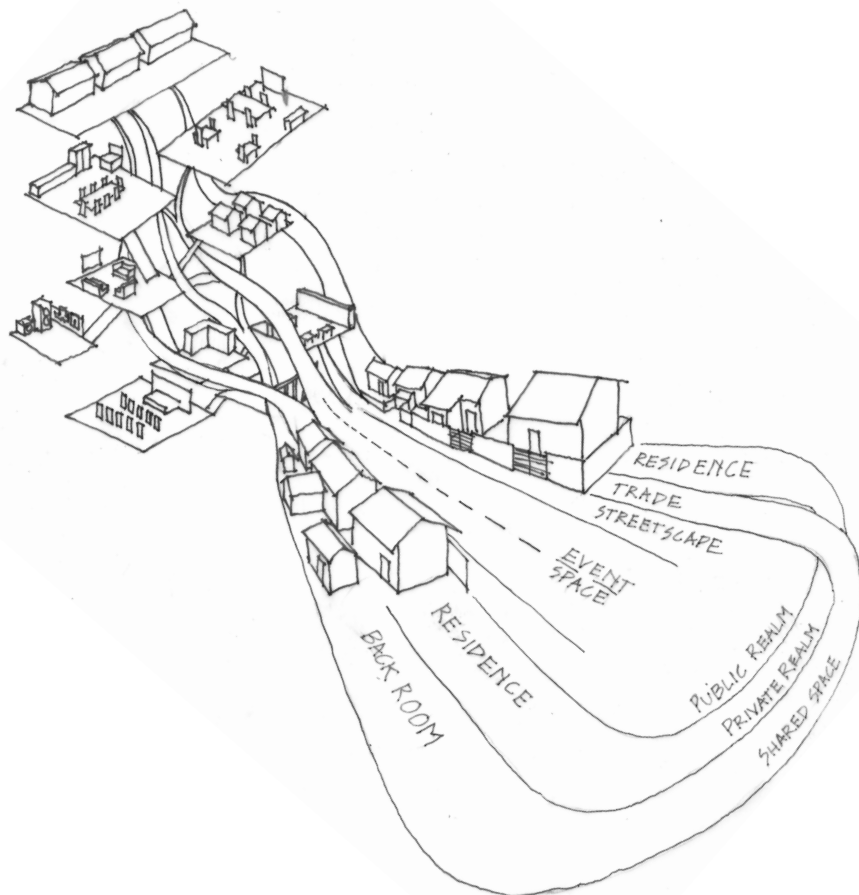


Incremental Co-Housing for the Community of Mamelodi West

Co-Housing as
streetscape



DEDICATION

Thank you

My friends and family who have supported me and tolerated my social absence.

To all of my parents for my architectural genes and teaching me to work with my hands.

To Chanté for pushing me forward when i felt i could not succeed.

I dedicate this dissertation to my grandmother Elin Heydenrych, who has supported my education and always believed in me.

Submitted in partial fulfillment of the requirements for
the degree Master of Architecture (Professional) to the
faculty of Engineering, Built Environment and Information
Technology. Department of Architecture University of
Pretoria 2019

Study Leader: Abre Crafford
Course coordinator: Arthur Barker

In accordance with Regulation 4(e) of the General
Regulations (G.57) for dissertations and theses, I declare
that this dissertation, which I hereby submit for the degree
of Masters of Architecture (Professional) at the University
of Pretoria, is my own work and has not previously been
submitted by me for a degree at this or any other tertiary
institution. I further state that no part of my dissertation has
already been, or is currently being, submitted for any such
degree, diploma or other qualification. I further declare that
this thesis is substantially my own work. Where reference
is made to the works of others, the extent to which that
work has been used is indicated and fully acknowledged
in the text and list of references.

Dirk Schmidt



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Environment and Information
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Year: 2019

PREFACE

This dissertation questions the relevance of social housing in tradition-rich and low-income areas of South Africa

The aim is to analyse the appropriate way social housing should accommodate traditions and flexibility within its context while allowing for intensification without densification within the area.

The current paradigm of social housing within South Africa will be analysed for its success and downfalls within similar existing housing projects in order to formulate a theoretical premise around the possibilities of South African intensification in the realm of housing. Some success can be seen in some of the 'Hostels to homes', but there is still little integration of semipublic facilitation and amenities (Joubert, 2009).

Mamelodi West is the point of origin of the whole of Mamelodi and has a robust spatial legacy through its creation during the Apartheid era's segregation housing strategies

The legacy has left Mamelodi west in a state of growth, decay and appropriation within the single suburb, with the suburban homes being privately upgraded and filled, the social housing

being left to deteriorate and the open spaces allowing for economic appropriation. There is economic interest in the area and potential to prevent pendulum migration by making Mamelodi into an independent town, decentralised from Pretoria and other outer regions (The Social Housing Foundation, 2005:4-5).

The dissertation intends to provide a social housing typology that offers a spectrum of spaces and places between the public realm and the private housing space that can accommodate existing critical interactions, trade and adaptable spaces. The focus of this proposal will be on the spatial conditions of the social, economic and cultural elements of the local context.

"...accommodate important existing interactions, trade and adaptable spaces."

Through theoretical and contextual enquiry, the study provides an understanding of the more profound roles that social housing should fulfil within its context and its potential to accommodate the contexts' of community.

PROJECT SUMMARY

Title: Incremental Co-Housing for the Community of Mamelodi West

Site Location
Mamelodi west

Research field: Human settlements and Urbanism

Site Description

1960's workers hostels which are in an uninhabitable and delapidated state.

Programme: Co-Housing / Social Housing

Client: Tshwane Department of Housing, Breaking New Ground

Address

0122 Shabangu Avenue,
Mamelodi

Users: New residents of Mamelodi West, Families, couples and bachelors in need of affordable housing.

Keywords: Co-housing, Social Housing, Appropriation, Intensification, Instrumentality,

Current owner

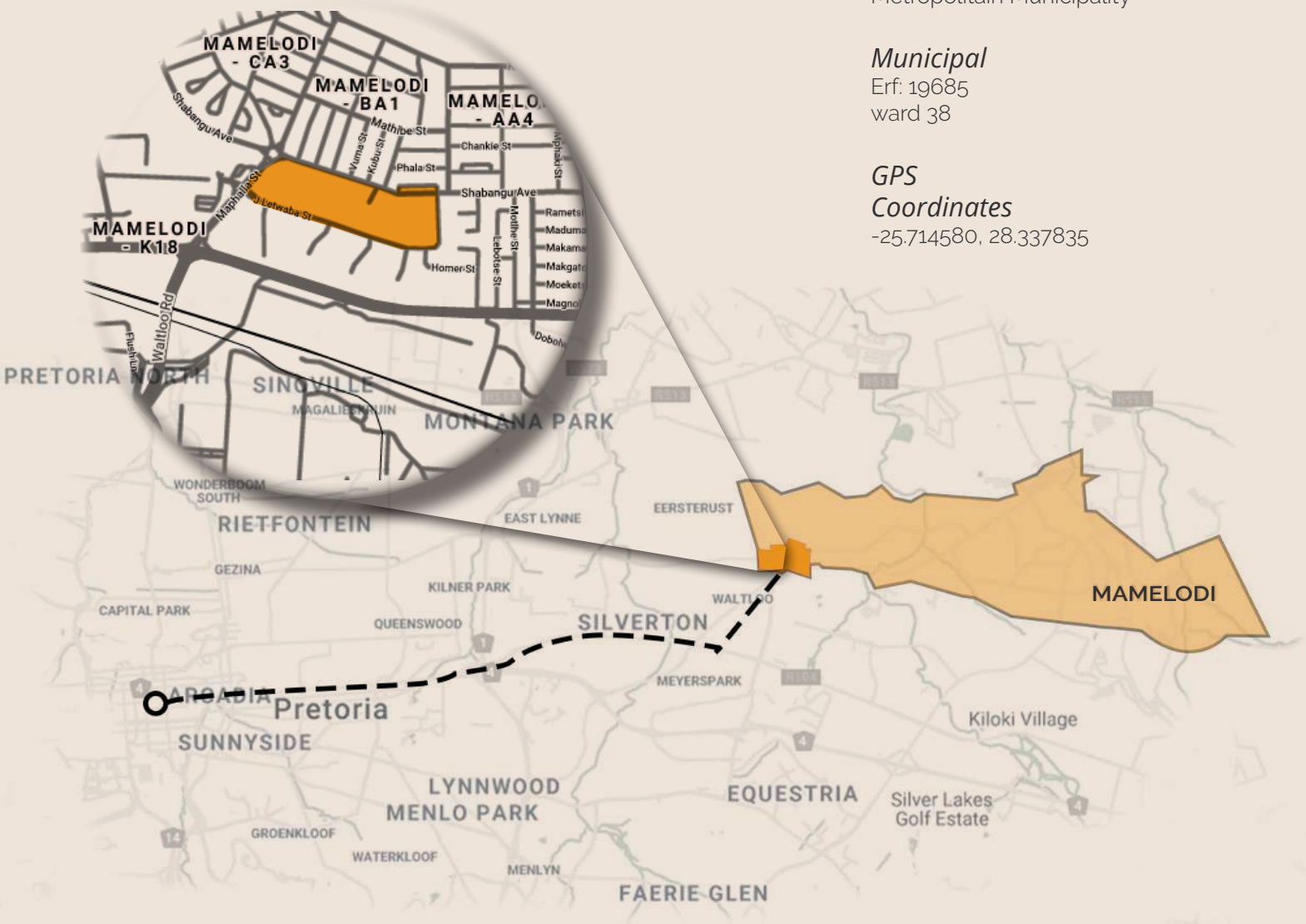
City of Tshwane
Metropolitan Municipality

Municipal

Erf: 19685
ward 38

GPS

Coordinates
-25.714580, 28.337835



DEFINITIONS

Incremental Architecture

Architecture which facilitates and promotes growth and change.

Co-Housing

Co-operative housing. Independent homes clustered into a community with shared spaces and amenities.

Social Housing

Government housing allocated to residents on low incomes, disabilities or otherwise in need.

Intensification

Unlike densification, which connotes to tall building and increasing density. Intensification increases the necessary aspects of housing, amenities and infrastructure while keeping the structures to a human scale.

Streetscape

The landscape that emerges from the street and its relation to the housing in the suburb.

The give and expand system

The system where a resident is given a portion of the potential housing on the property where they can expand further into the full potential of the property.

Core and infill

This is similar to The give and expand system but the given part is given as only services and facilities that support the expansion which is called infill as the core often comes with structural support for the resident to easily fill in.

TABLE OF CONTENTS

PREFACE

PROJECT SUMMARY

DEFINITIONS

TABLE OF CONTENTS

FIGURE LIST

INTRODUCTION

Background	2
Aims	2
Problem Statement	2

ABSTRACT

Research Questions	3
Hypothesis / Assumptions	3
Design Limitations / Delimitations	3
Continuum of Housing	4
Contextual Identity and culture contribution	4

INTENTION

METHODOLOGY

CONTEXT

1.1) SCOPE OF DENSIFICATION	8
-----------------------------	---

CONTEXT SELECTION

1.2) ARCHITECTURAL IDENTITY	8
1.3) DEFINED COMMUNITY	8
1.4) Physical context	9
1.5) Establishment	9
1.6) Location	9

MAMELODI WEST

1.7) Political control of Mamelodi	10
1.8) Formal Frameworks	11
1.9) Mamelodi Gateway	11

FRAMEWORKS

1.10) Regional scale	12
1.11) Neighbourhood Scale	12
1.12) Architectural and street scale	12
1.13) New Urbanism and its compatibility with cohousing	12

URBAN THEORY

LOCALITY

1.14) Urban Site Analysis	14
---------------------------	----

CONTEXT ANALYSIS

1.15) Urban Site location	15
---------------------------	----

SITE SELECTION

1.16) Site Boundary	16
1.17) Site Condition	17

PROGRAMME

CO-HOUSING VS SOCIAL HOUSING

CO-HOUSING PROGRAMMES

social housing	23
----------------	----

PROGRAMME COMPARISON

Conceptual merge of programmes	23
--------------------------------	----

co-housing	23
------------	----

PROGRAMME APPLICATION

INCREMENTALITY

3a.1) The core of the typological development - The NE51/6	26
--	----

STREETSCAPE TYPOLOGIES

3a.2) The street	27
------------------	----

3a.3) Conceptual approach to analysis	28
---------------------------------------	----

3a.4) Typology study Method	28
-----------------------------	----

3a.5) House as part of the street	29
-----------------------------------	----

3a.6) Standard House	30
----------------------	----

3a.7) The upgrade	31
-------------------	----

3a.8) Backyard shack rental	32
-----------------------------	----

3a.9) Built backyard rental	33
-----------------------------	----

3a.10) Large rental	34
---------------------	----

3a.11) Shop	35
-------------	----

3a.12) Carwash/Mechanic	36
-------------------------	----

3a.13) Tavern/Restaurant	37
--------------------------	----

3a.14) Temporary Retail	38
-------------------------	----

3b.1) Introduction	40
--------------------	----

3b.2) The principles of flexibility	40
-------------------------------------	----

FLEXIBILITY

3b.3) Elemental	41
-----------------	----

3b.4) Flexible buildings	42
--------------------------	----

3b.5) Open building theory	43
----------------------------	----

3b.6) Conclusion	43
------------------	----

PRECEDENTS

5.1) Introduction	45
-------------------	----

5.2) The process of the study	45
-------------------------------	----

PRECEDENT CODING

BG ALEXANDER

5.3) Funding model	46
--------------------	----

5.5) Coding	47
-------------	----

5.4) Conclusion	47
-----------------	----

BOTLHABELA VILLAGE

5.6) Funding model	48
--------------------	----

5.8) Coding	49
-------------	----

5.7) Conclusion	49
CANDELLA ROAD	
5.9) Funding model	50
5.10) Coding	51
5.11) Conclusion	51
ELANGENI	
5.12) Funding model	52
5.14) Coding	53
5.13) Conclusion	53
NEWKIRK	
5.15) Funding model	54
5.16) Coding	55
5.17) Conclusion	55
5.19) Location	56
5.18) Income Target Market (Rands)	56
RESULTS	
5.20) Density	57
5.21) Funding models	57
5.22) User Capacity	58
5.23) Programmes and elements	59
5.24) spatial devices	59
5.25) Conclusion	60
SUBSIDIES	
5.1) Basics of Government Subsidies	62
SUBSIDY STRUCTURES	
5.2) Requirements	62
5.3) Subsidy Types	63
5.4) Interviewing Prof. S de Beer	64
5.5) The gaps and issues with subsidy policies.	64
5.6) Backyard shack subsidies	64
5.7) Strategies to challenge current policies	64
QUESTIONING SUBSIDY POLICIES	
5.8) Subsidy Progression Strategy	65
CONCEPT	
6.1) Initial Urban Concepts	67
INITIAL CONCEPTS	
6.2) Introduction	68
6.3) street and co-housing	68
CO-HOUSING AS STREETScape	
6.4) Introduction	69
6.5) as informant	69
CORE AND INFILL	

DESIGN

7.1) Process	71
INTRODUCTION	
7.2) Programme	72
INFORMANTS	
7.3) Context	72
7.4) Practicality	72
CONTEXT INFORMANTS	
PROGRAMME	
INFORMANTS	
PRACTICAL	
INFORMANTS	
7.5) Macro site design strategy	76
URBAN DEVELOPMENT	
7.6) Site layout	78
7.7) Development on-site	78
SITE DEVELOPMENT	
7.8) Site layout design	79
SITE DESIGN	
7.9) External spatial Perspectives	81
EXTERNAL	
SPATIAL PERSPECTIVES	
7.10) Initial Block design process (JUne)	82
BLOCK	
DESIGN	
7.11) Block Iteration (September)	83
7.12) Final Block iteration	84
7.13) Final Block design process	85
BLOCK	
DESIGN	
7.14) Vertical conversion	86
VERTICAL	
TYPOLOGIES	
7.15) cluster division	89
CLUSTER DESIGN	
7.16) initial cluster division (june)	90
7.17) Cluster Iteration (September)	91
7.18) cluster iteration (October)	92
7.19) Final cluster design	93
7.20) Block spatial Perspectives	94

<i>BLOCK SPATIAL PERSPECTIVES</i>	
7.21) Common house september iteration	95
7.22) Common house final iteration	96
7.23) Unit core-infill relations	98
<i>UNIT DESIGN</i>	
7.24) Core - Stairs and bathroom	100
7.25) Testing sizes	101
<i>CORE VARIANTS</i>	
7.26) Unit design process	103
<i>OCCUPATION SCENARIOS</i>	
7.27) Unit Iteration (September)	107
<i>UNIT DESIGNS</i>	
7.28) Unit Iteration (October)	108
7.29) ground floor plan	109
<i>FLOOR PLANS</i>	
7.30) first floor plan	111
7.31) Second floor plan	113
7.32) Roof plan	115
7.33) Intention	117
7.34) Re-Use of materials	117
<i>SITE RE-USE</i>	
TECHNICAL	
8.1) Process	119
8.2) Technical Question	119
8.3) Separate element	119
<i>INTRODUCTION</i>	
8.5) Core	120
<i>MATERIAL MATRIX</i>	
8.4) Live	120
8.6) Addition	120
8.7) Core matrix	121
8.8) live matrix	123
8.9) addition matrix	125
8.10) core panel assembly and joints	127
<i>STRUCTURE DEVELOPMENT</i>	
8.11) Core roof	127
8.12) Core Concrete panel walling detail	128
8.14) Steel structure	128
8.13) Core panel to steel structure connection	128
8.15) Section through Unit	129
<i>STRUCTURE DEVELOPMENT</i>	
<i>CORE CONFIGURATION</i>	
<i>CONSTRUCTION PHASING</i>	
8.16) Section Through Core	133

SECTIONS

8.17) Section through common house	134
8.18) Section through Incremental spaces	135
8.19) Detail of the stairs within the core (C1)	136
8.20) Detail of the wet services duct (D1)	136

DETAILS

8.21) Detail of the 2nd floor Parapet	137
8.22) Detail of the Internal tank	137
8.23) Introduction	138

SBAT TOOL

CONCLUSION

9.6) Contribution	142
-------------------	-----

CONCLUSION

9.7) Recommendations	142
9.8) Conclusion	143

BIBLIOGRAPHY

BIBLIOGRAPHY

APPENDIX

EXAMINATION IMAGES

PLAGIARISM DECLARATION

ETHICAL CLEARANCE

FIGURE LIST

Figure 01 Sketch illustrating densification. Illustrated by author.	9	network. 2019)	21
Figure 02 Sketch illustrating architectural silhouettes. Illustrated by author.	9	Figure 25 Jernstoberiet, activity hall.)The cohousing network. 2019)	21
Figure 03 Sketch illustrating community layouts. Illustrated by author.	9	Figure 26 Jernstoberiet, activity in communal hall. (McCamant; 1988,94)	21
Figure 04 Sketch illustrating infrastructure. Illustrated by author.	9	Figure 27 Jernstoberiet, section. (McCamant; 1988,94)	21
Figure 05 Sketch illustrating standardised housing. Illustrated by author.	9	Figure 28 Co-housing diagrammatic interpretation. Layout by author icons by thenounproject.com	22
Figure 06 Sketches illustrating town layouts. Illustrated by author.	9	Figure 29 Co-housing programme layout diagram. Illustrated by Author.	23
Figure 07 Mamelodi In relation to Pretoria. Edited by author (Google Earth, 2019)	10	Figure 30 Conceptual synergy between the principals of social housing and co-housing. Drawn by author.	24
Figure 08 Mamelodi layout maps (Walker and Van Der Waal, 1991)	11	Figure 31 Spatial analysis of the standard base property in Mamelodi West. Source (Calderwood, 1953)	27
Figure 09 A sketch of the circle node. By author.	12	Figure 32 Plan of the NE 51-6 house indicating the beds for 6 adults and one toddler, a dining table and a kitchen Source (Calderwood, 1953).	27
Figure 10 A sketch of the pedestrian passage. By author	12	Figure 33 A photo of the celebration on the street as the bride arrives at the street wedding "the Arrival", (Ngonyama Photography, 2016)	28
Figure 11 A sketch of the peoples park. By author.	12	Figure 34 The construction of a temporary street event structure.(Glory Maseepe, 2016).	28
Figure 12 Mamelodi In relation to Pretoria. Edited by author (Google Earth, 2019)	14	Figure 35 Birds eye view of a street event being held (attached to a house).(Google Maps, 2019b)	28
Figure 13 The Mamelodi gateway . Edited by author (Google Maps, 2019)	14	Figure 36 Birds eye view of a street in Mamelodi West. (Google Maps, 2019b)	29
Figure 14 Site highlighted within the block. Edited by author (Google Maps 2019).	14	Figure 37 Spatial analysis of the standard base property with the street and street activity in Mamelodi West. Illustrated by author.	30
Figure 15 Site movement around the site, Mamelodi West. Edited by author (Google Maps, 2019)	15	Figure 38 Photo of the standard base property. Photo taken by author.	30
Figure 16 Existing programs around the site, Mamelodi West. Edited by author (Google Maps, 2019)	15	Figure 39 Spatial analysis of the standard base property in Mamelodi West. Illustrated by author.	31
Figure 17 Site highlighted within the block and situated within the suburb . Edited by author (Google Maps 2019).	16	Figure 40 Photo of the standard base property. Photo taken by author.	31
Figure 18 A series of sketches illustrating the boundary condition of the site. Sketched by author.	17	Figure 41 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	31
Figure 19 A photograph showing South West entrance to the hostels from the adjacent field. Photo taken by author.	17	Figure 42 Spatial analysis of the upgrade of the standard property. Illustrated by author.	32
Figure 20 A 3D view from the South West corner of the hostels. (Google Maps, 2019)	17	Figure 43 Photo of a large upgrade to the standard base property. Photo taken by author.	32
Figure 21 A series of sketches illustrating the boundary condition of the site. Sketched by author.	18	Figure 44 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	32
Figure 22 A photograph of the interior of the site . (Pretoria News, 2019)	18		
Figure 23 A photograph of the exterior boundary condition of the site . Photo taken by author.	18		
Figure 24 Jernstoberiet, front of house. (The cohousing			

Figure 45	Spatial analysis of the backyard shack rental typology. Illustrated by author.	33	Figure 65	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	39
Figure 46	Google maps 3D image of the standard base property in Mamelodi West. Image sourced from Google Maps.	33	Figure 66	Villa Verde, Chile by Elemental, (Greenspan, 2016)	41
Figure 47	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	33	Figure 67	The three principles of flexible housing by Elemental. (Elementalchile.cl, 2019)	42
Figure 48	Spatial analysis of the built backyard rental typology. Illustrated by author.	34	Figure 68	Villa Verde, Chile by Elemental, (Greenspan, 2016)	43
Figure 49	Photo of the built backyard rental typology in Mamelodi West. Photo taken by author.	34	Figure 69	Lo Espejo by Elemental, (Greenspan, 2016)	43
Figure 50	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	34	Figure 70	Quinta Monroy, by Elemental, (Greenspan, 2016)	43
Figure 51	Spatial analysis of the large rental typology. Illustrated by author.	35	Figure 71	View of Housing, Social Housing Foundation,(2010)	47
Figure 52	Photo of the large rental typology within Mamelodi West. Photo taken by author.	35	Figure 72	Site plan of Housing, Social Housing Foundation,(2010)	47
Figure 53	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	35	Figure 73	Icons sourced from The Noun Project (2019).	47
Figure 54	Spatial analysis of the shop addition. Illustrated by author.	36	Figure 74	View of Housing, Social Housing Foundation,(2010)	49
Figure 55	Photo of the shop addition within Mamelodi West. Photo taken by author.	36	Figure 75	Site plan of Housing, Social Housing Foundation,(2010)	49
Figure 56	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	36	Figure 76	Icons sourced from The Noun Project (2019).	49
Figure 57	Spatial analysis of a carwash/mechanic addition. Illustrated by author.	37	Figure 77	View of Housing, Social Housing Foundation,(2010)	51
Figure 58	Photo of a carwash and mechanic in Mamelodi West. Photo taken by author.	37	Figure 78	Site plan of Housing, Social Housing Foundation,(2010)	51
Figure 59	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	37	Figure 79	Icons sourced from The Noun Project (2019).	51
Figure 60	Spatial analysis of a tavern/ restaurant extension. Illustrated by author.	38	Figure 80	View of Housing, Social Housing Foundation,(2010)	53
Figure 61	Photo of tavern and shop extension in Mamelodi West. Photo taken by author.	38	Figure 81	Site plan of Housing, Social Housing Foundation,(2010)	53
Figure 62	Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.	38	Figure 82	Icons sourced from The Noun Project (2019).	53
Figure 63	Spatial analysis of the standard base property in Mamelodi West. Illustrated by author.	39	Figure 83	View of Housing, Social Housing Foundation,(2010)	55
Figure 64	Photo of the standard base property. Photo taken by author.	39	Figure 84	Site plan of Housing, Social Housing Foundation,(2010)	55
			Figure 85	Icons sourced from The Noun Project (2019).	55
			Figure 86	Icons sourced from The Noun Project (2019).	59
			Figure 87	Icons sourced from The Noun Project (2019).	60

Figure 88	Plan and perspective of a typical RDP house. (Republic of South Africa, National Department of Housing,2003, p18-40)	64	by author	78	
Figure 89	Urban concepts in sectional diagrams. Drawn by author.	68	Figure 111	3D graphic of iteration two.. Illustrated by author	78
Figure 90	Urban concept maquette in context model. Built by author.	68	Figure 112	Third iteration of the urban plan. Illustrated by author	78
Figure 91	Urban to human scale diagram Drawn by author.	69	Figure 113	3D visualization of iteration three. Illustrated by author	78
Figure 92	Co-housing streetscape conceptual graphic. Drawn by author.	69	Figure 114	Iteration of the urban layout design process. Illustrated by author.	79
Figure 93	Core and infill concept. Drawn by author.	70	Figure 115	Pulling through the contextual movement lines within the surrounding context. Illustrated by author.	79
Figure 94	Model built to illustrate the core and infill concept. By author	70	Figure 116	Block division of clusters. Illustrated by author.	80
Figure 95	Showing how the architecture aligns itself to the future of Mamelodi West. Illustrated by author.	72	Figure 117	Creation of a modular grid for the block. Illustrated by author.	80
Figure 96	Density alignment of the project. Illustrated by author.	72	Figure 118	(Left Top) Block division of clusters. Illustrated by author.	80
Figure 97	The concept of living separately together is illustrated. Drawn by author	73	Figure 119	(Right Top) Creation of a modular grid for the block. Illustrated by author.	80
Figure 98	Combining the contextual patterns with the selected site. Drawn by author	73	Figure 120	(Left Bottom) Cluster interior courtyards., Illustrated by Author.	80
Figure 99	Construction considerations impact cost on the long and short term Drawn by author	73	Figure 121	(Right Bottom) Central Courtyard. Illustrated by Author.	80
Figure 100	Pulling through the contextual movement lines within the surrounding context. Illustrated by author.	74	Figure 122	The final iteration of a block. Modeled and rendered by Author.	81
Figure 101	Final iteration of the urban layout. Illustrated by author.	74	Figure 123	The standard house, upgrade and backyard rental typologies. Illustrated by author.	83
Figure 102	Vertical interpretation of the streetscape typology, illustrated by author.	74	Figure 124	Vertical adaption of the standard house, upgrade and backyard rental typologies. Illustrated by author.	83
Figure 103	Diagrammatic illustration of a typical co-housing layout. Illustrated by author.	75	Figure 125	The backyard rental 2, backyard rental 3, and shop typologies. Illustrated by author.	84
Figure 104	Indicating typical sizes of units and the difference per person.	75	Figure 126	Vertical adaption of the backyard rental 2, backyard rental 3, and shop typologies. Illustrated by author.	84
Figure 105	The diagram indicating which elements of the existing buildings that can be up-cycled.. Illustrated by author.	76	Figure 127	The carwash, tavern and container typologies. Illustrated by author.	85
Figure 106	Illustration of concrete panel construction. Drawn by author.	76	Figure 128	Vertical adaption of the carwash, tavern and container typologies. Illustrated by author.	85
Figure 107	The thin red line showing the secure boundary for a cluster. Illustrated by author.	76	Figure 129	Exploded 3D diagram of the programmatic organisation of each cluster. Illustrated by author.	86
Figure 108	First iteration of the urban layout. Illustrated by author.	77	Figure 130	Organisational plan of the cluster, rough design work. Illustrated by author.	86
Figure 109	First iteration of the urban layout. Illustrated by author.	78	Figure 131	Further diagrams of organisational planning of the cluster layout. Illustrated by author.	86
Figure 110	Second iteration of the urban plan. Illustrated		Figure 132	First rough draft of lobby design	86

Figure 133	Second rough draft of lobby design	86	Figure 157	Floor plan iterations, By author	98
Figure 134	3D diagram of a cluster. Illustrated by author.	87	Figure 158	Sections with people to illustrate life and usability. Drawn by author	99
Figure 135	Exploded 3D diagram of the programmatic organisation of each cluster. Illustrated by author.	87	Figure 159	Sections with people to illustrate life and usability. Drawn by author	100
Figure 136	Exploded 3D diagram of the external flexible spaces within a cluster. Illustrated by Author.	87	Figure 160	(Below) The final iteration of a unit. Modeled and rendered by Author.	101
Figure 137	Ground floor plan, drawn by author	87	Figure 161	(Below) The final iteration of a unit. Modeled and rendered by Author.	102
Figure 138	First floor plan. Drawn by author	87	Figure 162	A photograph showing South West entrance to the hostels from the adjacent field. Photo taken by author.	103
Figure 139	(Below) The final iteration of a cluster. Modeled and rendered by Author.	88	Figure 163	A photograph of the exterior boundary condition of the site . Photo taken by author.	103
Figure 140	Ground floor plan. Drawn by author	88	Figure 164	Series of front elevations illustrating the different elements of the design. Illustrated by author.	105
Figure 141	First floor cluster layout and design. By author	89	Figure 165	Rough work illustrating the design of the core elements' roof. Drawn by author	113
Figure 142	Cluster elevation, before intervention of residents. By author	89	Figure 166	Rough work illustrating the design development of the concrete panel interior (insulation). Drawn by author	114
Figure 143	Illustrating the relationship between buildings, Illustrated by author	91	Figure 167	Rough work possible methods of connecting the concrete paneling to steel. Drawn by author	114
Figure 144	Illustrating the relationship between the co-housing and the residential street Illustrated by author	91	Figure 168	Sectional 3D of a unit showing the relationship between core and incremental layers . Modeled and rendered by Author.	115
Figure 145	Illustrating the concept of core (given) space, and what could be infill;. Illustrated by author	91	Figure 169	Section of the Core (not to scale) , Drafted by Author.	116
Figure 146	Illustrating the articulation between core and infill. Illustrated by author	91	Figure 170	Section of the lobby (not to scale) , Drafted by Author.	117
Figure 147	Model built to illustrate the core and infill concept. Illustrated by author	91	Figure 171	Section of the incremental layers (not to scale) , Drafted by Author.	118
Figure 148	3D diagram of a unit. Illustrated by author.	92	Figure 172	Detail of the Stairs and shower (not to scale) , Drafted by Author.	119
Figure 149	First floor plan indicating the stairwell and live space on the left and the populated first floor plan on the right. Illustrated by Author.	93	Figure 173	Detail of the wet services duct (not to scale) , Drafted by Author.	119
Figure 150	Top floor plan indicating the stairwell on the left and the populated top floor plan on the right. Illustrated by Author.	93	Figure 174	Detail of the 2nd floor parapet (not to scale) , Drafted by Author.	120
Figure 151	Variants A- C on the core layout, to determine the most efficient plan, By author	94	Figure 175	SBAT results graphic. (Gauge, 2019)	121
Figure 152	Variants D - H on the core layout, to determine the most efficient plan, By author	95	Figure 176	Block used for SBAT Rating. By author	121
Figure 153	3D diagram of a unit. Illustrated by author.	96	Figure 177	SBAT overall information. (Gauge, 2019)	122
Figure 154	(Center) First floor plan indicating the stairwell and live space on the left and the populated first floor plan on the right. Illustrated by Author.	96			
Figure 155	(Bottom) Top floor plan indicating the stairwell on the left and the populated top floor plan on the right. Illustrated by Author.	96			
Figure 156	Floor plan iterations, By author	97			

Introduction

Part 0

Welcome

ABSTRACT

BACKGROUND

The social housing architecture created by the apartheid government was built to suppress the inhabitants, this continues today, and the architecture is uninhabitable but still inhabited.

Social housing in South Africa needs to grow and adapt to the typologies and activities in its area. The site has to be a place with an architectural identity within a defined community. The community must also be within the scope of densification within the foreseeable future, this ensures that the housing is in a relevant location with close proximity to basic amenities.

Mamelodi west has been chosen as the focus area of the study. According to the collaborative effort of the Mamelodi gateway student urban vision group, the site that is prime for intensification is the original Mamelodi west women's hostels that are currently entirely in disrepair.

AIMS

This study aims to create a better understanding of the roles and responsibilities that social housing can fulfill. The expansion of the roles and responsibilities are intended to be focused on the spatial aspects of community within social housing environments.

PROBLEM STATEMENT

Mamelodi was created to be an apartheid planned suburb, used to segregate the black population from Pretoria. Mamelodi is spreading. Injections of economic and community interest are helping uplift the potential of the suburb.

However, Mamelodi West (being the oldest part of Mamelodi) is not adequately prepared for development. Attempts to create housing to replace the dilapidated hostels have been unsuccessful as they have not considered the importance of the community and its vibrant street life. Instead, they are based on basic amenities and higher population accommodation.

This creates spatial boundaries between housing and communities which often separate them in such a way that it can detach certain people from the activities within the community. These limitations that have been pushed onto previous housing projects are preventing Mamelodi West from developing properly into a prosperous town.

Social housing that can incorporate the community and street life could boost the areas' successful development.

RESEARCH QUESTIONS

Theoretical

How can co-housing be implemented to help a larger community develop?

Contextual

How can the European concept of co-housing be adapted in such a way as to be successful in Mamelodi?

Design

How can architecture create a solution to densify housing while integrating the community and respecting privacy?

Technical

How can incrementality be promoted (structured and supplied) as well as curated through structure and materials?

HYPOTHESIS / ASSUMPTIONS

The growing population will lead to the densification of the area, as shown in the Mamelodi West Local Open Space Framework by GAPP Architects and Urban Designers (2010).

The study will show that accommodating for the correct spaces, that are adapted to the users' needs, can be done through understanding the basic spatial requirements for everyday needs and rituals of the community.

THEORETICAL PREMISE

Design

The design research is focused on the use of co-housing as social housing, grounded in the contextual typologies of Mamelodi West.

Technical

The technical research expands from the basis of 'core and infill' architecture that leads to incrementality.

DESIGN LIMITATIONS / DELIMITATIONS

This study is limited to secondary research into the community as the investigation is not involving participatory design and any direct/ personal information will be kept to the level of essential requirement. The secondary research will include the consultation of experts in the study of the communities and similar communities.

The area of study will be limited to Mamelodi west, being separated from the east by the Pienaar River.

INTENTION

CONTINUUM OF HOUSING

Co-housing, the housing paradigm, has created its place because of its unique use of in-between and additional spaces being used for communal opportunities (Konigk, 2002). The concept is based on village life, but the intentional architectural intervention separates cohousing from the old tradition of security needs.

Social Housing can accommodate for a community's needs without compromising on the amount of space or quality of life; this can be seen in the works of The Architectural Association in several of the Hostels to homes projects in and around Cape town (Joubert, 2009).

CONTEXTUAL IDENTITY AND CULTURE

The contextual identity will inform the material investigation as well as design. Context is the place, culture and time that a building is situated, of which the critical sub-topics to investigate will be: identity, economics and local connotations.

Cultural identity is often represented physically by architecture (Grooms, 2017). In South Africa, designing with several materials associated with

one's cultures can be a powerful tool to contextualise a design (Hess, 2006; Marschall, 2001; Vale, 2008). Regional, post-typology and revivalist architectural are all reactions to these connotations (Wells, 1986). Economic context (the quality and perceived price of a product) can have a significant effect on a user's subjective experience (Openshaw, 2011; Wastiels & Wouters, 2012).

Spaces within the context are often made to accommodate for rituals, ceremonies and community events, the broader community of Mamelodi West will be investigated in order to find the rituals, ceremonies and community events that take place there and what spatial requirements and relationships are associated with them (Holbrook and Schindler, 2003).

CONTRIBUTION

Within Mamelodi west, the design will provide a view of how social housing in low-income areas can provide a healthy holistic environment. This will be achieved through the culmination of the principles of social housing, co-housing and new urbanism.

The current paradigm of social housing in South Africa requires expansion beyond the mitigation of the housing shortage and must look towards community and urban strategies to create a sustainably supportive residential structure.

METHODOLOGY

A multi-faceted methodology approach was used, to answer the research question. The decision to employ this approach was made to ensure the final solution is informed by an array of theoretical and practical methods, enabling multiple approaches towards a design solution.

Part 1 - Context

The site was chosen through selection criteria, a background study was done to investigate the establishment and political history of the area. For the urban planning theoretical texts were reviewed. The site was then mapped for an understanding of the urban characteristics of the context and the specifics of the micro site. This was done through means of online and visual observation with support from media reports.

Part 2 - Programme

Literature was reviewed to define the facets of housing as well as to create a factual comparison of social housing and co-housing.

Part 3a - Streetscape Typologies (Incrementality)

A visual study of the housing typologies and their relation to the street was coupled with online mapping to create a cohesive typological investigation into the houses in Mamelodi West.

Part 3b - Flexibility (Incrementality)

A theoretical study was done around flexible architecture including views of the specialist architectural firm Elemental.

Part 4 - Precedent

A coding method was used to analyse and compare South African social housing examples. This was done in order to achieve a factual result that could inform the more rigid specifications that are required to propose a social housing project.

Part 5 - Subsidy

An overview of governmental requirements for receiving subsidies was done, which then critically analysed by consulting with a professional in the field in order to align the requirements to the project.

Part 6 - Concept

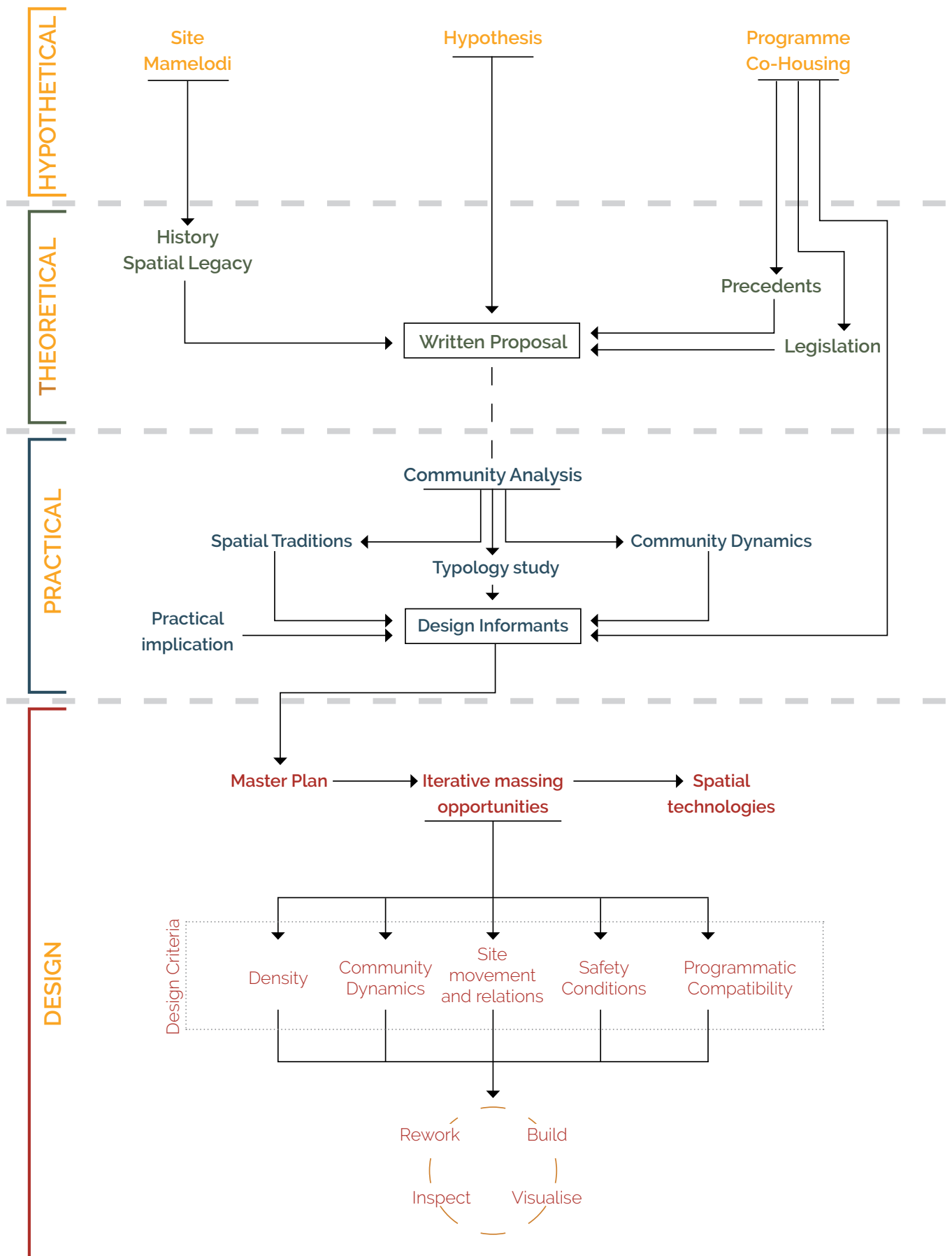
Practical investigation into the merging of informants to create a collective direction for both research and design.

Part 7 - Design

An iterative process was followed where the design was continuously tested against a strict set of informants. Each iteration was analysed against the informants, if it failed to relate, a following iteration would be focused on including and balancing the informants further.

Part 8 - Technical

The design was separated into distinct sections in which a material matrix was set out for each of the sections based on their most relevant informants. The technical investigations further explored how to create a practical and feasible design.



Context

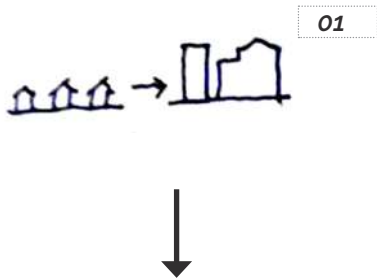
Part 1

This chapter expands on the site selection criteria, background history, physical analysis and urban strategies of Mamelodi West .

CONTEXT SELECTION

1.1) SCOPE OF DENSIFICATION

Urban co-housing is an ideal intervention when the context is either densified or growing towards it as the housing can refurbish old urban buildings or set a new vertical and densified standard for growing areas (Kim, 2018).



Established Amenities

Mamelodi West was planned to have a fully functioning infrastructure with all of the necessary urban amenities for healthy living. This has encouraged and supported growth in the area and the densification has already begun and can be identified (Boraine, 1988).

1.2) ARCHITECTURAL IDENTITY

To test the ability to contextualise a development, it is best to choose an area that holds some form of overall identity that can be extended.

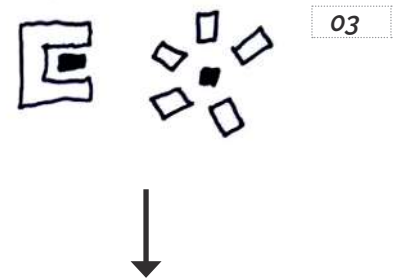


Mamelodi Legacy

Mamelodi was one of the core apartheid settlements used to segregate people of colour from 'white areas'. The standard NE51/6 houses built to create the housing for this forced migration still stand as a base for the growing typologies (Calderwood, 2012).

1.3) DEFINED COMMUNITY

To extend a community, the structure of the existing community must be somewhat structured and identifiable.



Apartheid Layouts

Mamelodi West has a structured layout. Although the large streets and distanced communal areas were not planned for community, it created a street based community where the streetscape becomes an interchangeable social and event space

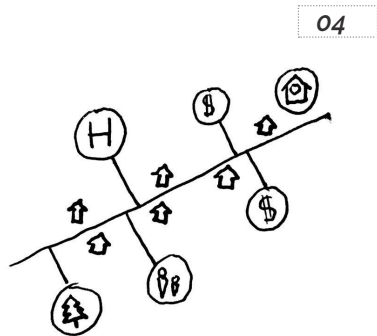


Figure 01 Sketch illustrating densification. Illustrated by author.

Figure 02 Sketch illustrating architectural silhouettes. Illustrated by author.

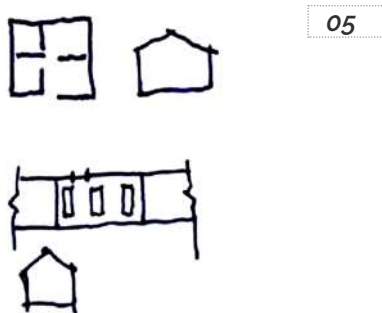


Figure 03 Sketch illustrating community layouts. Illustrated by author.

Figure 04 Sketch illustrating infrastructure. Illustrated by author.

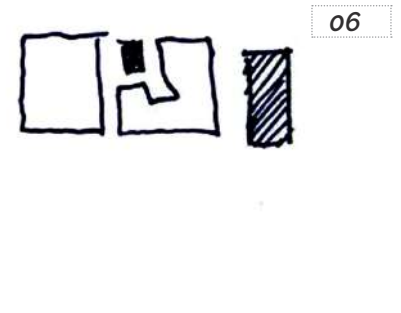


Figure 05 Sketch illustrating standardised housing. Illustrated by author.

Figure 06 Sketches illustrating town layouts. Illustrated by author.

MAMELODI WEST

1.4) PHYSICAL CONTEXT

Mamelodi was a planned township used as a residential area to place the black population that was evicted from inner parts of Pretoria and Pretoria east (which was then to be classified as white areas). The residential layout additionally separated the population by race-ethnic groupings through language such as Shangaan, Venda, Nguni and Sotho speakers. The Pretoria news reported comments that the residents had about the rondavels, which were the first houses built in Mamelodi by the government (Van Der Waal, 2000; Walker and Van Der Waal, 1991:3-4).

*“The charms of the new Rondavels did not seduce the users who condemned them as “primitive k*****r housing ... which was causing considerable racial conflict and feelings of hostility” (Pretoria News in Walker & Van Der Waal, 1991: 10).*

The idea of attempting to move the rural village to the urban area was soon discarded, and the development of standard housing such as the NE51/6 and NE51/9 began (Calderwood, 2012).

1.5) ESTABLISHMENT

Mamelodi was established on 30th October 1945 when the City Council of Pretoria (CCP) bought parts of the Vlakfontein 329 JR farmland intending to plan and implement a black urban area (Van Der Waal, 2000; Walker and Van Der Waal, 1991:3-4).

1.6) LOCATION

The town sits on the southern foot of the Magaliesberg Range and is bordered by Eerstrus on the west and a large industrial belt to the south. Mamelodi grew east as planned, and Mamelodi east and west became defined by the Pienaar’s River (see Figure 08).

Relation to Pretoria (Figure 07)

Pendulum migration is the daily migration of the majority of working adults from their place of residence, to their jobs and back (Dewar, Todes, Watson, 1986).

In Mamelodi West, this is due to the intentional placement of the suburb away from the central business district (Pretoria Central) when it was founded (Dewar, Todes, Watson, 1986).

Pendulum migration can cause low local economic activity and poor passive security during the work days as there are only a fraction of the people in the area.



Figure 07 Mamelodi In relation to Pretoria. Edited by author (Google Earth, 2019)

1.7) POLITICAL CONTROL OF MAMELODI

Mamelodi was considered to be an 'Oilspot', as described by the local joint management centers (JMCs) as a strategic base where the resident security forces or police could easily take control. After the 1985 Mamelodi massacre, internal groups began to form. The groups were a threat to the government and in the same year the state of emergency called for control of townships. The actions of this event included the eradication of all internal groups, raids and the banning of meetings (including public funerals which are of great importance to the community) (Boraine, 1988).

Magnus Malan in 1987, who was the defense minister at the time, said that in order to prevent the population from falling into 'terrorist' groups, their living conditions must be improved to get them to accept the government. In the same year Adriaan Vlok (Law and Order Minister) also mentioned the great importance of first taking out the resistance and then upgrade the socio-economic conditions and then make official political groups which can be monitored. The strategies both include addressing poor conditions within townships to prevent activists from being able to rally people using bad conditions as motivators (Boraine, 1988).

The mini-joint management centre (mini-JMC), and the joint operations centre (JOC) were the structures that were set to implement the improvement for control strategies. These actions started with the improvement of infrastructure (including the highway, roads and pedestrian walkways) (see Figure 08). The building of strategically placed police stations, post offices, parks and schools was

next and the final and continuous stage was to address the increasing housing needs (Boraine, 1988).

These strategies might not have worked to buy the peoples love for the government but it definitely created a successfully planned and built area where the infrastructure works and the ability to improve is possible (Boraine, 1988).

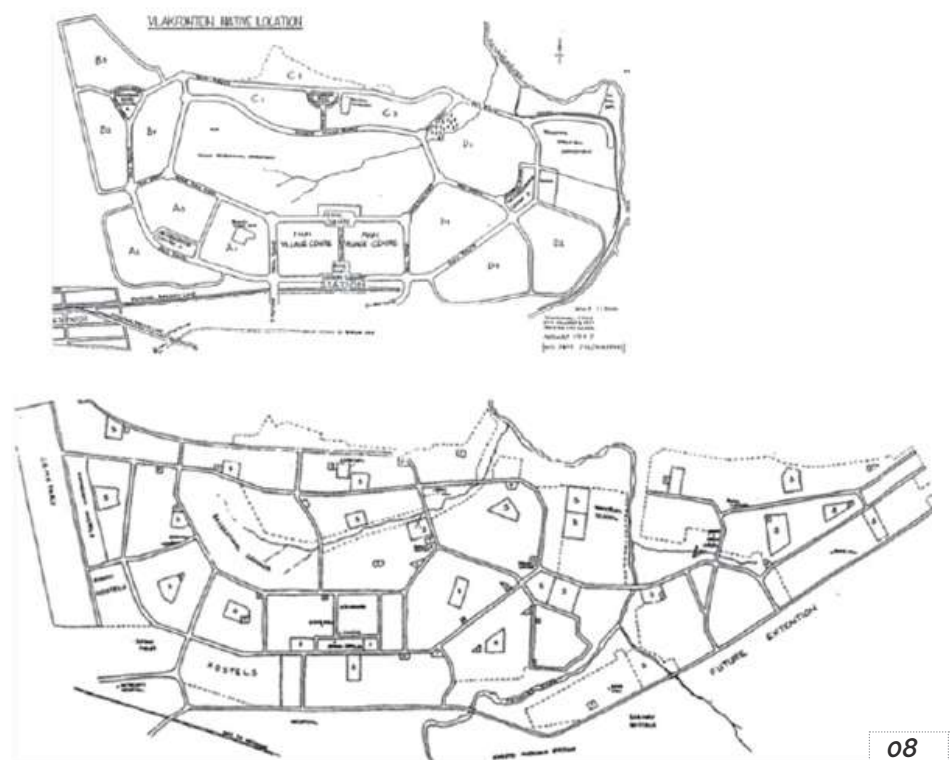


Figure 08 Mamelodi layout maps (Walker and Van Der Waal, 1991)

FRAMEWORKS

1.8) FORMAL FRAMEWORKS

The Tsosoloso Programme is focused explicitly on districts, as the framework is aiming to achieve more local ideals. The Tsosoloso Programme's prioritise the improvement of open and community spaces, and for Mamelodi.

The framework enriches the public environment by involving themselves in planning infrastructural layouts. Points of economic focus are essential as this is where these formworks place community activity centres and guide investment into local businesses. Ease of access to these points is strategised by transforming transport interchanges into civic termini, and activity linkages (spines/corridors) are strengthened to be more engaging and facilitating of a healthy pedestrian environment (GAPP 2010: 2).

The Tshwane open framework is a city-wide urban strategy mostly based around the increase of transport infrastructure and the development of the areas and nodes around the stops for these various forms of transport. This is all part of the Composite Regeneration Strategy as proposed by GAPP (2010: 18). This offers strategies to get new forms of transport such as the Gautrain and GauBus to run through Mamelodi West as part of the route to the rest of Mamelodi. A stop would be included in the Denneboom Train Station, which feeds directly into the Mamelodi Gateway GAPP (2010).

1.9) MAMELODI GATEWAY

Masters Framework group:

Dipna Bhana
Shakira Marais
Fras Bissett
Dirk Schmidt
Mangaliso Mtetwa

Mamelodi is still mostly dependent on other parts of Pretoria for jobs and amenities as people have to travel outside Mamelodi for work which can be expensive and causes significant amounts of household income to be spent on transport (GAPP, 2010). Further setbacks to the successful development of Mamelodi are:

- Large shopping malls do not improve the skill levels of residents.
- Government has not yet subsidised informal public transport.
- The difference in the housing density and the high population density is too high and better housing opportunities are required to meet the demands of the growing population of the increasingly urban suburb.

Over the recent years, Mamelodi West has gained a fair amount of civic services and infrastructure, but is it close enough and is it everything that is needed?

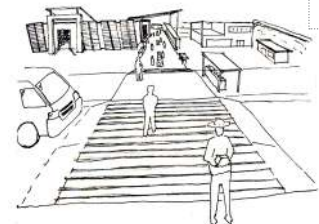
The following are three core nodes that were identified as crucial for development:



09

The Circle Node

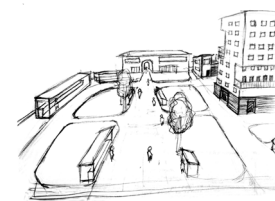
When entering Mamelodi West, there is a circle which everyone must go through to reach into the residential area. This circle was designated to become a densified node signifying the development of the area.



10

Pedestrian Passage

The line between the study area and both the taxi and train station currently acts as an informal footpath, and in the framework, we proposed that it will be formalised and existing informal trade will be facilitated along the path.



11

The Peoples Park

Currently, the vacant plot is being successfully appropriated to the needs of informal trade. This park will be improved to facilitate this trade better and improve the appeal of the area.

Figure 09 A sketch of the circle node. By author.

Figure 10 A sketch of the pedestrian passage. By author

Figure 11 A sketch of the peoples park. By author.

URBAN THEORY

1.10) REGIONAL SCALE

The organisation of expansion in areas sharing a common border to existing urban areas such as Mamelodi West should be in the form of neighbourhoods or districts that connect and relate themselves to existing urban patterns. The neighbourhoods and districts within themselves should be planned for a jobs/ housing balance and not as bedroom suburbs (as Mamelodi West previously was) (Sykes, 2010).

The formation of bedroom suburbs is a current problem in South Africa, and the conservation of culture in a stretched out system due to suburban and informal settlement creep (Sykes, 2010). Planned infill densification is a strategy that could mitigate the loss of identity of urban space. Through the principles of New Urbanism, as suggested in the framework where the densification of Mamelodi West could help the sprawl in the East.

1.11) NEIGHBOURHOOD SCALE

The formation of new neighbourhoods can be done by reclaiming marginal and abandoned areas helping to respect historical patterns, precedents and boundaries while not adding to the suburban sprawl. The formation of a neighbourhood should conserve environmental resources, allow economic investment and expand social fabric (Sykes, 2010).

The neighbourhood should be an identifiable area that allows for the residents to take ownership of their area. The neighbourhood should empower the resident by having daily activities within walking distance along with safe and easily navigable interconnected street networks. Mixed-use districts are crucial within neighbourhoods, but they should

emphasise a particular single-use, an example of this could be a High Street with a second storey residential component. Neighbourhoods should have the capacity to house people from multiple generations, income levels and races to encourage interaction on a wholesome level (Sykes, 2010).

In its criticism, New Urbanism has been found to struggle to achieve many of its social ideals. Issues arise when attempting to have lower and higher-income classes living together. A critical difficulty also arises when trying to prove to those who can afford suburban homes, that the denser neighbourhood model does not mean that they have less freedom. Models of the "American dream" suburban home is still believed to be the ideal model for successful living, and that is one of the New Urbanist's barriers (Ghorbi, Mohammadi, 2017). Mamelodi is currently in contradiction to this divide of class as most of the residents have lived in low-income families and even when they start to gain higher incomes, they stay in the area and improve their quality of life by upgrading their homes.

1.12) ARCHITECTURAL AND STREET SCALE

The architects have a responsibility to the human scale, streets and public spaces must be defined as shared space and the buildings should contribute to its surroundings. The pedestrian realm should encourage walking by drawing interest, ensuring safety and encouraging sociability. Access to casual social interactions is vital to a person's mental health as it encourages motivation (mostly through competitive reinforcement), creates a platform for new relationships (and easy maintenance thereof) and allows for a support

system to form (Gehl, 2011; Sykes, 2010).

Jan Gehl (2011) in his book "Life between buildings: using public space" he describes three types of outdoor activities:

- Necessary activities that one does every day and are unaffected by unsuitable exterior conditions.
- Optional activities which are acted on through occasion and if the exterior conditions are suitable.
- Social activities which are often the in-between, supported by other activities and are dependent on the presence of others in public spaces.

The design of the streetscape between these spaces to create the intersection of optional activities and social activities on the way to the necessary activities while still being accessible is ideal. Public spaces and points of civic importance are places that should create an identity for the community and become a space for open appropriation (Sykes, 2010). Mamelodi West has thrived in its human scale, street accessibility and ability to appropriate spaces for its needs. Any new architectural projects in this area must be able to enable the human scale while creating an identity and a safe environment.

1.13) NEW URBANISM AND ITS COMPATIBILITY WITH COHOUSING

New Urbanism is a culmination of principles that set the perfect urban setting for any co-housing building or group as they both focus on creating space and place for social interaction, safety and community identity (Sykes, 2010).

LOCALITY

Messo scale

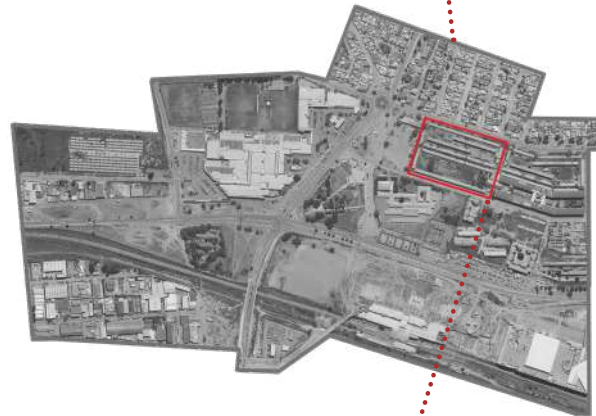
Relation of Mamelodi to Pretoria Central



12

Macro scale

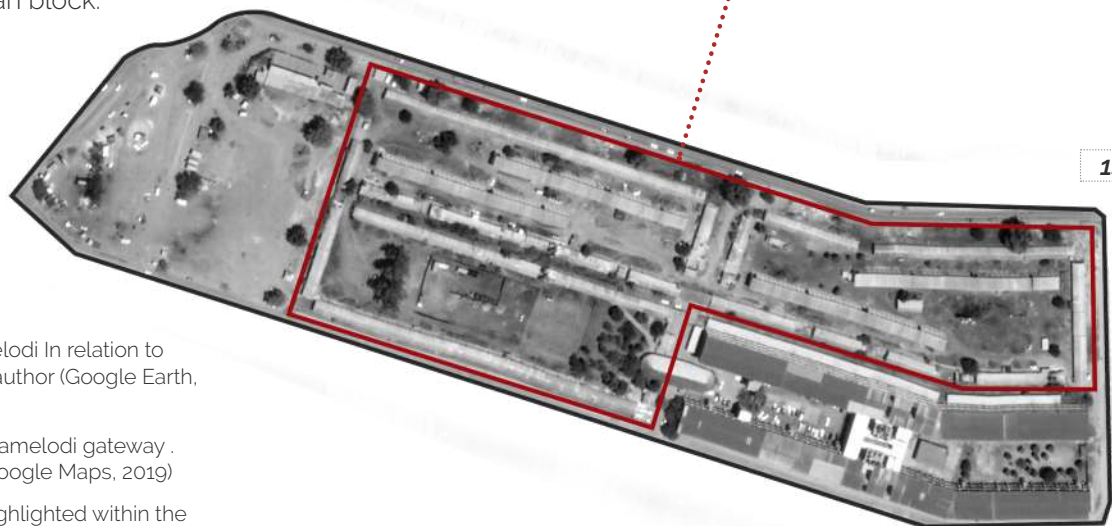
The area called 'the Mamelodi Gateway'



13

Micro scale

The proposed site situated in its urban block.



14

Figure 12 Mamelodi In relation to Pretoria. Edited by author (Google Earth, 2019)

Figure 13 The Mamelodi gateway . Edited by author (Google Maps, 2019)

Figure 14 Site highlighted within the block. Edited by author (Google Maps 2019).

CONTEXT ANALYSIS

1.14) URBAN SITE ANALYSIS

Mamelodi has a very comprehensive public and private transport system.

As noted with the framework, the gateway to Mamelodi sits on the approach to the circle, which the site has direct access to. To understand the accessibility to the selected site Figure 15 illustrates the movement around it within the Mamelodi Gateway. The site has access to the main road which feeds into the community core of Mamelodi West.

As illustrated in Figure 16, Mamelodi Gateway offers a wide variety of programs. The variety is an indication of the inevitable growth of the area to a more densely developed node. The Gateway offers several job opportunities, urban amenities, as well as having a close relation to the residential community.

The analysis of the Mamelodi Gateway illustrates that the site is a prime area for a housing development with its accessibility and proximity to necessities.

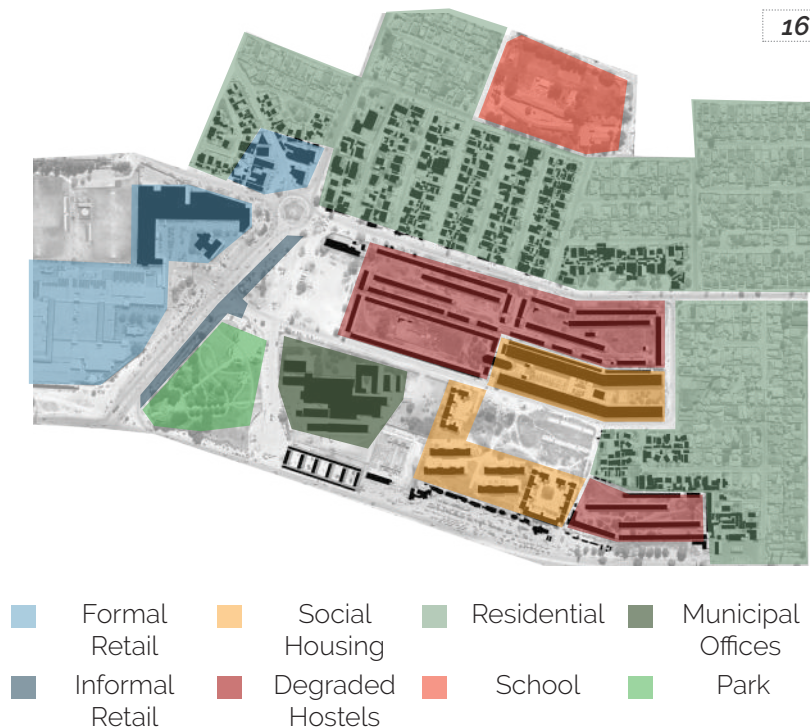
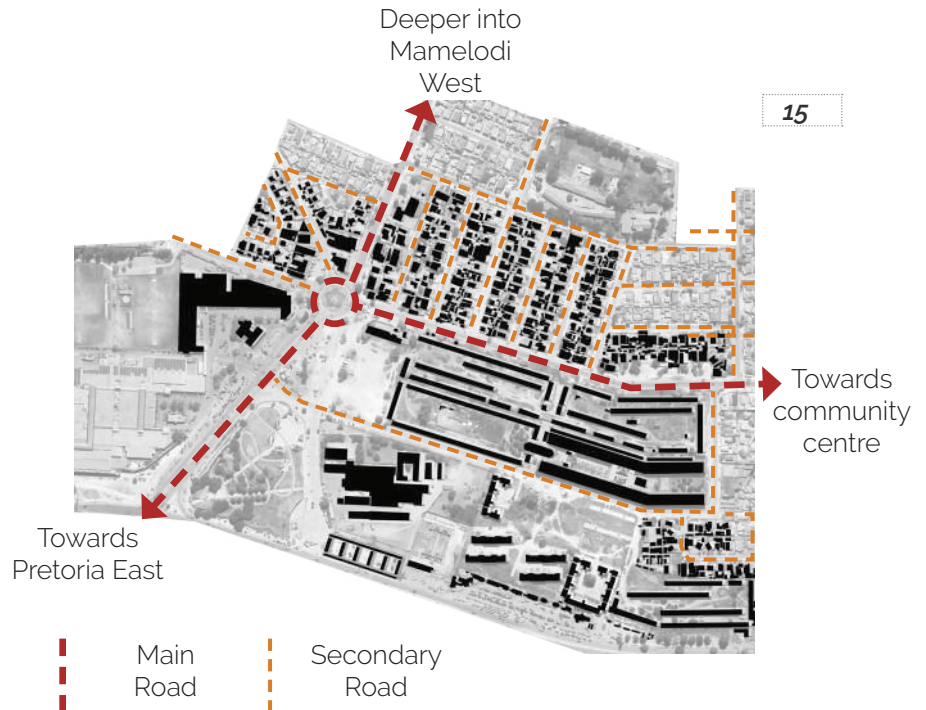


Figure 15 Site movement around the site, Mamelodi West. Edited by author (Google Maps, 2019)

Figure 16 Existing programs around the site, Mamelodi West. Edited by author (Google Maps, 2019)

SITE SELECTION

1.15) URBAN SITE LOCATION

Within Mamelodi West, the Southern section can be considered to be the 'Mamelodi Gateway' as it was the original entrance to Mamelodi and represents the condition of Mamelodi and especially Mamelodi West.

The chosen site is what was the woman's hostels (or barracks) in the 1970s. Unlike the men's hostels, it has a direct effect on the first impression of what anyone sees of Mamelodi West or the Mamelodi Gateway, it also is less habitable and is a smaller, more manageable site.

Site

'70s woman's hostels
western section
Mamelodi west,
ward 38

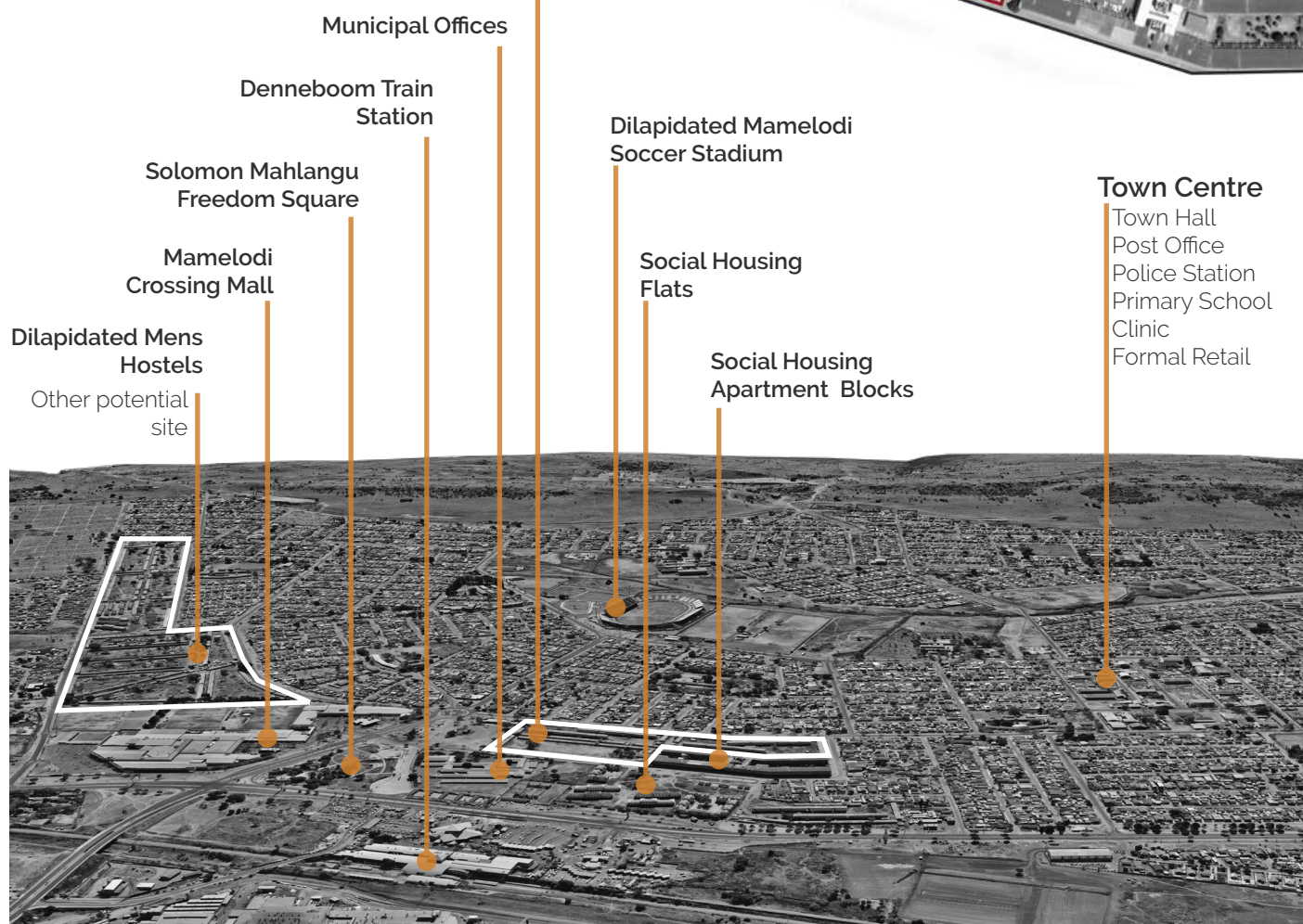
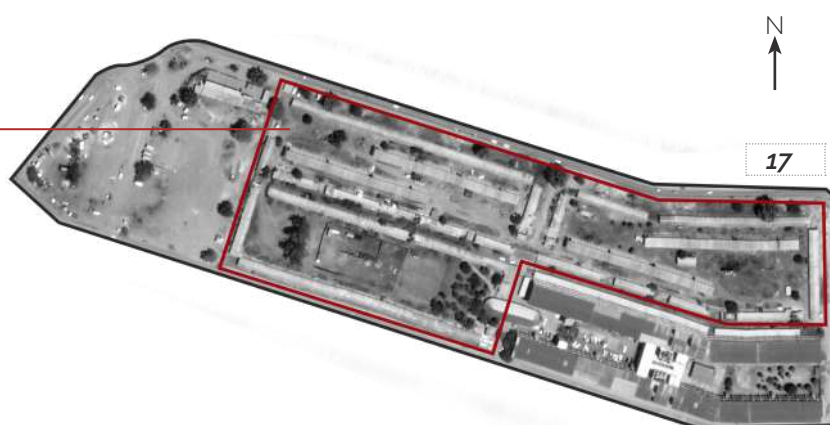


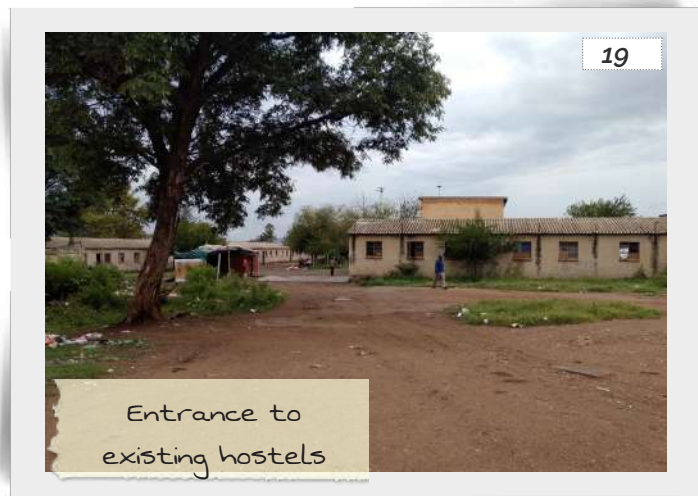
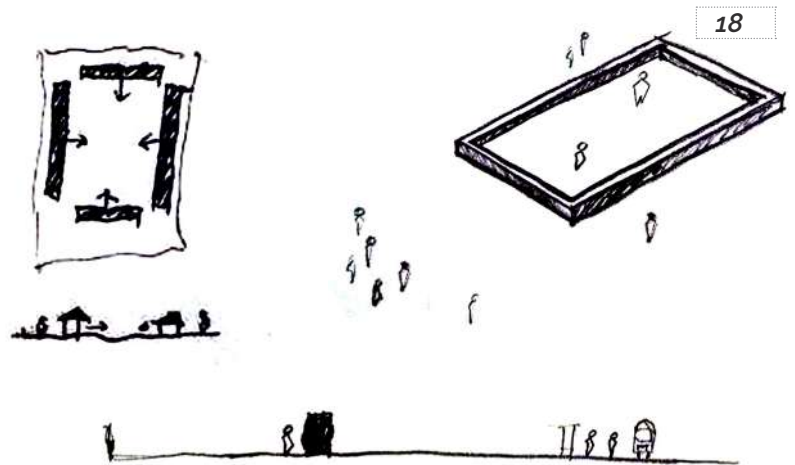
Figure 17 Site highlighted within the block and situated within the suburb . Edited by author (Google Maps 2019).

1.16) SITE BOUNDARY

The boundary around the site is restrictive and isolating (as illustrated in Figure 18). The buildings are single-storey row houses (or barracks) faced inwards that span the entire edge of the site as well as the few double storey rows in the centre of the site. There are two formal exits, one on the North-Western corner and one at the centre of the Northern face.

With rows as long as 200m and a total length of 420m, this hostel complex is a massive island within the suburb. The residential blocks around it are much smaller and accessible than the hostel block, causing several of the pleasant residential streets to end abruptly at a decayed exterior boundary of the hostel.

The inward isolation of the residents causes the space to allow criminal activity to manifest within its 'walls' as community intervention is immediately discouraged by the layout which has only a few entrances, which makes police enforcement difficult (Moatshe, 2019).



Indicated formal entrances to the site



Figure 18 A series of sketches illustrating the boundary condition of the site. Sketched by author.

Figure 19 A photograph showing South West entrance to the hostels from the adjacent field. Photo taken by author.

Figure 20 A 3D view from the South West corner of the hostels. (Google Maps, 2019)

1.17) SITE CONDITION

Government officials have deemed the existing buildings on site uninhabitable as the roofs and walls had not been maintained since the '90s. This has caused severe health conditions and structural damage (Figure 21 & 23). The interior has become either overgrown or barren with trash everywhere and windows with plastic or cardboard substituting the broken glass as seen in Figure 22 (Masombuka, 2009). The intentions to re-use the buildings will be discussed in (Ch7.19).

The apartheid-era hostels began to be demolished in 2009, but only a portion of the three sites marked for demolition, to make way for new housing, were actually worked on. The three sites were the larger men's hostels to the East, the central women's hostels (the project site) and the Southern smaller woman's hostels. Only half of the Southern woman's hostels were demolished, and only a handful of apartments were put up in their place (Masombuka, 2009).

The only intervention from the government since 2009 to the central woman's hostel has been the addition of a few water tanks in an attempt to comply with the right to basic water and sanitation that forces them to supply it to any inhabited dwellings (Tissington, 2011).

There are reports of drug dens, squatters, as well as illegal rental of the units to vulnerable individuals moving to the city (Moatshe, 2019).

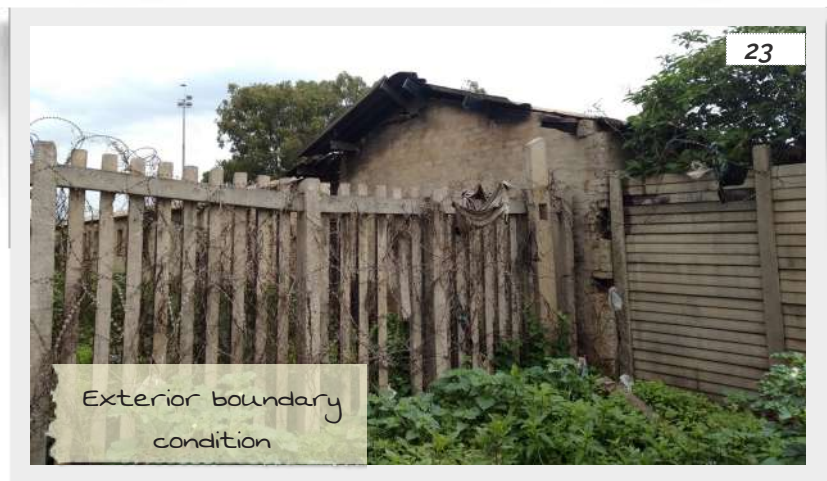
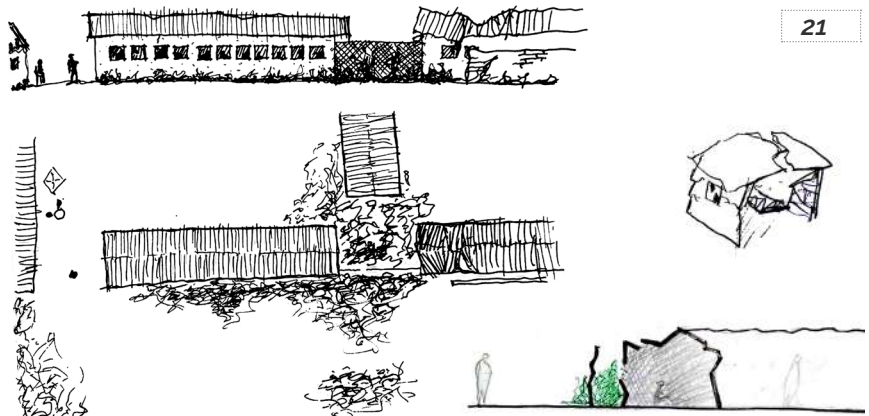


Figure 21 A series of sketches illustrating the boundary condition of the site. Sketched by author.

Figure 22 A photograph of the interior of the site . (Pretoria News, 2019)

Figure 23 A photograph of the exterior boundary condition of the site . Photo taken by author.

Programme

Part 2

This chapter provides descriptions of Co-Housing and Social housing, their differences and strategies to merge them into a single functioning programmatic typology

CO-HOUSING VS SOCIAL HOUSING

2.1) HOUSING

Housing itself stands as a description for a building of residency, a shelter, a place in which one can sleep, eat and wash. The different housing typologies mostly stem from their aesthetic styles and ideologies. The purpose of co-housing and social housing is beyond the unit's inhabitants but intends to create a place in which several people can create a supportive communal environment.

2.2) TENURE TYPES

The type of tenure within a housing scheme is critical for its strategised development and the sense of ownership that users are intended to have, based on the level of autonomy they have, for their units and the scheme as a whole. The two core tenure forms are owner-occupier and rent paid to a landlord or owner.

Owner occupancy, Tenancy, Cooperative, Condominium, Public Housing (social housing), Squatting and Land trust are the base tenancy types:

- Co-housing – A variant of a condominium or cooperative with a high degree of interaction with neighbours in shared areas.
- Social housing – Government-owned housing, either provided for free or leased at a subsidised rate.

2.3) SOCIAL HOUSING

Social housing is a deviation of public housing, stemming from an organised governments involvement in the safe housing of low-income citizens in England in the 19th century in denser areas as a need during the industrial revolution. The design of such housing developments currently tends to strive for a high resident density with basic amenities being shared, such as clothes hanging areas and a shared meeting hall. The residents often live in this form of housing due to the inability to afford any other form of tenure and as such are usually expected to move out after gaining a stable income (The Social Housing Foundation, 2010). Social housing precedents will be further investigated in the 'Precedents Chapter'.

2.4) CO-HOUSING

Co-housing is an intentional community of private homes with shared spaces. The theory is based on a movement in Denmark in the 1960s where groups of families became dissatisfied with the lack of structure in the housing and communities they lived in. The movement was spurred on one of the first Co-housing communities with content similar to the African proverb "it takes a village to raise a child" which suggests that the complexity of the support and variety of influences available in the interactions of an active community

should be considered invaluable to any development or lifestyle (McCamant and Durrett, 1988; 1991).

As the structure and shared spaces are not new concepts, Co-housing can, instead, be seen as an intentional rejuvenation of the formation of physical communities (such as villages which were made for economic and safety reasons). For this reason, precedents can be found since the beginning of civilisation, but the intentional architecture of Co-housing brings with it, a new spatial dimension of development (McCamant and Durrett, 1988; 1991).

The structure of the community is in order for private lives to be able to have their freedoms while having cooperative opportunities and support that a community can supply (Frank, 1991:3). The benefits range from social, practical, economical, and environmental.

Spatial characteristics include intentional encouragement of interaction between private residences and convenient cooperation between any of the members as part of the neighbourhood design and integrated with extensive common facilities. The design process is encouraged to have residents participate in the planning stages as well as the management once the project has been completed (McCamant, Durrett and Hertzman, 1988:36-41; 1991:1-100).

Jernsoberiet co-housing

When McCamant and Durrett (1991,112) speak about prime Co-housing precedents such as Jernsoberiet Co-housing Community, they emphasise the importance of making transitions from private to public informal through the use of inner streets, court spaces and an integrated common room. These spaces must come together in order to facilitate a flowing narrative that encourages casual socialising.

The design of the interiors must be flexible as to mitigate the need for users to move out of the community in order to expand or contract their living spaces according to their living needs and lifestyle changes. A consistent community is more likely to develop an elaborate support system and integrated community lifestyle making the Co-housing a sustainable community (McCamant and Durrett; 1991,120).

Jernsoberiet co-housing community has all of the living units directly

linked to the shared hall, making it a literal part of their house as seen in Figure 26 & 27. This forces the residents to interact with each other on a daily basis.

From the exterior, Figure 24, the housing looks like a compound but in

Figure 25 it can be seen that inside it is spacious enough for any form of community activity.

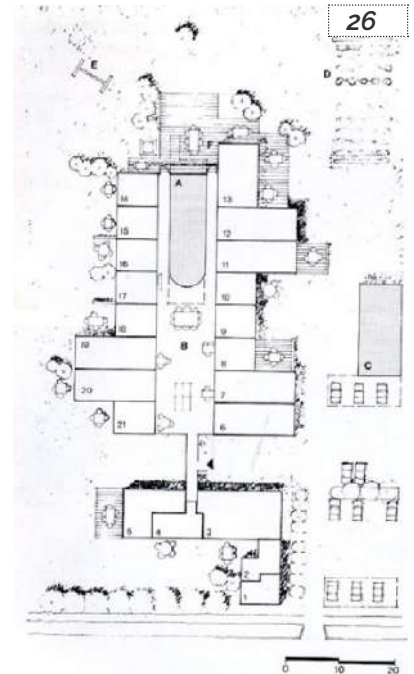
This is what architectural co-housing is, it must encourage the residents to interact through spacial proximity of communal and private programmes.



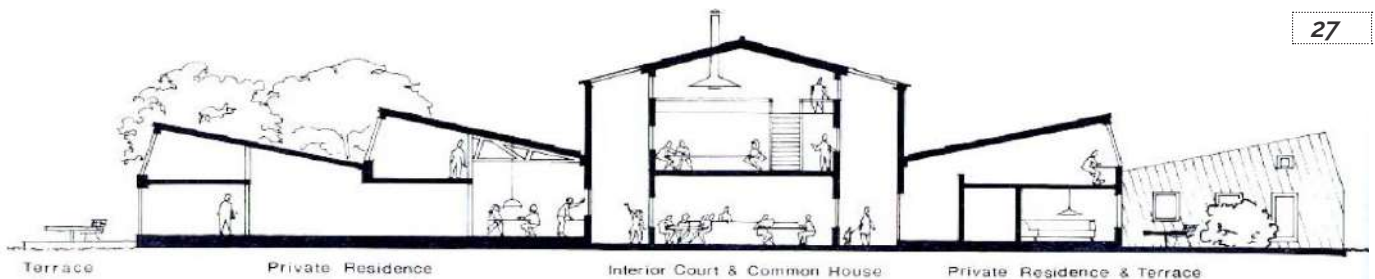
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Figure 24 Jernstoberiet, front of house. (The cohousing network. 2019)

Figure 25 Jernstoberiet, activity hall.) The cohousing network. 2019)

Figure 26 Jernstoberiet, activity in communal hall. (McCamant; 1988,94)

Figure 27 Jernstoberiet, section. (McCamant; 1988,94)

CO-HOUSING PROGRAMMES

"The luxury of having community and privacy with spaces designed for both extremes should be a more frequent design consideration in all kinds of housing."
Karen A. Frank (1991:17)

2.5) CO-HOUSING AS A SYSTEM

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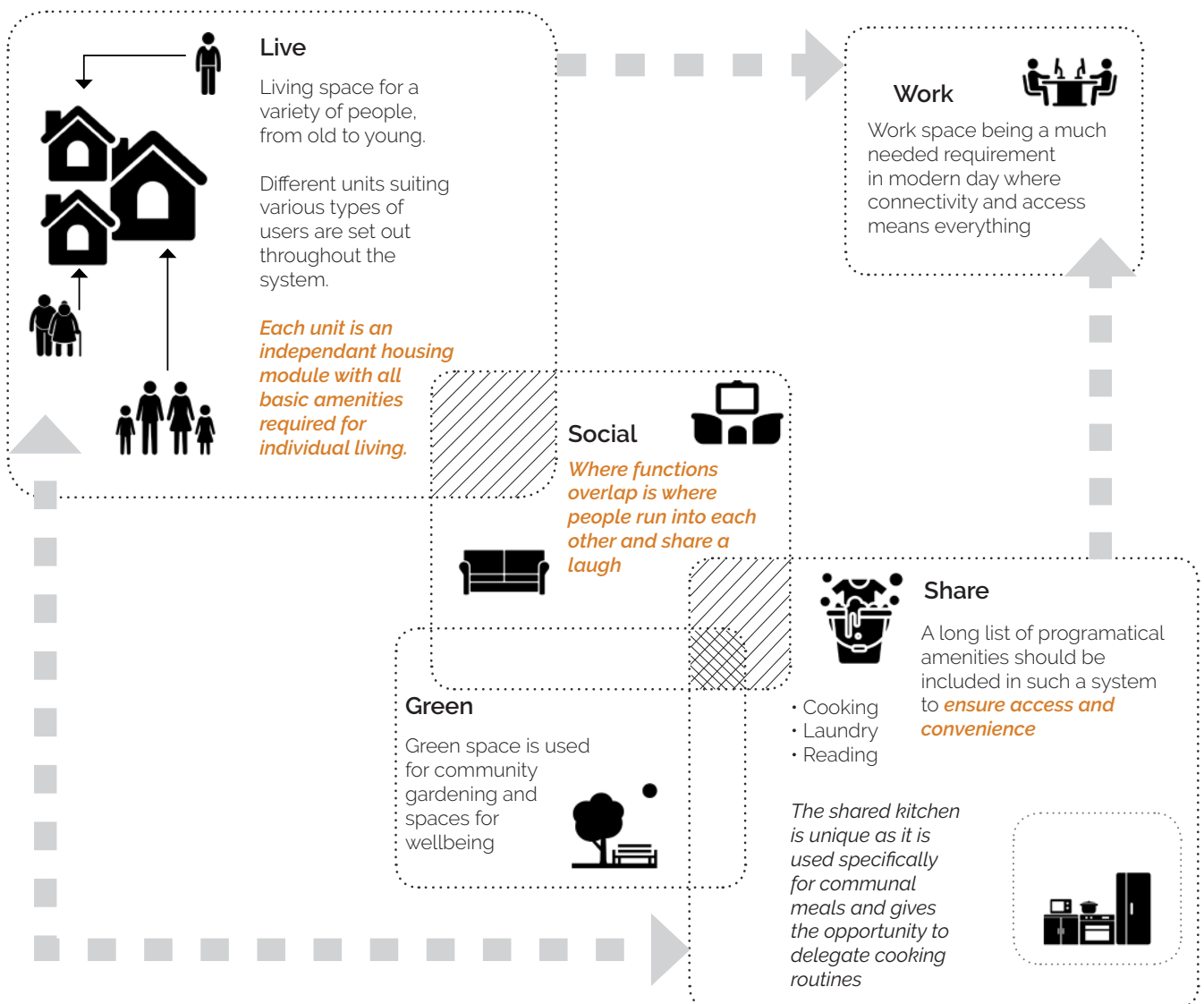


Figure 28 Co-housing diagrammatic interpretation. Layout by author icons by thenounproject.com

“...the Common House is the physical manifestation of the social and emotional center of a cohousing community.”
 Grace Kim (2006:1)

2.6) SPACIALITY OF THE CO-HOUSING COMMON HOUSE

There is a multi-functional role for a co-housing common house, the two main roles are to be a gateway to the residential units and then to act as a collection of communal amenities.

Intentional interaction is part of the gateway function of the common house. It brings residents through the common house which is usually the main or only door to the street. The entrance or lobby section will be attached to a kitchen, dining room or lounge. This is designed this way in order to maximise the chances of creating encounters between the people interacting or stagnating in these spaces and the people moving through it to their unit (Kim, 2006).

A kitchen in a common house is used for group meal schedules, family gatherings or for events. An example of an event that could be accommodated for in a common house kitchen is a Mamelodi Street wedding as discussed in incrementality chapter (Ch.3a.2).

The common house is also used for communal meetings and activities, these can be done in a large lounge or dining hall. Shared resources are common in co-housing communities in the form of libraries and communal pantries.

Shared necessities such as bathrooms are crucial for these spaces which act as part of the larger support system if , for example, there are plumbing problems in a residents' unit or a function (Kim, 2006).

Additional functions that are considered as communal in larger communities can also become shared such as laundry washing and informal kindergartens.

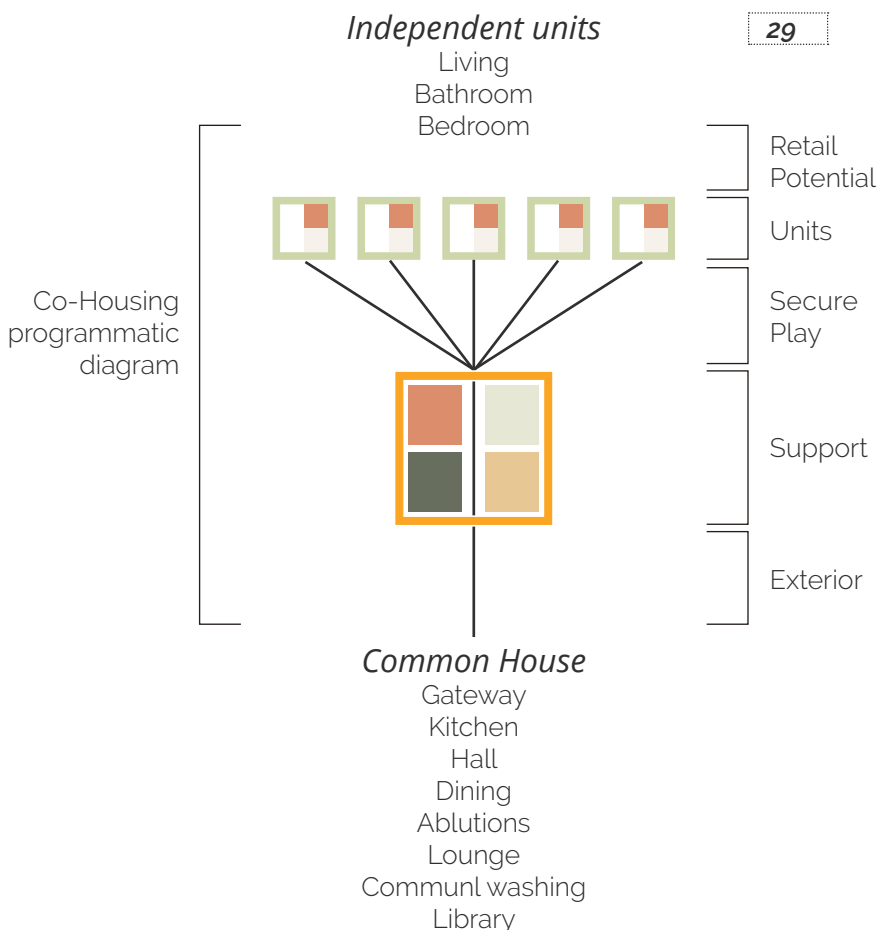


Figure 29 Co-housing programme layout diagram. Illustrated by Author.

PROGRAMME COMPARISON

SOCIAL HOUSING

CO-HOUSING

Target Users

Low income citizen.

A group of typically middle class residents intent of creating a community.

Intention

To supply acceptable housing to mitigate housing needs.

To create a support structure for mental and social needs.

Design Requirements

High density units

Well integrated yet autonomous units with social transition points.

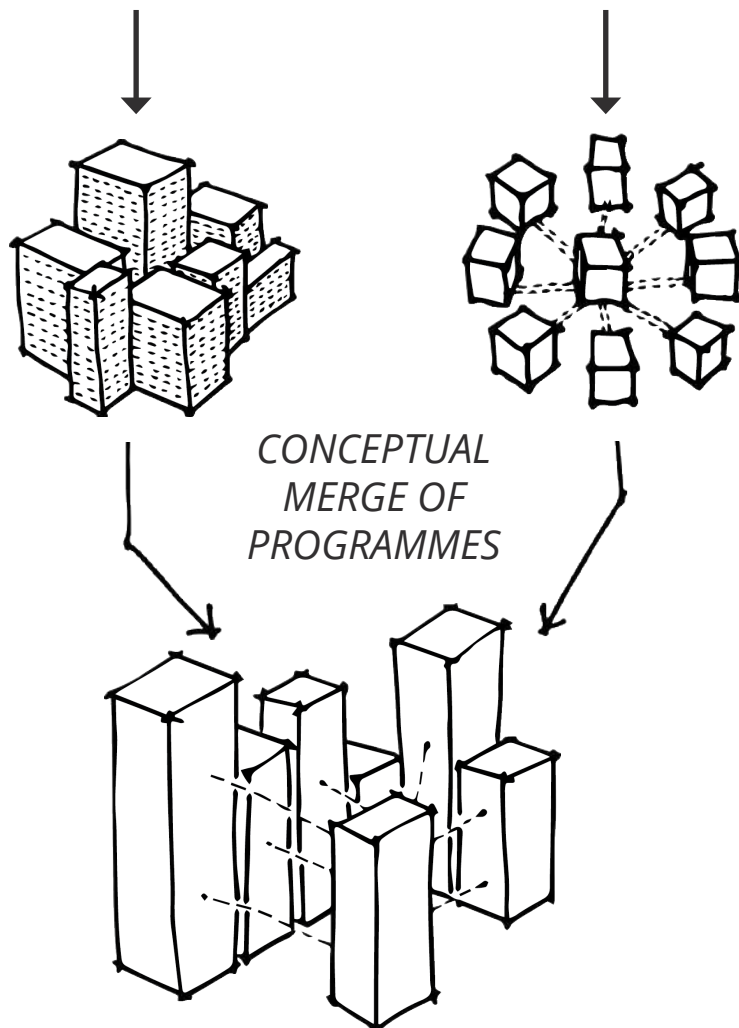
Amenities

Durable features for basic living such as splashbacks on sinks and laundry areas.

Shared amenities used for support and social interaction such a common houses, community kitchens and play areas.

(The Social Housing Foundation, 2010).

(McCamant and Durrett, 1988; 1991).



30

Figure 30 Conceptual synergy between the principals of social housing and co-housing. Drawn by author.

PROGRAMME APPLICATION

2.7) CONTEXTUAL APPLICATION

Mamelodi West has had three forms of social housing so far; these developments have become a violation of the existing community's urban lifestyle.

The need for Social housing is based on the fact that Mamelodi West is categorised as a low-income area while also having a constant influx of new residents looking for work and a better urban life (Gcro1.wits.ac.za, 2019; Statssa.gov.za, 2019)

Mamelodi West is an old township built in a suburban form with sufficient infrastructure within a well-structured layout, but the houses are small, and the area offers little to no opportunities for development or casual community interaction (Walker and Van Der Waal, 1991). The resulting culture is one where events, retail and mixed forms of tenure are all based on and around the streets between the previously private residences due to the entrepreneurial and social nature of the area's residents (Mahlangu, 2019). This culture is one of social openness, support and convenience, and these characteristics are ignored by the

current forms of social housing in the area.

The design question asks if the two can be combined to become a sustainable mitigator for the future development of housing within Mamelodi West. An appropriate form of co-housing within a low-income area must be able to support the basic needs of the resident affordably while also caring for their mental and social needs through community integration. It must be able to achieve a higher housing density and therefore will not be a type of suburban co-housing community initiative but instead a built vertical co-housing community. The residents should have the ability to trade and work from their units or at least within their cluster of units.

The concept of Co-Housing as Streetscape further emphasises the physical inspiration the form will take from Mamelodi West's street culture in terms of how the transition spaces, communal areas and relationships between units will be structured.

Incrementality

Typology analysis

Part 3 a.

In this chapter the suburban streetscape of Mamelodi West is analysed, focused on the characteristics of the housing typologies which will then be conceptually adapted to the design concept.

STREETSCAPE TYPOLOGIES

3a.1) THE CORE OF THE TYPOLOGICAL DEVELOP- MENT - THE NE51/6

In the document, 'An investigation into the planning of urban native' by D M Calderwood, the plans and perspectives of the houses indicate planning of the housing used in each region for segregating the populations by race. The model used in Mamelodi West was predominantly the NE51/6 (Non-European 1951 type 6) which was meant to house six adults and a toddler. It contained a small dining table and a kitchen; the WC was located in an outhouse (Calderwood, 1953).

These houses have been adapted and used as cores for extensions to create homes that adapt to the owners' aspirations and economic status. The extensions and additions include retail and rental spaces often detached from the core house as each house has a property large enough to allow for two potential zones of extension and addition. These zones are the private expansion in the backyard used for rental, the core private house and the public extension in the front yard, often used for retail.

These typologies are not mutually exclusive and often occur on the same property.

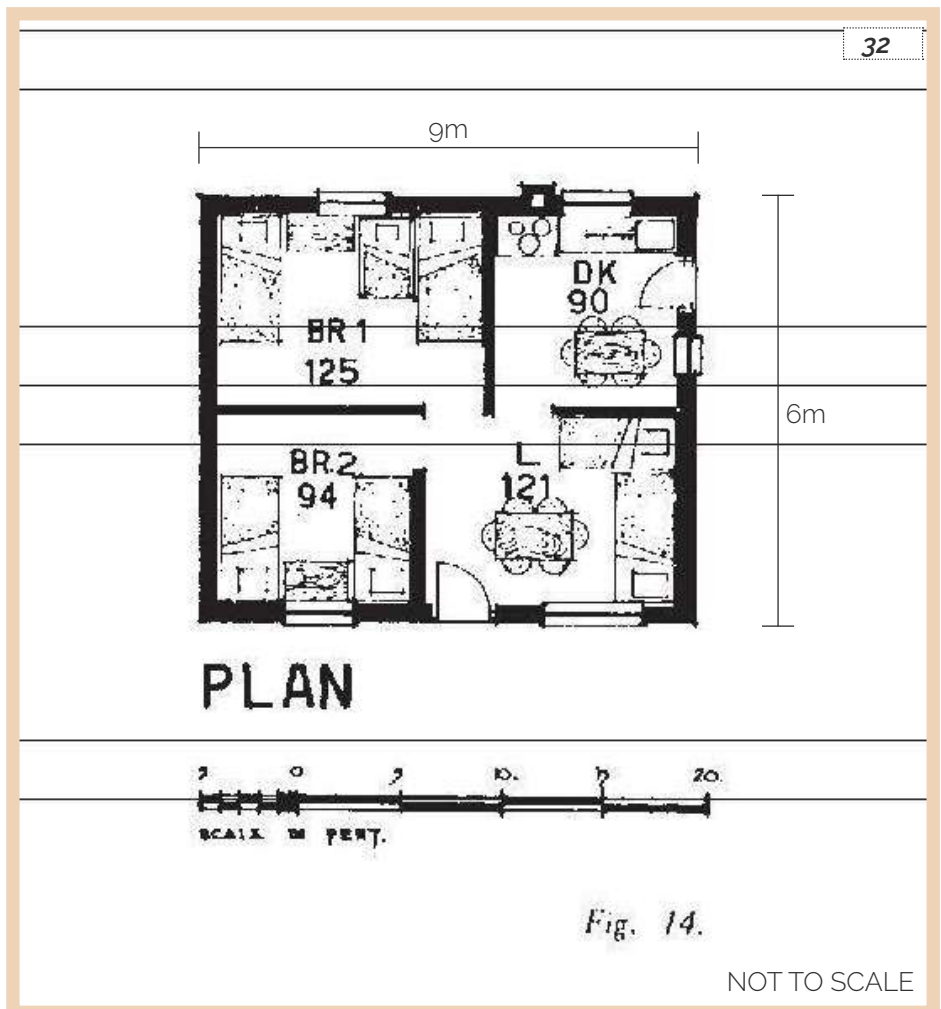
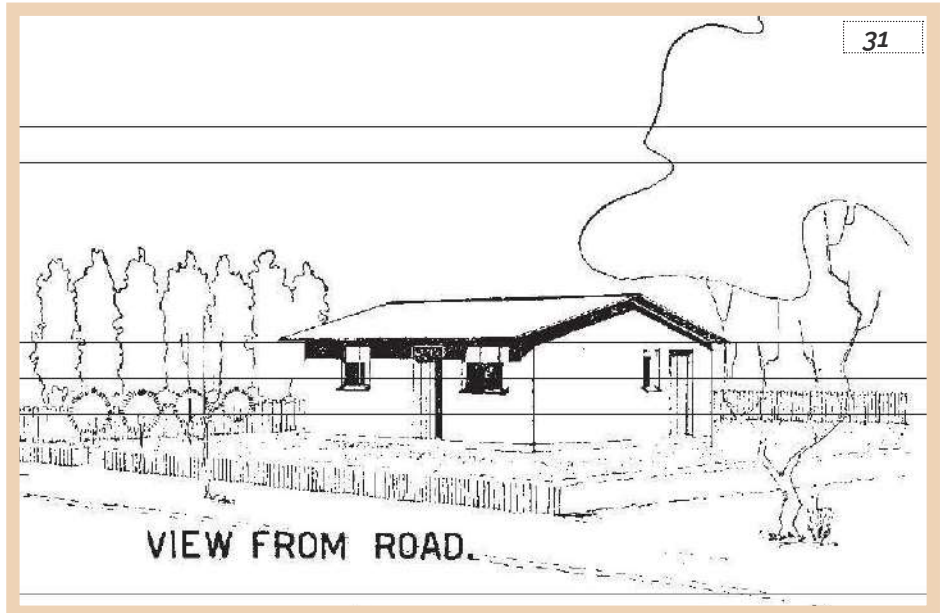


Figure 31 Spatial analysis of the standard base property in Mamelodi West. Source (Calderwood, 1953)

Figure 32 Plan of the NE 51-6 house indicating the beds for 6 adults and one toddler, a dining table and a kitchen Source (Calderwood, 1953).

Fig. 14.

NOT TO SCALE

3a.2) THE STREET

The street, in Mamelodi, is used as an event space. Trade, recreational sports, socialising, and formal events can all be held in the street in front of the residents' house. Weddings and funerals are events that take place in the streets of Mamelodi West; while they might not be the main event, the second ceremony or reception will often be held in the street outside the family's house.



The tradition, according to Siyabonga Mahlangu (2019), is the primary driver of these events continuing to be held in the street. The tradition is based around communal celebration, allowing your friends, neighbours and the general community to take part in the event. Siyabonga even reminisced about driving around Mamelodi with his friends looking to join a random wedding on the street.



Spatially, these events need to be visible enough for the entire street and passers-by to be able to recognise it as a community celebration. The event is usually facilitated within a large tent which takes up the entire width of the street.



Figure 33 A photo of the celebration on the street as the bride arrives at the street wedding "the Arrival", (Ngonyama Photography, 2016)

Figure 34 The construction of a temporary street event structure.(Glory Maseepe, 2016).

Figure 35 Birds eye view of a street event being held (attached to a house). (Google Maps, 2019b)

3a.3) CONCEPTUAL APPROACH TO ANALYSIS

The conceptual response to this architecture is the physical relation of programme and context. The programme, being co-housing/ social housing has several programmatic aspects that revolve around the housing element. All of the aspects of the programme will be designed around how they should physically react to its immediate context. The three zones guide and categorise the programmes as to how they should react to the street.

3a.4) TYPOLOGY STUDY METHOD

The typological study followed a similar approach to the methods of Mark Napier (2002) in his doctorate thesis 'Core housing, enablement and urban poverty'. Napier analysed the Inanda Newtown in Durban and Khayelitsha in Cape Town and concluded that the houses either supplied by the government or modelled similarly, have become a 'core' for incremental growth to build from.

The NE51/6 houses and properties in Mamelodi West are similar and will be analysed with the same method.

Programmes categorised by zone

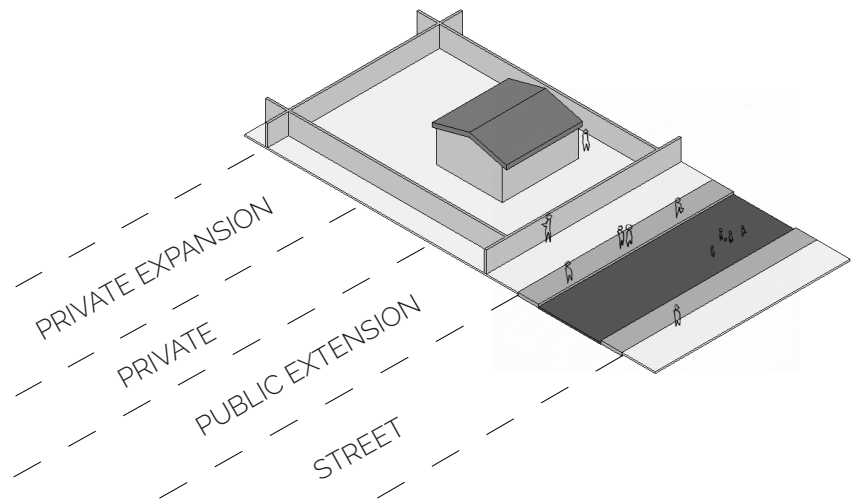
Public Extension	Private Residence	Backyard
Parking	House	Rental Units (Small-Large)
Retail	Amenities	Private Play
Boundary Decoration	Retail Kitchen	Washing



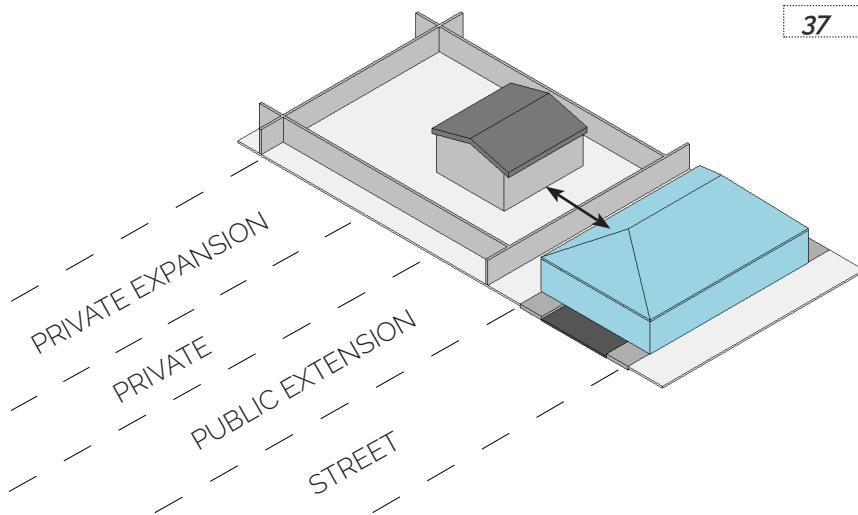
Figure 36 Birds eye view of a street in Mamelodi West.(Google Maps, 2019b)

3a.5) HOUSE AS PART OF THE STREET

The streetscape is an expression of the relation of the individual's property and the street. The private residence is considered to part of the street in Mamelodi West as most of the typologies are built to relate to the street, to be part of it (as seen in chapter 2). The breakdown of the three main zones of each residence is based on each zone's relation to the street.



38



37

The event is a street activity that directly links the street to the physical typologies. During these events, the house is used as a core to service the needs of the street event. They use the yard and kitchen to make the food, and the bathrooms for amenities. This is because the event is always held outside the persons home.

Figure 37 Spatial analysis of the standard base property with the street and street activity in Mamelodi West. Illustrated by author.

Figure 38 Photo of the standard base property. Photo taken by author.

3a.6) STANDARD HOUSE

The Ne51/6 model house still stands mostly unmodified on many properties in Mamelodi West. Although these houses hold a memory of the Apartheid era, they are considered to be reliable and easy to maintain (Calderwood, 1953).

These are the same buildings as described in (Ch.3a.1).

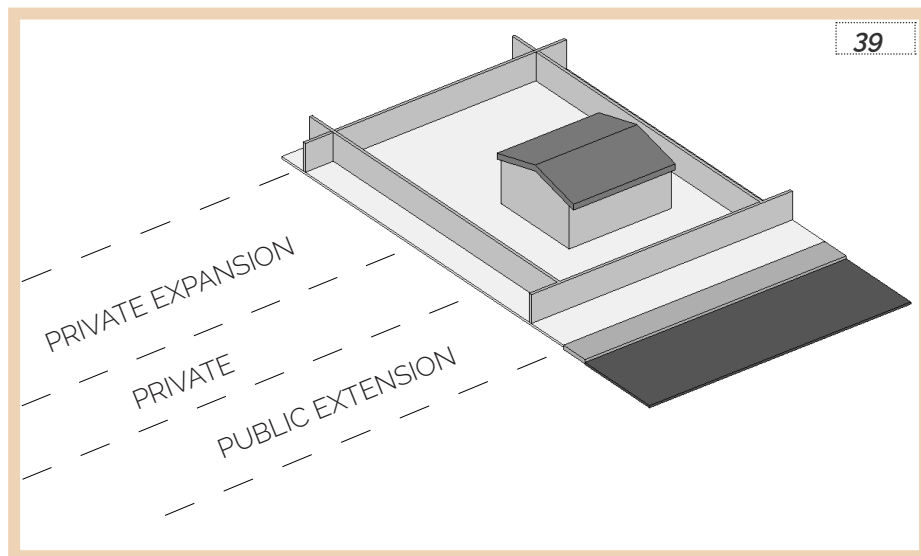
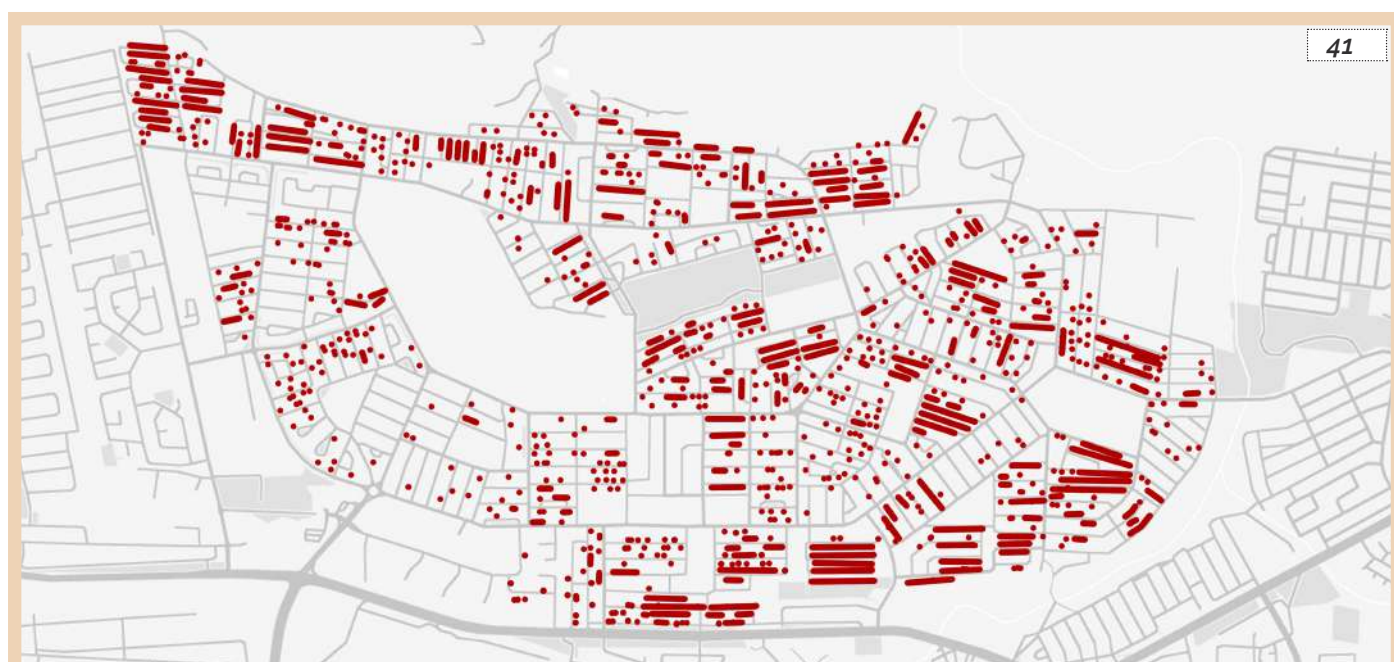


Figure 39 Spatial analysis of the standard base property in Mamelodi West. Illustrated by author.

Figure 40 Photo of the standard base property. Photo taken by author.

Figure 41 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.



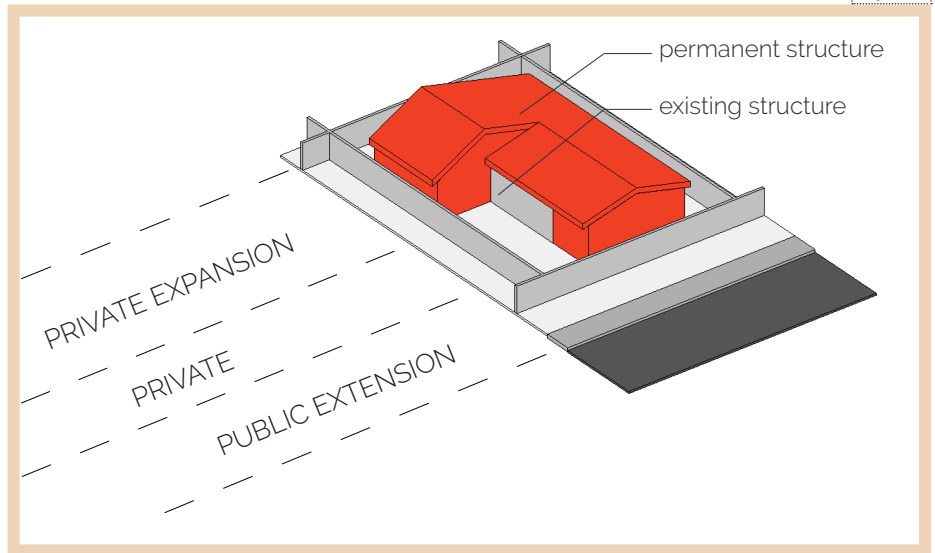
3a.7) THE UPGRADE

The upgrade of the standard NE51/6 is a result of the investment of the residents in their property. The potential for the upgrade of one's residence allows for investment emotionally, economically and in the neighbourhood.

The amount of upgrades to the area indicates continuous economic strength which creates a sense of wellbeing.

Essential aspects for this typology are ownership and space to expand fluidly.

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Figure 42 Spatial analysis of the upgrade of the standard property. Illustrated by author.

Figure 43 Photo of a large upgrade to the standard base property. Photo taken by author.

Figure 44 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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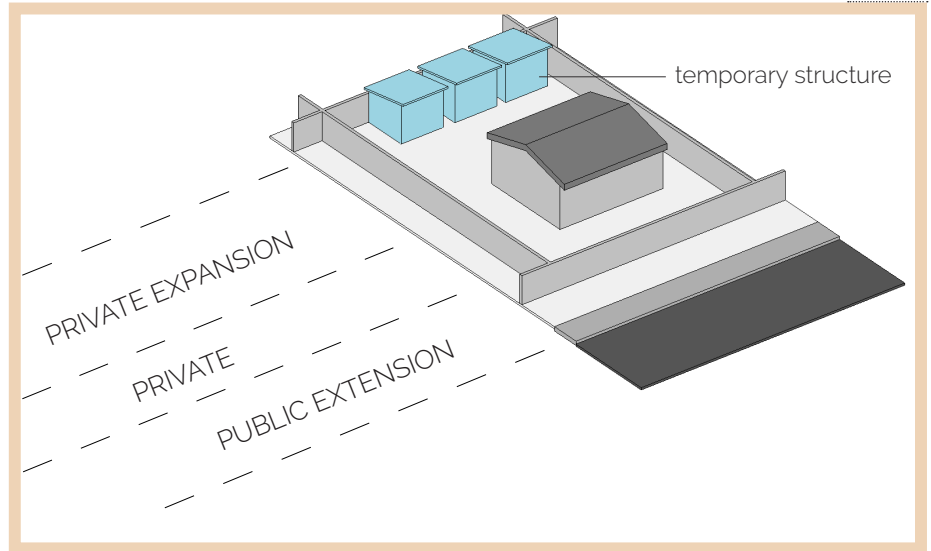
3a.8) BACKYARD SHACK RENTAL

The backyard shack is currently one of the most widespread additions to the Mamelodi West typologies. It is cheap to build and can be ordered from groups that build shacks in informal settlements.

Although the need for this low quality of housing is high, it is controversial and unnerving. The rent money helps the owner of the property make some money from their private expansion space while keeping it from being seen from the street.

Essential aspects to control in this typology are privacy, the ability to create the temporary structures cheaply and control tenants easily.

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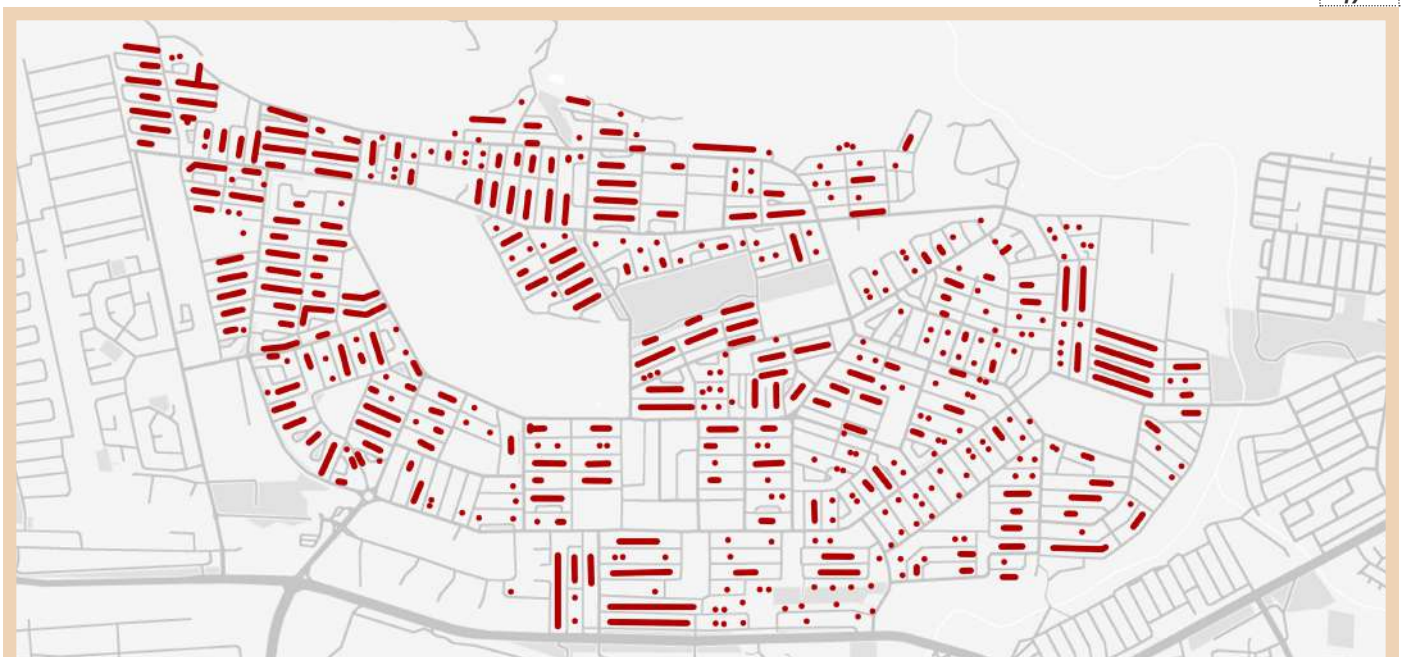


Figure 45 Spatial analysis of the backyard shack rental typology. Illustrated by author.

Figure 46 Google maps 3D image of the standard base property in Mamelodi West. Image sourced from Google Maps.

Figure 47 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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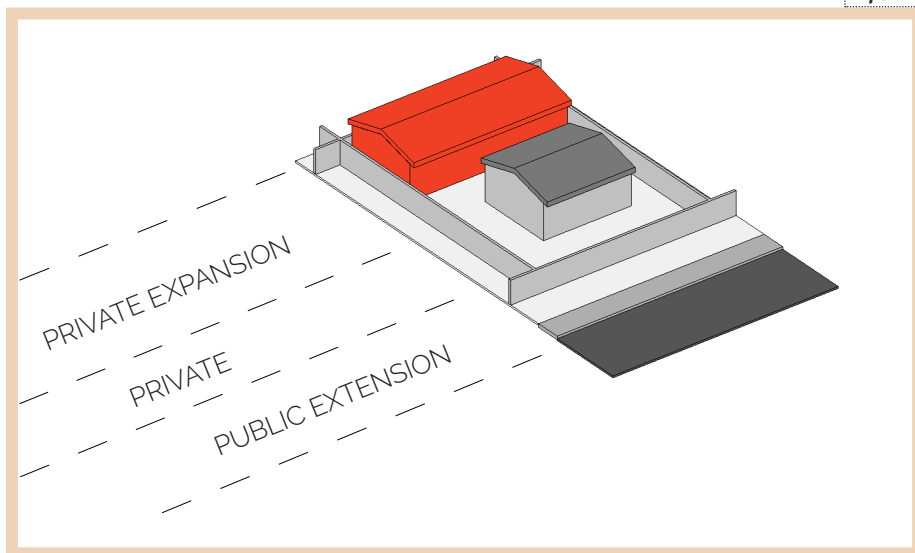


3a.9) BUILT BACKYARD RENTAL

The built backyard rental typology is typically an upgrade of the backyard shack rental. These buildings offer a healthier environment at a higher rental price but require a more substantial capital investment.

Essential aspects to control in this typology are privacy and tenant control.

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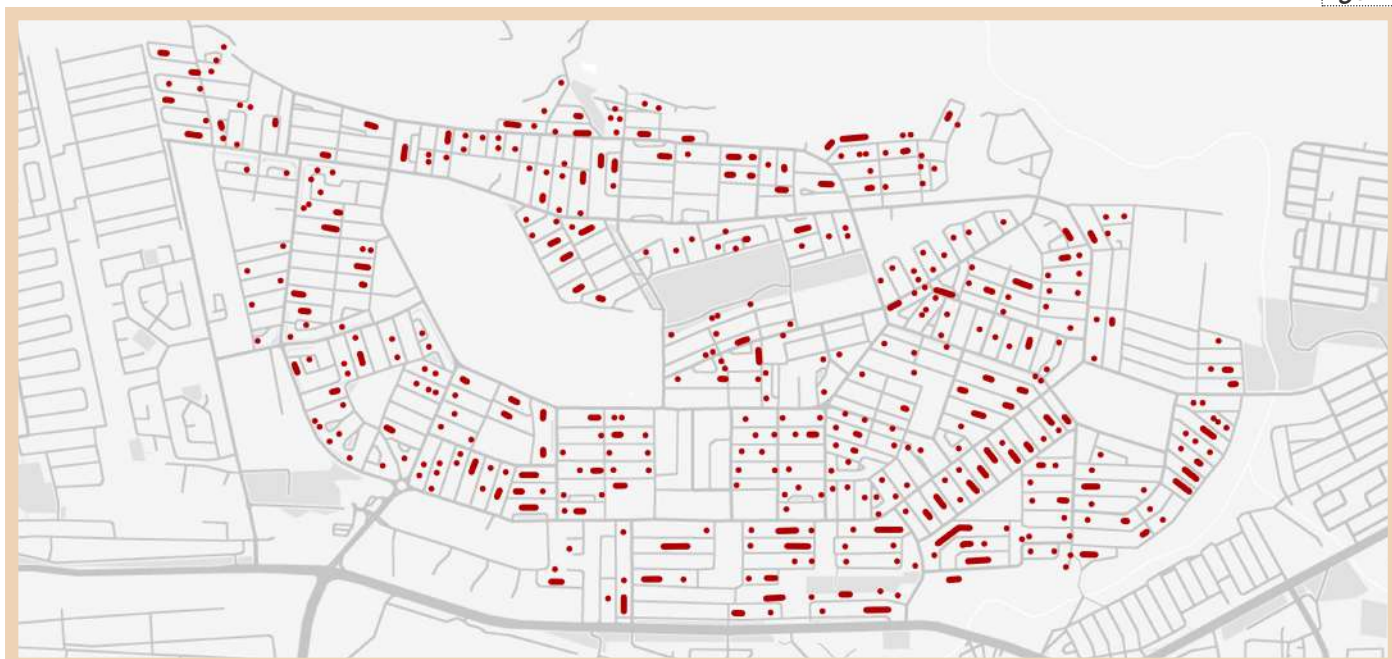


Figure 48 Spatial analysis of the built backyard rental typology. Illustrated by author.

Figure 49 Photo of the built backyard rental typology in Mamelodi West. Photo taken by author.

Figure 50 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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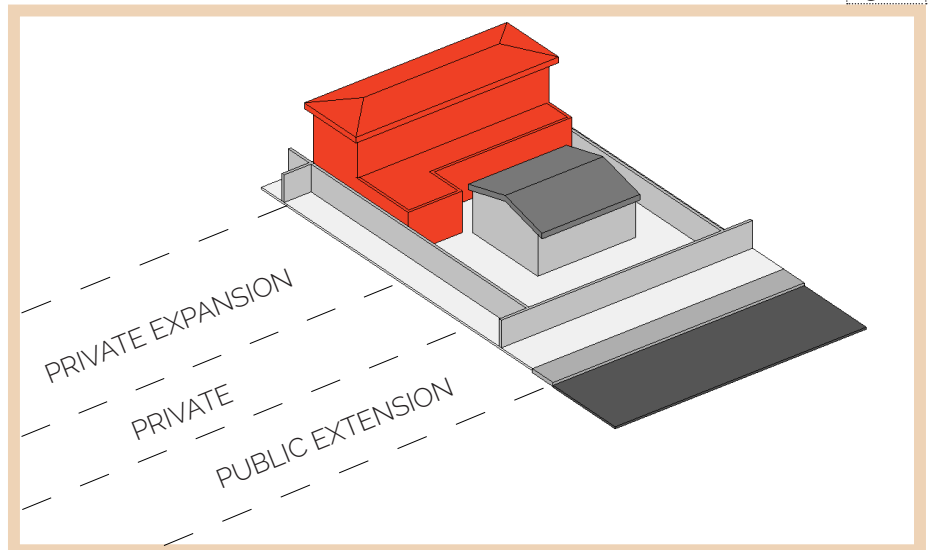


3a.10) LARGE RENTAL

The large rental is an extension of the built backyard rental but is a signifier of successful higher rental prices. This typology has sometimes overtaken the whole property as the owner decides to live in a better home, paid for by the rent made from their property. This extent of rental is seldom achieved.

Essential aspects to control in this typology are privacy and tenant control.

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Figure 51 Spatial analysis of the large rental typology. Illustrated by author.

Figure 52 Photo of the large rental typology within Mamelodi West. Photo taken by author.

Figure 53 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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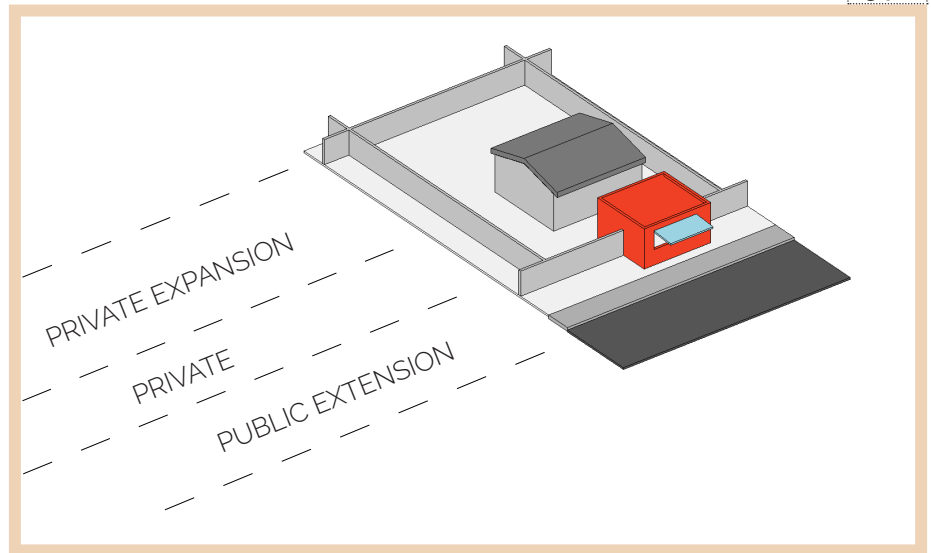


3a.11) SHOP

The small retail addition is always built into or protruding from the border wall of the property in the public extension space. The business that this facilitates is often a 'tuck shop' owned by the property owner.

Essential aspects to control in this typology are exposure to the street and security through the permanent structure.

54



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Figure 54 Spatial analysis of the shop addition. Illustrated by author.

Figure 55 Photo of the shop addition within Mamelodi West. Photo taken by author.

Figure 56 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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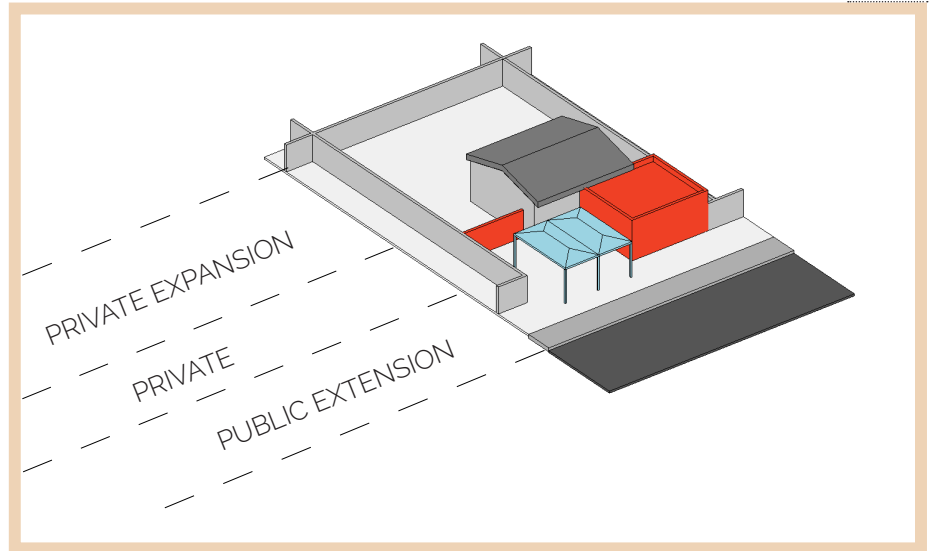


3a.12) CARWASH/MECHANIC

The carwash/mechanic addition is usually a combination of a temporary shade structure and a small permanent structure. The boundary wall is pushed back to fully expose the public extension space for cars to be parked under the shaded structure.

Essential aspects to control in this typology are exposure to the street enough street space for several cars and formwork for shade.

57



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Figure 57 Spatial analysis of a carwash/mechanic addition. Illustrated by author.

Figure 58 Photo of a carwash and mechanic in Mamelodi West. Photo taken by author.

Figure 59 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

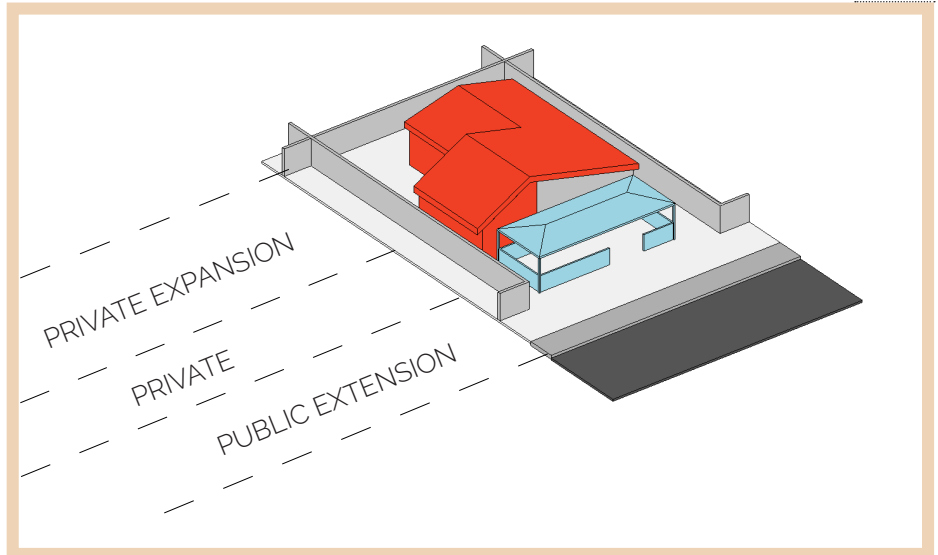
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3a.13) TAVERN/RESTAURANT

The tavern/restaurant is a place of drinking and eating. In Mamelodi this is often built as an extension from the standard house, converting the living space into a kitchen or dining space. A small shop or takeaways, as well as seating, is always on the street face of a tavern.

Essential aspects to control in this typology are exposure to the street and services for a kitchen.



61



Figure 60 Spatial analysis of a tavern/restaurant extension. Illustrated by author.

Figure 61 Photo of tavern and shop extension in Mamelodi West. Photo taken by author.

Figure 62 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

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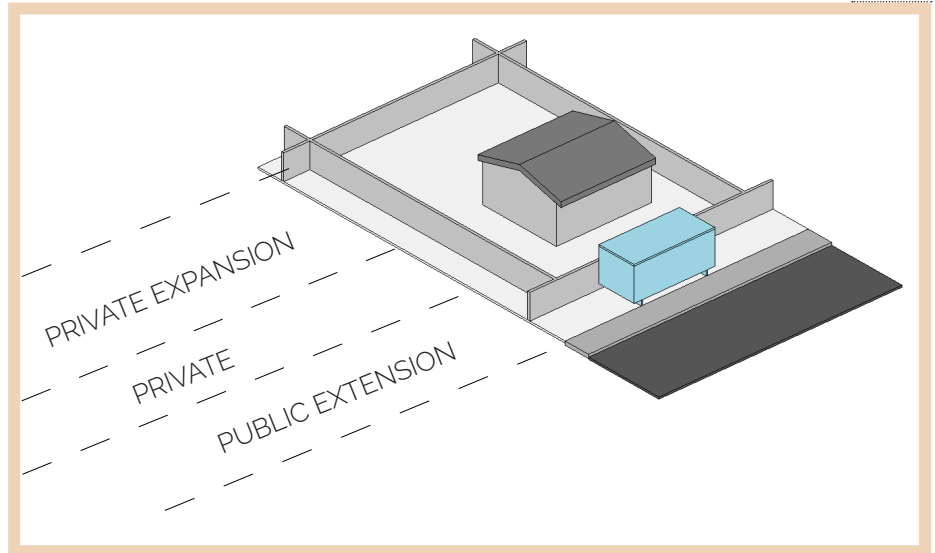


3a.14) TEMPORARY RE-TAIL

The temporary retail addition is almost always placed outside the boundary wall; this places it on or directly next to the sidewalk. These structures are made of shipping containers or corrugated sheeting.

Essential aspects to control in this typology are exposure to the street and having enough space between the street and the boundary wall for small retail.

63



64



Figure 63 Spatial analysis of the standard base property in Mamelodi West. Illustrated by author.

Figure 64 Photo of the standard base property. Photo taken by author.

Figure 65 Map of Mamelodi West indicating where this type of property can be found. Map sourced from Google Earth and indicators illustrated by author.

65



Incrementality

Theory

Part 4 b.

This chapter discusses the theories around flexible designs, their roles in residential architecture and the opportunities they should provide for their users.

FLEXIBILITY

3b.1) INTRODUCTION

Habitation in fixed architecture creates a sense of blindness to the fact that change is the only constant. The habitation of residences is no different, the success of the owner often gives the intent to increase the size and quality of one's home as it is a reflection of the users quality of life, this is seen in the various additions seen in Mamelodi West alone. Residential architecture has returned to the realisation that multiple functions can occupy the space such as home businesses and rental opportunities which supports the community as well as the owner.

3b.2) THE PRINCIPLES OF FLEXIBILITY

The four design approaches by Hashim Sarkis (2009:97-98) illustrates the various ways in which flexibility can be implemented in architecture when one is planning to create a flexible space for the possible and intentional changes in size, function, shape and identity.

Expandability

The size of the architecture should be anticipated on several scales for the change of use, the success of the program and the addition of complementary programs (Sarkis,

2009). Expandability, in its most considerate form, should consider the need to decrease the size of form as well as the increase of form (Sarkis, 2009).

Versatility

The architecture must be able to accommodate for various functions in the same space, in its extreme, this can be necessary for day to day changes in events and product arrangements (Sarkis, 2009).

Convertibility

The ability for the architecture to physically change its scale, geometry and translucence in order for the interior and exterior needs to be met for new components of the program, Fluidity, the ability for the identity of a part of the architecture or a component thereof to be able to develop and alter its identity in order to accommodate for the characteristics of the current styles and user's personalities (Sarkis, 2009).

66



Figure 66 Villa Verde, Chile by Elemental, (Greenspan, 2016)

3b.3) ELEMENTAL

Alejandro Aravena's firm Elemental creates their "ABC of Incremental Housing" as a statement as to how architects should see what core principals they used to create their famous incremental housing projects such as Lo Barnechea, Monterrey, Quinta Monroy, and Villa Verde. The architect should consider giving the owner the potential to improve their quality of life when all they can afford is a small government subsidised house, the fact that the lack of funds and materials that can be supplied to make these houses should not constrict the ability of the owner and therefore incrementality is the best option.

Good location

The project should be placed in an appropriate central space where densification is applicable and the site can grow in value.

Urban layout

There should be in-between spaces for social interaction between the private and public spaces with a maximum of 25 families surrounding one of the spaces.

Harmonious growth in time

Create a core architecture for the initial stage that frames important

activities and necessities. This should inspire future growth that will increase the quality of the context. Provide structure for future growth: An architectural frame should be provided that guides future growth and makes it easier for the user to make it habitable.

Middle-class DNA

Strategise the initial stage as well as the guidance structure so that the final product can be of middle class quality in terms of size (an estimated 70-80m²) and layout where there is no inhumane sense of being confined to a tiny room and amenities such as washing machines

can be fitted. The end product must potentially be able to improve itself to be far beyond the quality of social housing that it may begin as.

To summarise their thinking, Elemental made a diagram illustrating the three most important principles to keep in balance when designing incremental housing.

67

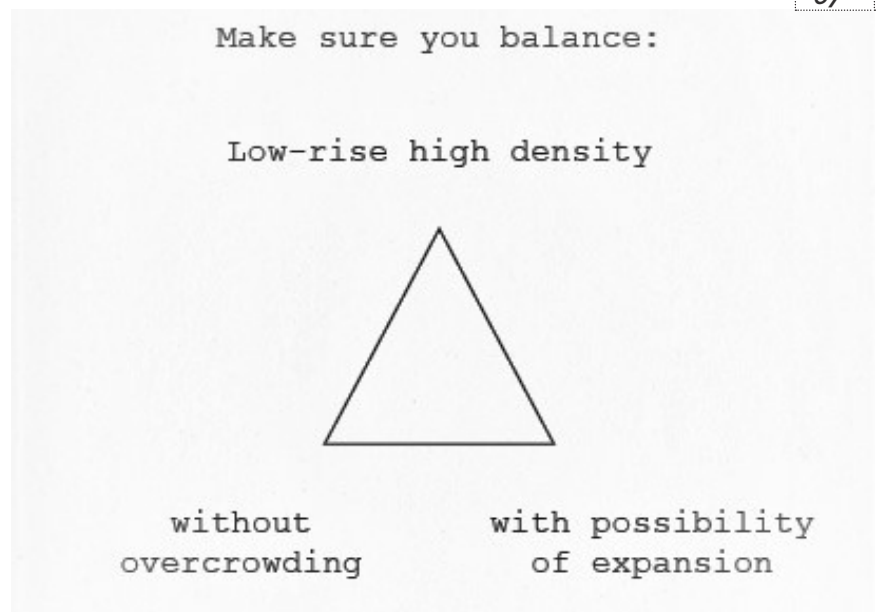


Figure 67 The three principles of flexible housing by Elemental. (Elementalchile.cl, 2019)

3b.4) FLEXIBLE BUILDINGS

Elemental has designed various forms of their flexible buildings. The core concept being given and expansion spaces.

In figures 68 to 70 the given space (1) is indicated adjacent to its expansion space (2). The expansion space is a space where a form of structure is given for the resident to easily extend their home onto.

These are mostly government projects so the proportion of give vs expand and the quality of the given section changes according to the provided funding.

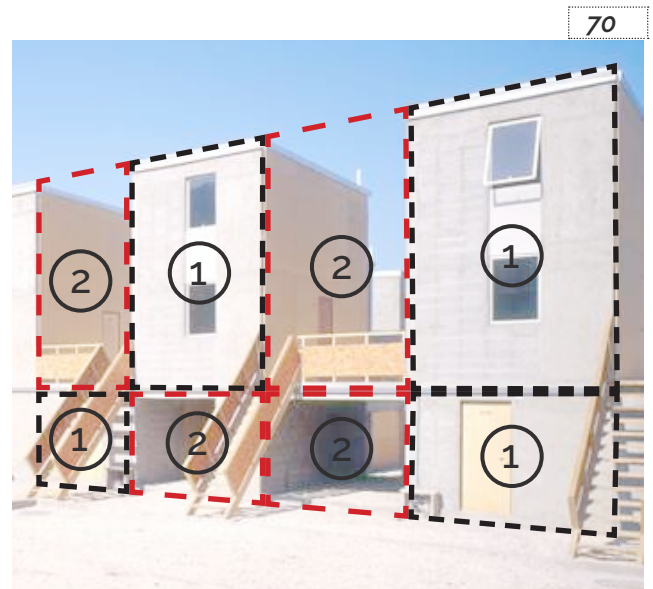
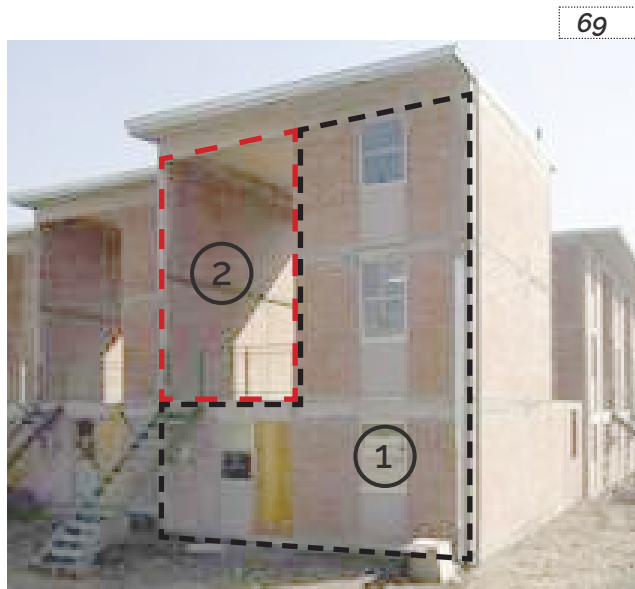
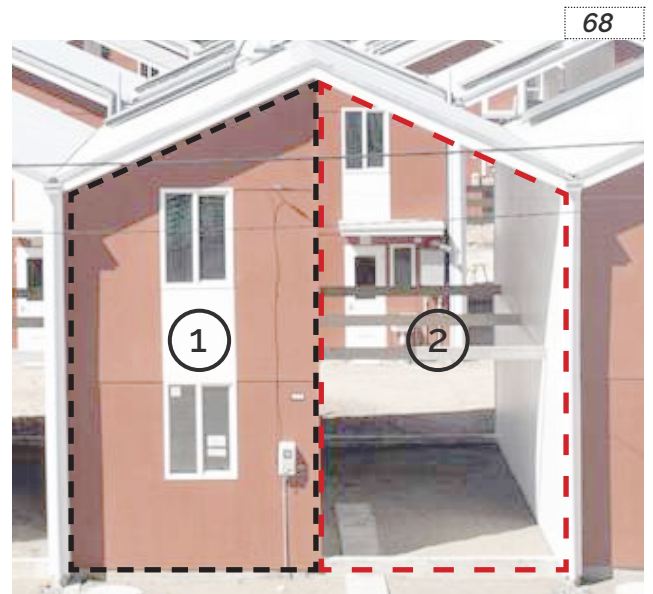


Figure 68 Villa Verde, Chile by Elemental, (Greenspan, 2016)

Figure 69 Lo Espejo by Elemental, (Greenspan, 2016)

Figure 70 Quinta Monroy, by Elemental, (Greenspan, 2016)

3b.5) OPEN BUILDING THEORY

Open building principles further align themselves within the intentions of sustainability in the built environment. While the constant possibility of change created the potential for furnishings to come and go in the throw-away mentality but on a larger scale it offers solutions to the destruction of buildings due to their lack to adapt to the needs of the users and context and new buildings are put up with potentially the same fate. Stephan Kendall (1999) further argues that the technical contribution of open building architecture is made through the complexity of the relationship between the necessary long term structures with permanent and reliable fixtures and the short term structures with furnishings and fittings for objects that the current users configurations require. On the structural level this can include systems where impermanent fixtures of components such as wood would need to be able to be removed from a more permanent structural component such as concrete, without causing deterioration to the fixings between them. The interior opportunities include creating service openings that can adapt to new configurations of commonly static objects as well as adaptable fixtures for partition walls.

The design of the building must, as discussed, be designed for

assembly, disassembly and reuse with consideration of new products that may need only semi-compatible connections (Kendall, 1999).

3b.6) CONCLUSION

Open architecture and flexibility lead not to high density architecture but instead follows the integration of large shell forms and core structures that create space for future users to adapt to their needs.

Precedents

Part 4

This chapter breaks down several South African social housing precedents using the coding method

PRECEDENT CODING

5.1) INTRODUCTION

In order to understand the requirements, funding potential and current paradigm of social housing, a comparative study of existing social housing has been done.

The comparative study will be completed through the method of coding, as demonstrated by Raymond Koningk (2015) in his analysis of cultural production of retail design. His analysis inspired the interpretation of the coding study because of the clarity that was achieved when collecting information from a collection of precedents. Coding can be done through a graphical quantitative study of potential precedents and existing examples of the current typology.

5.2) THE PROCESS OF THE STUDY

Project Vision

The project vision provides a description of the intentions behind the housing project. The project board writes the short project vision as a sales point for the development, it provides a direct insight into the tenant type and any specific amenity objectives.

Background

The background provides a description of the project specific process followed in terms of objectives and obstructions in the time-line of the building and initial tenant allocation.

Location

The location was included to illustrate what impact the projects' proximity has to its relative success.

Density

The comparison between building height and footprint illustrates how the building has adapted to the surrounding density.

Funding Model

The funding model graphic illustrates what roles the various types of board members can partake in throughout the development of the project.

The section named 'specific parties involved' describes the actual board members and includes significant members that have roles outside of the development such as investors.

Through these, a client and general view of the type of funding available for social housing in South Africa will become apparent. Further insight and critique is expanded on in (Ch.5.4).

Coding

The coding illustrated the four key aspects of each Social Housing project, being programme, user capacity, elements included and spatial devices.

Programme indicates the variety of programmes including housing that the development integrated into the project.

User Capacity illustrates the range of user groupings accommodated for, what size of unit is allocated to the user grouping and how much of the development is dedicated to that user grouping.

Elements included illustrates the various amenities and sustainability elements included in the housing.

Income Target Market

The income bracket of the targeted residents is often aligned to subsidy regulations, expanded on in (Ch.5.2). The difference between initial and current income bracket of the residents, indicates how long after they began earning more money did they eventually move. Social housing regulations do not provide strong policies in place that allow for the housing management to kick residents out for earning more money than their target market. This means that if the housing works well and is comfortable, then resident might not move out.

BG ALEXANDER

Project Vision

"To provide safe, clean and affordable inner city rental accommodation with supporting communal amenities for those people earning less than R3 500 per month."

Background

BG Alexander Housing Estate is part of an extensive restoration and conversion project comprising of over fourteen buildings within the inner city of JHB. The buildings include the college lecture rooms which includes an auditorium, student nurses' accommodation and an administration block with lecturer offices. The previous condition of the buildings were deemed rationally uninhabitable even though slumlords had taken over several parts of the buildings. This led the Johannesburg Social Housing Company, the Johannesburg Development Agency and Madulamoho Housing Association to come together to intervene. The intervention was focussed on taking on the targeted need to build safe buildings for 1 500 beds to accommodate displaced residents or people in need of temporary accommodation, a target set by the City of Johannesburg.

The project intends to encompass an entire precinct of existing and new buildings which will create a safe community of affordable housing for those in need. Another goal of the precinct is to combat the negative stigmas of social housing being places to avoid due the idea of it deteriorating the community around it.



71

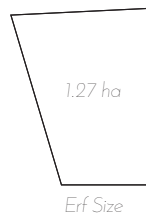
Location

Corner of Claim and Smit Streets, Hillbrow, Johannesburg

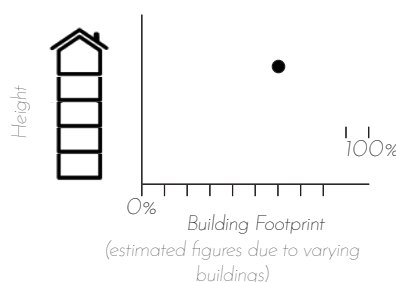
CBD	■	□	□	□
Schools	■	□	□	□
Hospitals	■	□	□	□



72



Density



5.3) FUNDING MODEL

	Land	Construction	Services	Maintenance
Government	■	□	□	□
Local Municipality	■	□	□	□
Property Companies	■	□	□	□
Social Housing Company	□	□	■	□
Social Housing Institution	□	□	□	■
Institutional Subsidies	□	■	□	□
Development Agency	□	■	□	□
Landlord Ownership	■	□	□	□
Private Banks	□	□	□	□
Other	□	□	□	□

Specific Parties Involved

Government

Gauteng Department of Transport and Public Works

Property Company

JOSHCO, Johannesburg Property Company

Social Services Company

MES, Metropolitan Evangelical Service

Social Housing Institution

Madulamoho Housing Association

Institutional Subsidies

Johannesburg Development Agency and Inner city regeneration Charter

Development Agency

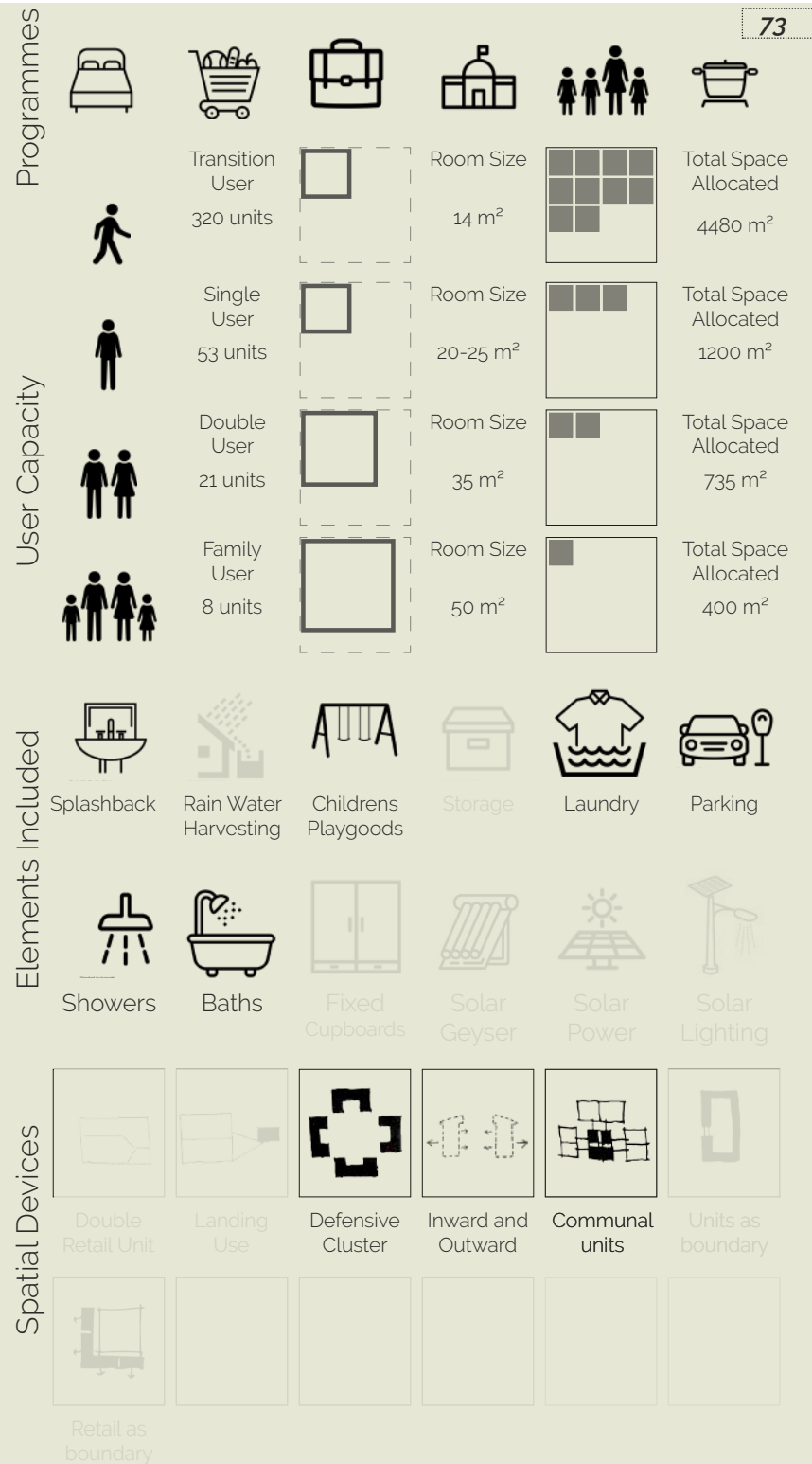
Johannesburg Development Agency

Figure 71 View of Housing, Social Housing Foundation,(2010)

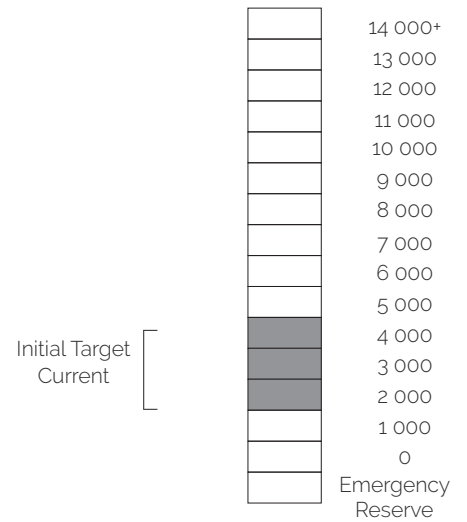
Figure 72 Site plan of Housing, Social Housing Foundation,(2010)

Figure 73 Icons sourced from The Noun Project (2019).

5.5) CODING



Income Target Market (Rands)



5.4) CONCLUSION

The housing within these units offers a diverse supply of affordable housing for many within the CBD.

The adaptation and renovation of previously different residential housing shows how social housing can be made from existing buildings.

This approach can become far more sustainable due to the lesser use of construction materials and the money can be used to furnish and improve the apartments and new facilities.

The consolidation of the blocks without major changes allows for there to be separate identities within one social housing complex which prevents stigma around the single identifiable block being for the low income bracket.

BOTLHABELA VILLAGE

Project Vision

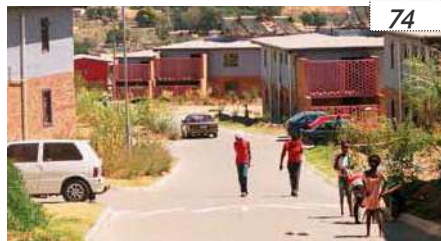
"A housing project for transient and/or people that have the desire to rent as they already own or qualify for houses somewhere else or can afford to rent in a structured manner"

Background

The Alexandra Renewal Project (ARP) has a unique intention to use affordable housing (specifically for those not intending on receiving RDP subsidies and cannot afford traditional social housing) in order to improve the housing condition in Alexandra through de-densification. The focus is further focused on single users willing to live in semi communal conditions.

The idea of a middle class looking layout for the property was used by creating clusters of communal buildings each with a courtyard and surrounding gardens and individual play areas, giving each building a sense of individual ownership.

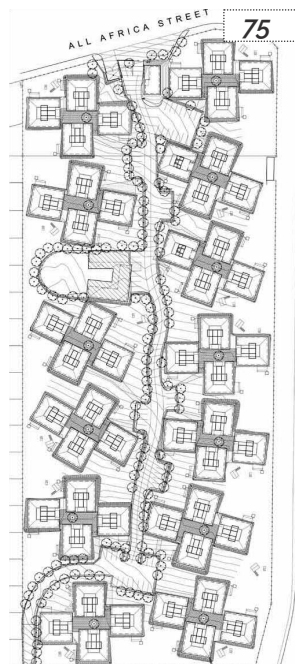
The location offers users the chance to work within the wide variety of light industrial areas. This is one of the reasons why Alexandra has always been a densified area.



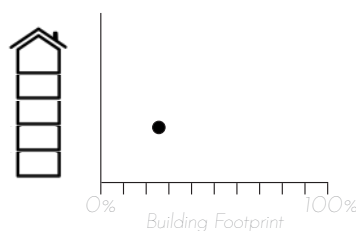
Location

3360 AllAfrica Street, Erf 3359 & 3360
Far East Bank, Alexandra

CBD	■	□	□	□
Schools	■	□	□	□
Hospitals	■	□	□	□



Density



5.6) FUNDING MODEL

	Land	Construction	Services	Maintenance
Government	■	□	□	□
Local Municipality	□	□	□	□
Property Companies	□	□	□	□
Social Housing Company	□	□	□	□
Social Housing Institution	□	□	□	■
Institutional Subsidies	□	□	□	□
Development Agency	□	■	□	□
Landlord Ownership	□	□	□	□
Private Banks	□	□	□	□
Other	□	□	□	□

Specific Parties Involved

Government

Gauteng Department of Transport and Public Works

Social Housing Institution

JOSHCO, Johannesburg Property Company

Development Agency

Alexander Renewal Project

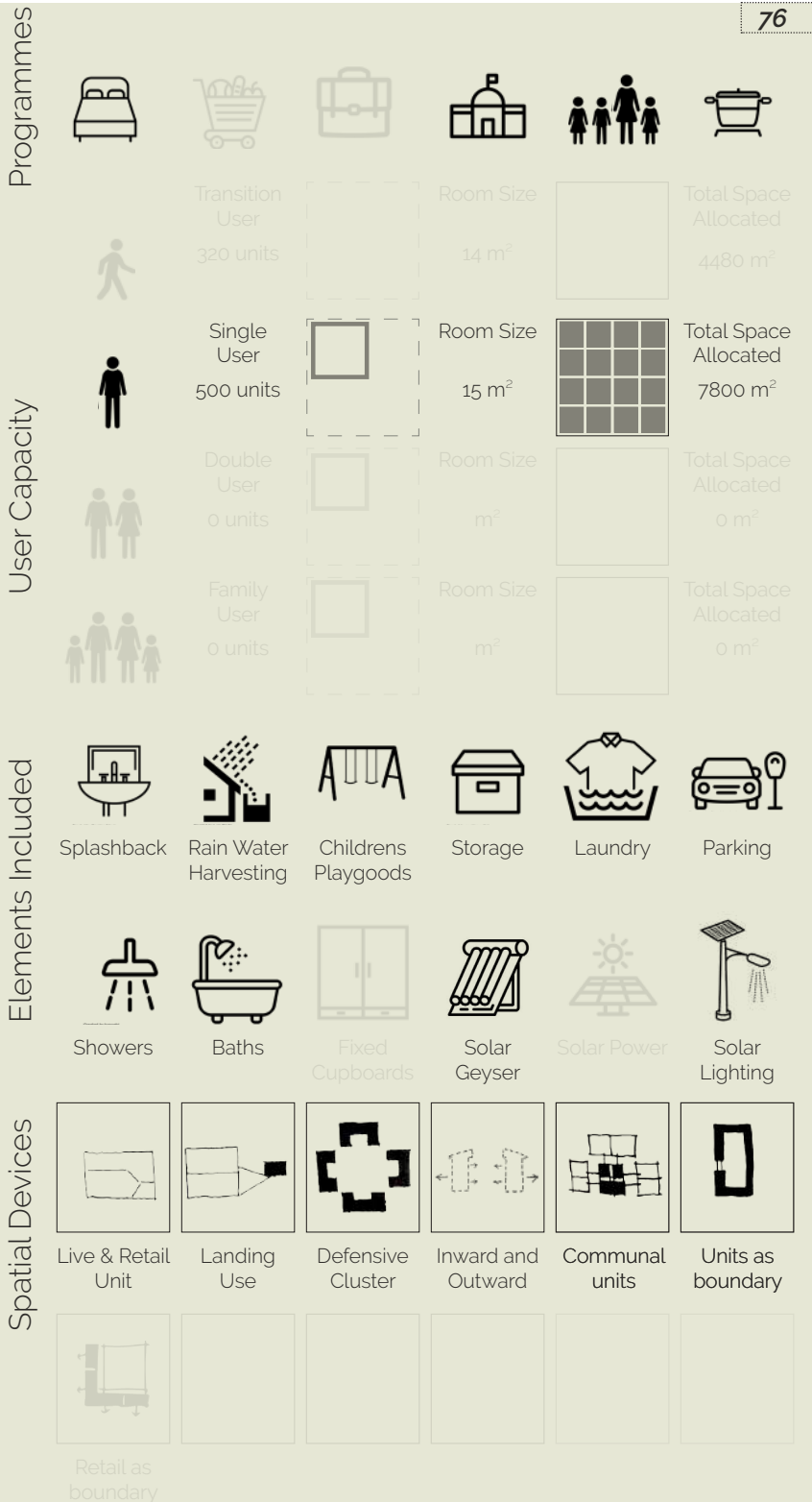
Figure 74 View of Housing, Social Housing Foundation,(2010)

Figure 75 Site plan of Housing, Social Housing Foundation,(2010)

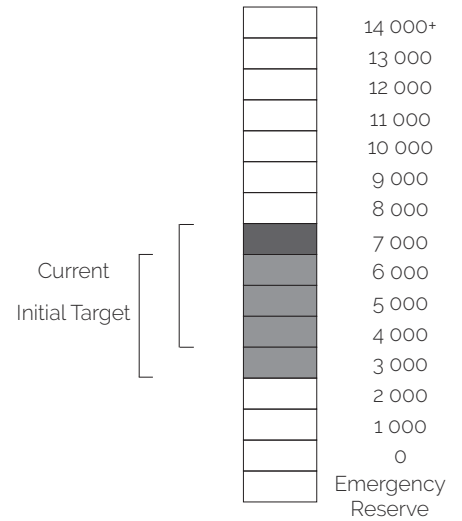
Figure 76 Icons sourced from The Noun Project (2019).

5.8) CODING

76



Income Target Market (Rands)



5.7) CONCLUSION

The the intent of the project is ambitious and leads to the new idea of social housing creating new conditions within its built environment instead of serving the existing condition.

The project is relatively straight forward in terms of its user proflex

CANDELLA ROAD

Project Vision

To provide safe, clean and affordable inner city rental accommodation with supporting communal amenities for those people earning less than R3 500 per month.

Background

The project falls under the Presidential Job Summit Pilot Programme (PJSP) which identified housing (using institutional subsidies) as one of the key areas that could be used to stimulate socio-economic growth through the provision of low-cost housing using labour intensive methods. Candella Road was first initiated in 1991 when the then House of Delegates proposed blocks of residential flats on two sites. This proposal never got further than some site preparation and bulk services supply on what became the site for Candella Road development. In 2001 the KwaZulu Natal Department of Housing approached Motheo East (Pty) Ltd (later Motheo Construction Group (MCG)) based on their successful track record, with a request to submit a proposal for the development. Changes in local government resulted in delays until late 2003 when the eThekweni Municipality's Housing section requested that the project be expedited under the auspices of the eThekweni Housing Association (eTHA).

Benefits:

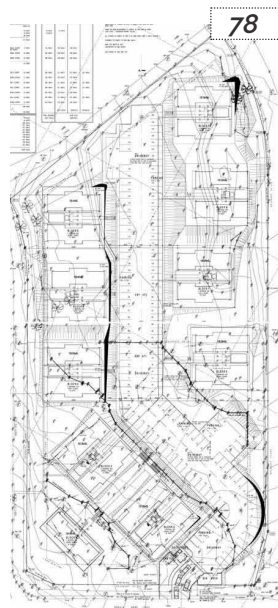
The provision of attractive medium-density social housing in a well-located area close to the CBD of Durban.



Location

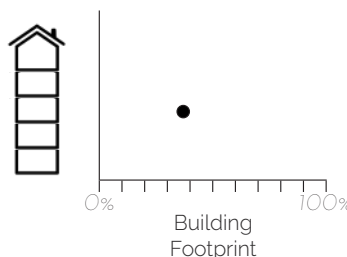
Ere 471 and 472 of the farm Bonela 111/117, Candella Road, Cato Manor, Durban

CBD	■	□	□	□
Schools	■	□	□	□
Hospitals	■	□	□	□



Erf Size

Density



5.9) FUNDING MODEL

	Land	Construction	Services	Maintenance
Government	■	■	□	□
Local Municipality	■	□	□	■
Property Companies	□	□	□	□
Social Housing Company	□	□	□	□
Social Housing Institution	□	□	□	■
Institutional Subsidies	□	□	□	□
Development Agency	■	■	■	□
Landlord Ownership	□	□	□	□
Private Banks	□	□	□	□
Other	■	■	□	□

Specific Parties Involved

Government

KwaZulu Natal Department of Housing

Municipality

eThekweni Metro Housing Department

Property Company

Motheo Construction Group

Stakeholder committee

PJSP Steering Committee

Social Housing Institution (Other)

Madulamoho Housing Association

Institutional Subsidies

Johannesburg Development Agency and Inner city regeneration Charter

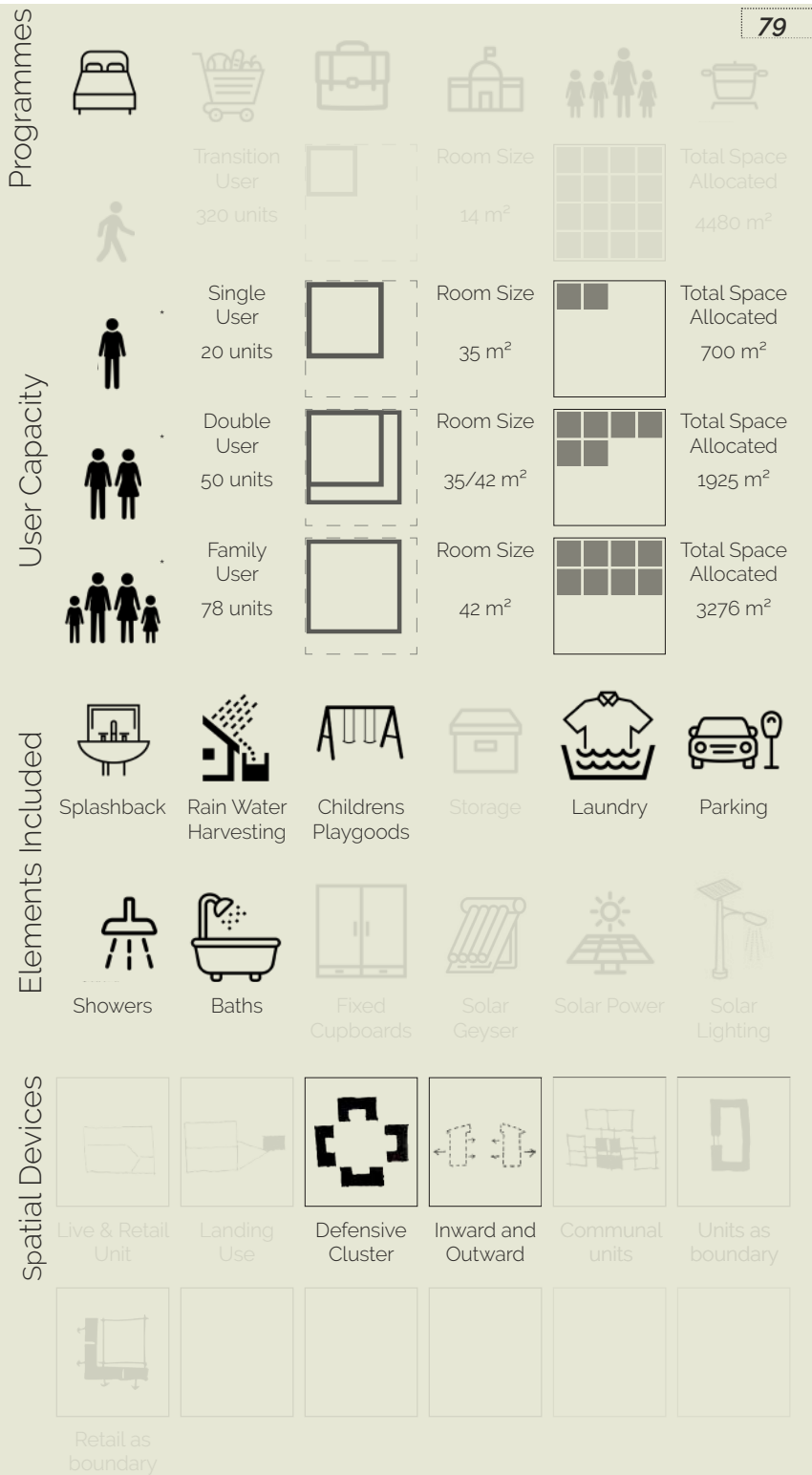
Development Agency

Figure 77 View of Housing, Social Housing Foundation, (2010)

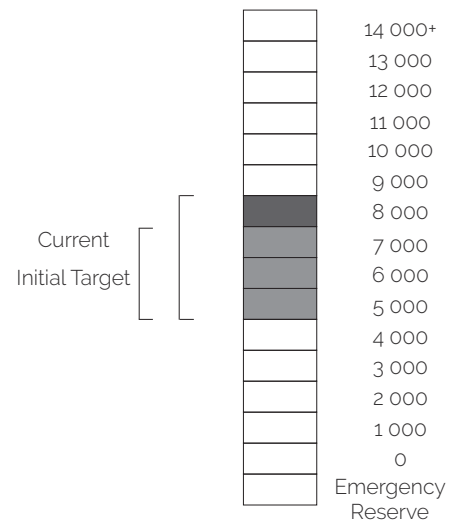
Figure 78 Site plan of Housing, Social Housing Foundation, (2010)

Figure 79 Icons sourced from The Noun Project (2019).

5.10) CODING



Income Target Market (Rands)



5.11) CONCLUSION

The Candella Road project project board gave the architect sparse time and funding which lead to a typical town house design. This gave problems when the residents were allocated the units as they got the impression that they were able to buy the home.

The buildings did not respond to the site and because of the uneven landscape, the areas between the houses rarely got used as they were too awkward.

The only reason this project worked was because of its locality and management.

ELANGENI

Background

The project is the first walk-up residential complex to be built in post apartheid Jo'burg CBD. The live-work concept affords some tenants the opportunity to live above a work space with street frontage. The JHC acquired the land from the City of Jo'burg. The location offers users the chance to start businesses and get to city wide work easily.

Project Vision

"The provision of architecturally innovative high quality medium density social housing at affordable rents in the inner city."

Management and Tenant Relationships

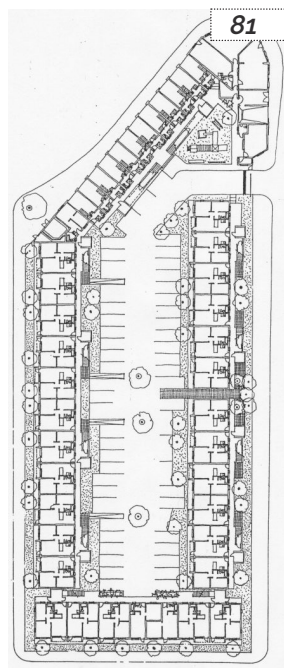
The JHC employs a dedicated Housing Supervisor (HSV) who links the operations of the project with the JHC and lives on site. The HSV oversees the daily running of the project and attends to tenant queries and any other problems that may arise. The HSV is trained, among others, to tackle general maintenance such as plumbing, electrical work, painting, tiling, and the use of main switches central to the running of the complex. He also oversees outsourced service providers such as security, pest control and cleaning services. The nature of communication between the HSV and the JHC is key to the smooth running and success of the project. Rigorous reporting mechanisms ensure that problems are dealt with. The HSV reports to the JHC Portfolio Officer (one to one) on a monthly basis, however, in reality the HSV and the Portfolio Officers are in contact almost daily.



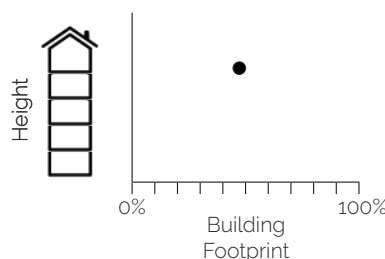
Location

80 Albert Street, corner Troye Street, Jo'burg

CBD	■	□	□	□
Schools	■	□	□	□
Hospitals	■	□	□	□



Density



5.12) FUNDING MODEL

	Land	Construction	Services	Maintenance
Government	■	■	□	□
Local Municipality	□	□	□	□
Property Companies	□	□	□	□
Social Housing Company	□	□	■	■
Social Housing Institution	□	□	□	□
Institutional Subsidies	□	□	□	□
Development Agency	□	□	□	□
Landlord Ownership	■	■	□	□
Private Banks	□	□	□	□
Other	□	□	□	□

Specific Parties Involved

Government

Gauteng Housing Department

Property Company

JOSHCO, Johannesburg Property Company

Social Housing Company

Johannesburg Housing Company

Social Housing Institution

Madulamoho Housing Association
Institutional Subsidies
Johannesburg Development

Private Bank

ABSA Bank (interest underwritten by JP Morgan Bank)

Development Agency

Johannesburg Development Agency

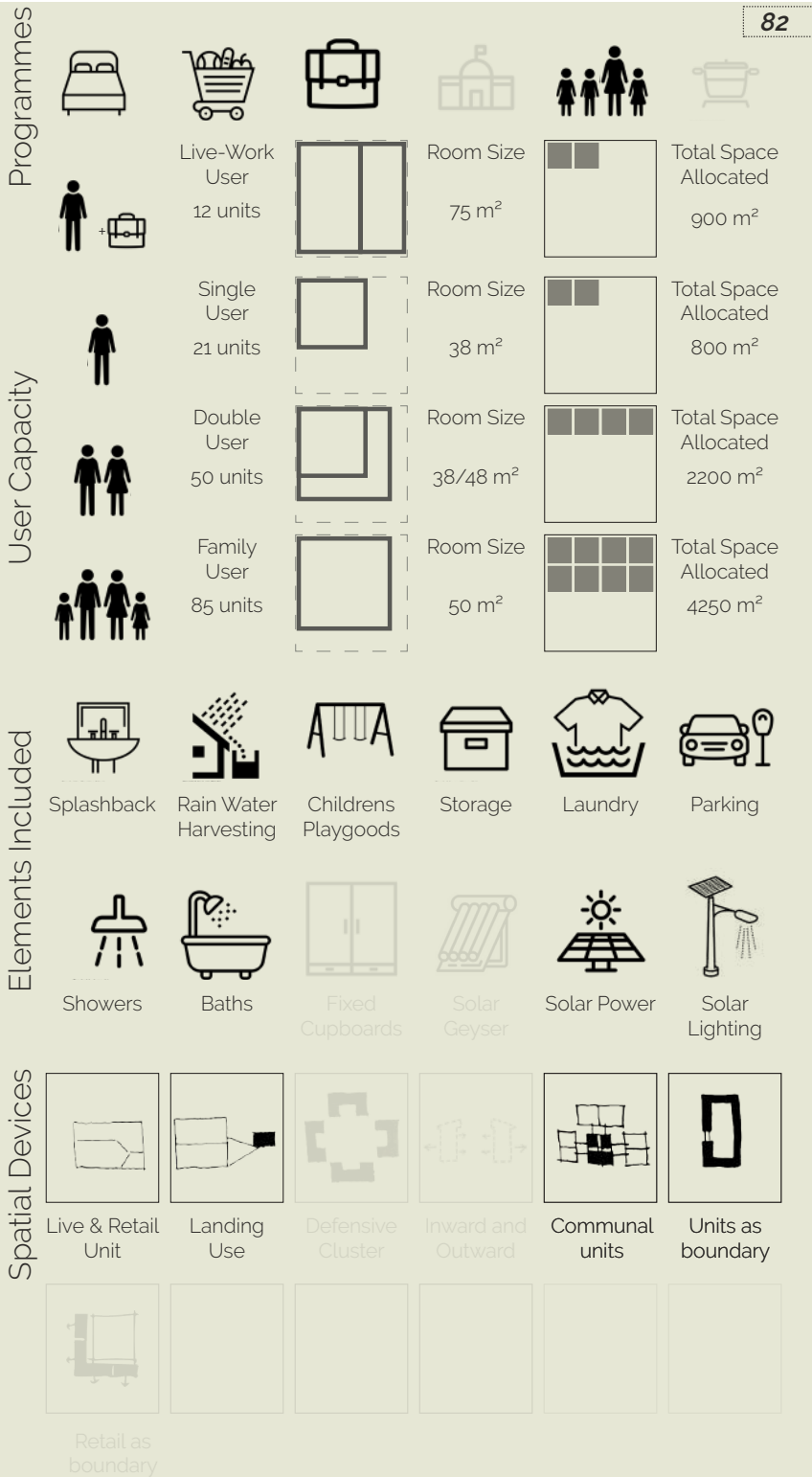
Figure 80 View of Housing, Social Housing Foundation,(2010)

Figure 81 Site plan of Housing, Social Housing Foundation,(2010)

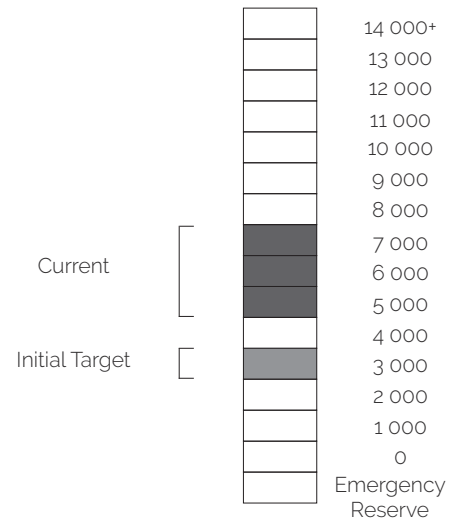
Figure 82 Icons sourced from The Noun Project (2019).

5.14) CODING

82



Income Target Market (Rands)



The current users income bracket has changed drastically due to the adoption of the housing by the intended tenants being of a relatively low income that were expected to move elsewhere when they had a higher income. Instead they stayed due to the success of the buildings.

5.13) CONCLUSION

Elangeni responds well to its context by reacting to the density of its surrounds while still giving the residents enough safe interior open space for movement and activities.

The live-work retail units are somewhat innovative for a social housing project in Johannesburg, specially designed into the housing aspect because the area is mostly industrial with the need for retail to accommodate for the people working there, which is a common starter business opportunity.

This project has been proven to be one of the most successful with residents living there well beyond their need for social housing and rather pay higher rent.

NEWKIRK

Background

NewKirk is part of AFHCO's (Affordable Housing Company) first inner city conversions from abandoned business buildings to residential units. The regeneration initiative by AFHCO, piloted by their 'Castle Mansions' project, is how NewKirk became what it is today.

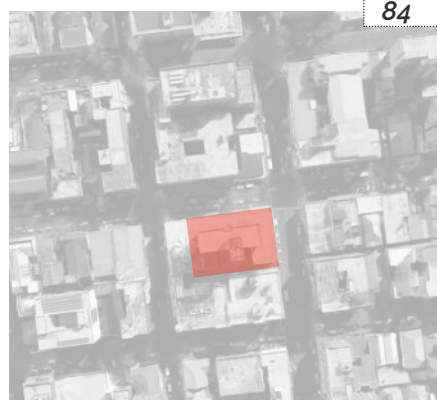
AFHCO is a private property investment, development and management company that saw the market for a company to become a fully in-house low cost residential development company involved from start to finish and further. Although the company often proceeds with the initial stages before subsidies from the government are presented (they have capital as their own investment body), their initiative allows them to have full support from the municipalities allowing for rezoning and other legal processes to be fast-tracked.



Location

Corner of Claim and Smit Streets, Hillbrow, Johannesburg

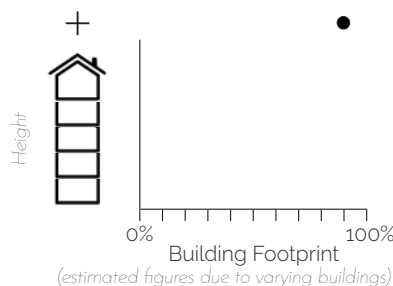
CBD	■	□	□	□
Schools	■	■	□	□
Hospitals	■	□	□	□



0.18 ha

 Erf Size

Density



5.15) FUNDING MODEL

	Land	Construction	Services	Maintenance
Government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local Municipality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property Companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social Housing Company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social Housing Institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Institutional Subsidies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Development Agency	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Landlord Ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private Banks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Specific Parties Involved

Government

Gauteng Department of Transport and Public Works

Property Company

JOSHCO, Johannesburg Property Company

Social Services Company

MES, Metropolitan Evangelical Service

Social Housing Institution

Madulamoho Housing Association

Institutional Subsidies

Johannesburg Development Agency and Inner city regeneration Charter

Development Agency

Affordable Housing Company (Afhco)

Figure 83 View of Housing, Social Housing Foundation.(2010)

Figure 84 Site plan of Housing, Social Housing Foundation.(2010)

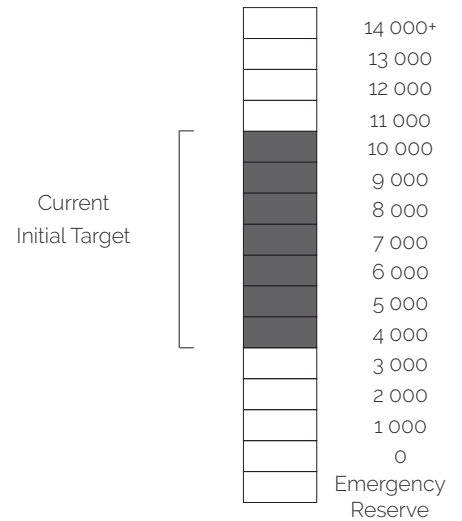
Figure 85 Icons sourced from The Noun Project (2019).

5.16) CODING

85



Income Target Market (Rands)



5.17) CONCLUSION

NewKirk is now effectively used as a student residence due to its mass of bachelor units and smaller amounts of apartments with multiple rooms (which can be used together with roomates).

The building was able to adapt to accomodate a population with low income even though they are not adults looking for a home.

The building is successful in the fact that it 'gains beds' in the inner city but it hasn't created a place where someone can improve their living condition.

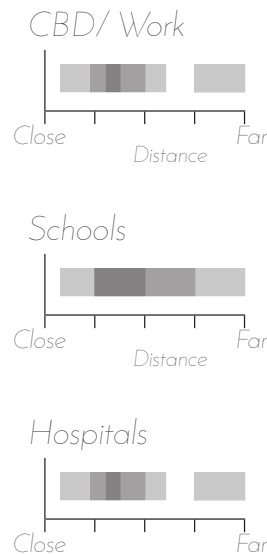
Apon closer inspection, it seems that out of the many social housing developers, AFHCO does not seem to try to improve living conditions but to only give the users a place to live.

RESULTS

5.19) LOCATION

The location comparison illustrates how successful projects are often located closer to all infrastructural amenities.

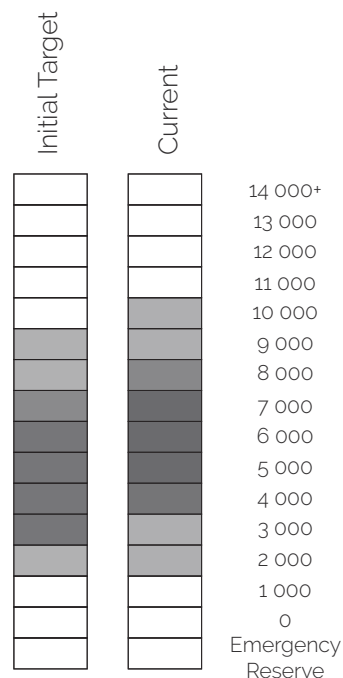
Mamelodi West has several amenities, including schools on all levels, several clinics but lacks the proximity to a CBD. The increase in both formal and informal retail, informal services and an industrial belt suggests that work opportunities aren't scarce.



5.18) INCOME TARGET MARKET (RANDS)

The difference (although seemingly small) strengthens the suggestion that residents tend to stay in their accommodation after their financial situations improve.

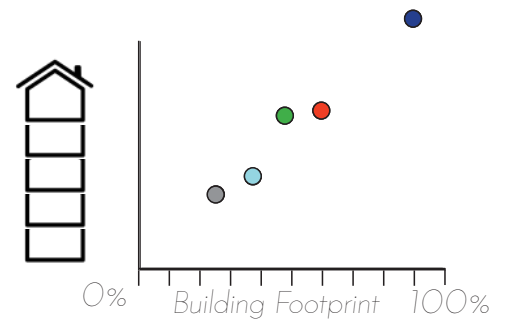
Incremental improvement of homes are a by-product of slow increase in a resident's financial situation while not risking relocating to a more expensive home or area. The entire suburb of Mamelodi West is riddled with examples of incremental improvement, proving that this form of using financial stability to improve existing living conditions is a suitable option for a social housing project in Mamelodi West.



5.20) DENSITY

The density comparison will be able to illustrate the tendencies relating to the Erf size similar to that of the proposed design.

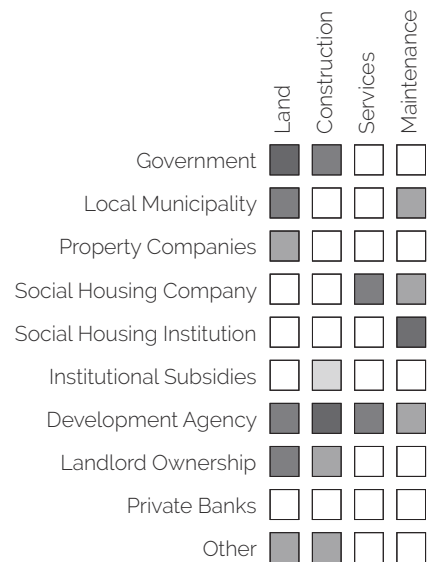
The site in Mamelodi West is a total size of 4.84 ha. According to the precedents, the suggested footprint percentage for the area would be between 60-80% for a three storey building.



5.21) FUNDING MODELS

The graphic illustrates the relationships between funding entities and the stages of constructing and running a social housing project.

The conclusion is that the government entities no longer play the larger roles in the process. Developers often take the largest roles after receiving a proposal from a government entity. The government will give their own property to the developer as to lower the cost but allowing the developer to take the responsibility of construction, this lowers the liability held by the government (The Social Housing Foundation, Project Review Series, 2010).



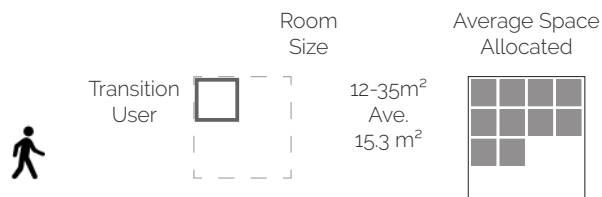
5.22) USER CAPACITY

The unit types are separated into the group type allocation. The size of the room and the average amount of space within the project per unit type have been analysed.

86

Transition

When transitional users are accommodated for then it acts as a large basis for that project. The rooms are small and are not meant for long residence.



Transition User

12-35m²
Ave.
15.3 m²

Single

A portion of the rooms allocated in social housing projects are always to single users. The rooms are small when they are not meant for long residence but can be up to 35m² for users that might become a two person household.

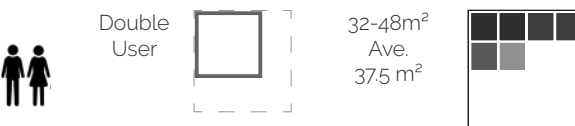


Single User

12-35m²
Ave.
15.3 m²

Double

The double user unit is only a slightly larger single unit for residents with more money or one dependant.



Double User

32-48m²
Ave.
37.5 m²

Family

The largest living only unit is meant to accommodate for between 4-6 residents and is the only one with definite space for separate rooms.

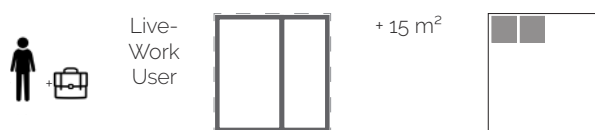


Family User

42-50m²
Ave.
47.5 m²

Live-Work

The live-work units are residential units linked directly to a space on the ground level that is exposed to the street for retail opportunities.



Live-Work User

+ 15 m²

Figure 86 Icons sourced from The Noun Project (2019).

5.23) PROGRAMMES AND ELEMENTS

The various programmes built into a social housing project other than the residential component include: Retail, work space, community halls, nurseries and communal kitchens.

The amenities and sustainability technologies illustrated in the 'Elements Included' diagram shows the physical components that are necessary to run an efficient social housing project.



5.24) SPATIAL DEVICES

The spatial devices used are noted commonly used layouts and unit configurations that can be used to inform the design.

All of the layouts used in the precedents suggest that communal clusters bordered by either residential or retail units should be used.

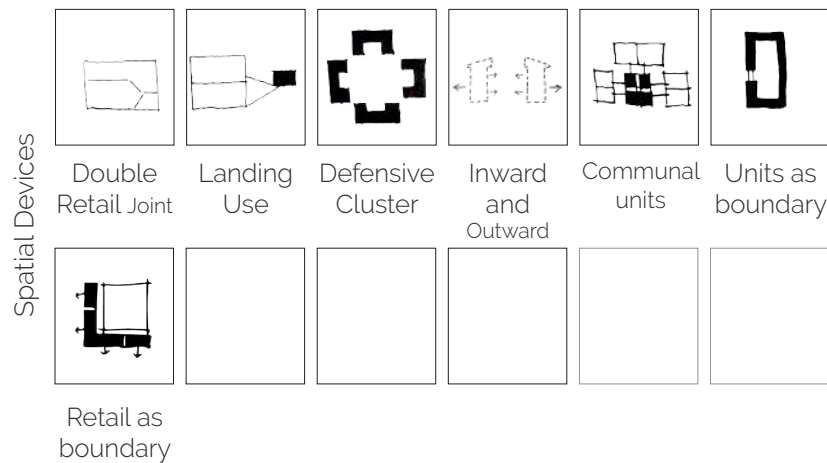


Figure 87 Icons sourced from The Noun Project (2019).

5.25) CONCLUSION

The coding of programs, spacial devices and elements will allow for faster design as well as a way to regulate the spacial requirements for the residential sections of the design.

The user capacity analysis will inform the size and type of the units required for each cluster.

The financial analysis indicates that further investigation is required into subsidies and project funding. This will be used to rationalise the plausibility of the project being built.

The location analysis confirms that the site is in a premium location for a social housing project.

Subsidies

Part 5

This chapter explains how government subsidies work, what the different types are and the project specific critique of these policies.

SUBSIDY STRUCTURES

5.1) BASICS OF GOVERNMENT SUBSIDIES

Housing subsidies include the various ways that the government provides funding and support for citizens that struggle to afford proper housing.

The government can provide subsidies directly or indirectly to a contractor.

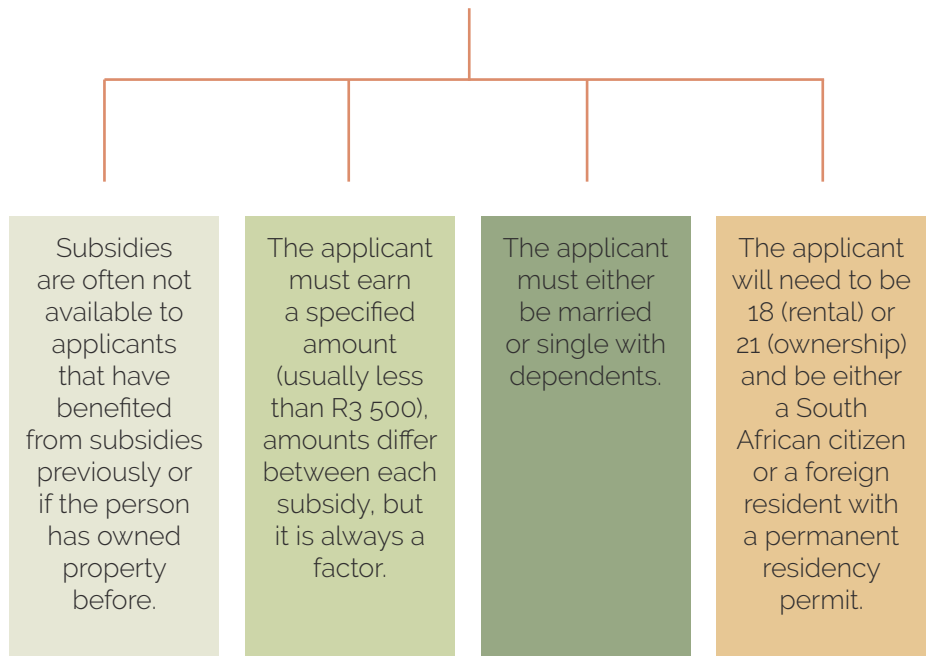
The requirements for someone to get a housing subsidy are varying according to the type of subsidy but are often strict and biased to people with dependents (Chaskalson, 2017).

According to the comprehensive plan for the development of sustainable human settlements, social housing, as well as deviations such as communal housing, cooperative housing as well as housing that can be inclusive of all income groups, can have several opportunities for government subsidies (Breaking New Ground, 2004, p18-19).

5.2) REQUIREMENTS

The requirements to receive any subsidies (Chaskalson, 2017).

Some exceptions apply to these requirements for applicants with disabilities or military veterans.



5.3) SUBSIDY TYPES

The government offers five different ways to assist people to getting housing.

1. Building and allocating standardised housing units

'Government Subsidy housing', previously known as the RDP (Reconstruction and Development Programme) housing subsidy scheme, it is now run by the Breaking New Ground group.

An RDP house is typically an 8.3m x 6.3m single storey house with three rooms, a kitchen and a bathroom. Further minor performance and aesthetic specifications such as the brick wall finish and performance level are decided during discussions with the community considering the cost division (the Republic of South Africa, National Department of Housing, 2003, p18-40).

2. Inner city rental

Community Residential Units and Housing Programme is a rental only subsidy programme that allows people that have previously owned property to rent inner-city units (Chaskalson, 2017).

3. The upgrading of informal settlements

The upgrading of Informal Settlements Programme is not aimed at the individual but rather at whole settlements. They create better infrastructure but do not supply better housing (Chaskalson, 2017).

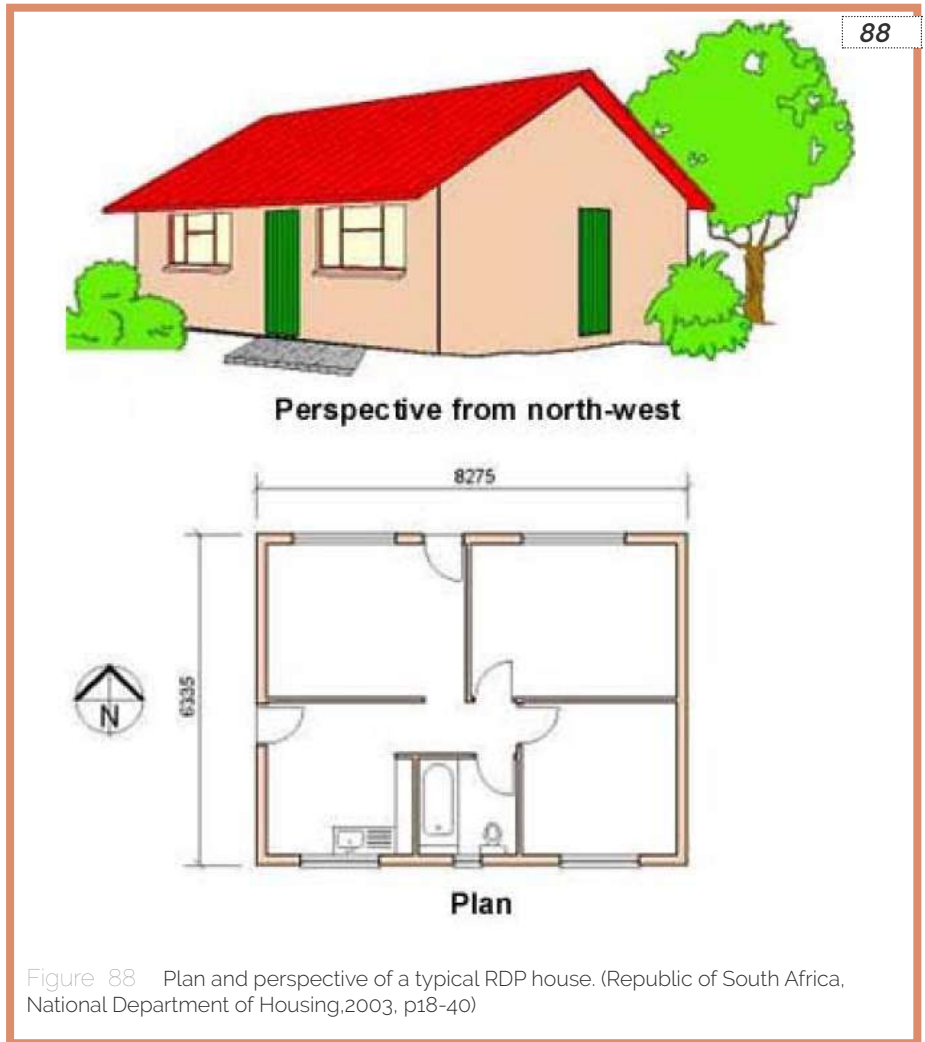


Figure 88 Plan and perspective of a typical RDP house. (Republic of South Africa, National Department of Housing, 2003, p18-40)

4. First time house owner subsidy

Finance Linked Individual Subsidy Programme is a grant that assists the applicant in paying back their home loan or to use as a deposit for a house. The applicant must qualify for a home loan to access this grant (Chaskalson, 2017).

5. Cheaper rental through subsidising developers

The Social Housing Programme assists development companies to gain subsidies from the local government to build social housing projects. This allows for rent to be cheaper as well as subsidies to rent the units to be easily controlled (Chaskalson, 2017).

QUESTIONING SUBSIDY POLICIES

with Prof. Stephan de Beer

5.4) INTERVIEWING PROF. S DE BEER

This chapter is based on an interview with Prof. Stephan de Beer in which policies behind subsidies and their effects on social housing typologies were discussed.

Professor Stephan de Beer is one of the founders of Yeast City Housing the largest private organisation involved in the development and management of social housing in Pretoria. He is also a director of the Centre for Contextual Ministry at the University of Pretoria, involving him in the fields of community involvement, housing and spatial justice (Yeast City Housing, 2019).

5.5) THE GAPS AND ISSUES WITH SUBSIDY POLICIES.

The subsidies provided by the South African government regularly change. According to Professor de Beer, the policies controlling subsidies in South Africa in most cases do not consider successful precedents of pilot social housing projects (S de Beer, 2019, personal communication, 4 October). Yeast City Housing has successfully launched and run several pilot social housing projects that explore policies that have since passed, such as the rent to buy subsidies or the disability commune subsidies. A suspected reason for this is the change in heads

of departments wanting their policies and pilot projects in order for them to be able to take full credit for their success. This does mean that a successful proposal for a pilot project could motivate the use of a new subsidy policy.

5.6) BACKYARD SHACK SUBSIDIES

Backyard shack subsidy is a scheme that is currently being proposed to the Department of Housing. The subsidy would assist individuals with paying the high prices for living in backyard shacks. As a smaller rental strategy, this could be the subsidy that could allow for individuals without dependents to access it (Topham, 2011).

Backyard shacks are typical in almost every house in Mamelodi West and can be found to be popular in locations all over South Africa. The popularity of this phenomenon has begun growing while freestanding shacks are proportionally decreasing, which suggests that this form of urban densification is expected to continue growing in popularity (Saladin and Turok, 2015).

5.7) STRATEGIES TO CHALLENGE CURRENT POLICIES

Current policies around obtaining subsidies are stringent when it comes to the requirements of who can receive

them and what they can be used for. When designing and proposing a housing development, with the intention for it to be subsidised, it must usually align itself to one type of policy.

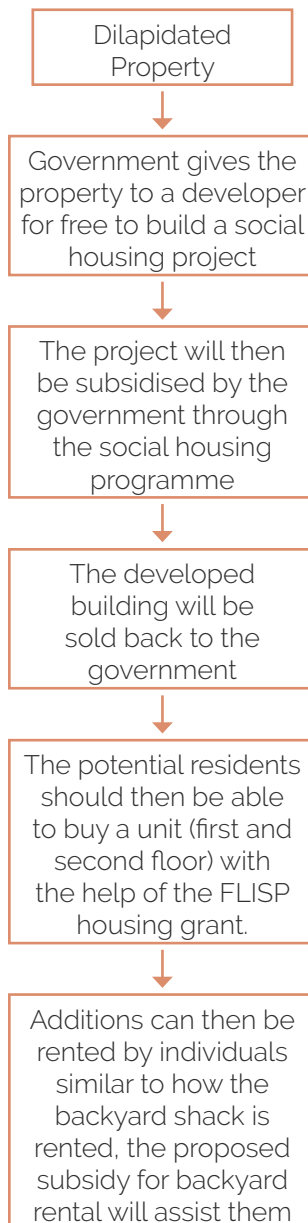
Prof. Stephan de Beer advised that this will not be the strategy used for this kind of student design project, as none of the current policies align with incremental housing, instead, a new subsidy structure would have to be proposed with the project.

The ideal subsidy progression for this project would be for the government to give the property to a developer for free, with a contract saying that they will develop with the intent to supply the government with housing. The construction will then be funded by the 'social housing' grant system. The developed building will be sold back to the government with potential spatial strategies aligned with their interests. At this point the strategy is similar to many of the projects in the precedent chapter, Financial Models (Ch.5.10).

The potential residents should then be able to buy the house section of the unit (first and second floor) with the help of the FLISP subsidy. Once they have enough money, they can build additions and rent those spaces.

Individuals without dependents could then rent these addition spaces with a 'backyard shack subsidy' (as mentioned in the previous page). This strategy would hypothetically create a system that closes several

5.8) *SUBSIDY PROGRESSION STRATEGY*



Concept

Part 6

This chapter provides an insight into the three concepts behind the project, how they inform each other and what aspects of the project they have informed.

INITIAL CONCEPTS

6.1) INITIAL URBAN CONCEPTS

As the first concept. In order to arrive at an urban intention, the criteria for the authors design site, massing was challenged, these criteria are: Community spaces, site movement

and relations, safe conditions, density and programmatic compatibility.

Although the urban layout through the site has changed, the role of the

built form has stayed the same. The new urban mass is required to be permeable, in order to prevent the site from becoming a barrier within the suburban community.

Concept 1 - Permeability

This concept focuses on creating a form that densifies the massing while allowing for various levels of permeability towards its context.



Community spaces,	Yes
site movement and relations	Yes
safe conditions,	Yes
density	Yes
programmatic compatibility.	Yes



Concept 2 - Lowering the higher density

This concept explores the idea of heightening the density of the massing more dramatically but levelling it with the context by lowering it below ground level.

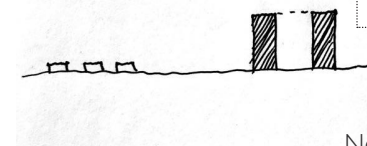


Community spaces,	Yes
site movement and relations	No
safe conditions,	No
density	Yes
programmatic compatibility.	Yes



Concept 3 - Distopian, perfectly bad application

This model simply demonstrated the opposite of what the site and context wants from the massing as it simply stands in blatant solitude from its context.



Community spaces,	No
site movement and relations	No
safe conditions,	No
density	Yes
programmatic compatibility.	No



89

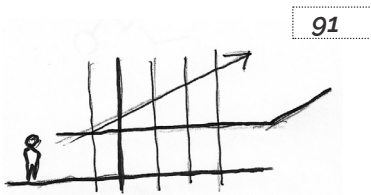
90

Figure 89 Urban concepts in sectional diagrams. Drawn by author.

Figure 90 Urban concept maquette in context model. Built by author.

CO-HOUSING AS STREETScape

6.2) INTRODUCTION



The concept of permeability identified in 3.1, speaks of contextual permeability which led to the use of the existing grain of the streets to inform the level of urban permeability through the site.

The concept was proposed at an early stage in the study as more than a design informant but rather, it informed the basis for the typological investigations as well as the theoretical research into incrementality and co-housing.

6.3) STREET AND CO-HOUSING

The concept of cohousing as streetscape was conceived with intent to integrate the streetscape of Mamelodi with the western concept of co-housing, and with this, create a

contextually relevant social housing scheme.

The importance of the streetscape comes from both, the concept of permeability (Ch.6.1) and life around the residential realm which is created on the street of Mamelodi West (Ch.3.2). The streetscape continues to the full extent of the residential properties, facing the street as well as the street itself. The importance of the streetscape will be taken from the way that the properties facing the street interact with it and how that allows for the programme to create a contextual connection.

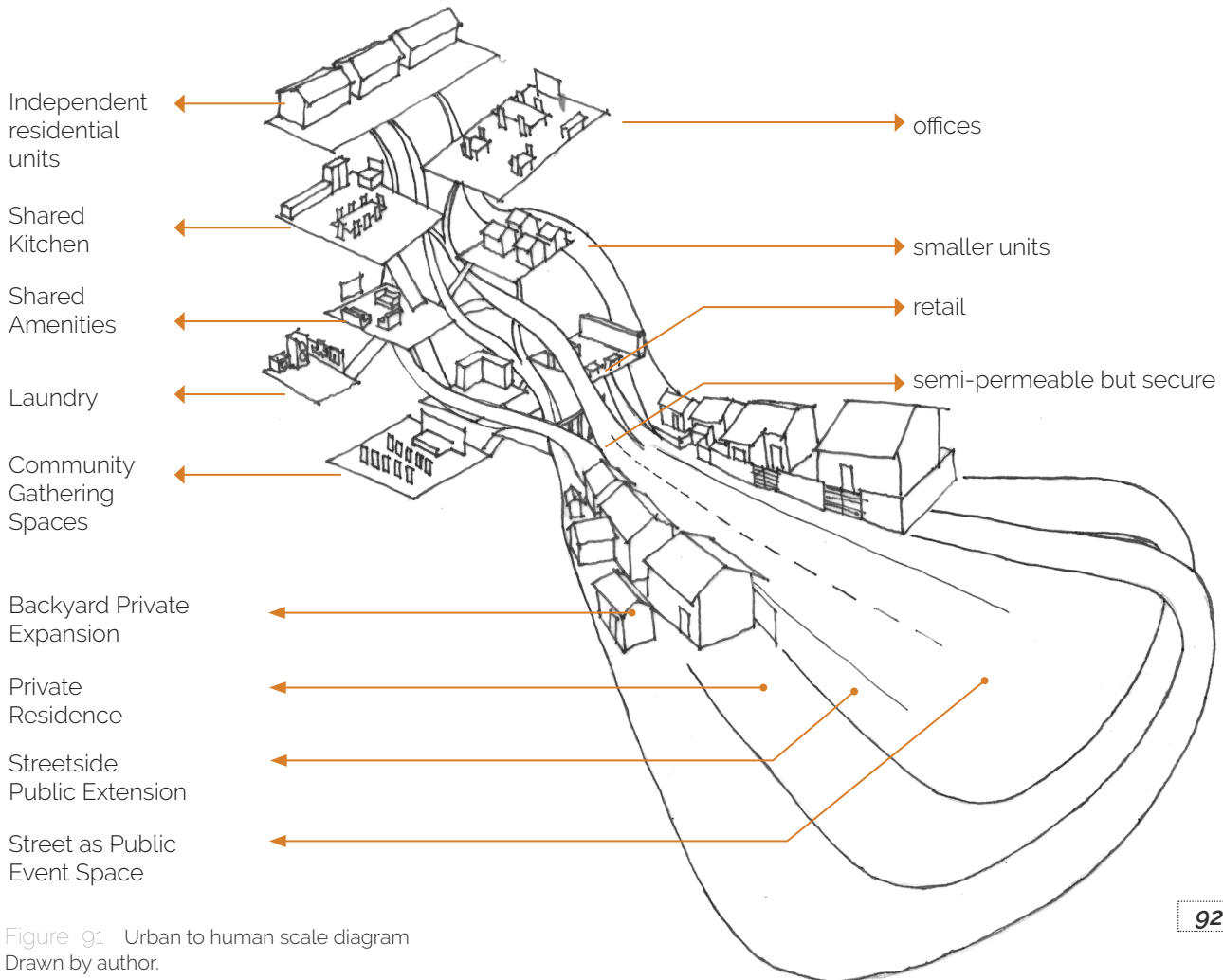


Figure 91 Urban to human scale diagram
Drawn by author.

Figure 92 Co-housing streetscape conceptual graphic. Drawn by author.

CORE AND INFILL

6.4) INTRODUCTION

The concept of core and infill became apparent after the dissection of the concept, 'Co-Housing as Streetscape' which had led to the topics of the home as the core and the public and private infill zones. The give and expand system used by Elemental is another informant of this concept explored in (Ch.3b.4).

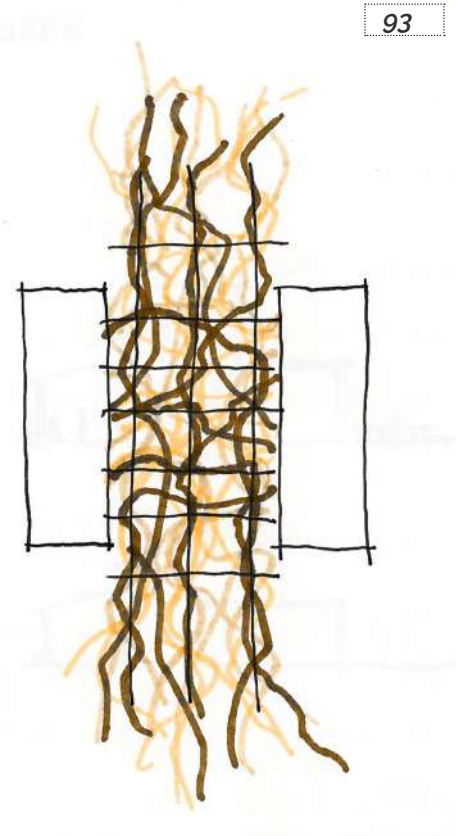
Core and infill is a simple system where a core is a form of permanent infrastructure that provides the necessities for what is attached to it to grow. Infill is what attaches itself to the core, this is the life and the temporal realm where conditions can cause change without the repercussions of losing infrastructure.

6.5) AS INFORMANT

The concept led to the design of the units being of two separate but symbiotic parts. The core had to become only residential infrastructure, meaning that it had to be minimal, strong and completely supportive of the infill space. This would include only the entrance, the necessary circulation, the plumbing, the power, the bathroom and fixtures for a kitchen.

The infill became the liveable space, where change happens as life changes and situations improve or

degrade. The infill must be flexible within curation for living spaces to grow safely. This should potentially be able to include bedrooms, dining rooms, leisure rooms, storage, business additions, living additions and retail additions.



93



94

Figure 93 Core and infill concept. Drawn by author.

Figure 94 Model built to illustrate the core and infill concept. By author

Design

Part 7

This chapter presents the informants as expanded on in the previous chapters and how they culminate to inform a design that mitigates the issues presented.

INTRODUCTION

7.1) PROCESS

The process of the design is followed by using practical thinking as well as formative ideas of the programme and creative synergy to the site. The three core informants are used to guide the design throughout the entire process.

The design is taken through various scales, and each informant takes place in the hierarchy within the concept.

The design aims to align itself with the future, potentially developed Mamelodi West as this is where urban co-housing makes a more significant impact to the context as well as being able to set a new South African model for the expansion of the residential space. The streetscape offers a constant as a link to infrastructure to feed growth.

95

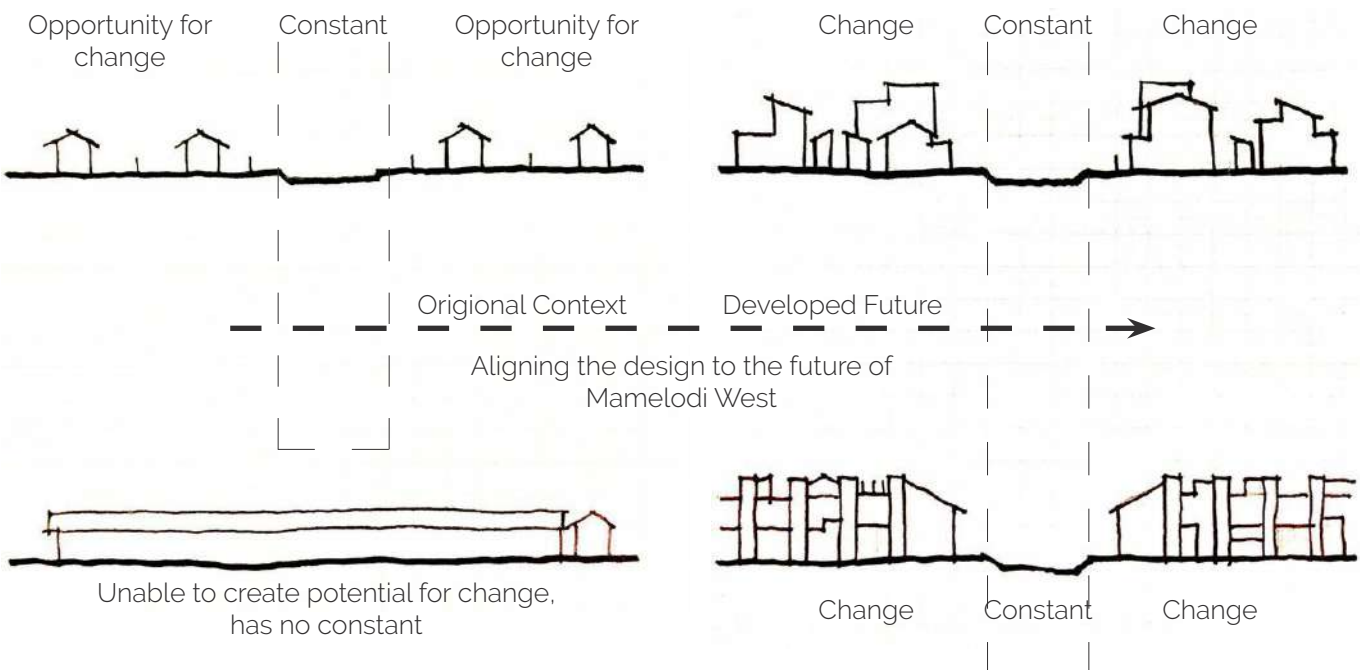


Figure 95 Showing how the architecture aligns itself to the future of Mamelodi West. Illustrated by author.

Figure 96 Density alignment of the project. Illustrated by author.

INFORMANTS

7.2) PROGRAMME

The type of housing significantly affects the relationships between the residences and types of spaces and amenities around them .

Co-housing

The relationship between the residences, amenities and other shared spaces is the most important aspect to bring through when designing co-housing.

Social Housing

The size and durability of the units dictate the potential users and subsidies available in social housing, smaller sizes and durable facilities are necessary.

7.3) CONTEXT

The relationship between context and architecture is a connection between the greater community and the user

Social Cohesion

The social and active retail realm in Mamelodi West is on the streetside, therefore it is essential for the architecture to connect to the street.

Incrementality as Typology

To connect with the contexts' architecture, essential characteristics should be identified. Mamelodi West has incrementality as its typology, and thus the architecture must be similarly flexible.

Densification

Mamelodi West is on its way to becoming a far denser suburb than it was only years ago. The architecture should reflect the projected densified context instead of what was.

7.4) PRACTICALITY

When designing social housing or any form of subsidised or government housing, practical realities play a crucial role in the design process.

Cost

The total expense of a housing project can make or break the deal at all stages of a project; this means that materials, joinery and method must be considered.

Time

The longer the duration of a construction process takes means that it will cost more and take longer to make money.

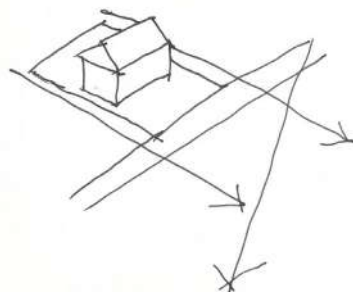
Security

The ability to create security through architecture is crucial as once the structure is built, it should not need expansive fencing systems to make it secure.

96



97



98



Figure 96 The concept of living separately together is illustrated. Drawn by author

Figure 97 Combining the contextual patterns with the selected site. Drawn by author

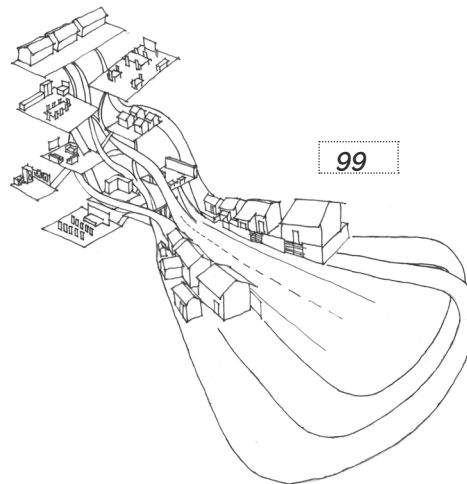
Figure 98 Construction considerations impact cost on the long and short term Drawn by author

CONTEXT INFORMANTS

Social cohesion

The symbiosis between the urban streetscape and the architecture must be apparent for the residents to be able to relate to the street in a similar manner to the surrounding housing.

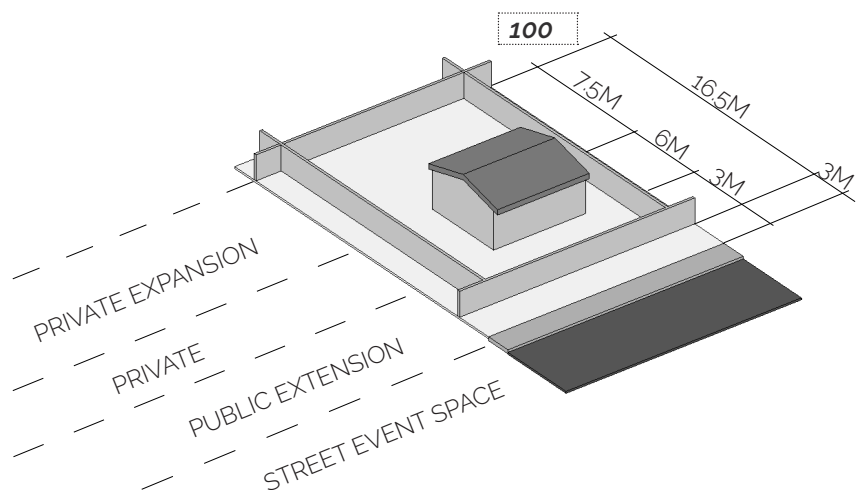
Retail and social activity in Mamelodi is most prominent on the streetside and for the growth of the units they must connect to the street.



Incrementality as Typology

The typological analysis of Mamelodi West concluded that incrementality is a critical part of a residents' growth and it is a large part of the economic growth of the area (Ch.3a.4).

The architecture must aim to create a residential typology that is able to facilitate the known typologies in Mamelodi West.



Density

The architecture must relate to the future density of Mamelodi West but the defining grain of the streetscape should shape the grain of the mass on the site.

The density of the architecture must be able to accommodate for the economic growth of its residents, which is the same driver of increasing density in the surrounding residences.



Figure 100 Pulling through the contextual movement lines within the surrounding context. Illustrated by author.

Figure 101 Final iteration of the urban layout. Illustrated by author.

Figure 102 Vertical interpretation of the streetscape typology, illustrated by author.

PROGRAMME INFORMANTS

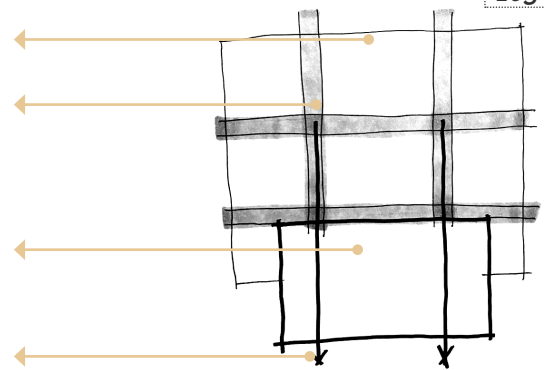
Co-housing Spatiality

The composition of the components of co-housing is essential, especially when the architecture is built to become a co-housing community instead of the traditional combination of existing houses.

- The Autonomous residential units, the units must be able to function individually for the community to act together without forcing communal activities.
- The in-between interaction spaces are the spaces where continuous random exposure to other residents occurs.
- Shared amenities and common spaces are used for communal facilities such as a shared kitchen and lounge space to support each other.
- Intentional direction movement through communal spaces allows for constant exposure to the facilities and people within the whole co-housing community.

Autonomous residential units
 In-between interaction Spaces
 Shared amenities and common space
 Intentional direction movement through communal spaces

103



Social Housing Spatial Standards

In the precedent chapter, it is observed that a standard set of sizes are followed for units per person. This correlates to achieving a larger amount of units for more rental.

Knowing how to create a service core for housing means that it must be as small as possible as it is not habitable space and is therefore not the space one rents out.

Transition User 320 units			Room Size 14 m ²
Single User 53 units			Room Size 20-25 m ²
Double User 21 units			Room Size 35 m ²
Family User 8 units			Room Size 50 m ²

104

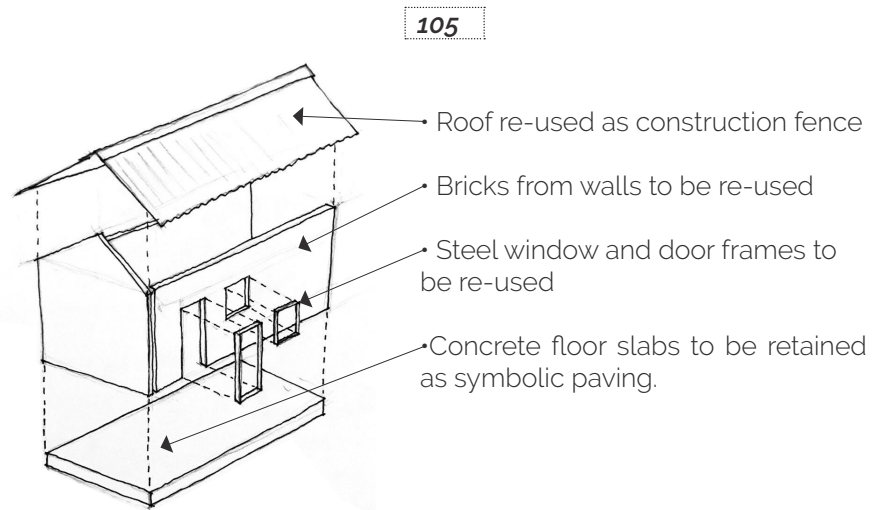
Figure 103 Diagrammatic illustration of a typical co-housing layout. Illustrated by author.

Figure 104 Indicating typical sizes of units and the difference per person.

PRACTICAL INFORMANTS

Cost

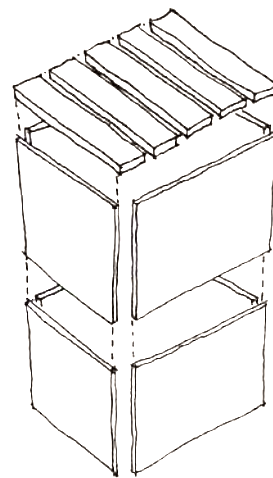
The cost of a project can be lowered by considering cheaper or efficiently sourced materials. Up-cycling materials from existing buildings on-site can be both cost-effective and lower the ecological footprint of the project. The up-cycling of the buildings signifies the removal of past obstructive placement of buildings and oppressive interior environment while keeping its memory, Figure 105 illustrates the elements that are to be re-used from the existing structures.



Time

The construction process can be shortened by using elements that can be efficiently joined that do not require long fixing and drying times.

Concrete panel pre-cast on site construction is a fast method of construction as the elements are large and require little to no time to be solidly fixed (Figure 106).



Security

The 'thin red line' is a concept where the architect should be able to draw a line on the edges of the building that can be easily secured, if there are significant gaps then the design has failed to provide higher security with low amounts of materials and effort.

Housing clusters with a combined lobby offer are easy to secure at a single point as any person trying to enter a house, or shared space must walk through a highly trafficked area of people that know each other as well as through a single entrance that can be easily secured.



Figure 105 The diagram indicating which elements of the existing buildings that can be up-cycled. Illustrated by author.

Figure 106 Illustration of concrete panel construction. Drawn by author.

Figure 107 The thin red line showing the secure boundary for a cluster. Illustrated by author.

URBAN DEVELOPMENT

7.5) MACRO SITE DESIGN STRATEGY

The size of the site requires a more extensive scale of design in order to create an environment for the co-housing to be situated within a larger design. The site design must follow the concept and intentions of the core design.

As discussed in the context chapter, informants and issues were identified that required resolving. These included the boundary condition, the lack of permeability, the grain of the site and the relation of the site to context.

The first iteration (Figure 108, Figure 109) of the urban design focused on the site as an object attempting to create a new grain to the area as well as creating controlled movement through the space. The form became solid and similar to the existing hostels with low urban permeability. Articulation required the addition of complicated programmatic layouts to force the shape of the urban form into architecturally accessible spaces, which is not desired in an urban form.

The second iteration (Figure 110, Figure 111) separated programs into four sectors to make active street retail a separate element from the residential blocks. The structure also struggled to relate to the residential

grain. This iteration became redundant as the concept developed at this point to the concept of co-housing as streetscape. Therefore the integration of the street into the built structure was considered.

The third iteration (Figure 112, Figure 113) far better considered the residential grain of the surrounding area. The street scape was pulled through the site to create a relationship, this ensures natural movement through the site. This new proposed level of permeability made security easier and buildings less obtrusive.

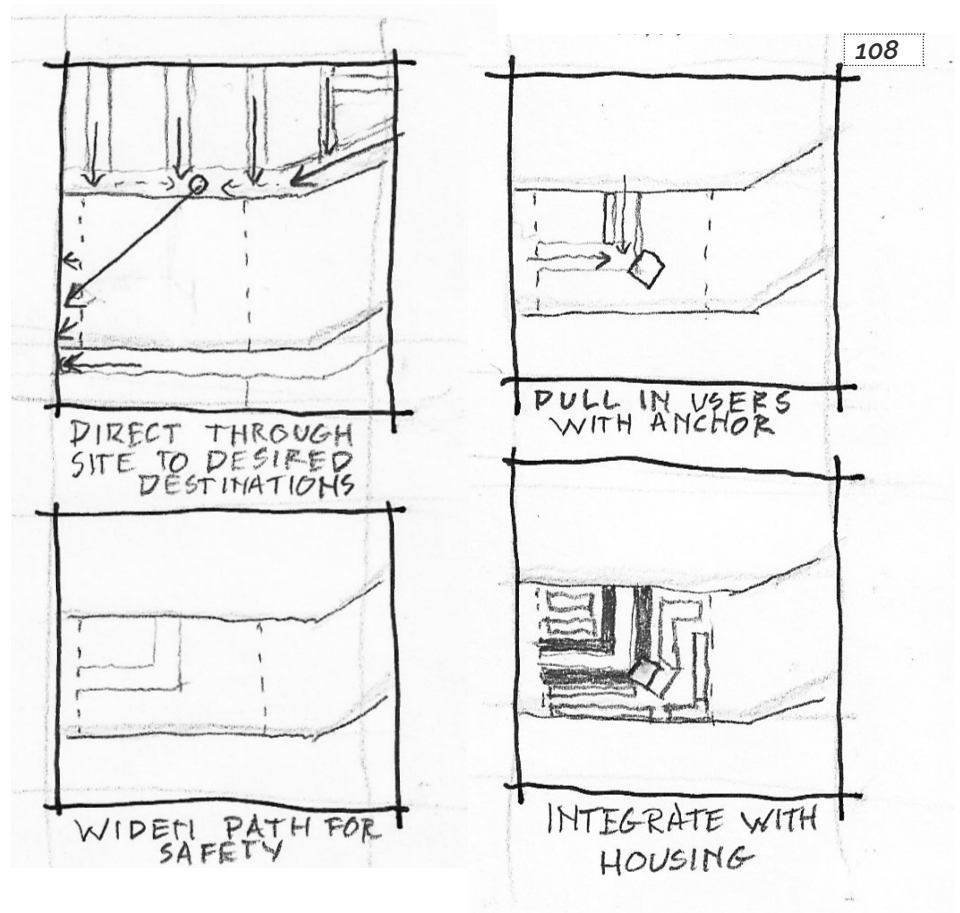
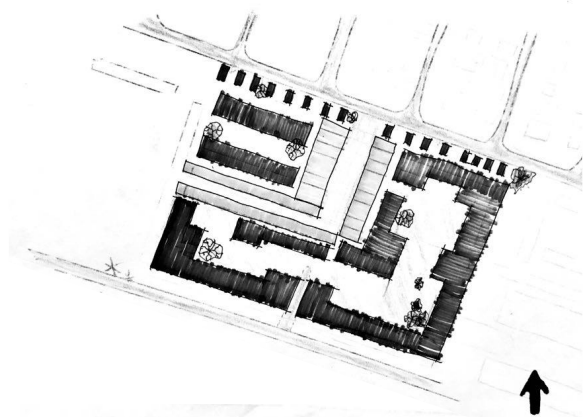
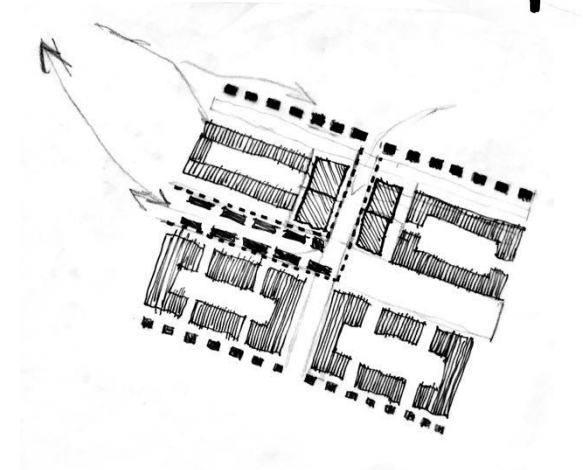


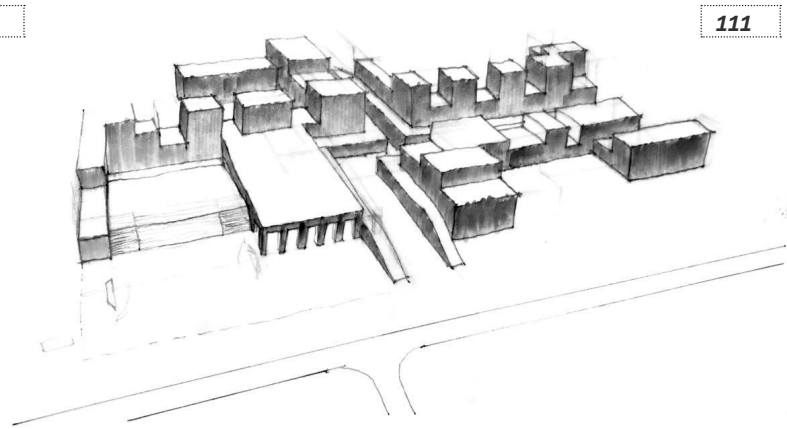
Figure 108 First iteration of the urban layout. Illustrated by author.



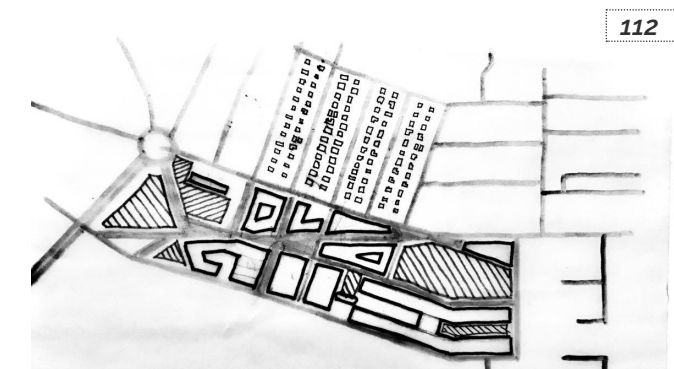
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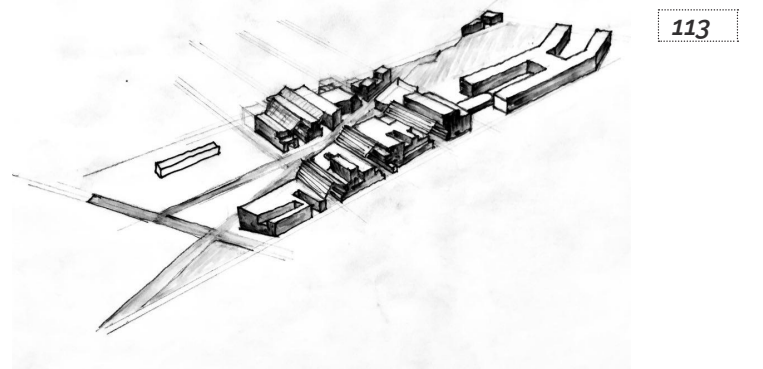
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112



113

Figure 109 First iteration of the urban layout. Illustrated by author.

Figure 112 Third iteration of the urban plan. Illustrated by author

Figure 110 Second iteration of the urban plan. Illustrated by author

Figure 113 3D visualization of iteration three. Illustrated by author

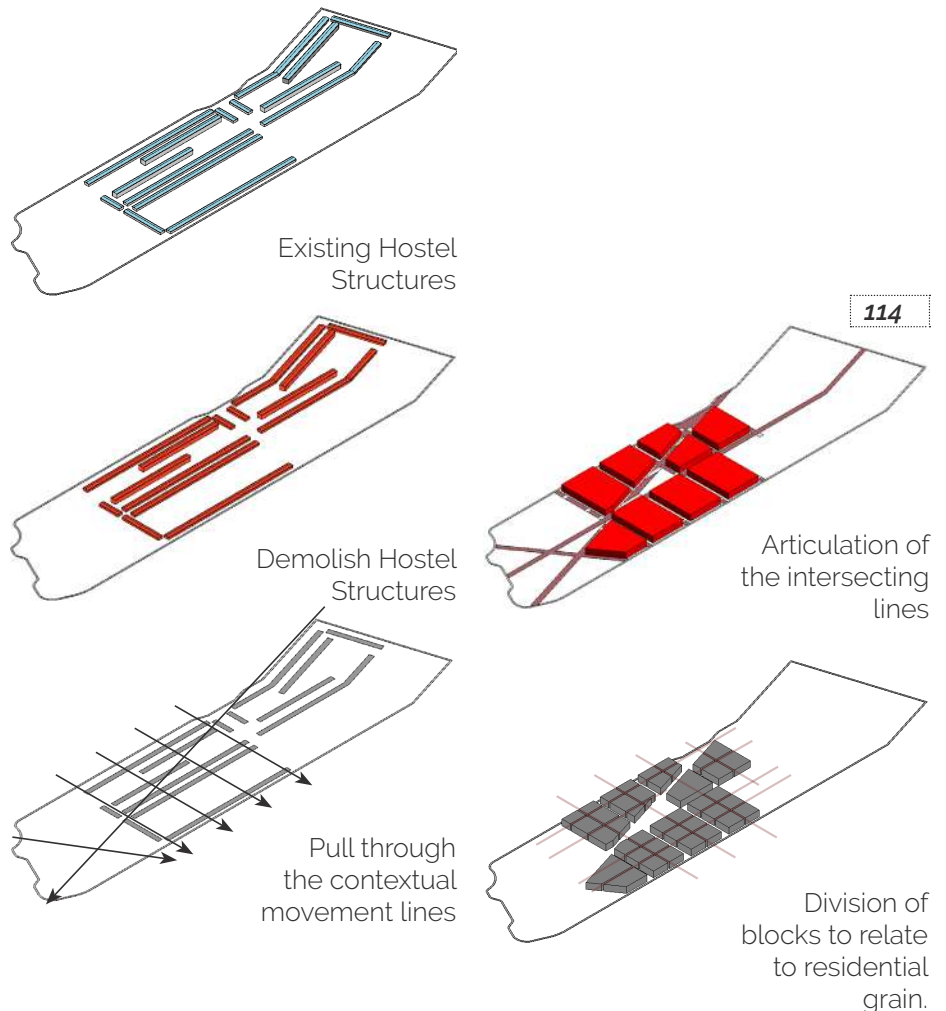
Figure 111 3D graphic of iteration two. Illustrated by author

SITE DEVELOPMENT

7.6) SITE LAYOUT

The continuation of the streetscape became apparent after the first, and second iteration failed to relate to the context. The developing iteration instead allowed the movement and flow of the context's streets to cut through the site, making the movement more natural and familiar to the community.

The question of urban control of the movement through the site became an architectural design opportunity to approach at the smaller scale. This is a similar approach that the urban designers of the new campus of Sol Plaatje University which integrates and opens itself to the fabric of its host city, Kimberly (Sol Plaatje University, 2019). Similarly, the urban designers of Sol Plaatje University mitigated the question of security of the amenities and facilities to an architectural scale, by using vertical organisation of programs and open ground floor lobbies (with a single entrance allowing for "red line" security to encompass the building) (Sol Plaatje University, 2019).



7.7) DEVELOPMENT ON-SITE

The urban grain of the surrounding suburb has been blocked by the sheer facade of the existing hostel blocks. The plan for the urban design is to become a continuation of the streetscape. The blocks that form from the surrounding geometries of the streets will be one of the informants for the shape and size of the new co-housing buildings.

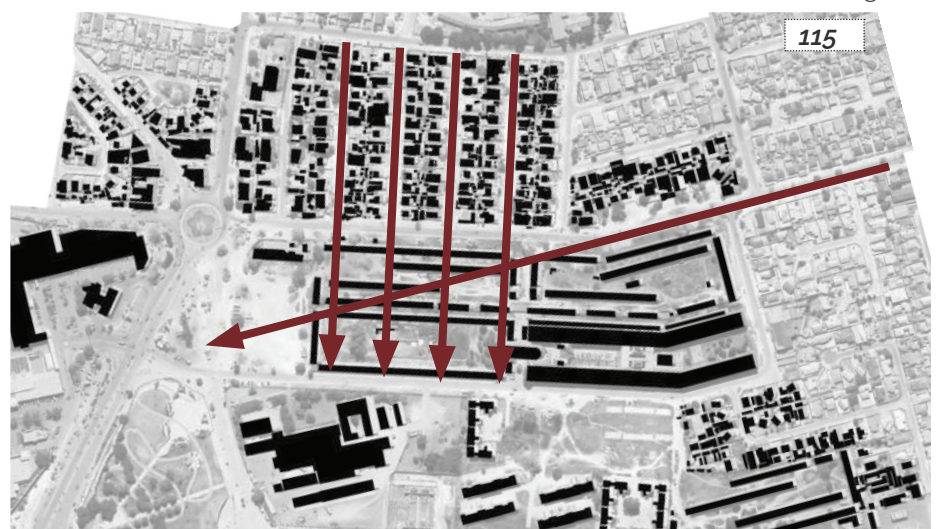


Figure 114 Iteration of the urban layout design process. Illustrated by author.

Figure 115 Pulling through the contextual movement lines within the surrounding context. Illustrated by author.

SITE DESIGN

7.8) SITE LAYOUT DESIGN

The site layout process set out the spaces for the clusters to be developed into.



Figure 116 The final iteration of the site design. Modeled and rendered by Author.



EXTERNAL SPATIAL PERSPECTIVES

7.9) EXTERNAL SPATIAL PERSPECTIVES

The perspectives illustrate how the spaces within the designed larger site would feel like once its populated

*entrance from eastern
Shabangu avenue
Transport node*



*central square
park and community
centre*

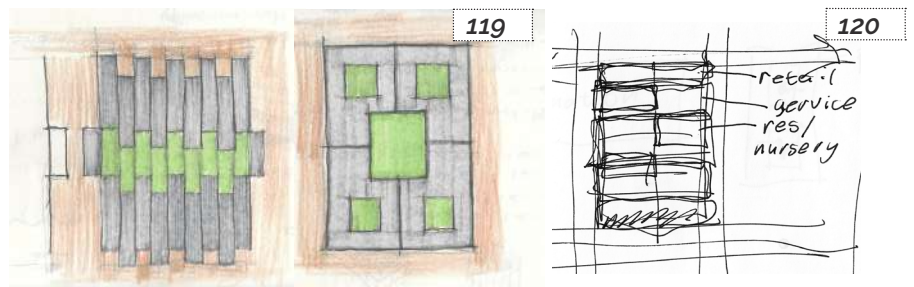


Figure 117 Perspective of entrance from eastern Shabangu avenue.

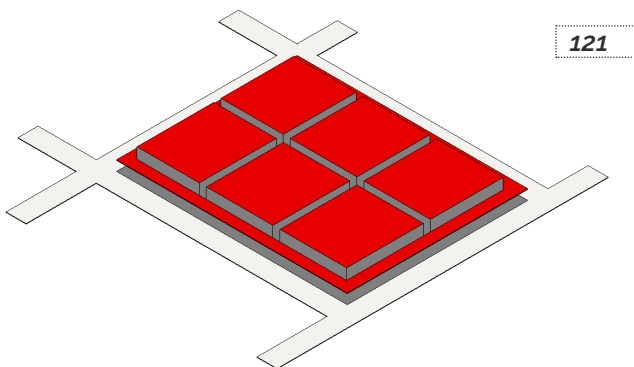
Figure 118 Perspective of central square park and community centre.

BLOCK DESIGN

7.10) INITIAL BLOCK DESIGN PROCESS (JUNE)

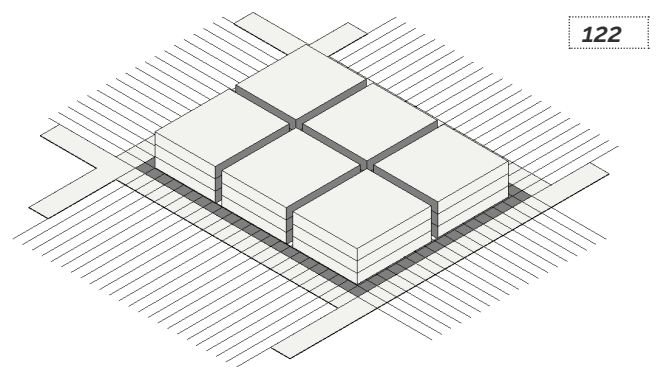


block division of clusters



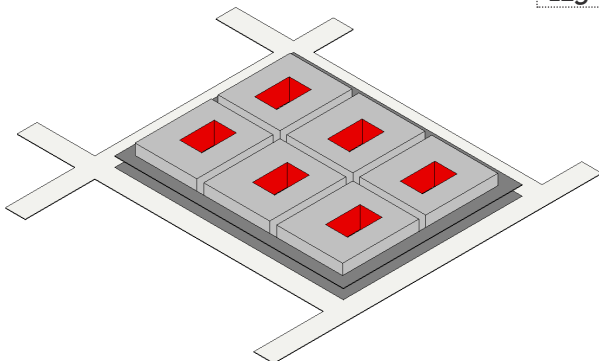
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3m Modules



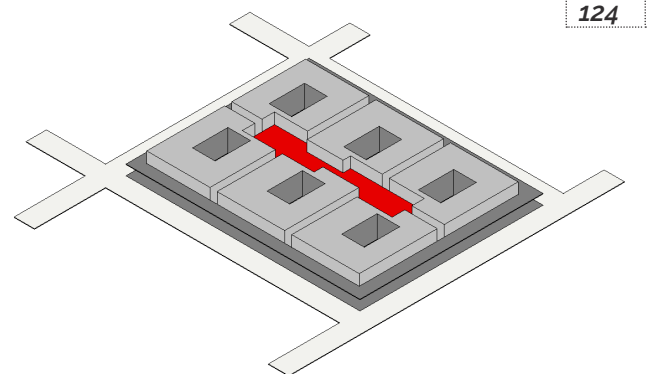
122

Interconnected space between clusters



123

Cluster interior open space



124

Figure 119 Block division of clusters. Illustrated by author.

Figure 120 Creation of a modular grid for the block. Illustrated by author.

Figure 121 (Left Top) Block division of clusters. Illustrated by author.

Figure 122 (Right Top) Creation of a modular grid for the block. Illustrated by author.

Figure 123 (Left Bottom) Cluster interior courtyards. Illustrated by Author.

Figure 124 (Right Bottom) Central Courtyard. Illustrated by Author.

7.11) BLOCK ITERATION (SEPTEMBER)

From Urban design (Ch. 7.3) it was set out that the grain of the co-housing block should align with a densified Mamelodi.

Due to cost implications, ease of access and fair spatial it made sense for it to be symmetrical. This is economical.

125



Figure 125 The final iteration of a block. Modeled and rendered by Author.

7.12) FINAL BLOCK ITERATION

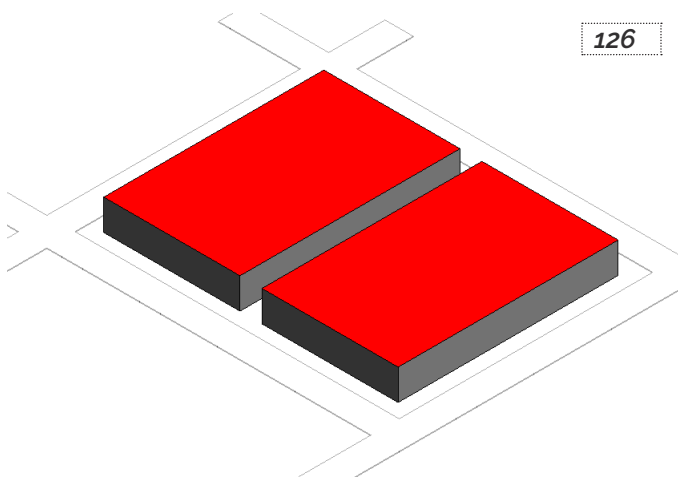
The final block iteration only has two clusters, as the four clusters were wasteful, the two clusters are separated by an inner street to create further permeation and involvement in the streetscape.



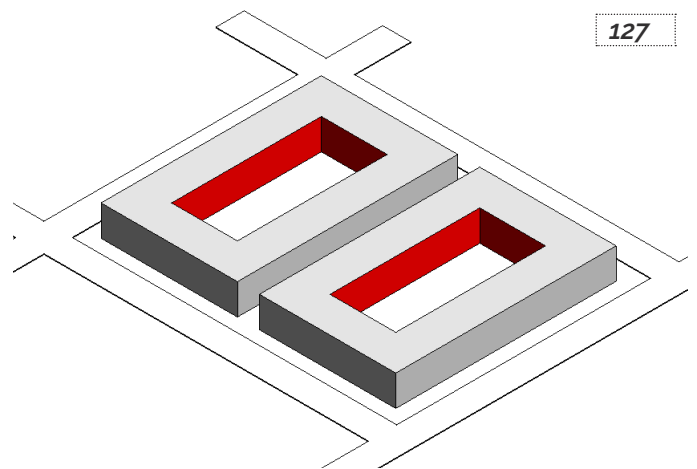
BLOCK DESIGN

7.13) FINAL BLOCK DESIGN PROCESS

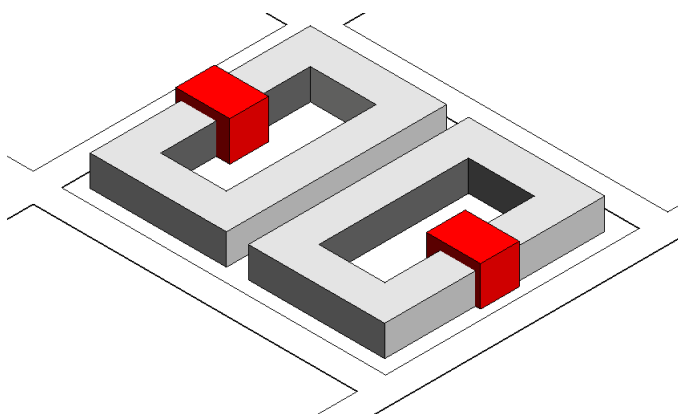
block division of clusters



Cluster interior space



Common house central placement



Residential line separation by cores

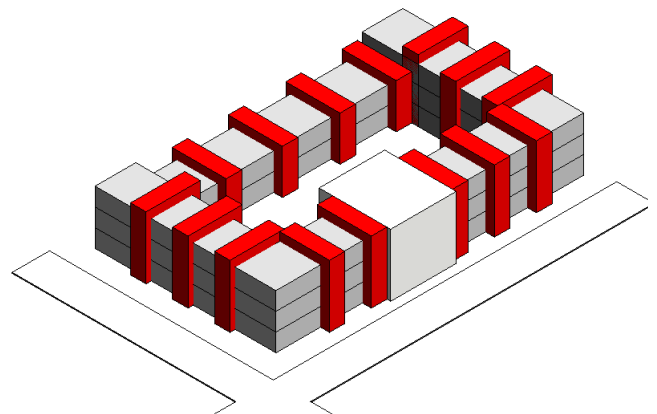


Figure 126 Block division of clusters. Illustrated by author.

Figure 128 (Left Top) Block division of clusters. Illustrated by author.

Figure 127 Creation of a modular grid for the block. Illustrated by author.

Figure 129 (Right Top) Creation of a modular grid for the block. Illustrated by author.

VERTICAL TYPOLOGIES

7.14) VERTICAL CONVERSION

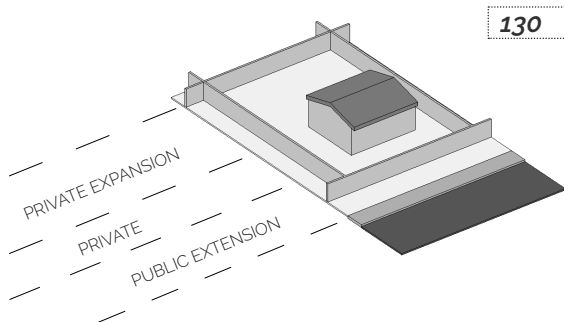
To achieve a higher density while keeping to the urban grain as well as creating the layout of co-housing, the level of incrementality achieved

within the context on basic plots cannot be used horizontally. The vertical adaption of these typologies will be illustrated in a literal manner to easily convey the concept for each scenario.

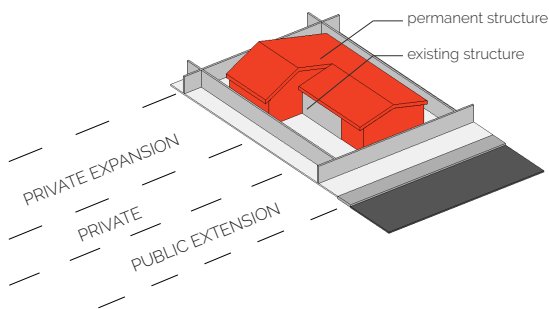
Figure 130 The standard house, upgrade and backyard rental typologies. Illustrated by author.

Figure 131 Vertical adaption of the standard house, upgrade and backyard rental typologies. Illustrated by author.

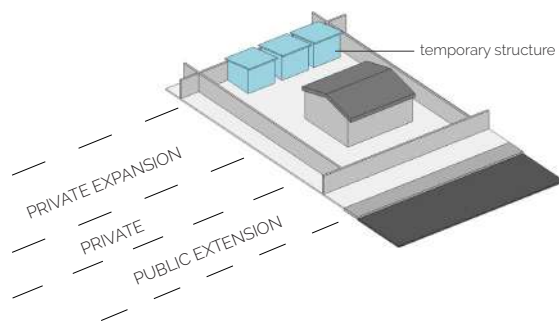
Standard House



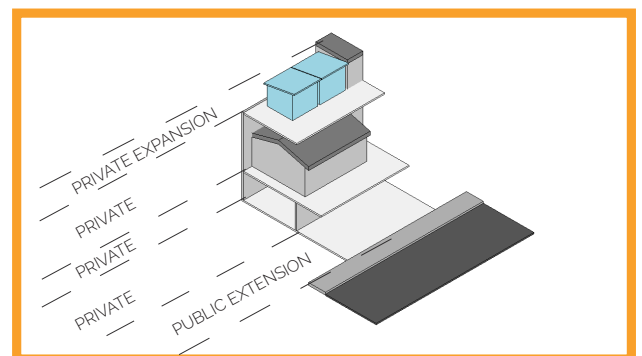
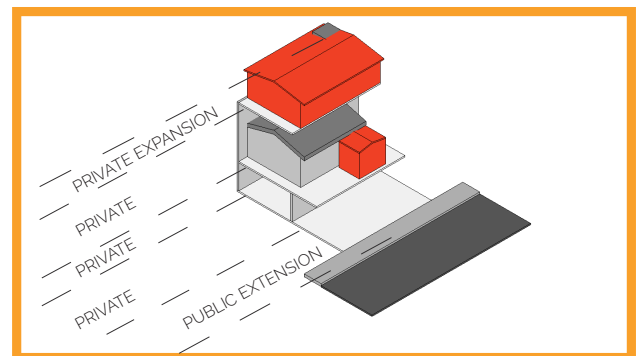
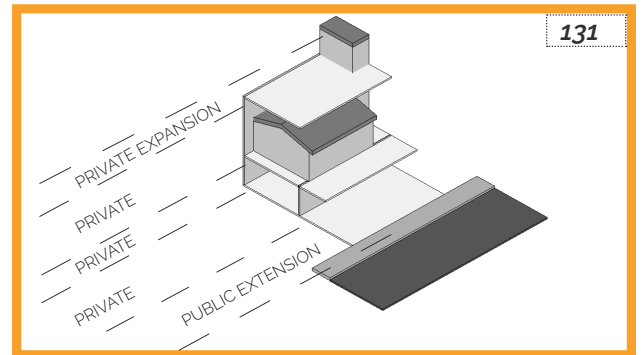
upgrade



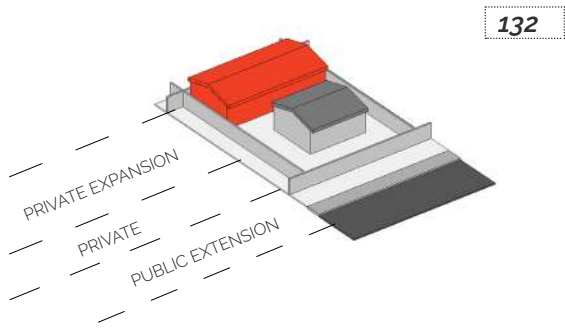
backyard rental 1



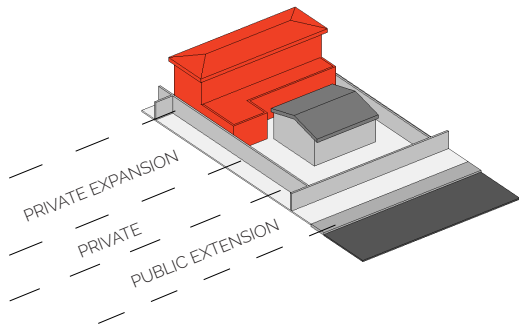
131



backyard rental2



backyard rental 3



shop

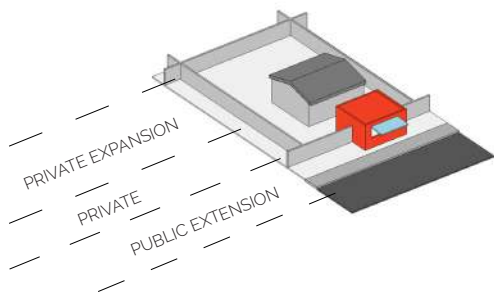
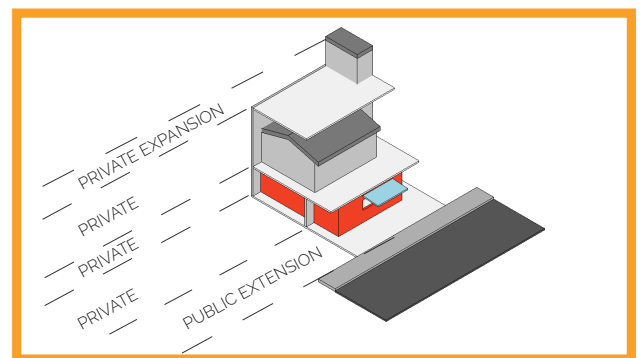
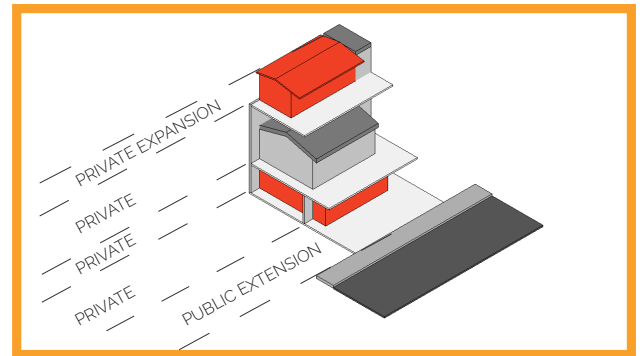
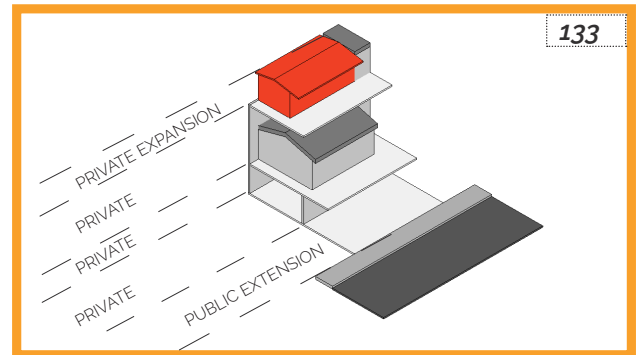


Figure 132 The backyard rental 2, backyard rental 3, and shop typologies. Illustrated by author.

Figure 133 Vertical adaption of the backyard rental 2, backyard rental 3, and shop typologies. Illustrated by author.



Mechanic/carwash

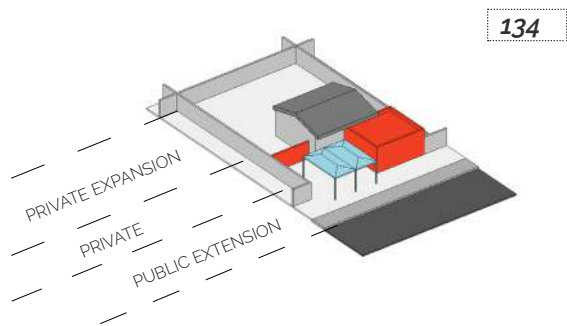
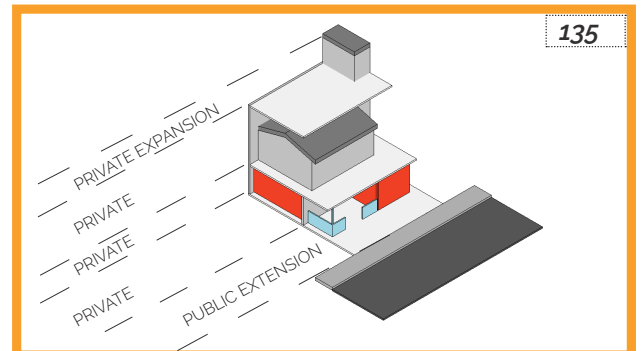
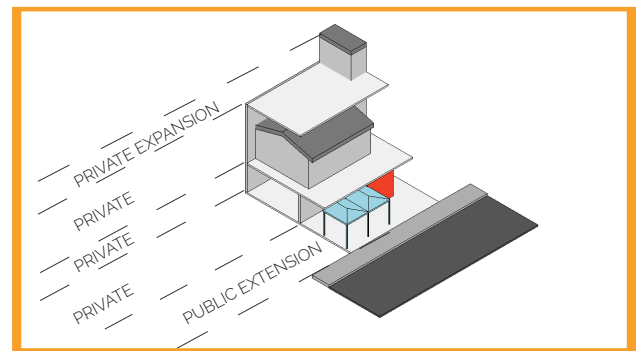
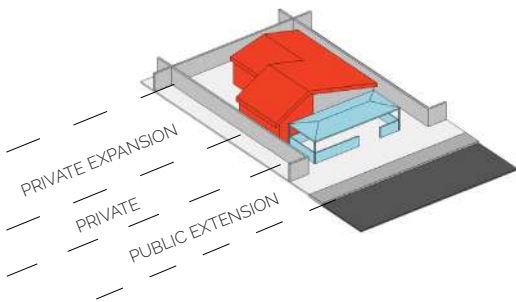


Figure 134 The carwash, tavern and container typologies. Illustrated by author.

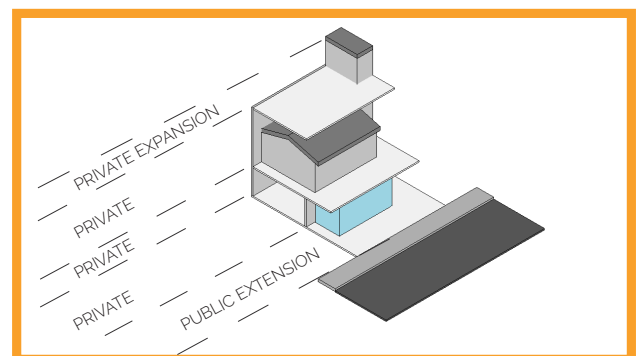
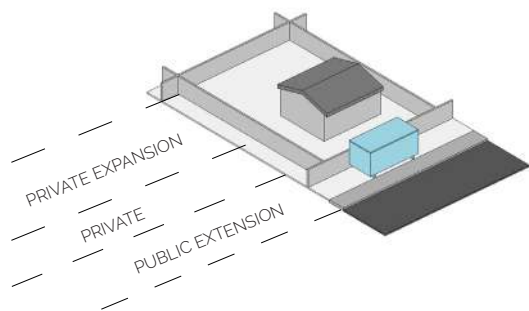
Figure 135 Vertical adaption of the carwash, tavern and container typologies. Illustrated by author.



the tavern



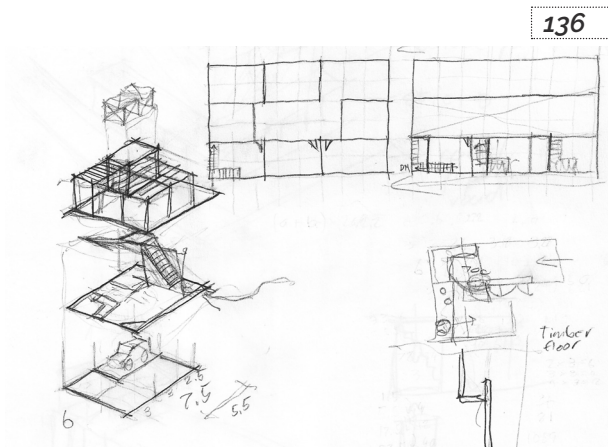
CONTAINER



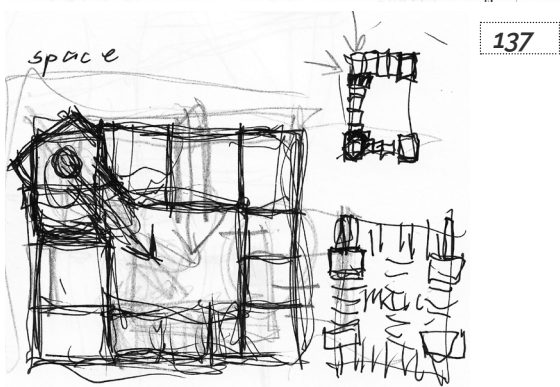
CLUSTER DESIGN

7.15) CLUSTER DIVISION

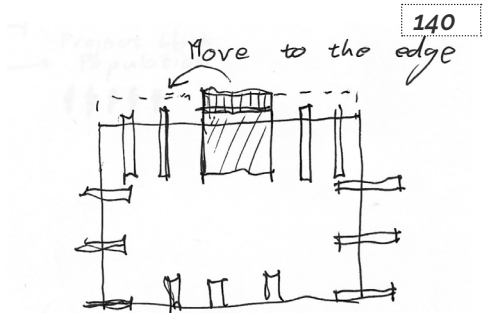
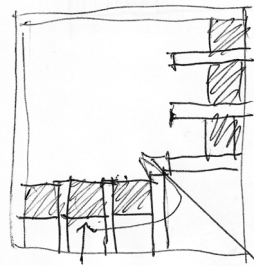
Cluster layout



136

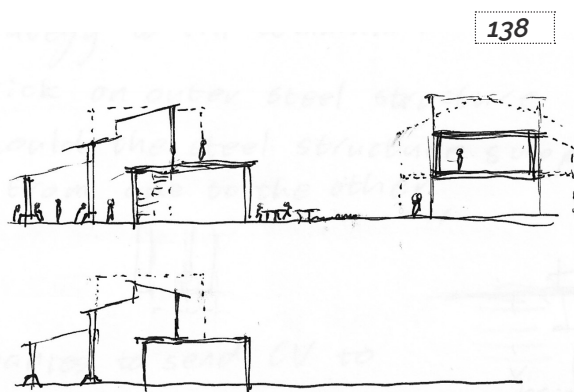


137

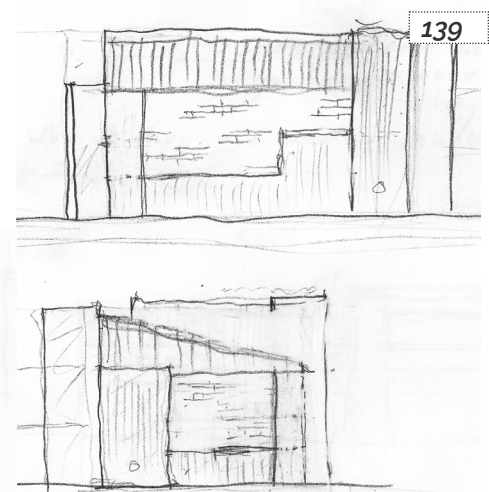
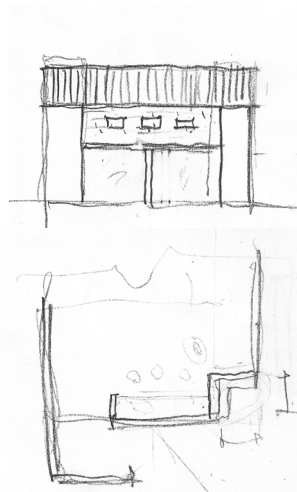


140

Cluster Lobby



138



139

Figure 136 Exploded 3D diagram of the programmatic organisation of each cluster. Illustrated by author.

Figure 137 Organisational plan of the cluster, rough design work. Illustrated by author.

Figure 138 Further diagrams of organisational planning of the cluster layout. Illustrated by author.

Figure 139 First rough draft of lobby design

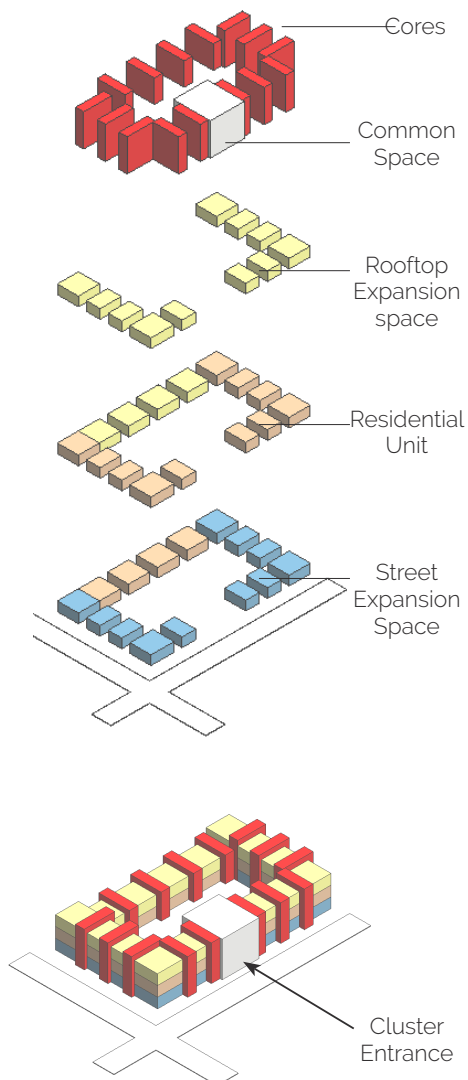
Figure 140 Second rough draft of lobby design

7.16) INITIAL CLUSTER DIVISION (JUNE)

141

Program organisation

The cluster division to maximise the programs



142

security border for residents

A common entrance creates **intentional interaction** as well as **heightened security**



Figure 141 3D diagram of a cluster. Illustrated by author.

Figure 142 Exploded 3D diagram of the programmatic organisation of each cluster. Illustrated by author.

7.17) CLUSTER ITERATION (SEPTEMBER)

The cluster facilitates a portion of the block's residents, the units act as a co-housing cluster where the families or individuals become a nested community.

The closed environment creates security and community.

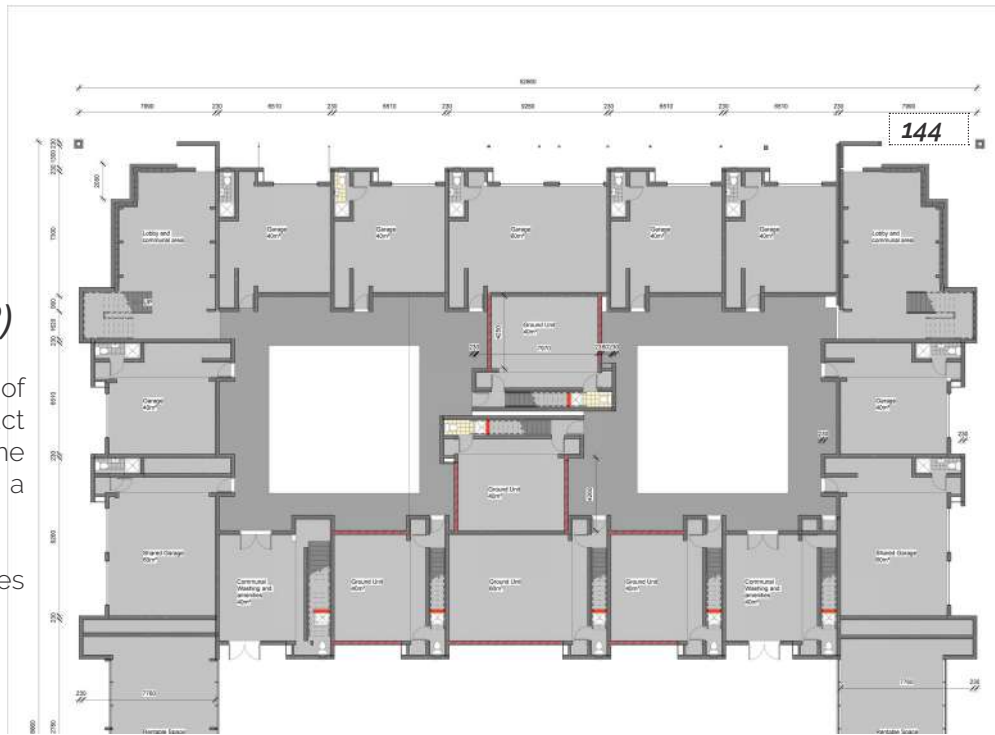
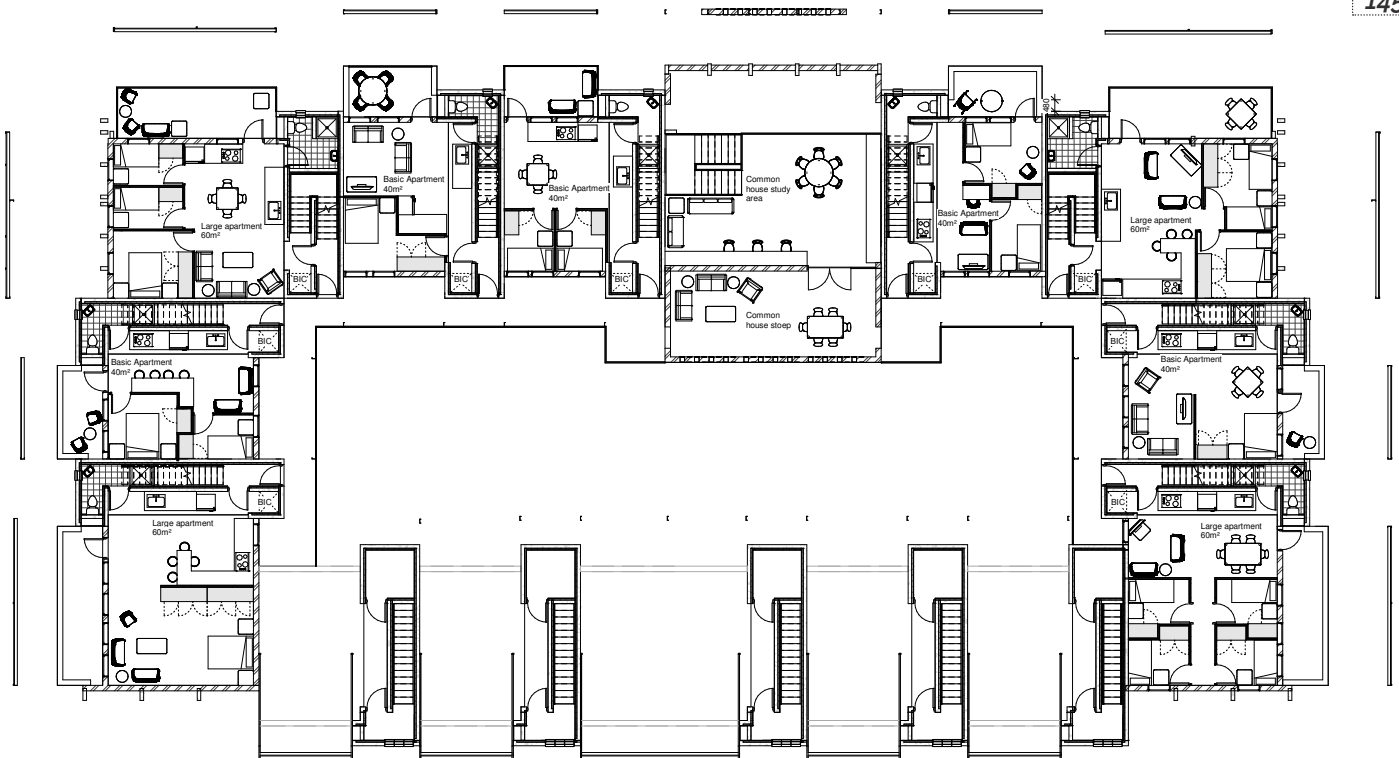


Figure 143 (Below) The final iteration of a cluster. Modeled and rendered by Author.

Figure 144 Ground floor plan. Drawn by author

7.18) CLUSTER ITERATION (OCTOBER)

145



146



Residential units

Common house

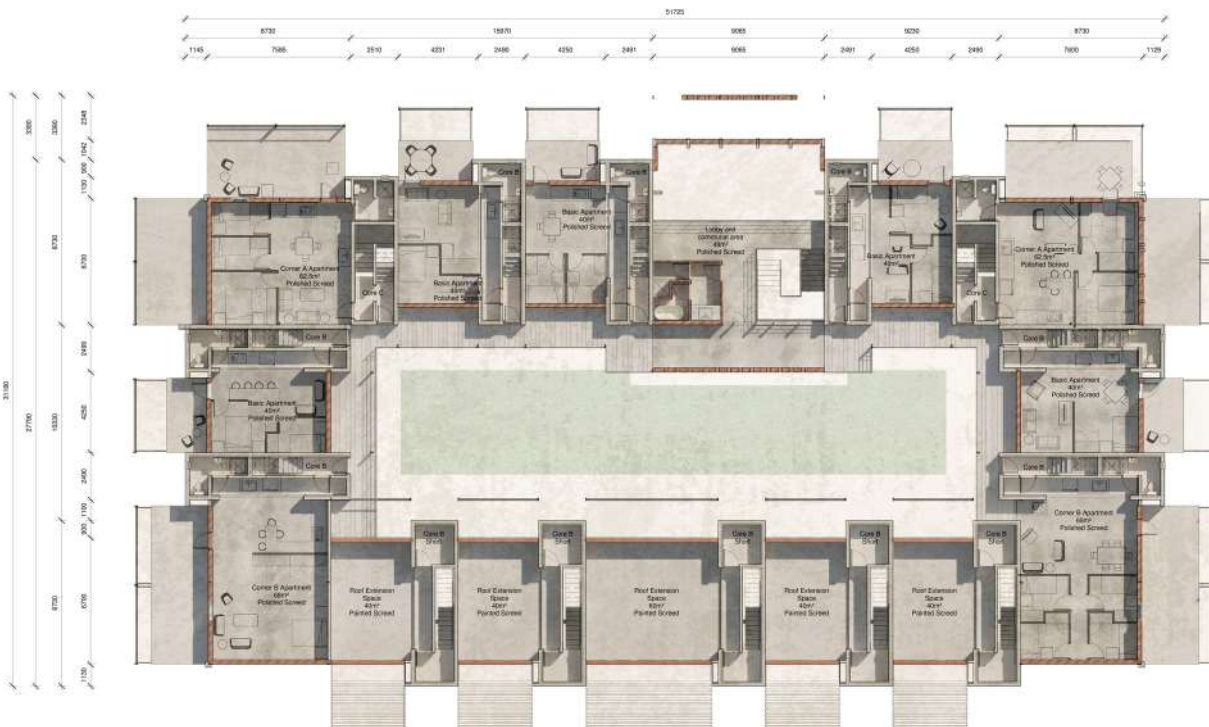
Residential units

Figure 145 First floor cluster layout and design. By author

Figure 146 Cluster elevation, before intervention of residents. By author

7.19) FINAL CLUSTER DESIGN

147



148



Figure 147 First floor cluster layout and design. By author

Figure 148 Cluster elevation, before intervention of residents. By author

BLOCK SPATIAL PERSPECTIVES

7.20) BLOCK SPATIAL PERSPECTIVES

The perspectives illustrate how the spaces within the designed larger site would feel like once its populated

*Interior courtyard space
for each cluster*



street between blocks



Figure 149 Perspective of entrance
from eastern Shabangu avenue.

Figure 150 Perspective of central
square park and community centre.

7.21) COMMON HOUSE SEPTEMBER ITERATION

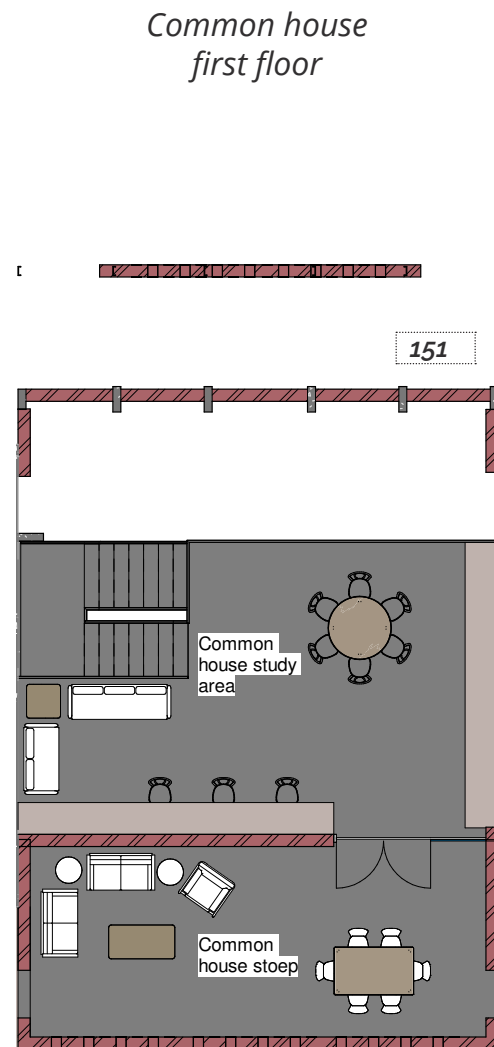
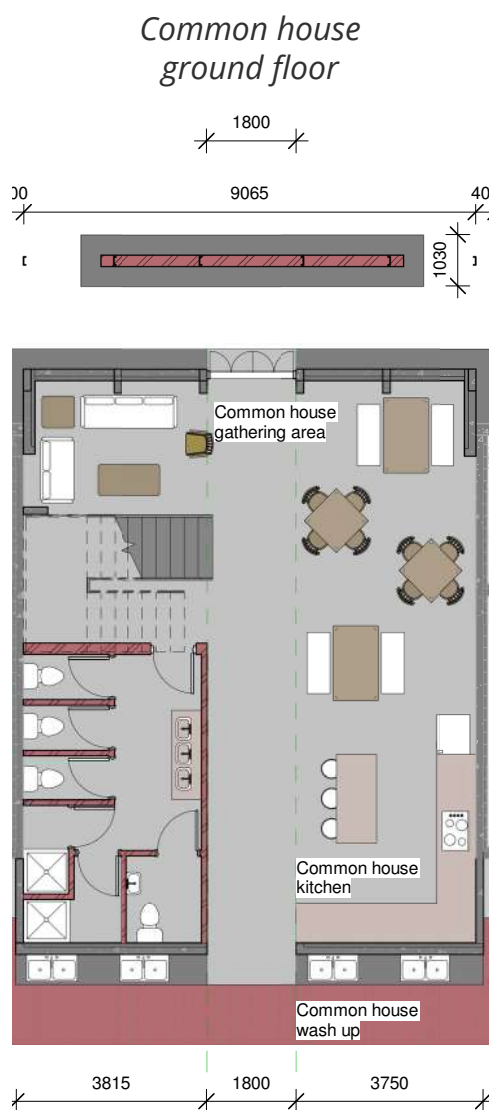
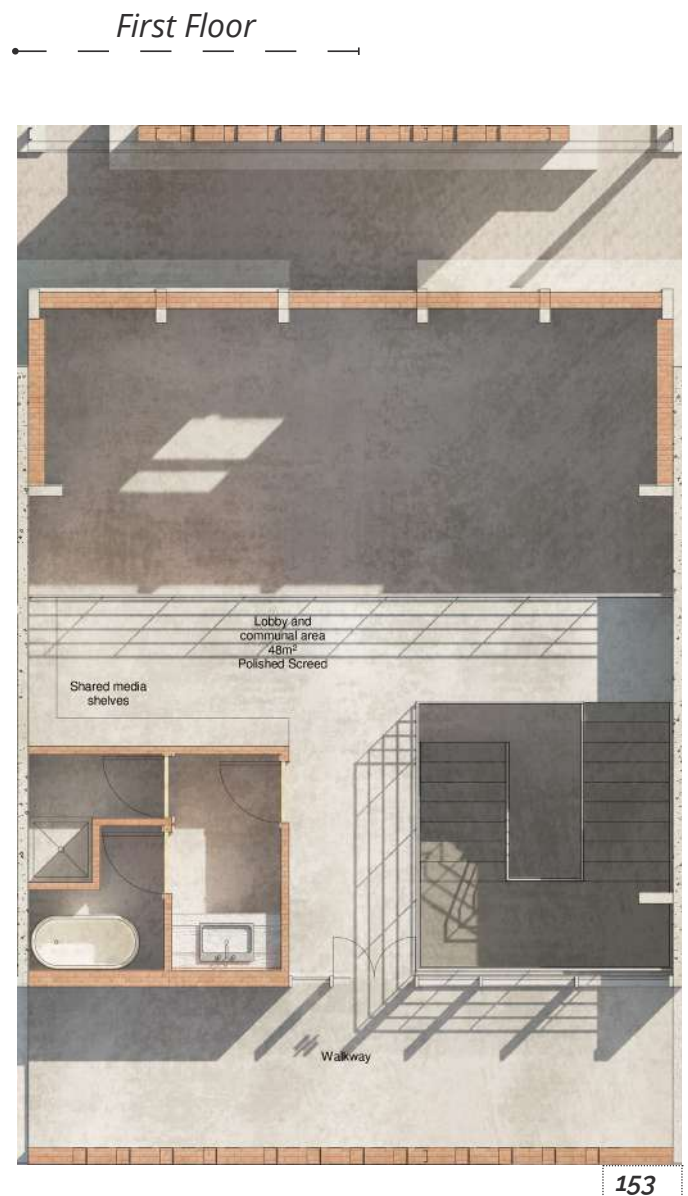
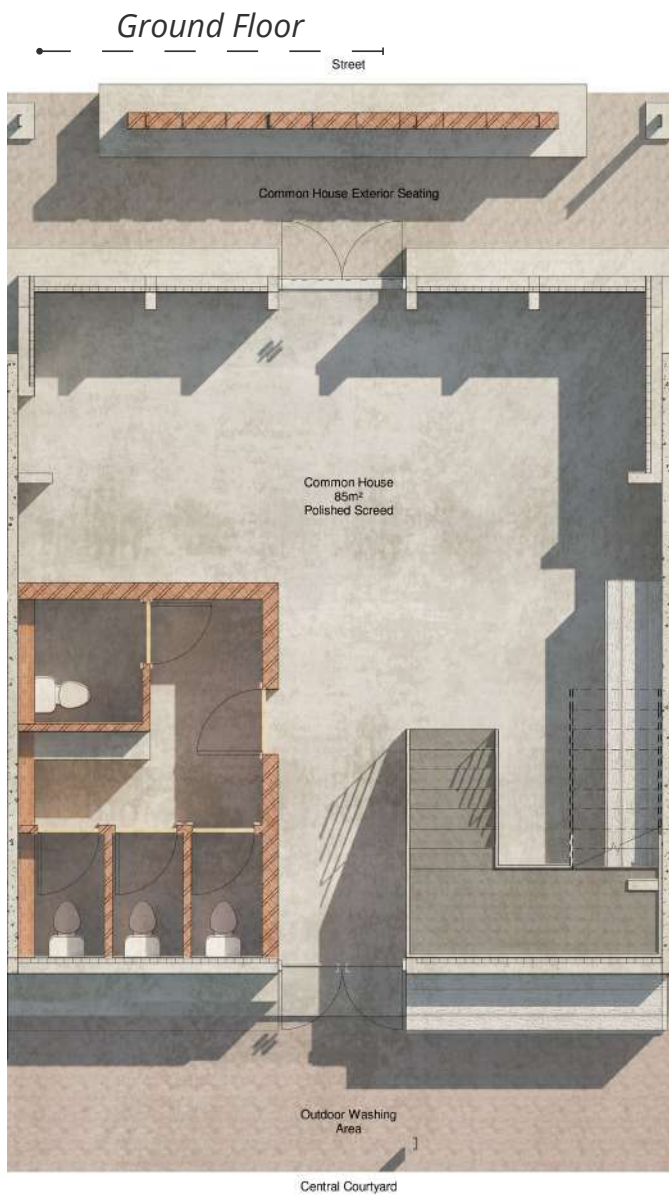


Figure 151 Floor plans of the common house (september iteration)

7.22) COMMON HOUSE FINAL ITERATION



152



153

Figure 152 Perspective of the entrance of the common house.

Figure 153 Floor plans of the common house.

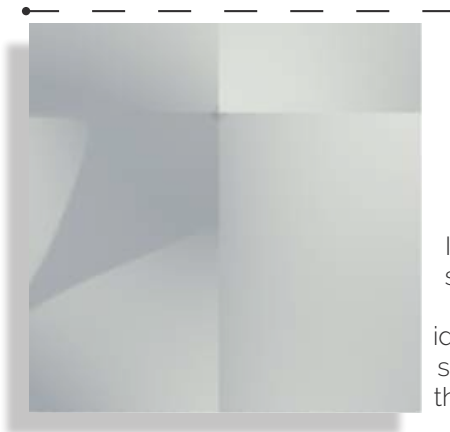
everyday



Everyday activities in a co-housing common house include

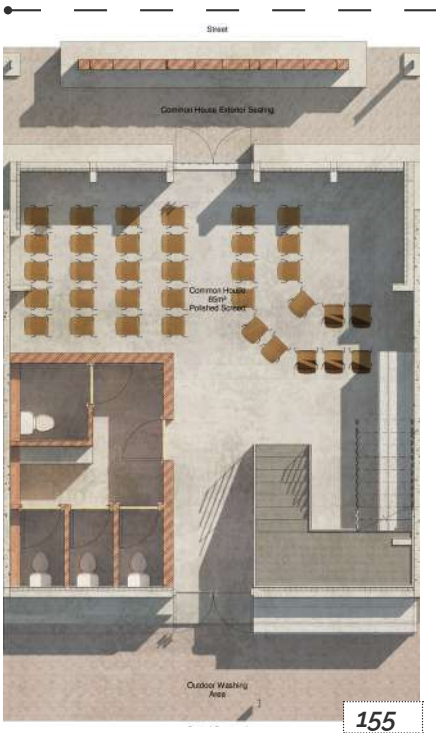
- communal group meal preparation
- group activities
- chore sharing

Street Wedding

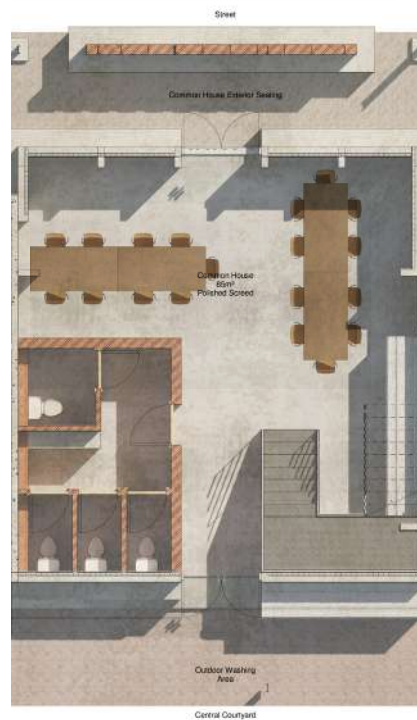


If a resident hosts a street wedding, the common house is ideal for acting as the support structure for the required facilities. The tent would be pitched in front of the common house.

Meeting hall



The common house must have a space where all of the residents of the cluster can meet formally for resident board meetings etc.



The kitchen and back yard will be used for food preparation and the open space can be used for table preparation and storage.

Figure 154 Floor plan of the common house in the everyday configuration.

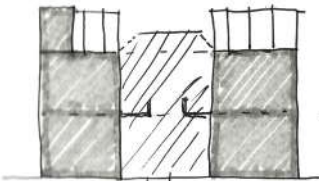
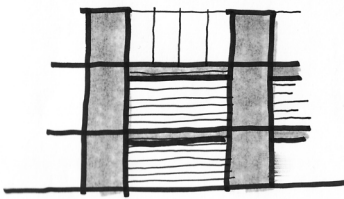
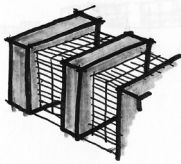
Figure 155 Floor plan of the common house in the meeting hall configuration.

Figure 156 Floor plan of the common house in the street wedding configuration.

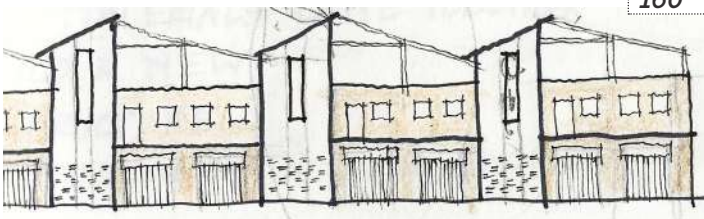
UNIT DESIGN

7.23) UNIT CORE-INFILL RELATIONS

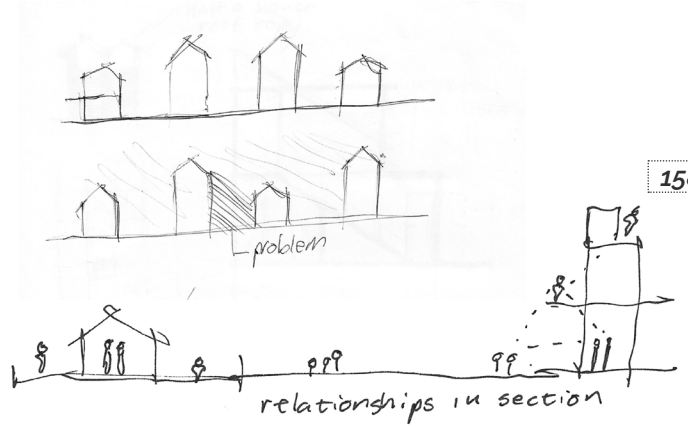
157



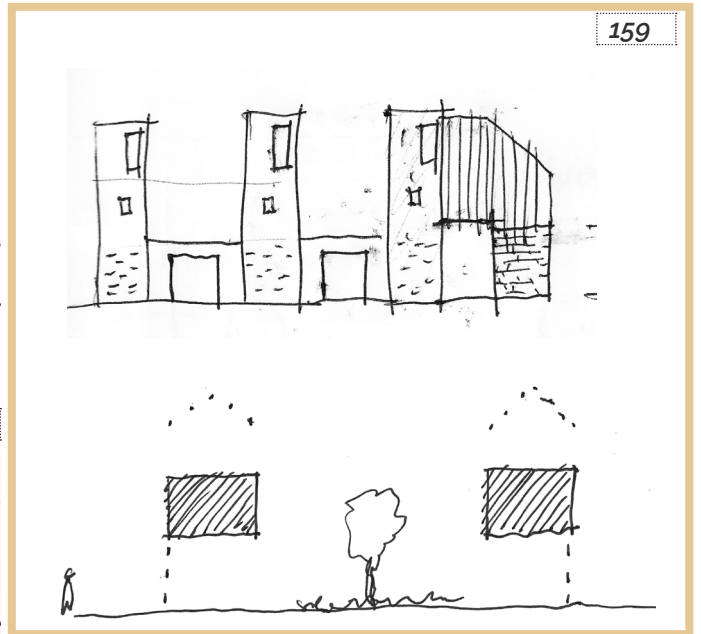
160



158



159



161

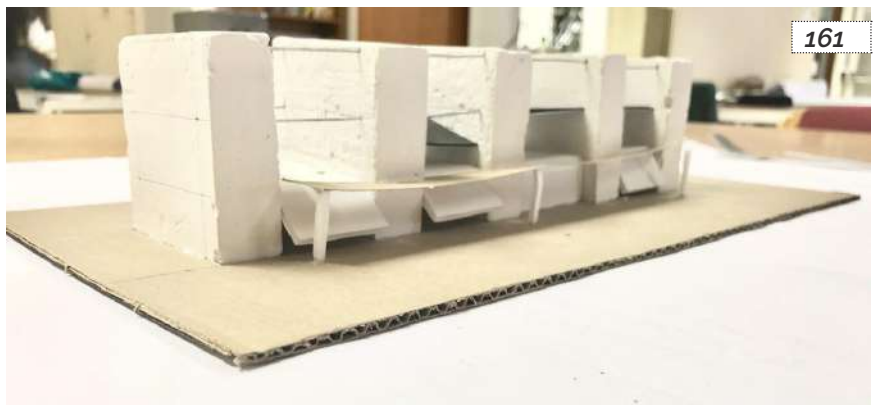


Figure 157 Illustrating the relationship between buildings. Illustrated by author

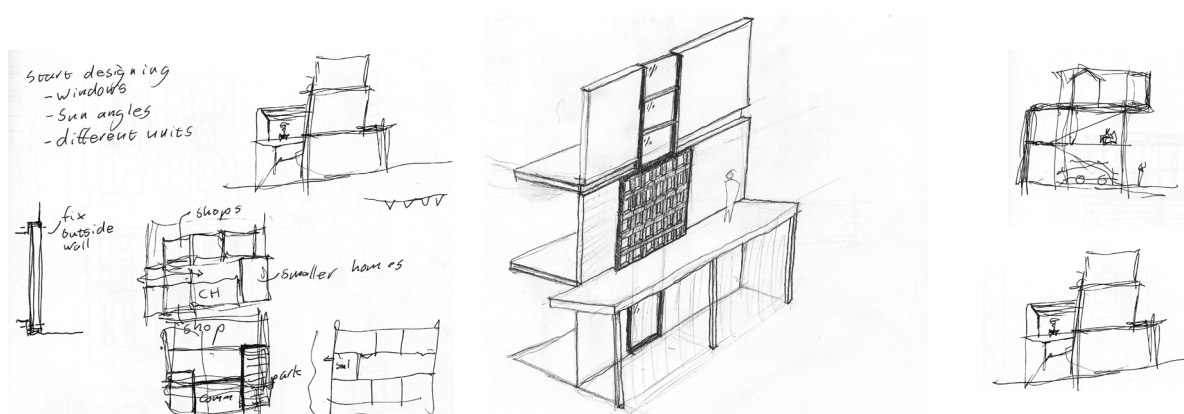
Figure 158 Illustrating the relationship between the co-housing and the residential street Illustrated by author

Figure 159 Illustrating the concept of core (given) space, and what could be infill. Illustrated by author

Figure 160 Illustrating the articulation between core and infill. Illustrated by author

Figure 161 Model built to illustrate the core and infill concept. Illustrated by author

flexible interior



Core-infill development

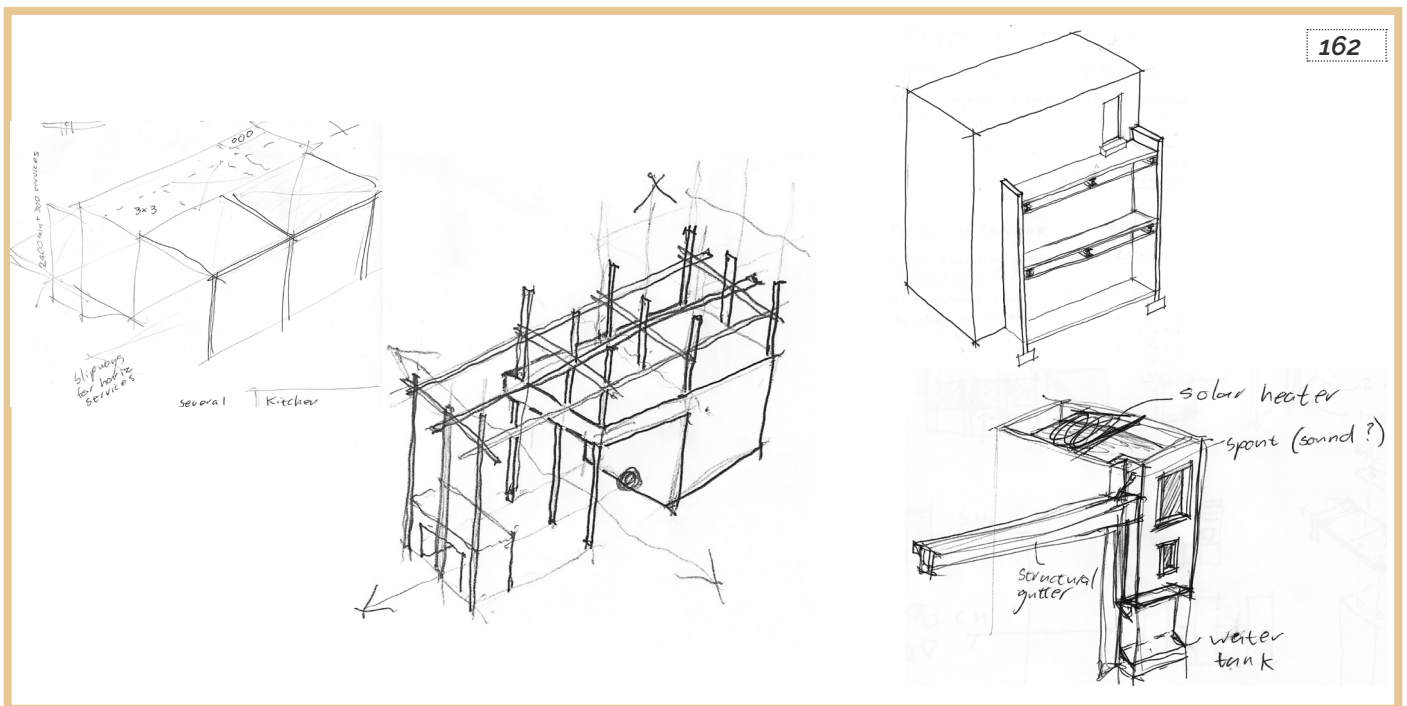


Figure 162 3D diagram of a unit. Illustrated by author.

7.24) CORE - STAIRS AND BATHROOM

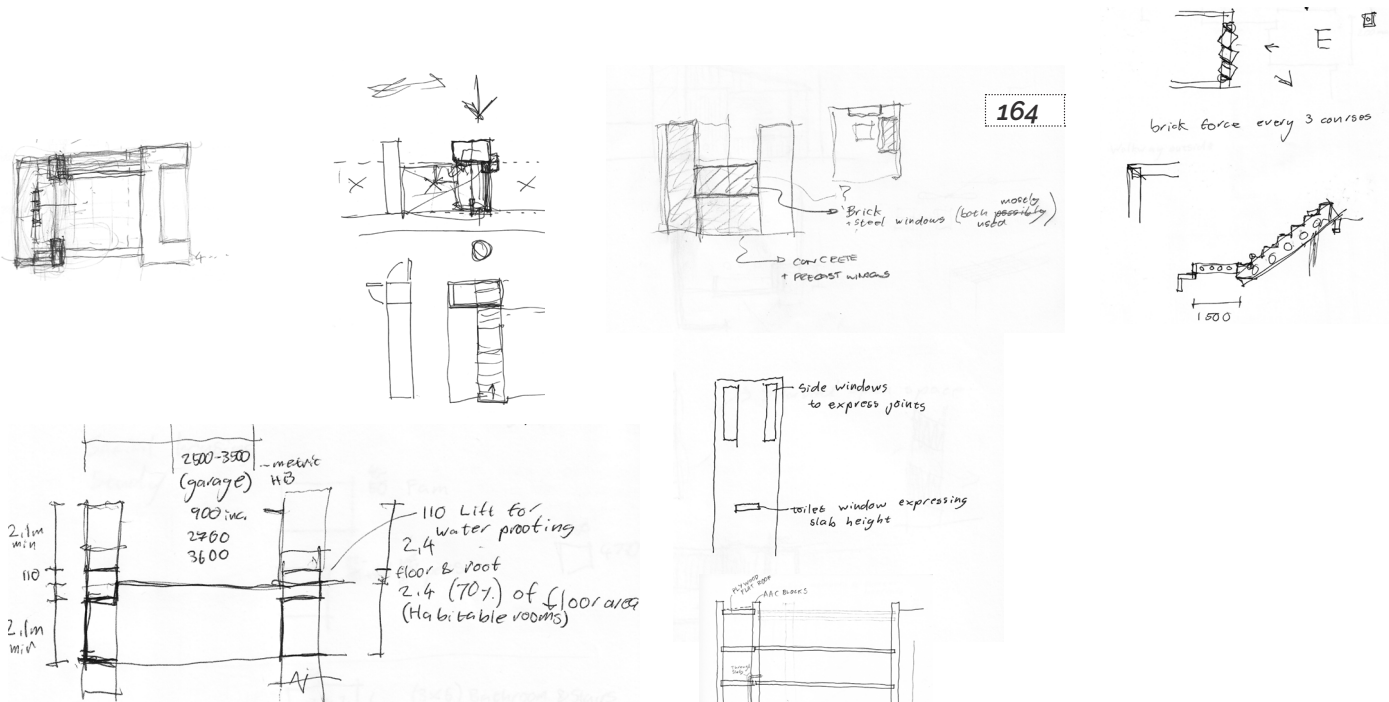
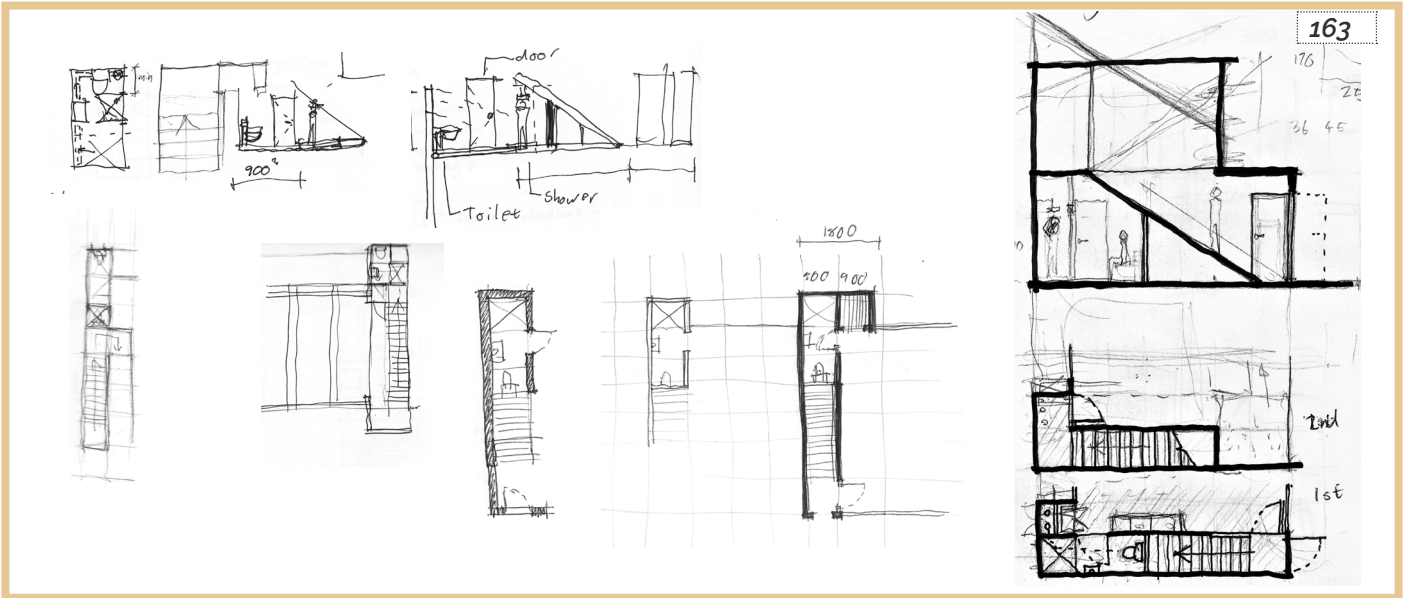


Figure 163 First floor plan indicating the stairwell and live space on the left and the populated first floor plan on the right. Illustrated by Author.

Figure 164 Top floor plan indicating the stairwell on the left and the populated top floor plan on the right. Illustrated by Author.

CORE VARIANTS

7.25) TESTING SIZES

In order to find the most suitable size and layout for the core design, it was decided to test the sizes of various options against each other. It was the authors decision to attempt to keep the size of the core within 30% of the total size of the unit. This was decided as the intention was that the core is the component that acts as necessity, and only that, therefore it should take up as little space as possible.

Of all the variants E, G and H, had the best percentage, however through incorporating these into the designed space it was found that the relative lengths of E and H were too long, as that would limit the size of the internal courtyard. And G was found to have

a very impractical bathroom design. With all three having uncomfortable entrance points.

For these reasons, B and F were stronger options with B being the most suitable.

There was a need for a dogleg stair on some units as this was the only suitable way for both the top floor and the ground floor to be connected to the living unit but the stairs either took up too much space of the compact version was too narrow from end to end and they were too big to fit below 30. The corner units, are bigger and have more need for double access therefore variant C became viable for only those units.

A	C - 14.36	29%
	L - 35.37	
	T- 49.73	
B	C - 15.1	30%
	L - 35.37	
	T- 50.47	
C	C - 19.5	45.5%
	L - 23.3	
	T- 42.8	
D	C - 19.56	38.75%
	L - 30.9	
	T- 50.47	
E	C - 15.6	27%
	L - 40	
	T- 55.6	
F	C - 16.36	29%
	L - 40	
	T- 56.36	
G	C - 16.49	27.8%
	L - 42.75	
	T- 59.24	
H	C - 17.23	28.7%
	L - 42.75	
	T- 60	

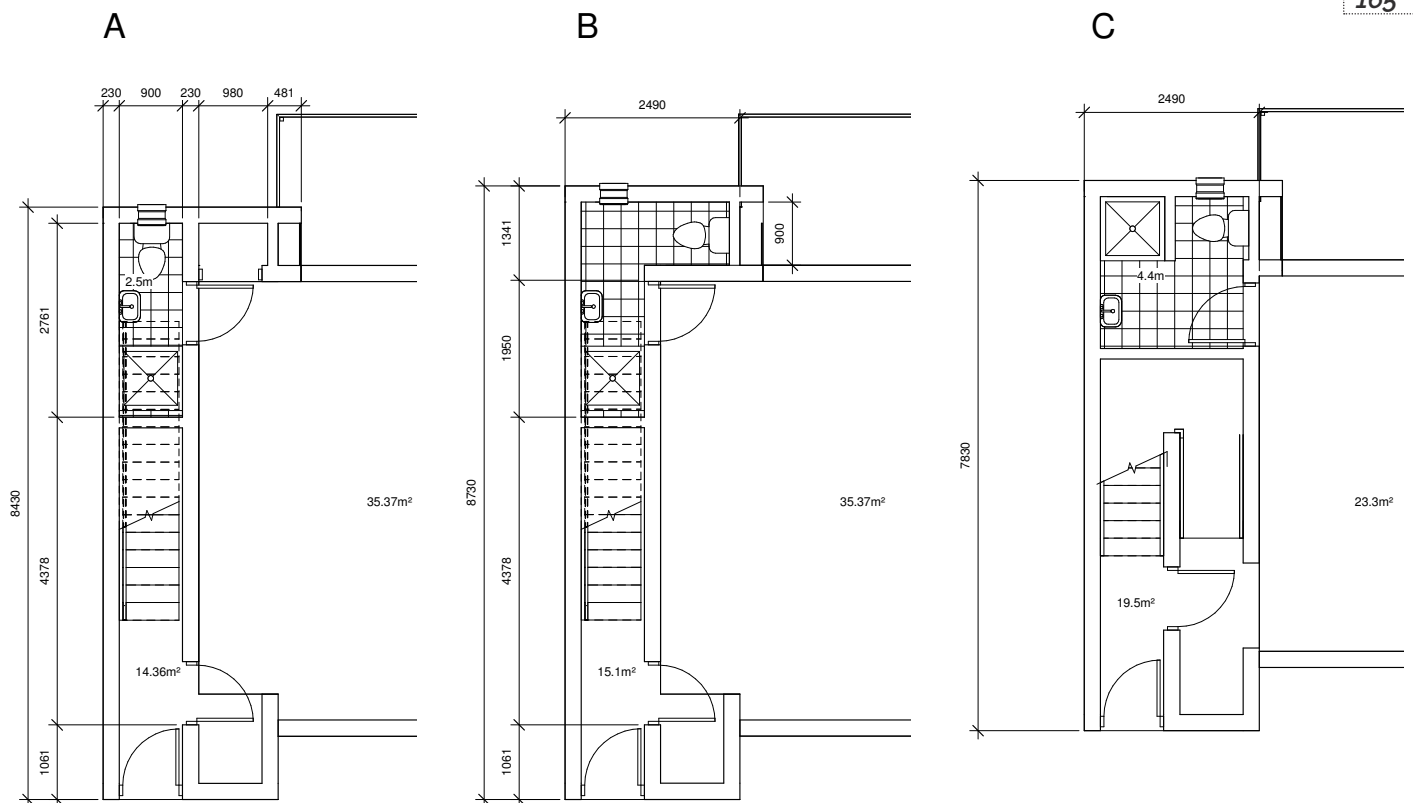


Figure 165 Variants A- C on the core layout, to determine the most efficient plan, By author

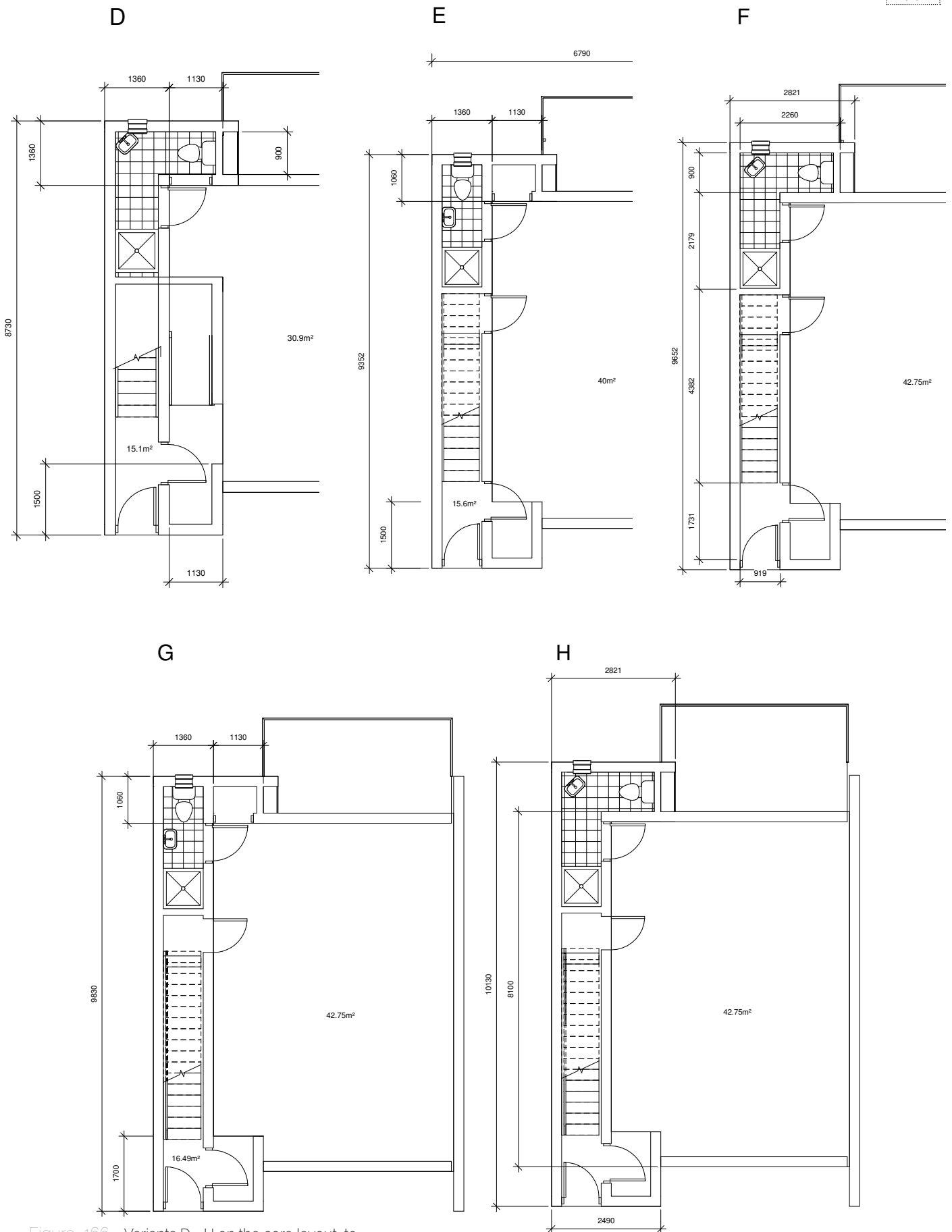


Figure 166 Variants D - H on the core layout, to determine the most efficient plan. By author

7.26) UNIT DESIGN PROCESS

The design of the units were driven by the size and layout of the supporting cores, as they function as the infill for the core as seen in figures 157 and 158.

The intention was for a flexible interior. The following pages illustrate

various configurations and layouts in the different sections of the cluster design, including medium sized units (40 m²) as well as a larger units (60 m²).

The iterations illustrate how much variety a single unit can hold, with one to four occupants in most of the units.

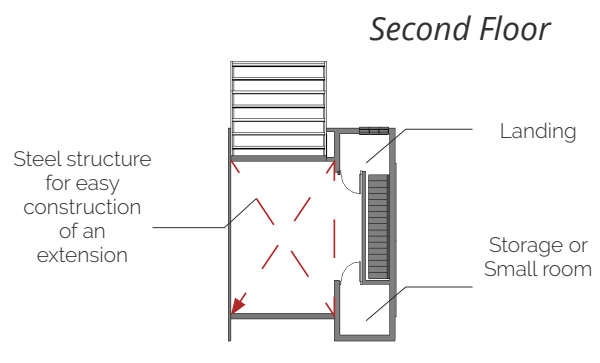
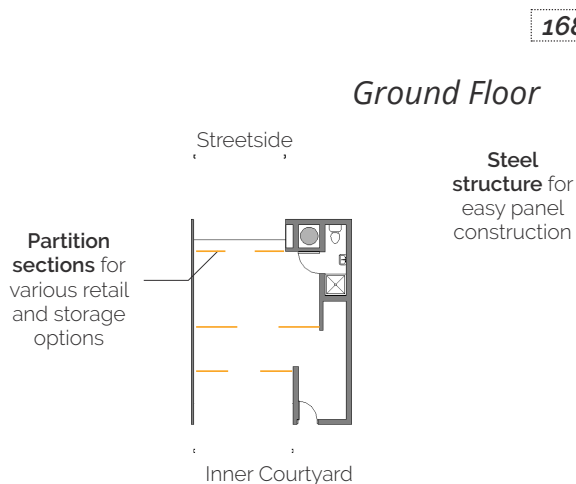
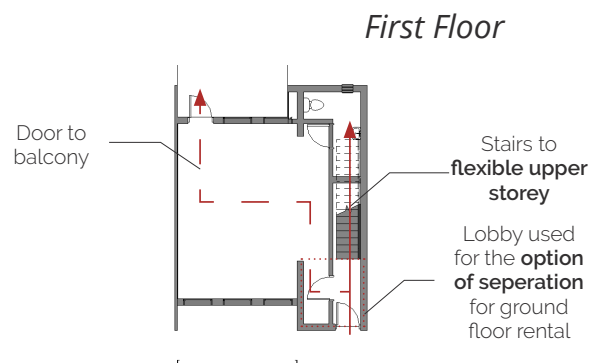
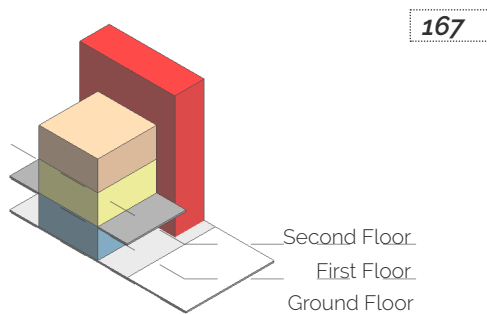


Figure 167 3D diagram of a unit. Illustrated by author.

Figure 168 Floor plans indicating the basic spatial layouts of the three levels.

OCCUPATION SCENARIOS

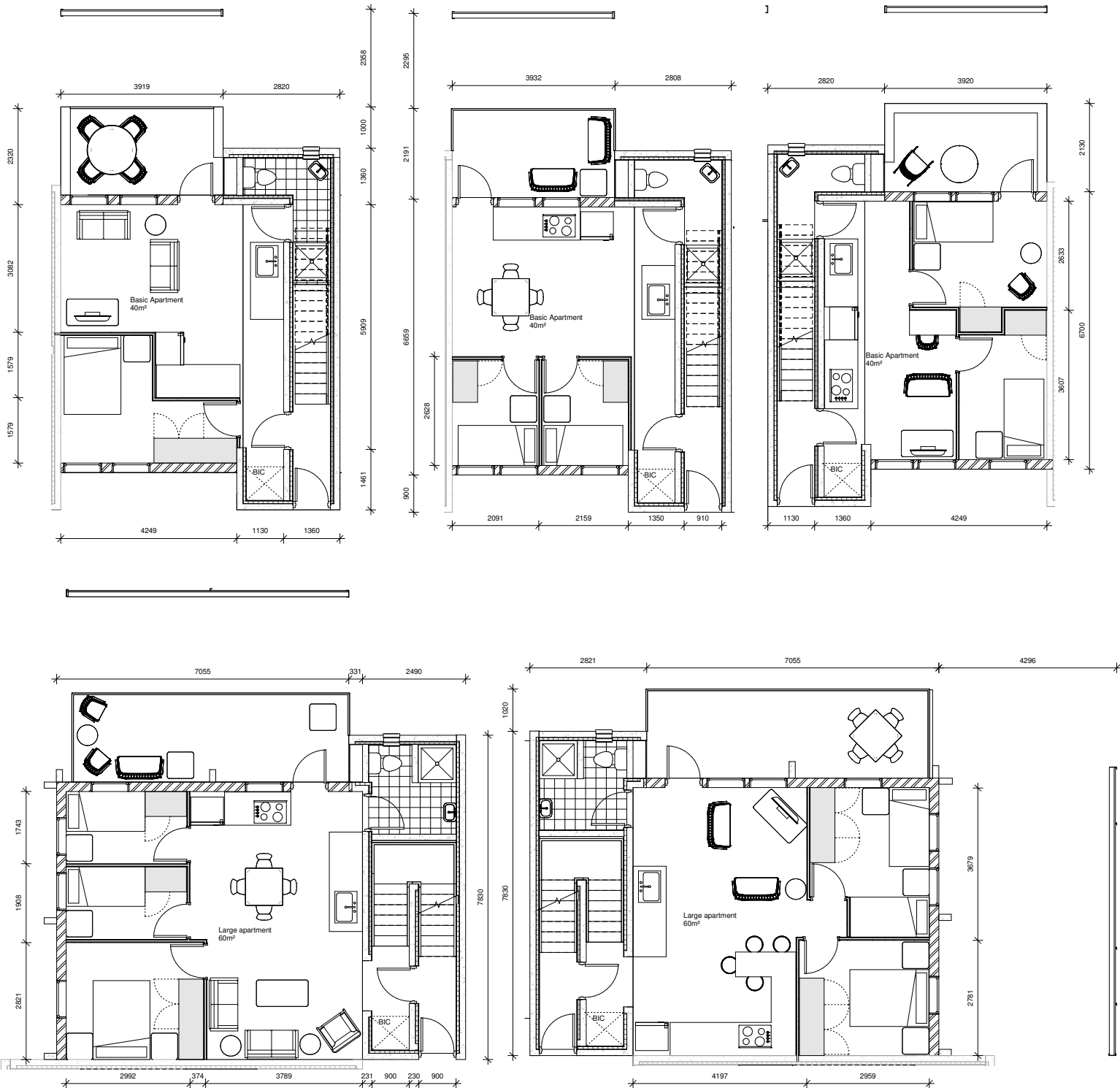


Figure 169 Floor plan iterations, By author

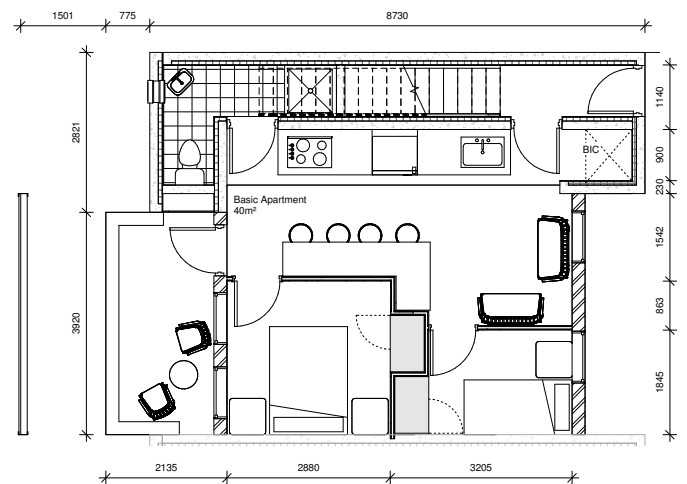
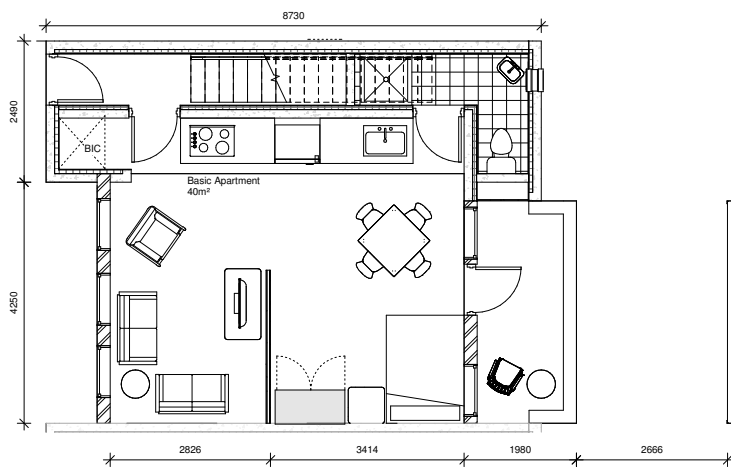
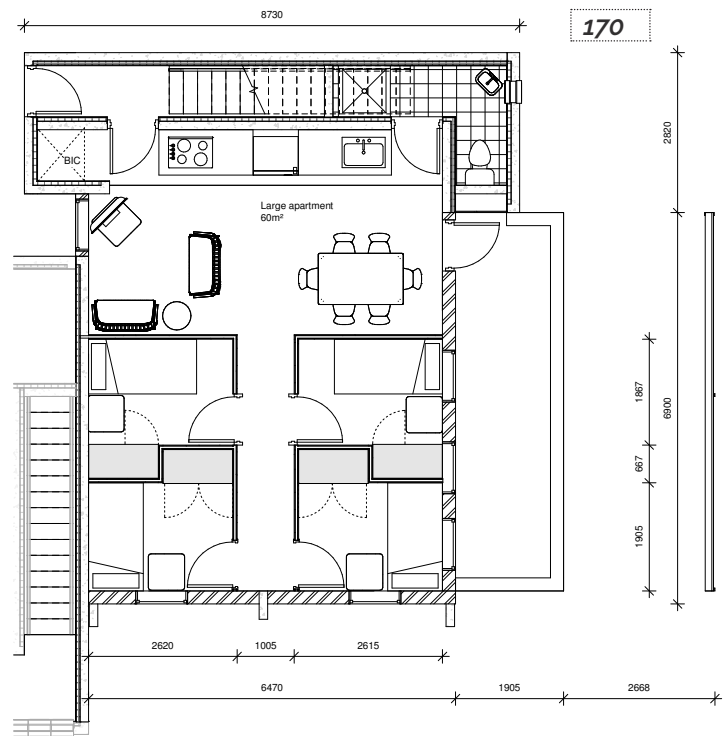
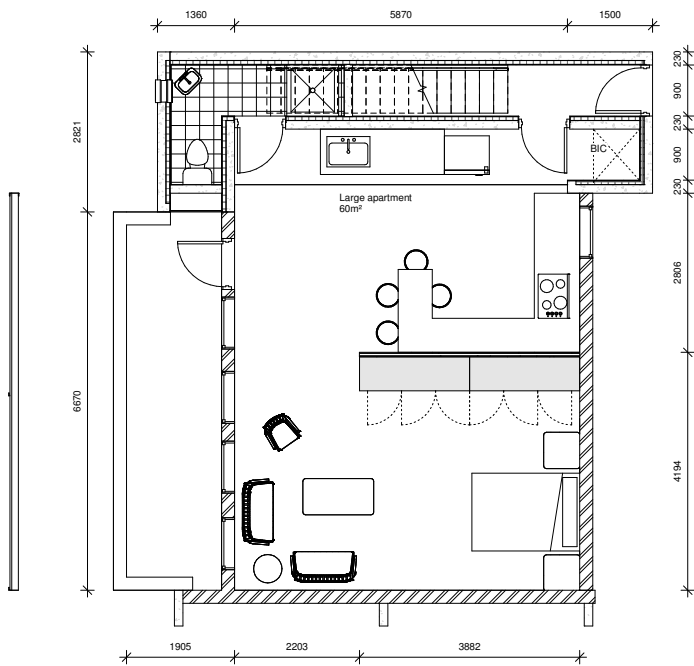
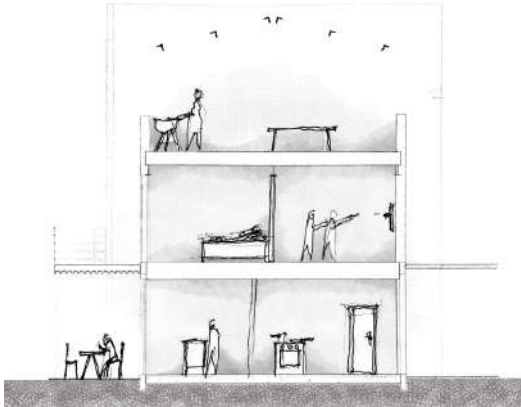


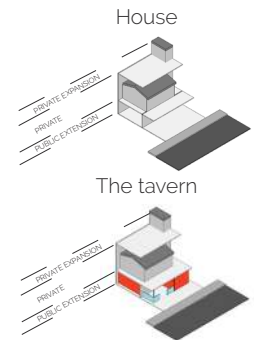
Figure 170 Floor plan iterations, By author

Social based

171

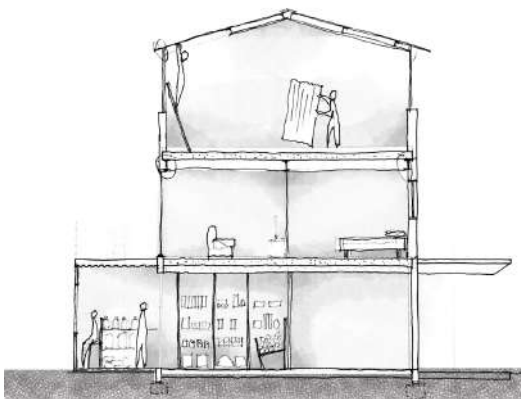


- **Commune**, groups of **young adults** starting life.
- Using the street level expansion space for **selling food**, drinks and to **create an atmosphere**.
- Rooftop extension as **outdoor social space**

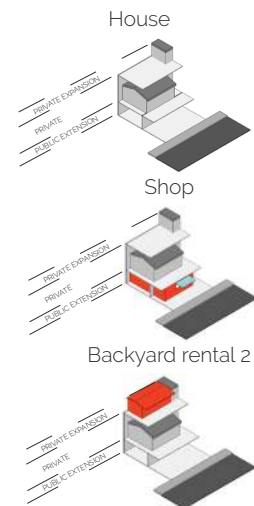


Commercial based

172

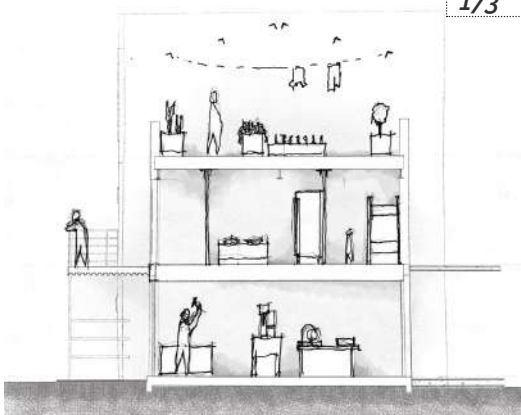


- **Spacious living** with couple or single.
- Using the streetlevel expansion space for **general retail**.
- Rooftop extension maximised as a residence to be **rented out**.



Family based

173



- **Compact rooms** for full family within standard unit
- Street level expansion space used as a **workshop for production**.
- Rooftop extension used for **growing produce and clothes washing**

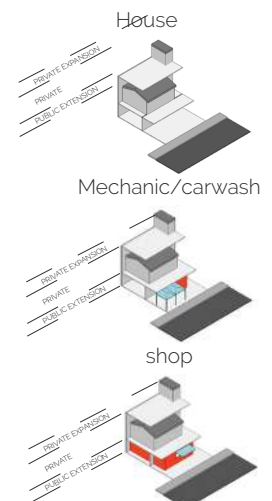


Figure 171 Sectional sketch of a residential unit in a social based occupation. Drawn by author

Figure 172 Sectional sketch of a residential unit in a commercial based occupation. Drawn by author

Figure 173 Sectional sketch of a residential unit in a family based occupation. Drawn by author

UNIT DESIGNS

7.27) UNIT ITERATION (SEPTEMBER)

The unit being the expression of the typology study chapter. The core acts as the service core and structural core.

174

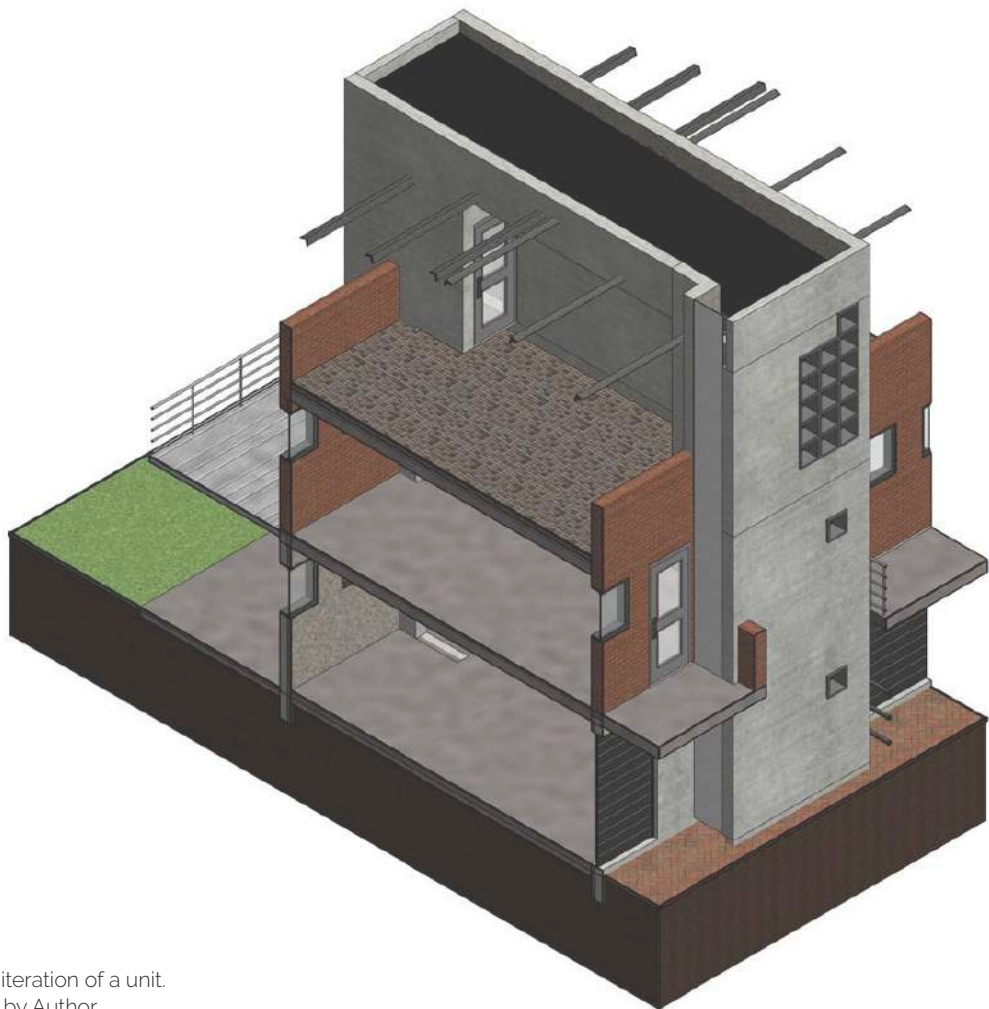


Figure 174 The final iteration of a unit.
Modeled and rendered by Author.

7.28) UNIT ITERATION (OCTOBER)

The current unit iteration has a more expressive steel structure that allows for more adaptability for the residents as well as creates a strong connection to the street in front of the unit by bringing the pedestrian into the structure.



175

Figure 175 The october iteration of a unit. Modeled and rendered by Author.

FLOOR PLANS

7.29) GROUND FLOOR PLAN



Figure 176 The final iteration of the ground floor plan

Internal Street



F
H
L
P
P
L
H
L

Street



7.30) FIRST FLOOR PLAN



Figure 177 The final iteration of the first floor plan.



7.31) SECOND FLOOR PLAN



Figure 178 The final iteration of the second floor plan



7.32) ROOF PLAN

179

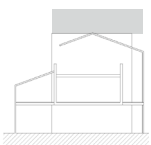
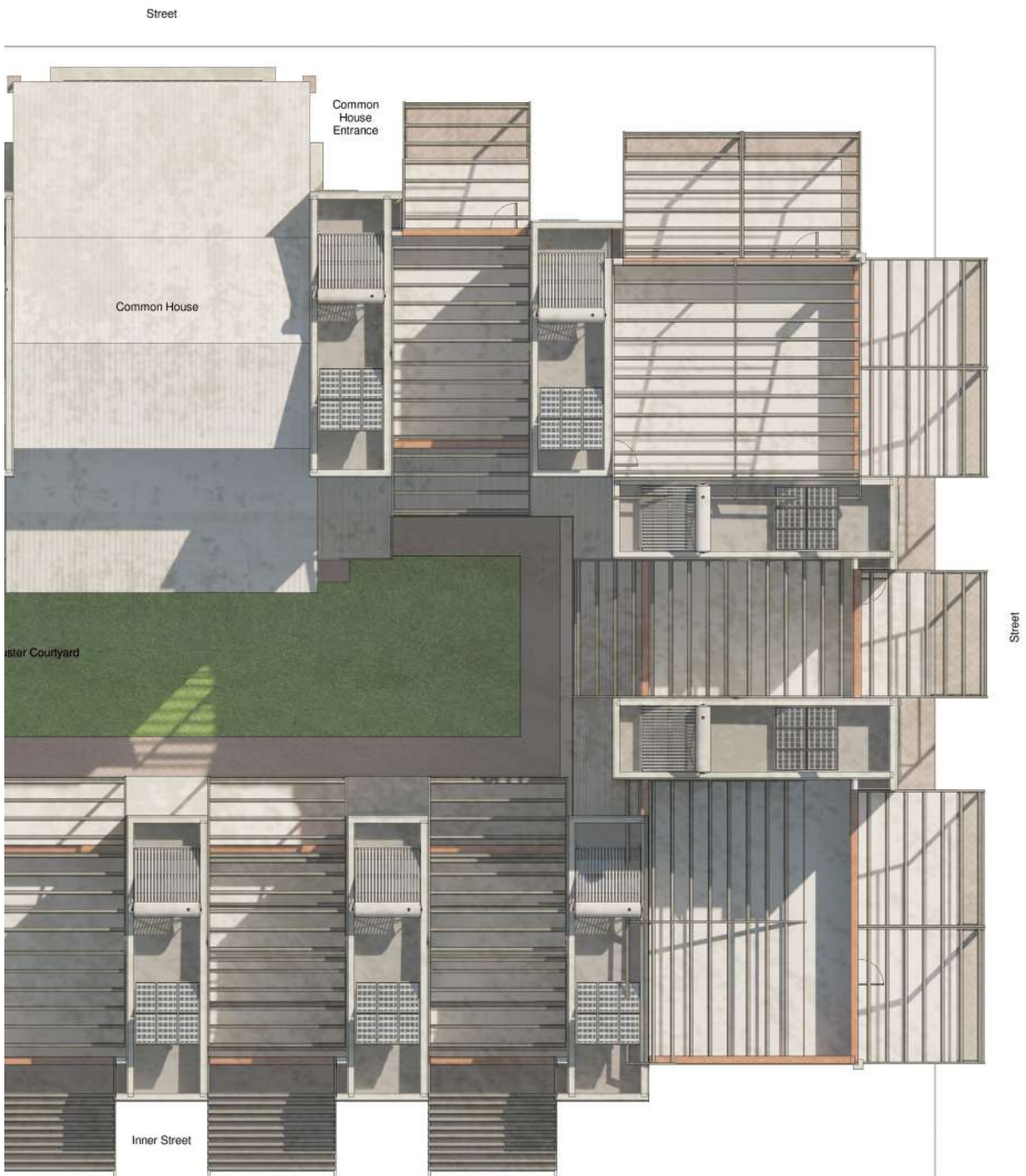


Figure 179 The final iteration of the roof plan.



SITE RE-USE

7.33) INTENTION

In Context (Ch.1.10), the hostels are presented as dilapidated and detrimental to the area. The project intention is to replace the existing hostels but as it has been a part of the community for decades and it is part of a designers responsibility to not create waste, the existing structures must find purpose within the new design.

7.34) RE-USE OF MATERIALS

In Figure 18070 it can be seen that the window frames are in tact and working (no. 2). They have been identified as 900 x 900 steel window frames. The glass has been broken or removed and replaced with plastic (1), this can be replaced with new glass panes. The floor slabs (3) will not be demolished and will be used as paving and to cast concrete panels on.

Figure 181 shows (1) the condition of the roof and its structure, which is the condition of most of the roofs in the site, which means that they are not suitable for re-use in a building but the broken roof sheeting could be used for site work border fencing. Figure 1815, (2) shows the general stability of the brick courses, this deterioration of the mortar, causing the bricks to fall out, can be seen on many of the buildings' corners. On closer inspection the bricks were in good condition, it was only the mortar and plaster that was failing. These bricks can be used for non-structural walls, paving and can be ground up for aggregate.



Figure 180 A photograph showing South West entrance to the hostels from the adjacent field. Photo taken by author.

Figure 181 A photograph of the exterior boundary condition of the site. Photo taken by author.

Technical

Part 8

This chapter expands on the technical aspects of the design which includes material choice, construction methods, details and technical drawings

INTRODUCTION

8.1) PROCESS

The concept of the extension of streetscape into co-housing continues into the technical explorations.

The informants of incrementality become one of, to what extent does the architect provide structure, curate the extensions and allow for flexibility

8.2) TECHNICAL QUESTION

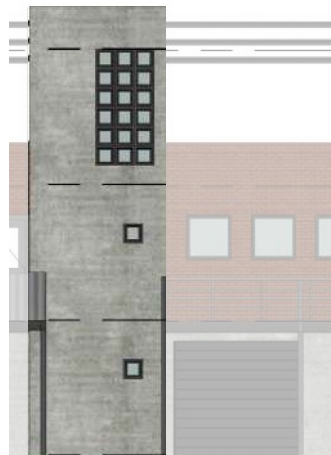
How can incrementality be curated as well as facilitated through structure and materials to promote controlled growth?

8.3) SEPARATE ELEMENT

Each of the core, Live space and addition elements of the design require different specific materials that convey its temporality as well as functioning structurally.

Most essential aspects are arranged into the different aspects of the price (being speed, basic cost and availability), Familiarity (the connotations, similarity to contextual structures and tactility) and permanence (ease of maintaining the building, the fixings and adaptability).

182



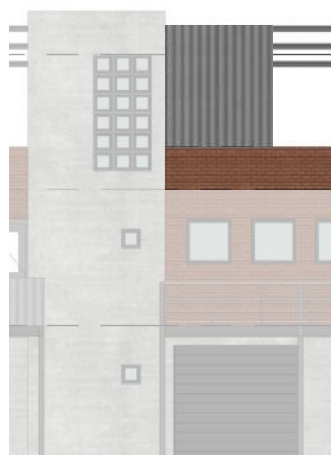
Core

The core is the structure and service core, the infrastructure that the incrementality can be supported by.



Live

The residence, this is the home, the space which will be used to live in. The bedroom, the kitchen and living room will expand into this space.



Addition

The addition is the 'back yard' where the backyard shack typology can be easily constructed, gardens can be grown and private gatherings can take place.

Figure 182 Series of front elevations illustrating the different elements of the design. Illustrated by author.

MATERIAL MATRIX

8.5) CORE

Tactility, the core must have the impression that it is a solid heavy unmoveable object.

Durability, the core must be extremely durable to both the environment and impact from surrounding construction as such, durability is considered to be more important than maintenance.

First Build, as the first and most crucial element to be built, the core must be able to be built quickly. Material cost and availability are not as crucial for this material choice.

Adaptability, the core should not be adaptable as it is the structure and holds the services.

Connotations and Perceptions, the Core requires to have a lower familiarity with Mamelodi West

Connections and fixings, the core must have hard fixtures that are either difficult to remove or require powerful equipment

Concrete panelling

With a score of 6/6 it is the most suitable construction material for the core. This material is ideal as it conveys solidity, is fast to assemble and the rigidity of the material prevents it from being altered by the residents.

8.4) LIVE

Mamelodi relevance, as the residence it must be visually recognisable as something similar to the houses in the context Tactility is not as important as familiarity.

Durability, the structure is the home supplied by the developer and needs to last at least until the resident can either extend or improve the structure.

First build, the speed of construction is crucial as it must be completed for the building can be rented or sold.

Maintenance, as this is a resident controlled space, they must be able to be responsible for maintaining the structure.

Adaptability, the ease at which the resident can change the house helps them improve it when they can afford it.

Material cost, the price that the developer must pay after the construction must be low as it does not need to be structural.

Availability, if the material is readily available, then it could be sourced from local retailers.

Brick (exposed, reused or plastered)

With a score of 6-6.5/7, brick is the most suitable construction material for the live space. The material works as it is familiar to the residents of Mamelodi and local skills allow for it to be functional as a semi-flexible material.

8.6) ADDITION

Durability, the structure should be durable as it is often used to build semi-permanent extensions to the live space.

First build, the speed of construction is crucial as it will be built by the resident and speed means money saved and ease of construction.

Adaptability, the ease at which the resident can change the addition is important as the intentions of the space must be able to be flexible.

Connotations and perceptions, unlike the live space, the material should be one that is considered cheap and easy to use.

Material cost, for additions to be quickly built, they must be cheap for the resident to be able to change the space quickly.

Availability, if the material is readily available, then it could be sourced from local retailers.

Connections and fixings, the material should be easy to take apart and reassembled to improve the ease of flexibility of the space.

Corrugated sheeting

With a score of 7/7, corrugated sheeting is the best choice as it is cheap and flexible. Local skills and availability make corrugated sheeting a cheap and fast to erect construction material, ideal additions.

8.7) CORE MATRIX

MATERIAL NAME	MAMELODI RELEVANCE	TACTILITY	DURABILITY	FIRST BUILD (PUT TOGETHER)	MAINTENANCE
Brick	Additions to buildings are commonly made in exposed brick	mildly rough, grout is smooth, gaps add additional texture	Durable on the interior but the exterior can be deteriorated by sun and water causes mineral decomposition	Easy but slow, common building material in South Africa	Difficult, requires replacement of materials
Brick (reused)	Additions to buildings are commonly made in exposed brick	mildly rough, grout is smooth, gaps add additional texture	As second hand, it is often compromised Durable on the interior but the exterior can be deteriorated by sun and water causes mineral decomposition	Easy, but extremely slow ((processing of old bricks takes long) common building material in South Africa	Difficult, requires replacement of materials
Brick (plastered)	The original NE51/9 houses were plastered. Additions are occasionally plastered.	Smooth to rough continuous surface sandy and temperate	The plaster acts as a protective layer but is only semi durable due to cracking when applied imperfectly or difference in expansion to inner wall material	Easy but slow, common building material in South Africa as well as finish	Easy, maintenance is only required on the plaster which can be scraped off and patched.
Concrete panels	None	smooth cold surface	Highly durable with discolouration, does not cope well with penetration damage	Difficult but extremely fast , requires a skilled team and a crane (size depends on panel size)	Moderate, can be patched but cracks and mismatched colour can be expected.
Concrete in-situ	None	smooth cold surface	Highly durable with discolouration, does not cope well with penetration damage	Difficult and moderate speed , but faster than brick requires a large team and specialised equipment	Moderate, can be patched but cracks and mismatched colour can be expected.
concrete block	Minimal Additions.	rough, patterned between blocks, often plastered	Durable but vulnerable to penetration damage, often coated with a plaster finish	Easy but slow, common building material in South Africa	Difficult, requires replacement of materials unless plastered in which case it will be easy.
aircrete	None	rough sandy	Very durable, naturally waterproof and fire resistant. Vulnerably to penetration damage.	Very easy and fast, material can be reworked in size and shape with basic tools and construction is the same as common building materials in SA.	Moderate, can be replaced
Corrugated iron	Temporary structures default material.	smooth wavy (rounded) cold to touch	Durable dependant on treatment (galvanized)	Easy and fast, common building material in South Africa as well as finish	Moderate, whole sheets must be replaced depending on damaged, dents can be hammered to correction.
Timber	None	Highly textured can be smooth dependant in finish, warm soft to the touch	Low durability, vulnerable to sun and water	Easy and fast, common building material in South Africa as well as finish	Difficulty depends on level of neglect. treatment is required regularly or replacement will be necessary.
Stone	History of additions to churches	Hard and cold, roughness dependant on cut	Extremely durable	Medium difficulty and slow, it takes an experienced builder to construct and the material is heavy.	Moderate depending on finish.
gypsum	None	Low smooth texture, papery feel to the touch	Not durable, easily damaged or warped by water.	Easy and fast, modular.	Easy, can be patched and repainted. Larger issues can be resolved through easy replacement of modules.

ADAPTABILITY	CONNOTATIONS AND PERCEPTIONS	MATERIAL COST	AVAILABILITY	CONNECTIONS AND FIXINGS	APPROPRIATENES S o-6
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way.	Trusted common and reliable material	Cheap Longer	Common	Packed and fixed together with mortar, can be anchored and bolted into	3.5
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way.	Trusted common and reliable material	Practically free	Common	Packed and fixed together with mortar, can be anchored and bolted into	3
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way. New plaster will have to be applied.	Suburban, decent, trusted, common and reliable	Moderate	Common	Packed, fixed together with mortar and plastered, can be anchored and bolted into	4
Poor, can only be added to a new wall as aggregate.	Industrial, cold, hard, durable	relatively cheap (fast build)	Low due to equipment required	Placed by crane and either bolted by brackets or joined by the reinforcing, can be anchored and bolted into	6
Poor, can only be added to a new wall as aggregate.	Industrial, cold, hard, durable	relatively cheap (fast build)	Low due to equipment required	Poured into shuttering, can be anchored and bolted into	5.5
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the blocks will be broken and cannot be used again in the same way.	cheap, efficient	cheaper	Common	Packed, fixed together with mortar and plastered, can be anchored and bolted into but the block may be compromised if it is not filled with concrete beforehand.	5
Poor, Disassembly is difficult and grout will stick to the units, blocks could easily be reused as they can be cut to new sizes	Not known, but similar aesthetic to common concrete materials	Expensive	Unknown	Packed and grouted and plastered, can be anchored and bolted into	4.5
Excellent, the modules can be reused and easily readjusted, the sheet can stay waterproof if all the holes are resealed.	Cheap, temporary	Cheap, easy to source	Common	Must be fixed to a frame by drilling holes through the sheet and screwing or bolting to the frame, making use of a rubber washer to make the fixing waterproof.	1.5
Moderate to good, easy to disassemble and reassemble if the material is in good condition.	Varnished is considered to be classy, easy to use as a raw material but hazardous	Cheap	Common	Fixed to other timber using nails or screws, when fixing to other materials, steel plates and bolts are used between the materials.	2
Poor-moderate, the solid wall must be broken down and stone will have to be cleaned of grout or plaster but the stone is often not damaged in the process and can be fully re-used.	Of the earth, strong	Expensive	Moderate, only available affordable through acquiring manually from the mountain.	Packed, fixed together with mortar and plastered, can be anchored and bolted into	4.5
Excellent, the modules can be reused and easily readjusted if the frame is correctly installed	practical, soft, commercial	Moderate	Poor, not commonly used in residential areas. can be acquired second hand relatively easily.	Strud and track framing system, gypsum is screwed into place, can be screwed into but cannot carry much weight.	1.5

8.8) LIVE MATRIX

MATERIAL NAME	MAMELODI RELEVANCE	TACTILITY	DURABILITY	FIRST BUILD (PUT TOGETHER)	MAINTENANCE
Brick	Additions to buildings are commonly made in exposed brick	mildly rough, grout is smooth, gaps add additional texture	Durable on the interior but the exterior can be deteriorated by sun and water causes mineral decomposition	Easy, common building material in South Africa	Difficult, requires replacement of materials
Brick (reused)	Additions to buildings are commonly made in exposed brick	mildly rough, grout is smooth, gaps add additional texture	As second hand, it is often compromised Durable on the interior but the exterior can be deteriorated by sun and water causes mineral decomposition	Easy, common building material in South Africa	Difficult, requires replacement of materials
Brick (plastered)	The original NE51/9 houses were plastered. Additions are occasionally plastered.	Smooth to rough continuous surface sandy and temporate	The plaster acts as a protective layer but is only semi durable due to cracking when applied imperfectly or difference in expansion to inner wall material	Easy, common building material in South Africa as well as finish	Easy, maintenance is only required on the plaster which can be scraped off and patched.
Concrete panels	None	smooth cold surface	Highly durable with discolouration, does not cope well with penetration damage	Difficult but extremely fast, requires a skilled team and a crane (size depends on panel size)	Moderate, can be patched but cracks and mismatched colour can be expected.
Concrete in-situ	None	smooth cold surface	Highly durable with discolouration, does not cope well with penetration damage	Difficult, requires a large team and specialised equipment	Moderate, can be patched but cracks and mismatched colour can be expected.
concrete block	Minimal Additions.	rough, patterned between blocks, often plastered	Durable but vulnerable to penetration damage, often coated with a plaster finish	Easy, common building material in South Africa	Difficult, requires replacement of materials unless plastered in which case it will be easy.
aircrete	None	rough sandy	Very durable, naturally waterproof and fire resistant. Vulnerably to penetration damage.	Very easy, material can be reworked in size and shape with basic tools and construction is the same as common building materials in SA.	Moderate, can be replaced
Corrugated iron	Temporary structures default material.	smooth wavy (rounded) cold to touch	Semi-Durable, malleable, dependant on treatment (galvanized)	Easy, common building material in South Africa as well as finish	Moderate, whole sheets must be replaced depending on damaged, dents can be hammered to correction.
Timber	None	Highly textured can be smooth dependant in finish, warm soft to the touch	Low durability, vulnerable to sun and water	Easy, common building material in South Africa as well as finish	Difficulty depends on level of neglect, treatment is required regulary or replacement will be necessary.
Stone	History of additions to churches	Hard and cold, roughness dependant on cut	Extremely durable	Medium difficulty, it takes an experienced builder to construct and the material is heavy.	Moderate depending on finish.
gypsum	None	Low smooth texture, papery feel to the touch	Not durable, easily damaged or warped by water.	Easy, modular.	Easy, can be patched and repainted. Larger issues can be resolved through easy replacement of modules.

ADAPTABILITY	CONNOTATIONS AND PERCEPTIONS	MATERIAL COST	AVAILABILITY	CONNECTIONS AND FIXINGS	APPROPRIATENESS: 0-8
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way.	Trusted common and reliable material	Cheap Longer	Common	Packed and fixed together with mortar, can be anchored and bolted into	6
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way.	Trusted common and reliable material	Practically free	Common	Packed and fixed together with mortar, can be anchored and bolted into	6
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the bricks will be broken and cannot be used again in the same way. New plaster will have to be applied.	Suburban, decent, trusted, common and reliable	Moderate	Common	Packed, fixed together with mortar and plastered, can be anchored and bolted into	6.5
Poor, can only be added to a new wall as aggregate.	Industrial, cold, hard, durable	relatively cheap (fast build)	Low due to equipment required	Placed by crane and either bolted by brackets or joined by the reinforcing, can be anchored and bolted into	2
Poor, can only be added to a new wall as aggregate.	Industrial, cold, hard, durable	relatively cheap (fast build)	Low due to equipment required	Poured into shuttering, can be anchored and bolted into	2
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the blocks will be broken and cannot be used again in the same way.	cheap, efficient	cheaper	Common	Packed, fixed together with mortar and plastered, can be anchored and bolted into but the block may be compromised if it is not filled with concrete beforehand.	5
Poor, Disassembly is difficult and grout will stick to the units, a large portion of the blocks will be broken and cannot be used again in the same way.	Not known, but similar aesthetic to common concrete materials	Expensive	Unknown	Packed and grouted and plastered, can be anchored and bolted into	3
Excellent, the modules can be reused and easily readjusted, the sheet can stay waterproof if all the holes are resealed.	Cheap, temporary	Cheap, easy to source	Common	Must be fixed to a frame by drilling holes through the sheet and screwing or bolting to the frame, making use of a rubber washer to make the fixing waterproof.	5.5
Moderate to good, easy to disassemble and reassemble if the material is in good condition.	Varnished is considered to be classy, easy to use as a raw material but hazardous	Cheap	Common	Fixed to other timber using nails or screws, when fixing to other materials, steel plates and bolts are used between the materials.	4
Poor-moderate, the solid wall must be broken down and stone will have to be cleaned of grout or plaster but the stone is often not damaged in the process and can be fully re-used.	Of the earth, strong	Expensive	Moderate, only available affordable through acquiring manually from the mountain.	Packed, fixed together with mortar and plastered, can be anchored and bolted into	4
Excellent, the modules can be reused and easily readjusted if the frame is correctly installed	practical, soft, commercial	Moderate	Poor, not commonly used in residential areas, can be acquired second hand relatively easily.	Strud and track framing system, gypsum is screwed into place, can be screwed into but cannot carry much weight.	3.5

8.9) ADDITION MATRIX

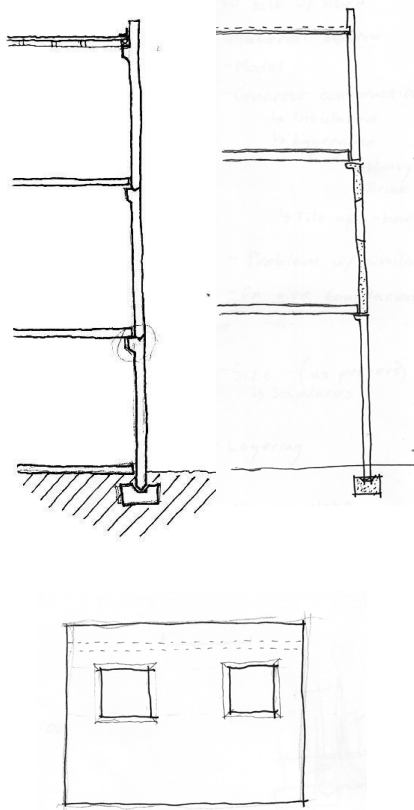
MATERIAL NAME	NUMBER OF WILDFIRES	FACTILITY	DURABILITY	FIXED BUILT OUT TOGETHER	MAINTENANCE
Brick	Adapted for buildings but commonly used in masonry work	extremely rough, great in smooth, glass and asbestos free	Extensive use of brick in building exterior can be demonstrated by use of brick in masonry construction	Very common building material in South Africa	Difficult, requires replacement of material
Brick (puzzell)	Adapted for buildings but commonly used in masonry work	extremely rough, great in smooth, glass and asbestos free	As issue of brick, masonry construction is made in the interior but, generally can be used outside by a good masonry construction	Very, common building material in South Africa	Difficult, requires replacement of material
Brick (clay/terracotta)	The original Moring House was built with masonry construction	Smooth to rough and porous surface, safety and fireproof	The original masonry construction was built with masonry but it is not clear the masonry is made in the interior or exterior or masonry is made in the interior	Very, common building material in South Africa	Very, maintenance is only required on the plaster which can be replaced off and patched
Concrete panels	None	smooth wall surface	Highly durable with excellent fire resistance and with good sound insulation	Very, common building material in South Africa	Medium, can be replaced but cracks and imperfections can be repaired
Concrete bricks	None	smooth wall surface	Highly durable with excellent fire resistance and with good sound insulation	Very, common building material in South Africa	Medium, can be replaced but cracks and imperfections can be repaired
Concrete blocks	Masonry construction	rough, porous, fireproof, of an exterior	Concrete blocks are made in masonry construction with a porous finish	Very, common building material in South Africa	Difficult, requires replacement of material unless plaster which can be replaced
Concrete	None	rough finish	Very durable, fireproof, excellent fire resistance and with good sound insulation	Very, common building material in South Africa	Medium, can be replaced
Corrugated iron	Temporary structure/default material	smooth, highly fireproof, low to high	Medium durable in exterior applications	Very, common building material in South Africa	Medium, while it can be replaced depending on damage, it can be replaced by other material
Insulation	None	Highly fireproof, of the smooth, resistant to heat, easy to use, of the wall	Highly durable, fireproof, excellent fire resistance and with good sound insulation	Very, common building material in South Africa	Difficult, depends on level of damage, insulation is replaced regularly or replacement will be necessary
Plaster	None	smooth, highly fireproof, low to high	Medium durable in exterior applications	Very, common building material in South Africa	Medium, depending on damage
Plasterboard	None	smooth, highly fireproof, low to high	Medium durable in exterior applications	Very, common building material in South Africa	Medium, depending on damage
Plaster (gypsum)	None	smooth, highly fireproof, low to high	Medium durable in exterior applications	Very, common building material in South Africa	Easy, can be patched and repaired. Larger areas can be replaced through replacement of material

STRUCTURE DEVELOPMENT

8.10) CORE PANEL ASSEMBLY AND JOINTS

The sectional 3D illustrated the relationship between the core and the incremental layers.

The core supports the incremental layers structurally as well as containing the services and circulation.



8.11) CORE ROOF

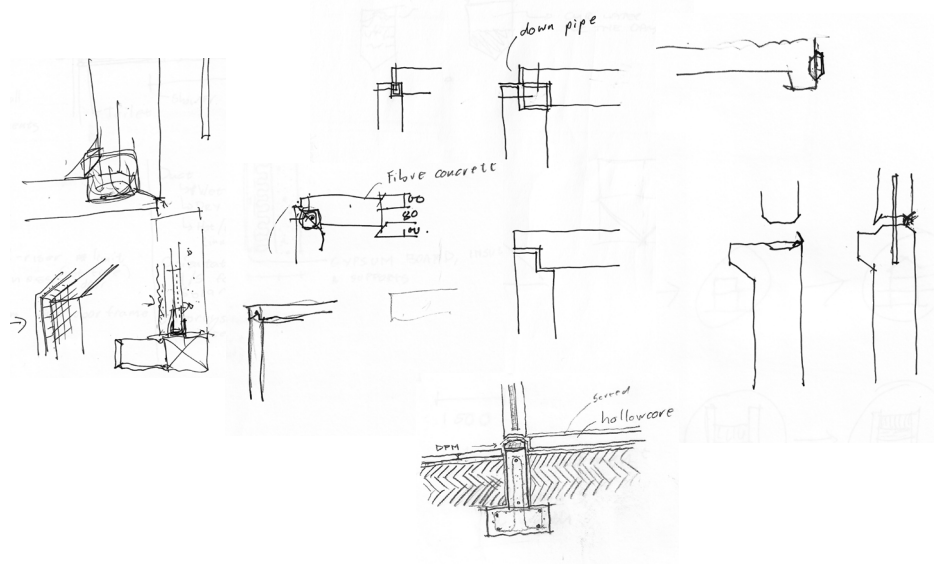
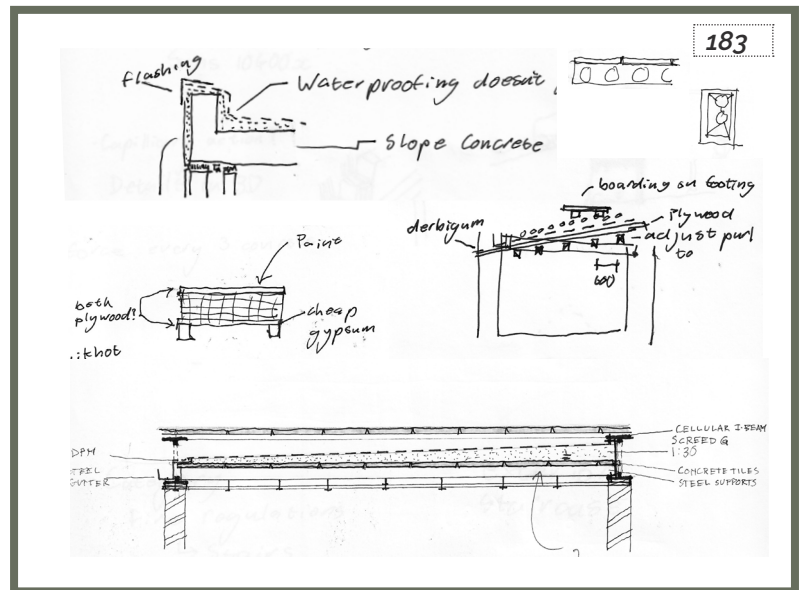
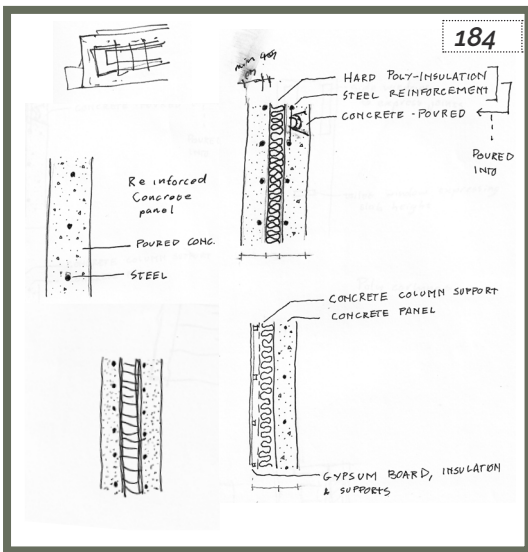
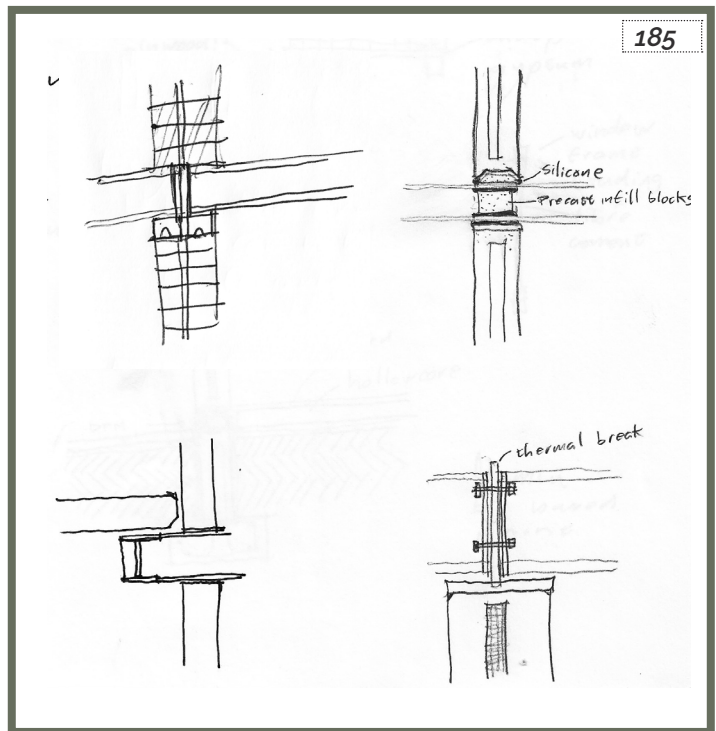


Figure 183 Rough work illustrating the design of the core elements' roof. Drawn by author

8.12) CORE CONCRETE PANEL WALLING DETAIL



8.13) CORE PANEL TO STEEL STRUCTURE CONNECTION



8.14) STEEL STRUCTURE

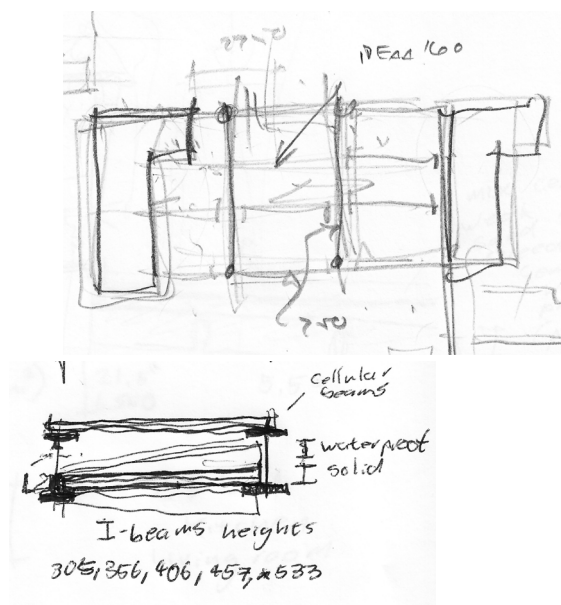
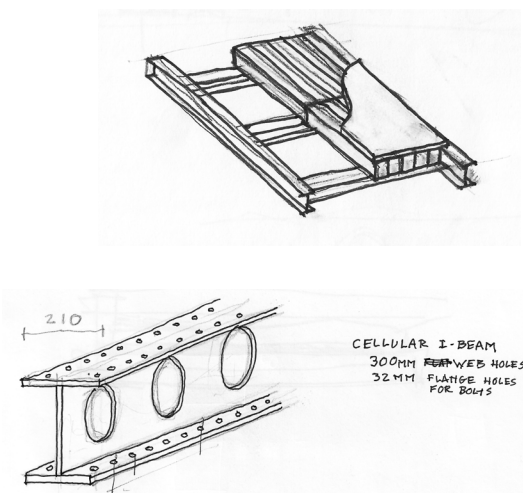


Figure 184 Rough work illustrating the design development of the concrete panel interior (insulation). Drawn by author

Figure 185 Rough work possible methods of connecting the concrete paneling to steel. Drawn by author

STRUCTURE DEVELOPMENT

8.15) SECTION THROUGH UNIT

The sectional 3D illustrated the relationship between the core and the incremental layers.

The core supports the incremental layers structurally as well as containing the services and circulation.

1. Core - the physical support, the structural grid spans between and outward from the core to support any infill.
2. The steel structure - The medium between the core and infill, this creates the structural support for the given residential unit but also

expands into the streetscape and interior yard as means to expand the unit.

3. The infill- the floors, walls and roofs all rest on the steel structure. This allows for the walls to be non structural.

186

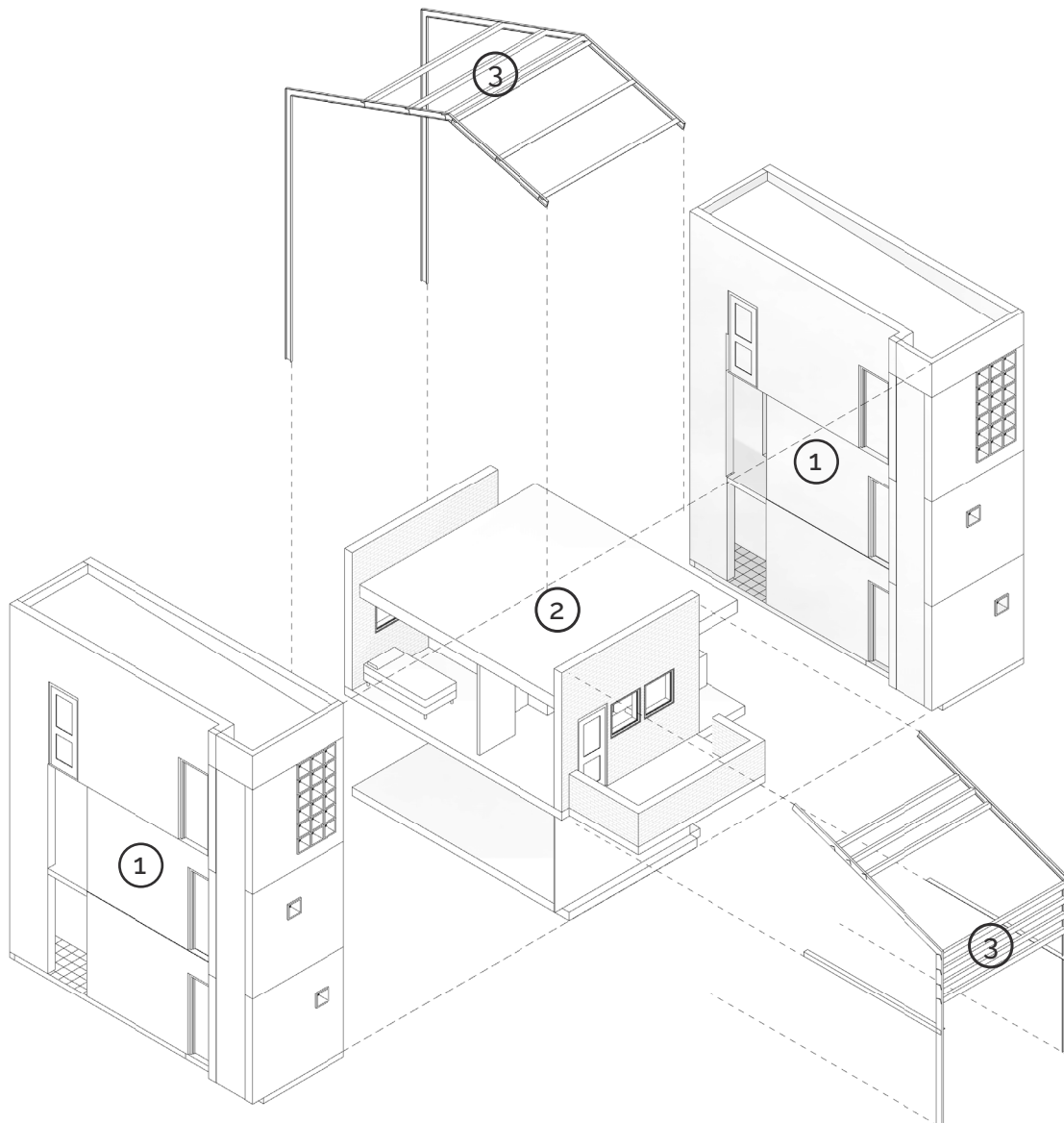
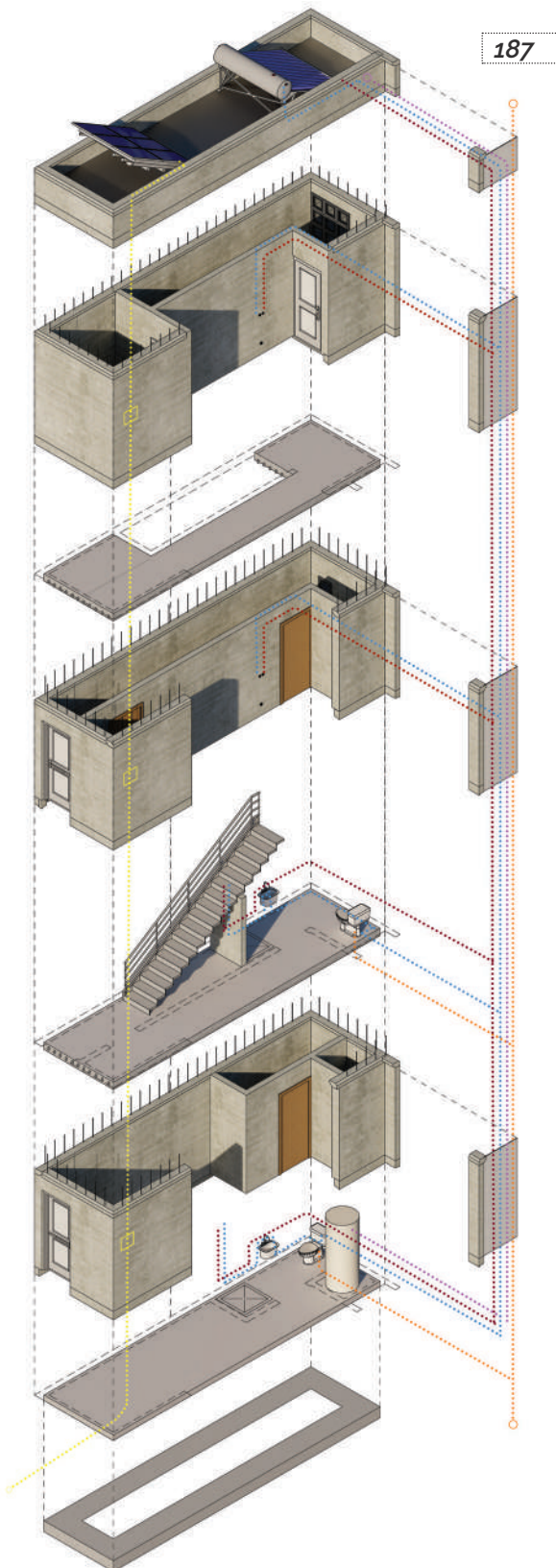


Figure 186 Sectional 3D of a unit showing the relationship between core and incremental layers . Modeled and rendered by Author.

CORE CONFIGURATION



Power line

The electricity for the unit is supplied by both a solar panel as well as a municipal connection



A distribution board with a meter will be on each floor to accommodate for rental and split programmes.

Wet core

The cold water line runs from the municipal connection to each bathroom fitting up to the solar geyser



The hot water line runs from the solar geyser to the bathroom and kitchen fittings.



Rainwater is collected from the roofs and taken down to the small collection tank on the ground floor.



The blackwater line runs from each water closet down the duct to the municipal line and runs up to the top of the duct where the stub stack can vent.



Figure 187 Exploded 3D of the core with services. Modeled and rendered by Author.

CONSTRUCTION PHASING

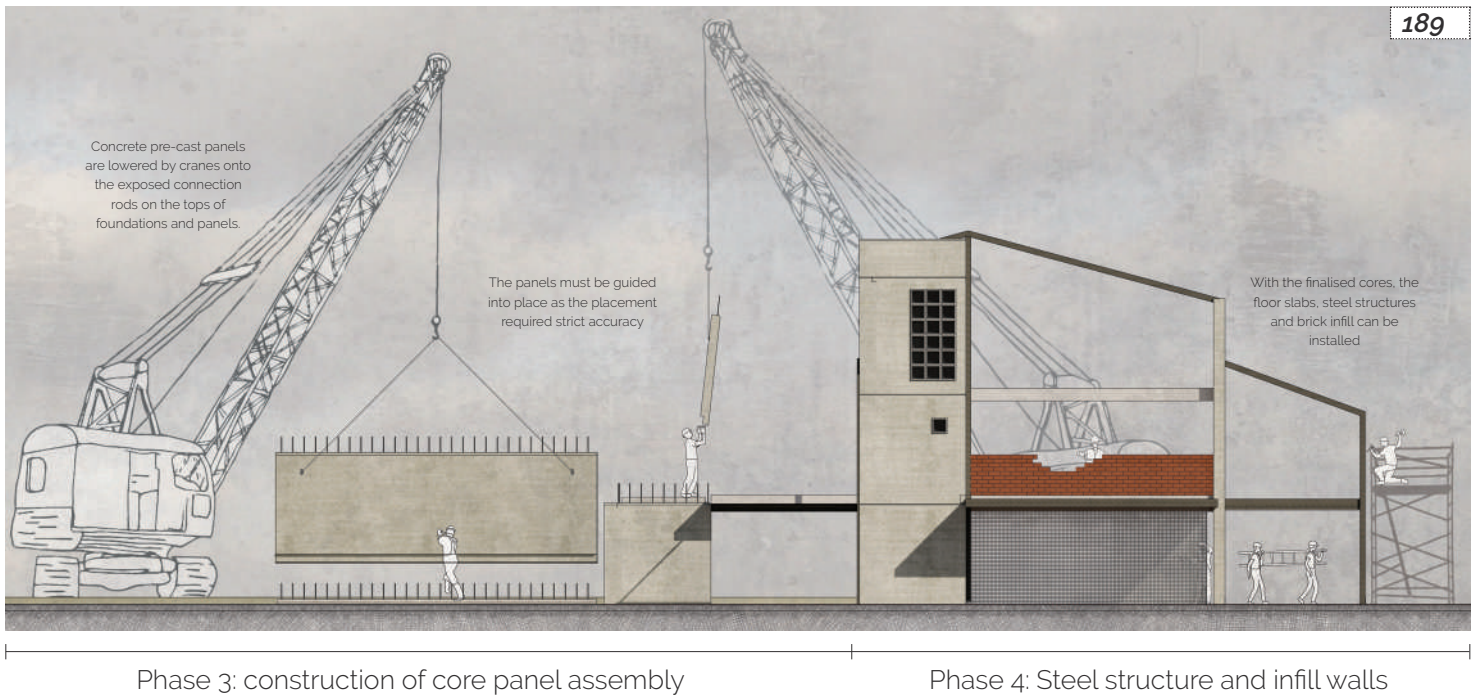
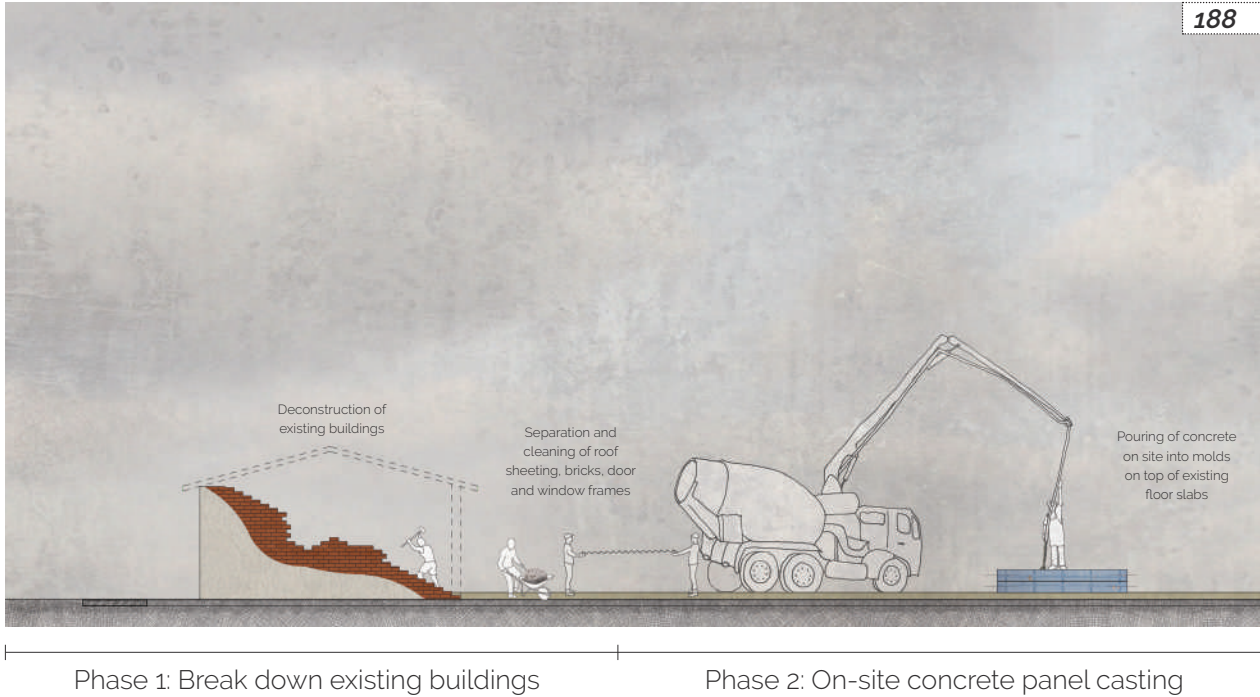


Figure 188 Phases 1 and 2 of the construction process. Modeled and rendered by Author.

Figure 189 Phases 3 and 4 of the construction process. Modeled and rendered by Author.



Phase 5: Initial Habitation

Phase 6: Basic improvements in expansion spaces



Phase 7: Optimum use of Expansion spaces

Suburban Context

Figure 190 Phases 5 and 6 of the construction process. Modeled and rendered by Author.

Figure 191 Phase 7 of the construction process and its suburban context. Modeled and rendered by Author.

SECTIONS

8.16) SECTION THROUGH CORE

The section through the core illustrates important connections and structural elements.

The levels are seen to further show that the plans differ because of vertical minimum constraints as well as the minimums on plan.

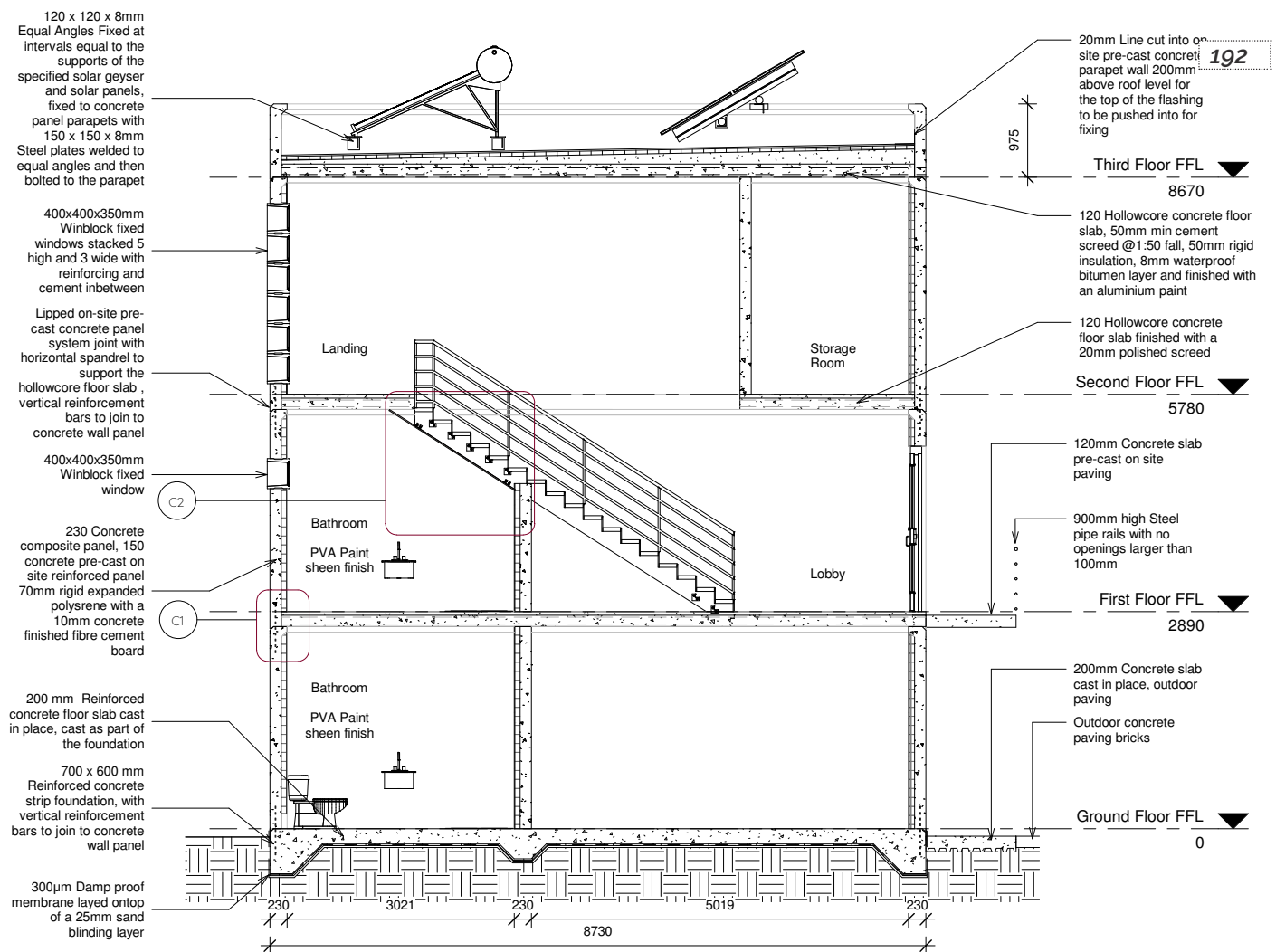


Figure 192 Section of the Core (not to scale), Drafted by Author.

8.17) SECTION THROUGH COMMON HOUSE

The common house is a space of communal interaction and as such, should be big enough to accommodate the families in the cluster.

The materials are meant to reflect those of the core, live and addition space.

The ground floor walls and supporting columns are concrete as they represent structure.

The brick walls continue up to the wall, adding colour, texture and light as well as imitating the live space by being in the middle vertically.

The roof structure is corrugated steel sheeting on hollow sections; this represents the material that is expected to be used for the additions. This is important as it creates vertical layers that correspond to the units and with the corrugated sheeting roof, it reinforces that the connotations towards corrugated sheeting do not need to be seen as adverse or detrimental to the image of the residents unit if it were to be used for the addition.

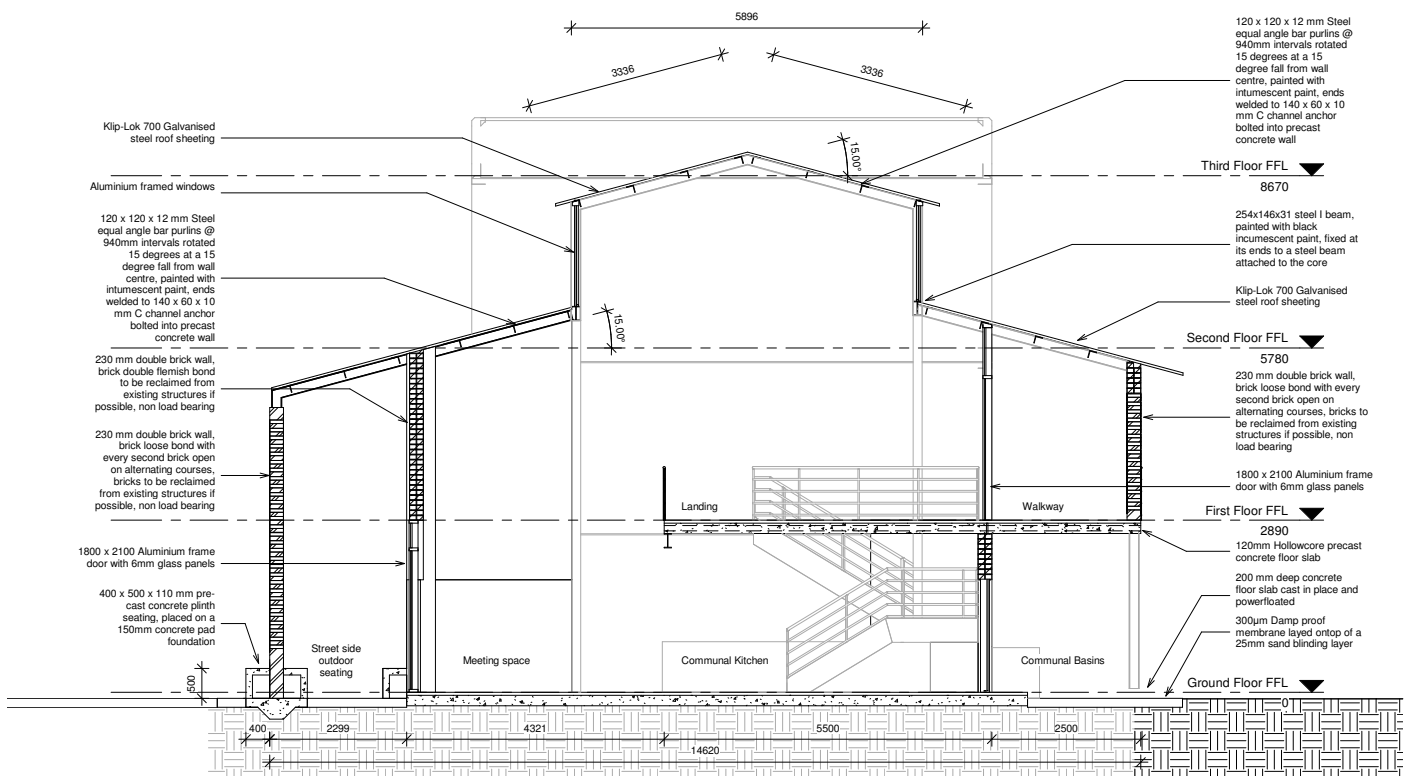


Figure 193 Perspective of the common house. Modelled and rendered by author.

Figure 194 Section of the common house (not to scale) , Drafted by Author.

8.18) SECTION THROUGH INCREMENTAL SPACES

The incremental spaces include the ground floor, the live space and the addition space on the 2nd floor.

The section shows how the core supports the 1st and second floor by spanning steel I beams from one core to the other. The walls can, therefore, be infill as they do not need to be structural. The angled bars spanning above the 2nd floor are there to act

as a structure for future roofs that the residents may want to build for any additions. The structure creates a controlled environment for water movement off added roofs.

The steel structure bolted to the core is the physical link between the expansion and the fixed elements.

195

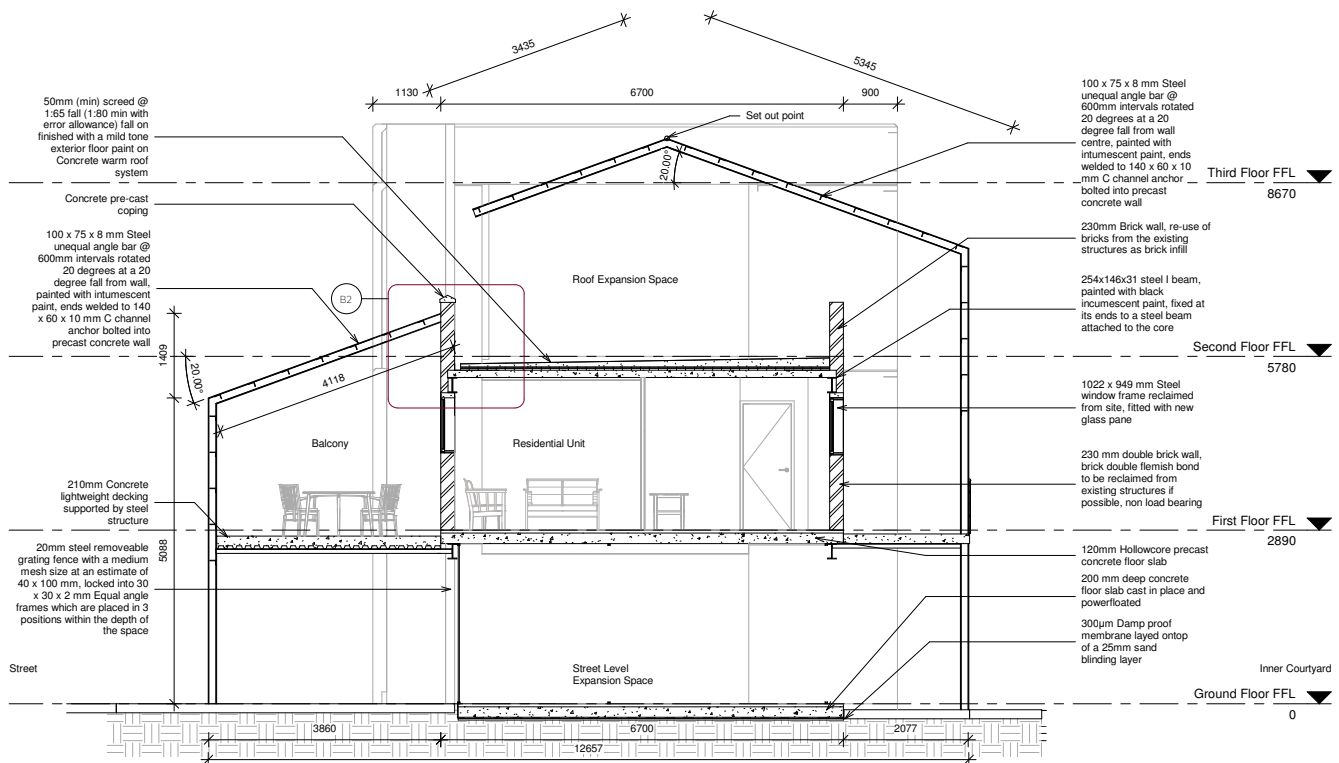


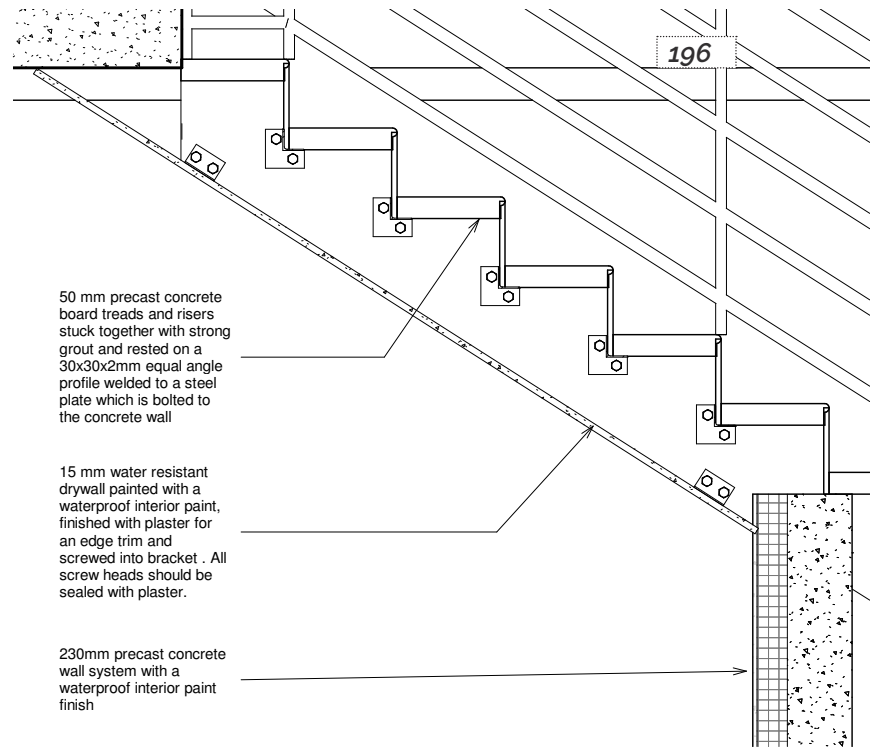
Figure 195 Section of the incremental layers (not to scale), Drafted by Author.

DETAILS

8.19) DETAIL OF THE STAIRS WITHIN THE CORE (C1)

The stairs in the core must be as solid and durable as the structure itself. It must be fast and easy to construct and hard fixed.

The specific detail area is where the stairs intersect with the shower space. The stairs are made of pre-cast concrete boards fixed to brackets and bolted to the walls. The shower would cause moisture to collect under the stairs and possibly compromised the bolts and brackets, and so a protective layer had to be added, a painted concrete fiberboard is used as it can be painted to be identical to the bathroom walls (painted concrete)



8.20) DETAIL OF THE WET SERVICES DUCT (D1)

The wet services duct carries all of the waste pipes as well as the down-pipe for the roof runoff. It is crucial to keep it layered from the interior but built into the core as it is one of the services that it must carry.

This detail shows how the duct interacts with the roof, allowing for the stub stack vent to protrude and the water to be collected by using one pre-cast gully element. The duct must be accessible from the outside for maintenance, but the surface must not look weak or too different from the concrete for its requires connotation of being a solid, stoic object. Fiberboards with a finish similar to the external concrete panels will be screwed into brackets, flush as to disguise it to an extent.

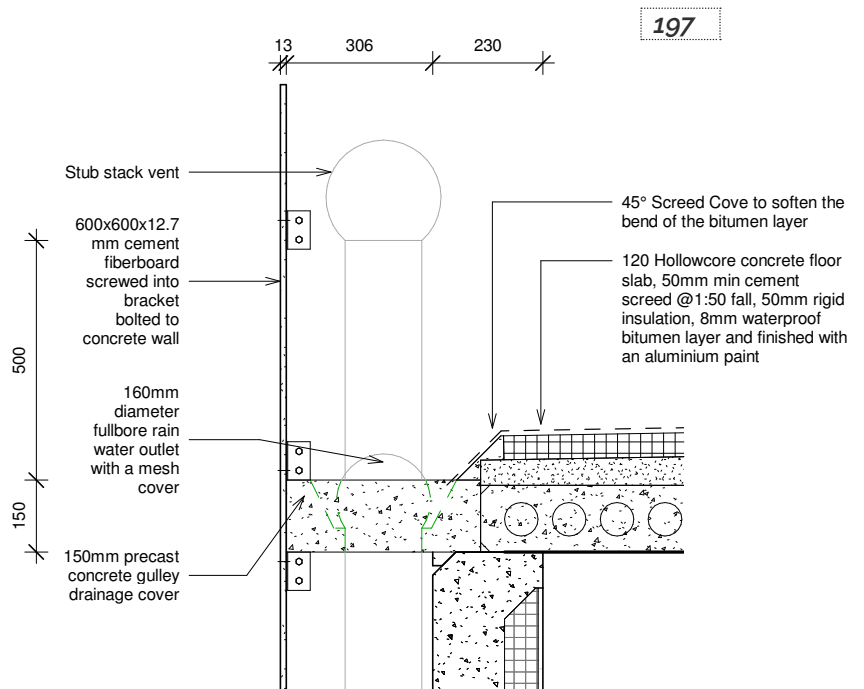


Figure 196 Detail of the Stairs and shower (not to scale) , Drafted by Author.

Figure 197 Detail of the wet services duct (not to scale) , Drafted by Author.

8.21) DETAIL OF THE 2ND FLOOR PARAPET

The detail shows how the floors are being treated as flat roofs, with run-off systems, allowing them to be either a roof or a floor if the addition is added.

The brick parapet is used first as an extension of the brick infill wall, secondly as a guard to prevent residents from falling off the edge of the 2nd floor (at the minimum of 900mm) and as a starting point for the construction of the addition.

The section also shows how the steel I-beam supports the floor slabs.

8.22) DETAIL OF THE INTERNAL TANK

The detail shows how the tank relates to the surrounding building envelope with the direct tap coming out of the wall to the street side green patch.

The tank is specifically kept 400mm above FFL as the outside tap should have space enough for a bucket to fit under it.

The detail shows the foundation relates to the ground and where the first layer of vertical reinforcement bars connect to the ground floor level walls.

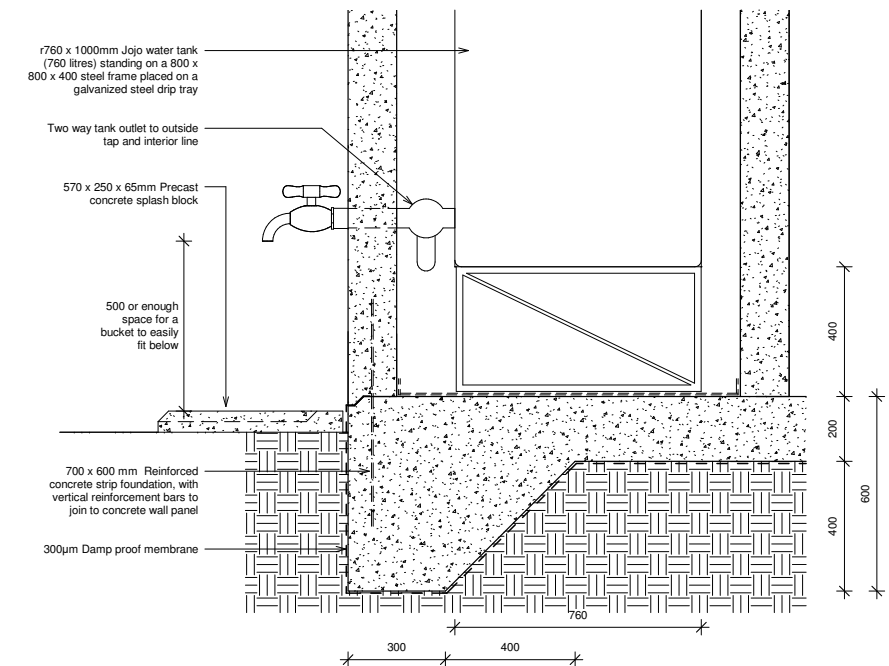
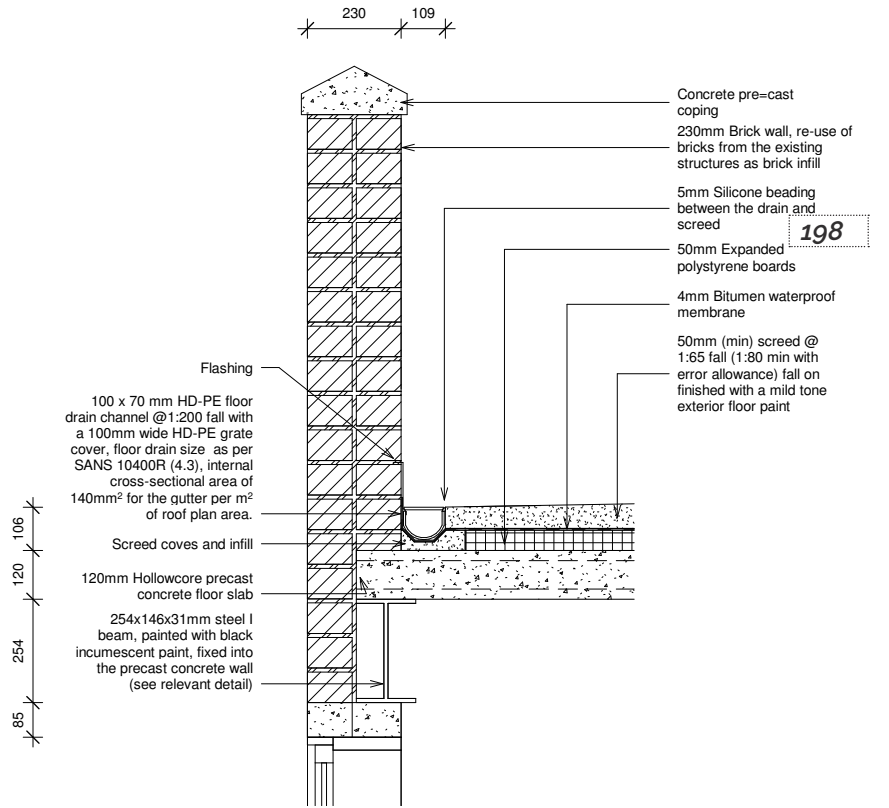


Figure 198 Detail of the 2nd floor parapet (not to scale), Drafted by Author.

SBAT TOOL

8.23) INTRODUCTION

The Sustainable Building Assessment Tool offers a holistic assessment into what makes a building sustainable. The tool has categories where each aspect must be rated according to the project. The categories are environmental, economical and social.

The assessment was done based on a single housing block as to keep it comprehensive and realistic to the focus architecture.

The tool has some aspects which are non-hypothetical, in which they were answered as 0. These aspects included dealings with contractors, construction crews, resource tracking and medical aid.

The project benefited greatly from the site as it has close proximity to retail, fresh goods, transport and schools.

The architecture performed well for its social cohesion and inclusion aspects.

Aspects that the project must improve on are mostly the environmental aspects such as recycling and composting space allocation, the increase of green space in the design and consideration of vegetation diversity.

Full analysis can be found in Part 9, Appendix

EI 3	Project Name	
	Incremental Co-Housing Mamelodi	
EI 4	Address	
	Mamelodi West, South Africa	
EI 5	Site Area	3300 m ²
EI 6	Gross Floor Area (GFA)	2145 m ²
EI 7	Gross Internal Area (GIA)	1900 m ²
EI 8	Number of Useable Rooms	140
EI 9	Number of Bedrooms	84

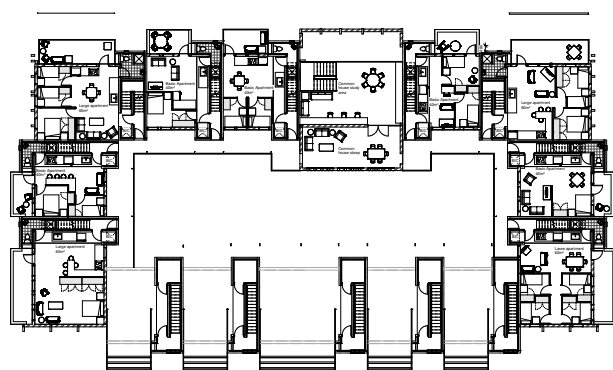
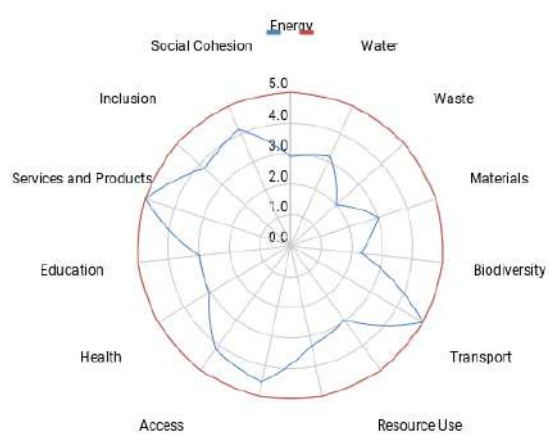


Figure 199 SBAT results graphic. (Gauge, 2019)

Figure 200 Block used for SBAT Rating. By author

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1.04

		Target	Achieved
BI	Building Information	5.0	3.5
BI 1	Building Targets	Target	Achieved
EN	Energy	5.0	2.9
WA	Water	5.0	3.2
WE	Waste	5.0	2.0
MA	Materials	5.0	3.0
BI	Biodiversity	5.0	2.3
TR	Transport	5.0	5.0
LE	Local Economy	5.0	3.0
MN	Management	5.0	3.3
RE	Resources	5.0	4.5
SP	Services and Products	5.0	4.2
AC	Access	5.0	3.1
HE	Health	5.0	3.0
ED	Education	5.0	5.0
IN	Inclusion	5.0	3.8
SC	Social Cohesion	5.0	4.2
SB4 Environmental, Social and Economic Performance		Score	
Environmental		2.7	
Economic		4.0	
Social		3.8	
SBAT Rating		3.5	
SB5 EF and HDI Factors		Score	
EF Factor		3.3	
HDI Factor		3.6	

Figure 201 SBAT overall information.
(Gauge, 2019)

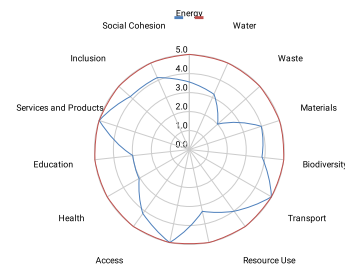
Sustainable improvements

The second values come from improvements to auxiliary elements such as:

The allocation of vegetation spaces in-front of each core with a variety of indigenous species.

Water storage tanks allocated per unit which greatly increased rainwater catchment.

Solar geyser and solar panels specified for each unit.



BI 1	Building Targets	Target	Achieved
EN	Energy	5.0	3.5
WA	Water	5.0	3.2
WE	Waste	5.0	2.0
MA	Materials	5.0	4.0
BI	Biodiversity	5.0	3.8
TR	Transport	5.0	5.0
LE	Local Economy	5.0	4.0
MN	Management	5.0	3.3
RE	Resources	5.0	5.0
SP	Services and Products	5.0	4.2
AC	Access	5.0	3.1
HE	Health	5.0	3.0
ED	Education	5.0	5.0
IN	Inclusion	5.0	4.2
SC	Social Cohesion	5.0	4.2

SB4 Environmental, Social and Economic Performance	Score
Environmental	3.3
Economic	4.3
Social	3.9
SBAT Rating	3.8

Logistic improvements

The final values come from logistical adjustments that would often be considered to not be part of the decisions made by the architect but can change the score greatly if the architect insists on these changes.

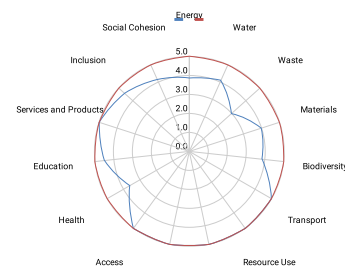
The installation of low cost internet.

An owners manual.

Proper education, medical treatment and accreditation for all construction workers.

On site organic waste recycling

Allocation of food production within the vegetation spaces



BI 1	Building Targets	Target	Achieved
EN	Energy	5.0	3.9
WA	Water	5.0	4.1
WE	Waste	5.0	3.0
MA	Materials	5.0	4.0
BI	Biodiversity	5.0	3.8
TR	Transport	5.0	5.0
LE	Local Economy	5.0	5.0
MN	Management	5.0	5.0
RE	Resources	5.0	5.0
SP	Services and Products	5.0	5.0
AC	Access	5.0	3.6
HE	Health	5.0	4.5
ED	Education	5.0	5.0
IN	Inclusion	5.0	4.6
SC	Social Cohesion	5.0	4.2

SB4 Environmental, Social and Economic Performance	Score
Environmental	3.8
Economic	5.0
Social	4.4
SBAT Rating	4.4

Figure 202 SBAT results graphic. (Gauge, 2019)

Figure 203 Block used for SBAT Rating. By author

Conclusion

Part 9

This chapter reflects on the final design, the contribution and conclusion.

CONCLUSION

9.6) CONTRIBUTION

This project is situated in the Human Settlements and Urbanism research field,

The body of research investigates how co-housing as well as incremental design can be further integrated into the continuum of social housing in South Africa.

- Comprehensive typology analysis of Mamelodi incremental housing
- Laid groundwork to a better understanding of the subsidising system in South Africa and the obstacles it creates.
- Illustrates the variety of funding options available for 'government housing' beyond the sole funding of the government
- A better understanding of how co-housing can mitigate social housing problems.
- An insight into the roles incremental housing can play for residents of social housing developments.
- Expands on the possibilities of the roles that a social housing development can contribute to the greater context.
- The potential for an entire building to be considered flexible with various overall functions being able to take over a 'cluster' such as schools or clinics for it to become holistically robust.
-

9.7) RECOMMENDATIONS

Recommendations for further investigation into the topics dealt with in this dissertation.

Further prototyping of potential sizes and extents of the core and infill concept to better understand the spatial balance between necessity and adaptation.

Experimentation into more experimental materials for the core in the scenario of cost not being a large factor in the project.

Exploration into more complex co-housing systems in place of social housing projects where incrementality is not the contextual informant.

A better understanding of the retail dynamics between social housing and street life.

An interior exploration into the extent of possibilities in a project with the incremental units as demonstrated in this project.

Completing a costing audit for the core in order to find where the balance between strength, quality and cost can provide better options for materials, fittings and finishes.

9.8) CONCLUSION

The dissertation aimed to find a contextual method to mitigate the need for social housing in Mamelodi West.

Theory

The theoretical investigation concluded that co-housing can assist the larger community by creating role model communities within the clusters that support each other. This creates a health mindset around the complexities of community based roles and responsibilities

Context

The contextual investigation of the typologies and the observations of the community dynamics, indicates that the implementation of co-housing in Mamelodi is viable. When the residential aspects of the introverted european type housing are isolated and made to include the critical aspects of the surrounding typologies, then the rest of the supporting structure of co-housing can only improve the quality of the housing. Where co-housing typically only protects the residents, the incremental aspects of the units now allow for the life of the individual to expand into the streetscape.

Design

The design explored the various levels of density and how this relates to the context. As the community of Mamelodi West is based on its active streetscape, the spatial inclusion of the streets into the architecture became the inherent requirement for a building when densifying. This concludes that it is not the height of the facade but instead how the pedestrian realm is treated that will allow for the community to continue to be included in a densified environment. The densified architecture is an active barrier between the street and a secure inner space, this creates space for density, community and privacy to become balanced.

Technical

The technification process proved through iterations that the solution to curate incrementality is to provide a core and infill system that supplies the space, necessities and structure for growth. The structure can be used to curate and limit the growth by making certain limits easier to expand into than others.

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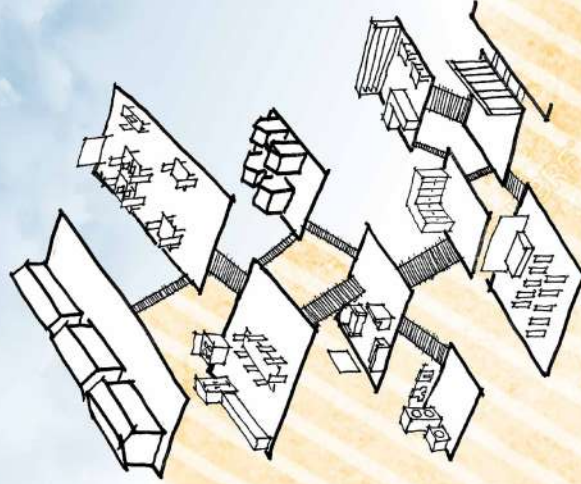
Appendix

Part 10

EXAMINATION IMAGES



Incremental Co-Housing for the Community of Mamelodi West



Co-Housing as streetscape

Programme:
Cohousing.

Site Location
Old woman's hostels western section
Mamelodi west, ward 38

Research Field:
History and Cultural Landscapes

Keywords
Cohousing, Appropriation, intensification

Background
The social housing architecture created by the apartheid government was built to suppress the inhabitants, this continues today and the architecture is uninhabitable but still inhabited.

Social housing in South Africa has a need to grow and adapt to the communities and activities in its area.

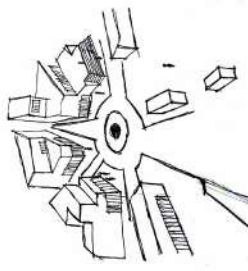
Aims
To create a social housing typology that uses the manipulation of boundaries between public and private spaces to facilitate communal interactions.

Hypothesis
The growing population will lead to densification of the area as shown in the Mamelodi West Local Open Space Framework by GaPP Architects and Urban Designers (2010).

MAMELODI GATEWAY

An Urban Framework by:

Dipna Bhana
Shakira Marais
Fras Bissett
Dirk Schmidt
Mangaliso Mletwa



The Circle Node

When entering Mamelodi West there is a circle which everyone must go through to reach into the residential area. This circle was designated to become a defined node signifying the development of the area.

Mamelodi is still largely dependant on other parts of pretoria for jobs and amenities.

People have to travel outside Mamelodi for work which can be expensive and causes a lot of household income to become lost.

Large shopping malls do not improve the skill level opportunities.

Government has not subsidised informal public transport.

The difference in the housing density and the high population density is too high and better housing opportunities are required

Over the recent years Mamelodi West has gained a fair amount of civic services and infrastructure but is it close enough and is it everything that is needed.

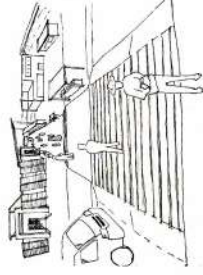
Housing is primarily backyard shacks and the NE 51/9 houses which have been adapted or demolished and new houses built

Recent social housing built is 3 to 4 floors

Old hostels unfit for habitation are still completely occupied

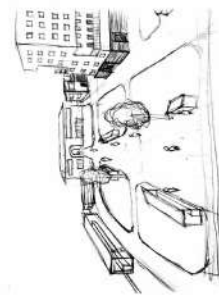
Pedestrian Passage

The line between the study area and both the taxi and train station currently acts as an informal footpath and in the framework we proposed that it will be formalised and existing informal trade will be facilitated along the path.



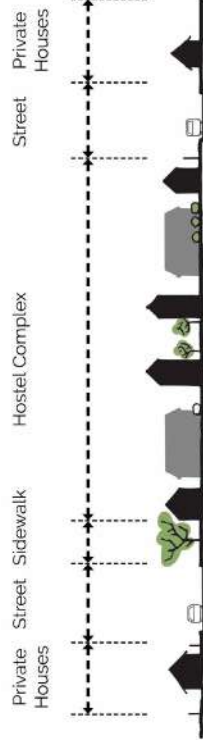
The Peoples Park

Currently the vacant plot is being successfully appropriated to the needs of informal trade, this park will be improved to better facilitate this trade and improve the areas appeal.



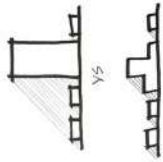
URBAN VISION SKETCHES

THE OLD WOMENS HOSTELS COMPLEX



The hostels act as a closed complex blocking any residence from direct access from the street causing isolation and a lack of street activity on its edge.

DESIGN QUESTION



How can architecture create a solution to **densify housing** while **integrating the community** and respecting privacy?

CONTEXTUAL QUESTION



How can the European concept of **co-housing** be adapted in such a way as to be successful in **Mamelodi**?

TECHNICAL QUESTION

How can **incrementality** be promoted (structured and supplied) as well as **curated through structure** and materials?

INFORMANTS

TO THE ARCHITECTURAL RESPONSE

- Hierarchy and dynamics of the contextual social condition
- Boundaries and transitions
- Co-housing (the current paradigm)
- The spatial legacy of Mamelodi West

URBAN INTENTIONS

In order to arrive at an urban intention concept, the criteria for the site massing was challenged, these criteria are: Community spaces, site movement and relations, safe conditions, density and programmatic compatibility.

Concept 1
Permeability
 This concept focuses on creating a form that identifies the missing permeability towards its context.

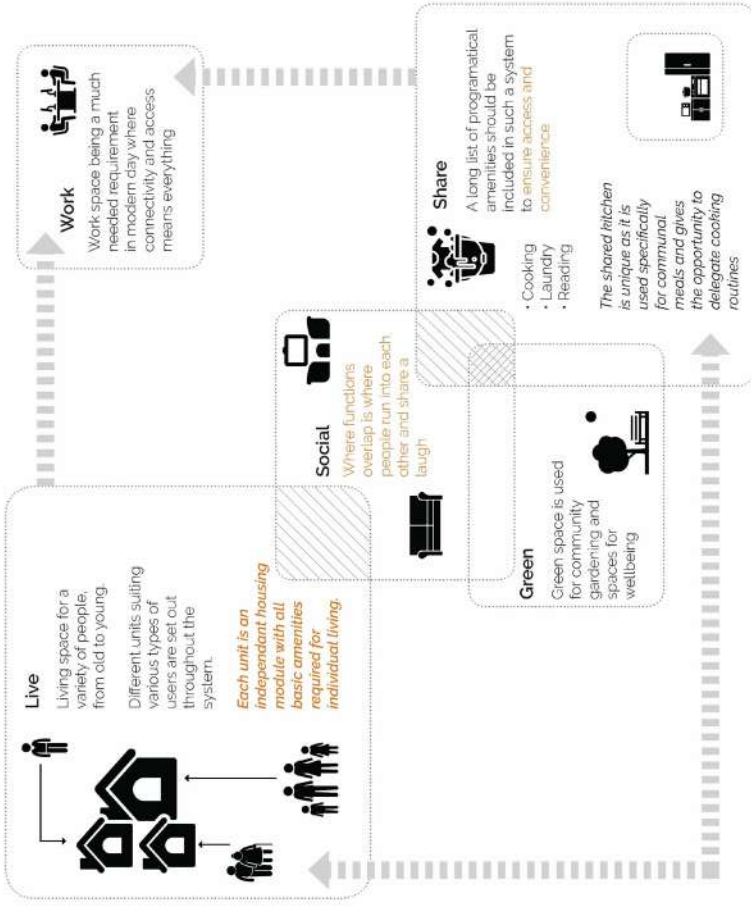
Community spaces	Yes
site movement and relations	Yes
safe conditions	Yes
density	Yes
programmatic compatibility	Yes

Concept 2
Lowering the higher density
 This concept explores the idea of highlighting the density of the massing more dramatically but leveling it with the context by lowering it below ground level.

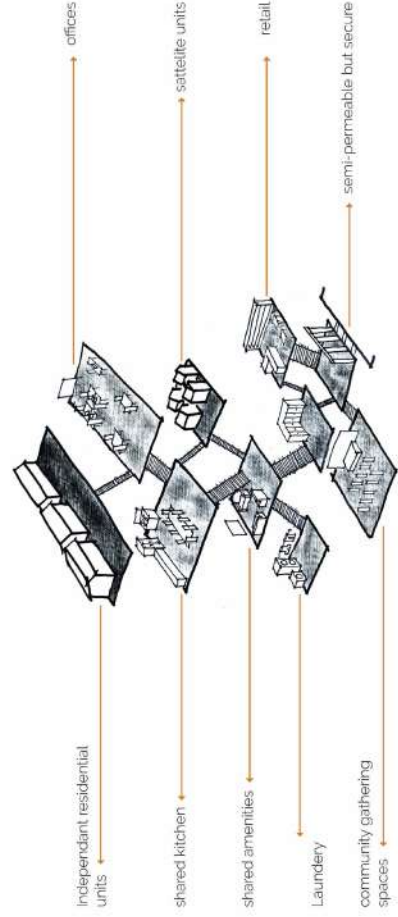
Community spaces	Yes
site movement and relations	No
safe conditions	No
density	Yes
programmatic compatibility	Yes

Concept 3
Distopian, perfectly bad application
 This model simply demonstrated the opposite of what the site and context wants from the massing as it simply stands in blatant solitude from its context.

Community spaces	No
site movement and relations	No
safe conditions	No
density	Yes
programmatic compatibility	No



All icons in this graphic were adapted from: www.shutterstock.com



SITE PHOTOS

Due to **dangerous conditions** in and around the site, the opportunities to take site photos were scarce.

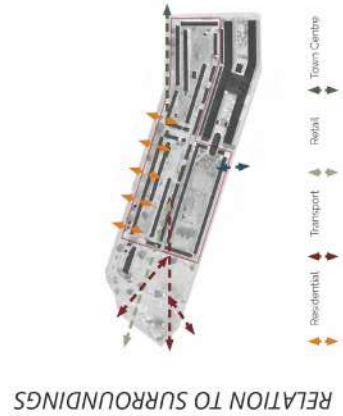
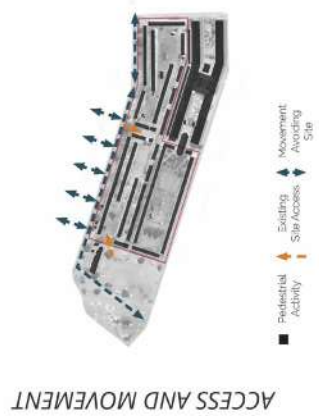


BIRDS EYE 3D'S

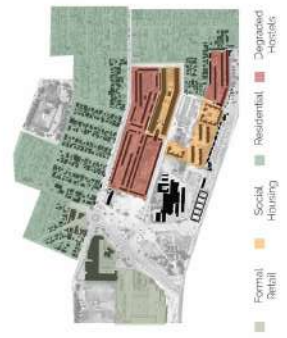
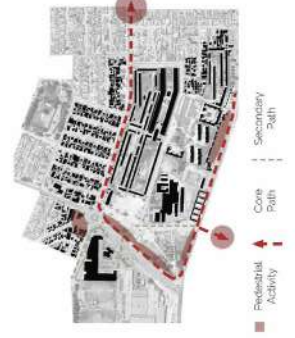
Provided by Google Earth™ mapping software



SITE ANALYSIS



NEIGHBOURHOOD ANALYSIS



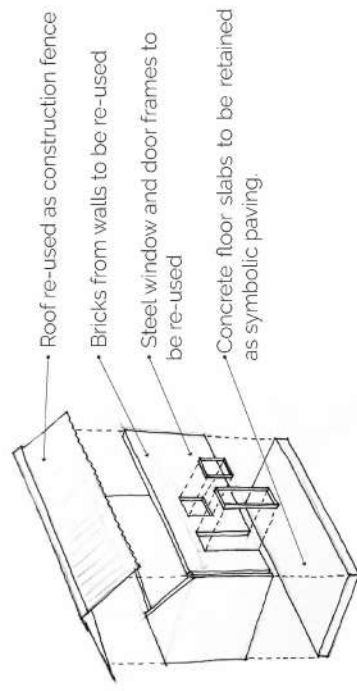
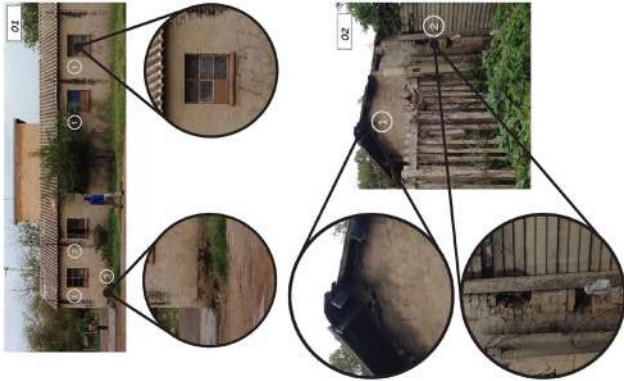
SITE MOVEMENT

PEDESTRIAN ACTIVITY

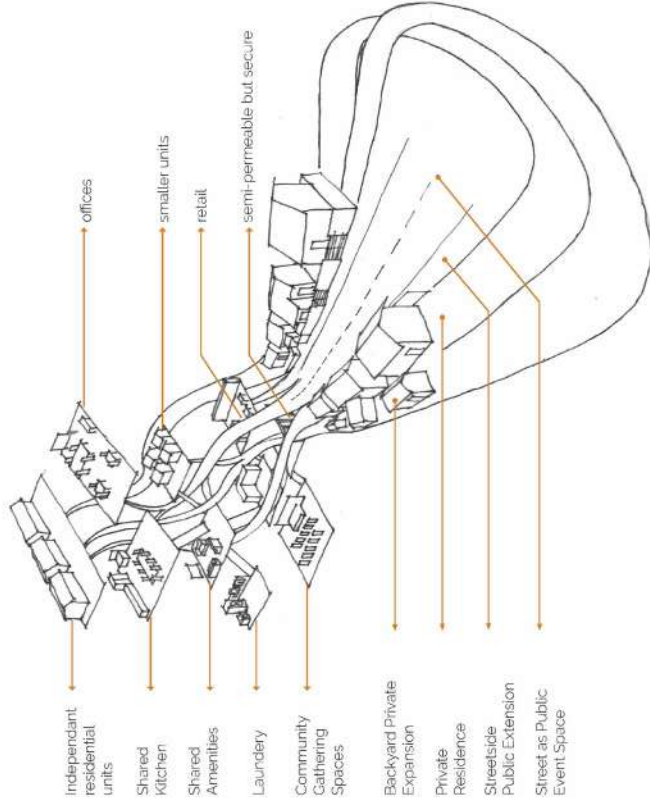
EXISTING PROGRAMS

SITE RE-USE

Due to **dangerous conditions** in and around the site, the opportunities to take site photos were scarce.



CONCEPTUAL INTENTIONS



STREETSCAPE TYPOLOGIES

The investigation into the typologies in Mamelodi west concluded that the residents have **altered their properties with 9 types of addition configurations around 3 zones.**

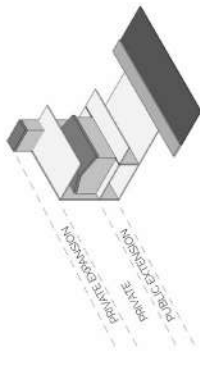
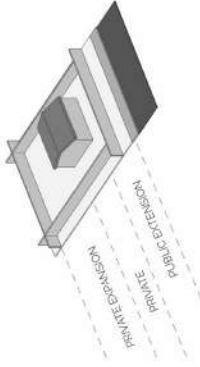
These zones are based on their **relationship to the street** and how they form part of the **streetscape**

The **vertical adaption** of the streetscape typologies is a hypothetical exploration into an **alternative form of densification** within Mamelodi West

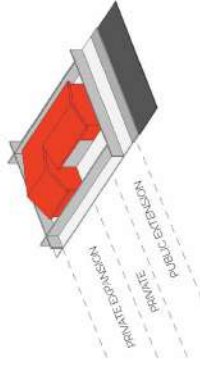
MAMELODI TYPOLOGIES

VERTICAL TYPOLOGIES

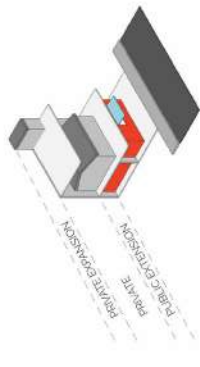
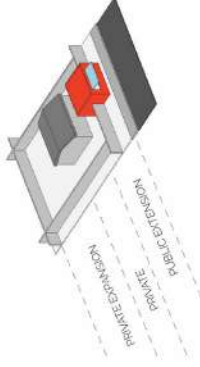
STANDARD (NE51/6) HOUSE



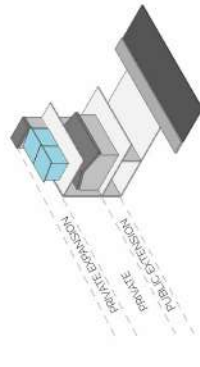
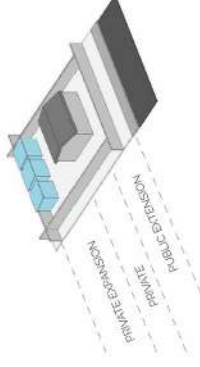
UPGRADE



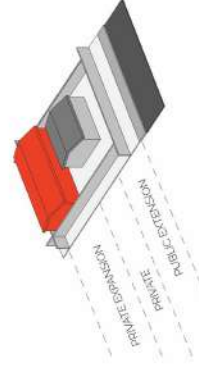
SHOP



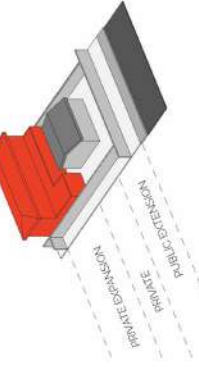
BACKYARD RENTAL 1



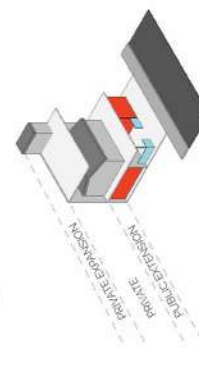
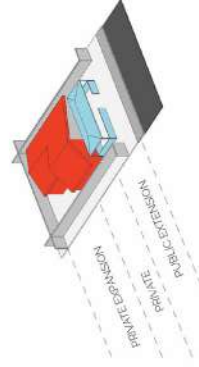
BACKYARD RENTAL 2



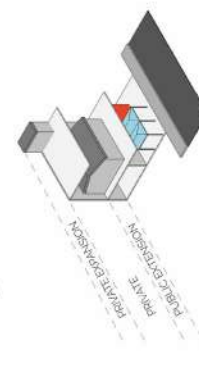
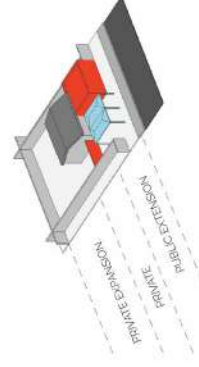
BACKYARD RENTAL 3



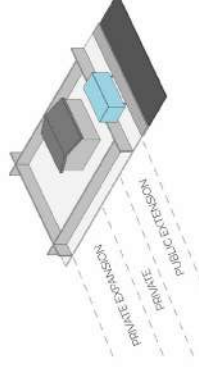
THE TAVERN



MECHANIC/CARWASH

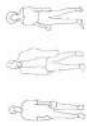
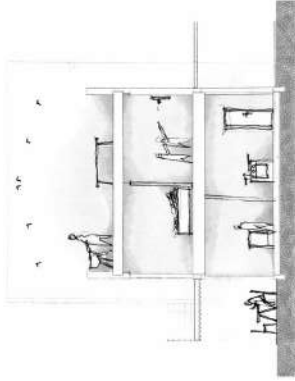


TEMPORARY SHOP

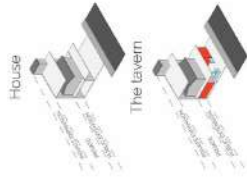


OCCUPATION SCENARIOS

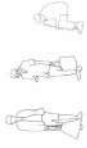
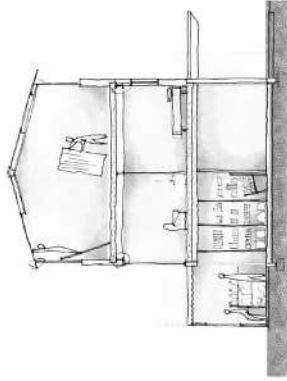
SOCIAL BASED



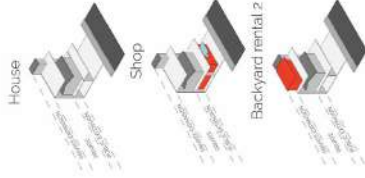
- **Commune** groups of young adults starting life.
- Using the street level expansion space for **selling food**, drinks and to **create an atmosphere**.
- Rooftop extension as **outdoor social space**



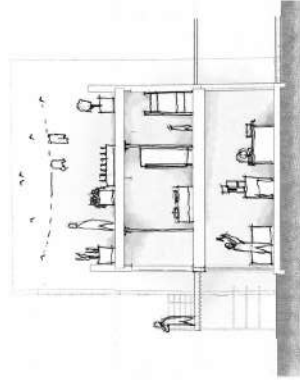
COMMERCIAL BASED



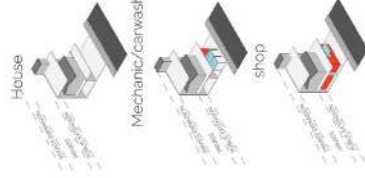
- **Spacious living** with couple or single.
- Using the streetlevel expansion space for **general retail**.
- Rooftop extension maximised as a residence to be **rented out**.



FAMILY BASED



- **Compact rooms** for full family within standard unit.
- Street level expansion space used as a **workshop for production**.
- Rooftop extension used for **growing produce and clothes washing**



COMPARING HOUSING TYPOLOGIES

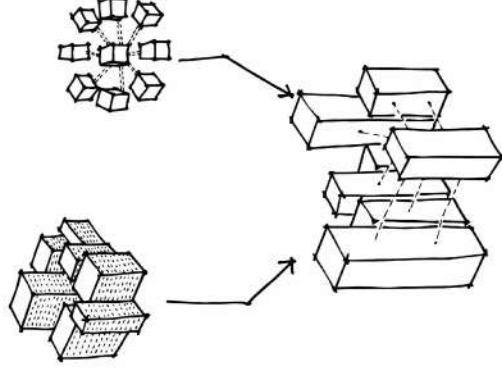
The current paradigm of social housing in South Africa requires expansion **beyond the mitigation the housing shortage** and must look towards community and urban strategies to **create a sustainably supportive residential structure**.

SOCIAL HOUSING

- **Low income citizen.**
- To supply **acceptable housing** to mitigate housing needs.
- **High density** units
- **Durable features** for basic living such as splashbacks on sinks and laundry areas.

CO-HOUSING

- Typically **middle class** residents intent of creating a community.
- To create a **support structure** for mental and social needs.
- **Integrated yet autonomous** units with social transition points.
- **Shared amenities** used for support and social interaction.



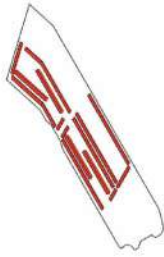
The solution to **meet the needs and intentions of the project** would be to create a residential typology that **meets the needs and characteristics of both social housing and co-housing**

SITE DESIGN PROCESS

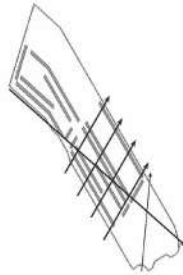
THE SITE



DEMOLISH BUILDINGS
KEEP FLOOR SLABS



INTERSECT WITH CONTEXT
STREETScape LINES



ARTICULATE BLOCK
OPPORTUNITIES



BLOCK DIVISION



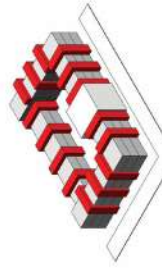
INNER COURTYARDS



PLACE CLUSTER CENTRAL
COMMON HOUSE



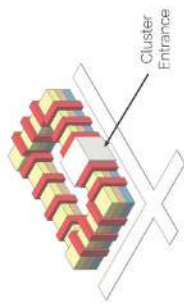
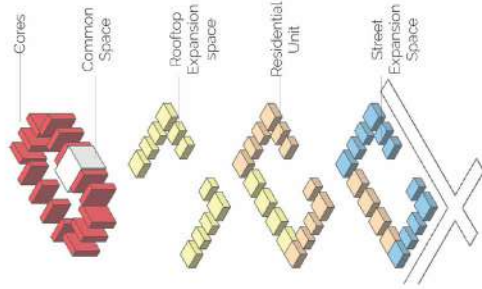
DIVIDE RESIDENTIAL DIVISION
BETWEEN CORES



UNIT DESIGN PROCESS

PROGRAM ORGANISATION

The cluster division to maximise the programs

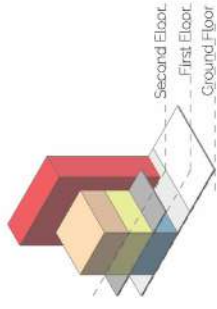


SECURITY BORDER FOR RESIDENTS

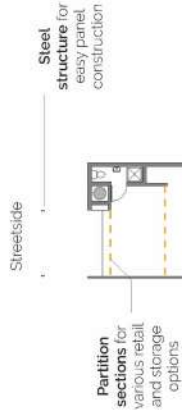
A common entrance creates intentional interaction as well as heightened security



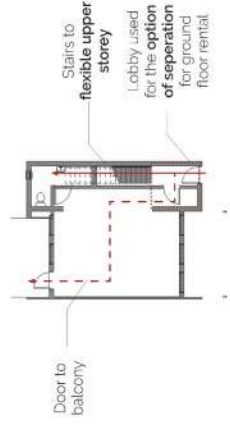
FULL UNIT



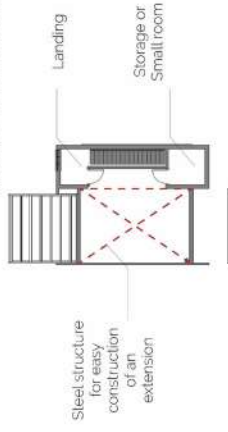
GROUND FLOOR



FIRST FLOOR

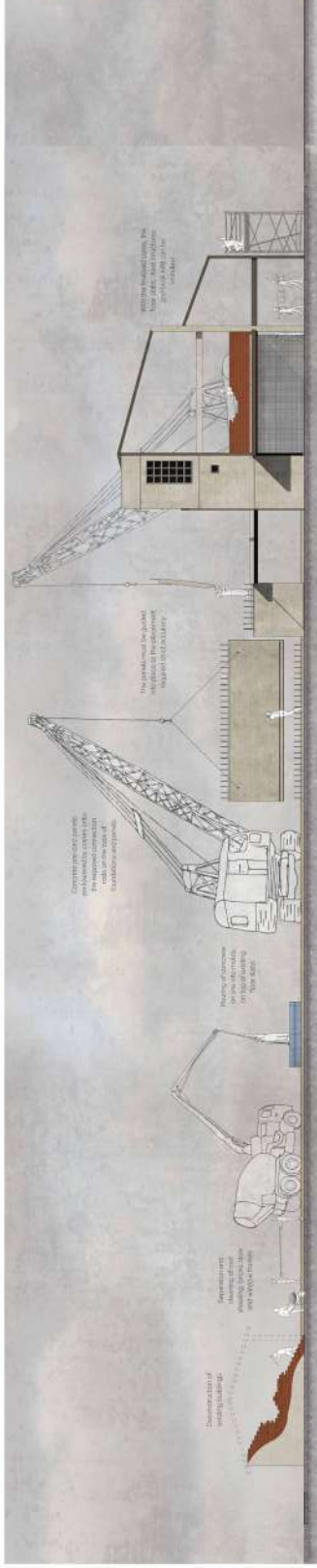


FLEXIBLE INTERIOR



PHASED ELEVATION

Scale 1:50



Suburban Center

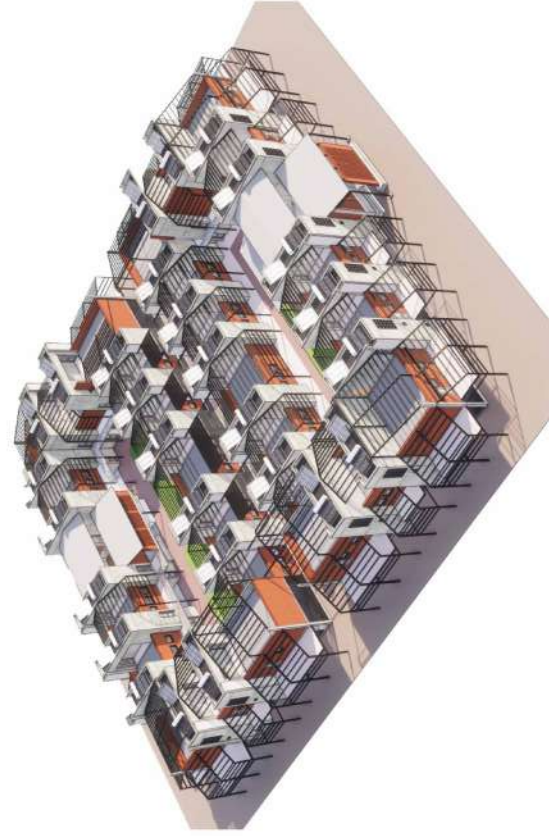
Phase 7: Improvements in expansion spaces

Phase 6: Basic improvements in expansion spaces

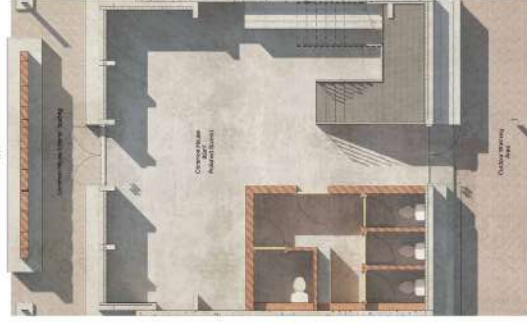
Phase 5: Initial installation

CLUSTER

COMMON HOUSE



GROUND FLOOR



FIRST FLOOR



CORE VARIANTS

EVERYDAY



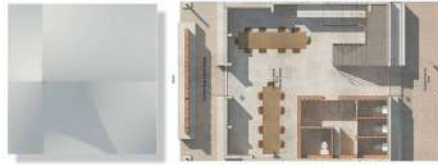
Everyday activities in a co-housing common house include communal group meal preparation group activities chore sharing

MEETING HALL



The common house must have a space where all of the residents of the cluster can meet formally for resident board meetings etc.

STREET WEDDING



If a resident hosts a street wedding, the common house is ideal for acting as the support structure for the required facilities. The tent would be pitched in front of the common house.

The kitchen and back yard will be used for food preparation and the open space can be used for table preparation and storage.

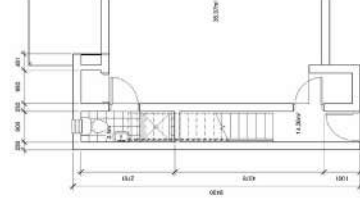
Scale 1:50

C - Core L - Living Unit T - Total

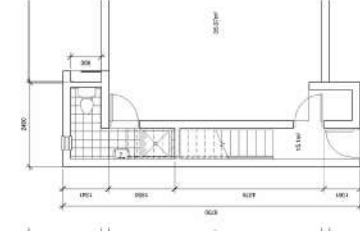
A	C - 14.98	29%	E	C - 15.6	27%	G	C - 16.49	27.8%
	L - 35.37			L - 40			L - 42.75	
	T - 49.73			T - 55.6			T - 59.24	
B	C - 15.1	30%	F	C - 16.36	29%	H	C - 17.23	28.7%
	L - 35.37			L - 40			L - 42.75	
	T - 50.47			T - 56.36			T - 60	

Movement from residential units must **pull residents through common spaces** to leave the building

A

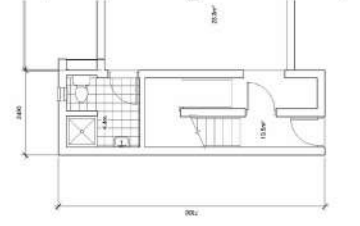


B

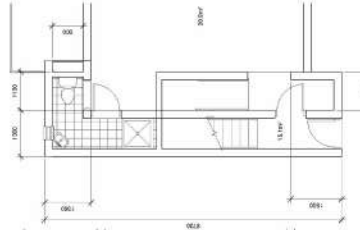


Movement from residential units must **pull residents through common spaces** to leave the building

C

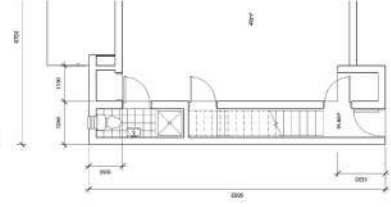


D

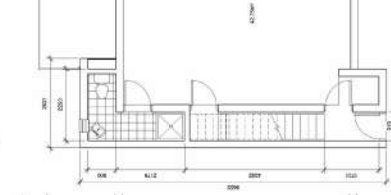


Movement from residential units must **pull residents through common spaces** to leave the building

E

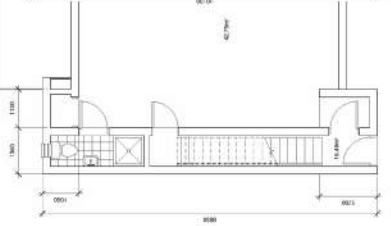


F

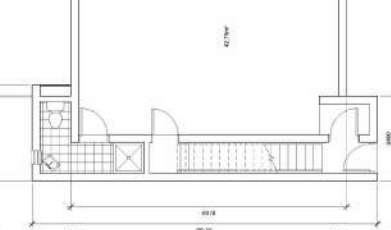


Movement from residential units must **pull residents through common spaces** to leave the building

G



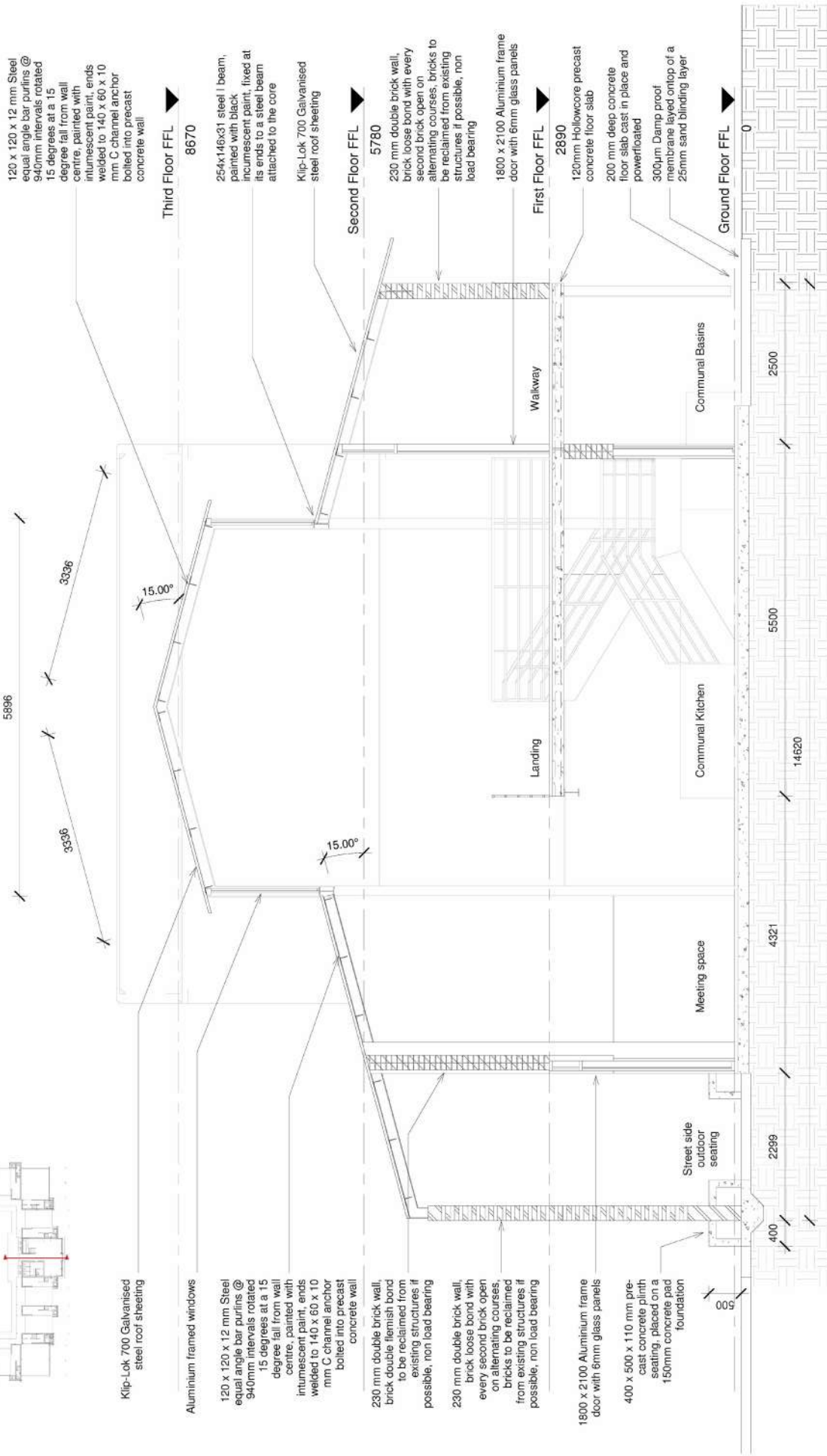
H



COMMON HOUSE SECTION



Scale 1:20



Klip-Lok 700 Galvanised steel roof sheeting

Aluminium framed windows

120 x 120 x 12 mm Steel equal angle bar purlins @ 940mm intervals rotated 15 degrees at a 15 degree fall from wall centre, painted with intumescent paint, ends welded to 140 x 60 x 10 mm C channel anchor bolted into precast concrete wall

230 mm double brick wall, brick double flemish bond to be reclaimed from existing structures if possible, non load bearing

230 mm double brick wall, brick loose bond with every second brick open on alternating courses, bricks to be reclaimed from existing structures if possible, non load bearing

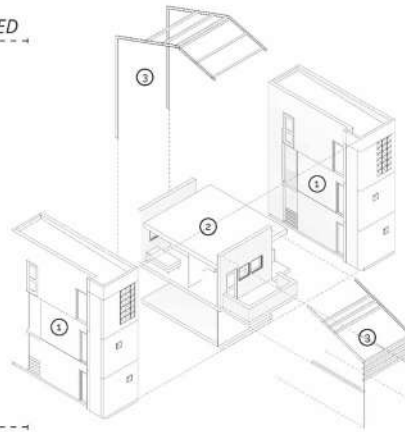
1800 x 2100 Aluminium frame door with 6mm glass panels

400 x 500 x 110 mm precast concrete plinth seating placed on a 150mm concrete pad foundation

CORE

FULL UNIT EXPLODED

- 3. Steel structure
- 2. Residential Unit
- 1. Core



CORE EXPLODED

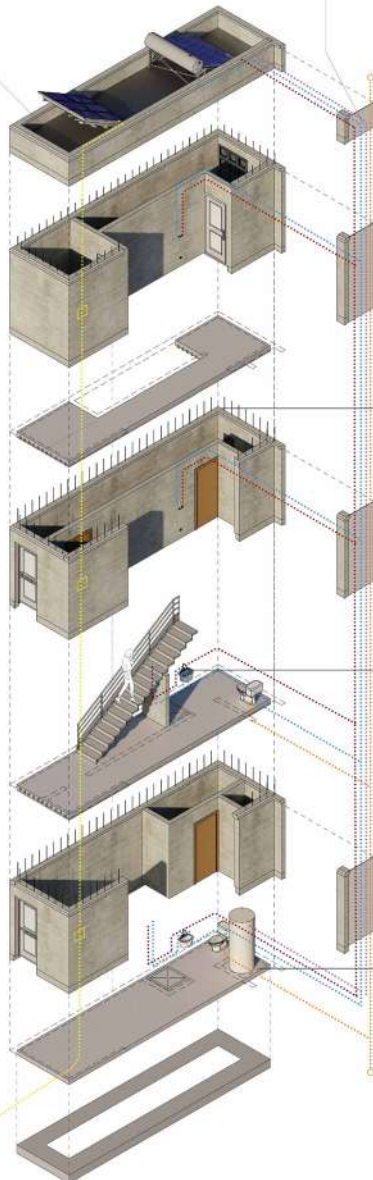
Scale 1:50

Power line

The electricity for the unit is supplied by both a water pressure meter and a magnetic connection. A distribution board with a meter will be on each floor to accommodate for hot and cold programmes.

Wet core

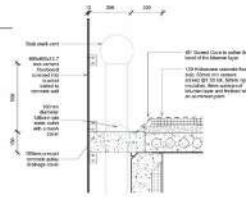
The cold water originates from the municipal connection to each bathroom fitting up to the water pressure. The hot water also runs from this water pressure to the bathroom and kitchen fittings. Rainwater is collected from the roof and taken down to the unit's condensation tank on the ground floor. The backwater line runs from each water closet down the duct to the municipal connection up to the top of the duct where the shut-off can vary.



Top of duct Detail

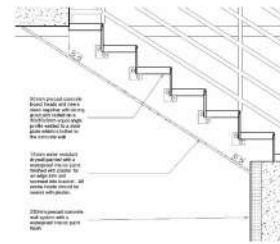
The top of the duct acts as the collection point for the rainwater from the roof's lead and accommodates to the ground and opening for the rain stack.

Scale 1:10



Wall Connection Detail

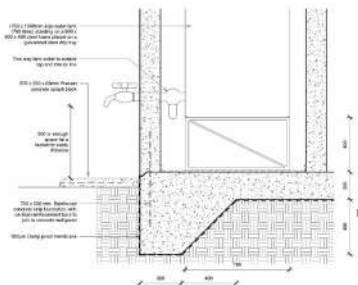
As per detail model.



Under Stair Detail

The shower is under the stairs and therefore respecting privacy and use of limited space in the unit.

Scale 1:10



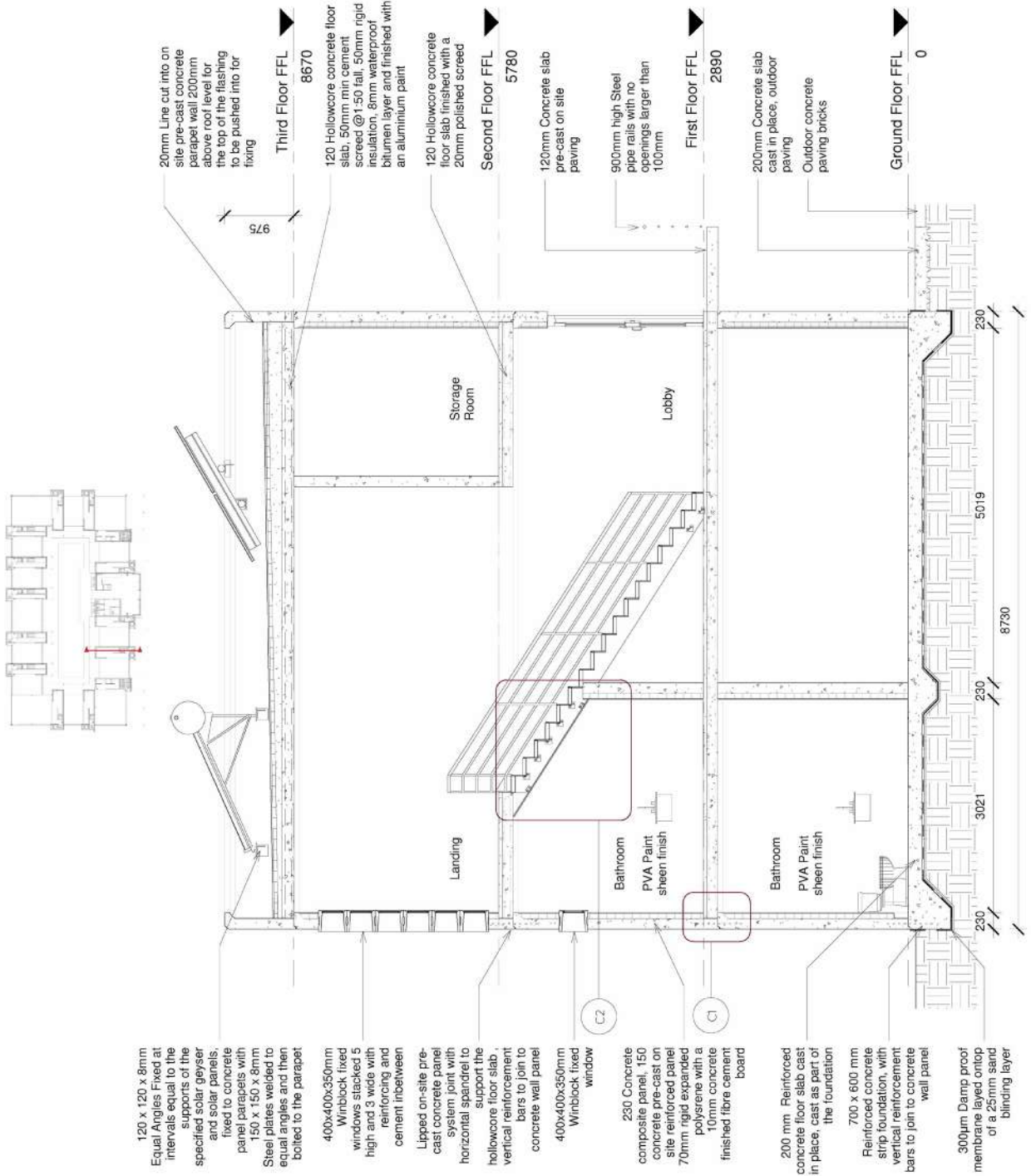
Rainwater Tap Detail

Rainwater water can be used for various outdoor water needs.

Scale 1:10

CORE SECTION

Scale 1:20

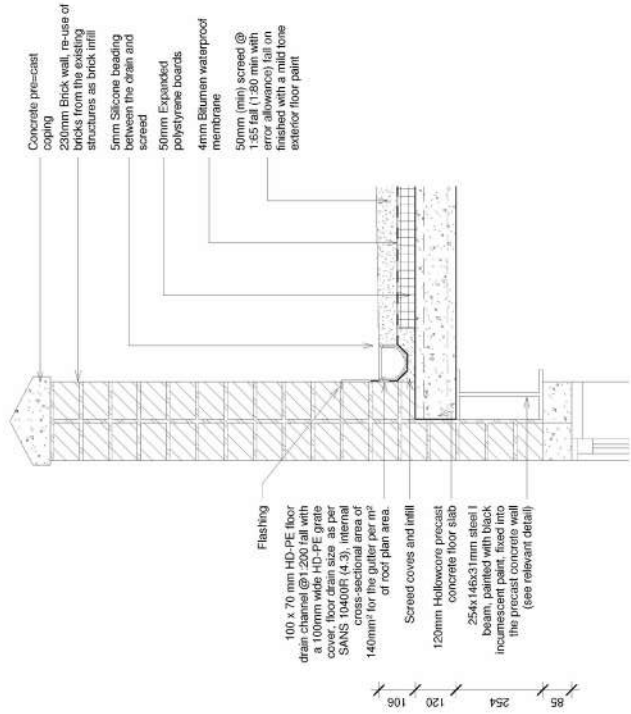


UNIT



ROOF DETAIL

Scale 1:5



SBAT

This SBAT tool is used to rate a building construction project on the holistic sustainability of a project from architecture to logistics. This covers the fields of economic, environmental and social sustainability.

BI 3	Project Name	Incremental Co-Housing Mamelodi
BI 4	Address	Mamelodi West, South Africa
BI 5	Site Area	3000 m ²
BI 6	Gross Floor Area (GFA)	2145 m ²
BI 7	Gross Internal Area (GIA)	1805 m ²
BI 8	Number of Habitable Rooms	14
BI 9	Number of Bedrooms	14

BUILDING ONLY

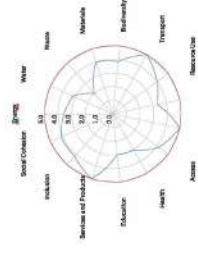
THIS SBAT score was calculated by only entering values according to the tool's instructions, calculations and logistics background information for the calculation of the SBAT rating.



SUSTAINABLE IMPROVEMENTS

The second values come from improved values in categories such as:

- The allocation of population species in front of each core with a variety of indigenous species.
- Water storage tanks allocated per unit which greatly increased rainwater catchment.
- Solar panels and local panels specified for each unit.



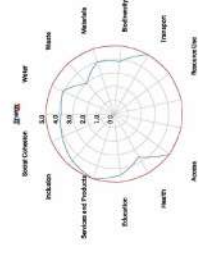
LOGISTIC IMPROVEMENTS

The final values come from additional values which would affect the decision made by the architect but can change the score greatly if the architect had to take into account the possibility of the cost of the material.

These values include the cost and accreditation for its construction workers.

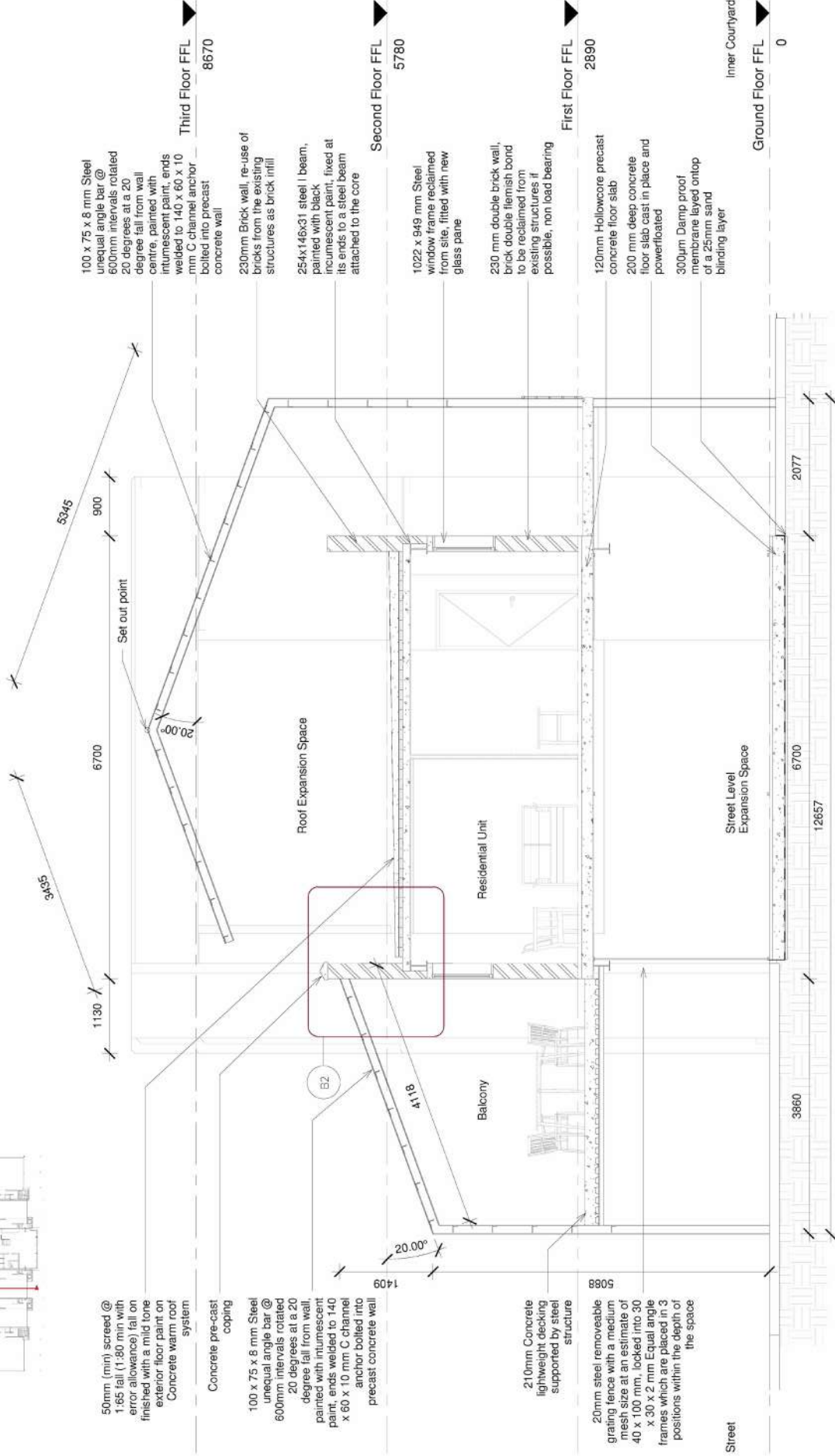
On-site organic waste recycling.

Alignment of floor slab with the ground level.



INFILL RESIDENCE SECTIONS

Scale 1:20



50mm (min) screed @ 1:65 fall (1:80 min with error allowance) fall on exterior floor paint on concrete warm roof system

Concrete pre-cast coping

100 x 75 x 8 mm Steel unequal angle bar @ 600mm intervals rotated 20 degrees at a 20 degree fall from wall, painted with intumescent paint, ends welded to 140 x 60 x 10 mm C channel anchor bolted into precast concrete wall

210mm Concrete lightweight decking supported by steel structure

20mm steel removable grating fence with a medium mesh size at an estimate of 40 x 100 mm, locked into 30 x 30 x 2 mm Equal angle frames which are placed in 3 positions within the depth of the space

100 x 75 x 8 mm Steel unequal angle bar @ 600mm intervals rotated 20 degrees at a 20 degree fall from wall centre, painted with intumescent paint, ends welded to 140 x 60 x 10 mm C channel anchor bolted into precast concrete wall

230mm Brick wall, re-use of bricks from the existing structures as brick infill

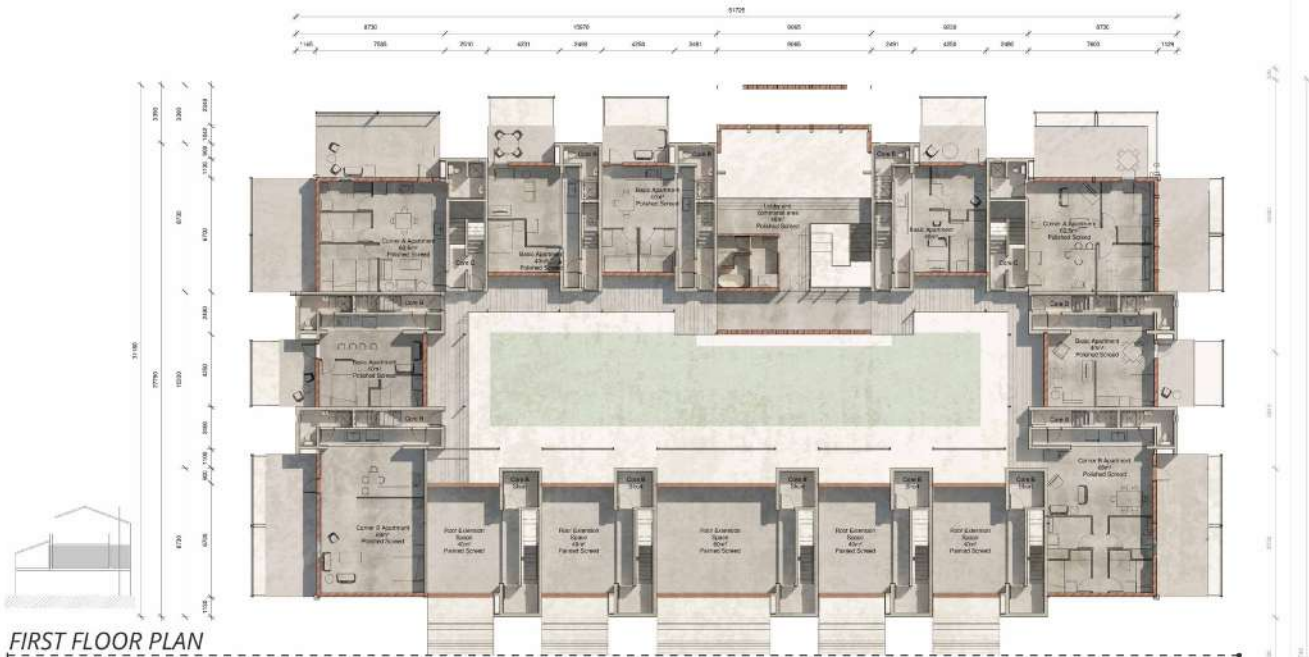
254x146x31 steel I beam, painted with black intumescent paint, fixed at its ends to a steel beam attached to the core

1022 x 949 mm Steel window frame reclaimed from site, fitted with new glass pane

230 mm double brick wall, brick double Flemish bond to be reclaimed from existing structures if possible, non load bearing

120mm Hollowcore precast concrete floor slab
200 mm deep concrete floor slab cast in place and powerfluted
300µm Damp proof membrane layed ontop of a 25mm sand binding layer

FLOOR PLANS



FIRST FLOOR PLAN

Scale 1:100



GROUND FLOOR PLAN

Scale 1:100



EXTERNAL
SPATIAL PERSPECTIVES



ENTRANCE FROM EASTERN
SHABANGU AVENUE
TRANSPORT NODE



CENTRAL SQUARE
PARK AND
COMMUNITY CENTRE



BLOCK
SPATIAL PERSPECTIVES



INTERIOR COURTYARD
SPACE FOR EACH
CLUSTER



STREET BETWEEN
BLOCKS



PLAGIARISM DECLARATION

Full names	Dirk Edward Schmidt
Student number	13090292
Topic of work	Social housing

Declaration

1. I understand what plagiarism is and am aware of the University's policy in this regard.
2. I declare that this Dissertation is my own original work. Where other people's work has been used (either from a printed source, internet or any other source), this has been properly acknowledged and referenced in accordance with the requirements as stated in the University's plagiarism prevention policy.
3. I have not used another student's past written work to hand in as my own.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

Signature



ETHICAL CLEARANCE



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UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en
Inligtingtegnologie / Lefapha la Boetšenere,
Tikologo ya Kago le Theknolotši ya Tshedimošo

Reference number: EBIT/E11/2019

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Dear All

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Approval is granted for the application with reference number that appears above.

1. This means that the research project entitled "*Masters professional dissertation in architecture, landscape architecture and interior architecture*" has been approved as submitted. It is important to note what approval implies. This is expanded on in the points that follow.
2. This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Research Ethics Committee.
3. If action is taken beyond the approved application, approval is withdrawn automatically.
4. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.
5. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom

Chair: Faculty Committee for Research Ethics and Integrity

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY