HOUSING:
A GREEN PROPRIETOR IN MARABASTAD.

An investigation into the connection between housing and open green space in the urban enviroment.

Submitted by: Jozanne Spies
Student number: 98028996
Mentor: Clinton Hindes
University of Pretoria
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CONTENTS

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JOZANNE SPIES MARCH(PROF) UNIVERSITY OF PRETORIA

CONTENTS

LIST OF FIGURES

LIST OF FIGURES:

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

Fig 1-1

1

PROLOGUE

Fig 1-2 Eastern Facade Elevation and section through site to illustrate the connection with the public garden. Pergola's and walkways greate intemediate spaces that define the transition from public space to private space.

PROLOGUE

A healthy growing society will always have a housing problem. If I ever met a society that claimed to have solved all its housing problems, I would look at it with great suspicion and conclude that it must be in a worrying state of decline. (Koeningsberger, O. 1993 A guided tour through third world housing Policies since the 1950's. p 42)

It is the aim of this project to confront the immense challenges of providing the city of Tshwane with appropriate affordable inner city housing. The city's urban living environments require a more innovative form of developmental planning in the contemporary epoch of radical urban transformation. In search of a fresh alternative, this dissertation is an exploration of the relevance of and benefits regarding the design connection between housing and productive green spaces within the urban fabric.

In an article by Professor Lindsay Bremner, published in the *Urban Age* conference paper, July 2006, she comments on Johannesburg that "On the one hand, its nascent public life is taking shape around new official narratives, modes of associational life, meanings of money and everyday travail. On the other hand, its public space is viewed and experienced by many as out of control and dangerous. It is bounded by fences, palisades, walls, gates, private security guards, cameras and other defensive security technologies. Public life withdraws into the interiority of the private realm (homes, malls, gated enclaves etc.) and urban space is abandoned to featurelessness and neglect. Building more robust intersections between the two becomes a priority." (Bremner, 2006: 9) Although she refers to Johannesburg, her comments in context are just as relevant to Tshwane.

The question becomes clear: "In what way can a housing model contribute to Public Space and Urban Life?"

Open Spaces in Tshwane are under-funded, neglected, inaccessible, and lacking the necessary infrastructure and amenities. Only 31% of parks are fully developed. The only worthwhile, well developed public spaces are located within the inner city and old established areas. Outside of this zone, public open space is overgrown, undeveloped or privatised into shopping malls and private residential estates.

Norberg-Schultz believes that "a building means the solution of social and cultural problems, rather than the erection of houses of a certain number of square meters. The education, therefore must develop the faculties of integration, analysis and experience, and must also furnish the general cultural background necessary to give the intentions an adequate depth "(Norberg-Schultz, 1968:218-219).

An important starting point for addressing the current urban crises is to understand the value and function of the existing energies within the City of Tshwane. On the one hand the crisis in the post- apartheid South African city must be acknowledged and confronted; on the other, it must be recast as an enabling moment – seeing it as an opportunity to align and coordinate energies to provide employment and housing to the people. There is a need for a renewed sphere and public debate where alternative ideas for specific urban areas can flourish.

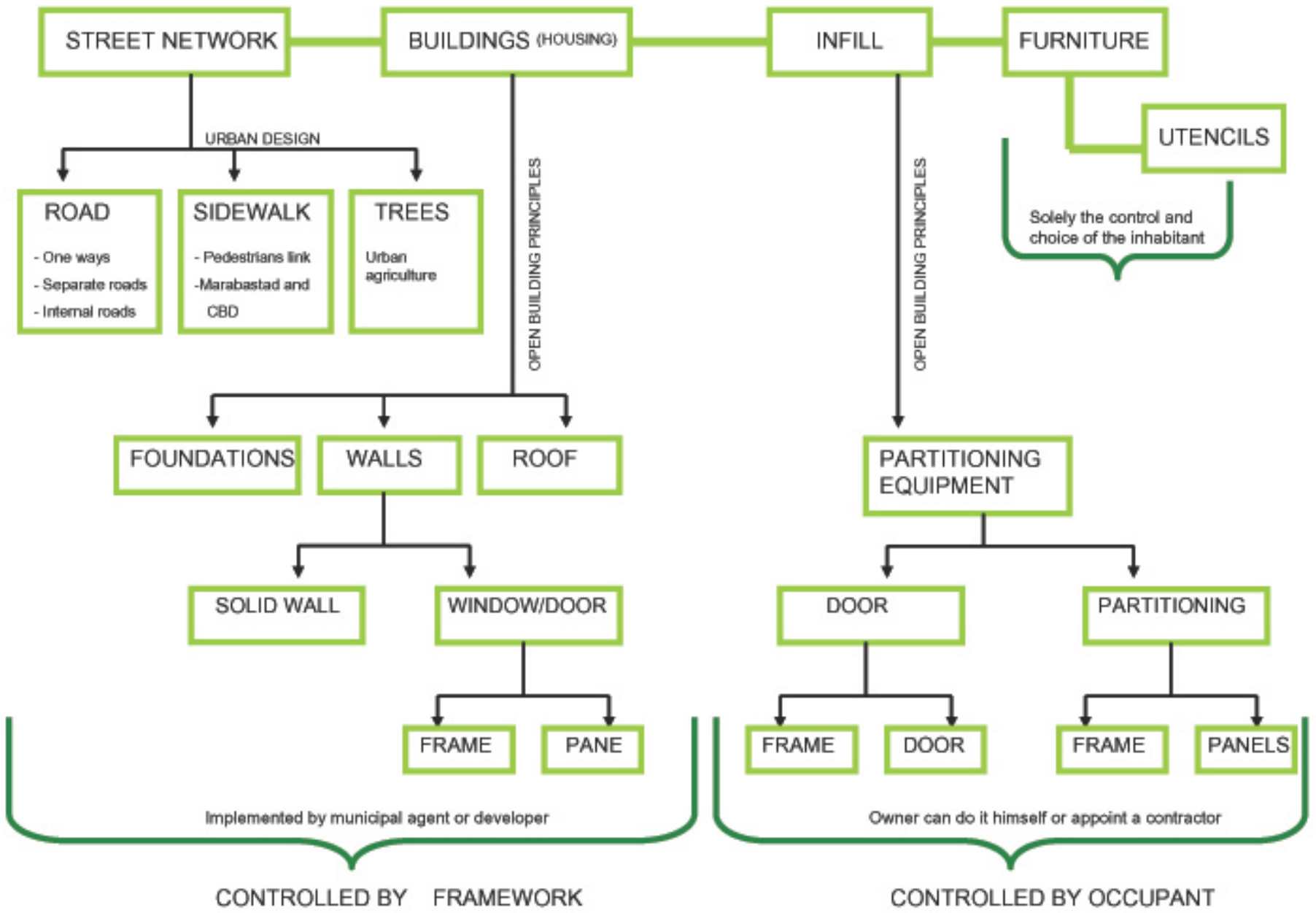


Fig 1-3 Diagram of levels defined for the initiation of the project.

From an urban design stance, the focus will fall on formulating an approach to the function of green space in the Marabastad milieu and context. The challenge lies in the integration between the private and semi-private housing spaces; and the public open park space. The present work is critical of the way open spaces are currently zoned and used within the city of Tshwane. In this project the writer intends to counter the need to gate these green parks, which often leads to them becoming neglected and dangerous places, like so many examples within the city of Tshwane and surrounding suburbs.

The intention of this project is to encourage the inhabitants of the housing scheme to become proprietors of the park; to accept stewardship and control, and to maintain the park with the possibility of reaping economic benefits. Defining a new small-scale form of urban agriculture, and finding mutualisms between productive urban green spaces and architecture, forms an important part of the investigation.

The issue of housing is further explored architecturally by adopting an “open-building” approach for the building design. This constitutes an experiment in the process of giving inhabitants a certain level of control to plan their internal space, by using new construction systems. The project will, in addition, allow the integration of less expensive social housing units within the overall project.

The theoretical approach relies on contemporary urban design and housing theory, and draws quite extensively on the principles of form and control in the built environment (Habrakens, *The Structure of the Ordinary*, 1998) and (Hamdi, Nabeel *Housing without houses – Participation, Flexibility, Enablement.* 1991). It has been remarked that:

Given our Apartheid history, one of the most challenging performance dimensions is integration. The integration of communities and activities to promote choice and flexibility through overlap as opposed to fragmentation and separation is viewed as a fundamental precondition for positive cities (Southworth 2003: *‘Urban design in action: the City of Cape Town’s Dignified Places Programme – implementation of new public spaces towards integration and urban regeneration in South Africa’*, Urban Design International 8.119).

The present project promotes integration on all levels, so that architecture can encourage and mobilise a community towards a better quality of life. In this way housing facilitates the inhabitants becoming green proprietors, which in turn provides an integrated live-and-work environment for the community.

Diagram of levels defined for the initiation of the project.

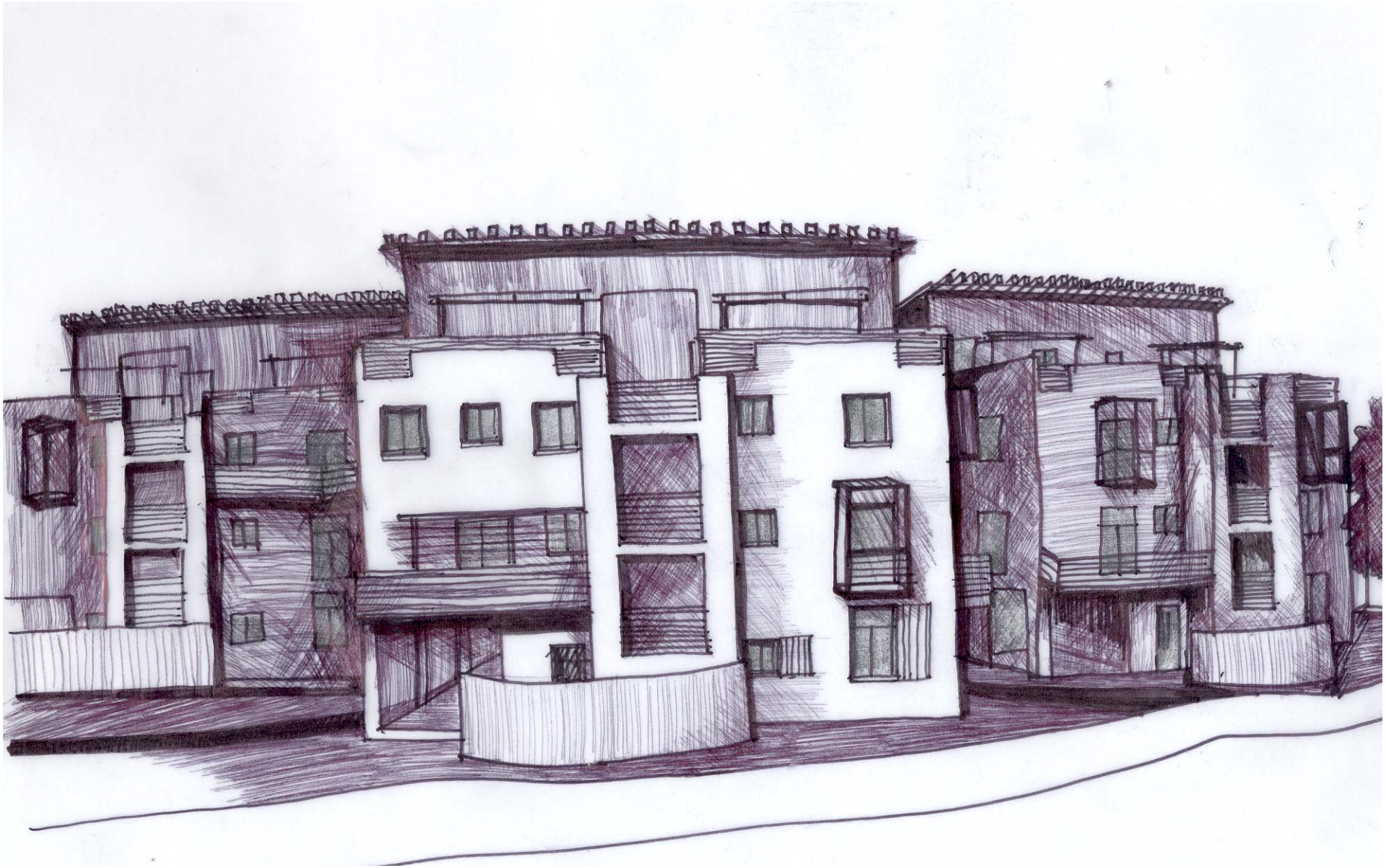


Fig 1-3 Eyes on the park. North eastern facade facing the Public park. The internal stairwell, balconies and roof garden gives the residents a open view over the park.

Fig 1-4 The entrance from the south west side. On arival the resident is confronted by the western facade with balocnies and shading devices. the innercourtyard becomes a protected enviroment for residents to meet and relax while children can safely play under the trees.

Fig 1-5 Residents have easy access to the park.

Fig 2-1

2

CONTEXT STUDY

Fig 2-2 CITY OF TSHWANE

Fig 2-4 IKOYI BAY LAGOS

Fig 2-3 COMMERCIAL ACTIVITY IN MARABASTAD

Fig 2-5 NIGERIAN MARKET

What does the term ‘African City’ entail?

2.1 VISION FOR THE CITY OF TSHWANE

In order to allow alternative ideas for specific urban areas in The City of Tshwane to flourish it is important to understand the value and function of the existing energies. The Tshwane metropolitan council acknowledges the crises in the post- apartheid South African city and is working to coordinate energies to provide a quality urban environment.

The *Inner City Redevelopment and Regeneration Strategy 2005* prepared by the Tshwane metropolitan council, states their City Vision for Tshwane as follows:

"To be an internationally acclaimed 'African City' that: empowers the community to prosper in a safe and healthy environment."
(Tshwane Metropolitan Council, 2005).

The vision of an internationally acclaimed "African City" is not one of more hulking government department and bank buildings in the central business district but rather wishes to encapsulate a city that serves and empowers ordinary people, a city that provides affordable accommodation, supports safe public transport for everyone, and offers well designed public spaces for healthy social interaction.

Tshwane is a city of potential, and the vision should harness this energy by absorbing opportunity seekers and structuring commitment to the city. Providing inclusive living environments is one element of the solution. This is not easy when so much energy is still dissipated by spatial, social and economic divisions. "In their green suburbs, some residents enjoy the highest level of service and public amenities; others dwell in dusty overcrowded, under serviced townships, where they struggle to reach jobs, education, shops and leisure on the side of incongruous 'buffer zones'." (Seedat, R and Gotz, G. 2006,pp.11).

Despite South Africa's position as Africa's industrial and financial powerhouse, with 47,4 million, (*Statistics South Africa*, Oct 2006) citizens, we look modest in comparison to Africa's real giant – Nigeria with 100 million people. For Tshwane to establish itself as an internationally acclaimed "African City", the city it would have to measure itself against is likely to be Lagos.

But what does the term "African City" entail? The apparent disorderliness manifesting itself, for example, in Marabastad, is one of the characteristics of the 'African City'. "There ordinary citizens are invariably obliged to make social 'infrastructures' out of daily improvisations and inscrutable social practices. In this vision of an acclaimed 'African City', city governance should enable, and work with this day to day ingenuity and generative interaction, through which residents continuously remake their futures." (Seedat, R, and Gotz, G. 2006) This ties in with the statement made earlier about the relevance of the theme of participatory design.

While the apartheid city remains, where wealth and poverty rub against each other in a harsh friction that invariably ignites crime and violence, and in spite of the city's deep and pervasive sense of incivility, over time, we must trust that the structures of exclusion are gradually dissolving. According to *The Inner City Redevelopment and Regeneration Strategy 2005*. (Tshwane metropolitan council, 2005) proposed redevelopment of the city is structured around an approach to direct growth to specific locations, to link these places of opportunities with each other by means of a metropolitan movement system and to other areas of opportunity within a wider geographical context, via development corridors. The aim is to support denser areas with linkages to an Open Space network.

2.2 EXISTING FRAMEWORKS FOR THE CITY OF TSHWANE

A development plan for the entire Tshwane area was approved by the Tshwane Council on 12 July 2002, as the *Tshwane 2020 Plan*. Eight strategic focus areas are identified; two of those are directly relevant to the development of the Inner City. The other six focus areas are relevant to the approach towards positioning and regenerating the Inner City. *The Inner City Redevelopment and Regeneration Strategy 2005,* and the *Tshwane Open Space Framework 2005 (TOSF),* compiled by the Tshwane City Council, were generated to give future direction to the redevelopment of the city.

Fig 2-6 Arial photograph of Tshwane CBD

2.2.1 THE INNER CITY REDEVELOPMENT AND REGENERATION STRATEGY 2005

The purpose of *The Inner City Redevelopment and Regeneration Strategy 2005*, is to lay the foundation for the repositioning and regeneration of the Tshwane Inner City. It recognises and addresses the need for urban housing developments and gives clear guidelines for areas earmarked for the development of housing. The following spatio-physical interventions in the strategy have specific relevance to this study:

2.2.1.1 RESIDENTIAL DEVELOPMENT:

The area to the west of the Tshwane CBD, in the vicinity of Marabastad, should be developed as a high intensity urban residential area, comprising different housing typologies and different price ranges, in order to ensure a socially integrated environment. The transformation of this area into a fine-grained urban residential area is appropriate from an historic point of view, as most of this area, specifically Marabastad, was traditionally a vibrant mixed-use residential area on the edge of the Inner City, until its people were removed.

2.2.1.2 TSHWANE PARK:

It is proposed to create a significant open space area on this land focused along the Steenhoven spruit, on a similar scale to Central Park in New York, or some of the other large internationally renowned parks. This park could comprise hard and soft open spaces, recreation and sport facilities, restaurants and other leisure activities. There are a number of depots in this area that need to be relocated to more appropriate locations, and these properties, together with portions of already vacant land in the area, could be used for the creation of such a park. This park is not only seen as a major intervention in the western part of the inner city, but also for the inner city's regeneration as a whole. It will drastically alter the character and perceptions associated with this part of the city, and allow for the creation of vibrant urban areas that are focused on people and their needs.

2.2.1.3 RESPONSE

The writer is in agreement with the area zoned for high density housing to serve the Tshwane CBD; but would like to challenge the relevance and feasibility of the proposed Tshwane park. The author is of the opinion that the city of Tshwane is not similar to New York and will never harbour the urban density that justifies a park on the scale of Central Park. Central park comprises of 8,43 hectares of manicured green space and according to the official central park website (www.centralpark.co.ny) it is used daily by approximately 9 000 people

Financial limitations will also, in all likelihood, prevent the development and maintenance of open spaces to international standards. The present researcher would like to suggest a new approach to sustainable productive open spaces.

Fig 2-7 Central park

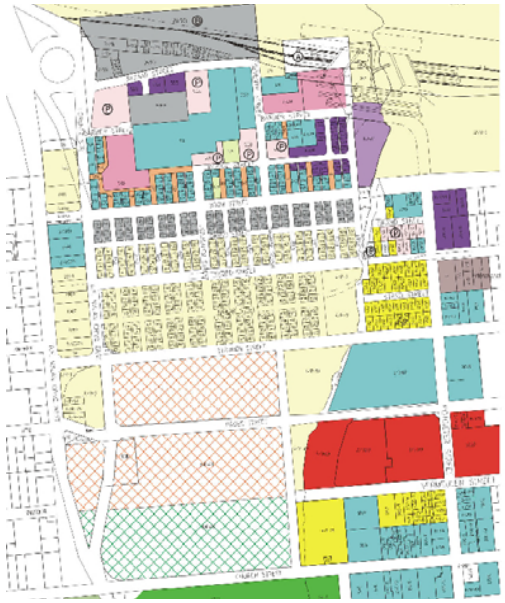


Fig 2-8 Existing zoning

Fig 2-9 Porposed zoning

Fig 2-10 Proposed green areas

Fig 2-11 Historical Features

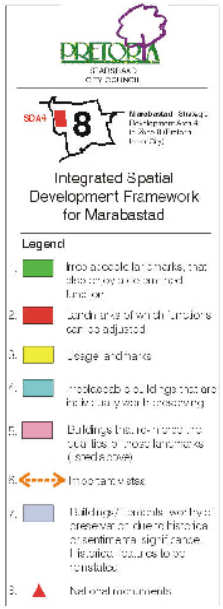


Fig 2-12 Marabastad connection to the inner city

2.2.2 INTEGRATED URBAN DESIGN FRAMEWORK FOR MARABASTAD

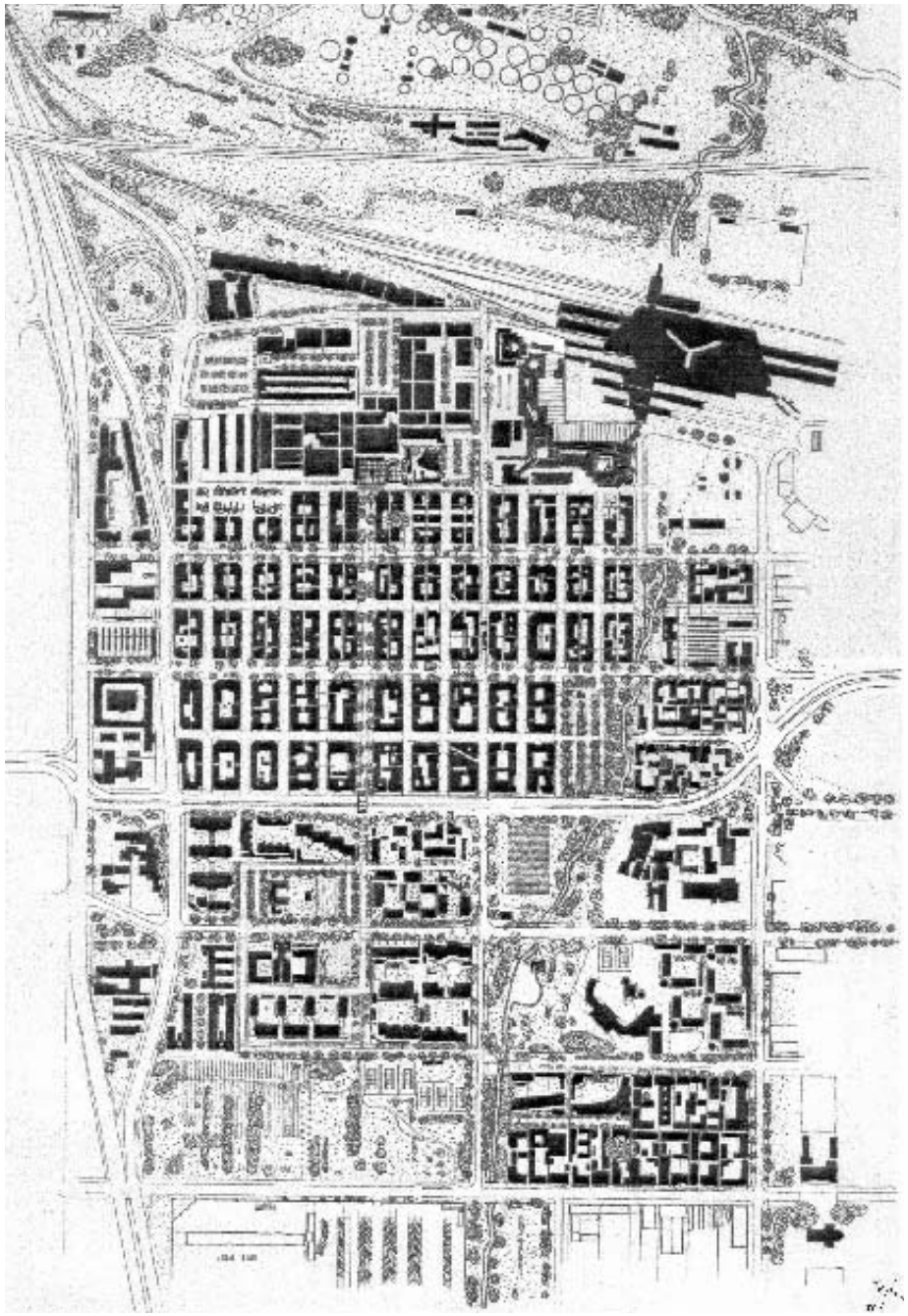


Fig 2-13 Proposed Framework

Further investigation of the Marabastad area led to the *Integrated urban design framework for Marabastad* devised in 1998 by Mayer, Pienaar, Tayob Partnership Architects & Urban Designers

2.2.2 INTEGRATED URBAN DESIGN FRAMEWORK FOR MARABASTAD : Mayer, Pienaar, Tayob Partnership Architects & Urban Designers

All physical aspects relating to the urban environment were considered and integrated into a unified proposal for the urban development plan for Marabastad. The development framework weaves all the diverse strands of a social, economic, legislative and physical environment into a single integrated urban tapestry. It proposes that the redevelopment of Marabastad could be a ground-breaking venture that would serve as a pilot project in which all parties involved in development can demonstrate the reality of a new South Africa. If implemented, the development framework demands extensive co-ordination and integration of activities. All levels of government, from local community structures to the relevant national government ministries, the Commission for the Restitution of Land Rights, the various local authorities in Pretoria, and private entrepreneurs from micro- to macro-level, have a role to play.

2.2.2.1 RESPONSE

This study accepts the general framework, but considers reworking the area zoned for open green space around the Steenhoven Spruit and areas allocated for high density housing developments. The aim is to synthesise the two disciplines in order to create diversity by interactive housing and community participation together with the maintenance of the green spaces. The author of this project strives to prove that green spaces must be beneficial to the community; not by merely being open park areas, but also serving as a benefit to the city by becoming productive community owned food gardens.

Moving away from the design strategy of the big housing block, the proposed design will accommodate architecture that encourages the use of the outside spaces as food gardens - thereby utilising the environment created by the buildings.

2.2.3 THE TSHWANE OPEN SPACE FRAMEWORK 2005

The Tshwane Open Space Framework (TOSF) establishes a thorough understanding concerning the intrinsic value of Open Space and develops a visionary roadmap towards the creation of an exceptional Open Space network for the city and its people. The TOSF consists of three volumes:

-- Volume 1: *The Analysis of the Current Open Space Situation within Tshwane*

-- Volume 2: *Open Space Vision, Policy and Plans*

-- Volume 3: *Implementation Strategies*

Concurrent with the three (3) volumes is a GIS Decision Support Tool.

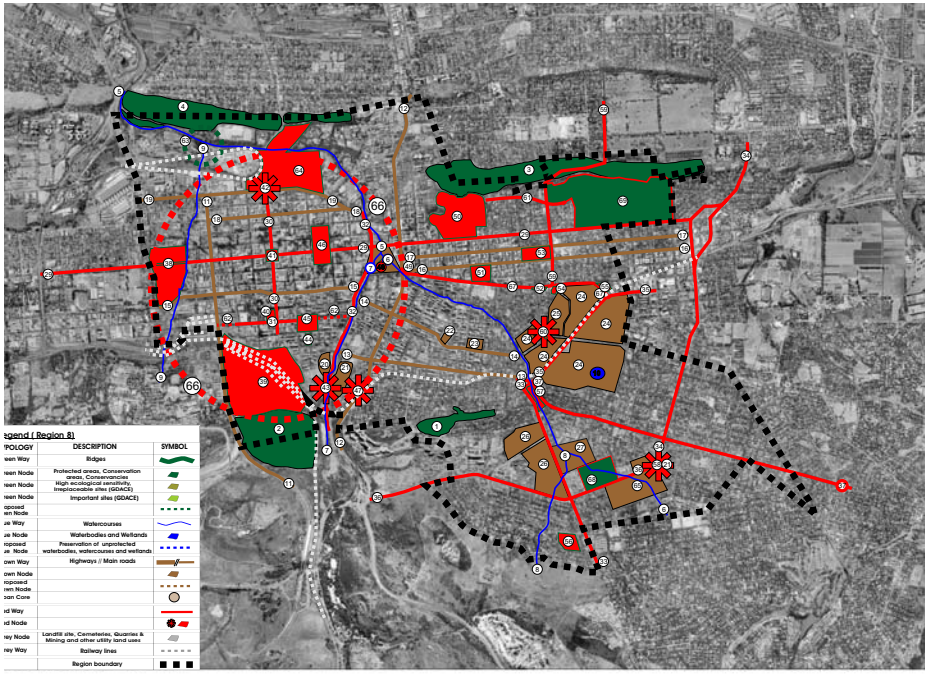


Fig 2-14 Region 8 of the Tswane Open Space Framework

Fig 2-15 Figure ground map with major roads and Historical grid.

Fig 2-16 Proposed Zoning Areas

2.3 SITE CHOICE.

From the frameworks, the relevance of working within Marabastad became clear. At the start of 2006 The Social Housing Focus Trust - SHIFT - Foundation announced that they would be using a site in Marabastad for their annual student housing competition. This provided confirmation of the decision to choose a site in the area.

After a visit to the Marabastad area the potential of the area surrounding the Steenhoven Spruit was noticed. The spruit is badly neglected and it is obvious that an intervention is needed before it will be able to function as a quality open space system. If the housing density is to be increased, an open green area of quality around the spruit would be of vital importance. It became clear that rejuvenation of the green space would have to form part of the regionalisation of the area.

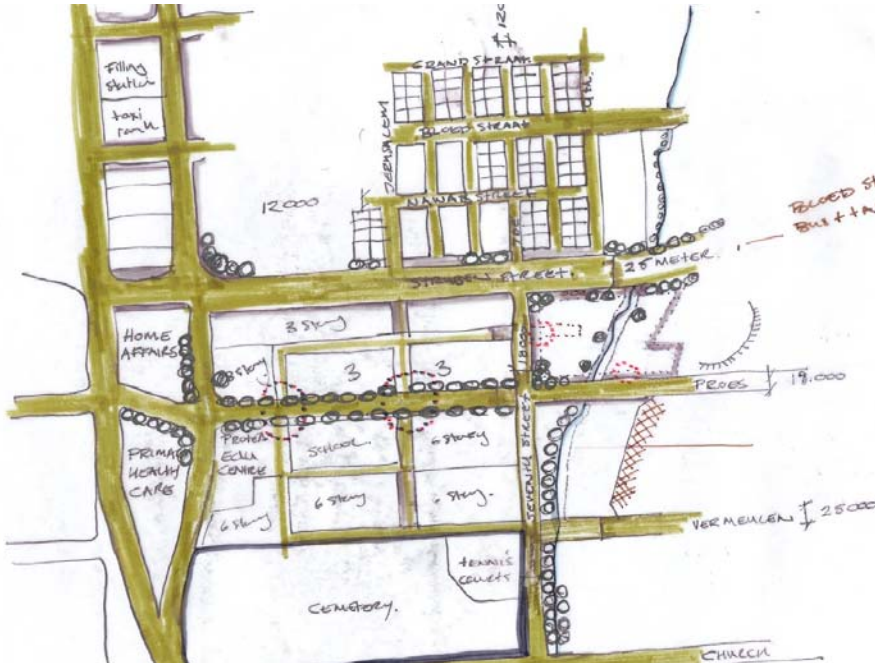
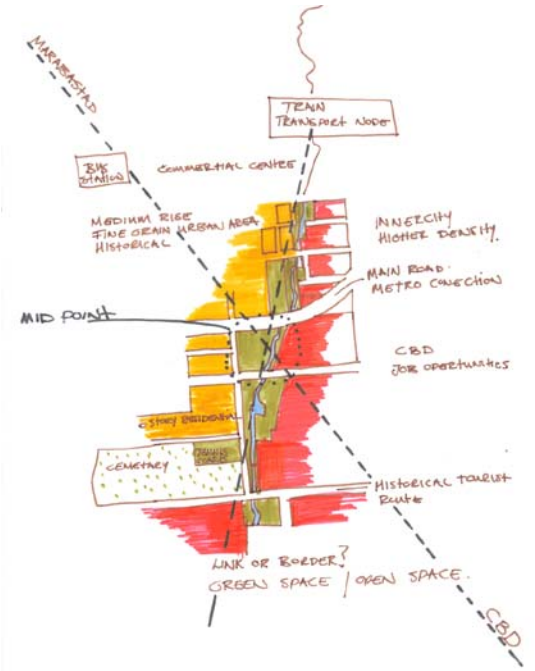


Fig 2-17 Sketch of Site and surrounding areas



LEGEND

1. Daspoort Ridge
2. Apies Rivier
3. Sewage works
4. Railway line
5. Station
6. Maraba Shopping Complex
7. Electrical substation
8. Shopping centre on shortcut to CBD
9. Bus Depot
10. Canalized Steenhoven Spruit
11. Vacant land
12. 30 story social housing block
13. Bus depot
14. Cemetary
15. Municipal workshops
16. Vacant (former municipal compounds)
17. Putco bus depot (demolished township)
18. DF Malan Drive traffic island with institutional buildings
19. Fresh produce market
20. DF Malan Roadway
21. Shopping centre

Proposed site

Fig 2-18 Map of focus area and surrounding features

2.3.1 FOCUS AREA

The City of Tshwane is the capital city and the centre of government of South Africa. With a population of approximately 2.3 million people, it is a cross-border municipality located in both the Gauteng and North-West provinces. Gauteng is considered the wealthiest and fastest growing economic region in Africa. The city is especially known for its high concentration of educational, research and foreign institutions. It is said that it boasts the highest per capita income per individual in South Africa.

The CBD of Pretoria is bounded by the Apies River in the east, the railway system of the south, Steenhoven Spruit in the west, and the valley of the Apies River in the north. Although a gradual move of the hard core towards the east is being experienced, Church Square, as the historical centre, has remained. Assuming a pedestrian movement velocity of 4 km/h, it takes approximately 40 minutes to cross the CBD. A proper street definition exists in the city centre due to the fact that the grid has been mostly filled. A development backlog in the north-west of the CBD has created left-over space, resulting in the perception that Marabastad has no spatial link with the city.

Fig 2-19 Arial Photograph of the Focus Area

2.4 MARABASTAD - HISTORY

Marabastad lies within a 10 minute walk from the historical core of Pretoria, yet perceptually it could have been on another planet. At present, Marabastad is in a condition of decay (referring to the built structure) and represents the major transport nodes for commuters from the townships. There is a huge influx of hawkers, selling their goods anywhere, and thereby causing resentment from the shop-owners who have to pay for rent and services. Squatters occupy vacant land that is under the threat of land restitution. Since the late 1980s, there have been several initiatives for redevelopment in the area, but as a result of the historical background nobody has dared to implement them. The area has had a vibrant past with members of different ethnic groups living peacefully together, despite the adverse living conditions resulting from the temporary status accorded by the Town Council. That pulsating and diverse life persisted until the Apartheid regime decided to remove the "*location*" during the 60's. Residents were removed, evicted, expropriated and/or compensated. People are still not legally allowed to reside in Marabastad. The operating businessmen, mostly Indians, receive their support from black commuters who use the bus, train and taxi stations.

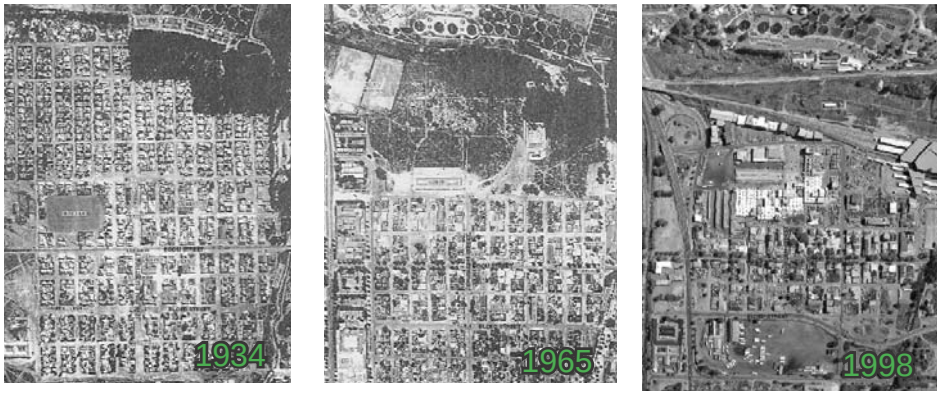
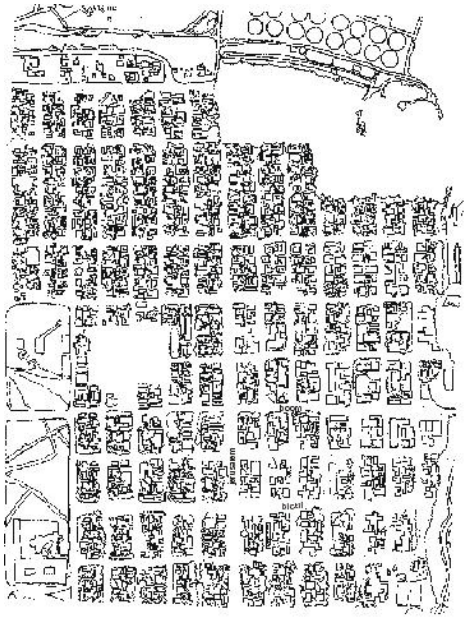
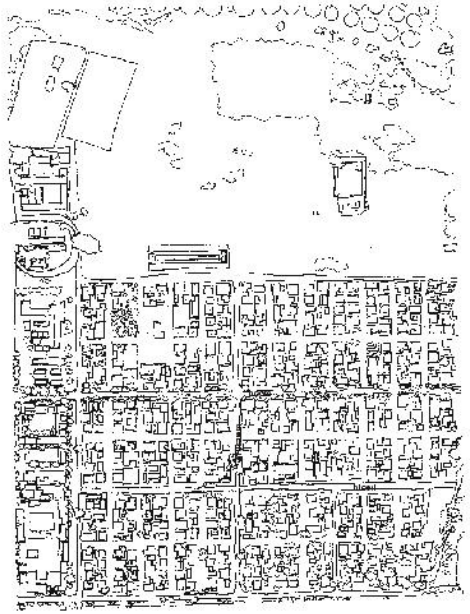


Fig 2-20 Arial Photograph of marabastad (Integrated urban design framework for Marabastad.1998)

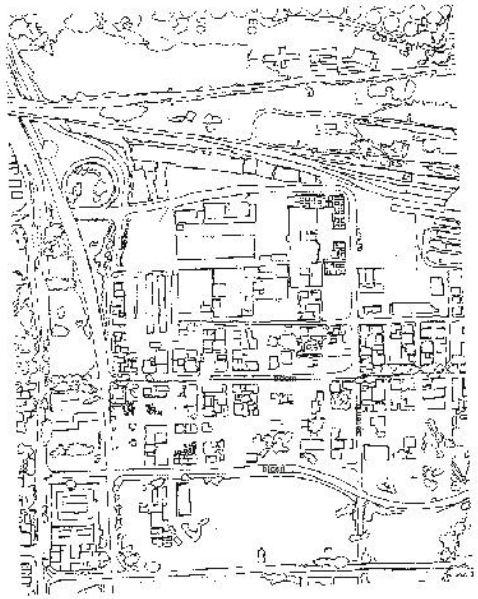
Fig 2-21 Arial Photo: The Asiatic bazaar in 1954



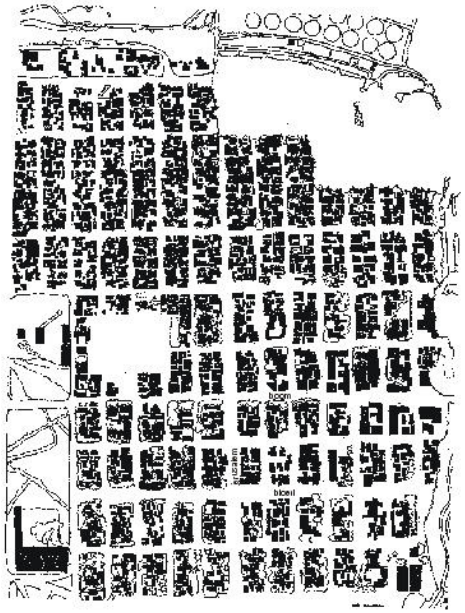
Marabastad - 1934



Marabastad - 1965



Marabastad - 1998



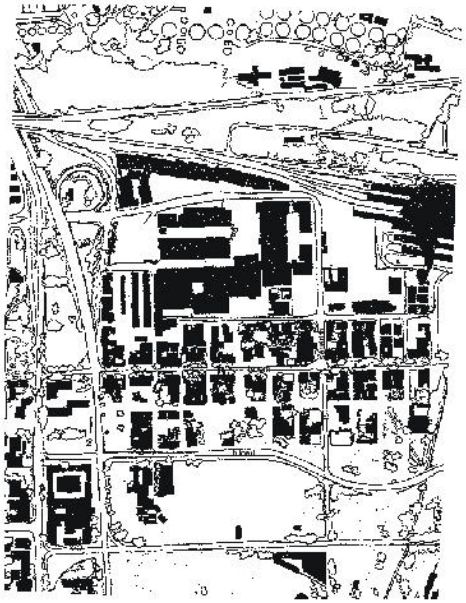


Fig 2-22 Comparitive densities - Urtban fabrick (Integrated urban design framework for Marabastad.1998)


Fig 2-23


Fig 2-24


Fig 2-25


Fig 2-26


Fig 2-27

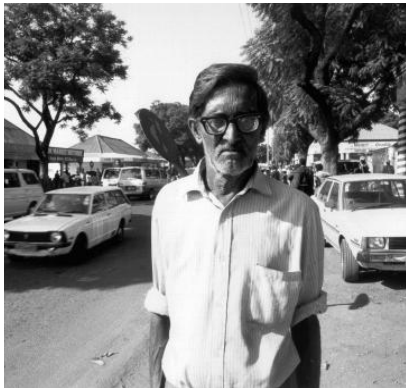


Fig 2-28

People of Marabastad

2.4.1 STRENGTHS

The following aspects of the area's strengths should be retained and/ or incorporated in the elaboration of design principles:

- Marabastad is a node for public transportation.
- The high flow of pedestrians creates a viable (in economic terms) and lively (in social terms) place.
- Marabastad is close to the city centre.
- The area is an activity centre in the western part of the city.
- The area has a unique character.
- The permeability of street-blocks facilitates access.
- A wide range of different shopping opportunities (from hawkers to the shopping centre) exists.
- In the area, there are already established groups of role players and stakeholders.
- Undeveloped land in and adjacent to Marabastad is available.
- Numerous symbolic and historical locations provide a strong historical background.
- Within the open space network, a fine grade of public, semi-public, and private domains exists.
- The street-section ratio is human-scaled.

2.4.2 WEAKNESSES

The following issues have been identified in Marabastad as regards the formulation of improvement strategies and actions:

- dirty and unhygienic conditions are prevalent in Marabastad;
- there is a lack of facilities and basic services to the public;
- the area is over-traded;
- there is a lack of job opportunities;
- Marabastad is isolated and not integrated within the CBD;
- the built structure is in a state of decay;
- the area is underdeveloped due to unsolved land claims, uncertainties, and neglect;
- the high traffic flow and travelling speed of motor-vehicles on main routes renders it unsafe for pedestrians and cyclists;
- the alteration of Boom Street into a one-way route;
- motor-vehicles and open fires generate air-pollution;
- Steenhoven Spruit and its surroundings are not celebrated;
- mega-structures and new developments do not relate to the historic architecture;
- almost no legal residents live in the area;
- the railway network is not connected between Belle Ombre and Pretoria Central stations; and
- the railway lines disconnect Marabastad from the Daspoort mountain range.

2.4.3 OPPORTUNITIES

The following key-points have been evolved during the analysis and observations in the study area, and they are regarded as essential opportunities to be picked up within this study:

- the area could attract other social groups and tourists;
- the residents living in the area facilitate a self-reliant community;
- the importance of public participation and the transfer of skills should be imbedded in the design;
- the integration of Marabastad with the CBD;
- the development of restricted industries in order to create jobs;
- the enhancement and improvement of the public transportation activities;
- the proximity to the resources of the Fresh Produce Market;
- the creation of a pedestrian and bicycle movement system, incorporating natural features throughout the city;
- the development of places for recreation along Steenhoven Spruit and along the Daspoort mountain range;
- the re-utilisation of symbolic locations;
- the investment of private businesses; and
- the development of an inner-city area in order to retain urban sprawl.

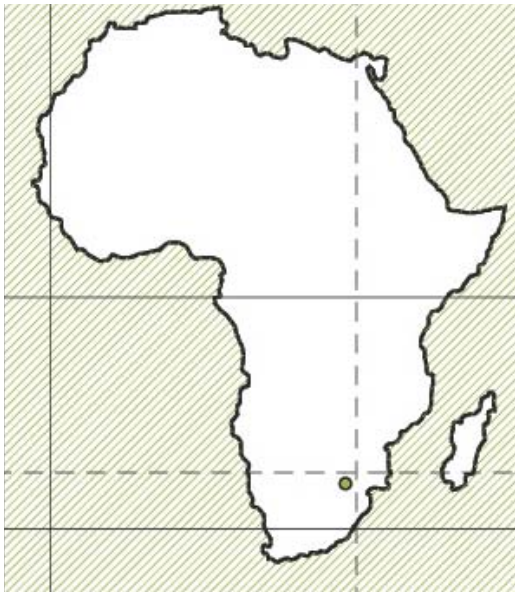


Fig 2-29 Locality map: Africa

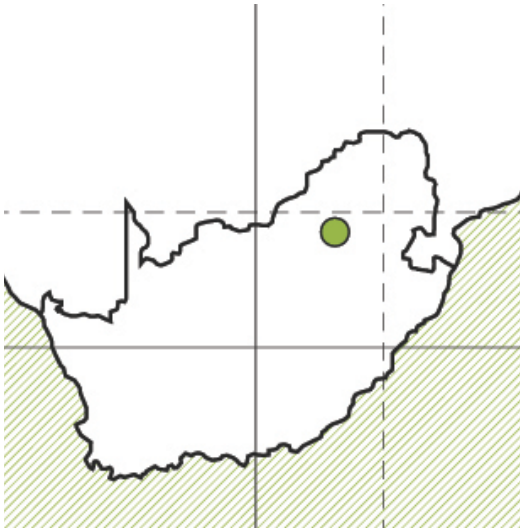


Fig 2-30 Locality map: South Africa

2.5 CLIMATE

LOCATION The City of Tshwane is located at longitude 25.5°E and latitude 26°S. The noon altitude of the sun is 88° in summer, 40° in winter, and the equinox is at 64°.

RAIN The average rainfall varies between 380mm and 700mm. The rainy season occurs from November to March, reaching its peak in January. 50 to 80 rainy days, some with hail, can be expected. Rain occurs mostly in the form of thunderstorms in the late afternoons.

TEMPERATURE The average maximum temperatures vary from 32°C in January to 22°C in July with extremes of 42°C and 31°C respectively. Average daily minimums range from 18°C in January to 4°C in July, with extremes of 8°C and -7°C respectively. Days are oppressive in summer, whereas winter nights can be particularly cold.

WINDS Winds are light to moderate and blow from a north-easterly direction, except during thunderstorms, early spring or weather changes, when they blow from the south.

SUNSHINE The duration of bright sunshine exceeds 80% of the possible maximum during winter and 60% of the possible maximum during summer.

HUMIDITY AND EVAPORATION. In Pretoria. vapour-pressure and temperature are more or less parallel. Evaporation is lowest during winter and highest during summer.

2.6 SITE LAYERS

Open building is, according to John Habraken, the term used to indicate a number of different but related ideas about the making of the environment. These include:

- social networks;
- street life;
- women and children;
- parking;
- features made by human beings;
- grids;
- urban fabric;
- public amenities;
- churches;
- sport and recreation;
- public transport.

Fig 2-31 Diagram indicating pedestrian walkway, possible cycle route and building edges

Fig 2-32 Existing parking

Fig 2-34 Social networks

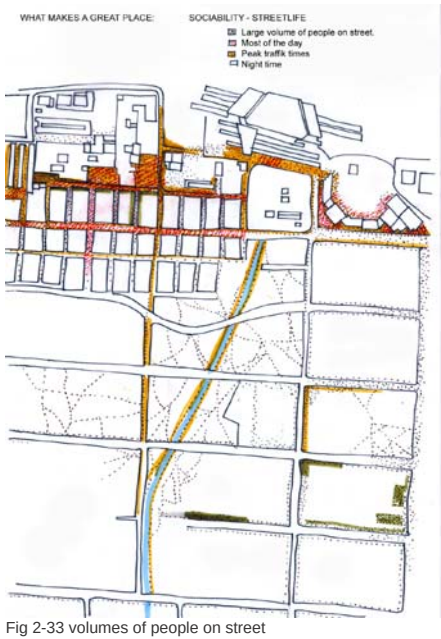


Fig 2-33 volumes of people on street

Fig 2-35 Streetlife and sociability

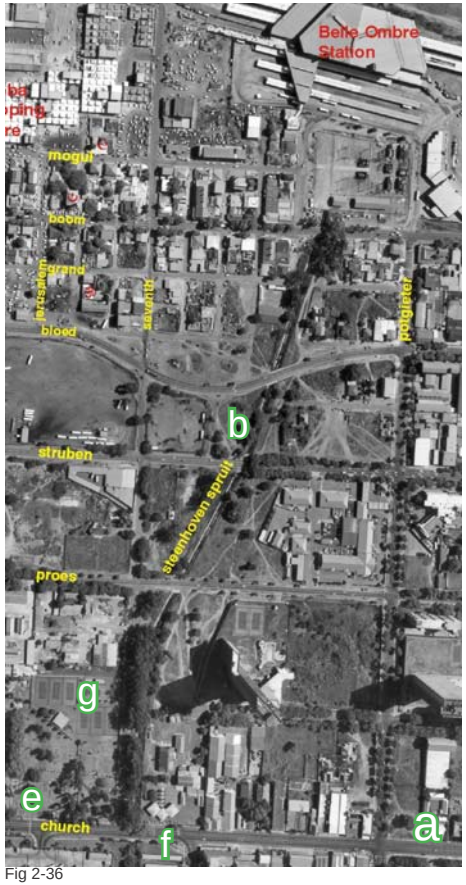


Fig 2-36

Fig 2-39

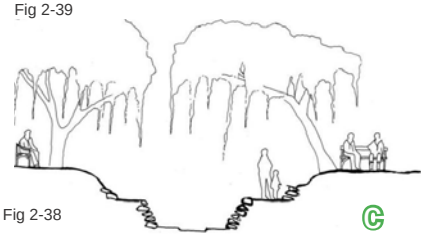


Fig 2-38

a - Arial Photo of the area
b - Steenhoven spruit
c - Section through spruit.
d - View of Daspoort Ridge from the site
e Diagram of ridges North
and south of the site
f - Heroes Acre Cemetary
g - Remainder of Princess Park
h,i and j - Bella Ombre Tennis club
k - Bird life

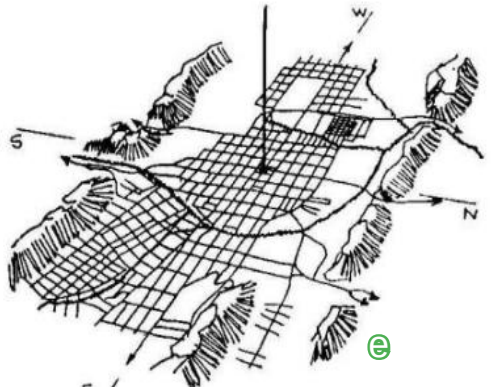


Fig 2-40

Fig 2-37

Fig 2-43

Fig 2-44

Fig 2-41

Fig 2-42

Fig 2-46

Fig 2-45

2.7 NATURAL FEATURES

The general study area, bordered by Seventh (Cowie) Street, Struben Street, D F Malan Drive East and the cemetery, is seen as a transition zone between the Tshwane CBD and Marabastad. It extends the housing belt of Schubart Park and Kruger Park into the Marabastad area, but not as such vast high-rise developments. High-density housing is envisaged, defined as above 60 units per hectare in the Pretoria Structure Plan, 1993.

Few developed open spaces and parks exist in the study area. The Heroes' Acre cemetery (a national monument) is of a solemn character that discourages recreational use. A mixture of large Jacarandas, Bluegums, Cypresses, Tipuanas, Karrees, Palms and Pines in the cemetery forms a visual and environmental asset to the area.

The banks of Steenhoven Spruit are not developed as a public open space, but the potential for a park development exists. Tipuana and large Bluegum trees line the watercourse, and other isolated Bluegums are scattered around Marabastad. Some Poplars have survived on the banks of the spruit around Church Street. Boom Street is lined with well-established Jacaranda trees, which make an important positive contribution to the character of the area. Proes Street is lined with a lane of well established Tipuana trees, which should be integrated into redevelopment proposals.

On the destruction of Princes Park, once located around Steenhoven Spruit to the south of Church Street, a promise was made for its nearby re-instatement north of Church Street, but to date, no improvements have been made. Formerly, sportsgrounds were located at the corner of Lorentz and Bazaar streets but have since been demolished. The Belle Ombre Tennis Club is located in Cowie Street, at the north-eastern corner of the cemetery.

After the flood in January 1996, which caused several animals at the Zoo to drown, a report (City Council of Pretoria, 1997) was compiled to indicate the weaknesses and lessons learnt in connection with the associated storm water management. Steenhoven Spruit exhibits badly damaged concrete linings along the course, due to the fact that once a section of concrete lining is washed away, further deterioration can rapidly follow. The city engineers have recently been testing arrangements other than concrete linings, namely the use of gabions and amorflex, which could bring the rivers a step closer to the once evident natural feature.

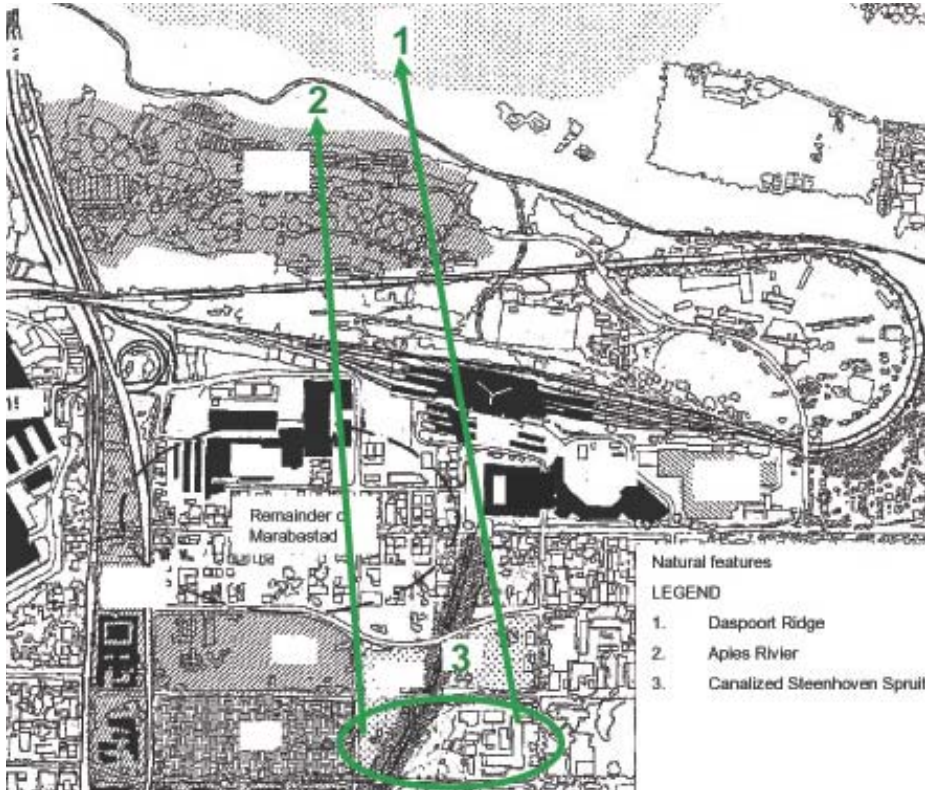


Fig 2-47 Map of natural features

Fig 2-48

Fig 2-49

Fig 2-50

Fig 2-51

Fig 2-52

Fig 2-53

Fig 2-54

a - Mariamen Temple
b - Islamic Mosque
c,d en e -Shops in Boom Street
f en g - Bella Ombre station
h,i en j - Hawker stalls, in vacinity of he bus depot

Fig 2-55

Fig 2-56

Fig 2-57

Fig 2-60

Fig 2-61

Fig 2-62

Fig 2-63

Fig 2-59

Fig 2-58

Fig 2-64

Fig 2-67

Fig 2-66

Fig 2-65

a - Arial Photo of the area
b - Malas Tyres and exhausts Retail Centre
c - Shopping centre
d - Kiddicol Creche and Nursery School
e - Schubert Park
f - Kruger Park
g - Ngelandla Zethu.Defeating poverty through
african skills centre.

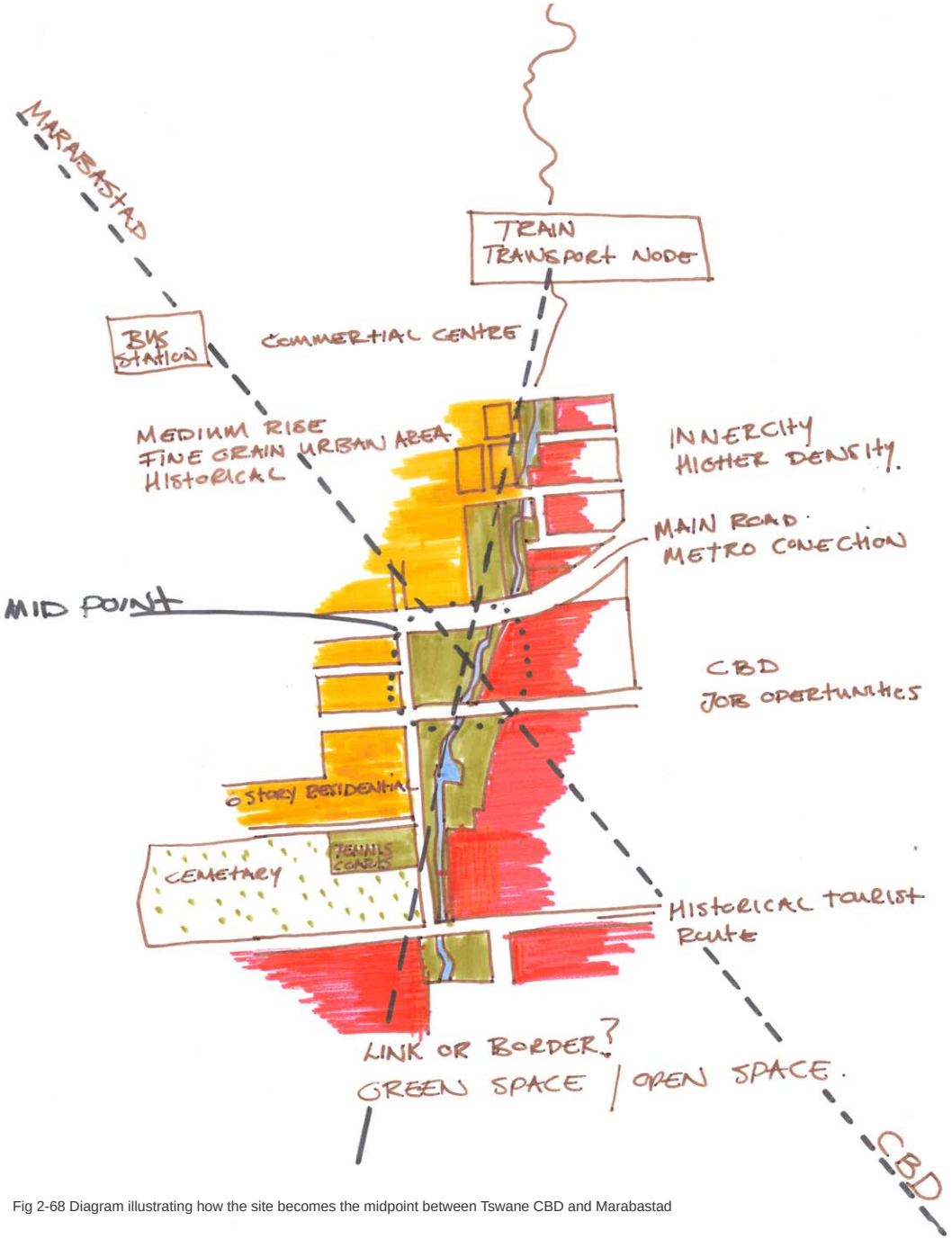


Fig 2-68 Diagram illustrating how the site becomes the midpoint between Tswane CBD and Marabastad

2.10 Conclusion

- The area to the west of the Tshwane CBD, in the vicinity of Marabastad, should be developed as a high intensity urban residential area.
- Marabastad should be redeveloped to the vibrant mixed-use residential area that it traditionally was.
- The potential for a park development exists along the banks of Steenhoven Spruit.
- The Site becomes an important midpoint in the link between Marabastad, Bella Ombre station and the Tshwane CBD

3 PRECEDENT STUDIES.

Firstly it is valuable to evaluate the current housing trends in south Africa. Much can be learned from their achievements and shortcomings. Secondly one has to look at successful new housing solutions from abroad. In Chile Alejandro Aravena is promoting a new social housing model and other stimulation comes from Japan and Scotland. Examples of housing that becomes integrate with the environment we find inspiration from Herzog & de Meuron's 491 Rue De Suisse Housing in Paris France. Finally we look at projects with a positive social outcome because the design becomes integrated with the landscape.

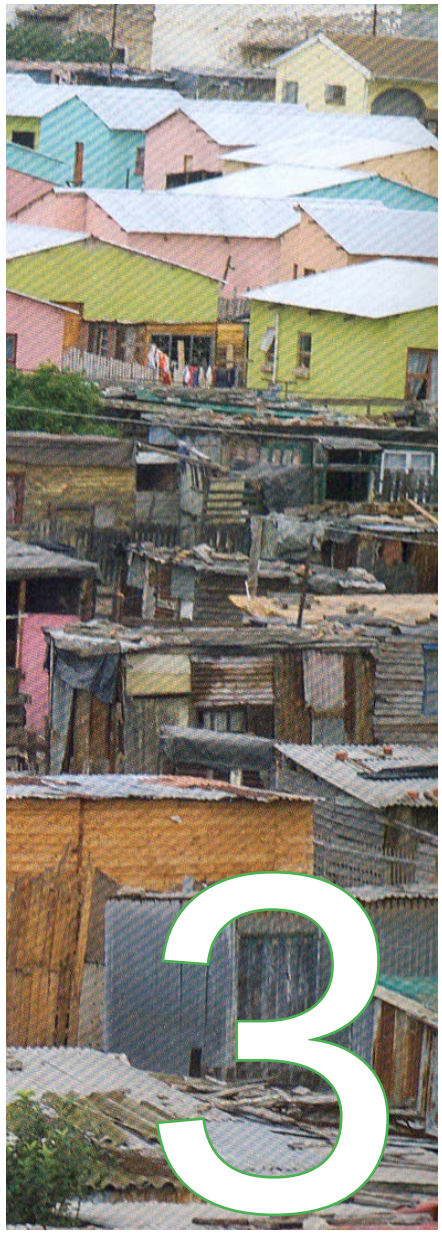


Fig 3-1 A typical South African housing scenario

Fig 3-2 Royal Maitland Streetscape

Fig 3-4 Royal Maitland playground square

Fig 3-3 Royal Maitland access to housing.

Fig 3-5 Royal Maitland covered entrances.

3.1 HOUSING: CURRENT TRENDS IN SOUTH AFRICA

3.1.1 ROYAL MAITLAND. Cape Town.

Architect : JSA Architects and Urban designers

Client : C.

Design - 2003 | **Implementation** - 2005.

- The project tries to create a setting for social interaction.
- The houses are arranged along a series of street spaces and relate to the street space wither via stoeps or a gallery.
- The development intended to tie in with the existing urban fabric in order to enhance the surveillance and sociability, but the development is gated by security fence and security guards, cutting it off from the existing street.
- Big part of the landscape is covered in tarmac because the city planning department demands high parking ratios.

Fig 3-6 Royal Maitland elevation.

3.1.2 BRICKFIELDS HOUSING PROJECT . Newtown ,Johannesburg

Architect : Savage + Dodd Architects cc, Fee&Challis Architecture, Makhene& associates, ASA Architectural Designs

Client : Johannesburg Housing Company, JHC.

Design - 2003 | **Implementation** - 2005.

Number of dwellings:	53 7
Access to public transport:	Close to Johannesburg CBD In the vicinity of the Metro Mall transport interchange.
Parking:	Parking in the courtyard.
Tenure:	Market related rental average R2000 per month. 20% Social housing. Small amount of retail.
Building types:	Walk up perimeter blocks
Building heights:	4 Storey walkup blocks and 9 to 10 storey tower blocks on the corners
Unit Types:	72 % are 2 bedroom units. 1 bedroom and 3 bedroom units
Circulation:	Communal semi closed sky lobbies
Communal Open space:	Collective drying yards, crèche homework room and outdoor play spaces for children.
Private/semi-private Open space:	Main courtyard space used predominantly for parking, is harsh and un shaded

Fig 3-7 Site Plan Brickfields

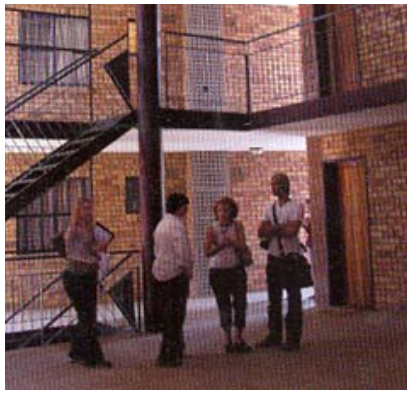


Fig 3-8 Brickfields internal stairwell

Fig 3-9 Brickfields balconies

Fig 3-10 Brickfields – Four and nine storey buildings in

Fig 3-11 Social spaces within precinct C

Fig 3-12 Arial photograph

Fig 3-13 Quinta Monroy Inquique

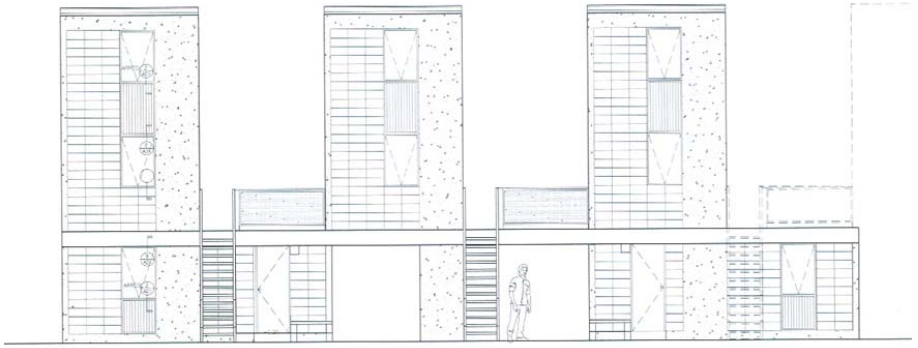


Fig 3-14 Front Elevation

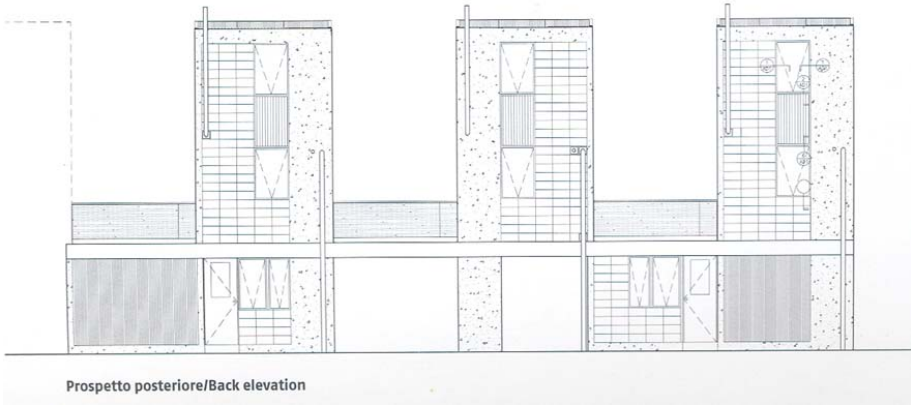


Fig 3-15 Back elevation

3.2 HOUSING – NEW SOLUTION GLOBALLY

3.2.1 BUILDING INNOVATIVE SOCIAL HOUSING. Quinta Monroy Iquique. Chile

Architect: Alejandro Aravena

Design - 2003 | **Implementation** – 2004

Number of dwellings: 93 family units
Site area: 3500 m²,
Density: 35 m² per family
Access to public transport: The property in is very centrally located in within the Iquique's network of opportunities. Making it close to amenities and lessening the dependability on public transport.
Parking: Parking space available next to each unit
Tenure: Individual ownership
Building types: House units are grouped together in a row
Building heights: 3
Circulation: Each unity has an internal and external staircase that can easily be altered according to the needs of the inhabitants.
Communal Open space: The project favors the use of communal space - designed for extended families living in collective spaces, urban centrality, and the creation of public spaces.
Private/semi-private Open space: Collective spaces work well at the scale of about twenty families.

Fig 3-16 Quinta Monroy Inquique

Fig 3-17 Quinta Monroy Inquique

Fig 3-18 Quinta Monroy Inquique

- Making it feasible to pay for a site that is better located within the network of opportunities in the city.
- Developing an architectural type that is strategically positioned to create quality urban space.
- That architectural type also allows the easy and safe building of expansions.
- The design of every house allows 60% of each unit's volume to eventually be self-built.
- The elemental project builds an open and varied scenario that lets life unfold in all its freedom and potential, and which resists the foresighted controls of architecture.

' Given budgets 'lower than low,' he says, the design had to focus on 'the most fundamental things that housing requires'—privacy, collective space, and community." (Rosenberg,J. 2004)

Fig 3-19 Slither Housing

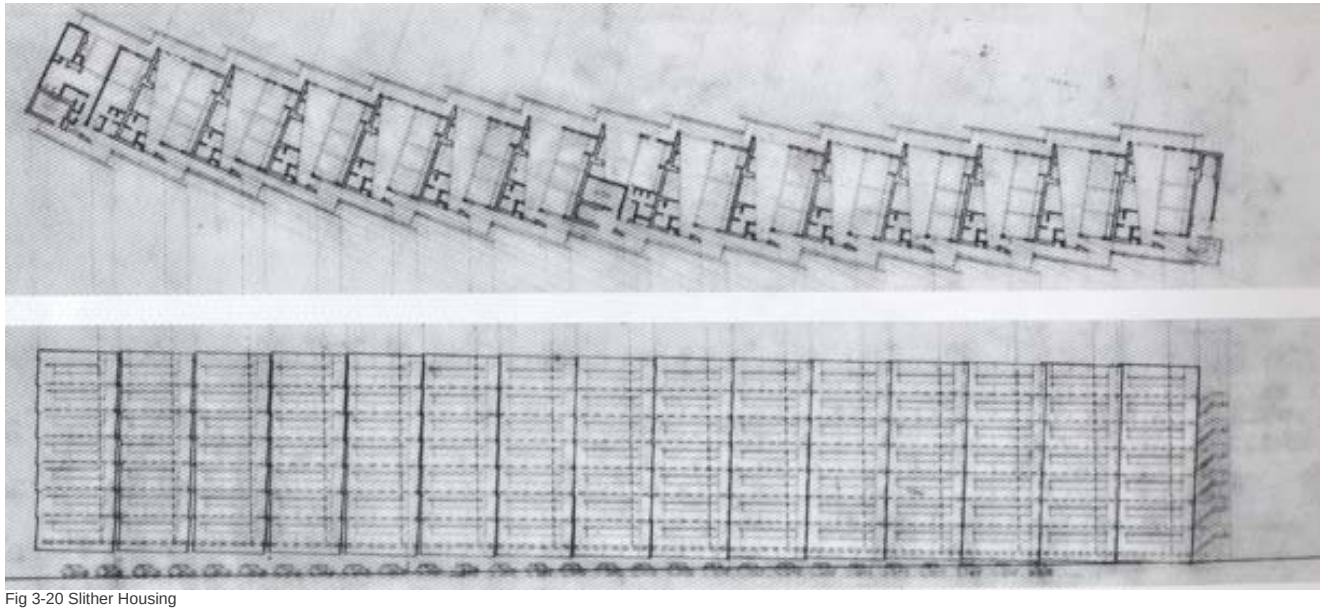


Fig 3-20 Slither Housing

'SLITHER HOUSING' Gifu, Japan, 2000

Architect: Diller +Scofidio

Number of dwellings: approximately 105 housing units
Site area: not available
Parking: On the ground floor
Tenure: Individual ownership
Building heights: 7 story's
Unit Types: Apartments
Circulation: 3 Open Staircases, one on each end of the building and one in the middle.
Communal Open space: **S**hallow curve convex to the street
Private/semi-private Shallow curve concave to the communal courtyard. The long elevations are faced with diaphanous overlapping 'scales' of perforated metal screening, with modulate the degree of privacy at the circulation corridor and balconies. On the north side each front door is metaphorically a private façade because each unit slips 1.4metres in plan from the next unit. The slippage also produces a private balcony on the south side.
Open space: Colorfully designed Landscape in the courtyard.

- They exhibit that the economic constrains that unavailingly produce the repetition of standardization in social housing, need not lead to erasure of the individual dwelling.
- The staggered segment of the façade creates a curve that allows each apartment to have its own balcony and makes the inhabitants experience of their home more personal.
- The housing units have interior sliding walls of extruded polycarbonate panels which can be altered by tenants according to their needs. Each apartment's design can be customized according to needs by altering the panels.

Fig 3-21 Slither Housing

Fig 3-22 walkway - Slither Housing

Fig 3-23 movable partitioning Slither Housing


Fig 3-24

330 GRAHAM SQAURE HOUSING. Glasgow, Scotland UK.

Architect: Page & Park Architects

Implementation 1999

Number of dwellings: **A**pproximately 105 housing units
Site area: 2,600m²
Parking: Road side
Tenure: Traditional tenement plan
Building heights: 4 story's
Building types: Apartment buildings.
Unit Types: Apartments based on a traditional tenement plan. 3 rows with 8 flats per row.
Circulation: Slot revealed by each fin houses the entrances to the apartments. Staircase at the back covered by expressed screens
Private/semi-private Bedrooms at the rear and living spaces and kitchens to the front.

- The design was expected to have an degree of flamboyancy to liven up the old neighborhood.
- The "matador' houses as they have become known is composed of seven curved, fin shaped walls which are expressed on the front elevation representing the cloak of a matador.


Fig 3-25


Fig 3-26


Fig 3-27

491 RUE DE SUISSE HOUSING Paris France.

Architect: Herzog & de Meuron

Implementation: 2000

Number of dwellings:	approximately 105 housing units
Site area:	8,419m²
Building heights:	3 story's
Building types:	Apartment buildings.
Unit Types:	Apartments vary in size, layout and placement, but are all designed to take advantage of sunlight and views of the gardens.
Circulation:	access via a central staircase
Communal Open space:	each apartment overlooks the garden
Private/semi-private:	Horizontal strategy so that as many apartments as possible have a direct connection to the gardens.

The building has a grass roof and the concrete walls have been covered with a grid of ropes to provide a climbing base for plants while the balcony façade features curved profile roller shutter doors

Fig 3-28

Fig 3-29

Fig 3-30

Fig 3-31

Fig 3-32

Fig 3-33 Royal Maitland covered entrances.

Fig 3-34 Covered entrances.

Fig 3-35 Slither housing - parking tucked underneath the building

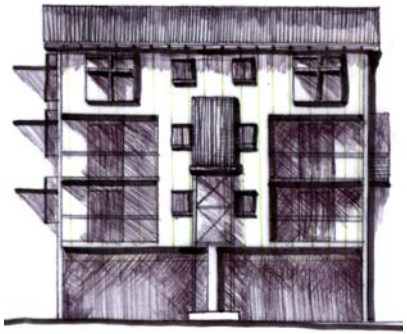


Fig 3-36 Parking underneath

Fig 3-37 Vegetation on facade

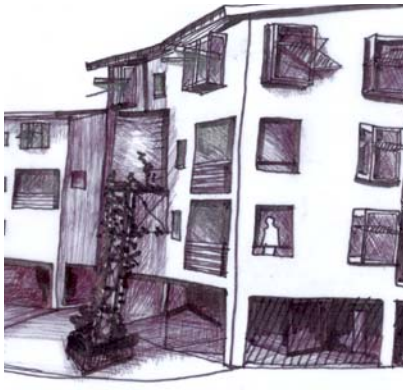


Fig 3-38 Climbers on the facade

RESPONSE TO HOUSING PRECEDENT STUDIES.

- Royal Maitland offer good legibility – it should be easy to find your way around the development. The way people access their homes are important and people also like to be able to identify their home easily .
- Brickfields represent a harmonious whole by repeating characteristically elements, but the mass of the development make it difficult to identify individual units.
- Aravena proves that it is feasible to give the residents control over their own infill. It will be incorporated in the design of the units.
- Slither housing is an example of how the façade influence the courtyard space.
- The Slither Housing project successfully tucks the parking underneath the building and opens up the courtyard space.
- The relevance of creating an interactive relationship between the building façade and the street is evident in Graham Square housing.
- The use of shading devices and plants on the facade is inspired by 491 Rue De Suisse Housing.

3.3 OPENSPACES IN THE CITY OF TSWANE.

6.3.1 ARADIA – WALKER SPRUIT

Walker spruit is n prominent river system in Tshwane. In Arcadia it meanders through the high rise residential suburb. A walkway runs along the treelined concrete canal and occasionally a pedestrian bridge allows the public to cross the spruit. Children's splay areas appear infrequently. The green link should serve the residents as a relief from their small flats. However the steep concrete channel makes it difficult to interact with the river and it can be dangerous for children to play around the steep edges.

6.3.2 MAGNOLIA DEELL – WALKER SPRUIT

The same river system approximately 1km upstream from Arcadia . Here the spruit is not canalized but designed to be a calm and natural looking feature. The stream is dammed at the northwest end of the park lifting the water level. This allow interaction with th spruit, people can touch and smell the water. Magnolia Dell is beautifully maintained by the municipality and there is always people relaxing in the park.

6.3.3 NIEUW MUCKELNEUK TRIM PARK

At the confluence of the Walker- and Muckelneuk spruit the river is allowed to roughly follow its natural course. The dams and banks are sustained by gabions and timber pedestrian bridges allows safe crossing over the stream.

6.3.4 BROOKLYN COMPLEX

The Commertial office development included a scheme to upgrade the spruit. A shallow system of concrete weirs replaced the canal. Each weir dams the water and allows the water to spill over at scattered overflows. A safe walkway runs along the section

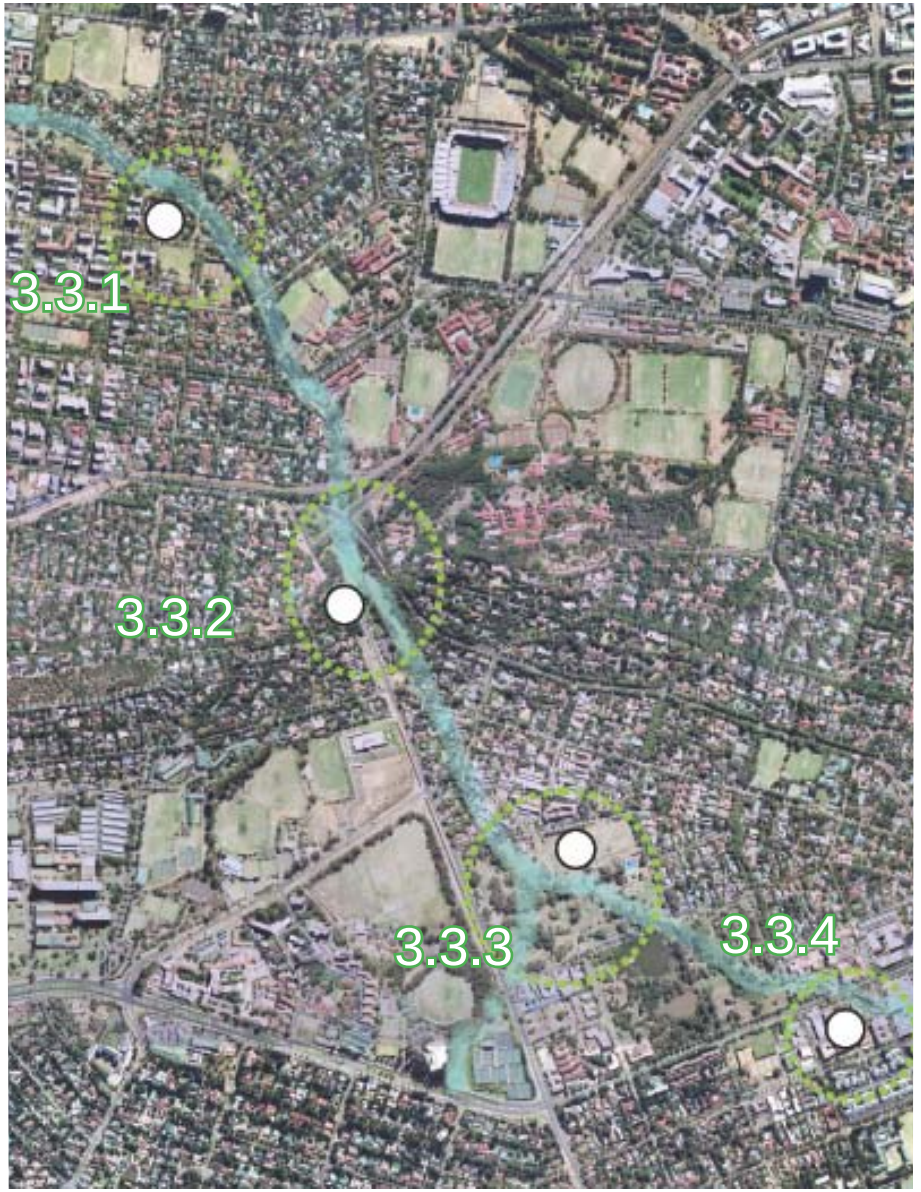


Fig 3-39 Arial photograph. Walker spruit.

3.3.1 ARCADIA - WALKER SPRUIT

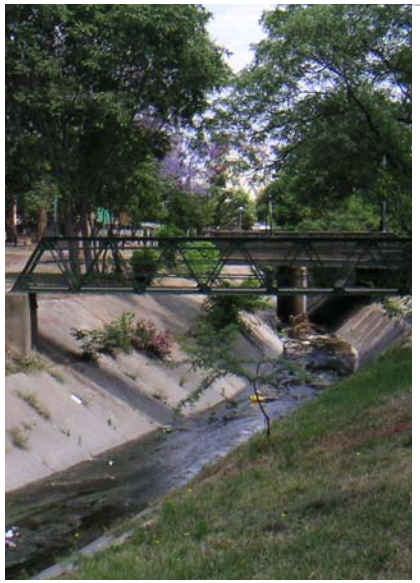


Fig 3-40 Canalized Spruit

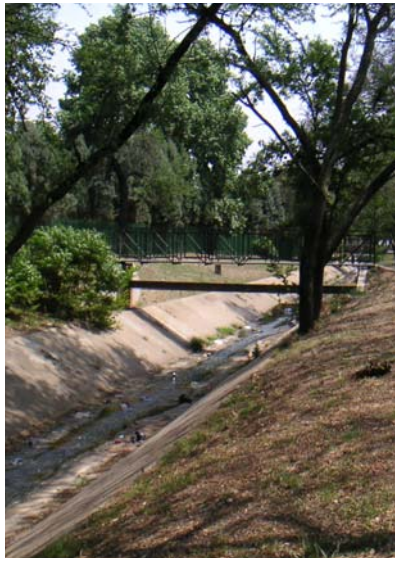


Fig 3-41 Occasional pedestrian bridge

Fig 3-42 park space next to the spruit

3.3.2 MAGNOLIA DELL - WALKER SPRUIT

Fig 3-42 Magnolia Dell information board

Fig 3-43 Pedestrian bridge and coffee shop

Fig 3-44 Playground

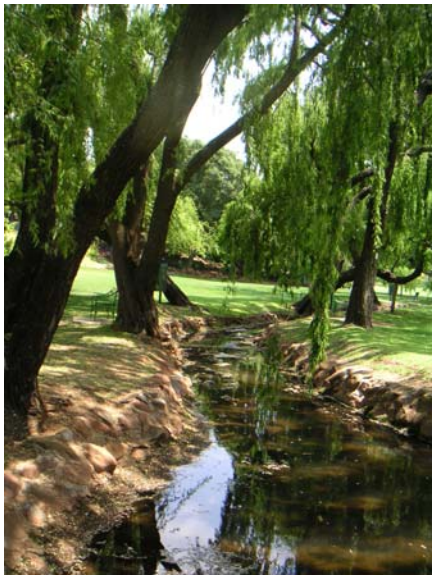


Fig 3-45 Natural looking spruit

Fig 3-46 Transition from canal to natural spruit.

33.3 NIEUW MUCKELNEUM TRIM PARK
CONFLUENCE OF THE WALKER AND MUCKELNEUK SPRUIT

Fig 3-47 Walkway

Fig 3-48 Gabion weirs

Fig 3-49 Timber pedestrian bridge

Fig 3-50 Walkway

Fig 3-51 Walkway

Fig 3-52 Dam

3.3.4 BROOKLYN BUSINESS COMPLEX - WALKER SPRUIT

Fig 3-53 Concrete weir and reabilitation of the river bank

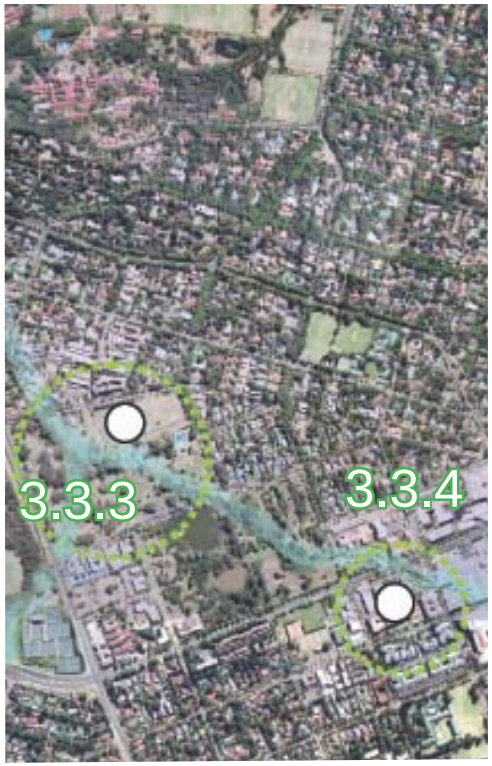


Fig 3-54 Pedestrian walkway

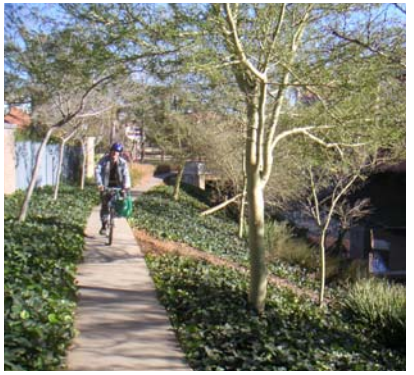


Fig 3-55 Pedestrian walkway

Fig.3-56 Well maintained development

PRECEDENT STUDIES


Fig 3-57


Fig 3-58


Fig 3-59

CALTHORPE PROJECT

Fig 3-55 Information bord keeps the cpmunity informed

Fig 3-56 Colourfull seating. Children gets the oppertunity to get involved with the decortion and maintanence of their park

Fig 3-57 Well designed walkways and timber screens


Fig 3-60

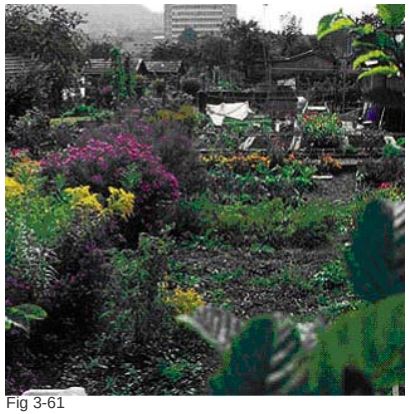


Fig 3-61

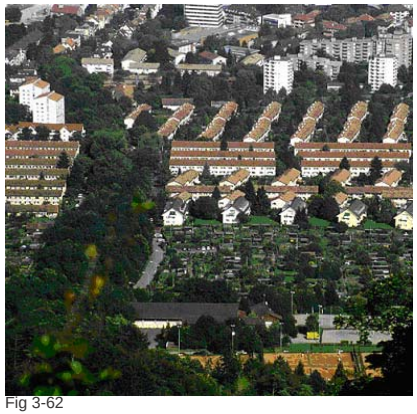


Fig 3-62

SELF-SUFFICIENCYPLAN FOR HÖJE TAASTRUP

Fig 3-58 Urban Agriculture: Allotment gardens next to a large shopping complex

Fig 3-59 Colourfull food garden with a high rise building in the background

Fig 3-60 Arial view over the town shows how the housing connects with the urban agriculture.


Fig 3-63


Fig 3-64


Fig 3-65

SAN ANTONIO'S RIVER WALK.

Fig 3-61 pedestrian walk way and bridge

Fig 3-62 Plants from a low barrier between pedestrians and the river

Fig 3-63 Development along the river.

3.4 INSPIRING OPEN SPACES

CALTHORPE PROJECT Borough of Camden

Opened in September 1984

Beautiful garden in London. where many office workers and residents come to eat their lunch.

In order to fulfill in a number of different needs the garden consist of different sections:

- Quiet section with water features and seating
- A glasshouse and other areas for germinating seeds and tending seedlings
- Tennis courts for recreation
- Area expressly for those under 5 years old and additional playground for older children
- A special path running through part of the garden which is a tile mosaic created by the local community to celebrate life

Fig 3-66

SELF-SUFFICIENCY PLAN FOR HÖJE TAASTRUP – Copenhagen.

The Environment and Energy Centre in Höje Taastrup a town to the west of Copenhagen in Denmark with a population of 45,000, has developed a realistic plan to make the region self-sufficient in food.

Fig 3-67

REHABILITATION OF URBAN WATER WAYS

URBAN VILLAGE CREEK. Zurich

The developer exhumed a concrete drain that was once fed into the sewer system in order for the water to be cleaned up before entering the Lake of Zurich and refurbished the creek that now percolates through the area and assists in giving the development a more natural quality

Fig 3-68

SAN ANTONIO'S RIVER WALK. San Antonio U.S.A

This San Antonio's River Walk project, is a central city revitalization scheme and a successful early attempt in the U.S.A. at bringing some ecological thinking and greater human sensitivity into urban planning and management practices, as they relate to natural features.

Fig 3-69

Fig 3-70

3.5 HOUSING IN SYNERGY WITH OPEN SPACE

3.5.1 HOUSING AT PARC DE BERCY Paris France.

Master planner: Jean-Pierre Buffi.

Architects: Frank Hammoutene, Fernando Montes, Yves Lion & Chaix Morel, Dusapin & Leclercq, Christian de Portzamparc, Henri Ciriani

Developer: City of Paris/ SEMAEST

Completed: circa 1995

Number of dwellings: approximately 514

Site area: 1.5ha(including the park)

Density: approximately 330dph excluding the park(building area only) and 34dph including the park.

Access to public transport: Bercy is well served by a network of transport links – busses, metro, and trains.

Access to amenities: Shopping parade on Rue de Pommard and shops, schools and offices integrated into the scheme.

Parking: Underground parking – 1.5 spaces per dwelling on average.

Tenure: Mix of tenures comprising private housing, Prix Locatif Aide(social housing with help towards rent payment) and Prix Locatif Intermediare(social housing – medium price range).

Uses: Residential, shops schools nursery, crèches and offices.

Building types: Apartment buildings.

Building heights: Eight or nine story's.

Unit Types: Apartments (some duplexes)

Circulation: Apartments are grouped around circulation cores (no deck access).

Disabled access : Lifts to all units.

Communal Open space: All buildings have access to courtyards within the blocks for communal use.

Private/semi-private Open space: All units overlooking the park, and most of the others, have balconies.

"The master plan provides synthesis between the housing and all elements of the public realm, a factor of the way the various architects' development parcels were assigned. The housing display both coherence and variety through its collection of architects." (Lewis.S.2005)

SUMMERY OF SUCCESSES.

- The housing in the new district of Bercy has a symbiotic relationship with the new park.
- The required high density also gave the park a necessary strong and defining edge.
- The concentration of the buildings against the park gives the scheme impact, status and most importantly, quality amenity space for all residents and visitors to the area.
- The master plan allowed for a mix of private and social housing without any distinction being made between the various buildings.
- A key success is the fine balance that was struck between transparency and definition of the housing blocks. Although they function very well as perimeter block making clear distinctions between public and private space they remain visually permeable, maintaining links with the park.

Fig 3-71

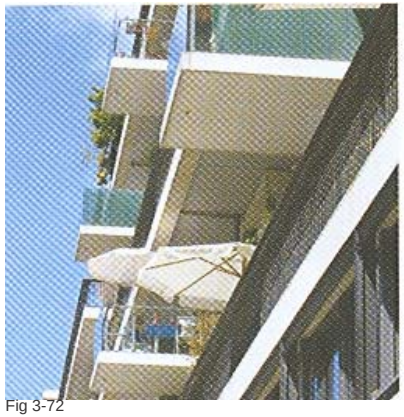
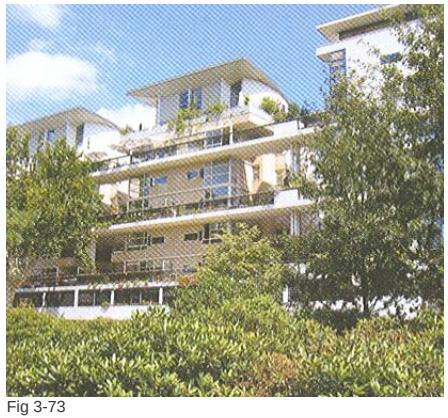


Fig 3-72



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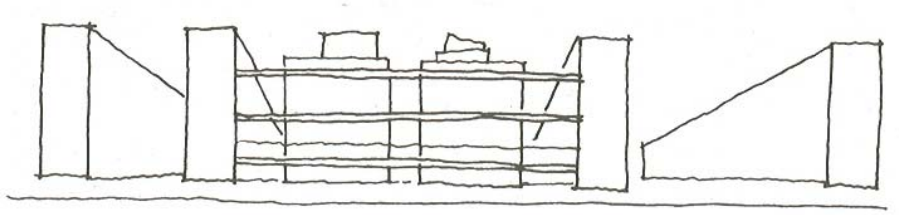


Fig 3-74

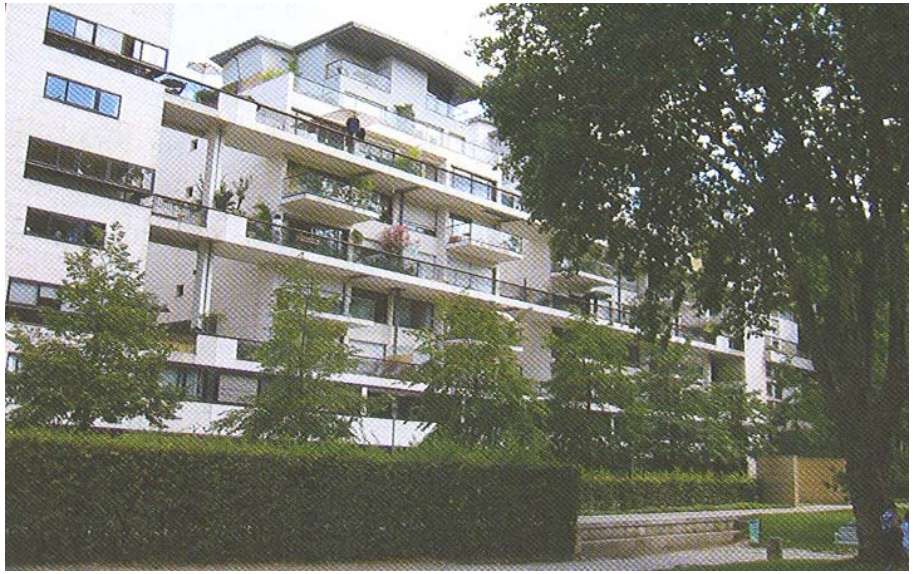


Fig 3-75

Fig 3-76 5900 CORVIALE URBAN ALOTMENTS

5900 CORVIALE URBAN ALLOTMENTS

Architect: nicole_fvr/2A+P aerchitettura

Completed: 2004-2005

Park Area;	17.000 m²
Cultivation area:	4.300 m²

The external strip of urban allotments that runs parallel to the building was reinterpreted as a suburban park. Aiming to understand the potential for triggering relational mechanisms between residents and the landscape. 1km of land self=managed by “pioneers of urban cultivation. By involving the community and giving it a leading role in managing green areas and their productive capacity Nicole_fvr/2A+P transformed the allotments into a shared park, a free appropriation of the natural space as an ecological system. (MOLINARI,L 2005)

Fig 3-77

Fig 3-78

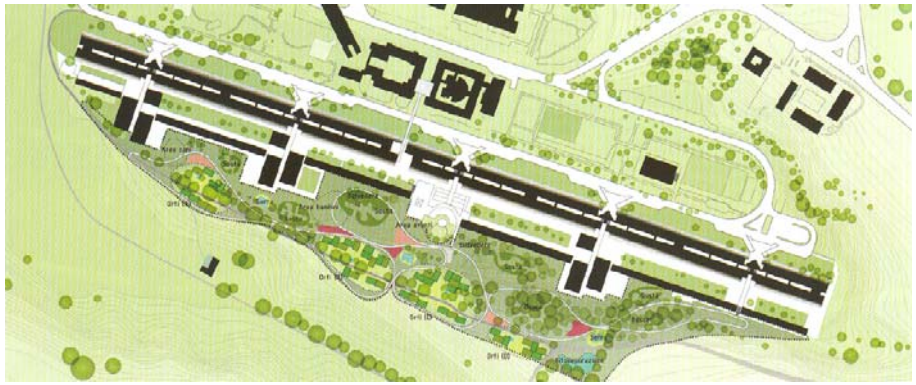


Fig 3-79

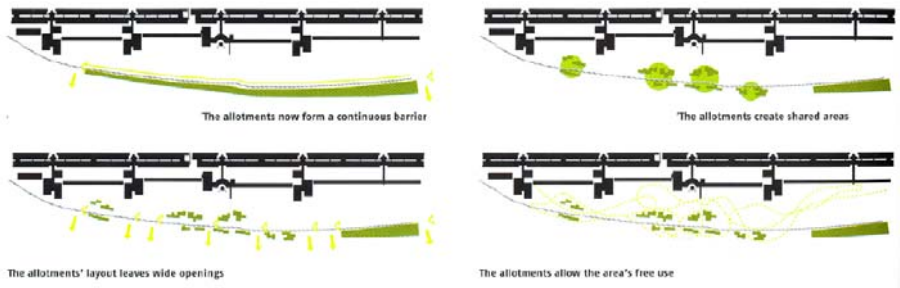


Fig 3-80

Fig 3-81 Canalized spruit

Fig 3-82 More natural looking spruit

RESPONSE TO OPENSPACE PRECEDENT STUDIES.

- The analysis of walker spruit clearly shows the impact that the canal has on the perception of the water course and the surrounding open space.
- Nieuw Muckelneuk trim park is an example of how gabions and pedestrian walkways and bridges can contribute to the integration of the spruit and the park.
- Community involvement is very important in the success of the development such as the Calthorp project.
- In Housing at Park De Bercy the initial framework determined the success- It is therefore important to set clear principles and outlines for the project to guarantee that it is in balance with the development with the park,
- Gardens can help to solve social problems surrounding housing developments.

Fig 3-83 Timper bridge

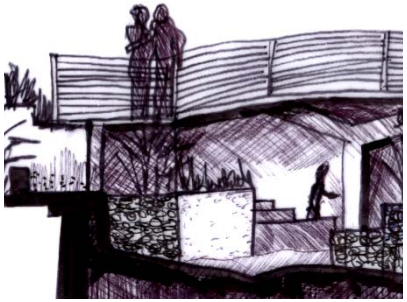


Fig 3-84 Bridge

Fig 3-85 Working in the garden

Fig 3-86 5900 CORVIALE URBAN ALOTMENTS

Fig 3-87 Park De Bercy - Green balconies

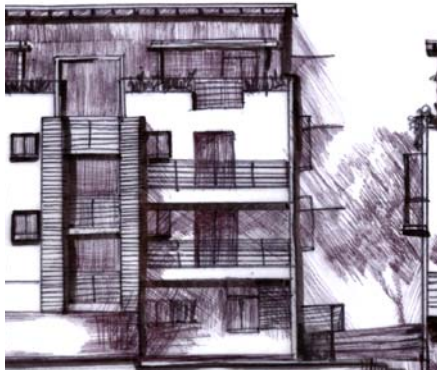


Fig 3-88 Green balconies

Fig 4-1

4

THEORY TO INFROM THE DESIGN

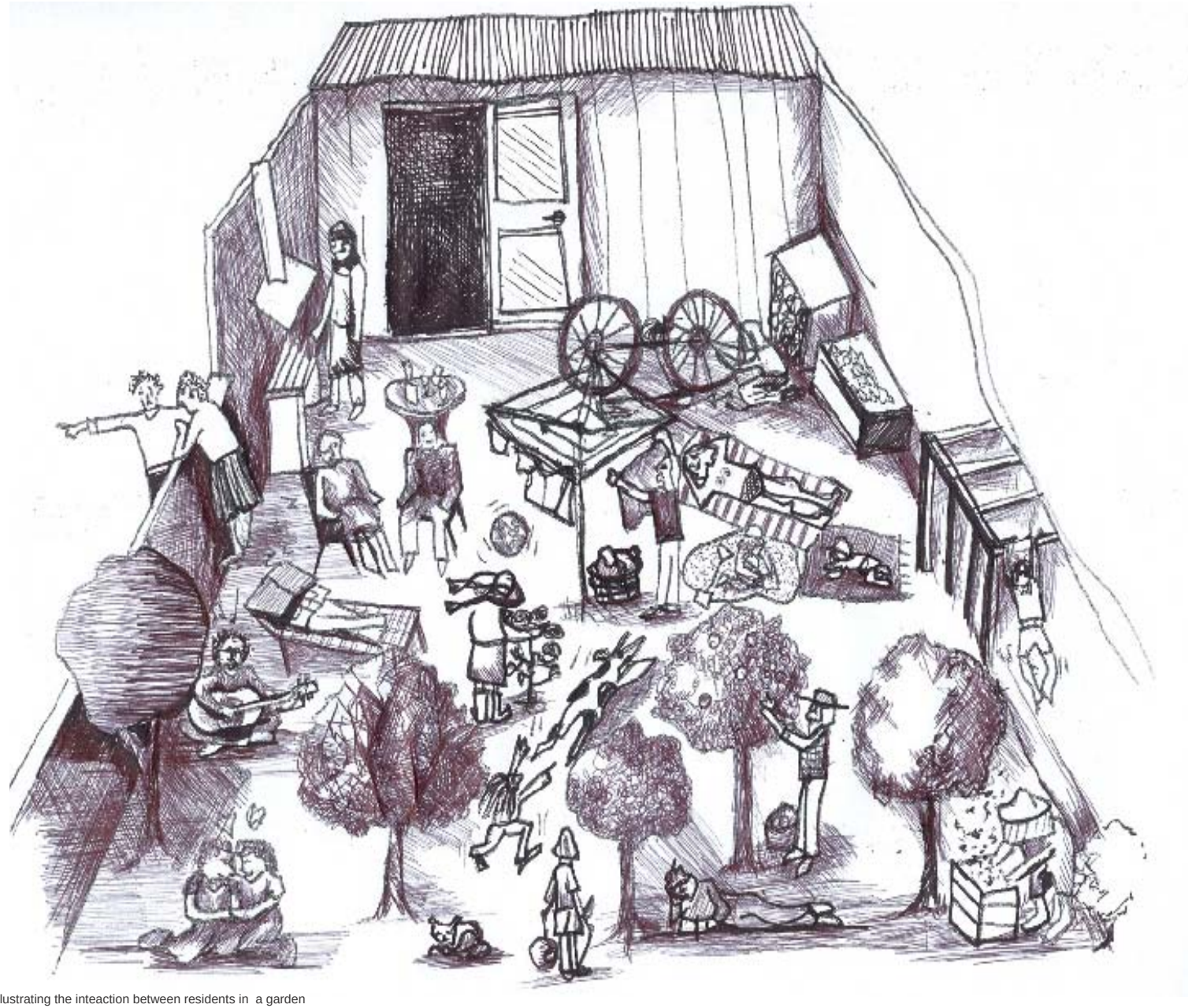


Fig 4-2 Sketch illustrating the inteaction between residents in a garden

4 THEORIES TO INFORM THE DESIGN

4.1THE NEED FOR OPEN SPACE

Open space is an essential element within our cities, for ecological, socio-economic and place-making purposes. Firstly, open space allows ecological systems, without which human beings cannot survive, to function: it purifies water, harbours plant and animal life, cleans the air and regulates the urban climate. This life-giving function of open spaces is the one most threatened by urban development and fragmentation.

Furthermore, human needs with regard to open spaces are fundamental. We need open spaces for our spiritual enhancement and for recreation. We need open space to conserve our natural environment so that we can enjoy clean streams, abundant wildlife, and witness the unfolding spectacle of nature. We need open space to give coherent structure and beauty to our cities as well as to guide metropolitan growth. Open spaces are important for our individual and collective well-being.

There is no doubt that open spaces play a critical role in our quality of life. Nature reserves, parks, sports fields, street trees, and even small spaces such as traffic circles define the areas in which we live. These resources, however, are not just “niceties” but play a central role in the health and economic viability of our community.

Sufficient funding for park maintenance, effective zoning by-laws, and a commitment to the long-term protection of key properties are necessary investments if we are to develop and sustain a healthy community. Besides the multiple benefits of open spaces to human beings, the sustainable development and protection of open spaces is a legal requirement. Various pieces of international, national and provincial commitments and legislation exist in this regard.

Fig 4-3 Resting on a park bench underneath a tree

Fig 4-4 Relaxing and socializing on the grass

Fig 4-5 Gardening

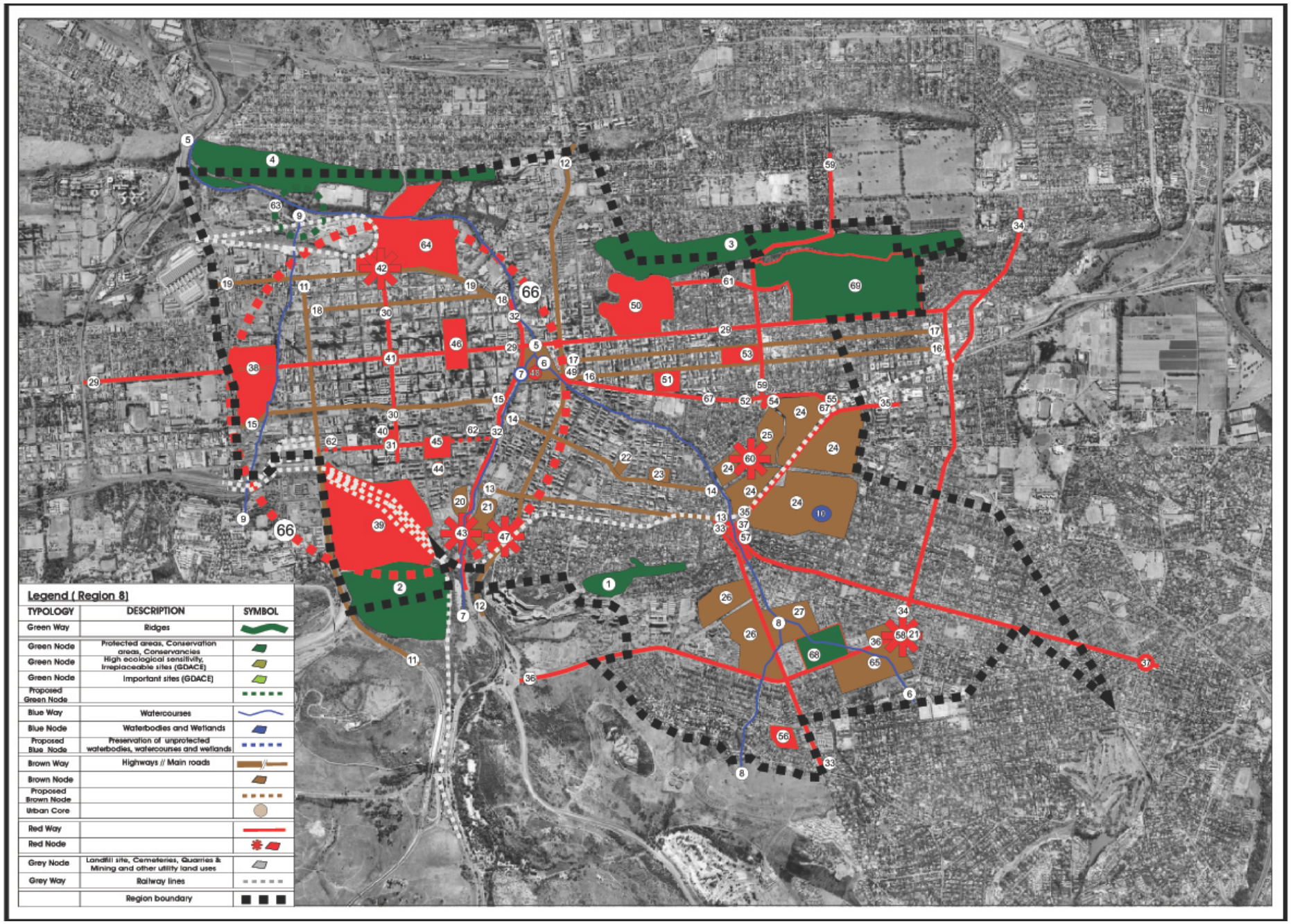


Fig 4-6 Region 8. Tshwane Open Space Framework

4.1.1 OPEN SPACE IN TSHWANE

4.1.1 OPEN SPACE IN TSHWANE

Given the acknowledged need for Open Space, it is therefore necessary to be critical about the way we zone and use Open Spaces within the city of Tshwane. Region 8 of the Tshwane Open Space framework, within which the study area falls, is characterised by the following aspects:

- significant ridge systems such as the Daspoort (4), Meintjieskop (3), Klapperkop, Salvokop (2) and Lukasrand Ridges(1);
- significant watercourse systems throughout, most notably the Apies River (5), Walker Spruit (6), Steenhoven Spruit (9) and Muckleneuk Spruit (8). However the Apies, Walker and Steenhoven watercourses have, for the most part, been transformed by human intervention;
- wetland system at the Pretoria Boys High School Dam (10);
- protected areas at the Austin Roberts Bird Sanctuary (68);
- significant institutional and recreational open spaces in the form of the University of Pretoria (24), Loftus Versfeld Rugby Stadium (25), Caledonia Stadium (6), Nieuw Muckleneuk trim park (27), Sunnyside swimming pool (22) etc.;
- several ornamental parks such as Burgers Park (45), Magnolia Dell(57), Venning Park (53), Berea Park (20);
- public open spaces around the Capital Core, Fountains Circle, Church Street (29), Paul Kruger Street (30); and
- nature reserves at Groenkloof Nature Reserve, Freedom Park and the Salvokop precinct (39),

Refer to an extract from Region 8 of the framework in Appendix i

A beautifully designed space is nevertheless not worth anything if people do not use it.

> *"… public space is viewed and experienced by many as out of control and dangerous. It is bounded by fences, palisades, walls, gates, private security guards, cameras and other defensive security technologies. Public life withdraws into the interiority of the private realm (homes, malls, gated enclaves etc.) and urban space is abandoned to featurelessness and neglect. Building more robust intersections between the two becomes a priority."*
> (Bremner, 2006 p9)

Fig 4-7 View over the skyline of Tshwane

Fig 4-8

Fig 4-9 Signage indicate that the park was intended for use.

Fig 4-10 The lush green area is out of bounds no gate is provided

Fig 4-11 Palisade fencing and barbed wire.

MORELETTA SPRUIT

This green link along the Morelleta Spruit between the affluent eastern suburbs of Pretoria has become a gated danger zone. It is a clear example of the effect of zoning principles that isolate the public green space from the private. The gated suburb and housing developments all turn their back on the green corridor and what could have served the residents as a open park is now perceived as a hazard.

If this is what happens to open space in the high income areas of the city, what will happen to open space in poorer areas?

Fig 4-12 Housing turns its back on valuable open space

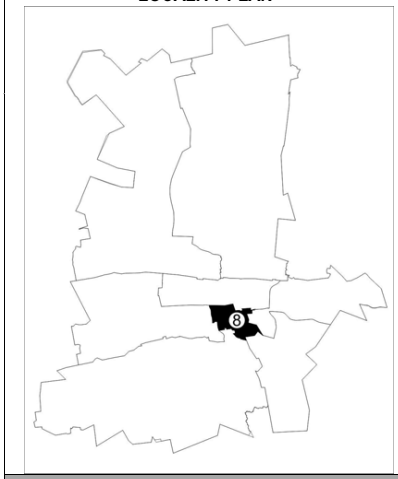
Fig 4-13 palisade fencing around the green strip.

According to the Tshwane Open Space Framework (2005), compiled by the Tshwane City Council and mentioned earlier, the majority of Open Spaces in Tshwane lag far behind international cities in terms of quality. The spaces are especially lacking in the following aspects:

- open spaces predominantly do not conform to the standards of development and comfort, do not offer any protection against the elements (sun, wind, rain) and do not offer opportunities for relaxation or recreation;
- open spaces are not integrated within a network, so as to facilitate movement from one to the other;
- there is no triangulation of Open Space as in the case of Paris, France. Triangulation requires that a variety of facilities and activities overlap to create interest, choice and variety;
- the open spaces in the City of Tshwane are generally mono-functional, thus only attracting a section of the community at certain times;
- hard open spaces, such as streets and activity spines, are mostly dominated by cars;
- civic spaces are non-existent; and
- the majority of Open Spaces are perceived as, and in many cases are, harbouring criminal activity, vagrancy, etc.

REGION 8: CENTRAL SECTION

LOCALITY PLAN



BOUNDARIES

North: Meintjies Ridge, Daspoort Ridge
East: Duncan Street
South: Klapperkop Ridge, Salvokop
West: DF Malan Drive

INCLUDES AREAS

Arcadia, Berea Park, Blackmoore 347 JR, Brooklyn, Bryntirion, Bryntirion 348JR, Central Pretoria Mss, Clydesdale), East Clyffe, Eastwood, Elandspoort 357 JR, Groenkloof, Groenkloof 358JR, Kilberry, Koedoespoort 456JR, Lisdogan Park, Loftus, Lukasrand, Muckleneuk, Bailey's Muckleneuk, Nieuw Muckleneuk, Pretoria, Prinshof 280JR, Prinshof 349JR, RiveRoadale, Salvokop, Skinner Court, Sunnyside, Trevenna.

VITAL STATISTICS

Total Area	Total Population	Gross Density	Vacant Land Ratio
2702	88 097	33p/ha	7ha/1000 population

VACANT LAND

Total Vacant Area: 627.901 ha

Total Developed Area: 2 074.008 ha

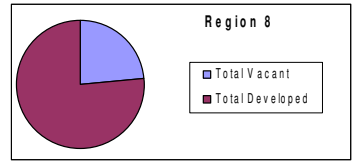


Fig 4-14 Extract from Open Space Framework

Many open spaces are under-funded, neglected, inaccessible, and lacking the necessary infrastructure and amenities. Only 31% of parks are fully developed. The only worthwhile, well developed public spaces are located within the inner city and old established areas. Outside of this zone, public Open Space is overgrown, undeveloped or privatised into shopping malls and private residential estates. Originally, all streets were lined with trees but nowadays this former closed tree structure is being eroded due to street widening and new developments.

Fig 4-15 Steenhoven spruit - open air bathrooom?

Fig 4-16 Streets lined with trees

Fig 4-17 Jacarandas

Fig 4-18

Fig 4-19 Gardens at the Union buildings

Fig 4-20 Kids need Parks to play in

Fig 4-21 Kids need Parks to play in

YEAR	EM BUDGET AS % OF TOTAL BUDGET		TOTAL COUNCIL BUDGET
	Operational budget of EM	IDP Capital budget of EM	Operational and Capital
2000/01	6,7%	-	not available
2001/02	8%	-	R735 731 000
2002/03	7,3%	4,3%	R755 586 000
2003/04	7,1%	4,4%	R1 005 000 000
2004/05	7%	3,1%	R1 224 000 000

Environmental Management Division's budget as a percentage of the total council budget

Table 1

(Source: CTMM, Environmental Management)

Year	Waste	Environmental Planning	Environmental Resource Management	Parks and Horticultural Services	Nature Conservation and Resorts	Cemeteries
	% ALLOCATION AND ACTUAL BUDGET TO SECTIONS					
2000/2001	50% R111 770 000	2% R799 672	0% R0	33% R73 304 000	10% R22 790 000	5% R11 659 000
2001/2002	52% R193 572 000	1% R705 127	5% R18 539 000	30% R112 878 000	8% R29 649 000	4% R16 008 000
2002/2003	53% R201 509 000	1% R542 939	5% R18 558 000	29% R110 786 000	8% R32 418 000	4% R15 886 000
2003/2004	53% R230 538 000	1% R847 000	1% R2 754 000	32% R141 013 000	9% R40 199 000	4% R21 521 000
2004/2005	52% R244 768 000	1% R2 945 000	1% R5 354 000	31% R148 469 000	10% R45 456 000	5% R24 979 000

Environmental Management Division Operational Maintenance Budget

Table 2

(Source: CTMM, Environmental Management)

Year	Waste	Environmental Planning	Environmental Resource Management	Parks and Horticultural Services	Nature Conservation and Resorts	Cemeteries
	% ALLOCATION AND ACTUAL BUDGET TO SECTIONS					
2000/2001	78% R 7 450 000	% R -	% R -	12% R1 158 000	7% R 648 000	3% R 255 000
2001/2002	% R 7 000 000	% R -	% R -	% R -	% R -	% R -
2002/2003	52% R17 300 000	% R -	% R -	14% R4 473 459	24% R8 020 000	10% R 3 360 000
2003/2004	41% R20 000 000	% R -	% R -	7% R3 000 000	17% R7 248 000	29% R12 548 000
2004/2005	27% R10 470 500	% R -	% R -	22% R8 556 000	16% R5 850 000	35% R13 463 000

Environmental Management Division IDP Capital Budget

Table 3

(Source: CTMM, Environmental Management)

34.1.2 BUDGET FOR OPEN SPACES

Apart from technical and legal restrictions on the sufficient provisioning and development of Open Space, the most important threat facing the Tshwane City Environmental Management Division is financial. Monetary limitations prevent the development and maintenance of Open Spaces to international standards. Open Space development and maintenance receive a very small portion of the budget. A political, monetary and fiscal perception exists that Open Space is not a direct income-generating service, nor a basic service delivery imperative. Proof of this lies in the facts that:

- over the past 10 years the Environmental Management Division has developed 70 new parks without being granted any additional human resources or increased maintenance budgets to maintain these parks;
- the Division must maintain parks and nature conservation areas within 13 previous local authorities' jurisdictional areas using a budget and human resource base tailor-made for only 3 previous local authorities; and
- the Division has a staff shortage within the Parks and Horticultural Services Section and Nature Conservation and Resorts Section amounting to 29%. (2005 Tshwane Open Space Framework Volume 1 p 20)

The Environmental Management Division only received 3,9% of the total council capital budget during the period 2002 - 2005 and was only allocated 7,1% of the council's total operating budget during the same period. The operational budget decreased from 8% in 2001/2 to 7% in 2004/5 and the capital budget from 4,3% in 2002/3 to 3.1% in 2004/5, as highlighted in the following tables extracted from the Tshwane Open Space Framework 2005. (Volume 1 p 72)

BURGERS PARK

A well maintained Victorian park south of the Tshwane CBD. The residents of the numerous apartment blocks in the area habitually use the park as an escape from the bustling city.

The Parks maintenance requires 15 fulltime gardeners to ensure that this public s[ace it in such a good condition.

Fig 4-22 Burgers park gate

Fig 4-23 Proud gardners at Burgers Park

Fig 4-24 Proud gardners at Burgers Park

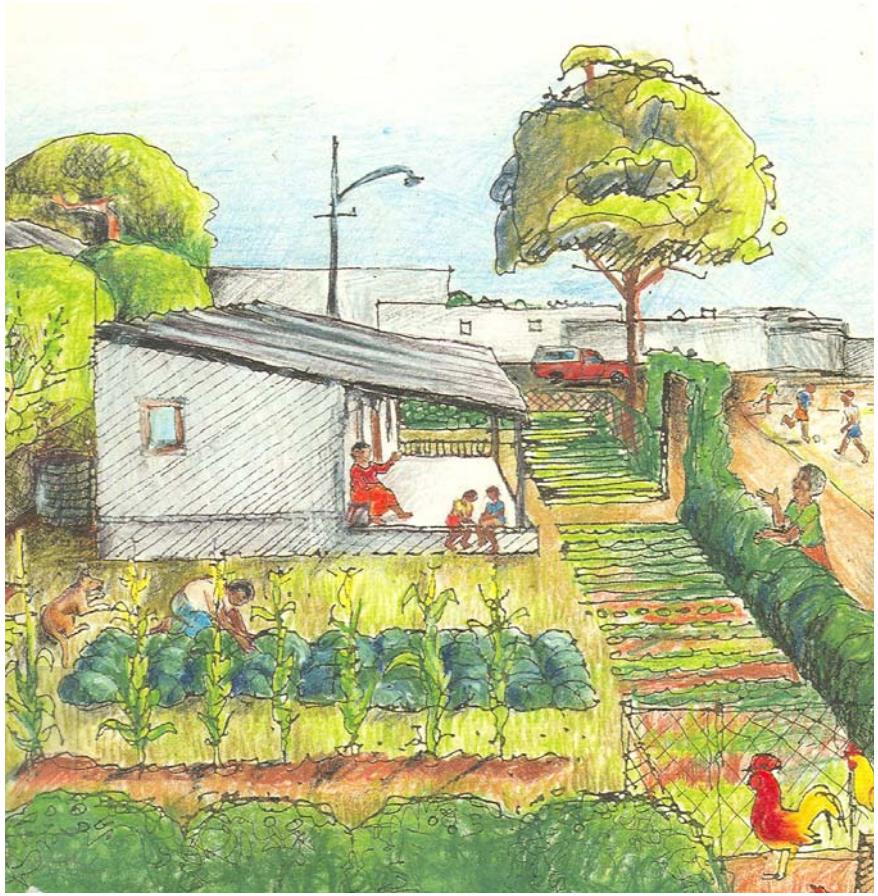


Fig 4-25 Low Cost Housing and Enviromental Issues. (Sowman. 1998)

4.1.3 PRODUCTIVE GREEN SPACE

Defining a new small-scale form of urban agriculture and finding mutuality between productive urban green spaces and architecture forms an important part of this investigation. In the book "*To dwell is to garden" Tshwane Open Space Framework* by Sam Bass Warner, professor of urban studies and planning at the Massachusetts Institute of Technology, the vision rests on the premise that the city is a garden - ".. Despite the dominance of streets, highways, and buildings, the city is an assembly of particular environments in which people favour some things and discourage others. What is special about a city is its product, its staple crop. The crops are not plants and animals but gardeners themselves." (Warner 1987. p 73).

In her examination of the relevance of Urban Agriculture: its role and contribution in structuring open space systems in economically disadvantaged areas of Cape Town, Victoria Crawley (Crawley.2005.p10) explains how community gardens can provide food. "The policy of urban agriculture leads to helping people / residents of an area to organize food cooperatives, farmers markets, playgrounds, health facilities and neighbourhood social and economic activities. It is about social reconstruction: a way to increase the power and efficiency of self-help neighbourhood schemes – so that fewer families will remain helpless in the city metropolis. Neighbourhood redevelopment: especially related to the control of land and housing. Gardens become important elements to be included in design providing the natural and human ecologies of the whole city. The goal is not to sacrifice the natural environment for short term advantages – the community garden is an important element because it demonstrates how people can use land in common for their individual and mutual benefit." (Crawley, 2005. p 40).

As long as poverty, hunger, multi-cultural traditions and land-connected recreational trends continue to influence city life and city form, urban agriculture will increasingly become a necessary urban land use function that should be publicly supported. The need to link land, food production and waste recycling with employment and income is a key factor in developing nations where poverty is a major problem.

One agricultural form that can be utilised is permaculture: “Permanent agriculture”; developed in sub-tropical Australia by Bill Mollison. It comprises a range of techniques which combine common sense and climatic factors to improve yields, especially where space is a scarce commodity, as food can be grown intensively in containers. These techniques are appropriate in warm climates with long daylight hours and sun exposure. Permaculture is a way of looking at the relationships between plants and animals instead of looking at the functioning of each element on its own. A particular method called “stacking” has evolved to take advantage of the favourable climate, thus minimizing the built footprint. (Gibbs; 2001)

By incorporating sustainable and permaculture principles into the design of social housing we can provide for the basic needs of a community: adopting the aspirations of Lynch, author of *Good City Form*: “to become a healthy and safe environment by functioning as an objective system that supports subjective growth, thus a ‘learning ecology’” (Lynch 1981: 115), and agreeing with Iain Low, who is known as a critical thinker on “new” public realms, dwelling and architectural pedagogy, that “poverty is at the centre of our problems and the provision of housing needs to be located within this understanding. It is, however, impossible to launch a campaign against poverty without an economic agenda.

Housing cannot simply be conceived of in quantitative terms, but rather through qualitative dimensions that can bring added value to users as members of families, communities and society at large.” (Low, I. 2005).

Some international examples follow:

--Kenya and Tanzania: two out of three urban households are engaged in food production activities;

--large cities in China produce 90% of their vegetable consumption;

-- Kampala devotes 50% of its land to urban food production;

-- Addis Ababa, Harare and Dar es Salaam are among the many southern cities where urban agriculture comprises a large portion of the urban economy; and

-- East Jakarta: 18% of total food consumption in low-income households was produced within the city proper. This proportion was even found to be as high as 60% in Kampala, and 50% in Nairobi.

Fig 4-26 Urban Agriculture in Tanzania

Fig 4-27 Urban Agriculture Tanzana

4.1.4 OPENSPACE PRODUCE

HIV/ Aids is a harsh reality in the city. Fresh grown products are essential for the infected, but healthy people also benefit from a healthy diet.

Food choices for people living with HIV/ Aids

STARCH: BASIS OF EACH MEAL.

Starchy foods should make up the biggest part of the food intake of people with HIV/AIDS. These foods are relatively cheap and supply lots of energy, which will help to keep the body weight stable.

Bread, pap, porridge, cereals, rice, potatoes, sweet potatoes, samp, millet, mealies, sorghum.

FRUITS AND VEGETABLES

They supply the vitamins and other substances that keep the immune system strong. These foods help in the fight against infections. Include fruits and vegetables of a yellow, orange, red or dark green colour.

Spinach, morogo, pumpkin leaves, green peppers, sweet potato, squash, pumpkin, carrots, yellow peaches, apricots, paw-paws, mangoes, Oranges, naartjies, grapefruit, lemons, and also guavas, tomatoes, maroelas.

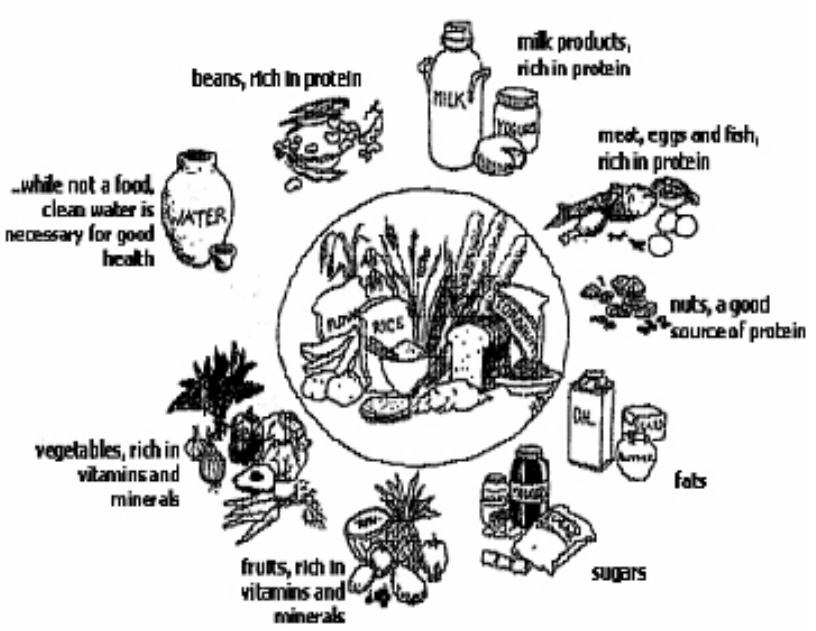


Fig 4-31 Diagram of foods that can possible be produced

Fig 4-28

Fig 4-29

Fig 4-30

4.1.~~4~~5 PUBLIC PARTICIPATION – A POSSIBLE SOLUTION

A community-based planning process allows all the stakeholders -- including residents, city agencies, local leaders and merchants – to define what goes on in a particular place. When ideas emerge from the ground up, not the top down, the events, programmes, recreation, and play areas in a public space are truly connected to the communities that use them. In addition, partnerships among local organisations, businesses, associations, and government agencies act as new sources of ideas for activities and help a public space become a true "community place". Planning for uses and activities in this way promotes sustainability and use, and therefore activity.

Although there is an awareness of the benefit and relevance of productive green spaces within the city, the current urban planning and management system in South Africa is not yet optimally geared to address the global and local challenges facing urban areas, as is apparent from the current experience in the City of Tshwane. The central concept of merging Housing with Open Park Space can create a positive relationship between the housing and the park.


Fig 4-32 Urban Agriculture


Fig 4-33Urban Agriculture


Fig 4-34 Urban Agriculture


Fig 4-35Urban Agriculture


Fig 4-36Urban Agriculture


Fig 4-37 Urban Agriculture


Fig 4-38 Urban Agriculture


Fig 4-39 Urban Agriculture

Fig 4-40 Susan Luthuli

33.1.5 PHILOSOPHY, PSYCHOLOGY and THEOLOGY

To amplify the significance of satisfying the basic needs of an urban society one can draw confirmation from not only the minds of many architects, landscape architects and urban planners but also those of philosophers, psychologists and theologians.

Rudolf Steiner philosophises about gardens and utopian expectations: “Gardens are an effort to replant the root of our existence, to restore a lost vitality. Organic gardens are symbolic of the re-affirmation of the integrity of organic nature. I want to go back to the garden, re-affirm the integrity of organic nature and engage in utopian expectations.”

Carl Jung (1875-1961), the Swiss psychiatrist, is one of the founding fathers of modern in-depth psychology. Jung's most famous concept, the collective unconscious, has exerted a deep influence not only on psychology but also on philosophy, the arts, and architecture. He stated that “Every person needs to have a piece of garden, however small, to keep them in touch with the earth and therefore with something deeper in themselves.” Carl Jung (1875-1961).

Paul Tillich is highly regarded as a theologian who stands at the boundary between liberalism and neo-orthodoxy, idealism and realism, Protestant and Roman Catholic theology. His indebtedness to the Romantic Movement in the 19th century means that his theology may be adequately identified as a philosophical theology. Tillich makes use of the Christian message, obtained from the Word of God, to answer philosophical questions that arise out of the cultural realm. He develops thinking around the “Ecology of being” and states: “This leads to the final aim of social work. In helping all individuals to find the place where they can consider themselves as necessary, you help to fulfil the ultimate aim of human beings and their world, namely, the universal community of all beings in which any individual aim is taken into the universal aim of being itself. Somebody who doesn’t feel necessary at all. Who feels that he or she is a mere burden, is on the edge of total despair.” (Tillich, p 131)

According to Dr Paul Lee, “Not having a job means ceasing to exist”. Lee was known for his proposed economic development plan for Santa Cruz based on the tourist industry – ”*Ecotopia for the ecotourist*”. His ultimate agenda was solving the problem of homelessness in Santa Cruz by setting aside revenues from gross productive urban agricultural proceeds.

According to Lee and Tillich, the proximity of housing to agricultural gardens can stimulate a sense of ownership. Community gardens provide food and also, if the policies of urban agriculture are applied, they lead to helping residents of an area to organise food cooperatives, farmers’ markets, playgrounds, health facilities and neighbourhood social and economic activities. This concerns social reconstruction: a way to increase the power and efficiency of self-help neighbourhood schemes – so that fewer families will become or remain helpless in the metropolis.

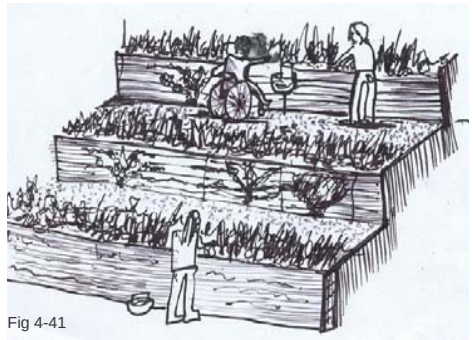


Fig 4-41

Fig 4-42


Fig 4-43


Fig 4-44


Fig 4-45

4.2 THE THEORY OF PARTICIPATORY DESIGN: Nabeel Hamdi.

In his book Housing without Houses – Participation, Flexibility, Enablement. (1991) Nabeel Hamdi essentially do not propose anything new but he unveils what housing is as shelter and what housing environments are as formal expressions of social and political systems. Uncovering the importance of what housing does to improve health, generate income, and provide security. His premise is around the theme of participatory design: that the involvement of users and community clients in design is an important part of decision making and of guaranteeing the efficiency of building in use. “Building lots of houses for people and places one does not know, where money is scarce and statistical information in unreliable, is neither an efficient nor an equitable way of solving housing problems, nor is it good design practice”. (Hamdi, 1991, p.xi) He both promotes and defends the program of enablement. “I do not believe that participation undermines the discipline of architecture or the role of architects, nor need it turn architects into political activists or social workers, as some would have it.” For Hamdi the object is to “describe housing as a multidisciplinary and nonsectorially bound system of activities that are likely to expand the services of architects without losing the specificity of architecture.” (Hamdi, 1991, p.xi)

In the chapter, A tale of two architects, Hamdi analyzes and compares the theories of two fellow architects whose ideas expanded the housing debate beyond ideology and technique and the design, designing and the role of architects firmly and squarely in a social and political arena. To support the theme of participatory design Hamdi makes a very valuable comparison between John Turner’s Housing by People (1976) and John Habraken, Supports: An alternative to mass housing(1972). Its forms an account on how they saw design and the activities of designers as measures that would cultivate a balanced, equitable environment for habitation or restore the balance where it had been upset. Their argument recognizes that professional interventions had to be applied carefully and that the actions of professionals had to be made accountable to the public if the public were to be informed rather than bewildered. Tuner and Habraken argue that housing dominated by public authorities is not an equitable way to solve housing problems, nor is it economical or efficient. Both offers a comprehensive definition of the support paradigm and its three tenets for design: flexibility, participation, and enablement explained in the table below:

Fig 4-46

Fig 4-47

Fig 4-48

Comparison: Table 4

John Turner (1976) Housing by People.	John Habraken (1972) Supports: alternative to mass housing
Concerned with supports for structuring government policy and directing professional interventions	Prime concern is for structuring the physical environment.
Turner's principle of planning for housing through limits.	Habrakens methods are not a substitute for good design or creative inductive thinking. They were never intended to induce good ideas but rather aimed at ordering ideas and building production so that they could be communicated to so inclusive of others.
Turner is driven by a concern for people, politics and global resources	Habraken looked to improve the efficiency of design, designer and building.
Flexibility	
For Turner flexibility has to do with ranges of possible courses of action available to people when organizing financing, planning, building and maintaining buildings and for sorting out tenure and materials. Flexibility is a quality by witch to measure the opportunities available to people to locally manage programs.	For Habraken flexibility is a quality by which to measure the capacity of physical settings to be easily modified, which could undergo a series of incremental transformations in order to ensure good fit through time. It is directly equal at housing management in deciding dwelling sites, dwelling types, and dwelling mix as to families. It is a basis on which to rationalize the production of houses, to reconcile both standardization and variety, on which a healthy industry depends.
Participation – Essential part of repairing the natural relationship between people and place.	
Turner definition is far broader. His search for better participation is directed at " the ways and means by which governments, NGO's and the building industry can enable people to do well as so many do in any case: the planning, building and management of their own houses and neighborhoods at costs both they and society can afford." He put the onus firmly and squarely on government and the professionals to participate in the action of people, not the other way around.	He believes that user participation helps designers better serve their public and that it enables the design and the production of the buildings to be more efficient and more dynamic so that the architecture can be made more relevant.
Enablement	

Defines enablement relative to government policy and relative to the role and services of professionals. Enablement policies and enabler professionals are those that support locally self managed programs. They deliver the money and resources to enable local organizations to build and manage their own housing.	For Habraken the concept is very much akin to cultivation. In contrast to building houses, enablement is a process by which to cultivate physically and gradually the conditions that enable habitation, that enable neighborhoods to grow and change in response to prevailing conditions. Architects must be part of these processes, which go on despite of infertile settings. They have to be able to design for change and incremental growth. They must see the user as an indispensable agent in the process, They must understand their work as part of a living process, In short they must be cultivators of environments, rather than makers of projects.(1983,p9) Habraken is preoccupation is with structure rather than the content of housing. Less interested in deciding the form and more interested in the way changing conditions and functions shape the form. He sees design as a process of enablement, which could change radically not only the process by witch housing is produces, but also the form of housing itself.

In conclusion Hamdi exposes some useful thoughts around flexibility and building and lists a number of important design principles that emerged from the early thinking and practice of flexibility. It gives recognition to the concept of a better fit among people, territory, finishes, and costs – not tailor-made responses to normative projected needs but as variable interpretive opportunities to package programs and interpret standards so finishes, space, and/or cost are variable. For Hamdi the crucial arising question is:

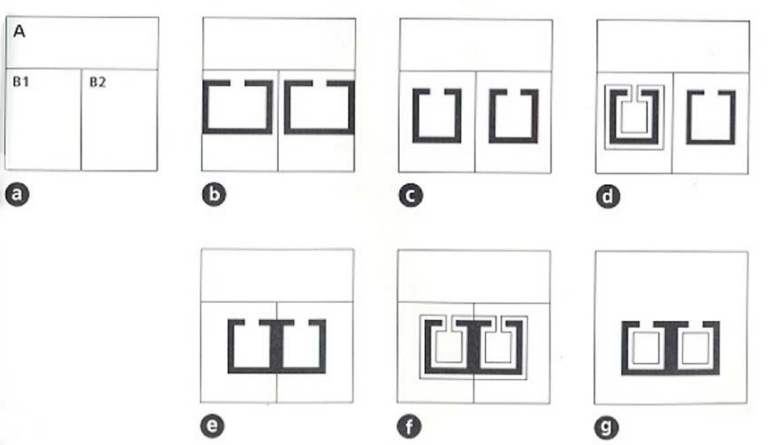
What is flexibility in the context of design that promotes participation?

Nominal Classes	"Wholes" (types)
6 Major arteries	Neighborhood-
5 Roads	Block
4 Building elements	"Built space"
3 Partitioning	"Room"
2 Furniture	"Place"
1 Body and utensils	

Wholes- as experienced in daily life, Wholes combine two levels. (Habraken.1998.p61)

Levels combine to form holes.

Dwelling does not figure among the wholes. Dwellings as a complex holistic notion is not tied to any single level, nor is it always identified with the same levels. Ultimately dwelling denotes action more than form.



Territorial diagram representing varied building and uses.
a initial territory diagram without walls
b atributing houses with blind walls.
c freestanding houses in gardens
d house as in c, when rented by occupant
e houses with common party wall
f houses as in e above, when rented by ocupants
(Habraken.1998.p 173)

4.3 LEVELS OF INTERVENTION IN THE BUILT ENVIROMENT

The principle tool used by those working in an open building way is the organization of the process of designing and building on environmental levels. The idea of environmental levels is not new, but the clear formulation of the principle of levels is rather new, having been framed most recently in The Structure of The Ordinary: Form and Control in the Built Environment (Habraken, MIT Press, 1998).

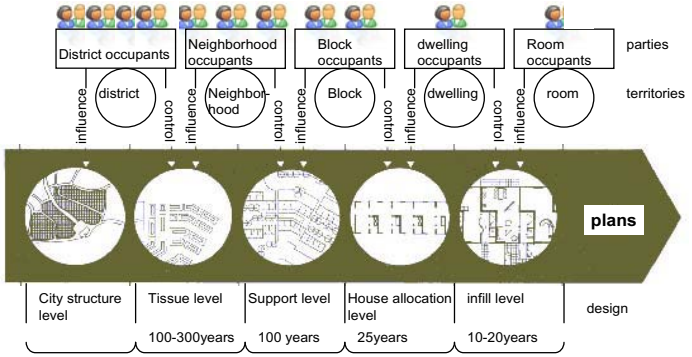


Fig 4-49

A Diagram of the Principle of Environmental Levels (Kendall: 2000.p4)

Each of these levels relates to the one below and above it according to certain rules. For example, an urban street pattern, perhaps centuries old, defines plots of land - territorial claims - of varying sizes on which individual buildings are constructed, demolished and new ones built over a time period during which the street grid remains stable. Often, several lots are acquired by one party. In some places and times, economic forces, methods of construction and changes in social patterns results in intensification of the use of spaces between the streets, while in other situations, the opposite is true, and the blocks become more vacant.

The characteristic here is that the street grid - on a higher "public" level - remains stable, while the lots divide and aggregate and buildings come and go - on a lower level - within the spatial and infrastructure capacity of the street level pattern. Sometimes, the public space on the higher level is invaded by private interests - either by agreement or by force - changing the balance of power and the structure of the levels.

If we look into the level of the individual building, we see the level of intervention we call architecture. Here, a building offers space for occupancy, offering form, services and safe passage for any of a variety of occupancies over time. The building is a stable spatial and technical "offering", making itself available to a variety of individual territorial claims, enabling each occupying power their own decisions within the constraints of the base architecture. The occupants can move in and out, without compromising or disrupting the interests of the entirety.

Sometimes, the entire façade of a building is removed and replaced, revealing yet another technical level, to a certain extent independent of the structure and interior layout. At a still lower level, the furniture in a room, the computers and other equipment, can be changed with some degrees of freedom without forcing the partitions of the room to be altered. These are familiar environmental levels, and there are more of them. It is the formal recognition of these levels that is a key characteristic of the open building approach.

Open building is, according to John Habraken, the term used to indicate a number of different but related ideas about the making of environment. These include:

- the idea of distinct Levels of intervention in the built environment, such as those represented by 'base building*' and 'fit-out*', or by urban design and architecture.
- the idea that users / inhabitants may make design decisions as well as professionals.
- the idea that, more generally, designing is a process with multiple participants also including different kinds of professionals.
- the idea that the interface between technical systems allows the replacement of one system with another performing the same function. (such as different fit-out systems applied in a given base building.)
- the idea that built environment is in constant transformation and change must be recognized and understood.
- the idea that built environment is the product of an ongoing, never ending design process, in which environment transforms part by part.

The Open Building approach seeks to formulate theories about the built environment seen in this dynamic way and to develop methods of design and building construction that are compatible with it.

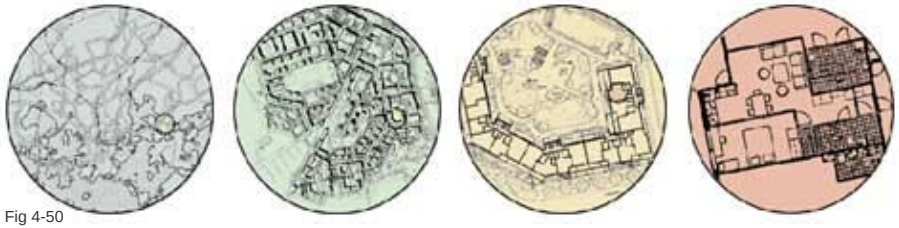


Fig 4-50

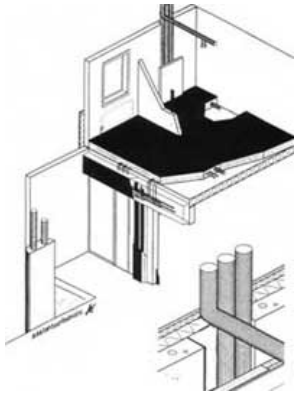


Fig 4-51

Fig 4-52

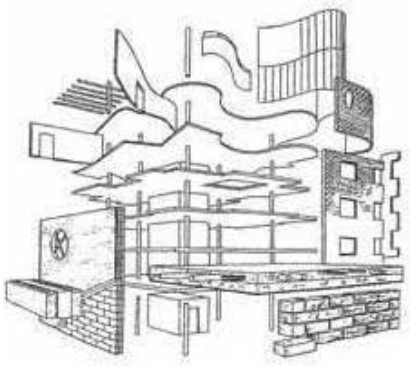


Fig 4-53

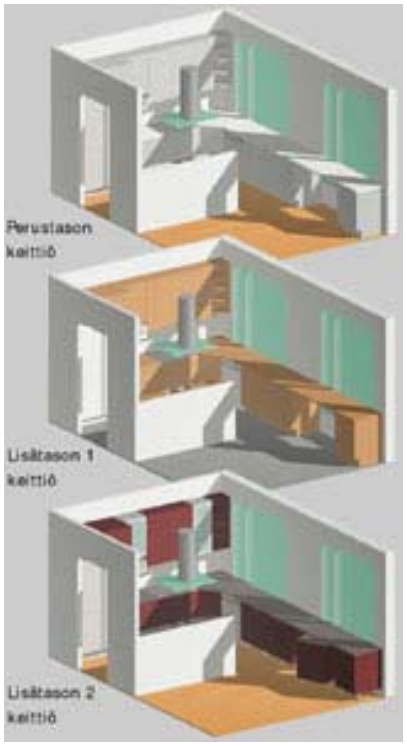


Fig 4-54

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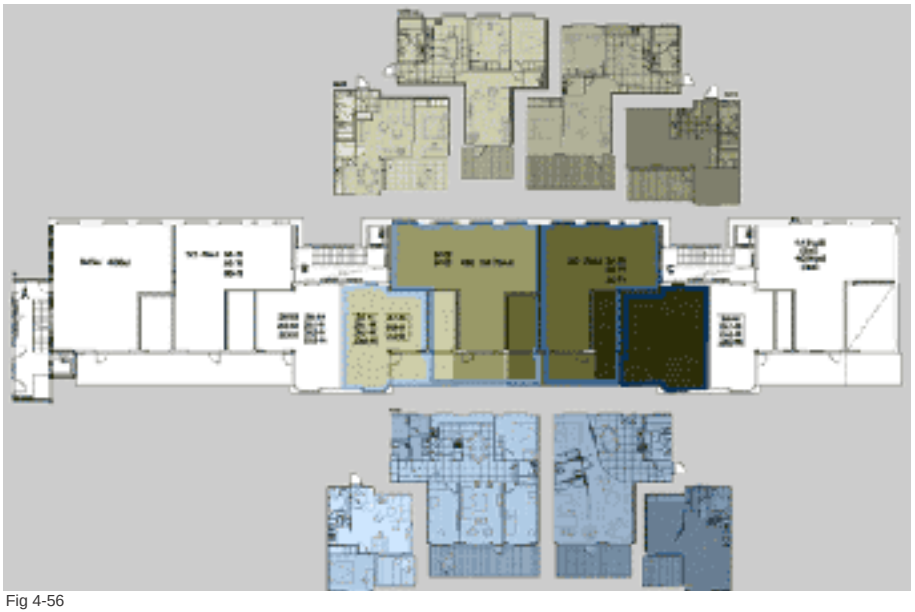


Fig 4-56

Fig 4-57

Fig 4-58

4.4 OPEN BUILDING

Open Building is an approach to the design of buildings that is recognized internationally to represent a new wave in architecture, but a new wave with roots in the way ordinary built environment grows, regenerates and achieves wholeness.

Open building is an organized way of responding to the demands of diversity, adaptability and user involvement in the built environment. In open building the built environment is approached as a constantly changing product engendered by human action, with the central features of the environment resulting from decisions made at various levels. The levels of city structure, urban tissue, support (or base building) and infill (or fit-out) are usually distinguished. Open building entails the idea that the need for change at a lower level, such as the inside of a dwelling, emerges faster than at upper levels, such as the support. Open building acknowledges the residents' rights to participate in the modification of their living environment On the upper levels, the decisions taken are collective and involve many parties, while decisions on the infill level are made by individual households.

4.4.1 OPEN AND LEAN CONSTRUCTION

The concept of Open Building aims to contribute to the quality of the built environment. Design decisions result in construction activities, such as connecting materials, components and products. The Open Building community in the Netherlands as well as Japan have done ground breaking work on co-ordinating dimensions, positions and interfaces of parts, in turn giving the key to controlling gaps and tolerances and clearly defining the domains of disciplines and their tradesmen, their duties and liabilities.

Open and Lean differ, touch and overlap, they can benefit from each other. They both respond to the negative effects of second wave mass production. Open Building advocates mass customization of housing, Lean Construction aims to at a improving the construction process by eliminating ‘waste’, being any activity that does not contribute to the required value of the end product, by improving the ‘flow’ of the construction process.

4.4.2 RESIDENTIAL OPEN BUILDING

Residential Open Building is only doing what already is familiar in other building types. The are several reasons for this lag. Commercial residential projects, in contrast to the commercial office building, usually operate in a sellers market which leaves no incentive for innovation because the product is sure to sell anyway. Non-profit housing organizations have not much incentive either to delegate design responsibility to the occupant. Moreover, the fit out of residential units is more complex compared to retail or office space. Kitchen and bathroom equipment in combination with communication and power supply systems must be integrated in a small volume

The introduction of an infill level to multifamily housing is a way of expanding the decision-making power of the user in new construction as well as in renewal of existing housing. Decisions on the infill level concern those parts of the building, where user requirements vary. The infill of an individual unit is chosen by the user and comprises the parts of the building which determine the lay-out, fixtures, fittings, equipment and finishes of the unit or apartment. Parts of the elevations may also form parts of the infill. The separation between elements belonging to the support level from those of the infill level is project specific. The long term aim is for the infill to be installed as a completely separate stage in the construction process, unit-by-unit, tailored to the household that is going to live there.

Fig 4-59

Fig 4-60

Fig 4-61

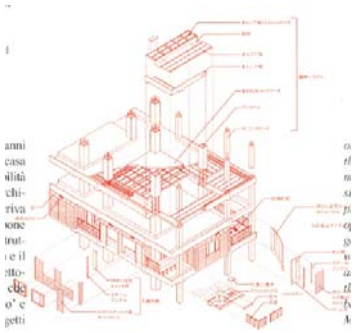


Fig 4-62

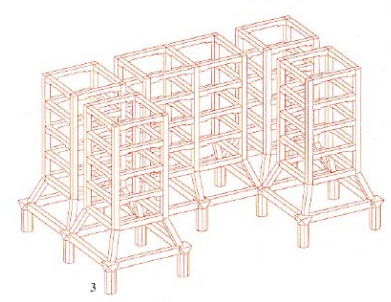


Fig 4-63 Next 21 Project

Fig 4-64 Next 21 Project

Breakdown of features that promote open building in multifamily housing:

4.4.2.1 OPEN SPACIAL STRUCTURE

An open spatial structure offers options for regulating the allocation of units and other facilities in the building, and anticipates a variety of different infill to be accommodated in every unit. Access spaces to the apartments are usually fixed as part of the support. The elements defining the floor plan of the units are ideally on the infill level, thus offering a free configuration of the floor plan. Even parts of the facades can be regulated or chosen by the user as part of the infill.

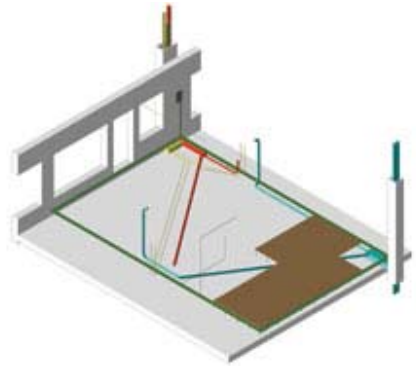


Fig 4-65

4.4.2.2 SEPERATION OF SUPPORT AND INFILL SYSTEMS

Building parts are divided into long lasting fixed support parts and an adaptable infill components inside individual dwelling units. The fixed support parts can be constructed with long life span, while changes in function can be adopted to by altering the shorter-term or reusable infill. Systems with easily changeable components are sought for the implementation of the infill. Building services are divided into systems serving the building and those serving the individual units. Adaptable component based infill systems for partitions, fittings, building services parts and access structures are the prerequisite for accommodating changes during use and help in phasing the construction process so that variation and individual user requirements can be implemented cost effectively.

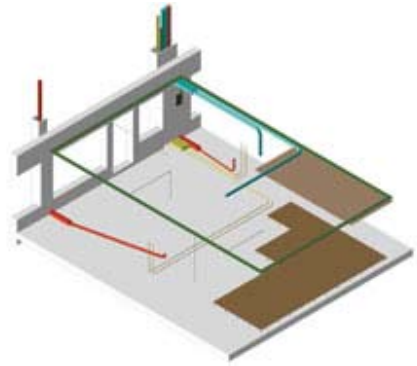


Fig 4-66

4.4.2.3. OPEN BUILDING PROCESS

A central feature in the realization of open building is the phasing of the design and implementation process into separate stages concerning the support and the infill. As infill decisions have no effect on the placing of the elements and building parts on the support level, they can be postponed to a later stage. Methods for immediate calculation of the cost or rent implications of alternative choices is required for decision making on the infill level. Separate procurement and assembly for infill systems is carried out unit by unit.

Fig 4-67


Fig 4-68 Plus home Project


Fig 4-69 Plus home Project


Fig 4-70 Next 21 Project


Fig 4-71 Next 21 Project


Fig 4-72 Next 21Project


Fig 4-73 Next 21 Project

4.4.3 OPEN BUILDING PRECEDENTS

4.4.3.1 PLUSHOME PROJECT

Project Architect ARK Oy Kahri & Co

The new PlusHome concept allows homebuyers to tailor their new home to their own needs and preferences by offering a wide variety of online design options to select from. With SATO PlusHome you can even choose from options regarding the size of your new home as well as the internal layout. This flexibility is made possible by using construction techniques, which eliminate the need for internal structural partitions. SATO PlusHome also allows the buyer to choose from carefully selected options regarding surface finishes and fixtures and fittings. The priced options may be either individually selected by the buyer or chosen as part of one of the architects suggested interior design schemes.

4.4.3.2 THE SOLIDS

The Solids, a project of Het Oosten in Amsterdam, to be developed by Krystal development, designed by Baumschlager and Eberle, architects. This large open building project, to be built in 2007.

4.4.3.3 NEXT21 PROJECT, Osaka, Japan

An experimental building, known as NEXT21, was completed for Osaka Gas Company in 1994 in the city of Osaka. Prof. Yositika Utida, Japan's premier authority on industrial residential construction, was asked to design the apartment building of the future. Not surprisingly, it contains the most advanced technology for the use of energy. Natural gas is chemically decomposed following principles first implemented for space craft. Solar panels are found on the building's roof garden. Waste from inhabitation is entirely processed for re-cycling.

4.4.3.4 MOLENVLIET PROJECT, Frans van der werf Netherlands

Built in the early seventies the project had to follow the strict rules for public housing of the time. But by making the basebuilding / fit-out separation very clear in both technical and architectural terms, van der Werf successfully enabled the users to design their own. The Molenvliet project also can be called three dimensional urban designs. We do not see separate buildings but a continuous 'urban framework' which forms courtyards interconnected by pedestrian alleys and accessible from the public street where cars are parked. Some courtyards are public and give direct access to the units on the ground floor while open public galleries lead to units on the second floor. Other courtyards contain garden space: both individual gardens for ground floor units, as well as collective gardens. Van der Werf allowed only two interviews with each of the user households to help them with their design. This proved sufficient. Because the units were for rent, cooperation of the owner of the estate, a non-profit corporation, was essentiall. Still, today, the management works in close cooperation with the users, and helps them adapt their unit's interior layout and equipment.

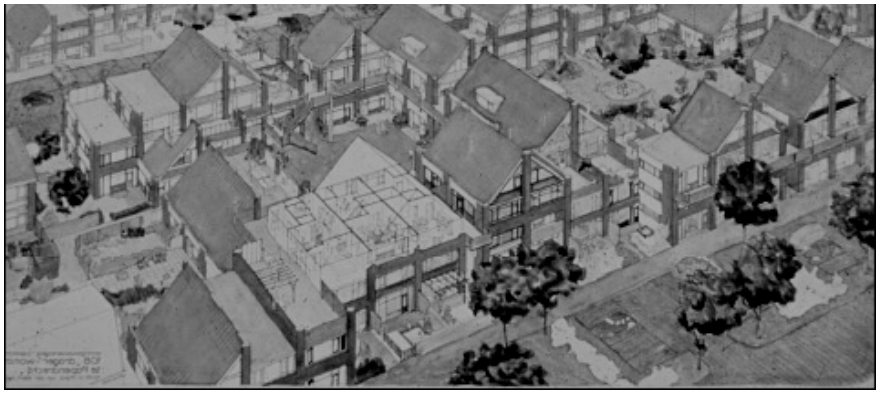


Fig 4-74 Molenvliet Project

Fig 4-75 Molenvliet Project

Fig 4-76 Molenvliet Project

Fig 4-77 Molenvliet Project

Fig 4-78 Molenvliet Project

Fig 4-79 Molenvliet Project

Fig 4-80 Molenvliet Project

Fig 4-81 Affection and belonging

Fig 4-82 Status and Recognition

Fig 4-83 Self actualization

Fig 4-84 Self actualization

Fig 4-85 Fresh produce vendor in front of Schubart Park

Fig 4-86 Healthy fresh produce

Housing: A Green Proprietor in Marabastad

4.5 ACCOMMODATING URBAN NEEDS

"Now my aim is clear: I must show that the house is one of the greatest powers of integration for the thoughts, memories and dreams of mankind."

Bachelard, G. (1964)

Presently, the focus in South Africa is placed on meeting basic needs (i.e. ensuring that all citizens enjoy proper housing, water supply and sanitation, electricity, health care and other services). However, housing should in fact aim to move beyond the provision of basic needs and provide a framework for people to satisfy the more complex needs for themselves. In order to define urban needs apart from basic human needs the following typology for urban needs is drawn up from Faulkner, as summed up in the book by Behrens and Watson: *Making urban places. 'Principles and guidelines for layout planning*. (Behrens & Watson; 1996 p60).

Christopher Alexander, the architect, planner and author of *A Pattern Language* (1977), is of the opinion that "Only people can guide the process of organic growth in a community. They know the most about their own needs" (Alexander, 1977:38) In order to further determine the specific needs of the urban community of Tshwane, part of the research aspect of this work consists of a general survey amongst residents of the housing developments from the 1980's - Schubart Park, and Kruger Park. This survey determined the existing problems in the area and allowed the existing residents to share their thoughts about the future of their neighbourhood.

Table 5: Defining urban needs: A Typology of urban needs – Faulkner (1978.p104)

Needs category	**Description**	**Attributes of the urban environment associated with the satisfaction of needs (examples)**
1. Physiological	Provision of food, shelter and health care.	Retailing / wholesaling systems distributing food, clothing and health supplies. Healthcare clinics and hospitals. Essential services (water, sewerage, power). Dwellings.
2. Safety and security	Protection from physical harm and intruders. Privacy and absence of overcrowding. Protection of property.	Fire and Police protection services. Road safety. Absence of noxious environmental elements (pollutants). Residential areas that ensure privacy.
3. Affection - belonging	Harmonious relationships with other members of the community. Identification with and acceptance of groups within the community.	Facilities for community organizations (meeting places). Physical layout of neighbourhood such that cooperative and harmonious inter-family relationships are fostered. Physical identity of the neighbourhood.
4. Esteem	Status and recognition by others in the community.	Opportunities for home ownership. Prestige of neighbourhood.
5. Self actualization	Role relationship vis a vis others. Realization of one's potential. Creativity / self expression.	Built environment that facilitates creativity and self expression. Employment opportunities and community organizations that enable the use and development of skills.
6. Cognitive/Aesthetic	Provision of educational experiences, as well as intellectual stimulation and experiences. Aesthetically appealing events and phenomena.	Educational and cultural facilities. Recreational facilities. Aesthetically appealing built and natural environment.

From the table we can conclude that a holistic approach towards the provision of housing must be considered in order to formulate a solution that might satisfy the attributes of the urban environment associated with the satisfaction of needs. "What matters in housing is what it does for people rather what it is." (Turner 1976)

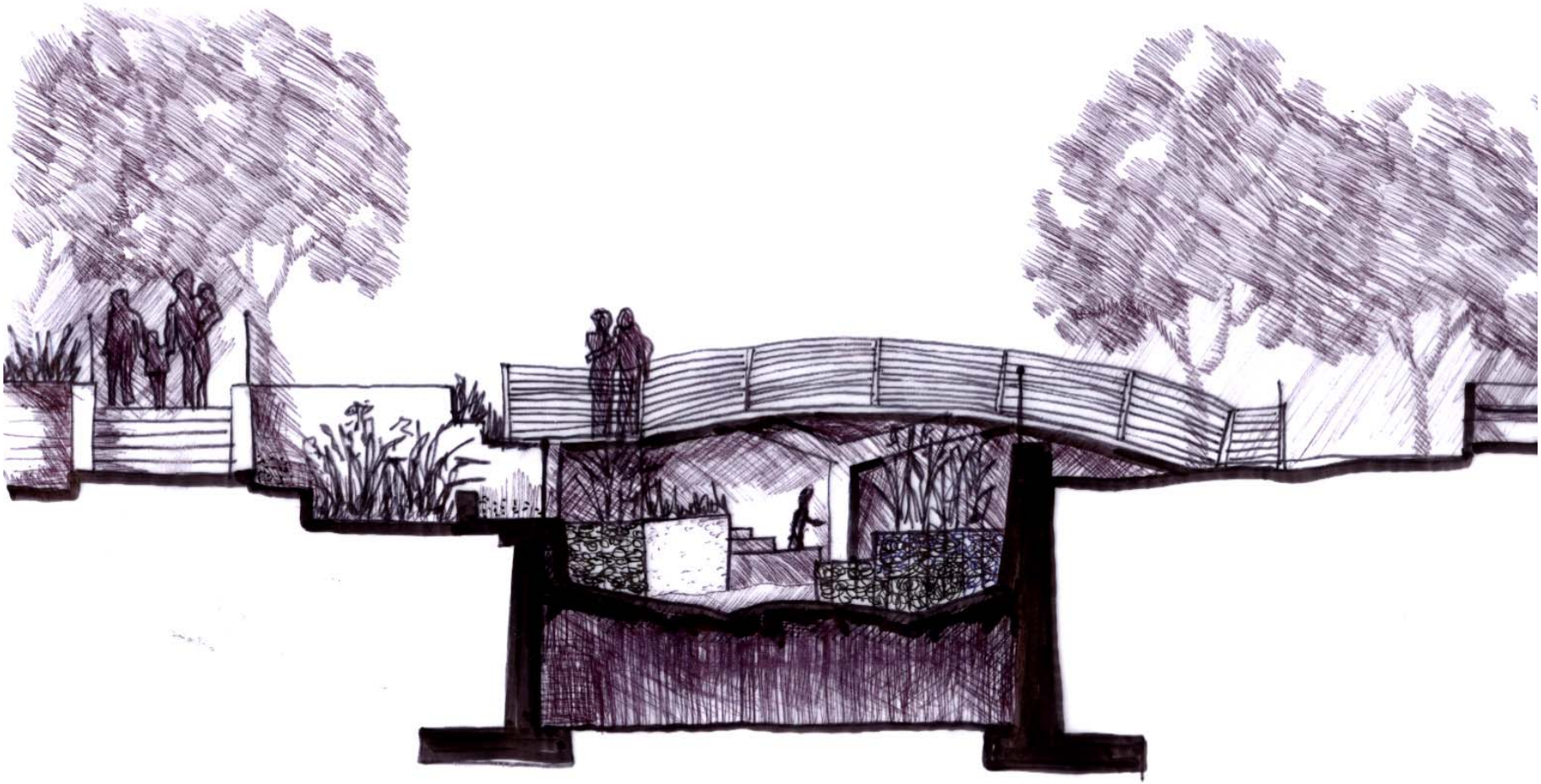


Fig 4-87 Open spaces are important for our individual

Fig 5-1

5

FORMULATING THE PROJECT

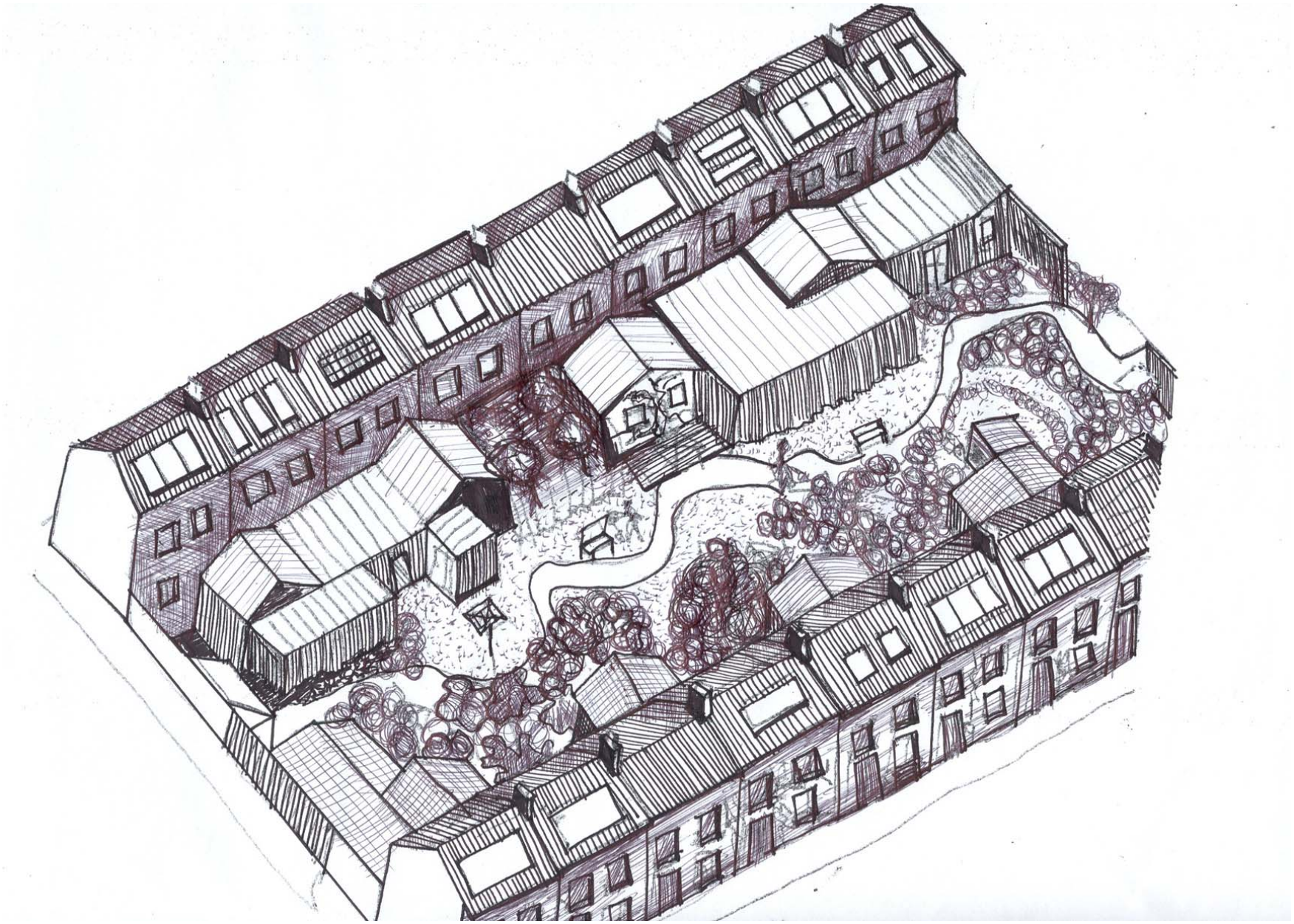


Fig 5-2 Sketch illustrating how gardens can become a communal intermediate space between housing.

5. FORMULATING THE PROJECT

5.1 THE SYNTHESIS: Housing + Green space.

"Building more robust intersections between the two (public life and public space) becomes a priority." (Bremner, 2006. p.9).

As people move away from rural areas into an urban, often consumerist setting, they lose the connection with nature, and forget the importance of maintaining environmental services such as water resources. However, people are in fact dependent on the natural environment to meet all their needs, and therefore the interactions between people and the environment cannot be separated. Changes in values and beliefs have also contributed to environmental change in South Africa, often negatively.

According to a statement on the Housing Generator Project website (www.housinggenerator.com), it is very important to view the housing problem within a wider perspective and to realise that housing projects cannot be reduced to just delivering homes. It is essential to recognize the important role of open space in and around the home, and to reflect on the relations that arise between these homes. People can use this open space creatively to generate income. So housing means that one accords these areas, which may vary from the space in front of the house to the centre of the neighbourhood or city, an appropriate place in the open sky. Furthermore, it is important to recognize that people move to the city mainly do so to look for work. The home and the land where people live can play an important role in the generation of income.

In this project, therefore, the park constitutes a key element, but its integration with the housing development bordering it is vital. The proposed resolution should provide a synthesis between the housing and all elements of the public realm. The vision for the park is to provide intimacy and familiarity, in contrast to the urban vastness. It invites interaction and use, and bonds the park to the housing. The park, as the primary green element, is visually and spatially linked to the housing courtyards and streets. It is the collective space (a common property with restricted access) that can successfully take urban living beyond the private realm and ensure that it is used and cared after.

A sense of community can be developed through a community activity such as gardening. It can be used to break down the isolation and sense of powerlessness in inhabitants of low-income suburbs - creating a sense of neighbourliness among residents. Until that happens, there is no community, but, rather, separate people who happen to live in the same place. This is all the more reason for promoting stewardship by giving people the responsibility of maintaining their own public park, thus allowing them to become a proprietor of the park.

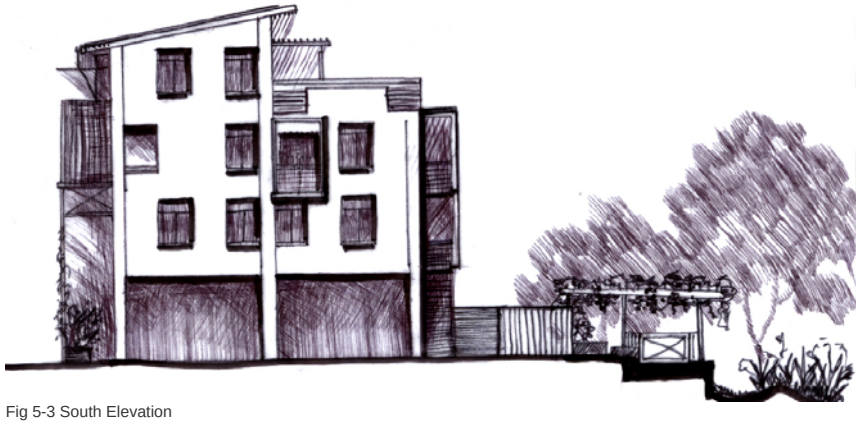


Fig 5-3 South Elevation

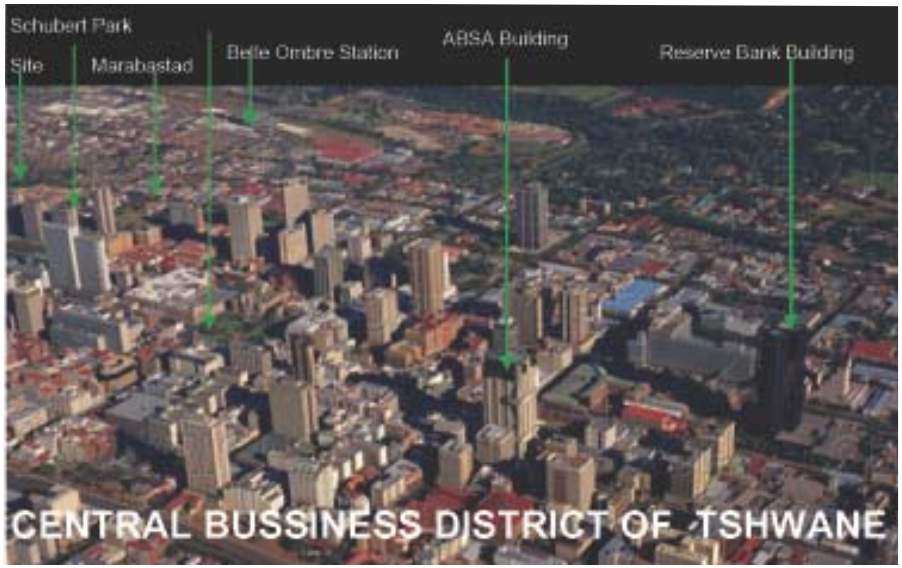
5.2 CLIENT:

City of Tshwane in association with Thubelisha Homes.

5.3 FUNDING

The project will be funded and supported by one or more of the following institutions and initiatives:

- Gauteng Department of housing
- Thubelisha Homes
- The Agrarian Research Development Program (ARDP)
- The City of Tshwane Metropolitan Municipality
  (Environmental resource management)
- The Greater Pretoria Metropolitan Council
  (In charge of the Environmental Resource Plan)
- The Food Gardens Foundation (FGF)
  (Training and support in Food Gardening)



5.3.1 GAUTENG DEPARTMENT OF HOUSING - INSTITUTIONAL SUBSIDY

The Institutional Subsidy is available to qualifying institutions to enable them to create affordable housing stock for persons who are entitled to housing subsidies. This housing subsidy mechanism provides R34 049, 00 to qualifying beneficiaries, whose monthly income may not exceed R3 500. The subsidy is paid to selected institutions to provide subsidised housing on deed of sale, rental or rent-to-buy options, on condition that the beneficiaries may not be compelled to pay the full purchase price and must take transfer within the first four years of receipt of the subsidy.
Institutions must also invest capital from their own resources in the projects. (www.housing.gpg.gov.za)

5.3.2 THUBELISHA HOMES

Thubelisha is a dynamic and rapidly expanding housing support institution of the National Department of Housing. Thubelisha is a Section 21 company supplying housing stock that is financed by subsidies provided by the Provincial Housing Departments. Its mission is to provide specialized interventions that positively impact on the development of integrated sustainable human settlements and accelerate affordable housing delivery. (www.thubelisha.co.za)

Thubelisha

5.3.3 AGRARIAN RESEARCH DEVELOPMENT PROGRAMME

The Agrarian Research Development Programme (ARDP) is aimed at developing postgraduate agricultural students and agricultural departments in new paradigms of agricultural research. With funding from the Agrarian Research Development Programme, a group of students will establish the urban agriculture park on the site and study the relevance of urban agriculture. Accommodation and facilities are initially provided for the research. At a later stage, when the students have completed their work, these facilities can then be taken over by the community.

The ARDP is a collaborative research programme that will address some of the basic issues underlying agrarian development and land reform in South Africa. ARDP is jointly sponsored by the Netherlands Government (the major funding organization for covering running costs, research costs, salaries, etc), the NRF (Bursaries), six South African Universities, the Agricultural Research Council, the National Department of Agriculture and Land Affairs, and Provincial Departments of Agriculture. The latter four organizations contribute in kind (office space, equipment, salaries, and communications).

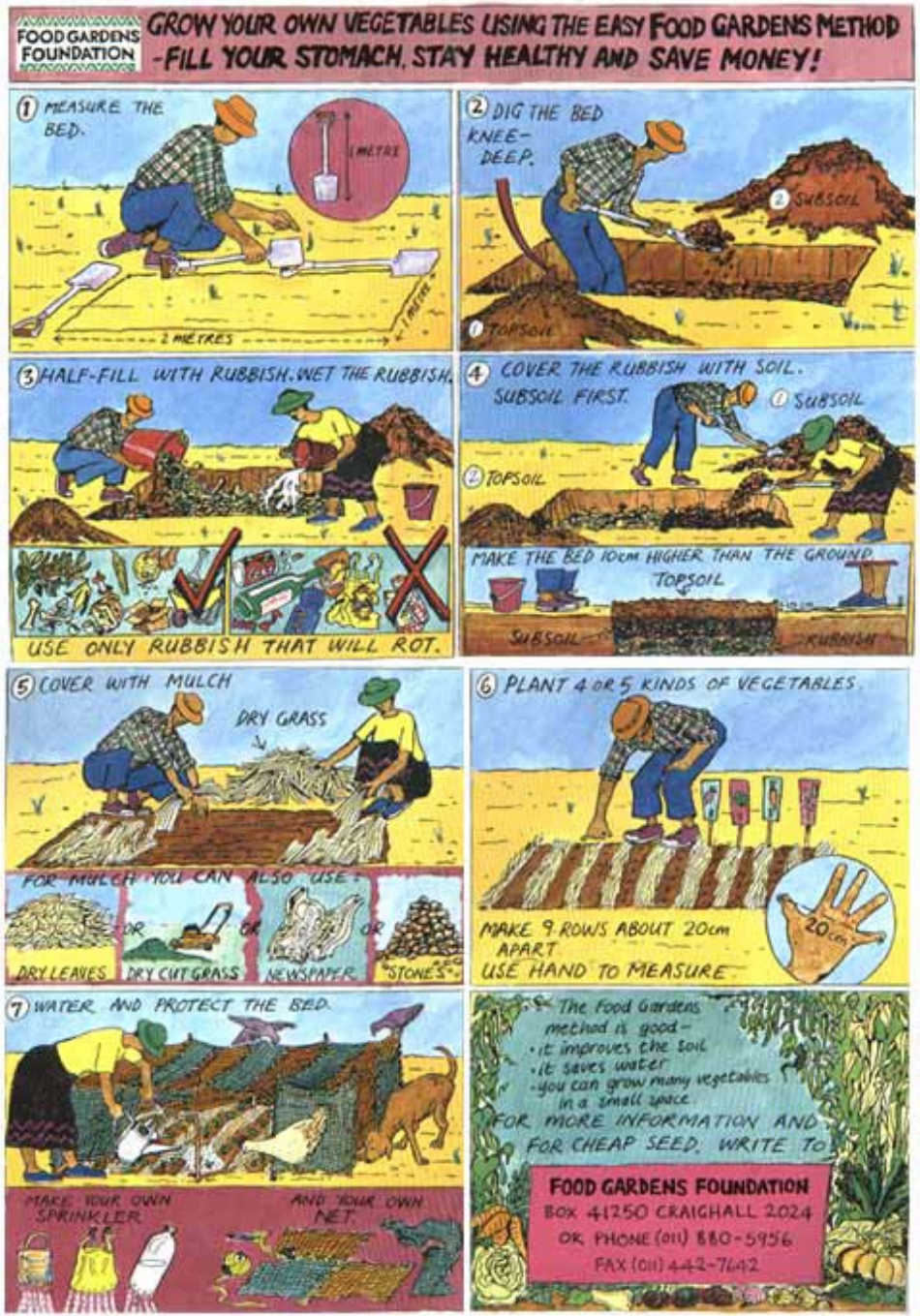
The ARDP initiates and facilitates the development of a research approach which combines social science perspectives with insights from agro-technical disciplines and determines how such a body of knowledge can be used in the development of policies and research processes through the use of universities, Research Councils, Government Departments, NGOs, communities and international contacts.

Fig 5-4

Fig 5-5

Fig 5-8

Fig 5-7



The soil is coming alive. The hungry are eating. The unemployed are earning.
The disabled are working. The children are smiling.
The methods are simple and easy to understand. Little water is needed.
All the compost comes from the rubbish heap.
There is fresh food on the table. There is the satisfaction of creating. There
is the expectation of abundance, earning money, improved health.
Requests for training are pouring in.
The bigger the success of Food Gardens, the further the word is spread, the more funds are needed.
One day will come the biggest success of all. Everyone will have enough to
eat. You'd like to be part of that success - wouldn't you?

Fig 5-8 An information leaflet handed out by the food garden foundation to encourage people to start their own fopod gardens.

5.3.3 THE FOOD GARDENS FOUNDATION

The Food Gardens Foundation (FGF) is a Non-Government Organisation and an Association Not-For-Gain registered under Section 21 of the Companies Act.

The Food Gardens Foundation was established in 1977 under the name of Food Gardens Unlimited, as a socio-economic project to teach people to help themselves by growing essential food according to sustainable organic principles. Its vision is the empowerment of people to overcome malnutrition, famine and hunger. FGF achieves community development and social upliftment by teaching people small-scale low-cost organic food gardening. FGF has developed a system, which dynamically responds to the changing needs and status of the community. The basic system is based on sound agricultural principles that have been tried and tested over the past 25 years. FGF makes available training manuals and material to support the training of individuals and communities in Food Gardening and possesses the infrastructure and contacts to source and supply seed and other support for Food Gardeners.

FGF's motto is: "Maximum nutrition in minimum space with limited water and resources", and the broad aims are:

- to improve the physical, mental and social well-being of the communities in which it works;
- to help communities to develop sustainable Food Gardening projects by ensuring that they have sufficient knowledge, experience and support;
- to create in the individuals an awareness of their potential; and
- to create an awareness of environmental issues and demonstrate the options for conservation.

Fig 5-9 Lady selling flowers

5.4 PHASING OF PROJECT

5.4.1. PHASING OF DEVELOPMENT

Not all the housing components need to be completed at the same time. The project deadlines can be spread over a number of stages:

- Phase 1: Establish the framework for the development.
  The northwest corner of the housing development and the ARDP research facility.
- Phase 2: Landscaping of agricultural fields.
  This is implemented by the ARDP students with the help of local residents.
  Skills transfer workshops are offered to develop local skills in order to equip residents to complete the infill level of the units.
  Food Garden Foundation workshops teach people to help themselves by growing essential food according to sustainable organic principles.
- Phase 3: The southeast corner of the site to be developed with more mixed-use facilities.
  Residents complete own infill in residential units and make [?] additions to the first part of the housing scheme.
- Phase 4: Residents take control of the maintenance and benefits of the agricultural park.
- Phase 5: ARDP facilities to be remodelled into an organic market and nursery.

5.4.2 PHASING OPEN BUILDINGS

A central idea in Open Building is to respond to the various needs of individual users by means of the phasing of the design, decision-making, and implementation processes. Some decisions are postponed until the stage at which future users can be identified and involved in the planning. In order to provide prospective occupants with the opportunity to influence their dwelling, the elements selected by the resident must be easy to change. Thus adaptability is not merely a means of modifying the dwelling during use; it is first and foremost a strategy for enabling the fulfilment of individual wishes without compromising the rights of the succeeding occupants.

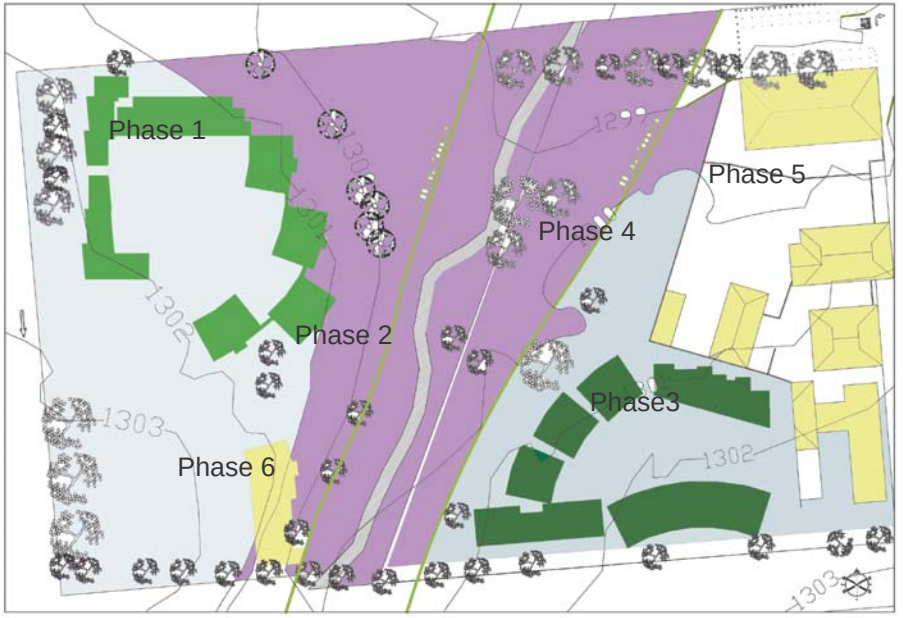


Fig 5-10 Plan: Phasing of the project

5.5 PROJECT PERFORMANCE GUIDELINES

Environmental sustainability

Social sustainability

Economic sustainability

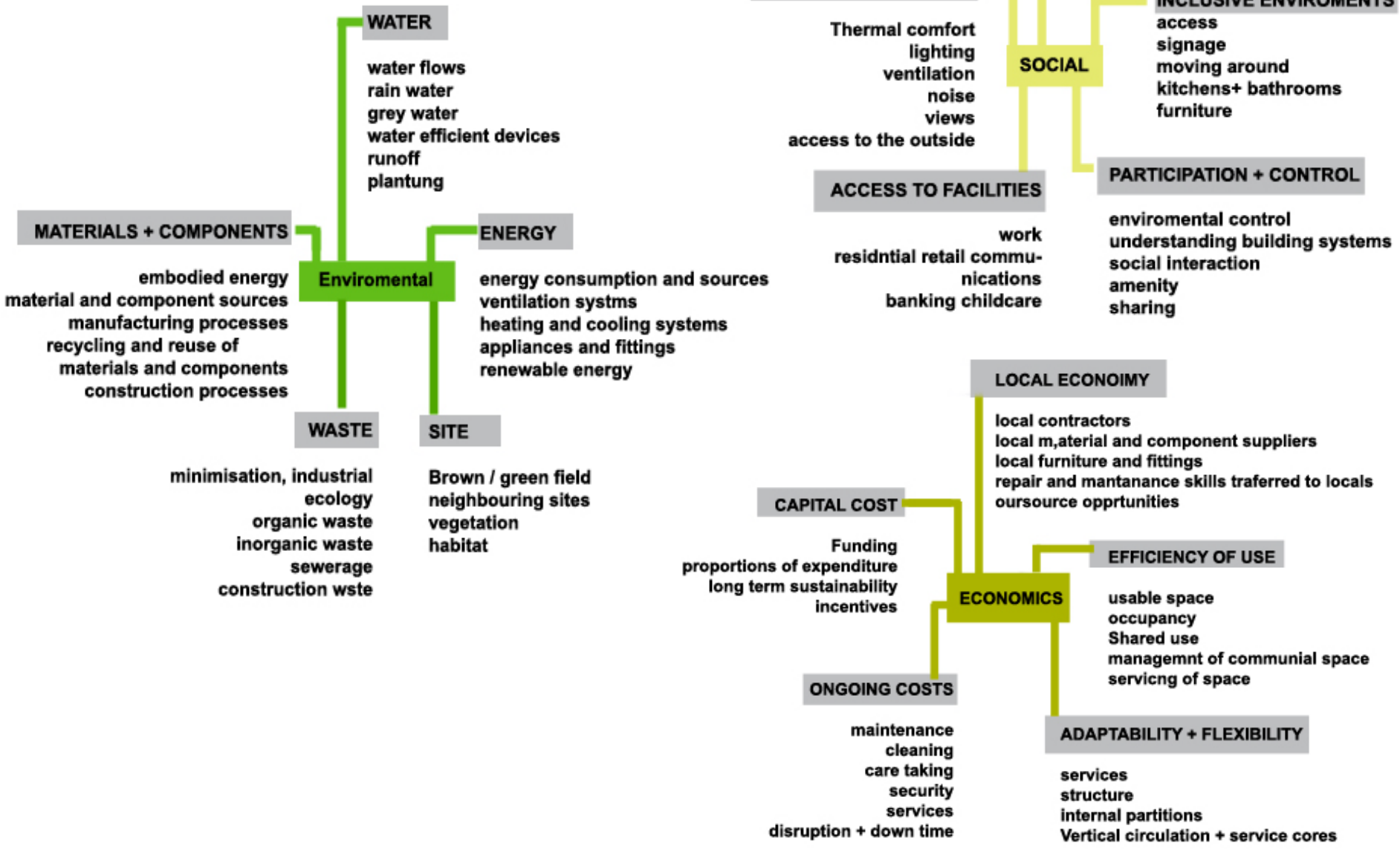


Fig 5-11

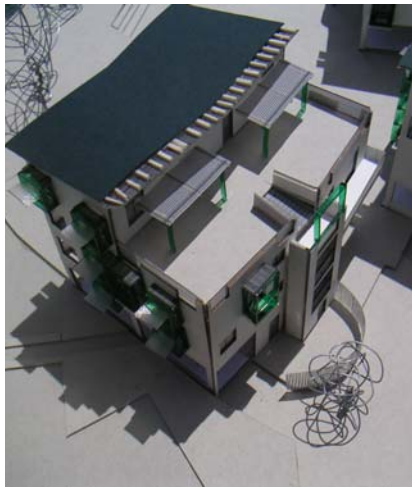


Fig 5-12

5.6 ACCOMODATION SCHEDULE:

SIZE OF TOTAL SITE: 25 037m²

NO OF HOUSING UNITS: 26

AVARAGE UNIT SIZE: 30 m²

m² PER PERSON: 15 m²

5.6.1 DENSITY.

High-density housing is envisaged, defined as above 60 units per hectare in the “Pretoria Structure Plan, 1993” A high density housing development normally covers 80% of the site and allows for 20% landscape. Because this site is zoned for open green space, and the main purpose of the architecture is to enhance the park, it appeared best to keep the density lower. When excluding the area designated to become the public park, the relationship between actual built area and number of units show that the development is in fact much denser.

5.6.2 RENTAL

The social scheme takes up 40% of the development and will be managed by a rental agency. The units will be made available to people with an income between R2000 and R7000 per month.

5.6.3 OWNERSHIP

60% will be sold as sectional title at market value.

5.6.4 PARKING:

According with the planning regulations, each unit will have its own designated parking bay. It can be argued that the parking is still excessive, especially or a development with a subsidized component. The proximity of public amenity’s and access to public transport should reduce the need for parking.

Fig 5-13 Nort East Elevation

DESIGN CHALLENGE AND RESPONSES

The challenges in designing the project include:

- Balancing the relationship between the built project and the green park space
- Creating a sense of place
- Forming thresholds between private, semi private, and public space
- Creating adaptable and versatile living units
- Creating spaces for communal use and social interaction
- Creating a safe environment
- Giving the residents the opportunity to gain socially and economically from the park
- Encouraging the residents to become proprietors

Fig 5-14 North elevation and view through to the courtyard

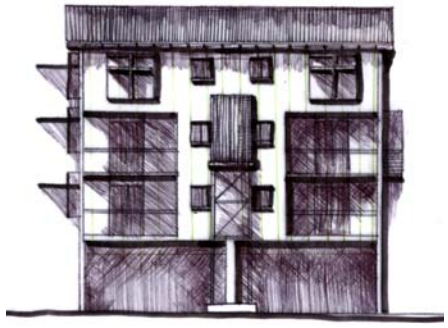


Fig 6-1

6

DESIGN PRINCIPLES AND IMPLEMENTATION

Fig 6-2 Sketch of Daspoort Ridge

Fig 6-3 Small Play nodes - like a basketball hoop and an adjacent bench - are located to serve small clusters of residents. (Newman,1999,p27)

6 DESIGNS: PRINCIPLES AND IMPLEMENTATION

6.1 URBAN DESIGN PRINCIPLES

The question of affordable housing in a highly segregated city is a problem with many dimensions. Moreover, the question of housing in the context of the South African city is a design and typological issue which must be considered on an architectural level, but most importantly, also on an urban planning level.

The book “Making urban places, Principles and guidelines for layout planning.” concerns itself with the quality of urban environments to produce layout plans with the ability to initiate urban environments of quality. It promotes the prioritizing of concerns, the recognition of functional and special relationships; making trade-offs, and understanding the social, financial, environmental and end-user implications of layout decisions. “It is neither possible nor desirable, at any one point in time to ‘design’ an urban settlement. Enriching urban environments are the result of successive collective and individual actions, and reactions over time.

The purpose of a layout plan is therefore understood to provide a spatial framework within which numerous collective and individual investments can be accommodated over time, in a mutually reinforcing and developmental manner.”(Behrens & Watson; 1996)

6.1.1 ROGERS URBAN TASK FORCE

A source of design guidelines by the Rogers Urban Task Force, led by architect Richard Rogers, drew up a set of basic principles for good urban design: (Lewis.S.2005 p 80) It promotes context specific layout planning responses to the particular cultural and natural features of a site. Context specific responses are central to the creation of a sense of uniqueness, or place, in urban developments.

They suggest the following:

- Respecting the site and setting.
- Respecting context and character
- Priority to the public realm
- Ensuring linkage and ‘fine grain’
- Using land efficiently.
- Mixing activities
- Mixing tenures
- Building durably
- Building to high quality
- Respect the environmental stock.

In summary, these design guidelines for urban housing includes the following issues for consideration:

Making Connections	Choice, permeability, activity, safety
Providing green areas and corridors	Legibility, variety, activity
Treating the streets as a place	Safety activity
Layout of the built form	Legibility, activity, neighborliness, safety
Absorbing diversity	Flexibility, variety
Defining public and private space	Choice safety, activity, privacy
Creating a relationship between buildings and spaces	Safety, activity, legibility
Arranging the building mass	Safety, legibility, energy efficiency
Optimizing solar potential and good aspect	Choice, energy efficiency, privacy
Managing and integrating parking	Safety, legibility, flexibility
Providing frequent and convenient access	Activity, privacy, flexibility
Mixing uses/ building in flexibility	Variety activity, adaptability, energy efficiency
Providing spaces around the home	Choice safety privacy
Meeting the ground-thresholds and interfaces	Safety, privacy, activity

(Lewis.S.2005)

Fig 6-4 Site: from the west.

Fig 6-5 Meeting the ground-thresholds and interfaces

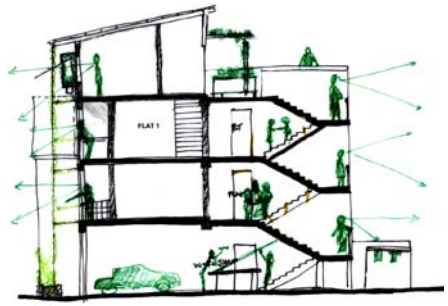


Fig 6-6 Connectivity:
Connecting places in the building to the park.
Creating places for social inter action

6.2 URBAN DESIGN IMPLEMANETATION:

Fig 6-7 Greenhouse and gardens in the openspaces between buildings.

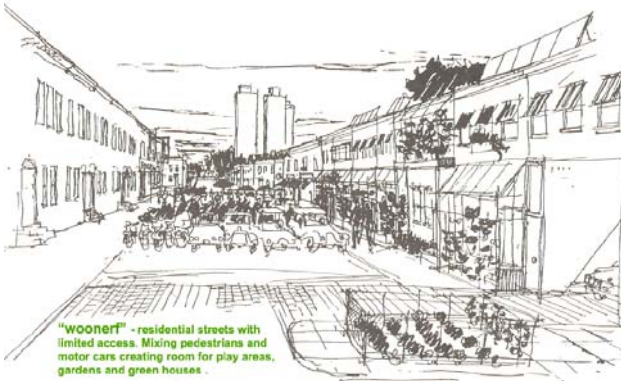


Fig 6-8

Fig 6-9

6.2.1 RESPECTING THE SITE –Building layout and orientation.

"Each act of settlement relies on articulated form to stimulate further interpretation. Given the increasing fluidity and variety of contemporary life, the functionalist approach may prove to be a short lived phenomenon. Inhabitation remains fundamentally territorial, and architecture may return to the articulation of space that is open to acts of inhabitation." (Habraken.1998p135)

To allow "the articulation of space that is open to acts of inhabitation': the main concern with regard to the placement of the buildings was to consider the park and the quality of the environment. The rectangular site is divided by the spruit and after consideration of the floodplains, the northwest corner and south east corner was deemed the most suitable position for development. The aim with the proposed buildings was firstly to allow the appropriation of the green space and to provide safe and secure living environments.

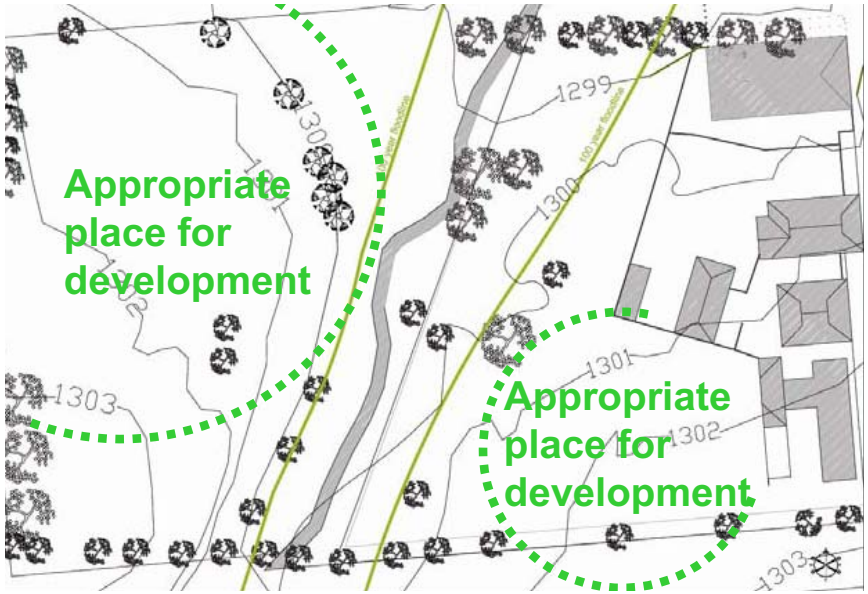


Fig 6-10

6.2.2 THE PERIMETER BLOCK

"The essence of urban architecture is how it negotiates the narrow margin available between territorial boundary and building façade" (Habraken.1998p167)

The three sided perimeter block defines the street edges. However, the design had to be cautious of turning its back on the agricultural park, where resident surveillance is important, and hamstringing the views over the green area.

In "Sustainable communities: A new design synthesis for cities, suburbs and towns", Calthorp and Van der Ryn offers examples of real and proposed environmental planning that promotes self-reliant cities. A prominent feature in the case studies is the courtyard and "woonerf" model.

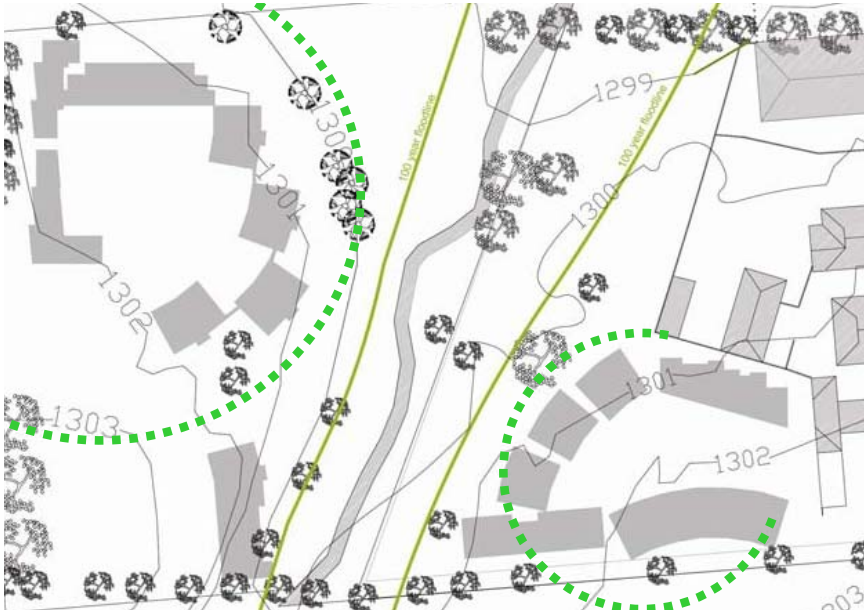


Fig 6-11 Placement of buildings on site.

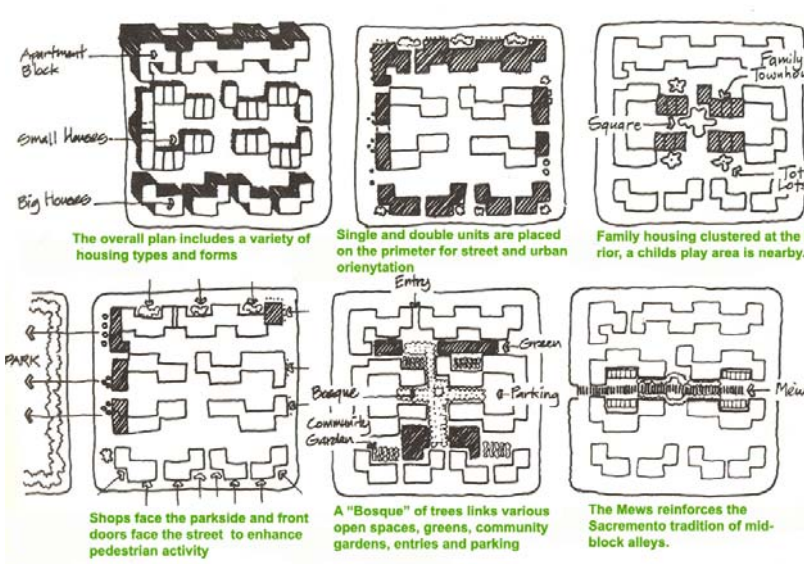


Fig 6-12

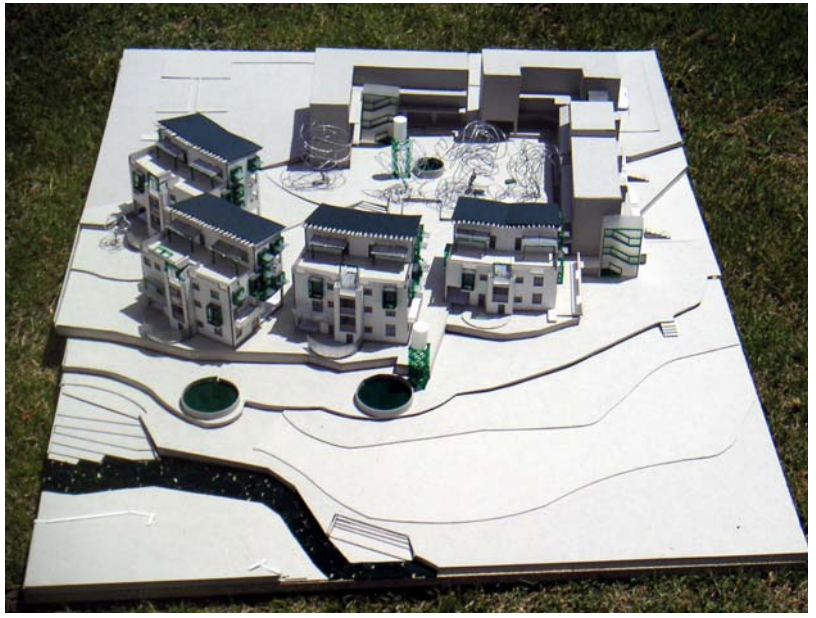


Fig 6-13 Model

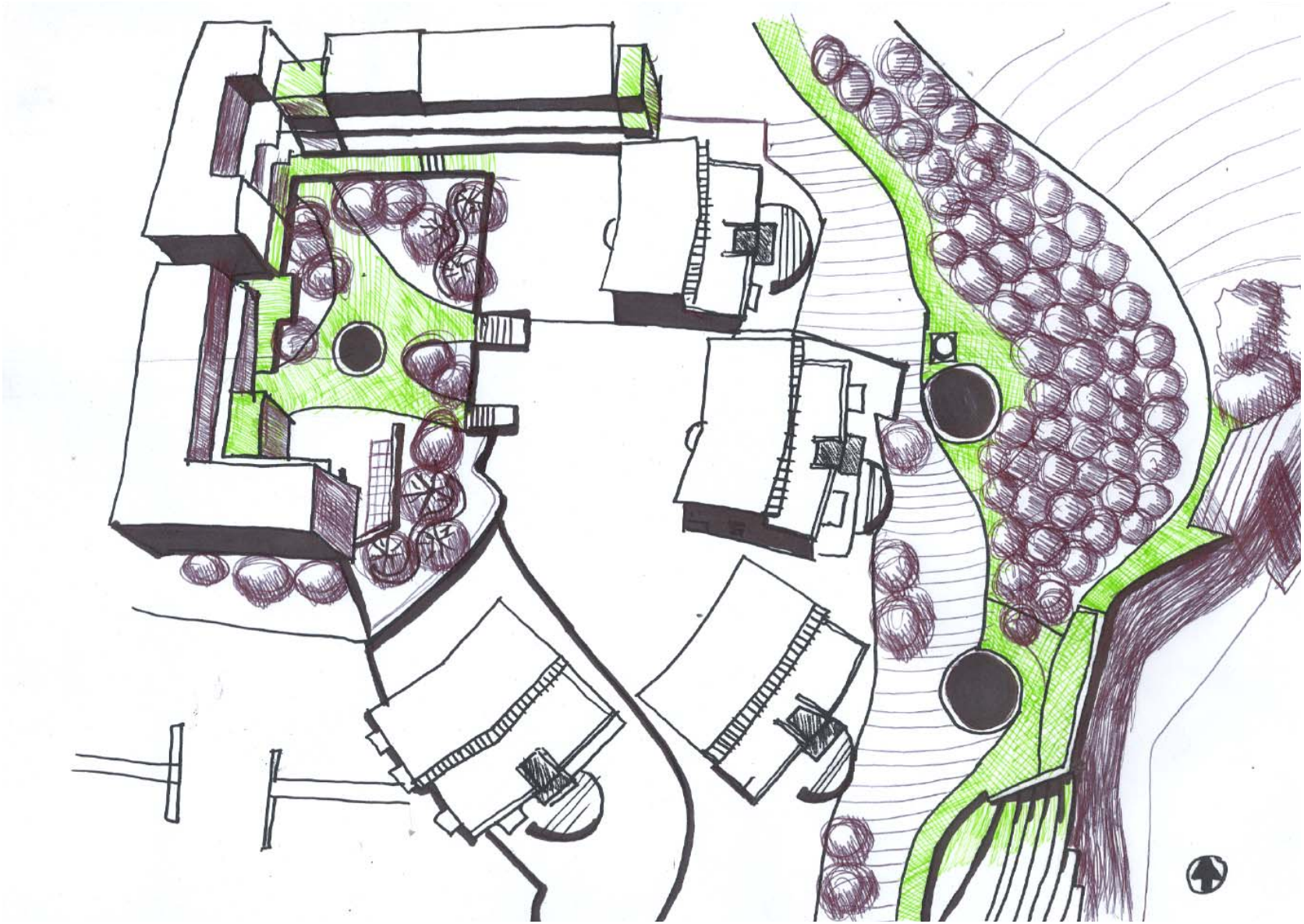


Fig 6-14 Sketch of site indicating defensible courtyard space

6.2.3 DEFENSIBLE SPACES

6.2.3 DEFENSIBLE SPACES

Oscar Newman is an architect and city planner known internationally for his work in community planning, assisted housing, crime prevention, and racial integration. His 'defensible space' concept has helped communities to redesign neighbourhoods for greater safety. Newman's theory of defensible space informed the decision and method of creating buildings with edges which contain various spaces. This also allows the creation of controlled entrances and exit points into the housing facility. The intention was to make the internal environments safe and secure for occupants – especially children. The ways in which the buildings are placed contribute to the surveillance and security of the facility.

The Defensible Space programs restructure the physical layout of communities to allow residents to control the areas around their homes. This includes the streets and grounds outside their buildings and the lobbies and corridors within them. The program helps people preserve those areas in which they can realize their commonly held values and lifestyles. "Defensible Space depends on resident involvement to reduce crime and remove the presence of criminals. It has the ability to bring people of different incomes and race together in a mutually beneficial union. For low-income people, Defensible Space can provide an introduction to the benefits of main-stream life and an opportunity to see how their own actions can better the world around them and lead to upward mobility. "(Newman, 1996.p9)

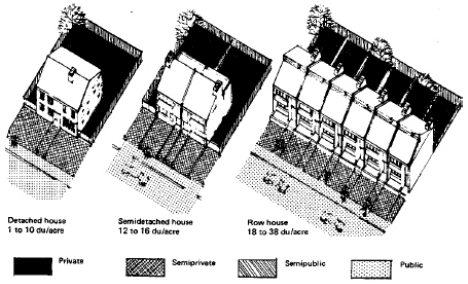


Fig 6-15
Three types of single-fami9ly houses and the nature of spaces in and around them.(Newman,1999, p27)

-all interior spaces are within the private domain of the family.
-all grounds around the private unit for the private use of the family.
-there is a direct abutment between private grounds and the sidewalk.
-the domain of the house encompasses the street.

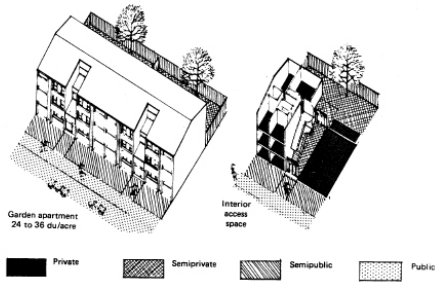


Fig 6-16
Walkup buildings and the nature of spaces in and around them. (Newman,1999,p 27)

- private spaces is within the apartment unit only.
-The interior lobby, stairs and corridor are semi private.
- Grounds can be designated for opne family but are usually shared by all the families in the building.
-Only a small number of families (three to six) share the interior circulation areas and grounds.
- The street is within the sphere of influence of dwellings.

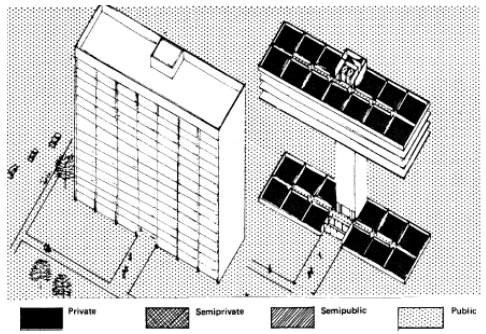


Fig 6-17
This elevator highrise and the nature of space in and around it. (Newman,1999,p 27)

- Private space exixt only within the apartment units.
- The interior circulation areas and the grounds are public.
-There is no association between building and street

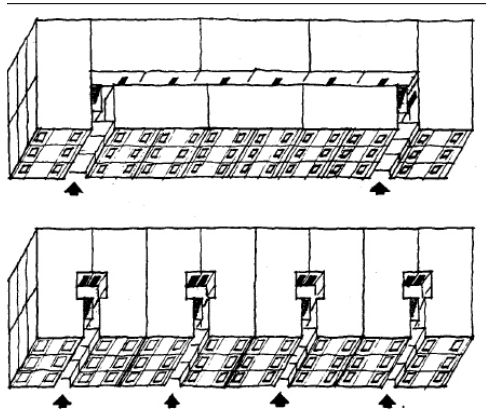


Fig 6-18
Comparison of two ways to subdivide the same building envelope to serve the same number of families, but in radically different ways. (Newman,1999,p 27)

Case Study: CLASON POINT , New York.

Photographs of an area of Clason Point a neighborhood in the Bronx, new York City. The original layout provided no grounds in the front of units for individual residents. In the site redesign, the central green area, which was largely neglected, was removed and residents were given their own front yards and a childrens play node was also added. (Newman,1999,p76)

Fig 6-19

Fig 6-20

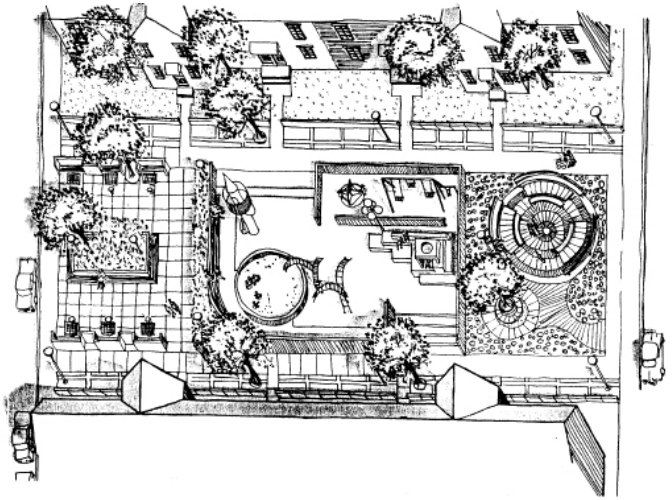


Fig 6-21
Plan for the conversion of the central area into a facility serving, from left to right the elderly, young children and teens (Newman,1999,p27)

Fig 6-22
The central area as modified. Note that the extended front yards of neighboring homes now border the central area, bringing a bigger area under the residents control (Newman,1999,p27)

Fig 6-23 Layout of the built from:
Safety - perimiter block
- eyes on the street
Courtyard - play area for children
Oppertunieties for neighbors to interact

Fig 6-24 Defining public, semi private and private space

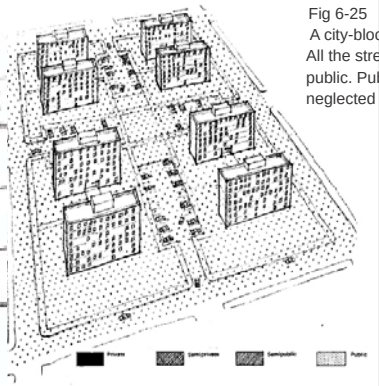


Fig 6-25
A city-block highrise development. All the streets and grounds are public. Public space tend to become neglected and dangerous

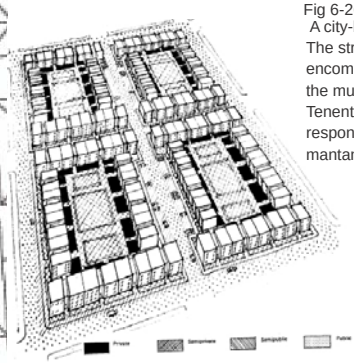


Fig 6-26
A city-block highrise development. The streets and grounds are encompssed within the domain of the multifamily dwellings. Tenents temnd to take responsibility for the safety and mantanence of the public spaces

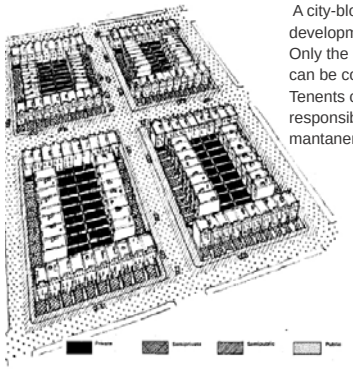


Fig 6-27
A city-block-row-house development.
Only the central portion of the road can be considered truly public. Tenents can easily take responsibility for the safety and mantanence of the public spaces

6.2.4 ACCESS CONTROL – Inhabitation and territory

Rather than focusing on how different parts of the site environment is demarcated and governed by territorial rules, we seek to determine how territorial boundaries can be demarcated and deduces by other means. In short, the interest lies in the overlapping relationship between physical form and territorial control. “On the one hand humans express territory explicitly – building walls, making gates, and placing marker stones. On the other hand, we draw implicitly understood territorial boundaries as custom and inhabitation dictates, within the artificial landscape of the built environment. Often as the shopkeeper’s claim of sidewalk space is marked by the placement of wares, territorial boundaries are drawn by setting lower level objects in relation to architectural form. Territory interprets architecture, but by no means in strict obeisance to it.” (Habraken 1998 p 132)

Private and Public space: The neighbourhood, as one territory, exhibits two kinds of space: space occupied by houses (private space) and other space (public space) Territory refers to a unit of special control. Private and public refers to space, but not to territory. There is a clear designation of space as private and the degree of privacy it affords. Territorial depth is measured by the number of boundary crossings needed to move from the outer space to the inner most territory.

The Design of low boundary walls that separates the patio form the park provides a threshold between semi private and public space.

Parting walls and territorial boundaries: Walls between neighbours are another aspect worthy of comparison. Different approaches to building parting walls reflect profound differences in conceiving the environment.

The western European model separates acts of settlement, utilizing a geometric structure that includes house lots. It creates a predetermined framework of relatively shallow territorial depth. The Middle Eastern model, devoid of predetermined geometry, recognizes only the act of settlement and produces over time a relatively deep territorial structure. Externally, one is a form containing settlement; the other is settlement generating form. (Habraken 1998 p 150)

Fig 6-28 Zoning

Fig 6-29 Diagram to explain placing of buildings on site

6.2.5 URBAN DESIGN INVESTIGATION

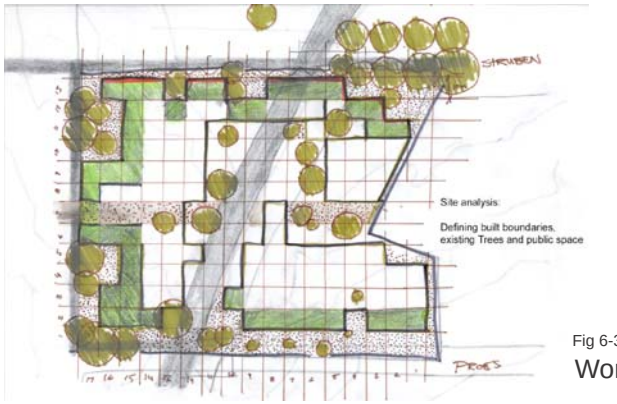


Fig 6-30
Working around existing trees

Fig 6-31
Defining the street.

Fig 6-32
2 access points

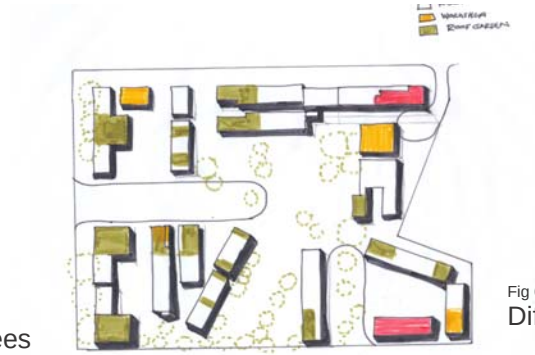


Fig 6-33
Different tenures

Fig 6-34
Allowing for communal
open green spaces

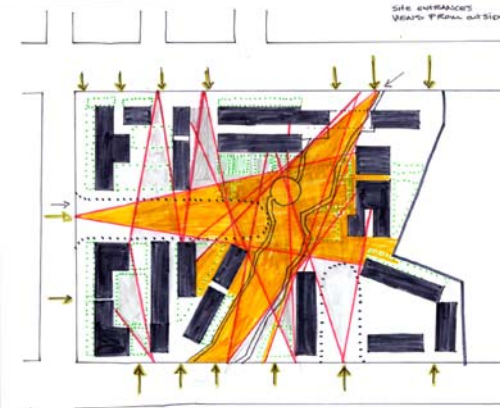


Fig 6-35
Views towards die
middle of the site

Conceptual investigation: creating perimiter blocks and internal spaces .

Fig 6-36 Concept sketch - April 2006
Investigating the Courtyard

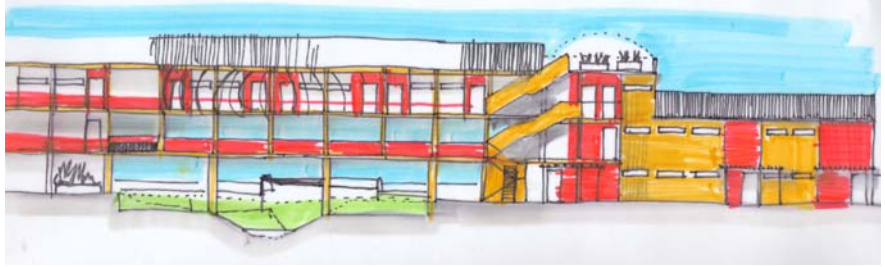


Fig 6-37 Concept sketch - April 2006
Experimenting with the idea of bridging the spruit.
Very high density

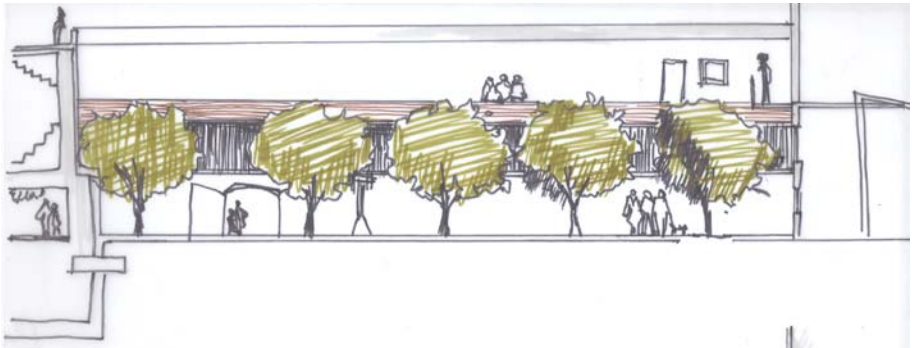


Fig 6-38 Concept sketch - April 2006 Relationship between the trees and the building

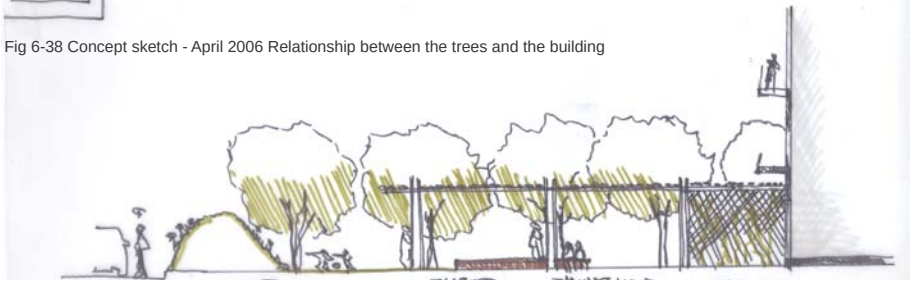


Fig 6-39 Concept sketch - April 2006
Green transition zones - Using landscaping to protect the building from the road.

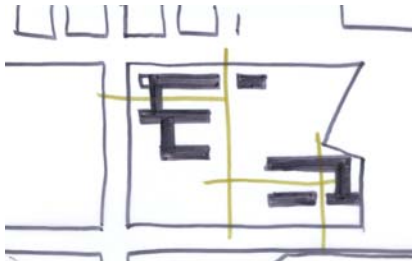


Fig 6-40 Concept sketch - April 2006
Determining access points and building edges

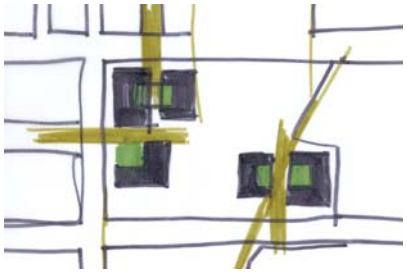


Fig 6-41 Concept sketch - April 2006
Permiability of the Perimiter block and balancing the relationship between building and open space

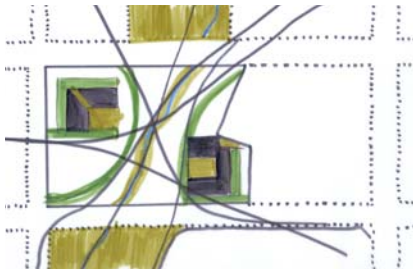


Fig 6-42 Concept sketch - July 2006
The imposrtance of openspace. Connecting the internal green areas with the green link along the spruit

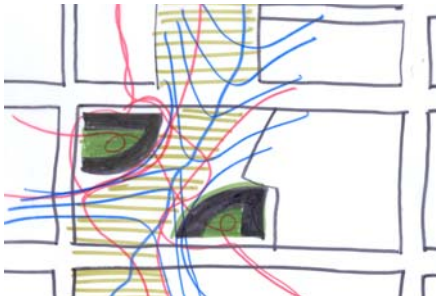


Fig 6-43 Concept sketch - June 2006
establishing the green corridor as a north south axis along the spruit

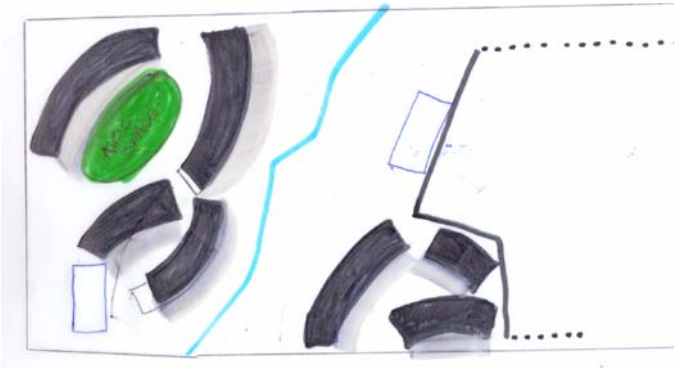


Fig 6-44 Concept sketch - June

Fig 6-45 Concept sketch - July

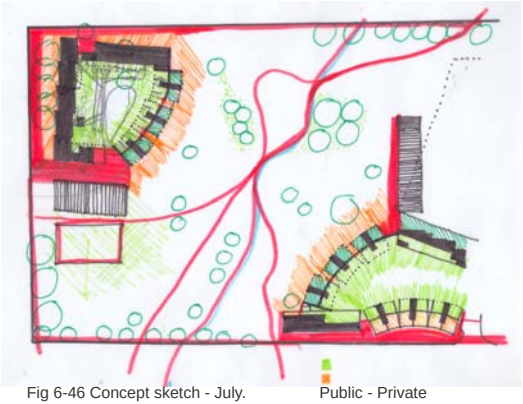


Fig 6-46 Concept sketch - July. Public - Private

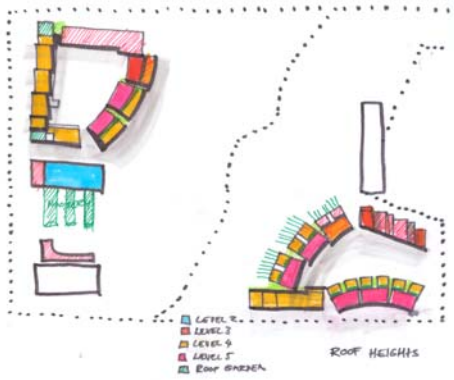


Fig 6-47 Concept sketch - July Building heights

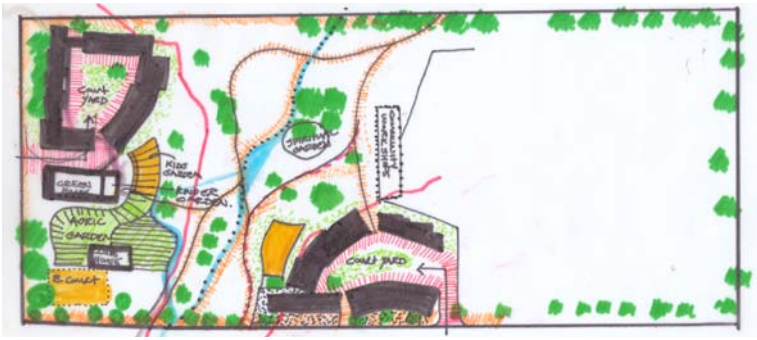


Fig 6-48 Concept sketch - August
Working to create a connection with the landscape

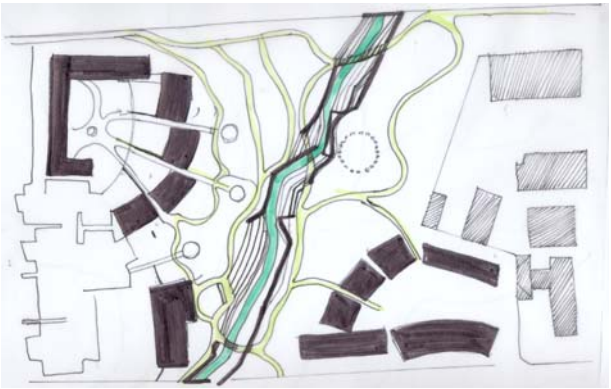


Fig 6-49 Concept sketch - September
Walkways connecting different parts of the development

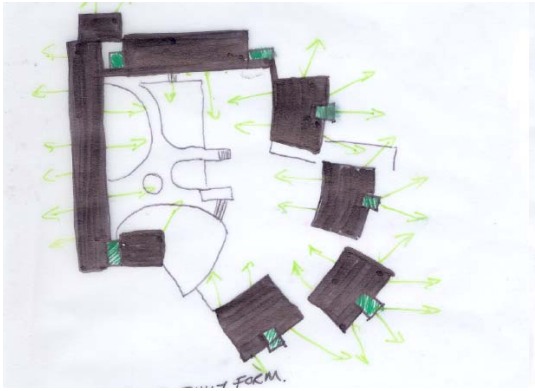


Fig 6-50 Concept sketch - September
Sitelines and views from the housing blocks

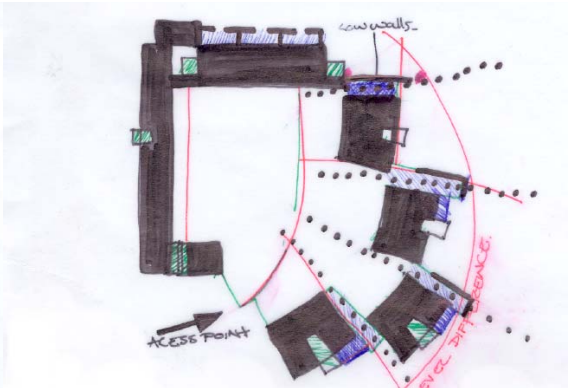


Fig 6-51 Concept sketch - September
Level changes and access points

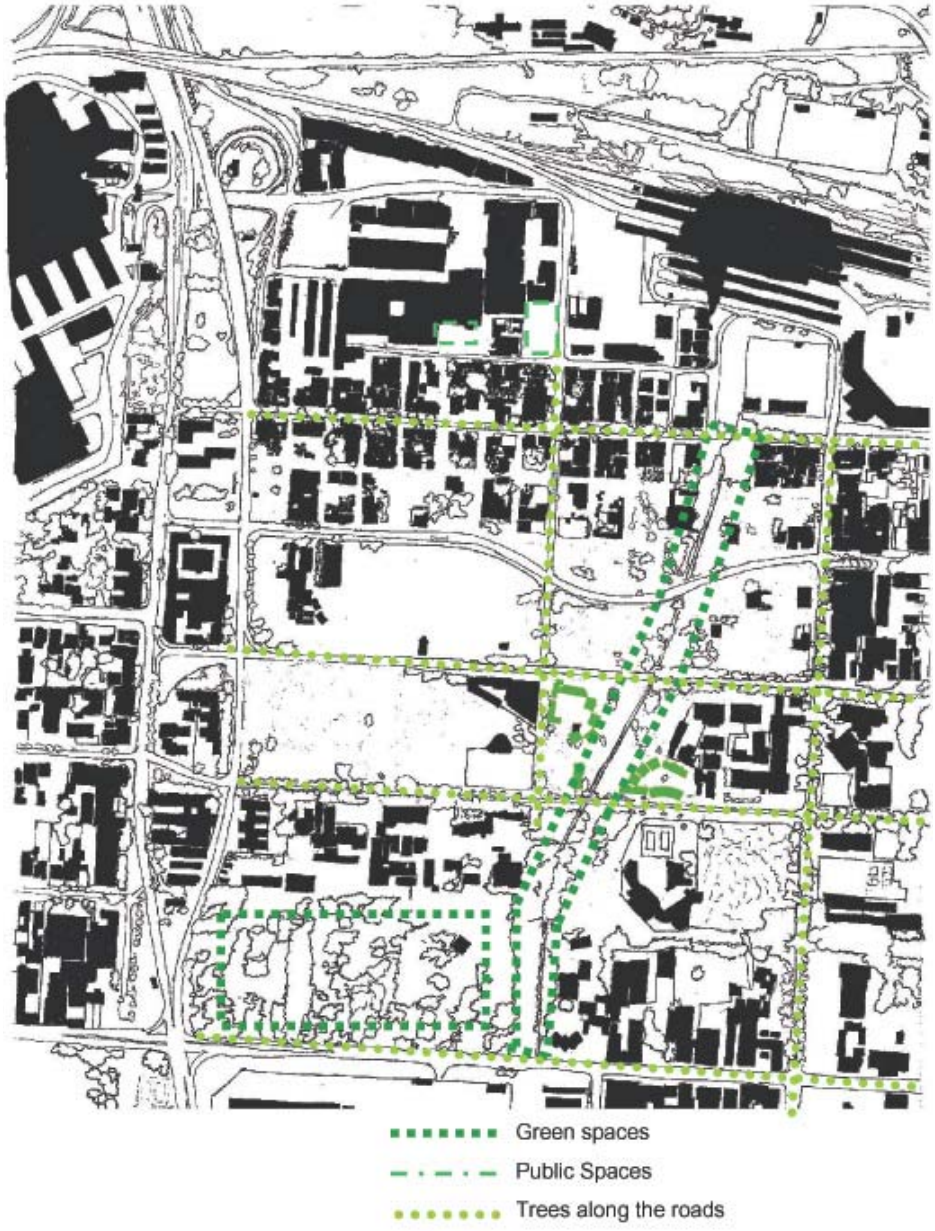


Fig 6-52 Figure ground study with highlighted green spaces

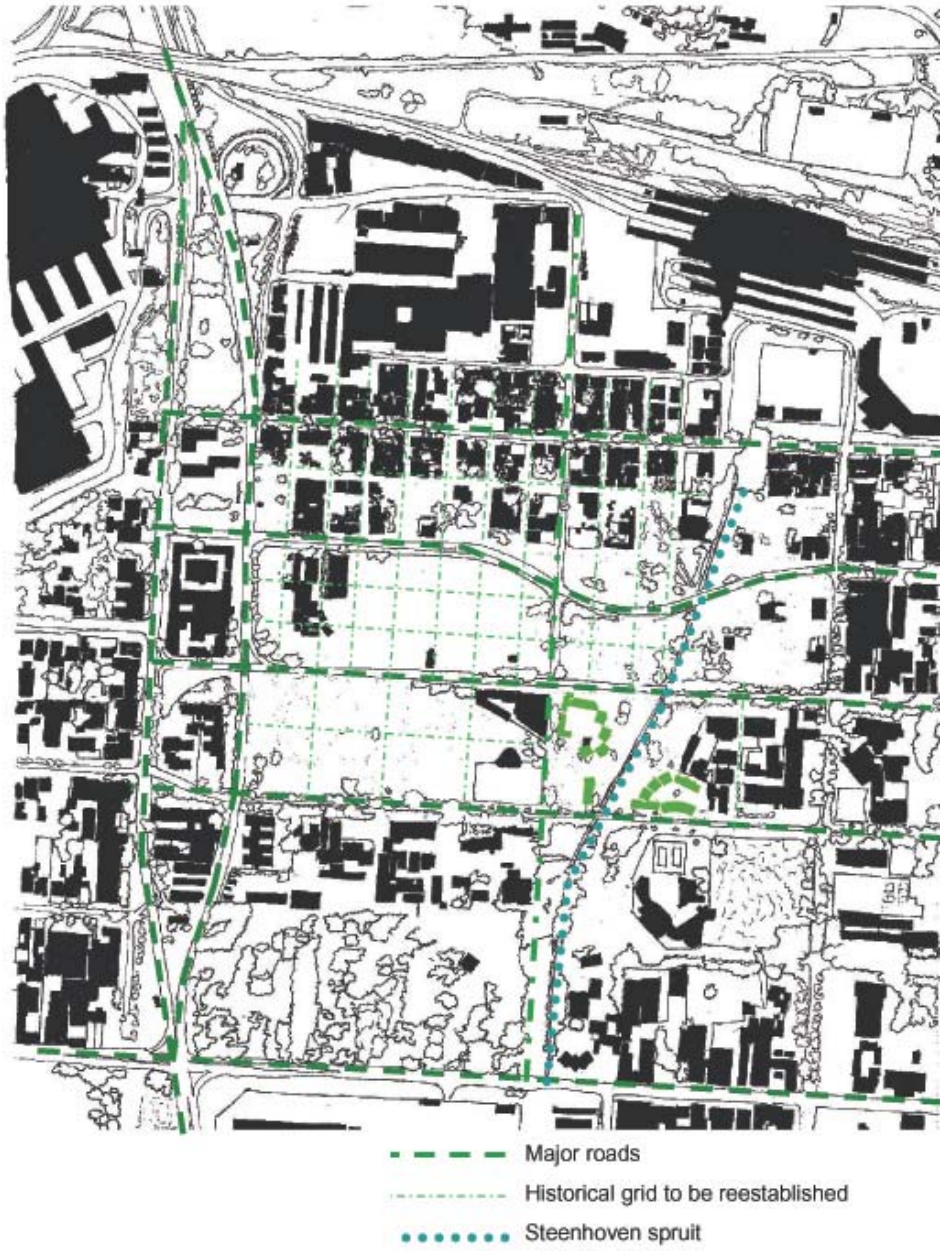


Fig 6-53 Figure ground study with road grid

6.2.5 INTEGRATION AND ACCESS TO THE PARK

Public Space is commonly defined as space used by those who do not individually control it. Entering the public realm form private space is a fundamental right; the door to public space is always open, and there must always be public space we can move out to. Public space is commonly shared among those from similarly included territories. Once one enters public space, by right or by admittances, one is free to walk in public parks, sit on public benches, and use, for a fee, public telephones. In addition to using space we also use things. Control of things is an immediate hands-on affair. To use and, manipulate things we move downward into the territory of the person in direct control: a person who is actually there. The unhappy fate of uncontrolled telephone booths and public toilets offers proof that this territorial reality cannot easily be denied. (Habraken 1998 p 158)

The human body implies territorial presence and people claim territory through the use of space. Therefore, being in a public space means partaking in a game of instant territorial reconfiguration, shifting as people use things: sitting on benches, waiting for buses, parking cars, entering telephone booths or standing on the side walk.

The building is divided into blocks separated by approximately 2 meter wide pathways. This is to allow the park to be viewed and accessed from the inner courtyard with the intention that it would assist people in claiming territory through the use of the courtyard space. Each block has a central staircase that leads up from the communal ground floor to the roof gardens and overlooks the park. The ground slopes away from the buildings. This level difference and terraces creates a physical boundary between the park and the building, without interfering with the visual connection.

Fig 6-54 South Facade

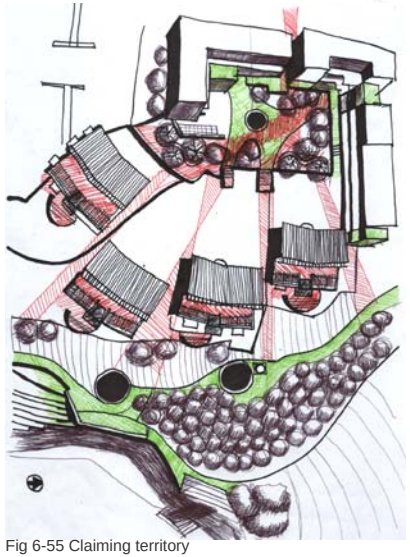


Fig 6-55 Claiming territory

Fig 6-57 Central staircase.

Fig 6-56 Building and landscape

Fig 6-58 Integration with the park


Fig 6-59


Fig 6-62 Coloured Jo-Jo Tanks


Fig 6-60


Fig 6-61 Irregation sytem

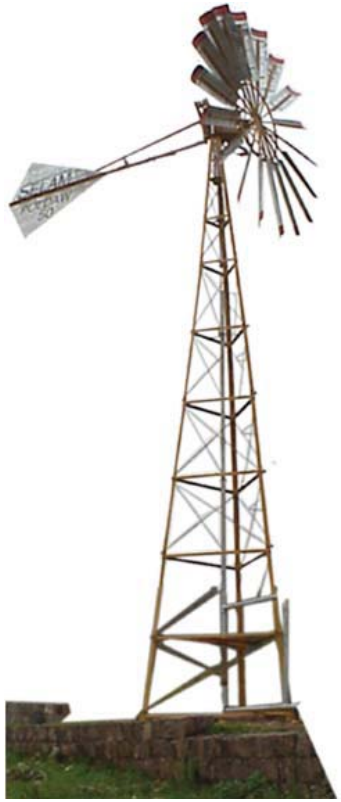


Fig 6-63 Wind mill

6.3 ECOLOGICAL PRINCIPLES:

Ecological buildings create room for living, and the object is to enable people to live in a healthy way without damaging the environment or spoiling the legacy they leave for future generations. A house that harmonizes human needs, technology and ecology should not only be a privilege for the affluent. This project intends to show that a green lifestyle can bring aesthetic enrichment. Today an eco-friendly home does not necessary require more money, just more thought and planning. Ecology in building has less to do with expensive technology than with durability and quality.

6.3.1 RAIN WATER HARVESTING

Rainwater should be harvested, collected and stored for use in the gardens. Storm water on ground level need to be controlled and also used in the garden.


Fig 6-64 Water Tower

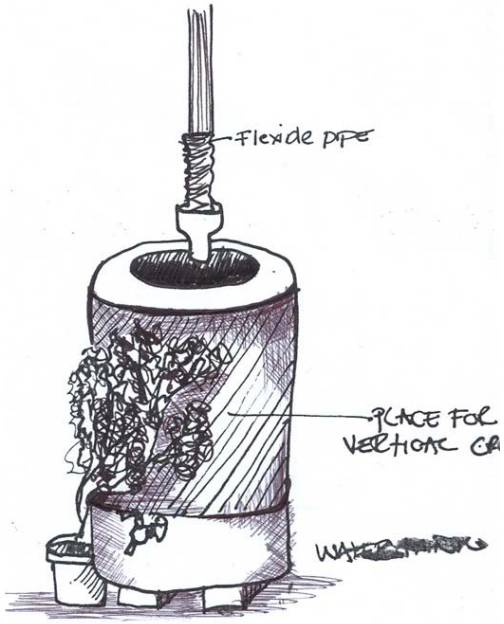


Fig 6-65 Storing rain water.

6.3.2. RUNOFF.

The site slopes towards the spruit. If the runoff is not properly controlled it can cause erosion. The best solution is to design to prevent excessive storm water runoff and to deal with runoff near its source. The further the runoff travel the faster it moves the greater is the erosive force.

Reaction in design: Control and minimizing hard landscaping by using pervious or absorbent surfaces and other paving solutions for the parking area and incorporating bioswales, linear, planted drainage channels into the design.

A typical bioswale moves storm water runoff as slowly as possible along a gentle incline, keeping the rain on the site as long as possible and allowing it to soak into the ground. At the lowest point of the swale there is usually a raised drain inlet that empties any overflow (during particularly heavy storms) into the nearest waterway. River rocks and small wooden check dams placed at 30-foot intervals, for water to pond and thus time to infiltrate the ground. Plants slow down the water flow and increase infiltration and biologically breaking down water pollutants. The water quality can be improved by filtering pollutants before entering the waterway. Bioswales functions particularly well in parking lots.

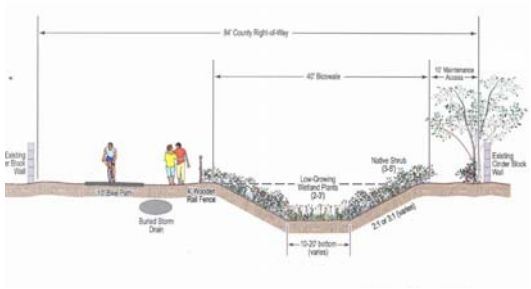


Fig 6-66 Bioswale Typical Cross Section.

Fig 6-67 Bioswale

6.3.3 WATER CONSUMPTION

Devices that can minimize water usage from the main water supply should be specified. Devices that can be used are:

- Dual flush toilet system, connected to the grey water supply.
- Aerating shower heads.

6.3.4 ENERGY CONSUMPTION

Appliances and fittings: Energy efficient fittings and devices should be specified. All light fittings in semi private and communal areas to be fluorescent or low energy consumption.

Solar technology is used for the light fittings in the landscape.

6.3.5 RECYCLING AND REUSE

Inorganic waste:

Residents are to be educated and encouraged to recycle. All recyclable waste should be sorted and stored in bins provided.

Organic waste:

A composting site will be established for suitable vegetation and kitchen waste.

6.3.6 MATERIALS AND EMBODIED ENERGY:

Low embodied energy materials include locally made and sourced timber, concrete, concrete blocks. Materials and component resources should be renewable. The building and construction process should be designed to minimally impact the environment.

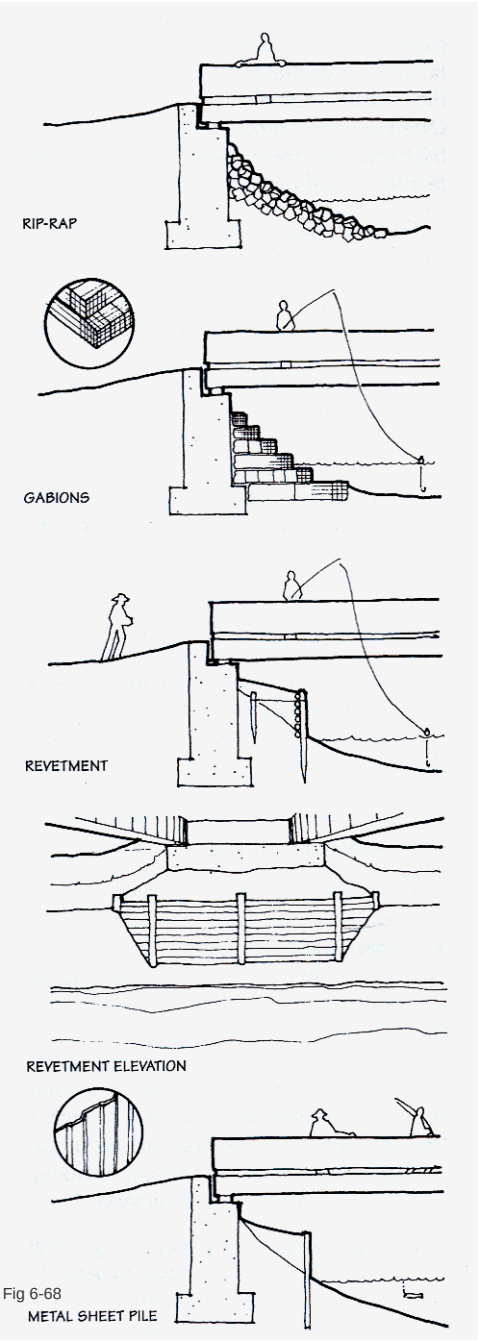


Fig 6-68

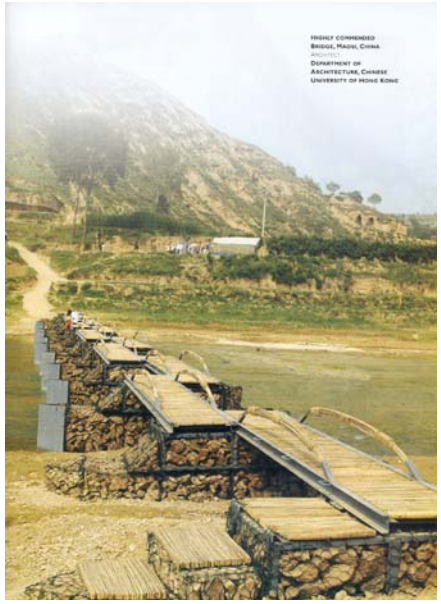


Fig 6-69 River crossing

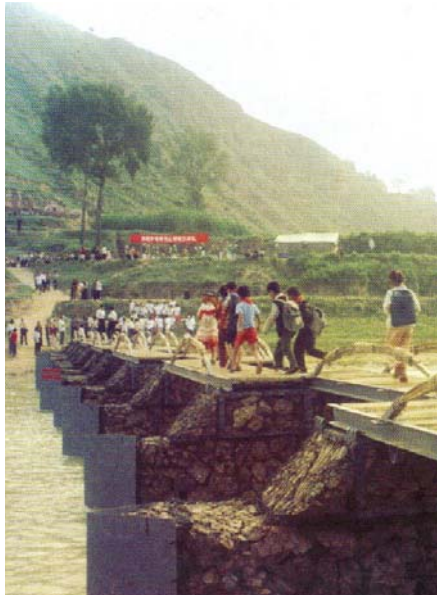


Fig 6-70 River crossing

Fig 6-71River crossing.

Fig 6-72 Timber foot bridge

Fig 6-73

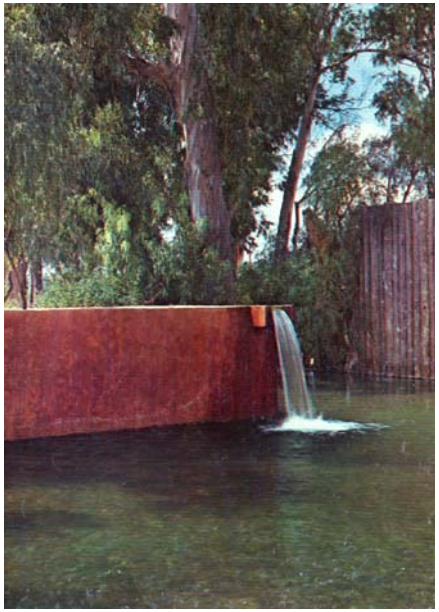


Fig 6-74 Baragon

Fig 6-75 Baragon Landscape

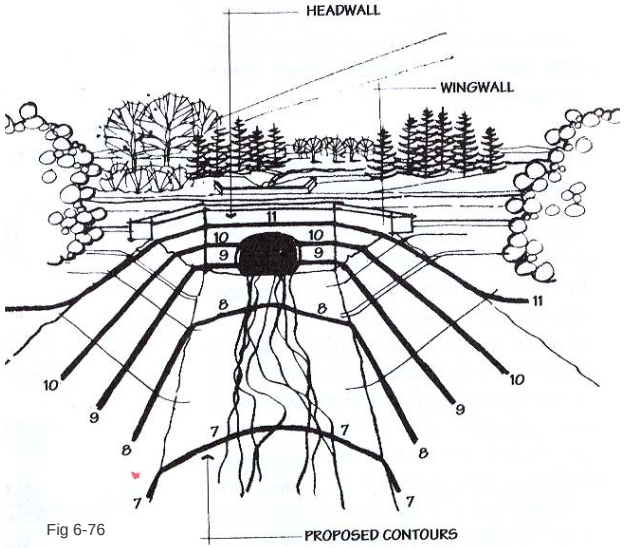


Fig 6-76

Fig 6-77

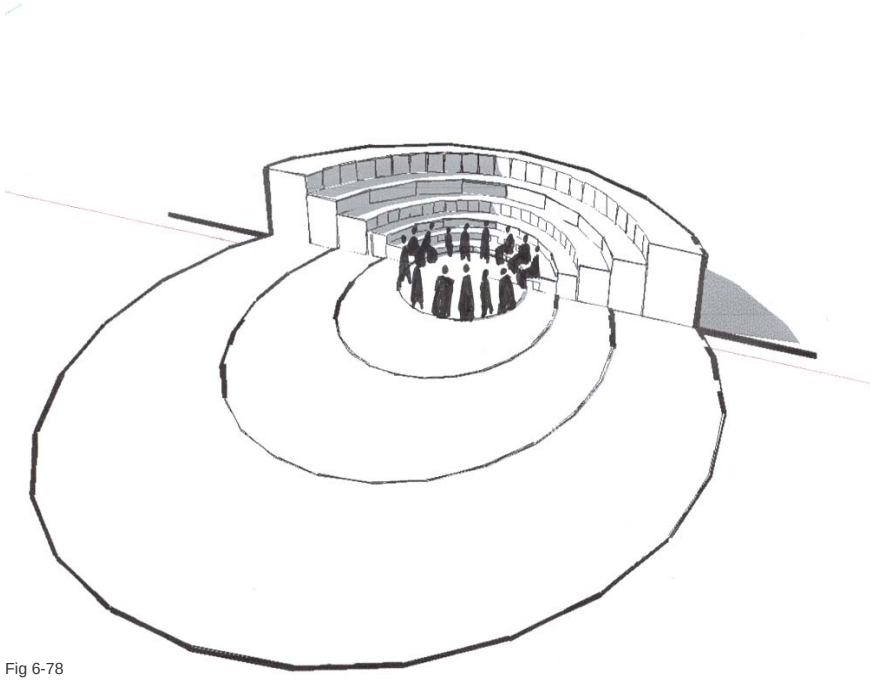


Fig 6-78

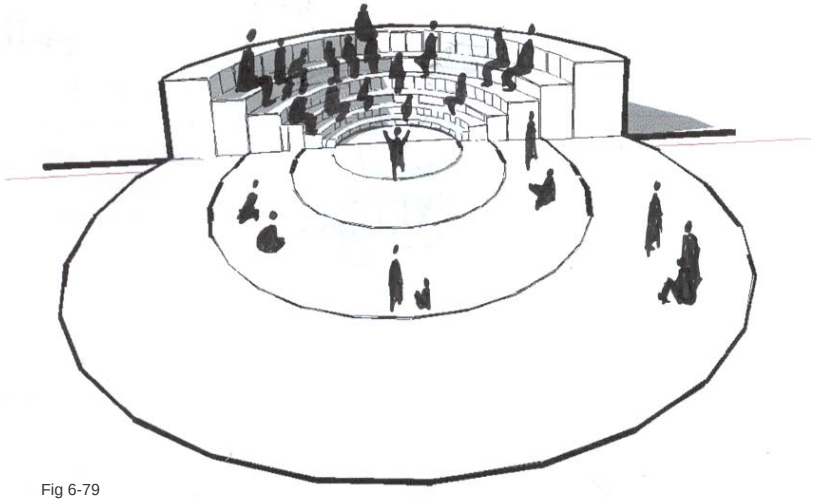


Fig 6-79

Fig 6-80

Fig 6-81

Fig 6-82

Fig 6-83

6.5 LANDSCAPE - SPIRITUAL CIRCLE

Fig 6-84 Spiritual circle on site plan.

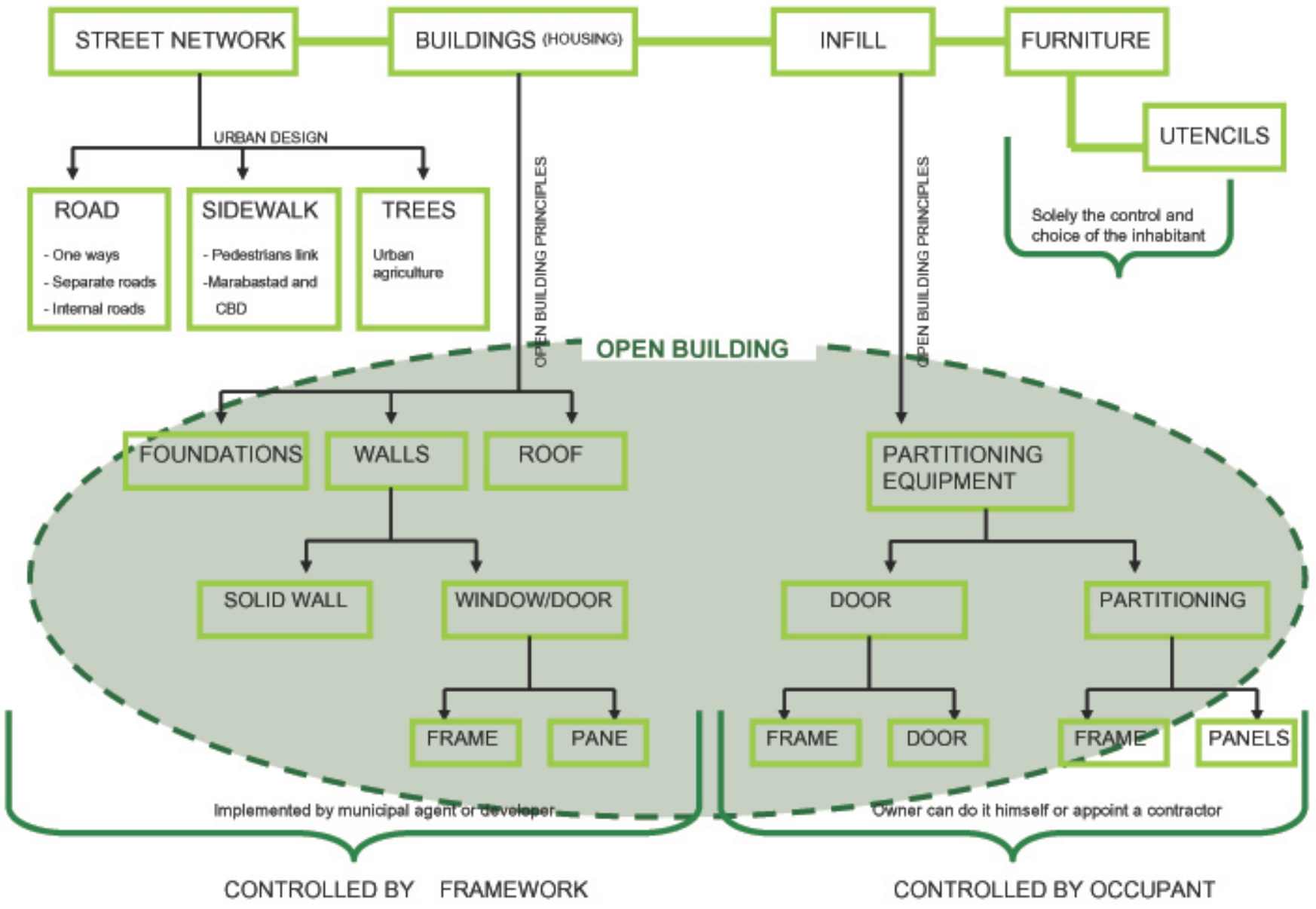


Fig 6-85 Diagram of levels defined for the initiation of the project.

6.6 OPEN BUILDING PRINCIPLES

- A distinction is made between ‘base-building’ and ‘fit-out’. The base-building serves as a standard collective facility; and the fit-out is different for each unit.
- The base building includes parking and pedestrian circulation; both horizontally and vertically.
- The base building includes public gardens; on the ground level and on the roof.
- It is essential to set down clear rules for separation of base building and fit-out to enable the clear distribution of design responsibilities

6.6 IMPLEMENTATION OF OPEN BUILDING PRINCIPLES:

6.6.1 FORM

The form of the base building creates a connection to the landscape and generates inner courtyard space for communal activities. Breaking away from a square courtyard pulls the development closer to the park and the openings create the physical connection.

The curved form lets the building seem like a single complete and integrated entity. If the four blocks where to be aligned in a straight line, the pathways between the blocks would be much more evident, breaking the building into 4 obviously separate units.

Fig 6-86 Model

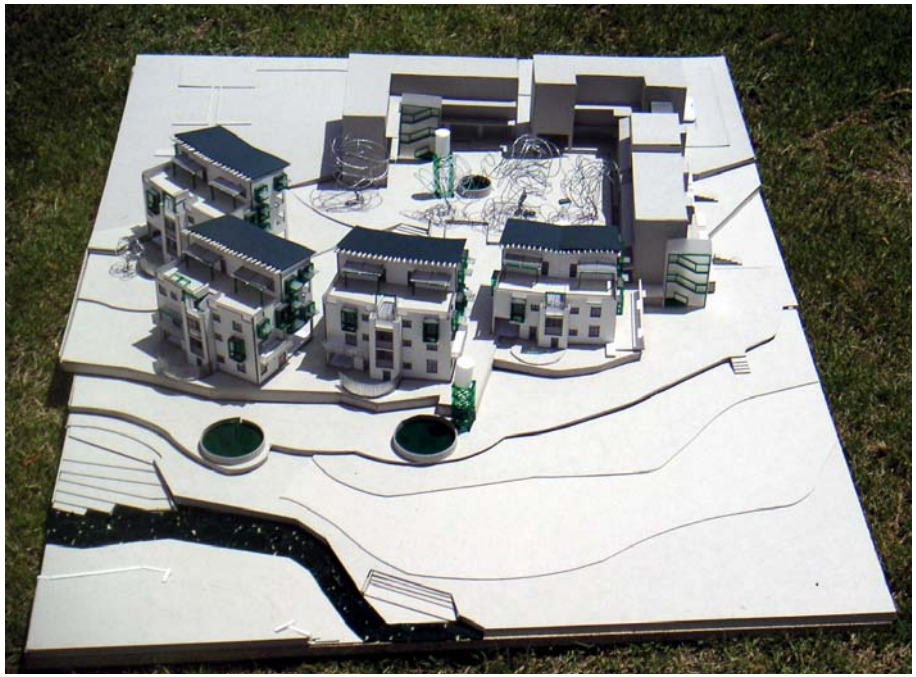


Fig 6-87 Model

6.5.4 CLIMATE CONTROL

The orientation of the building is a challenge. In order to keep a direct connection with the park the building faces predominantly East-West. Each block is slightly turned and the facades seldom face directly West, East, South or North respectively. The western façade remains problematic because of the excessive heat gain during summer. The handling of the facades becomes very important in order to make them responsive towards climatic changes. Each facade is designed individually according to the climatic needs. The north and western facades will be protected by roof overhangs, balconies or shading box devices. The façade design also keeps privacy and good neighbourly principles in mind.

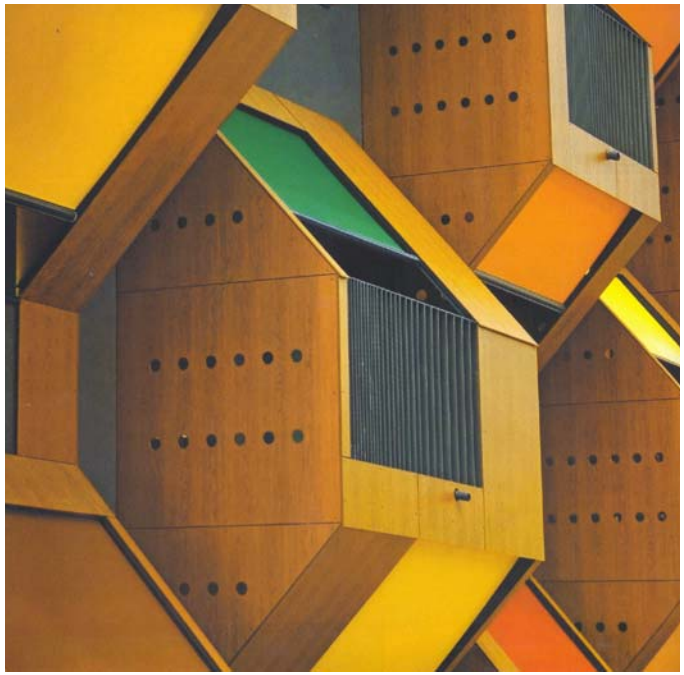


Fig 6-88
Apartment Bloks
Izola, Slovenia
Architect: Ofis Arhitekt

Wooden shading boxes and colourful blinds provide shade and privacy

6.5.4 BUDGET AND AFFORDABILITY

Cost cannot be treated as an after thought. In order to keep the building feasible and accessible for lower income groups, a stringent budget must be adhered to.

The design tries to be viable for a variety of cost models. Important cost factors include the efficiency of the design of the unit, especially as far as circulation space is concerned.

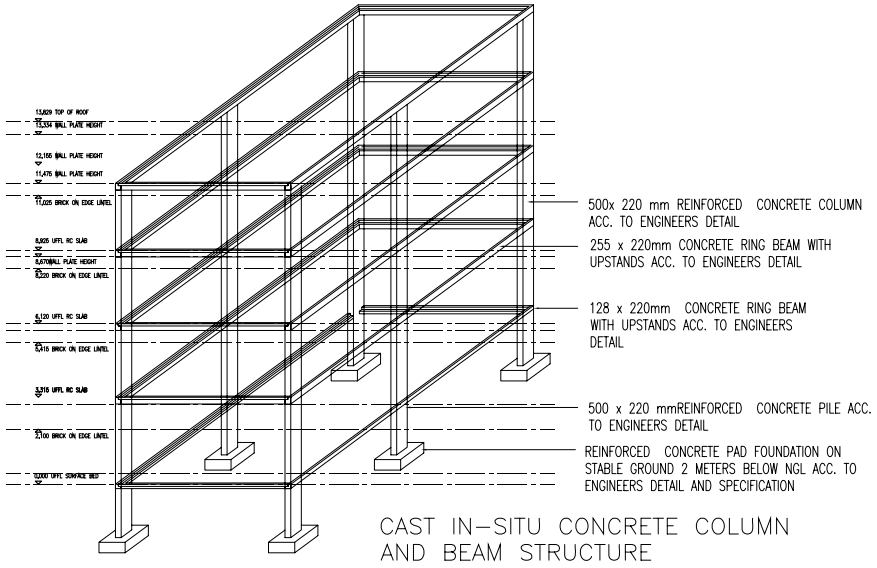
Construction cost saving decisions include the use of standard door and window systems , pre-cast flooring system and alternative local and low-cost materials.

6.5.5 DESIGN FOR CHANGE AND ADAPTABILITY.

"Knowing that partitioning dominates furniture (and much else in the enclosure hierarchy) may be a matter of custom and convention"

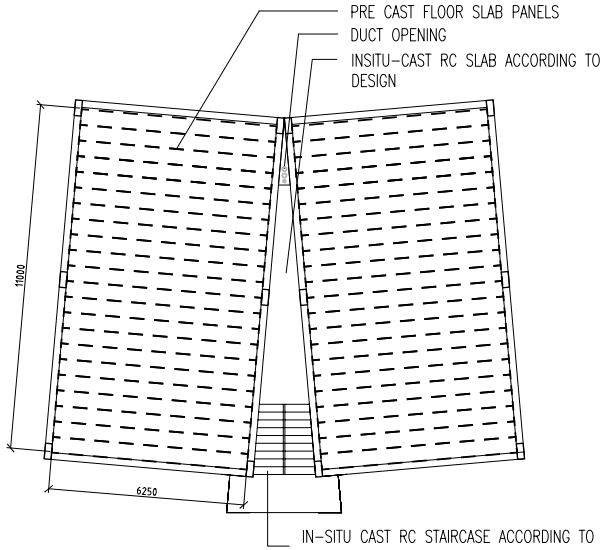
(Habraken 1998 p.97)

It is hard to determine where form imperatives end, and where habit and consensus begins; and even more difficult to break away from conventional practice, because it traditionally suits us best in living with complex from. What is truly conventional is not noticed. Therefore we tend to perceive all such dominance as inherent in the form.



STRUCTURE

Fig 6-89



PRE-CAST FLOOR SLAB PANELS

Fig 6-90

6.5.2 STRUCTURE

The ordering effects of gravity are most easily recognized in the frame, which represents a function rather than any particular shape. (Habraken 1998 p. 109)

Frameworks are singular entities created solely to organize support and resisting gravity. They distribute lower level parts in three dimensional spaces, after which lower-level configurations connect and relate among themselves as required. The Framework is not a principle of form but arrangement of it. It is recognized more by its function of holding things in their proper place and relation, rather than by any particular configuration or shape.

6.5.3 FORM OF THE STRUCTURAL FRAME

Two rectangles are joined at the top. The dimensions of the rectangle are defined by the span of the floor panels and size of the living units. The two rectangles are turned away from each other at 5 degrees from the midpoint. This opens up the space for the central staircase.

6.6 UNIT DESIGN:

The units are designed in such a manner that only minimal internal walls are necessary. The internal walls of the apartment can be of robust chipboard wall partitioning or similar system, so that the owner will be able to insert or remove infill walls according to their needs. Units can be easily joined to from bigger family apartments.

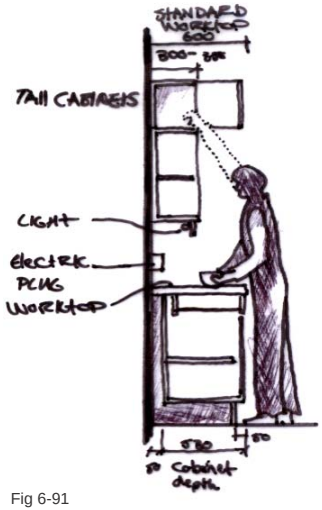


Fig 6-91

Fig 6-93Kitchen triangle

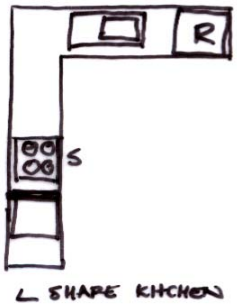


Fig 6-93 L Shape kitchen.

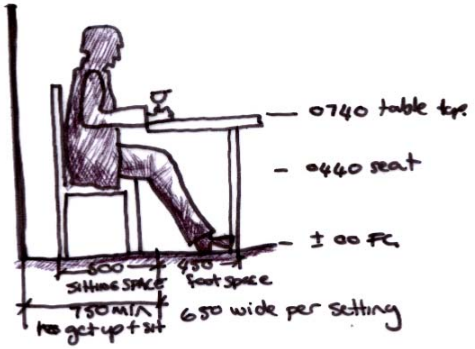


Fig 6-92

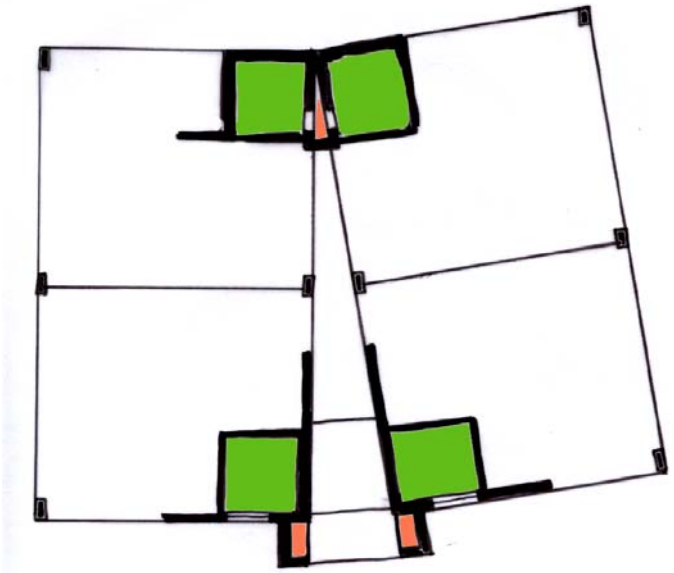


Fig6-95 Diagram of position of wetcore and ducts.

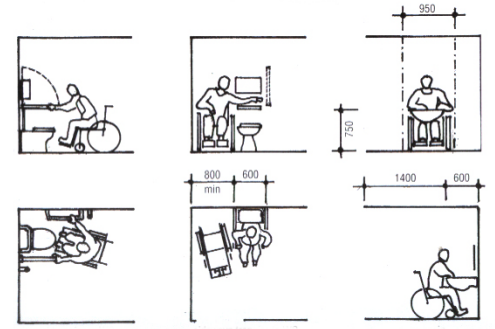
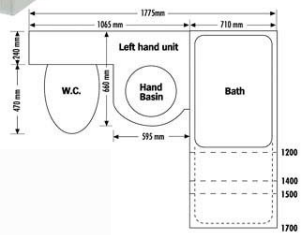


Fig 6-96 Designing for disability

GEZA EASY FIT BATHROOM UNIT

Fig 6-96



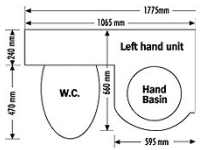


Fig 6-97

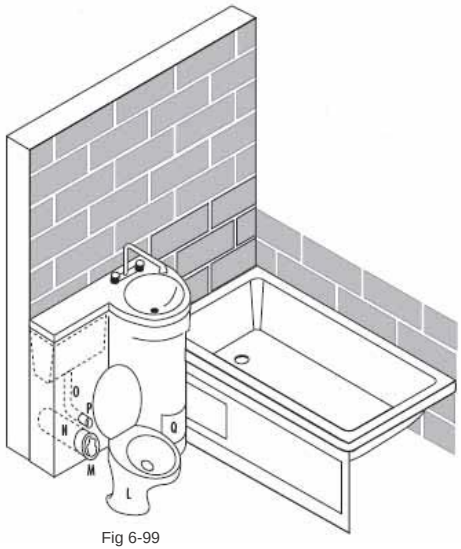


Fig 6-99

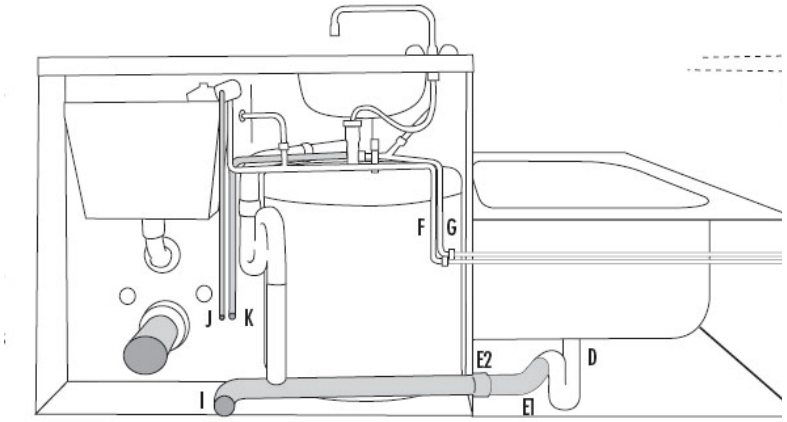


Fig 6-98

The GEZA Easy Fit Bathroom is a product designed and manufactured by Modular Plumbing Units cc.

It has been designed in response to the need for a compact, better quality and more efficient plumbing solution for the lower end of the housing market. This market has traditionally suffered from high priced, poor quality and aesthetically unappealing plumbing products.

The GEZA Easy Fit Bathroom was designed with a view to providing a product that was space saving and quick and easy to install and maintain. No wet trades are required for installation and all components are high quality, easily available and accessible for maintenance.

The first prototype was completed in April 1999 and a patent and design application was submitted for registration. The first 14 GEZA units were installed in a high rise building in Hillbrow, Johannesburg in September 1999 for the Johannesburg Housng Company.

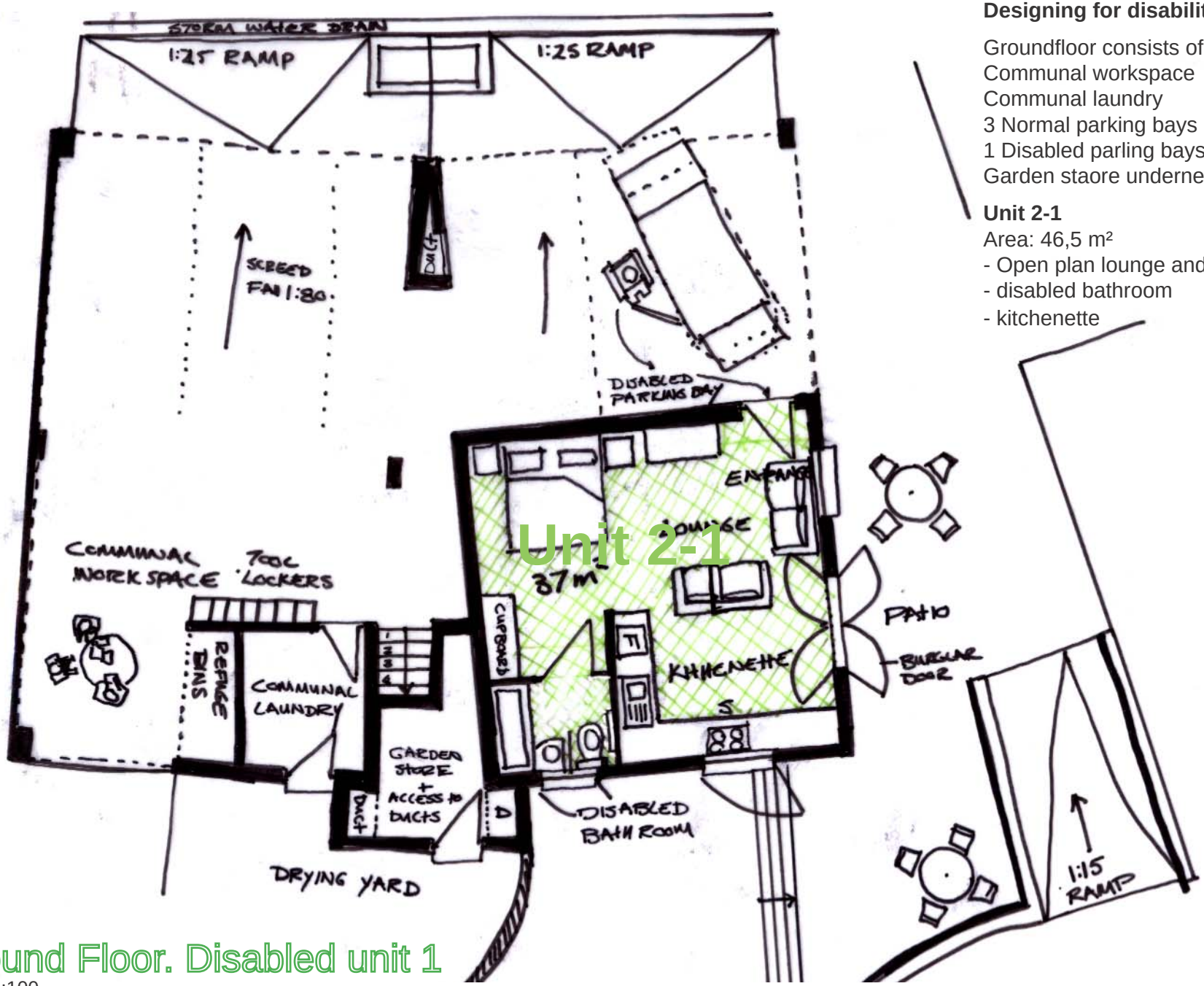
The Department of Trade and Industry (DTI) helped finance the development of the GEZA Easy Fit Bathroom through it's Support Program for Industrial Innovation (SPII). The SPII program was designed to support new and innovative South African products with manufacturing and export potential. The GEZA Easy Fit Bathroom won an award from the DTI in 2002 and 2003 for being one of the top ten performing products supported by the SPII program.

The GEZA Easy Fit Bathroom was also nominated as a finalist for the Technology Top100 awards presented in November 2000 by the State President, Thabo Mbeki and the Minister of Trade and Industry, Alec Erwin.

The first large scale installation of the GEZA Easy Fit Bathroom was in Pretoria, Gauteng. City Properties (Pty) Ltd, one of the largest property owners and developers in the Pretoria city centre, specified the GEZA unit for installation in four high rise buildings that they were converting from offices into residential apartments. By February 2001, more than 580 GEZA units had been installed in these four high rise buildings.

ADAVANTAGES:

- No chasing of walls
- No on-site storage
- Easy maintenance
- Minimal on site installation
- Installation cost saving



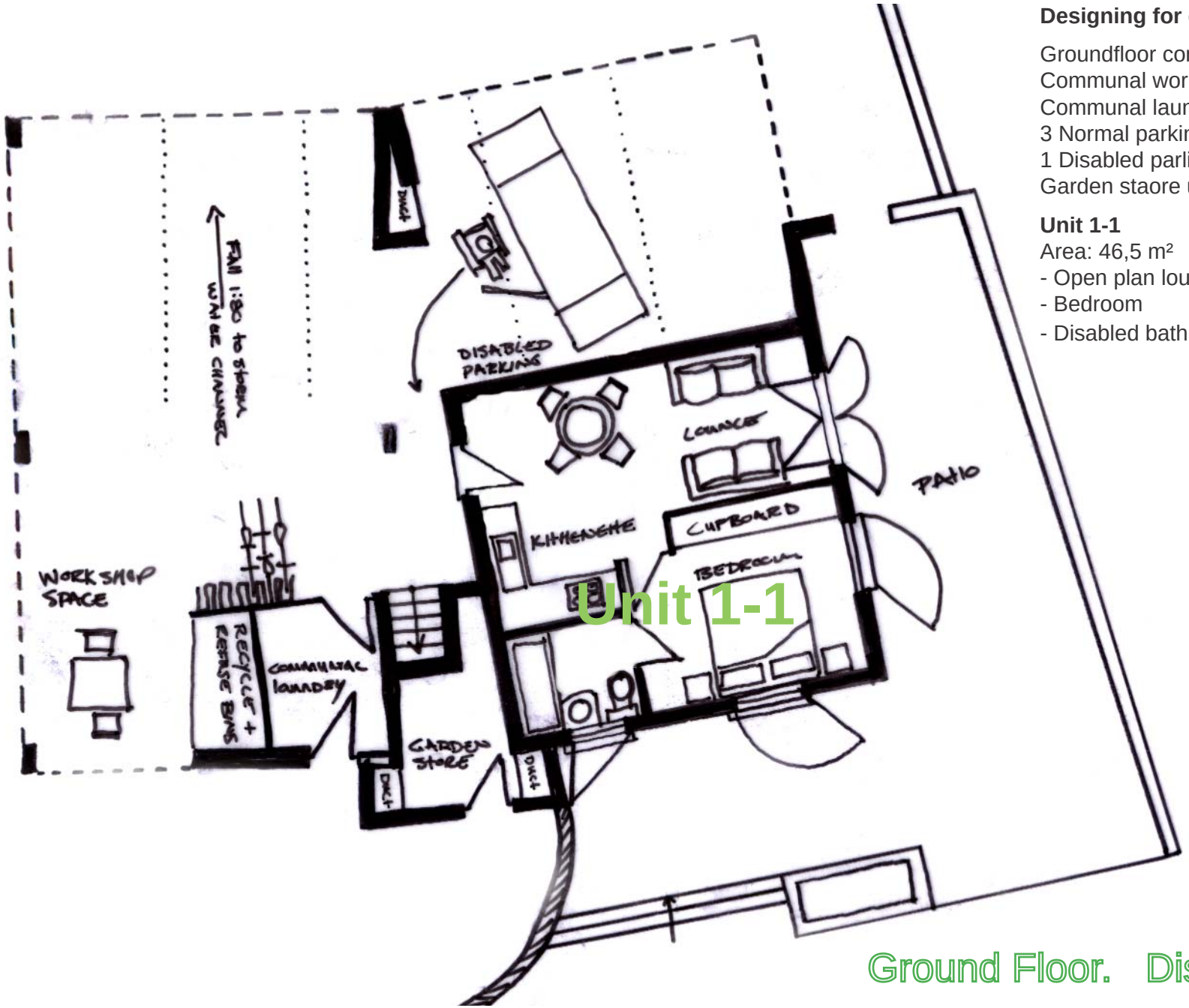
Ground Floor. Disabled unit 1

Scale 1;100

Designing for disability

Groundfloor consists of:
Communal workspace
Communal laundry
3 Normal parking bays
1 Disabled parling bays
Garden staore underneath stairs

Unit 2-1
Area: 46,5 m²
- Open plan lounge and bedroom
- disabled bathroom
- kitchenette



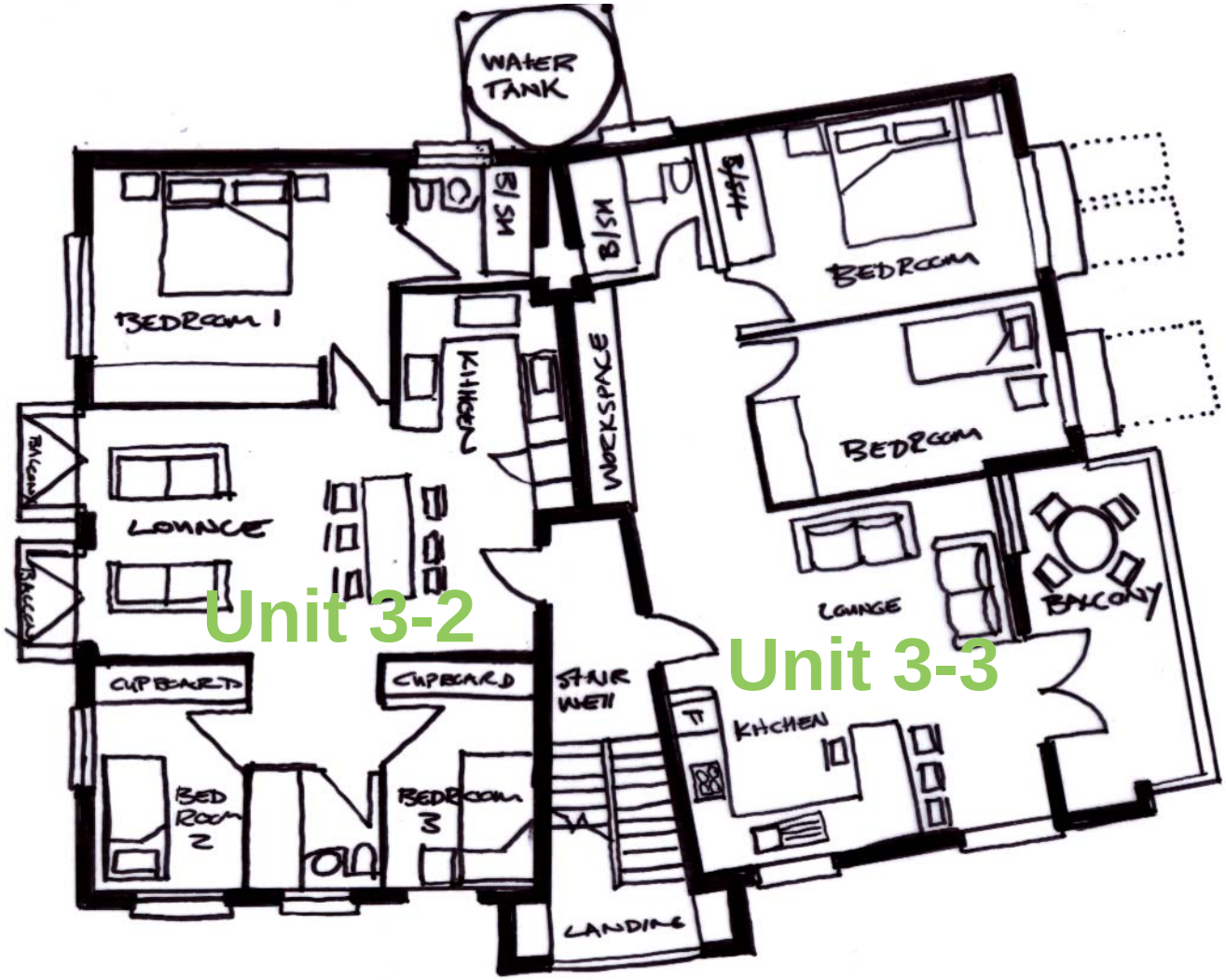
Designing for disability

Groundfloor consists of:
Communal workspace
Communal laundry
3 Normal parking bays
1 Disabled parling bays
Garden staore underneath stairs

Unit 1-1
Area: 46,5 m²
- Open plan lounge and kitchenette
- Bedroom
- Disabled bathroom

Ground Floor. Disabled unit. 2

Scale 1;100



Family Units

Unit 3-2
Area: 78m²
- open plan lounge and kitchen
- balcony
- bathroom
- double bedroom
- single bedroom
- workspace

Unit 3-3
Area: 78m²
- open plan lounge and kitchen
- 2 x bathroom
- 1 x double bedroom
- 2 x single bedroom

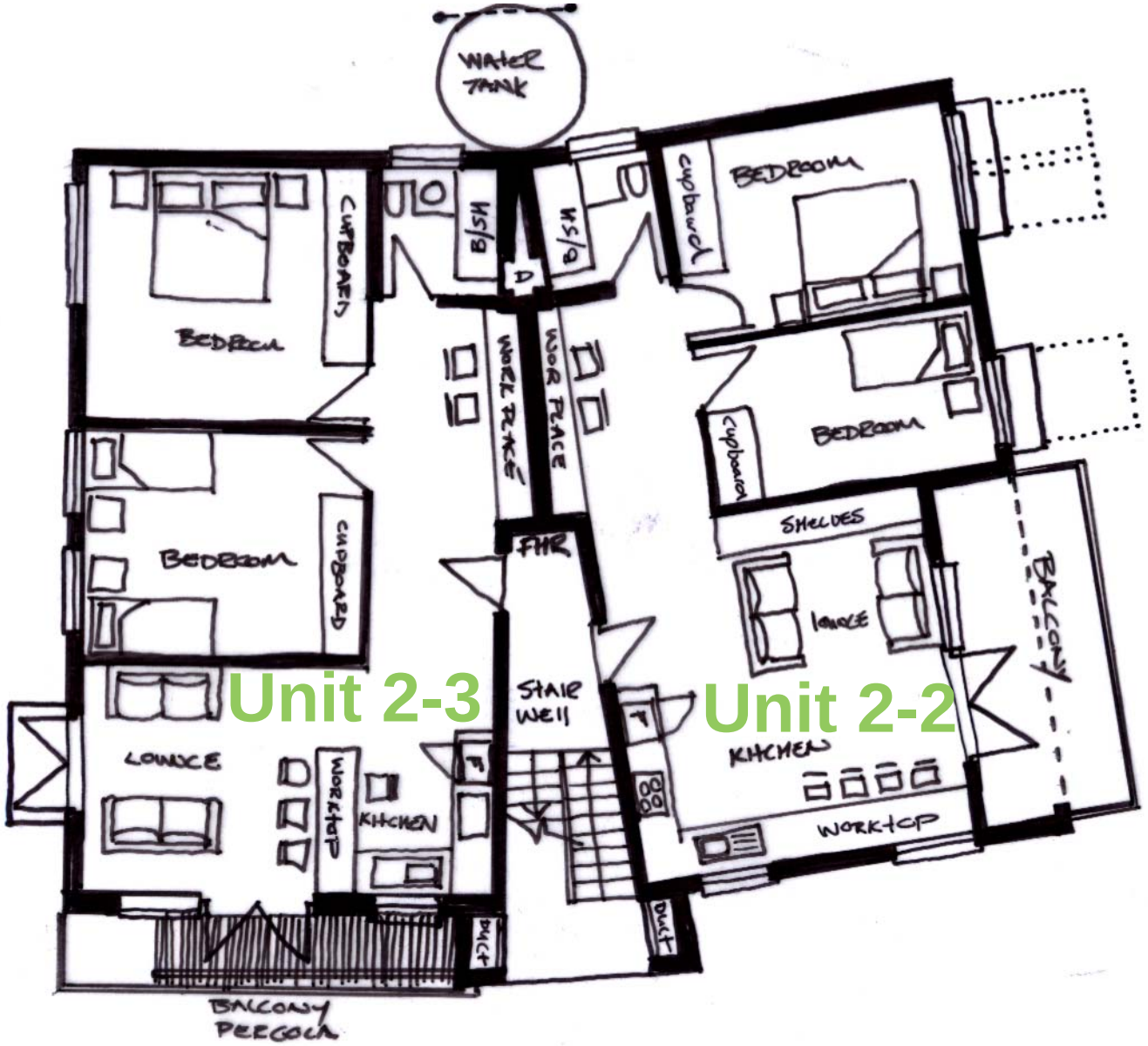
First Floor: Family unit 1 and 2

Scale 1;100

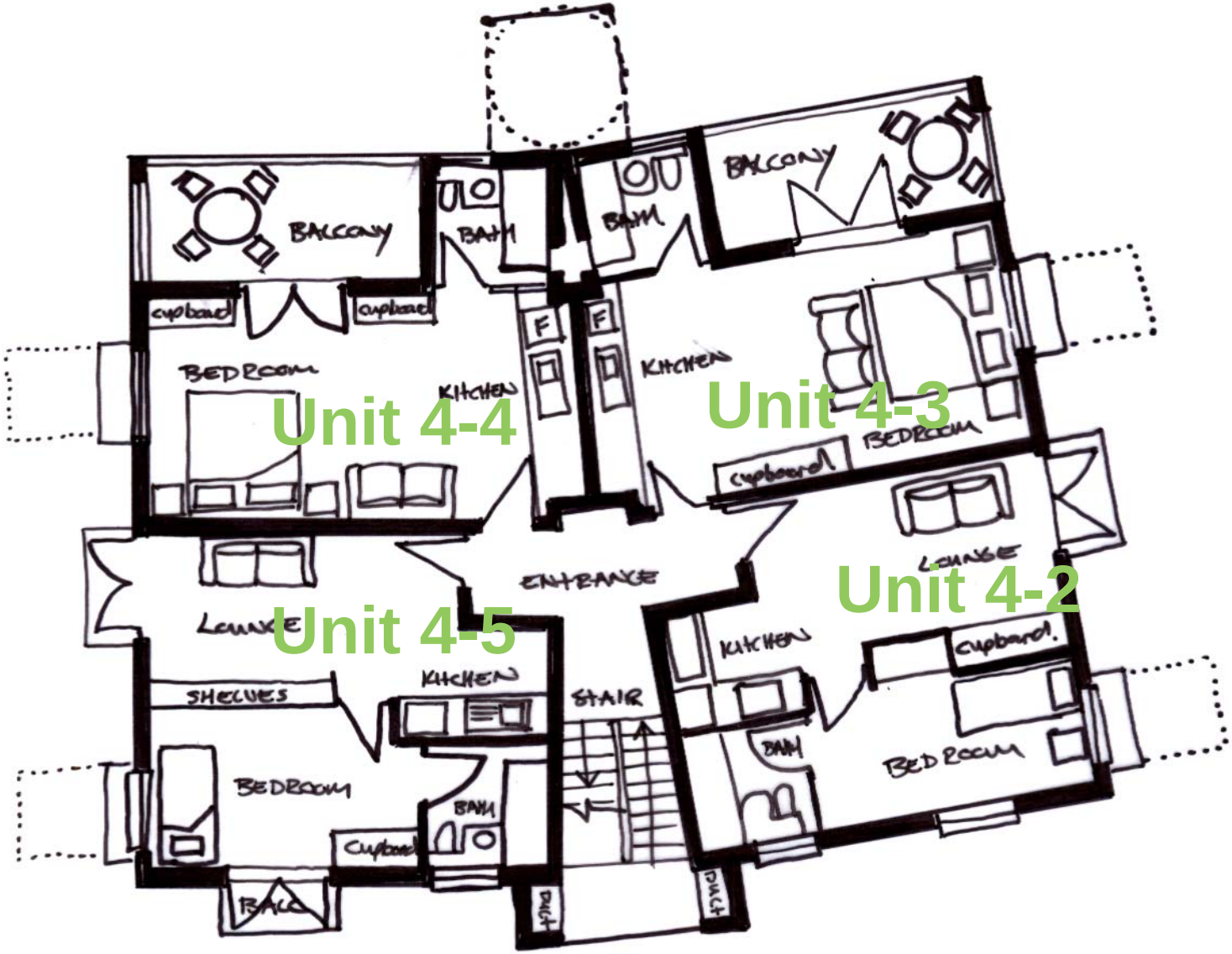
Family Units

Unit 2-2
Area: 78m²
- open plan lounge and kitchen
- balcony
- bathroom
- double bedroom
- single bedroom
- workspace

Unit 2-3
Area: 78m²
- open plan lounge and kitchen
- bathroom
- 1 x double bedroom
- 1 x double single bedroom
- balcony



First Floor : Family unit 3 and 4
Scale 1;100



Bachelor Units

Unit 4-2
Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Unit 4-3
Area: 38m²
- open plan:
  kitchenette
  lounge
  bedroom
- balcony
- bathroom

Unit 4-4
Area: 38m²
- open plan:
  kitchenette
  lounge
  bedroom
- balcony
- bathroom

Unit 4-5
Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Second floor. Bachelor Units

Scale 1;100

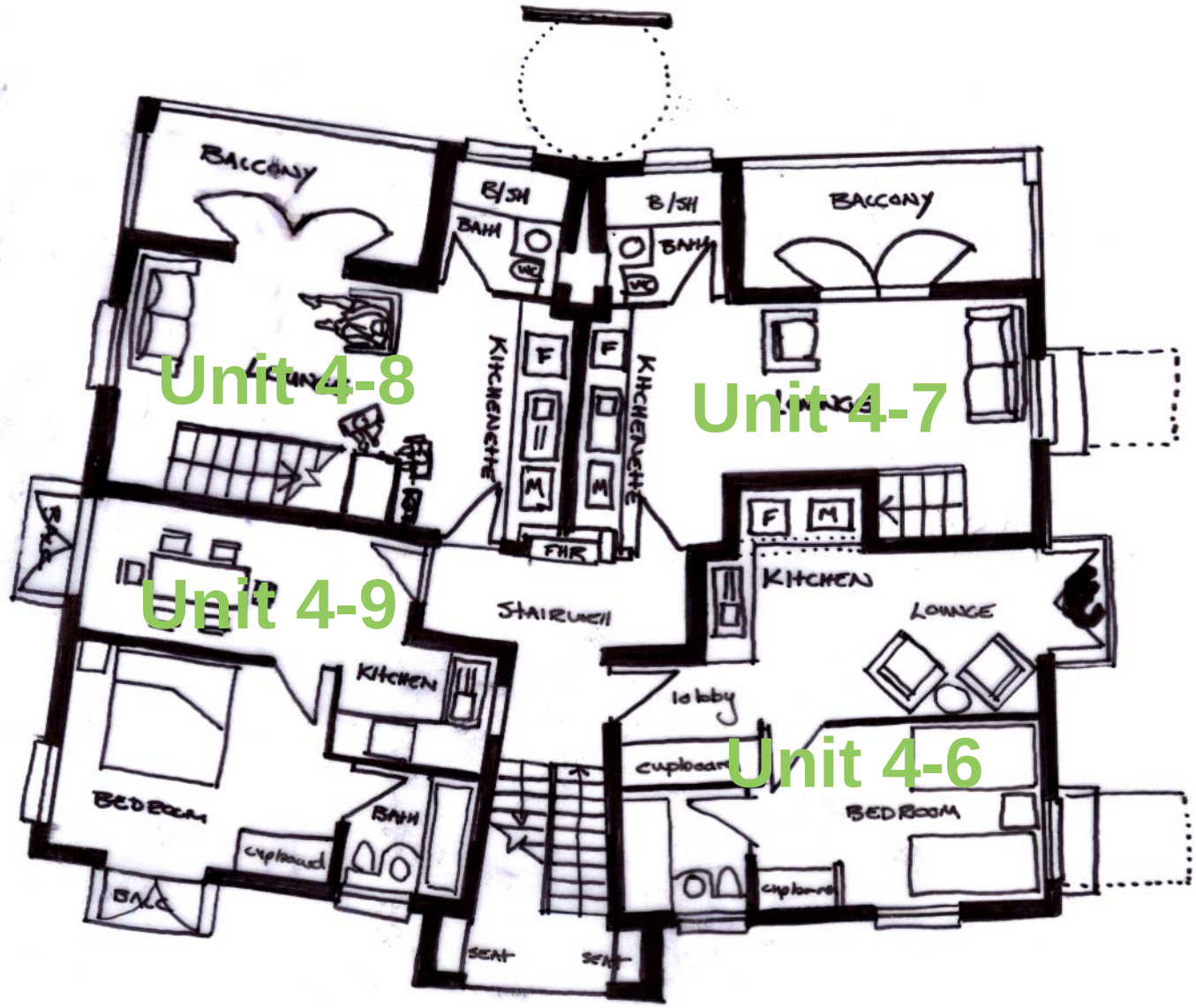
Bachelor Units

Unit 4-6
Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Unit 4-7 + Loft
Area: 38m²
- open plan:
  lounge
  bedroom
- balcony
- bathroom

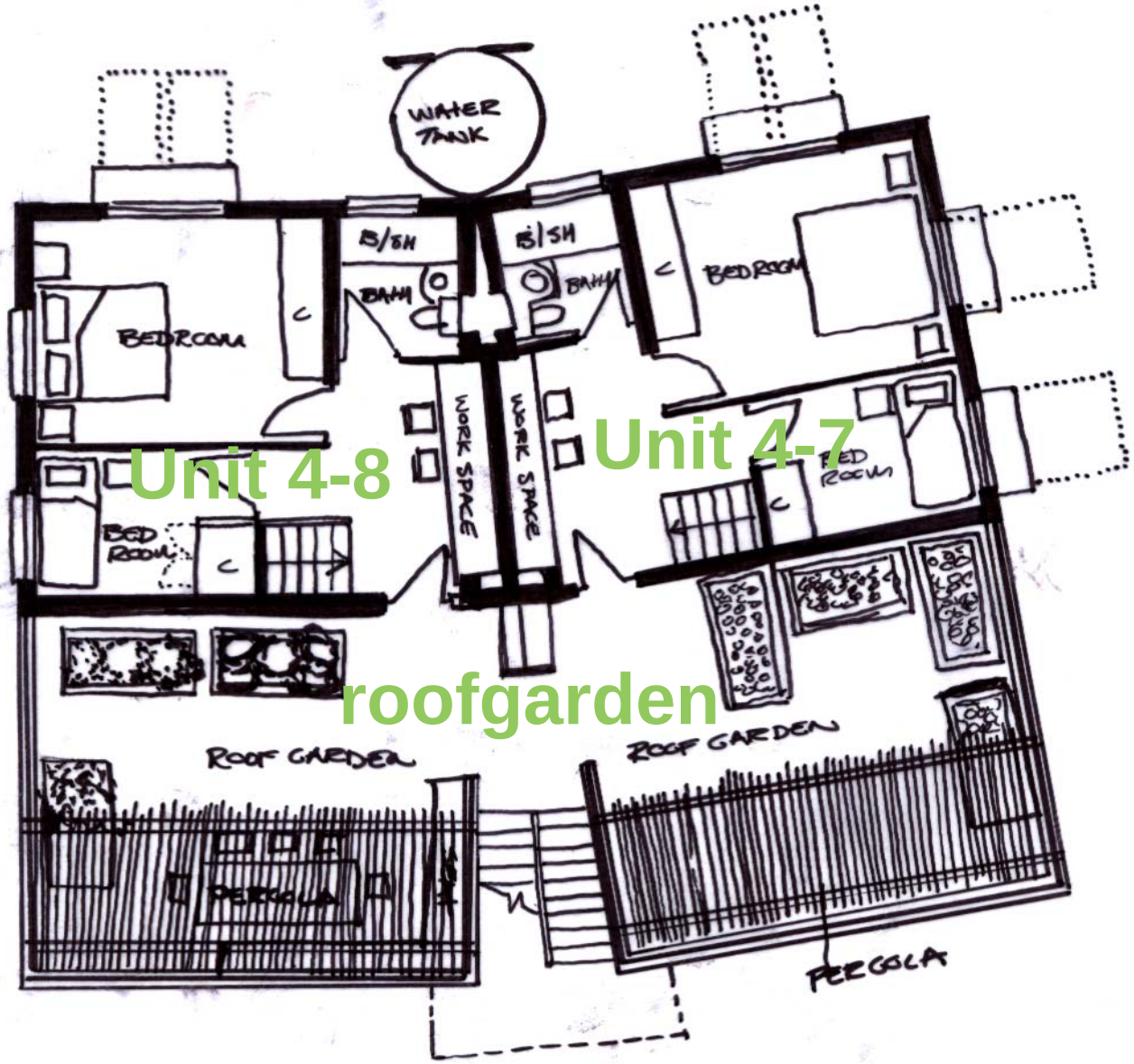
Unit 4-8 + Loft
Area: 38m²
- open plan:
  lounge
  bedroom
- balcony
- bathroom

Unit 4-9
Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom



Second Floor : Bachelor units and Loft units first floor

Scale 1;100



Loft Units

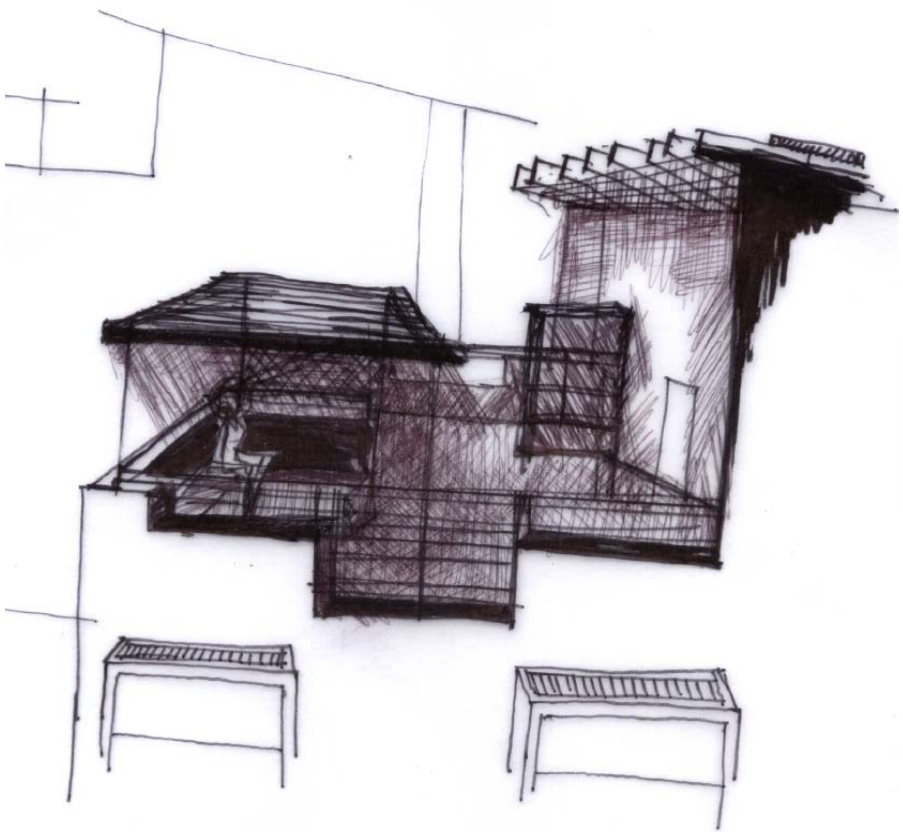
Unit 4-7 Loft
Area: 38m²
- double bedroom
- single bedroom
- bathroom

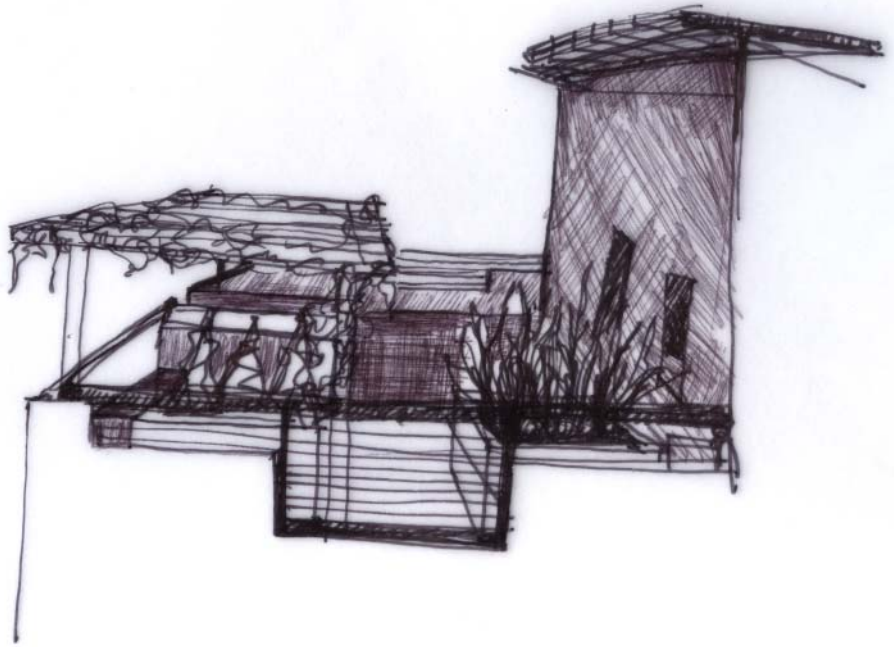
Unit 4-8 Loft
Area: 38m²
- double bedroom
- single bedroom
- bathroom

Roofgarden
Area: 70m²

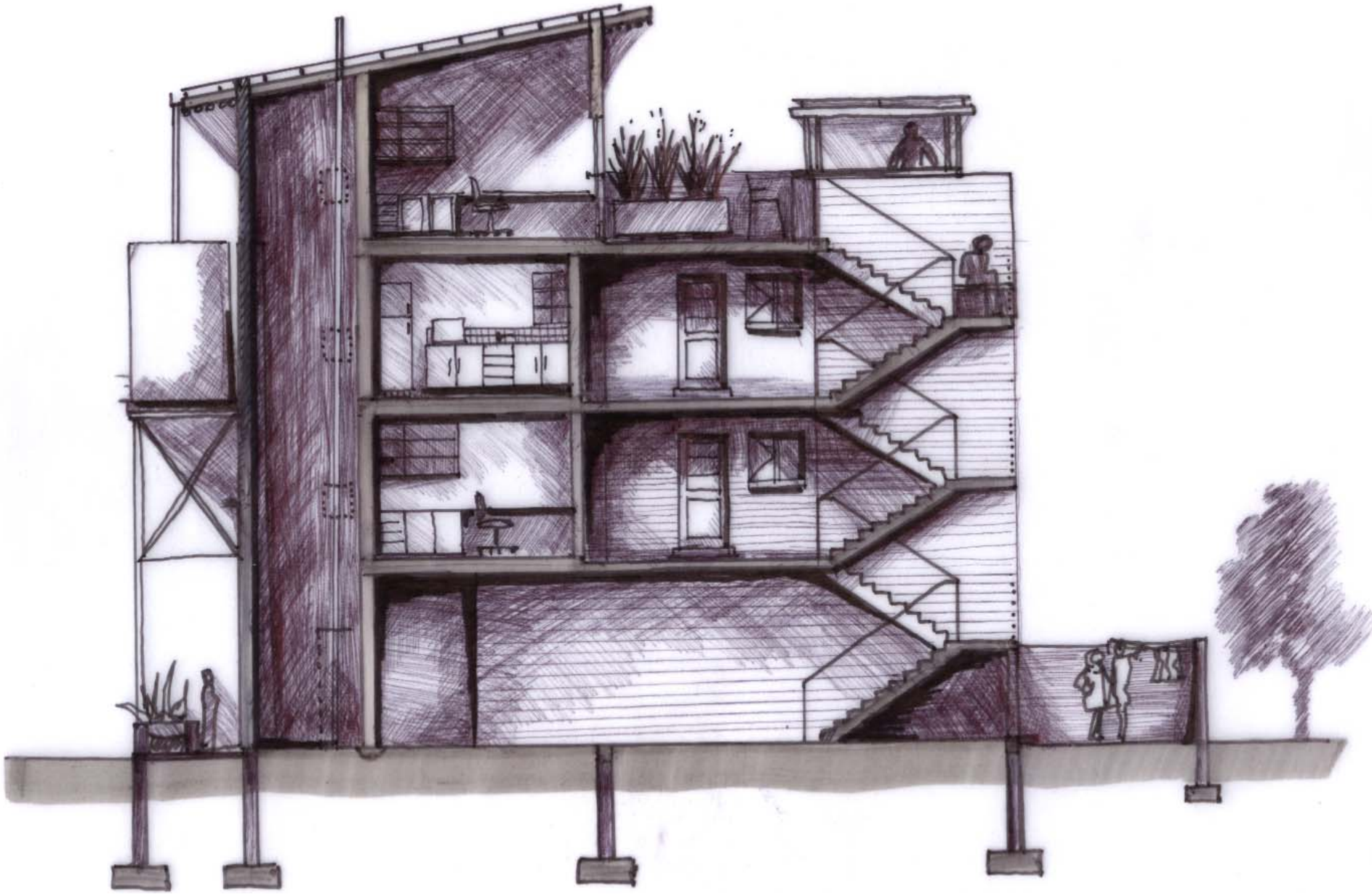
Loft and roof garden

Scale 1;100



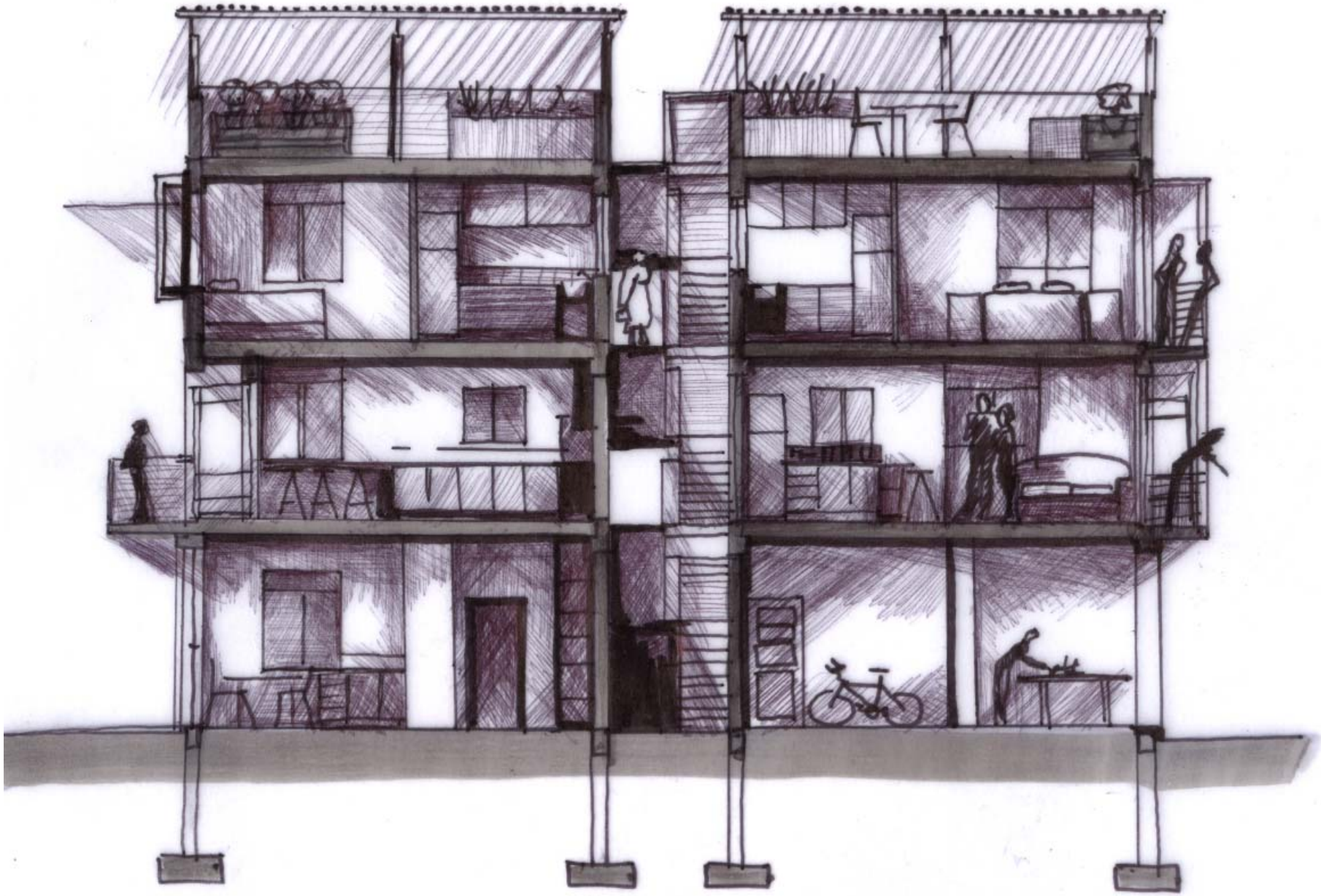


Design Sketch - Pergola on Balcony



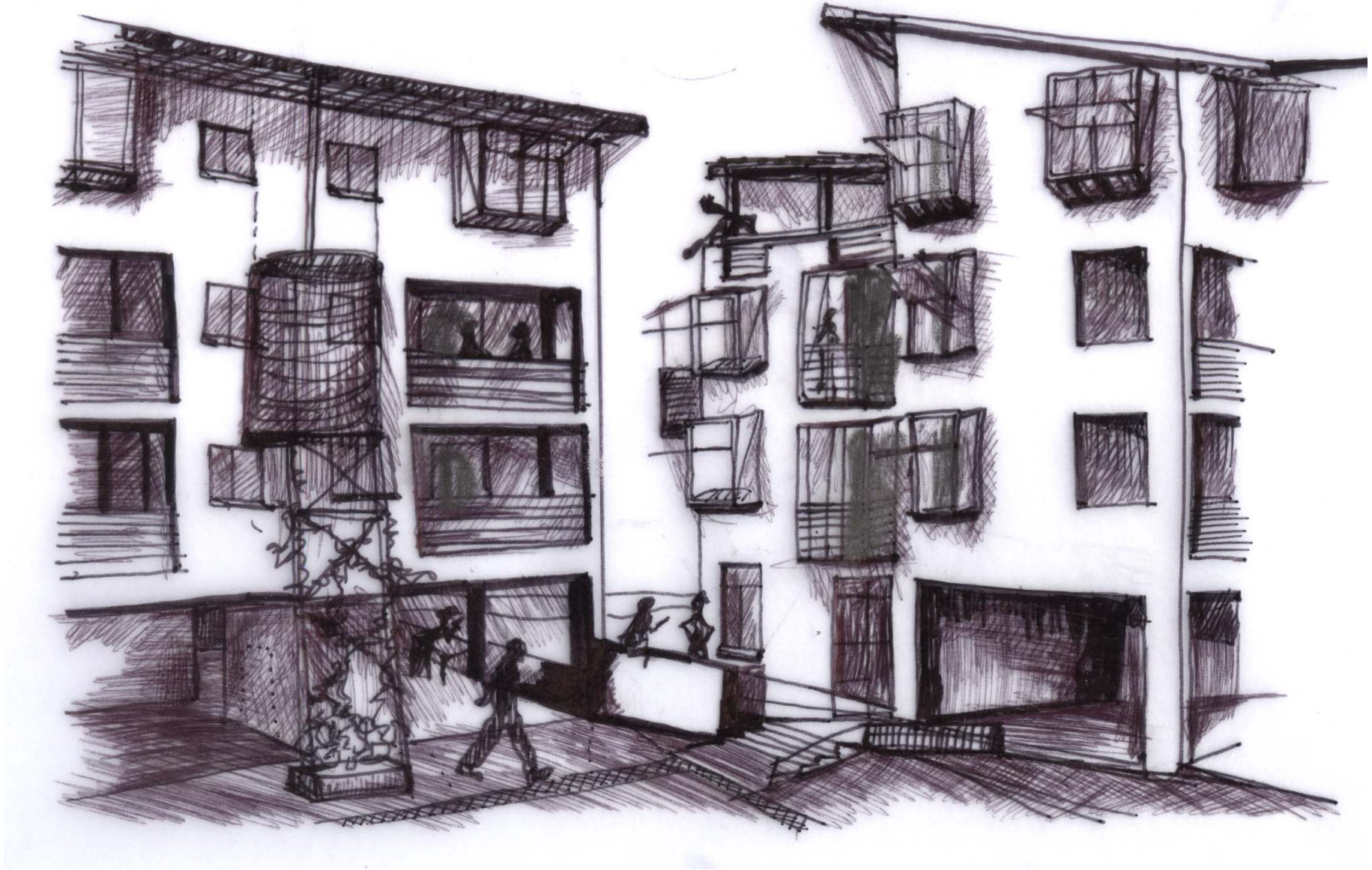
Design Section - Stairwell and duct

Not to scale



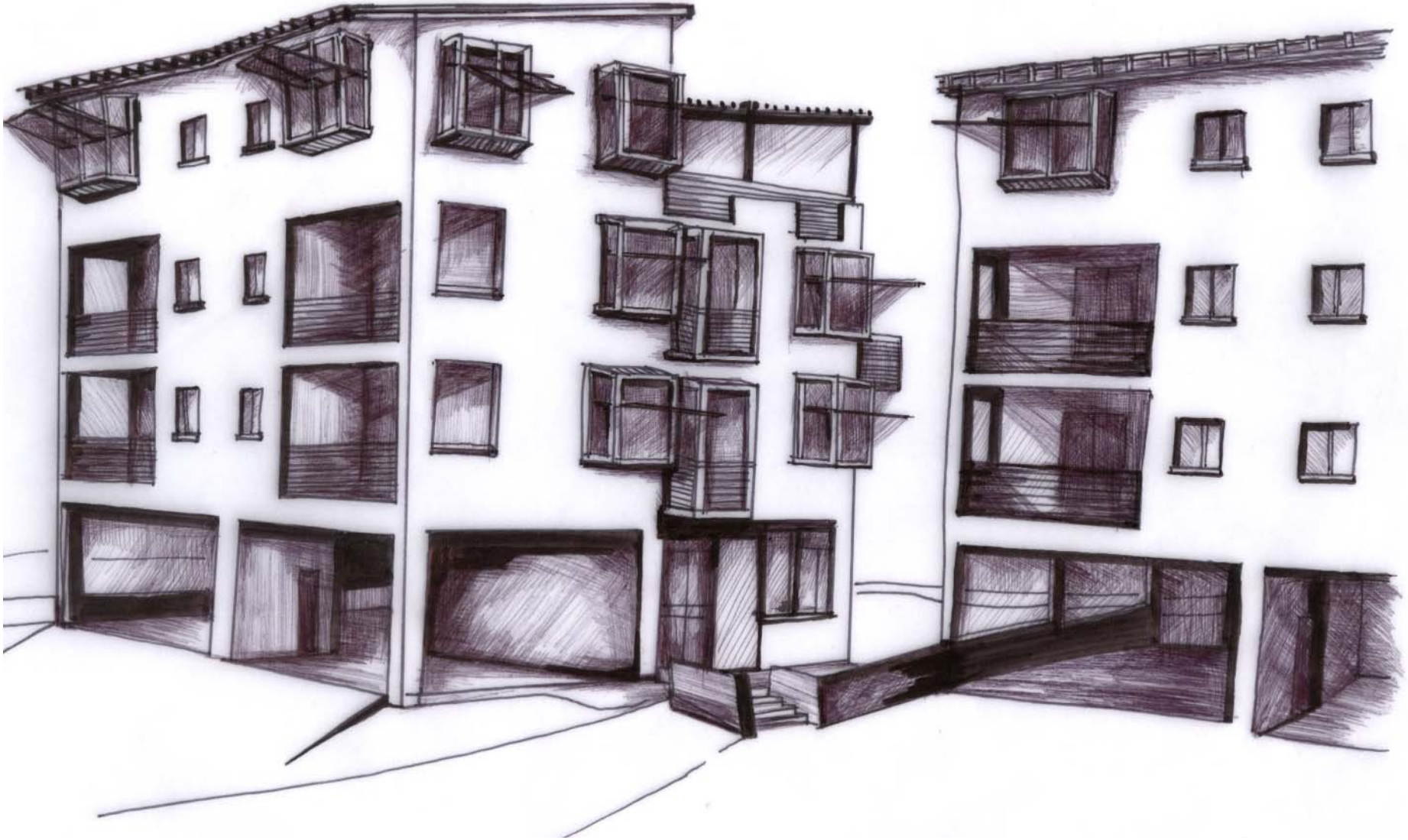
Design Section- Internal spaces

Not to scale

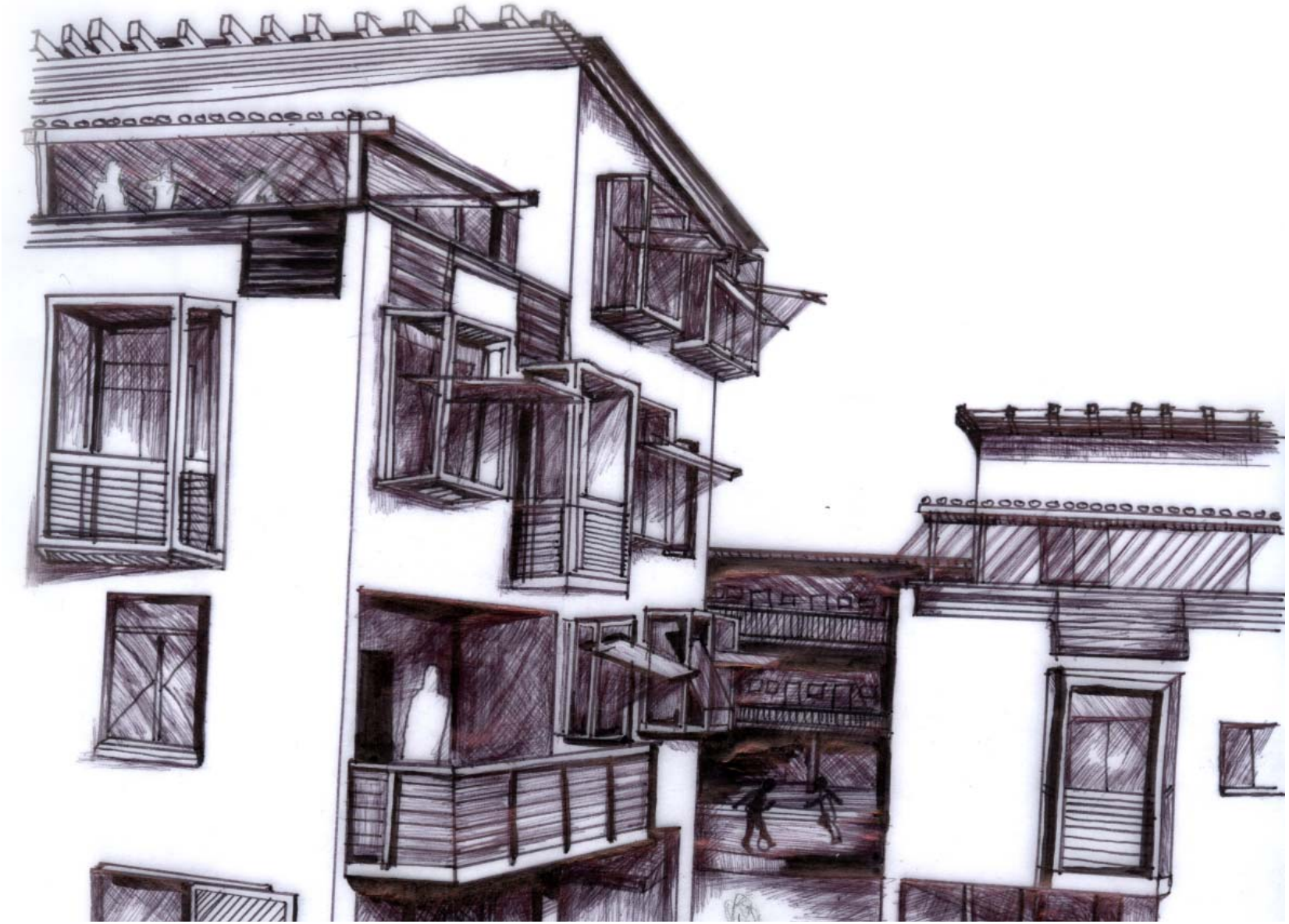


Perspective Drawing

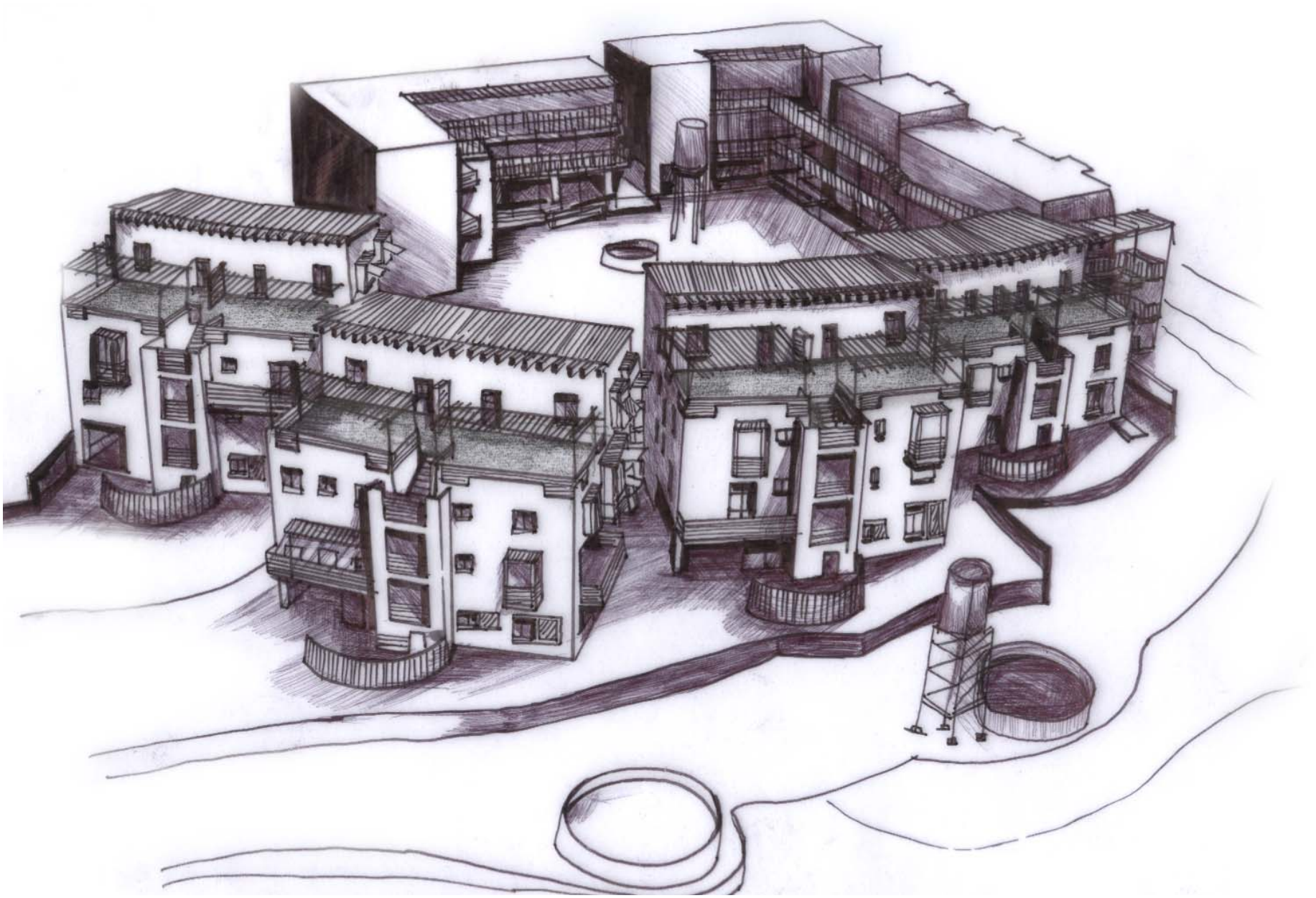
Perspective Drawing



Perspective Drawing



Perspective Drawing



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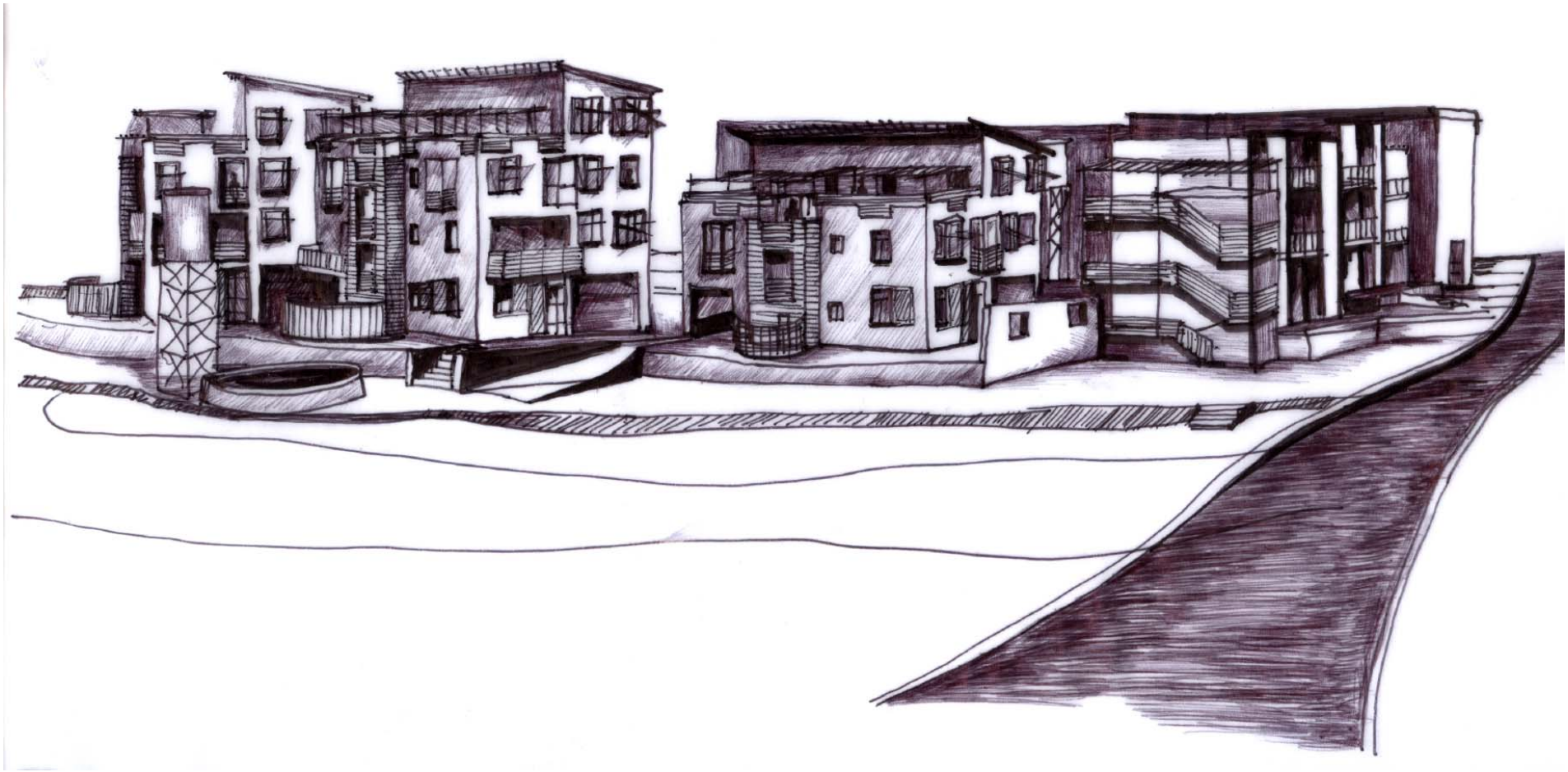

Perspective Drawing

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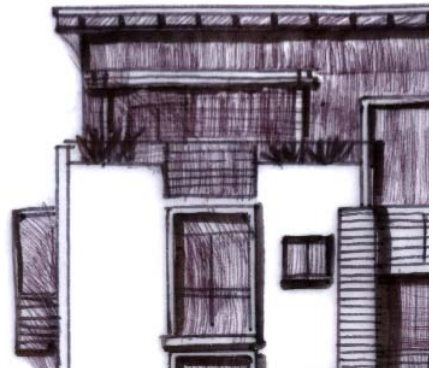


Fig 7-1

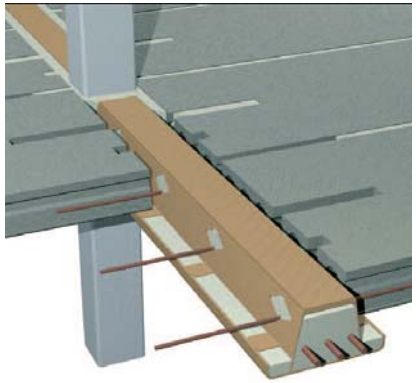


Fig 7-2 Pre-cast soncrete infill slabs

Fig 7-3 Floor slabs incorporate services

7 TECHNICAL INVESTIGATION.

7.1 STRUCTURE

7.1.1 THE STRUCTURAL FRAME

Gravity always requires a technical response. The need to array parts functionally keeps us reinventing the framework, creating new shapes for it. The framework does not seek spatial identity. It has only a single purpose: positioning related things in space. (Habraken,1998. p.150)

First a lightweight structure was considered because of attributes such as fast construction and the properties such as recyclablility of materials. From a housing point of view this benefit does not justify the greater cost of construction and a more robust approach is taken. Another problem that a light system passed was that a lightweight structure reacts too much to temperature swings and there is no thermal mass to store excess heat and coolth for later use. Therefore its was decided on a robust in-situ concrete columns and beams to support the pre-cast concrete floor slab. This structure provides mass for thermal storage, as well as create a Structural frame within which the housing infill can take place.

Fig 7-4

Fig 7-5

Fig 7-6

7.1.2 WALLS

The walls are not structural and can consist of a number of different infill systems. The perimeter walls of each apartment consist of 220mm masonry brickwork because of its robustness and acoustic qualities.
The units are designed in such a manner that the minimal internal walls are necessary. The internal walls of the apartment can be of robust chipboard wall portioning or similar system so that the owner will be able to insert or remove infill walls according to their needs.

The Retaining walls in the landscape, low garden walls and screen walls on ground floor will be made from a variety of experimental earth construction such as rammed earth and wattle and adobe. Gabion walls and pre cast concrete breeze blocks will also be used. These alternative construction methods are primarily introduced as an educational tool giving people the opportunity to experiment and learn from these low cost skills. The idea is that they will have the skills and courage to continue developing the rest of the site in a low cost way.

External walls will be finished with either a plastered brick or un-plastered concrete block. This is essentially a cost effective solution.

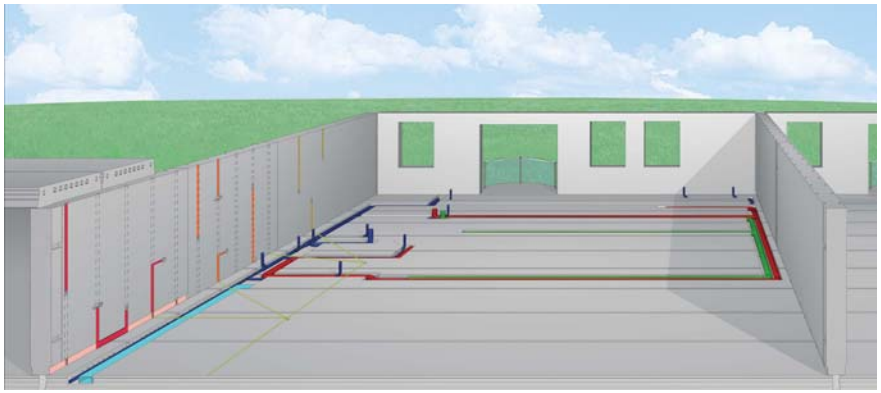


Fig 7-7

Fig 7-8

7.2 MATERIALS

In aiming towards sustainability the embodied energy of materials is very important. Factors influencing this are the actual sourcing of material, renew ability and recyclability or reusability. Using locally available materials will assist in saving cost and energy and less transportation will result in less pollution.

7.2.1 MASONRY BRICK

Masonry work is relatively robust and labor intensive with good thermal and acoustic qualities. Masonry has a long lifetime and fairly infrequent maintenance and repair. The longer construction time is a disadvantage and it is difficult to make changes in future.

Large hollow core cement blocks are used unfinished as a cost-effective building material and to create a contrast with the plastered brick work.

7.2.2 PAINT AND PLASTER WALL RENDERING

External – plaster generally consist of lime or cement plus sand and additives. The high cement content of plaster makes the wall surface watertight

7.2.3 CONCRETE

Columns and beams are cast in situ. Concrete is produced from cement, aggregate and water and in some cases additives. The embodied energy of concrete is relatively high because of the large amount of energy used to produce the cement. The most important factors taken into account when concrete was chosen are embodied energy, compressive strength, fire resistance and heat capacity.

Steel used to reinforce the concrete should be recycles with 10 percent new steel added to increase the strength. Durability of reinforced concrete depends on the quality of workmanship and raw materials, as well as the proportions of the mix and the location of the building. Carbon dioxide and sulphur dioxide, both of witch occur in high concentrations around industrial areas and towns are particularly damaging. It has been proved that carbon dioxide can carbonize up to 40mm into concrete. The concrete loses its alkaline properties as a result and can be subject to corrosive attack (Berge,1992,197) To prolong the lifespan of the concrete all reinforcement should have at least 40mm coverage and construction detailing is done to minimize the time water takes to move off the surface.

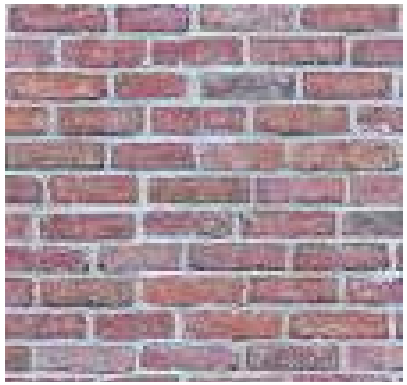


Fig 7-9

Fig 7-10

Fig 7-11

Fig 7-12

Fig 7-16 Timber and steel - pergola detail

Fig 7-17 Wattle lathes screen

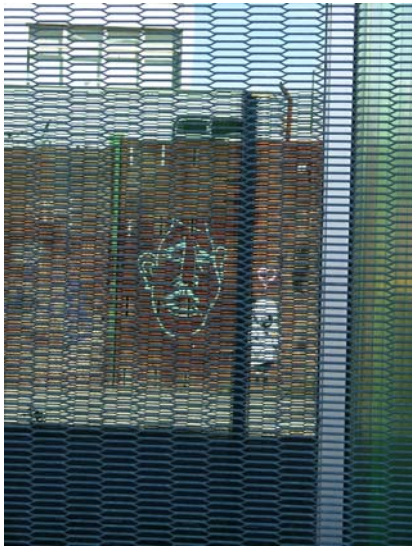


Fig 7-13 Steel mesh screen detail

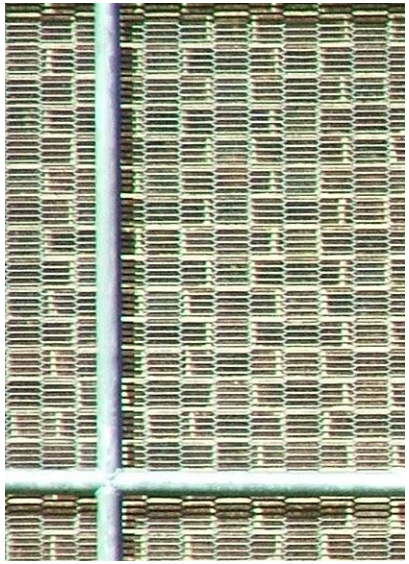


Fig 7-14 Steel mesh screen detail

7.2.4 TIMBER

Timber resources are renewable. The use of wattle lathes gives the architecture an earthy texture. The details can be easily constructed by local laborers. The biggest advantage when using timber is the relatively easy recyclability and reusability. Prefabricated components, such as rafters, battens and planks for external shading devices as well as other standard timber board products are used. If the lifespan of the components exceeds that of the building, it will be possible to reuse it directly.

7.2.5 METAL

Good properties of steel are that it is completely recyclable. In this case standard steel sections are used as far as possible. The shading devices consist of a steel frame of standard size components. The welding can be done on site or at a workshop where the skills can be thought to the unemployed people of the area. Because of cost, robustness and need for maintenance, all window and door frames are standard steel frames by manufacturer.

Fig 7-15

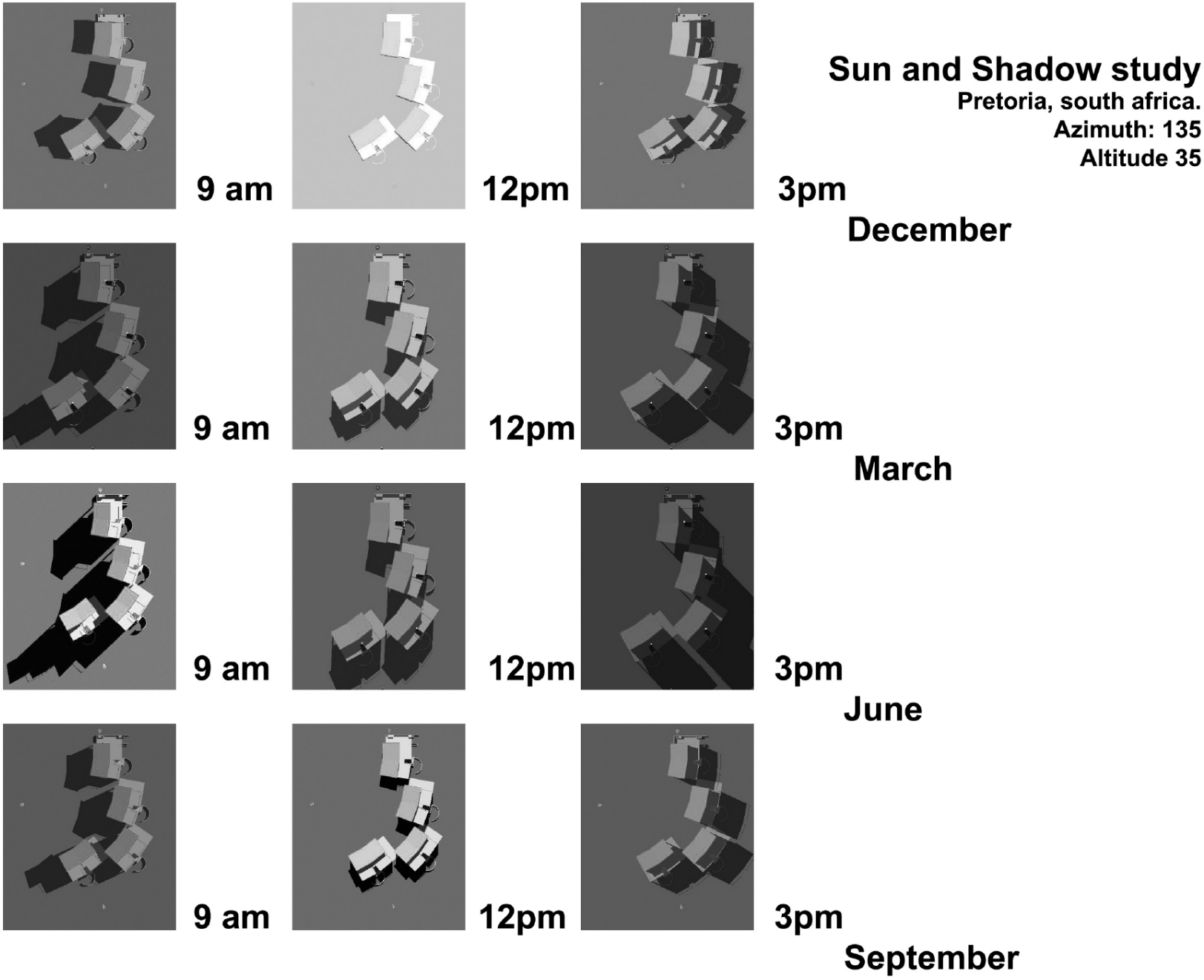


Fig 7-18

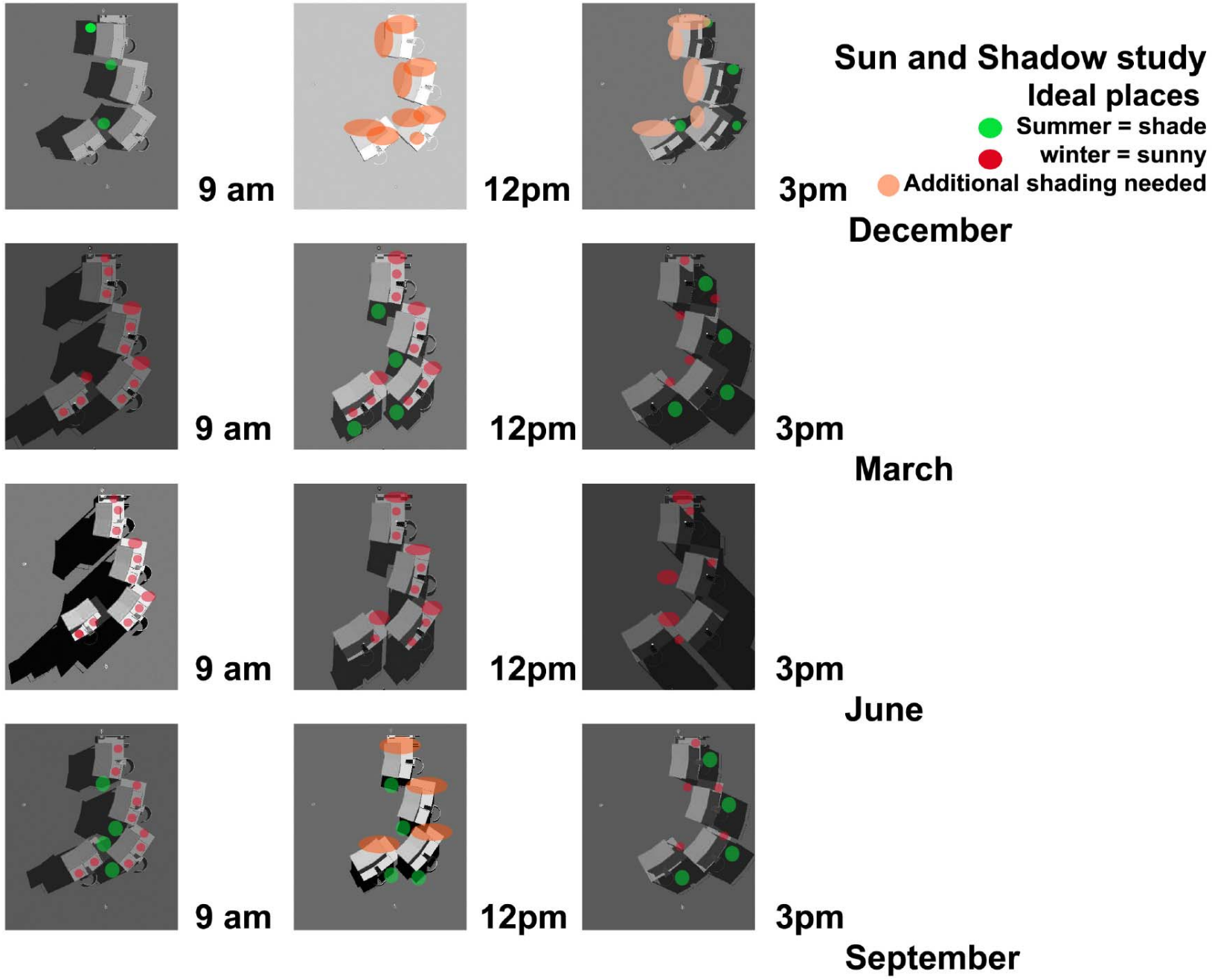

Sun and Shadow study
Ideal places
Summer = shade
winter = sunny
Additional shading needed
9 am
12pm
3pm
December
9 am
12pm
3pm
March
9 am
12pm
3pm
June
9 am
12pm
3pm
September

Fig 7-19

Fig 7-20

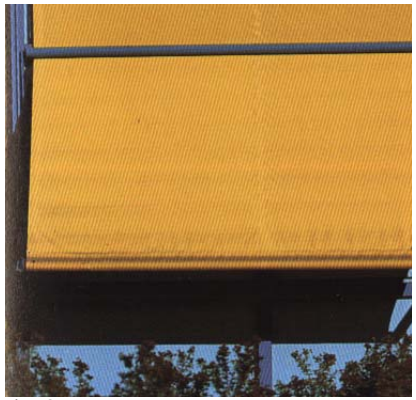


Fig 7-21

Fig 7-22

Fig 7-23

Fig 7-24

Fig 7-25

Fig 7-26

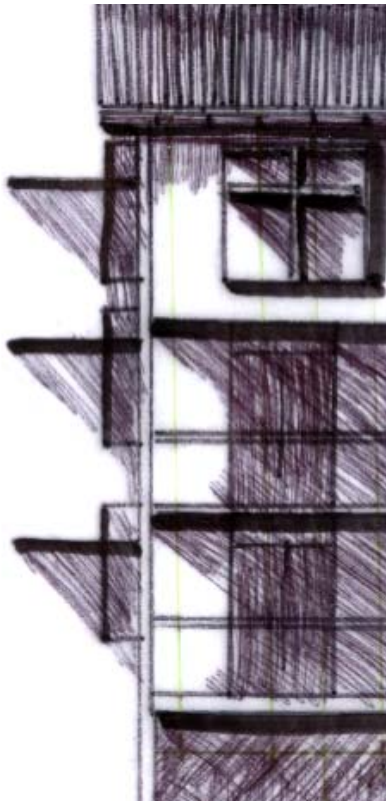


Fig 7-27

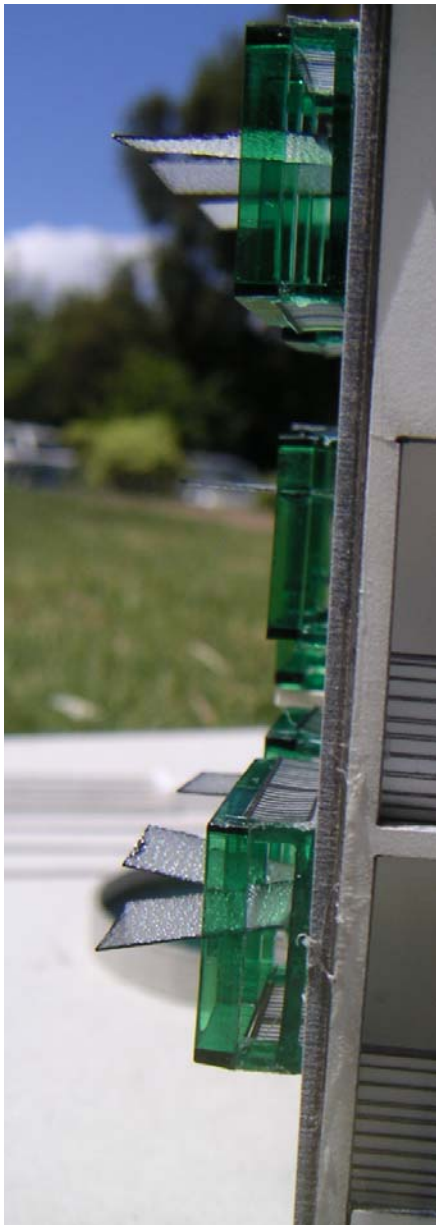


Fig 7-28

7.3 CLIMATE SYSTEMS

7.3.1 PASSIVE SYSTEMS:

"Good design exploits the potential for passive solar gain by consideration for glazing area, thermal mass and orientation" (baker&steemers,2006. P.56)

Passive solar design is about allowing daylight, heat, and airflow into a building only when beneficial. The objectives are to control the penetration of sunlight and airflows into the building at appropriate times and to store and distribute heat and cool air so its is available when needed. Many passive solar design options can be achieved at little or no additional cost.

7.3.2 WINDOWS

The positioning of windows and doors is allow to no cost intervention. Although windows can provide welcome heat in winter, they lead to overheating in summer. A window to floor area ratio of between 1 to 5 and 1 to 4 is considered appropriate with the largest windows facing north. Windows and doors can also be positioned on opposite sides of rooms to allow air-flow through the house

Windows provide visual contact with the out doors Al of the occupy able rooms have windows to the outside. It is a legal requirement for natural ventilation as well as the psychological advantages for humans to be able to see what's going in outside: weather conditions, time of day etc. A very important aspect when designing openings on the facade is a energy consideration. The size and orientation of these the window and shading elements determines heat gain, heat loss and the quality and quantity of natural interior lighting.

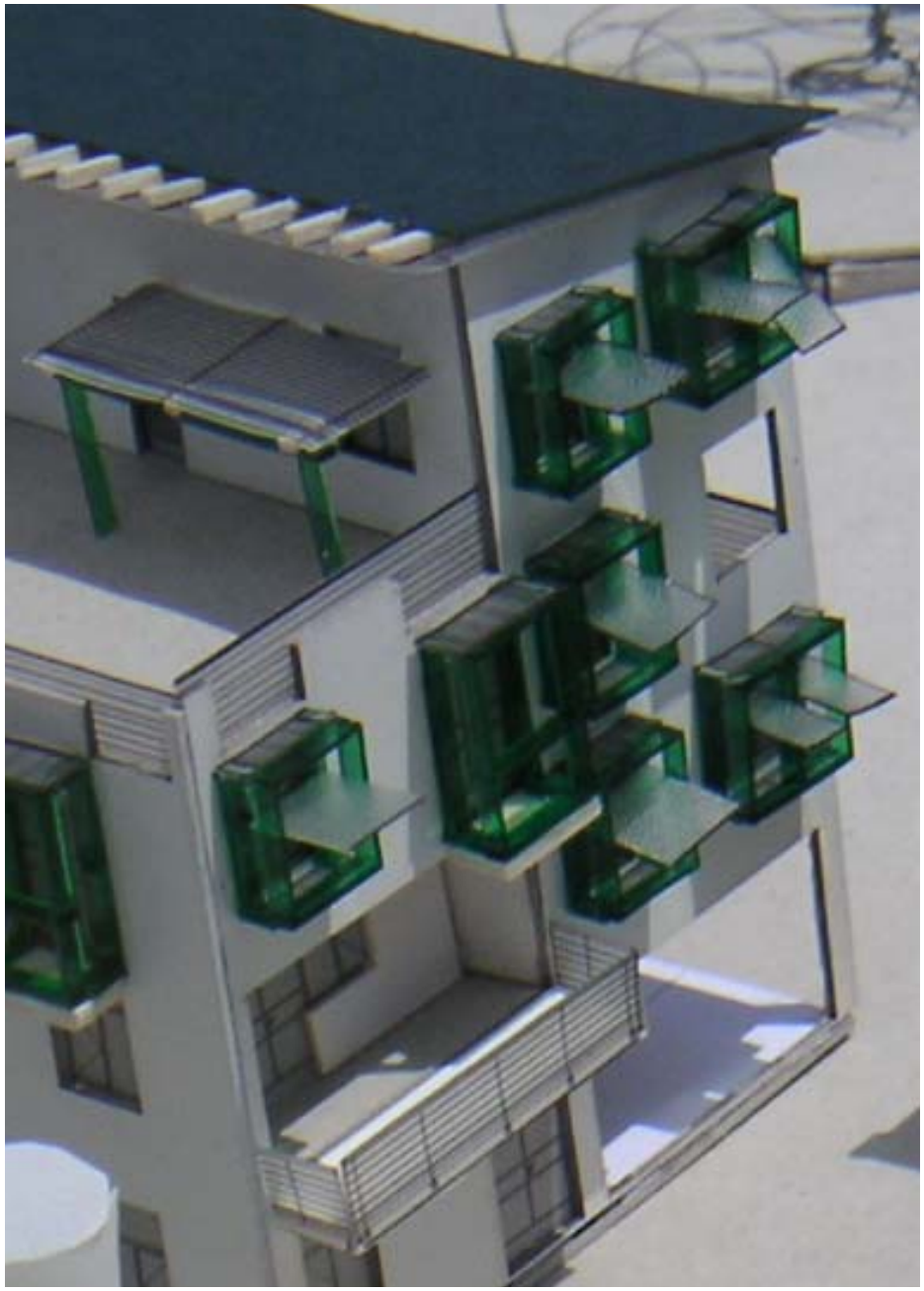


Fig 7-29

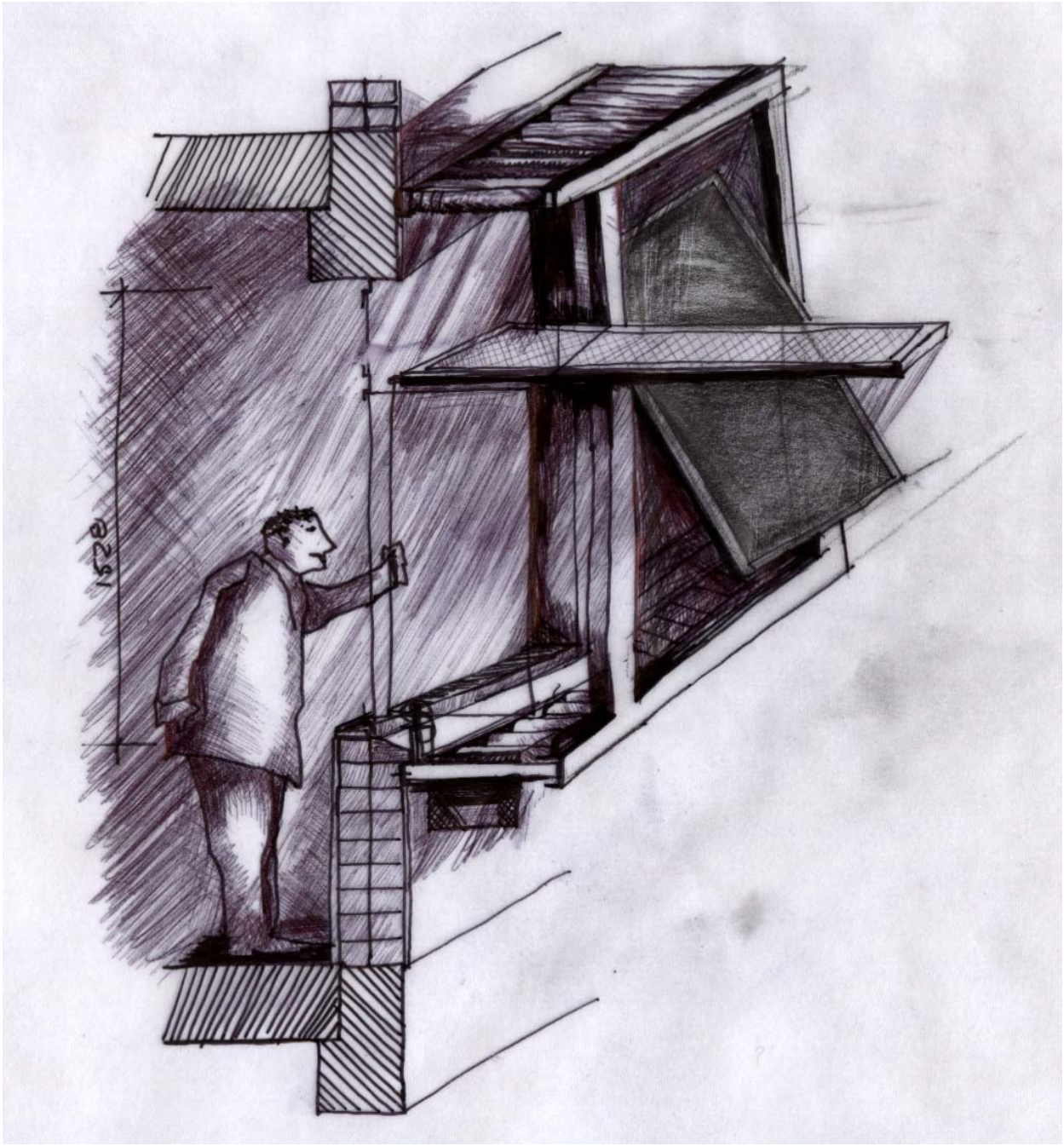


Fig 7-30

7.2 .3 WINDOW SHADING DEVICE

The most glazing occurs on the north and eastern facades. By the use of solar shading that can be manually operated by the inhabitant on the north and west façade, direct radiation is kept out during the summer but allowed through the façade during winter. Heat gain is important during winter – mainly on the north facade. This is primarily retained by the material use on the façade. The amount of heat storage depends on the thermal mass and its color. Concrete floor will be used as thermal storage element, storing it during the day and releasing it during the night.

On the western façade the openings are moved back in the façade to create balconies. The top floors are protected by the roof overhang, and planting.

As a protective measure against solar heat, protection of the sun is best achieved on the outside of the window. Protection against direct solar radiation is provided by external shading boxes Solar shading system- lightweight shading material covers a steel frame painted dark brown to restrict reflected solar radiation during summer months.

7.3.3.DAY LIGHTING

“Daylight is desired not only for energy conservation but is usually considered superior (psychologically) to electric lighting. In most domestic buildings this is potentially the most significant energy-saving measure.” (baker&steemers, 2000, 42)

7.3.4 NATURAL VENTILATION

“It appears that in many cases occupants are much happier and healthier in naturally ventilated buildings, in spite of the variability of environmental conditions which results” (Baker et al, 2000, 52)

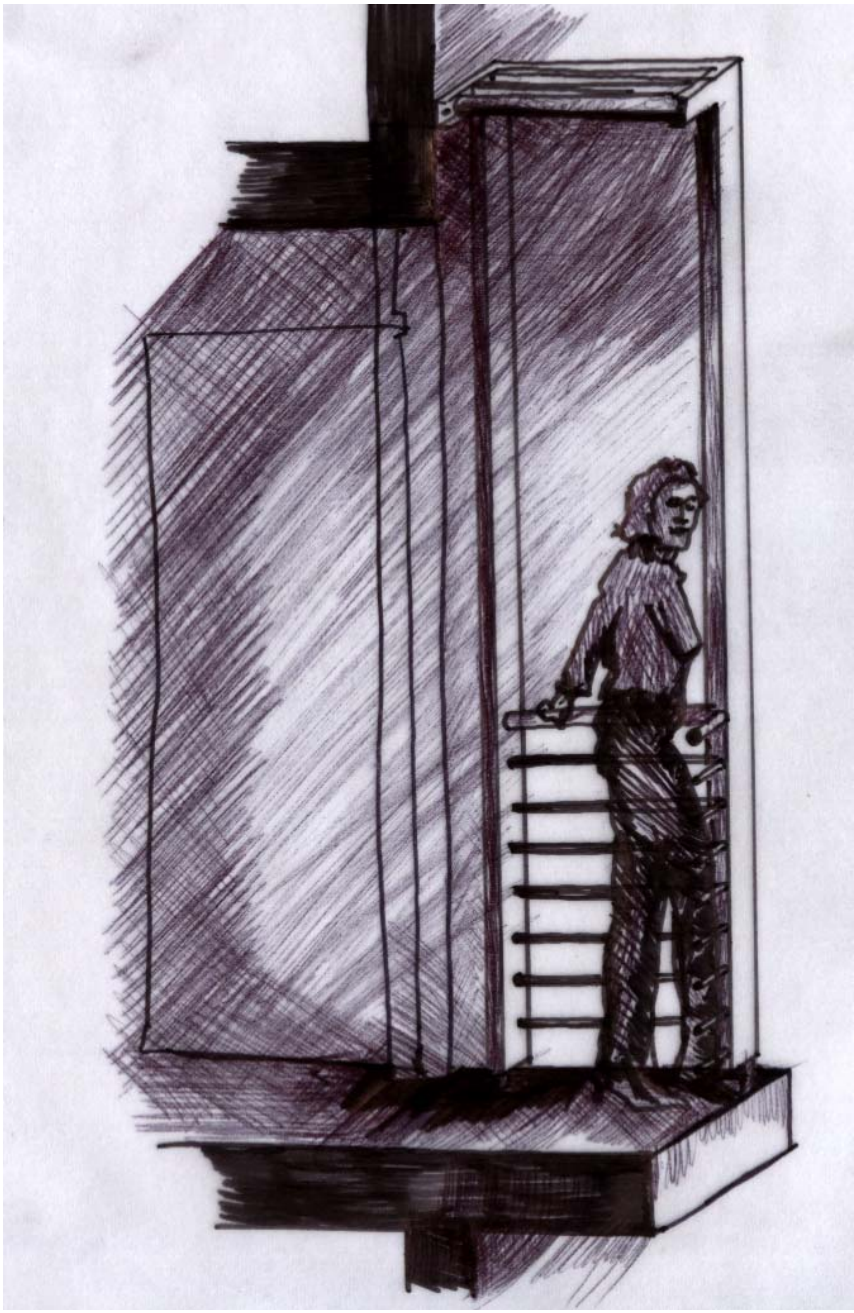


Fig 7-31

7.3.5 WIND PRESSURE

Ideally each apartment would have the possibility to ventilate naturally. When wind blows up against the building there will be positive pressure on the windward side and negative pressure on the leeward side. Because openings are distributed over all the facades of the building, it is ensured that, no matter what the wind directions, openings will be at different pressures that will introduce a natural airflow through the building that would introduce cross ventilation. The opening above the door directs pressure towards the stairwell.

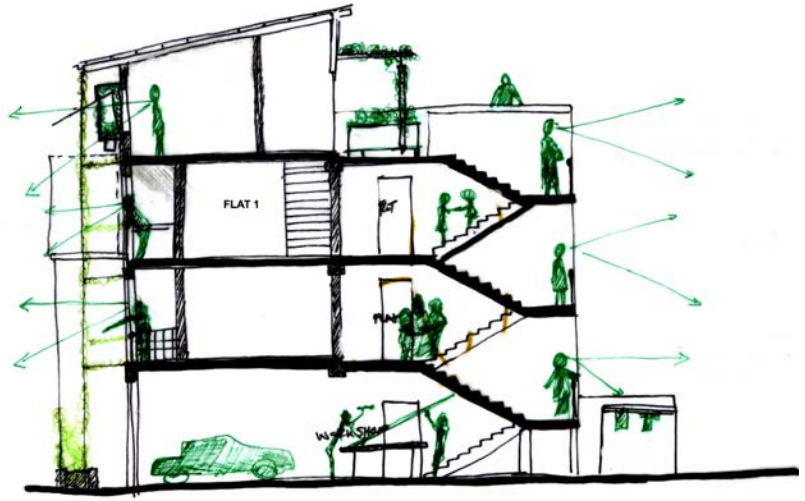


Fig 7-32 Openings in the facade

7.3.6 WATSE WATER SYSTEMS

Rain water is harvested from the roof and made available for use in the garden. Grey water – from shower, bath and washing machine will be directed through the artificial wetland and used in the green areas.

Although there is a number of experimental ways to handle sewage more environmentally friendly the urban nature of the development, it was decided to simply connect to the municipal connection.

Fig 7-34

Fig 7-33

7.4 RAINWATER HARVESTING

Rainwater will be harvested, stored, and used as water supply in the gardens. Water average consumption per Household in cubic meter per year: (Abraham, Fisher and Schmitz-Gunter 1999)

Person

1person = 57 m³ 2persons = 95 m³ 3 = 131 m³ 4persons = 161 m³ 5 5 persons = 182 m³

Fig 7-35

Estimated water consumption per day: 1 person +household: 120l

1 ha garden 10 000l (Grobler.1999 p 271)

Total roof surface: 740m2

Possible annual savings by using rain water:

Harvested rainwater volume = 688,764 kl 1kl = 1m³

Current Cost per 1m³ = R4

Possible savings per annum = R 2755.00

When considering this system it is important to look past the financial savings and rather consider the ecological impact that this can have in the long term.

	Aggregate rainfall in mm/month fir the Pretoria area	Potential annual rainwater harvesting volume:	Harvesting from the roof into a 10 000 l tank: Total roof surface leading into tank: 94 m2 Potential annual rainwater harvesting volume:
Jan	101.33mm	75 kl	9 000 l
Feb	108.8mm	80,512 kl	10 000 l
Mar	63mm	46,620 kl	6 000 l
Apr	48.4mm	35,816 kl	4 500 l
May	48.4mm	35,816 kl	4 500 l
Jun	3.8mm	28,12 kl	350 l
Jul	2.3mm	17,02 kl	220 l
Aug	2.3mm	17,02 kl	220 l
Sept	11.3mm	83,62 kl	1000 l
Oct	82.5mm	61,05 kl	7000 l
Nov	168.8mm	124,912 kl	15 000 l – tank will overflow
Des	112.5mm	83,250 kl	10 500 l – tank will overflow
	Total kl water per annum:	688,764 kl	

The tank will possible be filled to capacity in November, December and February, a bigger tank cannot be justified during the rest of the year.

It is more important to design the overflow facility.

Rainwater faucets have to be clearly marked so they are not confused with drinking water. A good precautionary method is to have the tap high so that children cannot reach and accidentally use it.

Fig 7-36

Fig 7-37

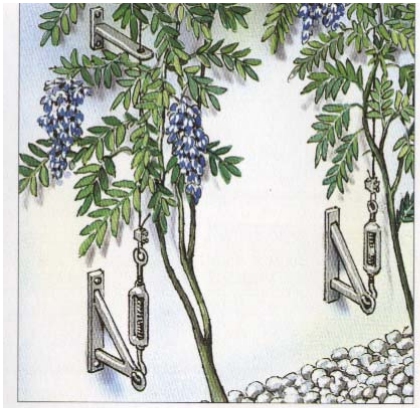


Fig 7-38

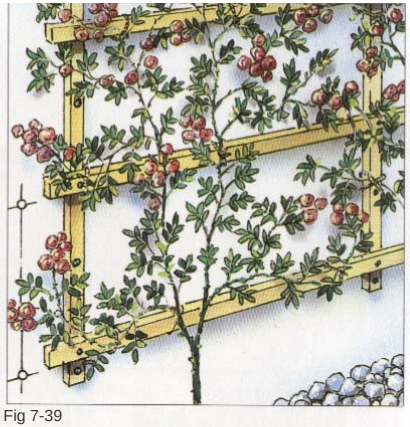


Fig 7-39

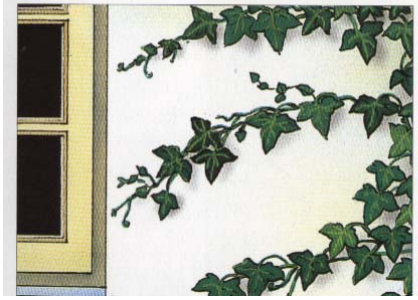


Fig 7-40

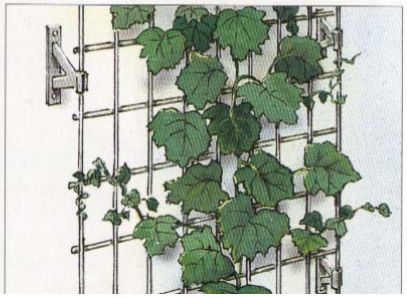


Fig 7-41

7.5 FACADE SYSTEM

Cultivating plants on the façade is an ideal way both of adding interest to a facade and also improving it from an environmental standpoint. It can provide a habitat and an indispensable food resource for a wide variety of different animals. The plants increase the local atmospheric humidity, provide shade and filter dust. It can also provide a degree of climate control in both summer and winter. Growing plants on the façade can bring a touch of nature into the most cramped city centre environments. If done correctly, virtually all buildings can be planted in some shape or form without any risk to the structure of the building. A distinction should be made between trellis climbing and clinging plants, while plants that need a trellis or other climbing assistance are easy to keep off areas where they are not wanted, clinging plants are more difficult to control.

The Indigenous trellis climber or any form of wine that bears fruit. for the Tshwane area:

Clemantis Brachiata – Travelers joy

Senecio tamoides - Canary creeper

5x3m wind resistant, yellow flowered climber.

Rhicissus tridentate – Bushman's Grape.

Attractive dark green foliage, with edible red berries. Drought tolerant, with medicinal properties

7.6 PAVING. A green car park.

Eco friendly alternatives to paving: The type of surface depends primarily on the degree of use. Paths that are not heavily used can be surfaced with a gravel lawn. Pre cast cement blocks are good for car parks but not good for walking paths. Paving with spaces for grass looks attractive but needs maintenance.

Fig 7-42 Permiable paving block

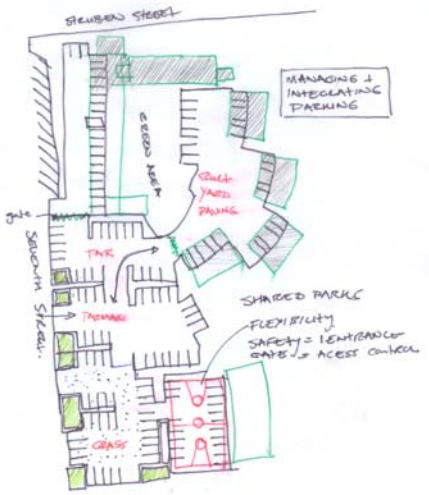


Fig 7-43 Sketch of parking area

Fig 7-44

7.7 LANDCAPING

Planting of deciduous trees can control heat gain by providing shade in summer and when the leaves fall in winter, sunshine can warm the house though north facing windows. Furthermore, breezes entering the house will be cooler if they have passed through gardens or courtyards that have shade, pools or shrubs and lawns.

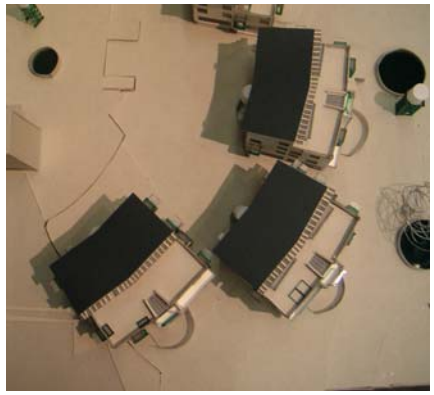
Fig 7-45 Parking area and bioswale system

Fig 7-46 Parking area and bioswale system

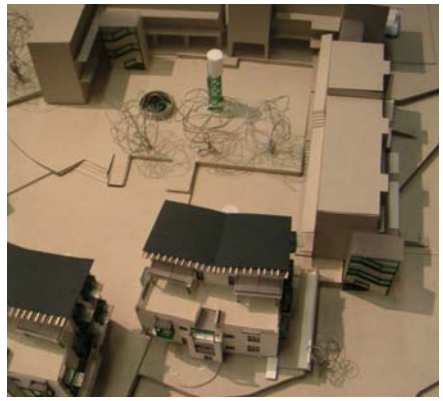
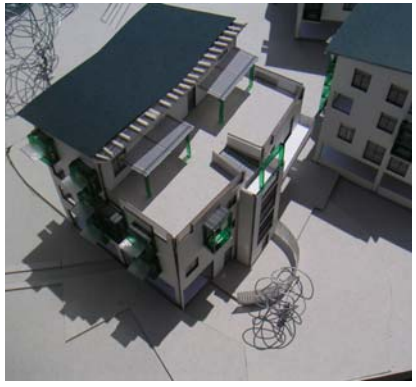
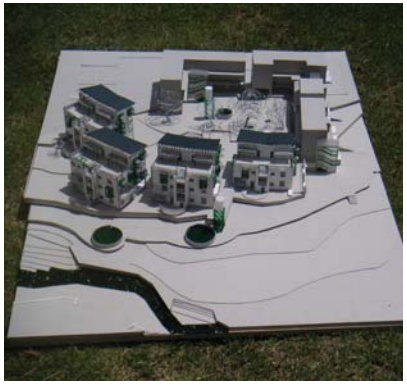
Fig 7-47 Parking area and bioswale system

Fig 7-48 Parking area and bioswale system





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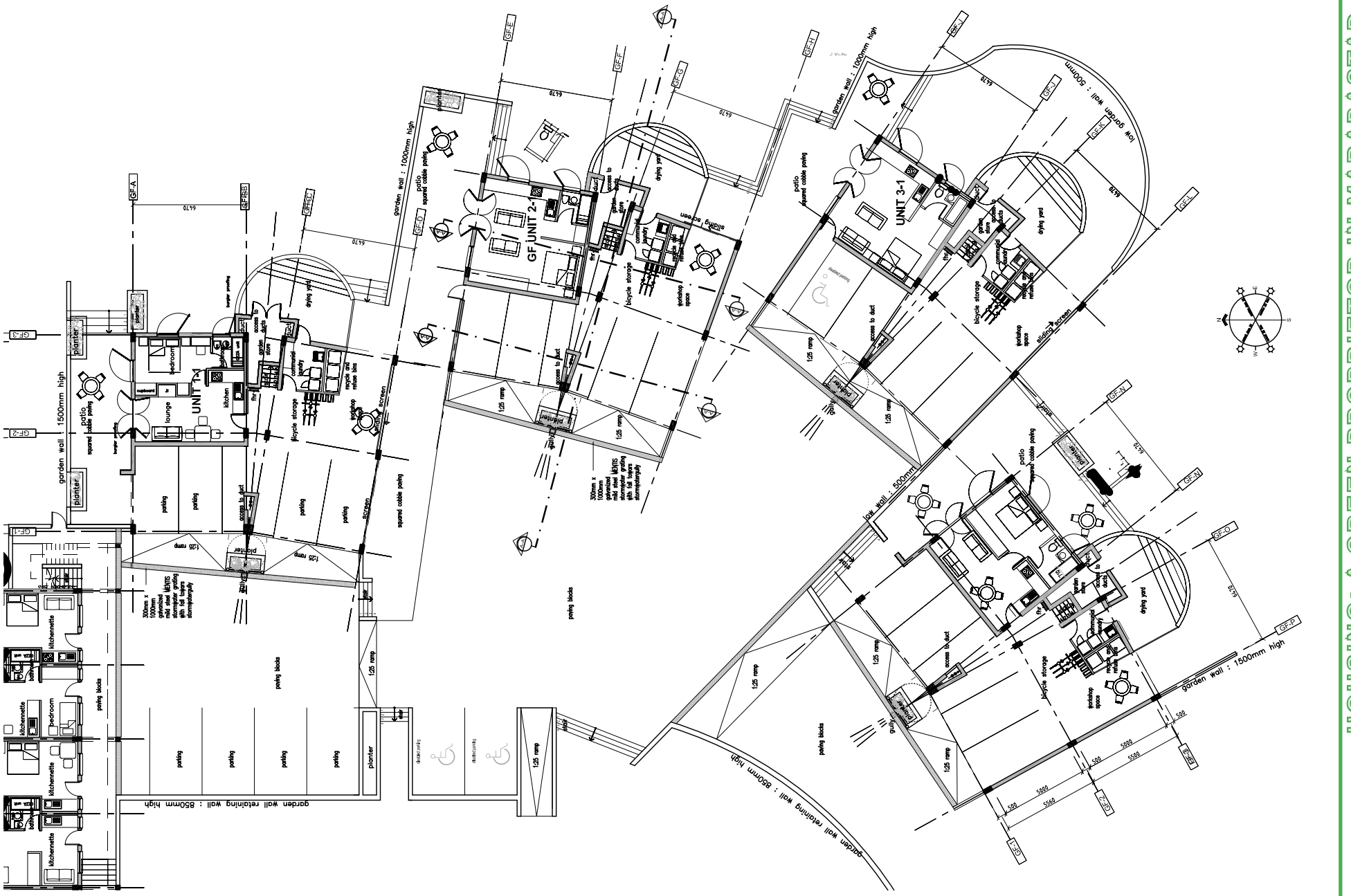
TECHNICAL DOCUMENTATION

7 SITE PLAN SCALE TO FIT

TECHNICAL DOCUMENTATION



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GROUND FLOOR PLAN SCALE TO FIT

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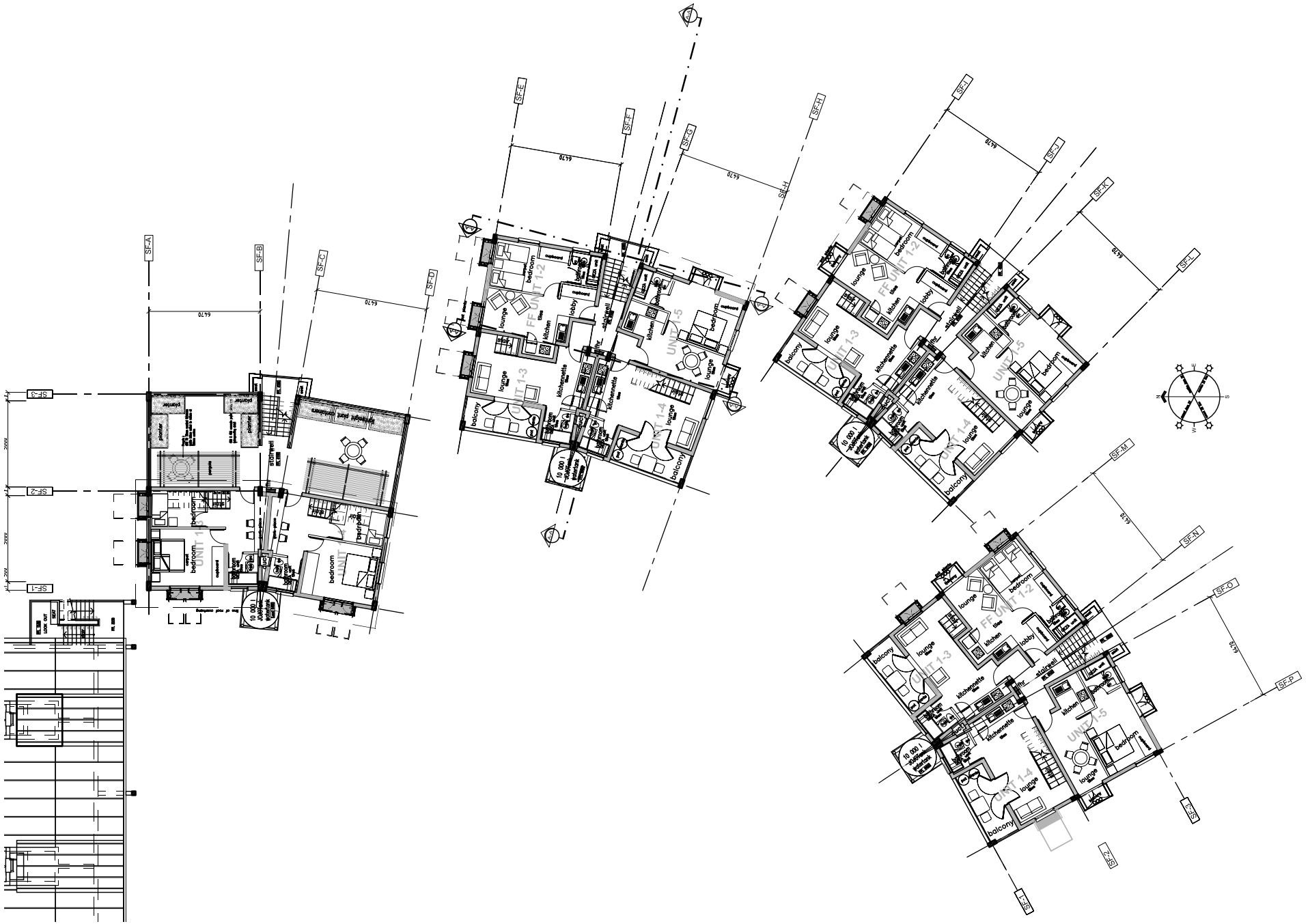
TECHNICAL DOCUMENTATION

FIRST FLOOR PLAN SCALE TO FIT

TECHNICAL DOCUMENTATION



SECOND FLOOR PLAN SCALE TO FIT

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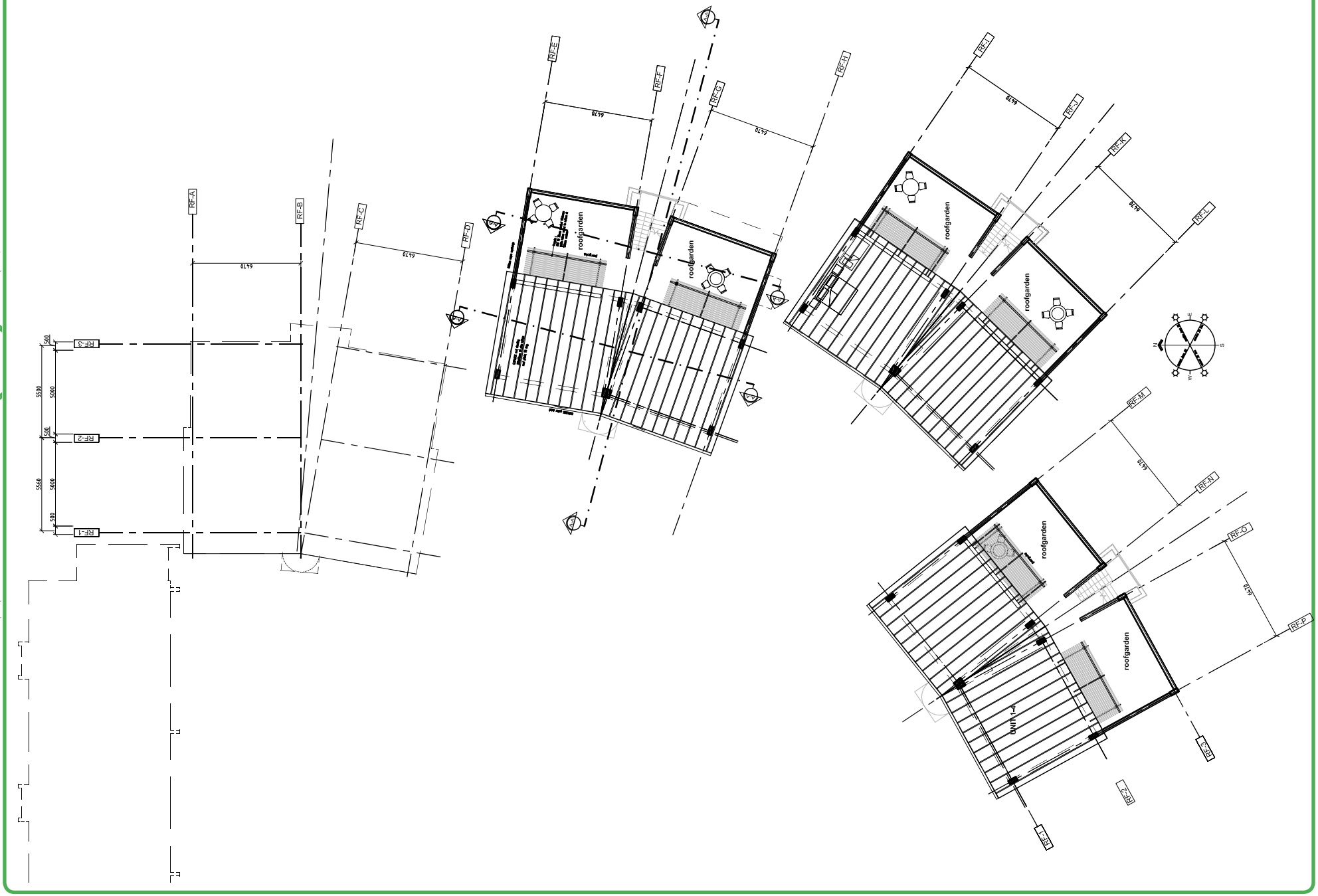

TECHNICAL DOCUMENTATION

ROOF PLAN SCALE TO FIT

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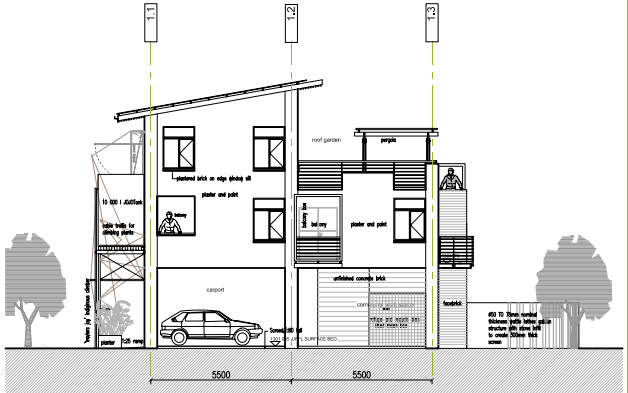

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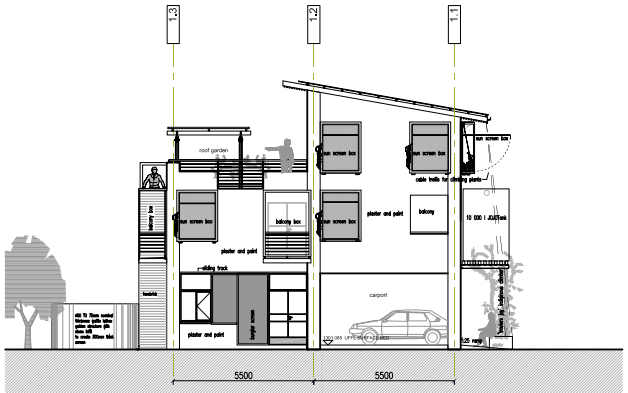
SCALE 1:100



SOUTH ELEVATION
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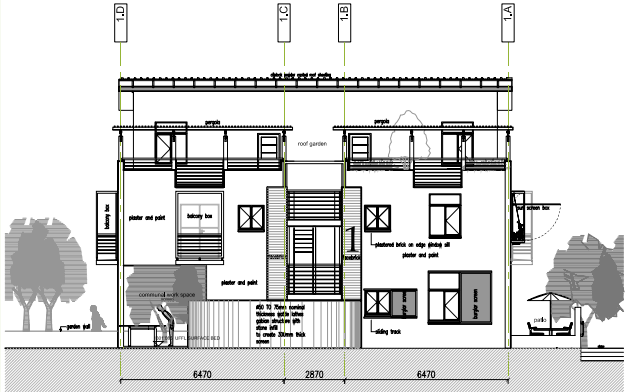

EAST ELEVATION
SCALE 1:100

WEST ELEVATION
SCALE 1:100

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ELEVATIONS BLOCK 1 SCALE 1:200

NORTH ELEVATION
SCALE 1:100

SOUTH ELEVATION
SCALE 1:100

EAST ELEVATION
SCALE 1:100

WEST ELEVATION
SCALE 1:100

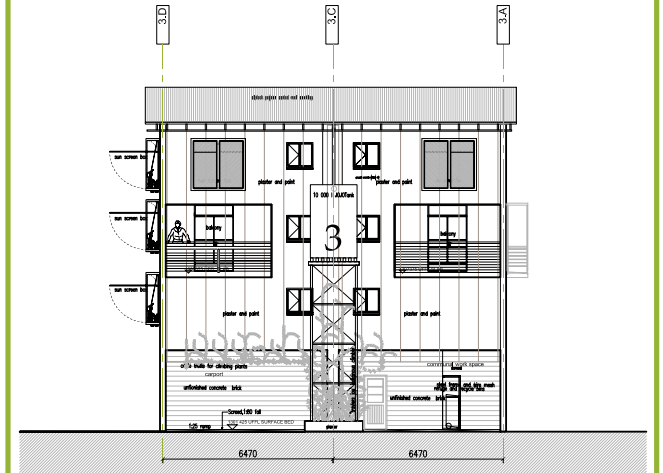
ELEVATIONS BLOCK 2 SCALE 1:200

TECHNICAL DOCUMENTATION

NORTH ELEVATION
SCALE 1:100

SOUTH ELEVATION
SCALE 1:100

EAST ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

ELEVATIONS BLOCK 3 SCALE 1:200

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NORTH ELEVATION
SCALE 1:100

SOUTH ELEVATION
SCALE 1:100

EAST ELEVATION
SCALE 1:100

WEST ELEVATION
SCALE 1:100

ELEVATIONS BLOCK 4

TECHNICAL DOCUMENTATION

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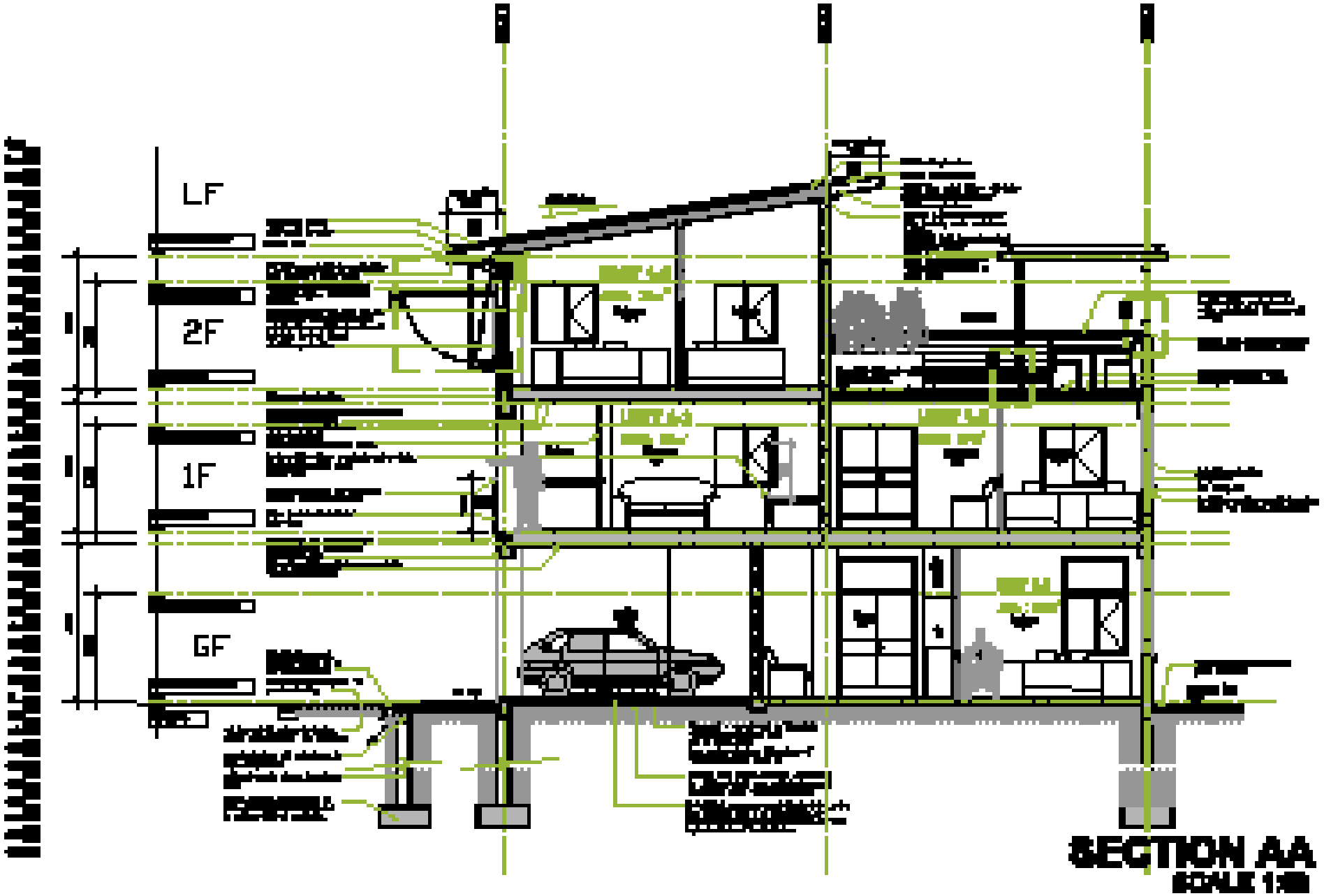
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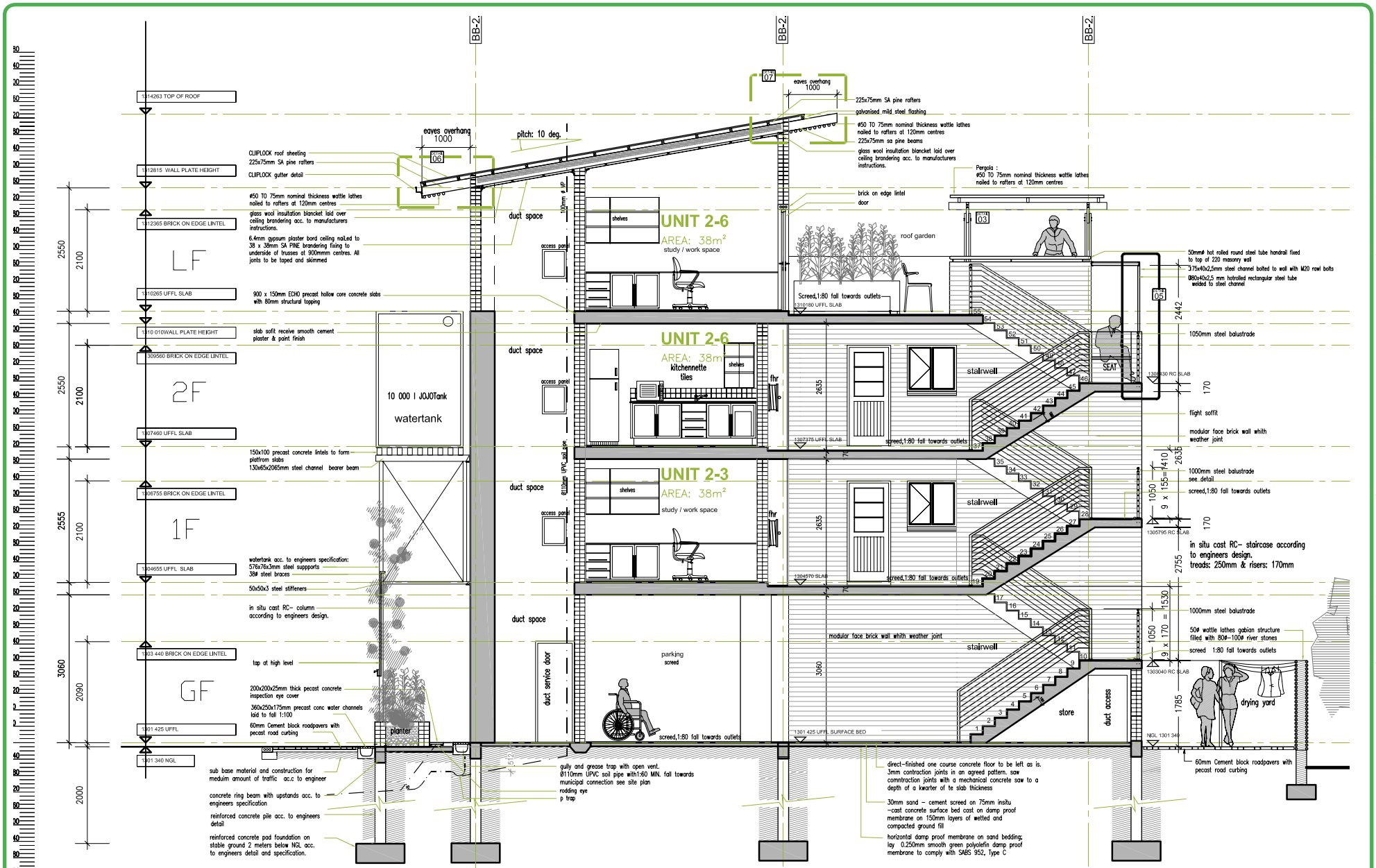

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TECHNICAL DOCUMENTATION

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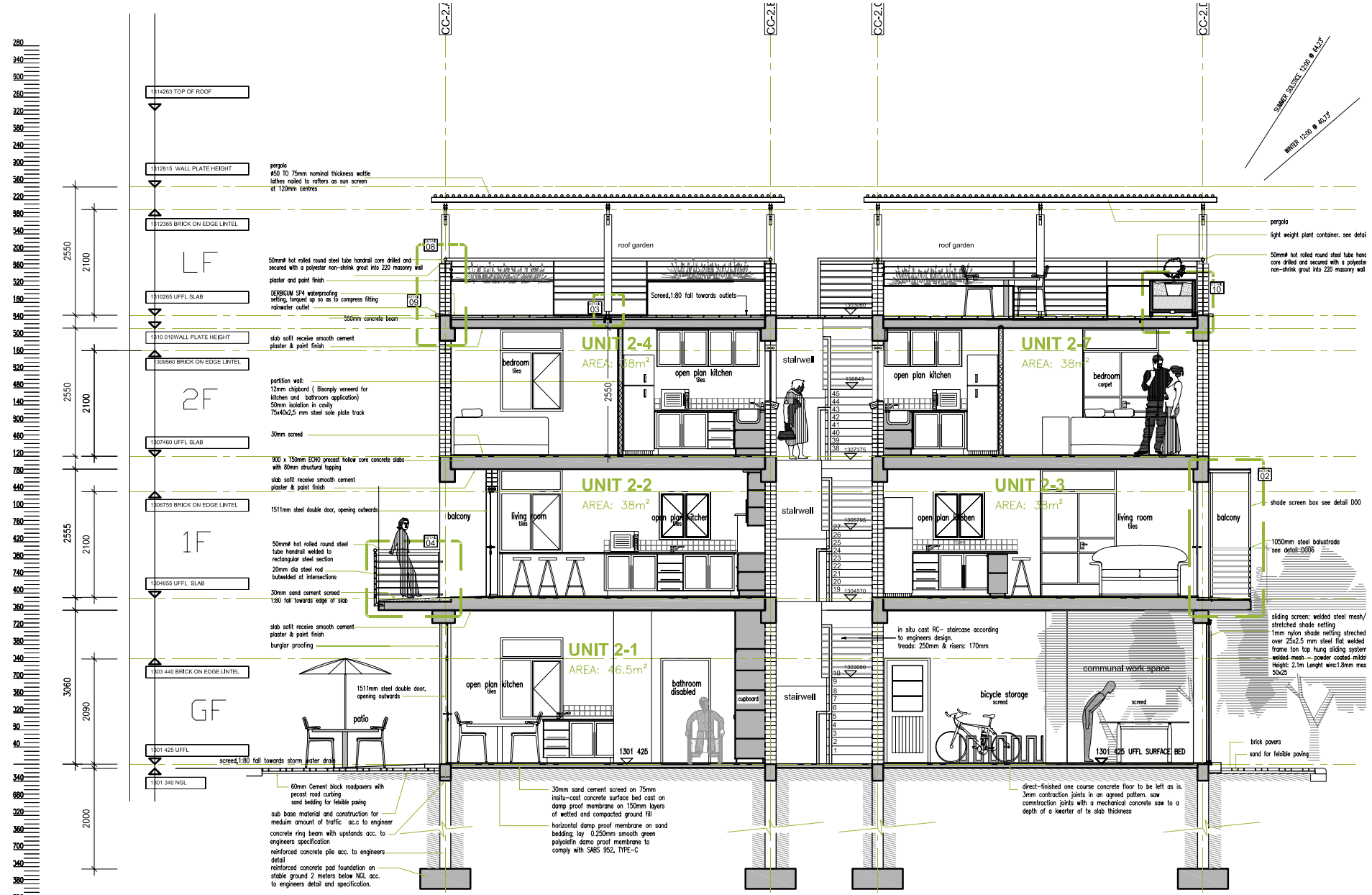

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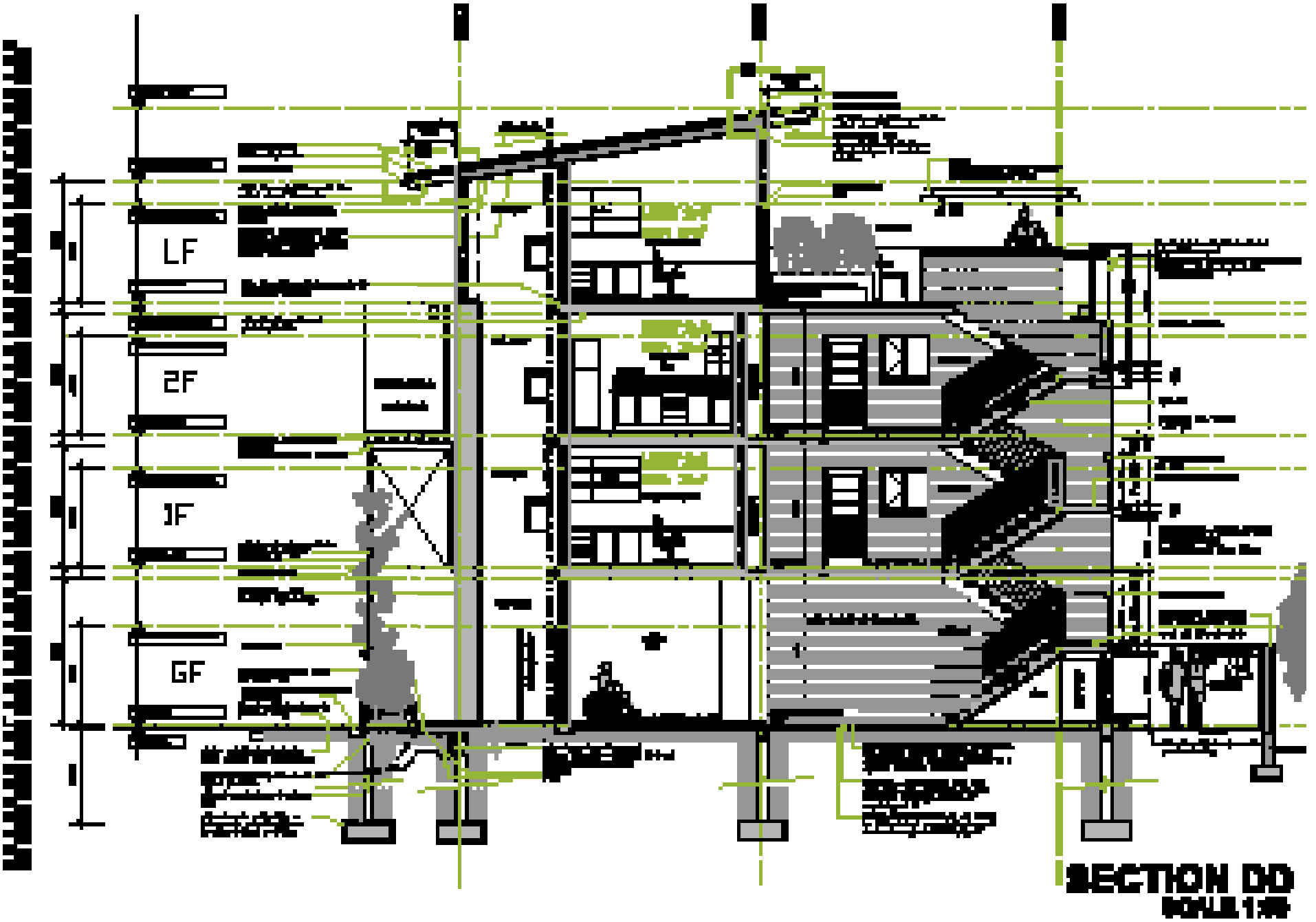

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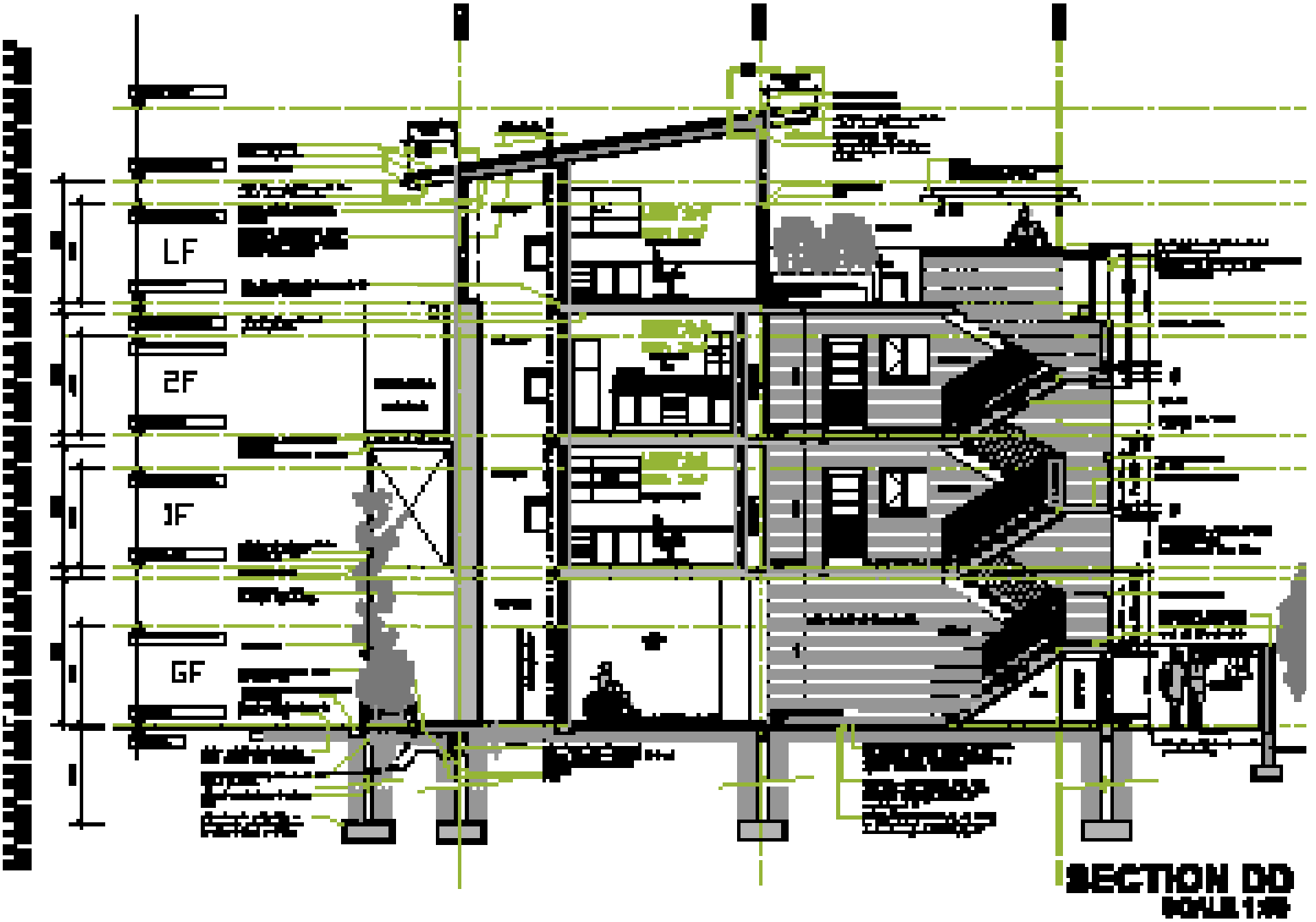

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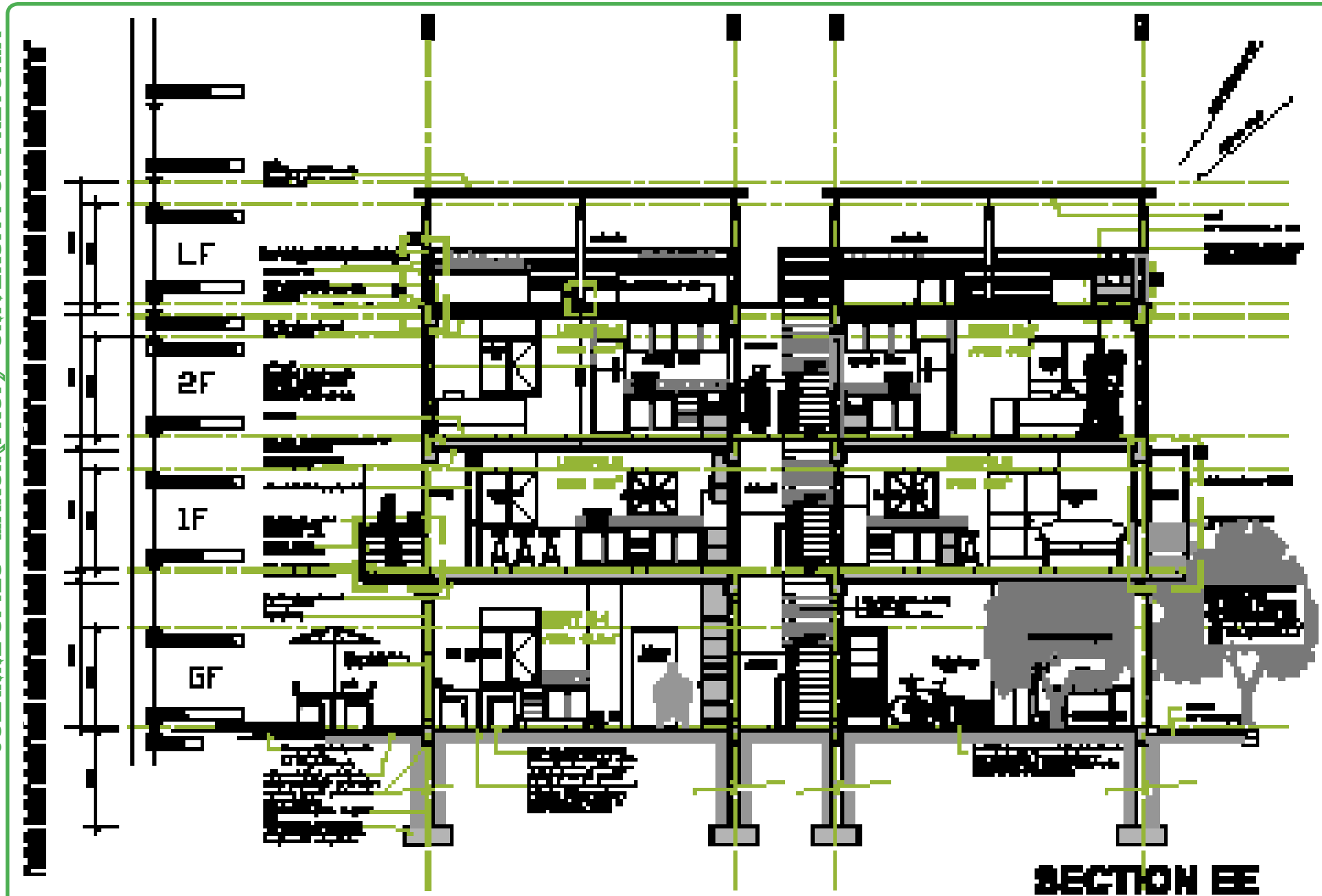

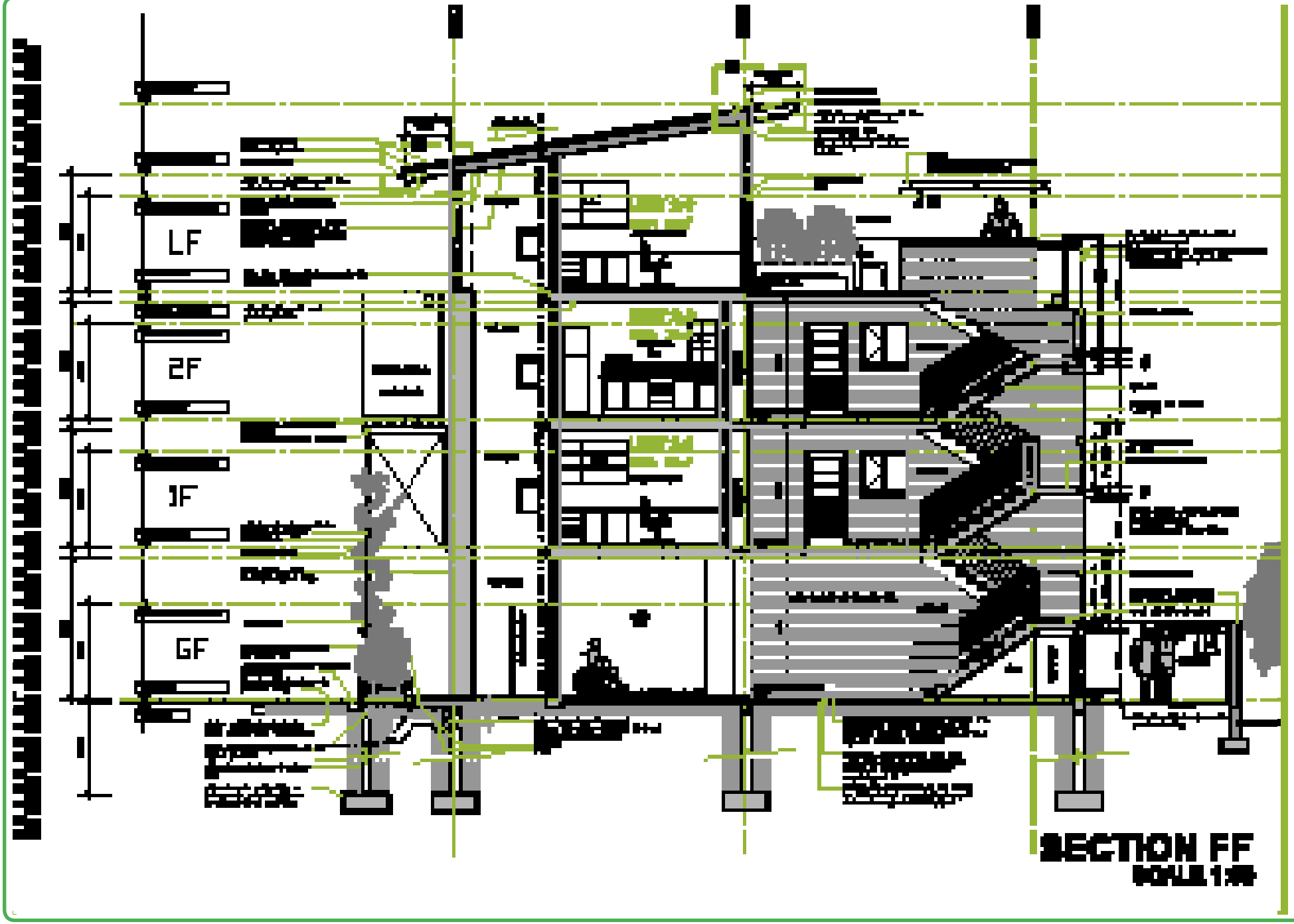

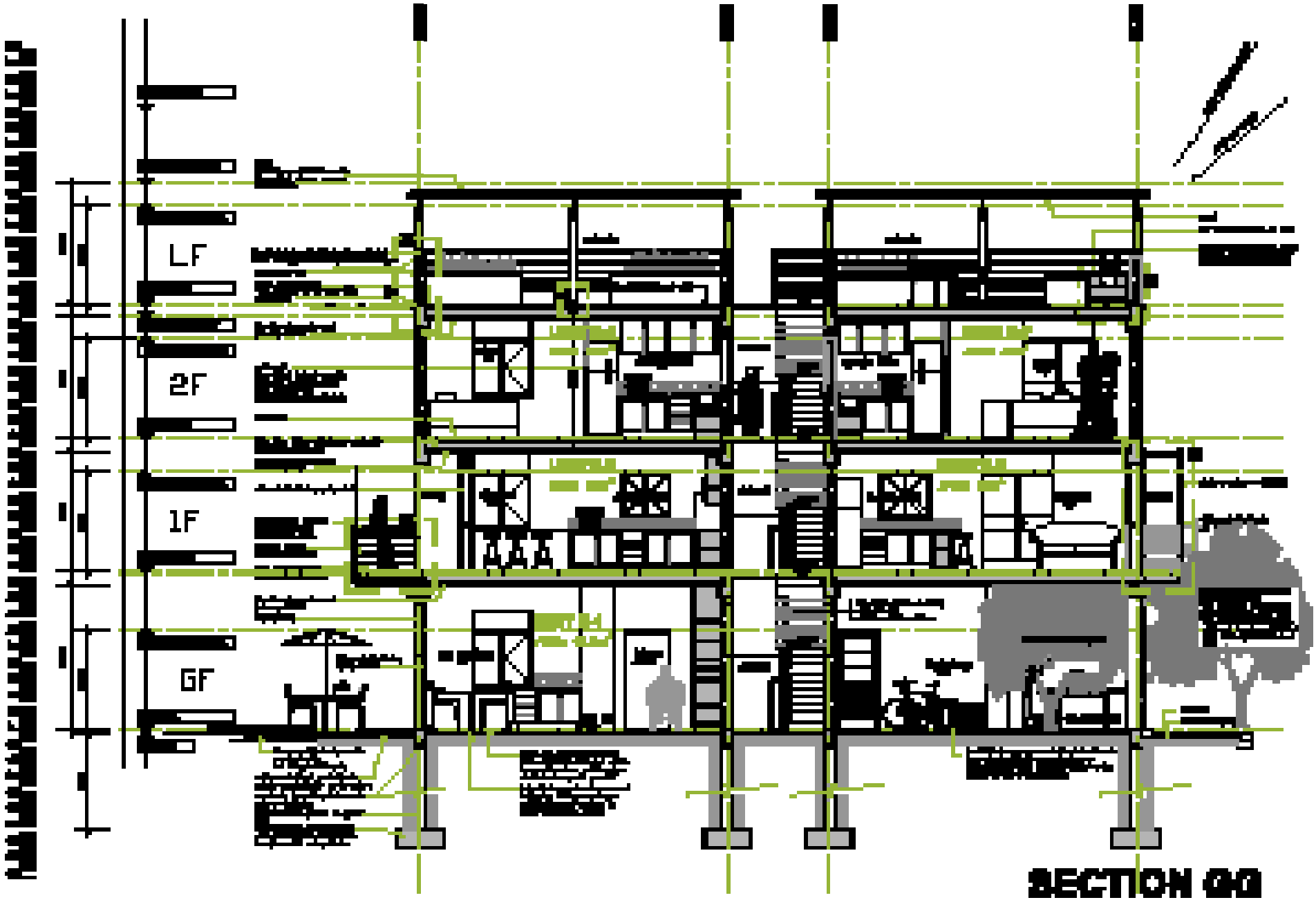
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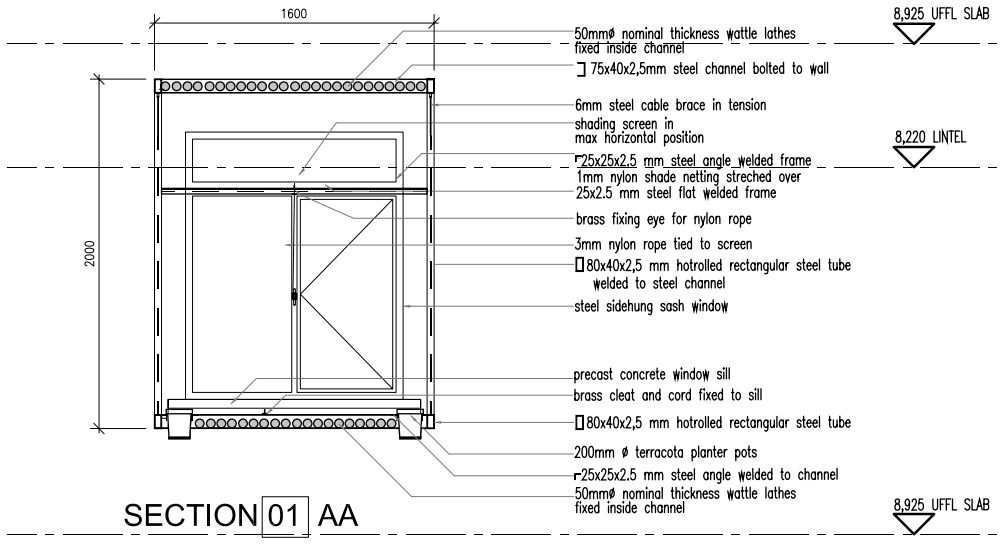

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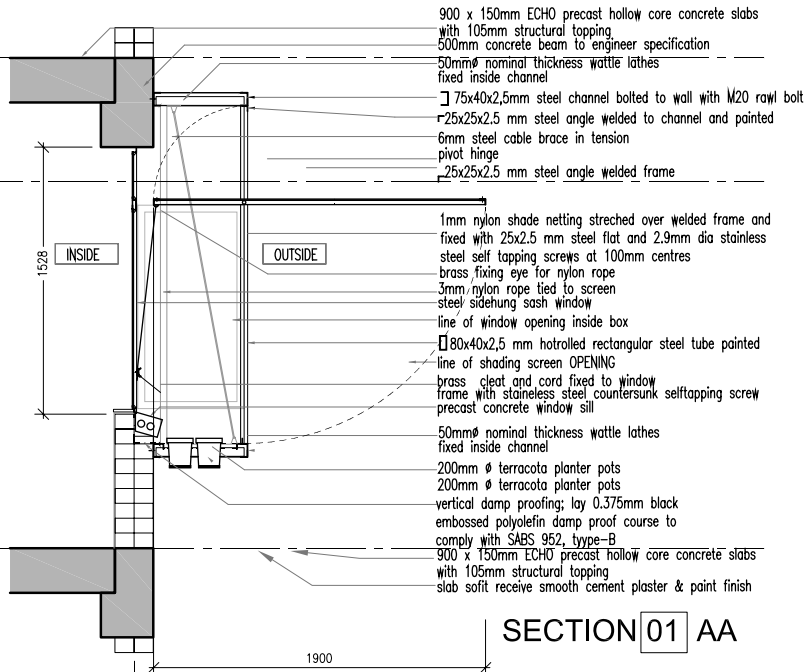

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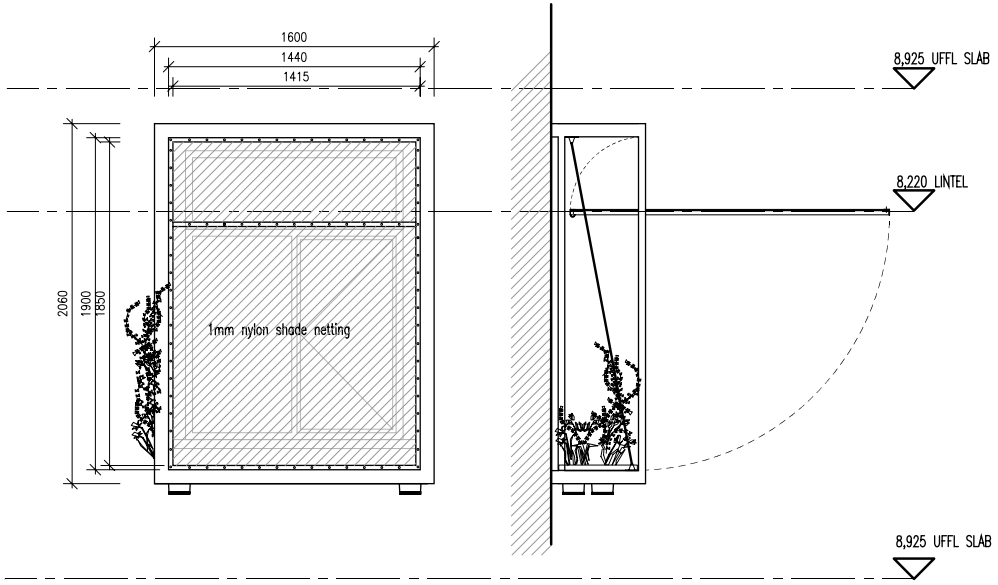

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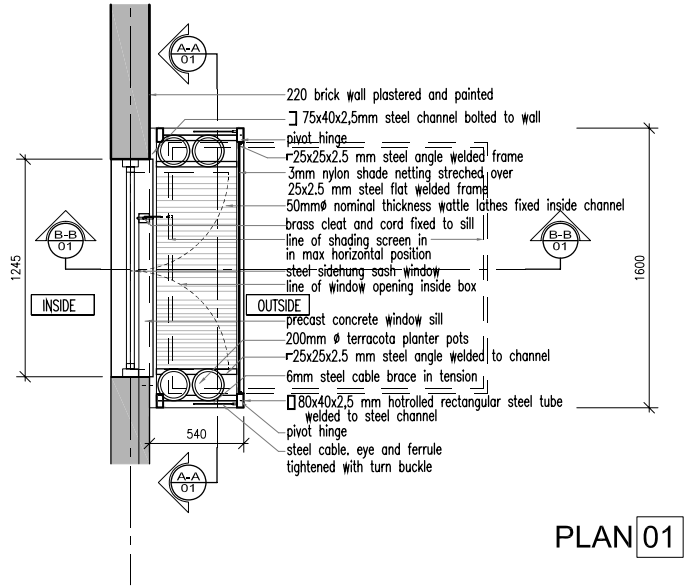

PLAN 01

DETAIL 01

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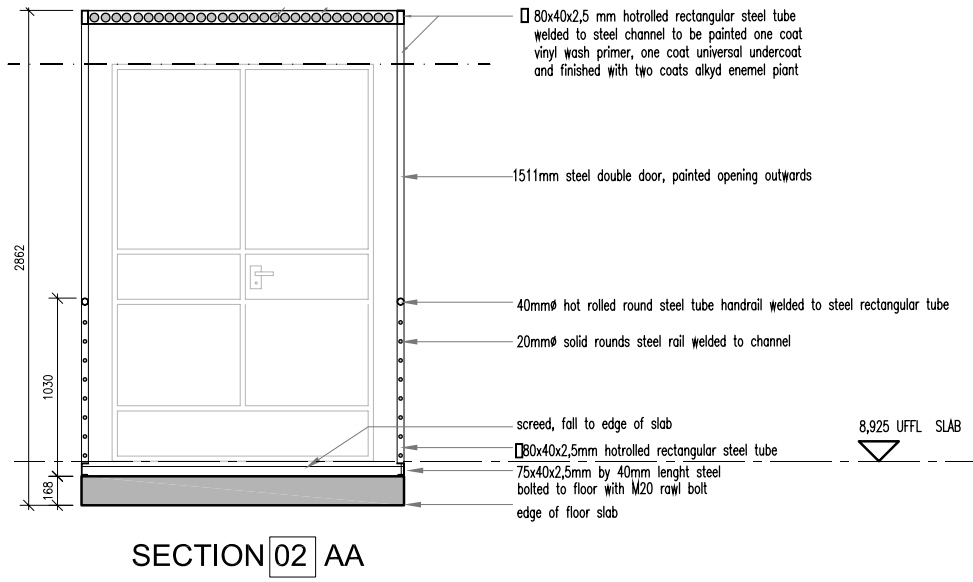

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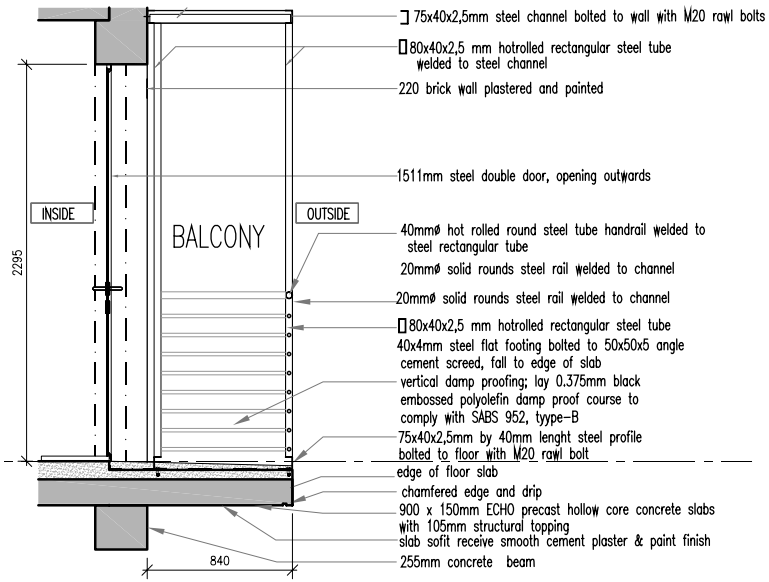

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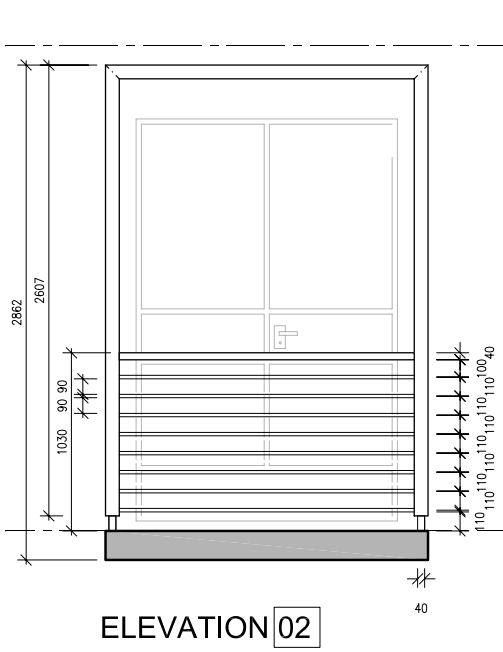

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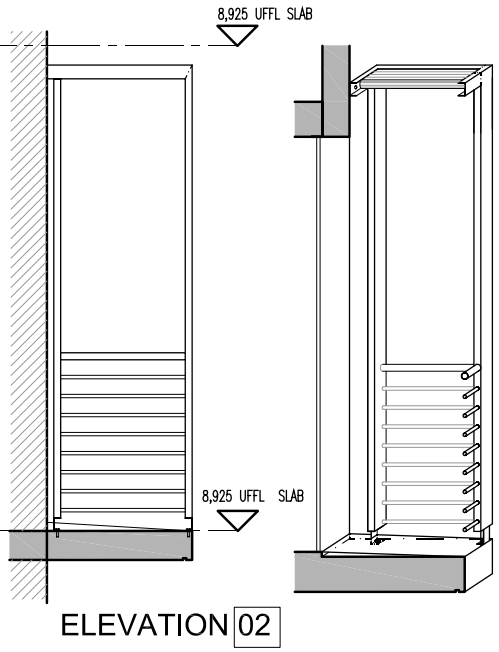

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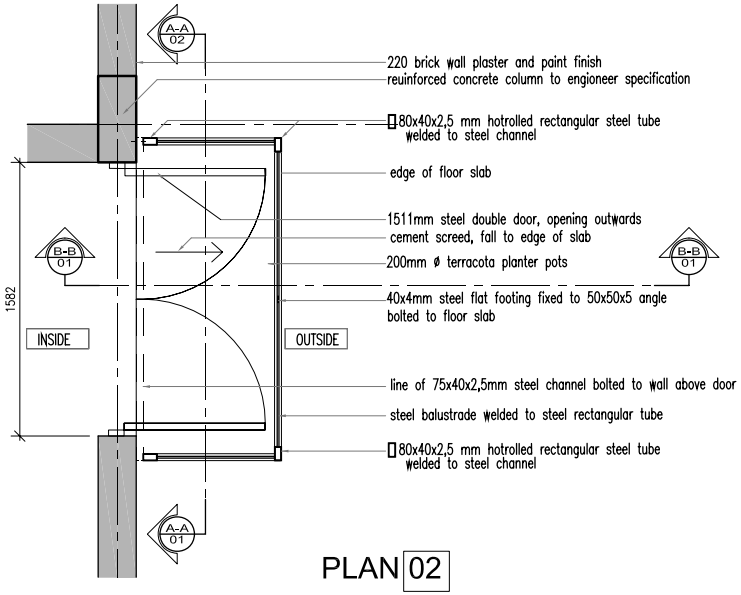

PLAN 02

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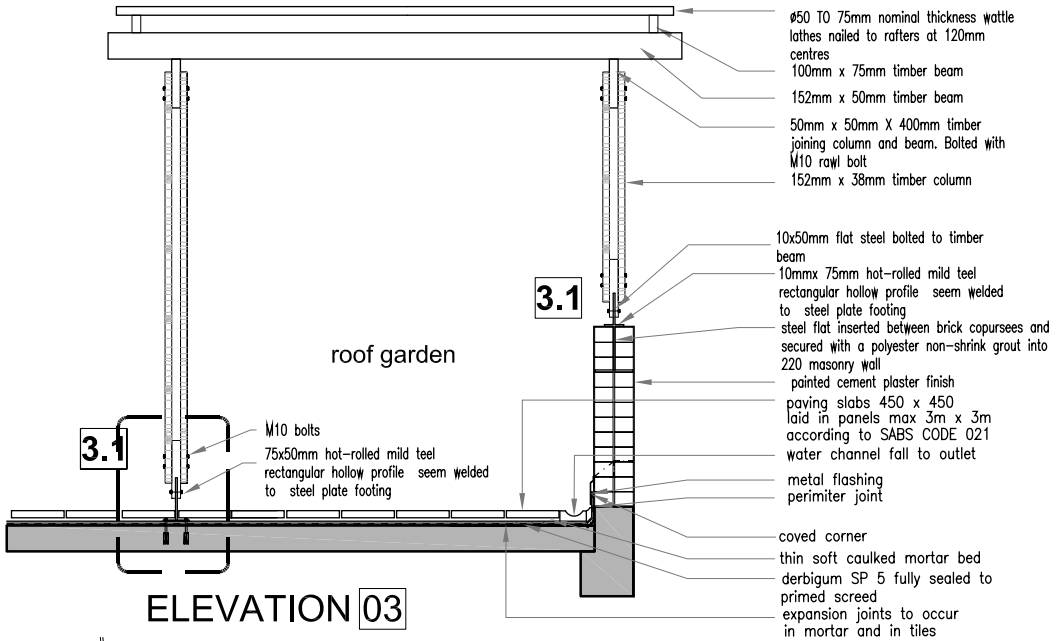
DETAIL 02



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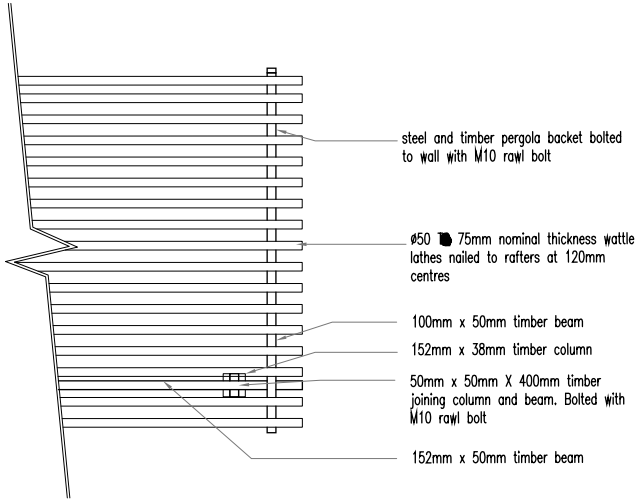
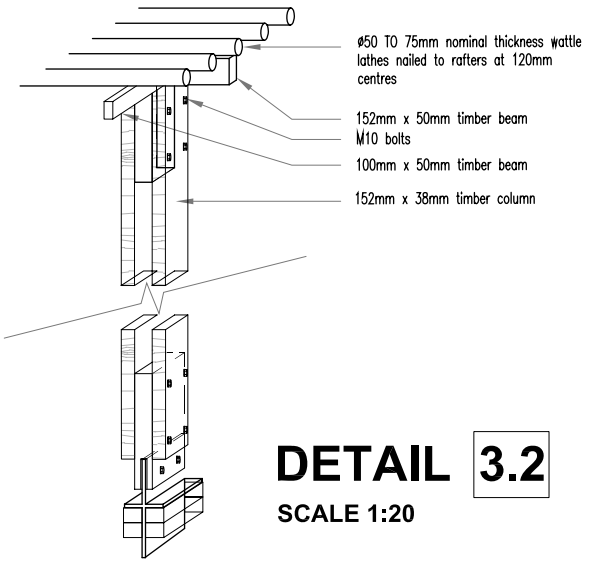


PLAN 03



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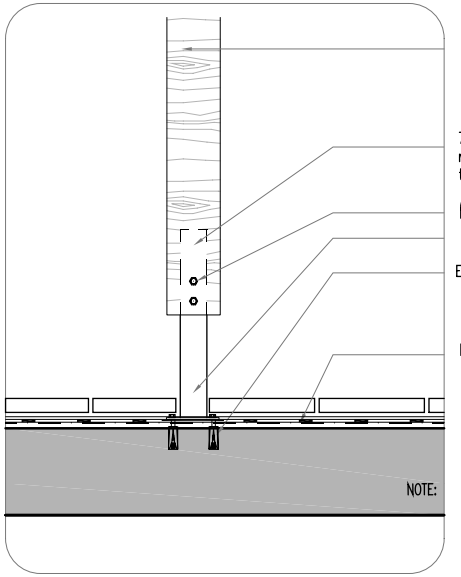

DETAIL 3.1

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DETAIL 03 PERGOLA DETAIL

SCALE 1:20

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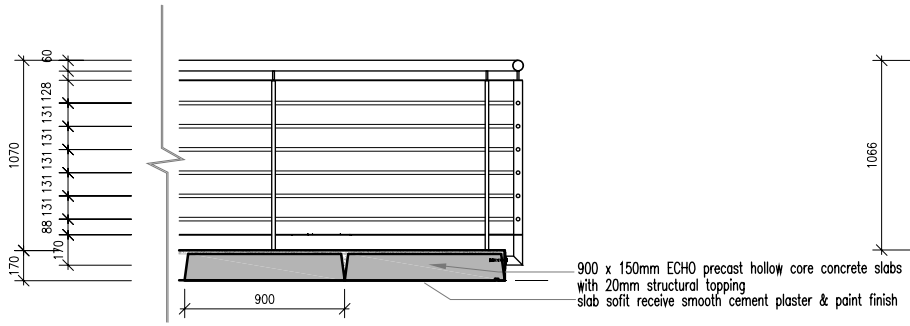

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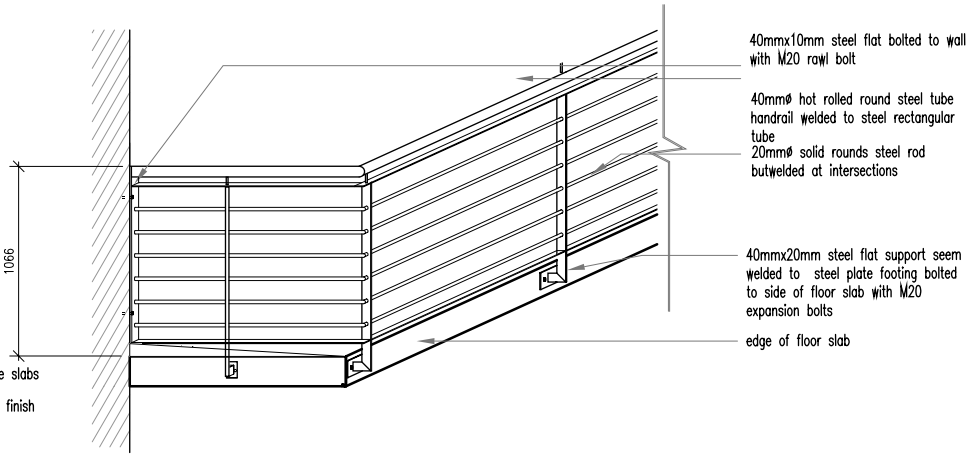

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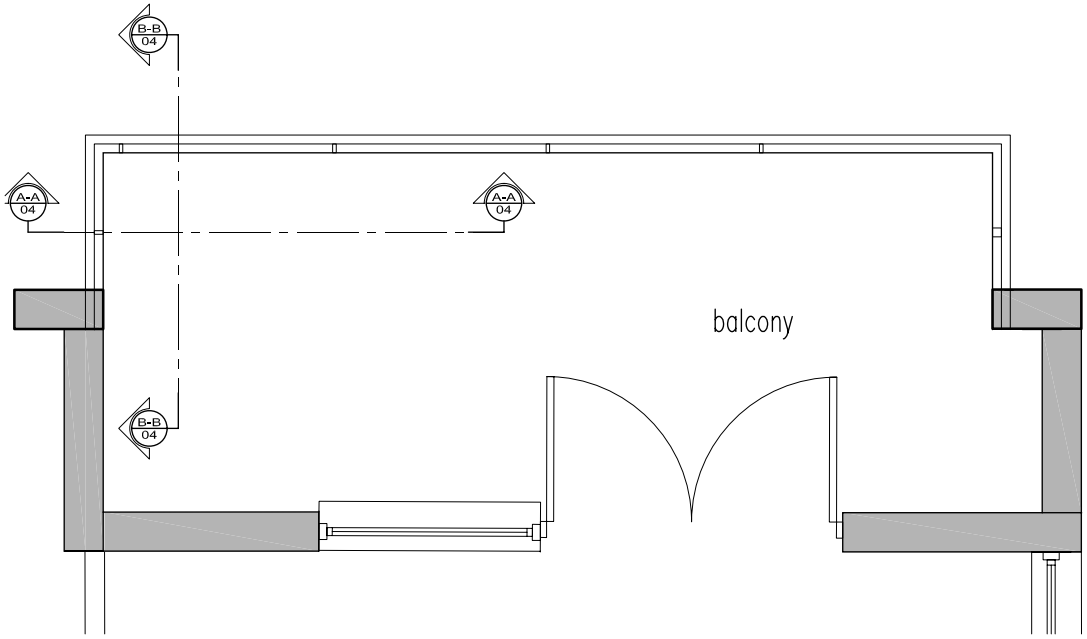

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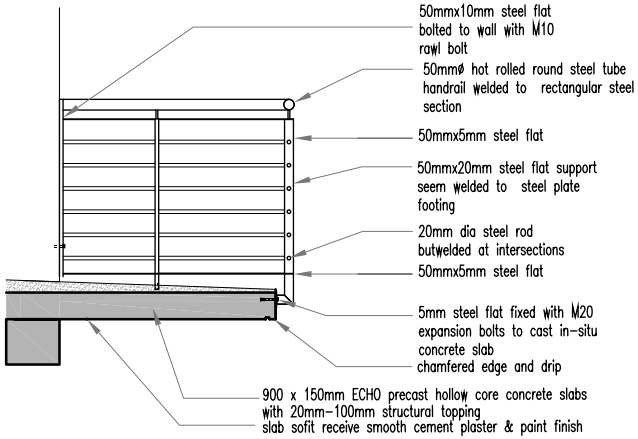

SECTION 04 BB

DETAIL 04 BALUSTRADE DETAIL

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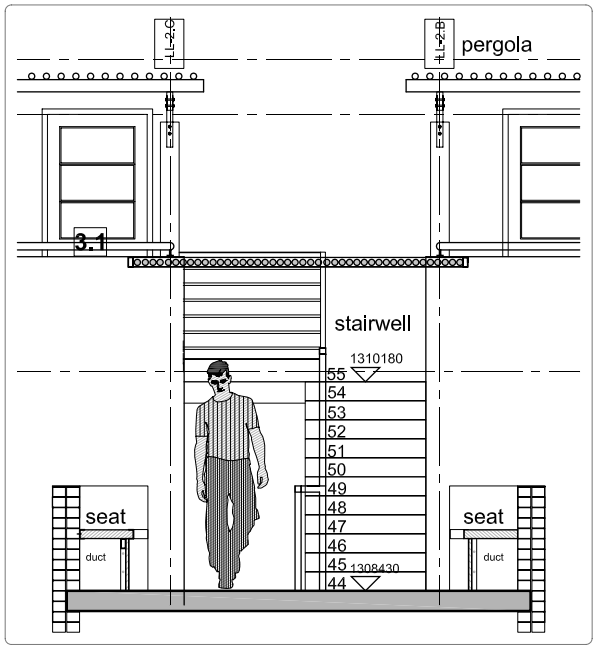

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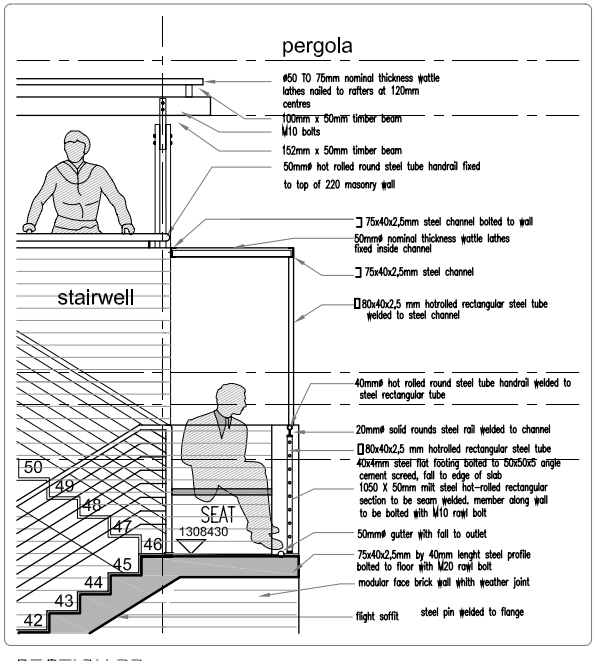

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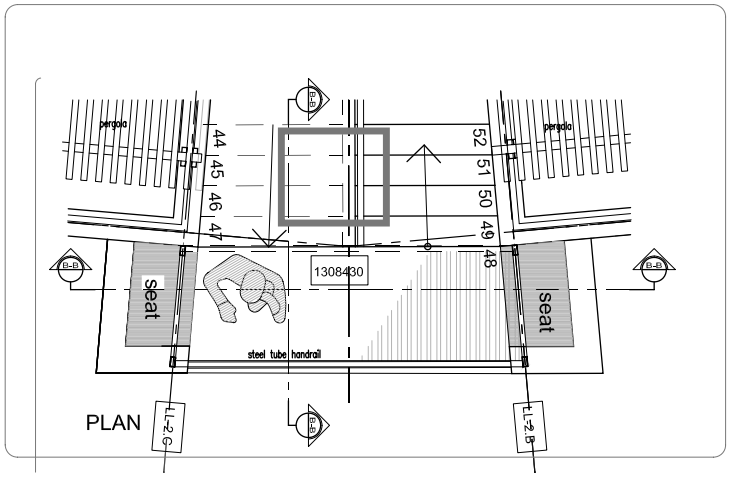

PLAN 05

DETAIL 05 STAIRWELL DETAIL

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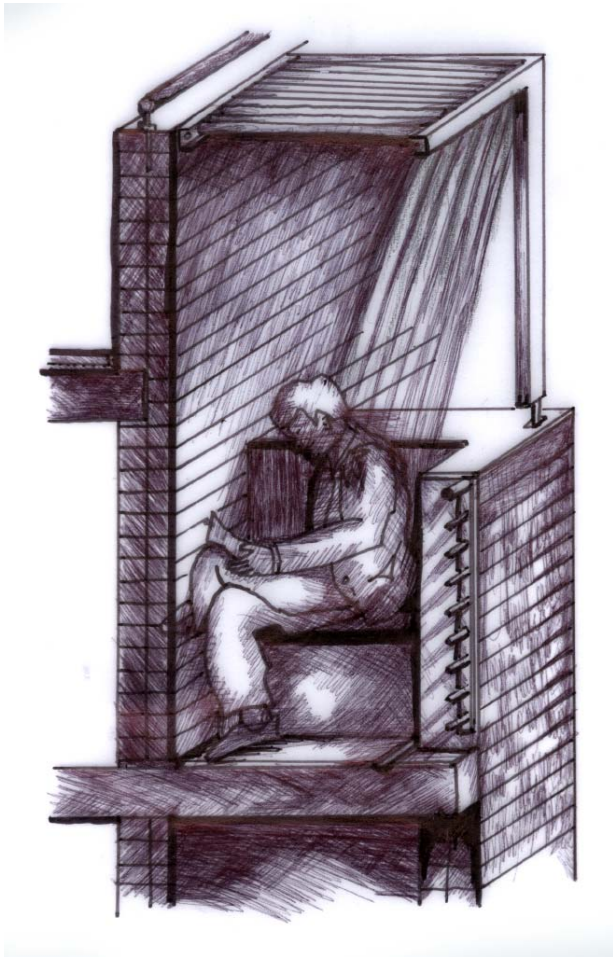

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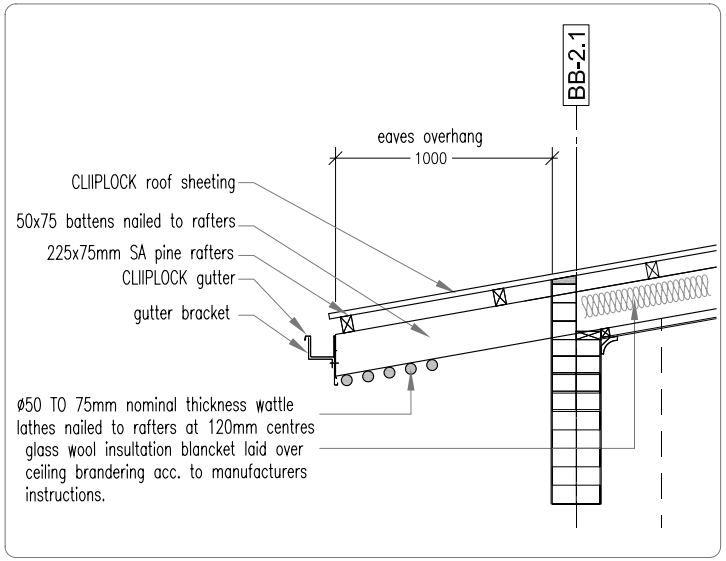
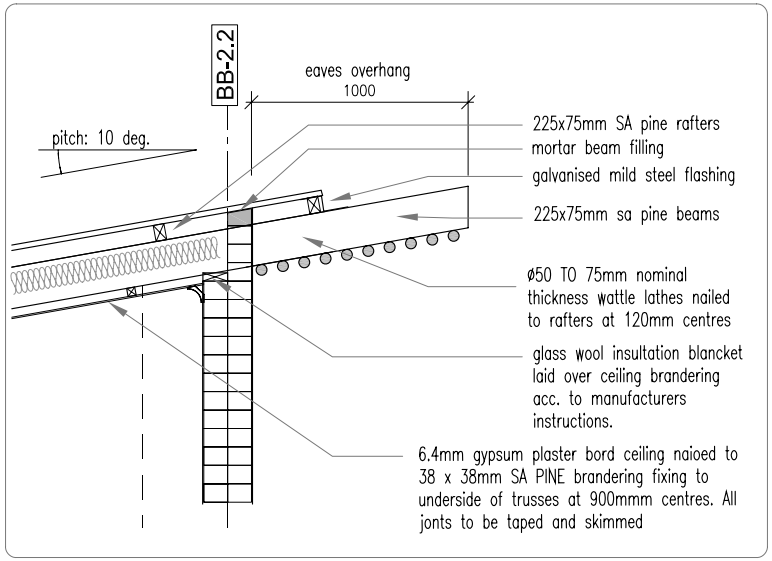
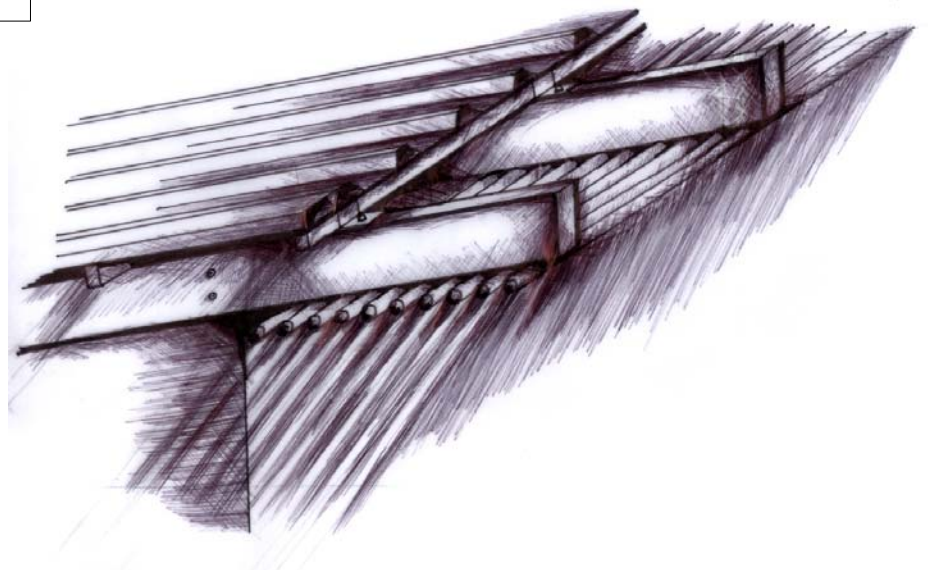




DETAIL 06

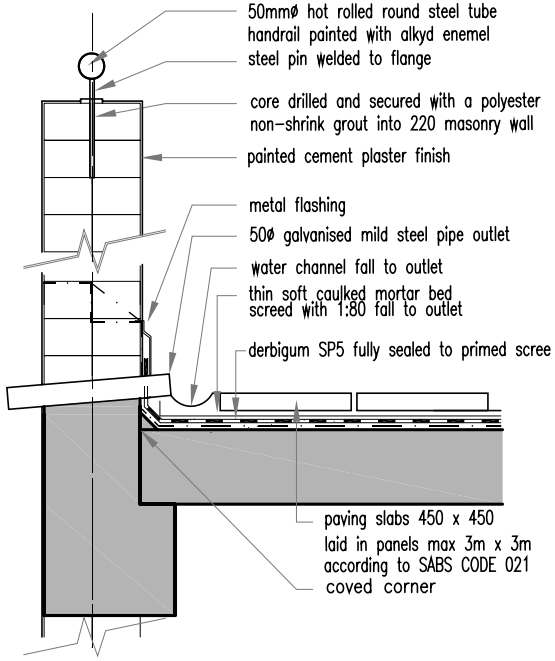
DETAIL 07

ROOF OVERHANG DETAIL



DETAIL 08 STEEL HANDRAIL DETAIL

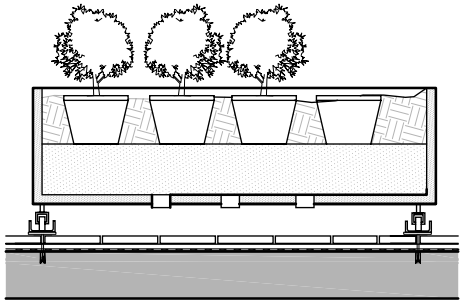
SCALE 1:10



LIGHTWIEGTH PLANT CONTAINERS.
METHOD FOR STINGENT WIEGTH RESTRICTICTIONS.
plastic containers are substituted for clay, and lightweight drainage meduim is substituted for soil.
for planting directly in soil, 200 to 250mm of lightwieght soil is placed on drainage meduim covered with a filter blanket.

industrial swiwel casters are fixed to the footings. the wheels move along the steel profile tracks attached to floor slab so not to damage waterproofing

140x60x10 mm steel channel welded to plate



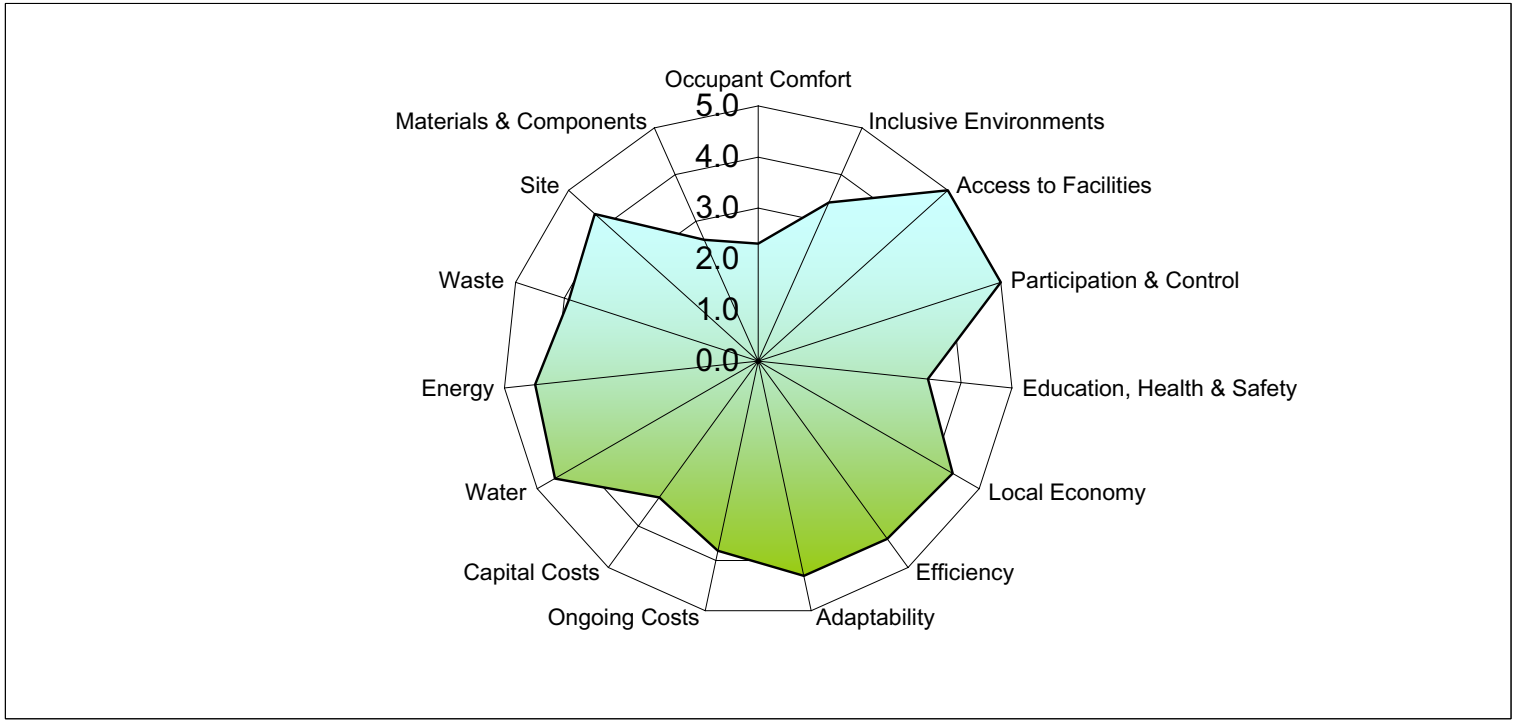
DETAIL 10 PLANT CONTAINER DETAIL

SCALE 1:20

DETAIL 09 RAIN WATER DETAIL

SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT- P) V1

PROJECT		ASSESSMENT	
Project title:	Housing: A Green Propriator in Marabastad	Date:	14-Oct-06
Location:	Marabastad, City of Tswhane	Undertaken by:	Jozanne Spies
Building type (specify):	Community	Company / organisation:	
Internal area (m2):		Telephone:	Fax:
Number of users:		Email:	
Building life cycle stage (specify):	Design/Construction/Operation		



Social	3.8
Economic	4.0
Environmental	4.0
Overall	3.9

Reference	Criteria	Description	Examples of quantified performance indicators
SO1	Occupant Comfort	The quality of environments in and around buildings has been shown to have a direct impact on health, happiness and productivity of people. Healthier, happier, more effective people contribute to sustainability by being more efficient and therefore reducing resource consumption and waste.	
SO2	Inclusive Environments	Buildings should be designed to accommodate and be accessible to everyone, or specially designed buildings need to be provided. Ensuring that buildings are inclusive supports sustainability as replication is avoided and change of use supported. It also ensures that as legislation in this area tightens, expensive retrofits are not required in order to ensure compliance	
SO3	Access to Facilities	Conventional living and working patterns require regular access to a range of services. Ensuring that these services can be accessed easily and in environmentally friendly ways supports sustainability by increasing efficiency and reducing environmental impact.	
SO4	Participation & Control	Enablingusers to participate in decisions about their environment helps ensure that they care for and manage this properly. Control over aspects of their local environment enables personal satisfaction and comfort. Both of these support sustainability by promoting proper management of buildings and increasing productivity.	
SO5	Education Health and Safety	Buildings need to cater for the well-being, development, health and safety of the people that use them Learning and access to information is increasingly seen as a requirement of a competitive work force. All of these factors contribute to sustainability by helping ensure that people remain healthy and economically active, thus reducing the 'costs' (to society, the environment and the economy) of unemployment and ill health.	
EC1	Local Economy	The construction and management of buildings can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by buildings that make use of, and develop, local skills and resources.	
EC2	Efficiency	Buildings cost money and make use of resources whether they are used or not. Effective and efficient use of buildings supports sustainability by reducing waste and the need for additional buildings.	
EC3	Adaptability and Flexibility	Most buildings can have a life span of at least 50 years. It is likely that within this time the use of the building will change, or that the feasibility of this will be investigated. Buildings, which can accommodate change easily, support sustainability by reducing the requirement for physical adaptation and associated disruption, energy consumption and cost as well as the need for new buildings.	
EC4	Ongoing Costs	Building cost money to operate. These costs include cleaning, maintenance, security and energy. These costs are often indicative of consumption and waste in the building. It is therefore important to monitor them. In addition operational budgets can be used to support the development of local economies.	
EC5	Capital Costs	Buildings are generally one of the most valuable assets that people, and often organisations and governments own. Money spent on buildings is not available for other uses such as health, education and business development. In addition,expensive buildings may mean that the services (i.e. health and education) they contain or the accommodation (for work and living) they provide is beyond the means of most users.	
EN1	Water	The large-scale provision of conventional water supply has many environmental implications. Water needs to be stored (sometimes taking up large areas of valuable land and disturbing natural drainage patterns with associated problems from erosion etc); it also needs to be pumped (using energy) through a large network of pipes (that need to be maintained and repaired). Having delivered the water, parallel efforts are then required to dispose of this after it is used in reticulation and sewerage systems. Reducing water consumption supports sustainability by reducing the environmental impact required to deliver water, and dispose of this after use. Maintaining natural ground water systems also supports sustainability through maintaining existing ecosystems and avoiding the environmental impact associated with for disposal of storm water and runoff.	
EN2	Energy	Buildings consume a large proportion of all energy produced. Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. Using less energy or using renewable energy in buildings therefore can make a substantial contribution	
EN3	Waste	Raw materials and new components used in buildings consume resources and energy in their manufacture and processes. Buildings accommodate activities that consume large amounts of resources and products and produce large amounts of waste. Reducing the use of new materials and components in buildings and in the activities accommodated and reducing waste by recycling and reuse supports sustainability by reducing the energy consumption and resource consumption.	
EN4	Site	Buildings have a footprint and a size that take up space that could otherwise be occupied by natural ecosystems which contribute to sustainability by helping create and maintain an environment that supports life. (By, for instance, controlling the carbon dioxide and oxygen balance and maintaining temperatures within a limited range). Buildings can support sustainability by, limiting development to sites that have already been disturbed, and working with nature by including aspects of natural ecosystems within the development.	
EN5	Materials and Components	The construction of buildings usually requires large quantities of materials and components. These may require large amounts of energy to produce. Their manufacture may also require processes that are harmful to the environment and consume non-renewable resources. It is therefore important to carefully select materials and components and construction methods.	

Building Performance - Social

	Criteria	Indicative performance measure	Measured	Points	C
SO 1	**Occupant Comfort**	Explanatory notes		2.3	h
SO 1.1	Daylighting	% of occupied spaces that are within distance 2H from window, where H is the height of the window or where there is good daylight from skylights	80	0.8	
SO 1.2	Ventilation	% of occupied spaces have equivalent of opening window area equivalent to 10% of floor area or adequate mechanica system, with upolluted air source	50	0.5	
SO 1.3	Noise	% of occupied spaces where external/internal/reverberation noise does not impinge on normal conversation (50dbA)	80	0.8	
SO 1.5	Thermal comfort	Tempreture of occupied space does not exceed 28 or go below 19ºC for less than 5 days per year (100%)	10	0.1	
SO 1.5	Views	% of occupied space that is 6m from an external window (not a skylight) with a view	10	0.1	
SO 2	**Inclusive Environment**	Explanatory notes		3.4	
SO 2.1	Public Transport	% of building (s) within 400m of disabled accessible (20%) and affordable (80%) public transport	60	0.6	
SO 2.2	Information	Comprehensive signage provided (50%), Signage high contrast, clear print signage in appropriate locations and language(s) / use of understandable symbols / manned reception at all entrances (50%)	90	0.9	
SO 2.3	Space	% of occupied spaces that are accessible to ambulant disabled / wheelchair users	10	0.1	
SO 2.4	Toilets	% of occupied space with fully accessible toilets within 50m along easily accessible route	100	1.0	
SO 2.5	Fittings & Furniture	% of commonly used furniture and fittings (reception desk, kitchenette, auditorium) fully accessible	80	0.8	
SO 3	**Access to Facilities**	Explanatory notes		5.0	
SO 3.1	Children	All users can walk (100%) / use public transport (50%) to get to their childrens' schools and creches	100	1.0	
SO 3.2	Banking	All users can walk (100%) / use public transport (50%) to get to banking facilities	100	1.0	
SO 3.3	Retail	All users can walk (100%) / use public transport (50%) to get to food retail	100	1.0	
SO 3.4	Communication	All users can walk (100%) / use public transport (50%) to get to communication facilities (post/telephone/internet)	100	1.0	
SO 3.5	Exercise	All users can walk (100%) / use public transport (50%) to get to recreation/excercise facilities	100	1.0	
SO 4	**Participation & Contro**	Explanatory notes		5.0	
SO 4.1	Environmental control	% of occupied space able to control their thermal environment (adjacent to openable windows/thermal controls)	100	1.0	
SO 4.2	Lighting control	% of occupied space able to control their light (adjacent to controllable blinds etc/local lighting control)	100	1.0	
SO 4.3	Social spaces	Social informal meeting spaces (parks / staff canteens / cafes) provided locally (within 400m) (100%)	100	1.0	
SO 4.4	Sharing facilties	5% or more of facilities shared with other users / organisations on a weekly basis (100%)	100	1.0	
SO 4.5	User group	Users actively involved in the design process (50%) / Active and representative management user group (50%)	100	1.0	
SO 5	**Education, Health & Sa**	Explanatory notes		3.4	
SO 5.1	Education	Two percent or more space/facilities available for education (seminar rooms / reading / libraries) per occupied space (75%). Construction training provided on site (25%)	25	0.3	
SO 5.2	Safety	All well used routes in and around building well lit (25%), all routes in and around buildings visually supervised (25%), secure perimeter and access control (50%), No crime (100%)	80	0.8	
SO 5.3	Awareness	% of users who can access information on health & safety issues (ie HIV/AIDS), training and employment opportunitie easily (posters/personnel/intranet site)	80	0.8	
SO 5.4	Materials	All materials/components used have no negative effects on indoor air quality (100%)	100	1.0	
SO 5.5	Accidents	Process in place for recording all occupational accidents and diseases and addressing these	50	0.5	

Building Performance - Economic

	Criteria	Indicative performance measure	Measured	Points
EC 1	**Local economy**	Explanatory notes		4.4
EC 1.1	Local contractors	% value of the building constructed by local (within 50km) small (employees<20) contractors	80	0.8
EC 1.2	Local materials	% of materials (sand, bricks, blocks, roofing material) sourced from within 50km	60	0.6
EC 1.3	Local components	% of components (windows, doors etc) made locally (in the country)	100	1.0
EC 1.4	Local furniture/fittings	% of furniture and fittings made locally (in the country)	100	1.0
EC 1.5	Maintenance	% of maintenance and repairs by value that can, and are undertaken, by local contractors (within 50km)	100	1.0
EC 2	**Efficiency**	Explanatory notes		4.3
EC 2.1	Capacity	% capacity of building used on a daily basis (actual number of users / number of users at full capacity*100)	100	1.0
EC 2.2	Occupancy	% of time building is occupied and used (actual average number of hours used / all potential hours building could be used (24) *100)	100	1.0
EC 2.3	Space per occupant	Space provision per user not more than 10% above national average for building type (100%)	50	0.5
EC 2.4	Communication	Site/building has access to internet and telephone (100%), telephone only (50%)	100	1.0
EC 2.5	Material & Components	Building design coordinated with material / component sizes in order to minimise wastage. Walls (50%), Roof and floors (50%)	80	0.8
EC 3	**Adaptability**	Explanatory notes		4.2
EC 3.1	Vertical heights	% of spaces that have a floor to ceiling height of 3000mm or more	30	0.3
EC 3.2	External space	Design facilitates flexible external space use (100%)	100	1.0
EC 3.3	Internal partition	Non loadbearing internal partitions that can be easily adapted (loose partioning (100%), studwall (50%), masonary (25%)	100	1.0
EC 3.4	Modular planning	Building with modular stucture, envelope (fenestration) & services allowing easly internal adaptaptation (100%)	90	0.9
EC 3.5	Furniture	Modular, limited variety furniture - can be easily configured for different uses (100%)	100	1.0
EC 4	**Ongoing costs**	Explanatory notes		3.8
EC 4.1	Induction	All new users receive induction training on building systems (50%), Detailed building user manual (50%)	50	0.5
EC4.2	Consumption & waste	% of users exposed on a monthly basis to building performance figures (water (25%), electricity (25%), waste (25%), accidents (25%)	80	0.8
EC 4.2	Metering	Easily monitored localised metering system for water (50%) and energy (50%)	70	0.7
EC4.3	Maintenance & Cleaning	% of building that can be cleaned and maintained easily and safely using simple equipment and local non-hazardous materials	80	0.8
SO 4.5	Procurement	% of value of all materials/equipment used in the building on a daily basis supplied by local (within the country) manufacturers	100	1.0
EC 5	**Capital Costs**	Explanatory notes		3.3
EC 5.1	Local need	Five percent capital cost allocated to address urgent local issues (employment, training etc) during construction process (100%)	100	1.0
EC5.2	Procurement	Tender / construction packaged to ensure involvement of small local contractors/manufacturers (100%)	80	0.8
EC 5.3	Building costs	Capital cost not more than fifteen % above national average building costs for the building type (100%)	100	1.0
EC5.4	Technology	3% or more of capital costs allocated to new sustainable/indigenous technology (100%)	50	0.5
EC 5.5	Existing Buildings	Existing buildings reused (100%)	0	0.0

Building Performance - Environmental

	Criteria	Indicative performance measure	Measured	Points
EN 1	**Water**	Explanatory notes		4.6
EN 1.1	Rainwater	% of water consumed sourced from rainwater harvested on site	100	1.0
EN 1.2	Water use	% of equipment (taps, washing machines, urinals showerheads) that are water efficient	100	1.0
EN 1.3	Runoff	% of carparking, paths, roads and roofs that have absorbant/semi absorbant/permeable surfaces (grassed/thatched/looselaid paving/ absorbant materials)	60	0.6
EN 1.4	Greywater	% of water from washing/relatively clean processes recycled and reused	100	1.0
EN 1.5	Planting	% of planting (other than food gardens) on site with low / appropriate water requirements	100	1.0
EN 2	**Energy**	Explanatory notes		4.4
EN 2.1	Location	% of users who walk / cycle / use public transport to commute to the building	80	0.8
EN 2.2	Ventilation	% of building ventilation requirements met through natural / passive ventilation	100	1.0
EN 2.3	Heating & Cooling	% of occupied space which relies solely on passive environmental control (no or minimal energy consumption)	100	1.0
EN 2.4	Appliances & fittings	% of appliances / lighting fixtures that are classed as highly energy efficient (ie energy star rating)	80	0.8
EN 2.5	Renewable energy	% of building energy requirements met from renewable sources	80	0.8
EN 3	**Waste**	Explanatory notes		3.9
EN 3.1	Toxic waste	% of toxic waste (batteries, ink cartridges, flourescent lamps) recycled	100	1.0
EN 3.2	Organic waste	% of organic waste recycled	100	1.0
EN 3.3	Inorganic waste	% of inorganic waste recycled.	100	1.0
EN 3.4	Sewerage	% of sewerage recycled on site	10	0.1
EN 3.5	Construction waste	% of damaged building materials / waste developed in construction recycled on site	80	0.8
EN 4	**Site**	Explanatory notes		4.3
EN 4.1	Brownfield site	% of proposed site already disturbed / brownfield (previously developed)	100	1.0
EN 4.2	Neighbouring buildings	No neighbouring buildings negatively affected (access to sunlight, daylight, ventilation) (100%)	100	1.0
EN 4.3	Vegetation	% of area of area covered in vegetation (include green roofs, internal planting) relative to whole site	66	0.7
EN 4.4	Food gardens	Food gardens on site (100%)	100	1.0
EN 4.5	Landscape inputs	% of landscape that does not require mechanical equipment (ie lawn cutting) and or artificial inputs such as weed killers and pesticides	65	0.7
EN 5	**Materials & Componen**	Explanatory notes		2.6
EN 5.1	Embodied energy	Materials with high embodied energy (aluminium,plastics) make up less than 1% of weight of building (100%)	80	0.8
EN 5.2	Material sources	% of materials and components by volume from grown sources (animal/plant)	10	0.1
EN 5.3	Ozone depletion	No materials and components used requiring ozone depleting processes (100%)	40	0.4
EN 5.4	Recyled / reuse	% of materials and components (by weight) reused / from recycled sources	30	0.3
EN 5.5	Construction process	Volume / area of site disturbed during construction less than 2X volume/area of new building (100%)	100	1.0

Instructions

Objective

The objective of the tool is to provide an indication of the performance of a building or the design of a building in terms of sustainability

Scope

The tool should be ideally be used on a building that has just been completed.
It can be used at other stages of a building's lifecycle but some criteria may not be relevant
The tool can be used on most building types such as schools, housing and offices, conventionally used by people to live and work in

Instructions

Step One **Setting the Project Up**
Complete the *project* and *assessment* sections of the *A. Report* section
Refer to *definitions* below

Step Two **Entering Measurements**
Complete each of the sections *B. Social, C. Economic* and *D. Environmental*
Should you require a description of the broad criteria used refer to *Criteria Notes.*
Under the column *Measured* indicate the percentage compliance from 0 to 100 % for each of the relevant criteria
If you do not have the information required for the criteria enter O%
Should you have detailed modelled or measured quantified performance data relevant to the criteria enter this under *Quantified modelled or measured performance data.* Where possible ensure that this data aligns with protocols provided in the green building assessment methodology (see http:greenbuildings.ca)
Detailed technical performance information on your building should also be entered directly into the powerpoint accompanying this document

Step Three **Reading the Report**
On completion return to the A. Report section. The spidergraph should now have filled and values should have appeared in all boxes.

Social provides an indication of the social performance of the building in terms of sustainability
Economic provides an indication of the economic performance of the building in terms of sustainability
Environmental provides an indication of the environmental performance of the building in terms of sustainability
Overall provides an indication of the overall building performance in terms of sustainability

Definitions

Occupied Space: Space that is normally used by people for living or working in
User: People who regularly use the building

Contact

Should you wish to comment on this tool, please contact:

Jeremy Gibberd, FPM, CSIR
Tel: 012 841 2839 Fax: 012 841 3504
Email: jgibberd@csir.co.za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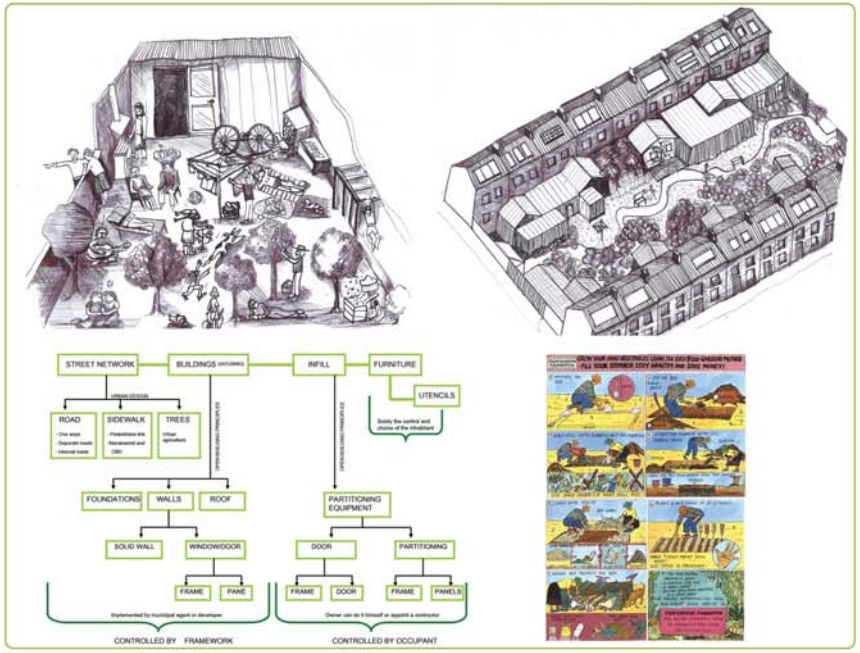
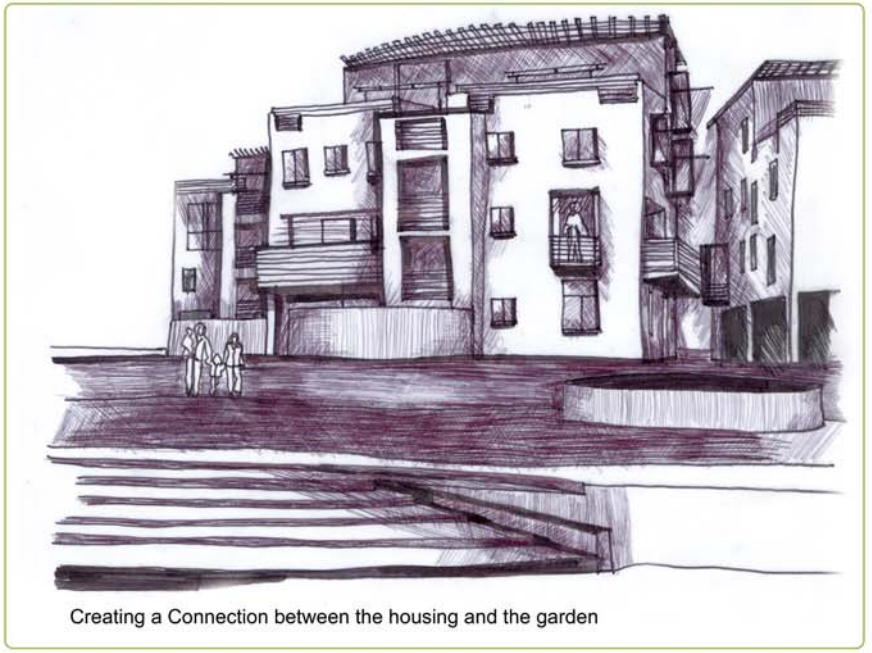
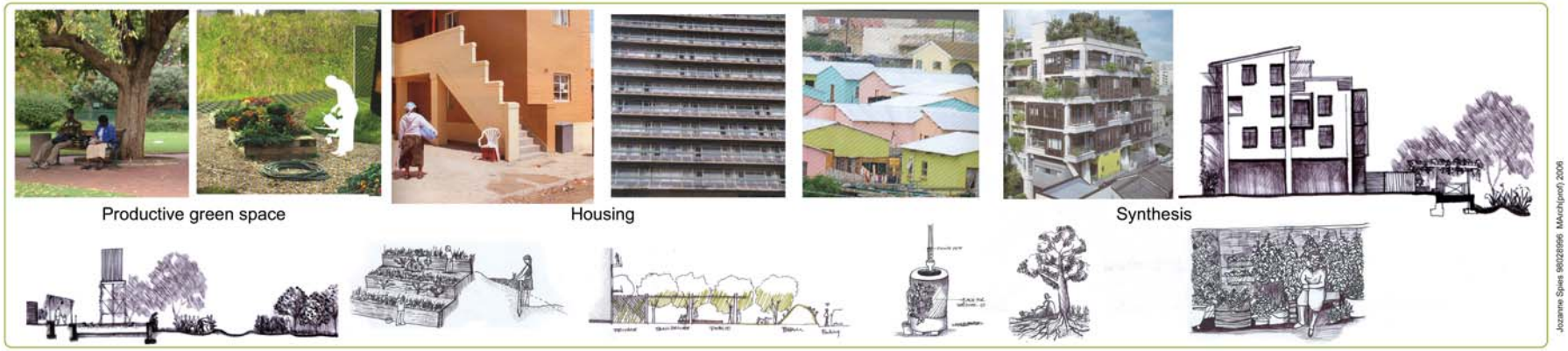




Creating a Connection between the housing and the garden

In what way can a housing model contribute to Public Space and Urban Life ?



Productive green space

Housing

Synthesis

Jozanne Spies 96028896 March(prof) 2006

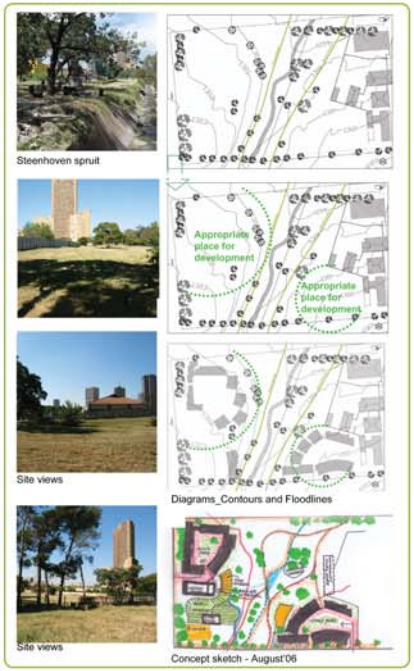
HOUSING: A GREEN PROPRIETOR IN MARABASTAD

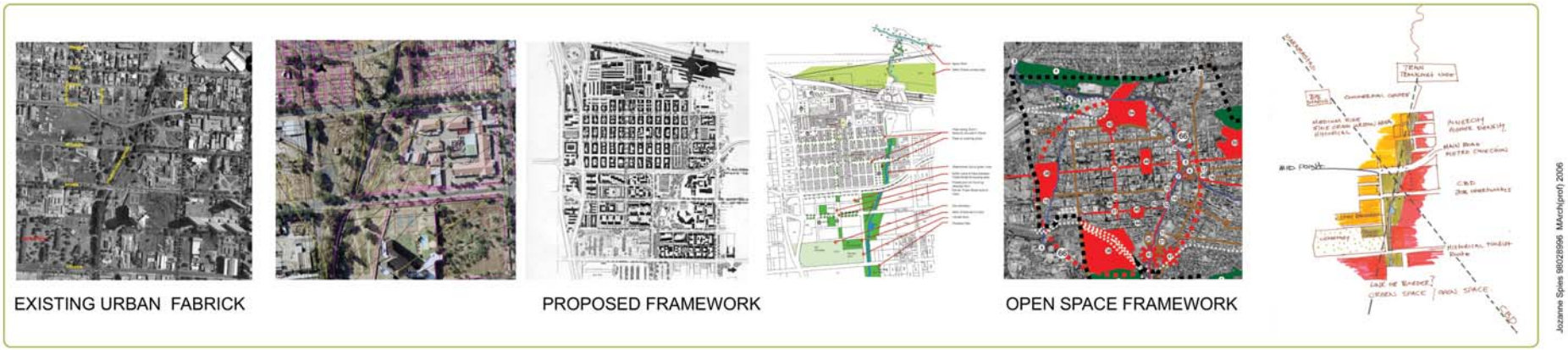
An investigation into the connection between housing and open greenspace in the urban enviroment.

Presentation

HOUSING: A GREEN PROPRIETOR IN MARABASTAD
JOZANNE SPIES MARCH(PROF) UNIVERSITY OF PRETORIA

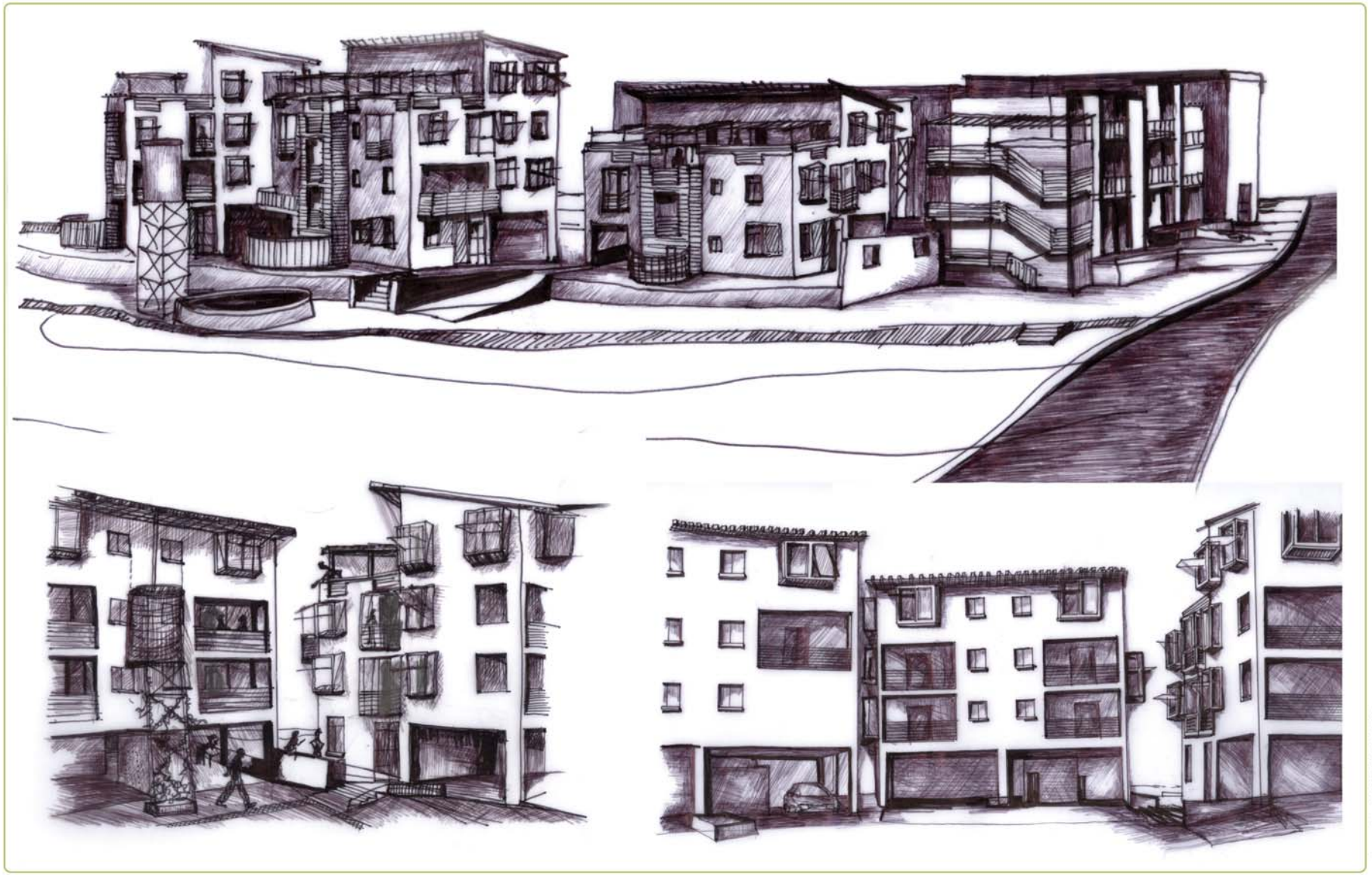
9





From the frameworks the relevance of working around Marabastad became clear. At the start of 2006 The Social Housing Focus Trust - SHIFT -Foundation announced that they will be using a site in Marabastad for their annual student housing competition. This gave confirmation for the decision to choose a site in the area.

After a visit to the Marabastad area the potential around the Steenhoven spruit was noticed. The spruit is badly neglected and it is obvious that an intervention is needed before it will be able to function as a quality open space system. If the housing density is to be increased, an open green are of quality around the spruit would be of vital importance. It became clear that rejuvenation of the green space would have to form part of the regionalization of the area.



Jozanne Spies 96029896 MArch(prof) 2006

The form of the building creates a connection to the landscape and generates inner courtyard space for communal activities. Breaking away from a square courtyard pulls the development closer to the park and the openings create the physical connection. The curved form lets the building seem like a single complete and integrated entity. If the four blocks where to be aligned in a straight line, the pathways between the blocks would be much more evident, breaking the building into 4 obviously separate units.

Presentation

HOUSING: A GREEN PROPRIETOR IN MARABASTAD
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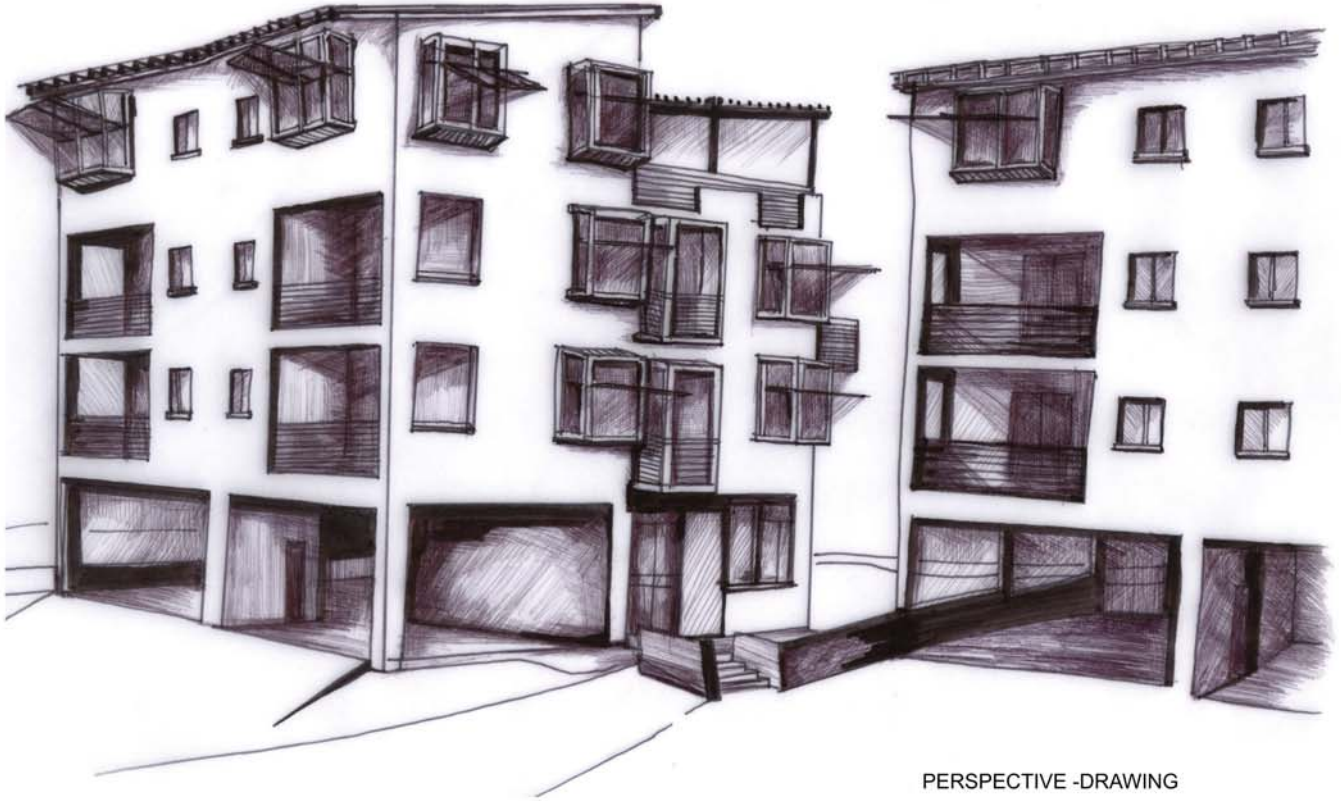
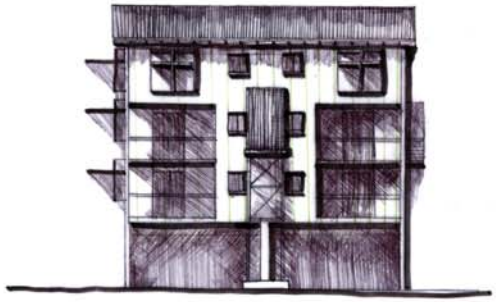


PERSPECTIVE -DRAWING

East Elevation



West Elevation

PERSPECTIVE -DRAWING

CLIMATE CONTROL

The orientation of the building is a challenge. In order to keep a direct connection with the park the building faces predominantly East-West. Each block is slightly turned and the facades seldom face directly West, East, South or North respectively. The western façade remains problematic because of the excessive heat gain during summer. The handling of the facades becomes very important in order to make them responsive towards climatic changes. Each facade is designed individually according to the climatic needs. The north and western facades will be protected by roof overhangs, balconies or shading box devices. The façade design also keeps privacy and good neighbourly principles in mind.

Presentation

HOUSING: A GREEN PROPRIETOR IN MARABASTAD
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9

HOUSING: A GREEN PROPRIETOR IN MARABASTAD
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9

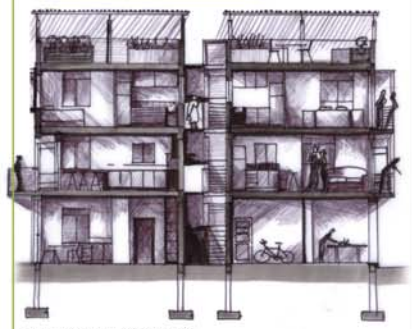
Designing for disability

Unit 2-1
Area: 46,5 m²
- Open plan lounge and bedroom
- disabled bathroom
- kitchenette
Designing for disability

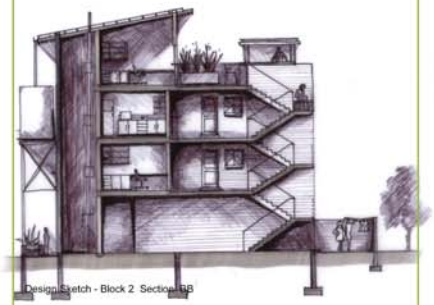
Ground floor consists of:
Communal workspace
Communal laundry
3 Normal parking bays
1 Disabled parking bays
Garden store underneath stairs

Unit 1-1
Area: 46,5 m²
- Open plan lounge and kitchenette
- Bedroom
- Disabled bathroom

Ground floor consists of:
Communal workspace
Communal laundry
3 Normal parking bays
1 Disabled parking bays
Garden store underneath stairs



Design Sketch - Block 2 Section CC



Design Sketch - Block 2 Section BB

GROUND LEVEL
SCALE 1:100

Presentation

Presentation

Family Units

Unit 3-2
Area: 78m²
- open plan lounge and kitchen
- balcony
- bathroom
- double bedroom
- single bedroom
- workspace

Unit 3-3
Area: 78m²
- open plan lounge and kitchen
- 2 x bathroom
- 1 x double bedroom
- 2 x single bedroom

Unit 2-2
Area: 78m²
- open plan lounge and kitchen
- balcony
- bathroom
- double bedroom
- single bedroom
- workspace

Unit 2-3
Area: 78m²
- open plan lounge and kitchen
- bathroom
- 1 x double bedroom
- 1 x double single bedroom
- balcony

FiRST FLOOR PLAN
SCALE 1:100

Bachelor Units

Unit 4-2 Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Unit 4-3 Area: 38m²
- open plan: kitchenette, lounge, bedroom
- balcony
- bathroom

Unit 4-4 Area: 38m²
- open plan: kitchenette, lounge, bedroom
- balcony
- bathroom

Unit 4-5 Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Unit 4-6 Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

Unit 4-7 + Loft Area: 38m²
- open plan: lounge, bedroom
- balcony
- bathroom

Unit 4-8 + Loft Area: 38m²
- open plan: lounge, bedroom
- balcony
- bathroom

Unit 4-9 Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

SECOND FLOOR PLAN
SCALE 1:100

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9

Bachelor Units
Unit 4-6 Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

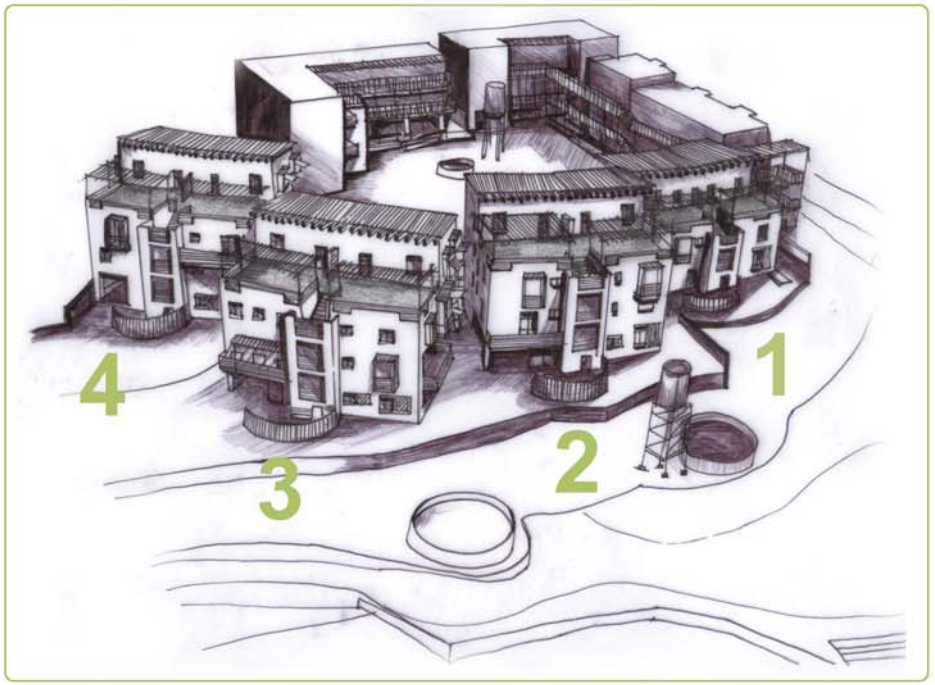
Unit 4-7 + Loft Area: 38m²
- open plan:
lounge
bedroom
- balcony
- bathroom

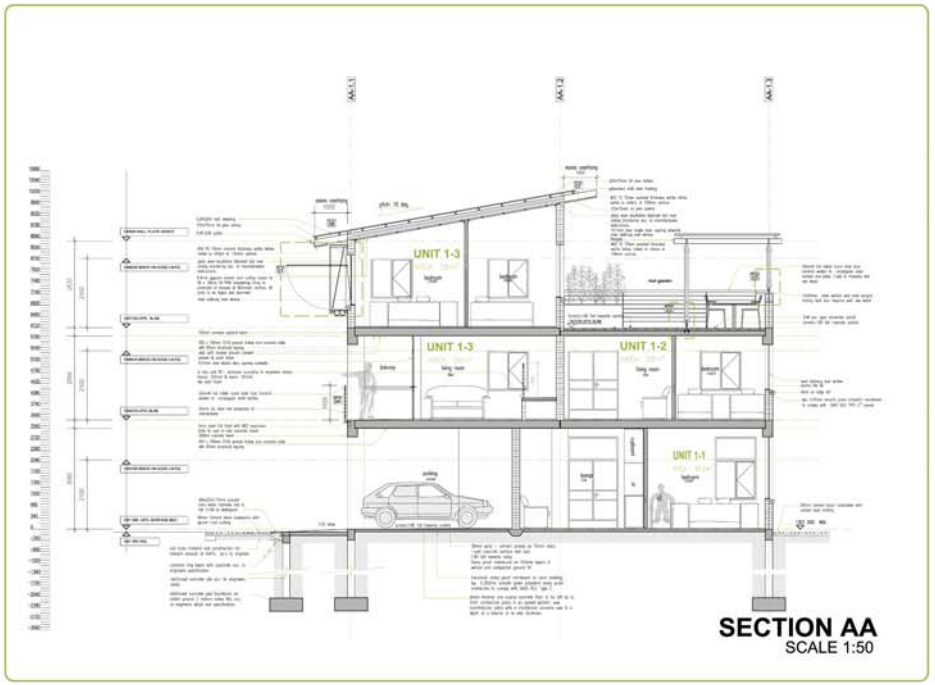
Unit 4-8 + Loft Area: 38m²
- open plan:
lounge
bedroom
- balcony
- bathroom

Unit 4-9
Area: 38m²
- open plan lounge and kitchen
- bathroom
- single bedroom

LOFT FLOOR PLAN
SCALE 1:100

ROOF PLAN
SCALE 1:100





SECTION AA
SCALE 1:50

NORTH ELEVATION
SCALE 1:100

SOUTH ELEVATION
SCALE 1:100

EAST ELEVATION
SCALE 1:100

WEST ELEVATION
SCALE 1:100

BLOCK 1

Presentation

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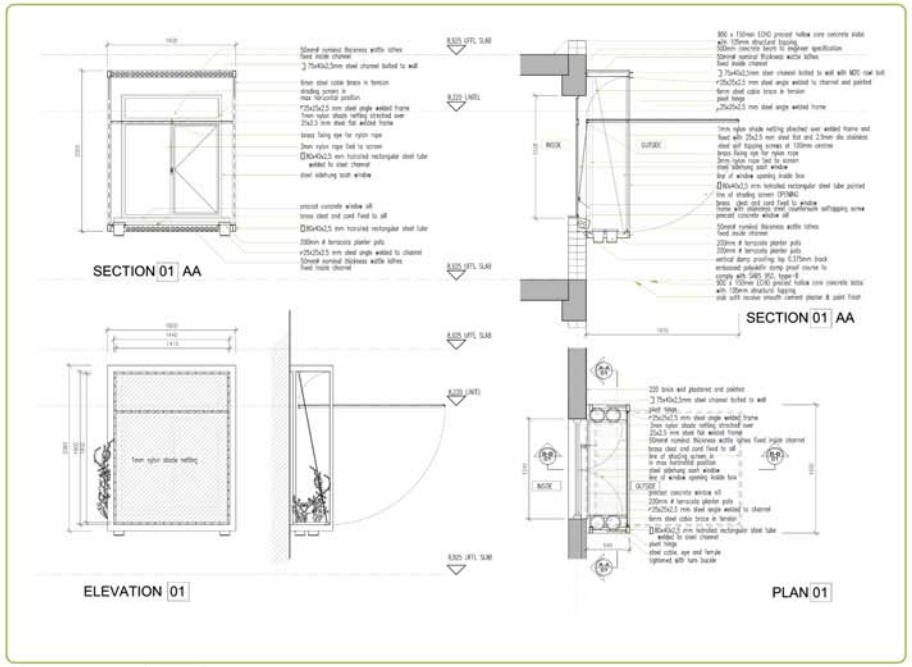
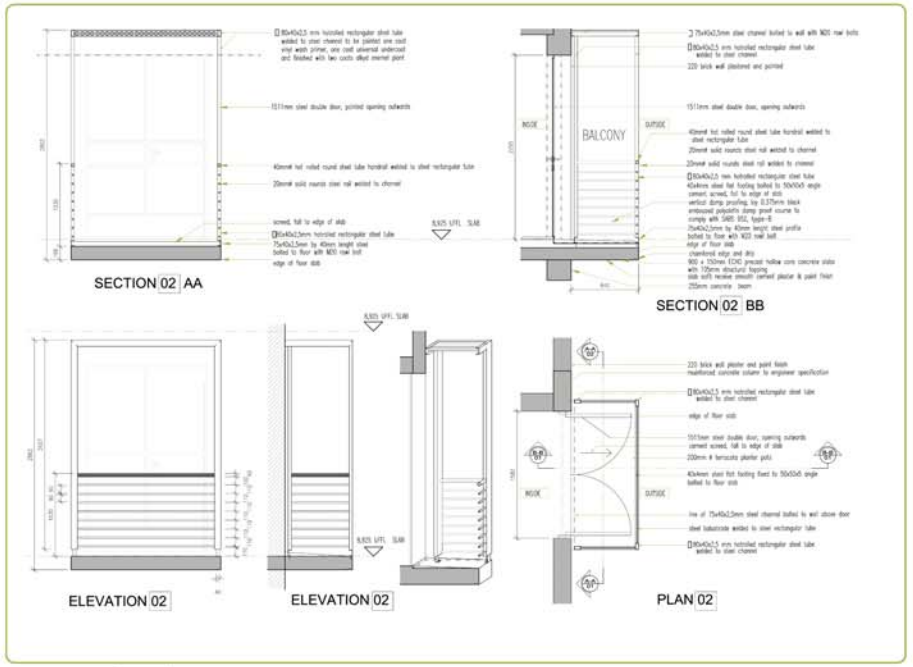
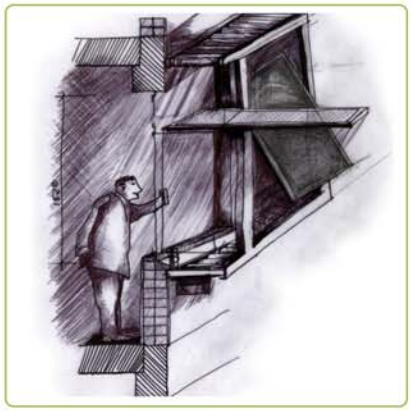
9

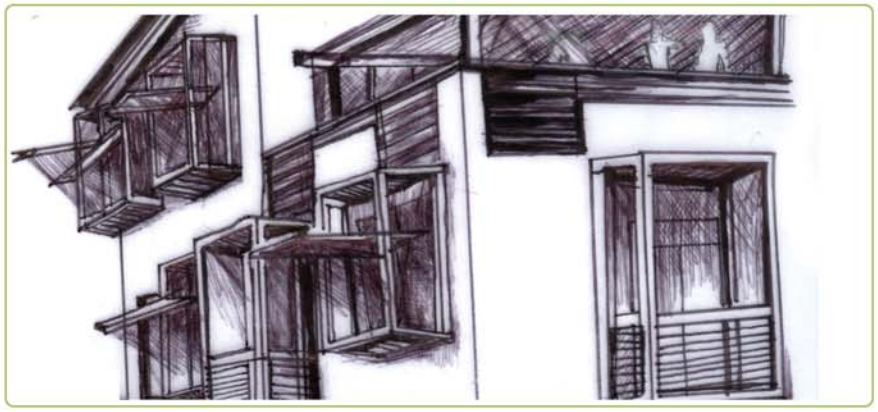


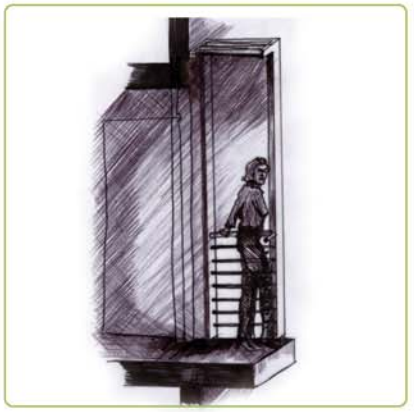
DETAIL 01 WINDOW BOX
SCALE 1:20

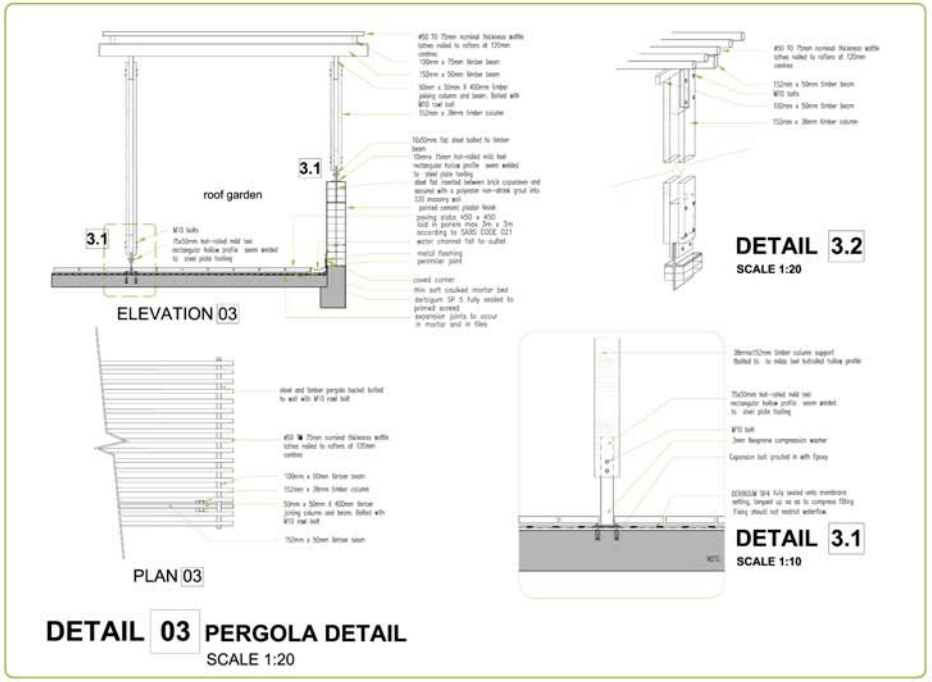


DETAIL 02 BALCONY BOX
SCALE 1:50

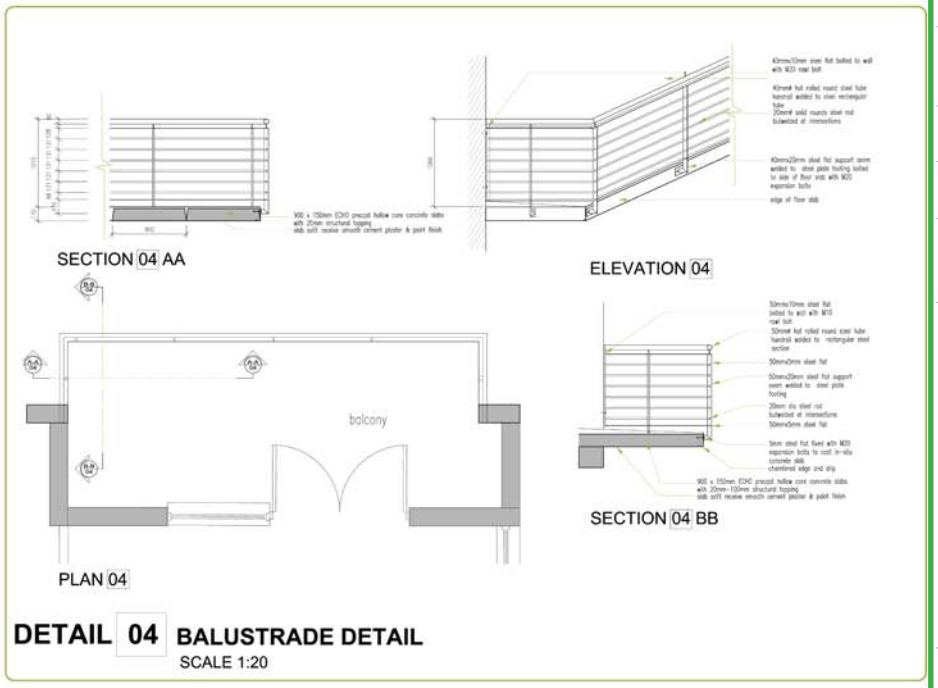




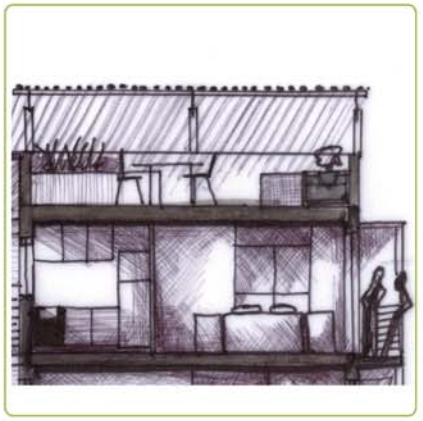


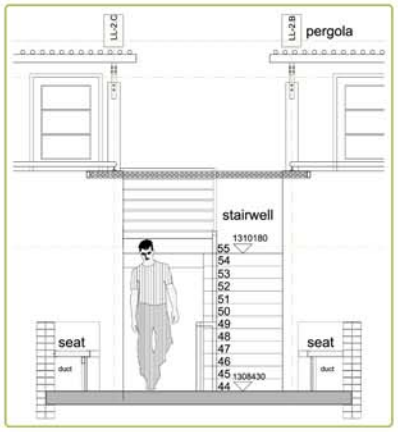


DETAIL 03 PERGOLA DETAIL
SCALE 1:20

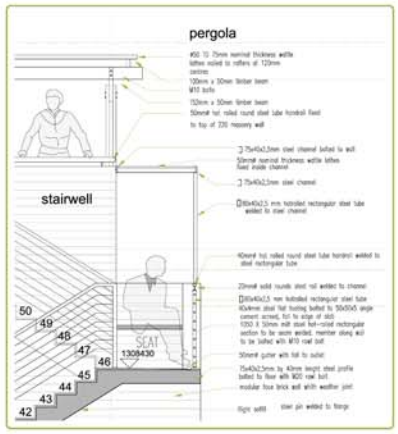


DETAIL 04 BALUSTRADE DETAIL
SCALE 1:20

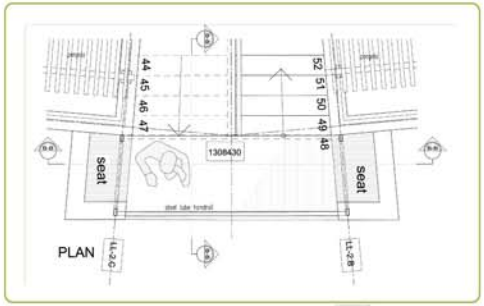




SECTION 05 AA

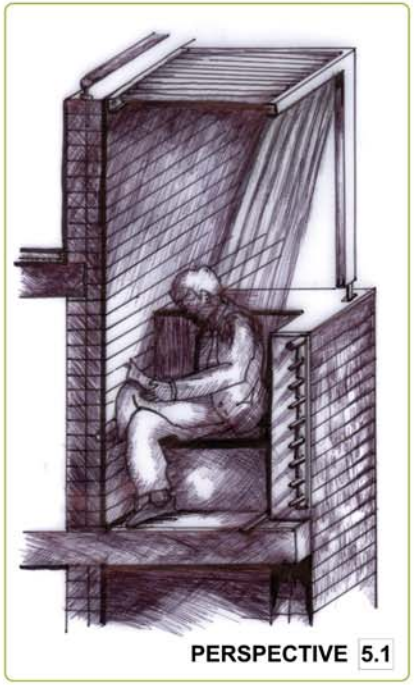


SECTION 05 BB

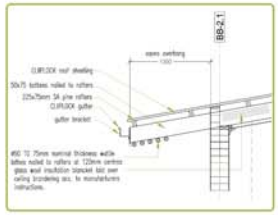


PLAN 05

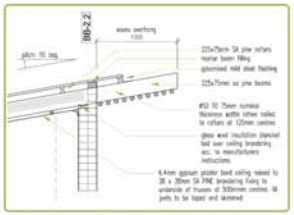
DETAIL 05 STAIRWELL DETAIL
SCALE 1:20



PERSPECTIVE 5.1

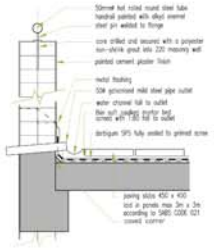


DETAIL 06
ROOF OVERHANG DETAIL
SCALE 1:20



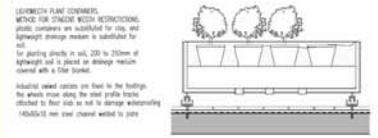
DETAIL 07
ROOF OVERHANG DETAIL
SCALE 1:20

DETAIL 08
STEEL HANDRAIL DETAIL
SCALE 1:10



DETAIL 09
RAIN WATER DETAIL
SCALE 1:10

PERSPECTIVE 7.1



DETAIL 10 PLANT CONTAINER
SCALE 1:20

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