Trans .....

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Trans ....

Riaan Visser

Mentor: John Deppe

Degree: Magister in Architecture

Submitted as part of the requirements for the degree of Magister in architecture (professional) in the faculty of Engineering, Built Environment and Information Technology.

University of Pretoria
Department of Architecture

October 2007

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Table of contents


A

Everyday items evolved from being re-usable to disposable.
A disposable culture developed all around the world.
Technology advances brings rapid change to these everyday items.
Architecture did not evolve the same way and can not adapt to technological advances in the same way as above mentioned everyday items.
This dissertation explores a way for architecture to bridge the gap that formed between a disposable adaptable society and the 'slowness' of adaptation in architecture. This will be a further development from what has already been researched by earlier pioneers like Archigram and the Metabolists of Japan.

1

Abstract:

The international studio under Sang Lee (New York) had the approach of 'design by research'. The starting point was doing what is called 'Sampling', this gives you an idea of what happens in and around an area of research. From this 'sampling' a direction for research was chosen for the design development.

A similar approach was taken in this dissertation by making use of the 'Sampling' method and 'design by research' approach.

The sampling for this dissertation was to investigate what the needs are within the world regarding adaptability and the 'slowness' of adaptation within architecture. These needs gave the platform for investigating and looking into existing systems and elements in the world. By identifying these sampling of systems, research was undertaken to connect possible systems to create a technology platform. This system being one possibility within ideas already thought out from groups like Archigram and the Metabolism group until today with all the debate from container architecture to prefabricated houses and buildings. This is not an effort to propose new ways of thinking in architecture, but combining ideas and systems out in the open to create a system and a building, being able to fit into context in Africa and also in the systems and context of the bigger world.

conception

"sampling"

Sampling gave us the direction the project steered towards and that was Graffiti. With the concept defined we looked at the lifestyle behind graffiti and how its a non-permanent form of art.

eindhoven - design capital

up-coming lifestyle

temporary

mobility

movements

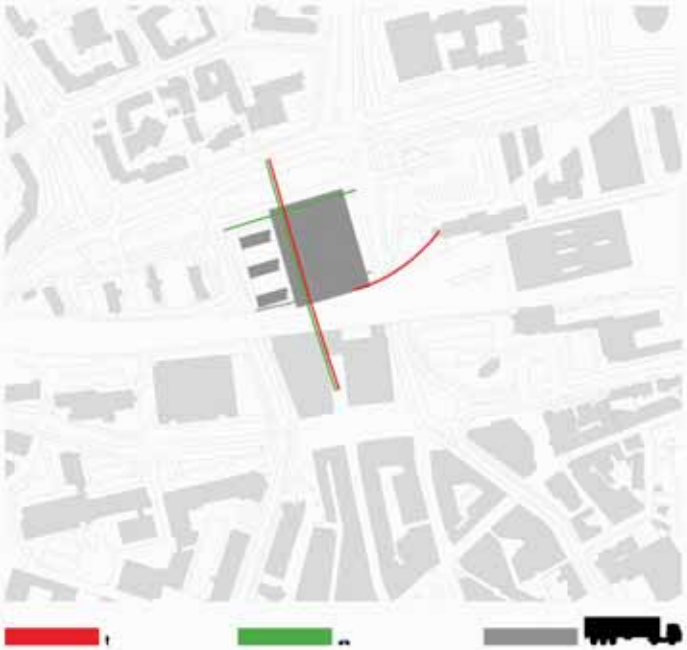
Every structure has limits in how it will be able to move, the human bone structure is the perfect example for that, the same application was given to our project with the site, horizontal and vertical reference being the limits.

limits & rules

basic conceptual movements

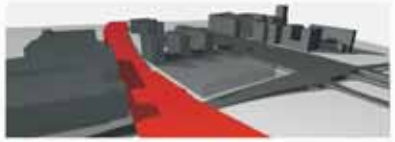
able to adapt to certain needs

site analysis

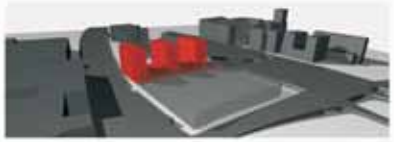


The site analysis indicated that the site is cut off from the city by the topography, its lying lower than the rest of the city level. Access tot the site is also a big problem, and human involvement on the site is non-existing.

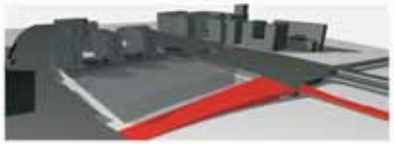
by the railway



by the towers



by level differencies

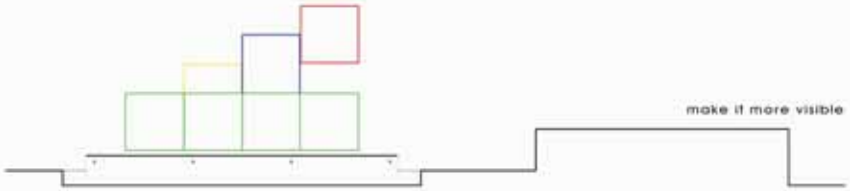


by level differencies

We resolved the access to the site with access-tunnels as indicated on the sections. The topographical problem was resolved by lifting the site onto the existing city level. Human involvement is improved with the structural elements on street level and the quick access from the tunnelsystem. Visibility of the building is improved by the multifunctional bases.

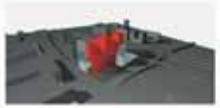
problems

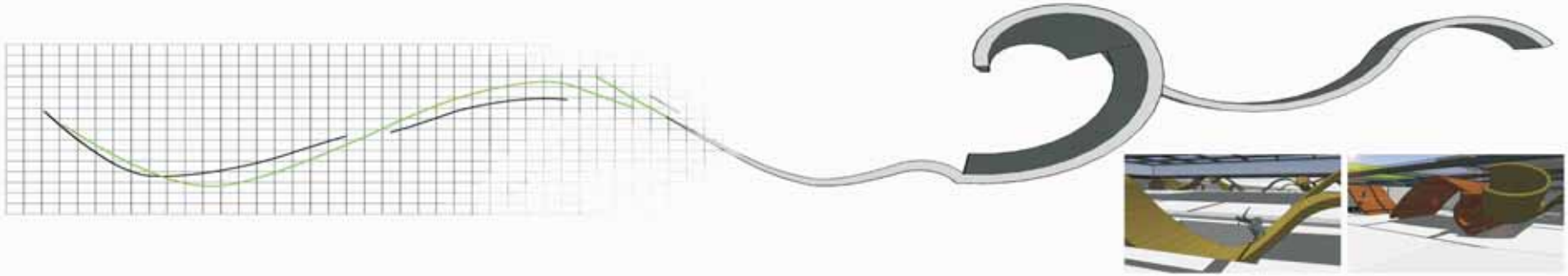
solutions



facilities

The movements and combinations of the boxes are flexible to whatever needs has to be met. The box was chosen as the shape for the space as it can accommodate the vertical and horizontal spatial elements optimally, forming the space.

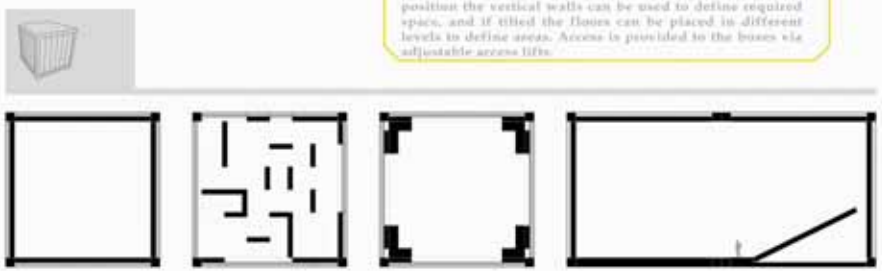
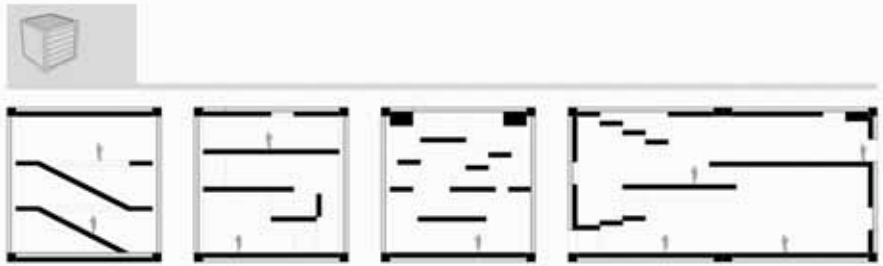










Movements of the multifunctional boxes will provide the possibilities to change the function. When in upright position the vertical walls can be used to define required space, and if tilted the floors can be placed in different levels to define areas. Access is provided to the boxes via adjustable access lifts.

perspectives

The access tunnel from the trainstation is set in place to improve direct access to the site from an important activity node of Eindhoven. Access from the street to the site's city-level is provided by access towers and a pedestrian ramp next to the railway lines..

visions

Working against gravity and forming useful spaces and areas is what every box provides in any direction it is turned. We have some examples of how a box can be structured to provide spaces in any given direction the gravity point is placed.

B

TRANSPORT

INTERNET

THIRD WORLD

TENT

TIME

WIRELESS

DISPOSE

DISASTER

TRAIN

SHIPMENT

NOMAD

DISASTER

CRANE

MOBILE

TRAIN

AIRPLANE

FASHION

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

1 

2 

3 

4 

5 

6 

7 

8 

9 

10 

11 

12 

13 

14 

15 

16 

17 

PORSCHE DESIGN

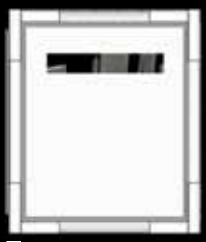
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

NEWS

The Porsche Design Edition

For orders and enquiries
contact
Prrsche Design centre Stuttgart
+32 5678 55506
www.porsche.com

1



2

Rear view

3

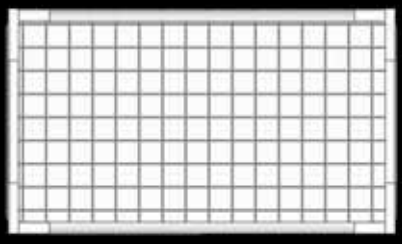
Front view

4

Window panel front view

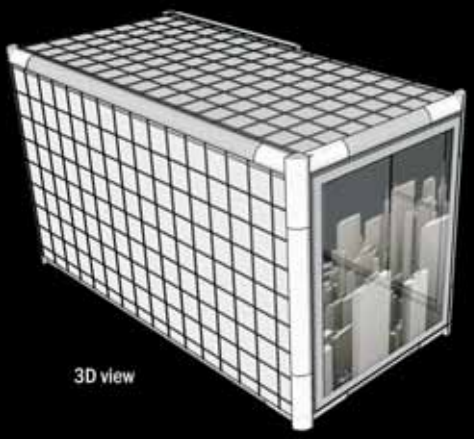
5

Side view



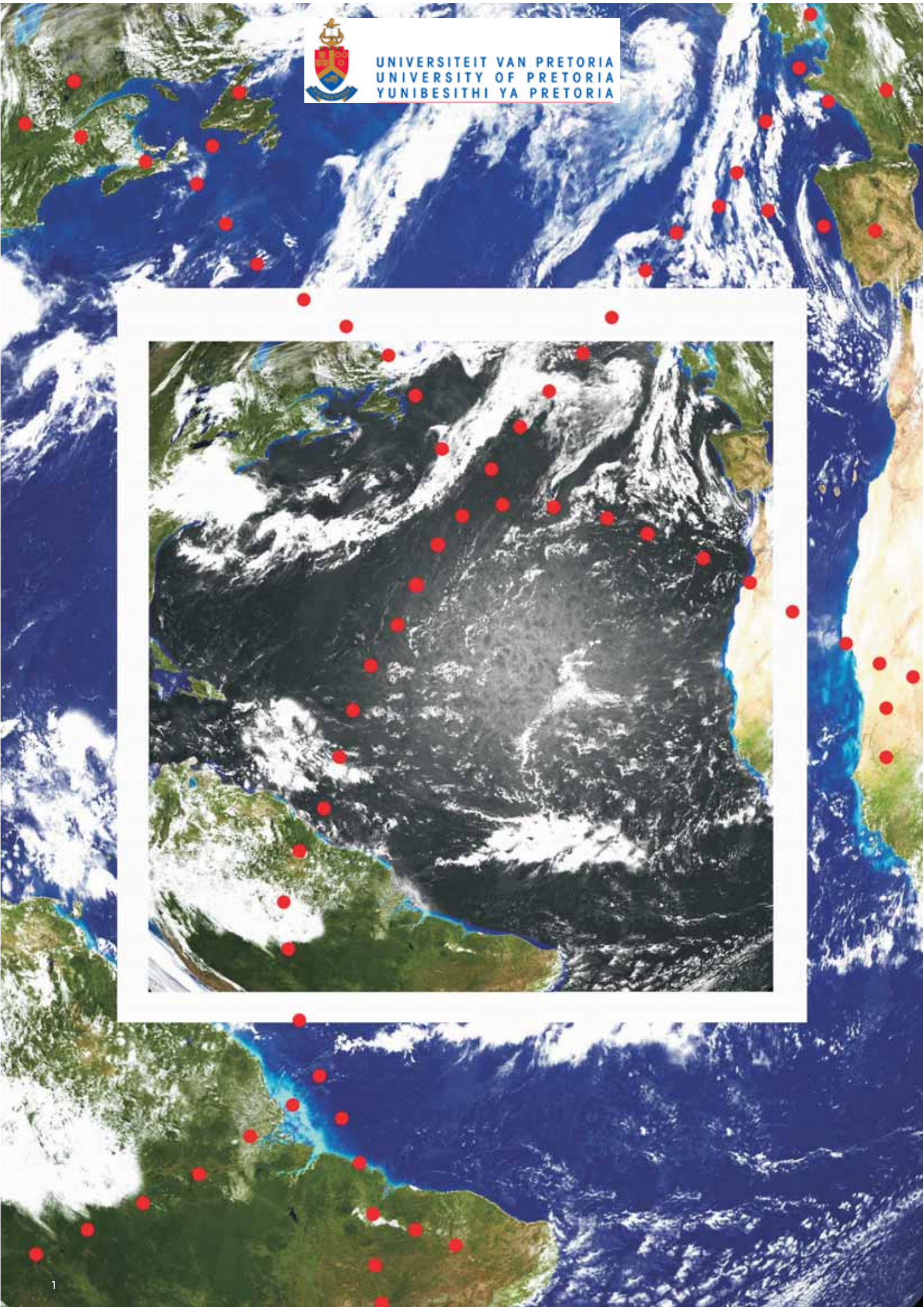
6

Side view

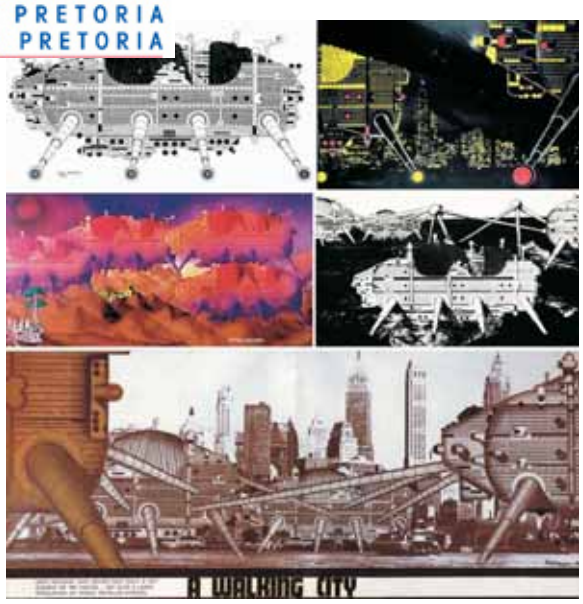


7

3D view

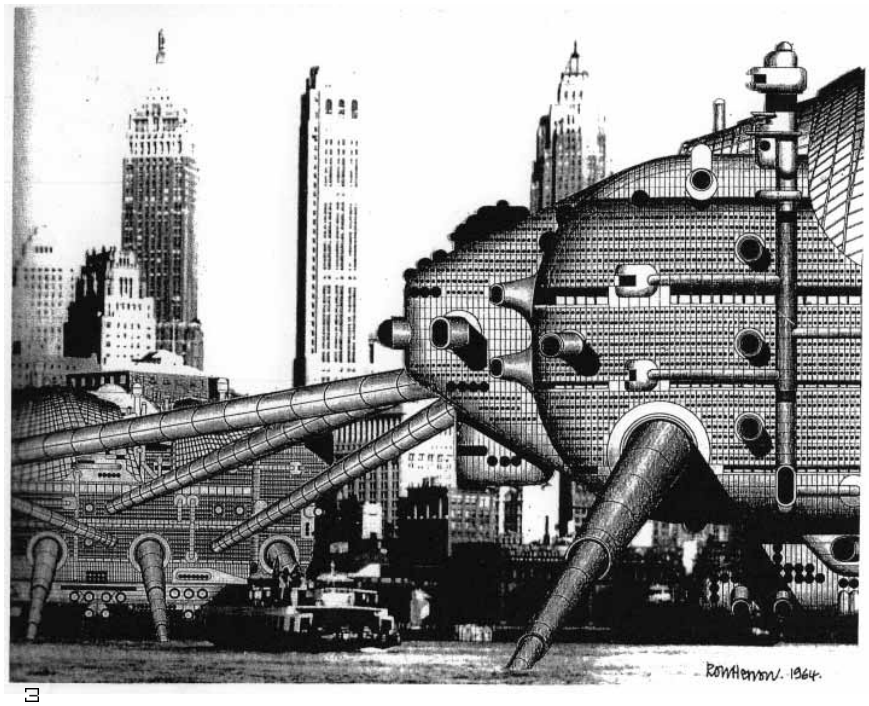

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

1



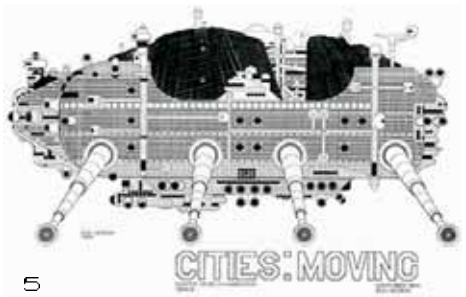
2

'The reason I value Archigram's work over all that which has been performed during the last ten years to dismantle the apparatus of Modern Architecture is that it has been consistently counter-cultural in character. Archigram has not limited its area of planning to architecture alone. At times its work has been graphic. At times it has been plastic. And at times it has taken the form of new technical proposals. In each case, however, the work done has been totally divorced from the patterned logic architecture has created within itself. When all values have thus been turned topsyturvy, Archigram has established a new structure of values, a new syntax, and demonstrated the possibility of an independent subculture. Japan's Metabolism Group, in contrast to Archigram, lacked this perspective on the necessity of discovering counter-cultural values. As a result, it made the easy identification with the ideas of managerial planning in the rapidly expanding City economy,'" and ultimately found itself being manipulated in the interests of the government's meretricious policies.
Archigram's work is being assessed and appreciated a new today because, not merely in architecture, but in a far broader sphere, pre-established systems of every kind are disintegrating before our eyes. What Archigram has done is to demonstrate clearly one part of this process. It is my hope that with the publication of Archigram's work of the last ten years an ever more intense exchange of communication will take place, that the malignant cells of the counter culture will be transplanted to every part of the world, to every area of culture, and that the process of disintegration will become increasingly violent and universal.' (Isozaki, 1999: 4)



3

4



5

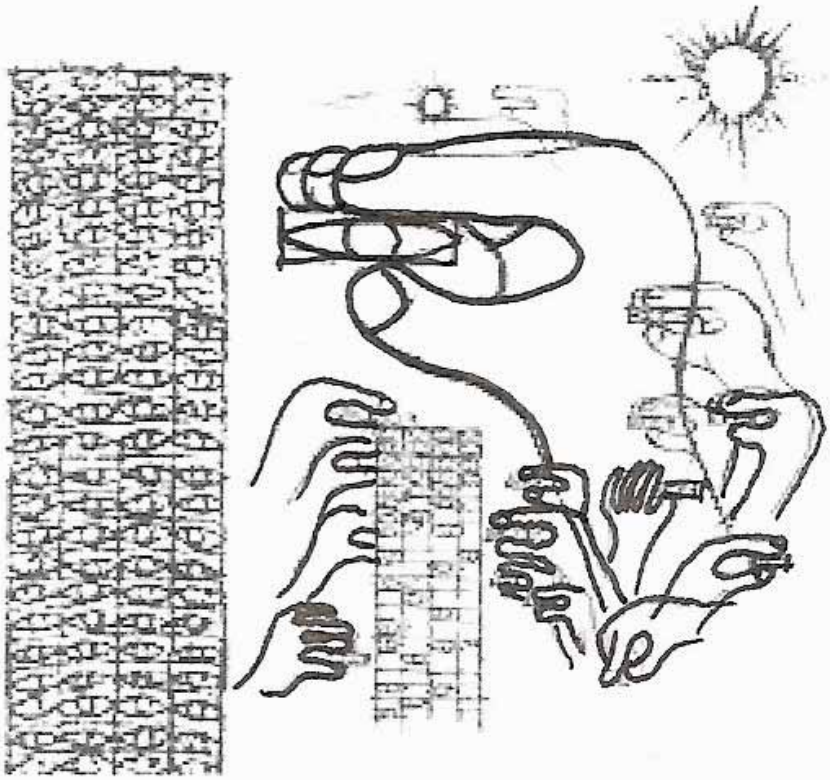
In spite of the natural process of inevitable change that occurs to ideas through the years, some central ideas developed by Metabolism are extremely topical: first of all the matter of how to link the Japanese traditional culture (that is an Asian culture) to the Western models, as well as the necessity to blend modernity with the heritage of the national culture and to create an environment that could promote the harmonization and the cooperation of the different aspects of the contemporary society.

The importance of a link between culture and other models imposed from outside also plays an important role in South Africa, as one should also consider cultural aspects when aiming to implement any new system or idea.

For the Metabolism group the city is conceived as a metaphor of the human body, and is seen as a structure that is composed by elements (cells) that are born, grow and then die, whereas the entire Body continues living and developing.

metabolist architects believed the architecture shouldn't be static, but capable to undergo "metabolic" changes, and instead of thinking of fixed forms and fuctions, they developed structures and projects composed of mobile and flexible elements.

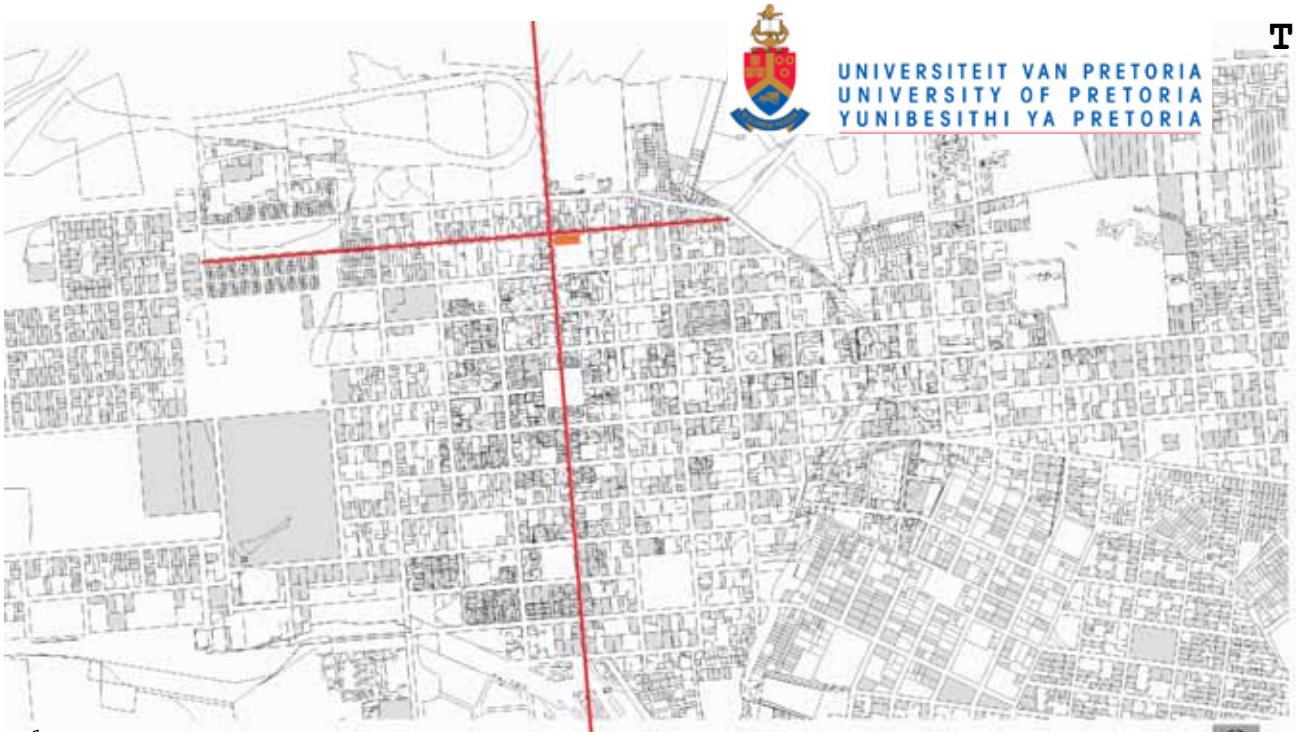
"What will be the final form? There is no fixed form in the ever developing world. We hope to create something which, even in destruction will cause subsequent new creation. This "something" must be found in the form of the cities we are going to make- city constantly undergoing the process of metabolism". (Pernice, 2004, 359)



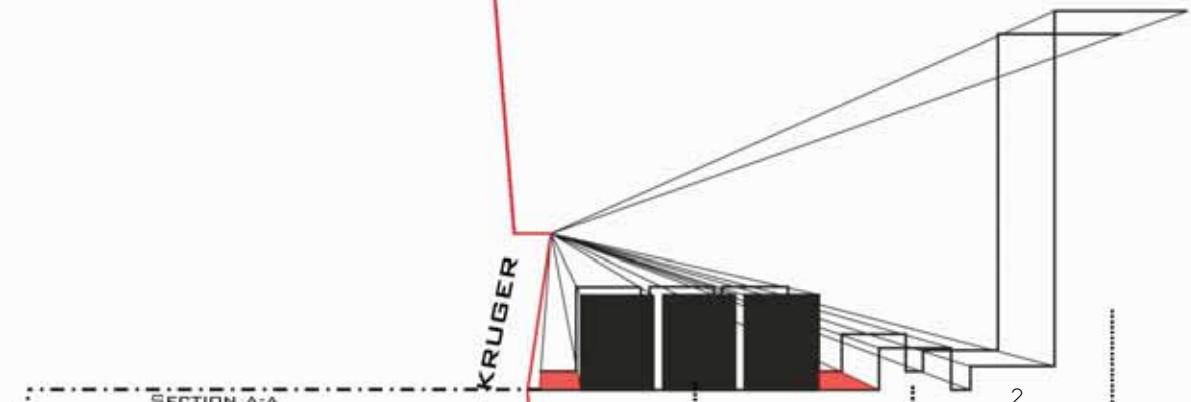
1


C

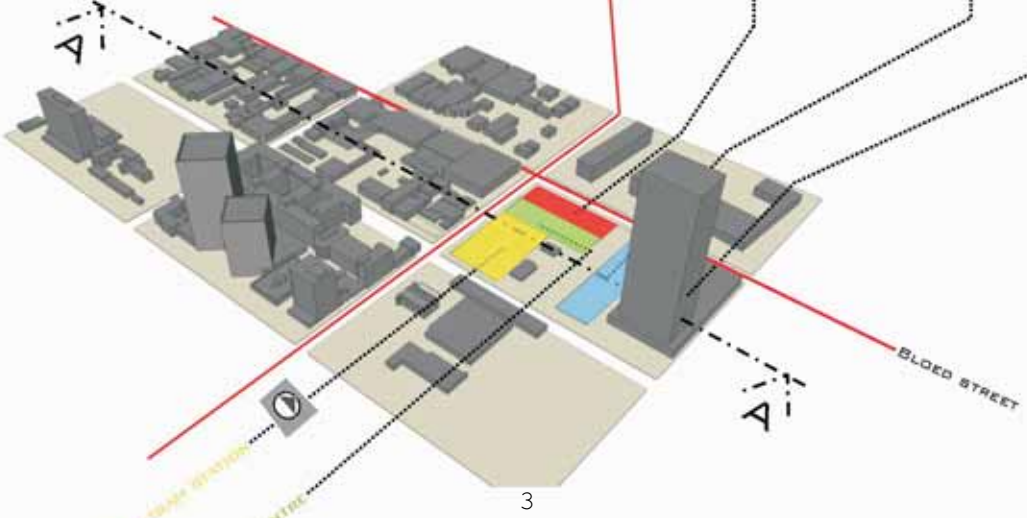
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



1



2



3

Site selection

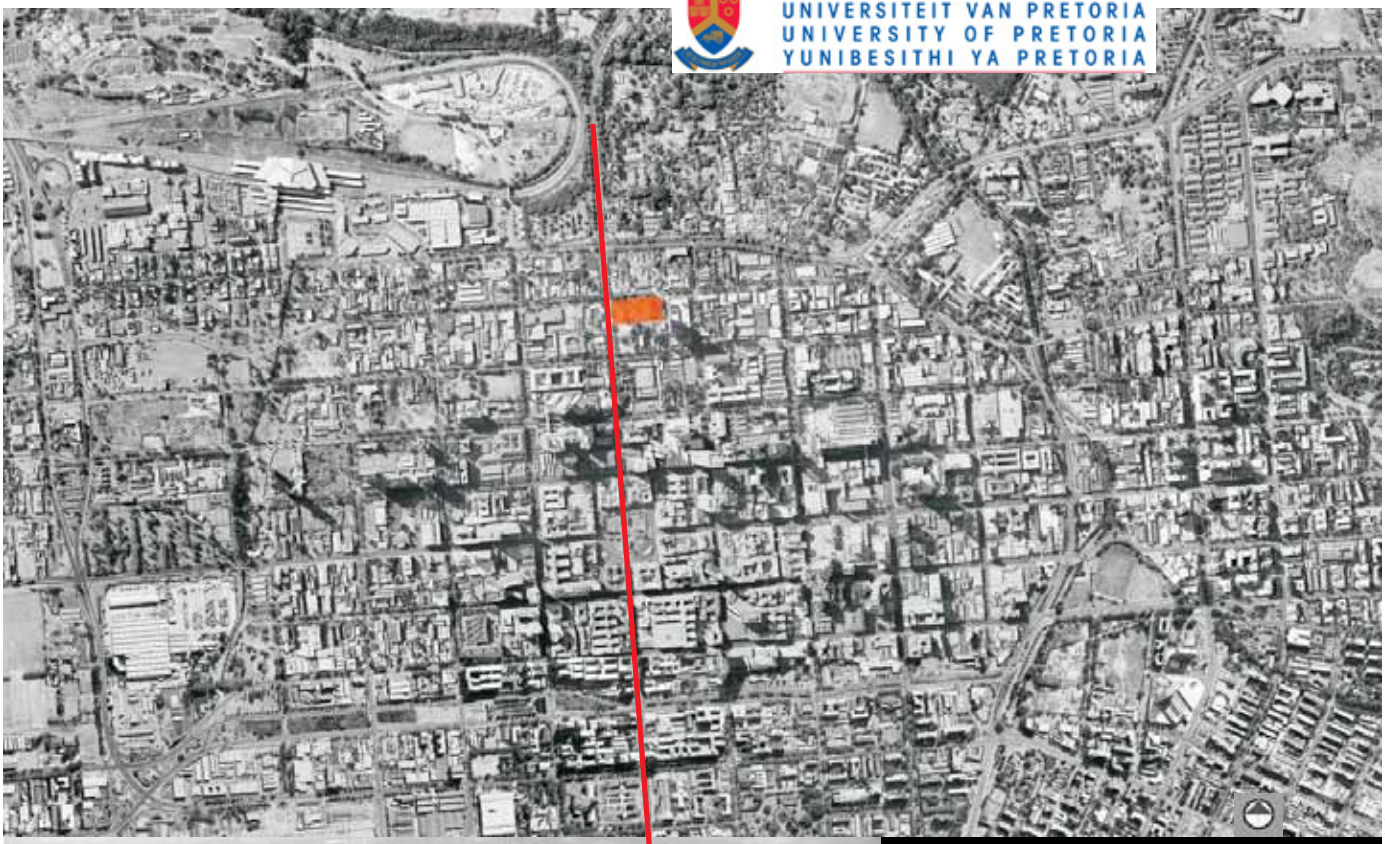
The selection of site was based on the placement of the main Tram station, and also the proposed music centre and art museum creating a residential friendly space. The station will form the platform for development as this catalytic generator will attract business and pedestrians traffic. This will be a staring point for the densification of the urban fabric within the inner city.

Locality

All major National Government Departments are located within the Inner City of Tshwane, with a few exceptions. The governmental Infrastructure Is supported by eleven International organizations, Including the United Nations. the International Red Cross, the World Bank and the International labor Organization. Several diplomatic representatives are also located In Pretoria. and proposals exist to relocate these Institutions to the Marabastad area to form part of the Struben Street Boulevard Development. The drive to move Parliament to Pretoria will in effect unify governmental services and enhance their efficiency. It Is essential to utilize this opportunity In order to reinforce the image of Pretoria as capital city. (ISDF: 20)

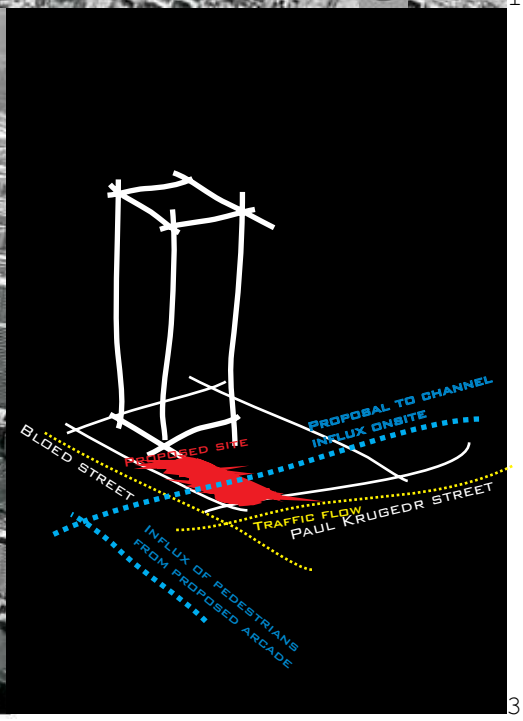
The site is located in the Central Business District of Pretoria, on the corner of Bloed and Paul Kruger streets. The district is identified as sub-functional area in the ISDF. The land use within this part of the CBD contains retail, offices and mixed activity areas. This area contains governmental and municipal functions. It contains low-density mixed land uses and has a lot of informal and formal components which creates heavy vehicular and pedestrian traffic. From uncertain road proposals this area is dominantly government owned.

Belle Ombre is located to the south of the railway line and to the north of Boom street. It contains major retail facilities catering for pedestrian activity, as well as activities relating to Marabastad and the CBD. There is a major influx of people to the inner city through this area via Belle Ombre station. (source: ISDF)



1

2



3

4

Proposed public spaces

Proposed building

Proposed student projects

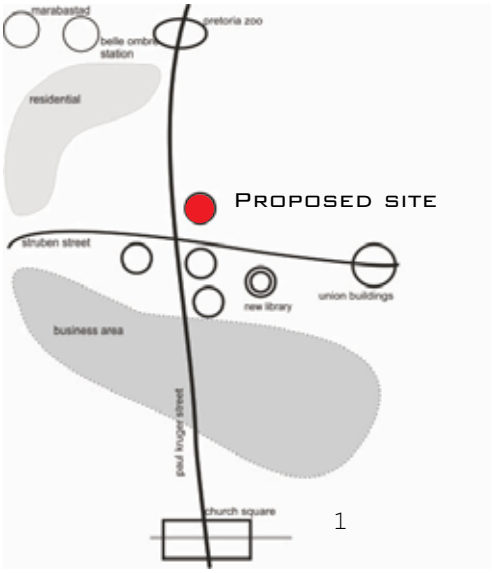
Land use

The development approach strategy for the Inner City revolves around two main principles:

Firstly, it is accepted that Pretoria is in a constant state of flux caused by political, social and environmental change over a period of time. In order to comply with this principle, any design approach or building development should be flexible and accommodating to cater for predicted or unpredicted changes in future conditions,

Secondly, the importance of Integration between the multitudes of components should be addressed and balanced to ensure a holistic compatibility between the city elements, (ISDF 4.1 p18)

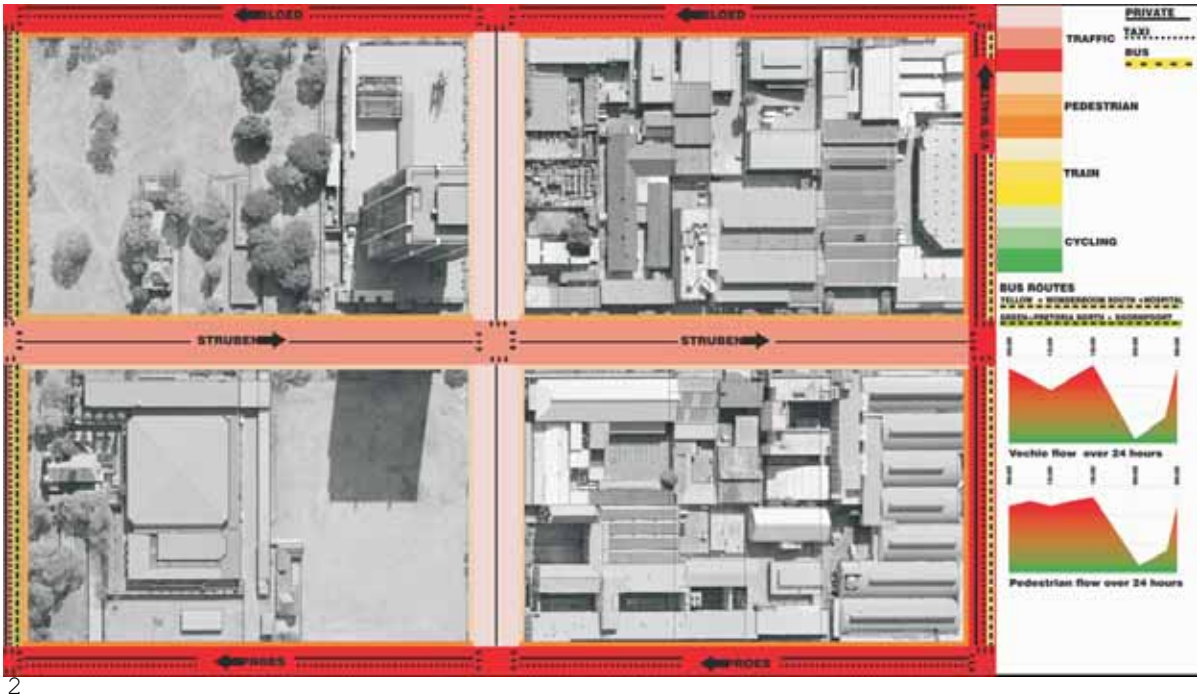
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



1

RESIDENTIAL

The situation inside the inner city now reflects almost a non existence of a residential component, only within the north western part of the CBD residential units are identified.



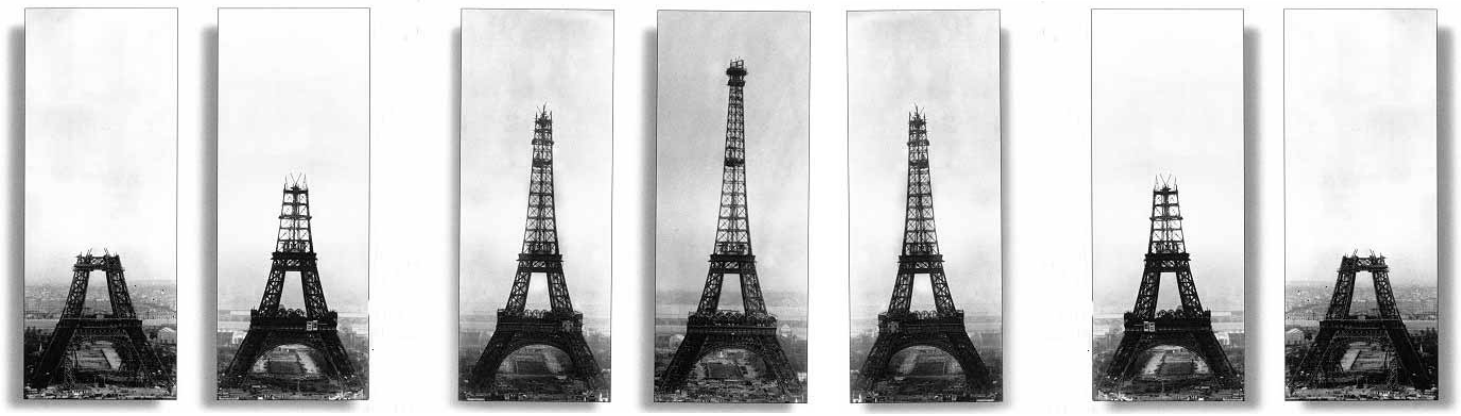
2

City scale

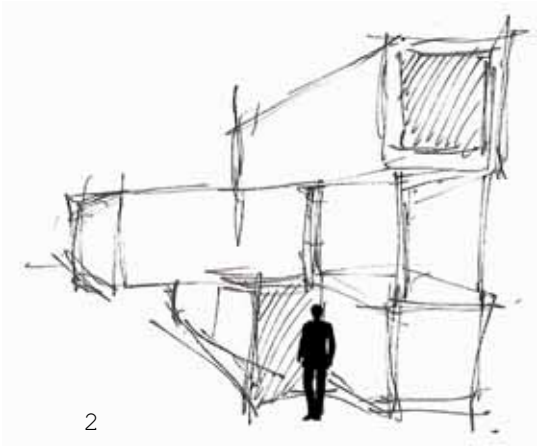
After group research done earlier this year it was concluded that there is a great need for residential parts within the inner city.
The research indicated that the great influx of people from the rural areas finding work within the inner city, the government buildings being built within the inner city providing a lot of jobs, all play a major role in this conclusion.
These people need homes and the closer people can life to work or to a tram station the more sustainable impact it will have on the traffic flow within the inner city everyday.

A proposal that emerged from the group work is to limit traffic movement within the inner city and to make it pedestrian dominant. The argument would not have been feasible without the proposed tram system. Parking garages will be proposed at the intersection of (identified as) important roads within the inner city. The tram stations will be located close to these parking garages feeding the people into the city without their cars.
Slowing down traffic movement within this identified pedestrian area should make moving by car difficult and this will promote the use of the tram line.
Other examples to minimize traffic flow are to implement a fee when accessing the pedestrian dominant zone.

The adaptability for the proposed system lies in the fact that it will be able to change to fluctuations within the inner city in commercial and residential needs. The building will be able to be fully dismountable and to be moved from one location to another.

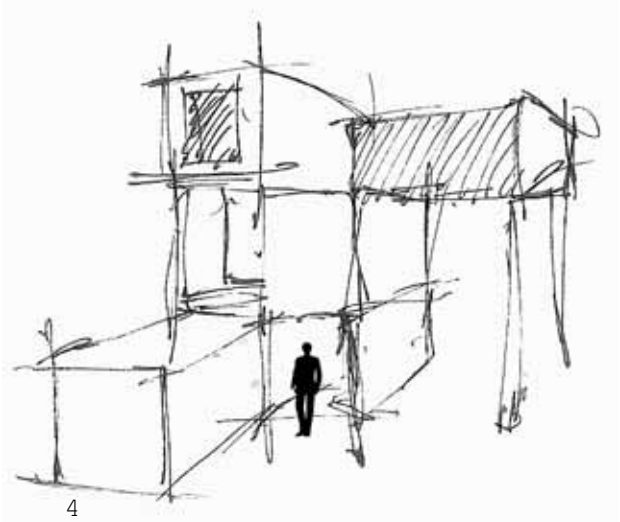


1



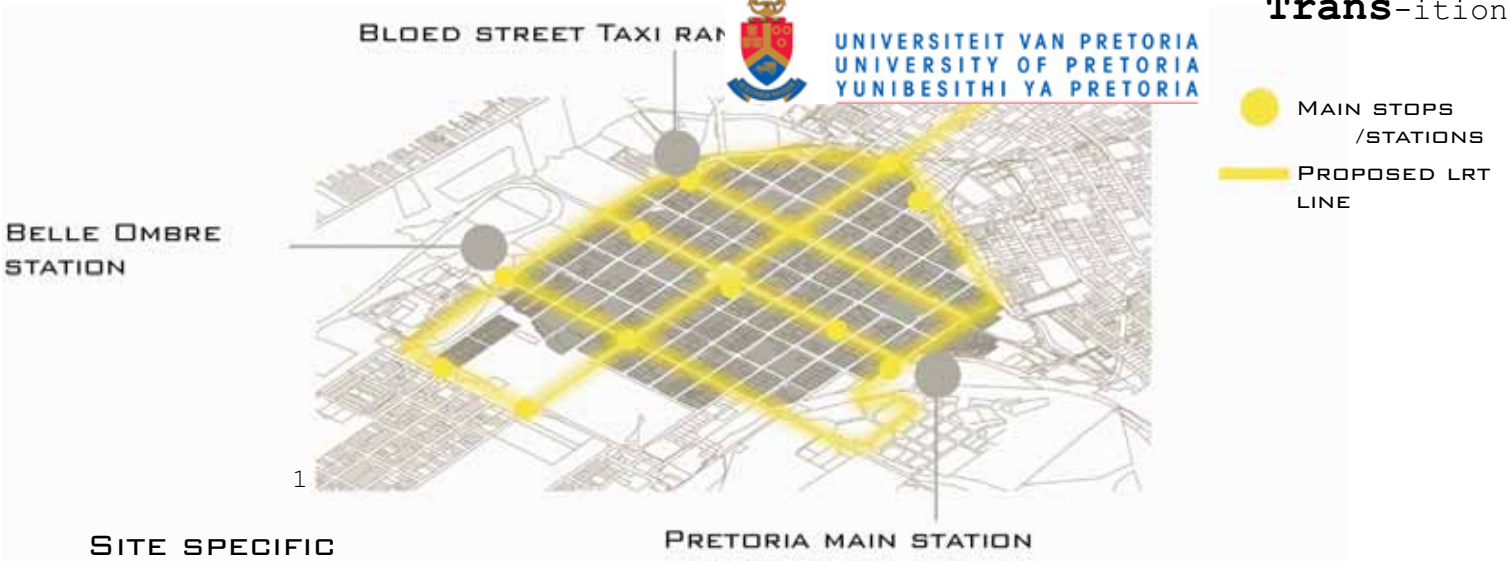
2

3



4

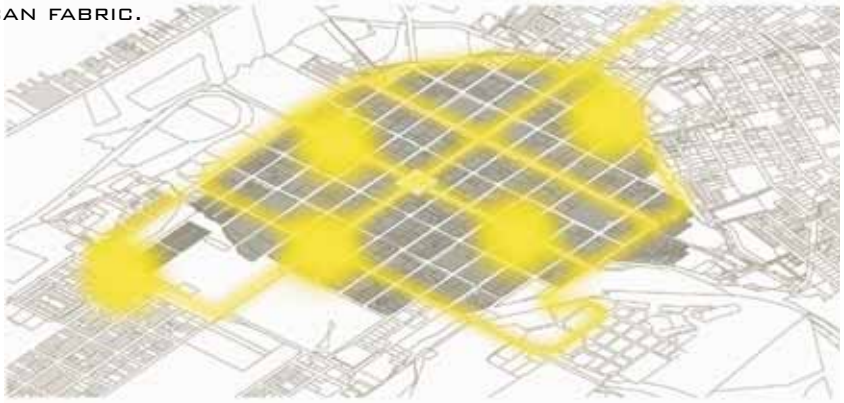
'Fashion' is a dirty word, so is 'temporary', so is 'flashy'. Yet it is the creation of those things that are necessarily fashionable, temporary or flashy that has more to do with the vitality of cities than 'monument buildings'. The pulsation of city life is fast so why not that of its environment? It reflects rise and fall. coming and going ... change. So why not build for this? (Bell, et al,1999:23)



1

Site specific

A twenty four hour cycle will be needed to make the inner city more residential friendly. The proposal on the site for residential close to the tram station will be the midway link between the government boulevard ending at the union buildings and the marabastad residential area. Situated next to the main tram station this will be the ideal starting point for implementing the residential sector into the inner city. The proposed music centre next in Paul Kruger street,
the proposed Art museum next in Bloed street and the proposed bookstore in house Jansen will accommodate the functions to help give a 24 hour cycle to the area. Currently the inner city is only in use during working hours. This proposal will serve as a starting point for the residential to grow within the inner city. The other identified catalytic generators are the tram stops. The residential and other developments that will follow will help to densify the urban fabric.

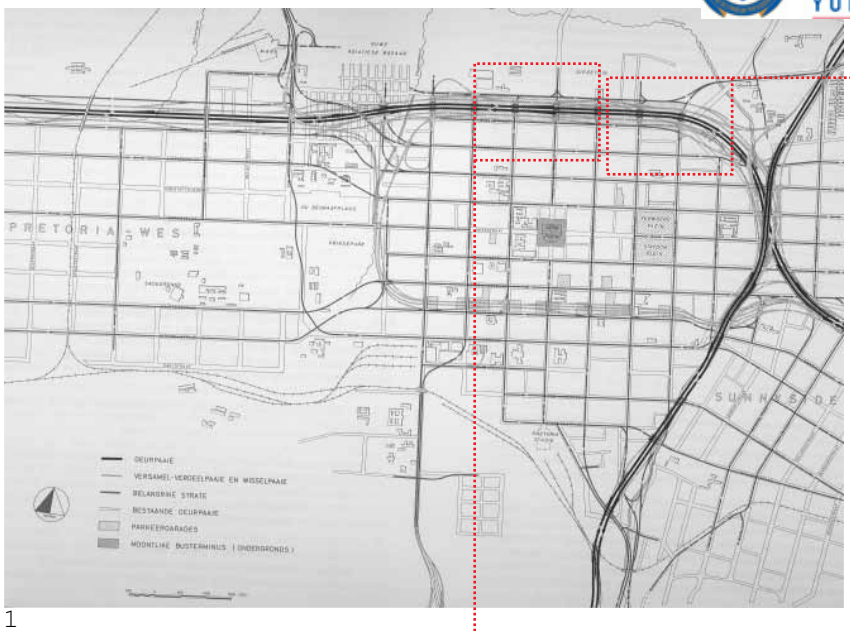


2

3

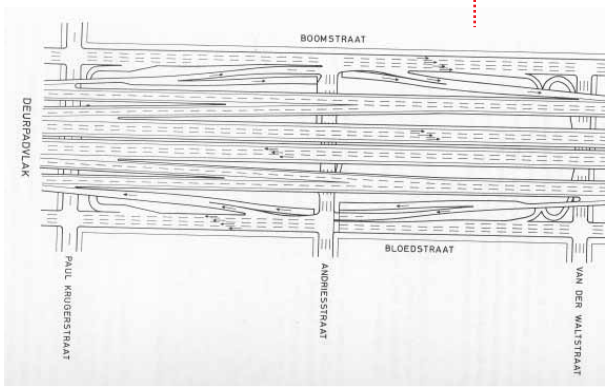
One of the main strategies of the strategic Public Transport Plan (SPTP) of the City Council of Tshwane is to create a "Compact City" where public transport stations acts as urban generators in the inner city of Pretoria. This will combat the urban sprawl phenomenon in the city where low density housing is provided on the periphery of the city. The overall goal of this strategy is that 90% of developments will take place in densified urban townships. (City of Tshwane: 2007 SPTP:40)

The key interchanges on Vancouver's skytrain system, developed since the mid 1980's, have mixed commercial, office, residential, retail and markets within short walk of the station. Strategies were aimed at providing new housing near the stations, creating sub-centres with diversity and character, and encouraging further medium density residential development and commercial mixed use development.
(What light Rail can do for cities: A review of what can be done, Appendix)



1

2



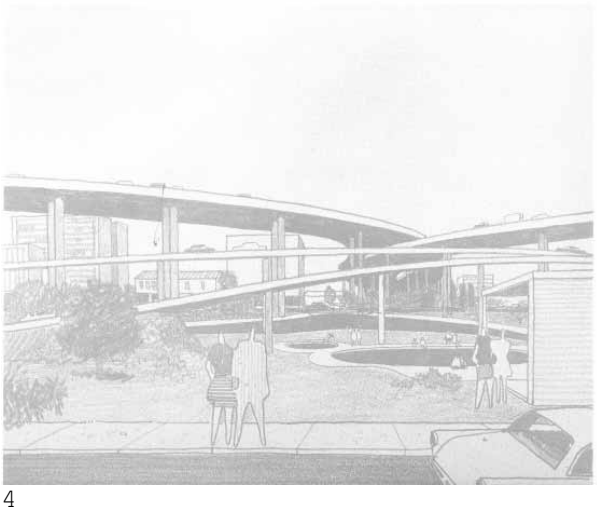
3

Figure Ground

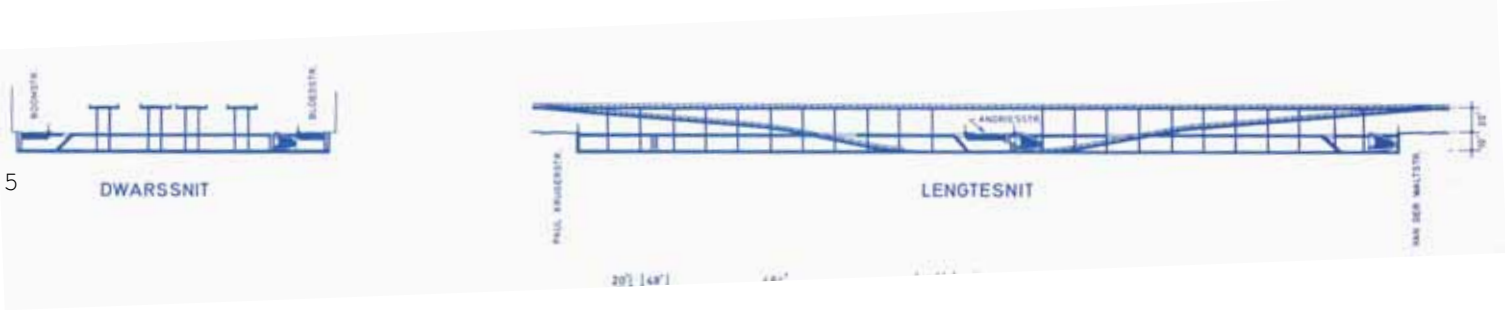
The figure ground study indicates that the immediate surroundings in the northern part of Paul Kruger street, consists of a lot of open spaces between buildings, the urban fabric is not dense enough. The generator of the spatial configuration of the area is the strong street structure. All movement patterns from pedestrians and vehicular movement are influenced by this configuration.Strategies are necessary to densify the urban fabric to be appropriate for the needs of the inner city and its users.

The proposed roads in the northern precinct of the inner city played a major role in the urban fabric and the poor developed area. Uncertainty kept developers away from this area; the properties falling within the designated area for the proposed roads are governmentally owned.

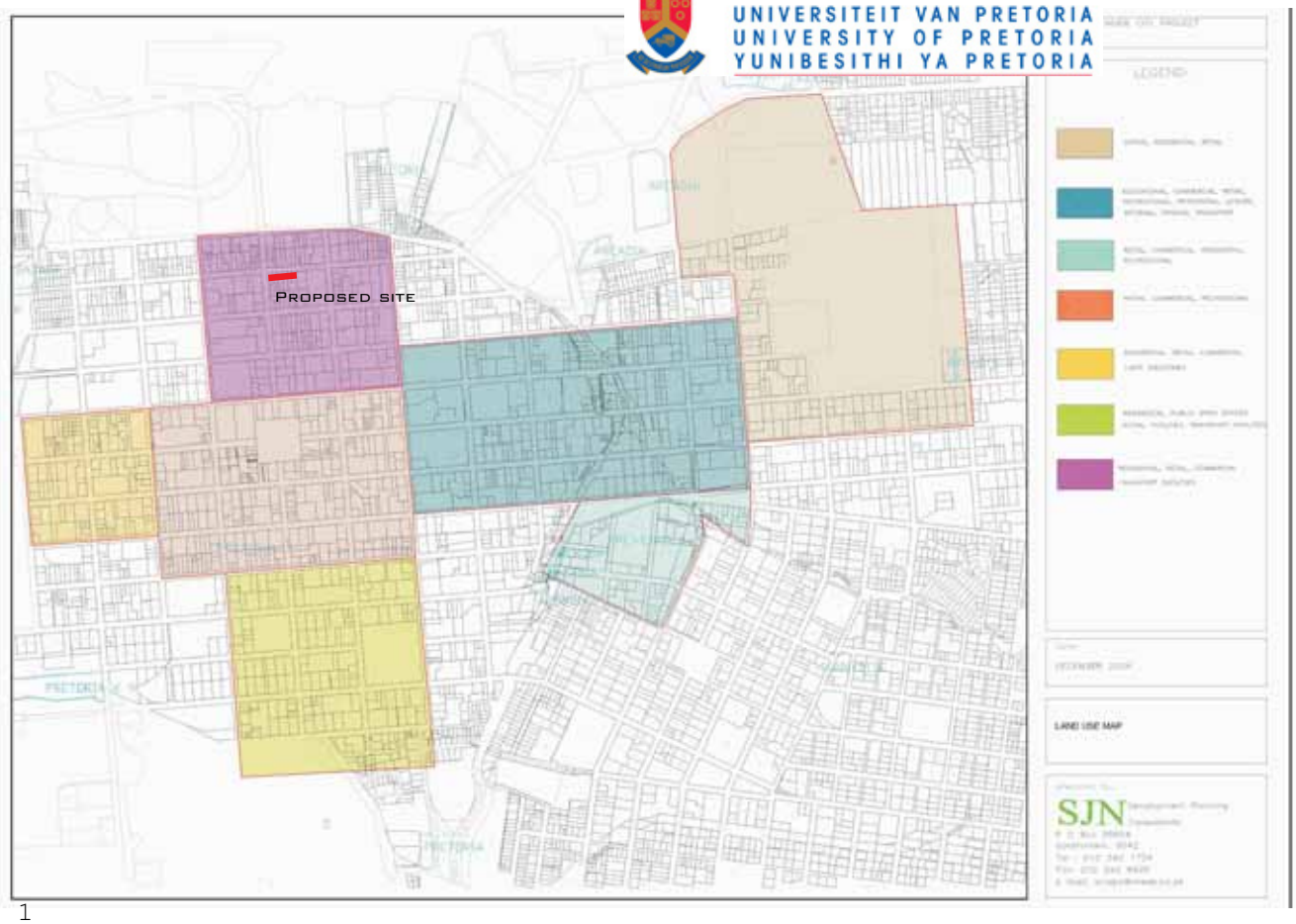
Proposing a tram line running within this area will be a great linkage, not only on small scale, but looking at the major transporting nodes that will be linked the tram stations between these important transporting nodes will act as catalytic generators. These tram stations will generate movement and activities that will stimulate the area, and give opportunities to construct mix-use buildings around these nodes. Residential being one of the uses introduced.



4



5

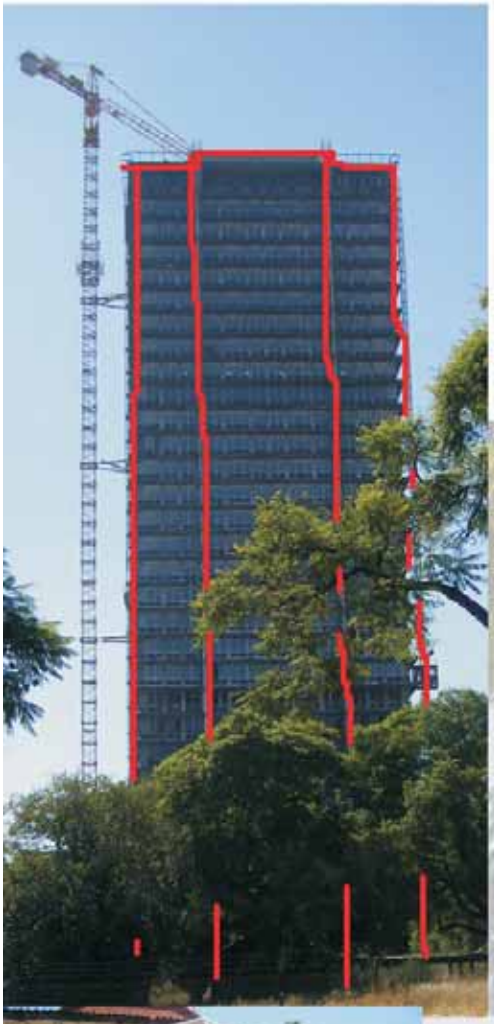


1

These maps show studies made on the northern precinct regarding the land use, and the areas that needs improvement. Needed improvements to Paul Kruger street and the identification of a residential zone for the area where the proposed site are situated indicates the need for these improvements in studies done by other groups of people on this area.

2

Precinct 5 Paul Kruger North



1

SITE PLAN

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

URBAN DESIGN PROPOSAL

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Semi-pedestrianisation of Paul Kruger Street for 3 blocks North mirroring the pedestrianisation of Church Street 3 blocks to the East

Proposed Government Boulevard

Proposed area to include housing

Existing one-way road

Proposed new one-way road

Proposed street improvement

View along Struben Street to the Union Buildings

Proposed Tram Line

0 100m 200m

A 1

known earlier as "Palmside". It was built in 1883 and has been declared a heritage Victorian building in the Pretoria CBD area.
This single storey house has a detailed parapet wall and bay window, as well as a tower with overhanging roof over a veranda. The veranda extends around the corners of the house and its structurally supported on timber posts with mouldings. The entrance is emphasized by a pitch roof and wooden pediment between the gable wall and the porch. The walls are constructed with red face brick and painted plaster, and are covered with a corrugated sheet metal roof. The house has timber window frames as well as timber floors.
It is a heritage monument.
(Le Roux, 1991, p22)

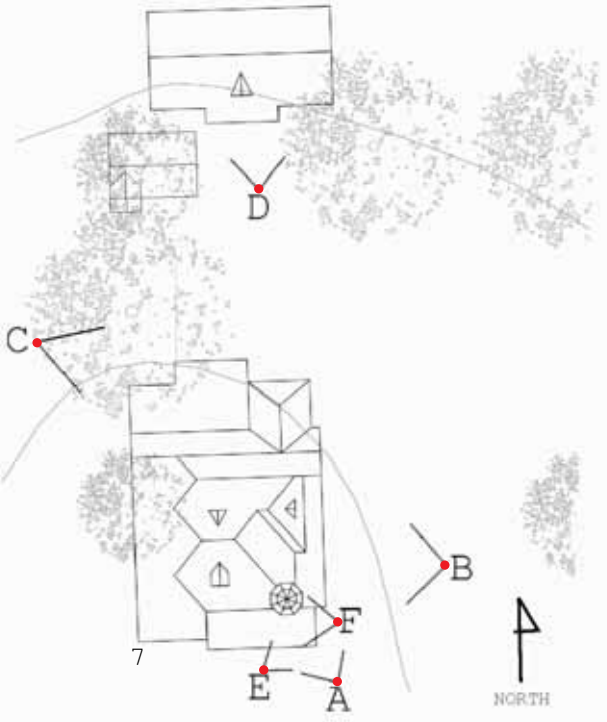
D 2

C 3

B 4

F 5

E 6



7

1

A

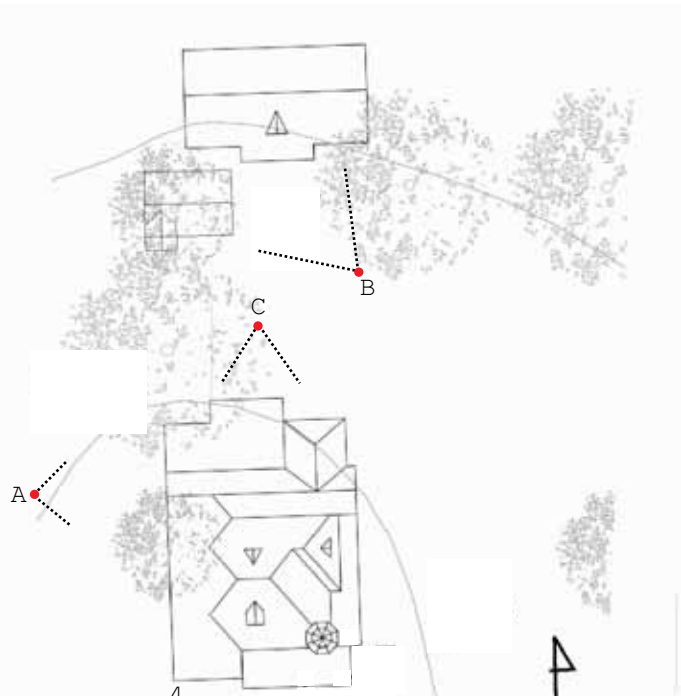
2

B

3

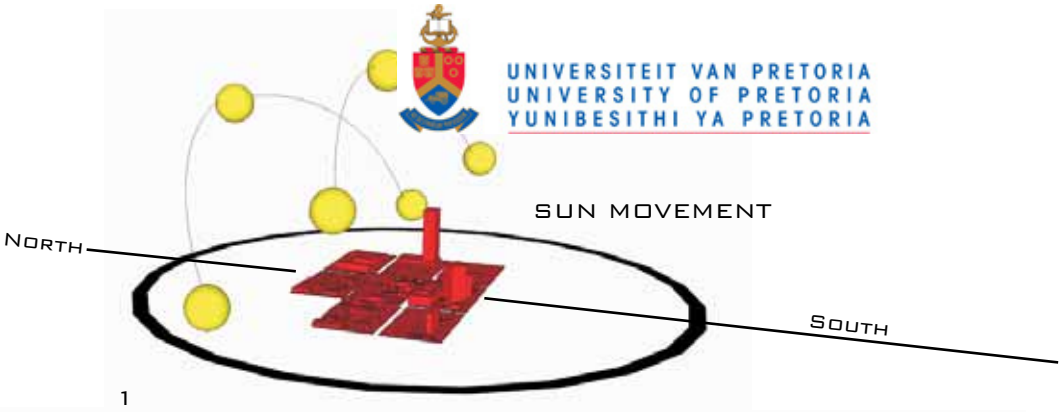
C

WILL BE TO CONVERT IT INTO A BOOKSTORE, THIS FUNCTION WAS CHOSEN TO EXTEND INTO AFTER WORKING HOURS, TO ATTRACT PEOPLE TO THE PUBLIC SQUARE AT NIGHT AS WELL. COMBINED WITH THE RESTAURANTS AND MUSIC CENTRE PROPOSALS IT WILL WORK ALL TOGETHER TO ATTRACT PEOPLE TO THE SITE. WHEN THERE IS PEOPLE ON THE SITE DAY AND NIGHT IT WILL FULLFILL THE AIM TO MAKE THE SPACE RESIDENTIAL FRIENDLY. PEOPLE DO NOT WANT TO LIVE IN A DEAD ISOLATED ENVIRONMENT, WHICH WILL BE THE CASE IF RESIDENTIAL UNITS ARE JUST PLACED WITHIN THE CITY WITHOUT AN URBAN FRAMEWORK.

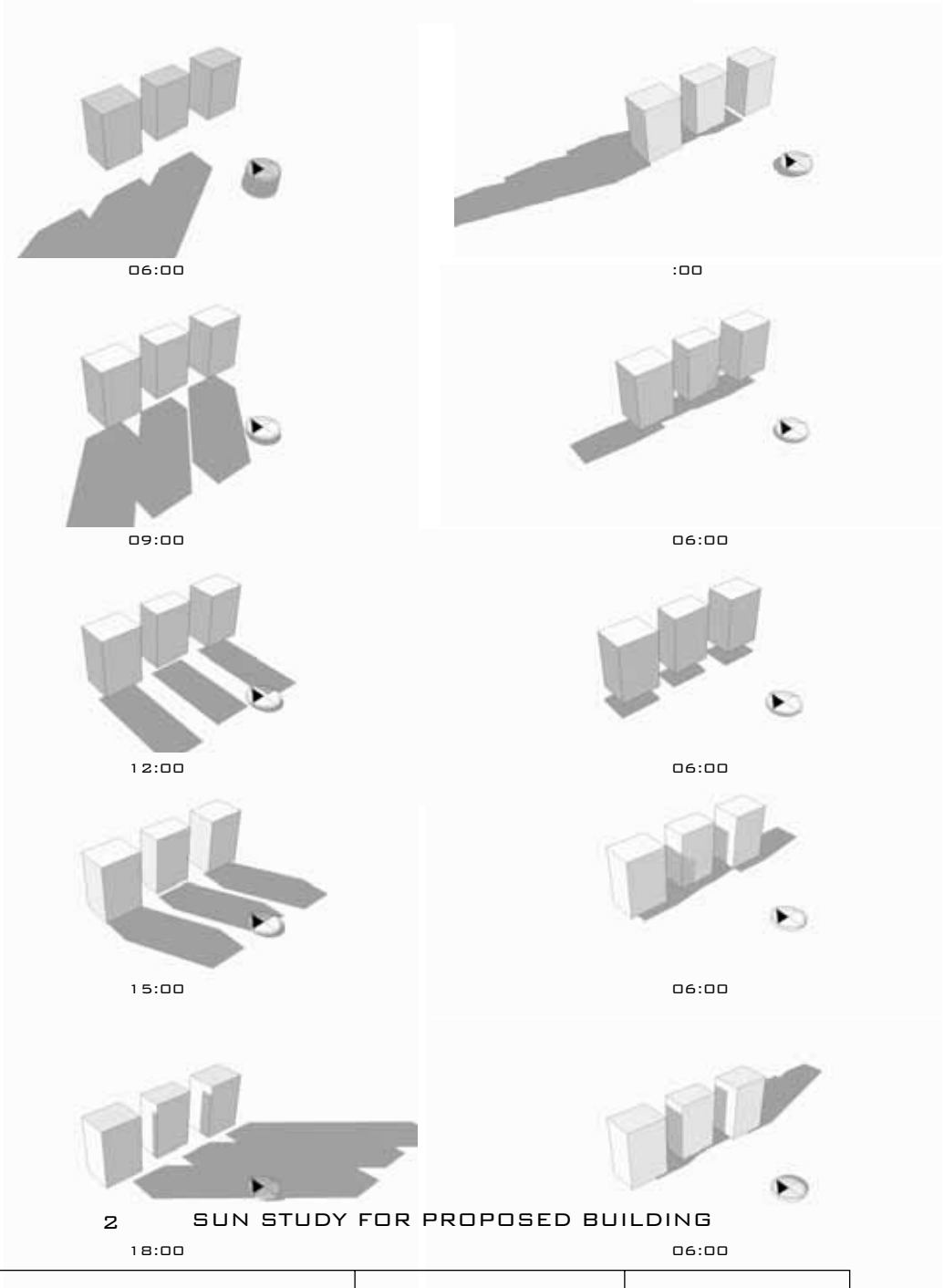


4

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



1

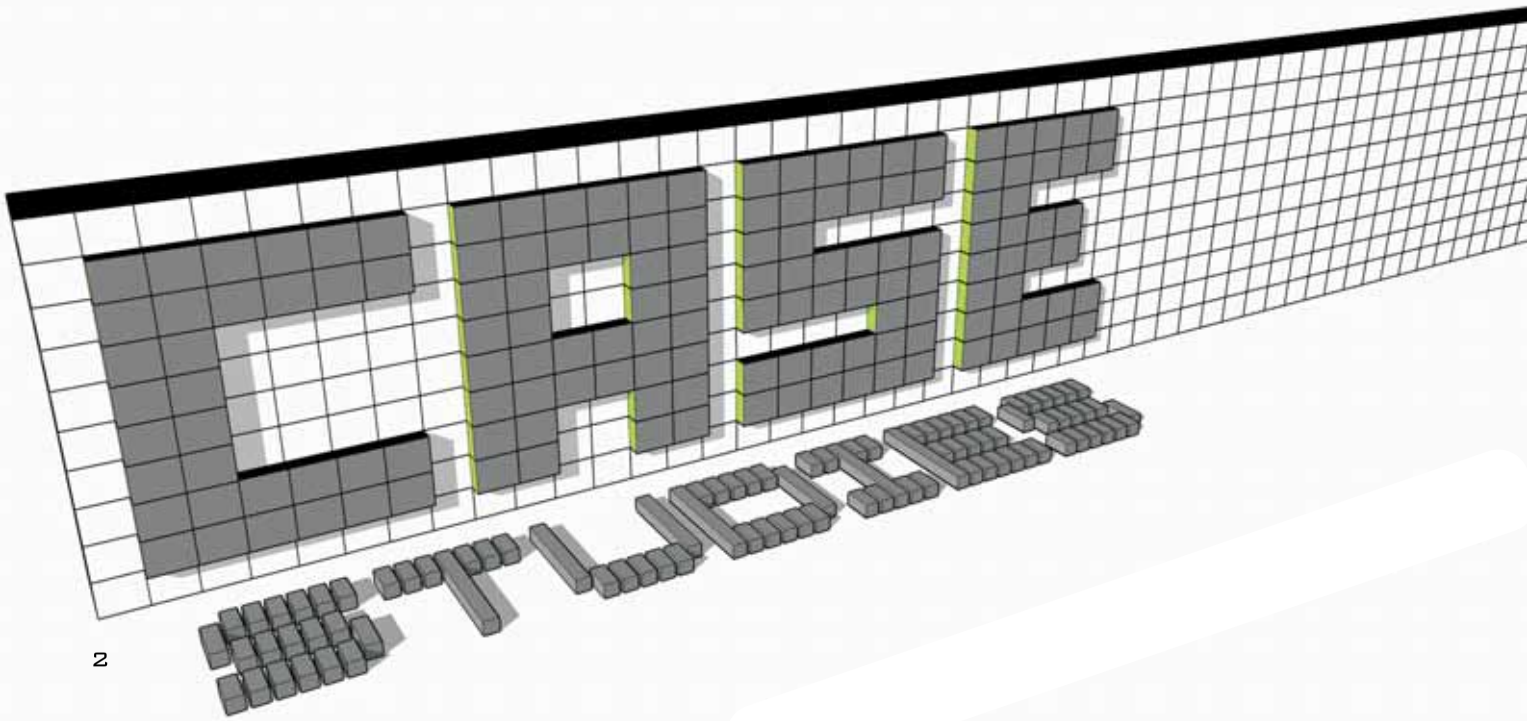


2 SUN STUDY FOR PROPOSED BUILDING

PRETORIA CLIMATE	SUMMER	WINTER
AVE TEMPERATURE		
MAX	28.8 C	25.7 C
MIN	12.8 C	2.6 C
AVE WIND SPEED	41 KM/H	60 KM/H
AVE RAINFALL	700 MM	
SUNNY DAYS	60%	80%

CASE STUDIES

1



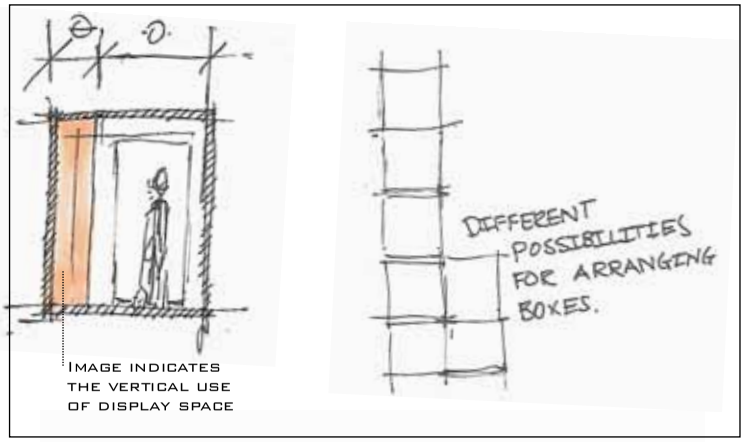
2

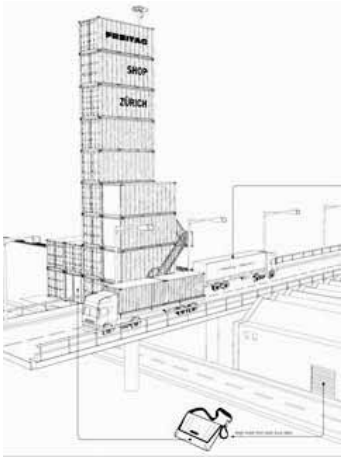
FREITAG SHOP: ZURICH

ANETTE SPILLMANN AND HARALD ECHSLE

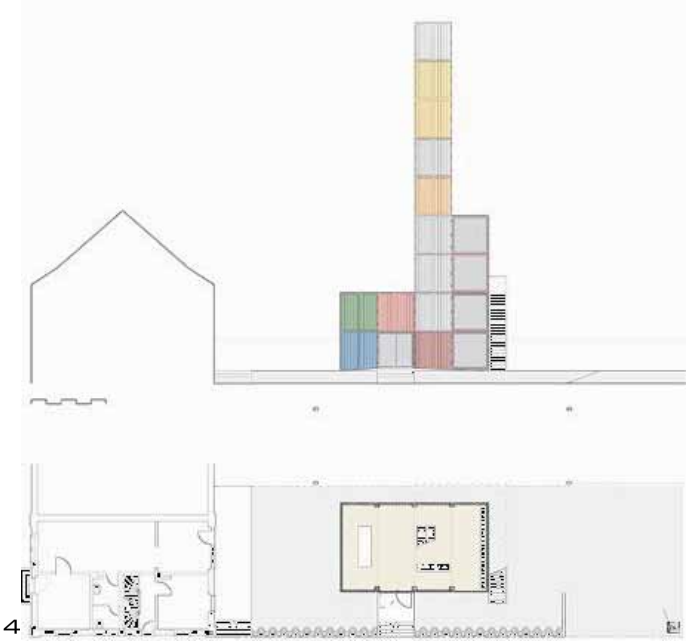
1

2





3



4

The shop achieved the utilization of a small space for retail use. The vertical use of display will have to be used within the proposed commercial shops to utilize the space optimally.

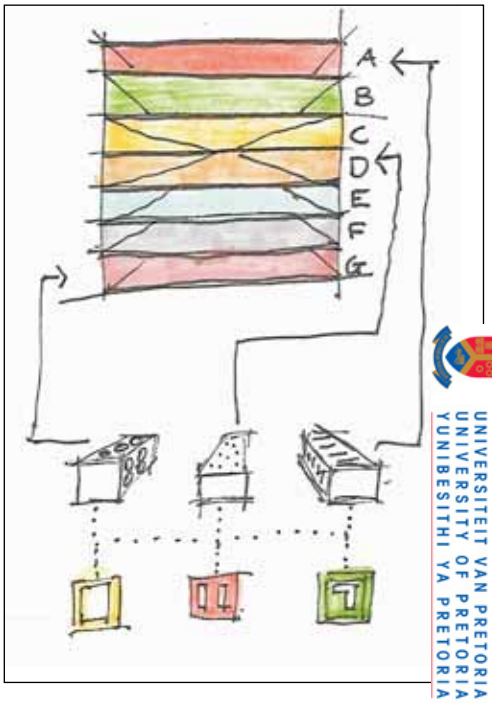
PUERTO AMERICA: MADRID

VARIOUS DESIGNERS

1

In this hotel well known designers were given the task to individually design one floor of the hotel. This concept illustrates that in one system it is possible to get input within a framework from different designers. This approach was taken for individual expression within the proposed building system, by providing various designs to choose from.

2



3

4

5

6

M-CH HOUSE

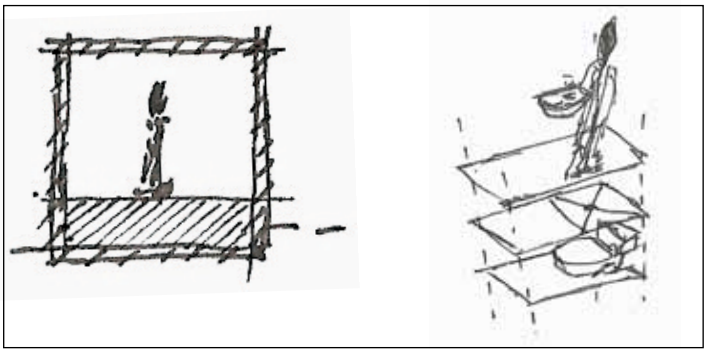
LONDON- HORDEN CHERRY LEE ARCHITECTS

1

The design by Horden Cherry Lee Architects for a micro-compact home (m-ch), developed with Munich University, is a prototype house designed for brief stays, that incorporates quality and high tech and is suitable for installation in very different environmental conditions. The aluminium cube (266 cm each side), is autonomous, in terms of energy and is ready for internet connection.
It includes an audio system, plasma screen and has no need for furniture: the interior is organised in functional layers that can be overlaid according to use, including a small kitchen and bed.
The m-ch house can be stacked vertically to form a village around an aluminium structure equipped with stairs or lift, or placed horizontally or following the shape of the terrain.
The concept was first tested in a mock-up, which is still on display and in use at the University institute. Considerations on cluster assembly of the single units led to a feasibility study for student housing funded by the Bavarian state.

Its design has been informed by the classic scale and order of a Japanese tea-house, combined with advanced concepts and technologies. Living in an m-ch means focusing on the essential - less is more. The use of progressive materials complements the sleek design. Quality of design, touch and use are the key objectives for the

The m-ch has a timber frame structure with anodised aluminium external cladding, insulated with polyurethane and fitted with aluminium frame double glazed windows and front door with security double lock; graphics can be applied for sponsors, exhibition and business use. (Poli, 2006:12)



1

2

Above: m-ch units with the corporate sponsor's logo on the facades.

Left: m-ch measures 266 cm x 266 cm x 266 cm. The ceiling height is 198 cm and the door width is 60 cm.

3

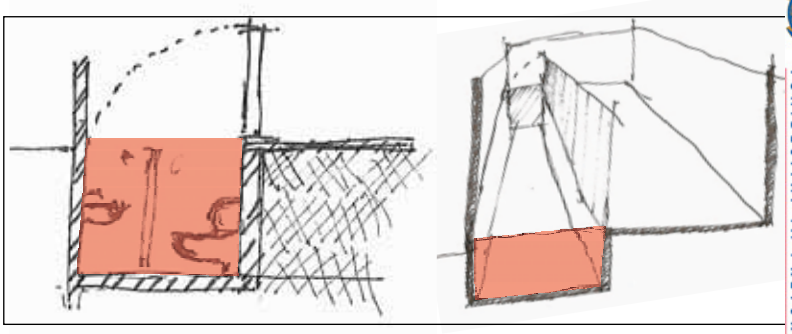
4

Above: showing the possibility of stacking the units around an aluminium frame.
Left: Interior view inside the m-ch showing the fine use of space.

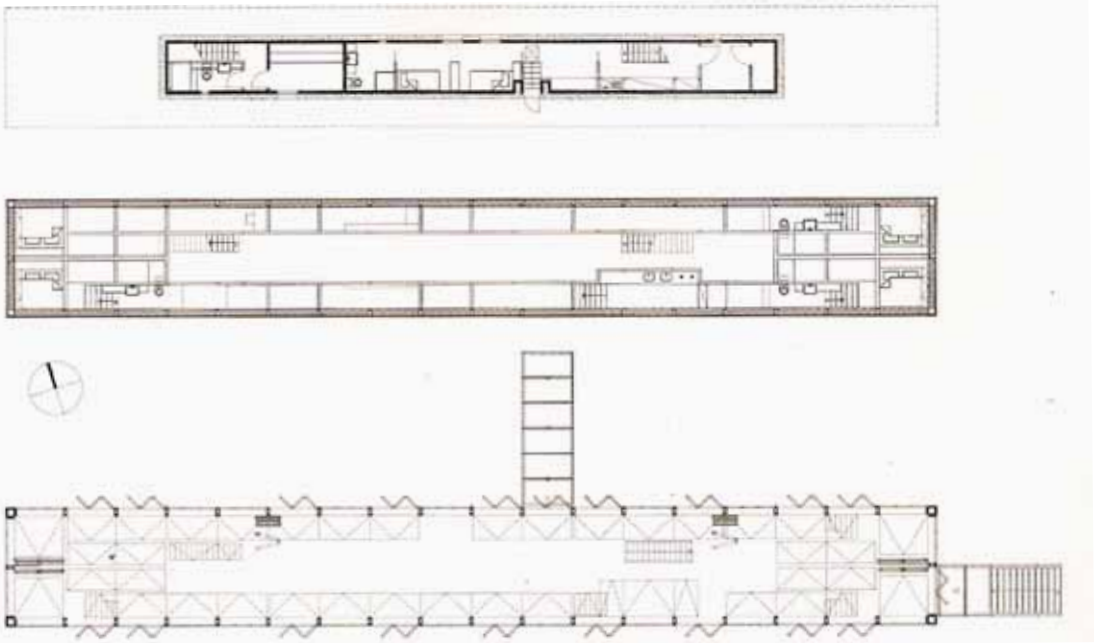
SUITCASE HOUSE HOTEL
EDGE ARCHITECTS

1

This project was part of a competition for twelve young promising Asian architects, which entailed the design of twelve communitarian residences at the foot of the Great Wall. The proposal was for a clear and pure volume with levels inside. It need be extremely adaptable to diverse uses during the day including use as a leisure space, where wood would become the unifying element. (Asensio, 2005;42)



The way the architect handled the wet services by providing a void below floor level gave the idea to provide the nomad pod with a service void to mix required space for the use of the sanitary appliances.



2

SPACEBOX: NETHERLANDS

MAERT DE JONG / DE VIJF

1

2

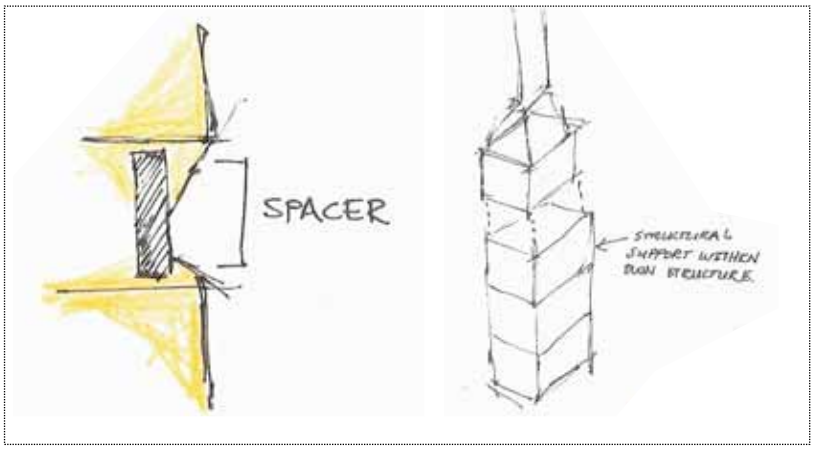
3

4

Instant, self-contained studio residences. All you need is a crane to stack them up to three units high. The Spacebox is equipped to function as a compact studio residence, complete with kitchen, shower and toilet with a surface area of 18 m² or 22 m². There's a large window on one end and the entryway on the other. The units are equipped with a boiler, mechanical ventilation and electrical heating. Spacebox units are made of the same high-grade light weight composites that are used in shipbuilding and aircraft manufacturing. <Http://mocoloco.com /archives/spacebox>

This precedent guided the system developed for handling the units on site.

The way these units stack on one another guided the way of handling a stacking structural system to minimize additional structure.

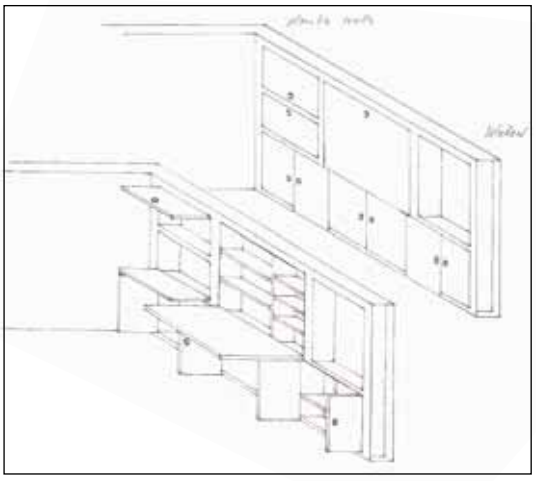


5

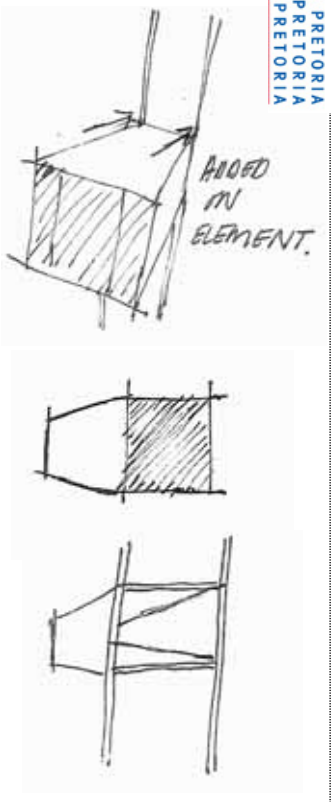
RUCKSACK HOUSE: COLOGNE GERMANY

STEFAN EBERSTADT

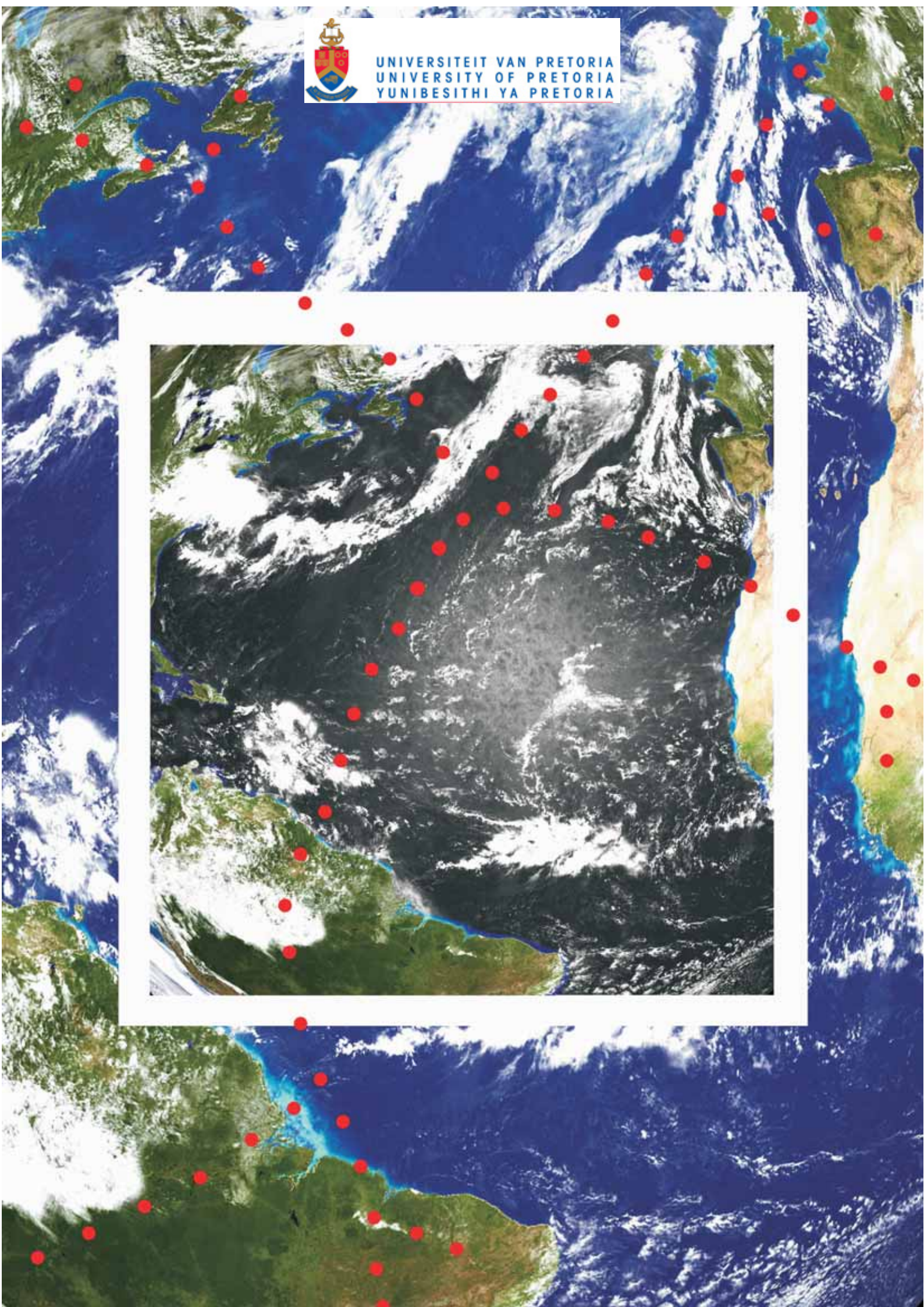
Stefan Ellerstadt had the unusual idea of simply adding space to an existing building. As he says, "New space gets slung onto an existing space by a simple, clear and understandable method. This reactivates the idea of the self-built anarchistic tree house, this time however, more prominently placed and structurally engineered. Our common perception needs to be challenged since It gets irritated when the plain facade of a building is suddenly interrupted by a box-shaped volume edging out into the realm of the street. " Working with Thomas Heck, a structural engineer from Munich, he devised a welded steel structure wit plywood cladding that was hung by steel cables from the Federkiel Stiftung/Halle 14 in Leipzig from September to November 2004 in the context of the exhibition Xtreme hou (Jodidio, 2006:152)



The concept idea of adding extra space with a unit fixed to a structure was taken from this precedent study. The use of space inside the walls guided the development of the secondary systems within the residential unit.




E


UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

The world became very small with the worldwide transport systems, air travel, internet, laptops, cell phones and google.
Today there are a lot of opportunity in existing technological platforms like the systems mentioned above that have had a great
impact on the world. There is a gap that has formed between a disposable society and a 'slowness' in architecture. To bridge this gap one should look at current technologies to aid the implementation of systems that will change the way architecture is perceived today.
The shift in the way architecture is perceived should lean towards disposable, recyclable and replacable. The way a building is changed by demolition should change towards replacing or adding elements without any demolition work.

This thesis adopts the same technology platform as the car, with standards to bind the system.
Pre fabrication will be the primary platform allowing the system to adapt to new technologies and materials.
For world wide implementation of the system it will be important to standardize the basic element in the structure.

The recycling aspect will, once a building is demolished, be a sustainable solution against the tons of rubble that is the result of traditional demolition.

News Flash: REDUCTIONS IN ..... WAS THE TRAM A GOOD IDEA??

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

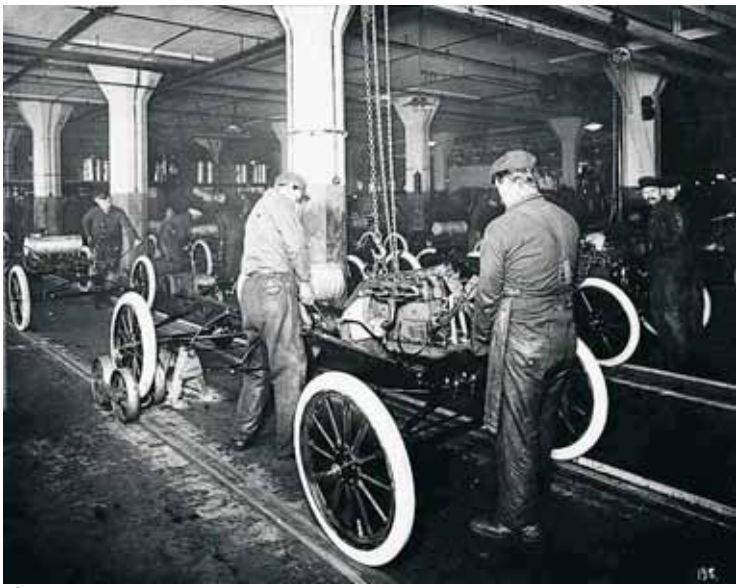
SOLUTION

CAR FACTORIES CAN MANUFACTURE THE NEW HUGELY SUCCESSFULL PODS, BECAUSE IT WILL FIT INTO THE ALREADY IN PLACE MANUFACTURING PLANT.

1

2

Elements that changed the world to a fast paced society was the car and airplane. Today these systems still serve as great examples to how a necessity can be manufactured to be affordable by the general public. These assembly plants work on a technology platform able to adapt to changes in model ranges.



3

Henry Ford made it possible for the general public to be able to afford a car, and he standardized parts so that it could be assembled in a controlled environment. He set in motion the concept of an assembly plant still being used today, except that today it is mostly computerized.

The level of substitution in cars is usually ten times higher than in dwellings, which is an indication of how easy it is to supply and replace moveable property. The level of substitution of dwellings is very different, because of a number of obstacles.

4

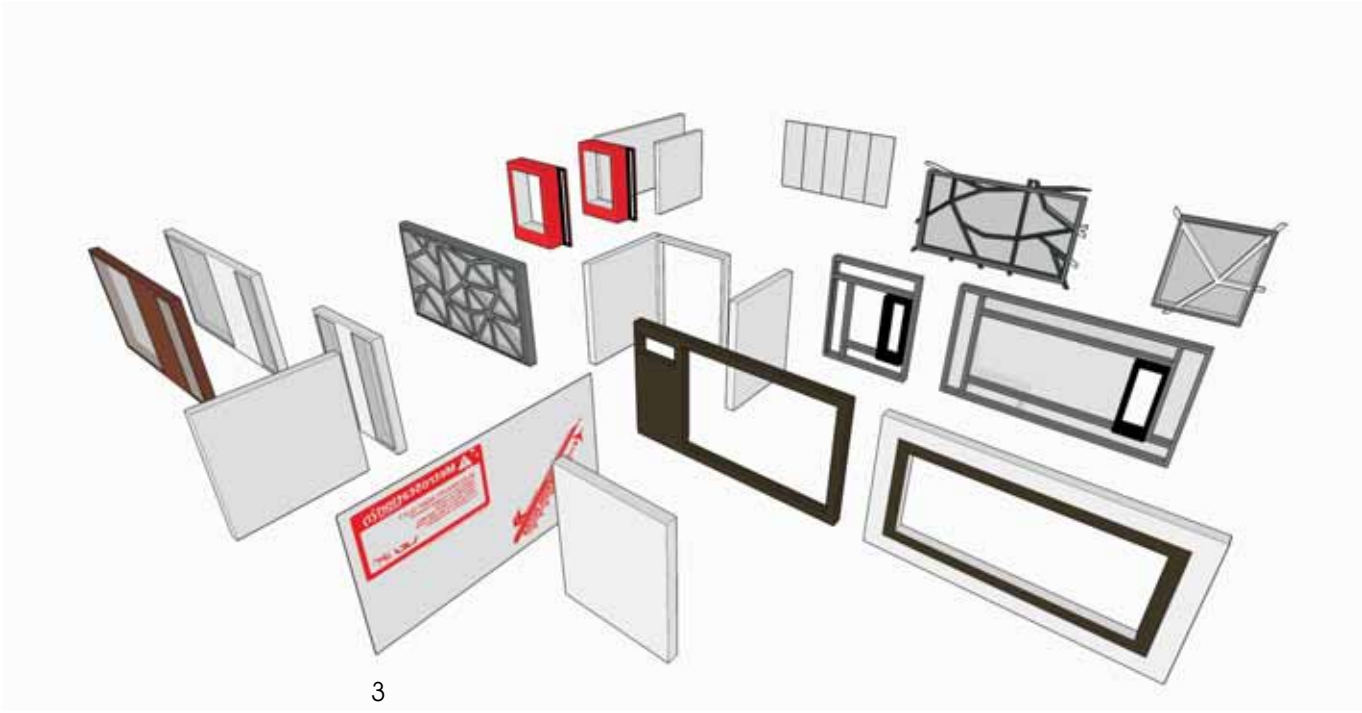
When designing a technology platform one need to take into consideration the other systems in place, like the roads system, where only certain sizes can be transported. In this dissertation the main shaping idea was the use of a module being able to be transportable not only on the public roads but also on every other transporting system that operates all around the globe. Looking at the systems already in place to do transport, the possibility to create a technology platform that will be able to work all around the world becomes very big.

1

2

Criticism against prefabrication is that it becomes monotonous. This became a point of departure for developing the system, how can identity and taste be expressed within the technology platform proposed in this dissertation.

Looking at the car as an example again, the variety within the models lies in the different shapes of the panels and the framework. Now taking the same approach the variety for the modules lies in the paneling and windows fixed to the standard structure.



3

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

LOUIS VUITTON

LOADING JOURNEYS

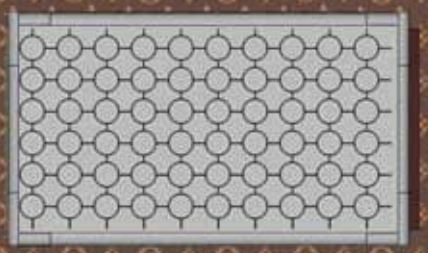
For orders
and enquiries
LV Paris
+3345 4732
service@LV.com

1

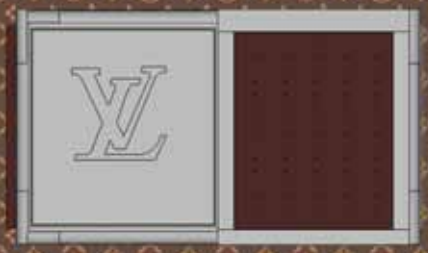
Front view

Rear view

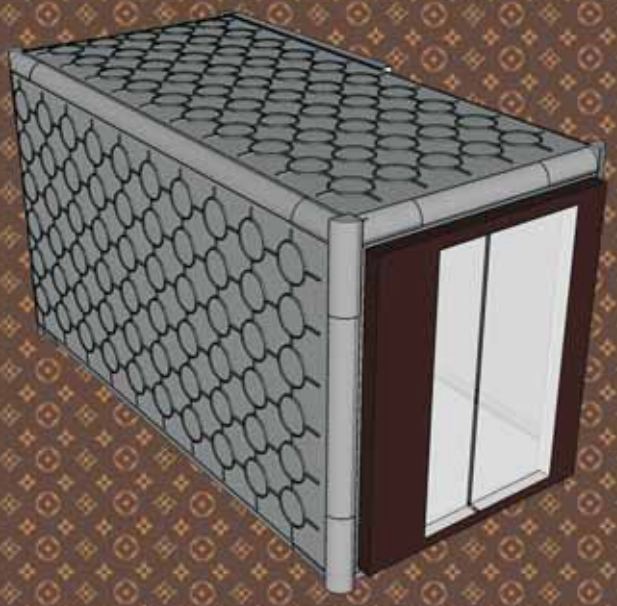
Window panel



Side view



Side view



3D view

2

1

3

With the immense pressure we force upon the world's resources for construction materials, recycling becomes extremely important. The choice of materials in this dissertation was based on the fact that it had to be recyclable
and to be light in weight. Financially the investor of a building will profit out of the recycling of his building materials
once the building is being demolished. Only when people will profit from something they will make the shift to a more sustainable solution.

2

2nd hand market

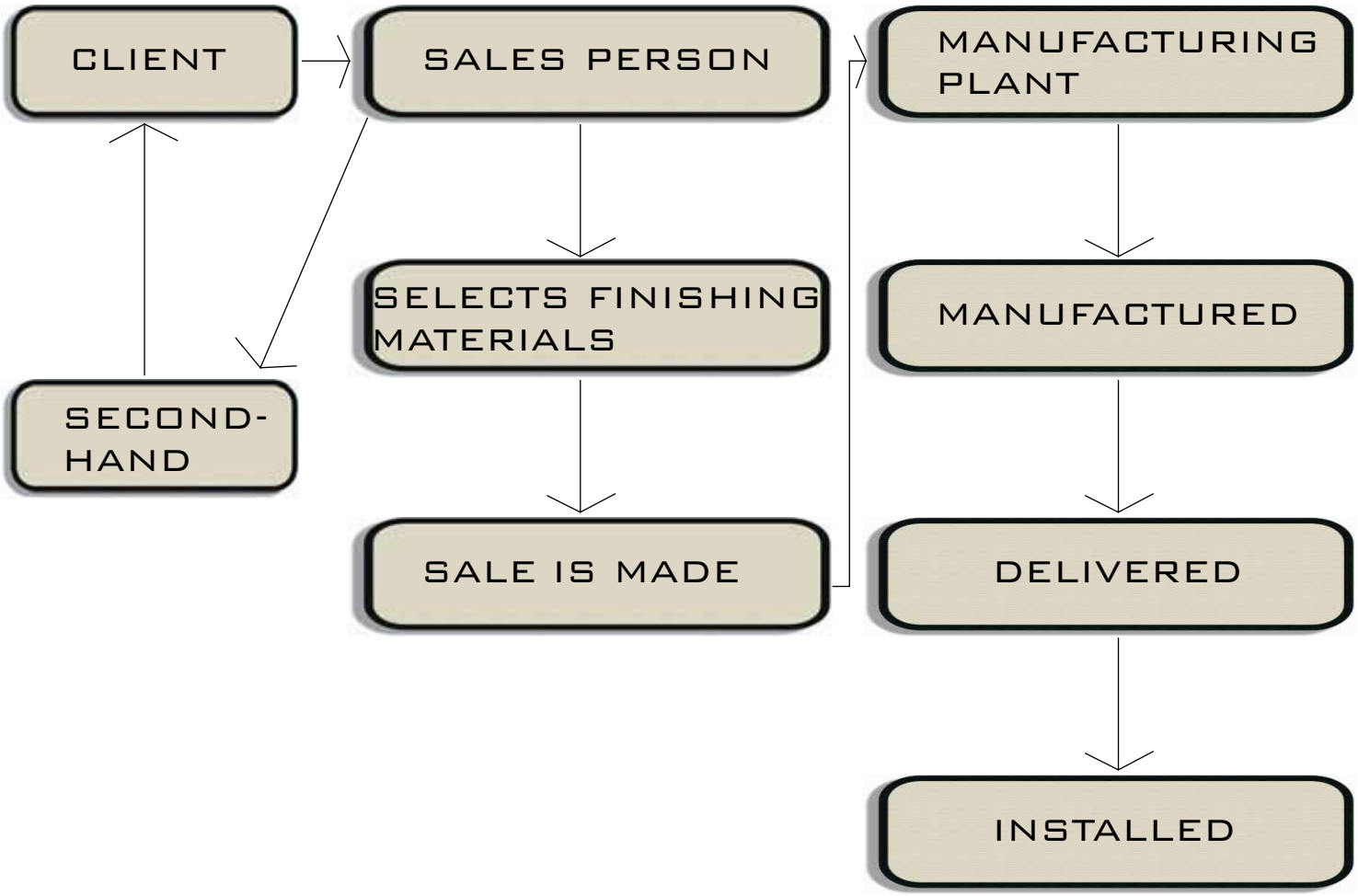
Within urban structures, the house is seen as a flexible/adaptable product rather than a fixed final product. Urban design is an inseparable component of housing [Dewar & Uytenbogaardt 1991] and this acknowledges the various levels of the environment differing in the degree of permanence and changeability thus allowing for more involvement and affordability. This challenges our understanding of informal economies, settlements and structures and our role as professionals in interacting with these alternative systems and "ways of doing/living". (Scheublen & Pronk,2006:2-116)

With the proposed technology platform producing transportable elements that can be added or removed from the building a secondhand market will develop giving the low income section of the population the opportunity to afford a secondhand home.

Designed and emergent systems [Hamdi 2004], are equally important and it is strongly believed that any approach that does not acknowledge the presence of the 'informal' as a force that cannot be eradicated and as a legitimate power, energy and form of expression is doomed to fail. (Scheublen & Pronk,2006:2-116)

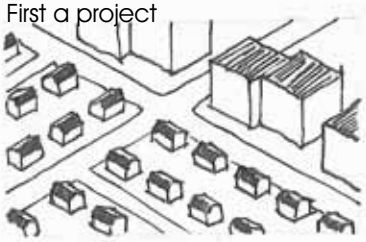
SALE PROCESS:

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



CLOLSED BUILDING SYSTEMS

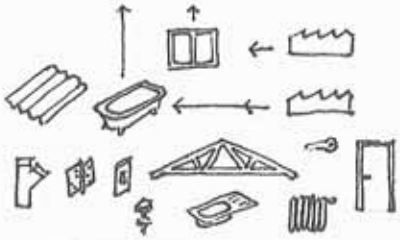
First a project



Then a system

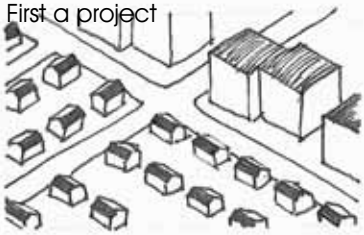
Mass-production
one end product

Always third party supply



SEMI-OPEN BUILDING SYSTEMS

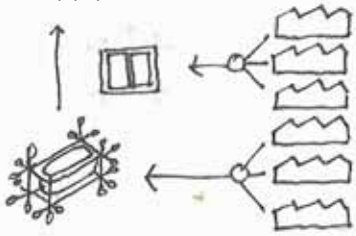
First a project



Then a system

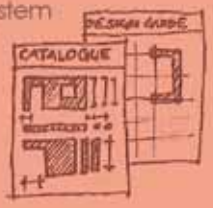
Mass-production
one end product

Open supply



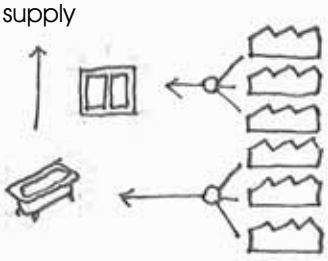
OPEN BUILDING SYSTEMS

First a system



Then many projects

Open supply

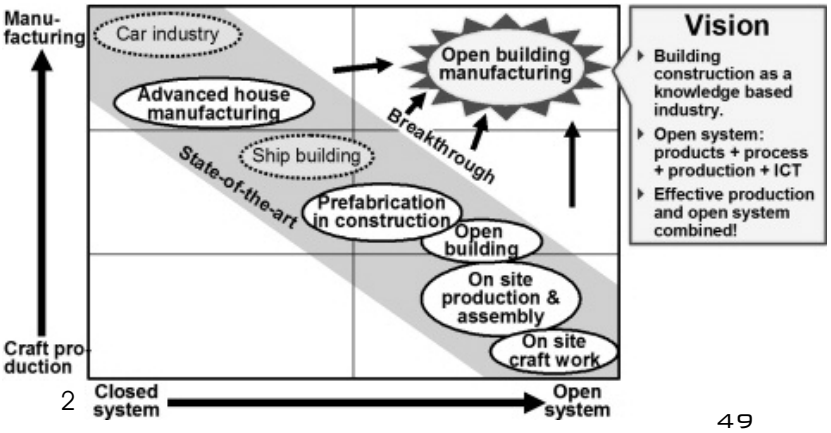


1

The processing of semi-manufactured components by tradesmen on the building site takes a relatively long time. Consider, for example, the hanging of doors, bricklaying for outside walls and the many tasks performed by tradesmen in sanitary areas. Each of these activities is carried out by a different tradesman, which results in poor logistics. There are many inefficient intervals between successive processes. No one considers himself responsible for the next one along, who often has to clear up the mess left by his predecessor.

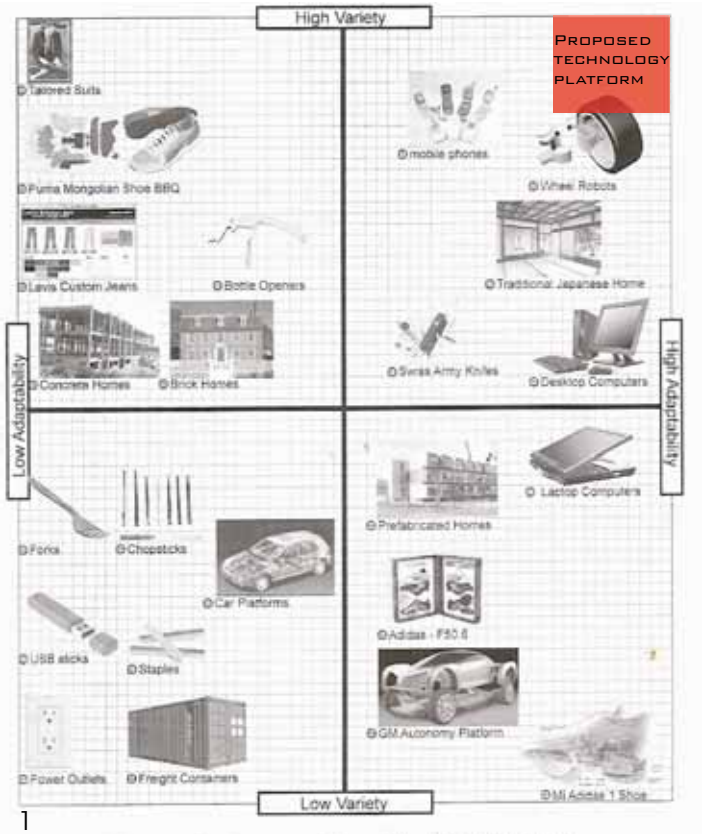
Firstly there will be a system in place and projects will be able to be constructed from this system, but the construction will take place in one controlled environment. There may be supplies of materials from different locations but the modules and all the parts and the assembly there off will take place in one environment.

'The traditional process of building a simple bathroom begins with the shell (walls and ceiling). Next the heating engineer arrives, followed by the plumber and the electrician (sometimes also the ventilation engineer), all of whom, one after another, install the connections for their own piping or cabling. Next comes the plasterer followed by someone to lay the floor screed. The plumber then returns to install the bath. The next tradesman to come along is the tiler, to tile the floor, the walls and the side of the bath, followed by the joiner, to fit the doors. He in turn is followed by the plasterer to finish the walls and ceiling. The heating engineer, plumber, electrician and ventilation engineer then return in succession to finish their own parts of the job. They are followed by someone to finish off the joints and the grouting. Last of all comes the painter.'
(TU/e Delft, 2006 :23)



2

The technology platform creates an ideal open building manufacturing system as it combines a mid way between the manufacturing principles of the car industry and the craft work on site.



Variety versus Adaptability (Post-Production)

5.2 Low Variety, High Adaptability
The Mi Adidas 1.1 shoe anchors the low variety, high adaptability quadrant [Mi Adidas 1.1 2006]. In contrast, the Adidas F50.6 TUN IT Premium ClimaCool® Set shoe offers a highly modular yet adaptable shoe architecture, whereby users can reconfigure the shoe by switching the shoe chassis and body to differing weather and comfort positions [Mi Adidas F50.6 2006]. Similarly, the GM autonomy vehicle platform provides future customers an adaptable skateboard like chassis which can fit to different body cabins [Burns et al.2002]. However, variety is limited to three sizes of platforms. Prefabricated homes are adaptable to different in still conditions. Often prefabricated modules can be clustered together to create' new combinations for given space requirements. With increasing adoption and improvements in rapid prototyping, variety will increase in the next decades. Laptop computers (like desktops) are fundamentally adaptable products due to their product and software architecture. Laptops are designed to be mobile. therefore adaptable to the user's environment: whereas desktops are less mobile, but have much freer packaging constraints thus are more adaptable for hardware additions.(Ryan, Chin, Patrik, 2006:3-209)

Adaptive Product Modules for Mass Customization: Lessons from Vehicular Architecture Development, Ryan c.c. Chin, Patrik KUnzler

y, Low Adaptability
occupy the extremities of this quadrant because each suit is customized ergonomically for each customer. Suit makers can combine different materials and styles to create infinite variety. Once the suit is made, changes are difficult to accommodate.
Puma introduced in 2005 its line of customizable shoes [Puma 2005]. To design the shoe, customers select components of the product which was are sent to the factory to be assembled and then sent back to the retailer. Like the tailored suit, variety is very high, but once configured the product has very little adaptability. More infamously, Levis introduced custom jeans by offering a website that allowed customers to specify the exact fit of the pants. In the building industry, brick and concrete homes inherently have high variety because of the endless combinations of brick types and forMwork that can yield endless designs. However, once built in place these architectural expressions are very static and offer very little adaptability by the users. Concrete buildings are less adaptable than brick buildings because of the monolithic nature of concrete construction. (Ryan, Chin, Patrik, 2006:3-209)
Adaptive Product Modules for Mass Customization: Lessons from Vehicular Architecture Development, Ryan c.c. Chin, Patrik Kiinzler

5.3 Low Variety, Low Adaptability
This quadrant of the diagram is dominated by mass produced products. Household power outlets have very little variety (except for the cover plate) and negligible adaptability. Freight containers come in only a few standard sizes. Truck beds, ship cargo bays, etc. have all been designed to fit those dimensions. USB memory sticks have more variety than power outlets and freight containers, but less than utensils like forks and chopsticks. Collectively. these products have very little adaptability aside from creative uses (i.e. using chopsticks to hold a hair bun). The automobile industry has perfected the use of product platforms because of the intensive capital investment necessary to develop a vehicle platform. For example, the Volkswagen group's A4 platform is the basis for 8 different frontand all-wheel drive model ranges [A4 Platform 2006]. (Ryan, Chin, Patrik, 2006:3-209)

5.4 High Variety, High Adaptability
Swiss Army knives can be adapted to solve a myriad of problems. Differing sizes and colors also make Swiss Army knifes a high variety product. Mobile devices like cell phones exhibit high degrees of variety not only because of the numbers of designs, but the endless ways a user can personalize the product (physical/virtual skins, downloadable ring tones, etc.). Cell phones are also very adaptive in post production because the modular architecture allows users to switch and replace batteries, SIM cards, face plates, and other physical components. The traditional Japanese home is designed and built based on the 'Ken.' a traditional proportioning system [Ching 1979]. The product of this proportioning system is architectural fmm of infinite variety and high levels of adaptability. With the introduction of flexible and movable wall partitions (which were also proportioned using the Ken), spaces could be adapted to fit differing spatial needs. Desktop and laptop computers straddle the line between low and high variety and with the continued demand for more customizable products will only see an increase in both variety and adaptability. (Ryan, Chin, Patrik, 2006:3-209)

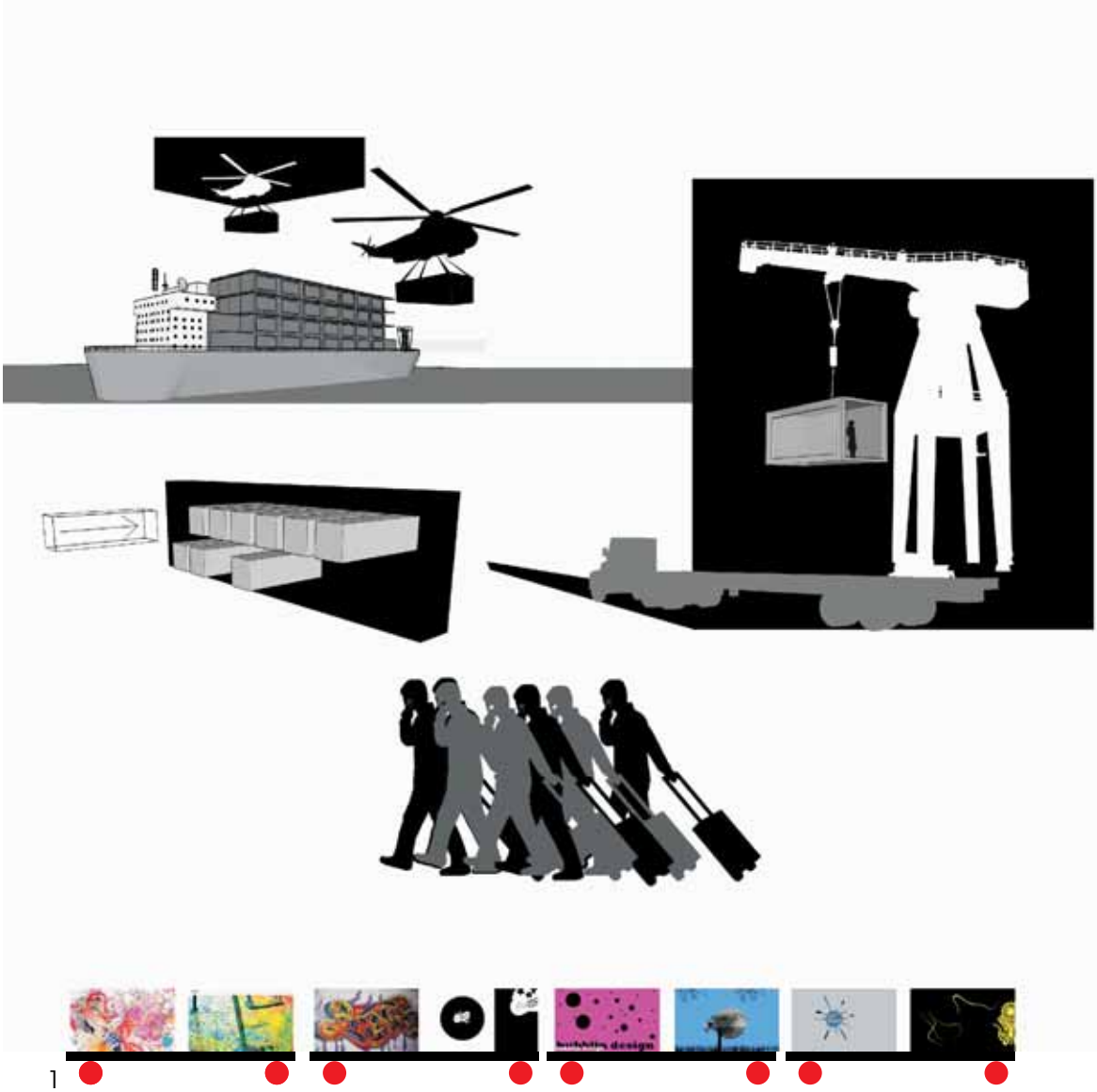
High Variety; High Adaptability;

Position on graph for proposed technology platform.

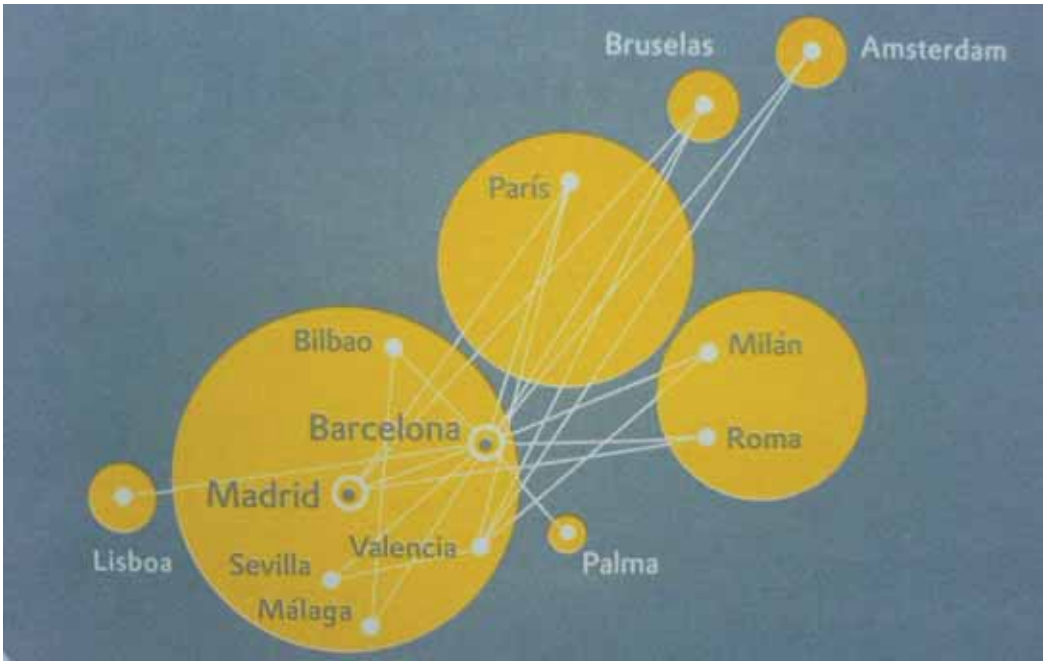
The high variety lies in the different options of exterior paneling available. The frames can be interconnected with one another giving endless variations for floor plan layouts and can adapt to needs, topography, city fluctuations, requirements, new shop/residence owner and changing needs of the user.

The diverse designs possible within this technology platform allows adaptability to changes in fashion and technology over time.
With all exterior panels, window panels and interior sub-systems (kitchen and bathroom) that have standard fixings, the user can personalize the product.

Today technology allows people to become more mobile with the aid of laptops, cell phones and the extensive networks of transport possibilities available to travel anywhere in the world in a short period of time. Information overload and the time frame in which the rapid growth of information and changes in technology takes place is becoming ever shorter. Adapting became the only way of survival.
This proposal aims to aid the adaptive nomadic person with a home which can accommodate him on his journey.



1

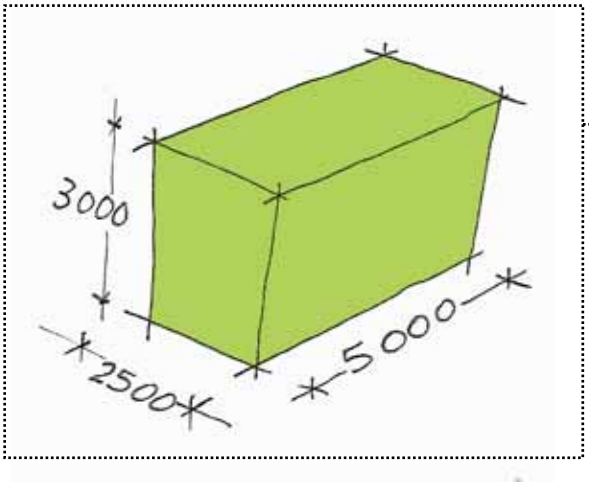

Bruselas
Amsterdam
París
Bilbao
Milán
Barcelona
Roma
Madrid
Valencia
Palma
Lisboa
Sevilla
Málaga

2

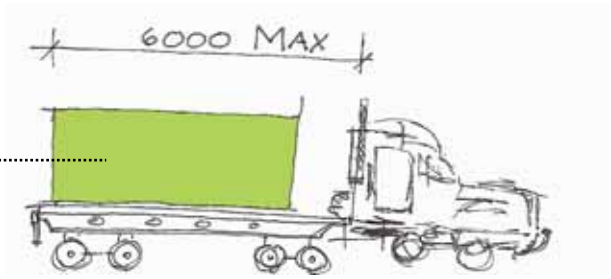
1

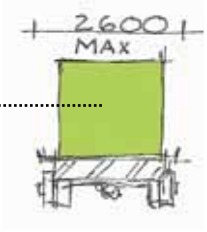
DESIGN DEVELOPMENT

DESIGN DEVELOPMENT
MODULAR

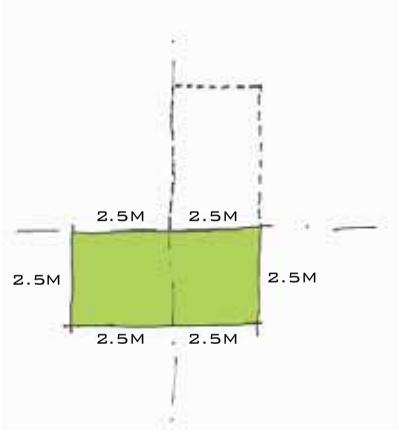


There are a lot of factors playing a role in the choice of the modular size for this dissertation.
The chosen modular size are used throughout the whole building.





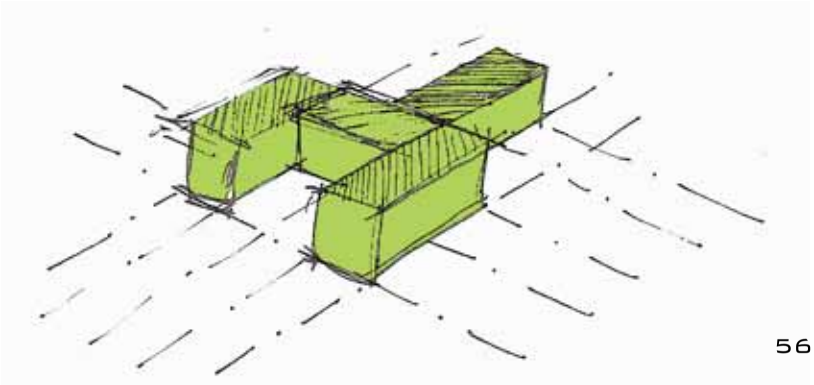
Existing transport systems played a major role in the layout sizes.
Transportable sizes are met as off site prefabrication forms the backbone for this dissertation.



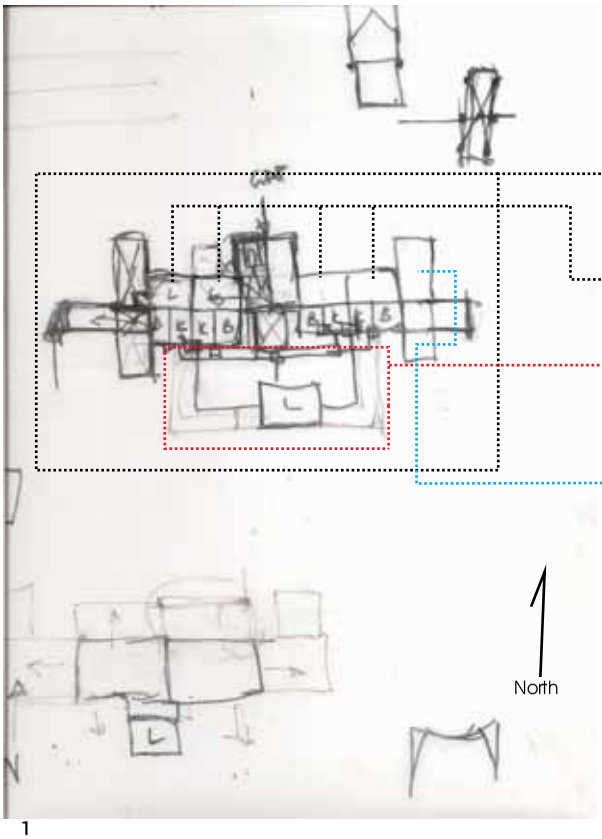
Having ratios to give optimal variations and easy assembly solutions was an important aspect in the adaptability for the proposed system.

The transport sizes gave the ratio of 2.5 m to 5 m. the ratio for 5 m were chosen to fit into car assembly plant.

Studies were firstly made to assure that these sizes give a livable space, and the results were positive.



DESIGN DEVELOPMENT
CONCEPT



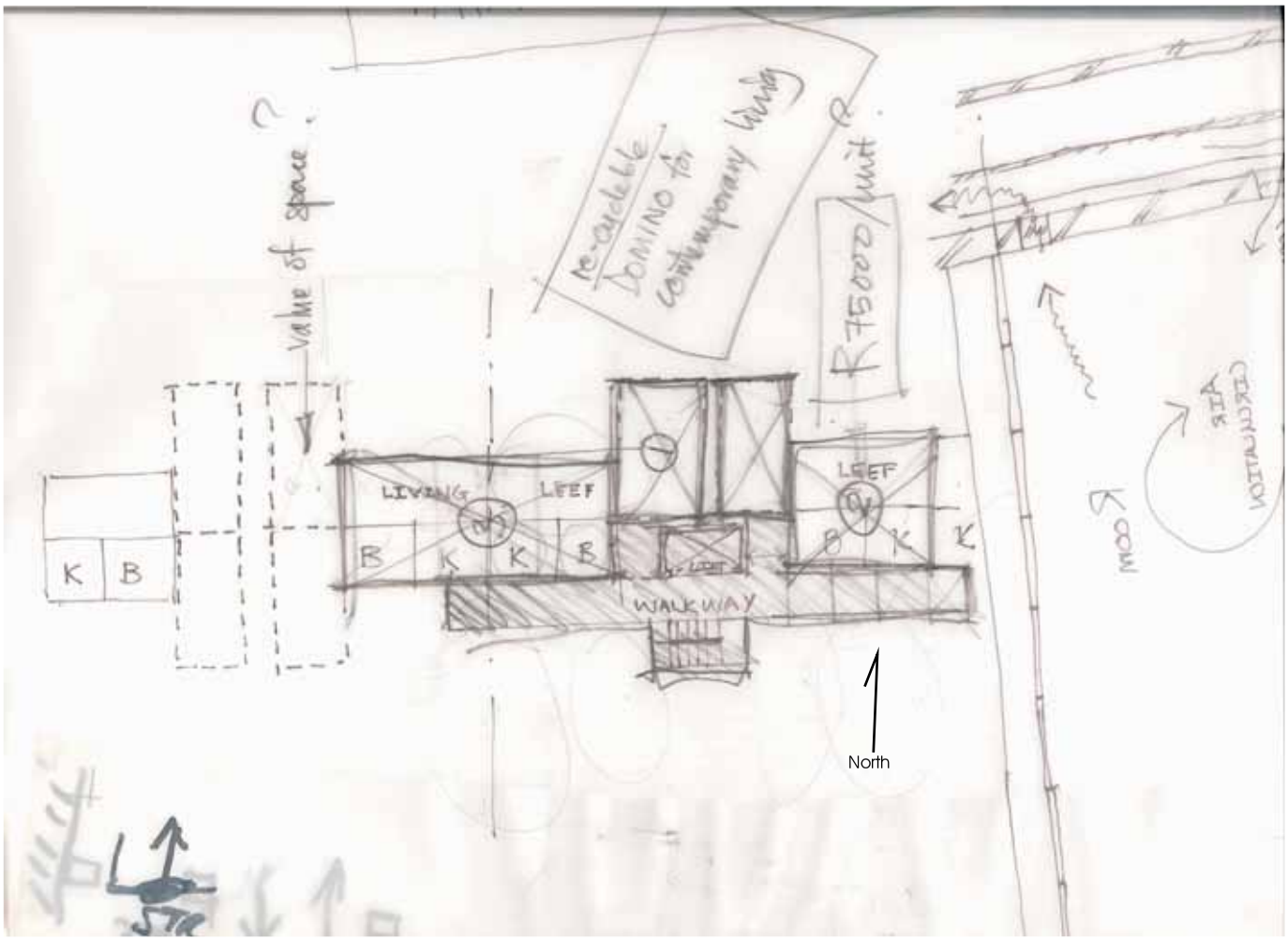
1

The plan layout came to this shape and layout due to several factors that influenced it.

Firstly letting all units face north was important.

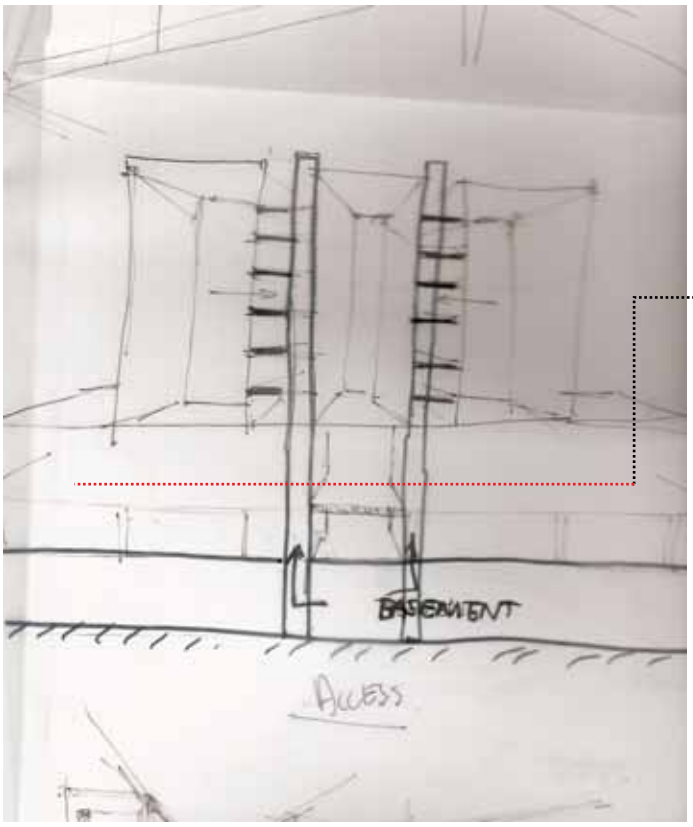
Access was a very important consideration especially to minimize the space utilized.

The plug-on units was positioned for the crane to load them into place.



2

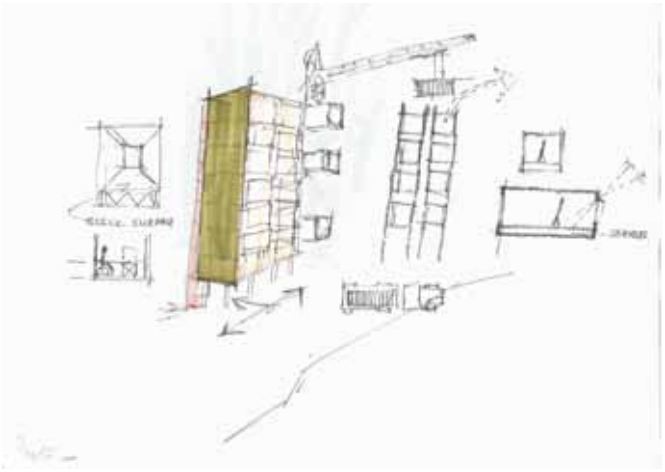
SECTIONS
CONCEPT



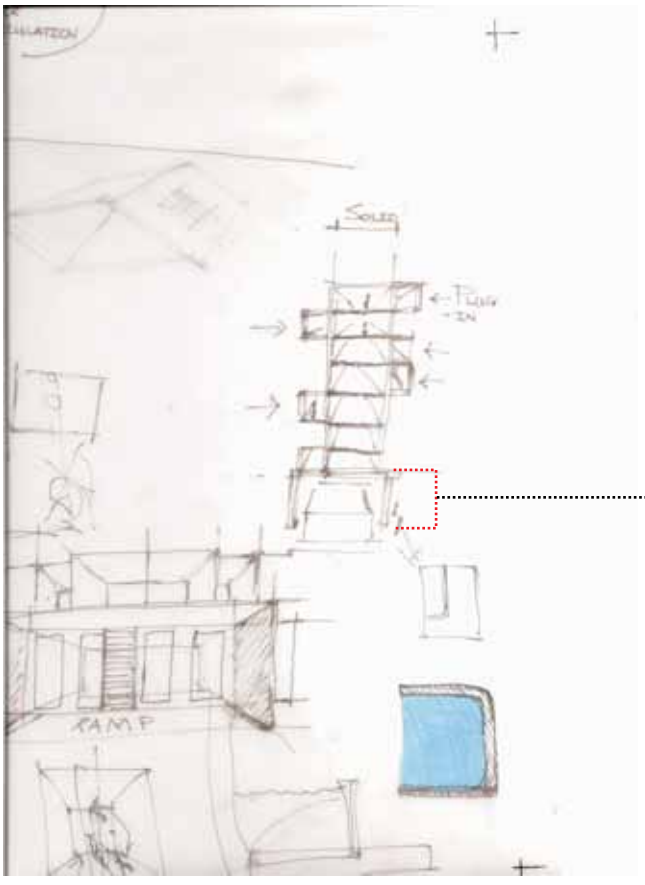
1

Vertical access was critical as basement parking was proposed and entrance to the residential units had to be provided.

On ground floor it was important to provide a separation order between public space and private entrance to the residences. This separation was handled by the use of a check-in security entrance.



3



2

Having a light footprint opens up the groundfloor for public movement.

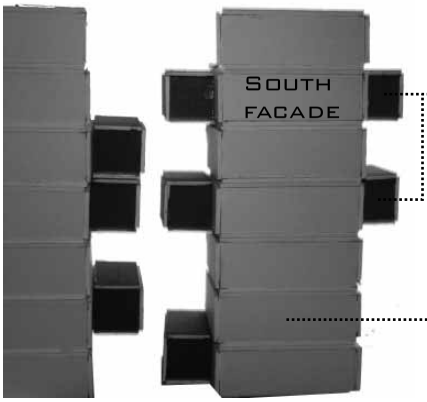
The two storey height clearance before the first residential unit starts, clearly separates the private from the public, and it shows a light footprint.

Deciding what had to be fixed and what movable was important to start with the layout suitable for the specific site.

The narrow site allowed only for a long thin design in the floorplan layout.

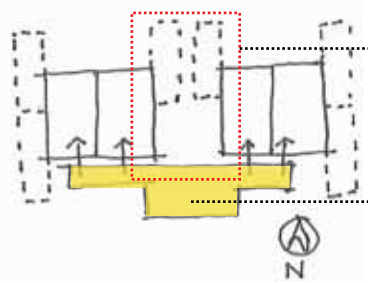
CONCEPT MODEL DEVELOPMENT

FIXING OR REMOVING EXTENDING UNITS



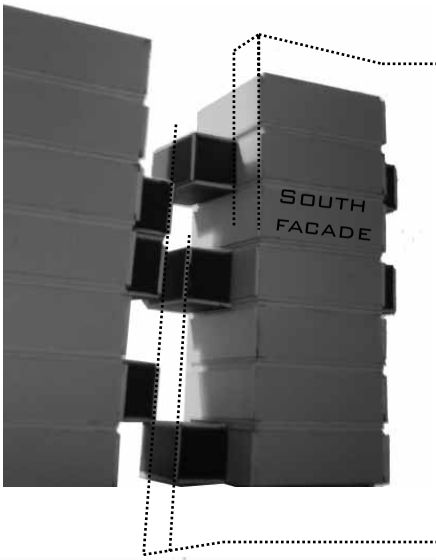
The added units are fixed to the sides of the residential units to keep the north facade free from any obstructions to have maximum use of the northern sun in winter, extending the unit to the north facade will obstruct the sun into the lower unit.

Clearing the facades allows access from the south and no obstructions for the sun into the unit from the north.

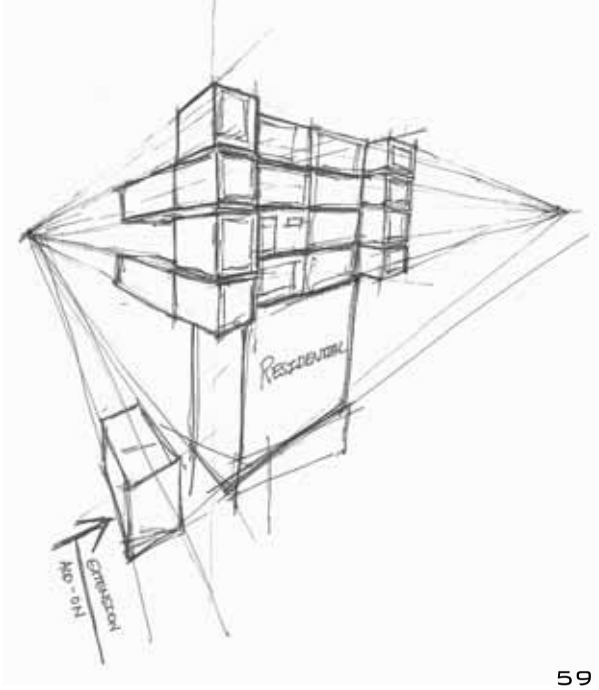


The access system causes that only one unit can be added.

Access system

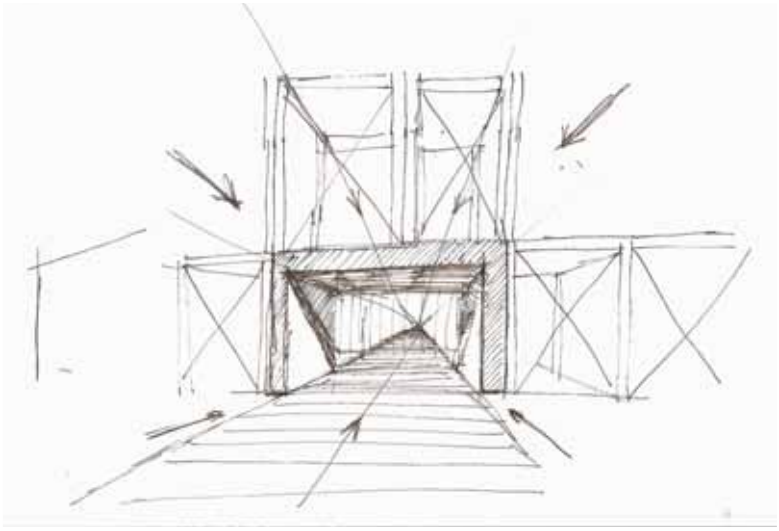


Having the ratio 2:1 the added units extends halfway to allow two units added on the sides where the access t the south have no influence.



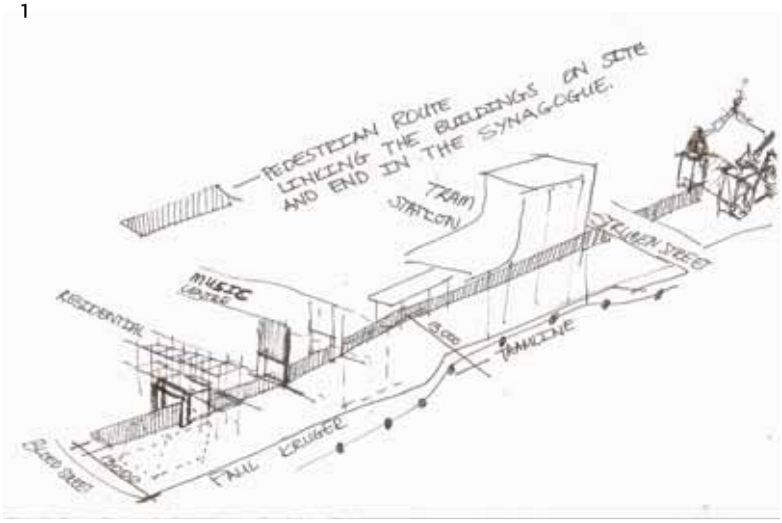
Gap between the extending units was given to easily operate the C-frame loader when fixing or removing the units.

PEDESTRIAN WALKWAY



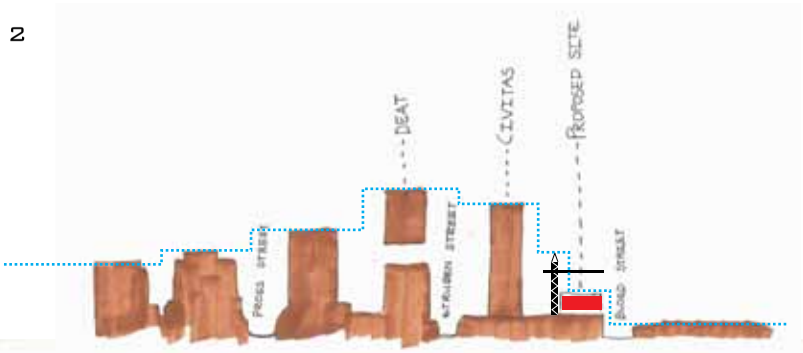
A pedestrian walkway to link the synagogue with the site running through the proposed music centre and tram station. The arch serves as a indicator for the pedestrian towards the direction of the walkway. And the arch will also serve as a structural element.

1

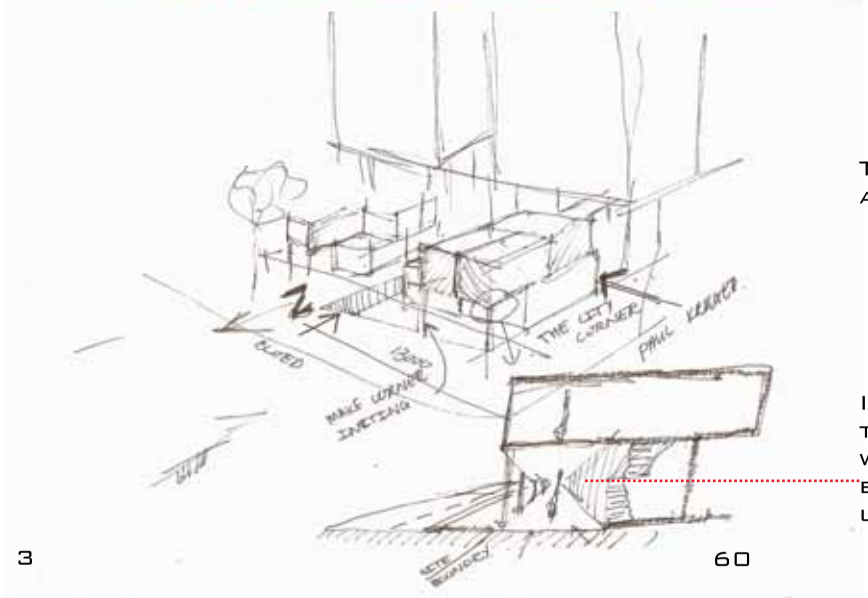


The walkway was proposed for a non-obstructive passage through the site, as the tram line crosses with the existing walkway next to the road. So the new walkway is at an offset distance of 1 into the site.

2



The proposed site is situated at the edge of the high rise buildings where the city starts to flatten down towards the northern partof the city. The height of the building fits into the step down of the city. The height of the building will be the last step down in the city scape, and it will be helped with an in between height of the tower crane.

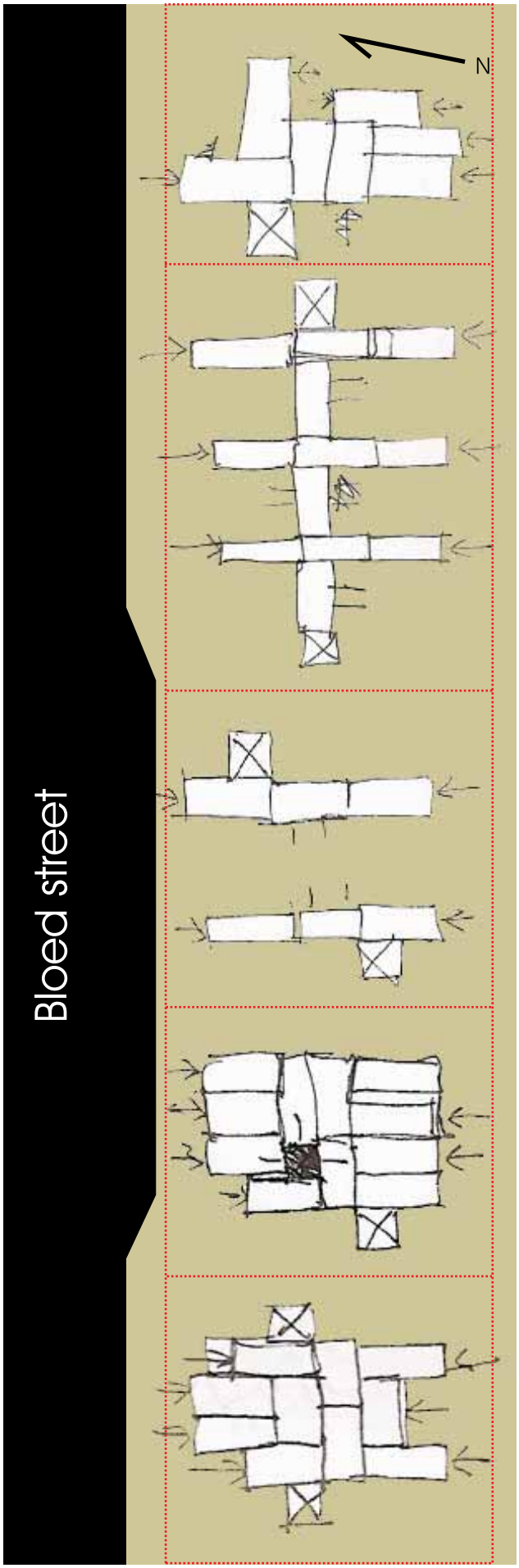


The corner plays a big role in the shape and experiences of a city.

In the inner city of Pretoria one of the main characteristics is the covered walkways, so this consideration played a big role in the layout of the commercial units at street level

3

COMMERCIAL
LAYOUT

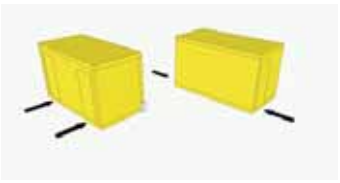


1 The image illustrates the difference in layouts that can be achieved with the flexibility of the units on its own site.

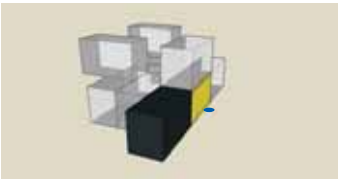
To achieve maximum flexibility within the commercial space each shop fits on its own site so that variations to the floor layout can be accommodated for within this contained site. The second reason for separating the shops is to make the site as penetrable as possible for pedestrians to filter through the building to the public square on the site and to access the tram station to the south of the site.

All units Prefabricated off site

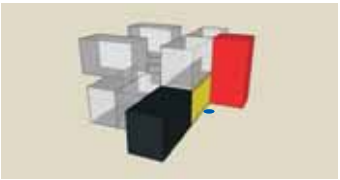
- Toilet unit
- Storage unit
- Staircase unit
- Retail floorspace unit
- Serviced point



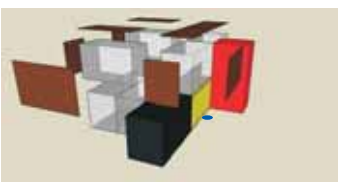
Providing two ways to a the toilet units gives m variations to choice in of the shop.



The toilet unit determines the starting point for the layout, the other units can be added to the clients needs and requirements.



The size of the units and the shop layout will require an approach of optimal space utilization. Every shop will have its own requirements for display depending on the products on sale. A great example of such an approach is the Freitag shop in Zurich, refer to case studies.



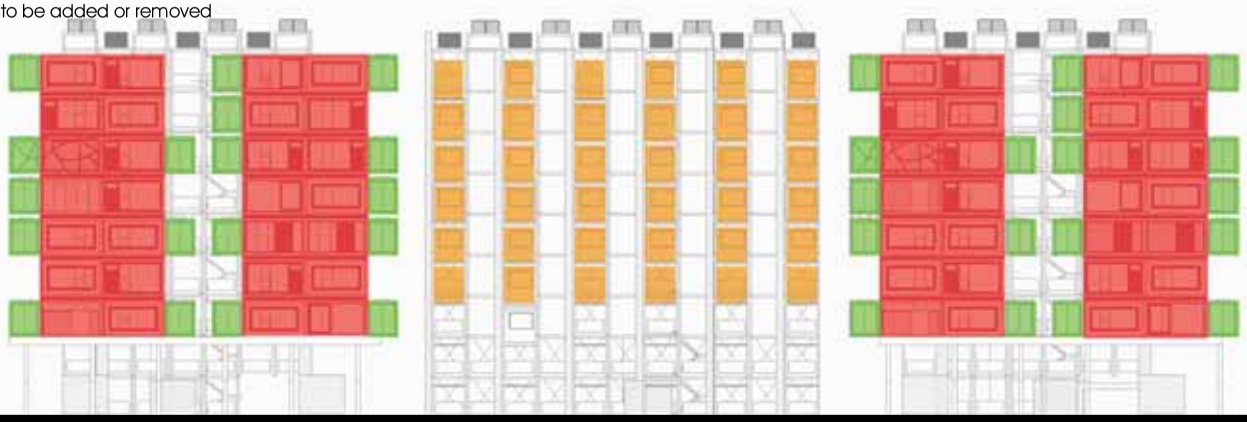
The various choices in paneling and windows for these commercial units will give each shop its own identity.

RESIDENTIAL / NOMAD PLUG IN FACILITY

Residential fixed stacked units

Nomad plug-in facility

Element to be added or removed



Paul Kruger street

1

Element to be added or removed

Access at the south side of building

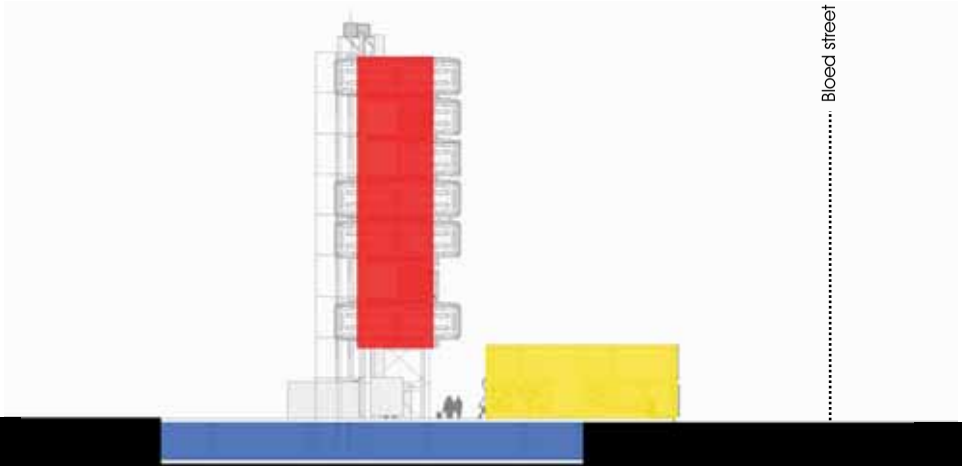
Bloed street

2

Residential fixed stacked units

Commercial

Basement parking

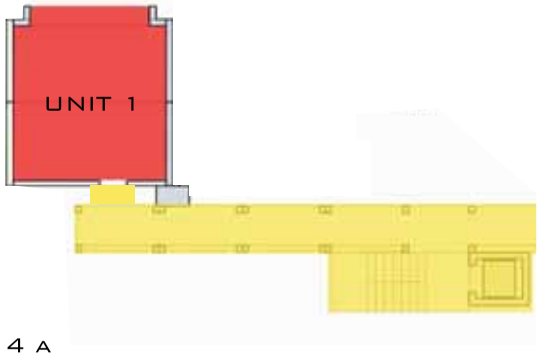


Bloed street

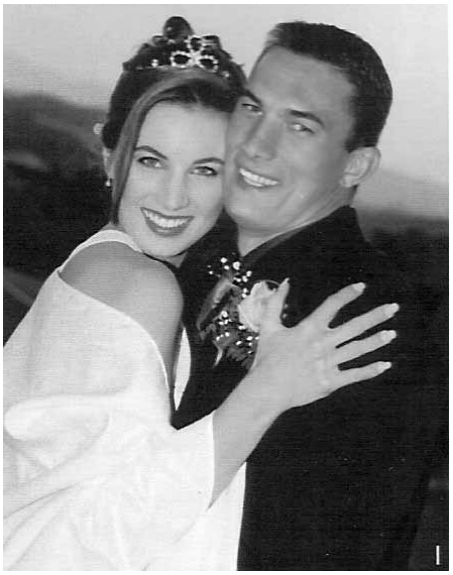
3

RESIDENTIAL
ADAPTABILITY

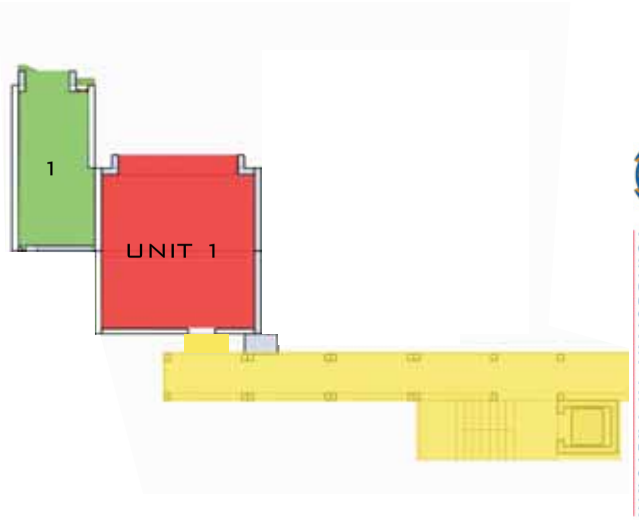
1



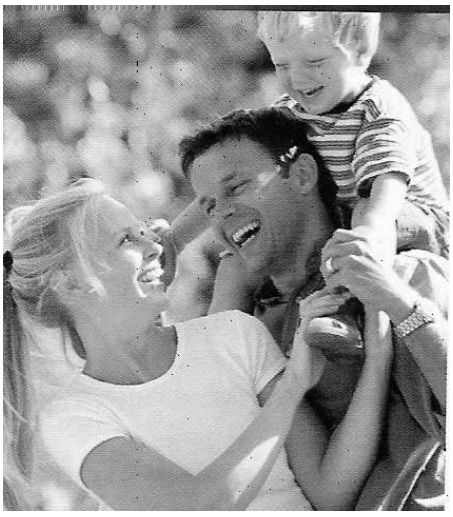
4 A



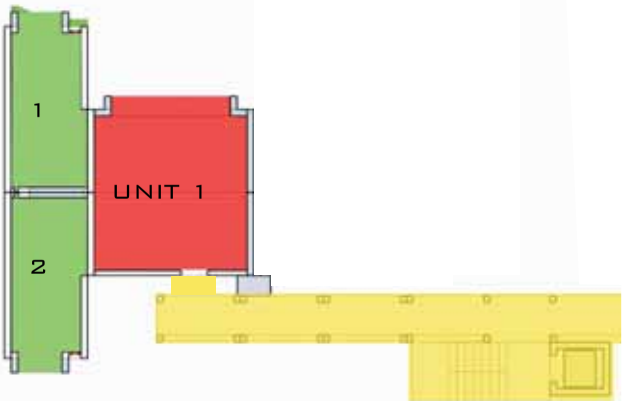
2



4 B



3

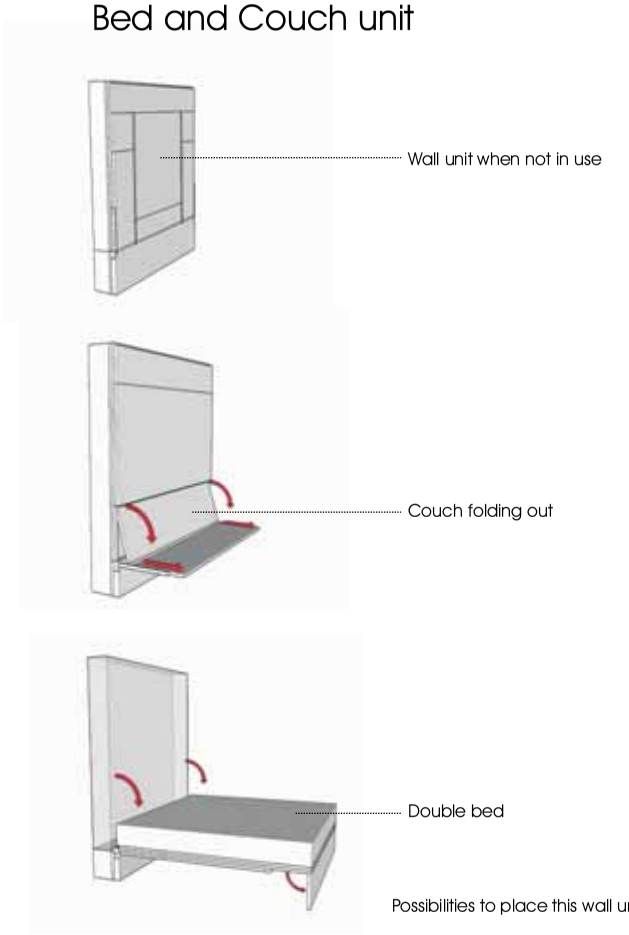


4 C

RESIDENTIAL

LAYOUT

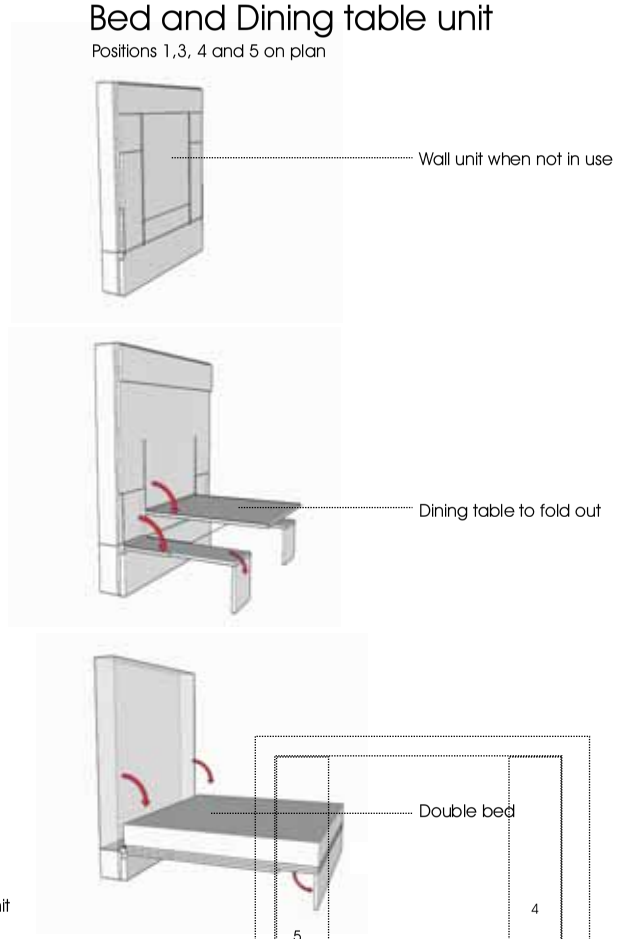
Bed and Couch unit

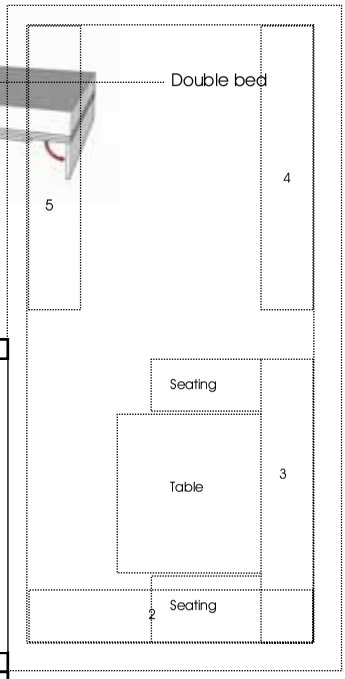


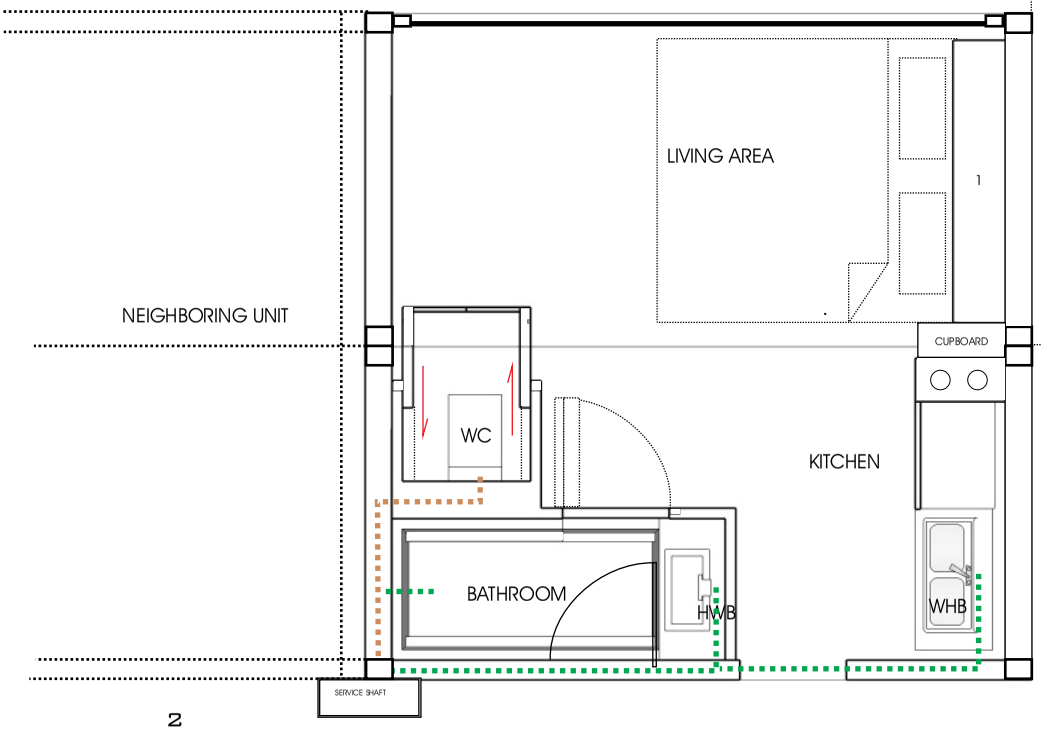
1

Bed and Dining table unit

Positions 1,3, 4 and 5 on plan





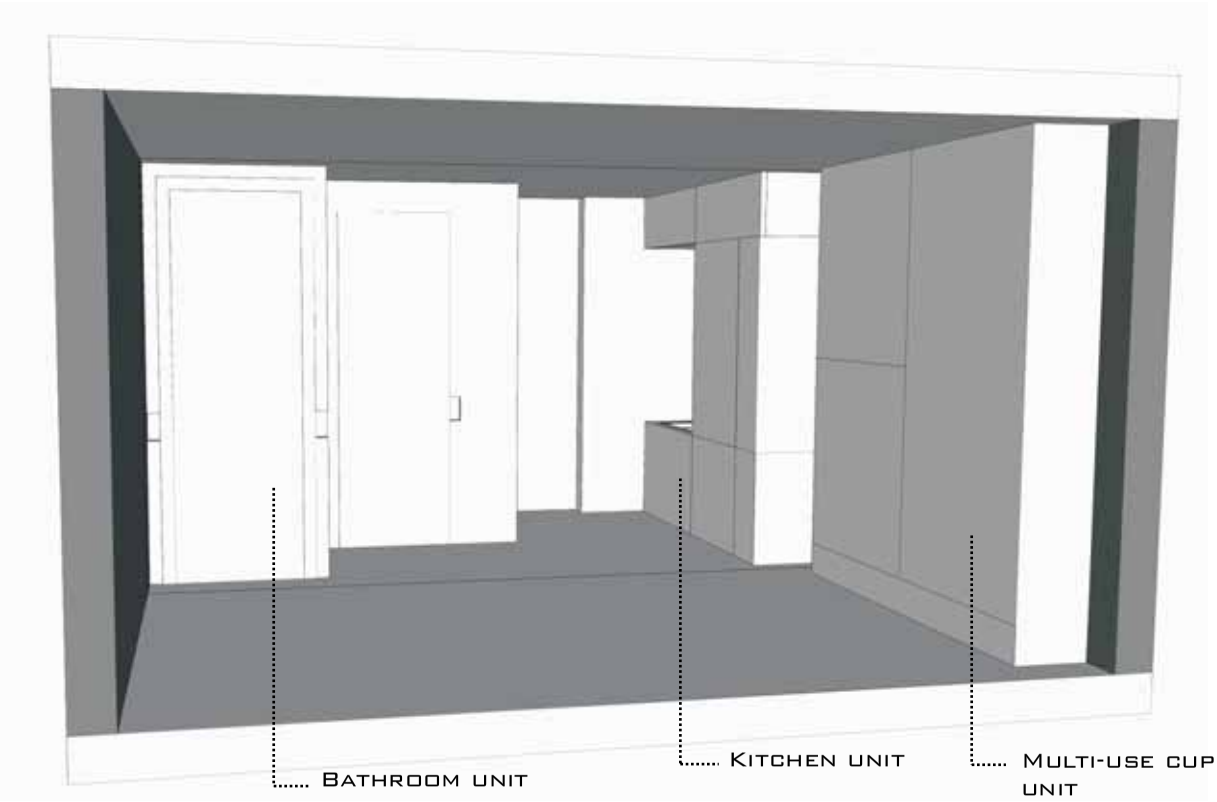


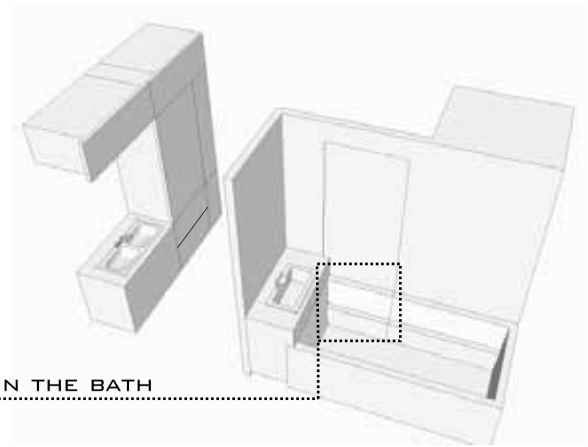
2

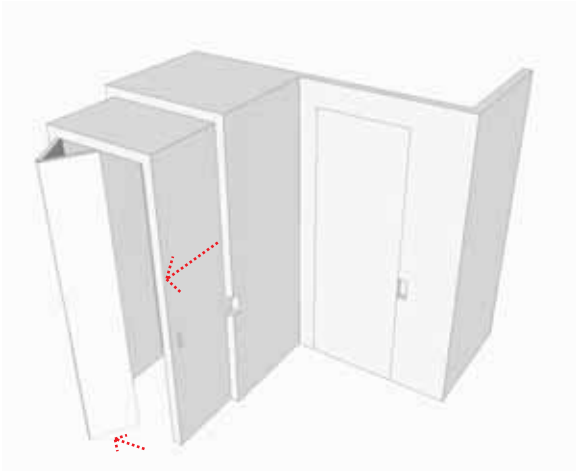
FLOOR PLAN BACHELOR UNIT

NORTH

RESIDENTIAL
LAYOUT







To use the limited space optimally when designing these units the required space needed for the functions will be shared. For example the bath becoming the bathroom floor space.

RESIDENTIAL

SUB SYSTEMS

1

2

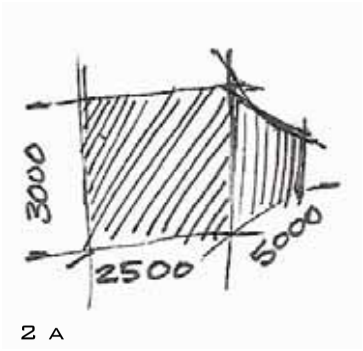
variations within the subsystems like the kitchen, bathroom and closet are endless, and these systems can be developed to fit within the technology platform. Standards within the structure of these subsystems can bind all the variations. Size limits will also be a limiting factor, but endless variations can be developed, especially when technology develops and allows the designer pushing the limits within these design parameters.

NOMAD POD

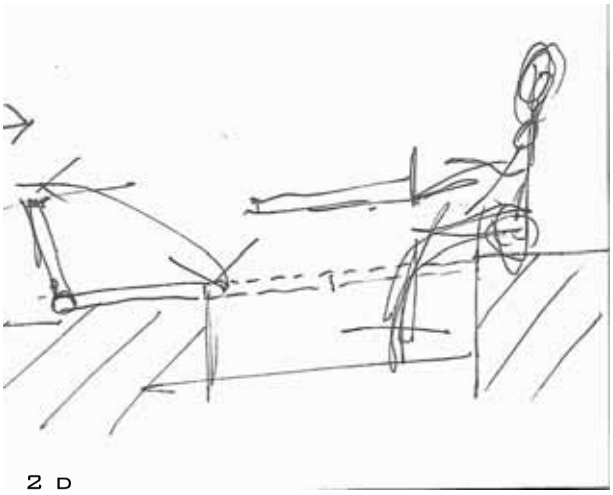
CONCEPT

1

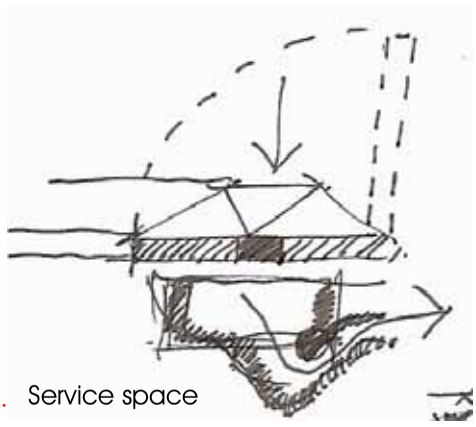
The size and structure of the pod is the same as all the other units used in the commercial and residential units.
The layout was designed to optimize the use of space and it was achieved by introducing a service space under the floor. This service space makes it possible to mix required space per function.



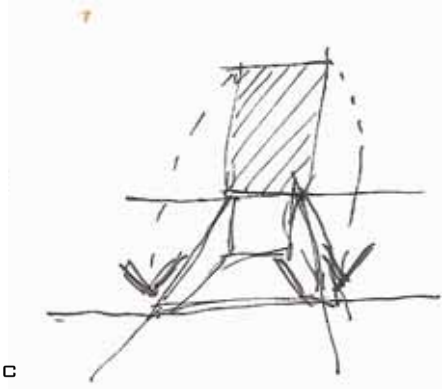
2 A



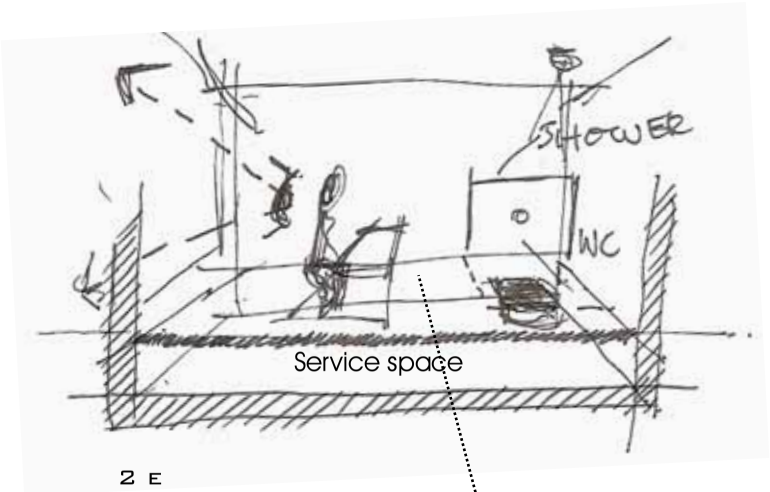
2 D



2 B



2 C

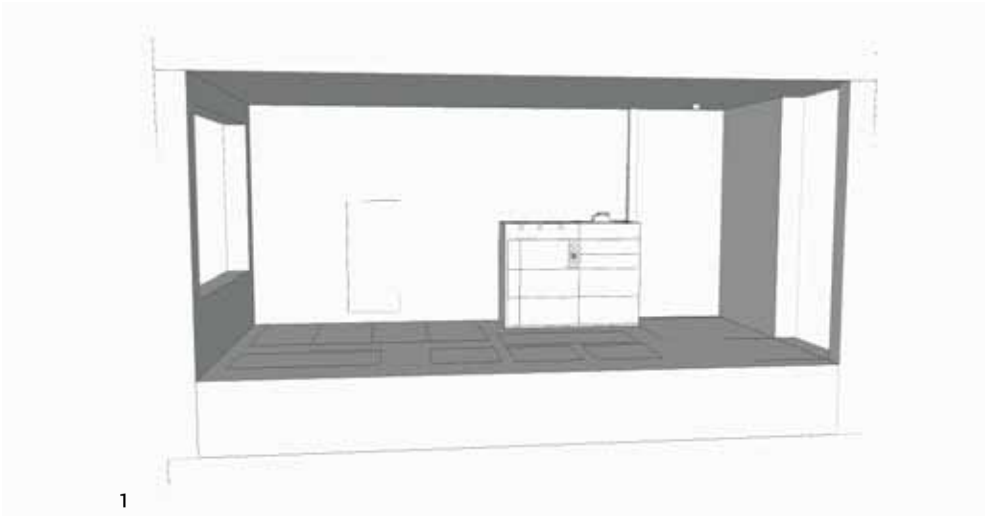


2 E

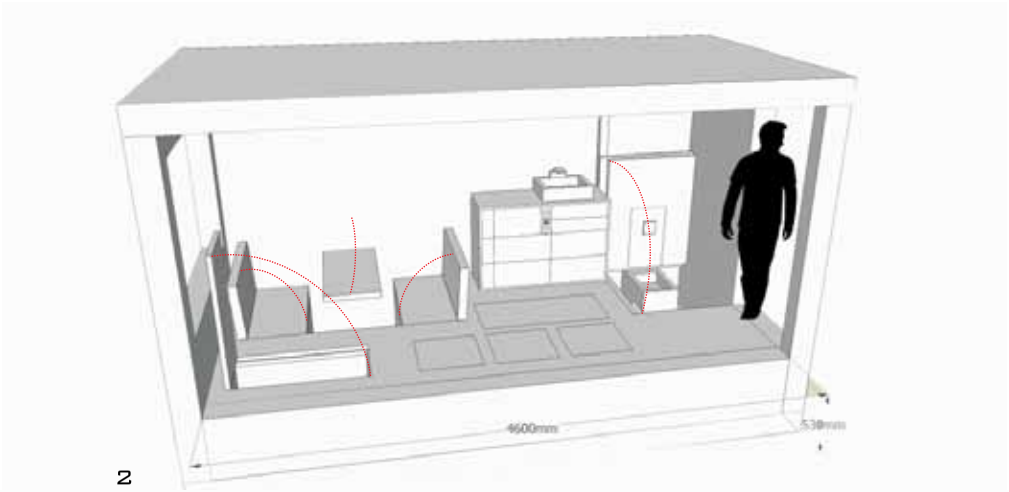
Design to seat 4 persons.

NOMAD POD

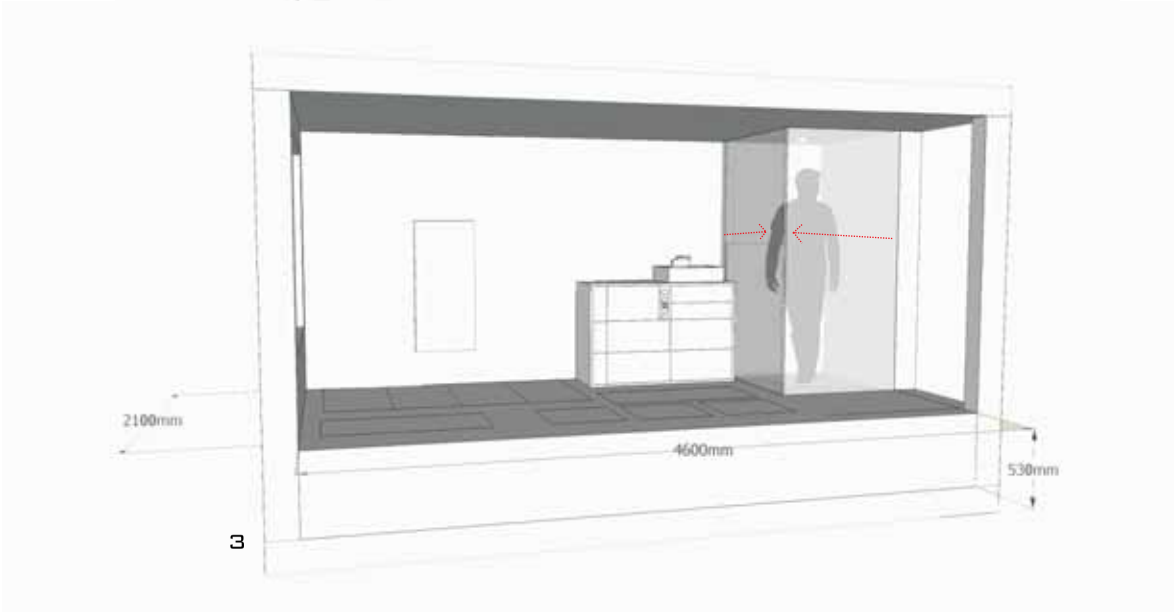
LAYOUT



1



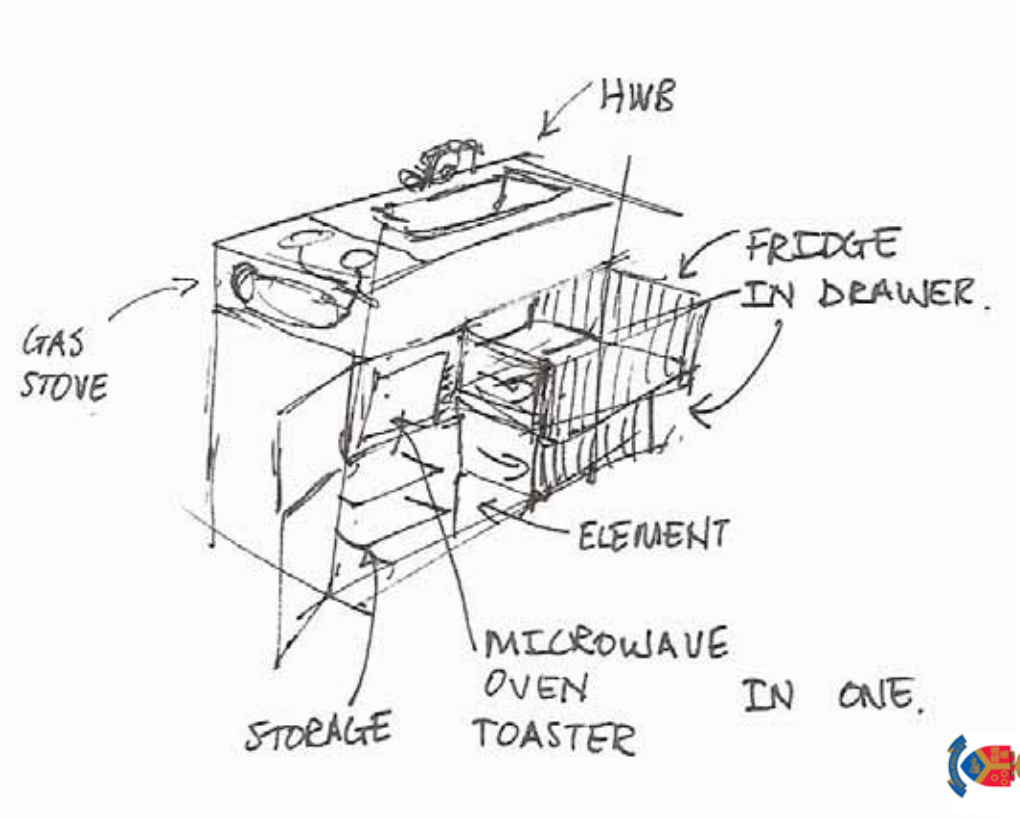
2



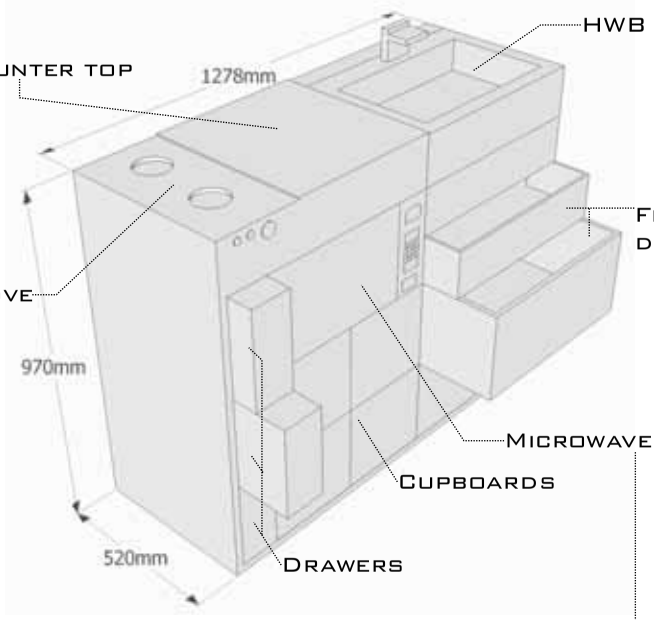
3

Contained in the nomad pod:
double bed
two double seat chairs with table
kitchen unit with a fridge, gas stove and washing basin (to be used for bathroom as well), shower
toilet

NOMAD POD
KITCHEN UNIT



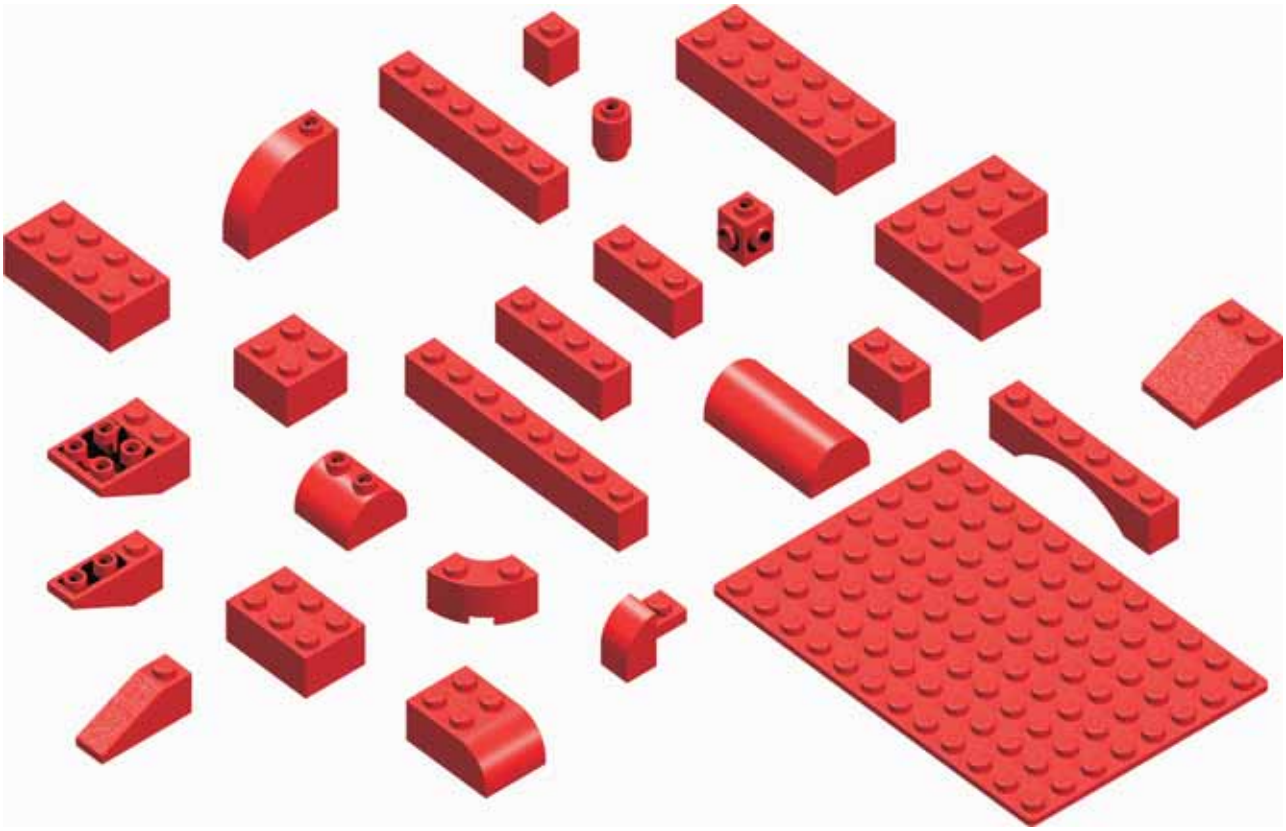
For a self catering unit one need the basic elements of a kitchen, This layout of a kitchen unit shows the feasibility to have a self catering unit the size of the proposed nomad pod.



0.9 cu. ft. combination microwave oven and toaster with 900 microwave watts, 6 auto cook options & 9 toaster browning levels: stainless steel

TECHNICAL INVESTIGATION

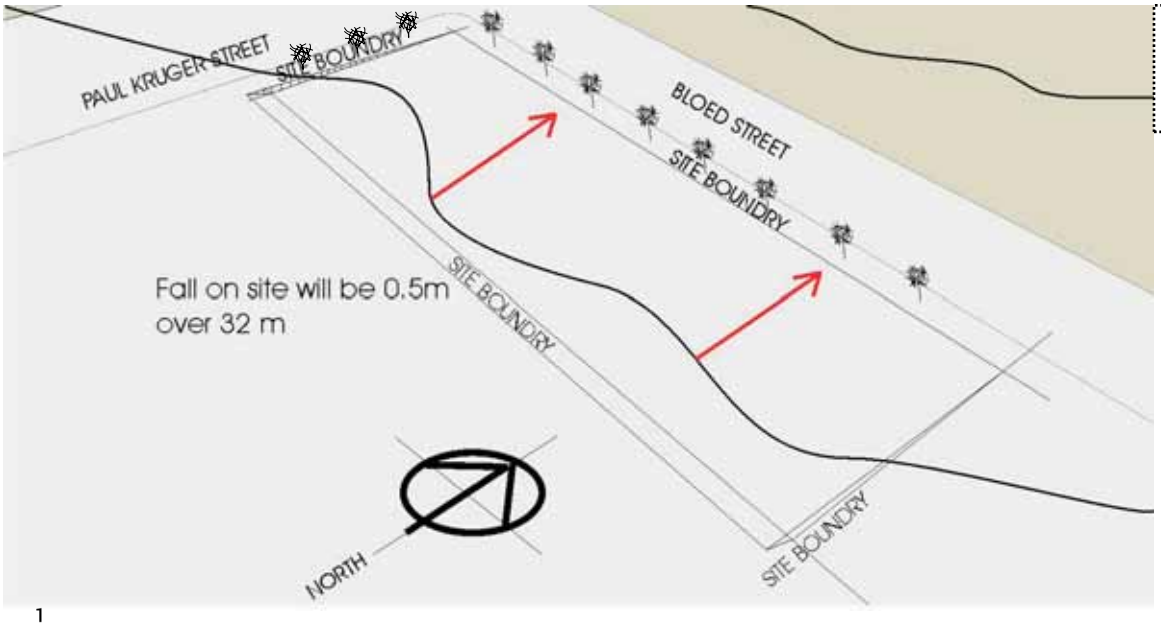
ON SITE WORK
OFF SITE WORK



1

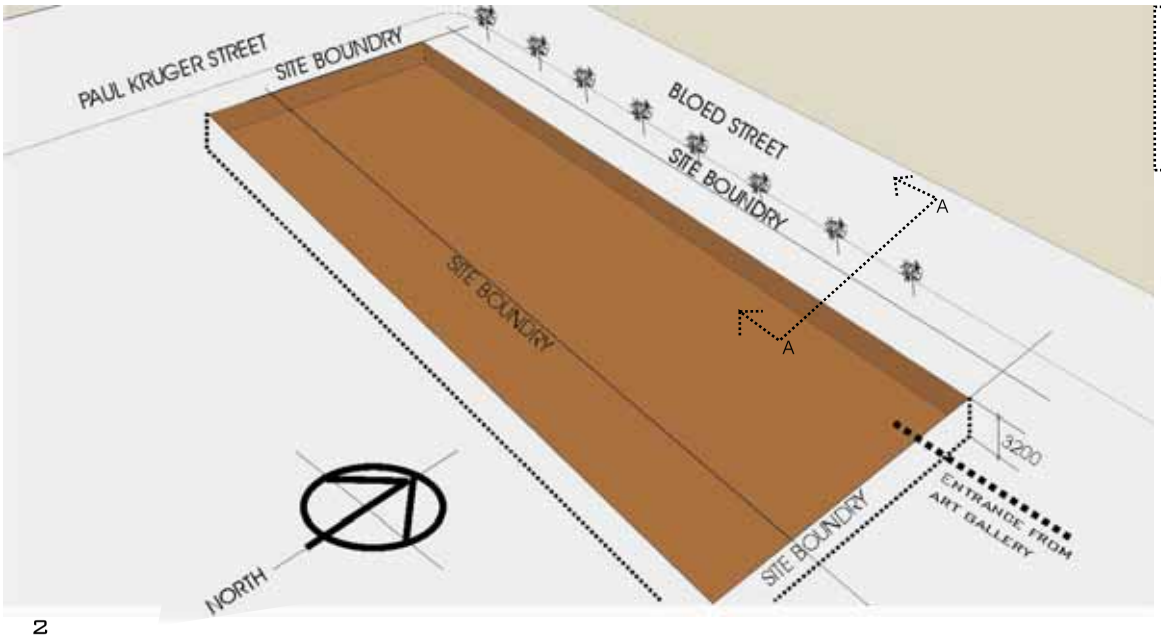
ON SITE WORK

PREPARATIONS TO SITE BEFORE ASSEMBLY OF THE BUILDING STARTS.



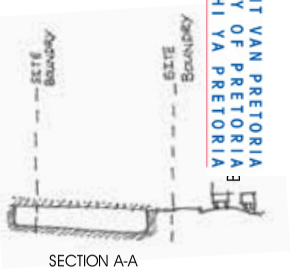
1

The existing site slopes 1/64 m from south to north. The size of the site is 32 m x 100 m. Cut and fill to a depth of maximum 0.5 m. Existing trees to stay.

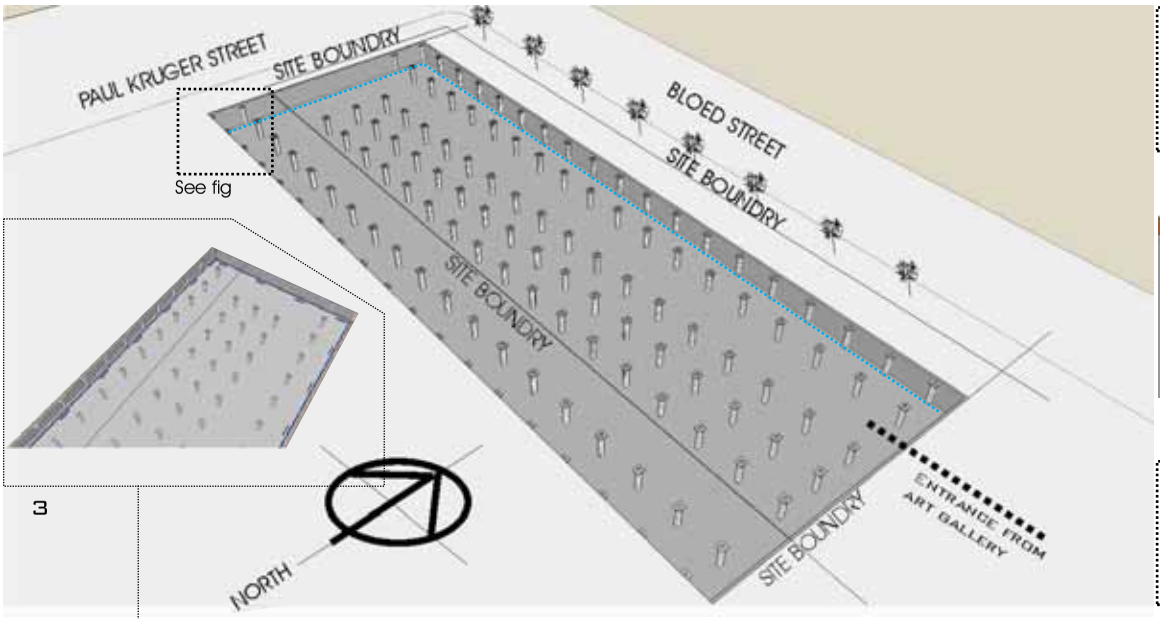


2

Excavations on site to a depth of 3.2 m for basement. Only one level of ba parking is required. Entrance into baseme from Bloed street ar situated under the A gallery.

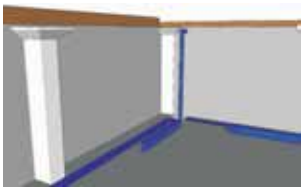


SECTION A-A



3

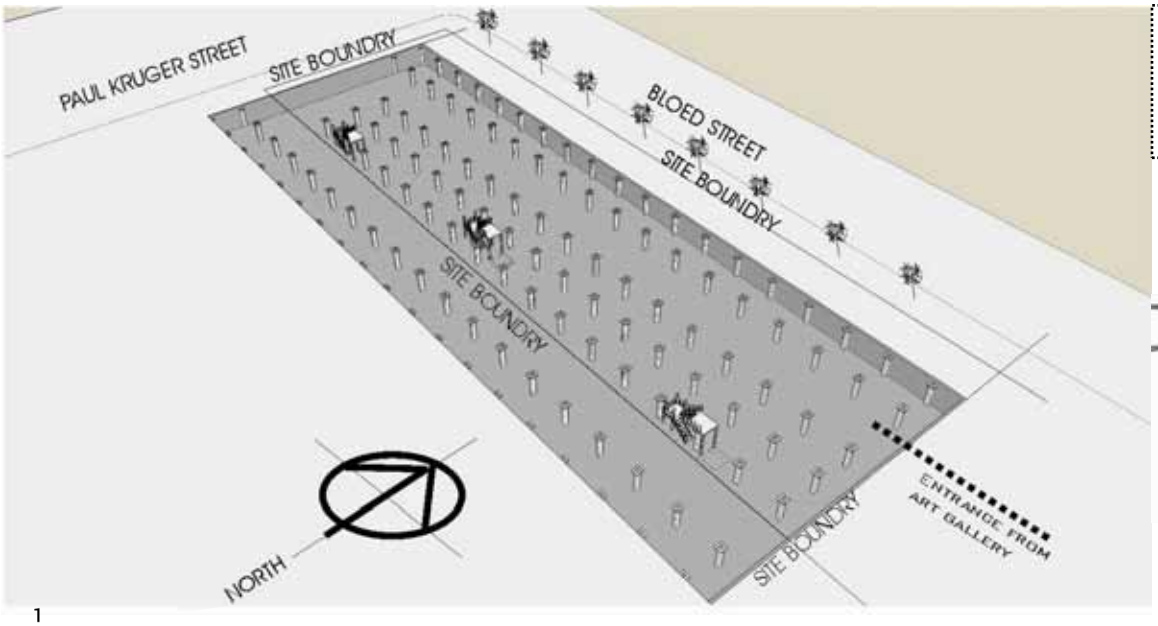
Flat slab and column head system are used for basement floor system. Basement to extend into neighboring site as the parking will be shared.



Water drainage inside basement in channels along the retaining walls to catchment, where water are pumped to existing storm water system.

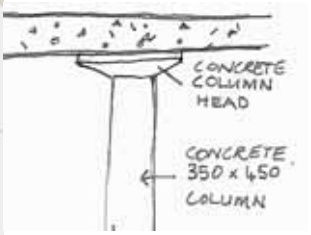
ON SITE WORK

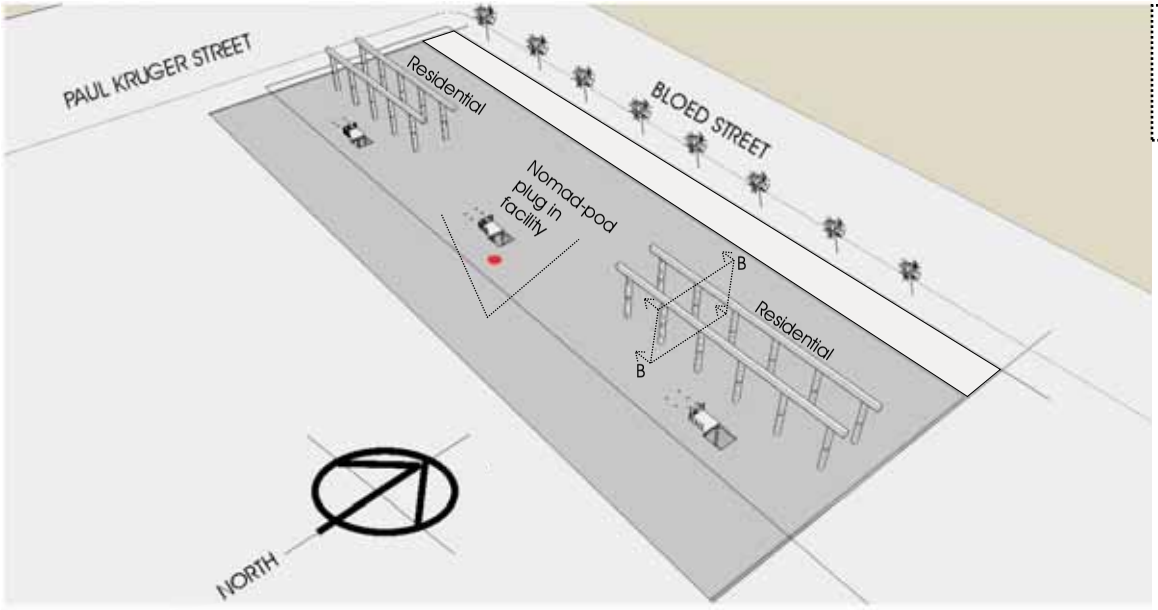
PREPARATIONS TO SITE BEFORE ASSEMBLY OF THE BUILDING STARTS.



1

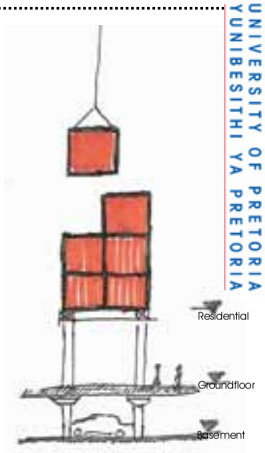
The access lift and staircase are installed into the basement where the stacking elements start from.Retaining wall 300 mm thick.Columns 350 x 450 mm with column heads.



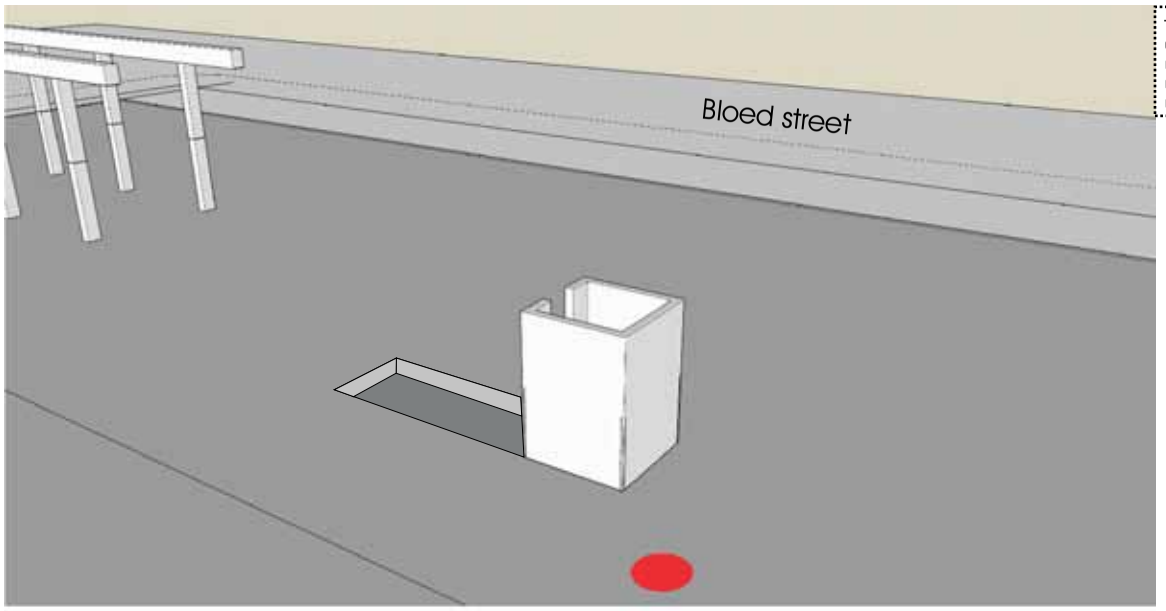


2

Structural supports are erected on the grid of basement columns. Th structural supports form the platform fo residential stacked l



Section B-B

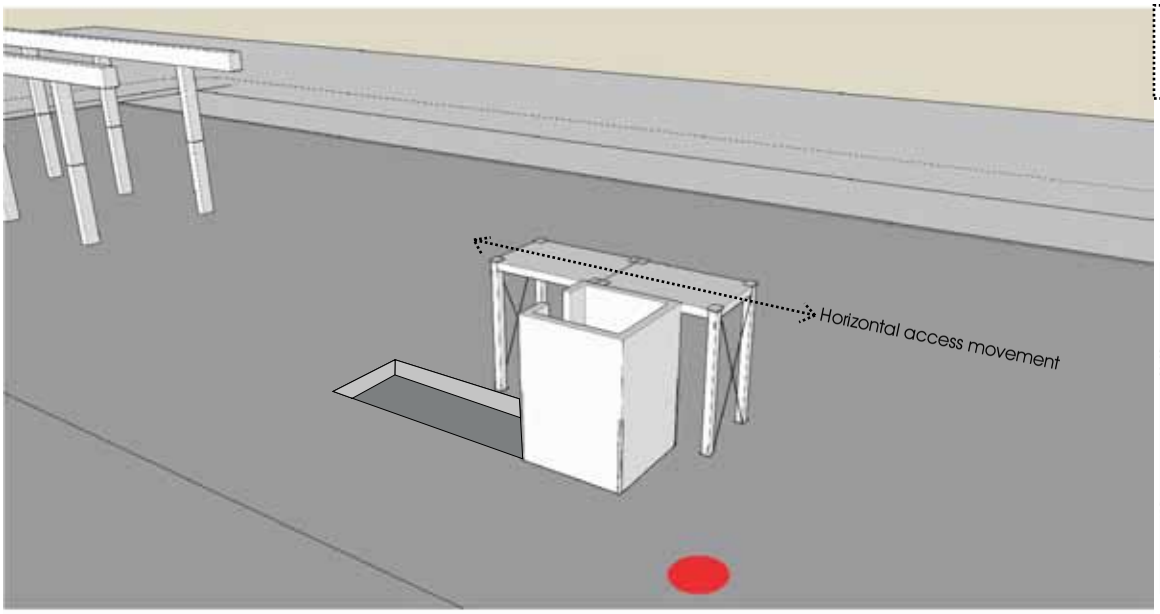


3

The transportable Pre-cast concrete lift shaft are placed on the already installed shaft in the basement.

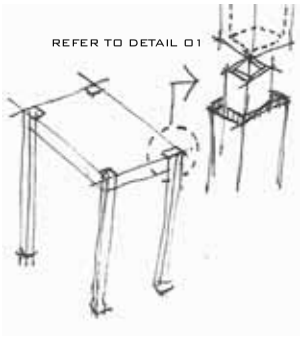
ON SITE WORK

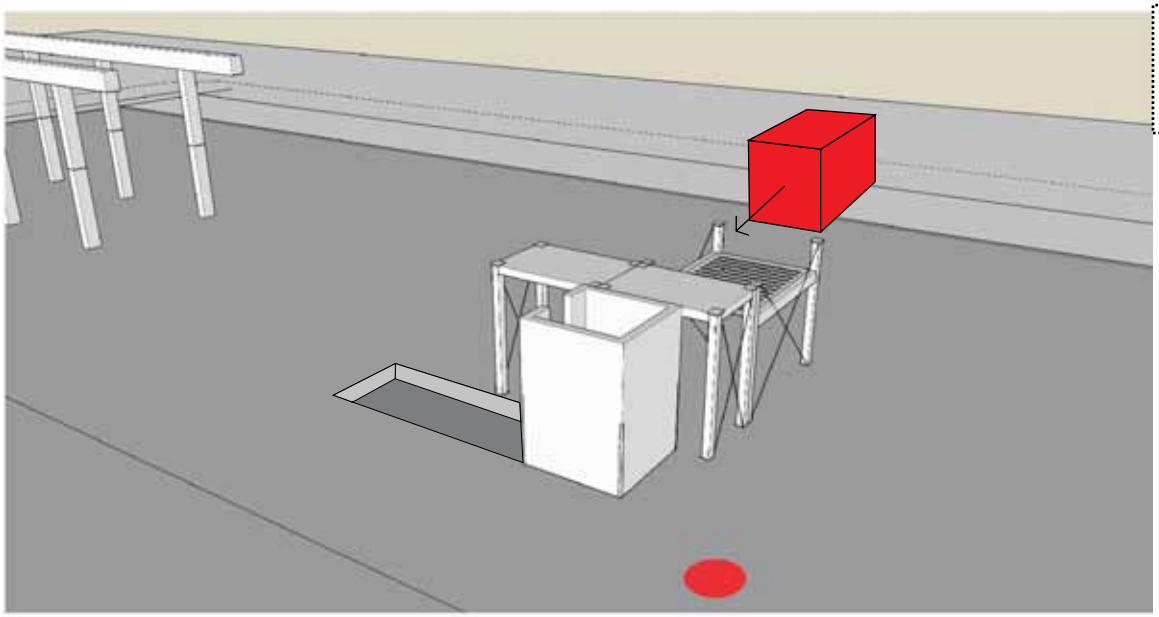
PREPARATIONS TO SITE BEFORE ASSEMBLY OF THE BUILDING STARTS.



1

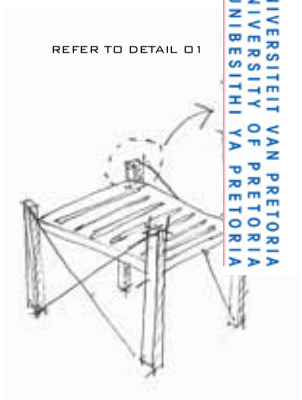
TRANSPORTABLE ACCESS WALKWAY MODULE ARE FIXED ONTO THE LIFT SHAFT TO GIVE MORE STABILITY.

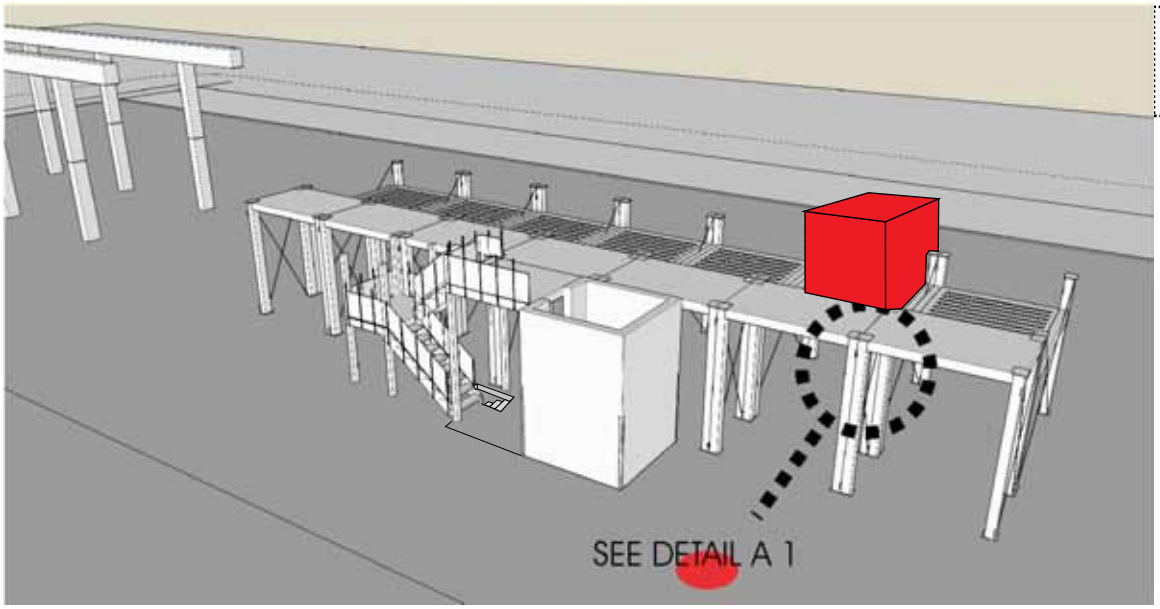




2

THE LOADING TRAY ARE ONLY INSTALLED FOR THE NOMAD-POD PLUG IN FACILITY. THE RESIDENTIAL UNITS WILL THE SAME ACCESS SYST BUT WITHOUTTHE LOADI



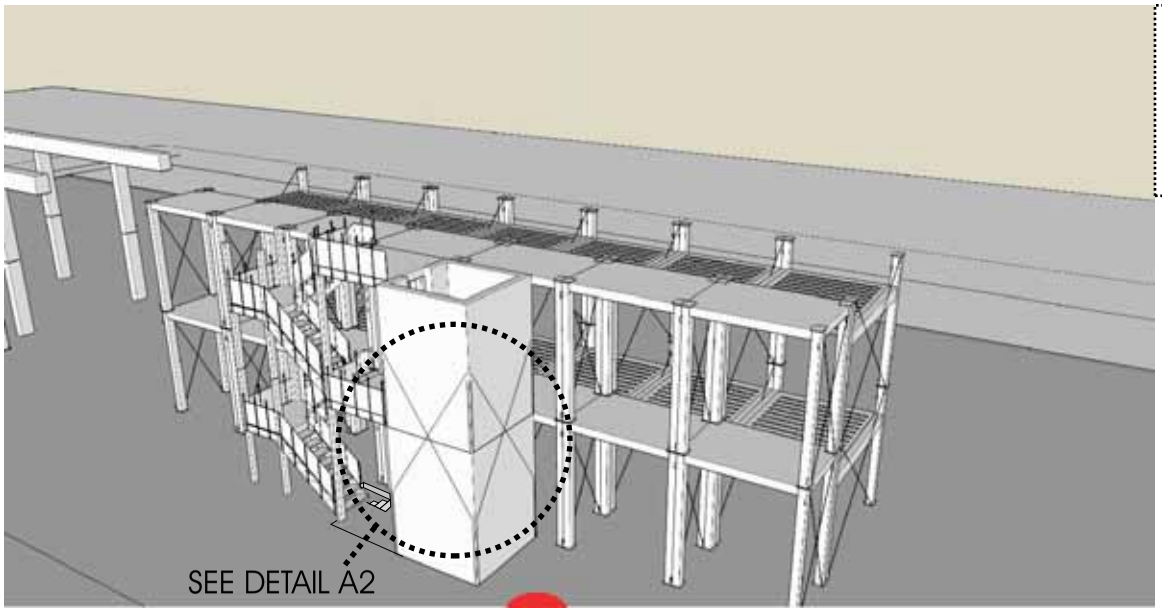


3

THE TRANSPORTABLE PRE-CAST CONCRETE LIFT SHAFT ARE PLACED ON THE ALREADY INSTALLED SHAFT IN THE BASEMENT.

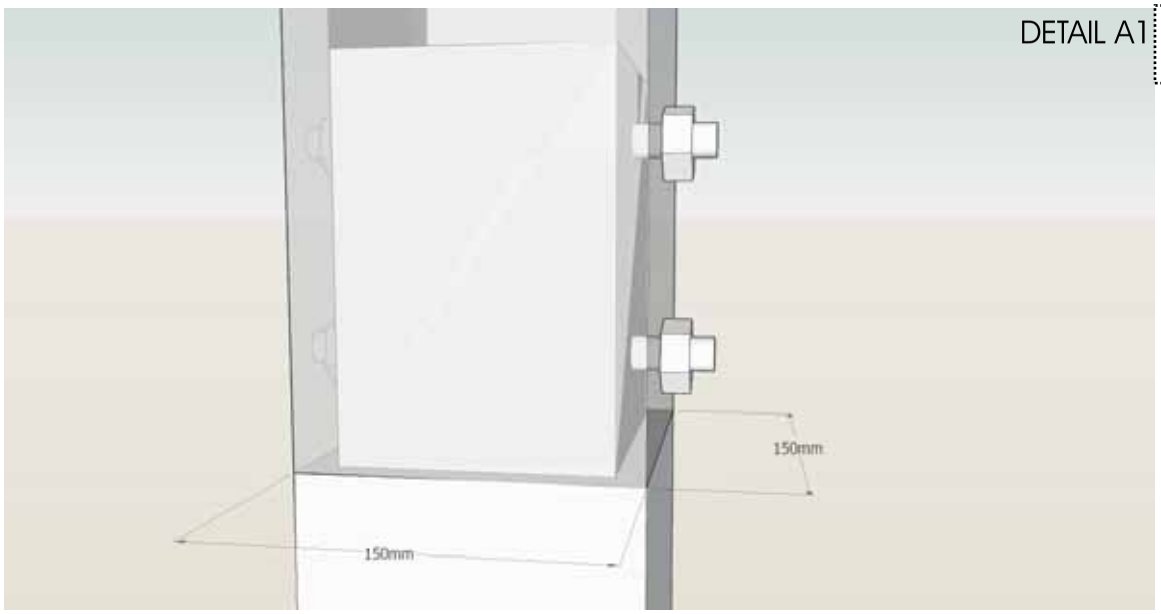
ON SITE WORK

PREPARATIONS TO SITE BEFORE ASSEMBLY OF THE BUILDING STARTS.



1

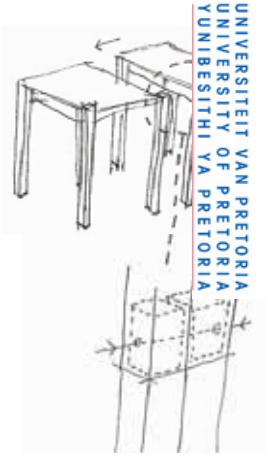
All these elements are fixed together to form a stable structure and to provide access to the units. This system developed from; smaller component sizes for when in compression and transportable sizes for off-site prefabrication.

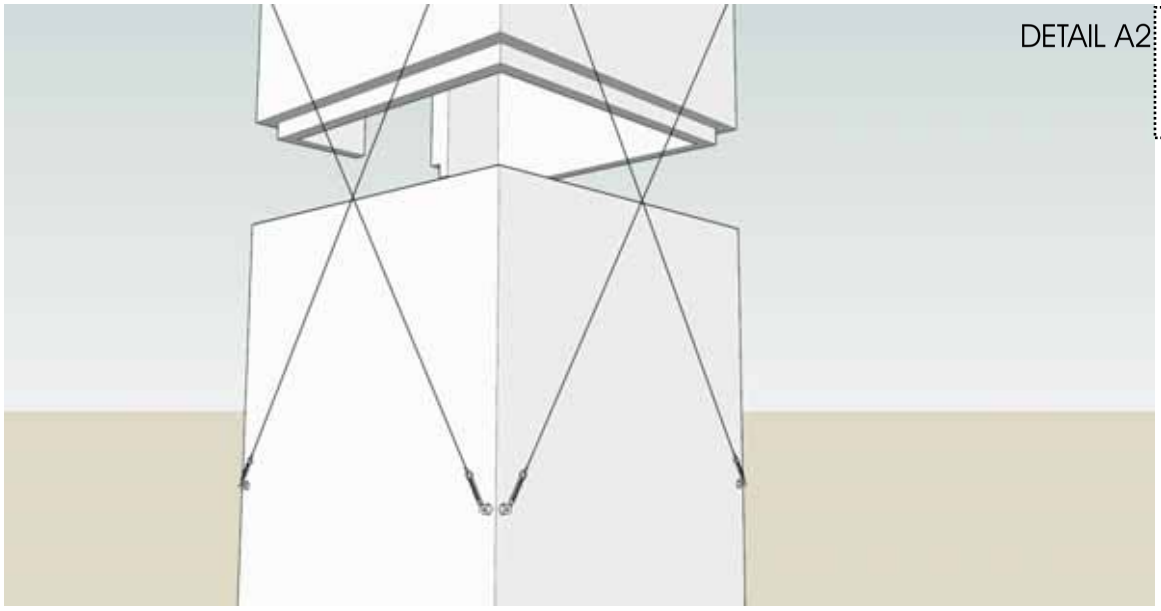


2

DETAIL A1

The transportable elements are bolted together for disassembly purposes





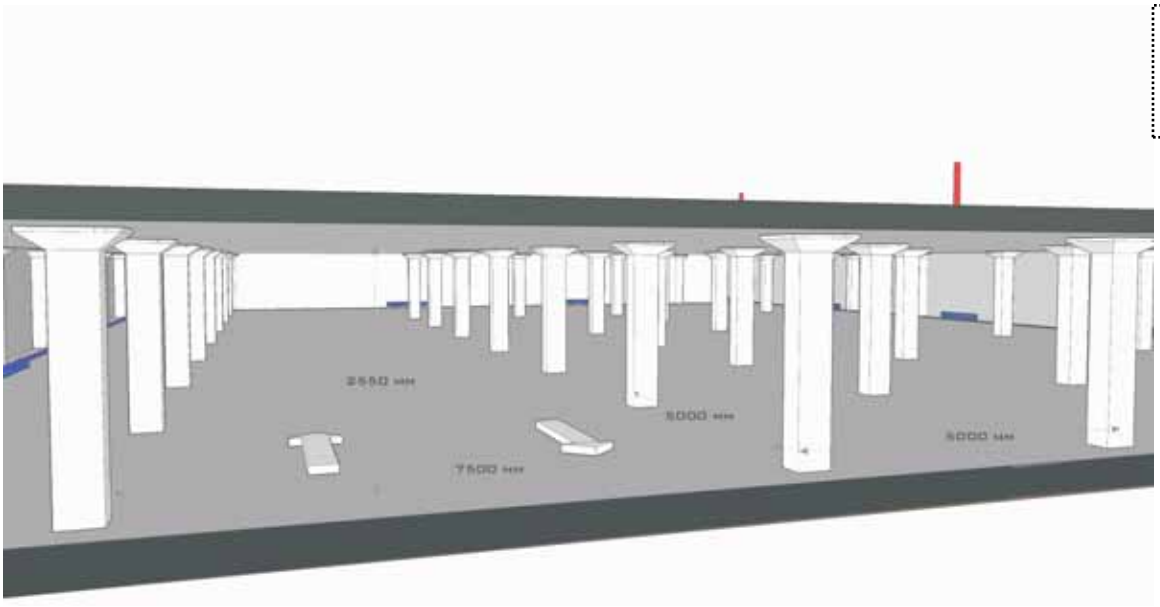
3

DETAIL A2

Lift shafts are stacked and cross braced to give further stability. After the shaft is stacked the lift rails and coach are installed.

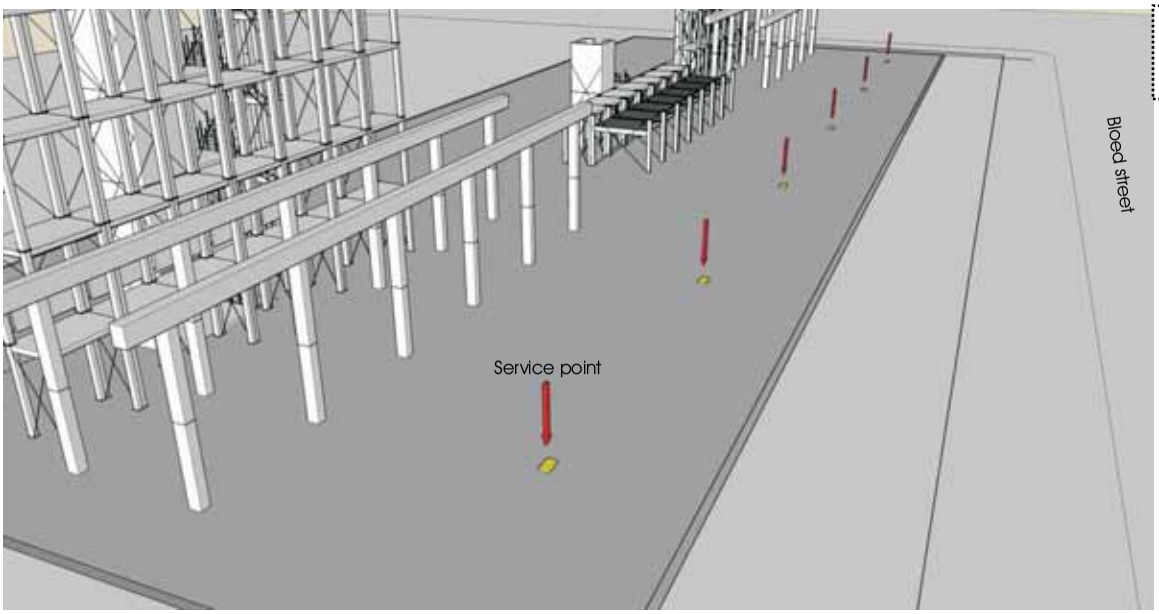
ON SITE WORK

PREPARATIONS TO SITE BEFORE ASSEMBLY OF THE PREFABRICATED ELEMENTS STARTS.



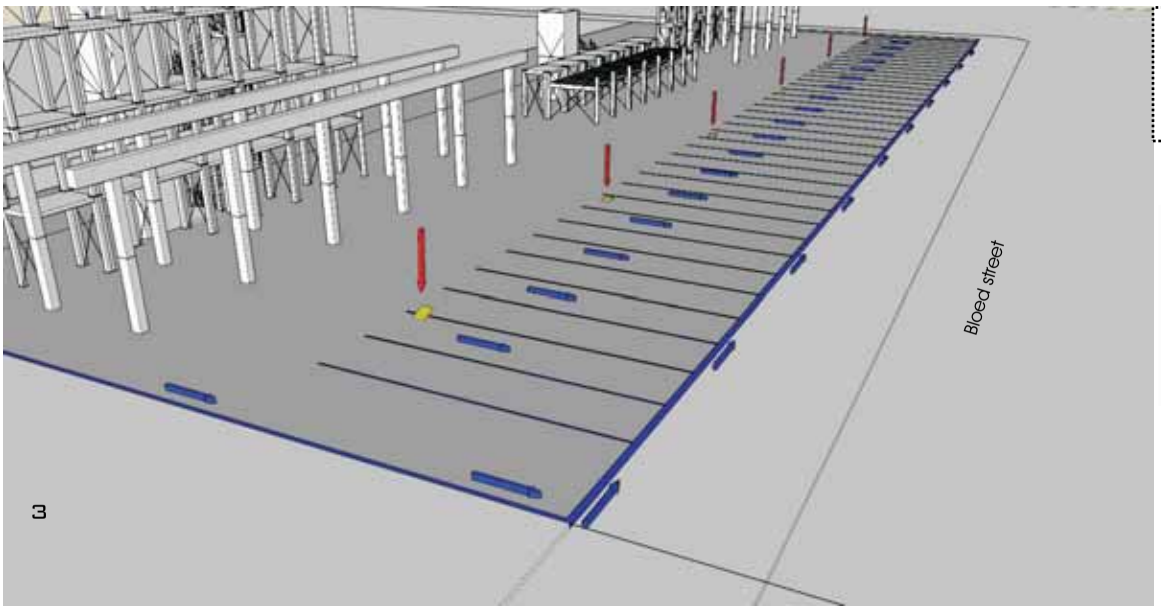
1

Basement layout to accommodate required parking. Dimensions suitable for double lane access, column spacings allow for two parking bays.



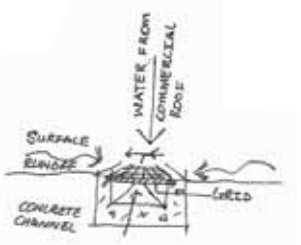
2

Service points for commercial. Arrangement for floor layout woi around this point.



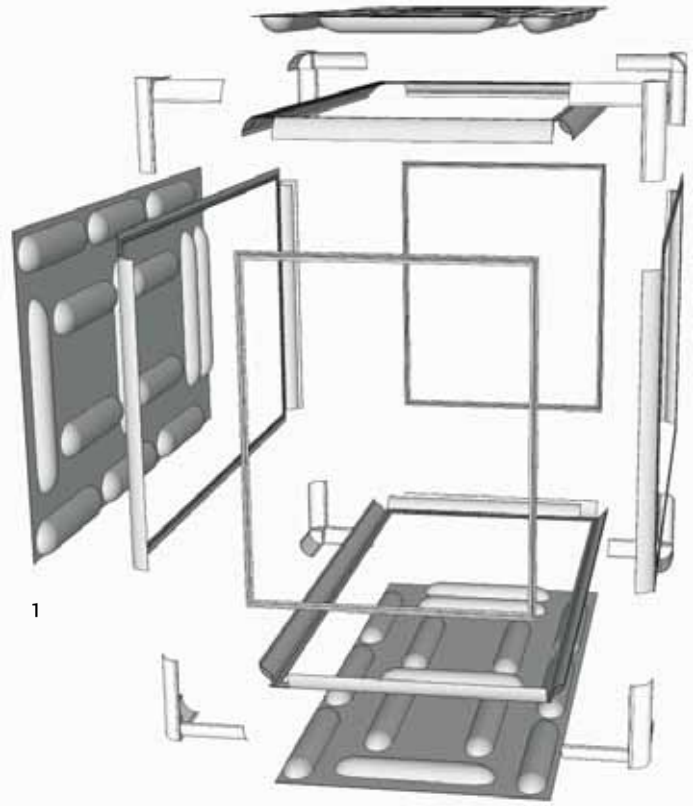
3

Strom water runoff from commercial. Spacing of 2500 mm allows system to line up with any configuration of the commercial space

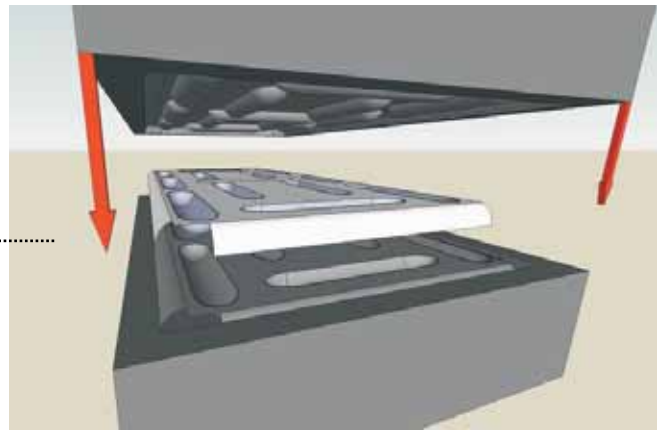


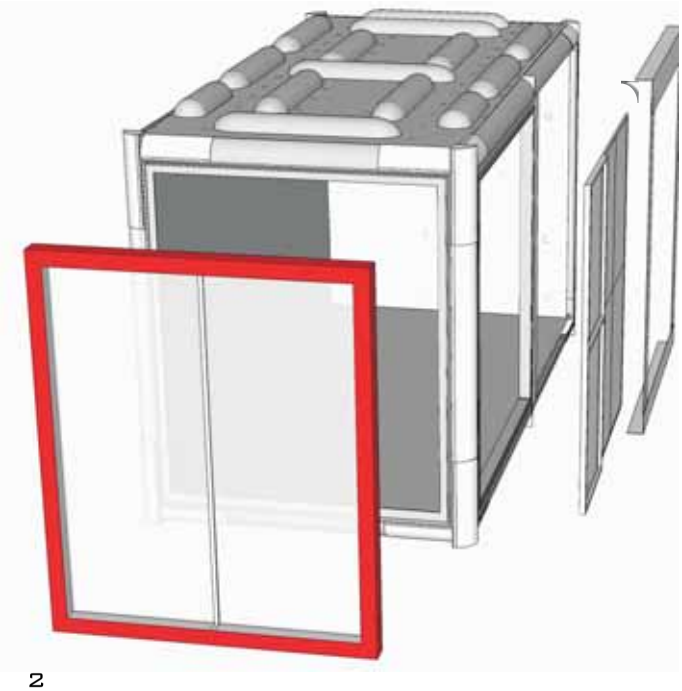
OFF SITE WORK

CONSTRUCTION OF MODULES IN CONTROLLED ENVIRONMENT.



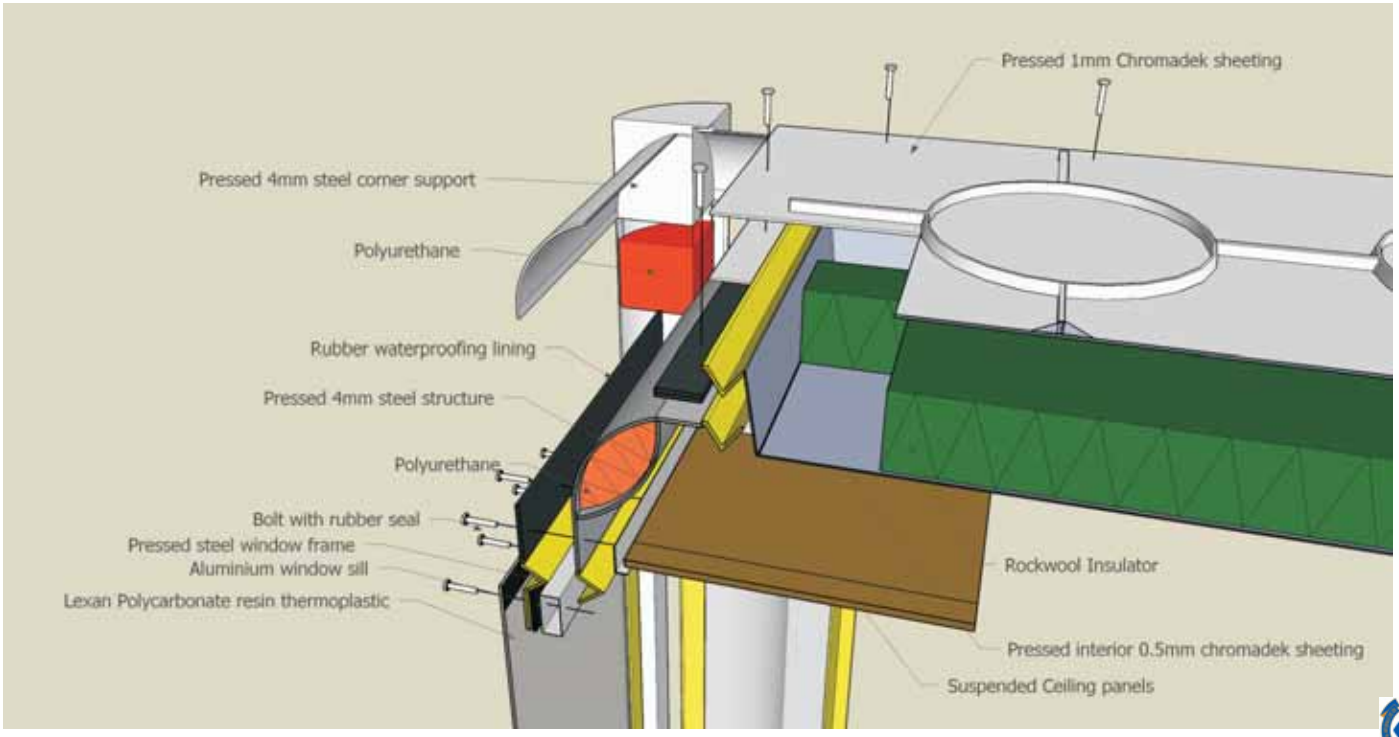
1



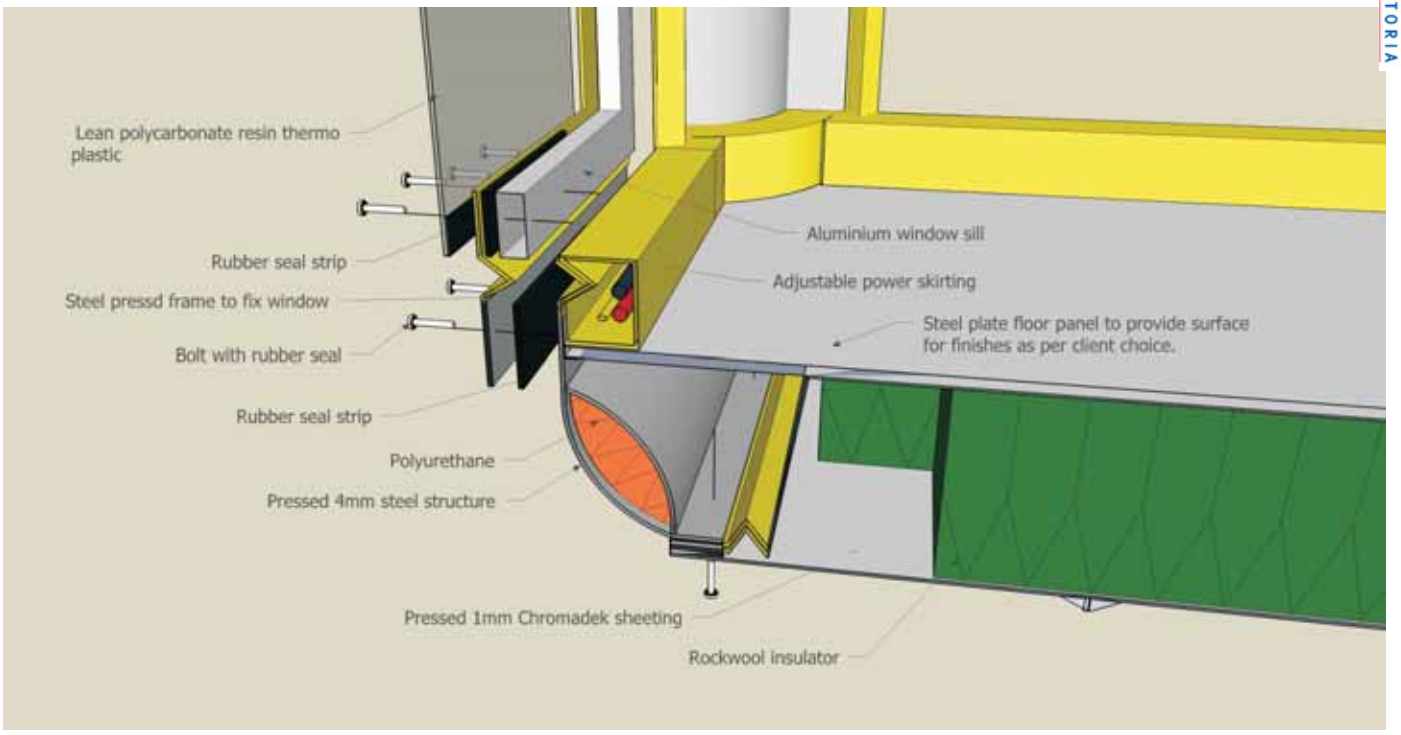


2

OFF SITE WORK
UNIT ASSEMBLY DETAILS



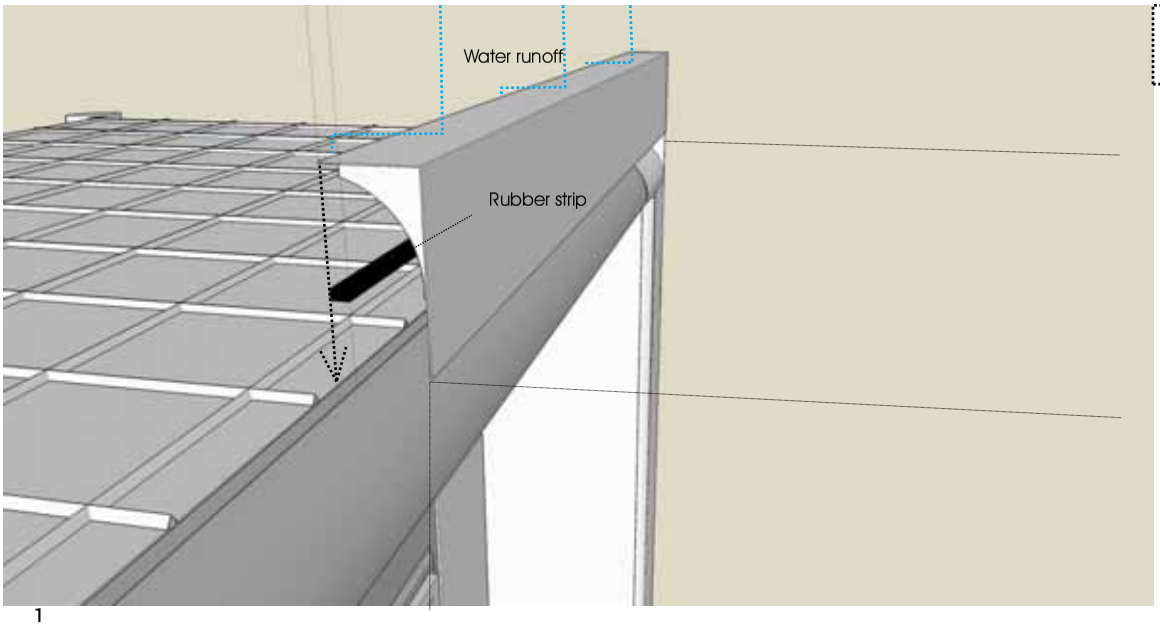
1



2

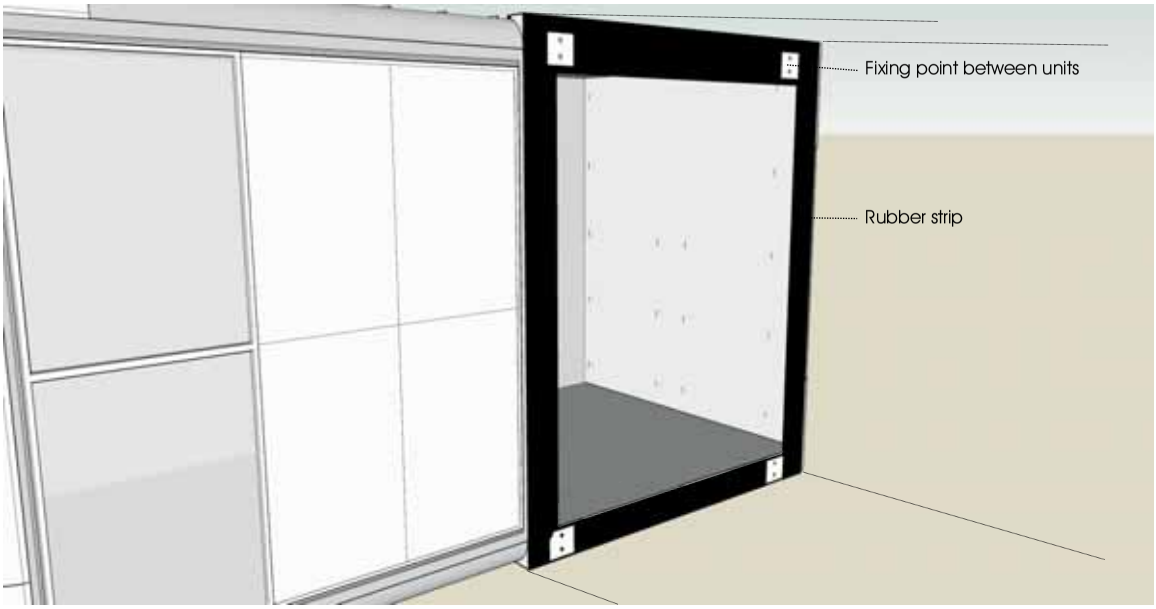
OFF SITE WORK

WATERPROOFING AT RESIDENTIAL EXTENSION UNITS

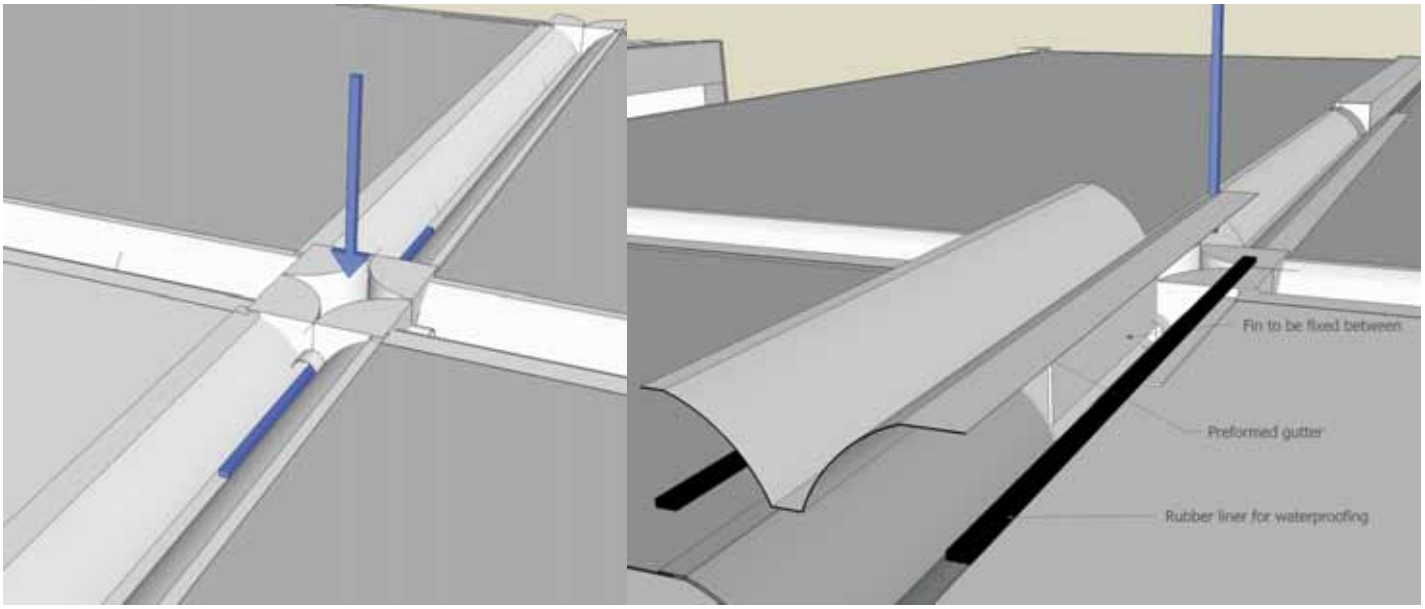


WATERPROOFING BETWEEN THE EXTENSION UNIT ADDED ONTO THE RESIDENTIAL UNIT.

1



2



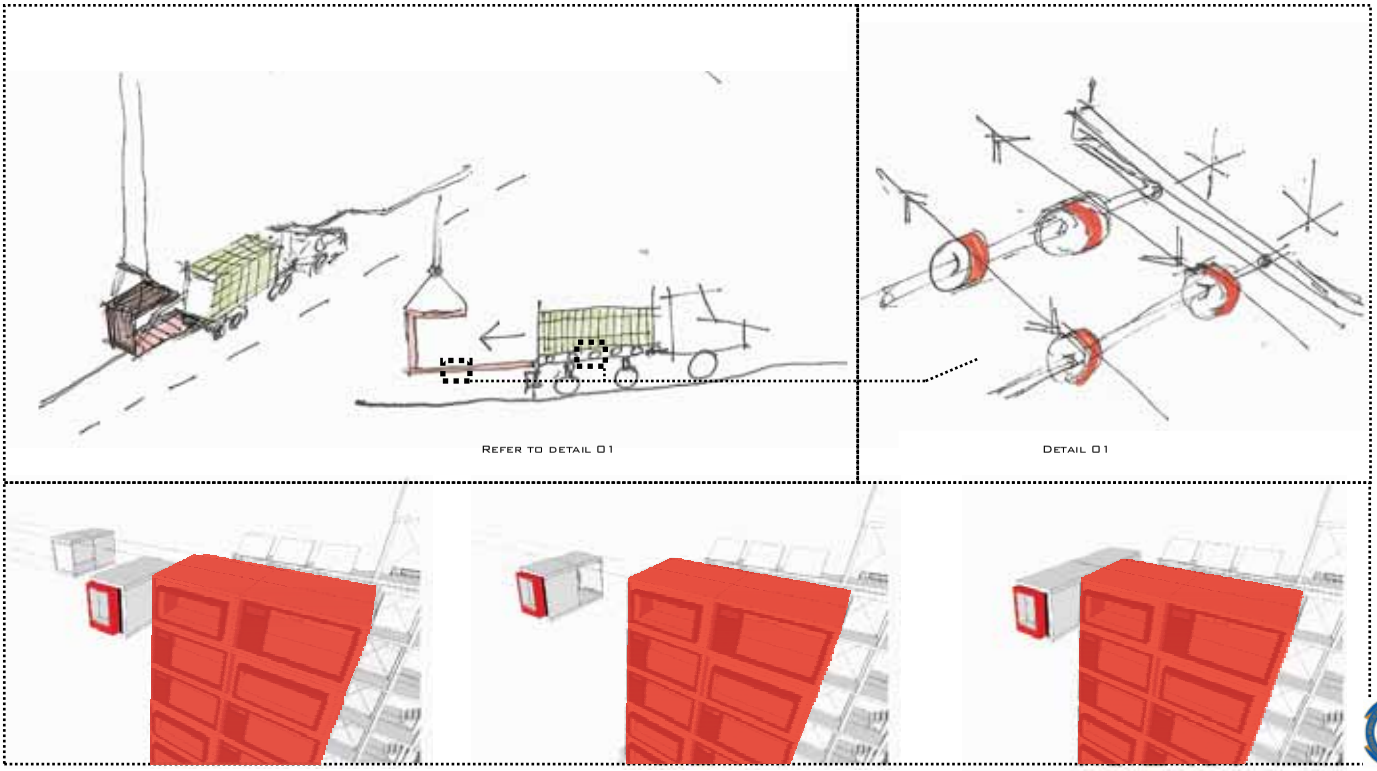
3

With a lot of the technical aspects, solutions was found that will not interfere with the layout and function of the units. The system technically functions as simple as possible to make the assembly process simple. This dissertation needed a lot of technical investigation. For the process a lot of technical issues was resolved.

After various discussions and fine tuning with all details for the process of assembly and extensions to the residential units was feasible and working. This indicated that the project can be implemented. No problem could be identified that will hinder the project or technology platform.

DELIVERY AND LOADING

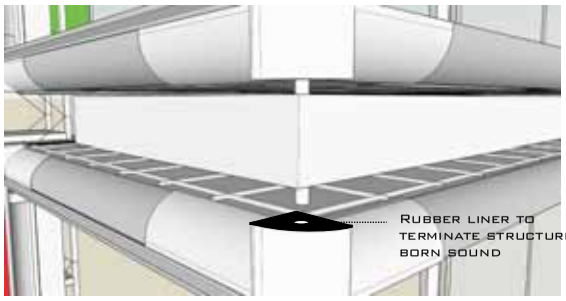
NOMAD-POD EXTENSION UNIT

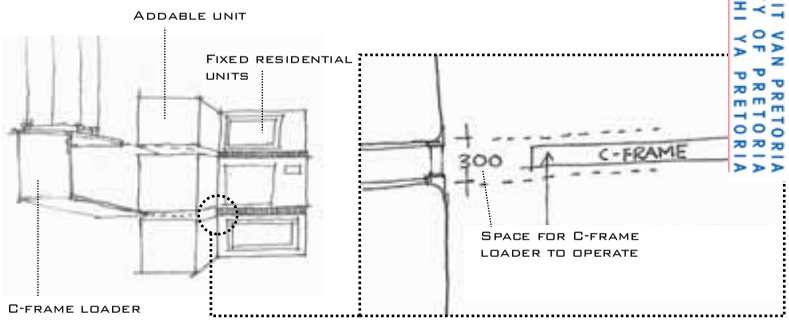


1

Images illustrating the fixed residential unit that extends by the addition of floor space.

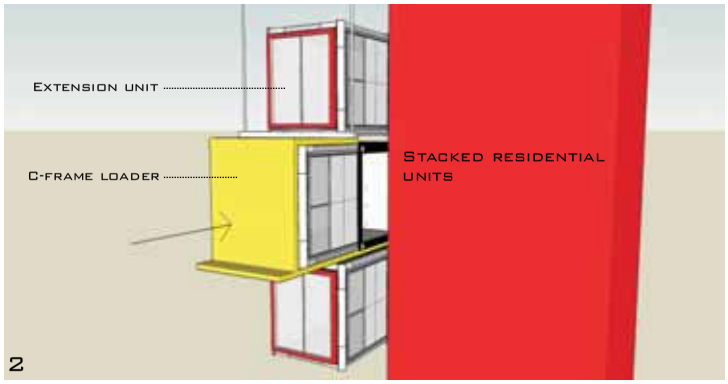
Pods added onto the residential unit will be loaded from the street. The unit will be loaded into the C-frame loader from where it will be lifted into position.





In this detail the 300 mm high spacer between the stacked residential units are shown, and it has a cover plate.

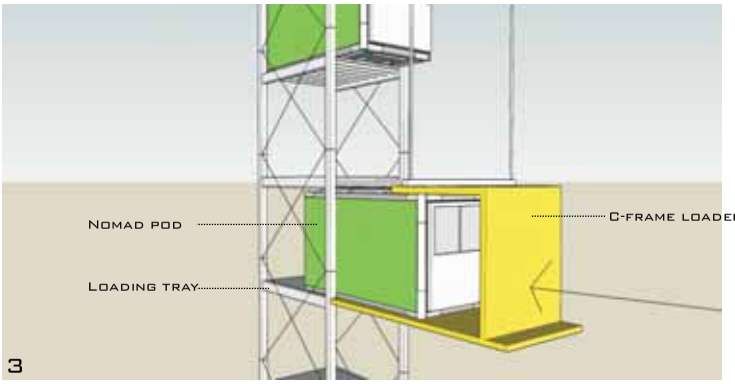
Residential extension unit system:



2

Residential extension unit is loaded into the C-frame loader. The pod placed next to the residential unit and fixed, the pod will not be rolled into place as the C-frame loader will extend to where the pod need to be fixed.

Nomad pod plug in system:

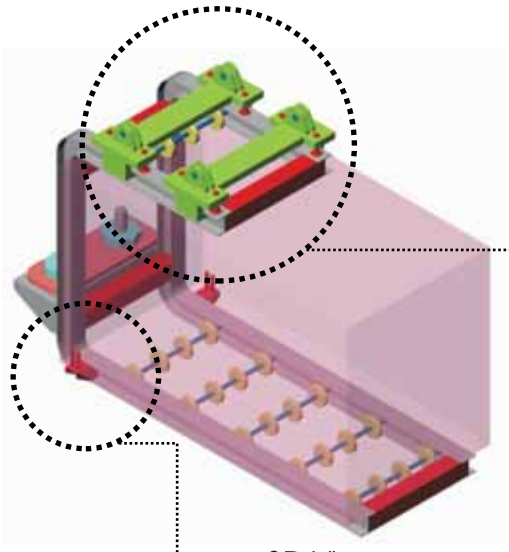


3

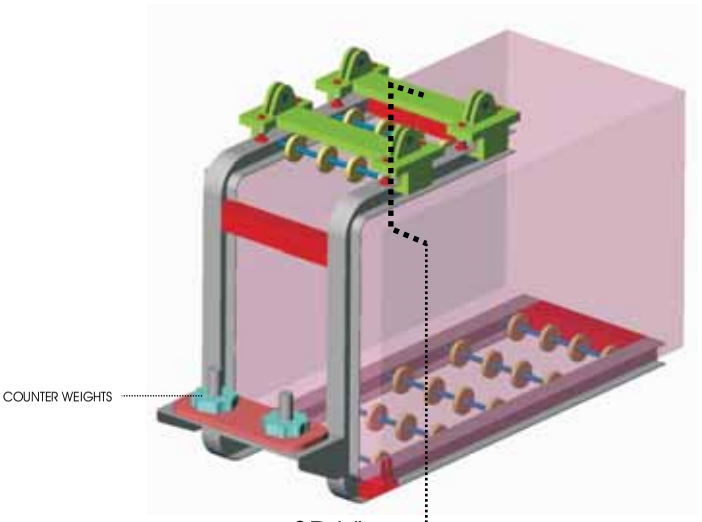
The nomad-pod is loaded into the C-frame loader. The Pod is pulled into place from the C-frame on the holding tray. Holding tray and C-frame will have wheels for the pod to roll on into place.

C-FRAME LOADER

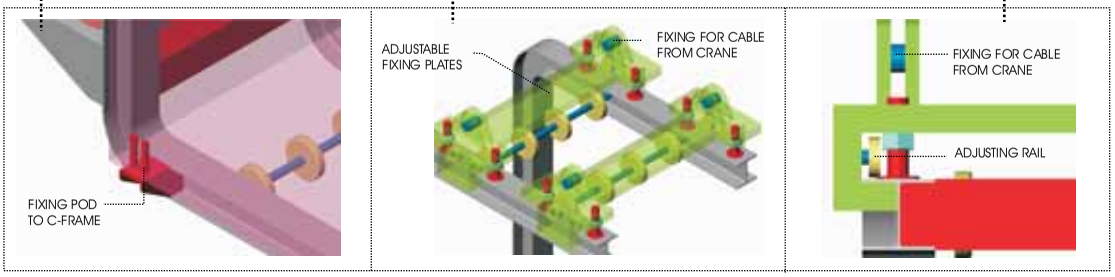
SPECIFICATIONS



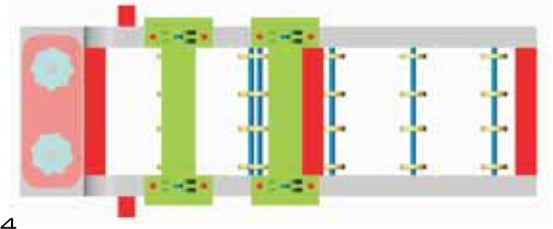
1 3D View



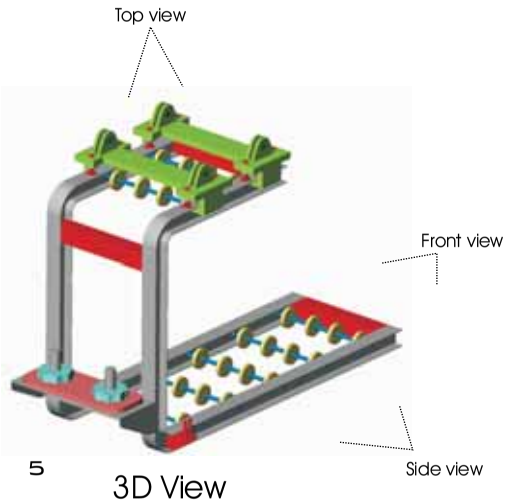
2 3D View



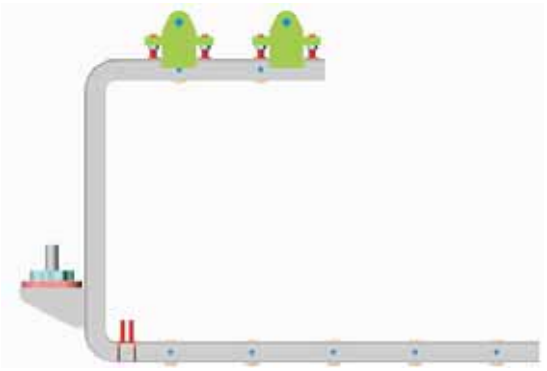
3



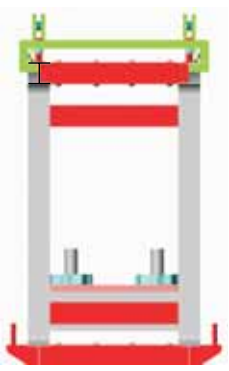
4 Top View



5 3D View



6 Side View



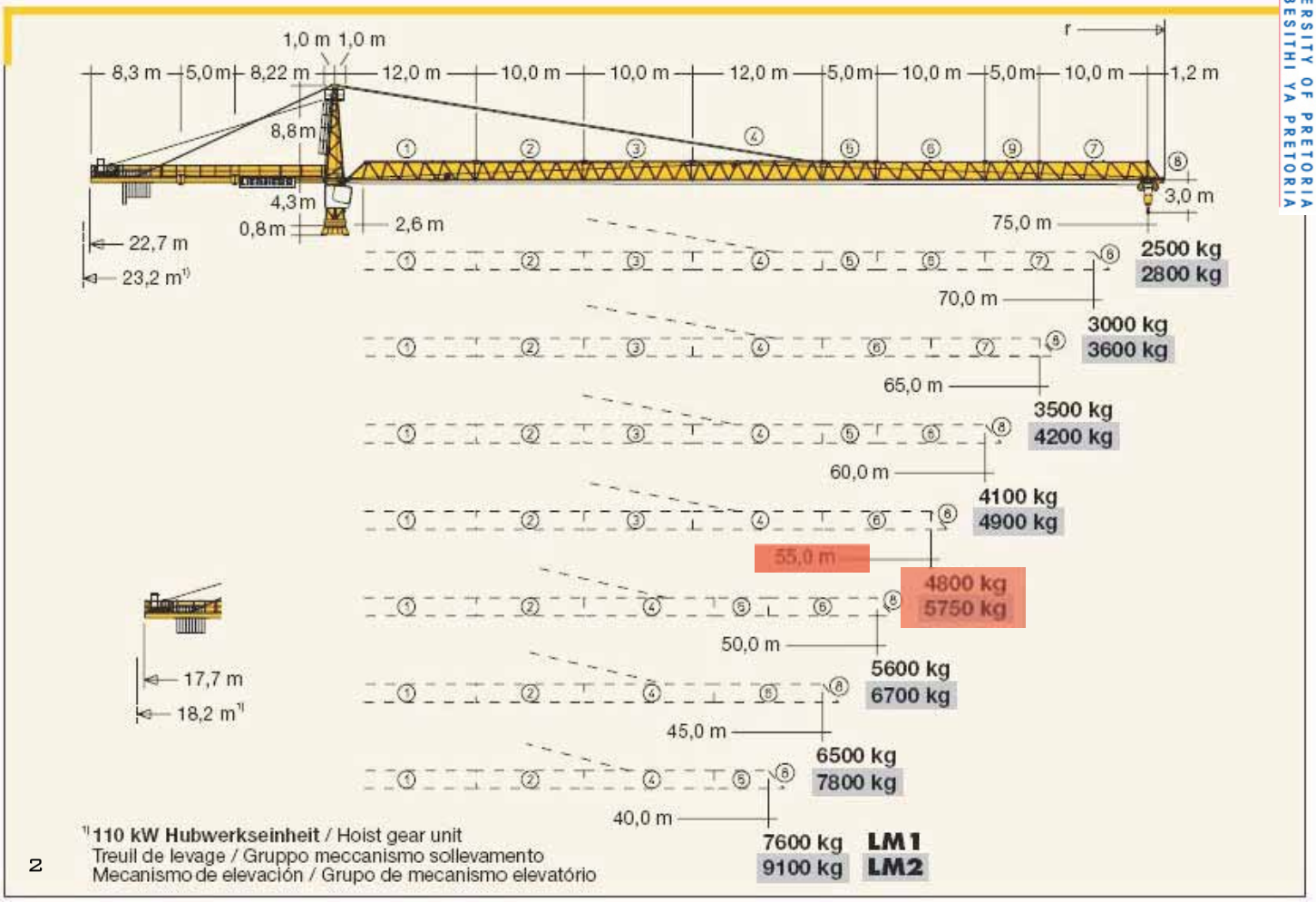
7 Front View

Images not to scale

TOWER CRANE
SPECIFICATIONS

The site requires a 50 m radius tower crane, and the weight at the end should be able to carry 4000 kg, this weight is the including the C-frame loader and Pod.
The tower crane specified can carry a load of 5750 kg maximum at 55 m.

1



¹⁾ **110 kW Hubwerkseinheit** / Hoist gear unit
Treuil de levage / Gruppo meccanismo sollevamento
Mecanismo de elevación / Grupo de mecanismo elevatório

2

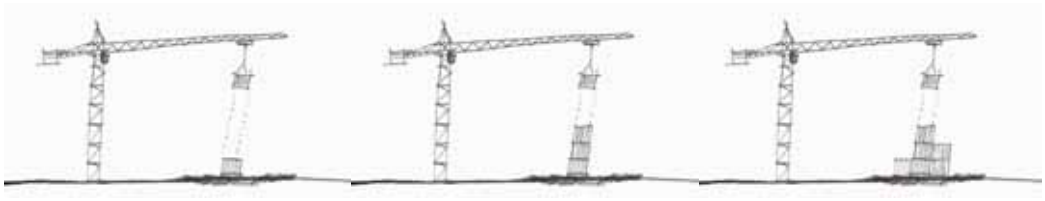
Hubhöhe Hoisting height / Hauteur sous crochet / Altezza di sollevamento / Altura bajo gancho / Altura de montagem

1

2

le Corbusier remarked that if you could place a windmill next to a building and it compliments the building the design was good. The windmill is essential form follows function. Functionally it pumps water from groundwater levels into a concrete dam.

The Tower crane is an essential prefabricated structure. It symbolizes the heart of the project, everything happens from this heart. It functionally moves transportable sized boxes into place and thus gives shape to the layout of the building.



3

Images illustrates the growth and heart that the tower crane identifies.

Similarly these two elements are functionally driven in design and material to perform according to its specific function. Also iconic in functional practicality and symbolizes more than just itself. The windmill symbolize: countryside, and the tower crane: progress, and that a city is never completely built.

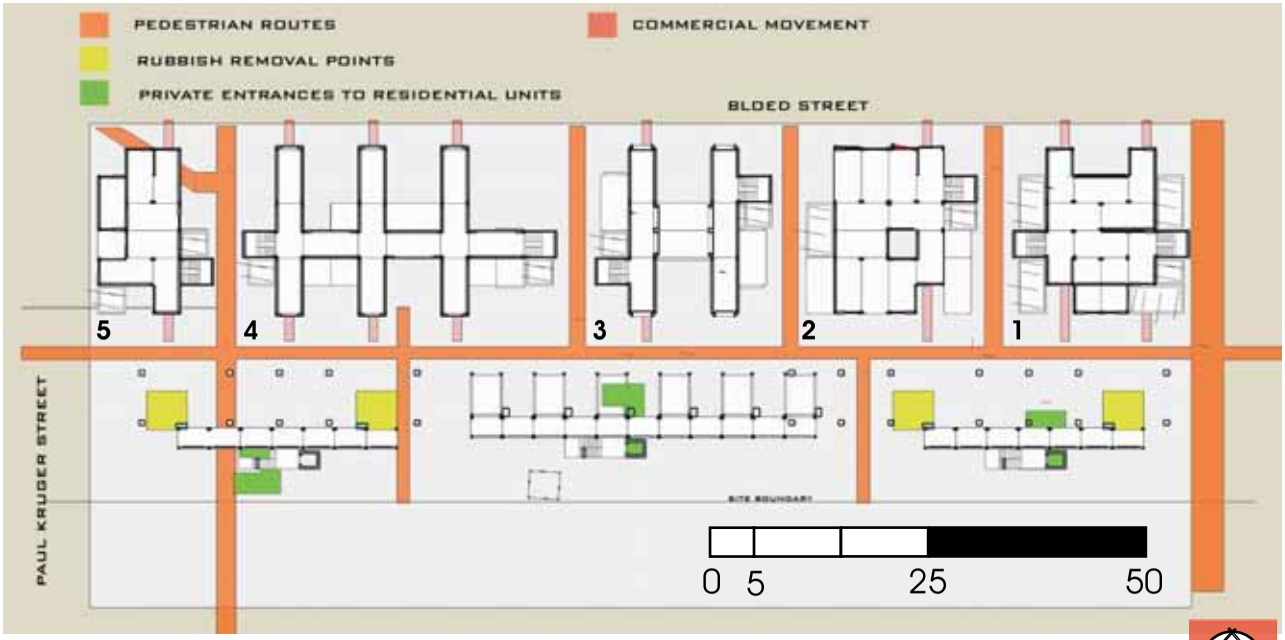
(Krane, J) states in a bussiness article "DUBAI, United Arab Emirates — New York has the Statue of Liberty. Paris has the Eiffel Tower. Dubai's symbol, for now, is the construction crane.
This Persian Gulf boomtown is more accurately described as an enormous construction site rather than a finished city. Cranes cram the skyline and line the highways, marring the view from almost any window.
Their latticed booms wheel over hundreds of half-finished skyscrapers, hauling up gray slabs of prefabricated wall, buckets of wet concrete, and bundles of steel reinforcing rod resembling rust-colored spaghetti. Building analysts say Dubai has emerged as the world's fastest growing city, as well as its largest repository of building cranes".

The tower crane can symbolize prosperity and growth, and can also serve to suggest the question of; are cities ever completely built or finished? Within the context of the inner city of Pretoria constantly fluctuating especially with the investment currently in this area, one can see the crane as a symbol of growth and progress.

4

ACCOMMODATION SCHEDULE

Residential		
Area per unit		19.32 m²
Total units	56	
Total		1 081.92 m²
Plug-in Facility		
Area per unit		9.66 m²
Total units when fully occupied	42	
Commercial ground- and first floors		
Area commercial 01		217.35 m²
commercial 02		72.45 m²
commercial 03		72.45 m²
commercial 04		222.18 m²
commercial 05		120.75 m²
Total commercial area		705.18 m²
Toilet facilities commercial		
SABS 0400 B3		
1 WC and 1 HWB for male and 1 WC and 1 HWB for female /15 persons		
1 Person/ 15m² commercial floor space		
705.18 m² / 15 m² = 47 Persons / 15 = 4 WC and 4 HWB for each male and female		
Total Supplied = 8 Paraplegic toilet facilities.		
Access walkways		
Area per floor /Residential and Plug-in facility		93.75 m²
Total for all floors		656.25 m²
Rubbish Storage facilities		
Area		19.32 m²
Laundromats		
Area		38.64 m²



1

Groundfloor plan

Basement:
Total parking bays required as per
TABLE F: PARKING APPLICABLE TO AREAS
IN ZONES A AND B ON ANNEXURE A

Duplex dwellings	As per schedule 3
Flats	One parking space per 93 square metres of the gross floor area of the flats
Residential buildings	One parking space per 37 square metres of bedroom and bathroom accommodation (other than Dwelling-houses and blocks of flats)
Offices	One parking space per 116 square metres of the gross floor area of the offices and their appurtenances such as storerooms, cloak-rooms, corridors etc.
Shops	One parking space per 93 square metres of the gross floor area of the shops and their appurtenances such as offices used in conjunction therewith, storerooms, cloak-roomscorridors etc.
Industries Restricted Industries Warehouses	One parking space per five employees including management.

1

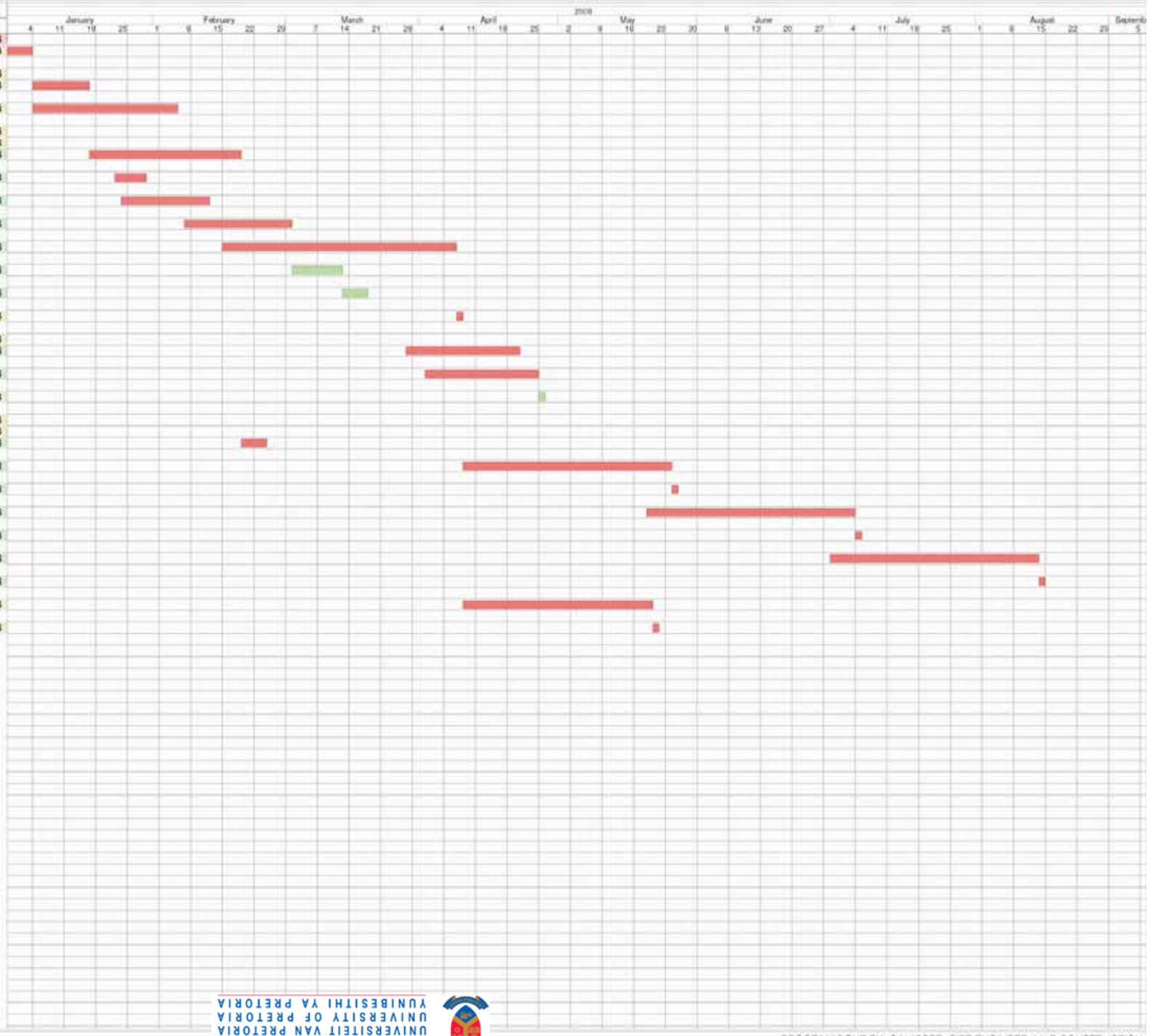
Function	Total area	Parking area	Bays required
Residential	1 081.92 m²	93 m²	12
Nomad pods	n.a.	n.a.	9
Shops	705.18 m²	56 m²	13

One parking space per 5 nomad plug-in pods.

MIX-USE RESIDENTUAL & COMMERCIAL DEVELOPMENT

Selection: Summarised to level 4

Activity Description	Durn	Current Start	Current Finish
A000 MIX-USE RESIDENUAL & COMMERCIAL DEVEL.	164	01/01/2008	15/08/2008
A050 SITE ESTABLISHMENT	4	01/01/2008	04/01/2008
A010 EARTHWORKS	23	07/01/2008	06/02/2008
A020 BASEMENT	9	07/01/2008	17/01/2008
A130 ACCESS ROAD	23	07/01/2008	06/02/2008
A110 CIVIL CONSTRUCTION	72	15/01/2008	28/04/2008
A120 BASEMENT	58	15/01/2008	08/04/2008
A770 FOUNDATIONS	24	15/01/2008	20/02/2008
E490 CRANE INSTALATION & COMITIONING	5	24/01/2008	30/01/2008
A780 COLUMNS	14	25/01/2008	13/02/2008
C080 RETAINING WALL	17	08/02/2008	03/03/2008
C790 FLAT SLABS	37	18/02/2008	08/04/2008
D360 WATER SEALANT - RETAINING WALLS	8	04/03/2008	13/03/2008
D390 BACKFILL BEHIND RETAINING WALL	4	14/03/2008	19/03/2008
D410 HANDOVER - BASEMENT	1	09/04/2008	09/04/2008
D450 STRUCTURAL SUPPORT	21	28/03/2008	25/04/2008
D460 SUPPORT COLUMNS & BEAMS - EAST TOWER	18	28/03/2008	22/04/2008
D900 SUPPORT COLUMNS & BEAMS - WEST TOWER	18	02/04/2008	25/04/2008
E330 HANDOVER - STRUCTURAL SUPPORT	1	28/04/2008	28/04/2008
E360 STRUCTURAL ASSEMBLY	127	21/02/2008	15/08/2008
E560 RESIDENTUAL UNITS	127	21/02/2008	15/08/2008
E570 BASEMENT	4	21/02/2008	26/02/2008
5140 NOMAD TOWER	33	10/04/2008	26/05/2008
5050 HANDOVER - NOMAD TOWER	1	27/05/2008	27/05/2008
F660 EASTERN TOWER	33	21/05/2008	04/07/2008
5060 HANDOVER - EASTERN TOWER	1	07/07/2008	07/07/2008
5010 WESTERN TOWER	33	01/07/2008	14/08/2008
5120 HANDOVER - WESTERN TOWER	1	15/08/2008	15/08/2008
5870 COMMERCIAL UNITS	30	10/04/2008	21/05/2008
5920 HANDOVER - COMMERCIAL UNITS	1	22/05/2008	22/05/2008



Without the basement the program will be 3.5 months shorter.
Total construction time on site:
7.5 months

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

PROGRAM DONE BY: GJ VISSER, SITE ENGINEER, M&R CONSTRUCTION.

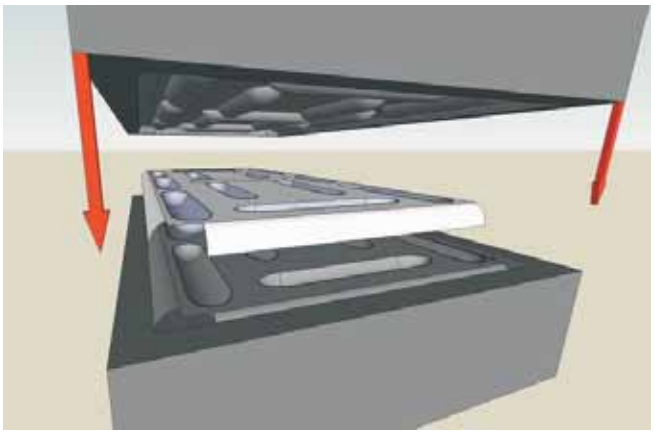
GJ 0017274

MATERIALS

STEEL

Steel metal sheeting for external use of modular unit.

The choice for this material stems out of recycling. This material is also very durable, especially with the harsh climate in Pretoria. The car inspired the choice of this material as it is a great example of great durability. The container serve as a great example for the use of sheet metal as structure.

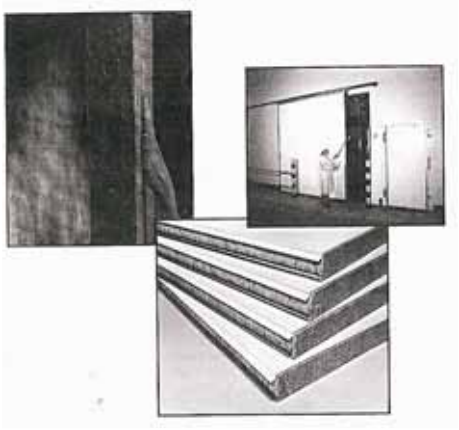


1

INSULATION

ROCKWOOL

The product is engineered from volcanic stone to use the properties of the stone fibres to achieve a structurally, sound, thermal and acoustically efficient panel. Bonded panels provide the solution to various types of insulation and exterior/interior cladding requirements. What makes Rockwool a suitable insulated panel is the fact that it has great thermal characteristics and is non-combustiable," compared to other insulation materials.



Characteristics

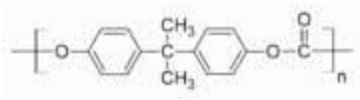
- Great strength and rigidity
- Stable in cold & hot conditions
- Great thermal insulation values
- Chemically neutral
- stable under humidconditions
- Acoustic insulation
- equivalent to impermeable
- surface
- Fire-safe

Fire Requirements

Fire starts when an ignition source, fuel and oxygen are simultaneously present. It is therefore of the utmost importance that the insulation core of any composite panel is as follows:

- Non Combustible
- High melting point
- Low smoke co-efficient
- Non toxic when heated
- Not a contribution towards fire

MATERIALS
WINDOWS



The chemical structure of Lexan
LEXAN is a registered trademark for General Electric's brand of highly durable polycarbonate resin thermoplastic intended to replace glass where the need for strength justifies its higher cost. It is a polycarbonate polymer produced by reacting Bisphenol A with carbonyl chloride, also known as phosgene. Lexan is the brand name for polycarbonate sheet in thicknesses from 0.75 mm (0.03 in) to 12 mm (0.48 in). Applications are mainly in three domains building (glazing and domes), industry (machine protection and fabricated parts) and communication and signage.

Imperial sizes	Metric sizes
Width / length	Width / length
81 " x 49 "	2050 x 1250
96 " x 48 "	2450 x 1230
120 " x 81 "	3050 x 2050

Lexan / Makrolon Polycarbonate

- Half the weight of glass
- As used in riot shields
- Fire resistance to BS476
  Often used to cover church windows

Perspex / Plexiglass Acrylic Sheets

- 10 times stronger than glass
- Glass clear 92% light transmission
- Ideal for secondary glazing
- Lightweight
- Easy to cut and drill
  Excellent weather resistance

SOLAR WATER HEATER

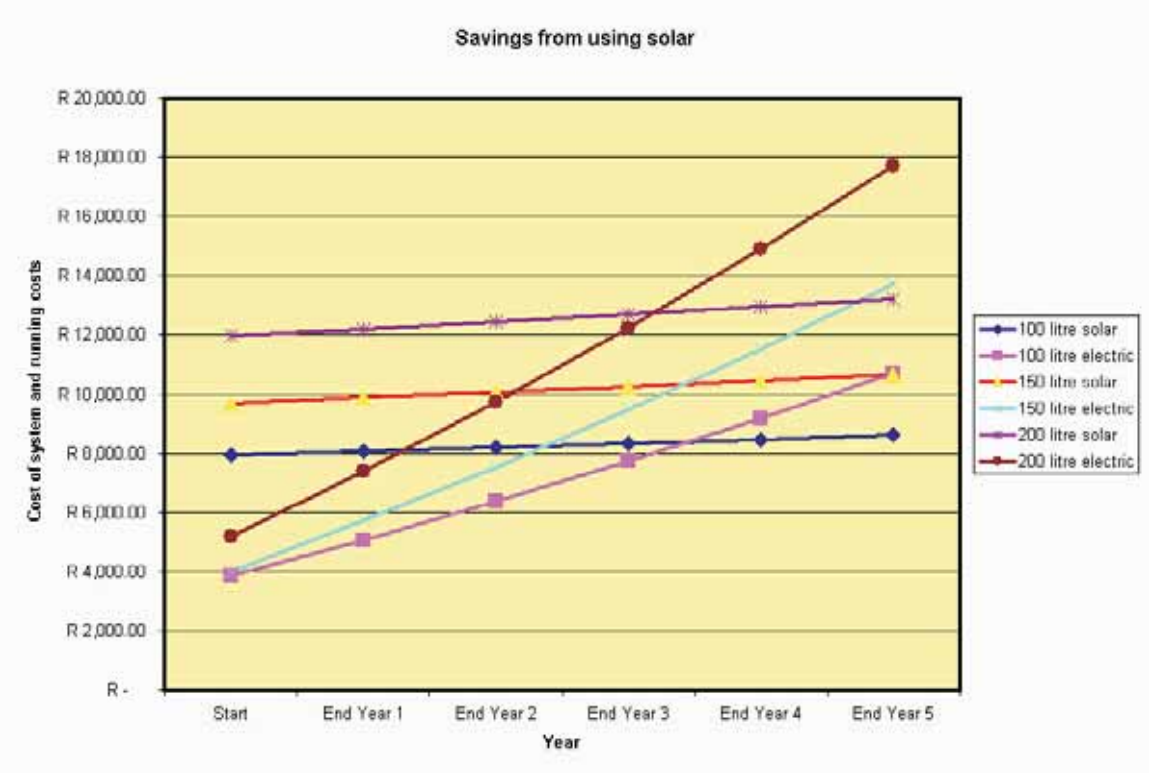
230 liters / day

5min shower = 100 liter/day
Flushing toilet with a 9 liters system = 45l/day
Washing clothes with top loader machine using 130liters/washcycle for a family of 4 = 33l/day
Washing dishes= 27liters/day
Cooking = 15 liters/day
Drinking washing hands and other uses = 10 liters/day

Reduced water consumption, Methods on reducing

3min shower or low flow shower head delivering 10 liters/ minute = 60liter/day
Install a 41/2:9 liter dual flush toilet = 32 liters/day
Wait until you have a full load of washing before washing clothes/ or use the halfload button on machine.
Frontloading machines uses 45% less water, so the Laundromat will be provided with these machines. = 16 liters/day
Don't wash the dishes under a running tap, use a bowl.
And use a bowl for washing vegetables.
(Sustainable Water (16 April 2007))

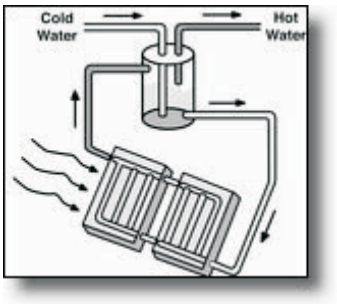
Solar Water heaters can supply 50-100% of a homes hot water needs, and provide savings up to 50-80% over electric heaters.

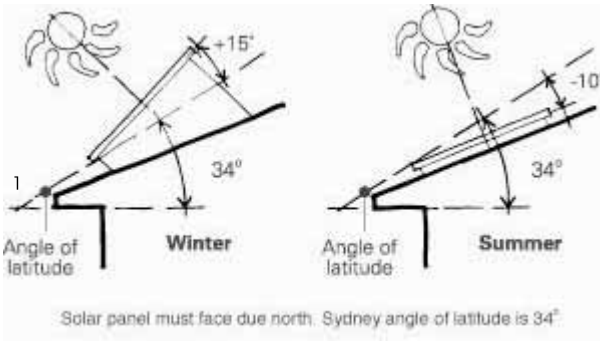


1

Passive systems
In Passive systems (or thermosiphon systems) the tank is placed above the solar collectors
so that cold water sinks into the collectors, where it is warmed by the sun, and rises into the tank. A continuous flow of water through the collectors is created without the need for pumps.

tank. A continuous flow of water through the collectors is created without the need for pumps.





2 persons per flat, and 7 units = 14 persons each using 76 liters hot water per day = 1064 liters hot water / day

Panel PG 2.0 size 2000 x 1000 mm
Panels needed:

5.7 liter storage for water for every 0.1 m² collector area. In very warm sunny climates the ratio is 7.6 liters storage for water every 0.1 m2 of collector area.

1064 liters / 7.6 = 140 x 0.1 m2 = 14 m²
panels needed.

Total of 7 panels of 2 m² needed.

300 liters storage capacity tank to be used with a backup heating element.
- Separation of potable water from solar fluid through thermal jacket
- Galvanised and painted special tank with high corrosion resistance
- Storage tank volumes 150 or 300 litres, depending on application
- Polyurethane foam insulation with additional polyurethane casing for optimum insulation and protection against the weather

thermosiphon collector
- Collector frames and rear panel made from aluminium
- Radiant piping for optimum thermal flow

- 4 mm clear glass with optimum angle correction factor – tested for resistance to hail in accordance with DIN EN 12975
- Integrated return flow pipe for protection against weather and to allow simplified installation
- Seamless, non-bonded EPDM gasket between glass and collector frame for thermal stress-free and secure sealing under all temperature conditions.

Climate data
Pretoria

Position: 25° 44' S 28° 11' E
Height: 1330m
Period: 1961-1990
This climatological information is the normal values and, according to World Meteorological Organization (WMO) prescripts, based on monthly averages for the 30-year period 1961 – 1990

Month	Temperature (° C)				Precipitation		
	Highest Recorded	Average Daily Maximum	Average Daily Minimum	Lowest Recorded	Average Monthly (mm)	Average Number of days with >= 1mm	Highest 24 Hour Rainfall (mm)
January	36	29	18	8	136	14	160
February	36	28	17	11	75	11	95
March	35	27	16	6	82	10	84
April	33	24	12	3	51	7	72
May	29	22	8	-1	13	3	40
June	25	19	5	-6	7	1	32
July	26	20	5	-4	3	1	18
August	31	22	8	-1	6	2	15
September	34	26	12	2	22	3	43
October	36	27	14	4	71	9	108
November	36	27	16	7	98	12	67
December	35	28	17	7	110	15	50
Year	**36**	**25**	**12**	**-6**	**674**	**87**	**160**

1

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

A B C D E F G H

TECHNICAL DOCUMENTATION

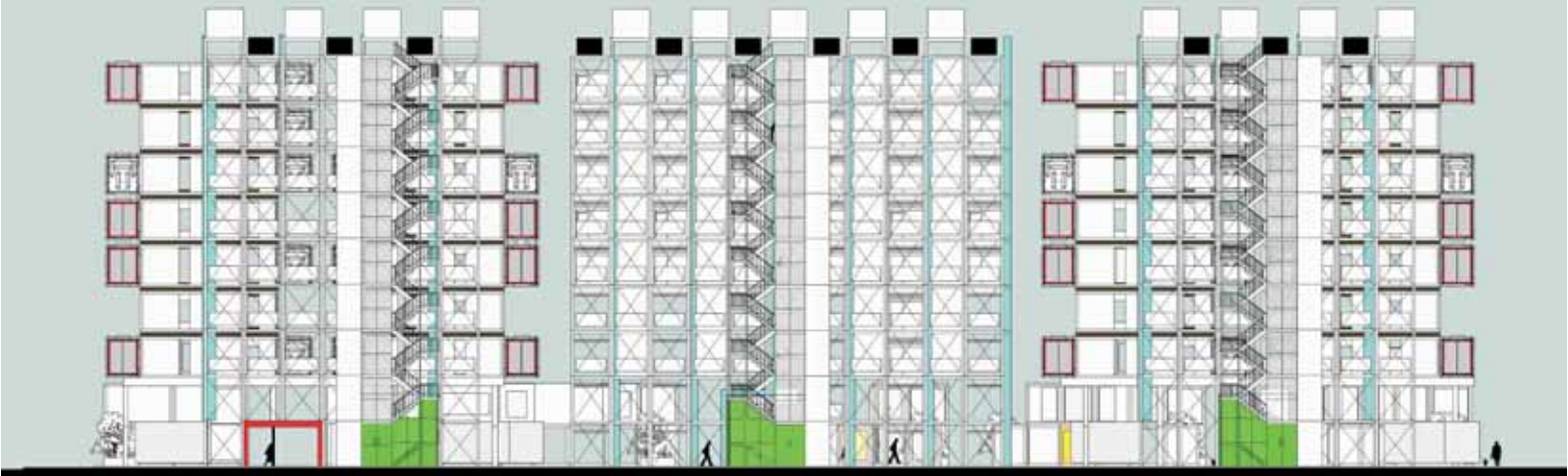
1

North Elevation

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

2

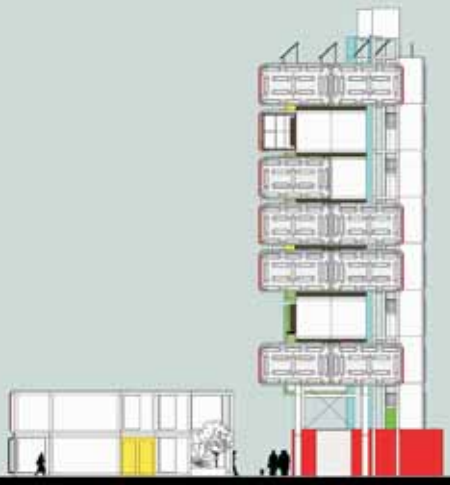
East Elevation



1

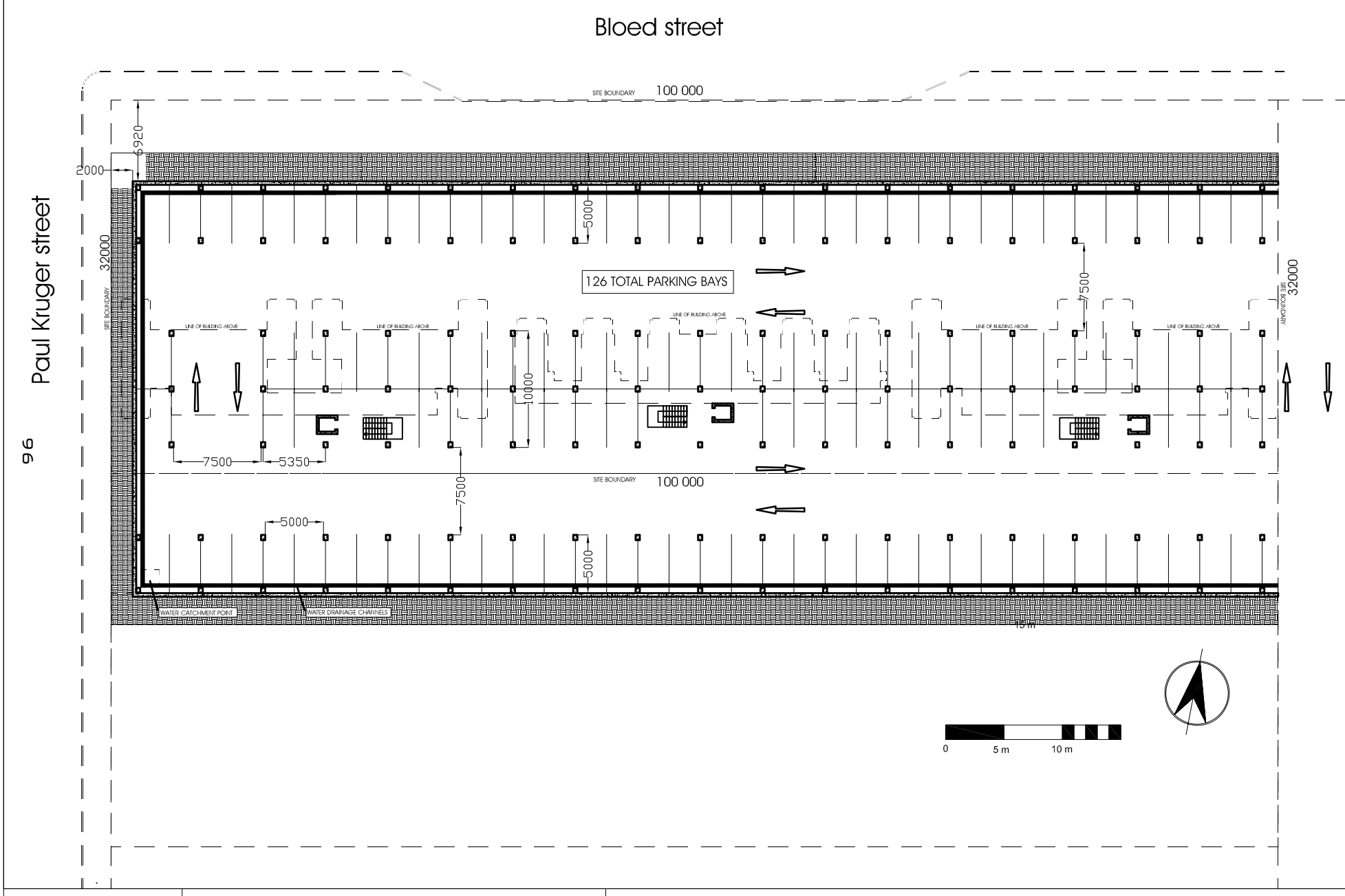
South Elevation

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



2

West Elevation



Notes:

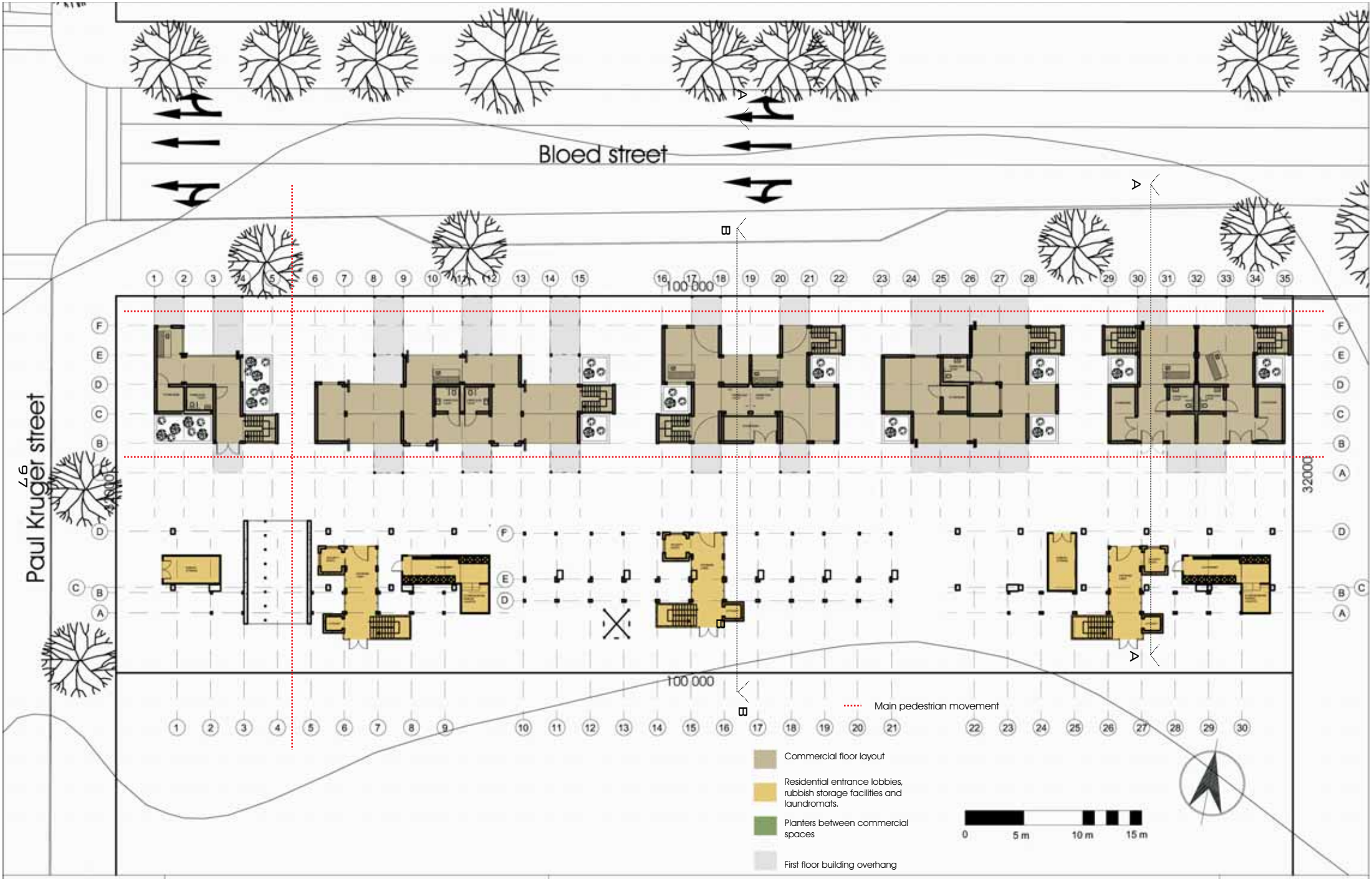
Water in the basement to be drained to the water catchment by the aid of water channels to be built into the slab of the basement floor. The water will be pumped into the existing storm water system

The liftshafts and the stairs in the basement to be constructed for the transportable liftshafts and stairsto be coordinated from these fixed points.

Flat slab and column head system are used for the basement structural system. Basement to extend into neighboring site as the parking will be shared.

Structural supports are erected on the grid of the basement columns. These structural supports will form the platform for the residential stacked units.

Riaan Visser		UNIVERSITEIT VAN PRETORIA UNIVERSITY OF PRETORIA YUNIBESITHI YA PRETORIA	Scale to bar
S 21049671		Basement Plan	



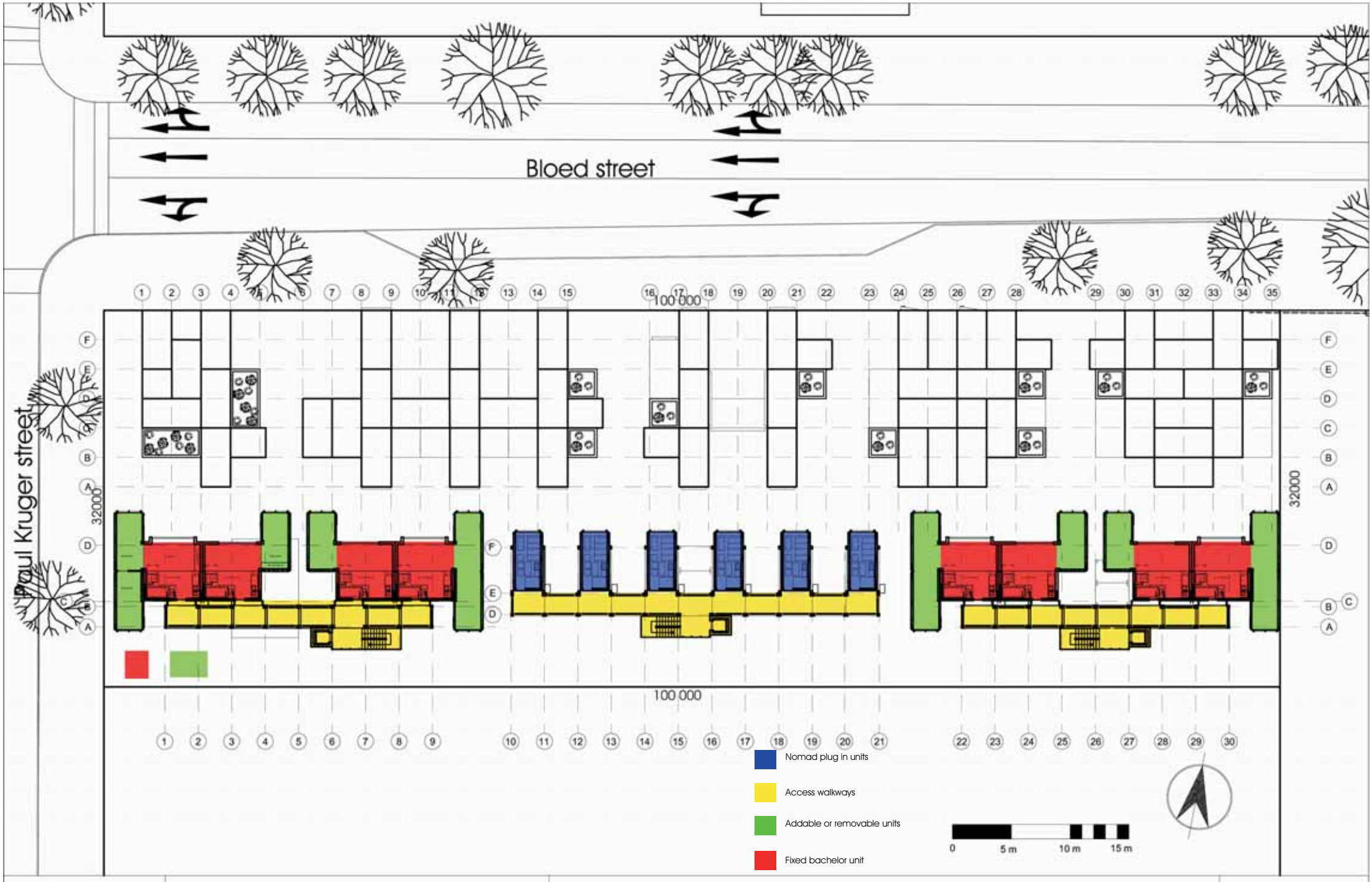
Riaan Visser

S 21049671

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Ground floor Plan

Scale to bar



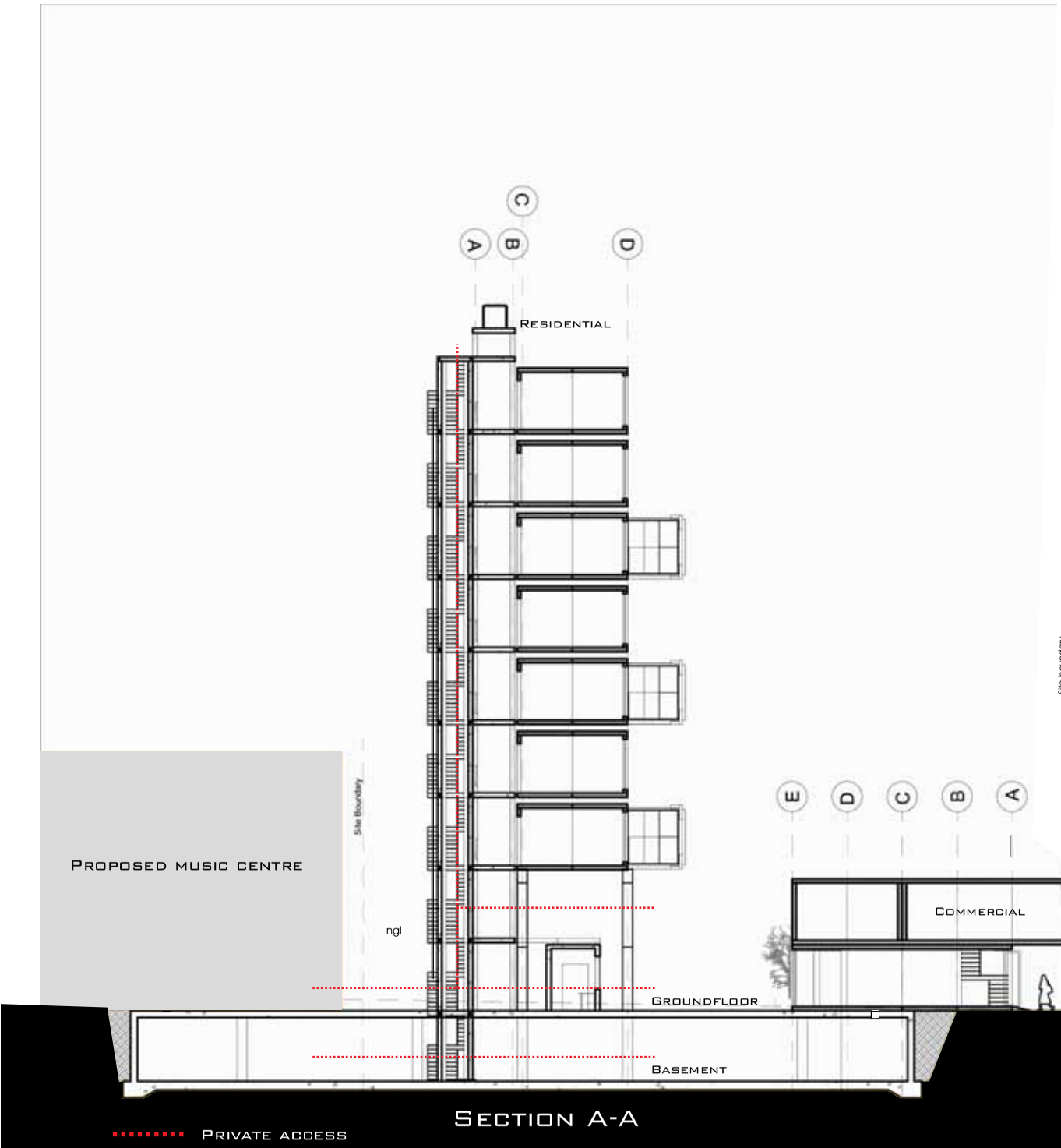
Riaan Visser

S 21049671

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Firstfloor Plan

Scale to bar

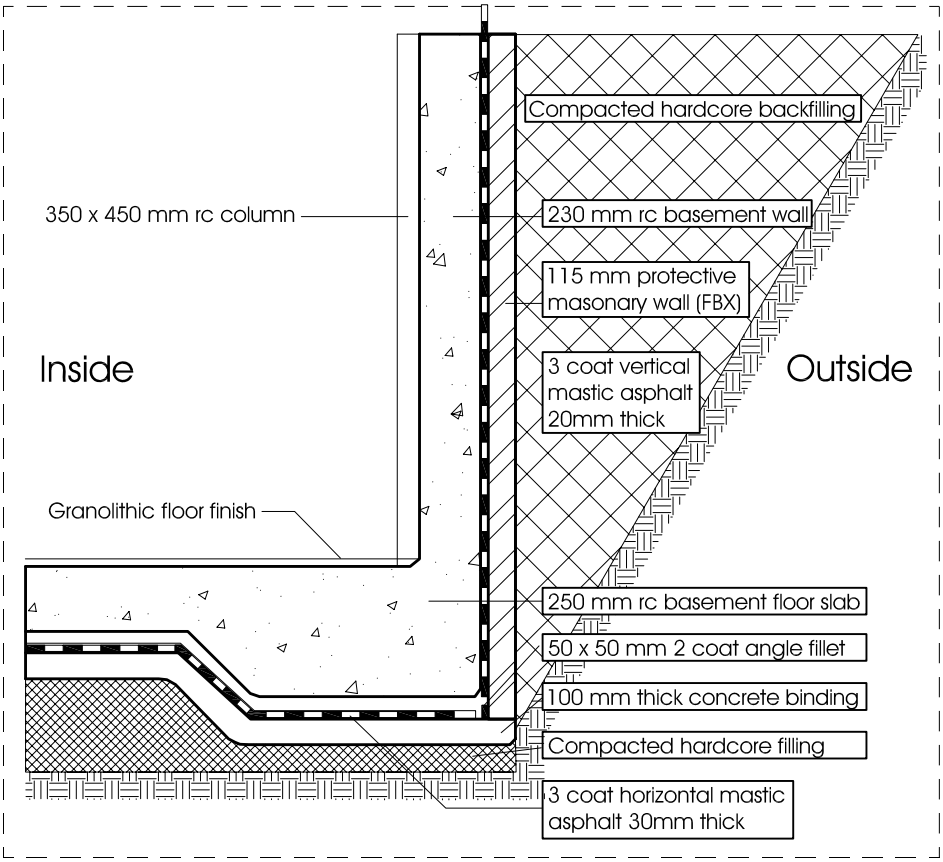


Proposed music centre

Section A-A

Private access

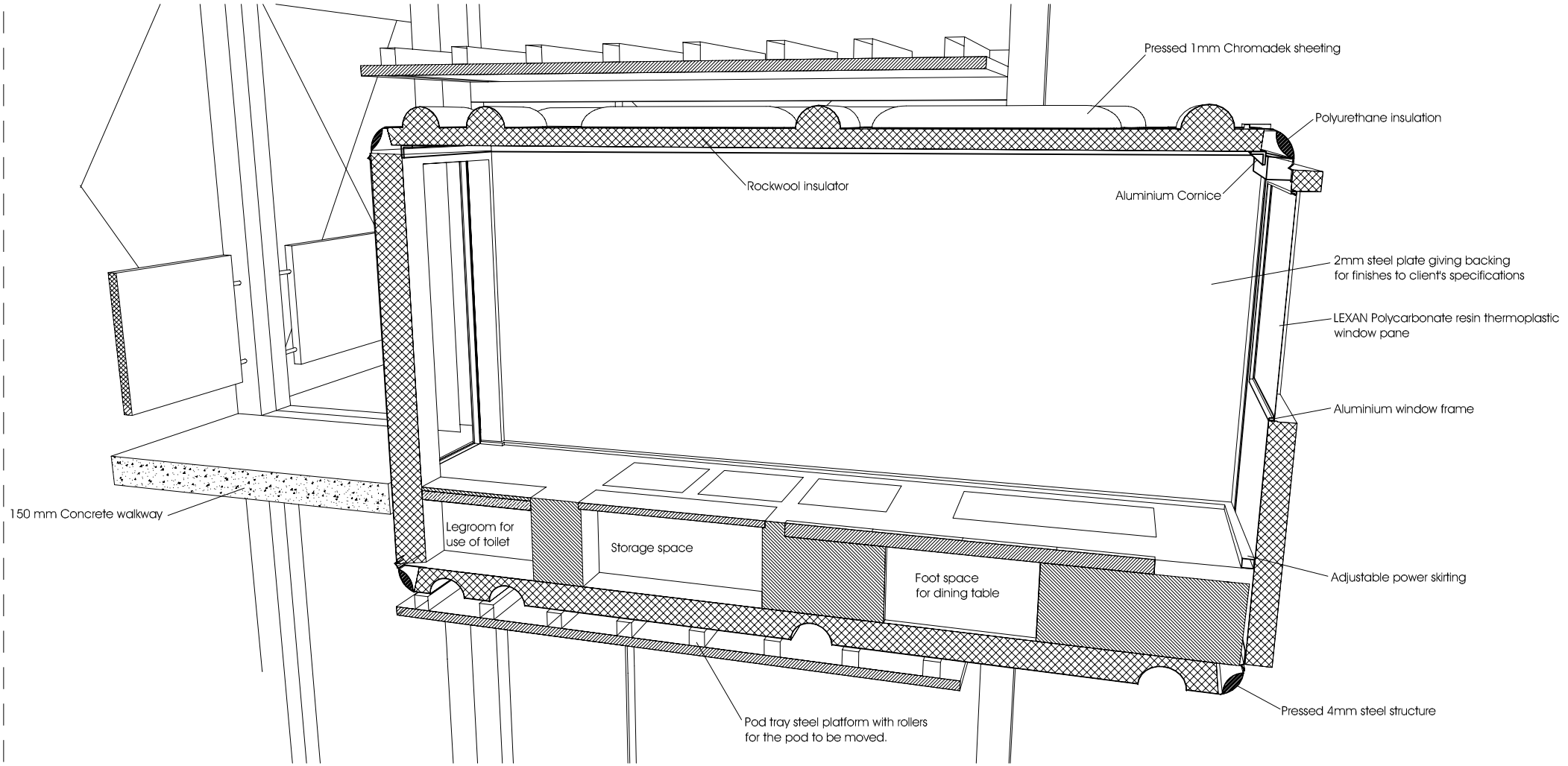
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



Scale 1:20

Basement wall detail

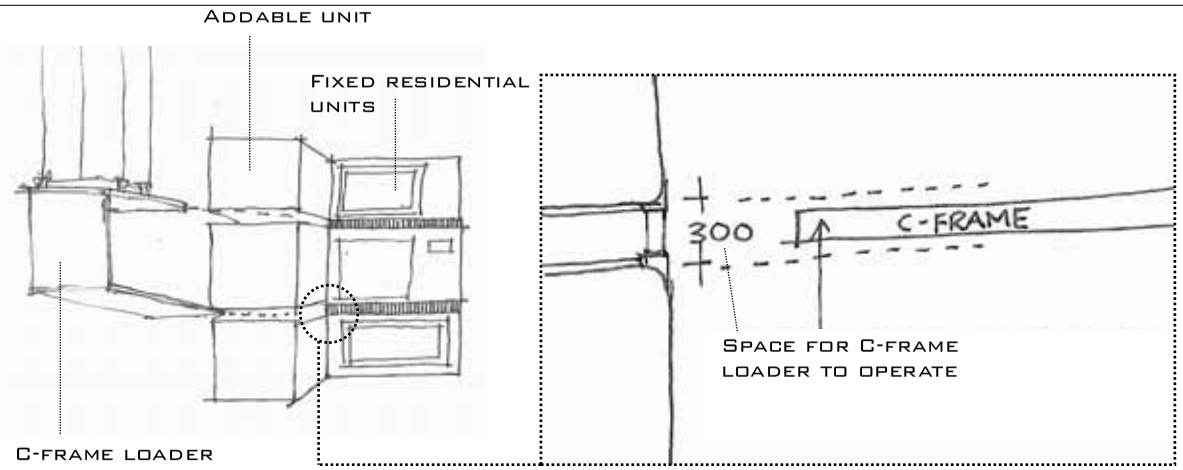
Section A-A

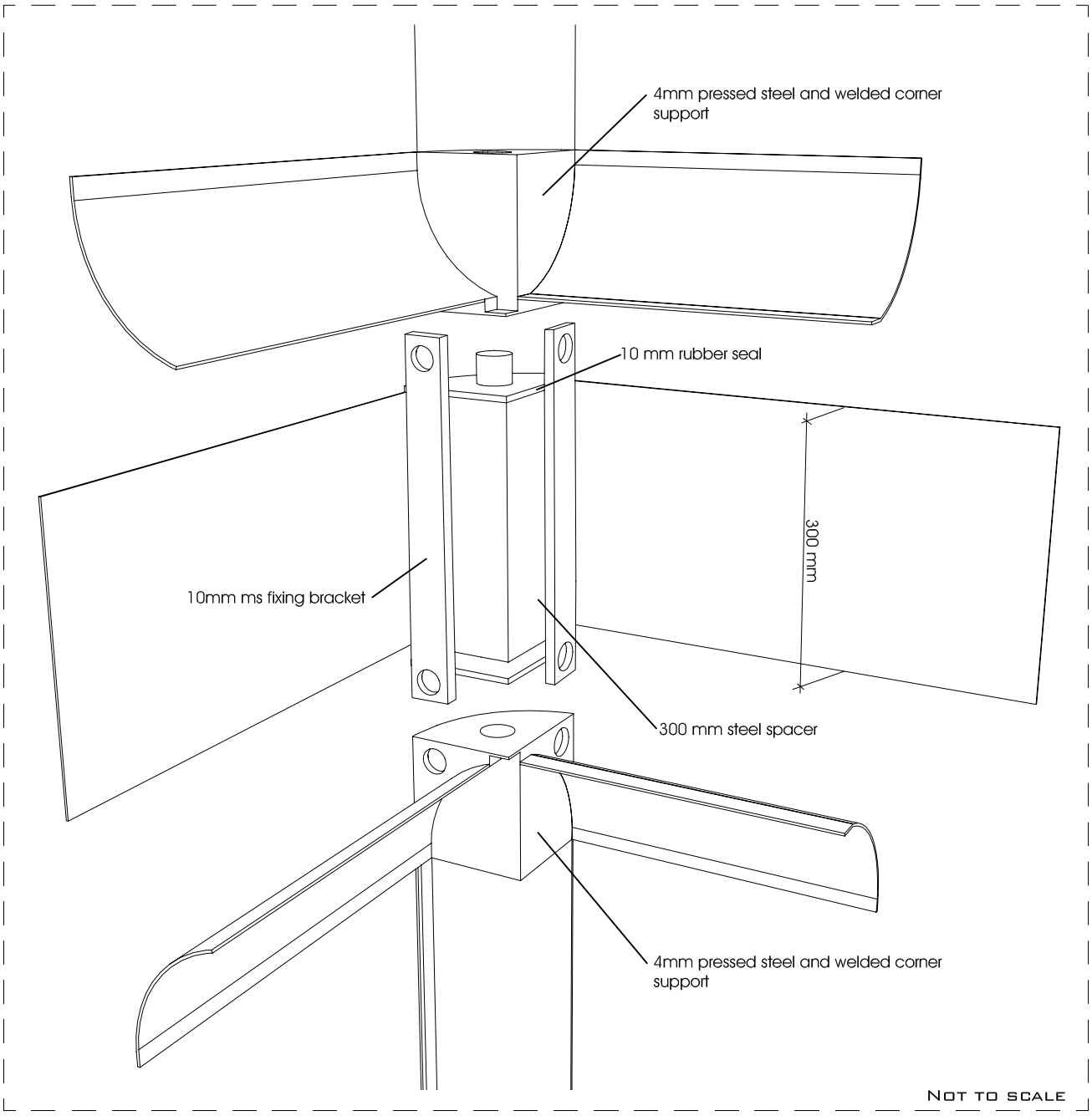


101

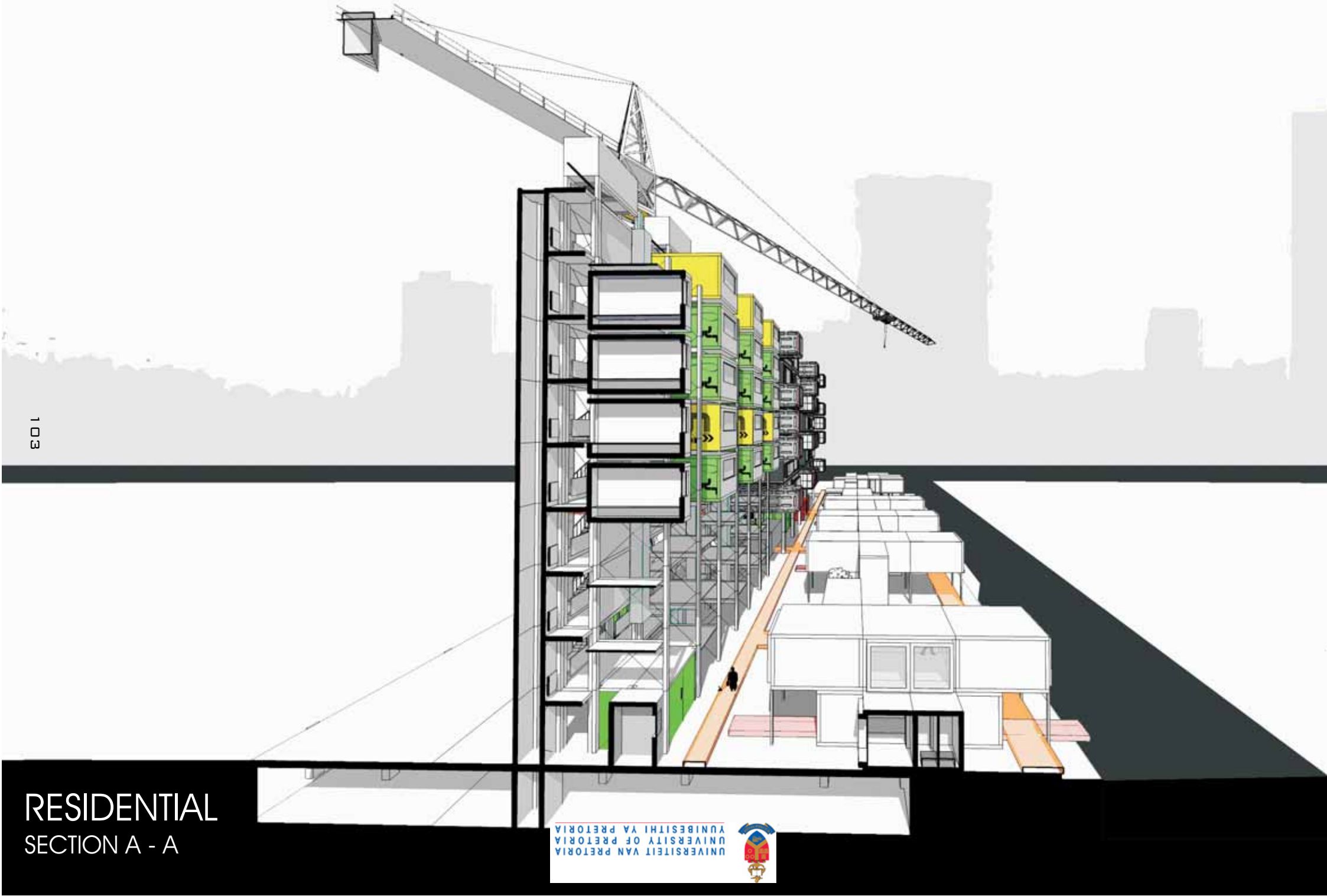
NOT TO SCALE

SECTION DETAIL OF PLUG IN FACILITY





SPACER DETAIL BETWEEN STACKED RESIDENTIAL UNITS



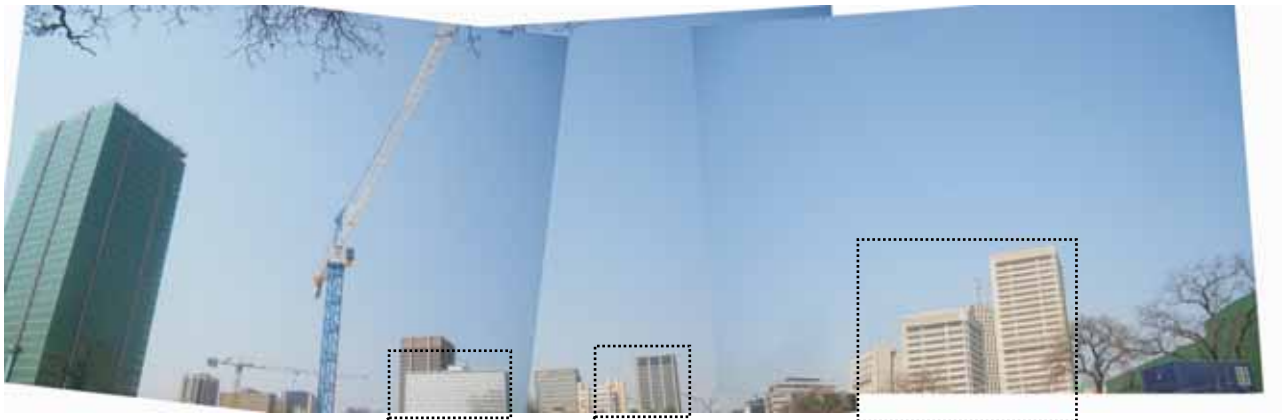
RESIDENTIAL

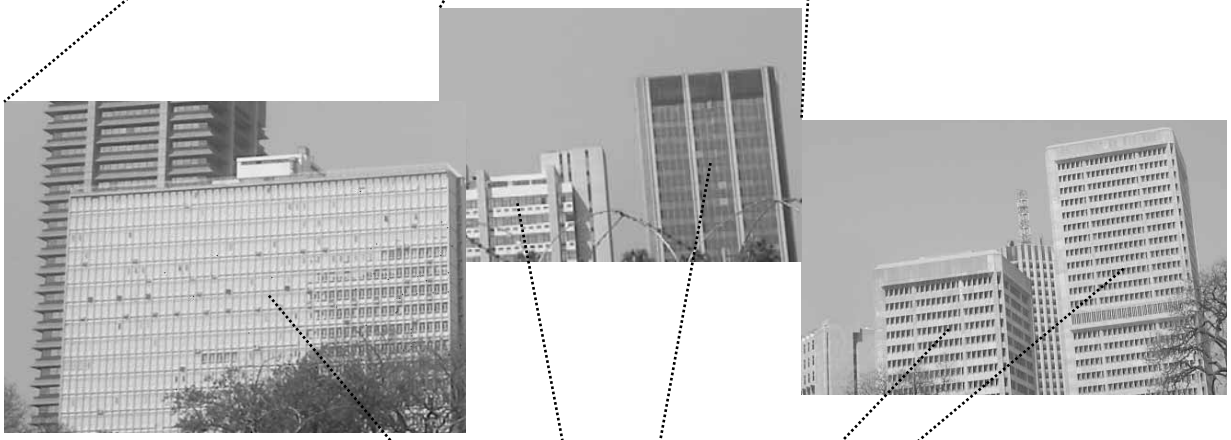
SECTION A - A

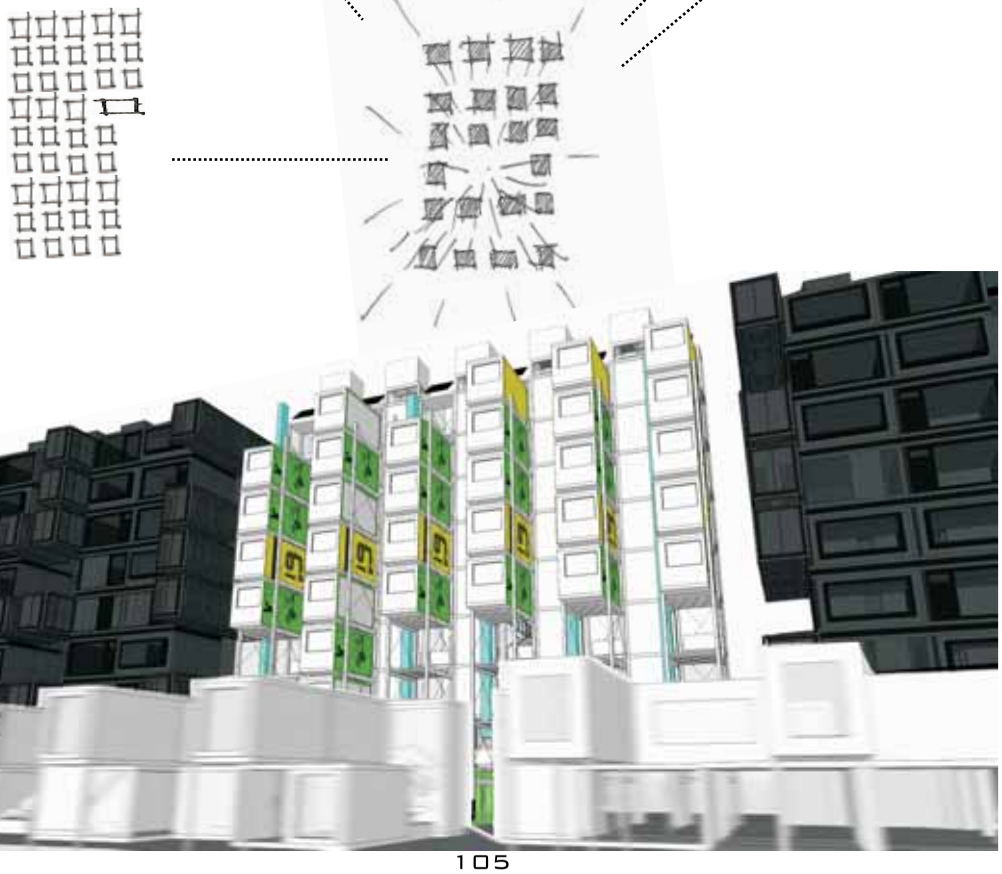
NOMAD PLUG IN FACILITY

SECTION B - B

CONTEXT PATTERNS







05
1 – Eindhoven International Project
(Author, Racz, S, 2006)
06
1 – Eindhoven Project Conception
(Author, Racz, S 2006)
07
1 – Eindhoven Project Site Analysis
(Author, Racz, S 2006)
08
1 – Eindhoven Project Facilities
(Author, Racz, S 2006)
09
1 – Eindhoven Project Perspectives
(Author, Racz, S 2006)
12
1 – Tower Cranes
(http://www.1adventure.com/archives/images/cranes-lowres.jpg)
2 – Recyclable Bottles
(http://www.notcot.com/images/cokemain.jpg)
3 – Nomads in Mongolia
(http://www.dkimages.com/discover/previews/982/50388059.JPG)
4 – Functionally Designed Lighter
(http://utxmart.com/images/bic%20lighter.gif)
5 – Wireless Internet
(http://static.howstuffworks.com/gif/wireless-network-new-4.jpg)
6 – Lego Children's Building Blocks

(http://a.beining.com/blog/uploaded_images/LEGO_logo-710596.png)
7 – Camping Tents, the Modern Nomad Element
(Author, 2007)
8 – Fashion Item
(http://www.replica031.com/Replica_Sunglasses/Christian_Dior/pic/Christian_Dior_Pop_Fake_Replica_Sunglasses_SG_CD004.jpg)
9 – Hot air Balloon

(http://www.bryancounty.org/Balloon/balloon1big.JPG)
10 – Vision of Future City
(http://3danimation.e-spaces.com/graphic_design/future_city_downtown.jpg)
11 – Digital Format of Music, Making Music Mobile
(http://www.melonfarmers.co.uk/images/nemp3.jpg)
12 – Containers in Harbor

(http://www.ics.uci.edu/~eppstein/pix/bar/mj/Containers-m.jpg)
13 – Natural Disaster in the Netherlands

(http://www.buildingconservation.com/articles/flood/flood.jpg)
14 – Disposable Camera
(http://www.diylive.net/wp-content/macro_camera.jpg)
15 – Nomad Lifestyle
(Author, 2007)
16 – Fashion

(http://anina.typepad.com/anina/images/2007/05/06/10.jpg)

17 – Disposing of Cellphones

(http://cohesion.rice.edu/Facilities/FEP/RiceRecycles/emplibrary/CellPhones.jpg)

13 1-7 Porsche Design
(Author, 2007)
(http://www.porsche.com/middle-east/_southafrica_/)

14
1 – World Getting Smaller

(http://www.opentopia.com/images/cams/world_sunlight_map_hemisphere.jpg)

15
1 –
2 – Concept of Walking City in Ocean
(Bell, E. et al. 1999. Archigram. Princeton Architectural Press)
3 – The Walking City in New York
(Bell, E. et al. 1999. Archigram. Princeton Architectural Press)
4 – A Walking City
(Bell, E. et al. 1999. Archigram. Princeton Architectural Press)

5 – Cities M(
(Bell, E. et al. 1999. Archigram. Princeton Architectural Press)
16
1 – Metabolism
(Graphic design from early 1960s by K. Awazu. JAABE vol.3 no.2 Nov. 2004)
18
1 – Site Location in City
(Author, 2007)
2 – Section through Site
(Author, 2007)
3 – Locality Plan
(Author, 2007)
20
1 – Site Location on Aerial Plan Photo
(Author, 2007)
2 – Site Location on Aerial Photograph
(Author, 2007)
3 – Movement around Site
(Author, 2007)
4 – Land Use Plan
(Author, 2007)
21

1 – Residential Mapping
(Werner Notnagel, 2007)
2 – Traffic Flow around Site
(Group 8, University of Pretoria Research on Inner City, 2007)
22
1 – Eiffel Tower

(http://img.nytstore.com/IMAGES/NSAPINT7_LARGE.JPG)
2-4 – Concept Sketches
(Author, 2007)
23
1 – Main Tram Stops
(Carel Dill, 2007)
2 – Catalytic Generator Map
(Carel Dill, 2007)
3 – Ants Attracted to Jam
(Author, 2007)
24
1-5 – Pretoria Road Scheme
(Pretoria City Council, 1967)
25
1 – Land Use Map
(SJN Development Planning Consultants, 2004)
2 – Paul Kruger North Precinct
(GAPP Inner City Proposal, 2005
26
1 – Paul Street Images
(Carel Dill, 2007)
28
1 – Urban design proposal
(Author. Carel Dill. Brian do Vale, Leila Wepener, 2007)
29
1-6 – Photos of House Jansen
(Author. Carel Dill. Brian do Vale, 2007)
30
1-3 – Photos of House Jansen
(Author. Carel Dill. Brian do Vale, 2007)
31
1- 2 Sun movement and sun study
(Author, 2007)
33
1- concept using containers
(http://www.
2 - (Author, 2007)

34
1 – Freitag Shop, Zurich

(http://www.lospremiagrumi.com/data/06.06_freitagstore_465.jpg)
2 – Inside Freitag Shop

(http://easteatswest.typepad.com/east_eats_west/images/freitag_shop_inside_2.jpg)
3 – 3d Concept View of Freitag Shop

(http://www.lospremiagrumi.com/data/06.06_freitagstore_465.jpg)
4 – Layout of Shop
(http://www.lewism.org/wp-content/uploads/2006/08/plans&elevations.jpg)

35
1 – (htt _america/p1.jpg)
2 – Puerto America, Madrid
(http://www.wayfaring.info/images/Hotel-Puerta-America.jpg)
3-4 – Designs by Zaha Hadid
(http://www.e-architect.co.uk/madrid/hotel_puerta_america.htm)
5-6 – Designs by Rod Arad
(http://www.e-architect.co.uk/madrid/hotel_puerta_america.htm)

36
1 – M-CH House
(http://www.microcompacthome.com)

37
1-4 – M-CH House
(http://www.microcompacthome.com)

38
1 – Suitcase House Hotel
(Wood. Madera. 2005. Architettura del Legno. Gribaudo)
2 – Suitcase House House Layout
(Wood. Madera. 2005. Architettura del Legno. Gribaudo)

39
1 – Spacebox, Netherlands
(http://mocoloco.com/archives/spacebox_prefab_jan_05.jpg)
2- Spacebox, Netherlands
(http://jetsongreen.typepad.com/jetson_green/images/2007/03/15/spacebox.jpg)
3- Spacebox, Netherlands
(http://logan.com/chris/hello/150/1093/640/spacebox_modular_jan_05.jpg)
4- Spacebox, Netherlands
(http://moblog.co.uk/blogs/75/moblog_29f32e485312a.jpg)
5- Spacebox, Netherlands
(http://blog.cybershark.net/aline/wp-content/spacebox_2.jpg)

40
1 – 6 Rucksack House, Germany
(Asensio, N. 2005. Architettura del legno. Gribaudo: Savigliano.)

42
1 – World Getting Smaller
(http://www.opentopia.com/images/cams/world_sunlight_map_hemisphere.jpg)

44
1 – Motorcar Manufacturing Line
(
2 – Boeing Assembly Line
(http://www.holophane.com/hlp_library/case_histories/Images/Boeing1.jpg)
3 – Worker Assembling Ford Model-T
(http://people.hofstra.edu/geotrans/eng/ch1en/conc1en/img/assemblyft.jpg)
4*** - Still to be reverenced

45
1 – Housing Development Complex
(http://cache.eb.com/eb/image?id=79569&rendTypeId=4)
2 - Housing Development Complex in the Netherlands
(http://www.kilduffs.com/Homes_5_Construction_1914_rowhouses_BaltimoreMd_photo.jpg)

46
1 – Louis Vuitton Ad
(http://www.louisvuitton.com)

47 1 – Rubble after demolitions
(http://www.rosaliavic.org/images/Lube%20Building%20Rubble.jpg)
2 – Image in Soweto township
(Author, 2007)
3 – Recycling
(http://www.lancashire.gov.uk/environment/waste/reduction/Images/Recycle.jpg)

49 1 – Building system processes
(Amira Osman University of Pretoria)
2 – Manufacturing vision
(Csir presentation)

50 1 - Variety versus Adaptability

54 1 – Alternative location
(Author, 2007)

56-63 Images
(Author, 2007)

65 Image of door in bath
(http://accessremodelers.com/../images/tub2.jpg)
Residential unit pictures
(Author, 2007)

66 1 – Kitchen unit
(http.//www.pitakpongsanit.com/images-kitchen 2.jpg)
2 – Bathroom unit
(http.//www.modularspace.com/images/prefab.jpg)

67-68 Images
(Author, 2007)

69 1-2 Fridge in a drawer
(http.//www.treehugger.com/ Tough Love Norcool Fridge.jpg)
3 – LG combination microwave oven toaster unit
(http.//www. LG LTM9000ST.com / image.jpg)
4-5 Kitchen unit
(Author, 2007)

71 1 – Lego

(http://a.beining.com/blog/uploaded_images/LEGO_logo-710596.png)

72-81 Images
(Author, 2007)

82 1 – 7 C-frame loader
(P.J Visser, Mechanical engineer)

83 Liebherr Tower crane
(http.//www.liebherr.com/280 ech-h12.pdf)

84 1,3 windmill and towercrane
(Author,2007)
2 le Corbusier
(http.//www.sikhchic.com/cms/articles-portrait-318.jpg)
4 Tower cranes in Dubai
(http.//www.honoluluadvertiser.com)

85 1 Firstfloor plan
(Author, 2007)

86 1 Basement parking requirements
(Town planning scheme 2007, clause 28)

87 Construction planning
(G.J Visser Civil Engineer)

88 1 Steel coil
(http.//www.google.com/images/steel-coil.jpg)
2 Rockwool
(information and picture received from metallurgic engineering department
University of Pretoria)

89 Images
(http.//www.lexan.com)

90-92 Tables and images
(http.//www.

93-99 Images
(Author, 2007)

100-101 Photos
(Author, 2007)

Bibliography

Jodidio, P. 2006. Architecture now 4. Taschen: Cologne.

Asensio, N. 2005. Architettura del legno. Gribaudo: Savigliano.

Scheublin, F. & Pronk, A. 2006. Adaptables '06. Technical University of Eindhoven: Eindhoven. (p50 also refers to this book)

Bell, E. et al. 1999. Archigram, Princeton Architectural press: New York.

C.C.A.M. van den Thillart, 2001. Customised industrialization in the Residential sector. Sun; Delft.

Journal Article

Pernice, R. 2004. Metabolism reconsidered. Its role in the Architectural context of the world, JAABE 3(2): 357-363)

Dictionary

Hornby, A.S. 1974. Oxford advanced learner's dictionary of current English. Oxford university press: London.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Thanks to:

Jesus my lord
my parents
Jaco, Hardus, Rineke
Carel
Bryan