

Boundaries in the Urban Context– Phenomenal vs. Literal Transparency:

Inter institutional & Disciplinary Research Facility at the University Square, Hatfield

Design project discourse



I am truly blessed. Thank you to the almighty creator;
For my wonderful family, friends, mentors and strangers that have
come into my life to support me. These people have kept me going,
you have kept me going.

The creator would never allow you into a situation that you can't handle



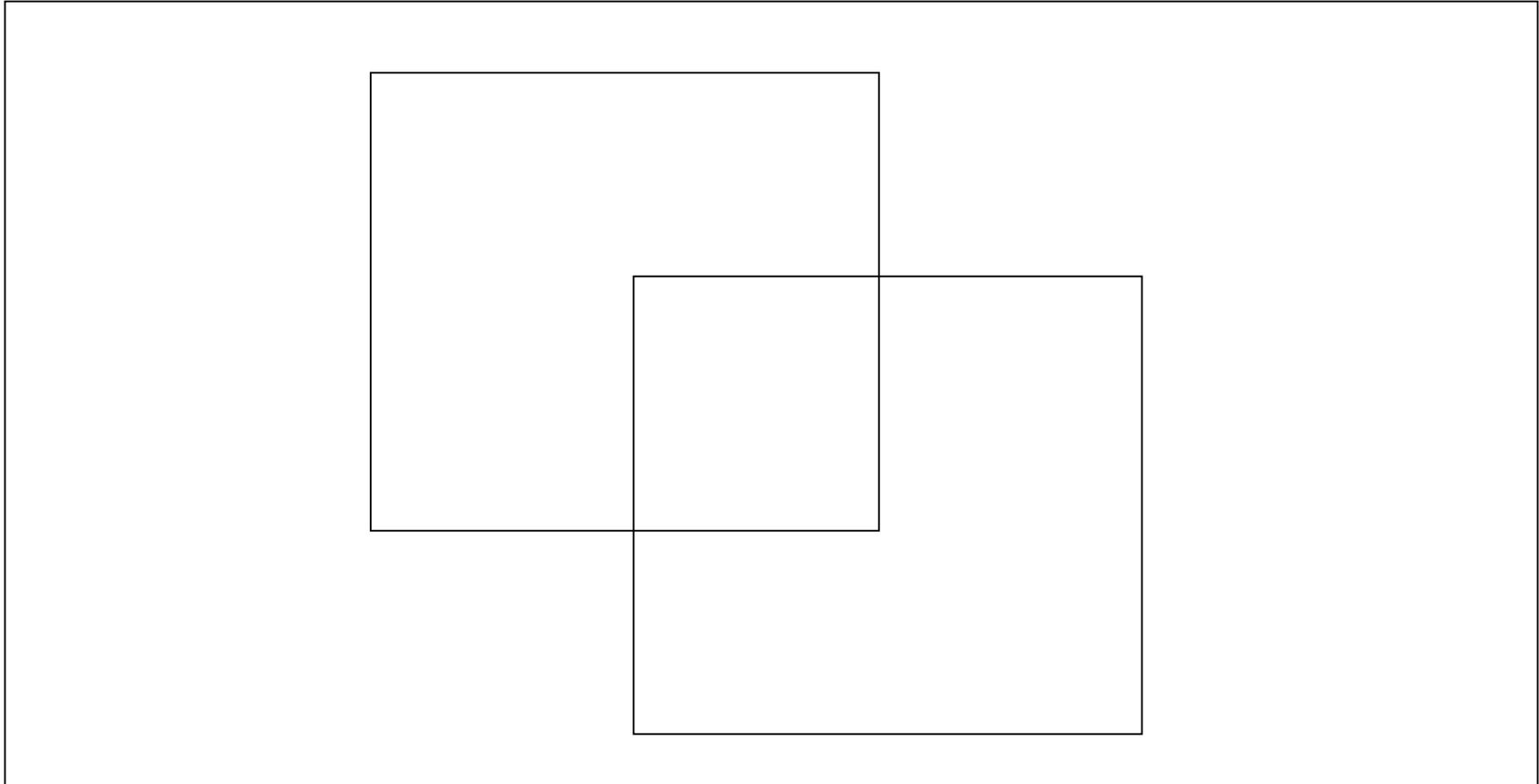


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CHAPTER 1

CONTEXT ANALYSIS



1. INTRODUCTION AND BACKGROUND

As social leaders, tertiary institutions have the responsibility to demonstrate visible efforts that contribute to their communities. A country such as South Africa that has constantly followed global trends throughout history, where tertiary education had been reserved for the privileged minority, and architecture was utilised as a physical and physiological tool for demonstrating and enforcing the segregation of the masses from one another- it becomes important to exhibit great efforts to reverse the physical and far more damaging psychological barriers that have been created within society. In light of this, it has become important for tertiary institutions, as some of the most relevant leaders in the world community, to be pioneers of breaking down all unconstructive barriers, rather to use innovative adaptive solutions and contribute an alternative architecture and urban fabric of inclusiveness, creating more efficiently functional cities. By doing so would ensure that universities exploit the opportunity of not only creating an identity for their location synonymous with their positive aspirations, but also an identity for itself synonymous with the successful development and positive activities of an area- thus reinventing urban environments that work more efficiently and in a more integrated manner.

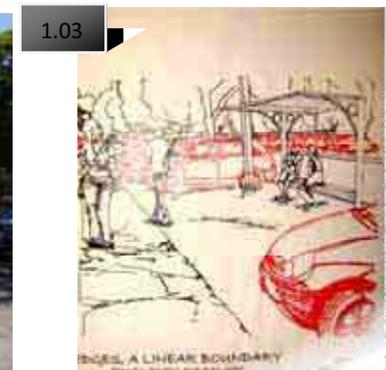
The fundamental objectives the design should fulfill are as follows:

- Creating an environment that is all encompassing of its surroundings and all its users.
- The design of a building that innovates within its constraints of low-tech building technology, local materials, and construction methods.
- Illustrate the translation of the concepts in the design so that users, though not expectedly, would perceive them.

Site selection

The site chosen for this dissertation is located on a corner edge of the University of Pretoria, Hatfield, Main Campus's boundary and forms part of the institution's property- positioned within its fences, in the Hatfield district, Pretoria. At 69m x 96m wide, it currently consists of a student parking lot, as well as an unused driveway and turning circle. The site is situated along the primary commercial activity path on Burnett Street, centrally situated at less than 10 minutes walk from the existing railway stations, the future Gautrain development (Hatfield station) and delineates the boundary edge of the Hatfield district business hub.

The client for the project may be described as being a partnership of a number of role players in the Provincial City of Tshwane Council and the University of Pretoria.



Typical view down Festival Street: Edges around the site are used primarily as thorough fares and informal street parking. Nothing indicates to a passerby that they are walking past the University of Pretoria. The university is undefined surrounded by a palisade fence housing the parking lot; a second fence divides the parking lot from the university within.

Client brief

The resultant urban brief entails the design of a development that not only demonstrates the university's core function- the creation and teaching of information and knowledge- but also includes the general public. The development is to house flexible research spaces, allowing the occupation of different research faculties with varying needs. The BE @UP (Business Enterprise at the University of Pretoria), currently situated on campus, is to be relocated to the new development to ensure that their commercial services are more accessible to a wider clientele.

The development aims to reduce the disparity between the part (university) and its whole (Hatfield district). Instead of the public identifying/perceiving each 'part' independently, they should rather perceive each as part of a whole.

The functional brief has been defined as follows: The University of Pretoria was last listed in the top 500 by Shanghai Jiao Tong in 2006, for its contribution to the engineering and science research fields. The university has, however, identified a lack of general resources to equip the various research departments with the ability to further excel and broaden these research scopes. The project is to develop a place of academic research that collaborates institutes within the university with other research institutions, such as the CSIR and Innovation Hub.

The development must establish a strong dialogue with its surroundings in order to assist in achieving acceptance and belonging of the institute. The project's broad brief is to spatially and functionally integrate the university with its surroundings, thus ensuring a more holistic interpretation of the district, as the home of the University of Pretoria.

The development should be perceived (branded) as a fixed point for a collective identity for the Hatfield district. Architecture with a strong social identity is required, defining the university as being part of the urban territory. In achieving this, the development should clearly reveal its function and organisation. The brief requires complete separation of public and institutional circulation patterns: identifying the building's constituent parts, resulting in a transparency that encourages a sense of accessibility and orientation, and communicated sensory-physically, psychologically and visually.

A result from the brief is the notion that in so far as the primary client is the university, the general public and future users of the development and feeders of the general Hatfield district must be considered clients or rather relevant stakeholders in insuring the success of the project.

The User

Defined as a person liable, in the lifetime of the built fabric (building and created infrastructure), to use the creation for his/her personal betterment.

The users are also service personnel, researchers and staff occupied in the daily running of the buildings and related activities.

Clients are those who require the professional services of the institution. Clients will probably be variable government departments and private industries, including developed enterprises and SMME'S.

Local residents are students and middle class young professionals. These residents would be defined as the after hour's users of the restaurant and entertainment sectors contained in the building complex.

The real world problem

The University of Pretoria, Hatfield, Main Campus is unrepresented within and is isolated from its urban framework (Hatfield district). This has limited the flexible growth of the area, attesting to general trends of traditionally designed institutions that have not embraced new urbanism ideas of connectivity between anchor parts and their surrounding environment for the benefit of the whole.

Some basic problems are encountered when analysing:

- Pedestrian movement patterns and their restrictions,
- Development patterns of the district; their potential and their restrictions,
- The boundary that is the university, ultimately revealing the primary restriction of the district's development.

Objectives

The objectives for the inter-institutional and Disciplinary Research Facility include the following:

Functionally

- To aid the goals of the Tshwane Hatfield district development framework- a tourist geared environment.

Architecturally

- To create an identity for the university along Burnett Street.

Spatially

- To reposition UP as a perceived gateway into the Hatfield district, driven by the critically located research hub facility interface between the general public and the university.
- To demolish physical and psychological barriers between the local and international demand markets, as well as the existing energies of Burnett Street, with the university, thereby encouraging the university to take upon itself the responsibility to stimulate development within the immediate surrounding urban environment.

These issues are:

- The psychological barrier created by the lack of user friendly and inclusive activities at the intersection of Burnett and Festival Street.
- The segregated and anonymous relation of the university to the active street edge of Burnett Street.
- The university's lack of interrelation and identification with the Hatfield district, which has become synonymous with Burnett Street.

Research Questions

- What are the requirements needed to house one of the world leading, international research, accredited facility universities?
- How can the development form an integrated whole within the full range of components of the urban arena and solve issues of the urban environment of the Hatfield district?
- How can the development retain its security requirements, yet fulfill the set objective of urbanising the university's edge?
- How do the needs of the pedestrian take preference without sacrificing vehicular users' growing requirements with the eminent Gautrain's arrival?
- What affects will the development have on the university's context, internally (UP) and externally (neighborhood and city)
- How does the project give all stakeholders- students, passerby's, lecturers, researchers and all other users- a sense of identifying, belonging and ownership of the campus?

Assumptions

- A great number of students will make use of the Gautrain to get to and from the university.
- Surrounding buildings on site of the university can be incorporated into the 'research triangle'.
- The co-operation of adjacent residential complex owners to take down their fences and use alternative security methods, which will be suggested and illustrated in the framework.

Delimitation

Barriers to be analysed will be limited to university road up to Burnett Street, and not the entire university perimeter.

1.04



(Gautrain Rapid Rail Link, September 2002-03)

2. CONTEXT STUDY

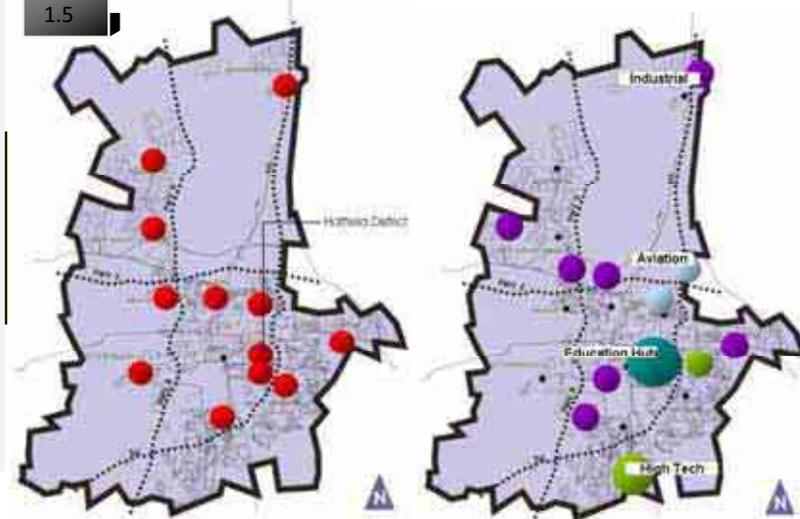
The following analyses are the departure points for creating an understanding that will influence the project's design development.

a) Macro context study

The area is divided into north and south Hatfield districts, separated by the existing South African Rail Commuters Corporation (SARCC) railway, leading to the future Gautrain development.

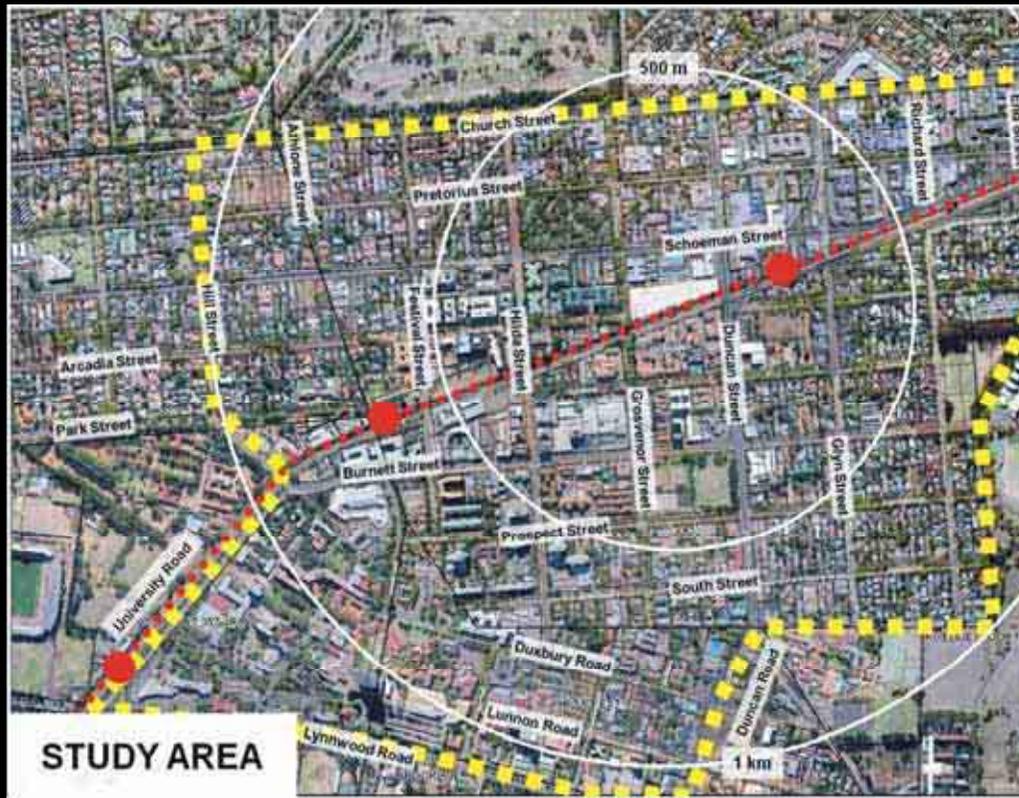
The Hatfield district has been identified as a metropolitan node of a specialised activity area in the Tshwane Spatial Development Strategy. This project would fulfill the strategies vision of developing such zones, having these become easily accessible and visible from mobility routes, thereby becoming more closely related to the development corridors. These areas will be heavily invested in by the city.

1.5



City of Tshwane Spatial Development Strategy 2010 & beyond- April 2007

1.06



(Tshwane Metropolitan Development Framework- Hatfield)

District Boundaries

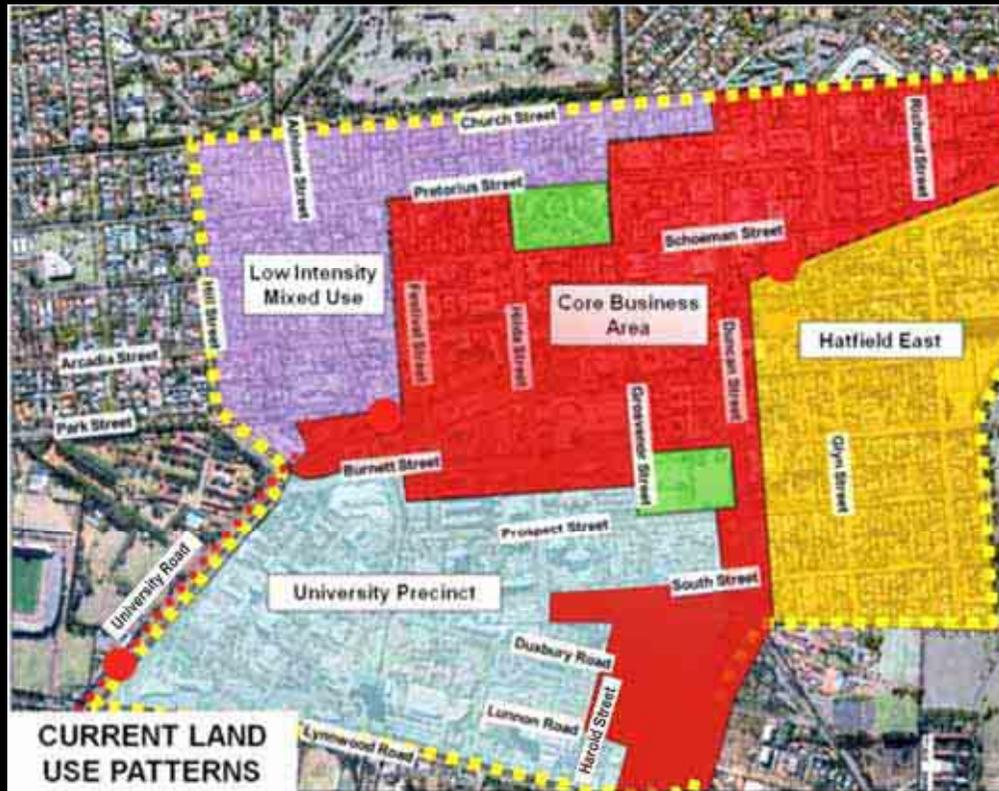
The location of Hatfield in the urban context of Pretoria is graphically illustrated in fig 1.06. The northern boundary of the district is defined by Church Street, which divides the residential areas of Colbyn and the Presidency to the north, from the offices and residential area to the south.

The western boundary is delineated by Hill Street and University Road, which lies between the University of Pretoria and Loftus on the railway line.

The southern boundary comprises of Lynnwood Road. This includes Hillcrest, which encompasses a portion of the University of Pretoria. Lynnwood Road divides the main university campus from the south campus, which falls under the Brooklyn district.

The eastern boundary is made up of Duncan Road and End Street, bordering the university sport grounds (LC de Villiers) and the residential area of Hatfield Village.

1.07



(Tshwane Metropolitan Development Framework- Hatfield)

Densities

Hatfield is a low density area. This is particularly the case for Duncan Road, as it is largely occupied by showrooms, the public swimming pool, gas stations and office blocks.

The highest residential densities are found to be within Hatfield east (Hatfield Village student accommodation) and south of Prospect Street, which comprises mostly of university residential accommodation. The university students are thus the largest continuous contributor to the area, followed by the commuter consumers and employees to the core business area.

The new inner city development situated on Burnett Street, a block away from the proposed project, houses mixed use functions, including residential accommodation, offices and retail space. This and the Gauteng Hatfield station development will undoubtedly generate an increase in day and night densities within the district.

1.08



(Tshwane Metropolitan Development Framework- Hatfield)

Driving Forces to the District

The development of a Gautrain station within the Hatfield district will increase accessibility to the district. Thus, the station will also increase pedestrian and vehicular densities within the area.

Three parks are situated in the Hatfield district, namely Richard Street Park, Belgrave Square and Springbokpark. (Laubscher, 1992: 19)

The commercial activity paths run along Arcadia Street and Duncan Street, with the highest concentration of commercial activities on Burnett Street- which does not extend east beyond Duncan Road, or west beyond University Road.

The diverse land use- such as sport and recreation facilities, parks, educational facilities, churches, a police station, and commercial activities- as well as the strong and stable buying power of students, the projected increase in densities and tourists within the area, recreational facilities, and a safe environment ensured through passive surveillance and the visible and active police force located within the district, makes Hatfield a powerful activity core within Tshwane, with an even greater growth potential.

The proposed institute lies within the inner hub identified by the City of Tshwane Metropolitan municipality Hatfield framework. It must, therefore, play a developmental role in championing the city frameworks' objectives for this area.

1.09



(Tshwane Metropolitan Development Framework- Hatfield)

Burnett Street is indicated as one of the two future road networks to link the Hatfield District to the Innovation Hub. South Street, the other of the two proposed, is cut off short by the University's boundaries.

The Tshwane Metropolitan Development Framework for the Hatfield district indicates future plans for the area. (Fig. 1.09)

- Future link with the Innovation Hub
- Proposed BRT routes
- Existing primary movement routes/ linkages

These vehicular routes are limited, due to the location of the university's boundary fences.

Transport Networks

East-west primary networks:

The one-way eastward bound Schoeman Street.

The one-way westward bound Pretorius Street.

These Streets provide direct access to and from the CBD from the N4 in the east, including access to Hatfield.

Church Street (two-way transit route). This is the only direct route from the Silverton district and Mamelodi, the most developed township within Tshwane, to the CBD.

Burnett Street encompasses the majority of the area's current commercial activities and services.

The Lynnwood Road network functions to link Pretoria East to Sunnyside and the CBD.

North- south primary networks:

Duncan Road links the Brooklyn core to the Hatfield core and serves the areas north of Hatfield, via Gordon Street. Duncan Street is the only primary north-south vehicular network as a result of the university's position not allowing vehicular transit through its property.

Grosvenor Street is to run through the eminent Gautrain development. This will make it the most relevant secondary north-south vehicular transit route in the future.

Current municipal bus routes:

-Park Street -Duncan Street
-Lynnwood Road -Burnett Street

There is a great demand on the east-west major road networks in the morning peak times, resulting in traffic congestion on Pretorius, Church Street, Lynnwood and Duxbury Road, and on the north- south networks that lead into and out of the district, namely Gordon and Duncan.

Pedestrian Networks

Retail areas south of the SARCC railway line from Burnett Street and the office areas along Arcadia, north of the SARCC railway lines, have been denoted as the Core Hub by the TMDF. This is the activity node of pedestrian activity. The University of Pretoria, Hatfield campus also has various strong pedestrian paths to be looked at.

Concrete sidewalks are found on one side of the primary and secondary roads in Hatfield with the exception of Burnett Street with sidewalks on both sides of the road. Bicycles share the road with motor vehicles and sidewalks with pedestrians. No designated paths have been made available exclusively for bicycles.

The Affected Environment

A broad study of the affected environment over the whole area of the Gautrain project was carried out by the 'Gautrain Rapid Rail Link', September 2002:0-1

Topography-

The University of Pretoria, Hatfield campus is approximately 1340m above sea level.

Climate-

Tshwane has a warm and moderate climate. The mean daily sunshine factor is approximately 0.7 hours/day. Temperature averages ranges from 11,8°C in June to 23°C in January (mean annual air temperature)

Rainfall-

The driest month is July with an average monthly total rainfall of 3mm. The wettest month is January with an average monthly rainfall of 136mm.

Wind-

In Pretoria predominant summer winds are mostly north-easterly and south-easterly, winter winds being north-easterly and south-westerly with an average speed of 2m/s.

Vegetation-

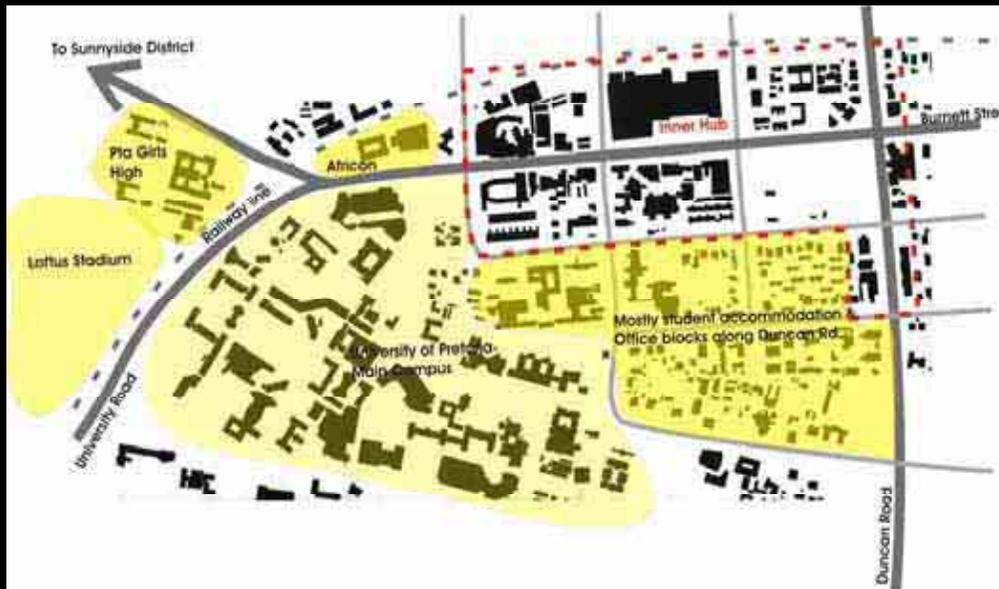
The road sides are planted with Jacaranda trees.

Air Quality-

The general air quality is assumed to be poor, as a result of the extent of the highly developed urbanised area. Pollutants emitted by vehicles include nitric oxide (No), carbon monoxide (Co), nitrogen dioxide (SO₂) particulate matter and lead.

Secondary pollutants from vehicle emissions include nitrogen dioxide, photochemical oxidants (ozone) nitric or sulphuric acids and nitrate and sulphate aerosols (Gauteng Department of Transport, Roads and Works, October 2002: 4- 1 – 4 -10).

1.10



The university poses a developmental restriction to the Hatfield district. The physical barriers (fences) and psychological barriers (lack of inclusive function) along the university's edge means the university has absolutely no interface with its surroundings, resulting in an isolation of the tertiary educational facility as a whole.

Loftus Stadium, Pretoria Girls High school, the Africon building and the railway line create a similar problem in the urban context. Loftus and the Pretoria Girls High school act as definitive barriers between Sunnyside, an active district comprising of mainly students and young professionals and families, and Hatfield. The two districts are a mere 10min walk away from each other.

b) Micro context study

The train station and the university are positioned adjacent each other on either side of University Road. The unsafe and insipid atmosphere down the road is a direct result of these two areas rejection of one another. Each is barricaded behind palisade fences, with no articulation of their functions along the street edge, or generated activities to promote pedestrian occupation for the efficient operation of passive surveillance, thereby creating a sterile, stagnant and dangerous environment. A similar problem occurs on Lynnwood Road and Burnett Street. The common denominator concerning the restriction of the district's development is the isolation of these diverse functions that occur within it, reinforced by the fact that they define the hub's west and southern boundaries. When analysing the activated areas within and around the district, one finds that there are disconnected nodes. These 'nodes' are disengaged from one another by activities that accommodate singular activities, are fenced off, become dead zones at particular times on the day or week, and/or are connected by insufficient light or planted road networks.

1.11



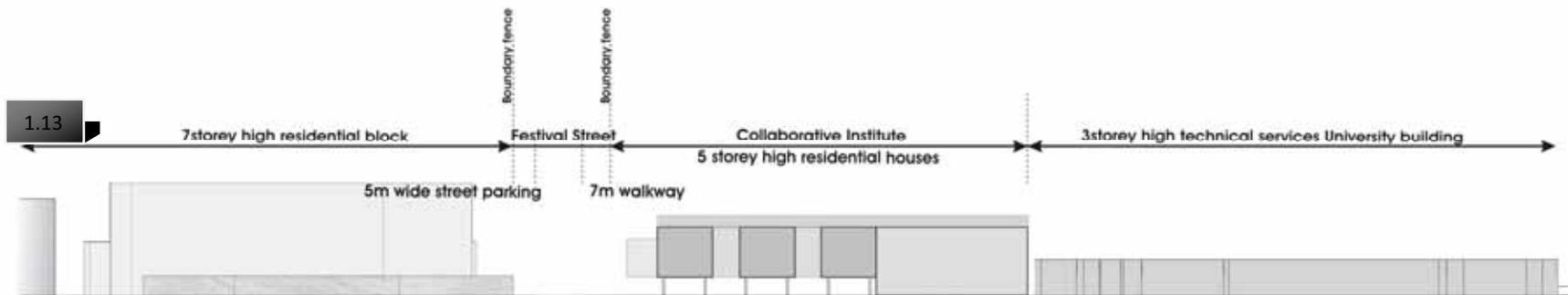
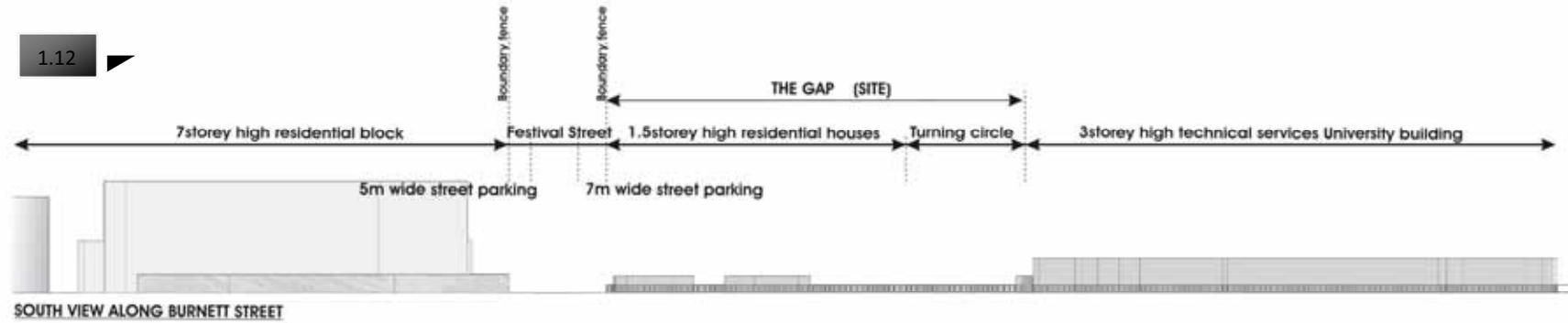
itself as the gateway to the heart of Hatfield. Burnett Street has the potential to stretch beyond the borders of Hatfield, becoming a commercial boulevard/strip that connects to similar activity areas within neighbouring zones, such as the Sunnyside and Arcadia districts.

Quality of environment

The quality of the public realm along Burnett Street is of a safe and secure environment, with sufficient street lighting and robust shading trees. The street is a public transport network, with the existing train station up the road and future Gautrain Hatfield Station 500m away. Most public transport users end up on or passing through Burnett Street, making it the busiest pedestrian street in Hatfield.

The impeded continuity of activity along this road is marked by the gaps (indicated in fig 1.11) along the line of buildings overlooking the street. One such gap is the chosen site, strategically located as the unexploited interface between the university and the heart of the Hatfield district, along Burnett Street.

The proposed development must incorporate similar activities occurring on Burnett Street, assisting to create a safer environment for pedestrians to walk along Burnett Street to University road, thus tapping into and associating the existing energy resource of the existing, but currently divorced activity spine. This also opens the opportunity for the university to position



In general, heights of buildings should be greatest at the centers and cores of areas and diminish gradually away from those areas. In this case, a disruption in the skyline has occurred with an abrupt and unannounced change to building scale and an end to social activity. The important feature is that heights of buildings should relate to the rest of the neighbourhood and building proportions should relate to the size of the human body.

3. PRECEDENT STUDY

One other utilised investigative tool includes an analysis of successful precedents, where human behavior patterns are studied in similar existing spatial developments (for example, Hatfield Square) along Burnett Street to generate an activated spatial threshold and envelopes, and then apply the findings to the project to enhance the existence of those patterns, thresholds and envelopes.

- a) Altering perceptions - transparency versus barriers:
Gauteng Tourism municipal building and Johannesburg Women's Prison Building.

(Fig. 2.01; 2.02; 2.03) The municipal building houses mainly the Gauteng tourism offices above. It forms the threshold between the semi-private court it encapsulates and fronts Jeppe Str. in Newtown, overlooking the parking which forms part of the Mary Fitzgerald square when there are no events.



The articulation of the disintegrating envelope of the government building by GAP architects, illustrates the notion of changing perceptions and thus attitudes towards the form. From a distance a solid, opaque and heavy form seems to be supported above a light structure. On approach the form becomes visibly penetrable, presenting its secondary layer and articulating the floor levels by exposing the extruded slabs, balcony openings and fenestration behind the screening mesh skin. A viewer begins to visually interact with the structure and becomes more aware of the true nature of the building, easing the feeling associated with approaching the unknown.

However, with Kate Otten's design of the women's jail in Johannesburg (Fig. 2.03), the opposite is true. This is as a result of the material, larger openings in and colour chosen for the shading screens utilised. From a distance, the light piercing through the screen openings dematerialises the enveloping layer, picking up the rusted brown tones and openings beneath. At a closer distance, the black and more solid nature of the screens become apparent, expressed as barriers to the skin beneath.



b) Accessibility and Orientation: National Assembly for Wales

The proposed development brief requires that the building accommodate two sets of users, which in many cases need to be kept apart physically. Similarly, the NAW is designed to provide complete separation of public and judicial circulation patterns. The building is essentially a transparent glass box, through which one can identify the building's constituent parts, encouraging a sense of accessibility and orientation.

Key elements of the design are the creation of a public space and integration with the existing urban landscape. The administrative offices are reached by bridges spanning the atrium and the clarity of the plan ensures that different routes across the atrium are maintained for both public and magistrates, emphasising function while ensuring sufficient levels of security.

c) Passive Environmental Control Systems

With a building as large as that proposed, and certain functions to function day and night, it is important to ensure that mechanical operations are minimised, especially lighting, ventilation and cooling. This is not only for economic reasons, but it is also the responsibility of the university as one of the social leaders to illustrate methods that are more sustainable.

Emphasis has been placed on passive environmental control systems at the NAW: the 'flask'-like volumes of the courtrooms allow daylight deep into the internal spaces and, through their height, ensure temperature control through stratification. The great glazed box wrapping around the chambers, with its sun-screening and ventilation systems incorporated within the roof, functions as a 'breathing' container. In addition, the podium and

offices are built in heavyweight concrete construction - resulting in an effective passive heat control system.



d) Programme: Princeton Advanced Research Institution

This will inform the operations and management processes, as well as the accommodation schedule, and justify the need for a similar institution at UP.

The programme in Interdisciplinary Studies at the Princeton Advanced Research Institute explores different ways of viewing the world, spanning a range of disciplines from physics, astrophysics, geology and paleontology to artificial intelligence, cognitive psychology and philosophy. The programme in Interdisciplinary Studies is focused on a variety of initiatives, most of which span two or more disciplines. For this reason, it is important that the development house's flexible spaces are capable of fulfilling various research needs either simultaneously and/or at changing intervals when a new team takes occupation of the building.

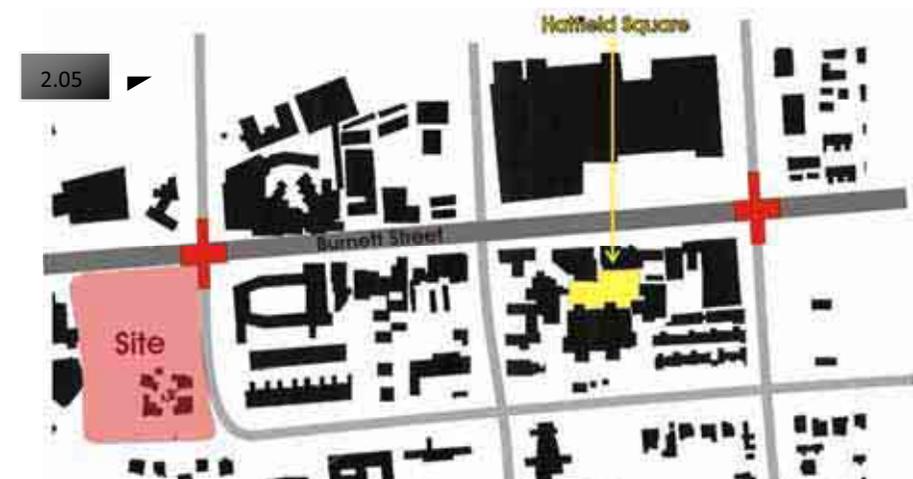
Interdisciplinary collaborations allow the different research disciplines to branch out from their comfort zones, and for information dissemination and research to become more accessible, including to the general public.

The institute must accommodate areas for informal presentation, intended for a general audience, where topics of a major open problem within the speaker's field are briefly described, together with suggestions for possible future progress with respect to that problem. These presentations are followed by discussions, after which everyone is free to mingle in more general discussions.

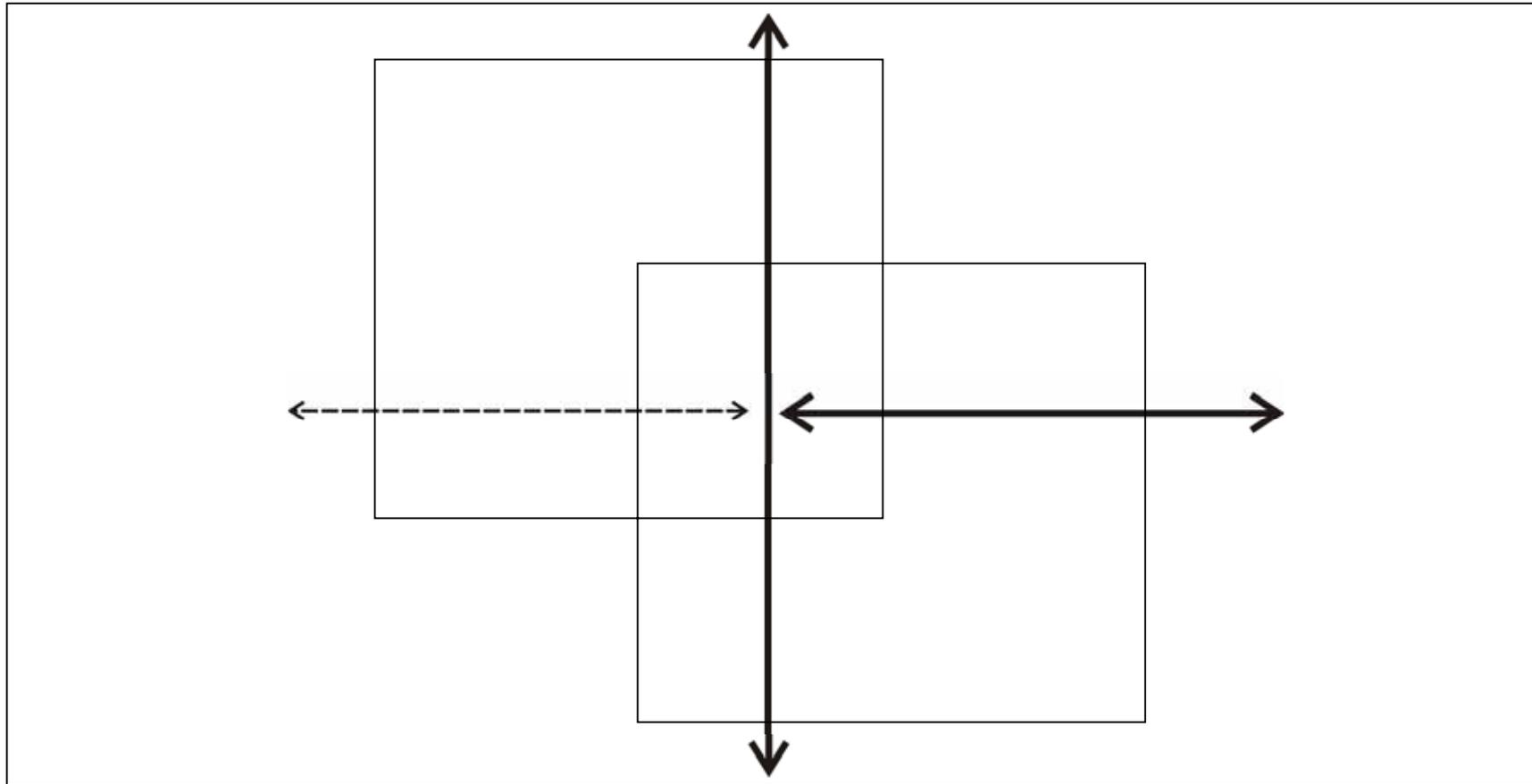
e) Spatial interpretation and application: Hatfield Square

In assisting the design's spatial organisation, drawing from the successful aspects of people accommodation and the hierarchy of functional spaces, the positioning of high demand day and night activities on the ground floor is maximized so as to keep the space alive with energy throughout most of the day and, therefore, safe as well. High demand day activities are those functions that everyone generally needs and will be used on a daily basis, such as the post office, food takeaway outlets, doctor's offices, pharmacies and grocery stores. High demand night activities may vary depending on the available market, in an area where such a substantial number of student reside, leisure activities such as pubs and game arcades would not be inappropriate.

The analysis also draws from the unsuccessful aspects of Hatfield Square. This also informs what to be careful of in this development. This includes the unaddressed need for shading within the open space, so that the centre is not merely used as a thorough-fare. All activities occur along the inner and outer edges of the buildings that form the Square.



CHAPTER 2 _____ THEORETICAL DISCOURSE _____



Barricading fences have become standard in the modern day. It would be reckless to expect that they disappear overnight, but so too is the notion that we simply have to live with their inadequacies in providing a more efficient, developed and safe urban environment. More appropriate urban design tools have to be utilised in place of fences to create this safety.

1. Urban design development

The theoretical discourse of this dissertation shall be based primarily on the analysis of the emerging urban theory from Christopher Alexander and Nikos A. Salingaros' perspective. Most intrinsic to this research is the analysis and application of Salingaros' principles of the urban web. The principles of the urban web are rooted in rules derived from connective principles in complexity theory, pattern recognition and artificial intelligence- based primarily on Christopher Alexander's work. Through the theory, the urban setting is decomposed into human activity nodes and their interconnections. Salingaros then treats the connections as a mathematical problem (here in a qualitative manner). It is his view that "...urban design is most successful when it establishes a certain number of connections between activity nodes."

Theory of the Urban Web (Abstract). Nikos A. Salingaros

In this Hatfield district location study, the university is one node and the activity business hub is the other node.

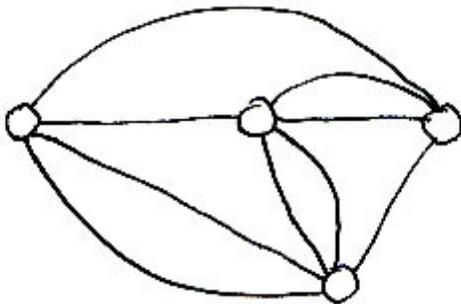
Structural principles of the urban web connections in architecture and urban design (Salingaros, 1998:55)

3.01

(a)



(b)



- Connecting nodes of human activity

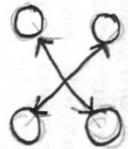
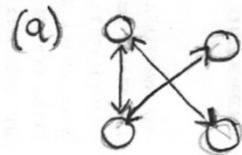
Both the placing of the nodes and the connections between them have to be optimized for human activity.

- (a) Four nodes placed so that they look "regular" from the air; but this regularity forbids anything more than minimal connections.
- (b) Multiple connectivity between the same four nodes, seen in plan.

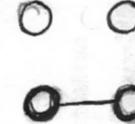
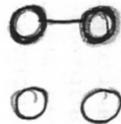
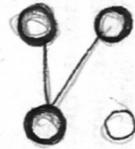
This chapter discusses the hierarchy of connections necessary to sustain urban life. This entails identifying the disconnected nodes within the Hatfield district; in particular, the impact of future envisioned developments on the current activity spine of Burnett Street, where the site is situated. Any new development along this path has great potential to become a node. This chapter informs as to how the development can best achieve connectivity to current and future nodal activities in areas such as the Gautrain station and Hatfield Square.

3.02

- Stability against loss of connections



(b)



- (a) Connecting nodes incrementally will result in a perceptible improvement in the organization of the overall structure. What happens if a single connection is broken;
- (b) A loss of just one of this connections results in an loss of connectivity of the whole. Illustrated are the indirect connections lost as a result the whole is weakened.

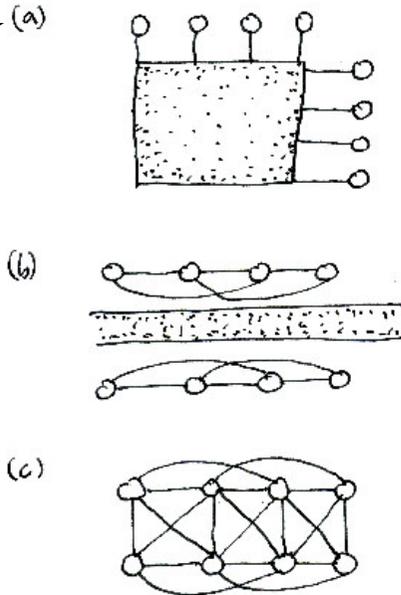
This concept informs the need to design a built environment that is in sync with the current successful trends along the Burnett, with the aim of stimulating the 'dead-ends' of the district activity spine.

To use a quote from Salingaros 1998; 57 – "...each line has a certain probability of failing, which applies directly to the urban web."

Currently the university is the severed link between Loftus and Burnett Street, two of the primary recreational areas within Hatfield. The resuscitation of this connection is feasible. By the development of pedestrian friendly environments along the University edge towards Burnett Street. This can be accomplished not only through architecture, but most often, by landscaping and street lighting. The development should read as a continuation, a step towards an interconnected city and not an end or individual, segregated from its context.

The following applications of the theory are from Theory of the Urban Web by Nikos A. Salingaros (1988:ch4.). These applications are investigated to achieve the above.

3.03



The success of a retail area is determined by the density of its pedestrian connections, listed in order below according to increasing effectiveness:

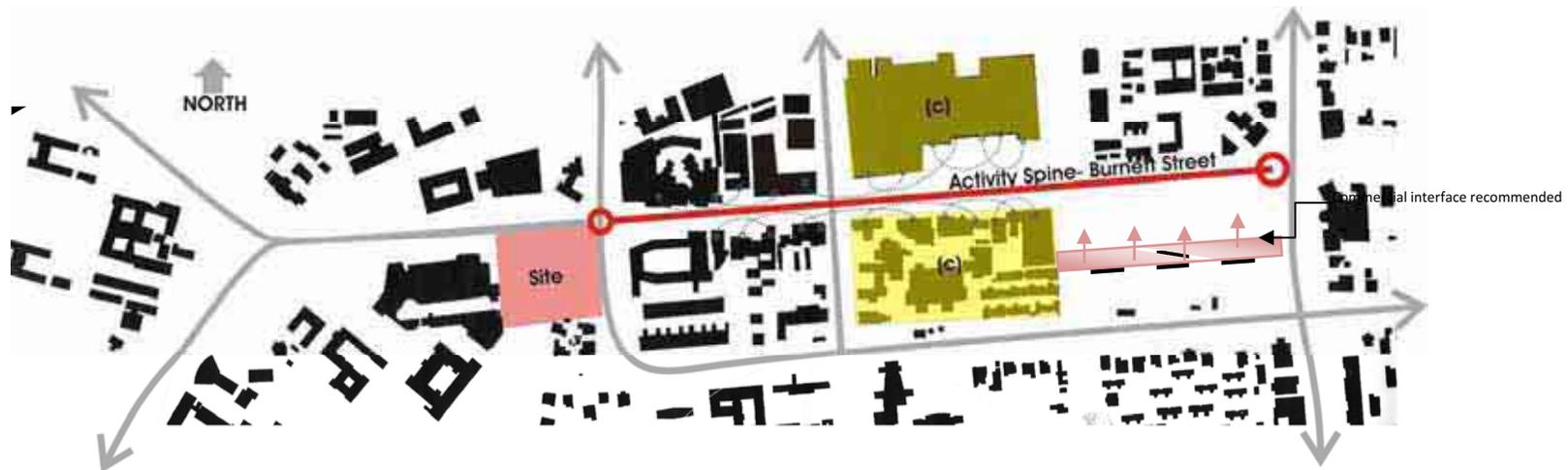
- (c) Strip mall, where each store is connected only to the parking lot.
- (d) Main street shopping, with stores on each side of the street.
- (e) Shops on a pedestrian street or indoor mall have many more connections, thus reinforcing each other.

Condition (b) exists along Burnett Street to create the activity spine. It is likely to be an informative design tool in extending the energy of the spine.

(Fig. 3.03) Options (b) and (c) occur at the Hatfield centre and Square, across from one another on Burnett Street.

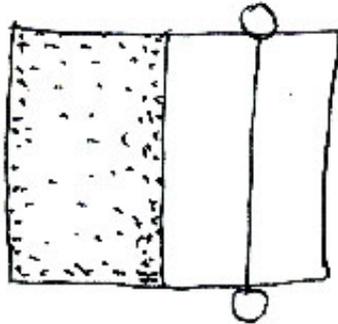
The proposed development is envisaged as a permeable commercial pedestrian area at ground level, similar to Hatfield Square, with parking provided underground.

3.04

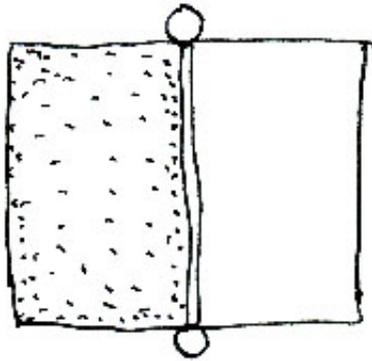


3.05

(a)



(b)



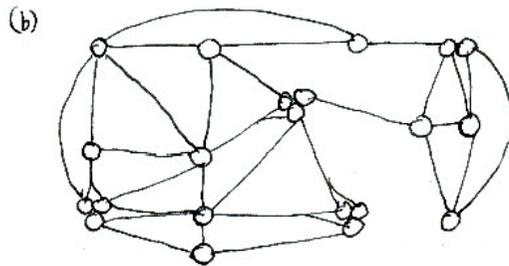
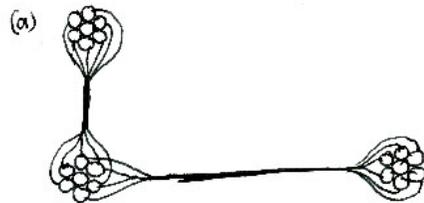
- A path as the edge of a region

- (a) Nodes and paths placed ineffectively; it is impossible to define this path without creating another boundary.
- (b) Natural boundaries help to fix and sustain this connection. From the point of view of an area being divided, a path disturbs the original unity of that area; it is an intrusion and is, therefore, unsupported by the area itself. It is very different when a path is created along a boundary between two distinct areas. The path now supports the boundary and vice-versa.

In order to form a continuous spine of activity involving the university, it is important that the chosen site for the development is situated within the set current boundaries of Burnett Street. This also ensures that the project receives maximum exposure, as it is also a corner site.

- Priority for creating pedestrian paths

3.06



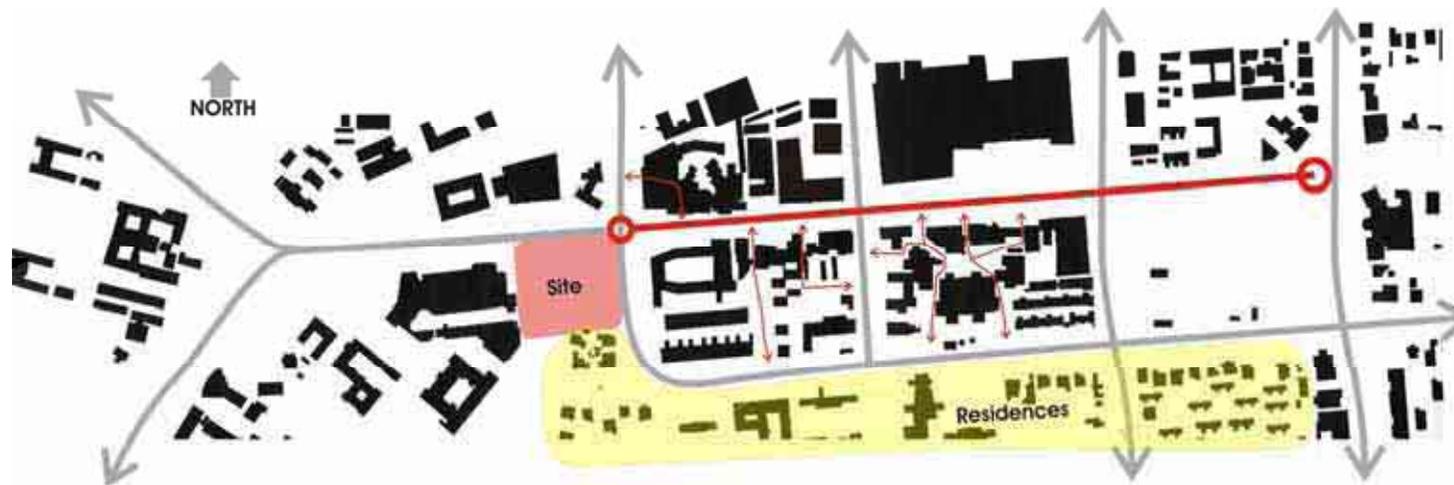
An over-concentration of nodes and connections create a singularity.

- Nodes are concentrated into three separate clusters and all connections are forced into two channels. Such connections exceed the carrying capacity of the channels.
- The same nodes distributed in their connections work much better, providing cross-connectivity. The nodes of a neighborhood must be connected by functional footpaths. It is advisable to follow existing patterns of movement, instead of creating artificial paths on a plan to guarantee the functionality of individual paths.

This idea is kept in mind when proposing new vehicular and pedestrian entries. A new development invariably introduces new users into not only the immediate, but also district proximity.

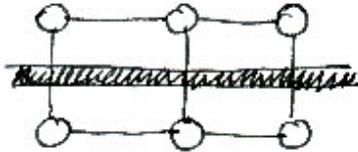
(Fig. 3.8) illustrates existing footpaths that allow students passage to and from the academic and activity nodes. They cease at the university and residential boundary gates. Such connections encourage the interconnectivity of activities in the area; this sort of permeability should be encouraged. Existing foot paths at the site will be integrated as an organising design tool.

3.07

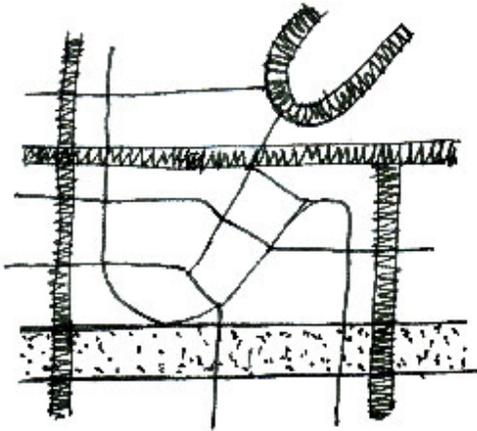


3.08

(a)



(b)



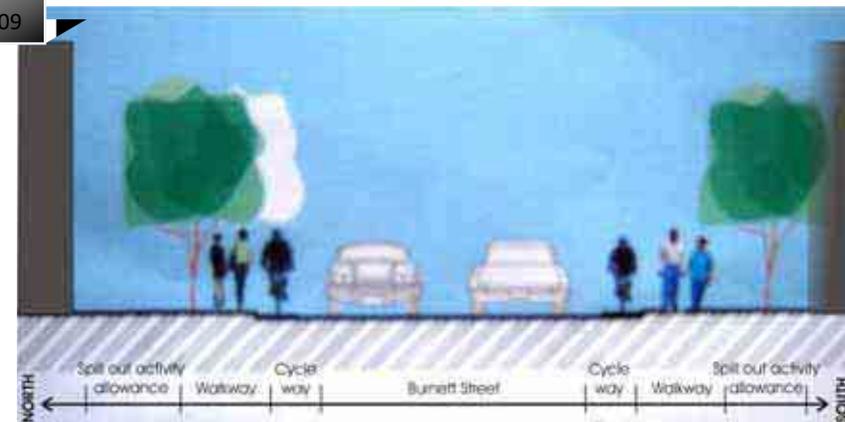
- The pattern of roads as an organising principle

Different networks of paths exist for foot and bicycle traffic, as well as for vehicular traffic at different capacities. Only connections of not-too-widely differing flow can align or intersect, and the weaker connection has to be protected from the stronger.

- (a) Pedestrian paths cross and connect to a local street.
- (b) Local streets feed into a through street, with superimposed pedestrian and bicycle paths.

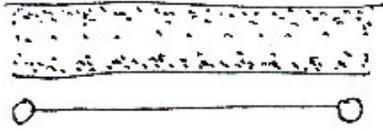
(Fig. 3.09) Dedicated network paths for pedestrian and bicycle traffic should exist on Burnett, especially considering the large numbers of students without vehicles that influx into the activity spine. Buildings along Burnett Street are, however, recessed at up to 10m from the pavement edge, but decrease to 4m on the south (at the corner of Festival and Burnett Street, adjacent to the site).

3.09

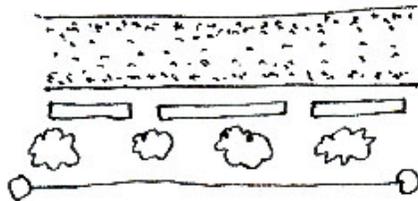


3.10

(a)



(b)



- Necessary discontinuities and separation

What cannot connect must be separated. Barriers are necessary to protect pedestrian paths from high-capacity roads.

- (a) A sidewalk next to a secondary vehicular route.
- (b) A busy, primary vehicular road is flanked by a barricade and/or trees, which protect the pedestrian and bicycle paths.

In this case, university access needs to be protected while being perceived as being connected to its surroundings, creating a sense of ambiguity. In satisfying the requirement to shield pedestrians and cyclists from a busy vehicular route, without creating a crude atmosphere, the divisions can be softened by a uniform surface on the sidewalk and road, thus alluding to a blurring of the divisions.

The existing secured entry off Prospect Street could be utilised so as to minimise the number of strategic security barriers ultimately required.

2. THE BUILDING WITHIN THE URBAN CONTEXT

a) The city: fragmentation versus unity (connective public space)

Much of this research is also supported by fractals, which are defined by applying a shared system of transformation to chaotic events. Shared transformations are the source of the new symmetric property of fractals known as self-similarity. In order to create modern fractal cities, it is necessary to adapt the relevant geometrical solutions from traditional cities, while incorporating new fractal structures appropriate for new demands and new technologies.

The common idea to be analysed and gleaned from theorists' various writing on urbanism, such that of Christopher Alexander and Nikos A. Salingaros, is that the work of urbanism must be about two fundamental aspects: defining a system of transformations that will apply to all unforeseeable acts of construction in the city, at all scales, and creating the connective public space that will bind the different buildings together.

The tradition of teaching the classical orders in architecture was once an imperfect approach to granting architects this skill. The classical orders are one form of transformation system, where large-scale elements, such as the column and the entablature, are decomposed into smaller-scale elements, such as the capital and the shaft, which form the large scale elements. And so when many architects, trained to share this transformation system as part of their skill set, worked on completely different buildings, their work could easily form a larger whole; whenever they hit similar problems, they would employ the similar solution they were trained to employ. While two buildings may have completely different sizes or roofs, or one could have a bell tower

while the other does not, if both buildings had windows and columns, the windows and columns would be made the same way and thus symmetrical to each other. This is how every building in a traditional city was tied together in a web of geometric relationships, and it is the density of these relationships that gives these cities their quality of wholeness and beauty.

These traditional cities created fractal cities of a smaller scale, applying these principles to the district rather than to the entire city, thus posing fewer constraints. Sourcing principles of urban design from pre-modernist cities, in accordance with these emerging urbanism theories, will impart knowledge as to how it is possible to design fractal cities, nodes, paths and edges to inform the thesis design project within the assigned city district.

A factor that is relevant to this research is the inappropriateness of zoning in the modern city.

For more than half a century, the modernists rebelled against the "mess" of the city. They put everything 'In their place', all the while, the in-between, what is not really a house, a shop or an office, has had no place. They call this urban planning.

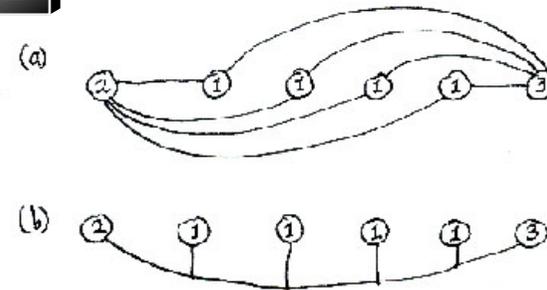
Contrary to modernist belief, that a functional urban environment are developed from specialised land uses and specific function driven buildings, the outcome is that these ideas have resulted in disconnected, non-fractal cities. The life of a city is directly dependent upon its matrix of connections and substructure because the geometry either encourages or discourages people's movements and interactions.

The design process is to be influenced by the idea articulated by Alexander (1965; A city is not a Tree) that a city is not reducible to parts, but that it is made up of a medley of relationships between spaces and at different levels. He expresses that the relationship begins once a space is built to provide a specialised function that is not fulfilled by another existing space, and the two spaces are linked together by a communication system. This relationship does exist in the study area of the university; the university's population acts as the link between institution, and commercial and social public spaces. It is, however, not articulated efficiently to optimise the development of this relationship, making it difficult for either 'space' to move freely between the two.

It is detrimental to design cities by designating district A, for example, to be made up of only building sets B and C, for example. Inevitably, some buildings in either group will need to form relationships with each other. However, this is exactly what zoning is meant to prevent. Zoning destroys many forms of exchange and holds back the complexity of the city. It is only relationships and not the individual spaces that form vibrant and user subservient cities. For such connections to develop naturally, they require an enormous variety of nodes in close mixing. Monofunctional zoning -- the pivotal notion of CIAM urban planning - is thereby shown to prevent life in a city.

Good urbanism is the creation of support systems for building relationships. Streets, public spaces, transportation networks and building codes achieve this. Zoning kills them. The best support systems, the best urbanism, will permit the greatest density of relationships (not density of people), implying the greatest special complexity and diversity achievable. (Alexander, 1965:pg).

3.11



(Fig 3.11) Connections form naturally, only between contrasting or complementary nodes. Different types of nodes (residential, school, office, and store) are shown with distinct numbers.

- (a) How connections between houses 1's are established by having neighborhood stores 2 and park 3 nearby.
- (b) Amalgamation of connections into a path that will be used (Salingaros, 1998:61).

Christopher Alexander advocates a return to the concept of multi-function localities in place of 20th century zoning, which he considers undemocratic.

"In looking deeply at systems in nature and society, and at human aspirations and needs and in challenging us to understand that improved methodologies for urban design are not enough, Christopher Alexander is asking us to keep the eye on the prize: the creation of enduring, organic places that can grow and deepen in complexity and character over time."

Hank Dittmar, Chairman of the Board, Congress for the New Urbanism, 2006.

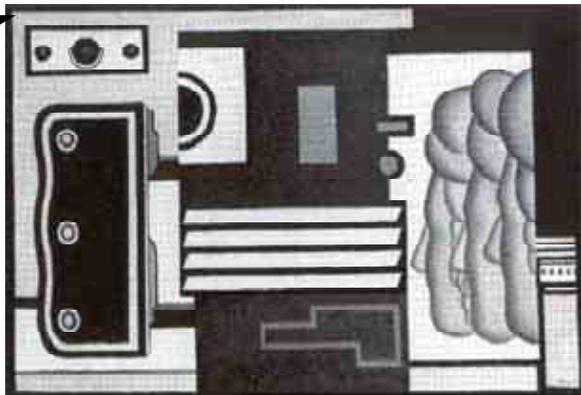
Habraken (2000) endeavors to answer this call for flexible, complex creations through his structure/open building approach. This theory is based on the concept of understanding the complex paradigm in levels. This theory explains the configuration of the components, structure and sub-structures and understanding how best they can depend on one another to create a better building, or in this case, urban framework. These theorists raise the subject of the need for the use of concepts such as coherence, emergence, information, self-organisation and adaptivity - illustrating how to operationalise them, and hopefully mark the beginnings of an urban science. These are the tools to be utilised in the design process, in the pursuit of a more efficient urban response in the 21st century and in an ever changing and demanding society.

3. THE BUILDING

a) Invisible barriers through architectural design

If one sees two or more figures overlapping one another, and each of them claims for itself the common overlapped part, then one is confronted with a contradiction of spatial dimensions. To resolve this contradiction one must assume the presence of a new optical quality. The figures are endowed with transparency; that is they are able to interpenetrate without an optical destruction of each other. Transparency however implies more than an optical characteristic; it implies a broader spatial order. Transparency means a simultaneous perception of different spatial locations. Space not only recedes but fluctuates in a continuous activity. The position of the transparent figures has equivocal meaning as one sees each figure now as the closer, now as the further one (Gyorgy Kepes, 1951:19)

3.12



(Fig. 3.12) The ambiguity formed- overlapped faces imply a sensation of depth that is not there without applying perspective techniques. Fernand Leger, Three Faces, 1926.

Rowe and Slutzky further developed the definition, making a more precise distinction between the kinds of transparency, which may be “an inherent quality of organization,” and that which may be “an inherent quality of substance,” such as with glass. They distinguish them from one another, referring to them as phenomenal and literal transparency, respectively.

Rowe and Slutzky compare paintings from the Cubist period to demonstrate when each kind of transparency is present. They state that simply overlapping literally transparent surfaces does not necessarily produce phenomenal transparency, as very little is left to interpretation. Phenomenal transparency involves ambiguity in terms of how the figures relate to each other and are thus perceived within their composition. It is achieved by implication rather than by the actual existence of multiple relationships between the figures.

Similarly, it is not a matter of simply allowing divergent functions to be housed on the same site - in this case academic and commercial - but rather of deciding how much of each function should be exposed and how each portion should relate to the other.

The dissertation investigates the metaphysical application of the concept of phenomenal transparency, in the urban architectural realm. If the existence of a phenomenal transparent space is a result of layering planes to achieve a third dimension, merely by the manner in which the planes relate to each other. Surely it is achievable, not in the pictorial juxtaposition of elevational planes as indicated in Rowe and Slutzky’s investigations of an architectural application- Transparency: Literal and Phenomenal; pg 5-11 - but more relevant is its conceptual application in the urban matrix.

b) Phenomenal transparency

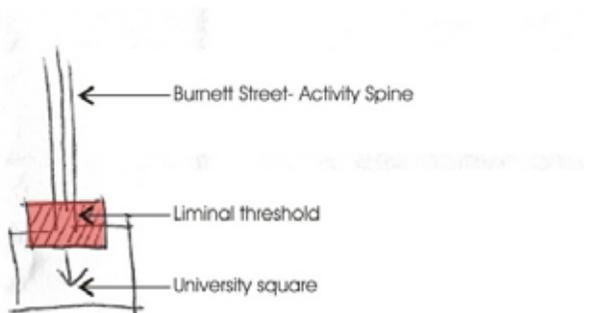
(Fig. 3.14) The illustrated silkscreen prints serve as a means to represent and study phenomenal transparent occurrences. The result is the reading of negative versus positive relationships with resultant newly formed shared areas. These perceived areas are a direct product of the overlapping parts (shared spaces). The shared/betwixt/liminal areas begin to blur the limits between the various parts; ambiguous by their very existence.

The process for this project begins with the 'placelessness' (lack of identity) of a place (university) within its context (Hatfield district) due to a lacking spatial relationship between the place and its context, which would define its character. The concept of phenomenal transparency is adopted to identify where these relationships could exist and how they could occur.

The development acts as a connector, housing university/academic functions, while giving the ground floor over to public use. The street edge composes of the existing public transport stop.

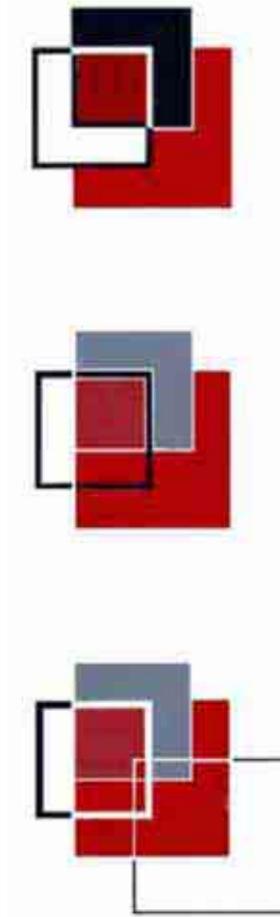
Spatial Transference

3.13



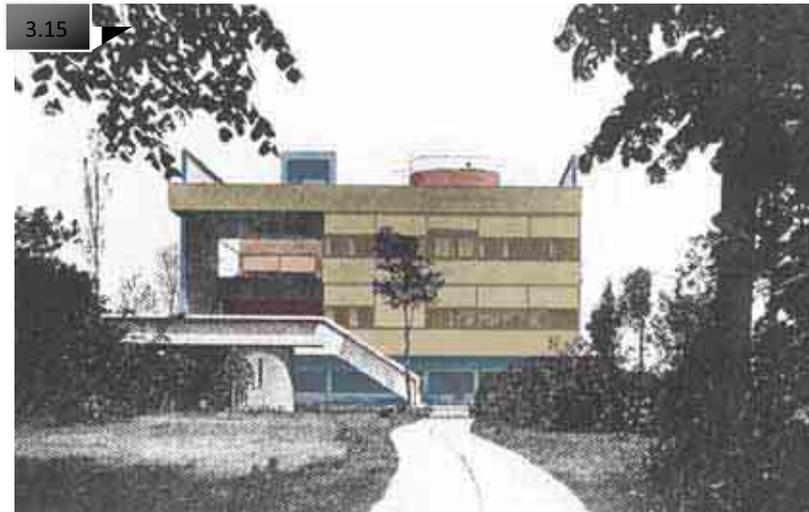
3.14

EXPERIMENTING WITH THE THEORY OF PHENOMENAL TRANSPARENCY IN 2D



Silkscreen prints - Rebeca Vicenz Sanchez

In considering architectural rather than pictorial transparencies, inevitable confusions arise; for while painting can only imply the third dimension, architecture cannot suppress it. Provided with the reality rather than the counterfeit of three dimensions, in architecture literal transparency can become a physical fact. However, phenomenal transparency will, for this reason, be more difficult to achieve; (Rowe & Slutzky, 1968:6)

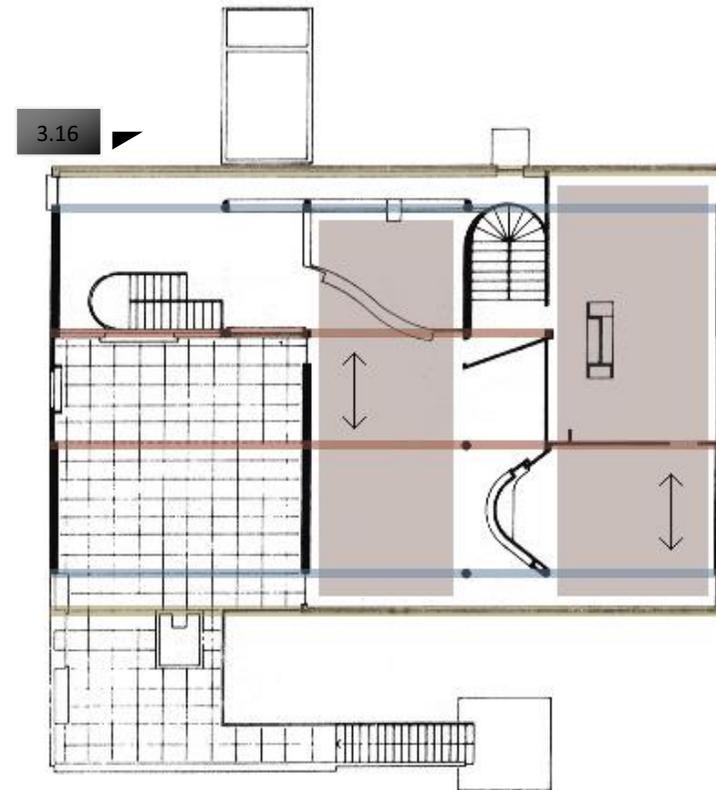


Villa Stein, Garches. Le Corbusier, 1927. Garden Façade.

Rowe proposes that Le Corbusier achieves phenomenal transparency in architecture even with the reality rather than the implication of the third dimension. At Villa Stein, Le Corbusier creates from a distance the visual effect that stratified planar surfaces slide behind each other to define successive shallow spaces parallel to the garden elevation (Fig. 3.15)

In reality, the plan of Villa Stein shows that the long dimension of the house's spaces occurs perpendicular rather than parallel to the garden elevation. "The reality of deep space is constantly

opposed to the inference of shallow; and, by means of the resultant tension, reading after reading is enforced." Ibid. p. 170. Rowe finds that Le Corbusier has achieved in architecture the compression of depth associated with phenomenally transparent paintings.



Villa Stein, Garches. Plan.

It becomes difficult for a person without the specialised knowledge to identify, and thus experience the ambiguity when directly applying the concept of phenomenal transparency to a three-dimensional object without introducing literal transparency. This is in direct opposition to Gyorgy Kepes's definition, which clearly implies that anyone with regular optical ability should be able to consciously, or un-consciously identify the transparency. In order to ensure similar sensory experience, literal transparency relating to the translucence of a material, is introduced. The transparency is defined by the sensory ability for a user to experience space beyond the boundaries limiting their physical access, which they understand to exist. The perceived sense of admission results in positive consequential actions of protecting, forced/essential interaction, passive/chance interaction and surveillance.

(Fig. 3.17) A sample of materials with various colour, texture and translucent properties have been introduced and juxtaposition within the very same context; illustrating the changing relationships the materials have in relation to their spatial atmosphere and thus, perception of that environment. Materials vary in their properties, either allowing or evading interaction through themselves with regard to the surroundings. These relations or the lack thereof, affects the degree of this interaction and, therefore, perceptions of the new material's role within its context.

It is evident that visual access or the transparent quality of the material enables this relationship to exist. In order to intensify the blurring/interplay of the element with its environment, a third element may be introduced- light. This emphasises the relationship.

Unlike the existing fence, the building is to be perceived as a threshold, not periphery. The users do not perceive the building as a barrier, but rather only concern themselves with its function and their destination. If the user were to think about the building in plan, he would understand the building to be a limiting mechanism to "the other side."



c) Liminality in architecture: The in-between

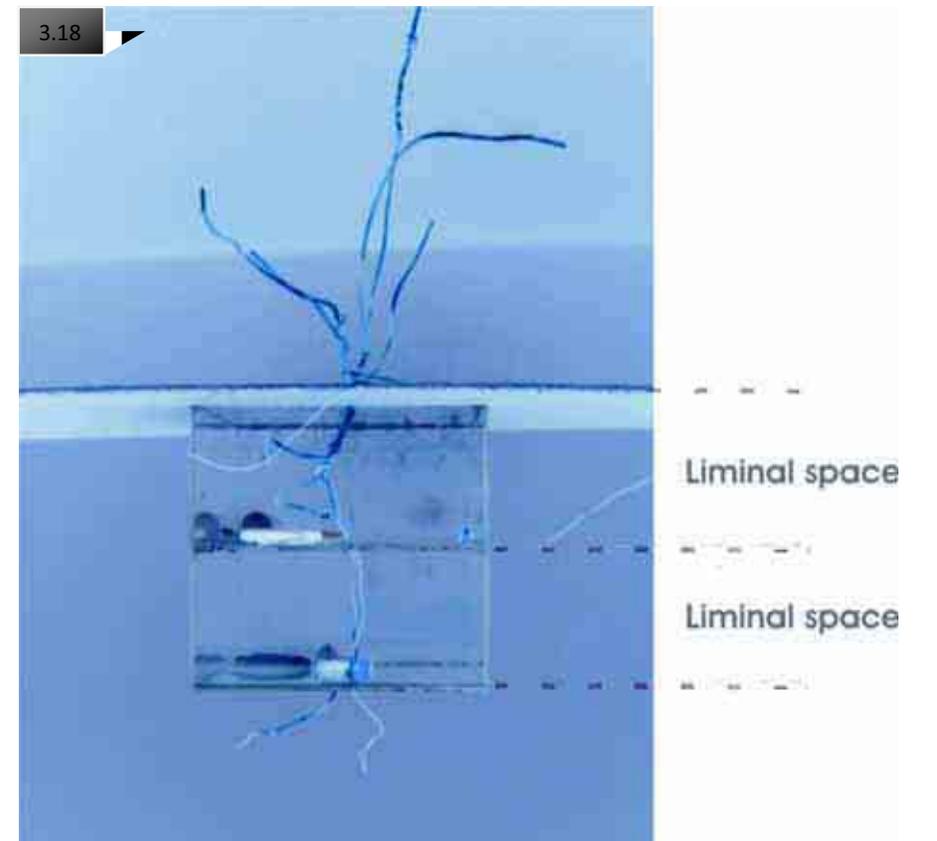
Psychologists call "liminal space," a place where boundaries dissolve a little and one stands there, on the threshold, getting ready to move across the limits from what we were, into what we are to be.

Victor Turner introduced the concept of "liminal space": a space of transformation between phases of separation and reincorporation. It represents a period of ambiguity, of marginal and transitional state (Wikipedia).

The liminal state is characterised by ambiguity, openness and indeterminacy. Sense of identity dissolves to some extent. Liminality is a period of transition where normal limits to thought, self-understanding and behavior are relaxed - a situation which can lead to new perspectives. People, places or things may not complete a transition, or a transition between two states may not be fully possible. Those who remain in a state between two other states may become permanently liminal.

Essentially, this is the core concept for the development; not committing itself to singular definition or taking sides. Architect Aldo van Eyck also reinforces that "a transitional threshold involves the interrelationship between two phenomena rather than their opposition".

In the context of this document, the liminal refers to the space of in-between; neither one place nor another. In this way, the idea of the in-between-ness of architecture is understood as a doubling interpretation of architectural relationships. In short, liminality in "architecture aims to make possible the unity of opposites, gestating a doubling inclusive effect towards the users" (Javier Rodriguez-Motta;2008)



The 'Touchstone' abstract model illustrates the passage through thresholds relating to alternative conditions. These thresholds, although seemingly accessible, are barriers which will work to filter through the in-between those who interact with them along the journey - only the concerned will get to the other side.

d) Multi-layered meaning- Liminal experiences

The process of research

Some scholars argue that ethnographers are present in their research, occupying a liminal state, regardless of their participant status. Justification for this position is that the researcher as a "human instrument" engages with his/her observations in the process of recording and analysing the data. A researcher, often unconsciously, selects what to observe, how to record observations and how to interpret observations based on personal reference points and experiences. For example, even in selecting what observations are interesting to record, the researcher must interpret and value the data available. In order to explore the liminal state of the researcher in relation to the culture, self-reflexivity and awareness are important tools to reveal researcher bias and interpretation (Liminality in ethnographic research – Wikipedia)

It is in this sense that the boundary becomes the place from which something begins: "Always and ever differently the bridge escorts the lingering and hastening ways of men to and fro, so that they may get to other banks....The bridge gathers as a passage that crosses" (Graves, 1998B:)

Liminality of barriers: The threshold

Liminal spaces are the spaces in-between; thresholds or transitions from one state or space to another. The project's goal is to create, through architecture, a development that suggests a liminal urban environment, which possesses the power of transference. The focus of this investigation is the thresholds which should strongly relate to their respective edges- speaking a totally different language to one another if need be. This changing

interpretation of face treatment should relate to the passerby the indistinct sense of being caught between different building, while providing an environment in tune with his desires.

These thresholds should mark an improved adjustment- in activity, noise and thus pace of movement and perception of place. The development should not be perceived as a break away from Burnett Street, as it also houses commercial activities, but rather as one of the activity spines with more pedestrian friendly stops along the way.

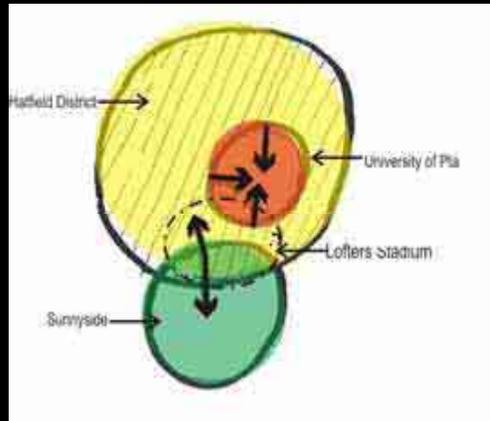
CHAPTER 3

DESIGN REPORT

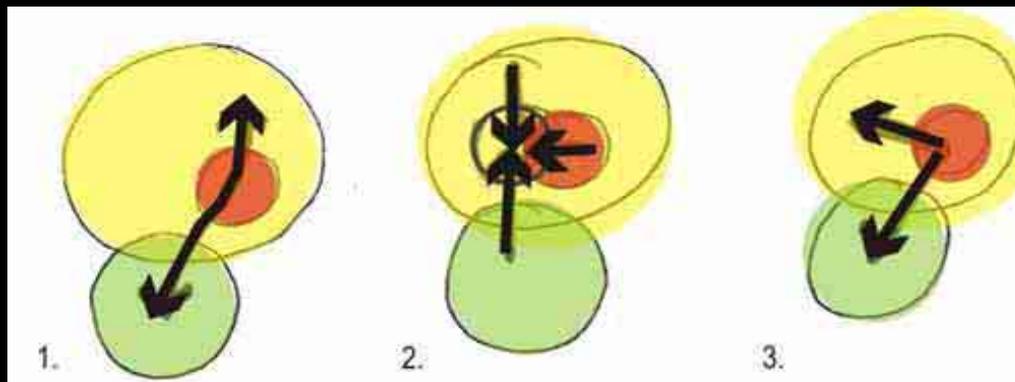


4.01

THE PROBLEM



POSSIBILITIES



Connect

common centre

Relating to urban context

1. INITIAL DESIGN APPROACH

a) Urban relationships- Redefining the barriers

Problem - Most important, are the psychological barriers created by the sudden change in activity - the lack of any type of activity along the street edge.

The physical barricade – the fence places a greater emphasis on the lack of relationship between the university and the existing Burnett Street activity spine, as well as along University Road.

Opportunity -To create a framework that encompasses activities that would encourage the co-habitation of passerby's, employees and residents of the area, as well as current users of the train adjacent to the university, and most importantly students, who make up the majority of the economic and social environment contributors to the district.

It is the university that does not allow permeability and rather rejects its surroundings. The urban context of the Hatfield district allows for the university's incorporation; in fact it needs the institution to open up for the Burnett Street activity spine to continue its expansion. The University of Pretoria main campus is one of the distinct barriers prohibiting the district from further development.

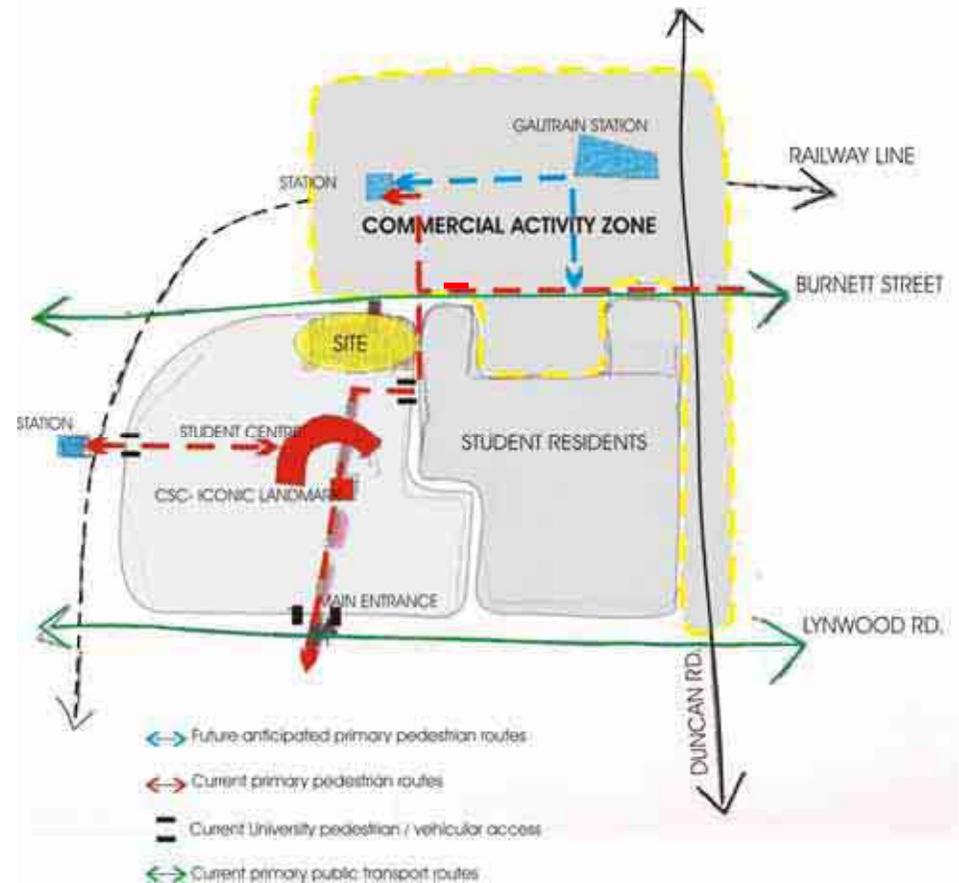
This site has to be re-programmed to identify with its surroundings, not only to urbanise the university, but most importantly to create solutions to the larger inner-city problem.

Multi-layered meanings were necessary to emphasise the experience objectified when walking past, entering and/or residing within the site.

Existing conditions need to be incorporated in order to enhance the development's interaction with the existing environment. Existing bus/taxi stops, pedestrian routes and university pedestrian and vehicular entrances have been identified, as they fulfill the following requirements:

- Created by users for their own convenience.
- Fulfill future anticipated developments or trends.
- Connect to existing and future public transport routes

4.02 Existing primary connections

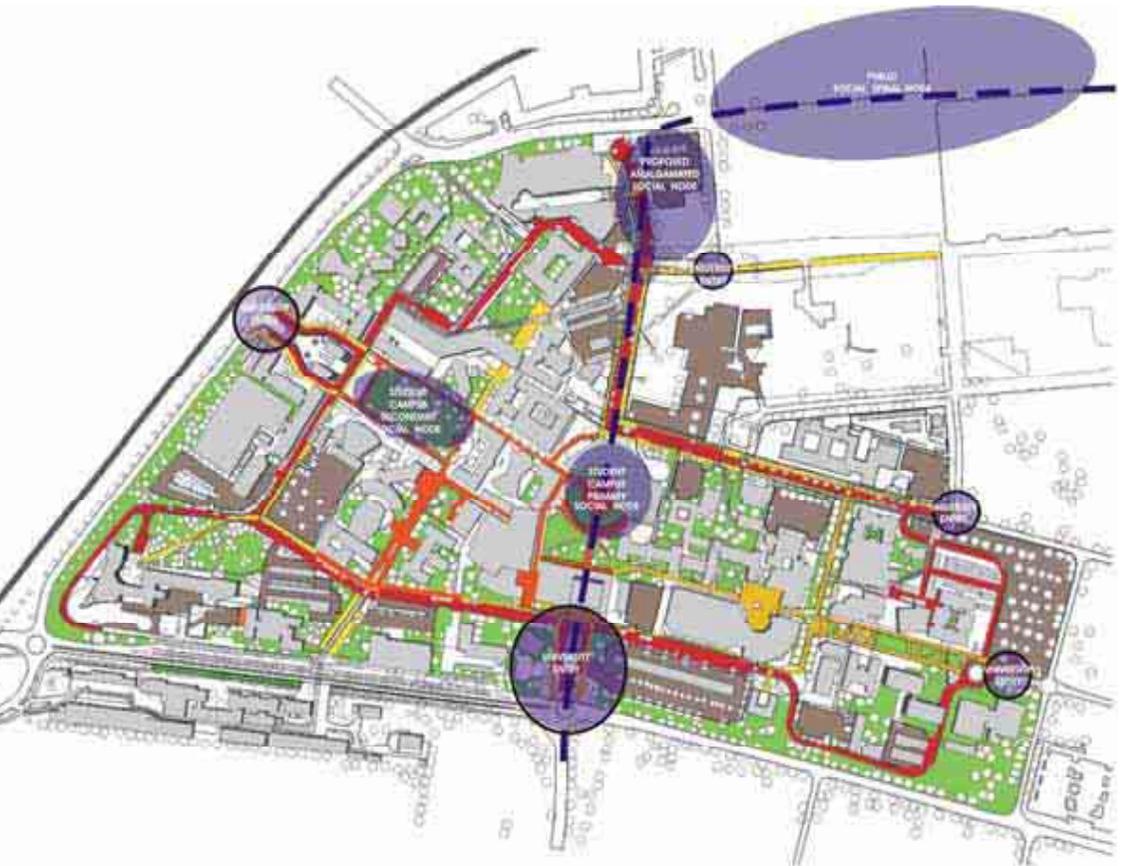


In the case of the north/south primary pedestrian route, a direct link through the proposed development to the activity spine would improve connectivity between the university and its pedestrians. This is especially necessary, since the most frequently used bus/taxi stop is situated along the Burnett Street edge of the site. This would also strengthen the currently weak relation between the social node on campus and the district node, and establish a hierarchy of nodes, with the collaborative research facility becoming the link between them.

The building's form is to respond to the linear paths of pedestrians moving north/south and west/ east, and to existing skyline and building setbacks along Burnett Street. This is especially the case with the new City Development building, which has created quiet an impact to the atmosphere along the activity spine.

Students (a majority being pedestrian, rather than those using the parking facility) and some staff currently access the site as a thorough fare from the vehicular guarded gates off Festival Street, to the pedestrian security gate onto the campus. Most of these pedestrians are either going to, coming from or will be passing through Burnett Street. The rest live across the road in the student accommodation, or are picking up their vehicles. All move right through without pause. The function of the site has a lot to do with these findings- the site has no human relation to the current "users". These movement patterns illustrate that the lack of an interactive interface "affects" spatial perceptions, human senses, or ultimately behavioural patterns.

4.03 ▶ Linear interpretation of hierarchal nodes



b) Principle urban issues in the planning process

The first approach to the resolution of Space in terms of site, took into consideration four primary concerns.

Spatial Organization

The relation between public and private is a pertinent issue, as the University's and the facilities security must not be compromised. How different functions relate to the public realm (external spaces) and vice versa.

Interface

The question of how the University is to be perceived along Burnett Street lies mainly with its interface with the street, as this is the first opportunity that all users especially passerby's have to make an impression.

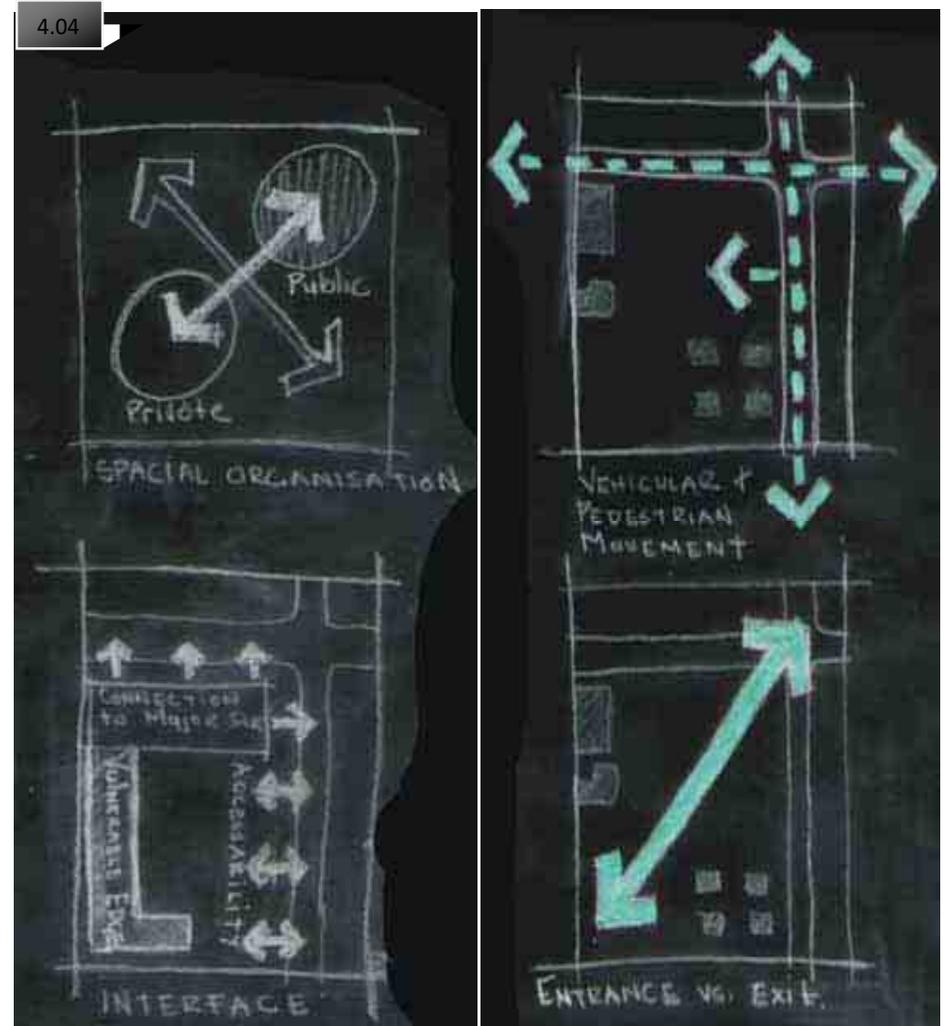
Entrance versus exit

The requirements of orientation within the environment, way finding, place differentiation, recognition, and accessibility must be addresses to create a coherent part of the urban web.

Vehicular versus pedestrian movement

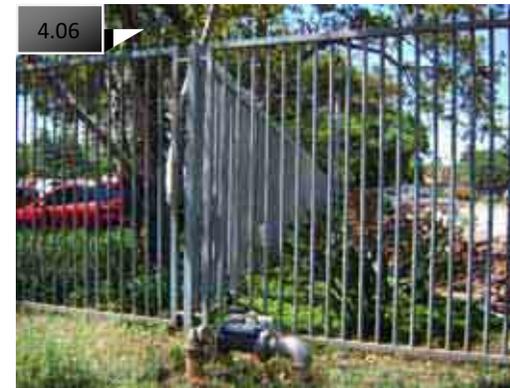
Most of our urban experience is during locomotion. A product that developed from the objective of the project to increase/ create connectivity, was creating a maximized affordances i.e. opportunity for action. This can be stimulated by maximizing routes through and past the site. Currently the site affords the greater district with no alternatives. Current pedestrian movement

is isolated to the pavement along the barriers, with no activities of interest or inclusion to the general public.



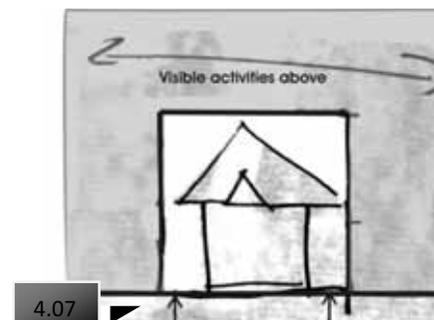
The parking lot reinforces the separation and restricted interaction of the pedestrian of the university from that of Burnett Street. It introduces a lack of continuity in the existing activity spine pattern language. This is evident in the movement patterns through the site and onto the activity spine. The university turns its back on the district and focuses inward.

The current quality of the disconnected selected campus space (parking), is near invisible in its existing condition because of the space's expansive size and functional-programme, unrelated scale to the streetscape, the displacement of the user and passerby perceptions, and a spatial detachment resulting from the users behavioural patterns.

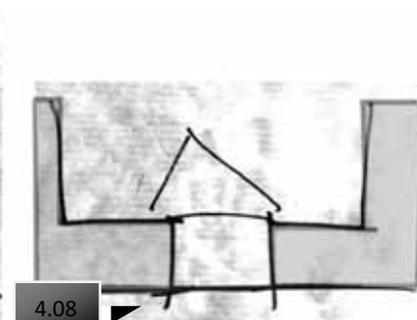


An unnecessary secondary boundary, trees within the boundary and no visible activities or people, as the first learning facility Scienza is 60m away, except for students walking through the two gates, accommodating the least number of students on campus.

The Festival houses were earmarked, by the university, for demolition when a collective blocked this process, marking them as having historical relevance. Below (fig. 4.07, 4.08) are illustrations of possible ways of interacting and incorporating the historic houses, to be renovated to house the Tourism Department which is currently located in a similar, singular structure on the campus, into the development. Alternatively, the houses could be protected as individual buildings. This allows all intrusive barriers to fall away, giving the department much needed accommodation and exposure to the general public.



4.07 Open entry points= framing the existing buildings with new structure, emphasizing their importance



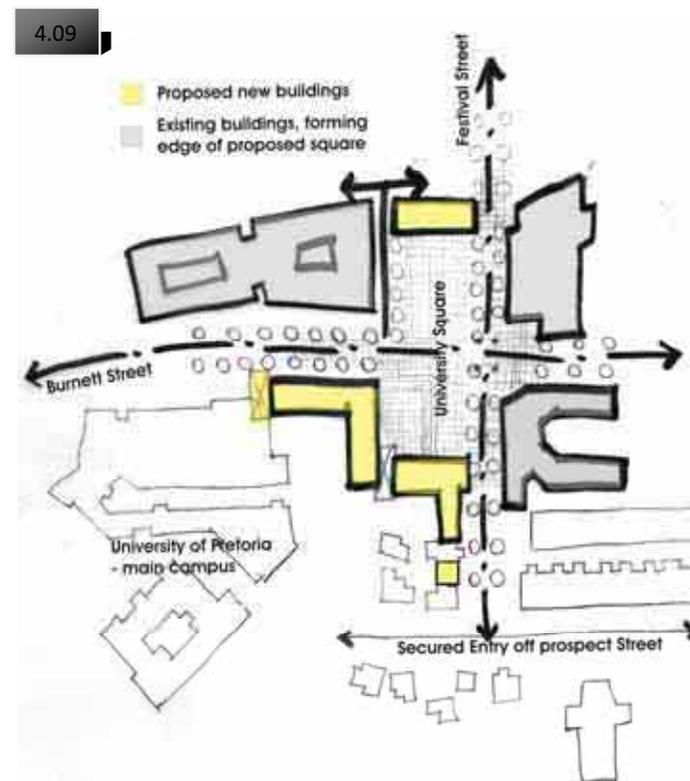
4.08 Transparent barriers= touching historic building lightly

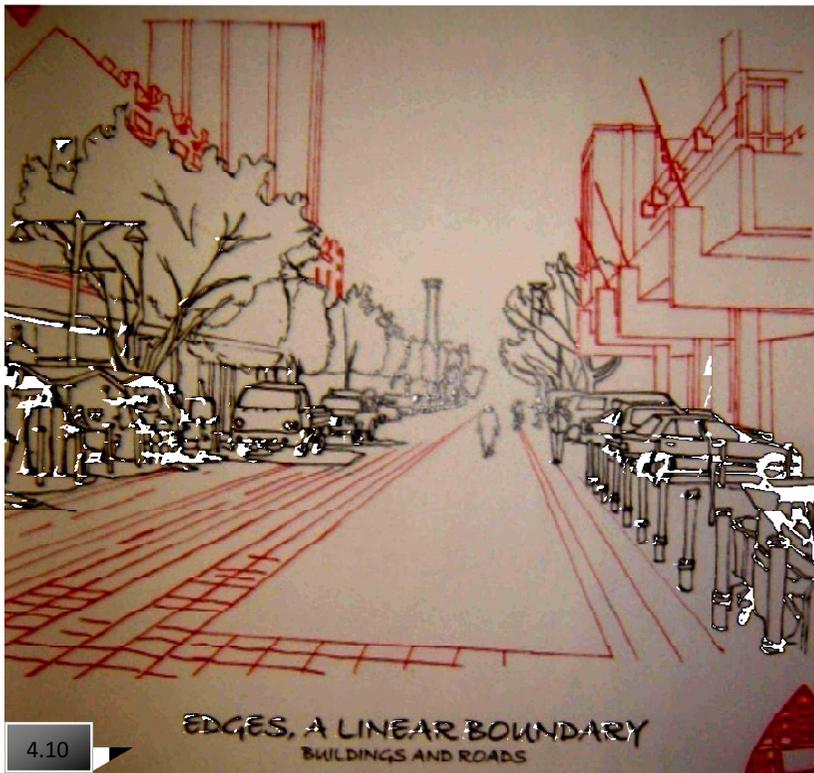
c) Concept 1- Connect

From the onset of the investigation of solution two (fig.4.01), the decision was made to replace fences with “invisible barriers,” namely buildings housing consumer friendly functions (at least on the ground floor), expanding on the existing energy along Burnett Street. These “invisible barriers” would improve conditions in perceptual awareness of spatial thresholds. The positioning of the buildings came about in order to ensure that, although the university would overlook the shared space, it would thus be part of it.

(Fig. 4.09) By using the buildings to form the barrier looking onto this shared space which forms part of the university grounds, it would perhaps improve the perception of integration to the “outsider”.

This option allows for passive surveillance from the student accommodation, but requires that the petrol station adjacent on Burnett Street be removed- a costly and environmentally hazardous exercise. The street edge would lose its current linear boundary created by building fronts, an undesirable effect in the quest to continue a similar language to the existing activity spine (see below). Another unconvincing element to this solution is the possibility of feeling exposed when moving down Burnett Street into the large open square. The sequence may seem too abrupt, thus making one experience even more alienation from the university.





Group 4- 4th year Hatfield campus analysis

Finding a way for the university to relate to the urban context

(Fig. 4.10) A perspective of envisioned view, along Burnett street, indicating the continuation of the spine through the development. This would encourage the pedestrianisation of the activity hub, thereby protecting pedestrians from the current competitive nature along the road. However it would cause grave vehicular congestion at the intersection, around the turning circle. The circle itself would severely disrupt the pedestrian path, affording the public less freedom to choose preferred routes. This would intensify the sterile environment and isolation of the

university from the general district. The intention is to create the perception that the university is the gateway into Burnett Street, and thus the Hatfield district.

4.11



The intervention would increase visibility, but is far too monumental a response, disrupting the flow of activity abruptly and possibly causing a more severe alienation of the business hub from the rest of the west Hatfield district.

The adjustments to the development's position within the area of the urban context expose possible manipulations of spatial awareness and behavioral activities. In solutions two and three, the vehicular movement patterns may cause an increased congestion of the neighboring roads when competing with pedestrians, especially with the future Gautrain Hatfield development.

d) Concept 2- Common Centre

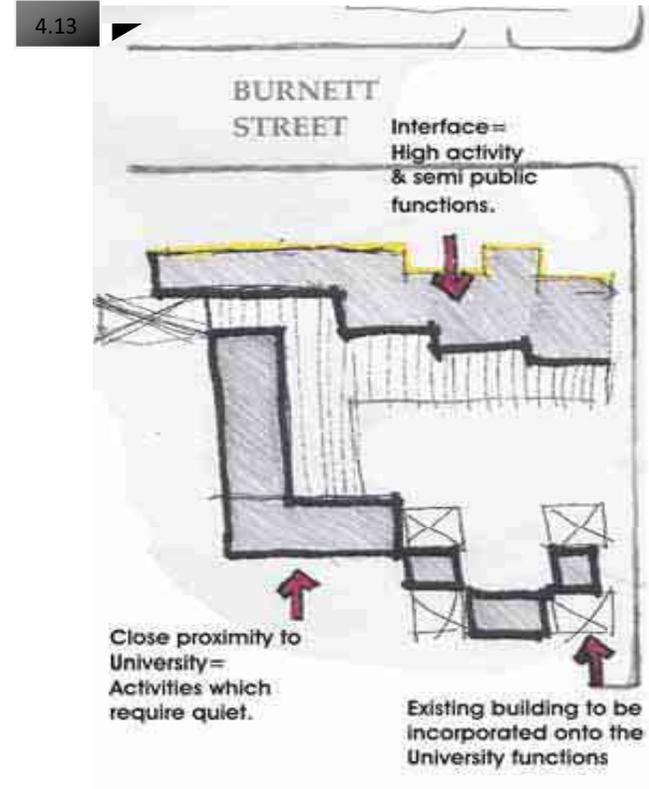


(Fig. 4.12) Activity spine: Sudden death in activity at the intersection of Burnett and Festival Street. The only attraction to this area of the spine to the public is the bus/ taxi stop.

It became clear that the development would have a greater impact if situated within its confines. This would serve to emphasise the existing linear path, forming urban continuity.

The development concerns itself with influencing, relating to and becoming activated within its urban atmosphere. Through the literal abolishment of barricading fences on the site and the introduction of common gathering spaces, that create deliberate perceptions of cohabitation in the various users' minds, improved conditions in perceptual awareness of spatial thresholds and sensitivity to relational nodes can be achieved. In this case, the university and Burnett Street are the concentrated

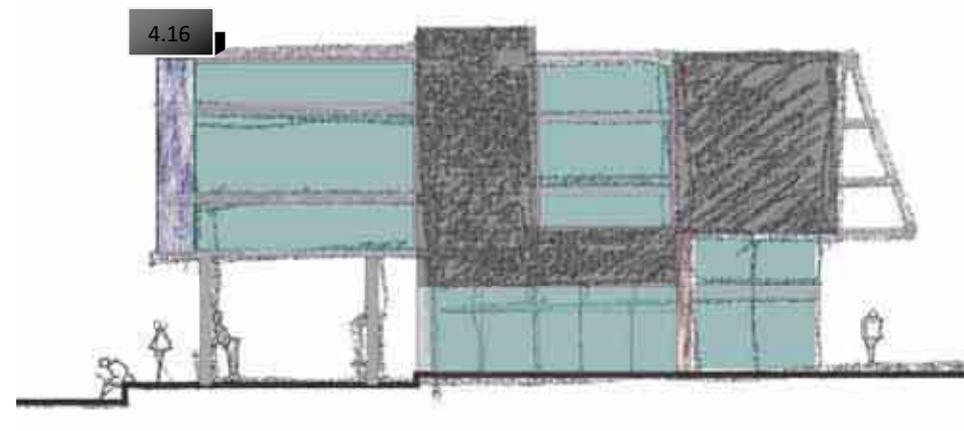
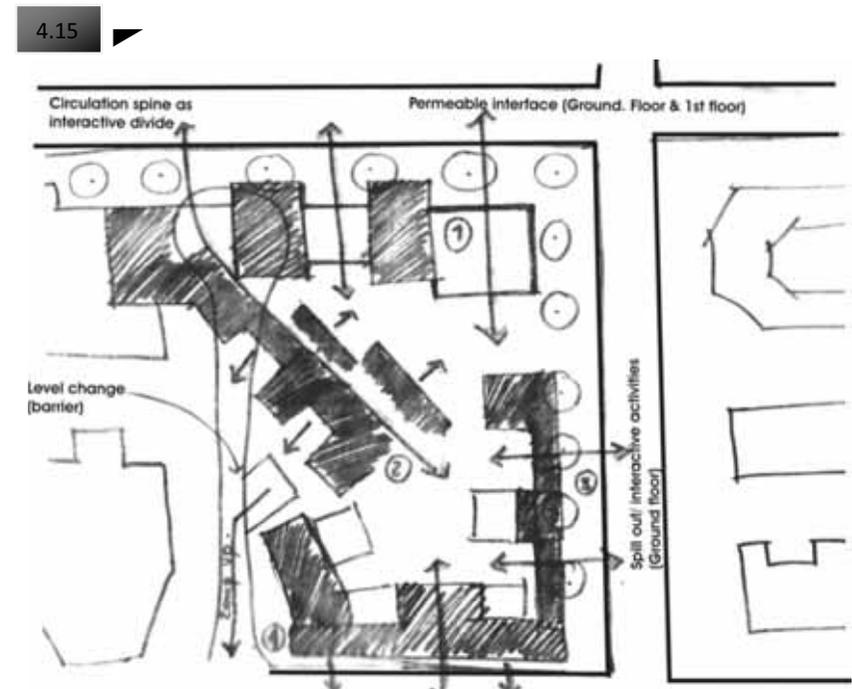
nodes in question. This should, however, be done without compromising the university's security. Knowing the boundaries and restrictions of the site is imperative, as this informs the design process in order to manipulate these restrictions to achieve a more dynamic solution and find the in-between.



e) Concept 3- Penetrating the edge/ Interface

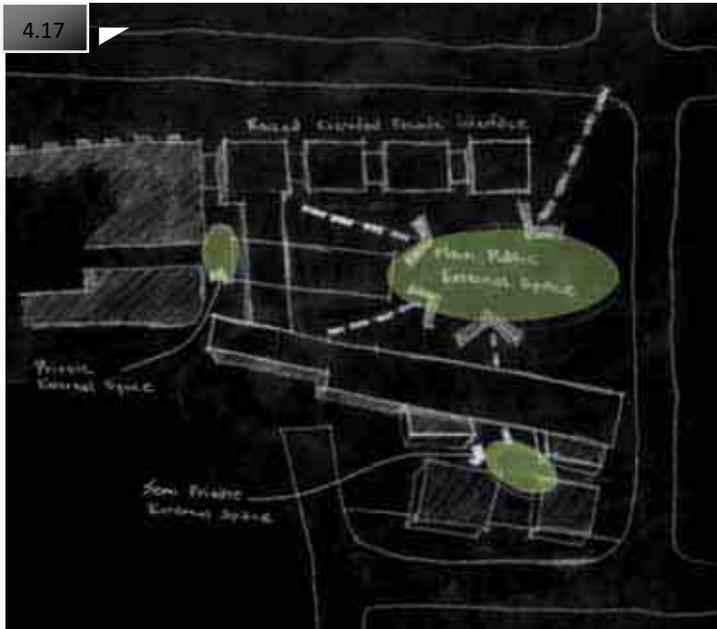
The edge from which the Institute contributes to the Street edge must enhance the existing flexibility afforded pedestrians, allowing them to move between buildings to get to their destination. This application will ensure urban continuity and the presence of a large number of students frequenting Burnett Street activities.

(Fig. 4.14; 4.15; 4.16) These illustrate possible arrangements of space, structure, and planes -their possible linkages or division in order to create relationships between public and private spaces and the activity spine.



2. Design development

Return to concept 2, now integrated with concept 3, results as it seemed to create more opportunity to the concept, with the possibility of developing a sequence layout responding to the various occupants. This proposal also has the opportunity to accommodate vehicles on the site (primary external space), making up for the lost parking lot facility.



The objective is to utilize external spaces as common ground, with the buildings forming subtly orchestrated divisions. The building forms a western boundary to the University. The Festival houses add historical value the development, they are thus to be renovated to form part of the Universities tourism department.

A sequence for the functional layout begins to unfold with the simplistic idea of forming a structure that relates to the concept of the between. Interactive functions are positioned at the thresholds between the larger gathering nodes.

The building is raised above the festival houses to the north, It is proposed that the space between will form a gateway from the primary into the secondary external space.

An attempt was made to alter the passing occupants' spatial assessment of detached and activated envelopes, as they walk by and through the chosen site in a sequence from the exterior (road edges), liminal (open gathering spaces), and interior to the university. This was achieved by introducing interstices designed to be the thresholds. By so doing, the users receive an indirect awareness of the "affective" quality of this site, in addition to the more direct awareness perceived of a now unhidden gateway entry.

Therefore, by enhancing the interstitial thresholds and residual nature of this site, the university's barriers will be endowed with transparency, while adding to the sequential relationship of the more primary spaces on the exterior and interior of the main campus.

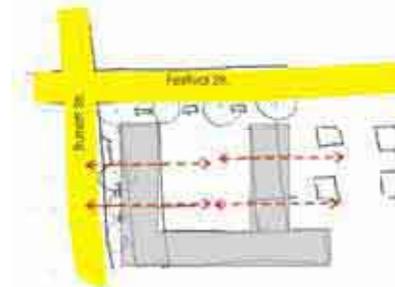
The large paved public square (public realm) in-between the threshold buildings, with views of the historic buildings, includes an avenue of trees and benches. It is designed to be accessible to all and yet ensures that the building maintains the required level of security at all times with the lifted buildings forming open and inviting spaces, ensuring clear navigation.

Perception influencing activities



4.18

The 'public' activities happen within buildings. The pavement is only utilised for walking. Pedestrians cross the busy road repeatedly in order to transfer from one building activity to the next.



4.19

Activities occur along the pavement- street furniture such as benches, vendor stations and dust bins encourage pedestrians to pause and not rush past. Sitting gathering spaces (under pass) situated at the ground floor encourage pedestrian occupation. Only commercial activities face the square on the ground floor, spilling out and around the buildings, within a pedestrian only zone.

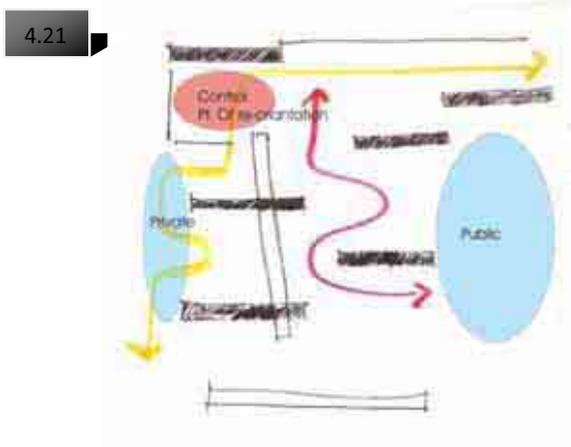
4.20

STREET EDGE - URBAN CONTINUITY

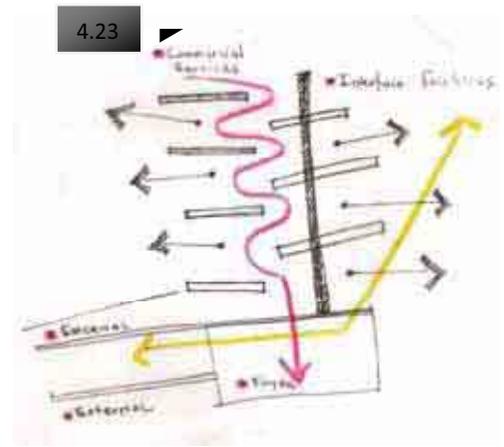
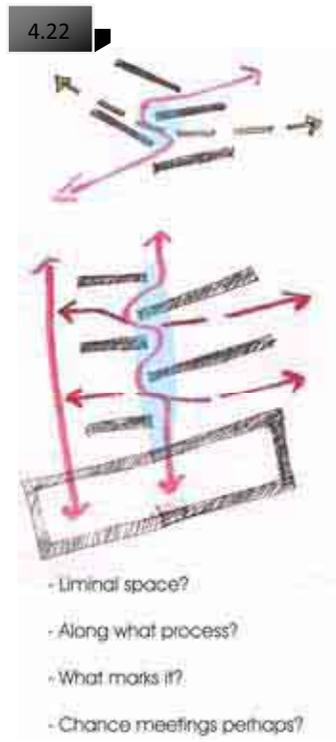


a) Spatial Organisation

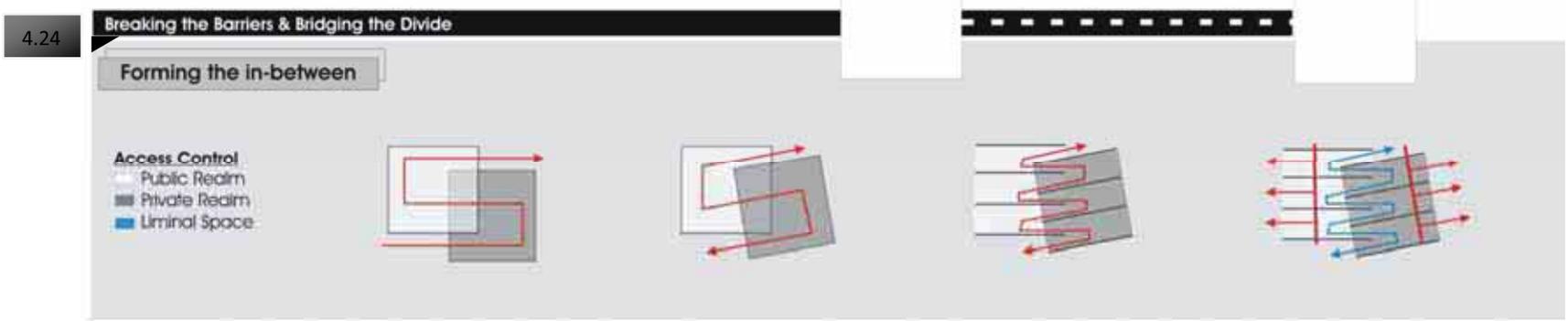
In order to define an envelope of activated space, the study is narrowed to a single, particular pattern of movement behavior: the sedimentation of potential users occupying or passing through the site. Divisions are defined between public realm and private realm (university) to ascertain how the two may cohabitate, without breaking the security breach.



(Fig. 4.24) Each group of users has dedicated circulation routes to maintain the required level of separation and security.



Initial sketches in response to possible new movement patterns: analysing methods of responding to a penetrable interface, while ensuring refuge from public interferences to functions, such as lecture theatres requiring privacy and quiet.



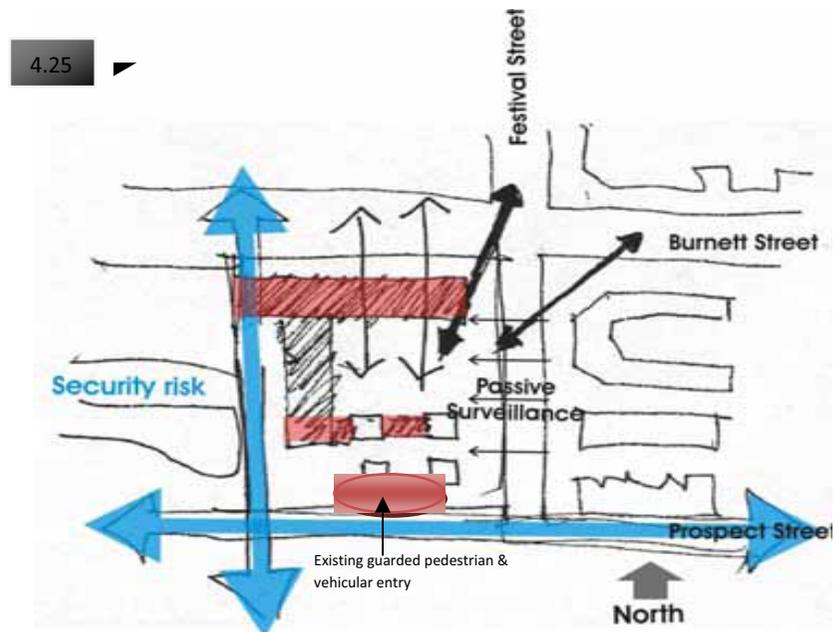
Three thresholds have been identified;

- Main: Burnett street edge
- Secondary: Tourism school threshold
- Tertiary: the boundary necessary to the university entrance

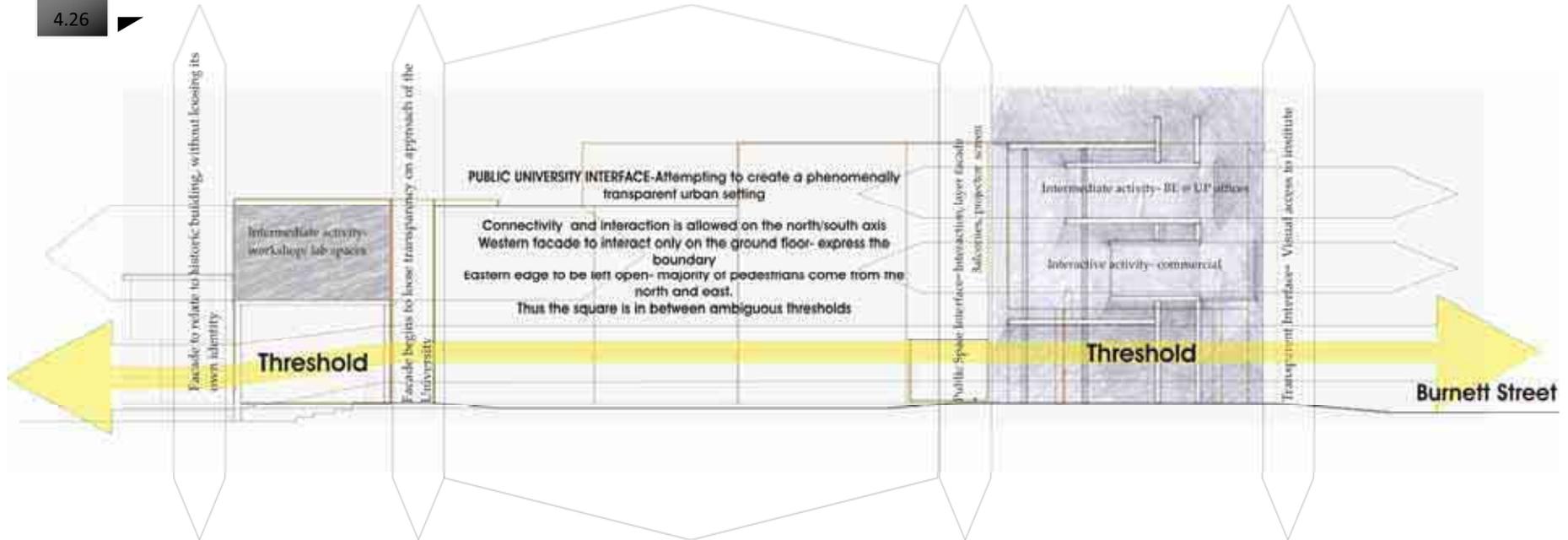
When locating the thresholds on the site in order to influence the spatial conditions that exist, there is an issue of physicality that needs to be addressed. The built form could be installed at the ground floor level, thereby physically obstructing the movement potential of the public.

As a result the structure of the primary threshold is lifted off the ground, above eye level, thereby removing physical obstruction to chosen movement patterns. This results in a study that could measure the degree to which subconscious perceptions influence movement behaviors within defined spatial envelopes.

In order to convey the marked entry into the development's interstitial (threshold) and residual (square and food court), quality control of the various spaces through an emphasis in sequential thresholds at critical points, and attention to the vocabulary of the enveloping forms of the interstices/thresholds is necessary. The perceptual awareness of these forms is paramount to the "effectiveness" of the project's intervals; since too harsh an awareness in perceiving the space's threshold would heighten any existing feeling of moving into a prohibited space.

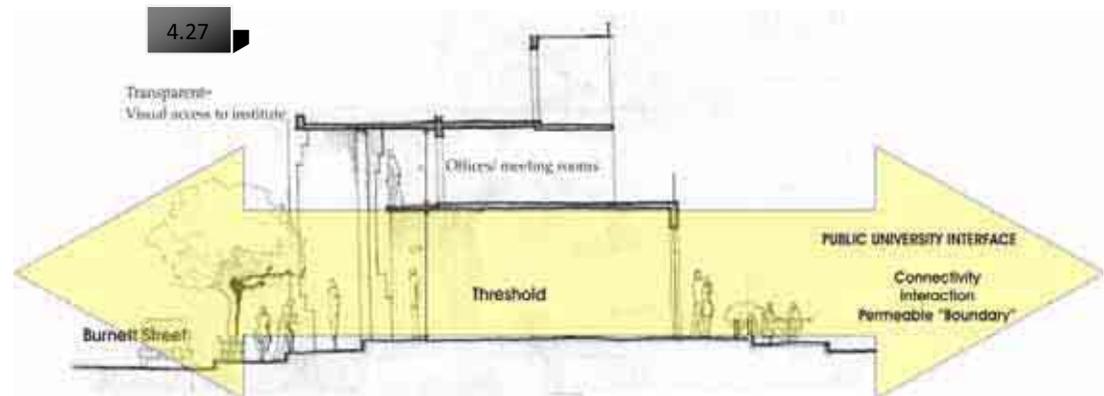


4.26

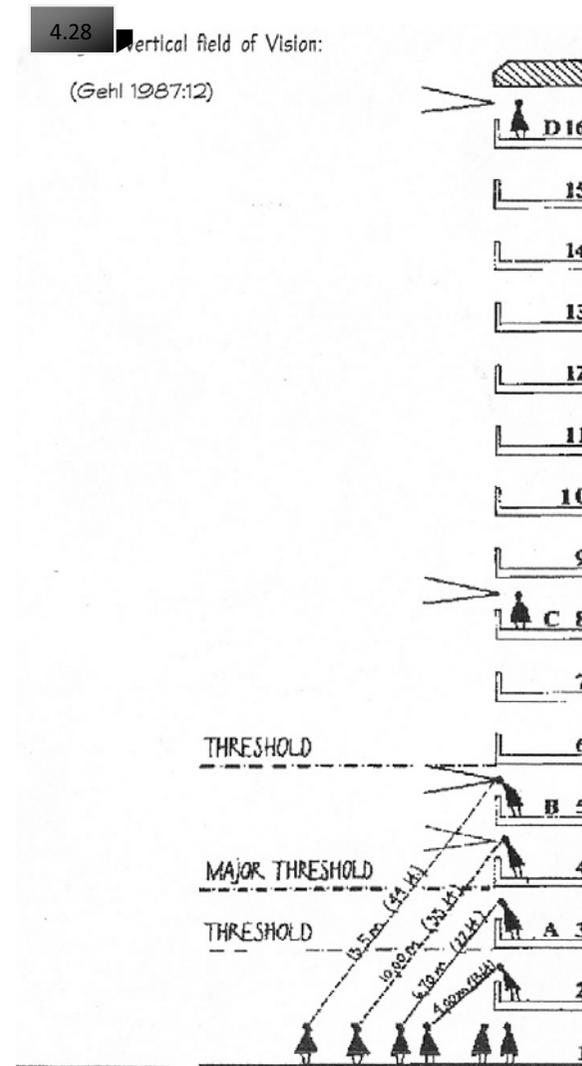


Vertical and horizontal relationships on site-between the parts of the building and also their surrounding environment must be designed so as to reinforce permeability. (Fig. 5.09 and 5.10) The section is used to investigate spatial and functional interaction between the primary and secondary threshold and the activity spine. Their inter-relation to one another on the horizontal and vertical planes is a translation of the concepts discussed, in the development of transparency in relation to the development (seen as the university street edge). Composing depths of volumes ensure the efficient operation of natural lighting and cross-ventilation.

4.27



In order to ensure the relation between the occupants of the building and the general public, it is important that the public be able to visibly access the building spaces and vice versa. Once the building becomes higher than five storey's, the internal activities above that level become divorced from their surroundings, as it becomes difficult to visually assess objects at these distances (Gehl, 1987:12).



b) Manipulating Perception

Surfaces and their layout need not be rigid and persistent, and should allow for elasticity and change. Gibson (1979: ch.6) provides classification of terrestrial events at three levels:

1. Change in layout.
2. Change of colour and texture.
3. Changes of surface existence.

These intermediate cases help to specify spatial relations, and most notably observe (a special case of relative motion) and approach or recession of objects, which are optically defined by texture magnification/minification relative to their background.

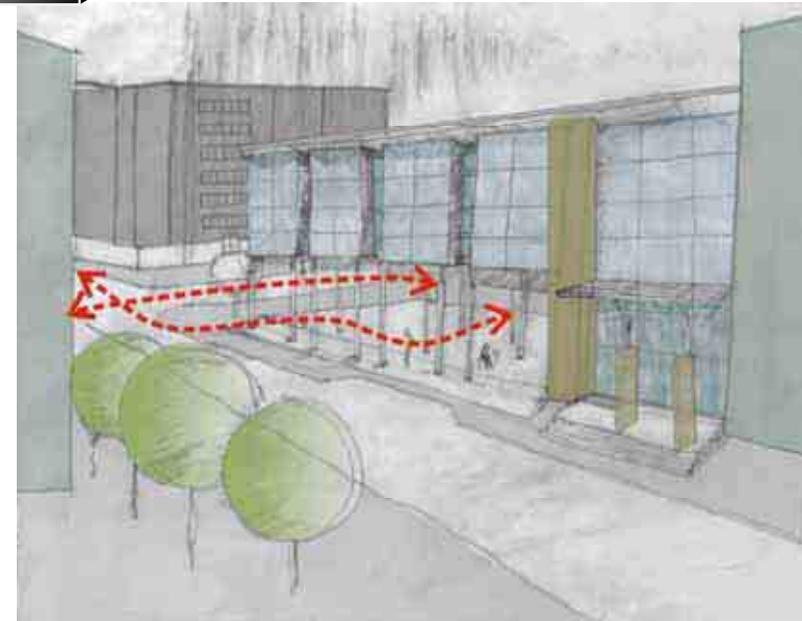
“We have to attend to available stimulus information not the least important of which is optical-visual” (Landwehr, 1988:35)

Envelope material selection

A transparent form was a requirement for the threshold surfaces. The higher the transparency, the less intrusive the forms would become, and the more interactive and expansive the various defined spaces would be. However, the forms need to be detected to some degree, or they would be of no use in redefining the existing spatial thresholds and relationships. In order to find a middle ground between transparent and perceivable, the threshold envelopes are to be made up of dual skins:

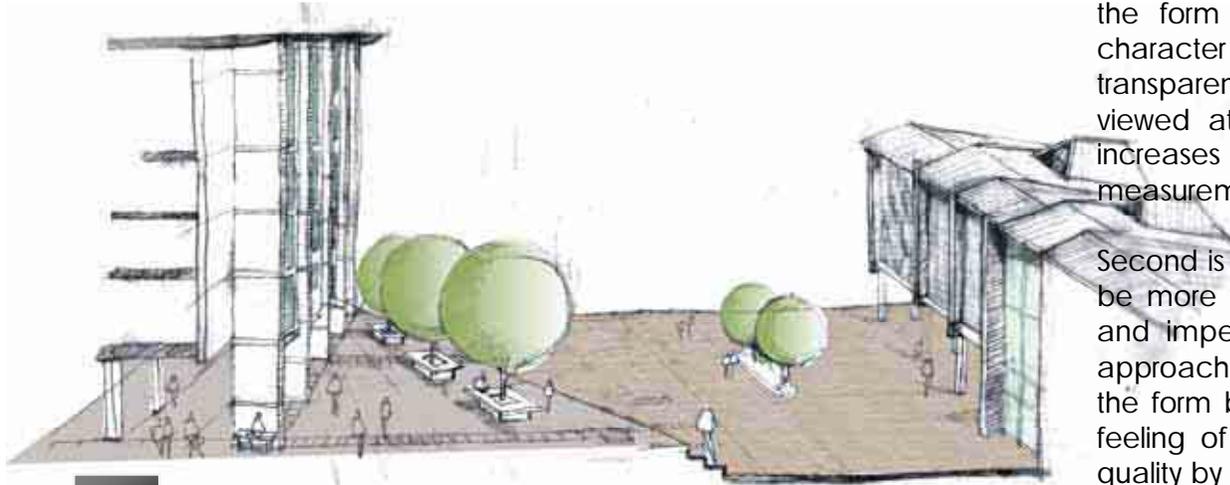
Threshold1- grey super-tinted glazing wall, and transparent secondary skin. The double walled skins in this case are for ventilation purposes, later discussed in the technical report.

4.29



(Fig. 4.39) While the “barrier” buildings should communicate their solidity, the punctured spaces that jut out of the building should ease feelings of being over alienated from the activities that occur within. The meeting points of these two structures are important junctions to detail.





4.31

Threshold2 - a mesh skin and transparent glass. This would allow the form to appear opaque at a distance, taking on the character of a solid surface and defining a spatial threshold, then transparent with a reduced perceived threshold of space when viewed at a closer proximity. This alteration through distance increases the perception of the spatial thresholds, enabling the measurement of transparency and opacity influences.

Second is the articulation of the above mass envelope, made to be more sculptural in that the material (mesh), seemingly solid and impenetrable from a distance, begins to disintegrate on approach, allowing the fabrication, activity and architecture of the form beneath to be enunciated. This once again instills the feeling of confidence. This mesh screen takes on a sculptural quality by expressing its ability to manipulate spatial perception of form as light and position of the viewer adjust. This effect would be most dramatised in the night time, when the form is lit from within and its detailing of connections, spaces and activities are most exposed. This is a reaction to the existing site's lack of use, especially in the evening; this architectural treatment of the site increases the opportunity to utilise the residual spaces (square) in the evenings for numerous activities.

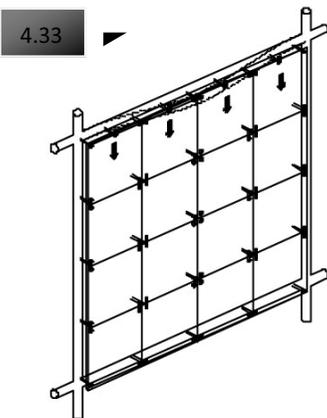
Although the ground floor is completely permeable, allowing the public free mobility, as pedestrians move under the interstitial threshold – they are directed between the monolithic walls into the open square. This is defined as the liminal space, as it is the intermediary, defined by its surroundings. This mediating space affords the opportunity, to the existing residential flats looking over the square, to participate in the environment of the development.



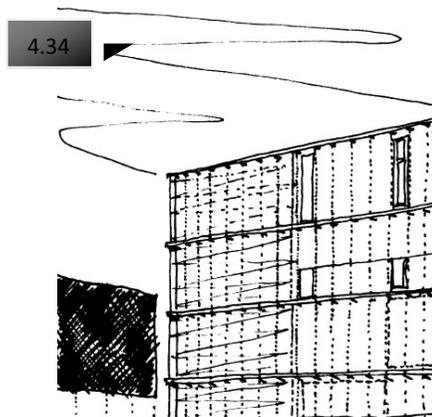
4.32

The structures of the buildings are to communicate the concept and theory attached to them. In the instance of the threshold buildings, which are to be visually penetrable, the structure needs to seem as unimposing as possible. This calls for the use of a light frame structure.

Glazed Façade



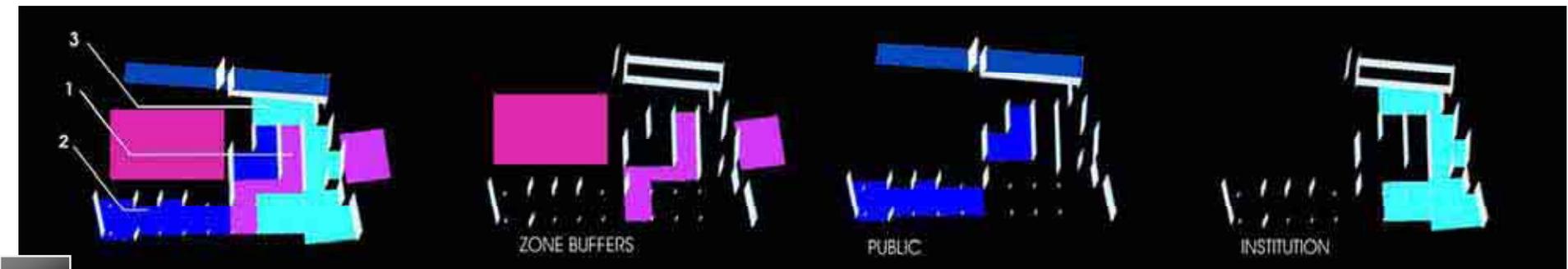
Mesh screen



This displaces enhancement from the architectural intervention onto the perceptual awareness of the interstitial and residual spaces, while still enhancing the behavioural activities indirectly. The method of emphasising the framing of the functioning activity, rather than the space, enhances the intelligibility of the design process related to structuring events and usage reasoning, at close proximity. Transparency of the defined thresholds in the spatial envelopes brings a new awareness to the building's usage patterns, ultimately encouraging a sense of accessibility.

This design development involves the adjustment and enhancement of the spaces contained. The identified edges that require high levels of security are articulated to communicate this by using solid and opaque material, allowing the user narrower options for physical and visual penetration. Thus, the user begins to sense a change in the site programming. The open spaces are accessible in all possible directions, through permeable interfaces. The Initial sketches of possible spatial organisation are formalized below (fig. 4.35).

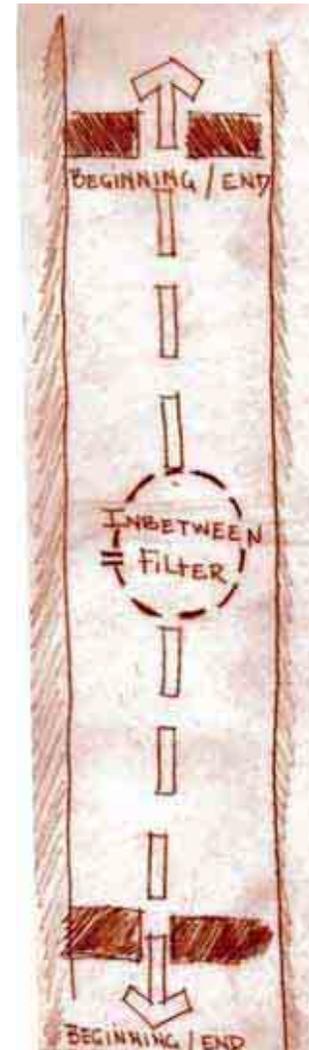
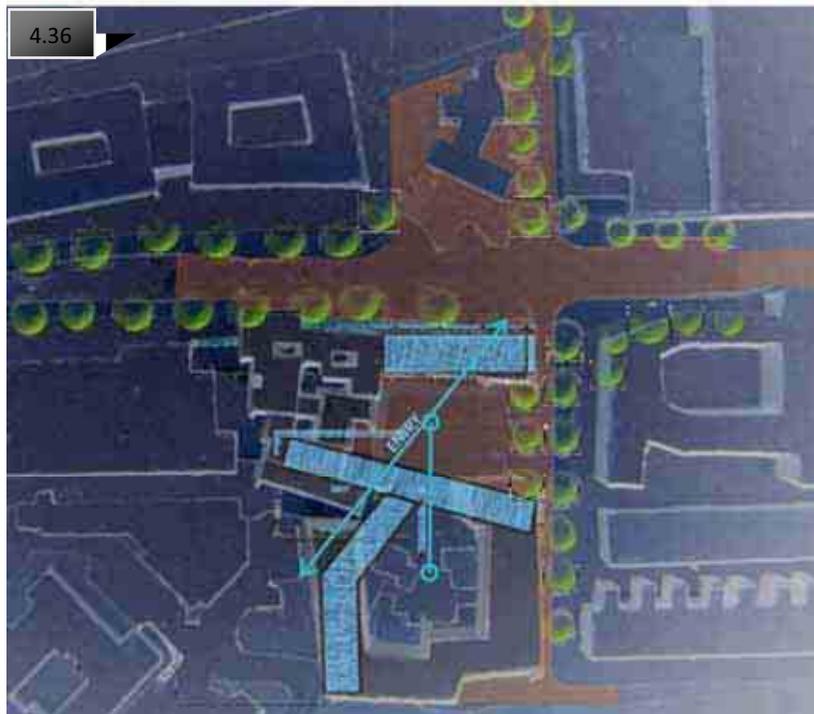
The threshold buildings and site are perceptually enhanced and define new movement and standing activities. These buildings frame the envelopes that contain the newly developed movement patterns, rather than describing the patterns directly.



4.35

c) Tertiary threshold- Addressing the articulation of entry

The current university entrances are not legible as self proclaimed entities, reinforcing the feeling of being isolated from the activities of the university. 'Access point should be perceived as hospitable interactive nodes, not a boundary to keep the neighbor out'. By openly exposing the university gateway entry, the design instills a feeling of comfort in the occupants of the site. Limits no longer feel as obtrusive, but rather subconsciously communicated, while maintaining visual access to what lies beyond. No distinct Genius Loci around campus is perceived, with all the associated boundaries - the University of Pretoria becomes an island within the city.



The rationale behind the positioning of the proposed entry into the university is informed by the direction in which a majority of occupants may approach the site. In this way the gateway is easily identifiable, continuing the idea of the transparency of barriers. By highlighting the threshold entry and exit, the in between is emphasized.

4.38



d) Defining the square as a liminal space

The site has the potential to accommodate both pedestrian interactions without sacrificing the parking essential to the university. The motor vehicle has become a necessity to be catered for and tolerated. We must be careful, however, not to place it ahead of the pedestrians who are still the majority of the district's and university's users.

These dual uses frequently result in thresholds in-between one functional space and another. This can be manipulated in the design process to intensify the notion of phenomenal transparency, as defined in this paper. For example, the shared access to the parking between students/personnel and the general public (though at different hours), begins to endow a psychological sense of entitlement to the space and thus a sense of belonging.

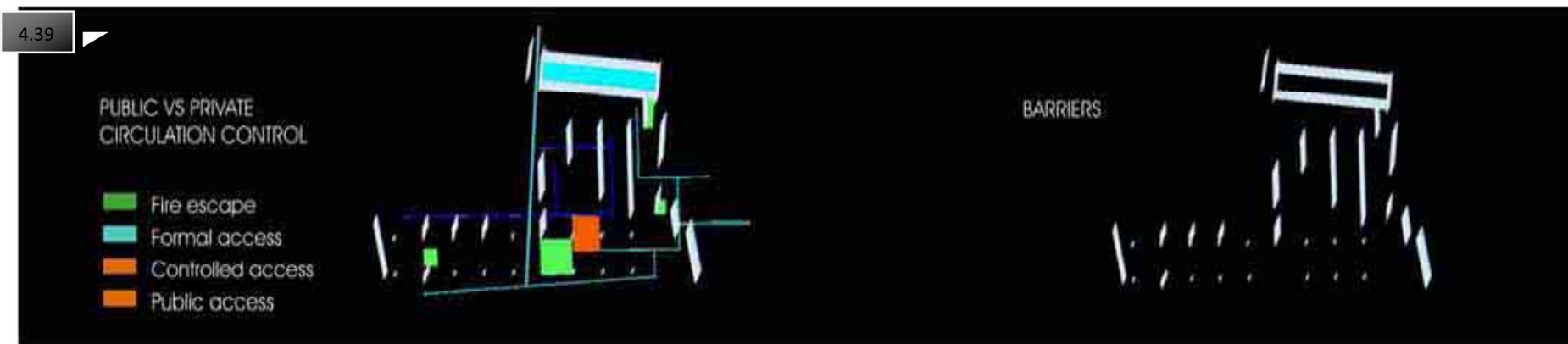
(Fig. 4.39) Fire escapes are situated strategically to service the three distinct areas to allow different researcher groups and the Business Enterprises Offices easy escape.

e) development Facilities

The Collaborative Institute is to be situated on the Hatfield main campus of the University of Pretoria; the first to break away from the ring-fenced property. Entry is obtained at ground floor, with camera surveillance of the entire site on a 24-hour basis. Staff and students obtain access from the development into the university through use of activated staff or student cards.

The Collaboration Research Institute development houses the following sections/services:

- Woolworths grocery store
- Restaurant
- Coffee shop
- Cafeteria
- Incorporated existing bus/taxi stop
- Academic Information Services (library)
- Cafeteria
- Computer Aided Instruction Centre (40 work stations)
- Management Administration
- Institute faculty Administration
- Lecture rooms equipped with computers, video and data projectors
- Business Enterprise offices (client interface service)
- Research support- outsourced or permanent
- Flexible spaces of instruction
- Telematic facilities equipped with satellite and video conference facilities/ debating rooms



f) Structural design- Concept 1

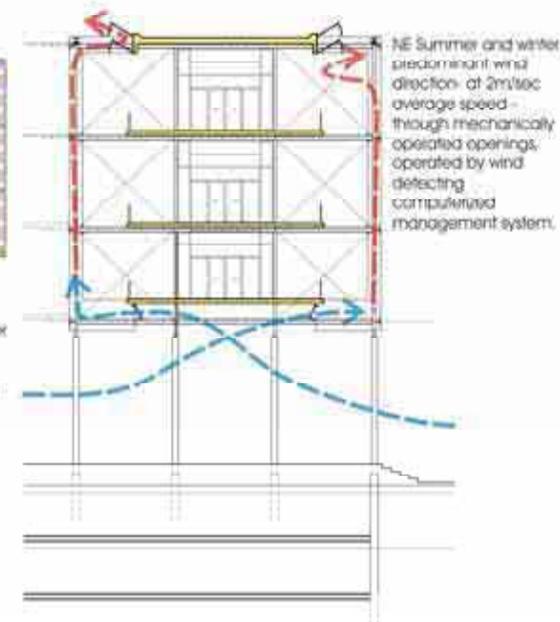
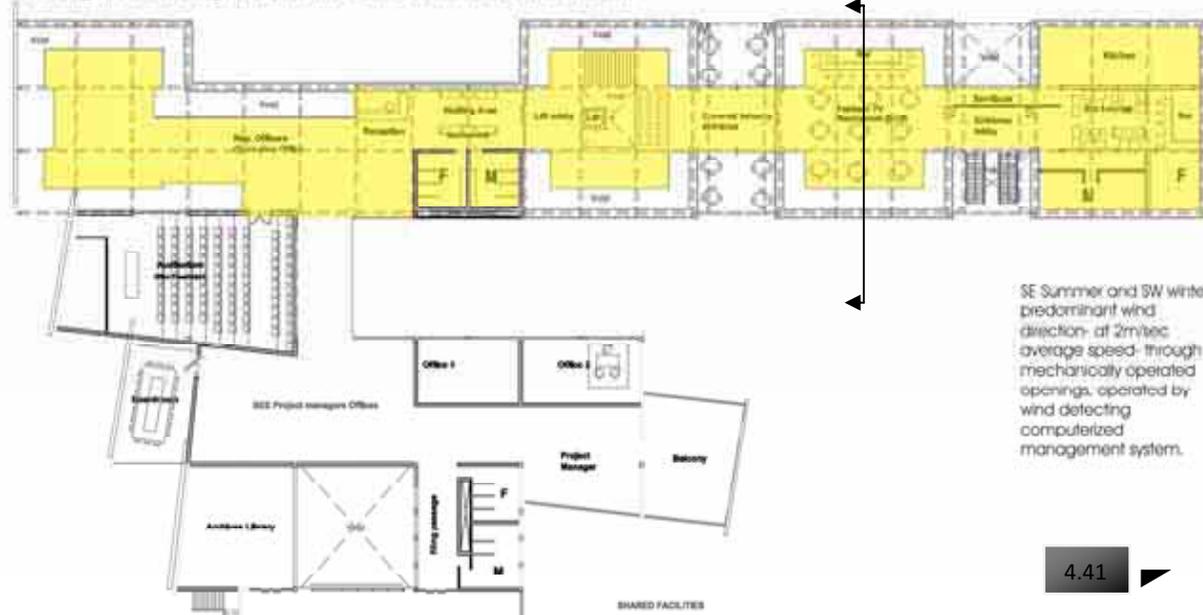
Applying the concept of liminality and the in between in the structural planning design process

LIMINALITY

Exploring ways of imparting the concept to the public by predetermining perceptions of the architecture.

Primary threshold/ encounter with the University

- Double skinned glazed wall
- Floating floors, allowing transparency and accessibility between floors.



SE Summer and SW winter predominant wind direction - at 2m/sec average speed - through mechanically operated openings, operated by wind detecting computerized management system.

NE Summer and winter predominant wind direction - at 2m/sec average speed - through mechanically operated openings, operated by wind detecting computerized management system.

4.41

4.40

The secondary threshold

- To reading on plan as a continuous linear form, creating a divide between the primary and the secondary gathering space

Structural design- Concept 2

Evolved into a pragmatic solution:

- Double skinned glazed wall only were required- north facing
- "transparency" and accessibility between floors not practical on the commercial floor. Its position out ways the original concept.



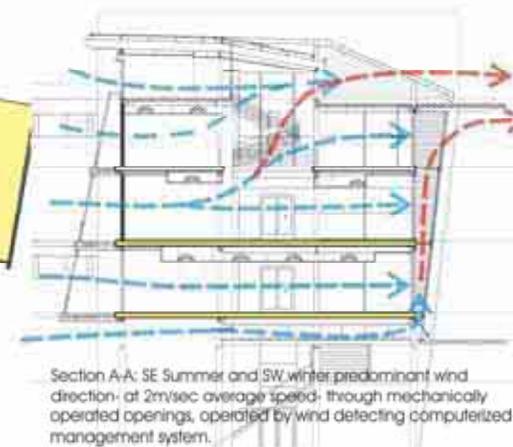
4.42

- The form is retained, the extruded forms are emphasised
- Facades to be treated in a contrasting manner to primary threshold, in that visual accessibility diminishes, making ones progression towards the university.



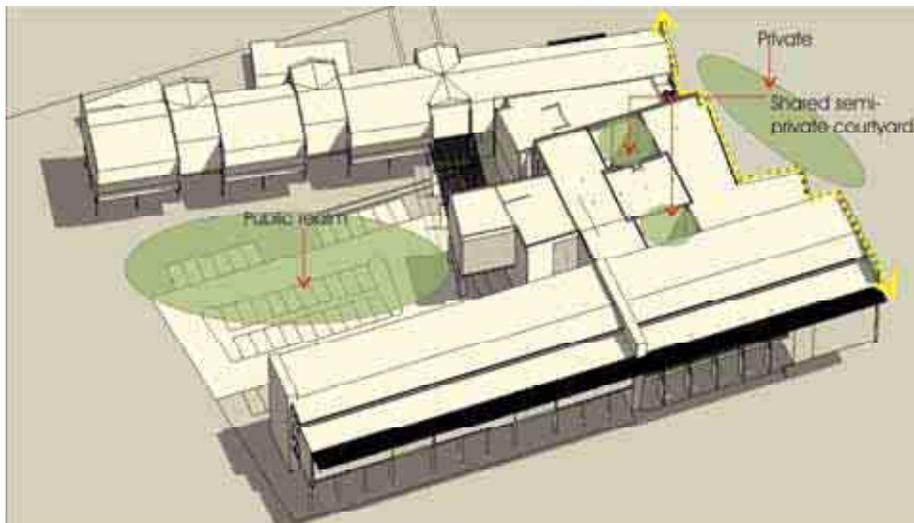
Section A-A: NE Summer and winter predominant wind direction - at 2m/sec average speed - through mechanically operated openings, operated by wind detecting computerized management system.

4.43



Section A-A: SE Summer and SW winter predominant wind direction - at 2m/sec average speed - through mechanically operated openings, operated by wind detecting computerized management system.

4.44



4.45 Hierarchy of space must not only be expressed through layout of functional internal spaces, but through the formation, and size of open spaces.



4.46 Linear walkway through development, to university pedestrian entrance. Continuity of linkage.



4.47

Creating perceptions through form

- Spatial structuring elements- allowing the experience of space 'within'
 - The liminal thresholds- dividing while bringing together
 - Thresholds - defining hierarchy of public spaces:
 - Burnett Street
 - Proposed 'university square'
 - The tourism department
 - Internal university
- Thus, the development becomes defined as the **interface of the campus**, between itself and the urban district on the activity spine.

3. CONCLUSION

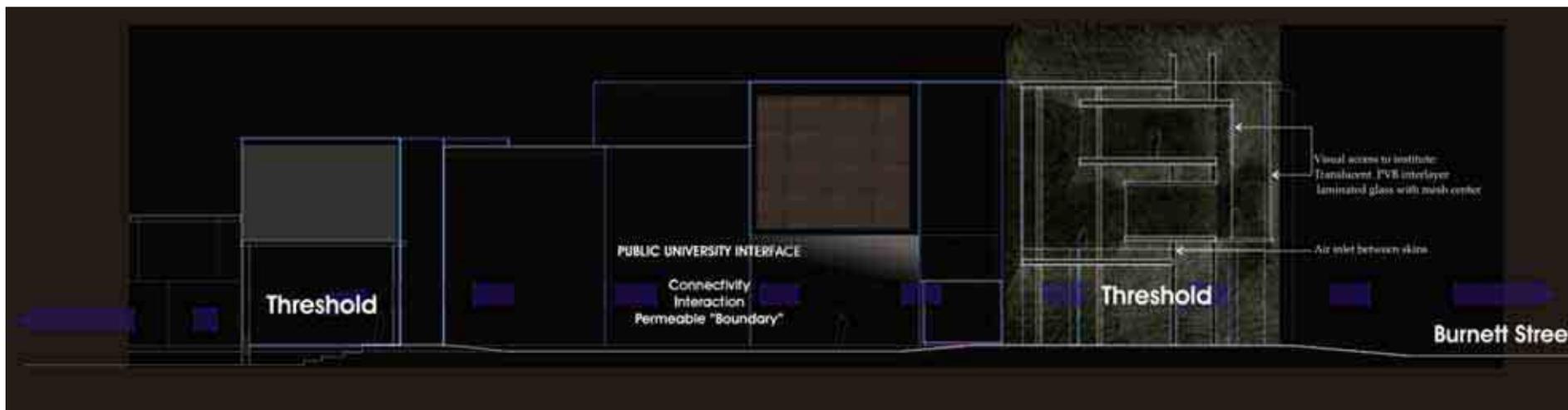
The research has revealed the influence that “spatial configuration and delineation” has on human behaviour, in addition to an ability to measure the location and extremes of spatial thresholds and envelopes. The study also establishes that human behaviour is influenced by “form positioning and articulation,” enabling an analysis of the human subconscious and fore-conscious perceptions.

For example, the current spatial threshold of the university (site), does not read as a point of entry, but rather as a prohibiting verge to an inaccessible region. The university is thus perceived as an unapproachable region apart from a whole. With this in mind a building can be designed to manipulate human perceptions as required by the brief.

Inherent in the process of interpreting the idea of phenomenal transparent urban compositions, is that of mediation. Ambiguous spatial relationships are sought through the overlapping of the parts (university and district) both spatially and functionally, thus exploring the concept of phenomenal transparency. By establishing an order in terms of how the various parts relate to one another, it becomes possible to recognise not only the basic parts, but also those between produced by their interaction. As a designer one has to be careful not to simply apply concepts without interpreting them for the context concerned. The project does not call for the pictorial response defined, when applied to architecture, by the originators of the concept Phenomenal Transparency. The dilemma in addressed in this dissertation is ‘urbanistic’, thus the concept must fulfill these needs.

The architecture of the project requires an articulation of various spatial components that induce different perceptions, as the currently untapped market of users enter and then move through the development's thresholds into an architectural translation of liminality.

From a site intervention, a greater awareness is made possible, beyond the current situation, of the university's existence and relevant position within the area.



1. INTRODUCTION

In order to understand how a research facility operates, the actual thought process of research is investigated and incorporated within the facility layout. The process is understood in sequence, where certain sequences in the thought process are adjusted to suite the new found idea as the idea is developed. This treatment has been utilised in the language of the various external façades, material selection and flexibility of vertical circulation, without compromising security.

The technical report highlights technical design decisions in a sequential approach of experience, from arrival to departure of the proposed development. Certain points of importance are discussed in detail to create an overall understanding of the building.

Discussed in the technical report are pertinent design decisions made relating to the technical resolve of the building. These are as follows:

- Site and demolition work
- Precedents
- Material selection
- Structure
- Facade treatment
- Services
- Drainage- ground floor level changes
- Thermal comfort systems

2. PRECEDENT STUDY



5.01

- Mediatheque in Sendai, Tokyo by Toyo Ito & Associates.

Influence: The use of a glazed double skin south façade overlooking the main road extends up over the structural floor slabs. The division between indoor and outdoor urban space appears to be dissolved. Spatial form is also articulated by the horizontal lines of the floors.



5.02

- Housing development in Tokyo by Akira Watanabe Architects & Associates.

Influence: The use of slender dimensioned steel members for the vertical circulation staircase, seemingly transparent and sophisticated. The patterns casts on the textures surrounding it creates a play of light and shadow.



- Carré d'Art- Languedoc Roussillon, France by Lord Norman Robert Foster.

Influence: The proportions of the building express its commanding presence, expressing the forms by articulating the horizontals through the arrival steps and roofing shading device.



- Gauteng municipal commercial building by Gap Architects.

Influence: A simple building, using local building techniques, is articulated to appear more contemporary by the incorporating an outer mesh skin.

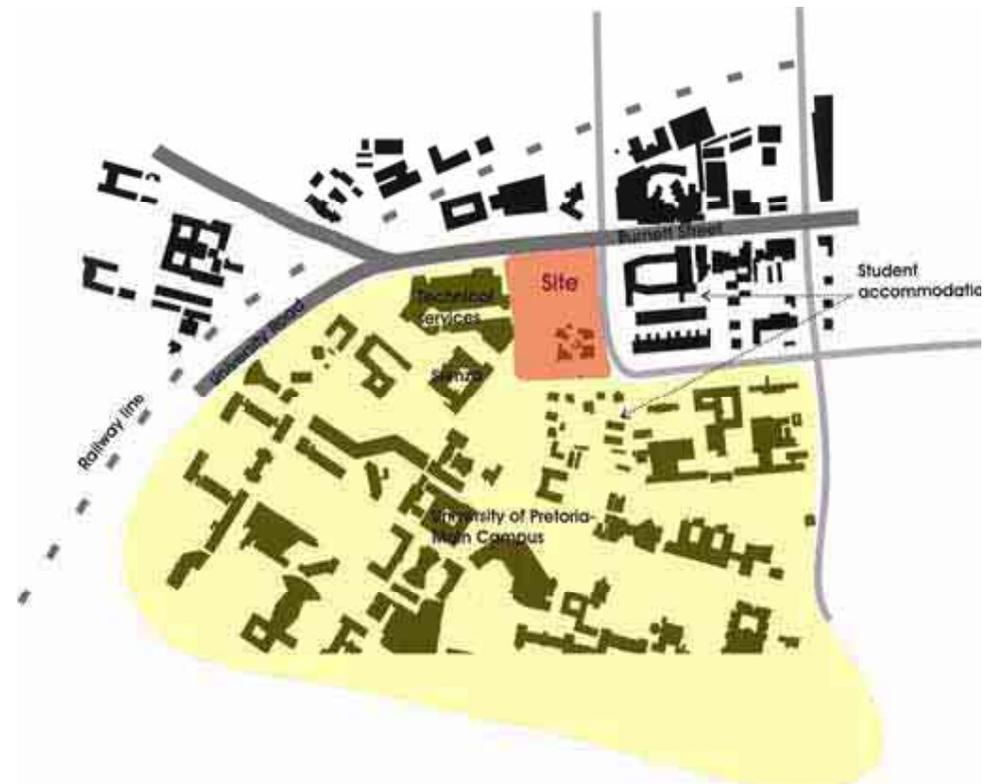
3. SITE AND DEMOLITION

The selected site is currently a parking lot for the University of Pretoria students and staff. There are no existing structures located on it. It is located adjacent to the 2.5 storey Technical Services building and the Scienza building, a single storey structure to the east, as well as adjacent to single storey buildings to the south. The single storey buildings were once demarcated for demolition, but have been preserved as heritage structures. These are to be renovated to house the Tourism Department.

The physical site has a gradual slope towards the north-west. The slope has no influence on the design considerations due to its negligible fall. All level changes on the site are created by design decisions, specifically the raised northern threshold. The Technical Services building's ground floor plan is raised by 1.2m above the Burnett Street side walk - presumably as an attempt to reduce excavation requirements for its basement level. This level is maintained and incorporated with the collaborative research ground floor, raised in a similar fashion to maintain continuity on the commercial street edge. Basement parking access has been restricted to the existing Festival Street secured entry, to ensure controlled vehicular entry to the university.

Site works will involve the removal of the existing asphalt and concrete parking surface, demolition of centered garages between the Festival Houses and the removal of surrounding barrier fences to the north, south and east.

5.05



4. MATERIAL SELECTION

Concrete, steel, glass and brick have been selected as the primary materials to be used for the infill, roof and super structure of the building, creating a robust and flexible structure to serve the variable needs of the constantly changing research departments and maintain structural integrity under unforeseen loading.

Concrete (and brick, where concrete is not the most suitable choice) has been selected to support the mass. Steel has been chosen to support the north facing outer curtain wall span and the main vertical circulation span. Face-brick and plastered brick with mortar are utilised for the infill of the conventional concrete column and slab system, which makes up most of the building, to create depth and texture to the building's surface. These construction materials and techniques were selected for the following reasons:

- Robust structure
- Flexibility
- Aesthetics
- Locally produced material
- Locally prevalent building technique equals labour intensive workforce
- Speed of construction equals reduced cost
- Response to philosophical approach

In the design investigation treatise, it became evident that research facilities are normally represented in high-tech constructed architecture. In this case, the development not only

facilitates the research facility, but also serves as a social and commercial space. Such developments are traditionally softer spaces, constructed of a concrete structure with brick and mortar infill. Materials had to, therefore, be appropriately applied along relevant edges. Thus the building becomes able to communicate its function to the users and passerby's coherently.

Distorting the boundaries between the university and its urban surroundings is one philosophical approach highlighted in the design investigation treatise. The means by which this is accomplished and to what degree, is highlighted by the following elements:

- Structure
- Façade treatment
- Appropriate positioning of various functions

5. STRUCTURE

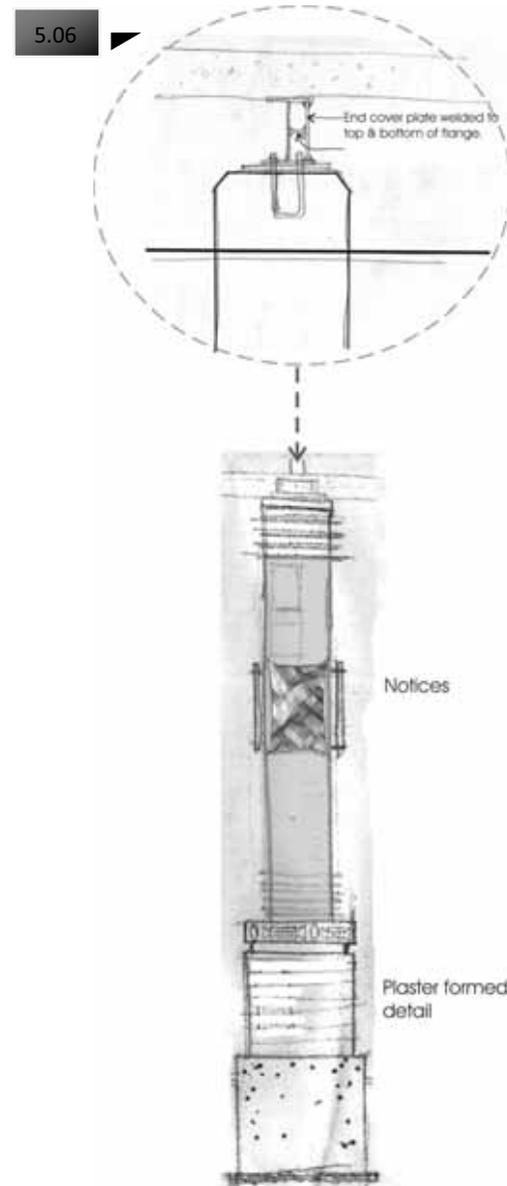
The column grid of the thresholds and the barriers of the building vary for the following reasons:

Threshold 1- The column grid includes both wider spans (10mx 9m) and narrower spans were required (5mx4.5m), with one way spanning beam fixed to them. The wider spans are incorporated so as to free up the ground floor (public realm) and to maximise the various floor plans, flexible to change for future requirements. This allows the public to witness the transformations. The beams are specified so as to carry 10m spans, to ensure flexibility in the possibility of adding new columns to further divide spaces.

Box steel columns fixed by means of a steel plate have been chosen for the glazed wall fixing, as opposed to cylindrical sections, so as to allow uniform technology to be used for the fixing of extra floor slabs, should more floor space be required. Thus, the building is able to extend inward.

Therefore, the use of steel sections for beams are utilised, and pre-cast, post reinforced floor slabs are used to ensure easy removal/addition and fixing of slabs.

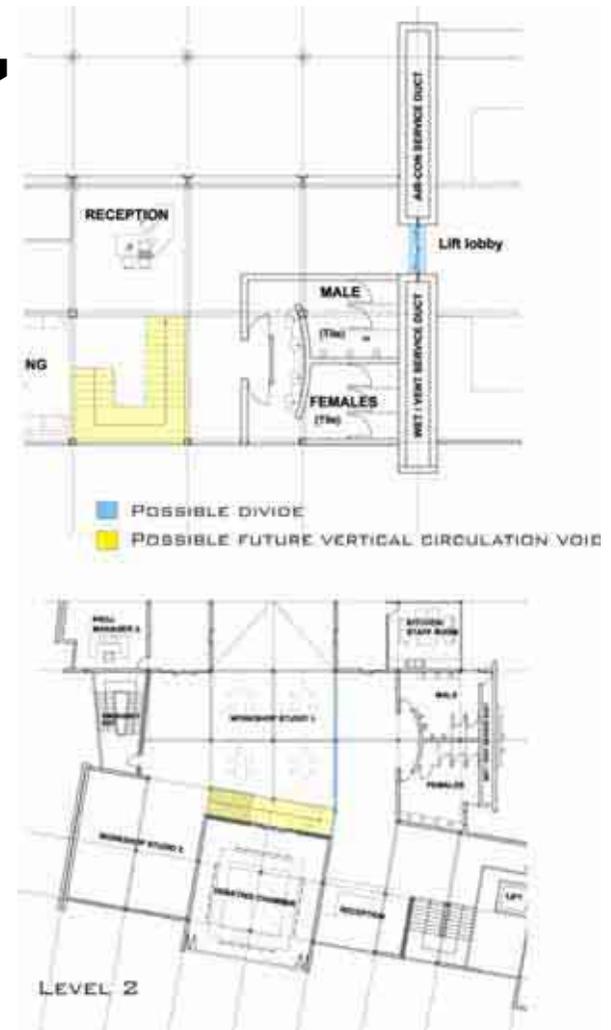
The rest of the building consists of shallow column grid depths to enable the ability to form offices with infill walling at a 5mx5m interval column spacing.



6. VERTICAL CIRCULATION

The structure is designed with numerous voids which allow for the building to further divide into three independent research departments at every level.

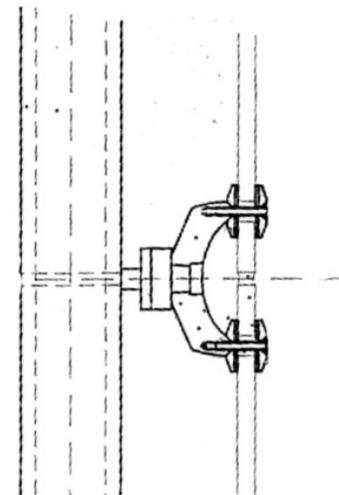
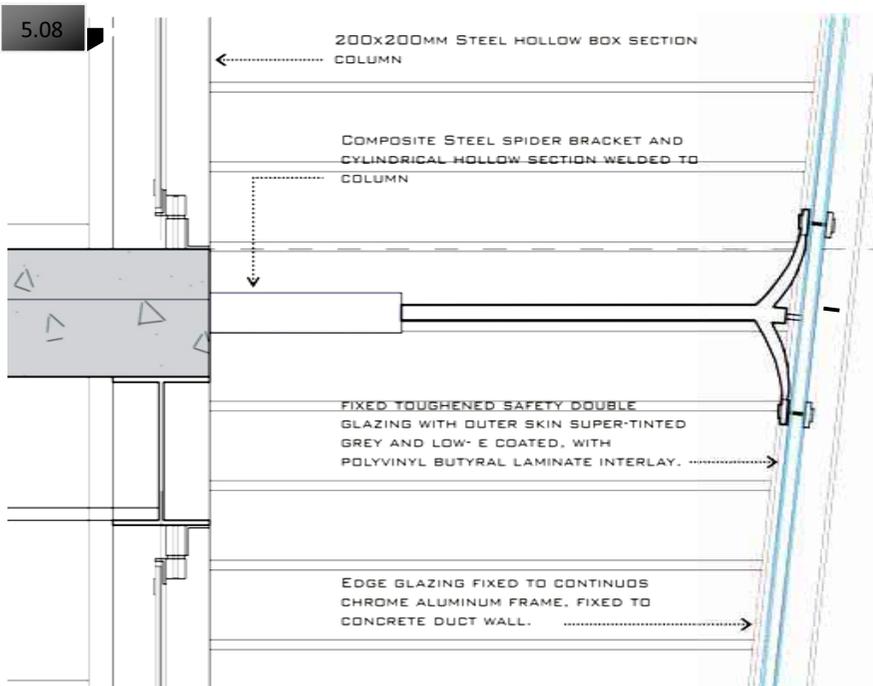
5.07



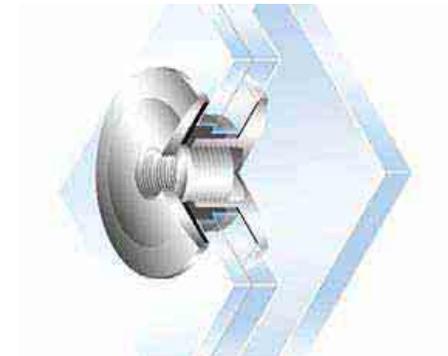
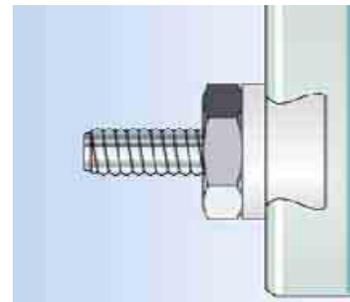
7. FAÇADE TREATMENT

The Burnett Street facade is designed to communicate to the commercial spine edge, through the use of contemporary building techniques. Both north facing glazed walls not only serve to convey a particular aesthetic, but also to reflect the surroundings and internal activities, especially in the evening when it is illuminated from within, allowing the co-existence of internal and external spaces and maximising passive surveillance, as well as acoustic and insulating properties.

The envelope consists of two skins of glazing with a spacer enclosing a sealed air space between. The primary glazing acts as an acoustic and solar screen. The specification is as follows: fixed, toughened safety double glazing with an outer skin of super-tinted grey that is low e-coated, with polyvinyl butyral laminate interlay.



5.09



The primary skin is held in place by spider brackets, and is waterproofed by applying structural silicone where the glass edges meet.

The avoidance of the use of a perimeter frame for the skin most exposed to solar radiation, will protect the skin from thermal breakage as a result of heat difference. Thermal stress is caused when the central area of the glass is heated (naturally or artificially) and expands, while the glass edges remain cool, resisting expansion.

Thermal breakage is a result of an excessive build-up of thermal stress in annealed glass. The amount of thermal stress depends upon the temperature difference between the hottest and coldest areas of the glass, as well as on the distribution of the temperature gradient across the glass.

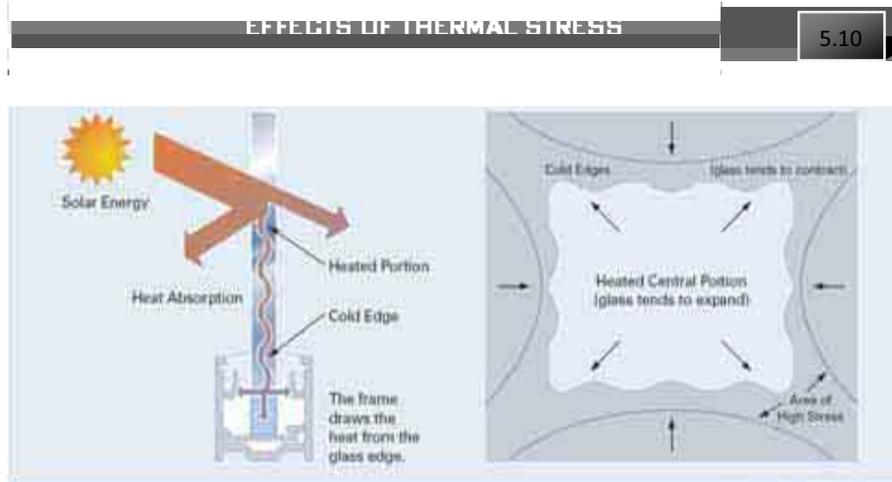
The low-emittance (Low-E) coated surface is to face into the gap between the glass layers. It blocks a significant amount of this radiant heat transfer, thus lowering the total heat flow through the window.

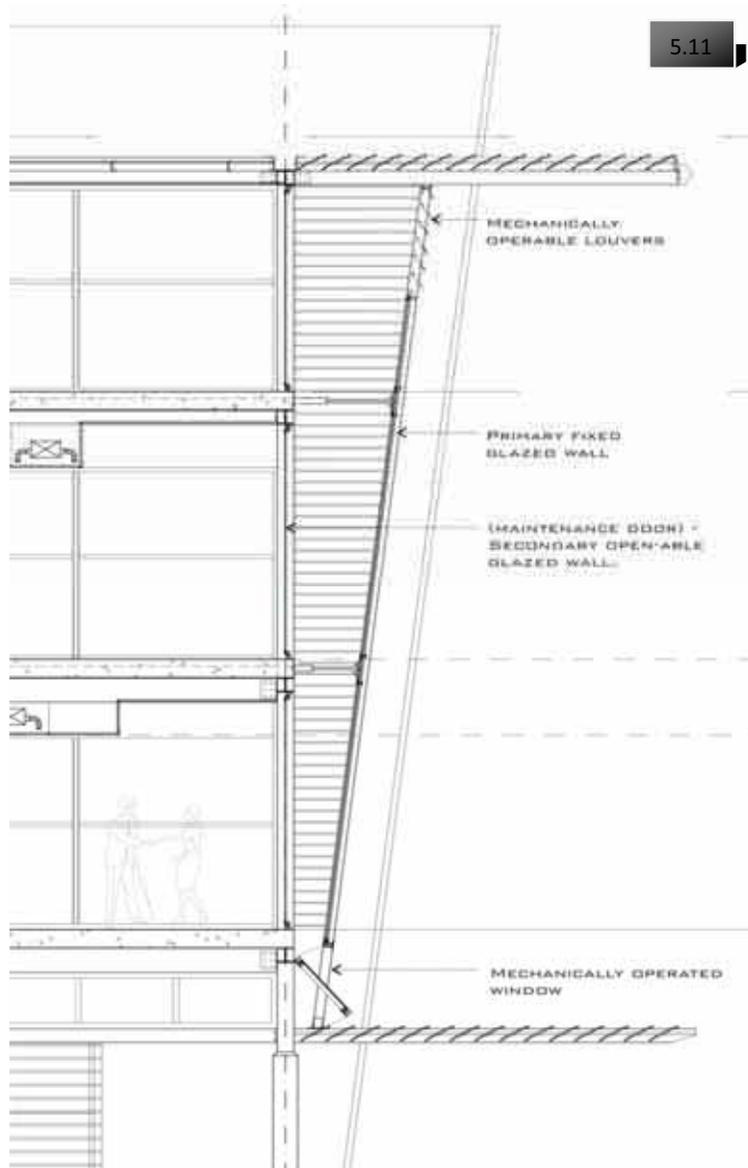
The secondary skin acts as a manually operable desiccant to the “spacer,” and solar-screen. The specification is as follows: low-emittance coated 6mm toughened glass. The skin is allowed to open so as to dehydrate the sealed air space and increase natural cross-ventilating air movement when required, while cooling the primary skin.

The secondary skin is fixed into aluminum frames. The perimeter seals consist of a combination of butyl primary seal and cured silicone secondary seal.

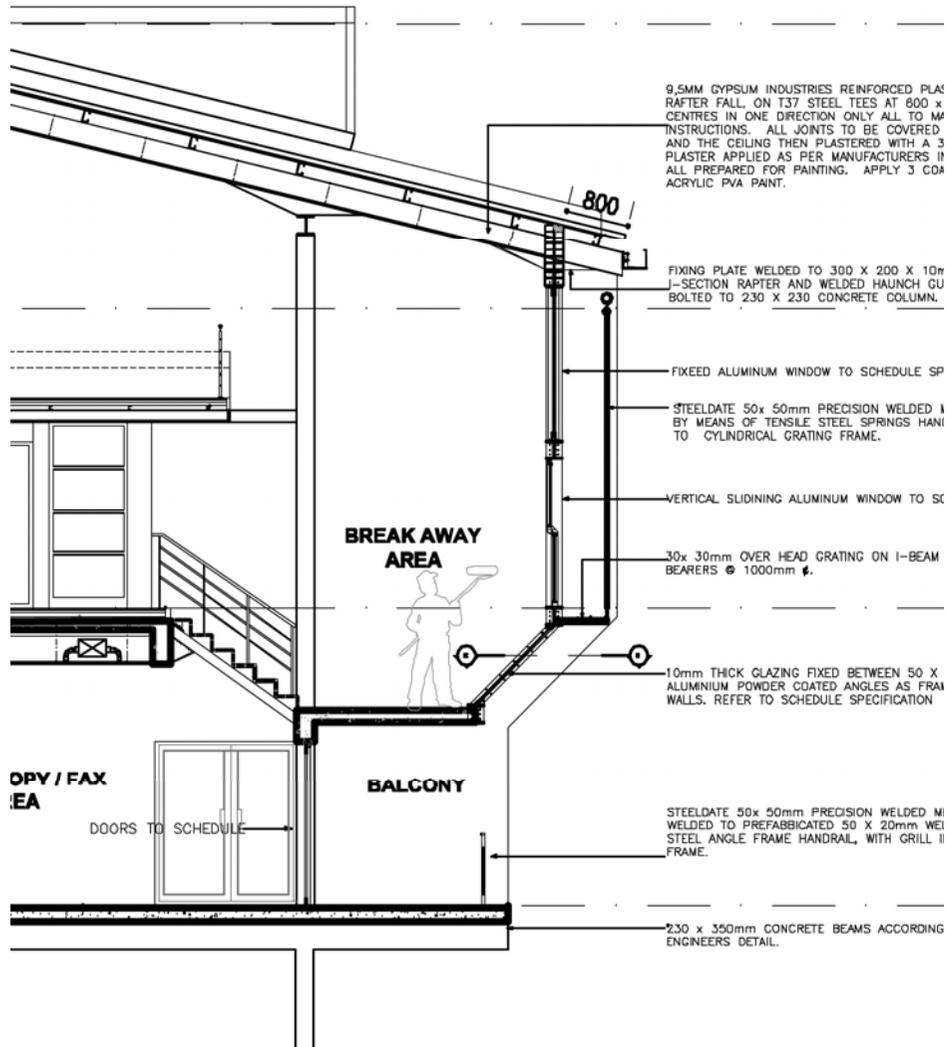
The thermal performance of insulating glazing depends mainly on the solar energy transmittance through the glazing, the reflectance of the glazing (measured by the shading coefficient), the ratio of the solar heat gain through the glazing to the solar heat gain or loss through the width of the air space, and the material and configuration of the spacer around the perimeter of the unit.

For these reasons, the spacer has been designed larger than a regular window glazing, while the open-able secondary skin acts as a service door to servicing the primary skin from every level without scaffolding on the outside.





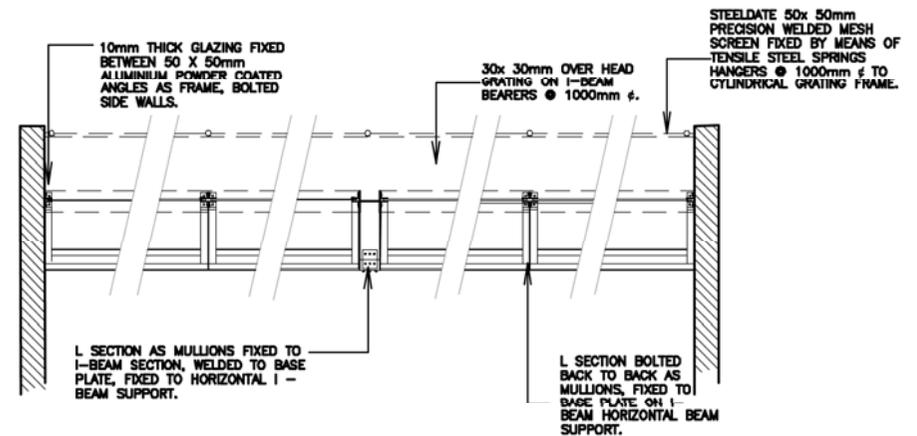
The air space reduces heat gain and loss of the north facing façade, as well as sound transmission, which gives the IG unit superior thermal performance and much needed road facing acoustical characteristics compared to single glazing. Acoustic performance of exterior building envelope assemblies is expressed in terms of the Outdoor—Indoor Transmission Class (OITC) rating. In general, a higher fenestration OITC rating is attained by incorporating laminated glass and insulating glass assemblies because the laminate reduces vibration and the air space limits sound transmission.



5.12

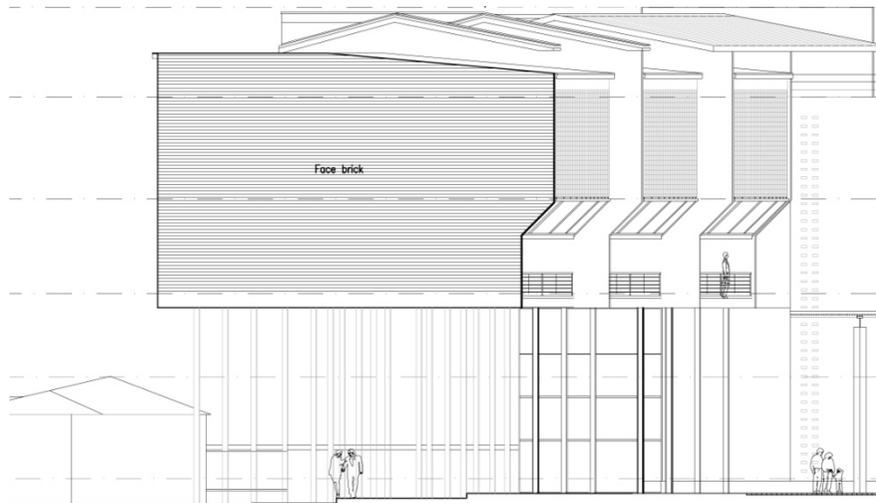
The square facing the north façade

In order to maximise the amount of light entering the building, the glazed façade is slanted outward, accommodating the balcony below. A mesh screen is incorporated into the design as a conceptual element, speaking to the idea of dissolving barriers. Occupants on the ground floor progress towards the university secured entrance, the transparency begins to blur, without completely disappearing. The screen's technical function is to break up the north light, 500mm away from the glazed façade and fixed to grating and side walls.



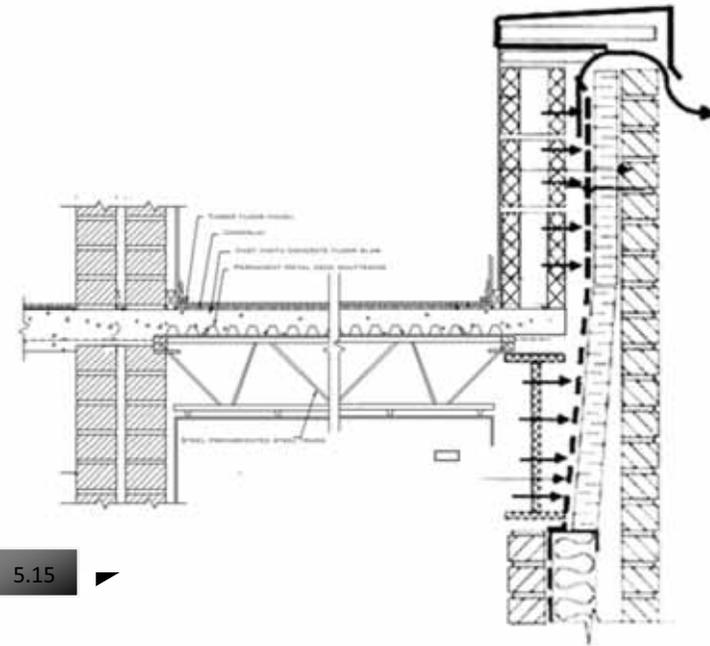
Section E - E

5.13

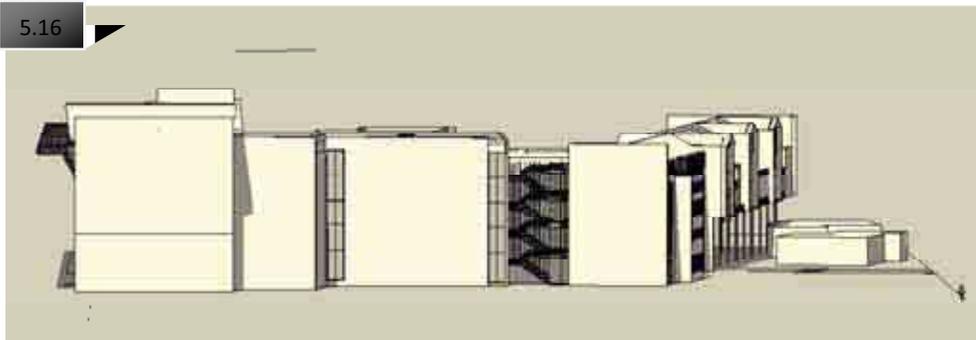


5.14

EAST ELEVATIONS



5.15



5.16



5.17

The western façade comprises mainly of 500mm wide brick cavity walls. These act as bearers to the prefabricated steel truss carrying the reinforced concrete roof slab. The walls insulate the building from the harsh western sun and have acoustic insulation properties with regard to the lecture rooms. Fig 5.15 illustrates a typical detail through the western walls.

Finally, the southern façade, with the pitched roofs and traditional building techniques, is designed to at least slightly resemble and relate to the proposed Tourism Department in the heritage buildings.



There is a definite contrast of elevational treatment, relating to the various edges. Fig 5.19 illustrates the initial views any new visitor from the outside the university would first encounter- that of transparency.

8. SERVICES

Traditional building techniques and materials have been applied to the square-facing façades. These have been employed with a contemporary aesthetic to them by using a linear texture application. This forms a minimalist aesthetic, allowing the building to facilitate human activities detailed with pergolas, mesh screens and changing paving colour and texture. Texture that is understood subconsciously by the user and relates to human activities is added.

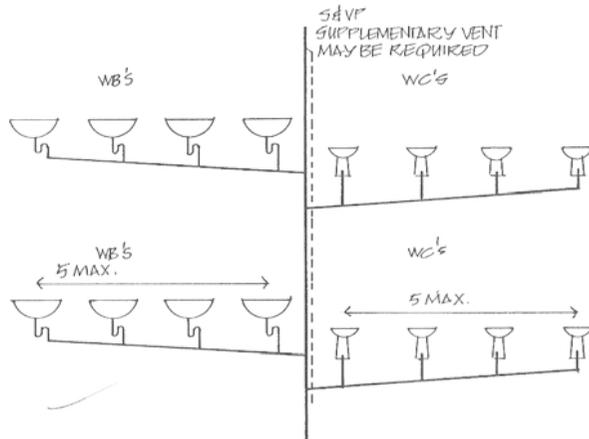
The introduction of the Square access concrete walls echoes the sentiments of the philosophical approach, introducing a second layering threshold and acting as a gateway entry. In the process of research, we cross a boundary that signifies the distinction between an old thought and a new more developed idea. In crossing this boundary, the new idea carries with it all previous ideas that lead to its inception. These walls, therefore, act as layers which allow visual and physical access in a linear movement as to where the user is coming from and where the user is headed. This is accentuated by the 5.5m length of the gateway walls into the inner public pedestrian social realm (the Square), from the vehicular dominated street edge.

The visual penetration of these walls is another philosophical point discussed in the treatise. As one moves away from these walls towards the commercial activities offered, one begins to lose partial view from between the walls of from where one has come. This symbolises the focus on the new idea, where some ideas need to be disregarded- the movement from the beginning (the

liminal/becoming) to the new point of being, as discussed in the theoretical treatise.



5.21

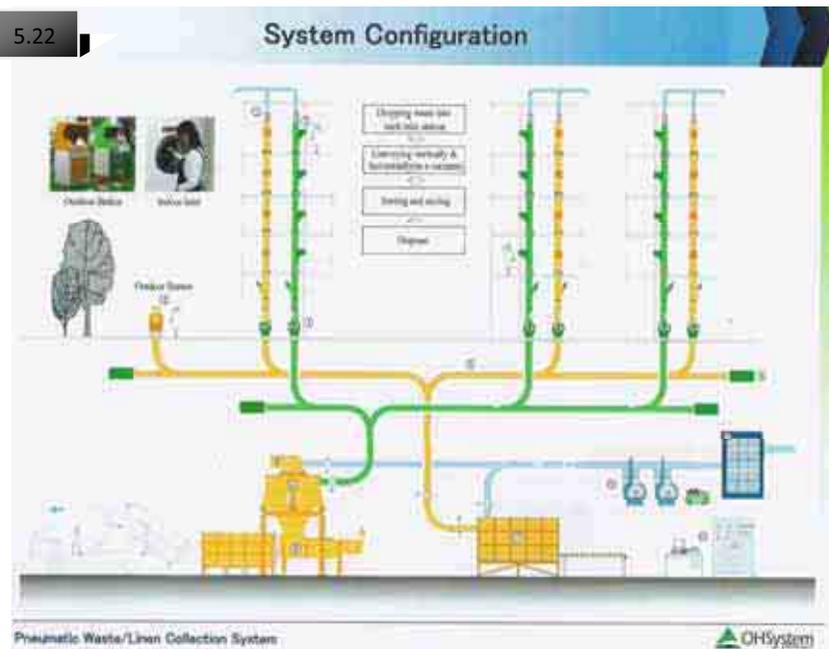


SINGLE STACK SYSTEM IN AN OFFICE BUILDING ~RANGES OF APPLIANCES

SOURCE: AFTER (ZSP3)

FIG.58

5.22



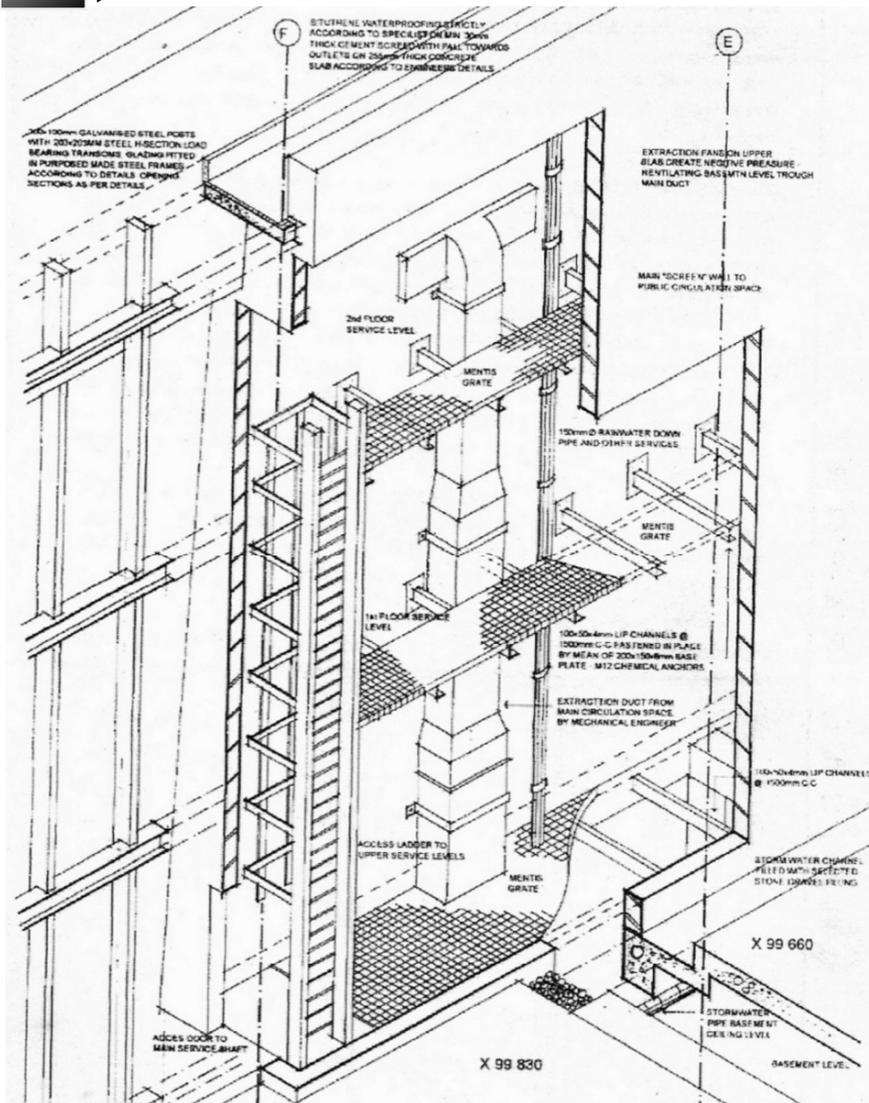
The technical functions of the walls are to act as service ducts:

- To accommodate natural air supply to all levels of the north threshold structure, assisted by air-conditioned supply from the chiller room on the basement level. Mechanical systems are to be designed by a mechanical engineer.
- To accommodate rainwater pipes from a photovoltaic clad roof, collected via storm water pipes below the ground floor slab at basement ceiling level in order to be filtered and reused in the chiller room.
- To serve as a vertical electrical supply duct through-out the building, linked to the power room beneath the stairs at basement level.
- To act as a vertical super-structure, constructed of prefabricated concrete, to free up the ground floor at the threshold area.
- To house a Pneumatic Waste Collection duct system for paper disposal, to be collected into 700mm wide trolleys at ground floor for sorting. (Fig. 5.22)
- As waste water and sanitation central cores. Three central service cores have been located throughout the building. The service ducts are vertically ventilated. Access to the ducts is at ground floor level, and upper floors are accessed via an access ladder (indicated in the figure below by M. Sutherland, Thesis 2002 doc 2:72).

Fig 5.21 illustrates typical stack system utilized in the building.

9. THERMAL COMFORT

5.23

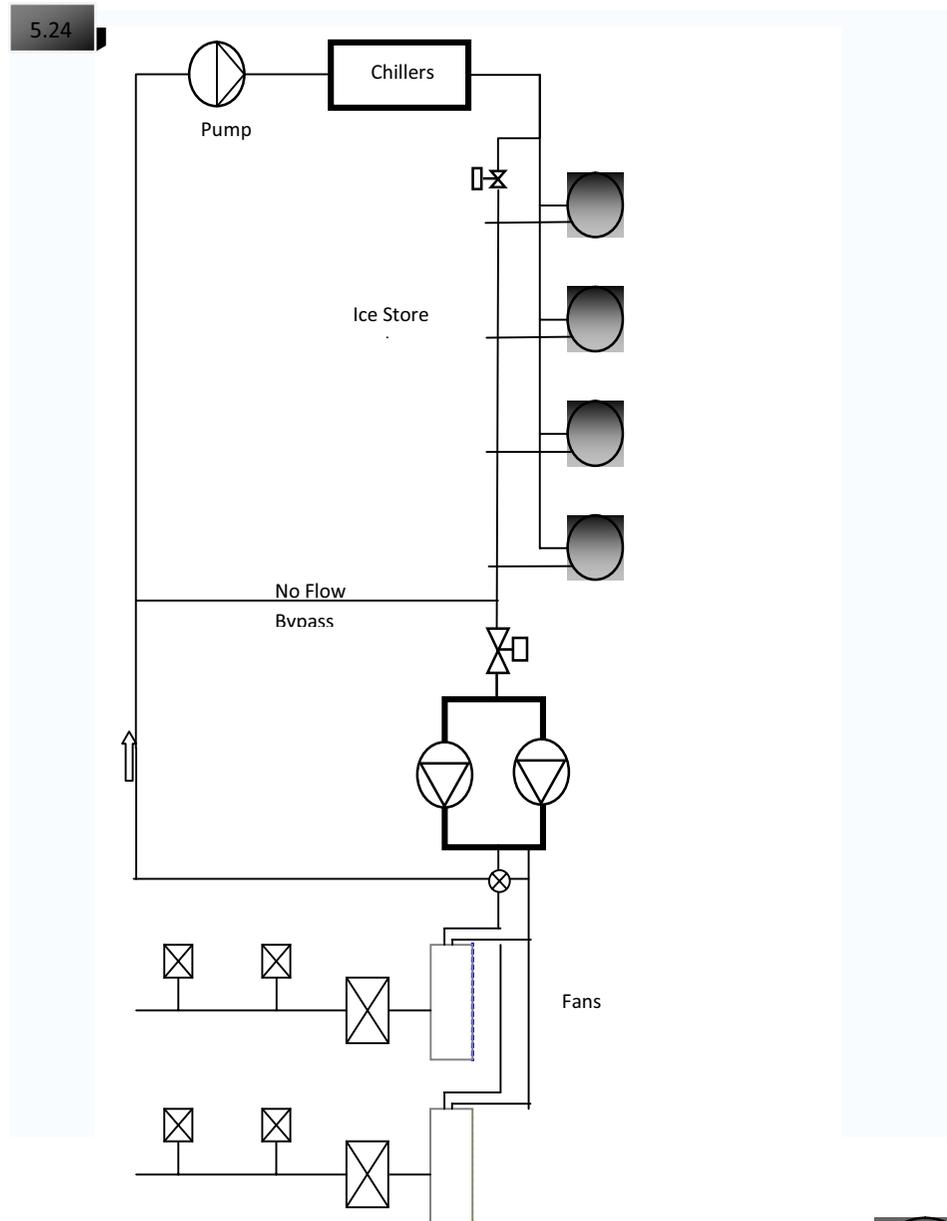


The mechanically assisted ventilation system consists of extraction ducts (to extract warm spent air) and fresh air supply ducts (replacing spent air with water chilled, humidified, fresh air) moving up the central duct carried horizontally under the ceilings.

This thermal storage system essentially shifts electricity loads to off-peak periods with significantly lowers costs. The system uses a standard chiller to produce ice (produced in off-peak periods) which significantly lowers costs and does not require any complicated duct system beyond the conventional duct systems. Water is circulated through the pile during the day to produce chilled water that would normally be the daytime output of the chillers.

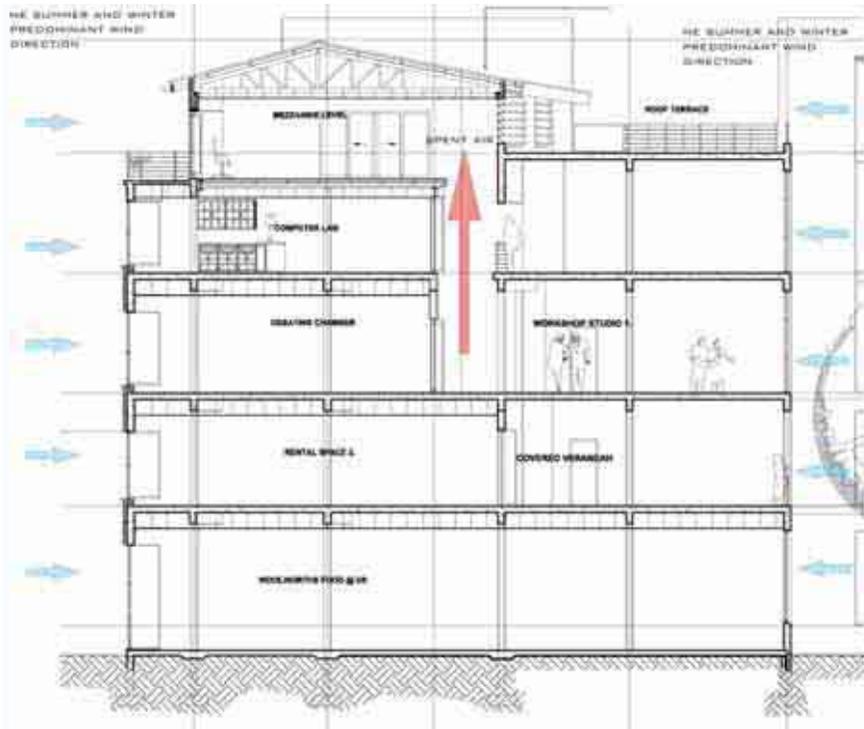
A new twist is that this technology uses ice as a condensing medium for refrigerant. In this case, regular refrigerant is pumped to coils where it is used. Instead of needing a compressor to convert it back in to a liquid, however, the low temperature of the ice is used to chill the refrigerant back in to a liquid. This type of system allows existing refrigerant-based HVAC equipment to be converted to Thermal Energy Storage systems, something that could not previously be done easily with chill water technology. In addition, unlike water-cooled chill water systems that do not experience a tremendous difference in efficiency from day to night, this new class of equipment typically displaces the daytime operation of air cooled condensing units. In areas where there is a significant difference between peak daytime temperatures and off-peak temperatures, this type of unit is typically more energy efficient than the equipment it is replacing.

The flow diagram shows a typical storage plant.

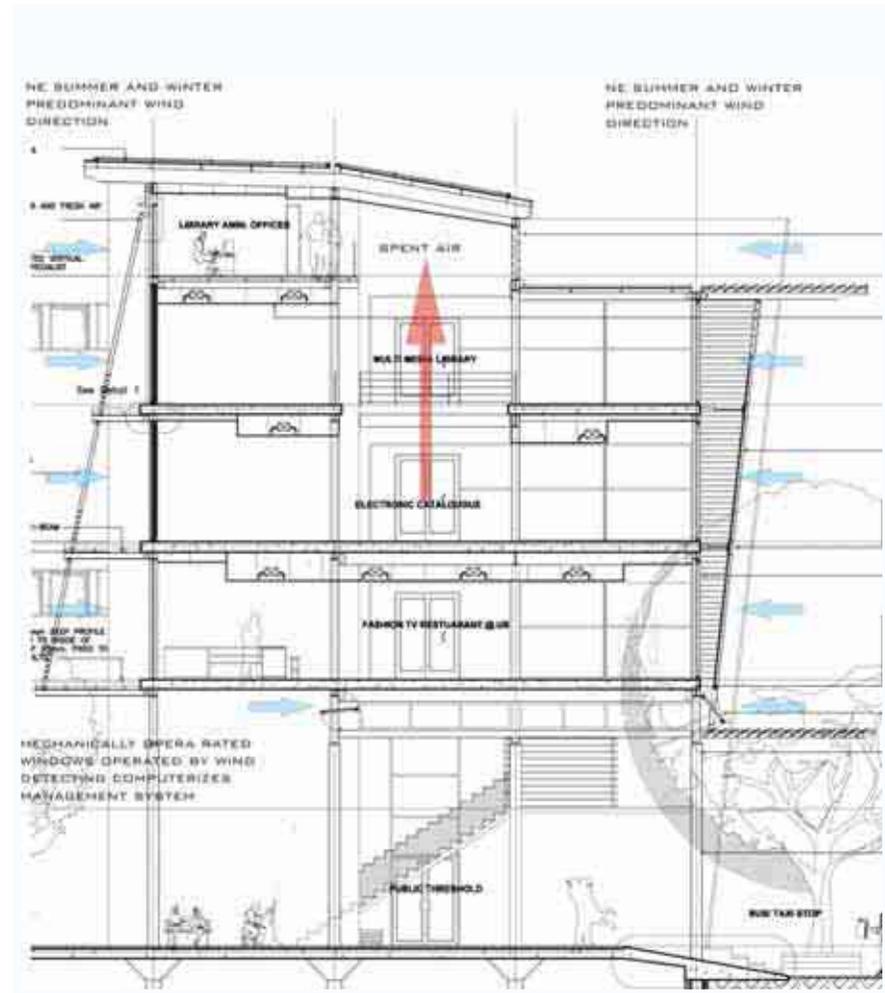


In addition to the air extraction and supply devices, numerous other environmental controlling systems have been incorporated to ensure user comfort. These are as follows:

- Structural mass – a cavity wall that acts as a barrier from the harsh western sun.
- North facing insulated double skin wall to keep internal spaces cool in summer and hold the heat in winter.
- Expansive use of glazing on the south façades.
- The building has been orientated so as to take advantage of the summer north-eastern and south-eastern prevalent winds, as well as the winter south-western winds- with winds with the highest intensity coming predominantly from the south of Pretoria.
- The depths are kept shallow at a minimum of 10m and a maximum of 15m to encourage the efficiency of cross ventilation.



5.25



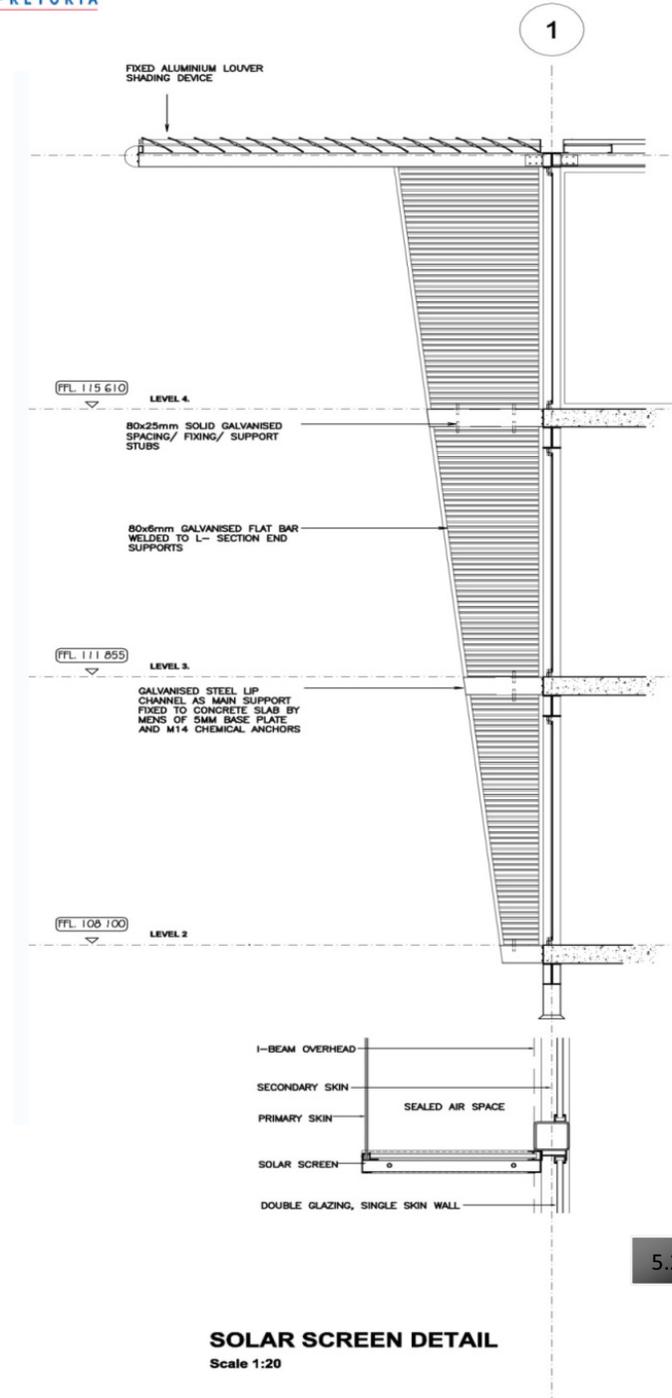
5.26

Solar screens

In an effort to limit internal spaces from exposure to the western sun, activities which require little to no natural light have been positioned to the west of the building. These include lecture theatres, laboratories, conference rooms and exhibition spaces.

Where transparency of the threshold could not be avoided, as a result of the philosophical discourse, solar screens were employed to protect glazed surfaces from exposure.

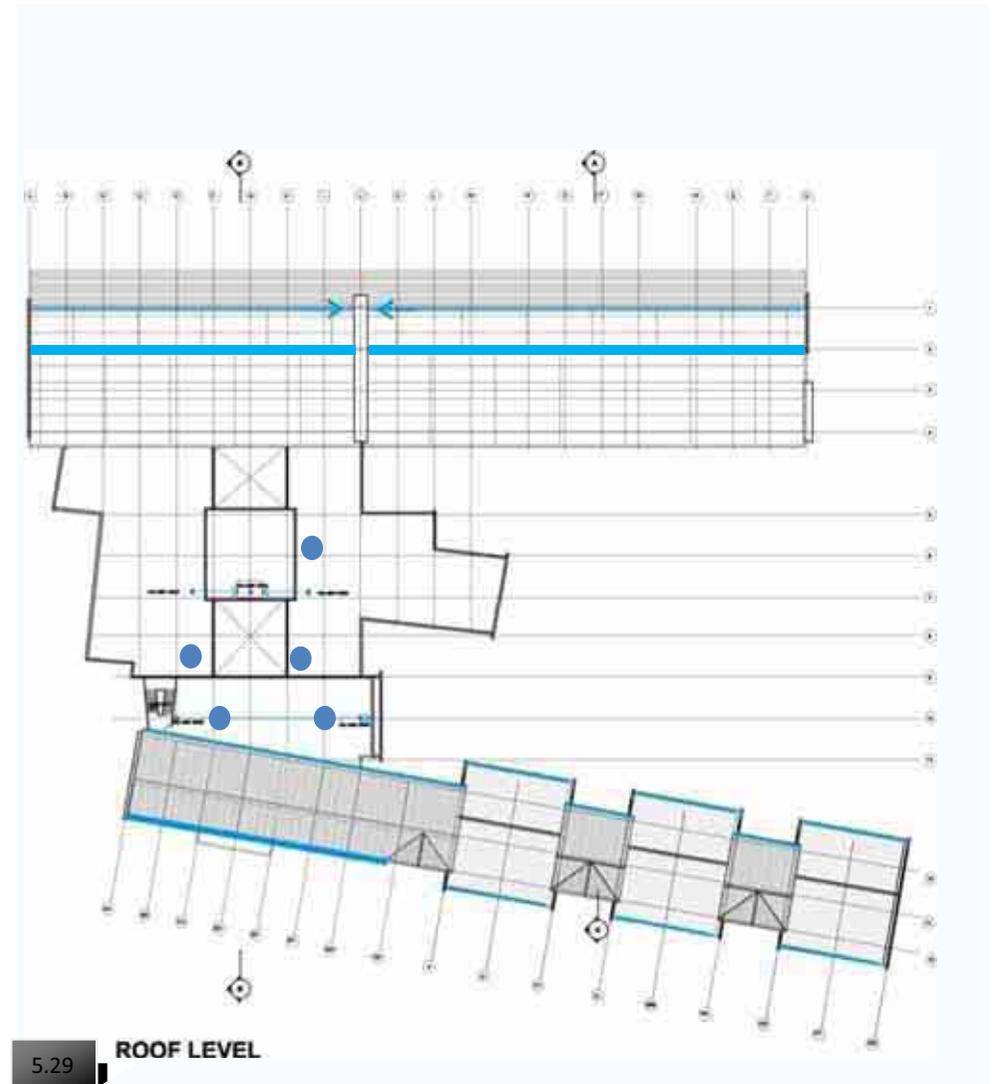
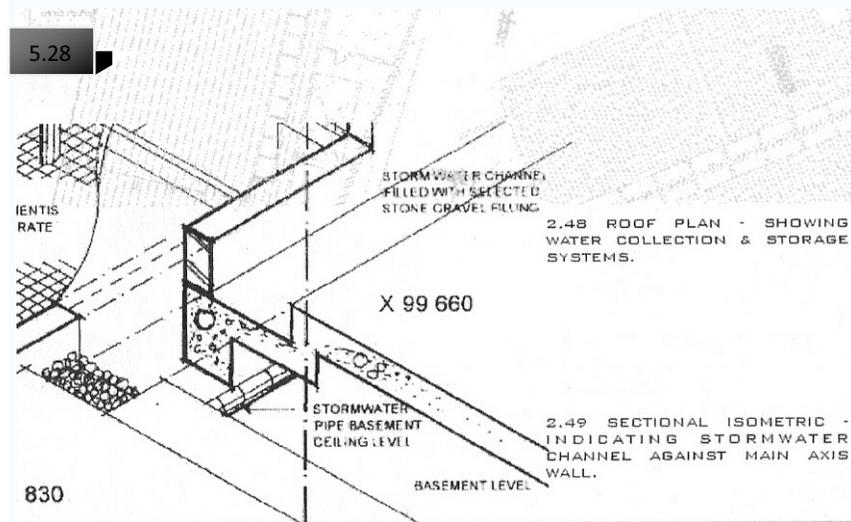
The use of these galvanized steel bars welded to I-sections allow for the continuity of transparency, while layering the minimalist aesthetic of the northern façade when approached from University Road.



SOLAR SCREEN DETAIL
Scale 1:20

10. STORMWATER

The water off the roof slabs will be collected into the ducts to be used as a non-drinkable grey water source for toilets, urinals and landscaping. The grey water is to be directed into subsurface storage tanks. From the storage tanks the water will be pumped to other storage tanks on structurally strengthened concrete roof slabs near service cores (refer to roof plan). Ground level storm water is to be directed, via paving laid to fall, to join the municipal connection at the corner of Festival and Burnett Street.



11. FIRE SAFETY

The following structural stability guidelines are to be adhered to:

- Offices and administration = 60min
- Places of assembly = 120min
- Service ducts = 120min

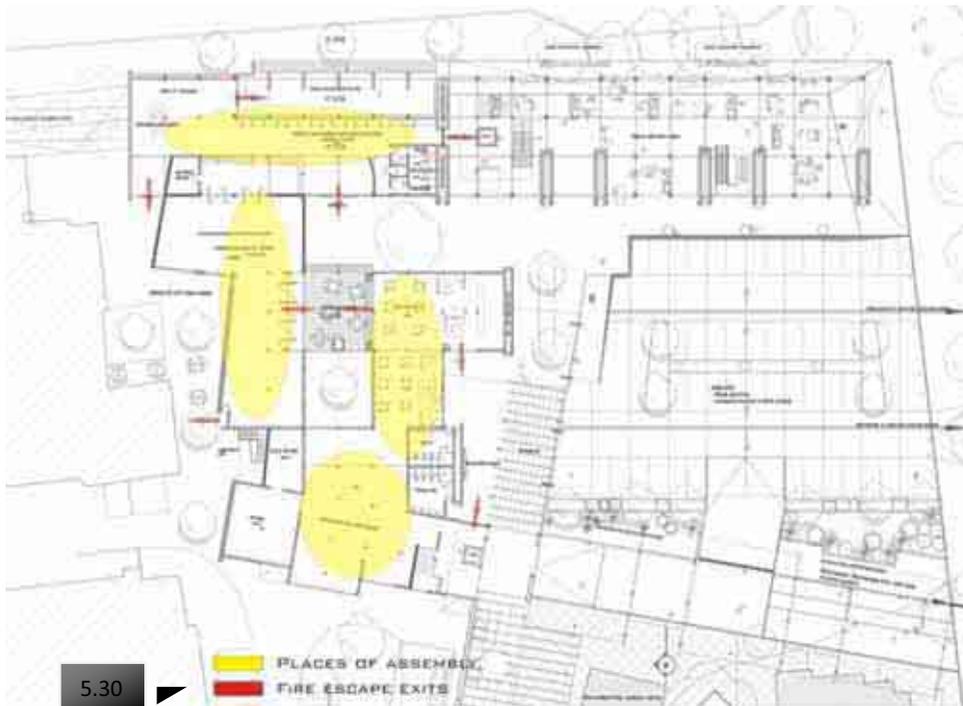
Firefighting equipment to be installed in the building must adhere to national building regulations.

Fire escapes are a maximum of 45m travelling distance to the closest exit point.

No staircase forming part of the escape route has direct access to the basement.

Lifts do not form part of the escape route.

The minimum width of a staircase, stipulated by building regulations of 1200mm, is exceeded throughout the building- the narrowest being 1500mm.



Ground Floor Plan – Illustrating fire escape exits at ground floor level to either public or private external spaces.



12. PAVERS

Typical upper floor plan – Illustrating fire escape routes to staircases to ground floor level to either public or private external spaces.



Colonial style stone company's paving products of equivalent local product.

Road paving entering the Hatfield district hub should be considered, in order to slow down cars and also to signal entry into the district.

Walkway paving is to match the Square's paving, so as to integrate and indicate the Square as a public realm. A different colour of a similar paving should be used to indicate parking bay spacing and, therefore, also rentable area for the weekend formalised market.

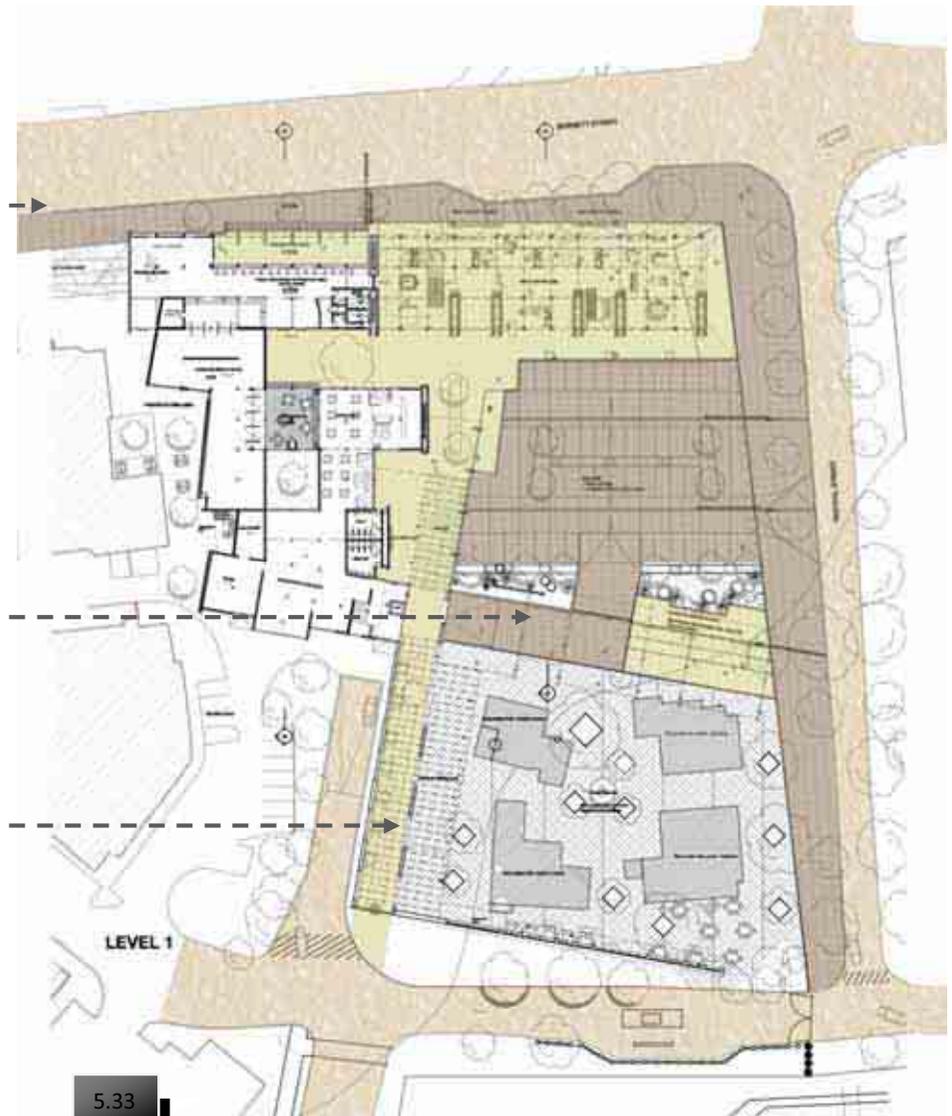


The development's public areas and walkways are to be paved with pavers of a singular colour, varying in sized to create pattern; to be designed by landscape specialist. This ensures easy orientation for users.



Pavers to the west are to match the existing pavers.

Treat ground underneath pavers with an approved weed-killer. Pavers to be laid on 50 mm clean river sand with a 1:100 fall away from the building, or as specified. Fill joints with class 1 cement mortar and strike off with a jointer. All paver layouts, mixed colour and sizes to be designed by landscape specialist.



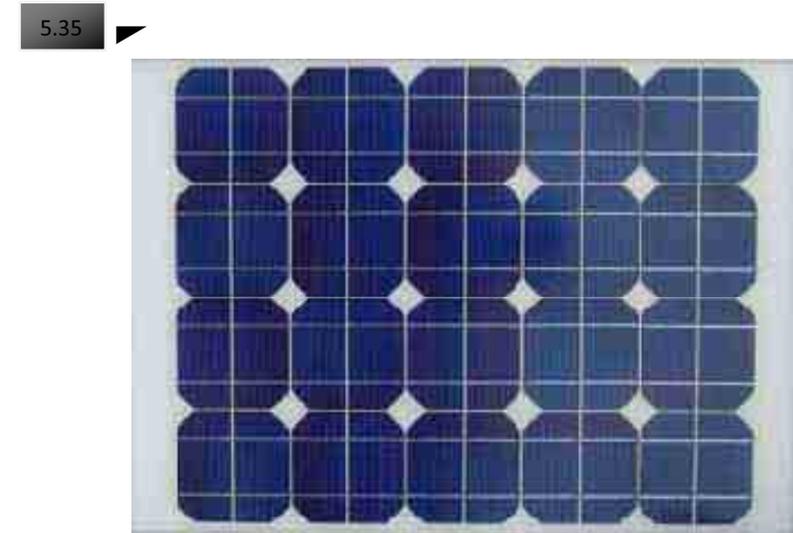
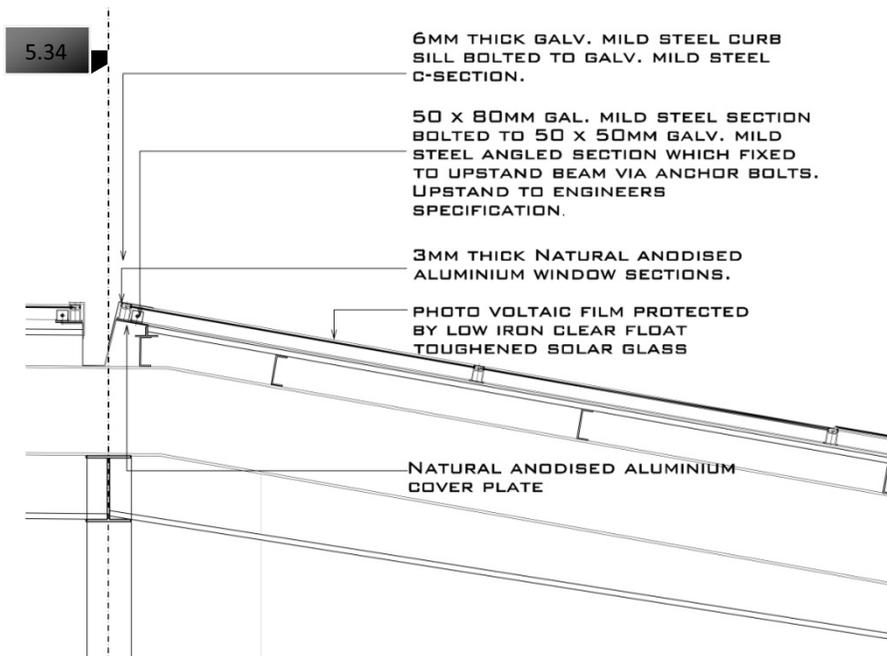
5.32

5.33

13. SOLAR PANELS

Thin film photovoltaic paneling is situated on the expansive north-facing roof. They are covered with low iron clear float toughened solar glass, which allows higher energy transmittance of about 91% compared to ordinary glass, provides excellent light diffusion, which decreases reflection, allows higher light transmission at an acute incidence angle and lower absorption by the glass itself.

The panels double up as a shading device, allowing dappled light to penetrate through diamond shaped spaces between them. The power sourced from the panels will be battery stored in the power room at basement level in order to power lights. The photovoltaic panels supplement municipal power and are, therefore, not the only source of electrical supply. Depending on the available power stored that day, they may also supplement landscape lighting on the development.



New technology- Photovoltaic film

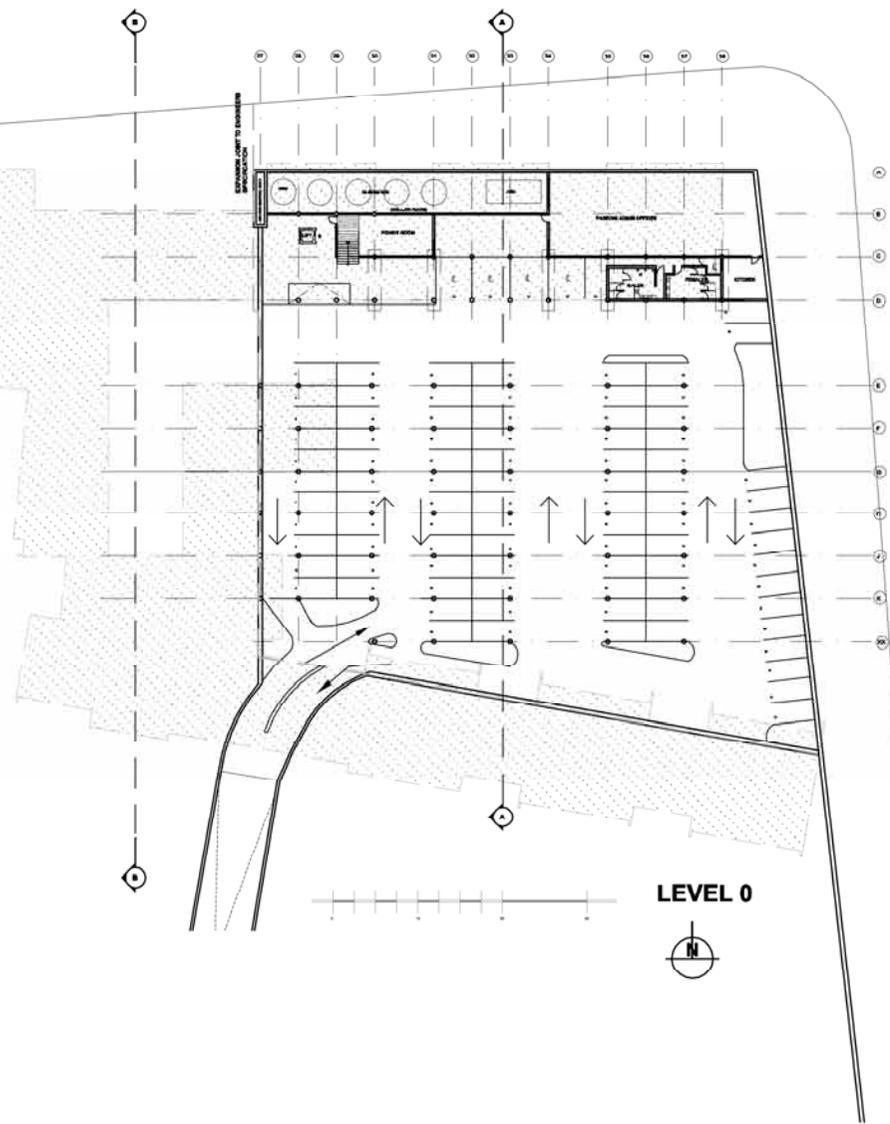
Parking Requirements

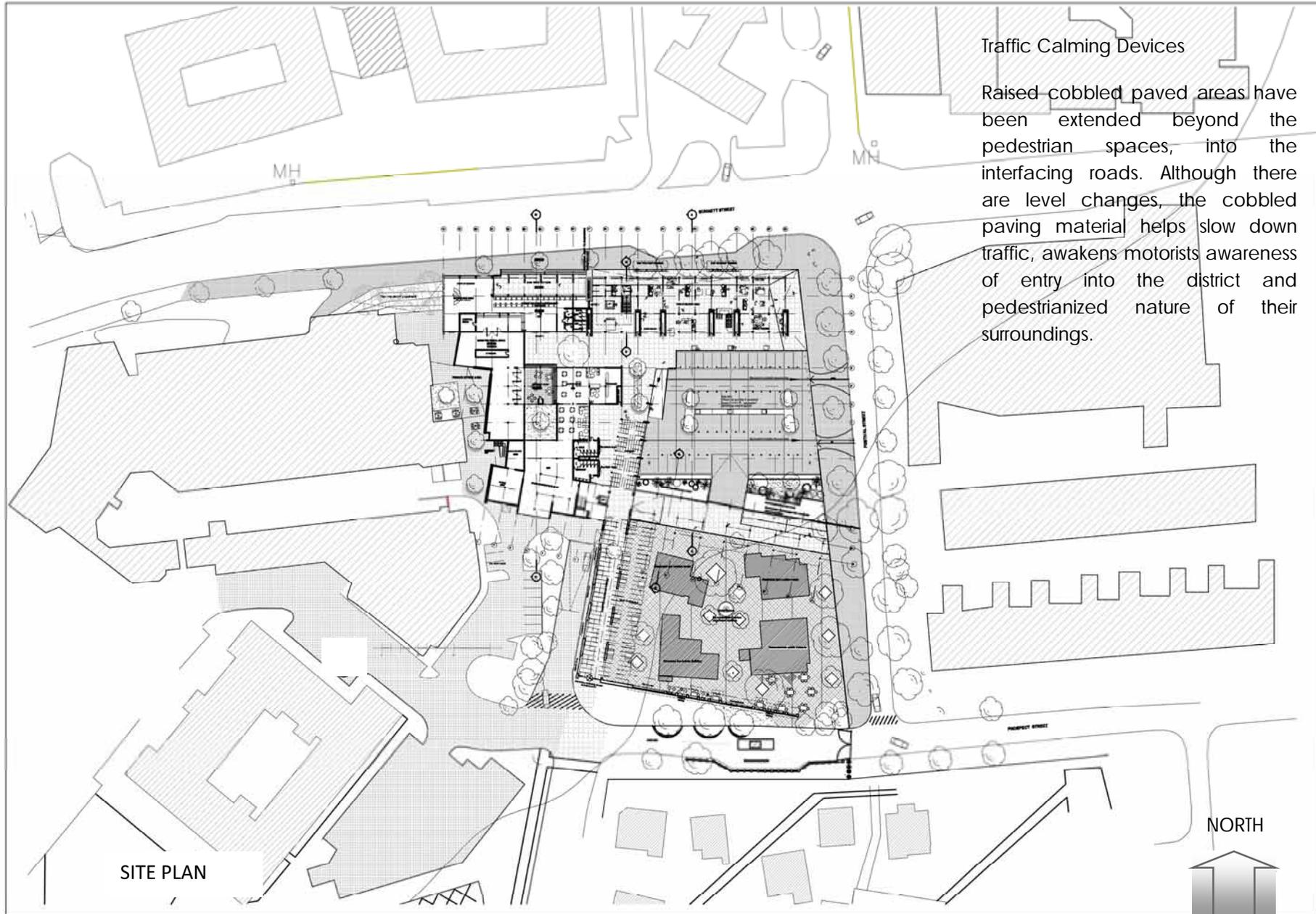
The required number to support functions, has not as yet reached.

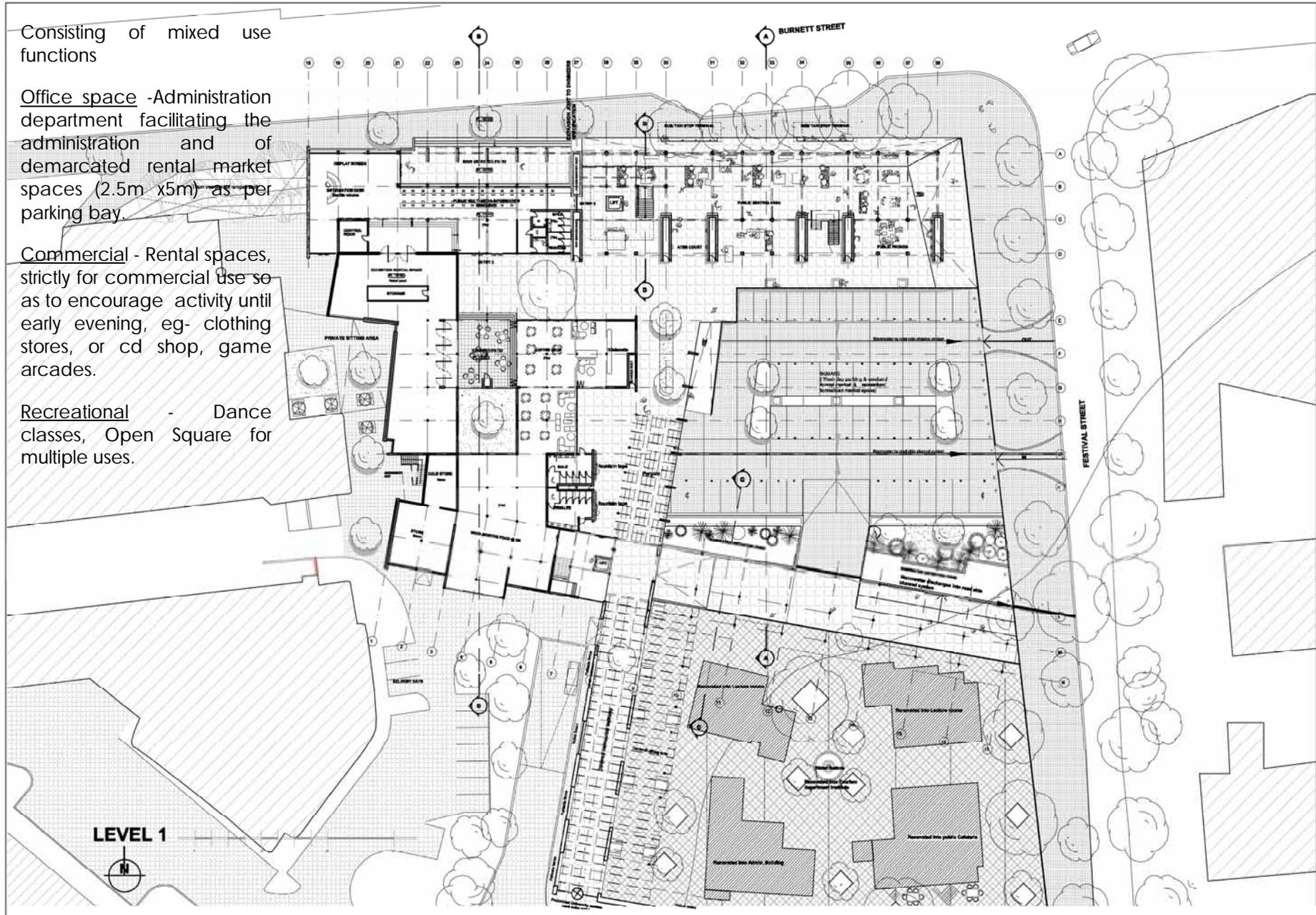
A provision of 145 parking bays has been made. Currently the student parking lot provides for 160 cars, there will be loss of student parking, considering that the facility will occupy the ground level parking. A second basement level must be considered.

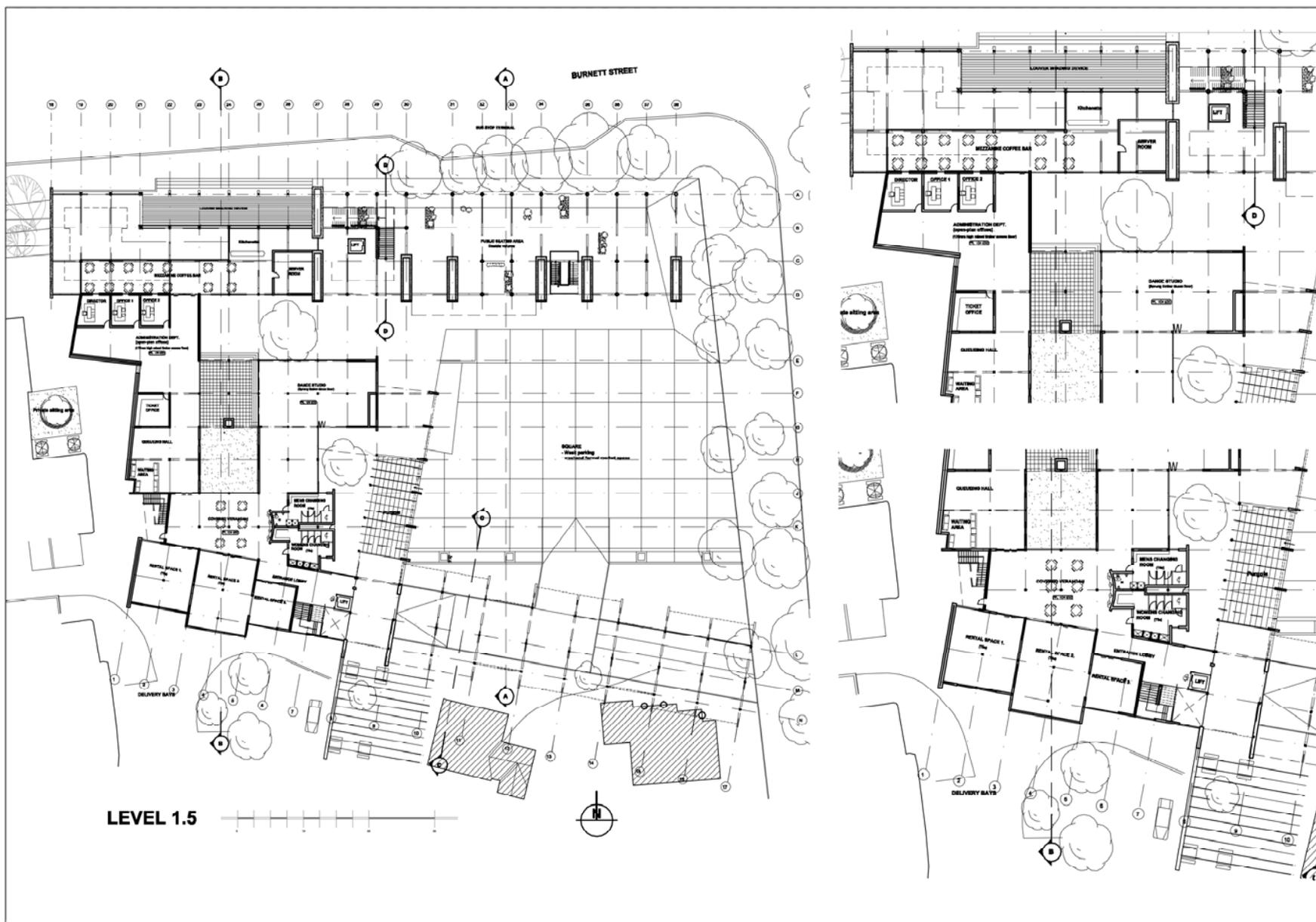
External Traffic Considerations

In order to not increase the congestion existing on Burnett Street during peak hours. No new vehicular entry points have been incorporated. The existing Vehicular entrance point off festival and corner festival and Prospect Street will be utilized.

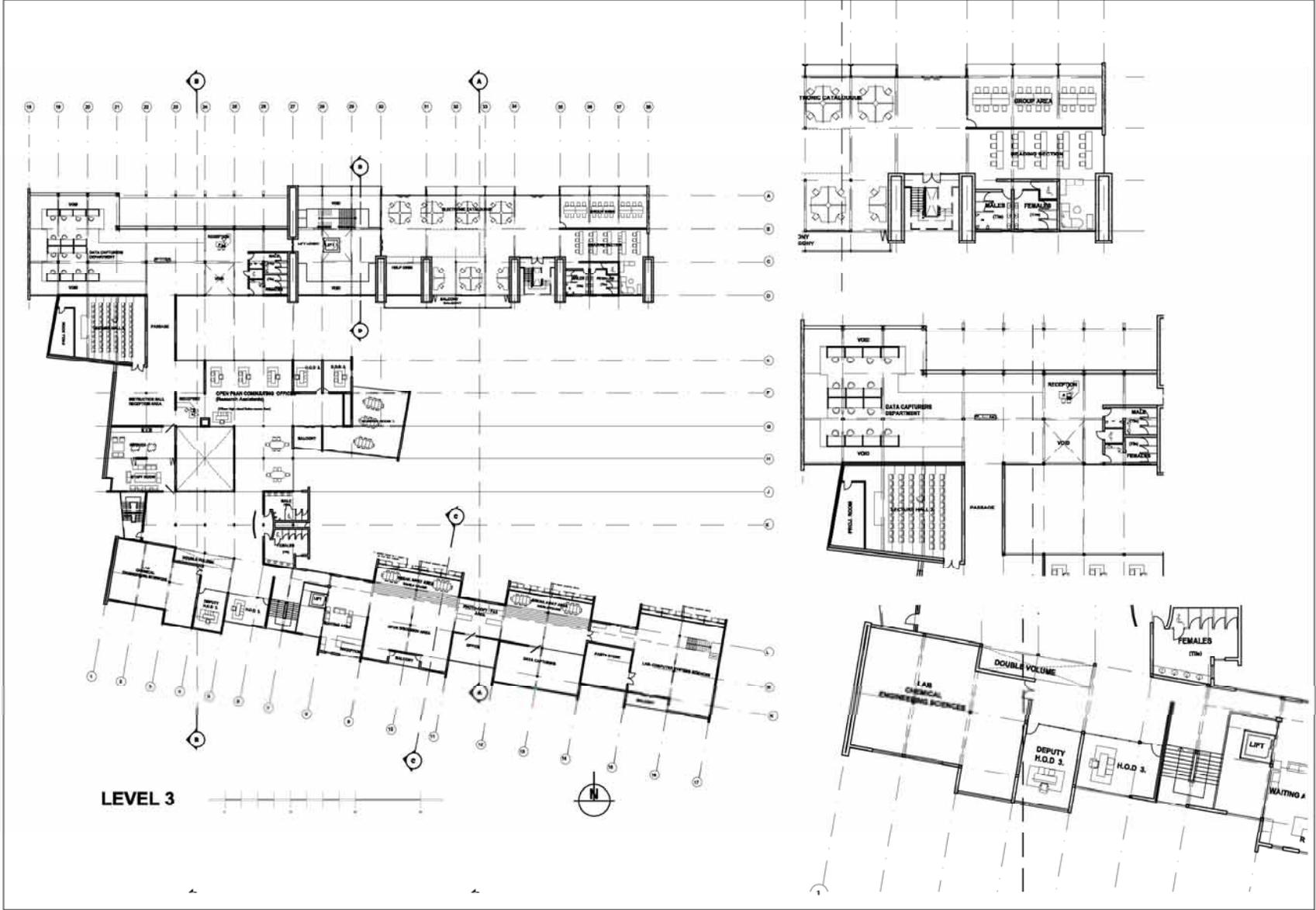




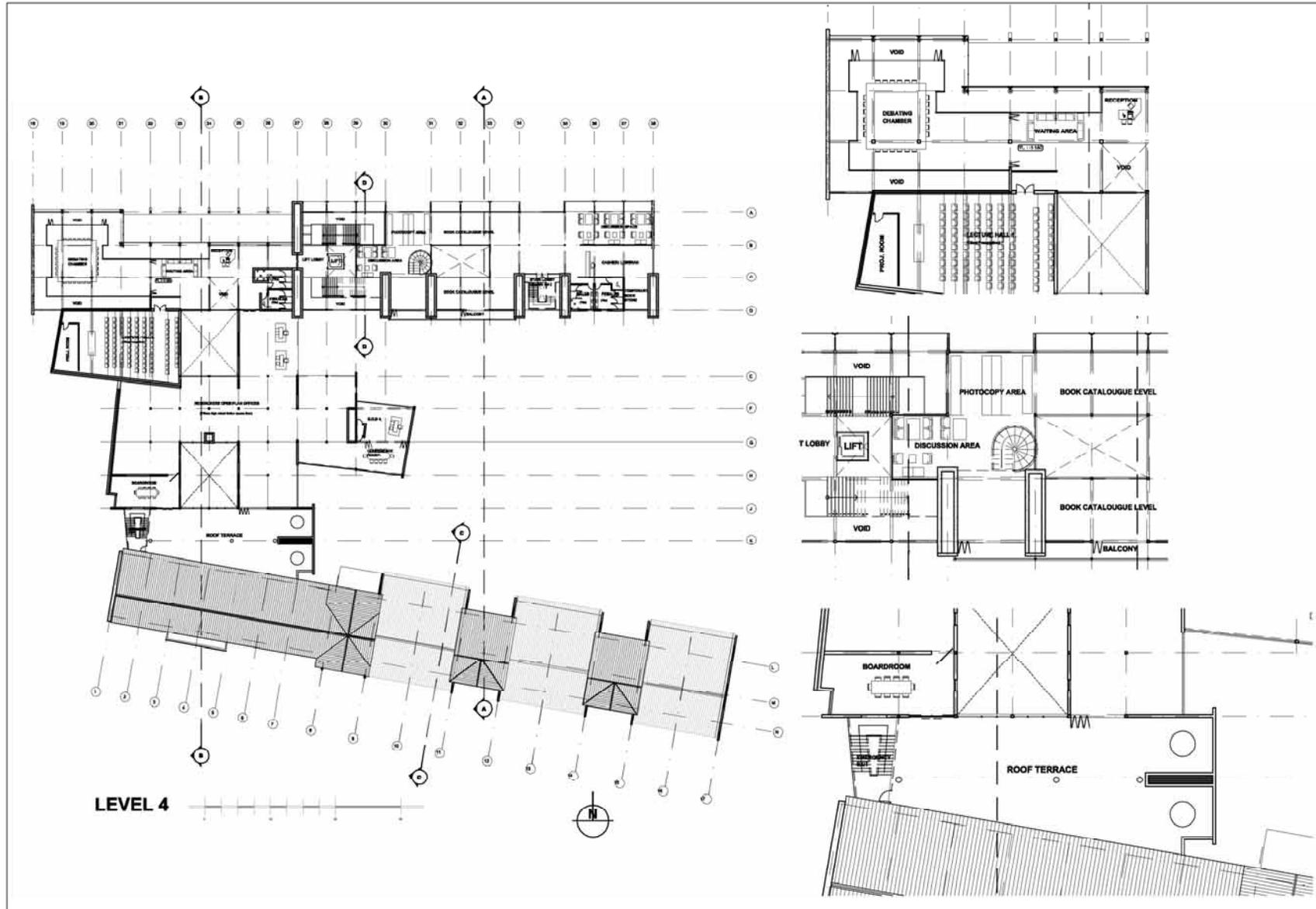


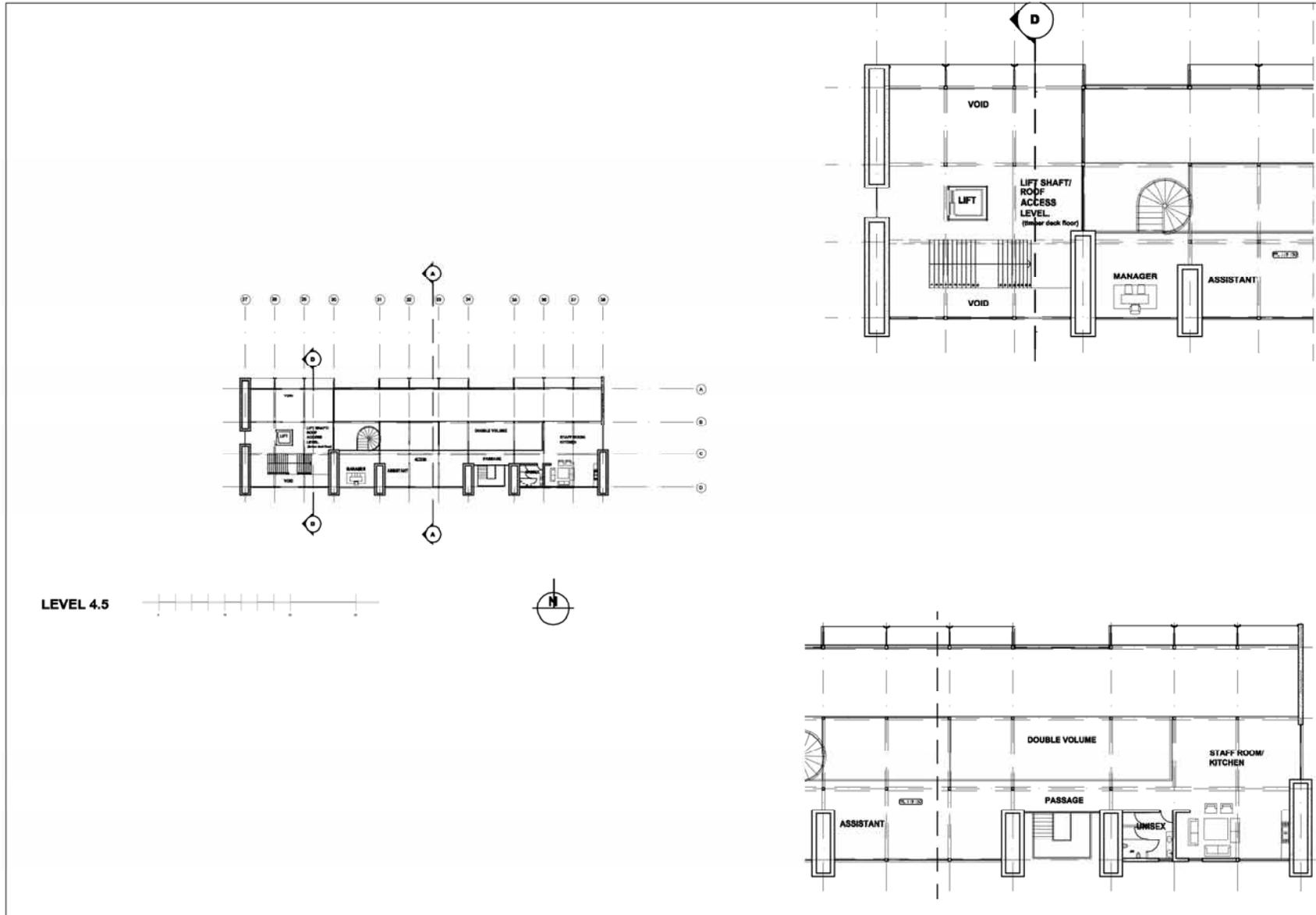


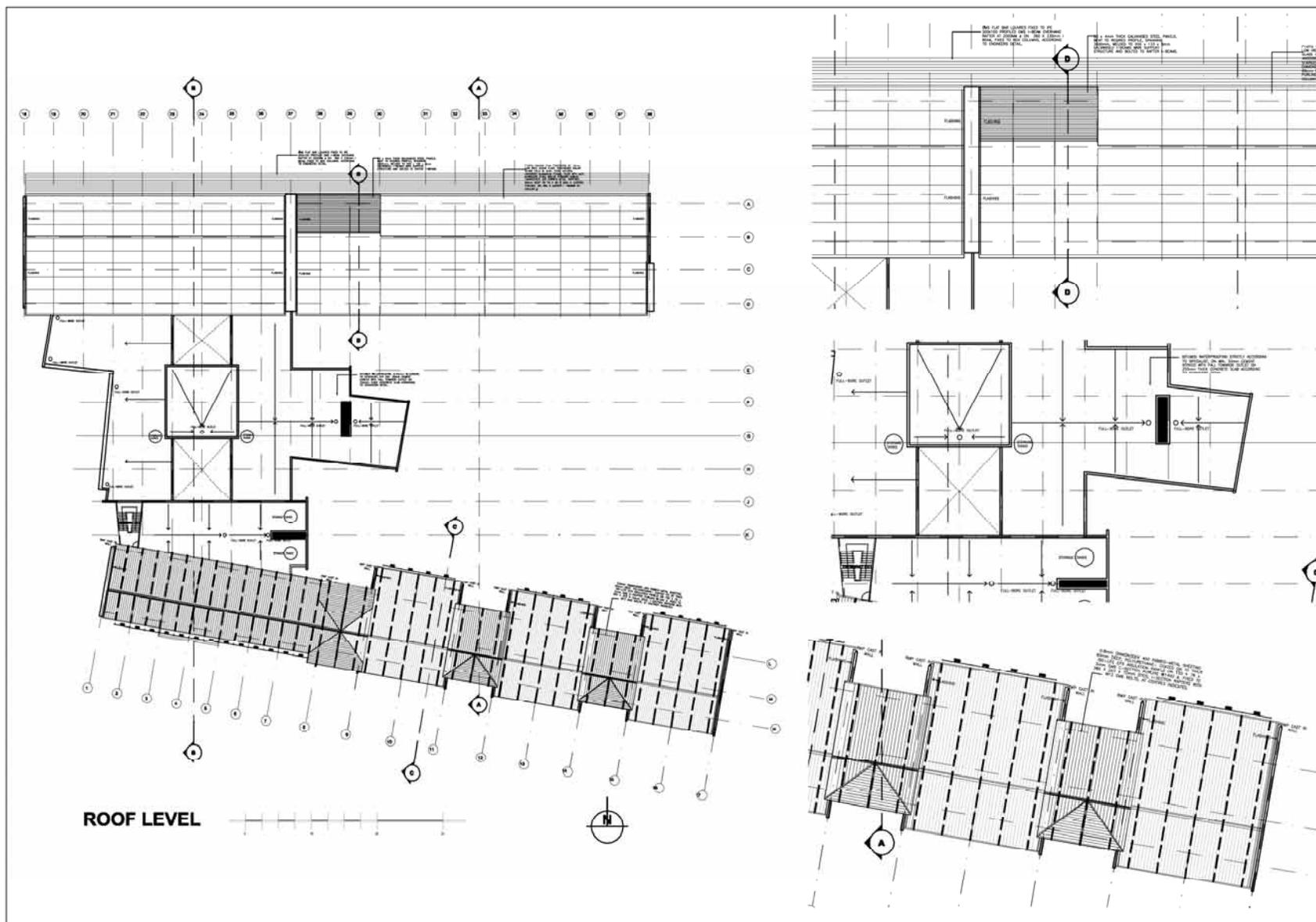






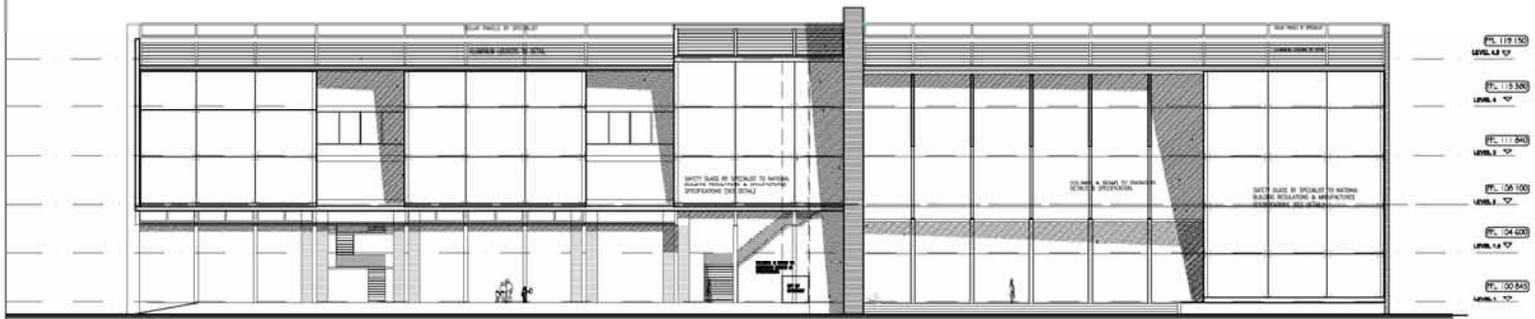








SOUTH ELEVATION

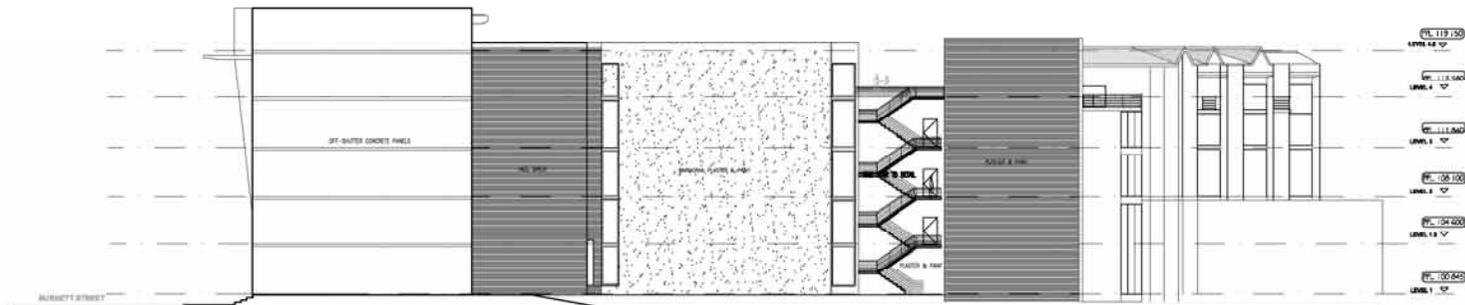


NORTH ELEVATION

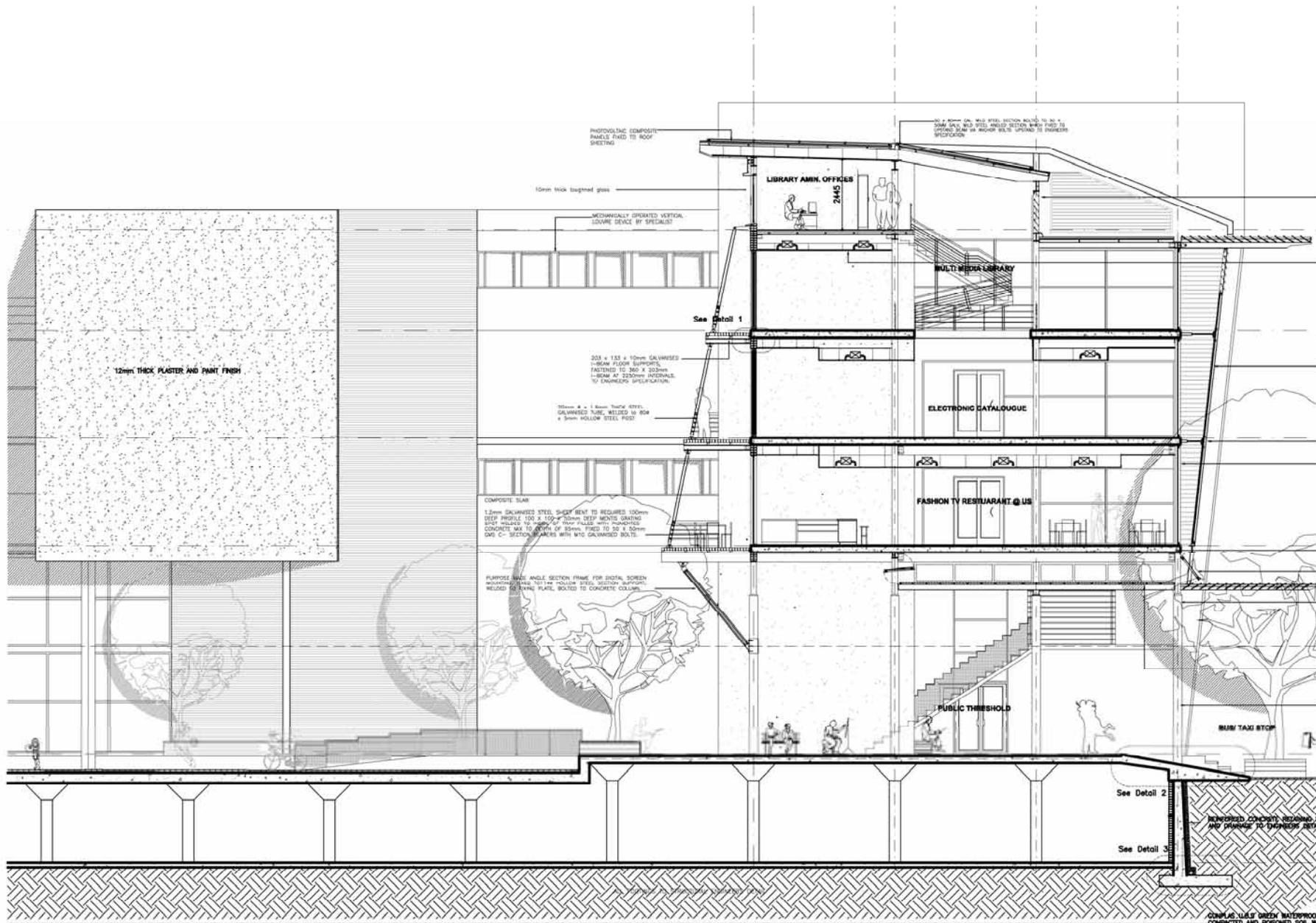


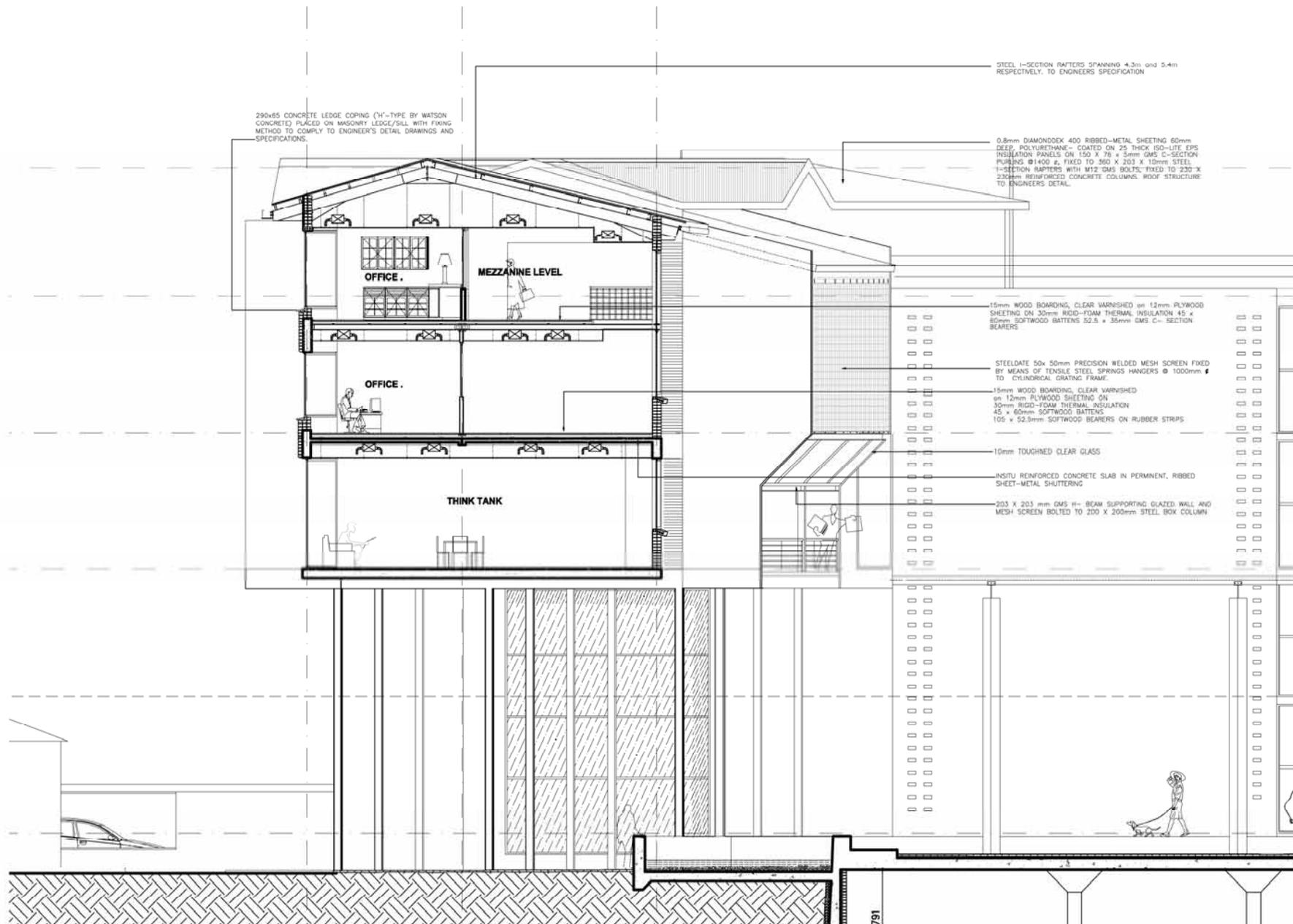


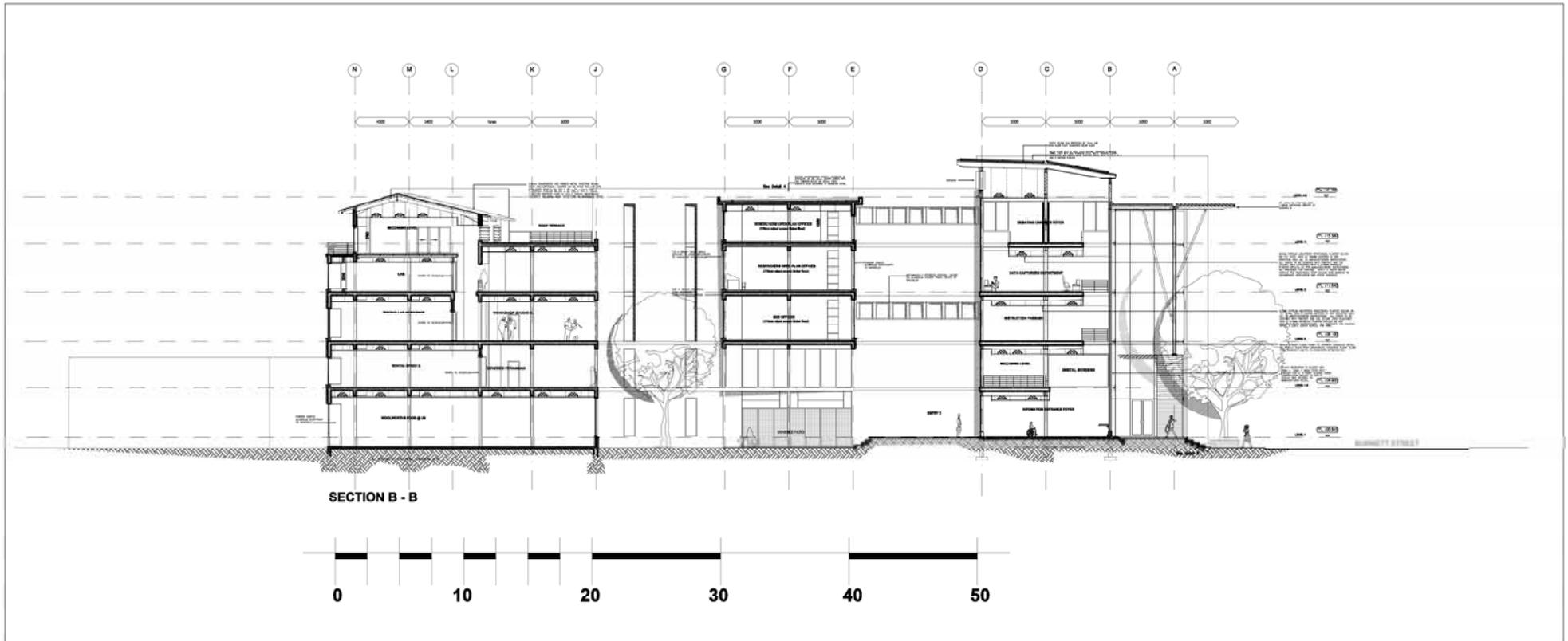
EAST ELEVATIONS

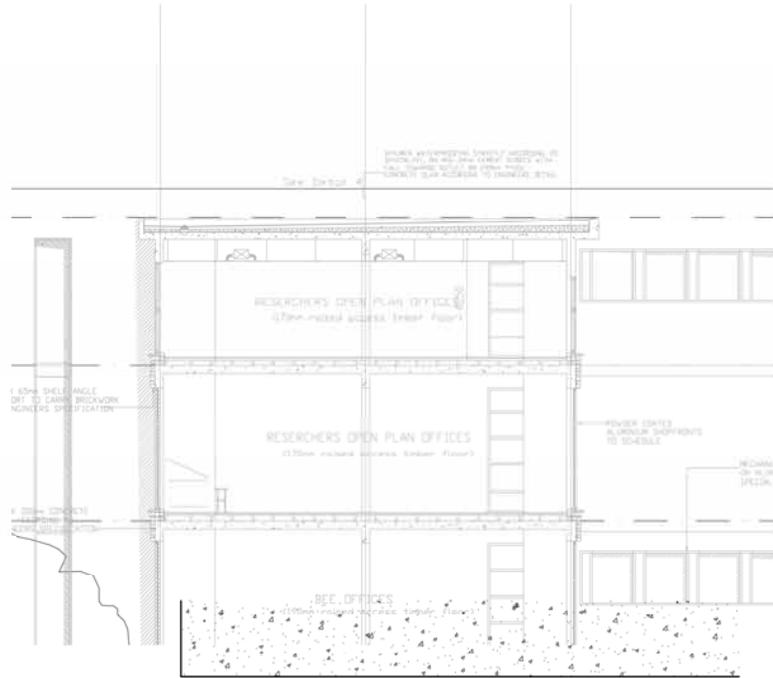


WEST ELEVATIONS

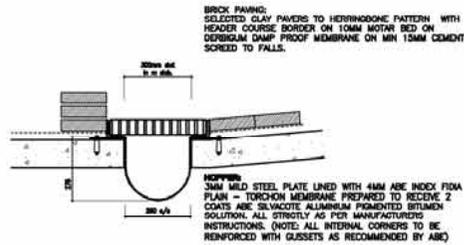




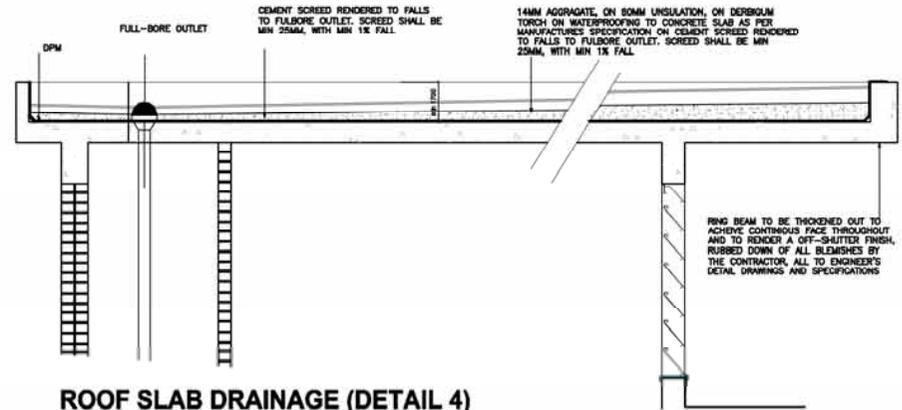




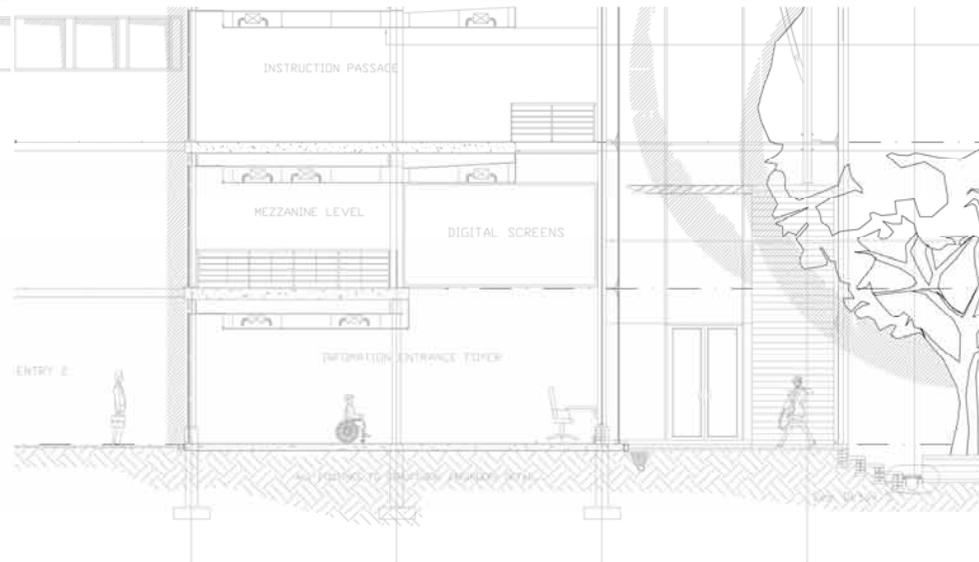
FOUNDATION FOOTING (DETAIL 3)
Scale 1:10

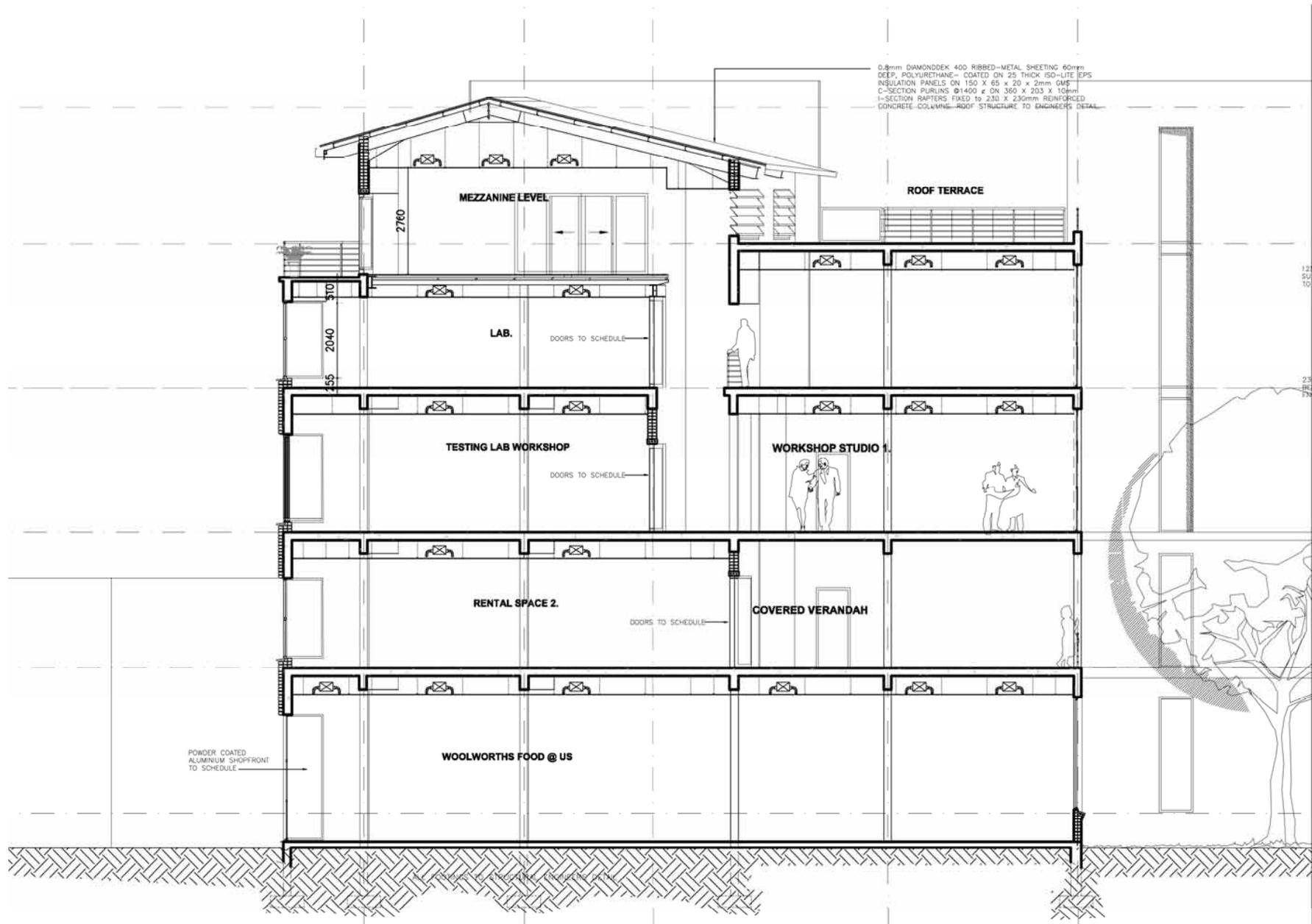


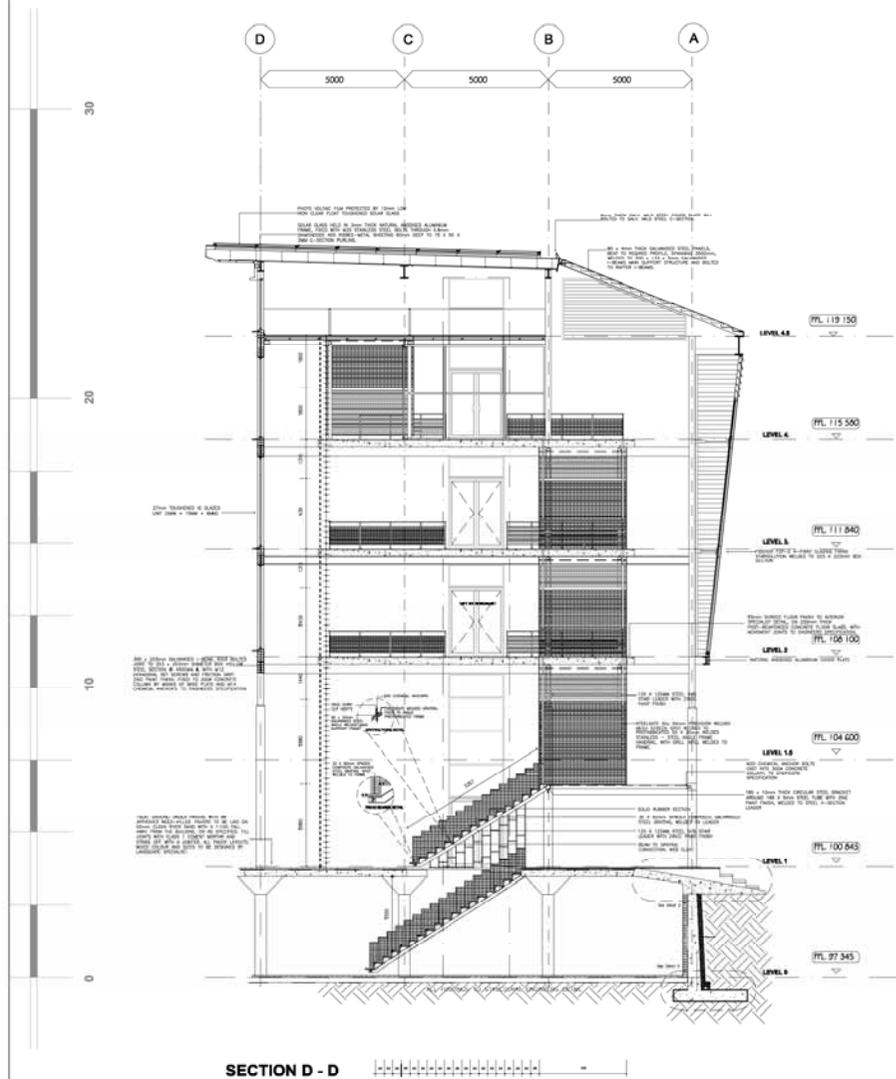
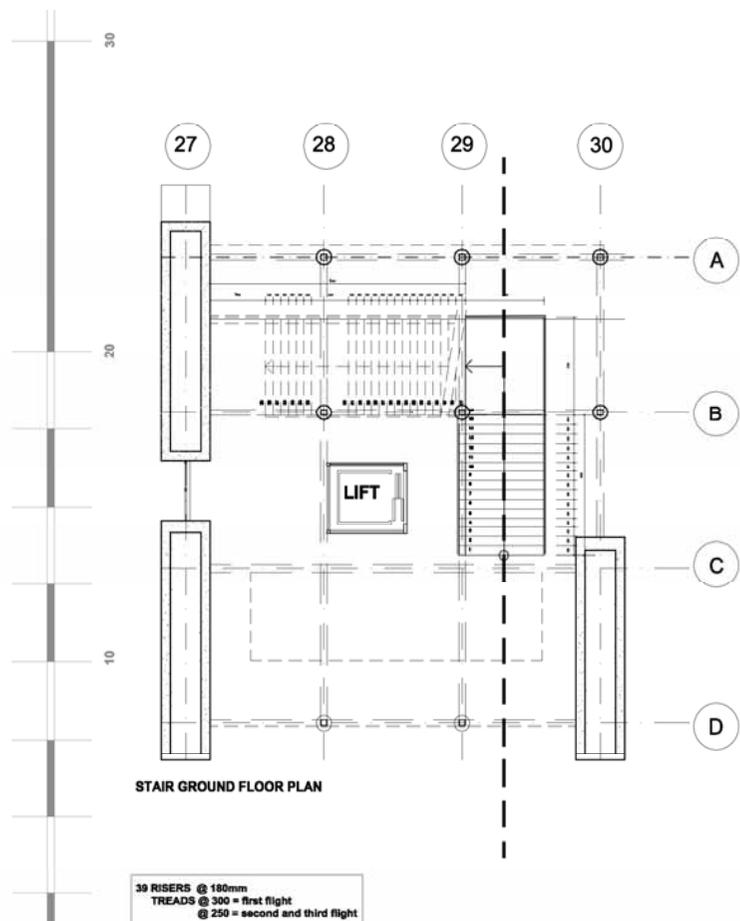
STORM WATER DRAIN (DETAIL 5)
Scale 1:10



ROOF SLAB DRAINAGE (DETAIL 4)
Scale 1:20







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SOUTH AFRICA: University`s set priorities for research
Writer: Karen Macgregor
November 2007