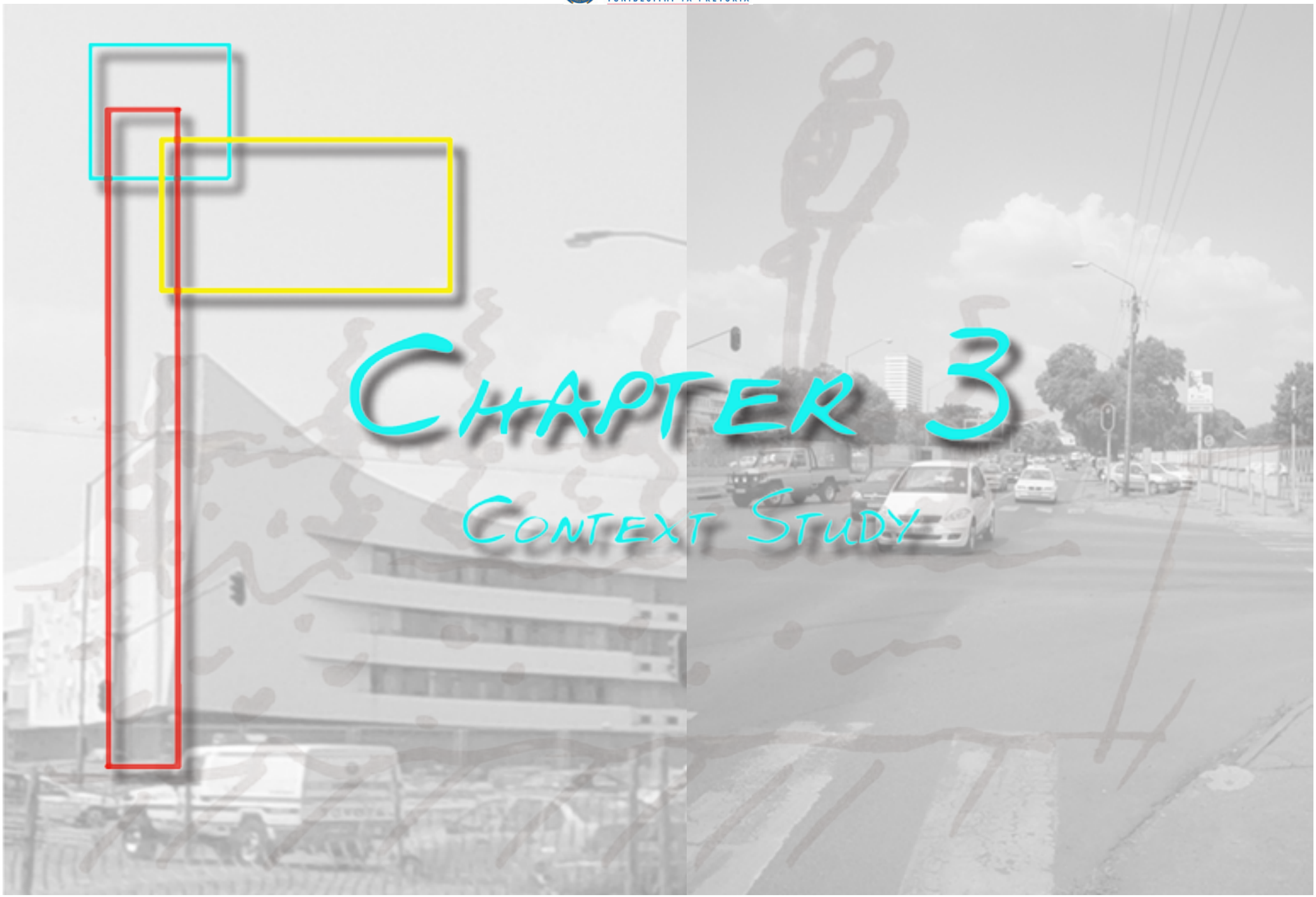


Chapter 3

Context Study

CHAPTER 3
CONTEX STUDY

Introduction

No ecological system can be studied in isolation from the environment in which it exists. Therefore the context study will be divided into three different scales.

- Urban scale

The site and how it functions in relation to Tshwane

- Precinct scale

The site and its relation with its immediate surrounds

- Site scale

A detail analysis of the activities and uses on the site

The focus must be reduced and enlarged to consider the impact on various scales. The issues under investigation will be seen as different systems operating on various scales in, and within the context of the site. This method will enable the designer to draw as much potential from the site and asses which systems might be of real significance for the future design.

Other studies will include a historical, social and physical environment analysis.

Historical Analysis

"When we describe the forms and features of a landscape, we are actually observing the artefacts and fingerprints of the formative processes." *(Woodward, J.1997.*) Without underestimating the importance of functional analysis, the landscape architectural reading of sites is not limited to quantities and capacities. A historical analysis is conducted to see the landscape as a palimpsest and to understand the time layers of the site, knowing how the non - physical environment on the site as well as the surrounding context affected the development of the site.

"No place is a tabula rasa, without history; any intervention by any designer is part of a series of interventions, of marks already inscribed or yet to be inscribed on the site. Every design is subject to the actions of dynamic and unpredictable natural and cultural forces—the continual transformations produced by growth and decay, for example, or by changing patterns of social use and habitation." (*Beardsley, J.2000.)*

Site specific

The form of the site is a constant evolutionary process. Originally the site formed part of the farm Elandspoort. The farm Elandspoort was divided in two by an ox wagon trail running from east to west – currently known as Lynnwood Road. *(Africana Collection 1900's)* When Boys High was established in 1901 it formed part of their sports fields, *(Pretoria Boys High.2000).* In 1930 it was sold to the CSIR (Council for Scientific and Industrial Research). The site was known as the Petroleum Research Institute and later as the CSIR's Division for Energy and Technology.

Fig. 3.1 Existing Historical buildings.

Fig. 3.2 1930 Site buildings.

Fig. 3.3 1940 Site buildings.

Previous site activities included:

The study and investigation of fuel resources in South Africa
Testing, analysing and grading of coal products
Coal grading,
Physical and chemical surveys of coal
Coal washability, crushing and screening
Coal segregation and degradation

The Fuel Research Institute was formerly established in 1931 and the first offices were constructed in 1932, these early 1930's red brick buildings are typical examples of Public Works buildings of that era. In 1969 the briquette factories was established and in 1976 extensions were made to the dense medium coal washing facilities.
(CSIR.1980)

The buildings on the terrain were owned by the state. On the 1st of February 1989 the University of Pretoria laid down a proposal to make it part of the Main Campus and on the 4th of October 1990 this proposal was confirmed with the Department of Education and Culture.

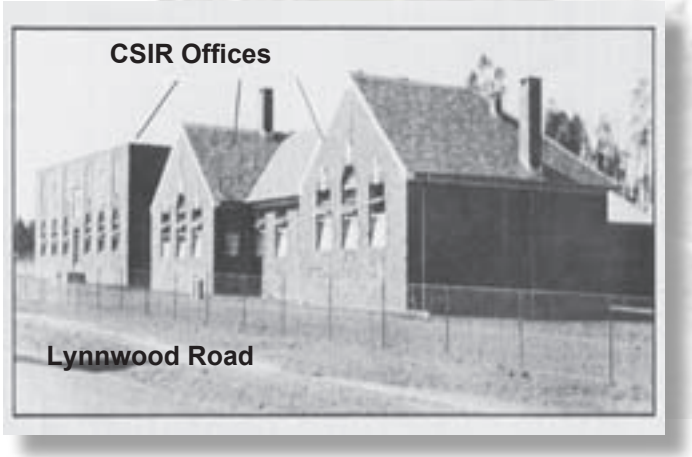


Fig.3.4 1933 CSIR offices.

The site was transferred to the University on the following behalf:

- That the site is available to the University only for educational reasons

- The university should be responsible for moving costs of any property of the CSIR and the DET.

(Ad Destinatum.1982 - 1992)

After a few renovations and internal structural modifications on some of the buildings they were allocated to various departments which used them either for storage, administration offices or lecture facilities. Other activities included a kiosk and a Centre for Electromagnetic Studies.

Contextual

A natural stream use to run through the existing sport fields, it was canalised after numerous incidents of flooding were experienced after heavy rains. The channel has a trapezoidal profile with no formal lining. This has a result that the maximum channel depth has increased, due to scouring and erosion. (Presently 2m below the existing ground level.)

Fig. 3.5 1960 Birds Eye view of CSIR offices.

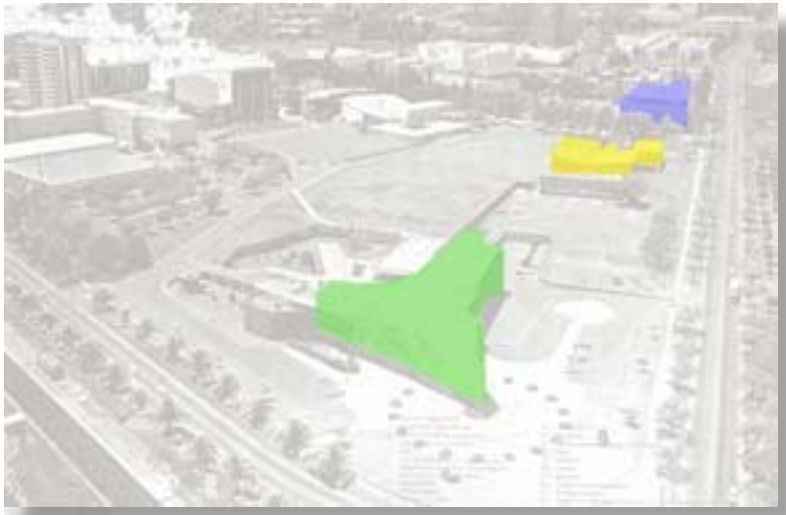


Fig. 3.6 Adjacent site buildings.

The buildings lying towards the north of the site, next to Lynnwood Road

Administration Building (Brian Sandrock)
The construction of the Administration building started in 1960. The building was designed to face directly to the Voortrekker Monument. During 1979 – 1982 renovations were done.

Boukunde Building (designed by own personnel)
The Boukunde building was constructed in 1960.

Fine Arts Building
The Fine Arts building was constructed during 1948.
(Hindes, C.2003.)

The Footbridge and Lynnwood Road
Lynnwood Road was widened in 1990 and the footbridge across Lynnwood was constructed in 1995, after a student was killed while crossing the road.
(Potgieter, D.2008)

Urban scale

Study Area

Park Street, including the Gautrain station and Duncan Street will respectively form the northern and eastern borders for the area under investigation. The boundary line of Pretoria Boys High will form the southern border and Walton Jameson Avenue, next to Afrikaans Meisies Hoër, the western boundary line.

Fig. 3.7 Study Area.

Based on research and evolution of modern space and the analysis of historic precedents, the following approaches to urban design theory can be identified. An integration of these theories can improve the success of urban design.

- Figure ground

The figure ground drawing is a graphic tool for illustrating mass void relationships, which clarifies the structure of the urban environment. The articulation of solids and voids establish the physical sequences, visual orientation and distinctive characteristics between places.

This is the starting point for an understanding of urban form and is the analysis of relationships between building form and open space.

Land uses

The sport grounds surrounding the educational precinct, lends the area a more rural character in terms of open space. Towards the north, composition of land use around the university is very diverse and accommodates a range of activities. Commercial and retail facilities have been introduced over the past 10 years; it forms the centre of the area, consisting of Hatfield Plaza and Hatfield Square as well as some buildings along Burnett Street.

Towards the north, residential areas with the highest concentration are situated at Hatfield Village and south of Prospect Street, including student accommodation. Office blocks are found in high concentration along Duncan Road, especially along the proposed Gautrain Hatfield station. Newly developed office and houses which have been converted, form part of this mixed use area.

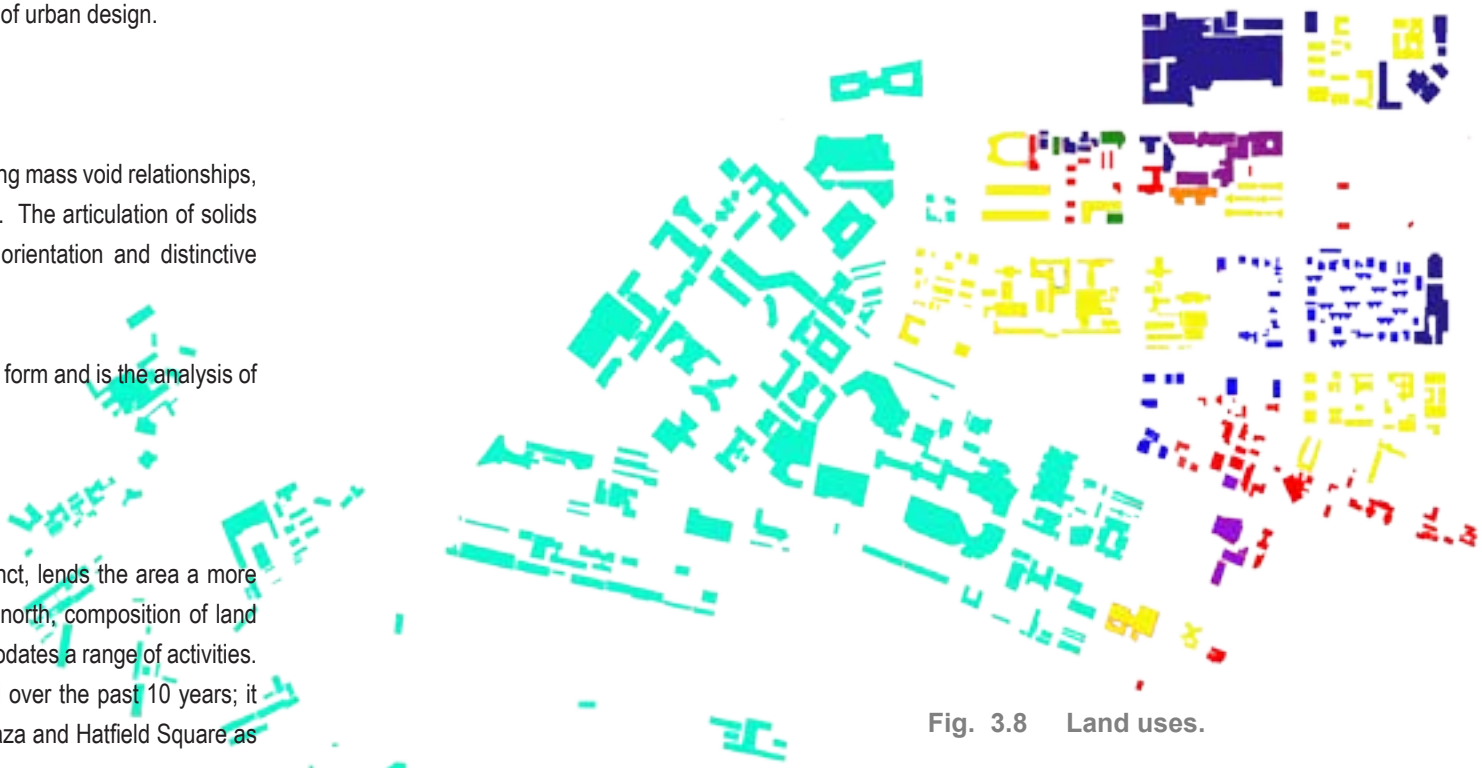


Fig. 3.8 Land uses.

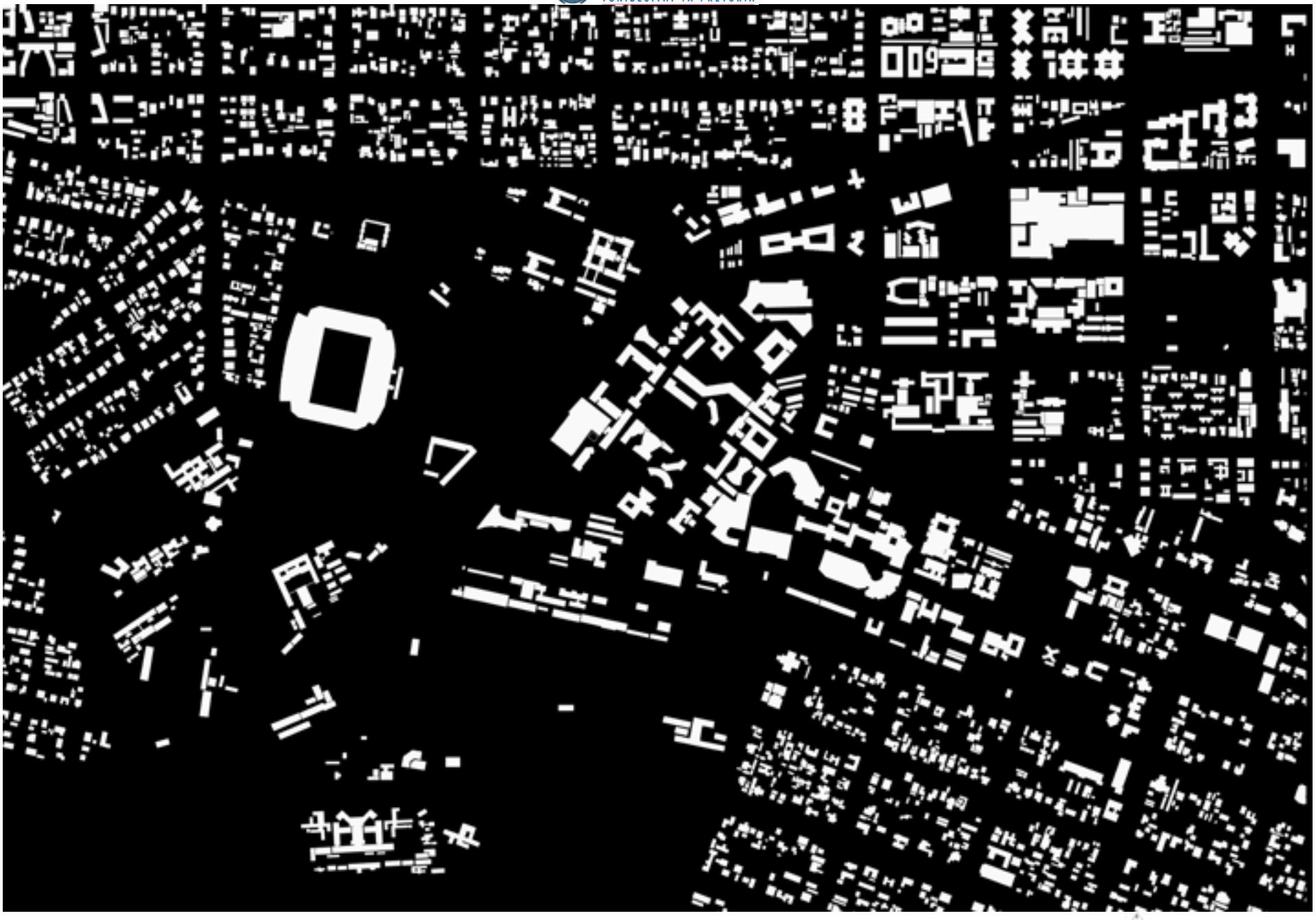


Fig. 3.9 Ground Figure.

- Linkage

In this theory, the dynamics of circulation becomes the generator for urban form. The organization of lines connects the different parts of the urban network.

Visual orientation

Tukkielaan forms a strong pedestrian axis along the north south direction and Lynnwood Road forms a strong axis along the east west direction.

Edges of buildings

Building edges along South Campus are situated a significant distance from Lynnwood Road, this results in lost space between building edges and Lynnwood Road.

Transport routes and modes

Vehicular system

Current vehicular activity is primarily along Lynnwood Road. Lynnwood Road forms an east – west vehicular access route between the East and the CBD. Duncan Road forms the most important road in the north south direction as it links the Hatfield node with the Brooklyn node and serves the area north of Hatfield via Gordon Road. Due to the position of the University of Pretoria, there is a lack of routes in these directions.

Fig. 3.10 Visual orientation.

Fig. 3.11 Building edges from Lynnwood Road.

The Tshwane Development Framework proposes for Lynnwood Road to become an activity spine with vibrant activities concentrated along specific portions of the road. Where appropriate traffic calming measures will be implemented to create a pedestrian and cyclist orientated environment. *(http://www.tshwane.gov.za)* Local access considerations and urban design should be taken into account along Lynnwood Road. The introduction of service roads should also be considered.

Public Transport plays an important role along Lynnwood Road. Several bus and taxi stops are situated along Lynnwood Road. A future BRT (Bus Rapid Transport) stop on the corner of Lynnwood and University Road will be completed in 2009. *(Claassen, C. 2008.)* (Refer to appendix 2)

Railway system

The Hatfield Gautrain station is within walking distance from the University of Pretoria, this provides easy access for students from Johannesburg. Other train stations in close proximity from the site include the Hartebeespoort station in Hatfield and the Loftus station next to University Road.

- Place

The essence of place theory lies in the understanding of cultural, social, environmental and human characteristics of a physical place.
(Trancki, R.1986.)

According to the Tshwane Regional Spatial Development framework various urban core activity nodes are identified within the city of Tshwane. Urban cores are activity nodes of metropolitan significance which are characterised by high intensity mixed land use, high levels of accessibility, 24 hour activity, well defined public spaces, pedestrian friendly environments and public transport facilities and activities. It forms a hub for various levels of education, research, business, sports and tourism. These activities are clustered around strategic points in the city. The site is located in an educational cluster situated in the Central Western Region of Tshwane.

The site is centrally located and forms part of the transition zone between two nodes of activity; namely the Brooklyn and Hatfield Metropolitan Cores. Brooklyn has developed into a major financial centre and proposed to be densified and extended to the north, Hatfield as an existing node will accommodate the future Gautrain Station.
(http://www.tshwane.gov.za.)

Fig. 3.12 Bus routes.

The understanding of environment places a large focus on the recognition that human life forms the central part of the physical and cultural medium. Lynch looked at the city as a system that contains a set of organizing structures which have physiological significance for its inhabitants. (Trancki, R.1986.) He outlined a vocabulary for reading and interpreting a place through different constructions, he provided one of the first theoretical strategies to connect the aesthetic and the environment. (*Meyer, E.K.2000.)*

The contents of the urban environment, which formulate the physical structure give spatial definition and help create a sense of place. It is important to identify these different elements, in order to understand the urban site and how it connects to its surroundings. *(Trancki, R.1986.)*

Districts

The isolated buildings of South Campus are not tied into the larger context, this becomes visible when analysed through the figure ground.

Fig. 3.13 Site within educational cluster.

Social composition

People between the ages of 15 and 34 make up the largest composition of residents in the Hatfield-Brooklyn area. A large percentage of these people are students who only stay in the area for 3 – 4 years. Brooklyn, the neighbourhood lying east of the site is home to more permanent residents.
(Census 2003)

Fig.3.14 Spatial elements of the city.

- Urban green and hydrology

Urban green

The site is surrounded by a large amount of sports fields which form a large percentage of the urban green structure in the area. These green areas in the city are deceiving as they offer no contribution to the overall urban ecological system's vitality and diversity and only function as visual amenities. Various alien species, like Eucalyptus and Casserina are found along the channel. The palm trees along University Road and the Jacaranda trees along Lynnwood Road have historical value and cannot be removed.

Water bodies

The open storm water channel runs from the Roper street entrance of Pretoria Boys High towards University Road where it forms a closed system which conveys the water to the Walkerspruit channel. As a result of the channel an abundant amount of birdlife and tree species are present along the southern edge of the site. The linearity of the channel and the amount of tree species growing along its edges functions as an urban green corridor, enabling the movement of various species.

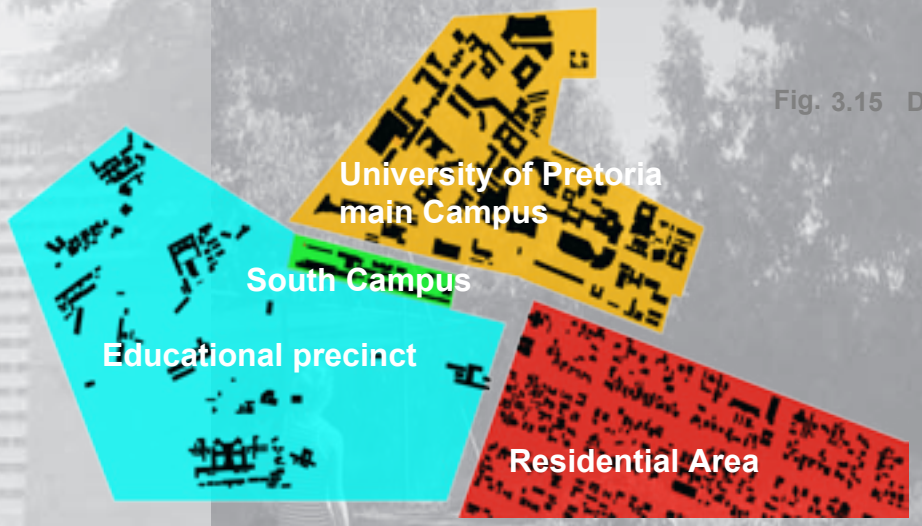


Fig. 3.15 Districts.

Fig. 3.16 Green areas and water bodies.

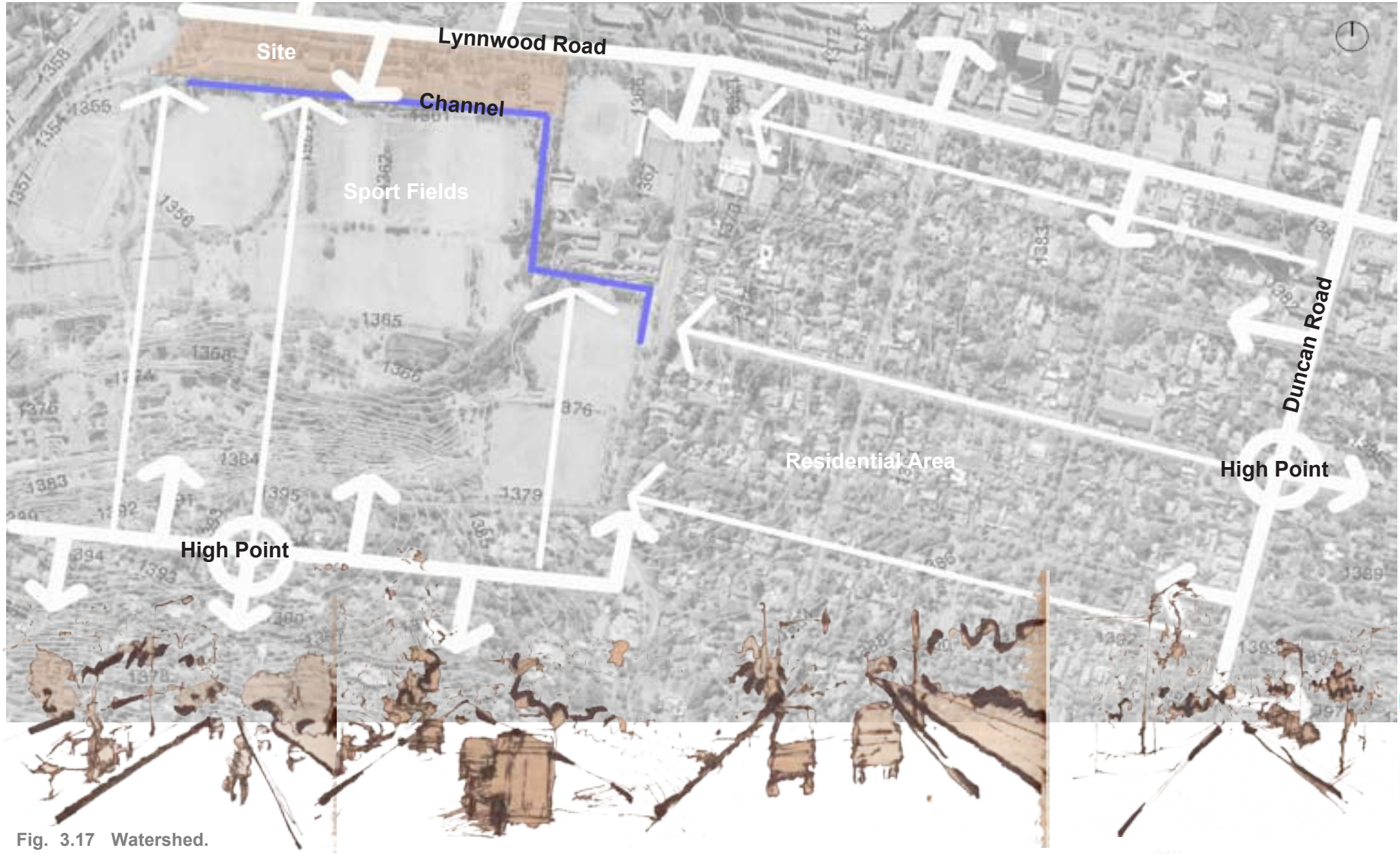


Fig. 3.17 Watershed.

Fig. 3.18 – 3.21 Vignettes along Lynnwood Road.

Precinct scale

The systems operating on site level are generated by existing systems which operate on a bigger scale. Although the site has its own rhythm and character, the surrounding context plays a major role in the continuous flow of systems operating on the site. The precinct analysis is conducted to have an understanding of the area, its activities, functions and overall character.

Currently Holm and Jordaan Urban designers are formalising a framework for Main Campus. It is still just a proposal and has not yet been approved and published. As a student group, working on or near the borders of Main Campus we have proposed our own framework for the campus and its immediate context. The framework (refer to appendix 1) is based on The Tshwane Spatial Development Framework, the existing framework for Hatfield and the Tshwane Integrated Development Framework. I have also taken into account aspects which were raised during a class meeting with Mr. Jordaan and some proposed future development of South Campus which came under my attention through interviews with Mr. Potgieter from the Facilities and Services division of the University of Pretoria.

The area surrounding the University of Pretoria's Main Campus is changing from a sub urban to a more urban environment. Main Campus is continuously expanding to accommodate for the rapid student growth, walking distances on campus are getting too time consuming resulting in the need to cluster facilities. *(Jordaan, G.2008.)*

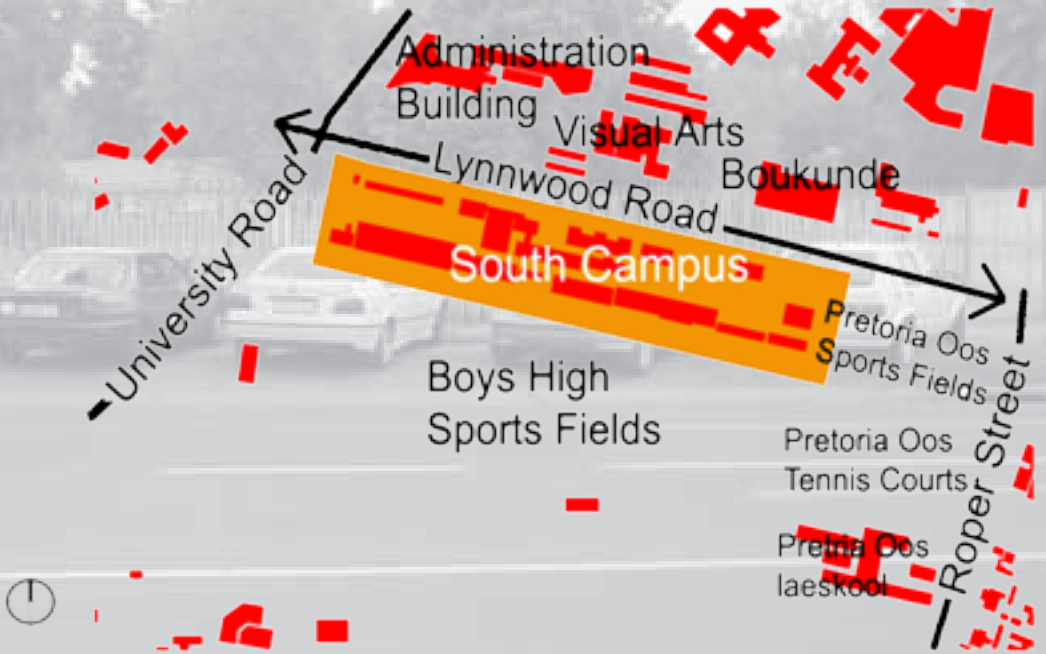


Fig. 3.22 Study Area.

Study Area

This study is focussed between the crossings of Lynnwood and Roper Street and Lynnwood and University Road. The area on Main Campus, along Lynnwood Road and the Sports fields towards the south and east is also included in this study.

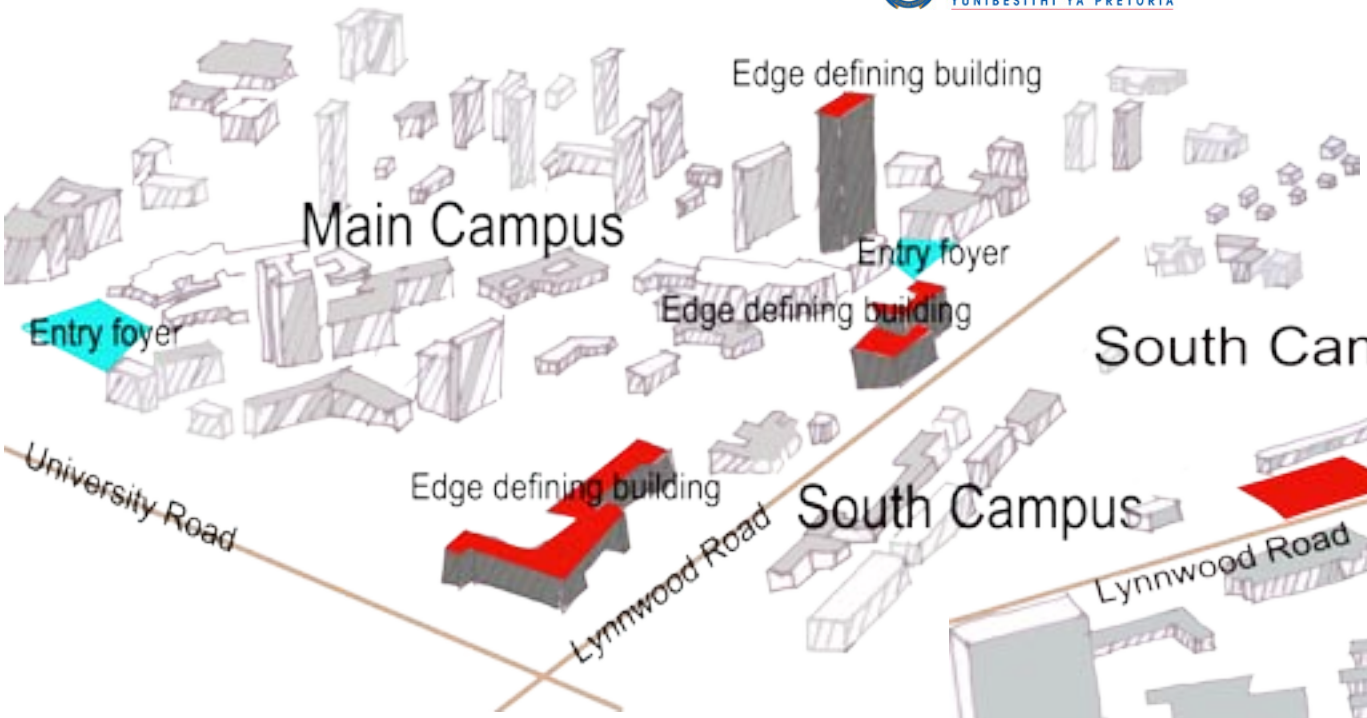


Fig. 3.23 Types of urban solids and voids.

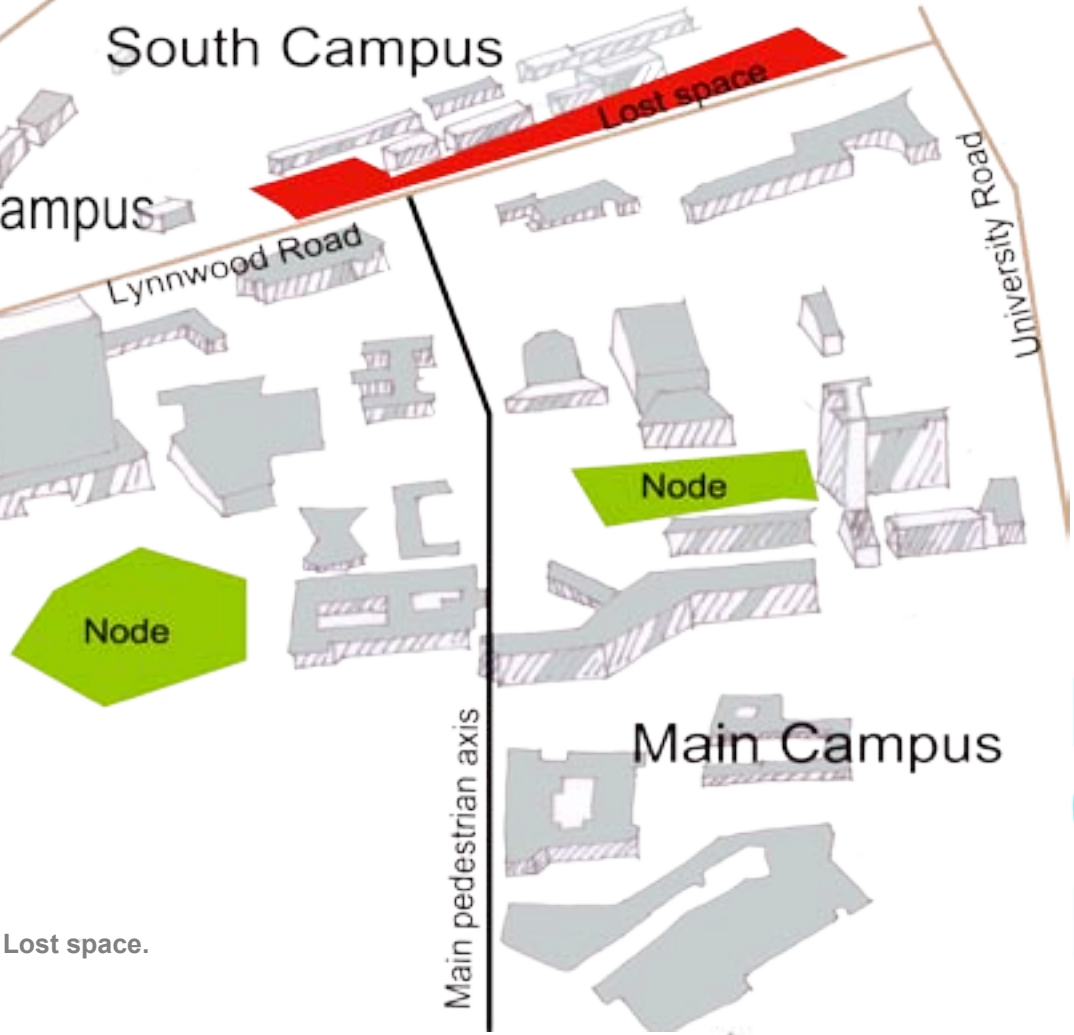


Fig. 3.24 Lost space.

Pedestrian movement

Pedestrian activity streams from the large amount of student cars parked along Lynnwood and University Road as well as school children and students gathering at bus stops. The fast vehicle movement on Lynnwood Road and the uncomfortable pedestrian bridge over it separates the South Campus of the University of Pretoria from the Main Campus. The school sport fields along the East and South border is fenced off and walled off therefore prohibiting infiltration into the site. Strategic planning with regard to movement is of extreme importance to the context.

Vehicular movement

Lynnwood Road

Lynnwood Road acts as a link which connects the site to the city as a whole. The vehicular access gate situated along Lynnwood Road is only reserved for service vehicles.

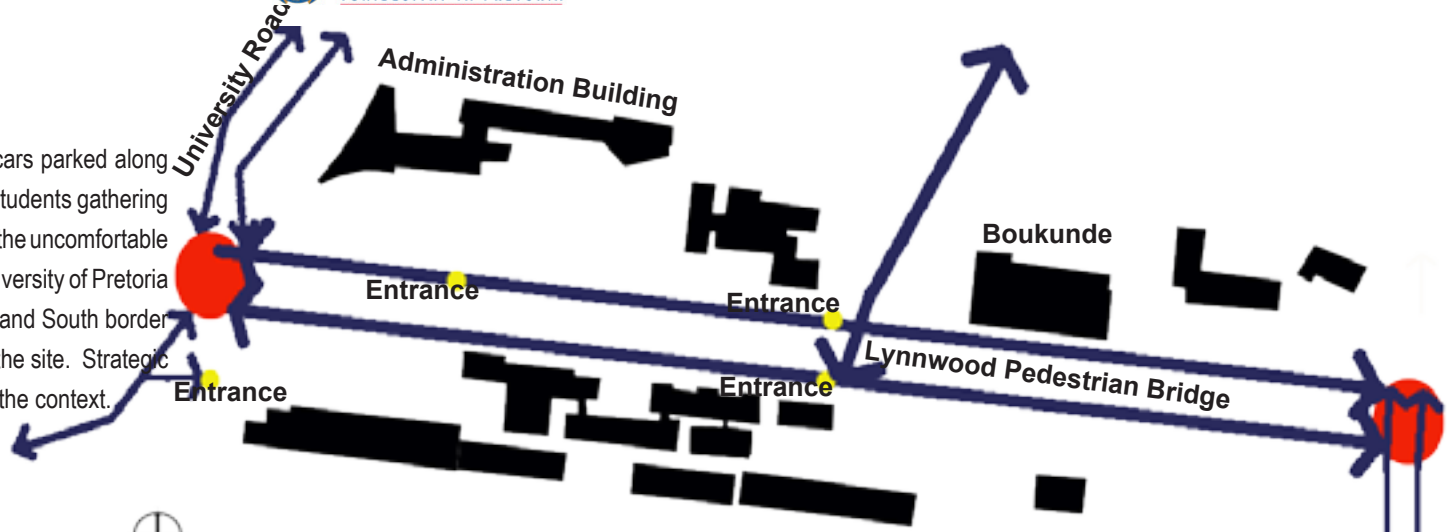


Fig.3.25 Pedestrian movement.

Seqeuntial Movement

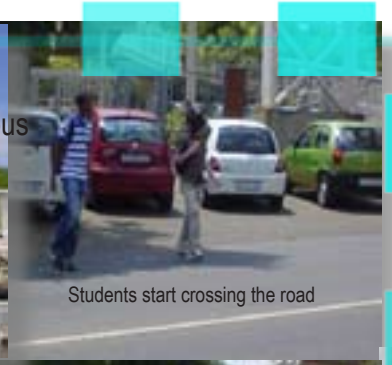


Fig. 3.27 View from Main Campus

Fig. 3.28 – 3.30 Pedestrian movement across Lynnwood Road.

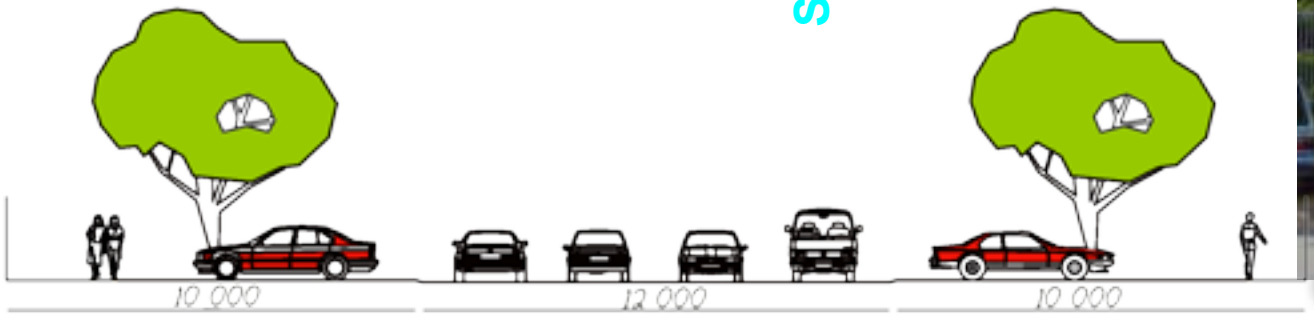


Fig. 3.26 Existing section across Lynnwood Road.

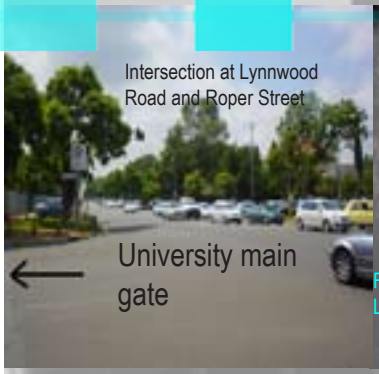
University Road

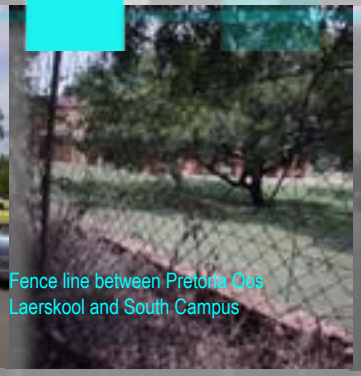
University Road connects the site to its immediate surroundings. The only vehicle access on University Road, into and from the site, is not functioning. Vehicles entering and exiting the site and vehicles entering and exiting the informal parking results in traffic congestion, especially during peak traffic hours.

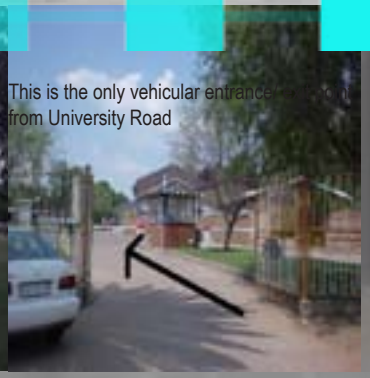
Visual Permeability

Visual permeability is prohibited as a result of the palisade fencing and dense plantings along Lynnwood Road. Medium density vegetation and fragmented pieces of solid wall minimize the visual permeability of the site. The edges around the site forms isolating barriers rather than uniting seams, it is turned upon itself and has little reference to the city outside

Fig. 3.37 Vehicular movement and bus stops.







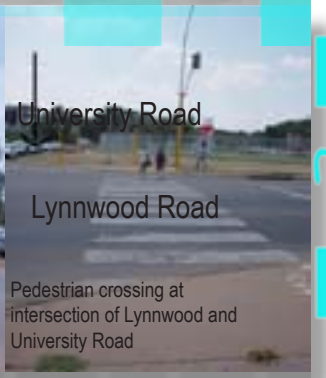


Fig. 3.31 – 3.36 Sequential movement.

Hydrology

Storm water drainage

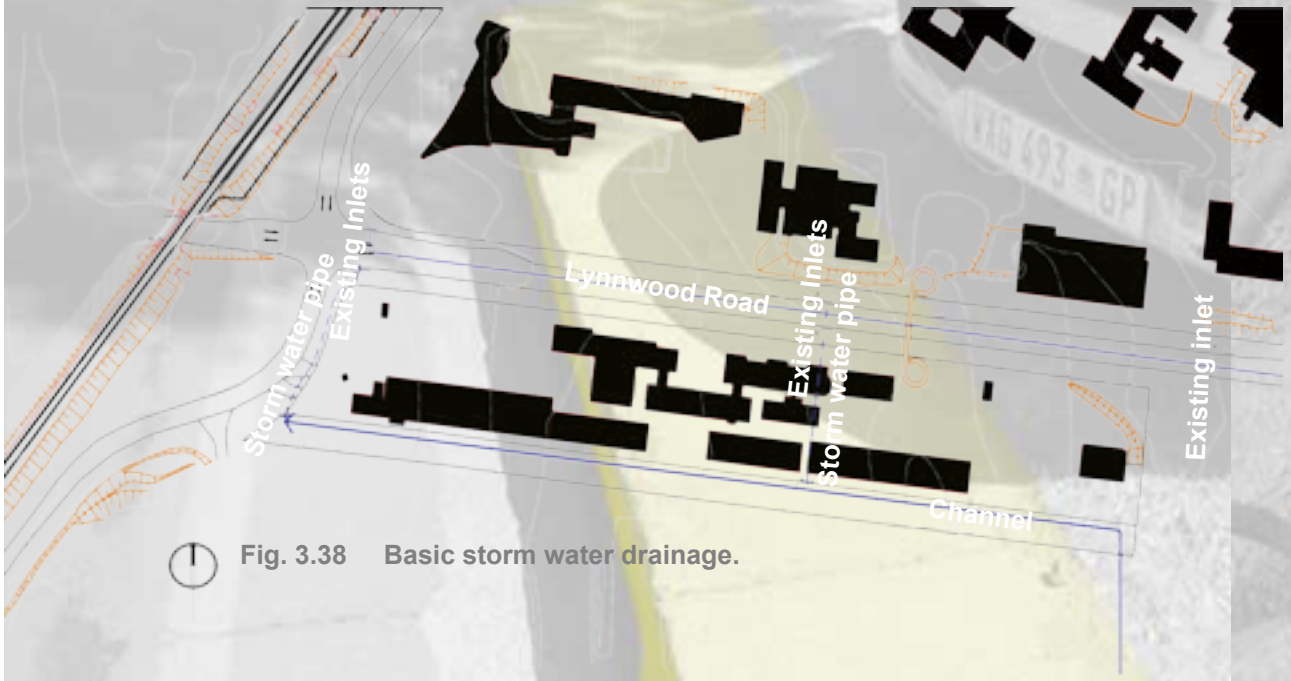


Fig. 3.38 Basic storm water drainage.

The Channel

Fig. 3.39 Channel profile and dimensions.

The wetland system at Pretoria Boys High

The wetland system near the main entrance gate of Pretoria Boys High is man made wetland which functions as a natural system. The water depth is maintained from runoff and an overflow sewage pipe. During exceptional dry months water is pumped from a bore hole lying further south. The wetland supports a viable community of fish species and a healthy insect life. Water seeps down from the bottom of the wetland due to the porous nature of the soil found in the area. (*Grobbelaar, J. 2008.)*

Wildlife

Most wildlife occurs along the strip of trees planted along the channel. The wetland at Pretoria Boys High also acts as a stepping stone for various animal species inhabiting the urban environment.

Future Developments

New pavilions are proposed on the western side of each sport field at Pretoria Boys High.

Site scale

By analysing the site on plan it identifies boundaries and shapes, but the spatiality of trees is neither a solid nor a void and therefore and in addition to the two dimensional view, a three dimensional sequence explores the space making opportunities. *(Hough, M.2004.)*

Rather than reading a space as emptiness, defined by a series of surfaces, an in depth vision sees the open space as a habitat in which the sky and the ground surface engage in multiple relationships.

The ecosystem on the site is fragmented and reduced to mere shreds, buried under refuge, left in neglected corners. This analysis tries to capture the spirit of the site and its main focus is to understand the existing systems operating on a site specific scale. The study zooms in on different detailed areas two dimensionally on plan and three dimensionally, by moving through the site, experiencing it on a human scale.

Study Area

The chosen site lays 25° south 28° east. It is situated directly south from Main Campus, consisting out of two parts, remainder of portion 332 of the farm Elandspoort and portion 375.

Cadastral information

The site's registered zoning is educational and building lines are 4.5 m from the sides and 3.5m from the street.

(City of Tshwane , City Planning and Regional Services Department.2008.)

Physical Area of the site

The total site area is 35600m^2

3 Physical sequence

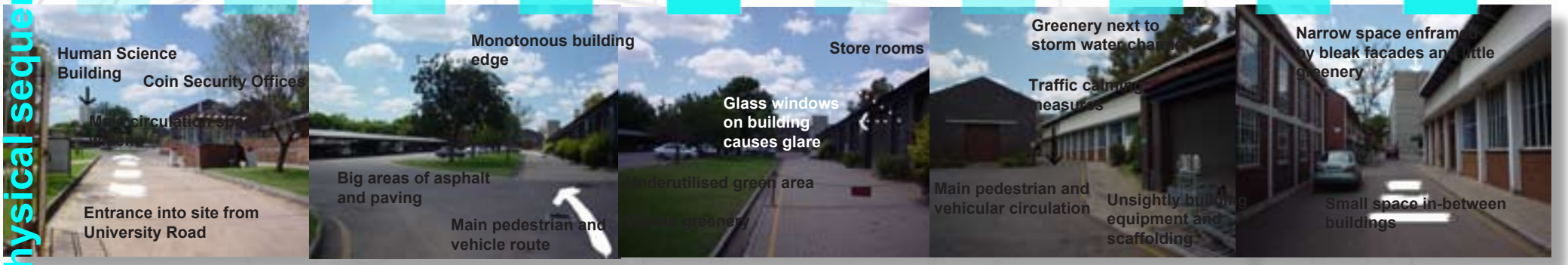


Fig. 3.40 – 3.45 Physical sequence.

Existing site activities

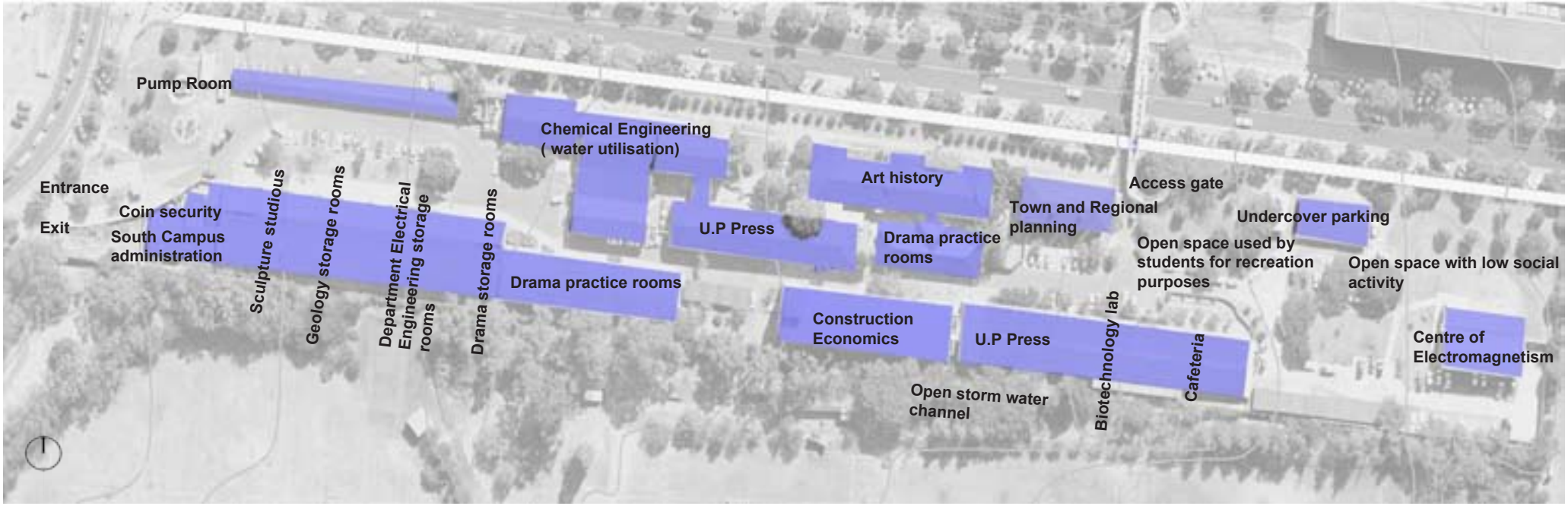


Fig. 3.51 Site activities.

Fig. 3.46 – 3.50 Physical sequence.

Main pedestrian movement and access

Pedestrians entering from outside university property use the gates which are situated west on University Road and north, on Lynnwood Road. Some students entering South Campus from the Main Campus use the pedestrian bridge over Lynnwood Road, others prefer crossing Lynnwood Road at street level. The access gate on Lynnwood Road functions as the main pedestrian entrance. The highest pedestrian activity is situated around this area because it is located close to an open area of grass and the cafeteria.

Fig. 3.52 Pedestrian dispersal and concentration.

Fig. 3.53 – 3.58 Physical sequence.

There is virtually no pedestrian movement towards the eastern side of the site and very little pedestrian movement towards the west. Pedestrians moving in an east west direction share the circulation route with vehicles, this sometimes lead to conflict between vehicles and pedestrians. Pedestrian movement in a north south direction is only short distances between buildings.

Fig. 3.65 On site circulation.

Fig. 3.59 – 3.64 Physical sequence.

Existing Structures

Buildings are seen as elements part of the landscape rather than discrete objects standing in isolation.

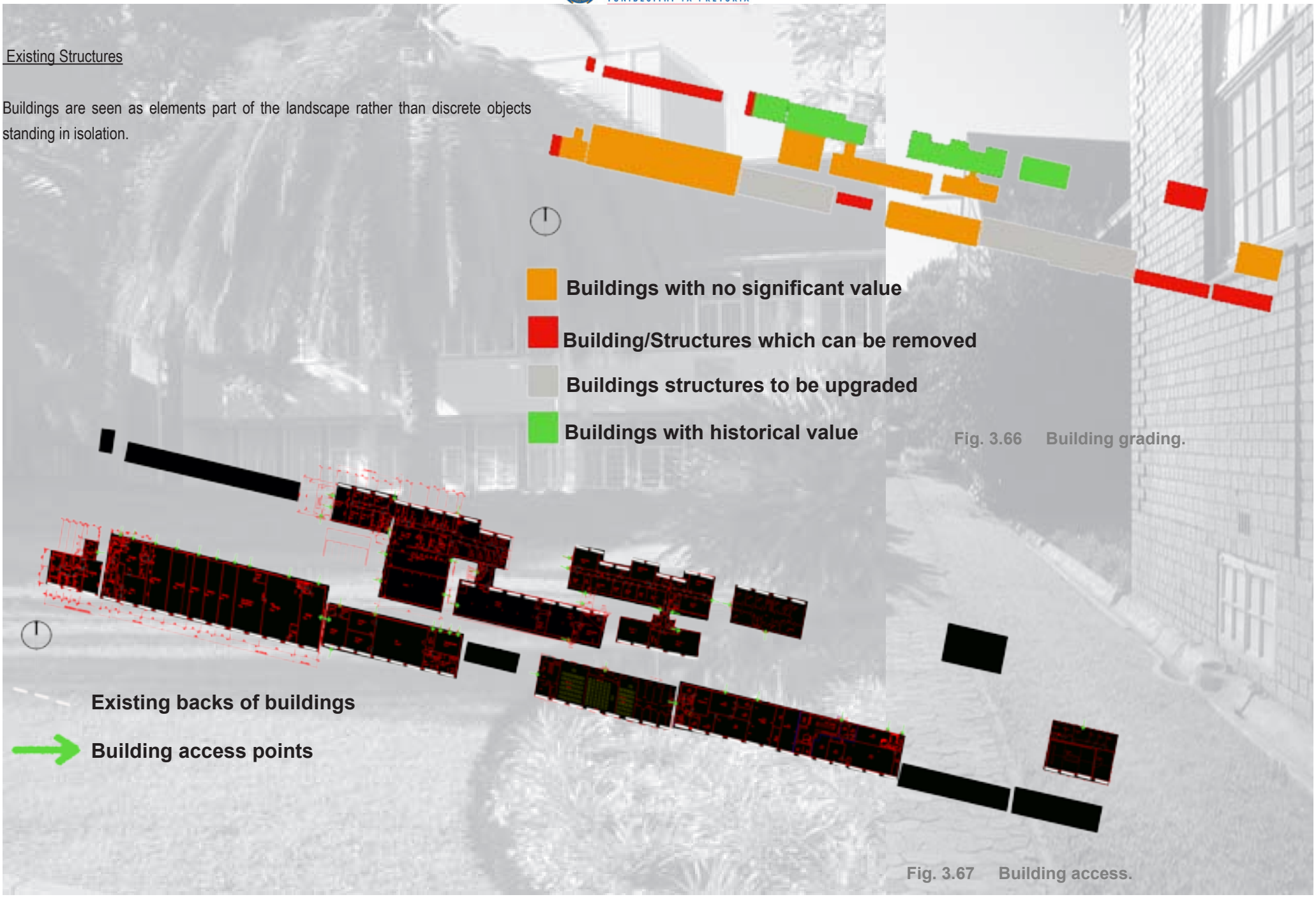


Fig. 3.66 Building grading.

Fig. 3.67 Building access.

Social activities


The main entry onto South Campus from Lynnwood Road, It forms a gathering space as students wait for their turn through the access control gate.


"Most of the time the same people come here over and over again" (Cafeteria owner)


The front porch of the Town and Regional Planning building are very well utilised by students. Benches and low rise seating walls encourages social interaction.

"The campus is like a small community, everybody knows everybody" (Town and Regional planning student)

"The distances from Main Campus is so far."
(Fine Arts student)

"It's not so crowded here."
(Fine Arts student)

"I come from Main Campus , the main attraction are the cheap food. "
(Engineering student)

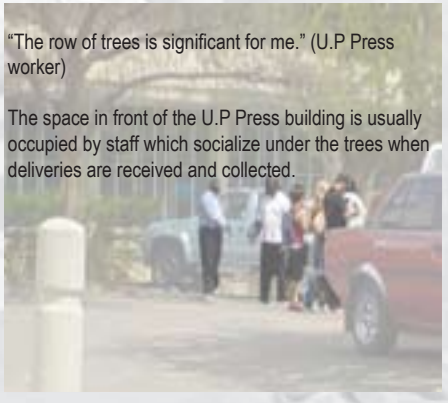
"Personnel , students and security workers buy from me."
(Cafeteria owner)


Personnel use the backdoor of this building for activities such as smoking and chatting.


" We use the braai area sometimes on Friday afternoons " (Town and Regional Planning Student)

Students prefer chatting and leaning against the edges of the building as it provides shade during the summer , they will rarely occupy this space during the winter.


Areas located away from pedestrian and vehicular movement are used for activities such as sleeping, studying and reading.


"The row of trees is significant for me." (U.P Press worker)

The space in front of the U.P Press building is usually occupied by staff which socialize under the trees when deliveries are received and collected.


Students use this space in front of the cafeteria for eating lunch, reading, smoking, chatting and studying. There is a diverse range of seating [illegible] are clustered together which [illegible] of students. Other [illegible] of two [illegible]

Fig. 3.68 – 3.75 Social activity.

Urban Voids

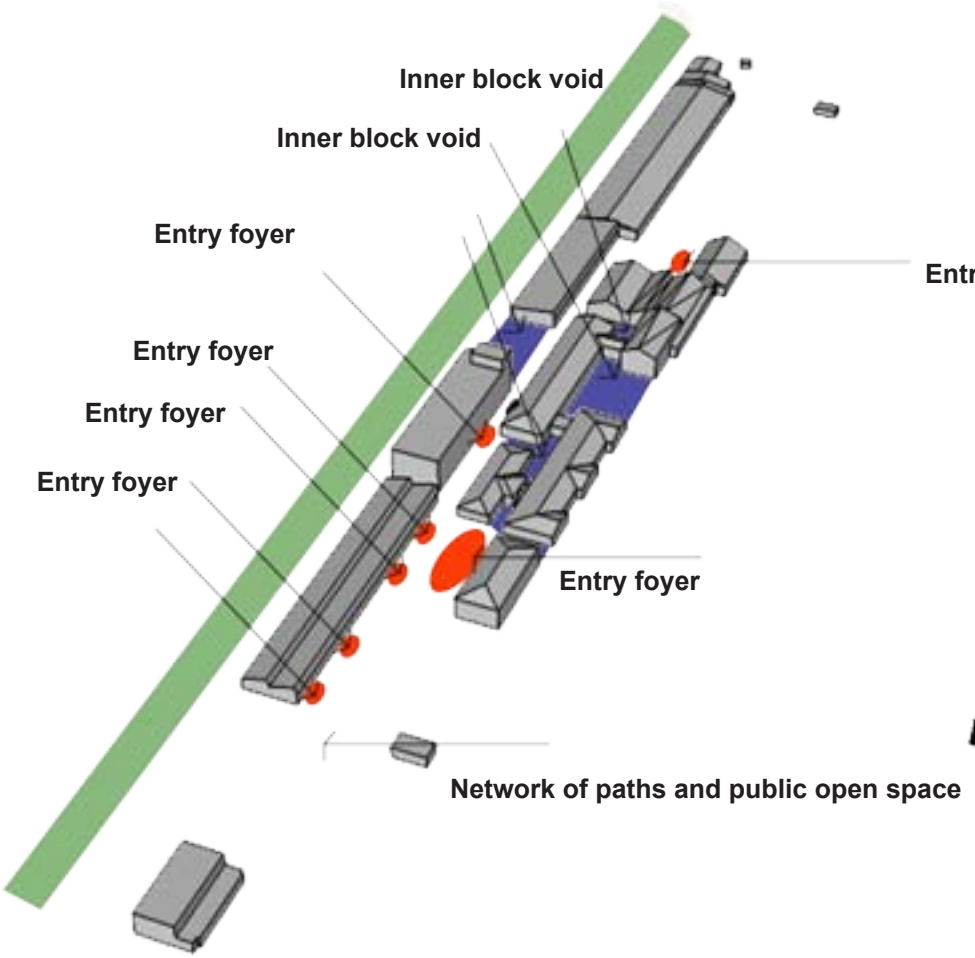


Fig. 3.76 Site voids.

Visual orientation

Fig. 3.77 Visual orientation.

Physical sequence

Fig. 3.78 Physical sequence.

Linkage

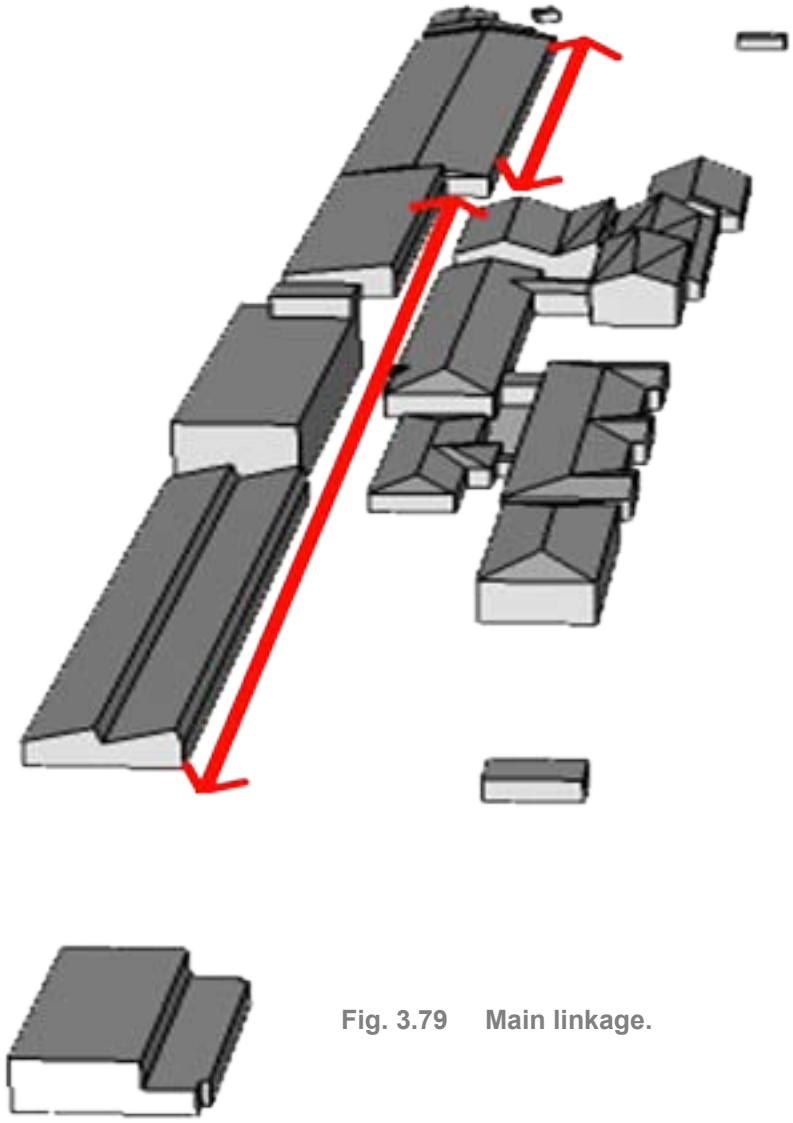


Fig. 3.79 Main linkage.

Lost space

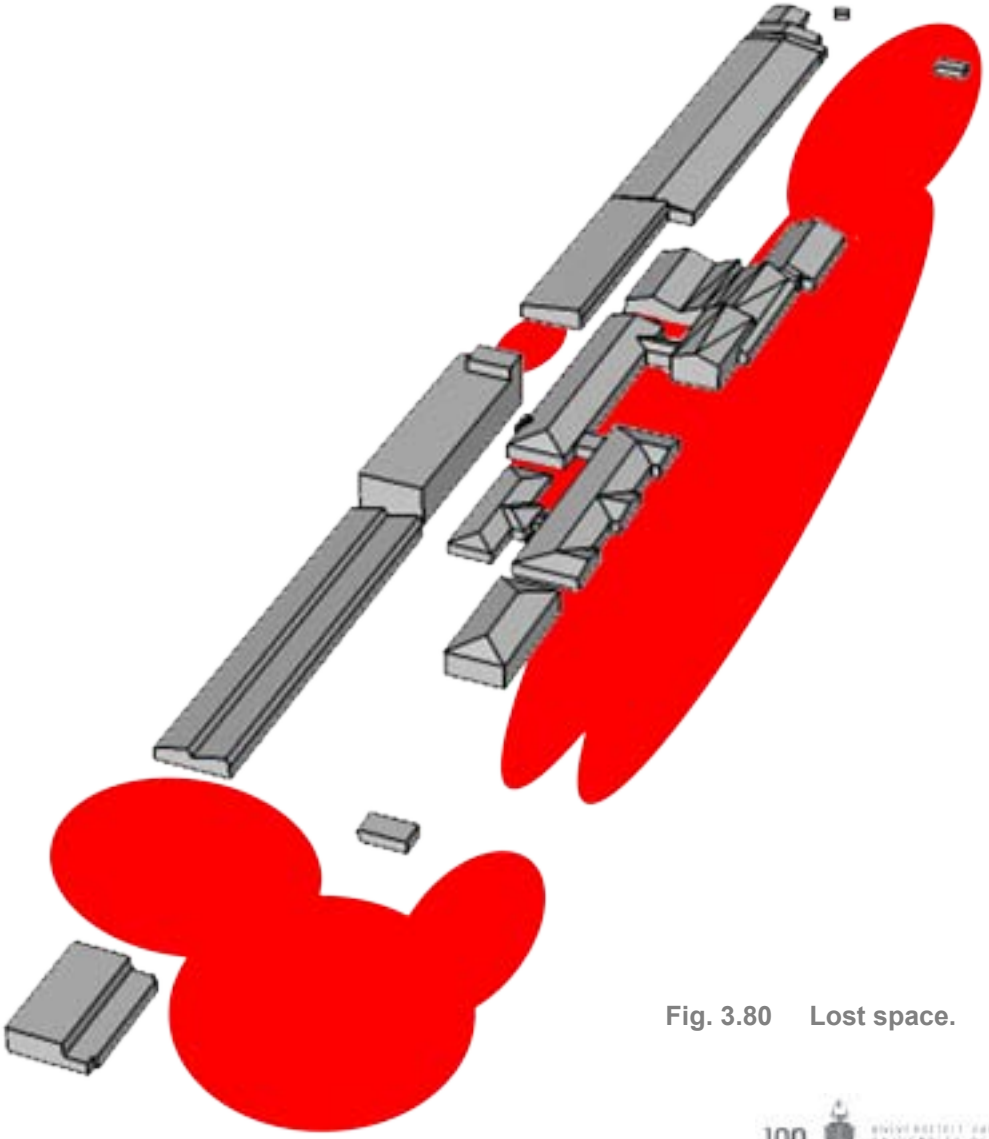


Fig. 3.80 Lost space.

Physical Area Analysis

Surface Geology

The area where the site falls has quite a unique geological appearance which consists out of mud stone, shale and sand stone which varies in depth in different areas.

Topography

- Slope

1:56 from east to west.

Drainage

- Soil drainage

Soil drainage is quite good as soils are porous which allows easy water drainage.

- Surface drainage

Gutters running along soft surfaces end, by spilling water onto hard impermeable surfaces. Precipitation falling on the hard impermeable surfaces are quickly carried away via storm water pipes, thus the water is contained and bypasses other landscape processes.

Vegetation

The greater Tshwane falls within two South African biomes, the Grassveld and the Savannah biome; this has a result that the region is intermingled with species from both biomes, depending on site characteristics like slope water availability and soil type.

Climate

The area has a warm and moderate climate; the mean daily sunshine factor is approximately 8.7 hours per day.

The average daily maximum temperatures are:

January 28.1°C
(Max 37°C)

July 19.5°C
(Max 25.9°C)

Fig. 3.81 Slope section.

The average daily minimum temperature:

January 16°C
July 3.6 °C

- Rainfall

The mean annual precipitation in Pretoria is:

494mm per year (min)
686mm per year (average)
1069mm per year (max)

The mean monthly precipitation in Pretoria is:

January – March 300mm
April – June 75mm
July – September 34mm
October – December 272mm
(Carruthers, V.2000.)
(www.weathersa.co.za)

- Wind

Prevailing, calm winds is mostly north - east and north - west, during summer, with an average speed of 2km /h. General prevailing wind direction in winter is from south east.

- Humidity

59%

(AAL 310, class notes)

Position of the sun

- Vertical sun angle

Summer solstice 21Mrt/23 Sept 64.24°
Winter solstice 22 June 40.73°

Solar incidence is high in the Pretoria region with a maximum of 67% sunshine in winter. The percentage translates into solar radiation energy as 8 Whr/m^2/day in summer and 4.5Whr/m^2/ day in winter.

(AAL 310, class notes)

Legislation

National Water Act
National Heritage Act
Wetland Management
Storm water management – performance criteria
Disabled persons and the urban environment
Building codes regarding loading zones.

Synthesis

Historical synthesis

The South Campus was not a part of the initial planning of the university and is therefore disconnected from Main Campus. Buildings and their relationship with outdoor spaces were not designed to function as a campus. Over the years the site has changed from a place which hosted a specific use (administration offices and research laboratories) to a place which hosts a diversity of uses and a variety of people. There is a need to accommodate the different uses of the place. It can be concluded that the history of the site is one of the main reasons for its disconnection from Main Campus. The site edge can be made more legible by enhancing the historical buildings and relating the landscape to the existing elements on the site and its surroundings.

Urban synthesis

The site is separated form the central area of activity due to the more residential area surrounding it. There is a need to promote the integration of public facilities with other activities. A primary use or anchor is necessary on South Campus to draw people into the site and strengthen the connection between the two campuses.

South Campus functions as a district separated from the Main Campus, these two districts should be connected. Thus, I support the general vision of transforming the social, physical and virtual fragmented image of the University of Pretoria into an inter related whole, which will function in a symbiotic relationship. (Refer to appendix 1)

Nutrients form the sport field fertilization can cause high concentrations of phosphorous and nitrogen in the water. This causes algae blooms which degrade the quality of fish habitats and other organisms which are vital for down stream health. Due to the sandy conditions of the soil, the area is prone to contamination by nitrogen.

Lynnwood Road, which functions as an edge should be more defined. Both the connection of the two districts and the definition of Lynnwood Road can be achieved through appropriate streetscaping along both sides of Lynnwood Road. There lies an opportunity to create a strong landscape identity along Lynnwood which will visually connect South Campus to Main Campus.

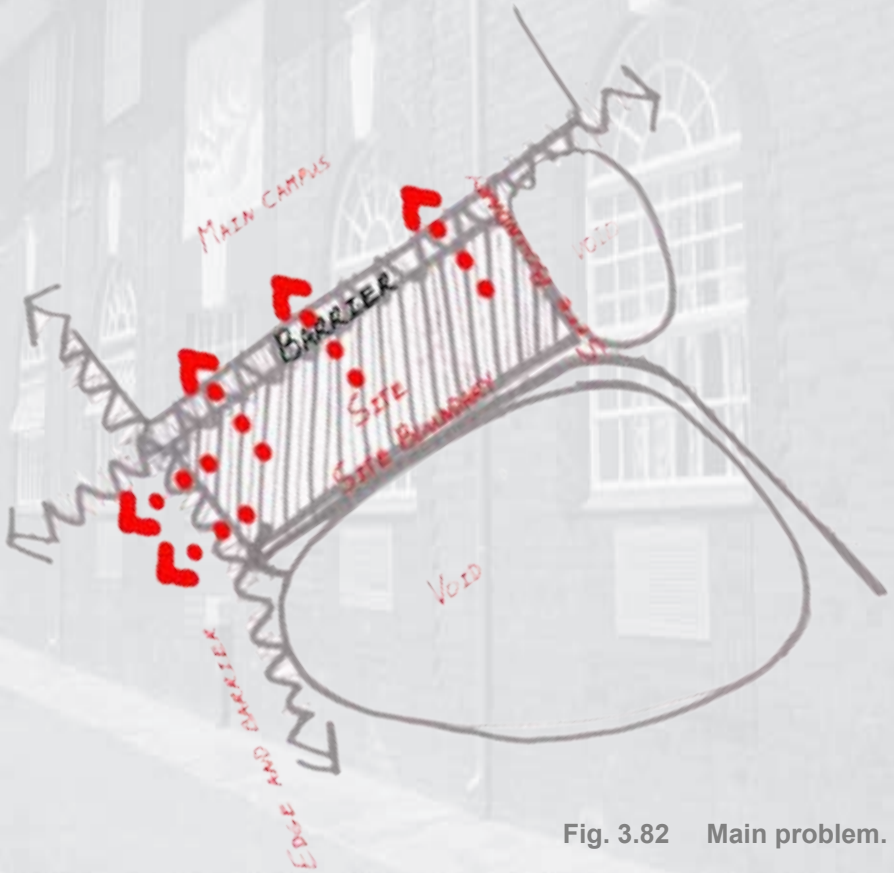


Fig. 3.82 Main problem.

Precinct Synthesis

The dislocation of the site is a result of physical entities on the peripheries. Streets are the predominant urban elements and act as guidebooks to any city. Presently neither Lynnwood nor University Road has any prominent activity along its edge; the introduction of special landscape characteristics can enhance the prominence to the user.

The site is not responsive as it offers little choice of access and visual permeability is decreased by dense vegetation. Lynnwood Road has the potential to become more legible. Lynnwood Road edges should be more continuous and existing gaps in the urban fabric should be filled.

Piped drainage which has been designed to carry excess water away from urban surfaces has major effects causing flooding which impairs water quality. Storm water drainage must be designed to correspond as closely as possible to natural drainage patterns. Through the use of infiltration trenches it allows storm water to be treated at source.

Toxic materials from roads contribute materials such as zinc, lead, manganese and cadmium to waters. These elements also kill organisms by cutting off oxygen supplies. In order to minimize the problem, buffer zone needs to be considered early in the design process. These zones need to be populated by plants which have the ability to remove toxic as well as organic substances from the water. *(Harris, C. & Dines, N. 1997)*

Site Synthesis

Courtyard spaces in between buildings, just of side the major pedestrian flow act as eddy spaces. These spaces are well located to function as quiet study areas, as the surrounding buildings block noises from Lynnwood Road.

Vehicles, trucks and service vehicles have the predominant right of way on the campus; this should be prohibited by redesigning vehicular access routes. To get concentrated pedestrian flows extra magnet facilities is necessary to attract a large number of pedestrians.

By analysing the current site figure ground the relationship between solids and voids is poorly balanced, this results in disjointed fragments which becomes lost space. The figure ground should be changed by the selective infill of buildings to establish definite edges and urban open spaces.

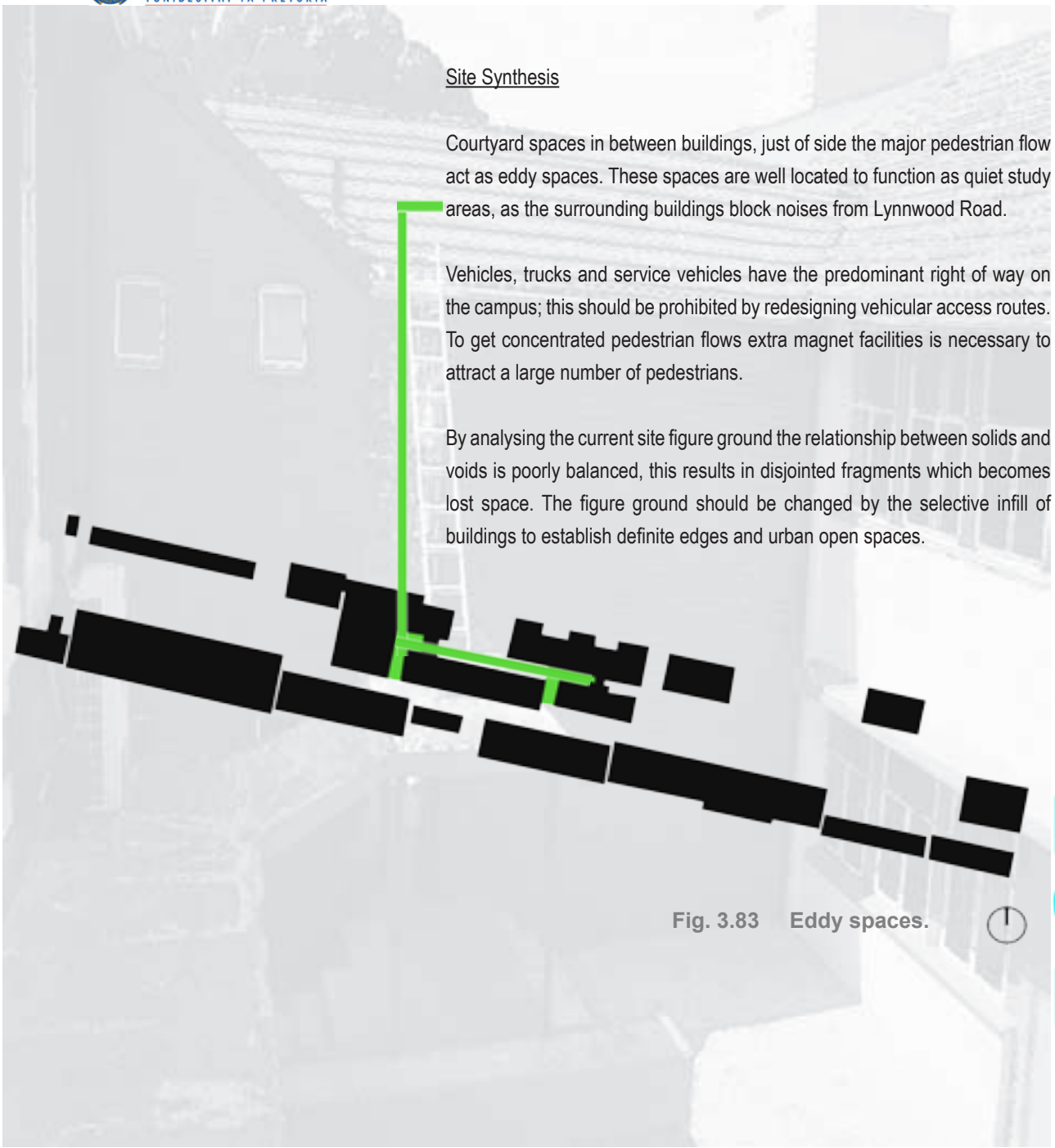


Fig. 3.83 Eddy spaces.

The existing strong circulation axis running in an east west direction should be accentuated and adjacent spaces should be designed in order to give the feeling of transition from one space to the next.

The gaps on the northern edge fronting on Lynnwood Road should be filled in to enhance the consistency of the urban edge. The articulation of this edge should respond to both the needs of the interior and the exterior. The existing main public space edges should be better defined by treating the edges and increasing the height of the building which contains the kiosk, the U.P Press and the biotechnical lab. Existing indoor activities should contribute, where possible to, outdoor activities. Visual contact contributes to animating the public edge.

Physical Area Synthesis

A close study of the site's natural processes offers a possibility for new forms and arrangements to be revealed.

Topographically the site is ideal for making accessible open spaces. A gentle slope facilitates easy movement through the site. The gentle east west slope ensures good storm water drainage. Introduction of water features might be a possibility as it can be well maintained. There consist an opportunity in creating a new symbolism for water which reflects the hydrological processes of the urban environment.

As temperatures are mostly pleasant, and rain most often occurs during summer months in the form of thunderstorms, the site lends itself to intense outdoor use. The potential for wildlife to survive in the urban environment will depend on the complexity and the size and shape of habitat.

Soil toxicity can play a role in places, due to the deposits of toxic substances and substrates as a result of pollution from past site activities.