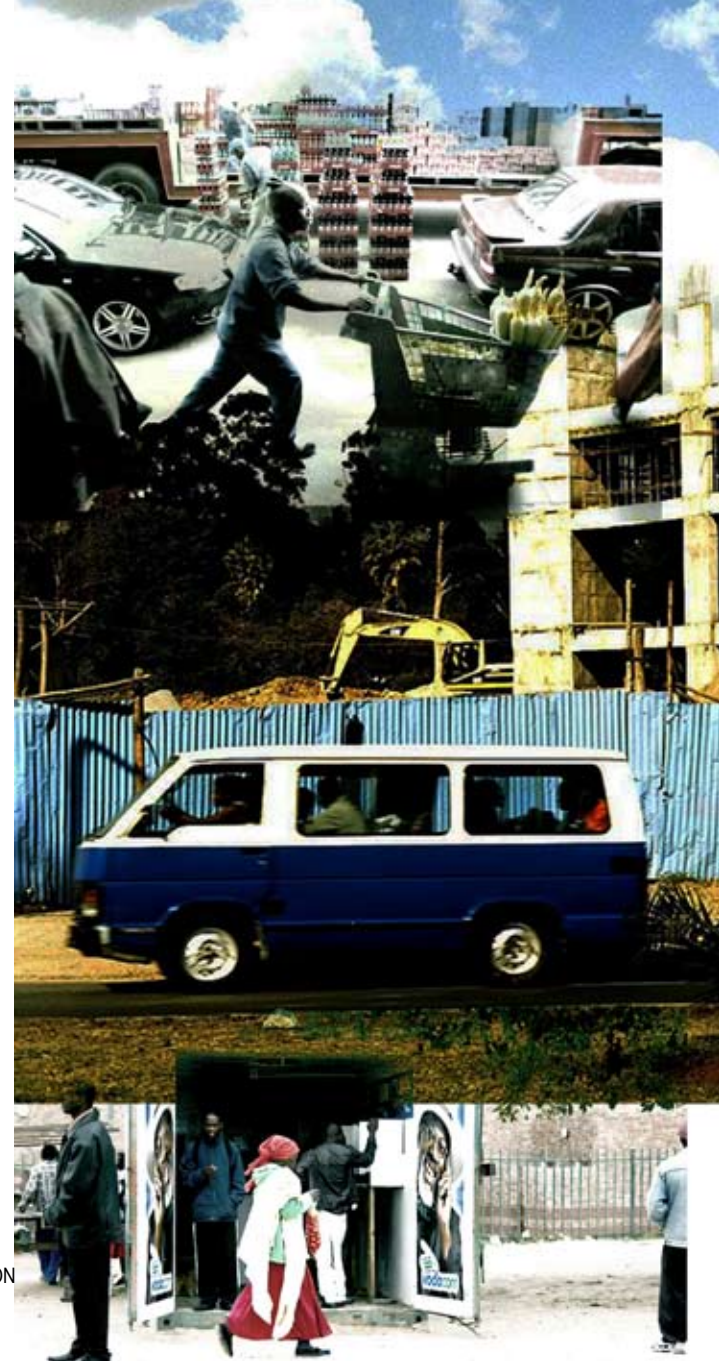




FIG.101. 3D EXPLORATION OF BUILDING IN CONTEXT





710 Design Solution  
720 Accomodation  
730 Final Design

# 07

**DESIGN SOLUTION:**

The Taxi transit Park located within the urban environment was envisioned as a sustainable multi-functional complex of buildings. Taxis are a transport system using carbon dioxide this requires a move towards sustainability resulting in a new typology. Using canopies for protection is not sufficient anymore. The taxi facilities should represent the symbiosis between the various role players. Taxi facilities should move away from extremes (see Mahube in Mamelodi) where an over designed urban field does not contribute to the city. From afore mentioned it was concluded that a taxi rank should be defined as a sustainable urban park.

Through planting trees and vegetation the carbon footprint of the taxis (and their users) can be reduced. In addition green spaces could re-establish a sense of place. The use of recycled material can further assist in reducing the carbon footprint. The harvesting of rainwater should be employed as part of the technical resolution of the design. Excess water is allowed filter into the landscape (hard and soft). Recreational sport facilities in the interest of the user should be provided. The result will be an increase in pedestrian attracting people during the day and night. By using this method to the communal aspect of the Taxi Transit Park is enriched.

Designated areas with proper facilities for the key users should be provided. Through proper allocation possible conflict between pedestrian and vehicle is minimised. Offices for taxi association and transport officials should be provided.

VEGETATION .....  
PEDESTRIAN MOVEMENT .....  
TAXI MOVEMENT .....  
PEDESTRIAN / TRADER AREA .....

NIGHT BASKETBALL FIELD

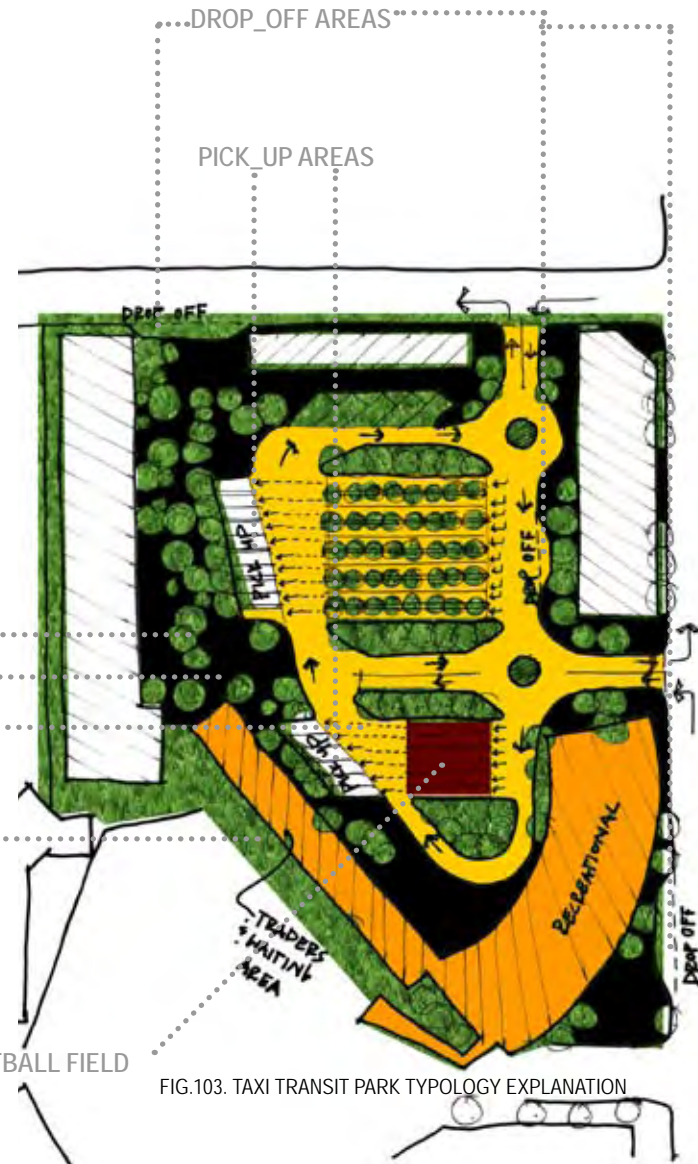


FIG.103. TAXI TRANSIT PARK TYPOLOGY EXPLANATION

SHARED FUNCTIONS

- The entrance (service foyer) and circulation area positioned around the main stairs. These stairs serve both main building and the offices.
- The services includes the following:
  - Refuse area
  - Recycle area
  - Plant Room
  - Store Room
- Restrooms: there are four ablutions facilities placed in the building.
  - The changing rooms for the boxing club.
  - The toilets for the taxi commuters.
  - The toilets for the retail area
  - The toilets for the office area.

PRIMARY FUNCTIONS

- Trader area with trading booths defining the waiting area for the commuters. This connects to the taxi pick-up area.
- Restaurants:
  - A traditional Pap & Vleis restaurant
  - A more conventional restaurant for instance (i.e. Wimpy).

- Retail:
  - Facilities
  - Post Office.
- South African National Council (SANTACO)
  - 10 Offices
  - 2 Boardrooms
  - 2 Offices for Secretary
  - 2 Offices for the Transport Officials.
- Boxing Club
  - Admin Office
  - Management Office
  - Open Plan Office
  - Biokenetic Office
  - 2 Studios
  - Warm up and training area.
- Kitchen for both restaurants and SANTACO office.



FIG.104. TRANSIT TAXI PARK ACCOMMODATION SIGNAGE DIAGRAM

## FINAL DESIGN

The Taxi Transit Park is designed as a possible prototype for future taxi facilities. The building complex acts as a gateway between the Public Square, as required by the Urban Framework, and taxi area. Trader booths depicting jewellery boxes are scattered on the ground floor. The trader booths are a steel frame with polycarbonate infill panels. Their placement regulates the movement towards the water points further emphasising the path to the pick-up area. These areas are accentuated with solid vertical red face brick elements that originate from the concrete box gutters.

The structure and envelope for the offices consist of a concrete frame with glazing and red face brick infill. Steel mesh screens are employed as sun screening devices. A public gathering space in the form of a Restaurant connects the bridge with the service building, overlooking the taxi rank by day, and basketball court by night. The main focus on ground floor is the boxing club.

The upper level is accessed via a ramp on the public square side, and stairs on the side of the taxis. Various retail activities are hosted on the first floor together with a post office and an information sector. The transport officials' offices take on an identity of a commentator's

box. The site is landscaped with trees and a roof garden over the building. When the need arises the building can be changed into a high rise building. The structure is also a concrete frame with glazing and off shutter concrete infill panels. Steel mesh acts as sunscreen devices on the western façade. Recycled rubber pavers are used around the building for pedestrian traffic.

The design remains unpretentious and it is linked to the landscape. The fixed structure and varied infills assists in this aim. The openness and potential flexibility allow for future change rather than only adhering to current requirements. The building contributes towards public space in an existing urban area where it is desperately needed. The spaces related to the traditional restaurant, traders and taxis respond toward the landscape. It offers shelter, it is open to sky space at times and covered elsewhere. Within this context the building forms on human scale an extension of the podium of Kruger Park and Schubart Park.

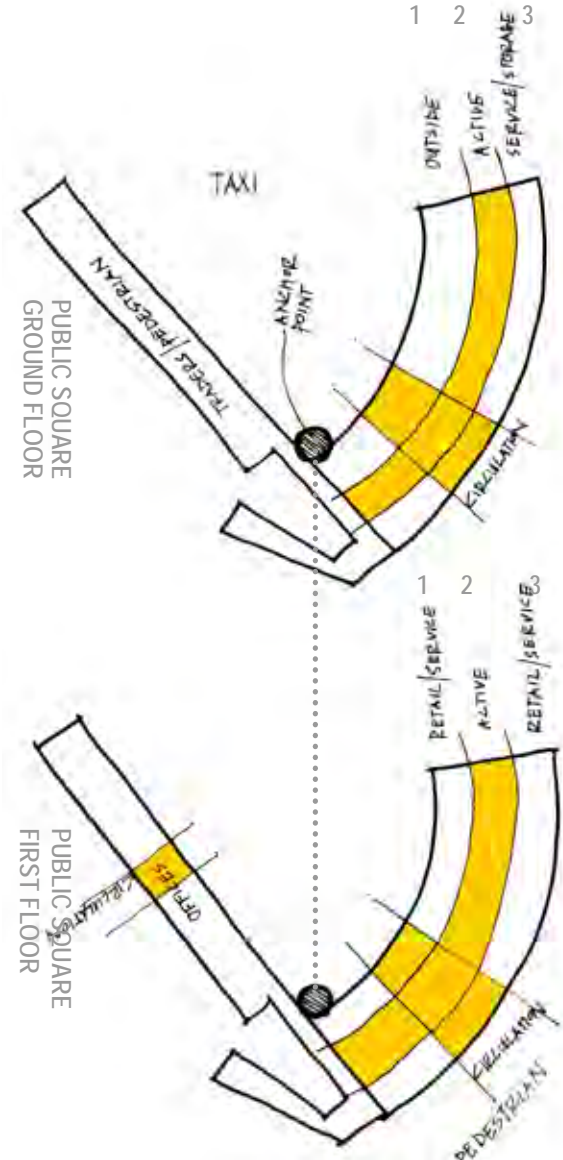


FIG.105. TAXI TRANSIT PARK DIAGRAM PLAN

CARBON FOOTPRINT TRADE-OFF



FIG.106. VEGETATION PULLED OVER THROUGH TRANSIT PARK

HUMAN SCALE PLINTH

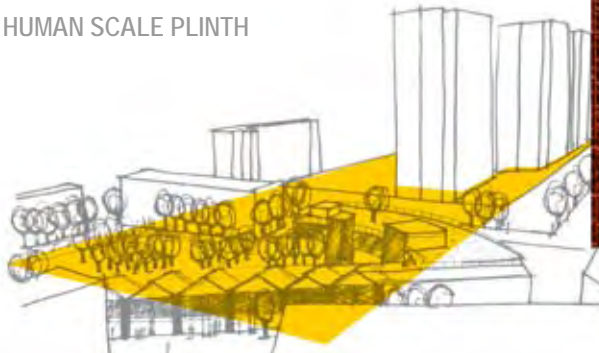


FIG.107. BUILDING AS EXTENSION OF KRUGER & SCHUBART PARK  
PODIUM



FIG.108. 3D EXPLORATION OF TAXI TRANSIT PARK  
STREET FACADE



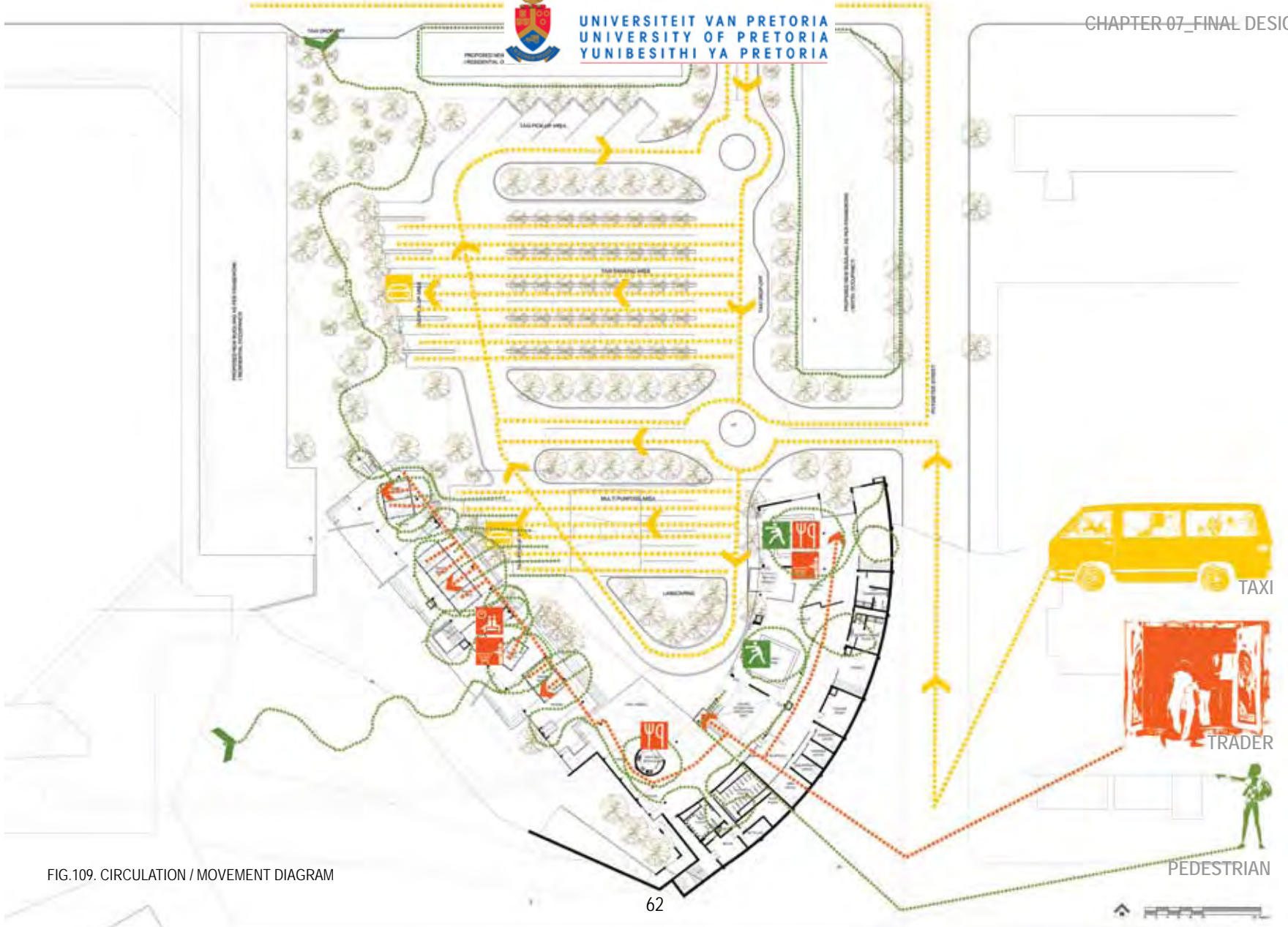


FIG.109. CIRCULATION / MOVEMENT DIAGRAM



FIG.110. 3D EXPLORATION OF TAXI TRANSIT PARK WAITING AREA





FIG.112. 3D EXPLORATION OF WATER POINT



FIG.113. TRADER BOOTH JEWELLERY BOX IN WAITING AREA

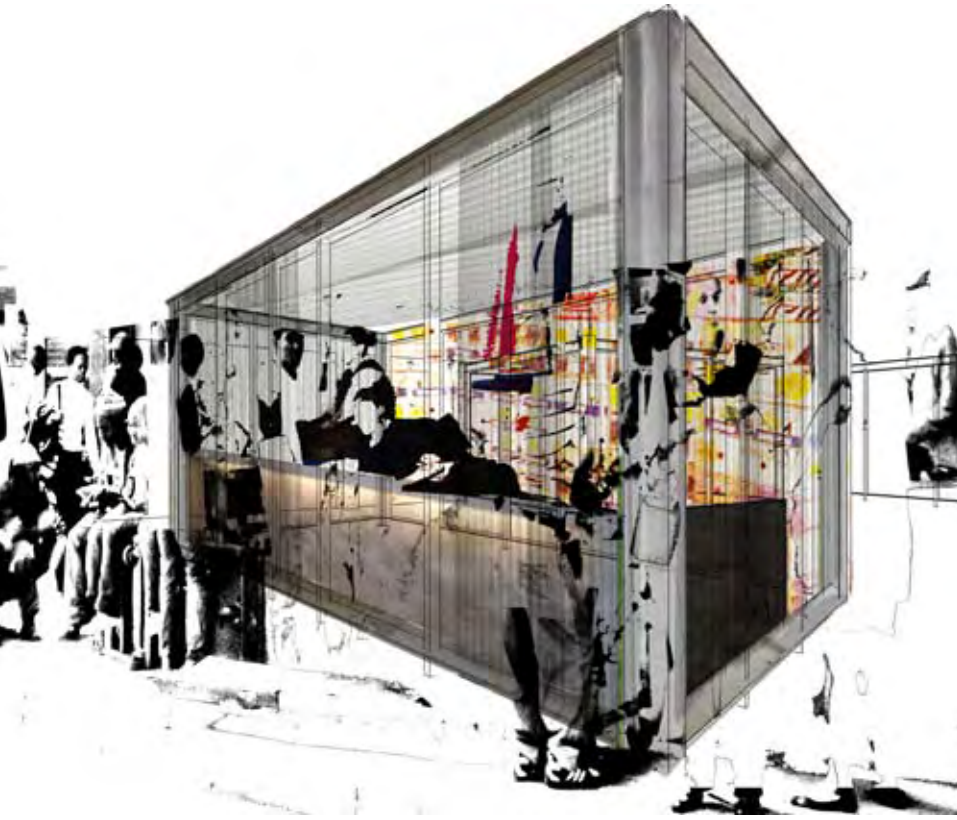


FIG.114. TRADER BOOTH JEWELLERY BOX IN WAITING AREA



810	Materials
820	Technical Report
821	Site Plan
822	Ground Floor Plan
823	First Floor Plan
824	Roof Plan
825	Section Elevation a_a
826	Section Elevation b_b
827	Section Elevation c_c
828	Section Elevation d_d
829	Technical Details

# 08

## VEGETATION

Motor vehicles are weighty contributors to global warming their Carbon footprint should be considered in any design. As previously discussed the new typology for taxi ranks require a green trade off to reduce the taxis Carbon footprint. However all the trees should not necessary be accommodated on the premises it could also be positioned along the route (productive landscape). This consideration renders taxi rank a multi functional space that allows for activities.

### CALCULATION FOR CARBON DIOXIDE TRADE

According to the Carbon free PATT foundation a large tree will absorb approximately 20.3kgs of carbon dioxide / annum during its 40 year life span.

Emissions factors are required to estimate the CO<sub>2</sub> impact per km (or passenger-km, tonne-km) from passenger and freight transport. An assumption is made from the Department for Environment Food and Rural Affairs Table 15 p20 that the emission factor of taxis is 224.4gCO<sub>2</sub> per km. 73 Taxis on site. An assumption is made of a third of the taxis for each destination.

### DISTANCES

- Atteridgeville single trip is average 15km: Double is 30km
- Mabopane single trip is average 35km: Double is 70km
- City CBD single trip is average 1.2km: Double is 2.4km: Average 4 trips a day is 4.8km from proposed site.

### ATTERIDGEVILLE

30km x 224.4gCO<sub>2</sub> = 6 732gCO<sub>2</sub> per day  
 6 732 gCO<sub>2</sub> x 365days = 2457 180 gCO<sub>2</sub> per year  
 =2457.2 kgCO<sub>2</sub>  
 =121 trees per taxi for a 1  
 2 457.2 / 20.3  
 year  
 121 trees x 24 taxis =2 904 trees for  
 Atteridgeville destination

### MABOPANE

70km x 224.4gCO<sub>2</sub> = 15 708gCO<sub>2</sub> per day  
 15 708 gCO<sub>2</sub> x 365days = 5733 420 gCO<sub>2</sub> per year  
 =5 733.4 kgCO<sub>2</sub>  
 =283 trees per taxi for a 1  
 5 733.4 / 20.3  
 year  
 283 trees x 24 taxis =6 792 trees for Mabopane  
 destination

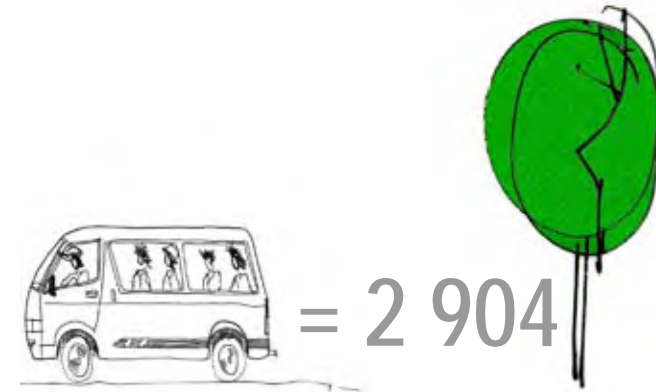


FIG.115. ATTERIDGEVILLE TAXIS CARBON TRADE

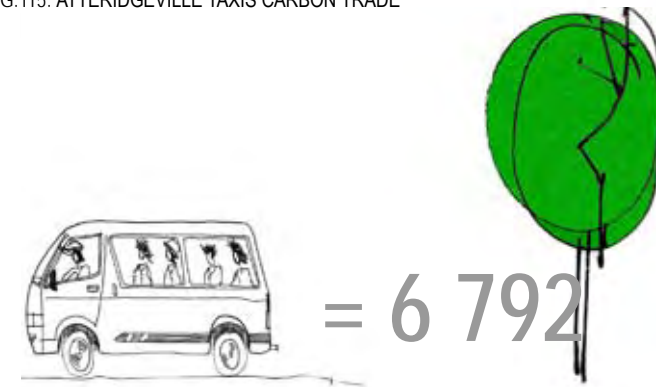


FIG.116. MABOPANE TAXIS CARBON TRADE

*CITY*  
2.4km x 224.4gCO<sup>2</sup> = 538gCO<sup>2</sup> per day  
15 708 gCO<sup>2</sup> x 365days = 196 574 gCO<sup>2</sup> per year  
=196.6 kgCO<sup>2</sup>  
196.6 / 20.3 =10 trees per taxi for a  
year  
10 trees x 24 taxis =240 trees for City CBD  
destination

*TOTAL*  
2 904 + 6 792 + 240 = 9 936 trees ≈ 10 000 trees  
200 trees on site  
Estimate of 1000 trees in Productive Landscape

*PROPOSED TREES:*  
Fruit bearing trees for Productive Landscape.  
Combretaceae (River Bushwillow) for Taxi Rank Facility  
Olea europaea Africana (Wild Olive) outlining edge of  
facility. Both trees are indigenous evergreen trees with  
dense foliage.



FIG.117. CITY CBD TAXIS CARBON TRADE



FIG.118. RIVER BUSHWILLOW AND WILD OLIVE TREES

## PAVING RUBBER PAVEMENTS

South Africa faces a major environmental problem with the volume of waste tyres generated. As many landfill sites do not accept waste tyres for disposal, large quantities are dumped in the veldt. These are then either burnt, to recover the steel content, contributing significantly to air pollution. Of the tyres are recovered and sold as second-hand tyres leading to excessive road accident statistics (Department of Environmental Affairs, 2009). The other option is to recycle the tyres at one of the two 'tyre recycler' companies in South Africa. The two companies are Vredestein SA Recycling & Alrode and SA Tyre Recyclers in Atlantis. These companies process the old tyres into "rubber crumbs" that are being sold at R2 per KG to companies like master Rubber which in turn manufacture products for instance rubber sheets for playgrounds and parks from the rubber crumbs. At present no company manufactures rubber pavers as it is too expensive to manufacture, but Rubber pavement Blocks are being imported by a company called Spectrum. Master Rubber manufactures rubber blocks 300x300x12mm and claims that they can manufacture rubber pavers. The upcoming law about recycling tyres will be implicated in 2010 (Department of Environmental Affairs, 2009),

stipulates that all tyres must be recycled and a green fee added to each new tyre sold in South Africa. Through this an established network will form of registered companies, waste tyre agents and a waste tyre industry. With this law it is an ideal opportunity to implement the use of rubber pavers for all new taxi transit facilities, as the technology exists and there is a movement to a greener South Africa. Rubber sidewalks are a modular sidewalk system made from recycled tyres with a polyurethane binder and colorant, and is particularly intended for use near trees (Rubbersidewalks, Inc, 2009). Just to give an example of a whole tyres' equivalent: 2 500 tyres are needed for 1km road porous bitumen additive, and 1400 tyres for a 25mm playground surface of about 500m<sup>2</sup>.

Reason for Rubber sidewalks being green:

- Post-consumer recycled material
- Reduces renovation impacts
- Reduces pollution or waste from operations

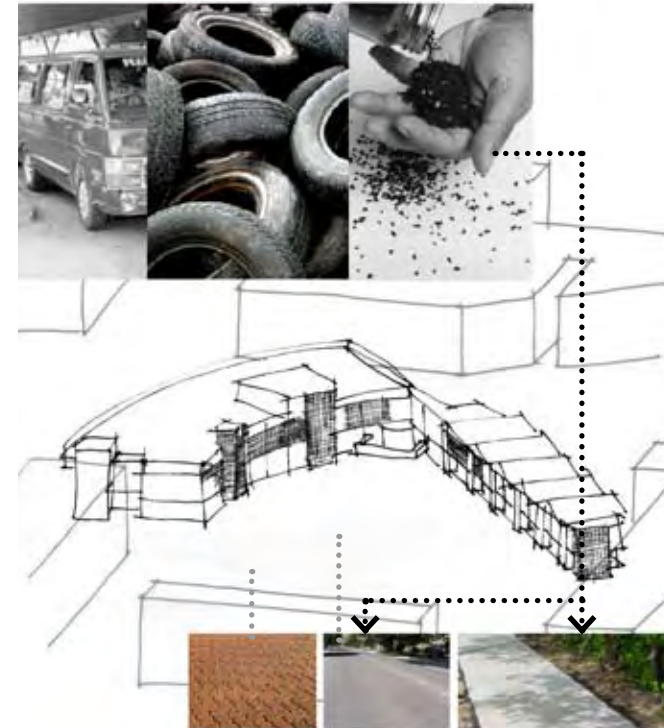


FIG.119. RUBBER SIDEWALKS

FIG.120. G BLOCKS PAVING

FIG.121. SITE MATERIALS DIAGRAM

*G BLOCKS PAVING* manufactured by *INFRASET* for taxi ranking area.

Reason for using G Blocks:

- Ideal for heavy parking areas.
- Little maintenance required
- G Block can be 80% recovered and reused
- Contribute to site drainage ([www.infraset.co.za](http://www.infraset.co.za))

*CRUMBED RUBBER ASPHALT* for the road and night basketball play court:

Reason for using Asphalt:

- produced from recycled tyre rubber crumbs
- change of colour and texture appropriate for basketball court.

#### MATERIAL CHOICE

There are two main driving factors in material choice. The first concern is practicality and the second concern that the building has to be a robust building because of its public programme with the focus on materials to be sustainable.

#### EXTERIOR

##### *PG BISON SURINNO SOLID SURFACING*

Used as infill panels underneath various office windows on building facade.

*SURINNO Solid Surfacing* is a homogenous, innovative, composite acrylic modified polyester resin system with pure inert fillers and proprietary colorants. The solid composition creates colour and pattern throughout the material that are being used alongside building facade ([www.surinno.co.za](http://www.surinno.co.za)).

##### *RED FACEBRICK*

Used at gateway wing to emphasise the catchment's area of the rainwater.

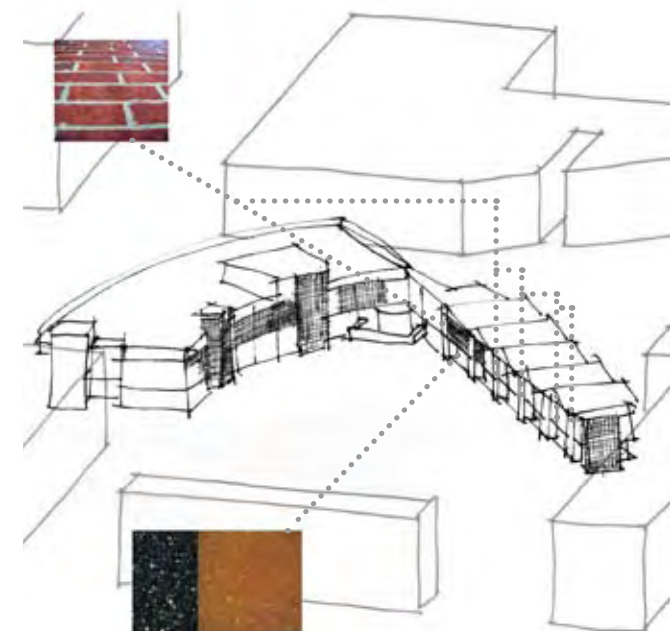


FIG. 122. BUILDING MATERIALS DIAGRAM



*CORRUGATED POLYCARBONATE SHEETING:*

Used as infill panels for trader booth and lighting wall detail in First Floor Restaurant manufactured by Safintra ([www.safintra.co.za](http://www.safintra.co.za)).

Reason for use:

- Flexibility: virtually unbreakable, offer great design flexibility curving along and across corrugations.
- Longevity: guaranteed not to lose more than 8 % of the sheets light transmission in first 10 years and not more than 1% for every year thereafter.
- Versatility: Light weight with best combination of light and heat transmission.
- Maximum protection against harmful UV rays, allows 90% light through sheet and resistance to weathering makes it ideal for South Africa.

*CONCRETE*

Structure frame.

Off shutter concrete is used to emphasise box gutter details, and facade textures.  
Cast in Situ concrete for roof.

*GLASS*

Infill glazing and window panels for shops, offices and the restaurant.

*GKD MESH,*  
LAMELLA Mesh used for stair balustrade, and  
KIWI Mesh used for exterior sun screens ([www.gkdmetalfabrics.com](http://www.gkdmetalfabrics.com)).

*CORRUGATED METAL SHEETING*

Roof cladding for gateway wing.

*COR-TEN SHINGLES*

Ramp walls are clad with Cor-Ten to underline the theory of time and movement in building by means of colour change.



FIG.123. 3D BUILDING MATERIALS DIAGRAM

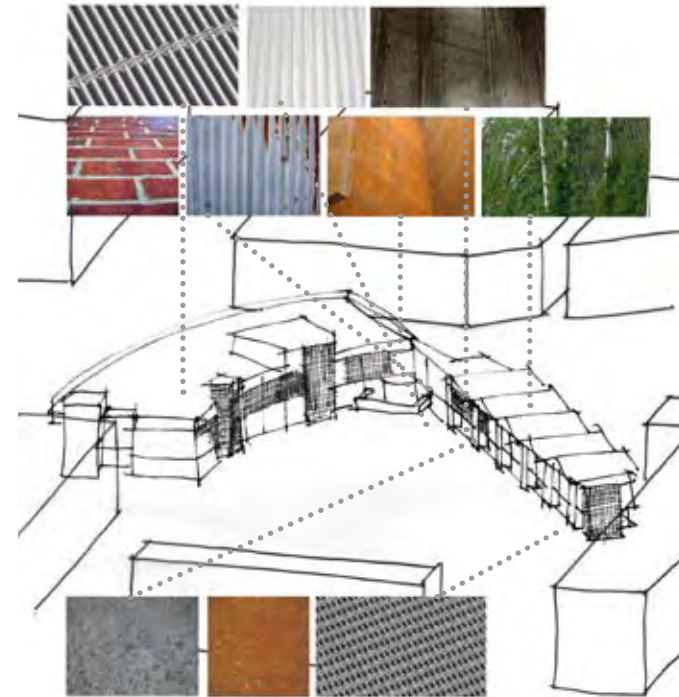


FIG.124. BUILDING MATLS DIAGRAM



FIG.125. FIRE STAIRCASES

FIG.126. VERTICAL SERVICE SHAFTS

## VENTILATION

The design opted for natural cross ventilation throughout the building, except in the exercise studios and offices areas where mechanical cooling was required due to heat build up. HVAC units on 85mm concrete pediment are placed on roof for this reason. Vertical Stacks are placed over staircases to assist in natural ventilation. Floor to ceiling heights are increased with a roof garden that contributes to passive cooling, by means of plants and mass.

## FIRE PLAN

According to SANS 10400

Three steel staircases are strategically placed that also functions as fire escapes. The travel distance from any point in the building to the nearest escape is less than 45m. An automatic fire sprinkler system is installed and receives its water from the wet core on the Eastern building edge (ASIB Automatic Sprinkler Inspection Bureau.) All steel members are painted with a thin-film mastic coating and all internal walls are fire proofed with a coat B-seal.

## STORMWATER

Emphasising the sustainable design, retaining water is important. The roof garden reduce excessive overflow to a minimum. The excess stormwater drains by means of a screed that falls towards inlet gutters. On gateway wing water harvesting are directed from box gutters to Polyethylene Aqua Slim Wall tank used for water points. Within the taxi rank area G-block pavers are used to reduce stormwater run off through drainage. Stormwater catch pits are provided for excess stormwater connected to municipality stormwater sewer.

## SERVICES

Vertical shafts are placed strategically in building to host various services from where horizontal ceiling ducts are used to feed selected areas.

## CLIMATE

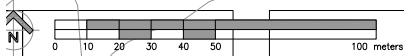
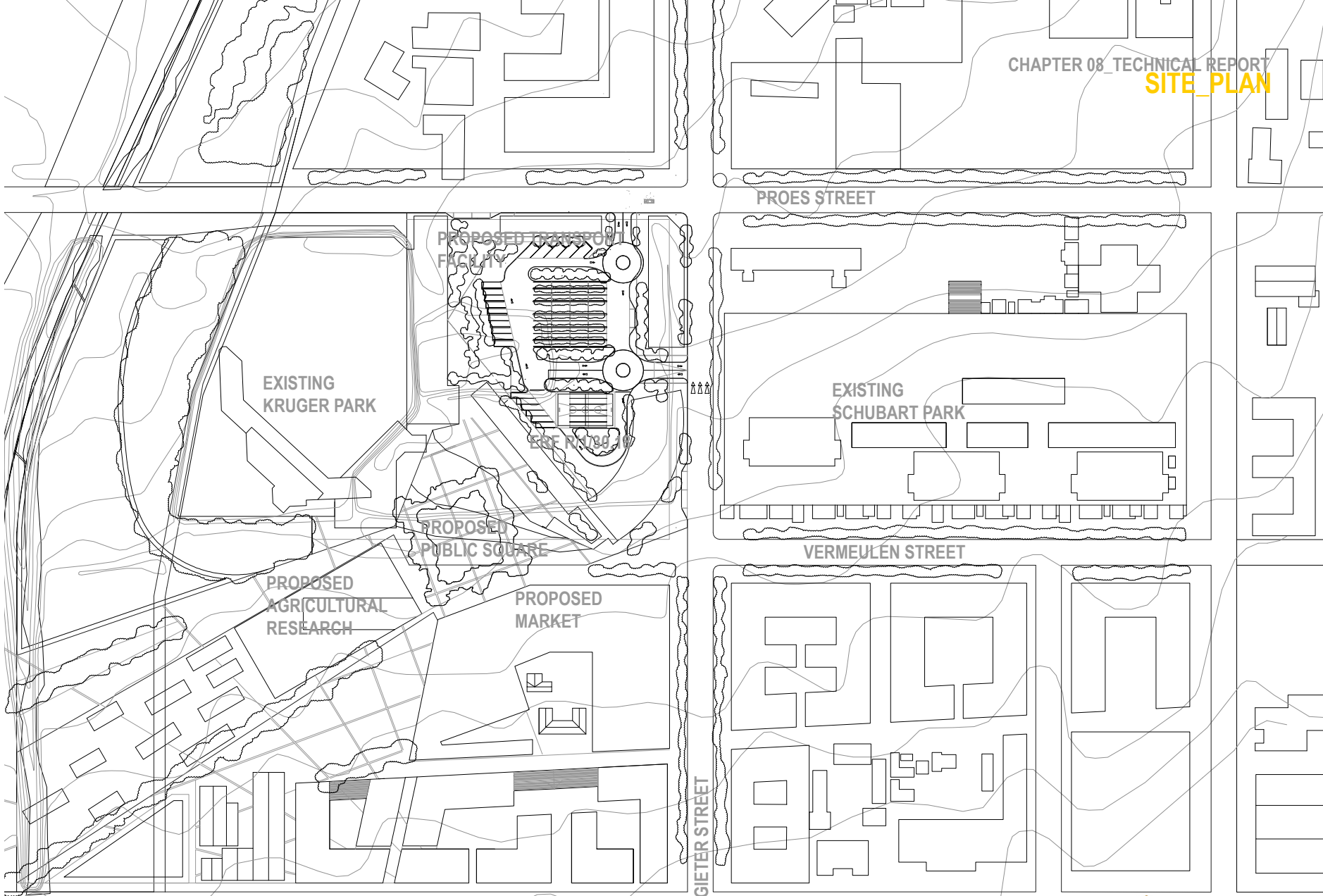
Permeable sun screens are carefully placed on Western façade protecting it against excessive heat gain and glare by preventing direct sunlight on floor surfaces. A planter screen is used for sun protection on the South Western Façade of the gateway.

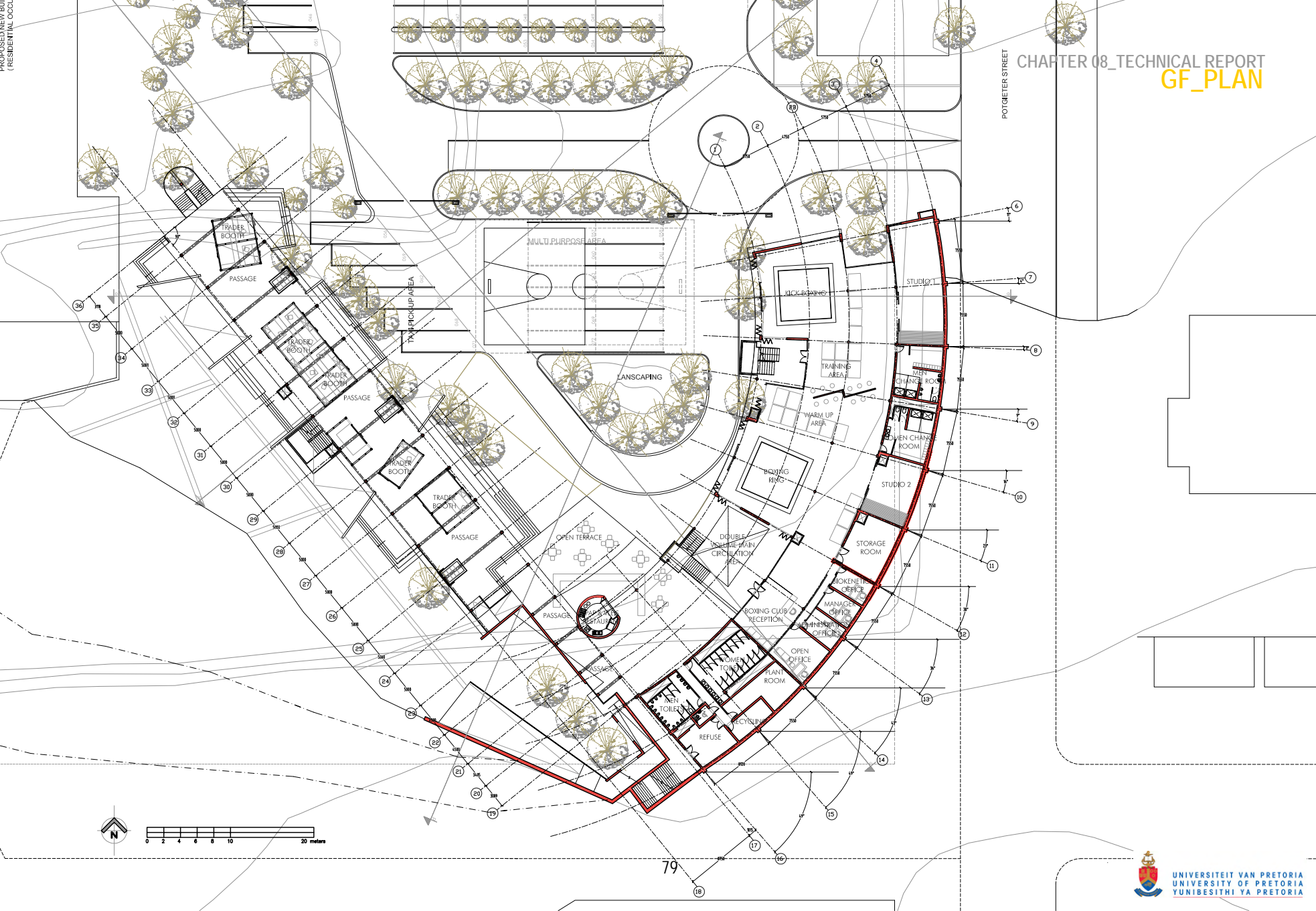


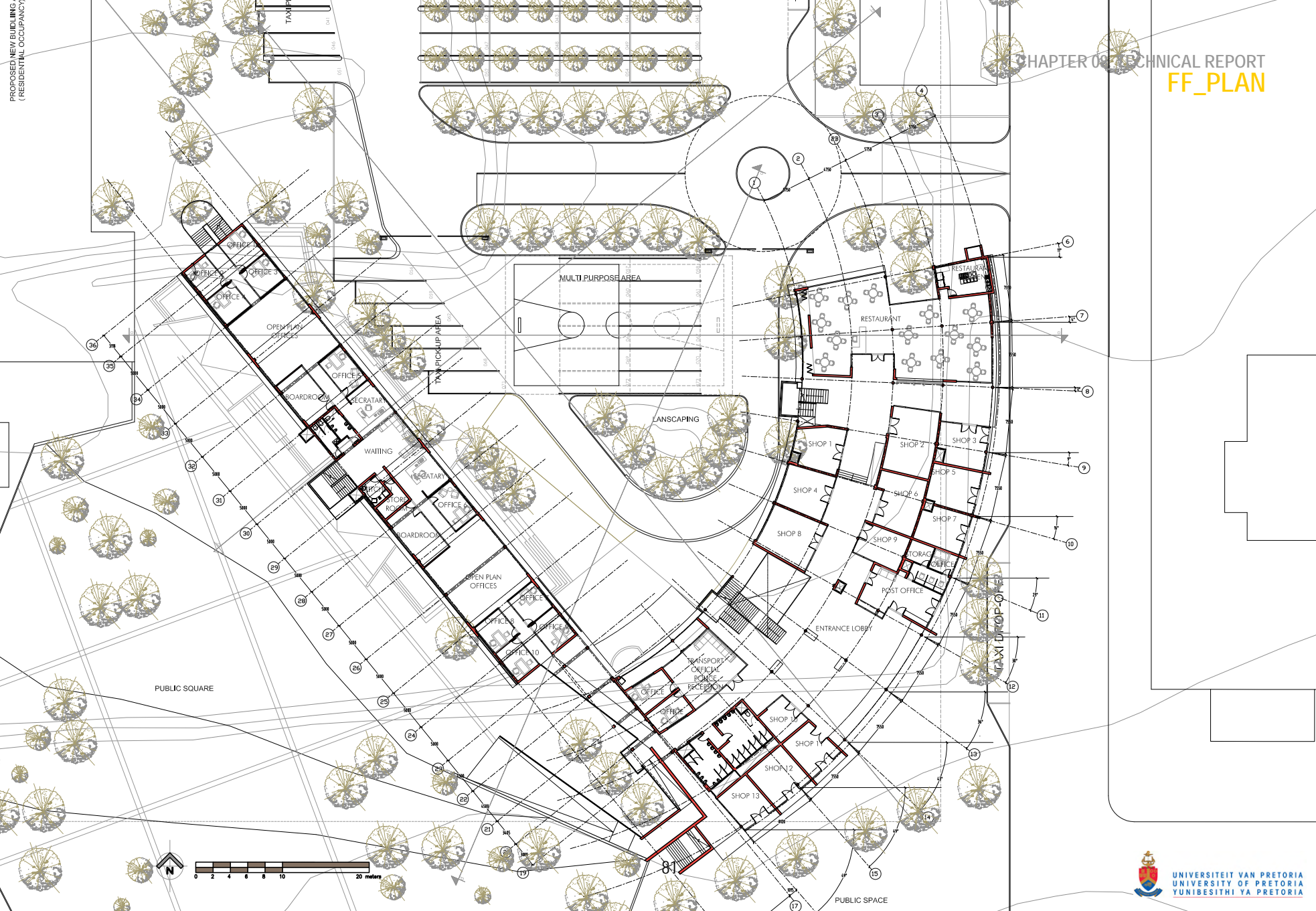
FIG.127. MODEL PRESENTATION

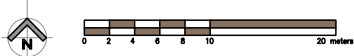
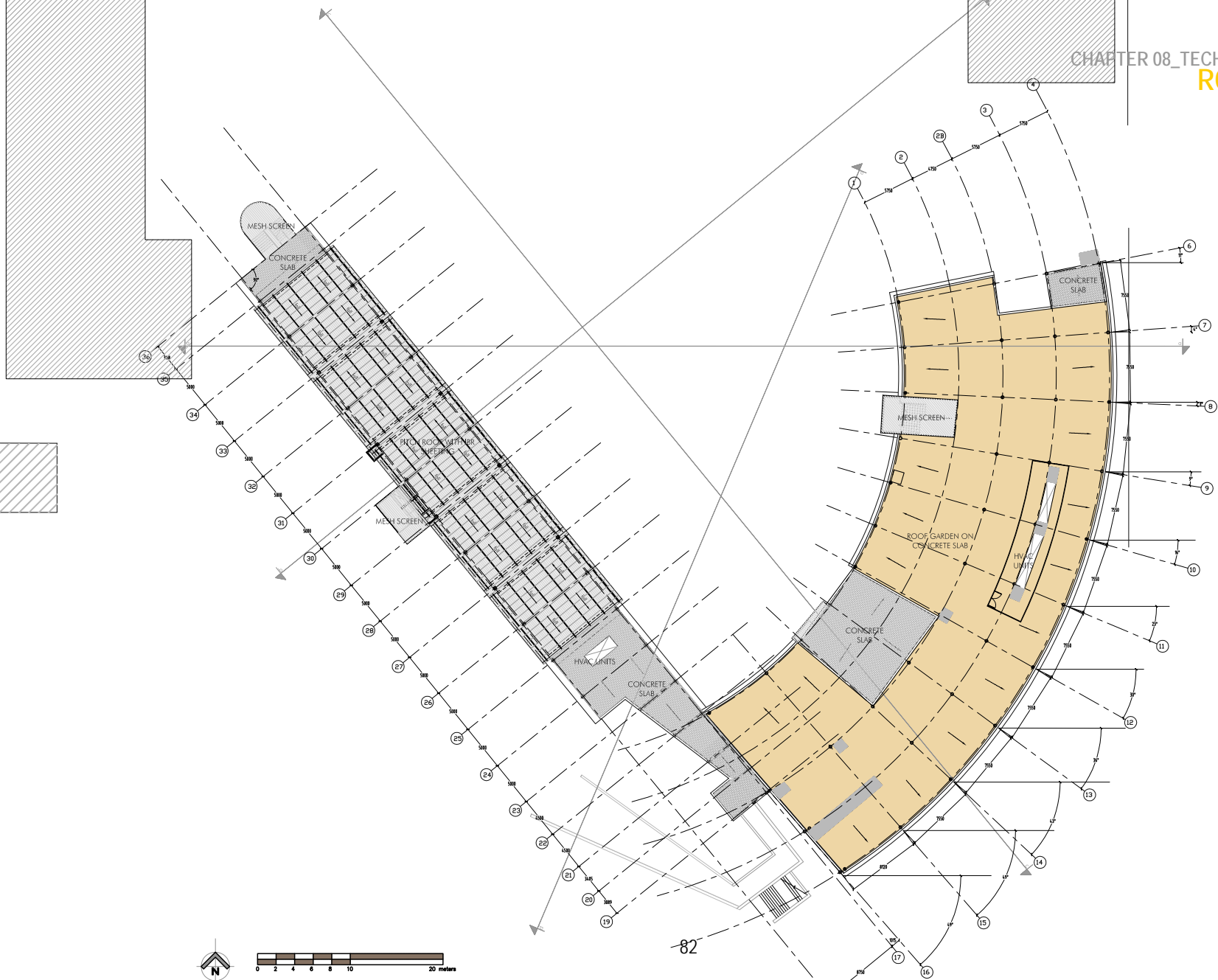
**+AXI +TRANSIT PARK**  
RELATIONSHIP BETWEEN TIME & MOVEMENT

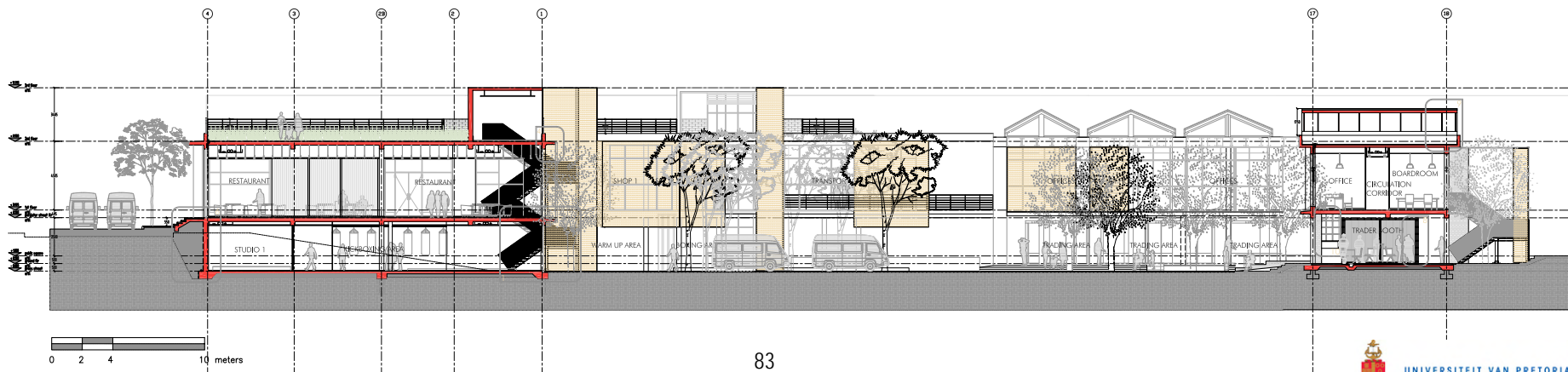
**TECHNICAL**



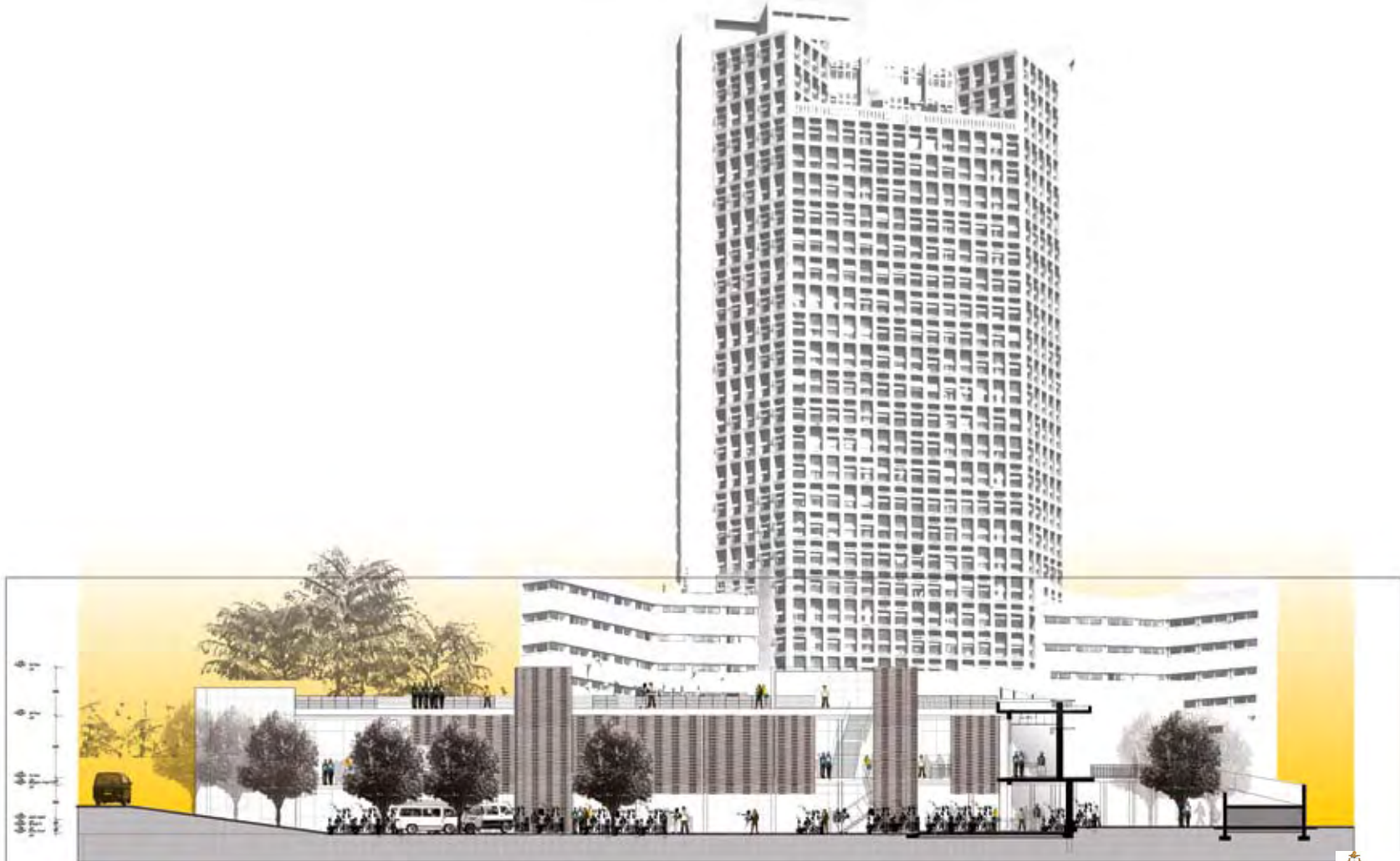


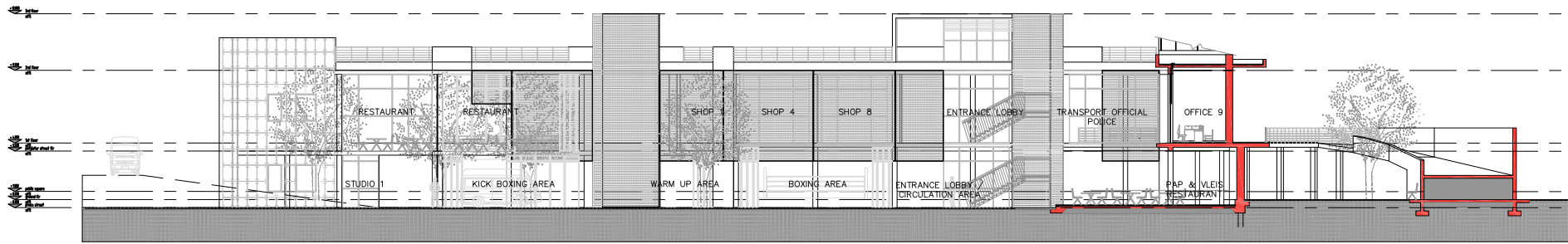








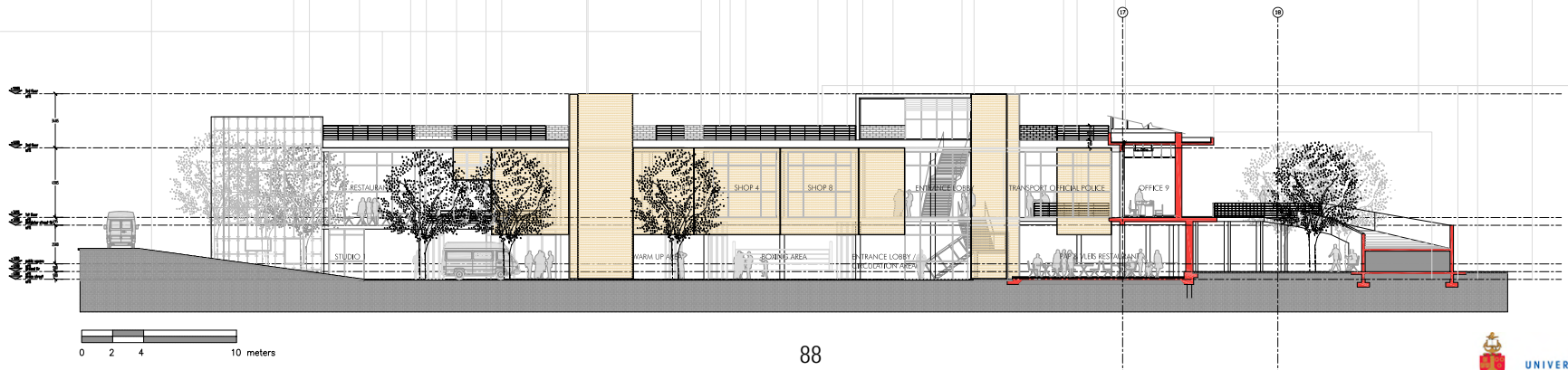




0 2 4 10 meters

SECTION d d





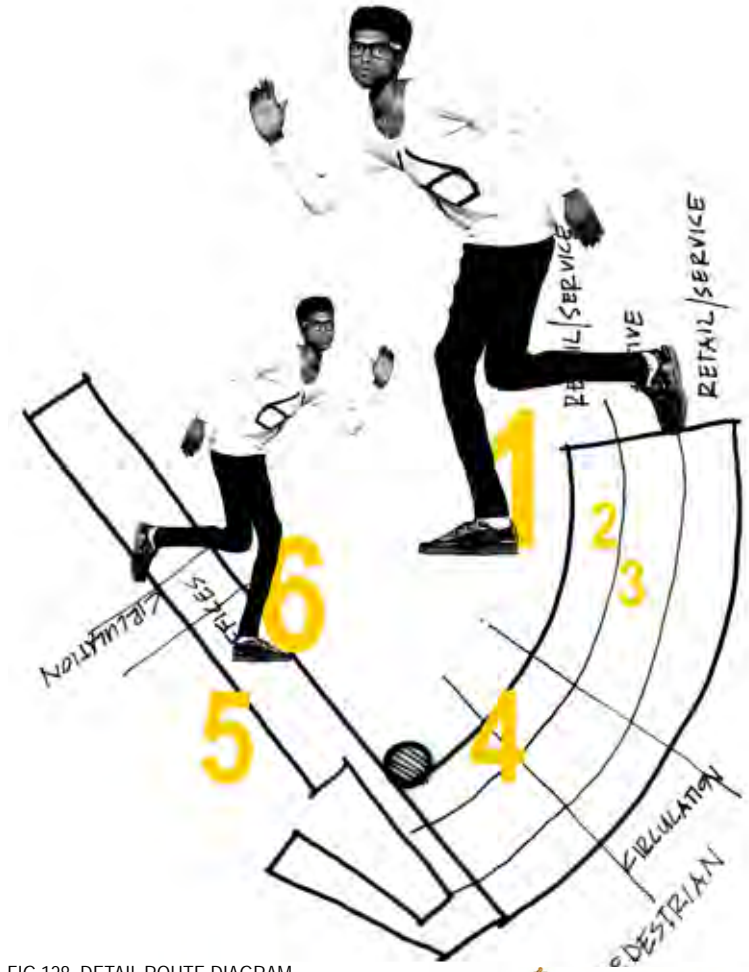
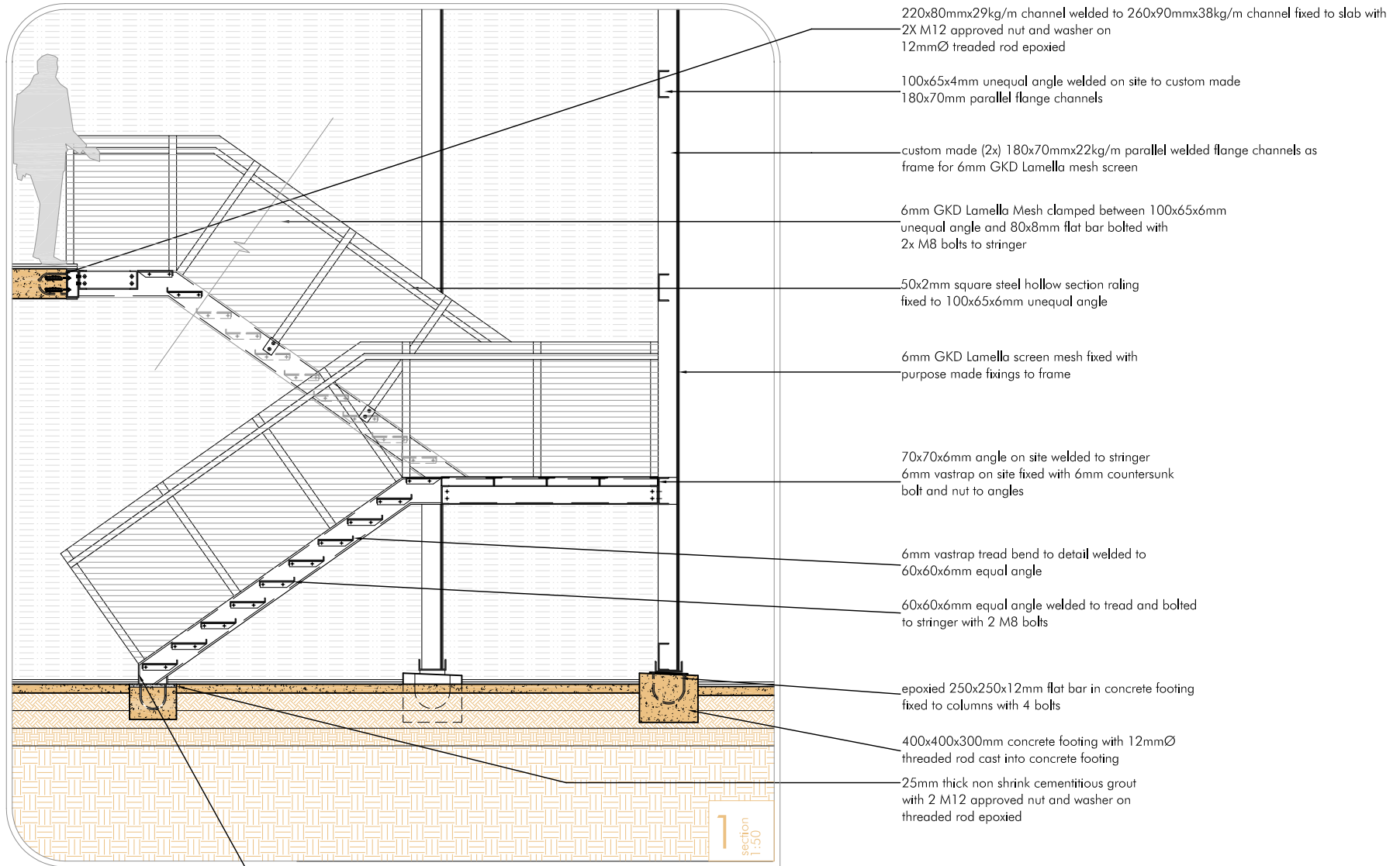
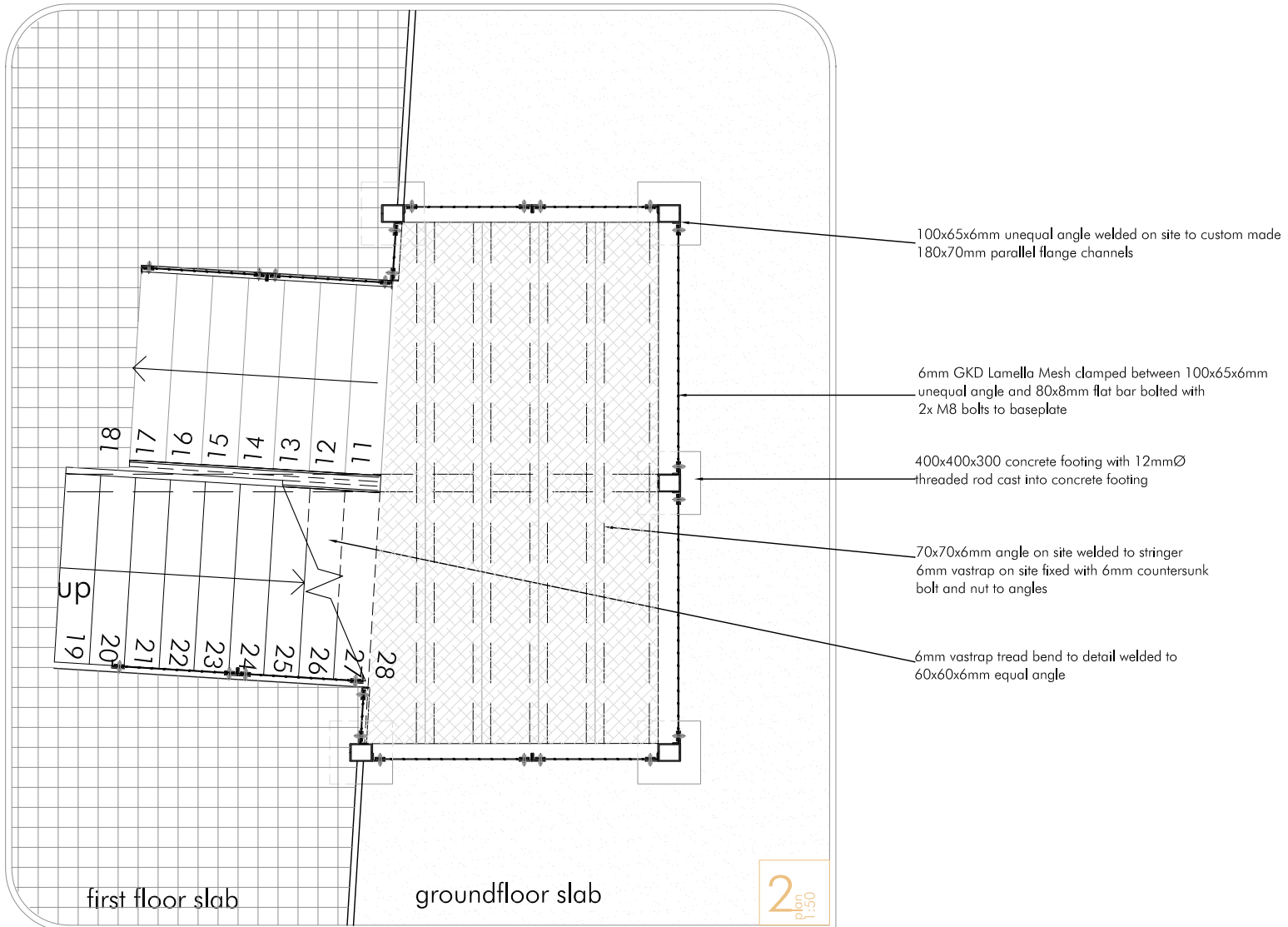


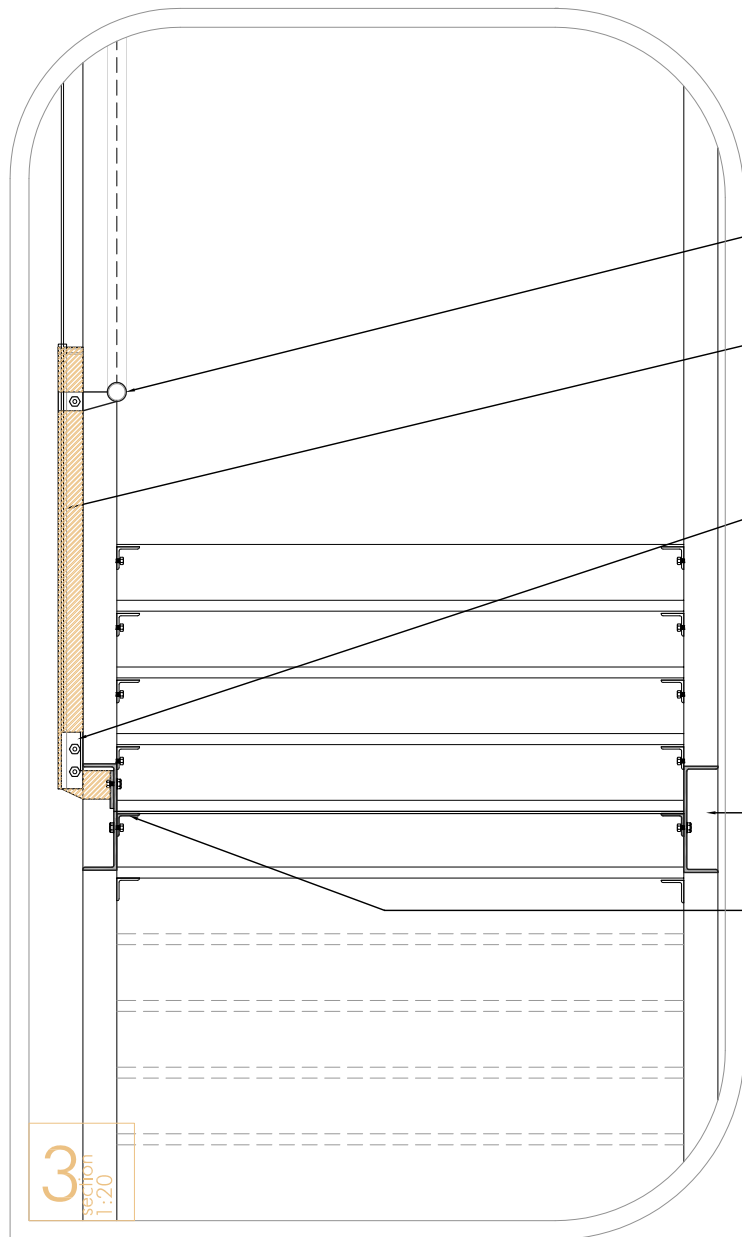
FIG.128. DETAIL ROUTE DIAGRAM



STAIRCASE SECTION  
 1:50



STAIRCASE PLAN  
 1:50



custom made hot rolled 51x2mmx2,42kg/m circular hollow section handrail welded to purpose made 10mm thick fixing plate fixed to 100x65x6mm unequal angle

6mm GKD Lamella Mesh clamped between 100x65x6mm unequal angle and 80x8mm flat upright bolted with 2x M8 bolts to baseplate

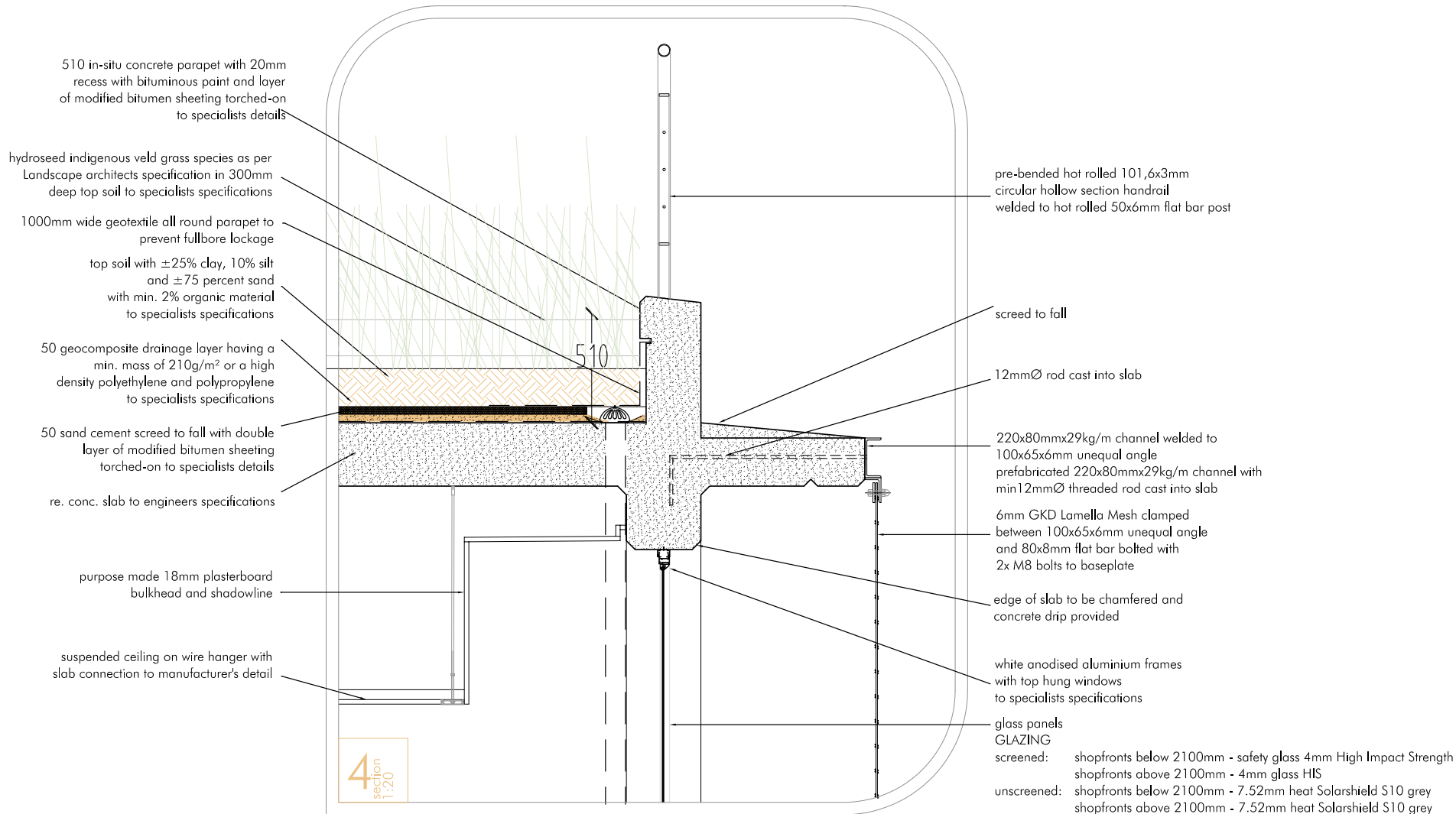
purpose made 10mm thick steel railing fixing plate bolted with 2x M8 bolts to 220x80mmx26kg/m parallel flange channel stringer

220x80mmx29kg/m parallel flange channel stringer

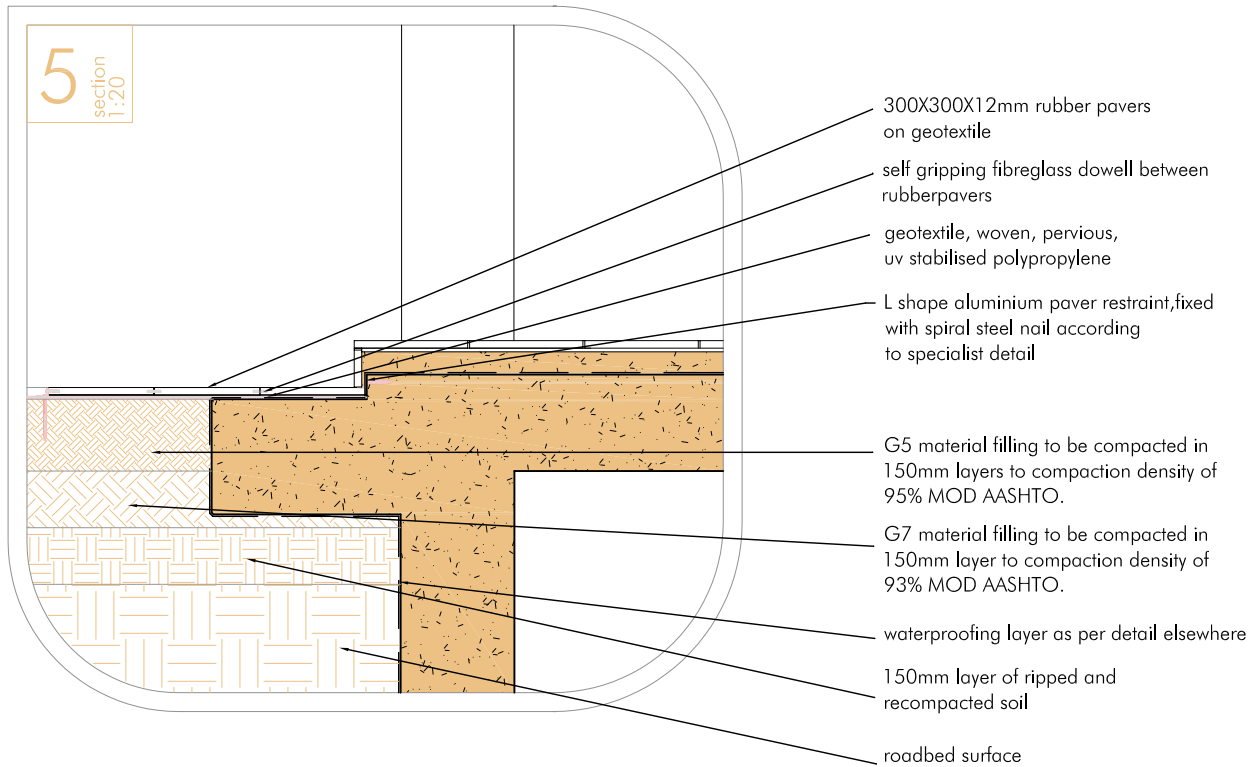
60x60x6mm equal angle welded to tread and bolted to stringer with 2x M8 bolts.

HANDRAIL DETAIL

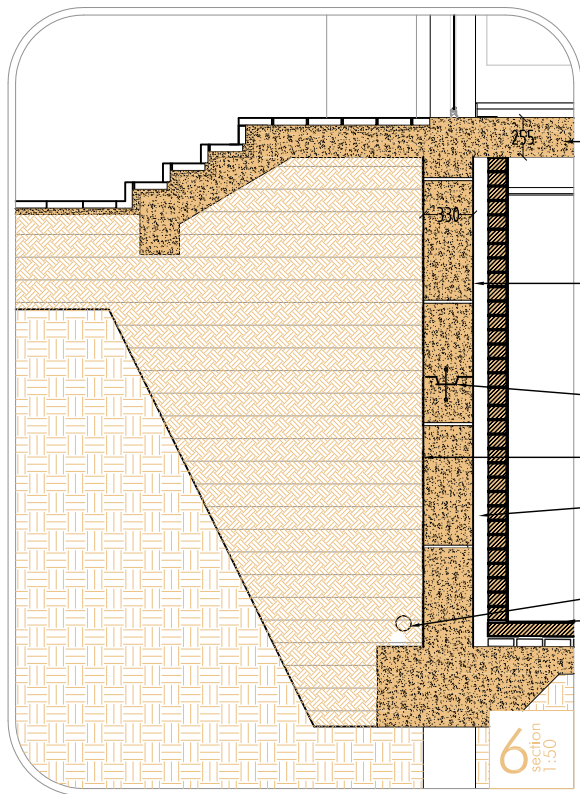
1:20



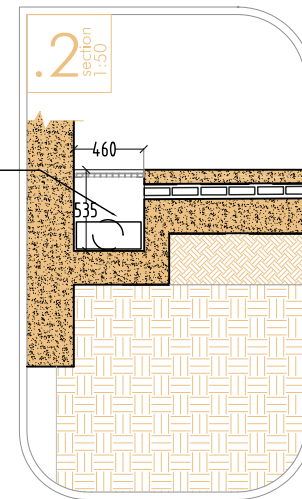
**SUN SCREEN DETAIL**  
 1:20



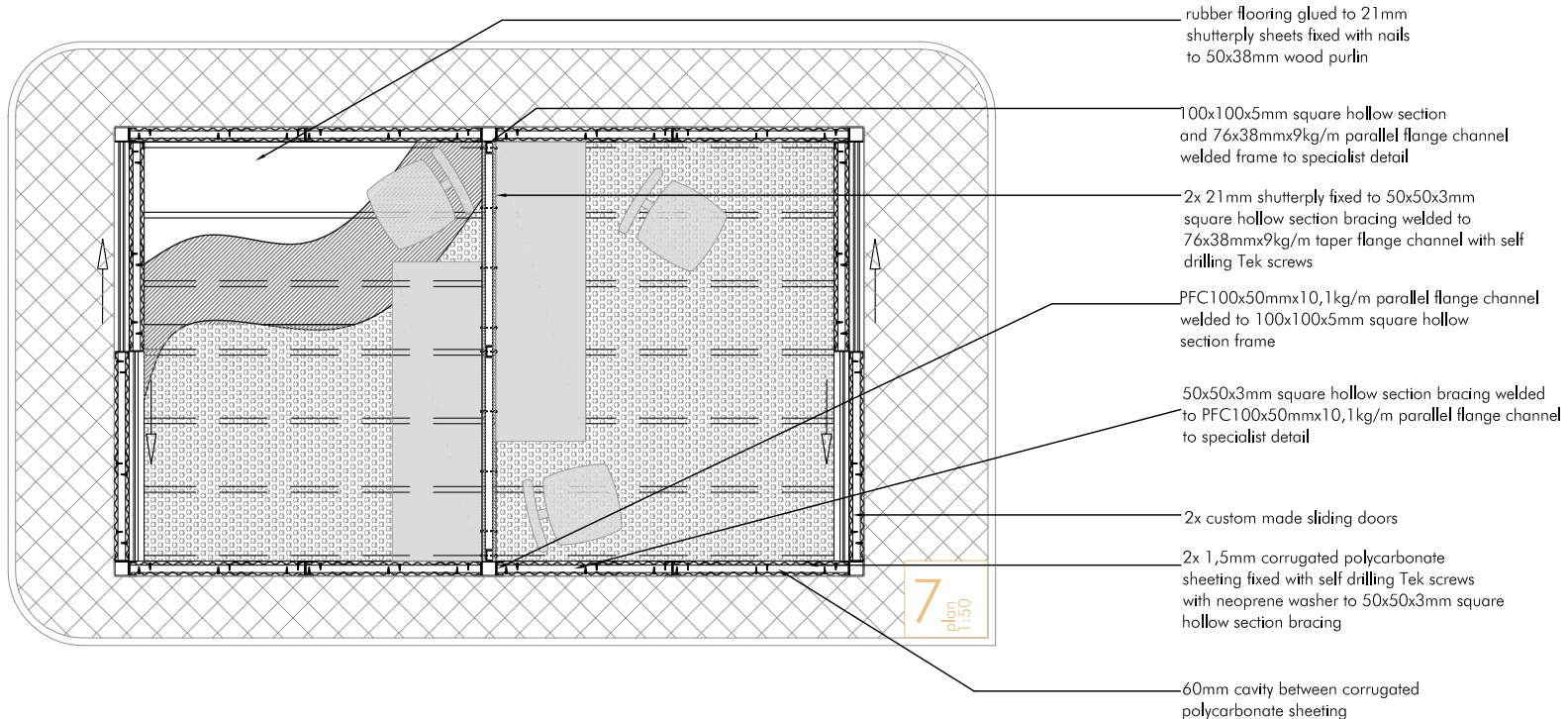
RUBBER PAVERS DETAIL  
1:20



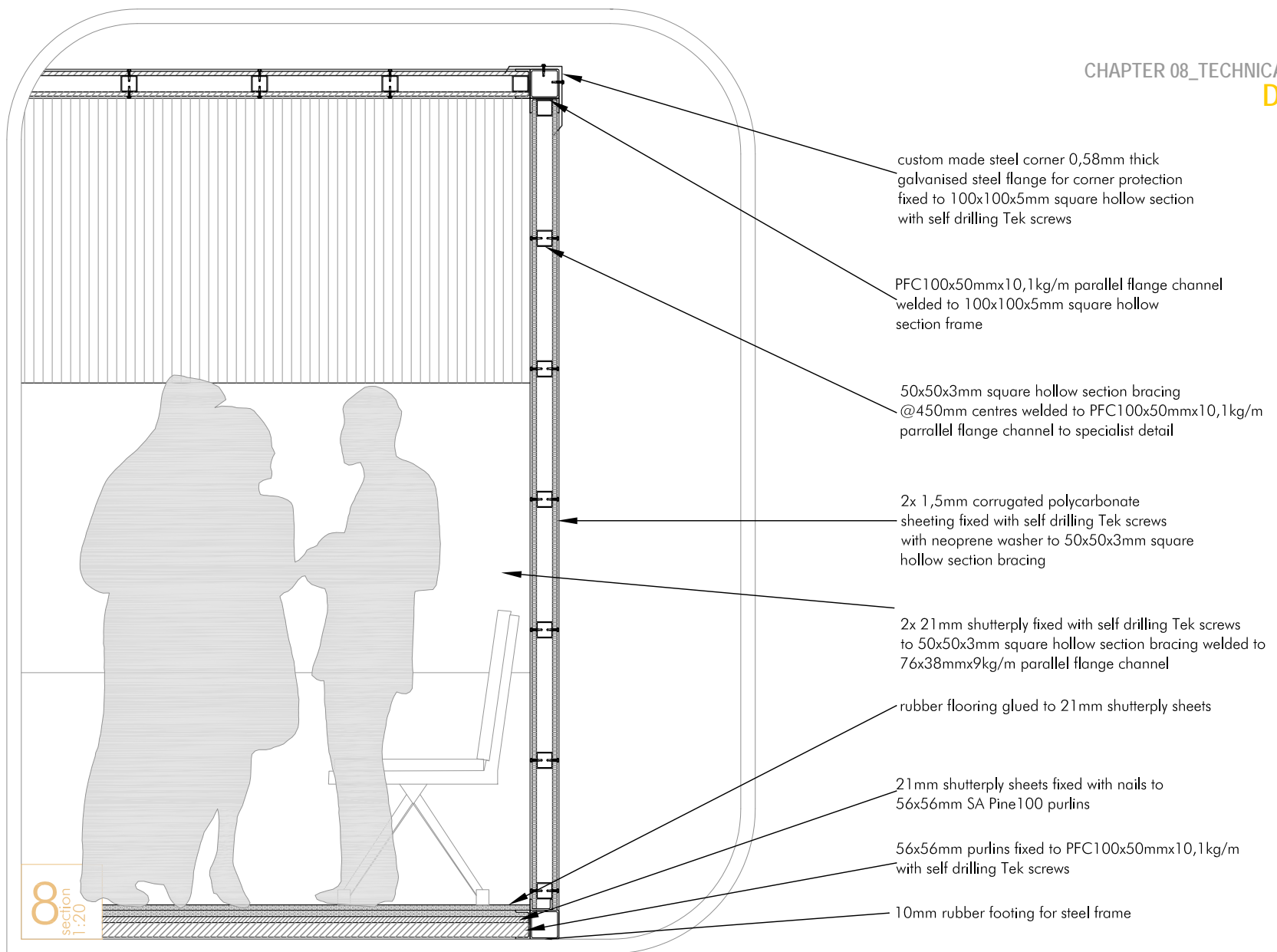
- 255 supported r.conc. slab to eng. design, on 300x700 r.conc. columns also to eng. design. slab soffit to have off-shutter finish for fixing of service pipes and ducts excavated ground fill to be compacted in 150 layers to compaction density of 90% aashto
- r.conc. retaining wall on r.conc footing to eng. design. shuttering openings to act as weepholes for reduction of ground water pressure
- construction joints to eng. design and spec.
- bituminous waterproofing layer
- 120 wide cavity concealed by half-brick protective layer. Air brick to be provided in wall for ventilation of cavity
- 100Ø high density Polyethylene Geopipe to drain excess underground water
- 100 mesh-reinforced conc. floor slab on 0,45 polyolefin damp-proof membrane on 50 open-jointed conc. paver cavity layer on 150 no-fines conc. surface bed. top of surface bed to have min. 1:80 slope towards sump



- r.conc. sump with sensor-activated mechanical pump system connected to stormwater system. wrought-iron cover and grille by specialist

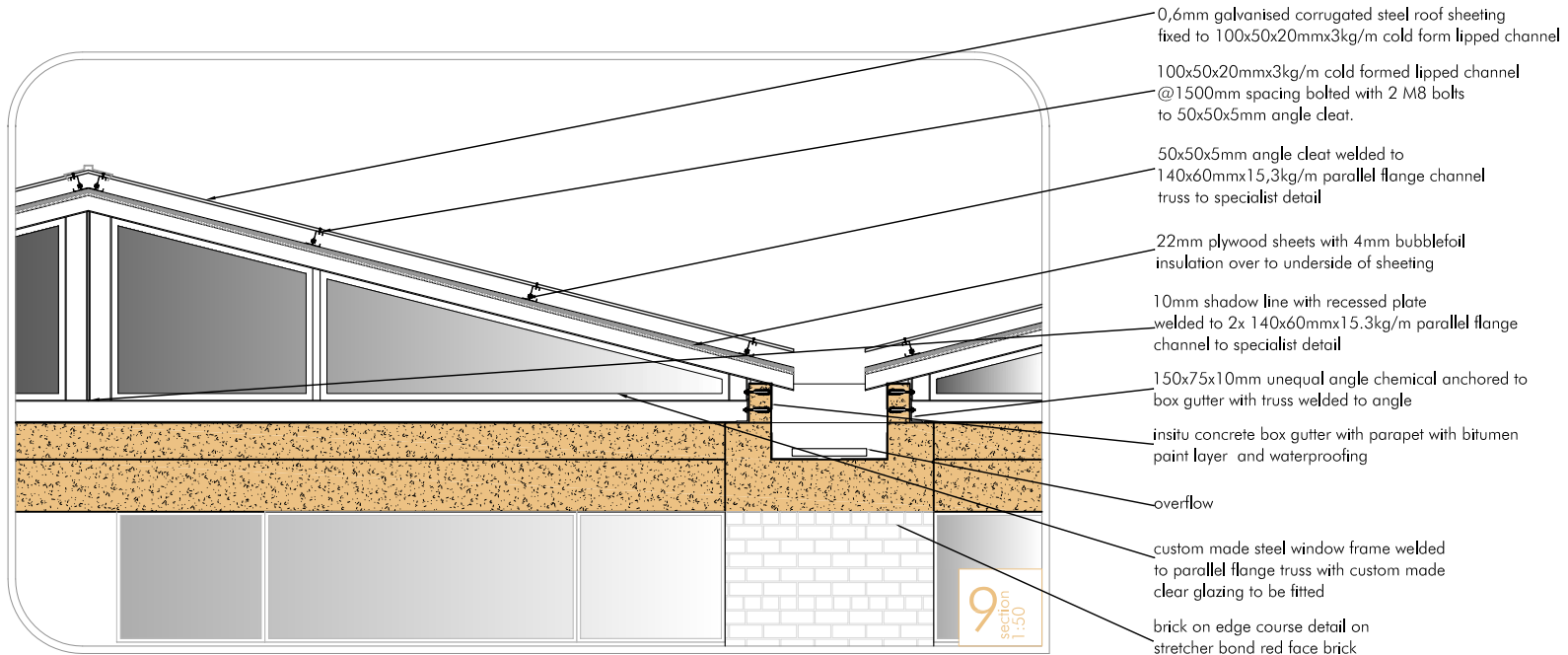


TRADER BOOTH PLAN DETAIL  
 1:50



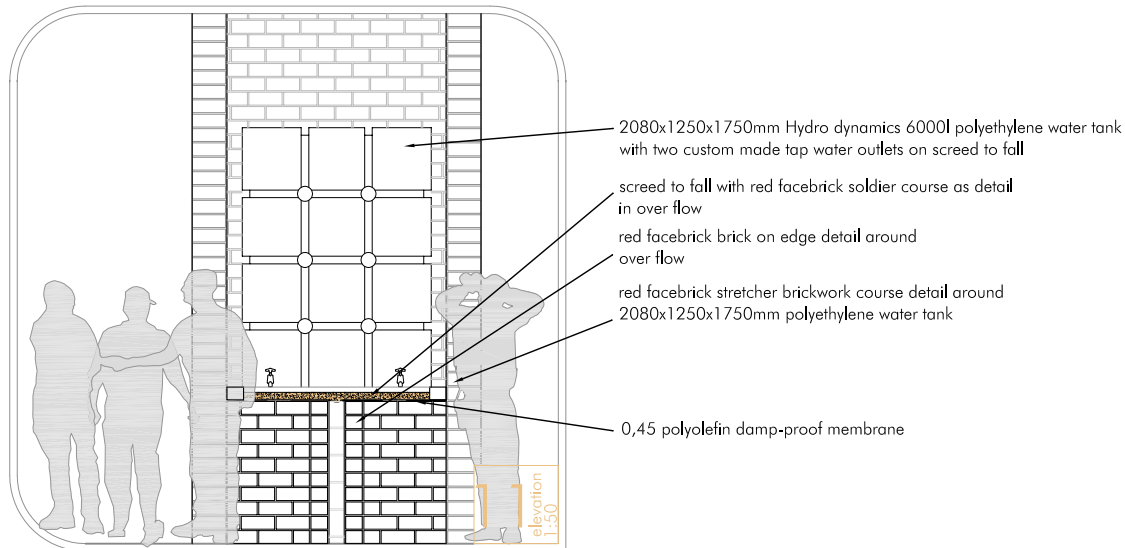
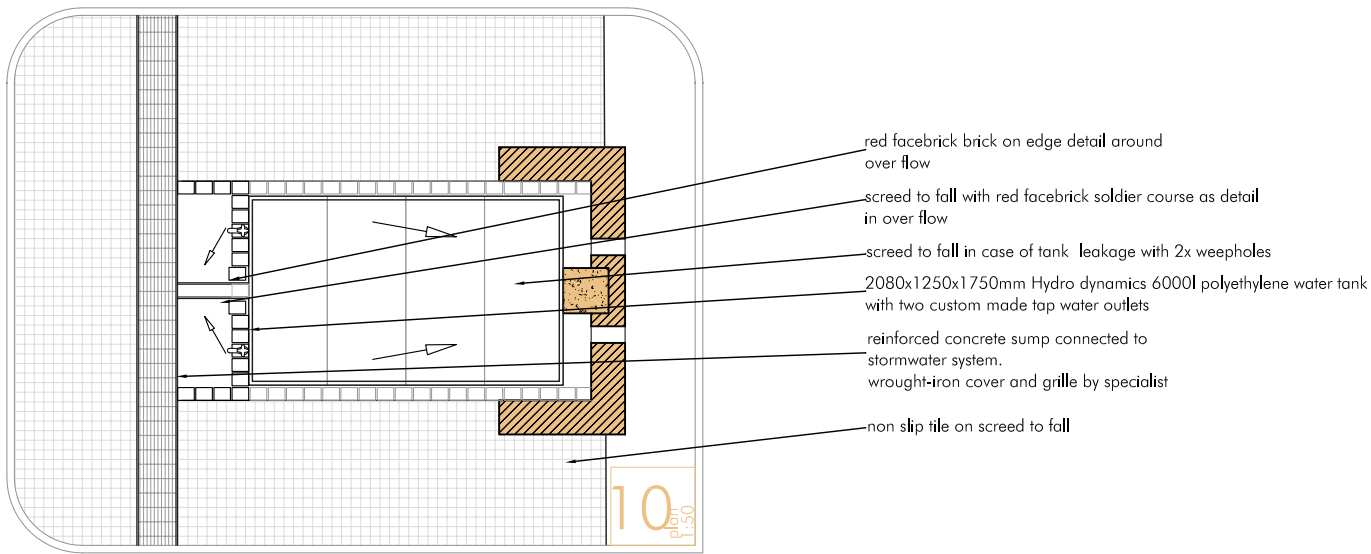
TRADER BOOTH SECTION DETAIL

1:20



SIDE WING ROOF TRUSS DETAIL

1:50



WATER POINT DETAIL  
 1:50



1010	Addendum
1011	Addendum A: Needs Assessment
1012	Addendum B: Site Framework
1013	Addendum C: SBAT
1020	Bibliography
1021	Books
1022	Journals
1023	Articles
1024	Electronic
1025	Personal Communication

# 09



FIG.129. FUEL OF PROJECT



## ADDENDUM

### ADDENDUM A:

#### NEEDS ASSESSMENT:

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### ADDENDUM B:

#### SITE FRAMEWORK





## 2. SOIL CONDITIONS AND TESTS

Geology: shale

Geology Patterns: Plinthic catena: upland duplex and marginalitic soils rare, dystrophic and/or mesotrophic; red soils widespread.

Soil Classes: Red – Yellow – Grey Latosol Plinthic Catena, Neutral, sands/loams, red dominant, but with much rocky land

Rainfall: 700-750mm

Native Vegetation Description: Bushveld

Vegetation type: disturbed urban temperate bushveld

Reservoir zone: PR15

Pretoria water supply: Findlay

## 3. CURRENT LANDUSE

### 4. NOISE AND FORMS OF POLLUTION

Noise pollution predominantly from the west-east axis streets of Proes and Struben as well as north-south along Potgieter and Schubart.

### 5. VIEWS AND OTHER ASSETS

Steenhovenspruit

Kruger Park (Opportunity that can become an asset)

Schubert Park (Opportunity that can become an asset)

### 6.2. High places

Build occasional high places as landmarks throughout the city. They can be a natural part of the topography, or towers, or part of the roofs if the highest local building – but, in any case, they should include a physical climb. (Alexander1977:317)

Landmarks are a point of reference - "are another type of point-reference, but in this case the observer does not enter within them, they are external. They are usually a rather simply defined physical object: building, sign, store, or mountain" (LYNCH1975:48).

## 6. MONUMENTS TO BE CONSERVED

Kruger House

Ga Mohle

## 7. FRAMEWORK OBJECTIVE

To create a sustainable borough in the city with its own identity in the city:

- Focussing on the needs of the pedestrian by densifying and placing focus on shared public space

- That becomes South African by providing dwellers with adequate access and choice
- By utilising existing fabric to its fullest potential, both natural and man-made
- By reconnecting the city with the landscape, creating a productive system

### 8. Mosaic of subcultures

Do everything possible to enrich the cultures and sub-cultures of the city, by breaking the city, as far as possible into a vast mosaic small and different subcultures, each with the power to create its own distinct life style. Make sure that the subcultures are small enough, so that each person has access to the full variety of life styles in the subcultures near his own. (Alexander1977:50)

### 12. Community of 7000

Decentralise the city governments in a way that gives local control communities of 5000-10000 persons. As nearly as possible, use natural geographic and historical boundaries to mark these communities. Give each community the power to initiate, decide, and execute the affairs that concern it closely: land use, housing, maintenance, streets, parks, police, schooling, welfare, neighbourhood services. (Alexander1977:74)

13. Subculture boundary Separate neighbouring subcultures with a swatch of land at least 200 feet wide. Let this boundary be natural – wilderness, farmland, water – or man-made – rail roads, major roads, parks, schools, some housing. Along the seam between two subcultures, build meeting places, shared functions, touching each community. (Alexander1977:78)

### 15. Neighbourhood boundary

Encourage the formation of a boundary around each neighbourhood, to separate it from the next door neighbourhoods. From this boundary by closing down streets and limiting access to the neighbourhood – cut the normal number of streets at least in half. Place the gateways at those points where the restricted access paths cross the boundary; and make the boundary zone wide enough to contain meeting places for the common functions shared by several neighbourhoods. (Alexander1977:90)

Districts- areas with perceived internal homogeneity - "are medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters 'inside of,'

and which are recognizable as having some common identifying character" (LYNCH1975:47)

## 8. BUILDING GUIDELINES BY FOCUS AREA

A: Vermeulen Promenade

### 31. Promenade

Encourage the gradual formation of a promenade at the heart of every community, linking the main activity nodes and placed centrally, so that each point in the community is within 10 minutes walk of it. Put main points of attraction at the two ends, to keep a constant movement up and down. (Alexander1977:173)

Edges: dividing lines between districts - "are the linear elements not used or considered as paths by the observer. They are boundaries between two phases, linear breaks in continuity: shores, railroad cuts, edges of development, walls .." (LYNCH197:47)

Paths: familiar routes followed - "are the channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, transit lines, canals, railroads .." (LYNCH1975:47)

Main focus area from Steenhovenspruit to Schubert Street with civic connections to Bosman street. The Promenade is divided into two sections:

Conversion of section 1- from Steenhovenspruit to Potgieter Street  
Complete pedestrian promenade, with access for service vehicles.

Conversion of section 2 – between Potgieter to Schubert Street  
Traffic calming interventions. This section of Vermeulen Street is a dual way.





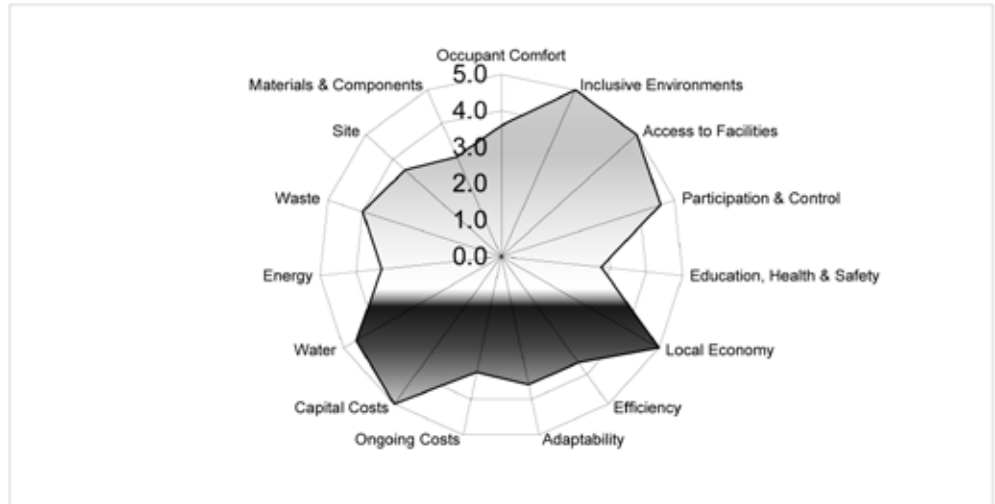
*SUSTAINABLE STUDY:*

The self assessment sustainable building design tool was used as model to generate a more sustainable orientated design. The tool consists of three components rated out of five, the social-, economic- and environmental- aspect of the design that should be evaluated. From these three an overall building performance in terms of sustainability is provided.

The design achieved a four, which is a very good in terms of sustainability.

**SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT- P) V1**

PROJECT	ASSESSMENT
Project title: TAXI TRANSIT PARK	Date: Oct-09
Location: Pretoria CBD	Undertaken by: Buys
Building type: Transport Facility	Company / organisation: SANTACO
Internal area (m2): 2241	



Social	4.2	Economic	4.1	Environmental	3.7
Overall	4.0	Classification	VERY GOOD		



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