RISING

voices of community

Explorations of identity driven low-cost housing systems, incrementally sprouting into urban developments in the Haakbosdraai settlement

Lara Kotze | 20182480 43 | DESN6800 Thesis

This dissertation is submitted in partial fulfillment of the requirements for the degree; Masters in

Architecture. All the work contained in this document is my own except where otherwise acknowledged.

Department of Architecture, Faculty of Natural and Agricultural Sciences, University of the Free State.

Elizabeth Kotze | 201824804 | 2018248043@ufs4life.ac.za

Supervisors:

David vd Merwe, Jan Smit, Petria Smit

Date of submission:

14 September 2023

Declaration of original authorship:

The work contained in this dissertation has not been previously submitted to meet requirements for an award at this or any other institution of higher education. To the best of my knowledge, this dissertation contains no material previously published or written by another person except where due reference is made.

“The architecture profession's paradigm shift:

A new type of architect is needed; equal parts social worker, anthropologist and psychologist.”

- Campbell (2016) -





1. ABSTRACT

In informal settlements two of the main challenges facing communities are that informal housing such as shanties can only offer limited relief for their inhabitants in terms of meeting their basic needs of shelter and secondly public spaces in these areas although in some cases dynamic, do not allow for optimal living conditions and can benefit from urban design input by architects through public participation and community engagement. One of the questions that will be interrogated in this study is how social housing can create environments which augment individuality and contextuality while remaining low-cost. The primary issue is that low-cost social housing solutions, such as RDP housing, disregards the value of personal stories and a sense of identity as seen in the informal settlement of Haakbosdraai, Postmasburg. To address this an incremental system of adaptation and in-person interviews are used to individually convert existing shanties and create personal connections with the existing urban infrastructure. By investigating the link between narrative and architecture and the value of the organic growth prevalent in informal settlements, one can see how the method of using stories and incrementality can sustain a dynamic built identity within communities. This methodology allows for low-cost, social housing and supportive public functions and urban upgrading which sustain the growth of informal settlements into thriving contributors within the larger built reality.

2. RESEARCH QUESTION

How can the introduction of personal stories complementary to incrementality, establish a sense of a growing identity within the informal housing context of Haakbosdraai Postmasburg?

2. LEADING THEMES

Stories :

{Spatial fecundity/ Poetic mapping

(pragmatic vs poetic}

Incrementality :

{Incompleteness/ Potential/ Growth

mindset /House=living entity/ resonating/

gerund, subjunctive}

Identity :

{Meaning/ Ownership/ Community

Participation}

3. FAMILY OF THINKERS

Balkrishna Doshi
Teddy Cruz
Kelvin Campbell

Kelvin Campbell
Carin Combrinck
Alejandro Aravenna
Carin Smuts

Balkrishna Doshi
Teddy Cruz
Dalibor Vesley

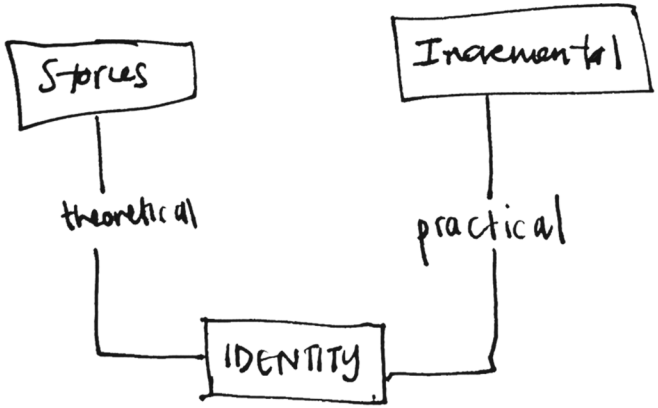


Fig. 02 Theme configuration (Author, 2023)

CONTENT PAGE

Plagiarism declaration 3

Abstract 8

1.1 **CONTEXT** IDENTITY 17

1.1.1 Postmasburg Identity 18
- pragmatic
- poetic 22

1.1.2 Haakbosdraai Identity 24
- pragmatic
- poetic 26

1.2 **HOUSING** IDENTITY 36
- pragmatic
- poetic 44

2.1 PROJECT **THEMES** 51

2.1.1 Stories 54

2.1.2 Incrementally 62

2.1.3 Identity 69

2.2 THEORETICAL **CONCEPTS** 79

2.2.1 Extract 80

2.2.2 Elongate 82

2.2.3 Protect 84

2.3 THEORETICAL **TOUCHSTONE** 86

2.4 **PRECEDENT** STUDIES 91

2.1.1 Incremental Systems 92
- the caracas compact
- bester's camp

2.1.2 Alternative low-cost housing solutions 94
- social housing
- empower shack

2.1.3 Earth Construction 96
- earth house sa
- lycee schorge school

3.1 DESIGN **PROPOSAL** 109

3.2 DESIGN **DEVELOPMENT** 111

3.2.1 Built analysis 112

3.2.2 Personal priorities 116

3.2.3 Design possibilities 118

3.3 DESIGN **SYNTHESIS**

3.4 **TECHNICAL** RESOLUTION 91

3.5 PRACTICAL **SYSTEM**

3.6 **CONCLUSION**


CH. 01



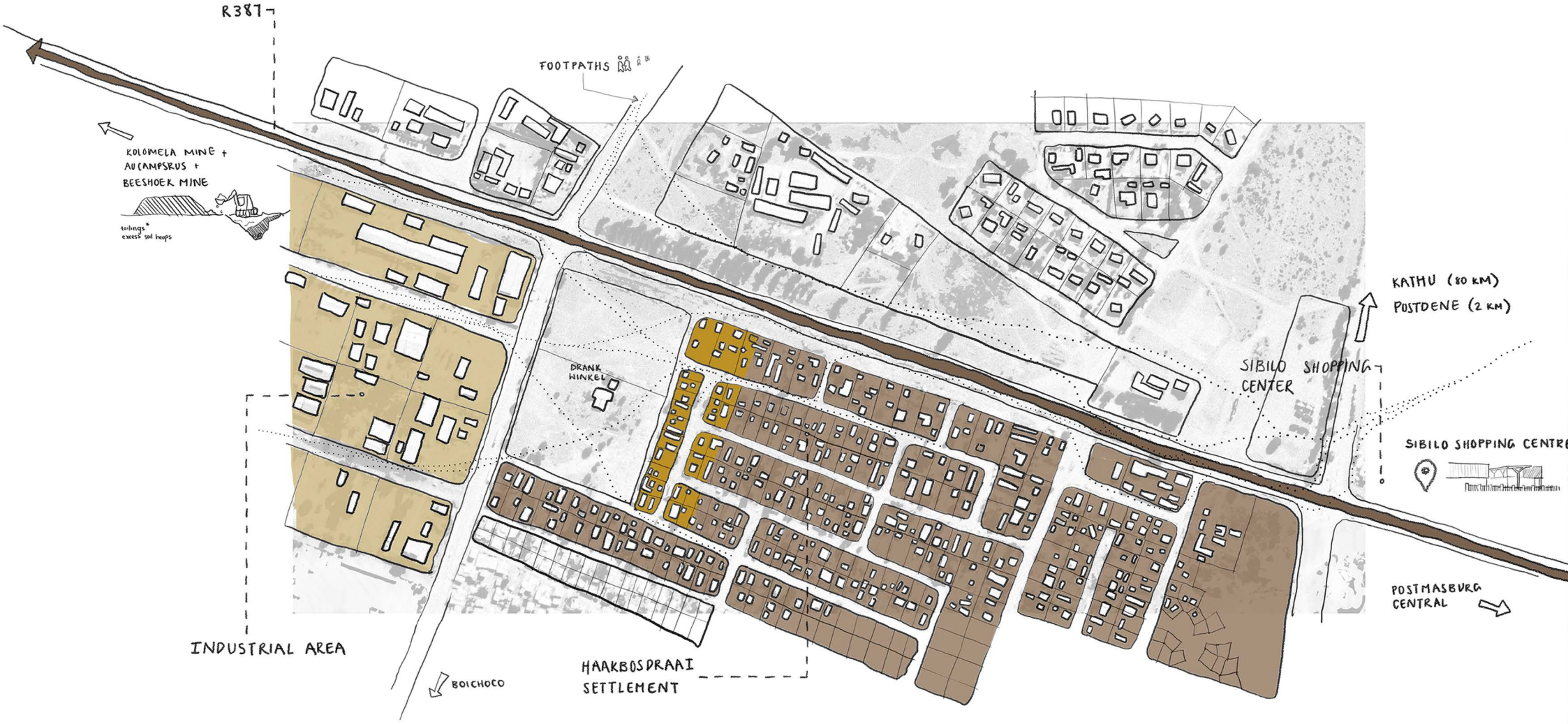
Fig. 03 Theoretical sketch (Author, 2023)

1.1 **CONTEXT** IDENTITY

1.1.1 Postmasburg Identity
- pragmatic
- poetic

1.1.2 Haakbosdraai Identity
- pragmatic
- poetic

1.2 **HOUSING** IDENTITY
- pragmatic
- poetic



CONTEXT PLAN

Fig. 04 Context plan (Author, 2023)

CONTEXT IDENTITY

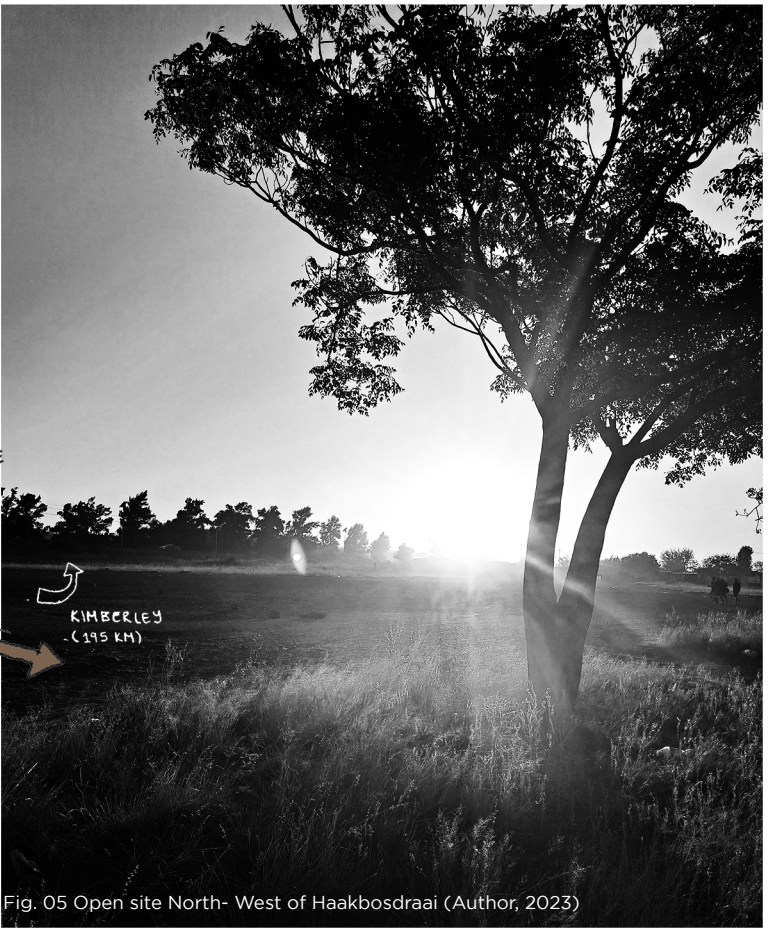


Fig. 05 Open site North- West of Haakbosdraai (Author, 2023)

Haakbosdraai is a small settlement on the Western side of Postmasburg, Northern Cape.

It lies adjacent to a predominantly open lot on the southern edge of the industrial district of Postmasburg. This creates an interesting potential of a hybrid connection between industrial, economic, and domestic. To the North it is flanked by the R387, which connects to most of the major iron ore mines in the area and is one of two major crossroads through town. The settlement itself is home to over two hundred families, most of which can be classified as chronically poor. The majority live in informal, self-built, zinc & timber structures, that have been adapted over time to adjust to the ever changing, non-conventional household and family compositions. Many of these structures do not allow for healthy living environments.

The Context identity consists of two parts:

1. **Postmasburg Identity**
2. **Haakbosdraai Identity**

Postmasburg Identity





Fig. 06 Postmasburg (Google, 2023) Adapted

Since the establishment of Postmasburg (Tsanstabane municipality) and the earlier settlement of Blink Klip, this area has been subject to prospecting and mining activities (from as early as 1786).

It has shifted from specularite and diamonds to the current manganese and iron ore. The mines have been a 70% majorty contributor to Postmasburg's economy (HDA, 2015)

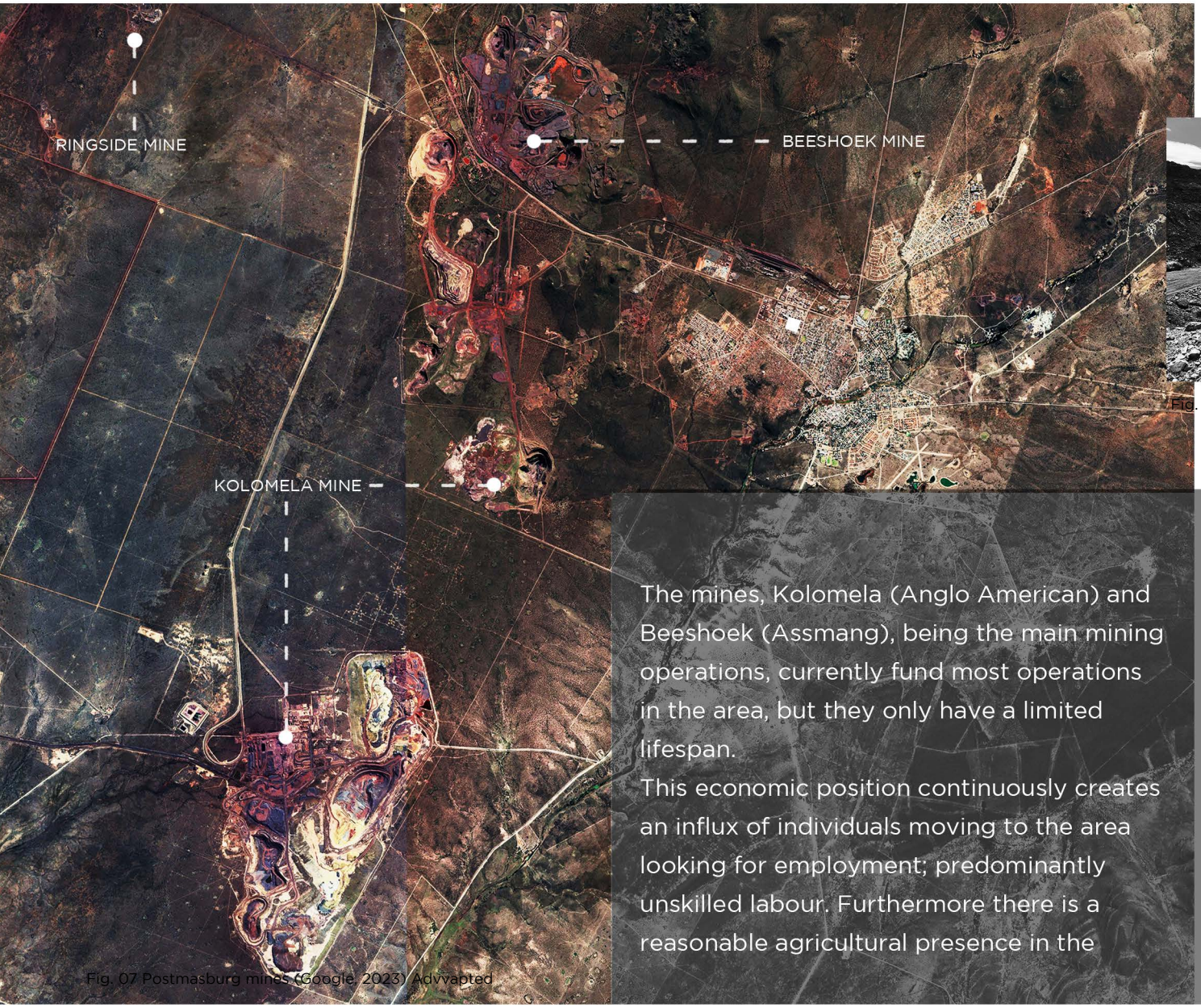


Fig. 07 Postmasburg mines (Google, 2023) Advvapted



Fig. 08 Ringside mine operations on Aucampsrus (Author, 2023)

The mines, Kolomela (Anglo American) and Beeshoek (Assmang), being the main mining operations, currently fund most operations in the area, but they only have a limited lifespan.

This economic position continuously creates an influx of individuals moving to the area looking for employment; predominantly unskilled labour. Furthermore there is a reasonable agricultural presence in the community (10% of population) in addition to a few independent factories and businesses located on the western outskirts. The mines fund multiple projects within the area as part of their community initiatives, including education, skills development, and local businesses. But when the mines close, currently estimated to be in 2031, Postmasburg will lose a critical source of econmic and social support..(Anglo American, 2023)

However much money the mines might have pumped into the economy, this industry will leave behind the skeletons of the mining process, a large population of unemployed physical labourers and the threatening ecological impacts of their activities. An impact which is specifically notable is the negative affect on water sources of local farming - Postmasburg's current second largest economic contributor.

This space will have been used up and cast to the side.

Yet the biggest problem to be faced thereafter is the large number of residents living in the ever-expanding informal settlements throughout Postmasburg. Informal housing provides a low level of quality of life, victim to the elements. And then the ability to rely on the mines for housing developments will be lost.



Fig. 10 Informal housing Postmasburg (HDA, 2015) Adapted

Fig. 09 Postmasburg informal settlements aerial view (Google, 2023) Adapted



Fig. 11 Kolomela mine housing Postmasburg (HDA, 2015)



Fig. 12 Generic housing (Author, 2023) Adapted

The government's national answer to this housing problem, RDP housing, fills the practical needs in which the informal housing falls short, but entirely negates the human and individualistic aspect of housing. The matchbox design is a one-size-fits-all solution to a very complex challenge. Similarly the mines' housing solutions accessible to the vulnerable to stable middle- class middle-class mine workers, are uniform, isolated, and impersonal.

Thus, the search for an individualistic solution to the housing predicament, not disregarding the current housing typology or the pressing financial constraints, aims to aid more than just the lower-class approach to housing.



I walk soundlessly through the house;

I look down to see my feet as they tread on

old wooden floorboards,

but the loud creaking that should have met

my ears is lost

within a deafening

void of silence,

a non-descript

nothingness.

-Author-



The prospector looks past the surface and sees the value which lies far underneath the sole of his steel point boot. The explosives are meticulously calculated and buried deep under the skin of the earth; it tears the flesh apart as the conductor stands back.
A tender but beautiful wound is exposed.

The people faintly hear a thud in the distance, not giving it a second thought. They continue with their job. Ripping the rusted zinc plates from its timber joints and casting it aside. Rip then discard, rip and then hide away. The earth is tightly tucked in, layer after layer. Concrete is cast, another layer. Adding, layering, separating from. Maybe a few more centimeters. Another house is built on top of the earth; protected or just isolated ?

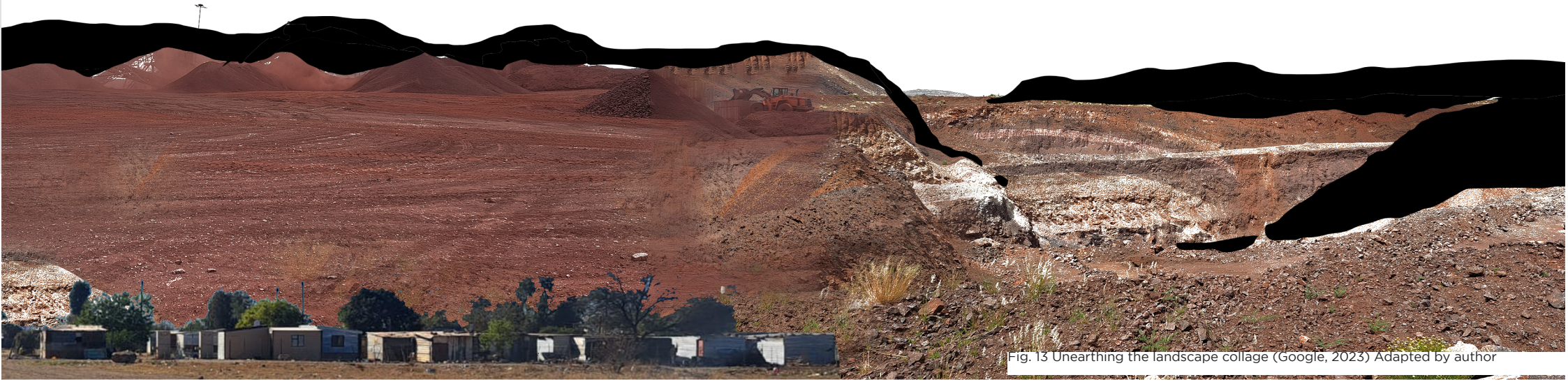


Fig. 13 Unearthing the landscape collage (Google, 2023) Adapted by author

HaakbosdraaiIdentity

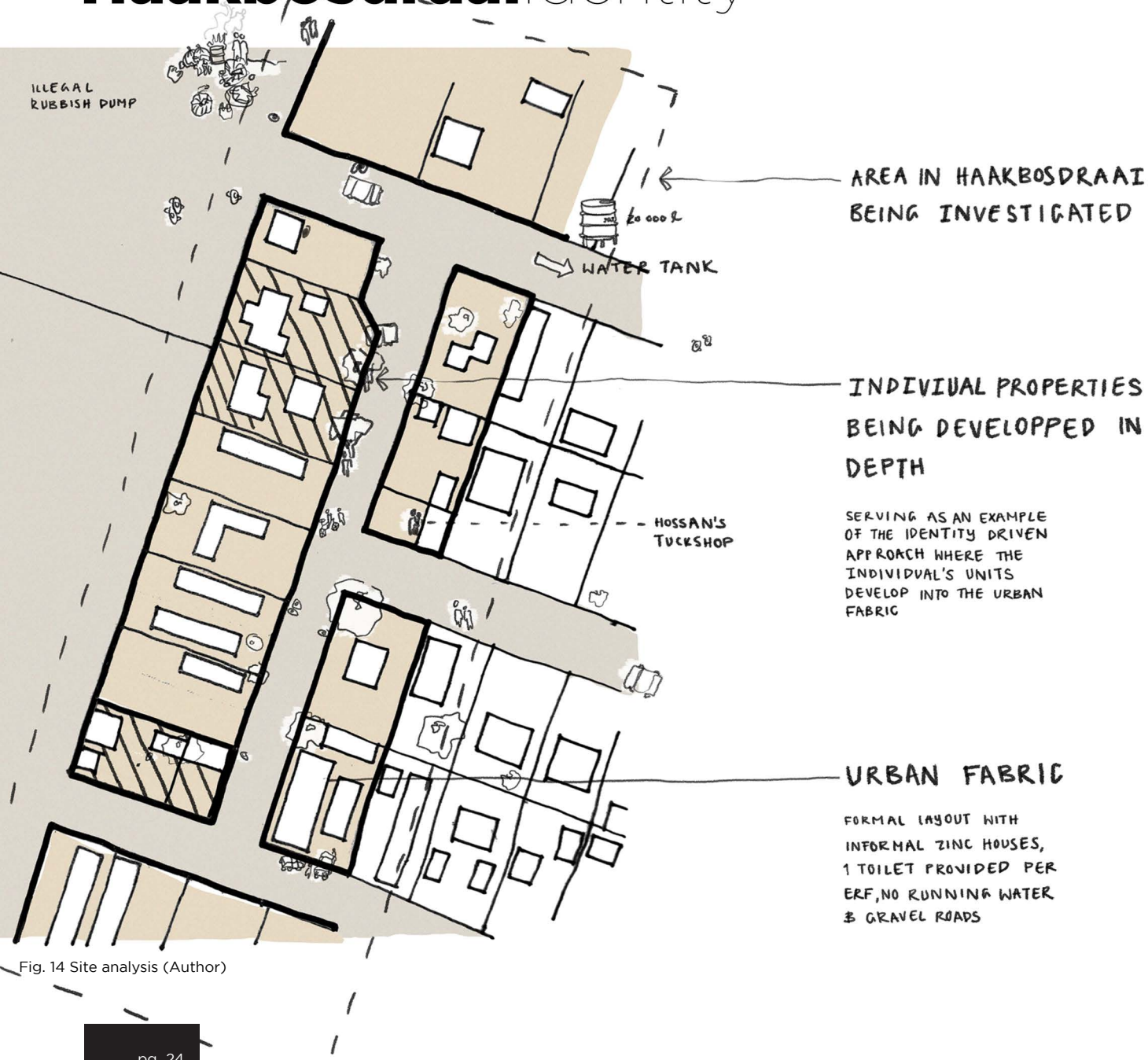


Fig. 14 Site analysis (Author)

A section of Haakbosdraai is investigated to allow for the individualistic approach, which is the aim of this study.

Three erfs and families' houses is developed in detail and subsequently into the urban realm of the larger block-section.
The spaces are investigated in terms of the stories of the people who live there.



Fig. 15 Haakbosdraai homes (Author)

SOCIO-ECONOMIC CLASSES IN THE SOUTH AFRICAN CONTEXT

In South Africa households are divided into five socio-economic classes;

- Chronically poor 48.8%
- Transient poor 12%
- Vulnerable middle class 15%
- Stable middle class 21%
- Elite 3%

This is based not only on income levels but also a household's ability to move up the ladder and having access to or being able to create opportunities for this growth. (SA-TIED, 2019)
This uneven distribution, with the heavy weight of almost half the population on the bottom end of this scale, not being able to meet their basic needs and with no prospects of escaping these circumstances, is of great concern for our country.
There is a myriad of factors which need to be addressed to remedy this problem. These include education, job-creation, economic development, accessibility to basic needs (water, sanitation, electricity, healthcare) and, most importantly for this investigation, housing.

HaakbosdraaiIdentity

The time will come when, with elation,
you will greet yourself arriving at your own door, in your own mirror,
and each will smile at the other's welcome,

and say 'sit here'. 'Eat'.
You will love again the stranger who was your self.
Give wine. 'Give bread'. Give back your heart
to itself, to the stranger who has loved you

all your life, whom you ignored
for another, who knows you by heart.
Take down the love letters from the bookshelf,
the photographs, the desperate notes,
peel your own image from the mirror.
Sit, feast on your life.

- Derek Walcott

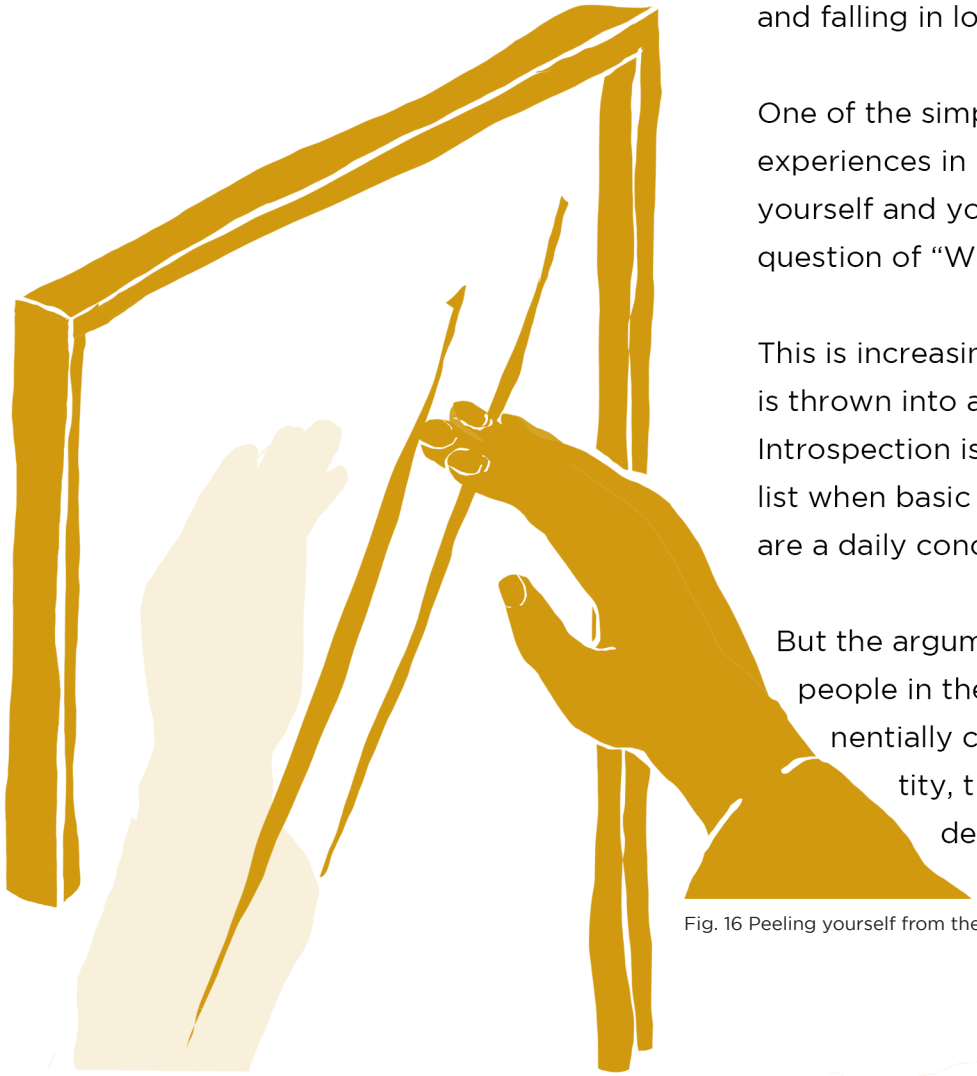


Fig. 16 Peeling yourself from the mirror (Author)

This poem is about re-discovering and embracing your personal identity, inspecting and falling in love with your own life.

One of the simplest, but most frightening experiences in life is to take a hard look at yourself and your life, entertaining the question of "Who am I".

This is increasingly more difficult when one is thrown into a cycle of day-to-day survival. Introspection is far from the top of the to-do list when basic needs like food and shelter are a daily concern.

But the argument can be made that for people in these conditions it is exponentially crucial to inspect their identity, their future plans and personal development, to be able to rise out of these situations.

It is noon and there are people all around; walking and lazily chatting or quickly scurrying to get their lunch in time. The kids are playing soccer on a big stretch of earth as their mothers and grandmothers are busy cooking outside over a fire. A few young entrepreneurs are hustling to make a living; braiding hair, Hassan managing his tuck-shop, working underneath a car or looking after a bunch of the young ones at the kid's safety haven. -Author-

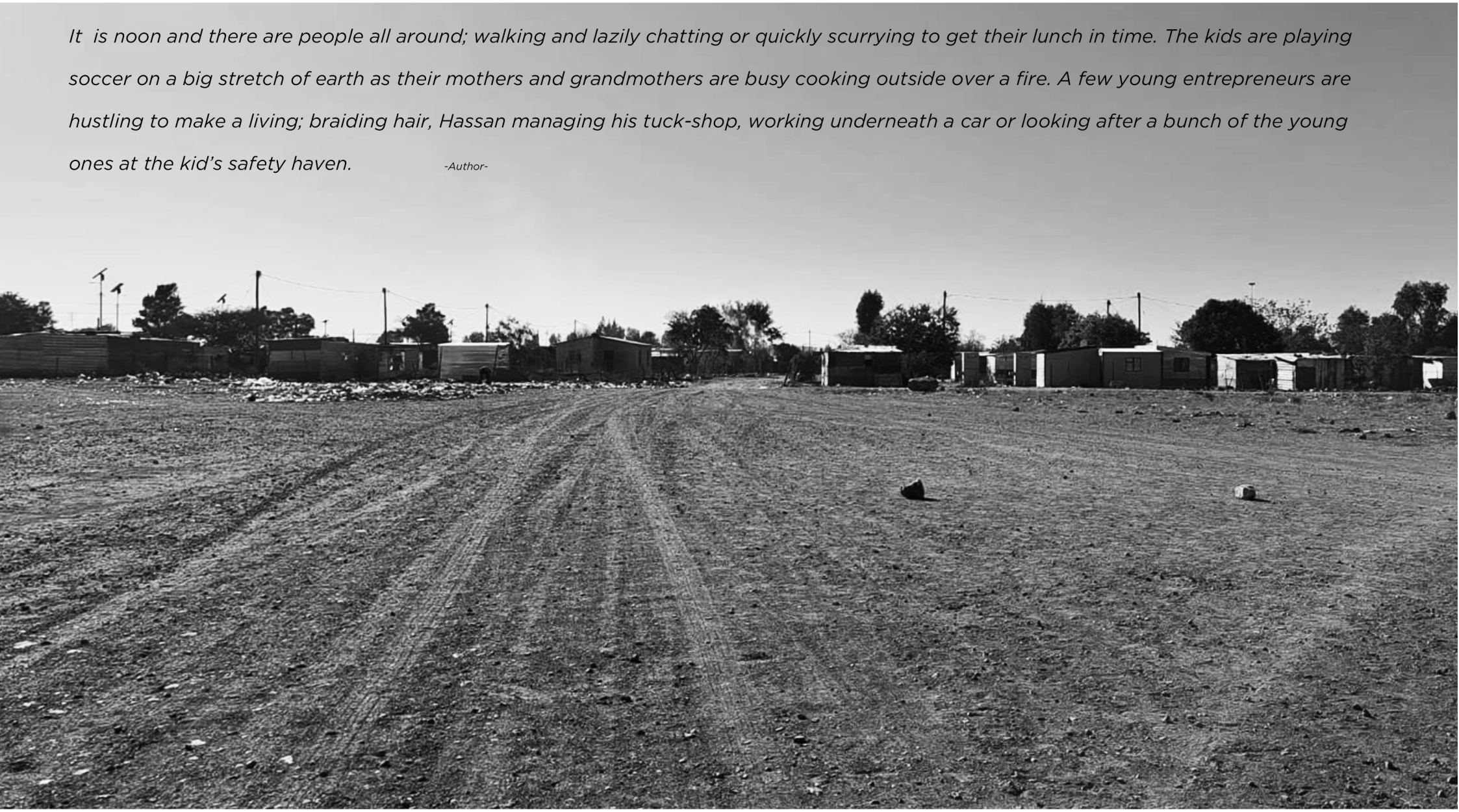


Fig. 17 Breaching the distance (Author)

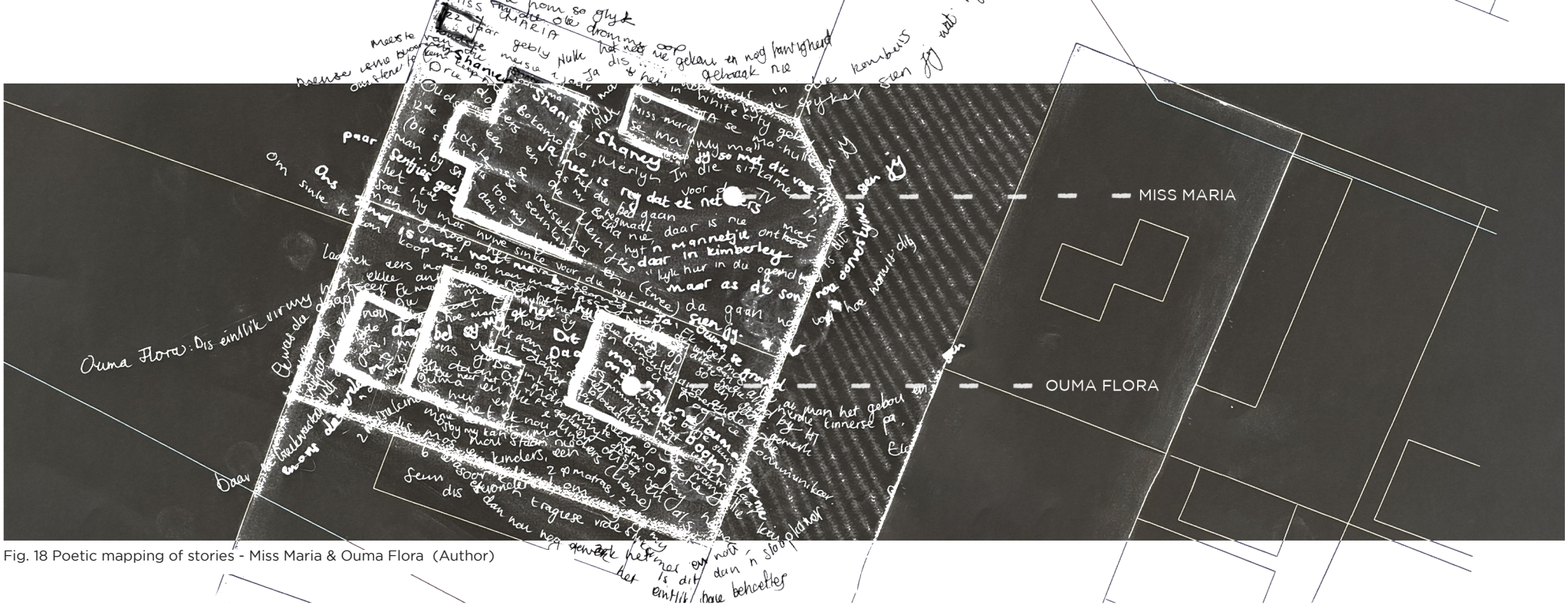


Fig. 18 Poetic mapping of stories - Miss Maria & Ouma Flora (Author)

And then there are Miss Maria, Nonno and Ouma Flora.

As you walk on the main road that enters into Haakbosdraai from the industrial side, their homes are to your right. Miss Maria's home is visible just as you turn the corner, then Ouma's and Nonno's at the far end. All of them with their own, very unique family structure.

Miss Maria with her husband, four daughters and her mother.

Ouma Flora, the widow with a bunch of her grandkids and other kids who she took in. Also on her property is her brother and the father of one of the kids who lives with her.

Nonno lives with her husband, Plaatjie, and two young kids, Raylee en Raylon, her parents and brother also live on the same erf.

All these people have their own specific stories and intricate identities. But to concretize these identities, there is the need for a certain level of introspection into their lives, from the side of the architect but also the individual.

Here follows the resulting identities which I was privileged enough to piece together through conversations and visits to the three Haakbosdraai inhabitants.

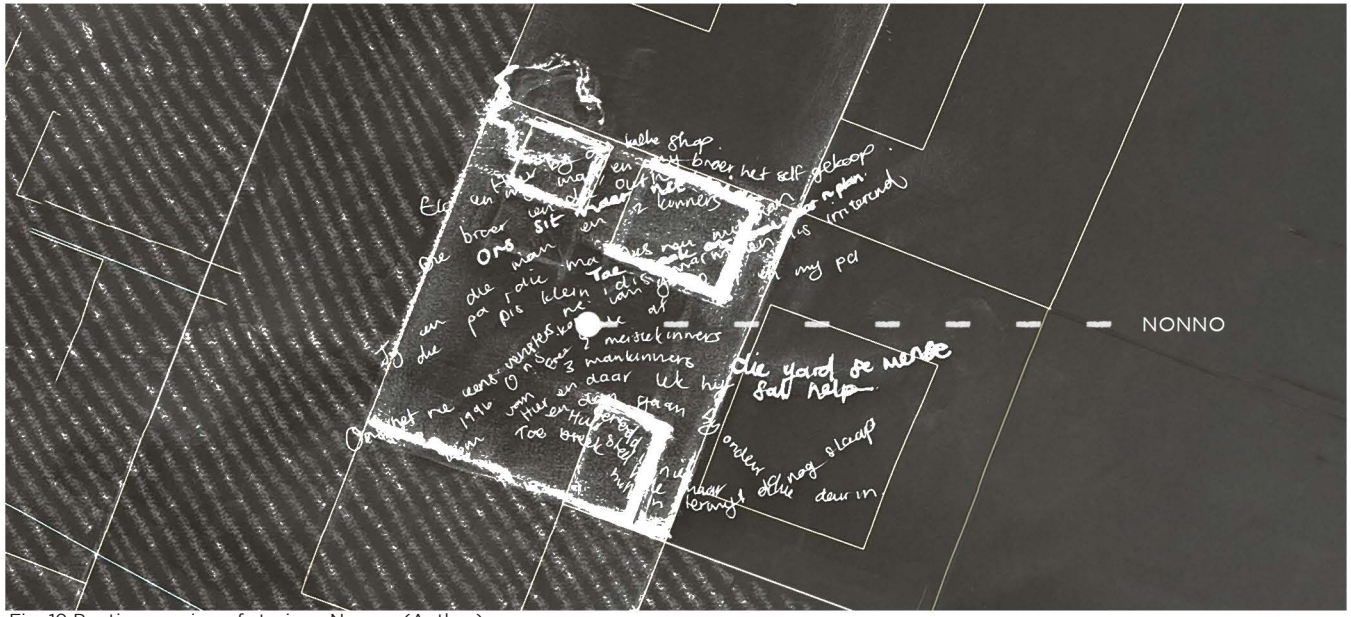


Fig. 19 Poetic mapping of stories - Nonno (Author)

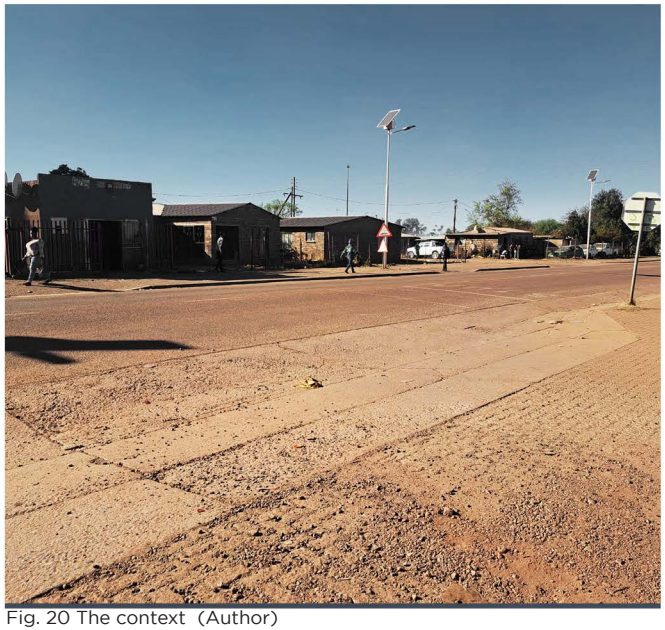


Fig. 20 The context (Author)



Fig. 22 Traces on site/ footpaths (Author)



Fig. 21 An existing shebeen on site (Author)

Miss Maria spends her days looking after her second eldest daughter's little girl or working outside in her garden. There are lovely beddings of well-kept greenery around her house and a grape vine under the shadow of a tree, just next to her mother-in-law's shanty. These plants beam with bright greens, a testament to the love and care they receive despite the scarcity of water in Haakbosdraai. Here in her living room they sit and wait for a lorry to come fill up four 20 000-liter tanks, of which the community lives off, bucket by bucket until the last drop falls. Then she waits for the lorry to come around again. Her husband, Botha, drives around trucks, a time-intensive job which keeps him away from home for weeks at a time or more. Even though they don't live a lavish lifestyle, they have one of the only professionally built shanties in the community. After they got money back from SARS they were able to get "'n mannetjie daar van Kimberley af" to build them a home.



Fig. 23 Miss Maria in her sitting room (Author)

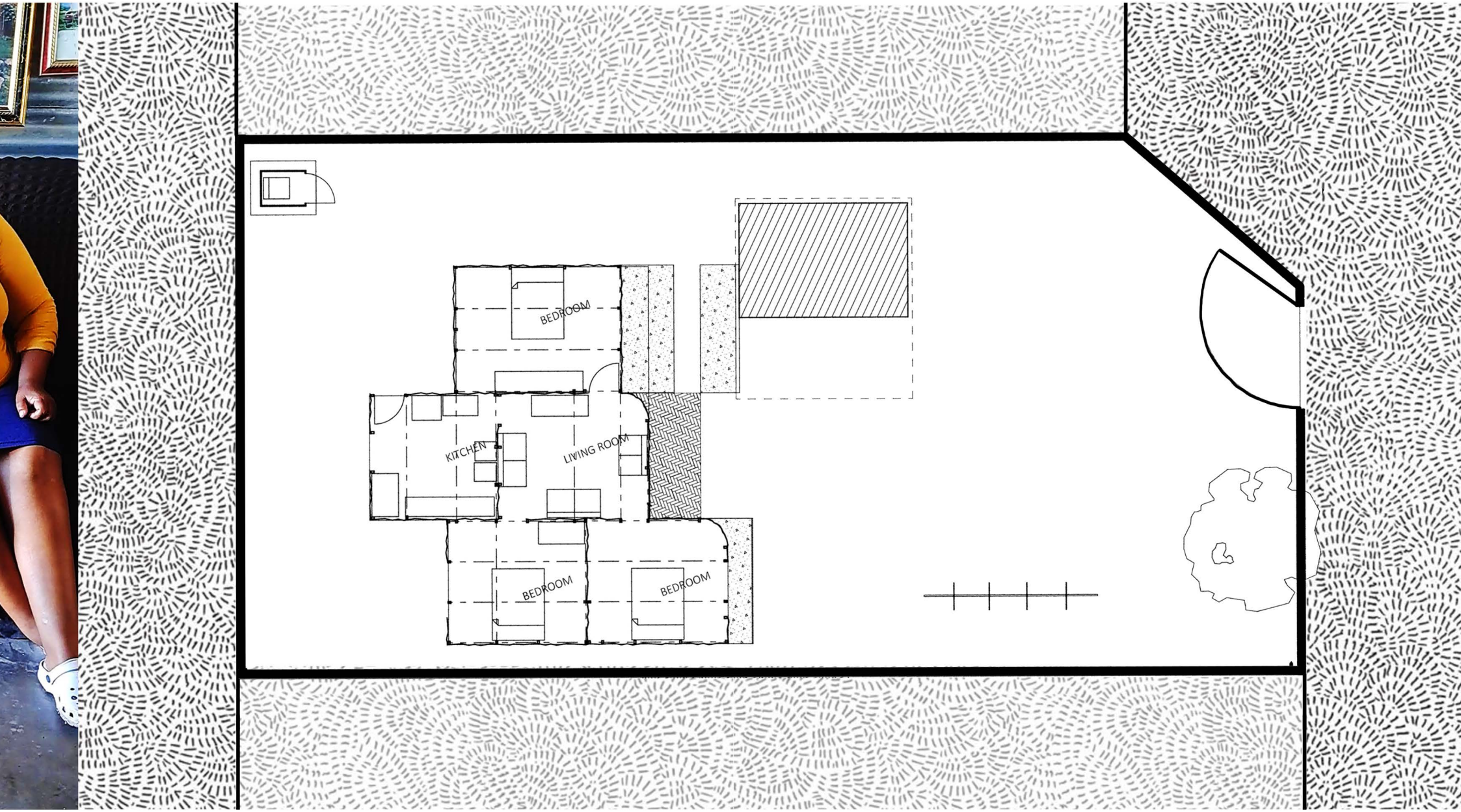


Fig. 24 Plan of Miss Maria's home (Author)

Nonno sits with the wind rustling through her bright pink dress. I can see the day has been rough on her, trying to shush little Raylene who is crying with all her might. She tells me about her boy, Raylon, and husband, Plaatjie. Together this family of five lives in a five by six home, which Plaatjie and her brother built. She would love to cook more but her kitchen consists of a fridge and one counter. And most of the days the whole family sits outside in the sun, in-between the two structures. Her brother, two parents and a few uncles and aunts. Plaatjie is very good with his hands, with electrician skills added to his house building skills. He was a great help discussing with me and explaining how they built their home. This introspection allows the individual to delineate their own identity and also for the architect to have a look at the present and possible future reality of the families and how this individual potential be elongated into the built reality and the urban realm.



Fig. 25 Nonno with Raylee infront of their home (Author)

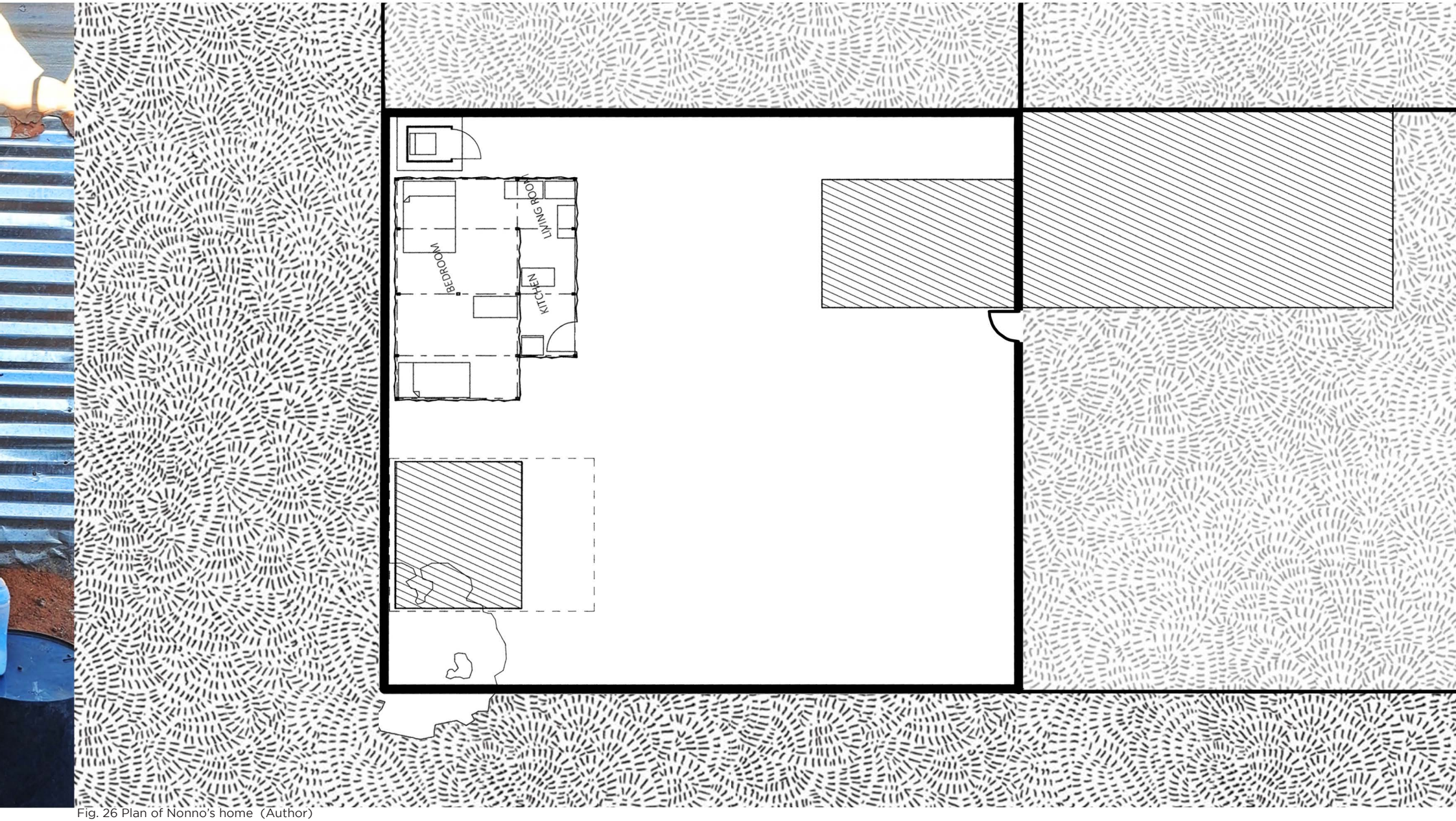


Fig. 26 Plan of Nonno's home (Author)

Ouma Flora's kind eyes are the first thing that greets you. She might have a stern look reserved for the whirlwind of kids running around her but as you step inside you can feel that you are in a loving home. She stays there with 5 kids, her own grandkids, and other kids whose moms left them. She proudly says, "Ek is ma, en ouma en oupa en als." In the tight quarters, the youngest two sleeps with her on the bed, two on the other bed behind the curtain and a boy next to the kitchen table and the broken TV. Although she has been through a lot in her life she speaks hopefully of having a big window here and a stoep which opens up outward over there. Her first husband left her and her second husband passed away. "Toe het my man mos nou gesterwe, toe het ek nie meer een wat saam met my kan staan nie." Through all this she kept on being the beautiful woman that she is, working as a maid and nanny for one of the well known families in Postmasburg, climbing into their hearts so much so that they asked her to move with them in 2018, but she could not leave her kids behind; who would look after them then?



Fig. 27 Ouma Flora and some of her "aanneem kinners" (Author)

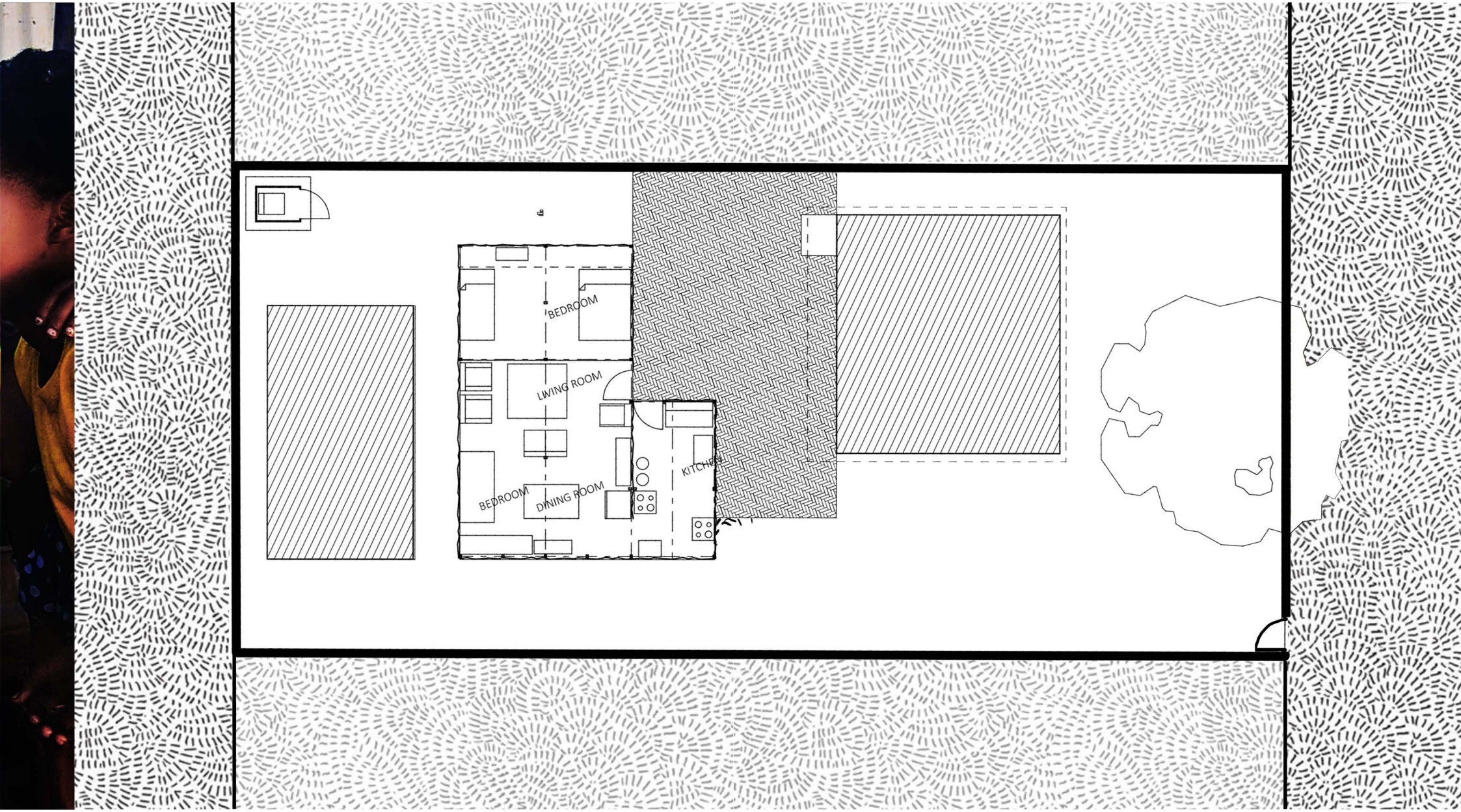


Fig. 28 Plan of Ouma Flora's home (Author)

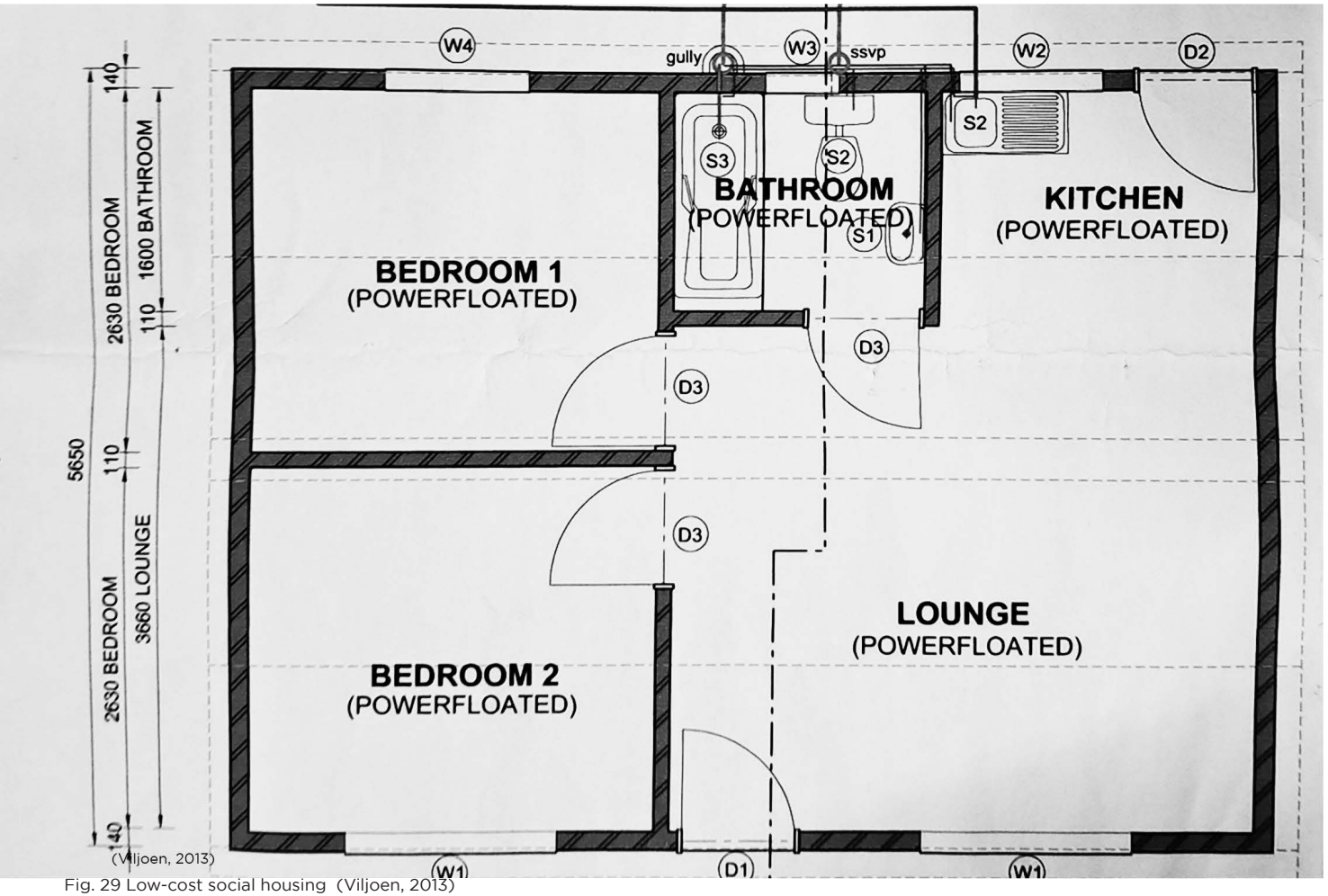


Fig. 29 Low-cost social housing (Viljoen, 2013)

NE 51/9

Non - European 1951

Drawing 9 out of
9 plan variations

Fig. 30 Analysis of NE 51/9 acronym (Viljoen, 2013)

HOUSING IDENTITY

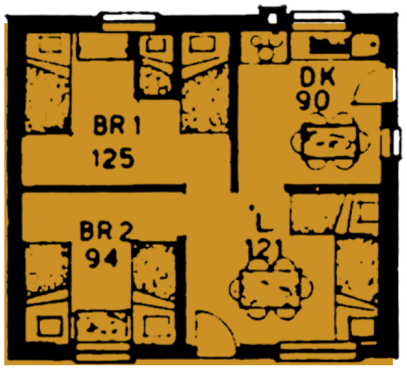


Fig. 31 NE 51 plan variations (Jennings, 1954)

RDP Housing is currently the solution to the housing problem.

This government- subsidized housing, which forms part of the **Reconstruction and Development Programme** (Salingaros, 2014) .The problem with this program reaches further than just the cost, time and application procedure associated with it, it negates the social and individual identity.

The design being utilized for RDP housing today is still the NE 51/9 *(Fig.)* (non-European) house, designed between 1948-1951 by Douglas Calderwood, a young architect from the NBRI (National Building Research Institute).

Calderwood designed this as low-cost mass housing, the product of a rational , not to mention failed, design process inspired by Le Corbusier's Ville Contemporaine (Mills, 1989) *(Fig.)*.


Fig. 32 Model op Ville Contemporaine (Mills, 1989)

The design has since been reproduced in the thousands across South Africa from the 1950s and continuously until today. This is a very uncritical continuance of a reductionist design housing model and therefore begs for a new way of approaching the design.

The cost of one unit in the Northern Cape was R 123 829.00 in 2018, excluding the cost of land or the provision of water and sanitation (MATLATSI, 2018). Aditional to this, in the five years which followed this amount increased with an astonishing 106% to the recently announced amount of R255 364 per unit, from the 1st April 2023 (Mahlati, 2023).

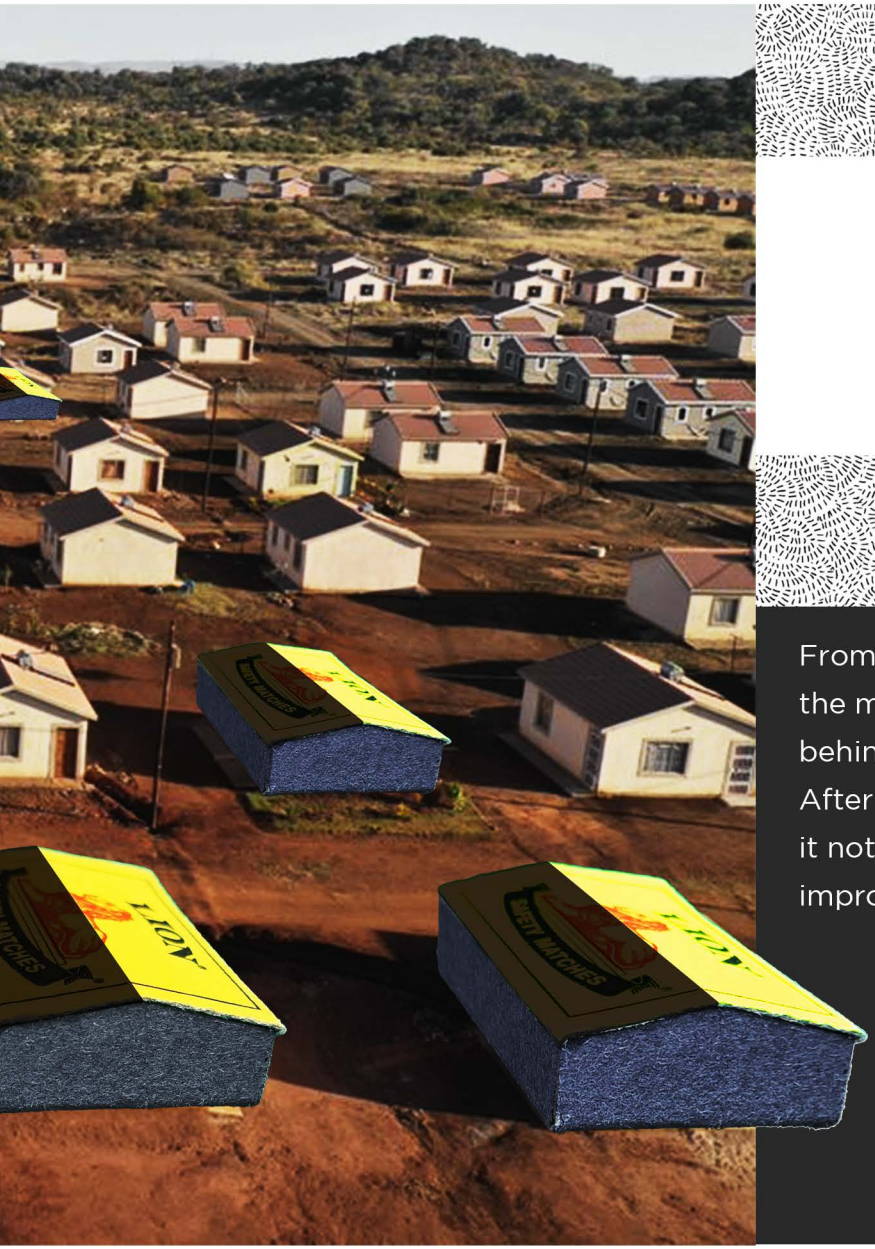
There is a long waiting list for applicants with deserving candidates often waiting indefinitely for some kind of correspondance. This is due to construction time, administration, funding, relocation/ temporary housing, etc. Currently the RDP housing backlog in south Africa is estimated at about 2.5 million.

This approach is clearly not working effectively or at the rate required, and therefore we have to look at possible alternatives.



Fig. 33 Matchbox[1] housing (Haranani, 2022)

1) In full matchbox house: a small house, one of many built to the same plan as part of a mass housing scheme in a township.



"Ek het 7 jaar terug al aansoek gedoen maar ek hoor dan nou nog niks"

- Ouma Flora -

From a architectural point of view, one of the main problems lies within the mindset behind the designs of these RDP houses. After all the effort to obtain a house, should it not at least create some considerable improvement in living quality.

The main bases are being covered, a relatively warm place to stay with basic amenities. But could one risk the luxury of asking whether housing might be about more than just these fundamentals?

What elements are missing from these designs which would allow residents to create opportunities to improve their socio-economic class and their holistic wellbeing.

In the extensive, expensive process of RDP housing, the following elements are overlooked or negated.

1. The social and adaptive value of the informal settlement

2. Regional and individual style

3. Township economy

The social and adaptive value of the informal settlement

In informal settlements and informal housing, the built environment organically develops as time passes by. Housing responds to its circumstances, as it should for families and relations which are ever-changing and expanding.

Aside from the quality of living due to the financial burden of construction, there are multiple factors which augment the social relations, living reality and the public realm in ways that current RDP housing couldn't even dream of addressing.

This presents the question: why are we throwing all this away, bulldozing and rebuilding the most basic design in merely a different building material?

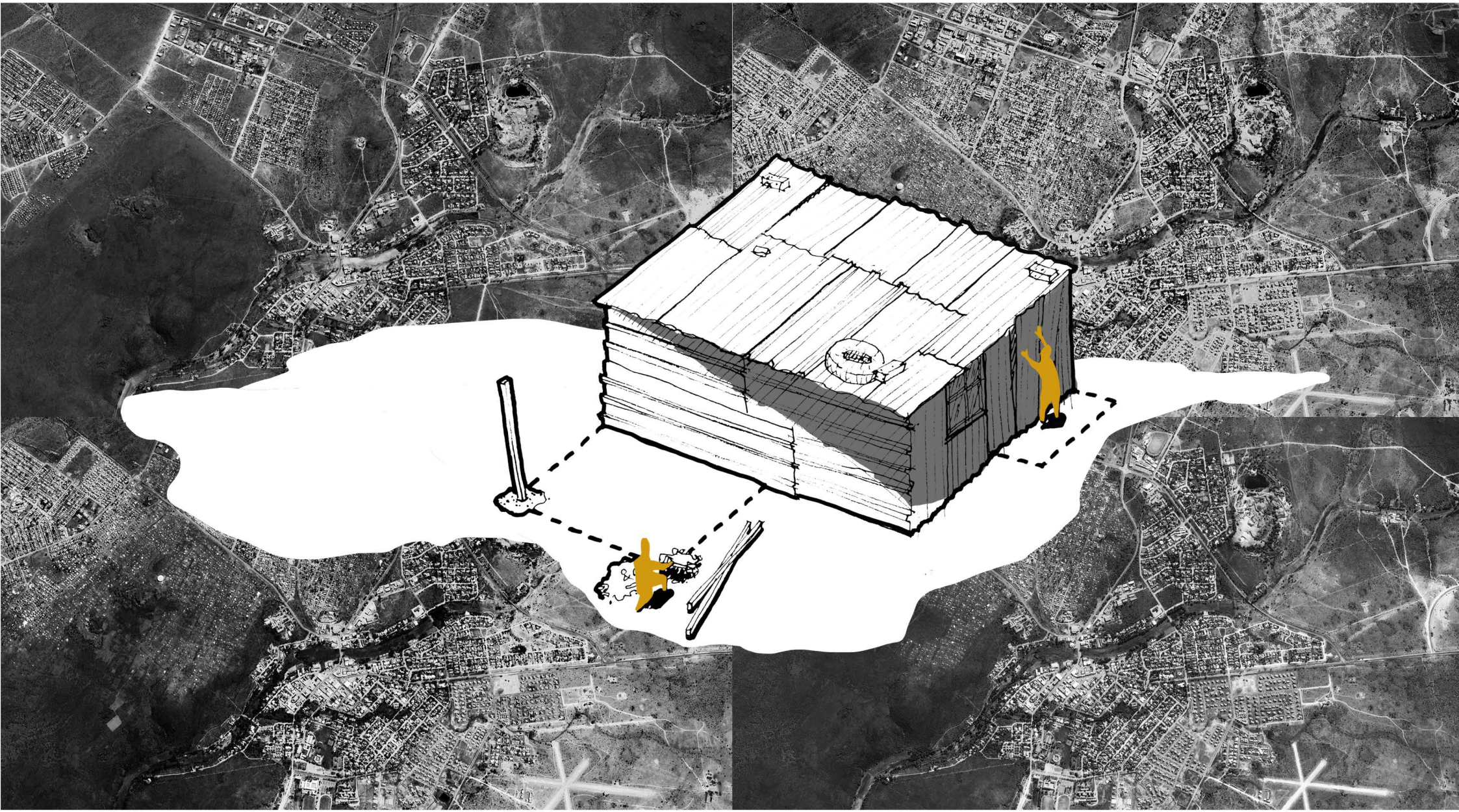


Fig. 34 The expansion of Postmasburg over time with the expansion potential of shanties (Google, 2023) Adapted by author

Regional and individual style

Has RDP housing become the modern day, working-class version of the international style? Replicated across the country, the identity of individuals and regions are set aside. Once again, the complication arises of whether design and architecture can be realistically associated with low-cost housing. This is one of the main inquiries of this thesis:

Can one through alternative regional materials and adaptive design develop adequate, low-budget housing, whilst allowing for identity within the personal and public realm?

The housing problem is an issue which comes not only with a complicated, multi-faceted set of problems, but also brings about opportunities. Through these points one can see that for effective, poverty-alleviating and opportunity-creating communities, housing is a social issue as much as it is a practical issue.

Township economy

And lastly there is the township economy, which is one of the biggest and most overlooked influential aspects of not just the informal settlement but the whole South Africa.
This hybrid way of living and working in decentralized nodes is an invaluable asset to the economy as well as a regionalist and modern way of handling local supply and demand. This phenomenon needs to be supported and planned for.



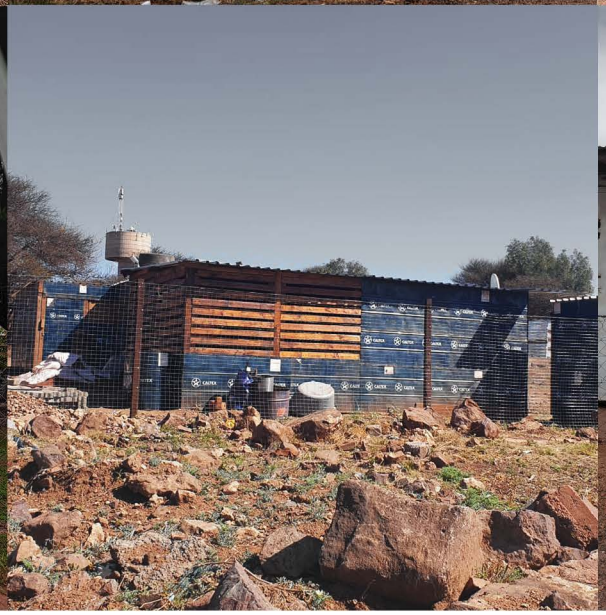
Fig. 35 Haakbosdraai creativity and economy (Author)



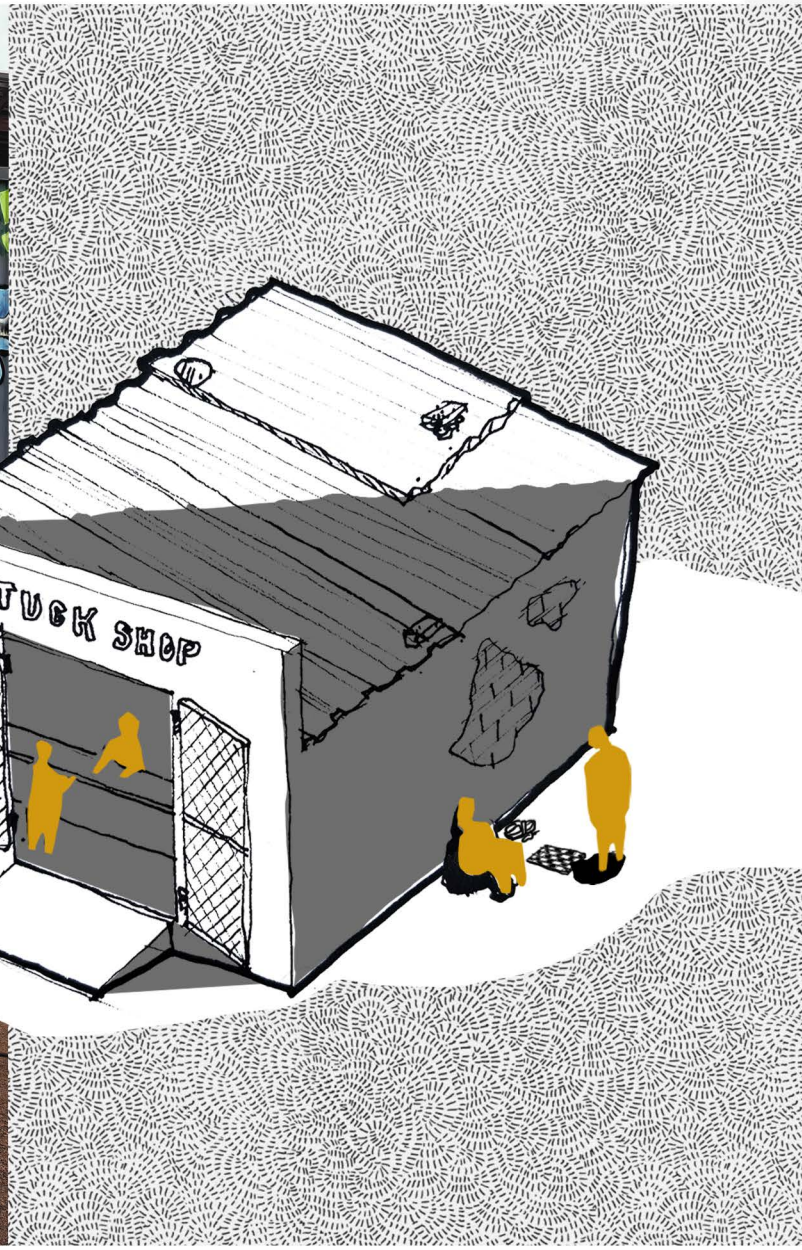











TUCK SHOP

The house speaking. But the truth is that it has already spoken and still has much more to say.

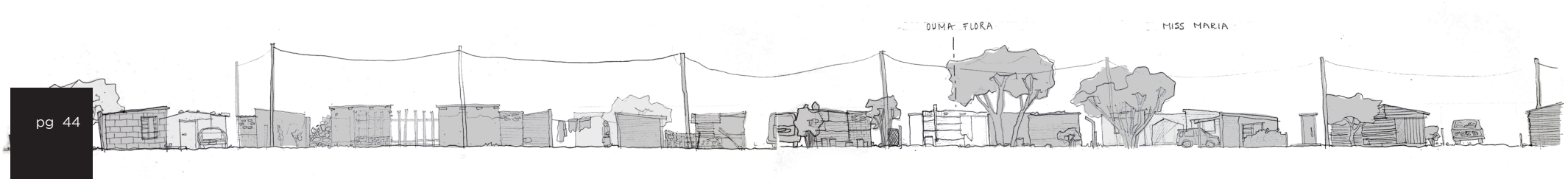
It is the place where you can sit in solitude, or the place where the weekly chat between you and the neighbourhood moms takes place. The coffee table with the crumbs on where your grandchildren sit and eat freshly baked cookies is also the one you rest your feet on after a long day. The sofa where you lie back into your loved ones' arms is where you plan out the inventory for your spaza shop. It is the fence which keeps you safe which you lean on when you exchange the weekly gossip.

The boundary of this home is continuously expanding and contracting, looking inward and reaching outward. This house is speaking of you and that which you are connected to, where we've been and where the journey is headed.

- Author -



Fig. 36 Becoming one (Author)



But then I hear a faint echo, a footfall creaking over wooden floors, another rustling through the dried grass, one crunching over gravel.

A kid runs over to the building site with a rock five times the size of his tiny little fists. He places it next to a bunch of others packed in a circle, following the curve of a short mud wall. It is decorated with thousands of intricate engravings. He joins friends in their serious discussion of how they will rule their kingdom, what will they do next, what will they build, who will they conquer.

-Author-



Fig. 37 The foot falls (Author)

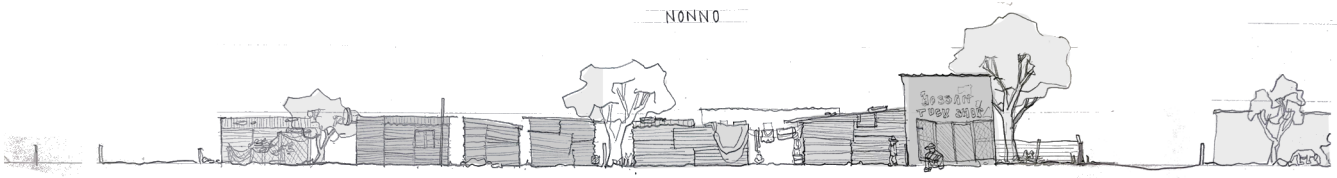
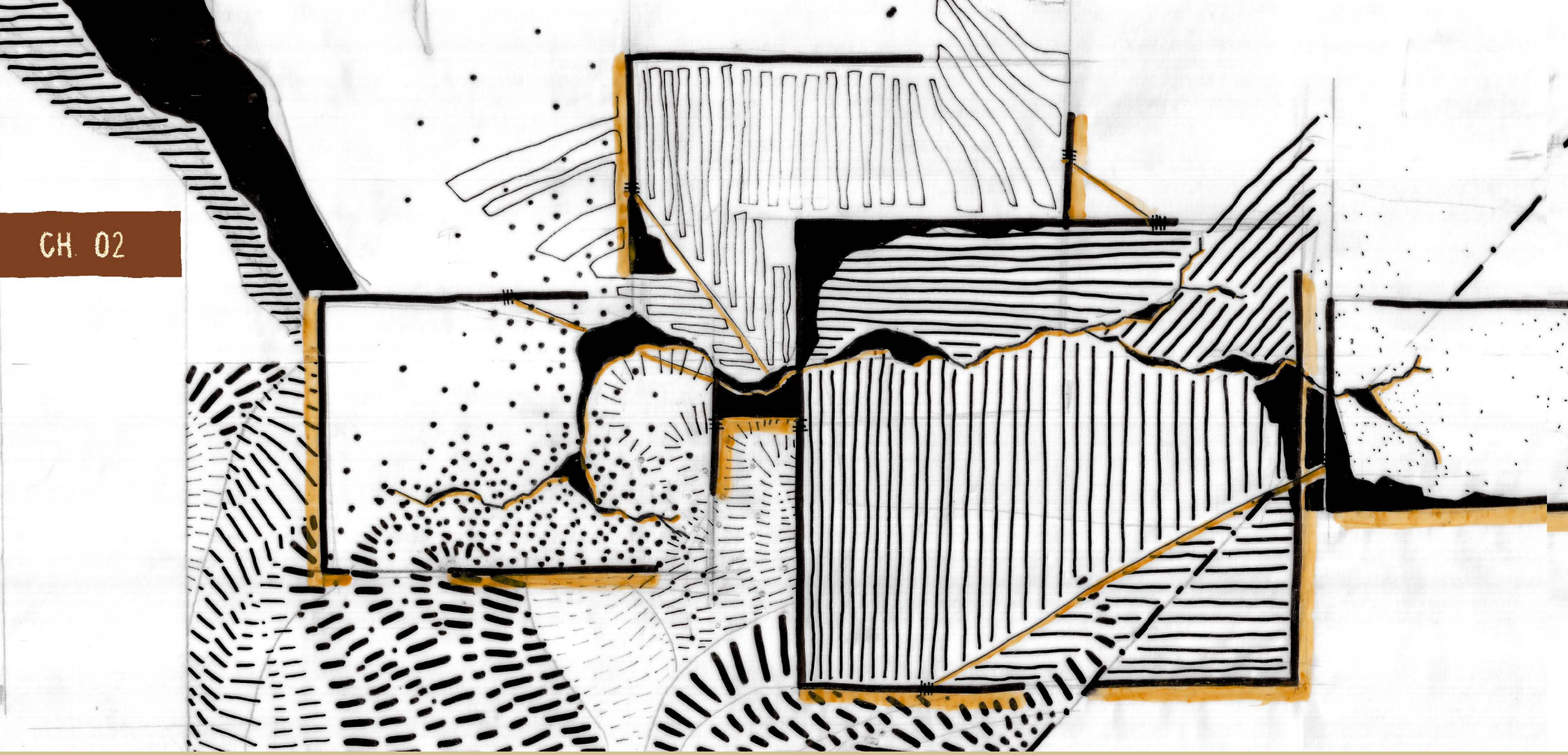




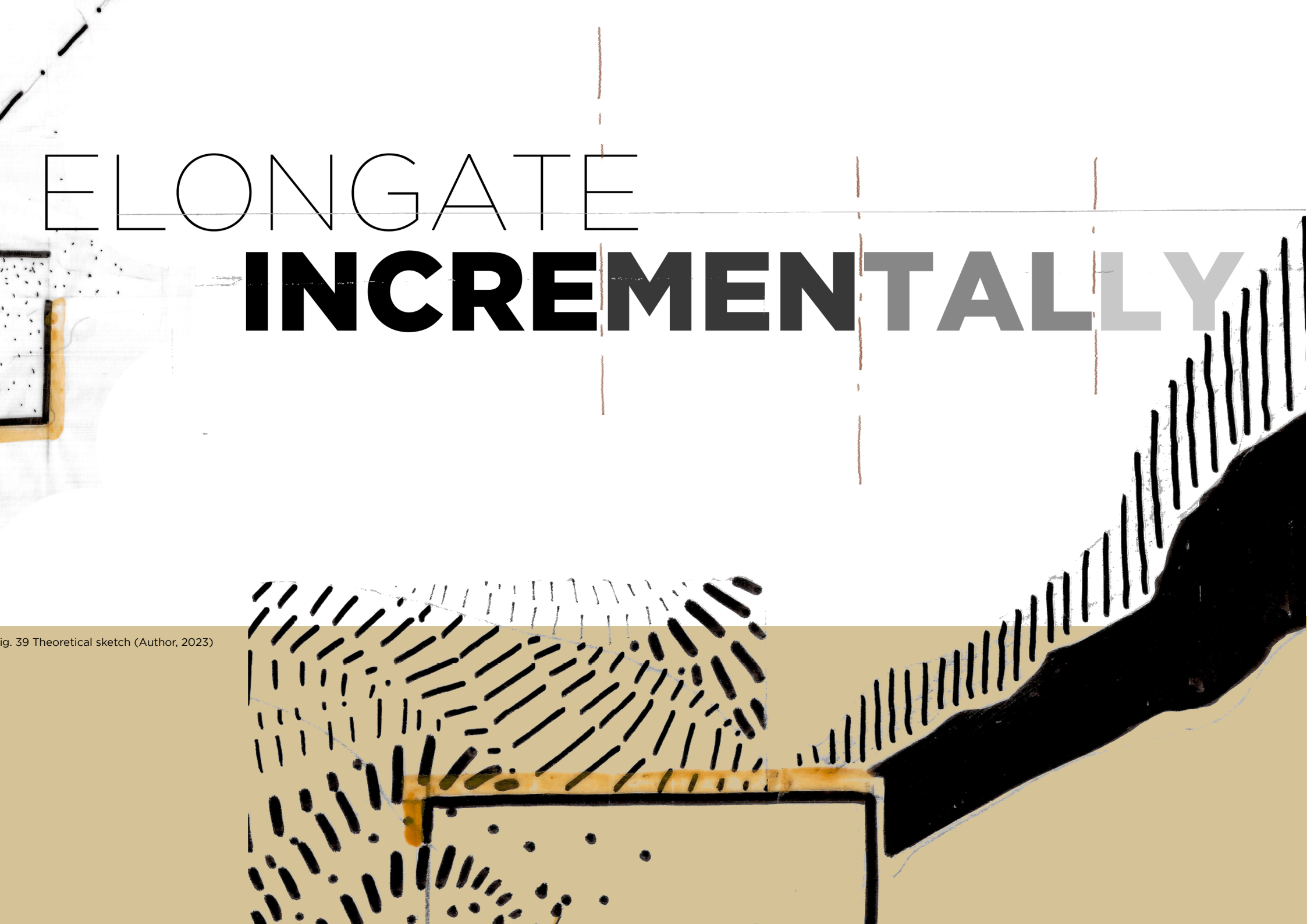
Fig. 38 Haakbosdraai context (Author)

CH. 02



F

ELONGATE
INCREMENTALLY



ig. 39 Theoretical sketch (Author, 2023)

2.1 PROJECT **THEMES**

2.1.1 Stories

2.1.2 Incrementally

2.1.3 Identity

2.2 THEORETICAL **CONCEPTS**

2.2.1 Extract

2.2.2 Elongate

2.2.3 Protect

2.3 THEORETICAL **TOUCHSTONE**

2.4 **PRECEDENT** STUDIES

2.1.1 Incremental Systems
- the caracas compact
- bester's camp
- aranya social housing

2.1.2 Alternative low-cost housing solutions
- social housing
- empower shack

2.1.3 Earth Construction
- earth house sa
- lycee schorge school



Fig. 40 Theme diagram (Author)

PROJECT **THEMES**



Fig. 41 Extracting the contextual (Author)

The main theme throughout this thesis is delineating and augmenting identity, but this is dependent on the acknowledgement of a succession of themes.

The starting point entails having conversations with individuals to extract personal and contextual stories whereafter these particular narratives are elongated with incremental models to establish a continuous catalyst for protection of identities through architectural concretization.

The methodology applied to realise this goal is the

1. **incremental** *poetic mapping* of
2. **stories** to solidify personal and public
3. **identities**.

What is mapping in poetry?

'A poem becomes a map when it crosses boundaries of identity and experience,
when it shows us how to move through and beyond the spaces that keep us from one another and keep us from our own humanity.
The poem as map situates readers within larger contexts: cultural, historical, social, and spatial.

(Coleman, 2017)



Fig. 42 Theme diagram (Author)

How can this definition be applied to mapping in a poetic sense for an architectural purpose?

Mapping becomes poetic when it allows one to reach across the boundaries of identity and experience of inhabitants, when it creates connections through and beyond the spaces which keep us from one another as well as our own individual humanity.

Mapping which allows for the envisioning of an individual within a larger context: cultural, historical, social, and spatial.

-Author-

Extract**Stories**

According to the Greek philosopher Aristotle, a **narrative** is the **mimesis** (interpretation, or hermeneutics) **of praxis** (action) and attracts the theatrical implications of the term 'setting' (Belfiore, 1983).

The famous Danish architect and urban design consultant, Jan Gehl argues (Kent, 2008) that in architecture one must acknowledge "[f]irst life, then spaces, then buildings – the other way around never works" (Gehl, 2020).

Thus, we can accept, in this spirit, the definition of architecture to be the physical 'interpretation of action', just as it is with narrative.

This creates an intertwined connection between narrative and architecture.

Mimesis of praxis can refer to any work of art or architecture, with praxis referring to experiences, especially the experiencing of things which contribute to the fulfilment of human life (Belfiore, 1983). For example, how the envelope of a building, a single wall, protects the intimacy of our human connections.

Accordingly, the design of a building does not depend upon adapting form to behaviour, but was already implicated by designing in harmony with the life of the culture and the context.

The human story is tightly intertwined with architecture, one existing intimately with the other.

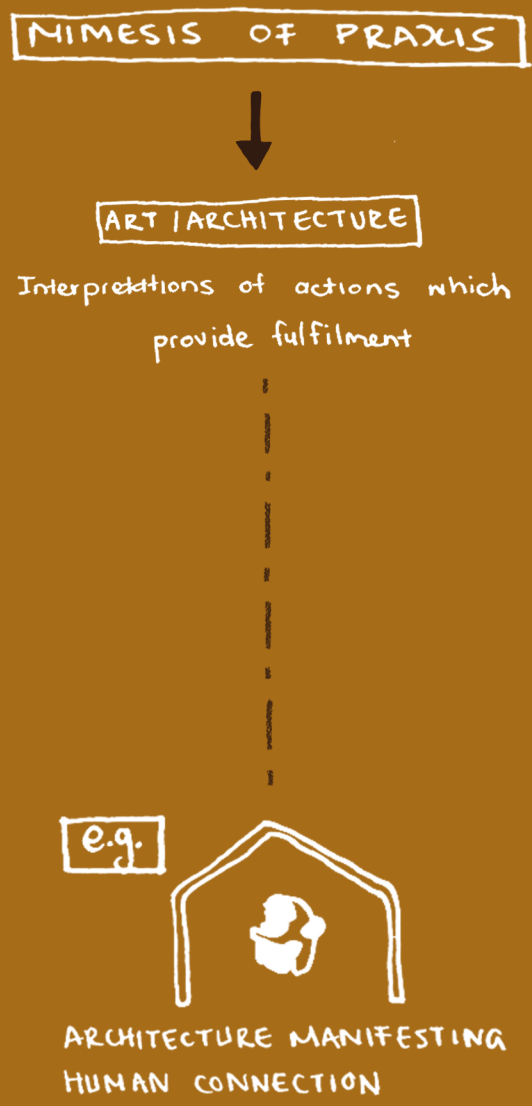


Fig. 43 Narrative and architecture (Author)

"Now I, Architect, if I ignore anything of the inevitable image of the thing that I build [...] I invite you to consider the thing in cohesion with the processes that gave birth to it."

- C Smuts (Frey, 2021) -

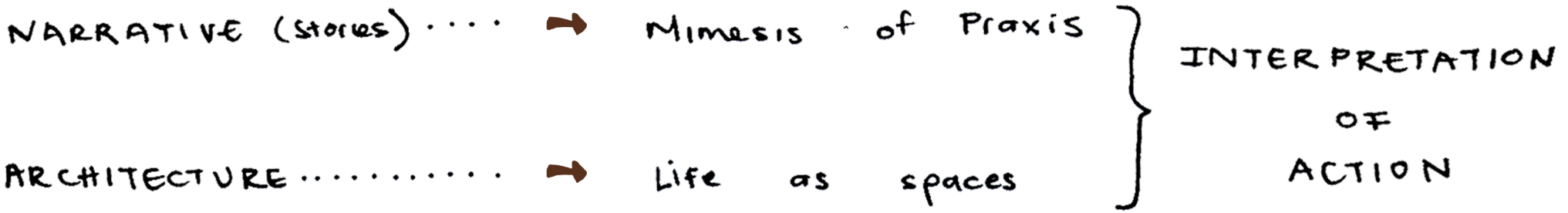


Fig. 44 Interpretation of action (Author)

"[Y]ou also know what I carry inside of me. Ive always known it – now you also know"

- Mondli (Antjie Krog, 1999) -

One of the best ways of learning from what is already in the community is through stories - the stories of building, living, and surviving within this ecosystem.

‘There is much to learn from architecture before it became an expert’s art’, wrote Bernard Rudofsky (Rudofsky, 2002) the Austrian American writer and architect. This type of realisation neccesitates the architect to be humble; cognisant his/her own knowledge, but able to acknowledge that of another.

Ouma Flora knows how much space she needs for the kids to play; she knows how it feels in a cold house with leaks destroying her favourite and only closet.

She knows it just as Plaatjie knows how to work resource- fully with zinc and the small number of other materials which he had on hand to build his family’s home, how Nonno knows the intricacies of her family structure.

Cognisant of this type of inherent knowledge Balkrishna Doshi, a famous Indian architect, has resourcefully contributed to social housing projects.

He prefers to analyse social structures and how everyday habits unfolds into spaces instead of just focusing on materials and practicalities (Mollard, 2019) Fig .
This is what the architect has to offer in this pursuit of more than just structurally adequate housing; analysing and planning

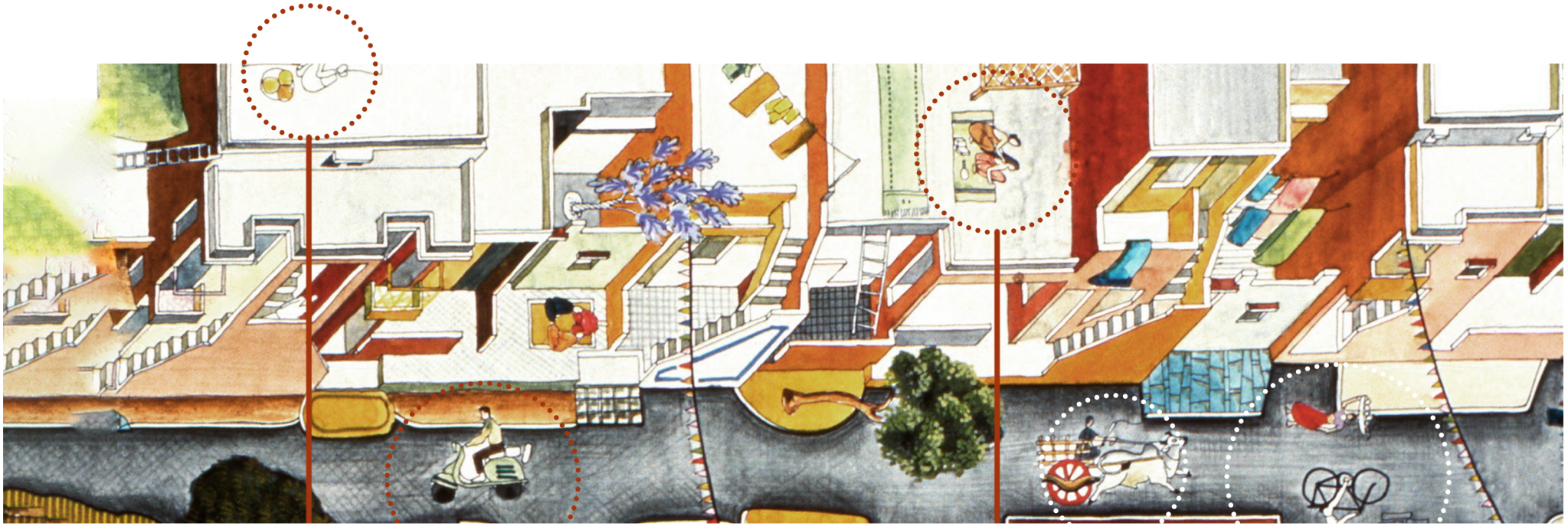


Fig. 45 Doshi’s depiction of Aranya and its inhabitants (Mollard, 2019) Adapted by author

for the social and personal implication of a tangible life that has to be lived in the reality of this home.

Doshi notes that ‘Designing homes requires thinking about spare time’, therefore his buildings are not conceived separately. They are created as a unity, leading to a design which responds to a ‘total environment’.

In his works, structures, spaces, and cultures are being merged as a unified whole. In this same way the inhabitants of Haakbosdraai’s stories, hobbies and identities stand central in the design process.

As each of these identities are solidified within the individual homes its connection with the urban is strengthened through the personal interest and ownership that takes place within these public functions.

The functions are tied to individuals and their pursuits within this community, creating the infrastructure to support existing potential instead of creating general, not-too-specific spaces. Interventions like these might be adaptable but after the newness wears off, left to adapt to abandonment as it is forgotten with the same type of indifference that it was built.

Why not intentionally build places like;

‘Ouma Flora se creche’,
issus Maria se groente tuin’,
‘Take-aways by Nonno’,
the guy down the street’s car wash or Haakbosdraai’s community hall,

These are places that could live on, not because of the brick and mortar with which it was constructed, but because of the existing social connections of the people within.

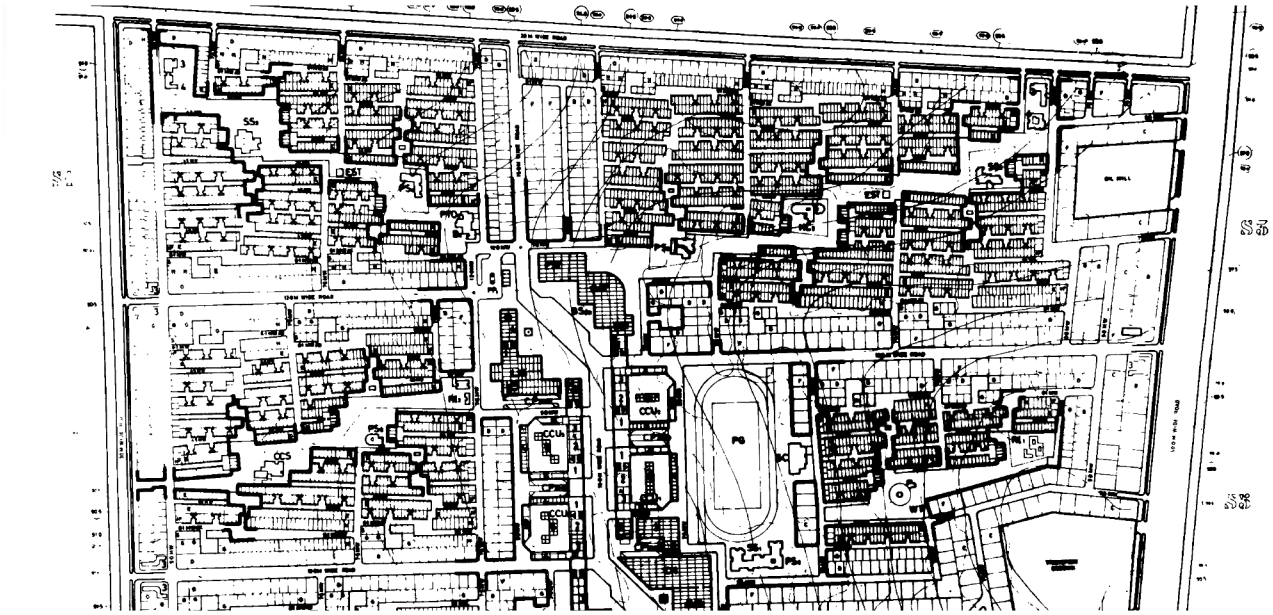


Fig. 46 Aranya Masterplan (Mollard, 2019)

‘We have reduced architecture to its minimum, to a purist and clean definition’,

- (Balkrishna, 2019) -

If this individual and urban expression within Haakbosdraai can be more than this purist and technical architecture - the mathematic calculation which social housing has become - it can develop into a catalyst for inclusion, for planning *with*, for expression *of*.

It can become the architecture which Doshi speaks of: *‘art of the built environment’, ‘the human habitat’.*

In architecture it is often seen that discussion about low-cost housing is being reduced to ticking off a universal, clinical criterion, to the detriment of design principles. As is the case with the NE 51/9 social housing plan, which has been duplicated to ineffectively attempt to solve the housing problem because of its simplicity and supposed inexpensive nature (R200 000 per home).

Although social housing is very much central to the reality of available funds, the simplest technical answer is not necessarily the answer which will effectively address this complex issue. As Doshi motivates: *currently the norm is to speak about rooms and not families,* (Balkrishna, 2019). We talk about affordability and not usability.

This is where clinical methods start to cast aside the real stories; the identities and narratives which it is supposed to house and foster, is classified irrelevant.

To avoid this detached view an in-person investigation was done into the realities of the three mentioned families and their narratives in Haakbosdraai. Casual conversations, house visits, experiencing the reality of a day within their homes and their community.

‘We tell stories not to die of life’

- Antjie Krog (1999) -

Accompanying this stance in terms of design, Doshi made sure that his projects interacted with the client communities in three ways to ensure that people understood what was taking place.

1. Verbal

(oral and written stories),

2. Tectonic

(the physical building).

3. Visual

(architectural drawings, artistic and technical)



Fig. 47 Talking to the ladies (Author)

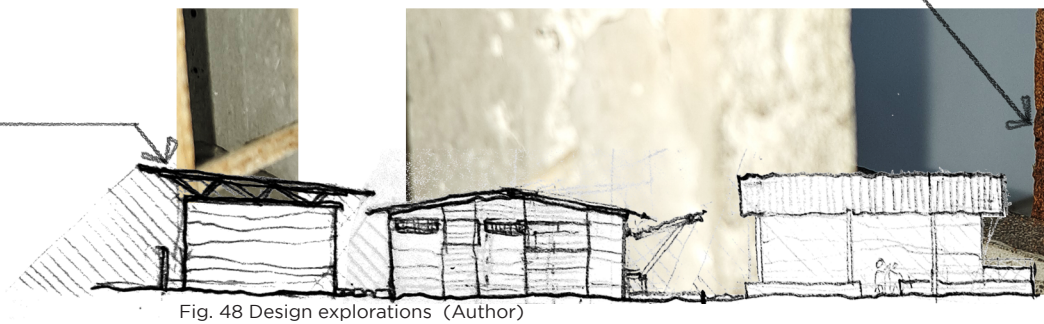


Fig. 48 Design explorations (Author)



Fig. 49 Rammed earth experiments (Author)

This muti-facetedness is one of the aspects which allows his architecture to be such holistic responses to the actuality of the human need rather than just the architectural need.

In Doshi's human habitat the personal story steps into the foreground, leads the narrative of building. In designs, especially low-cost informal housing, and urban design, it should be recognised that the spaces are alive – they evolve, grow and tell stories themselves, long after the architect has left. This is why in this thesis, the same story-telling approach is taken.

But Doshi took storytelling far past just the investigation into the lives of families; he spun stories of majestic beings and histories, weaving fantasy, and fiction through the fabric of the context.

For this exploration the future personal, social, and economic possibilities of the individuals' lives can take on this notion of imaginative understanding and deeper insight applied by Doshi.

A defamiliarization of reality to inspire new moments of identification, identification with a future self, future possibilities and dreams. In one of his stories, *The Revelation*, one sees the close relation in which stories and reality interact with one another, questioning and reinterpreting one another.

This fantastical fiction of Doshi, combined with technical knowledge and empirical accounts, allows an eventual architectural expression which is not just essentialist but allows for a provisional 'as if' perspective. This positive reverie, contemplation of the future and what it can hold, encompasses within itself a fervent catalyst.

Being excited about the future of one single person is being excited about the future of a family, a neighbourhood, a town.



Fig. 50 Sketching fables (Mollard, 2019)

These stories work at removing the emphasis from the physical. There is no ultimate, final design, it is just a point somewhere in the middle of the story, the continuous fantastical narrative.

Because of this - the design process - it continuously extends an invitation to the community to be part of this continuity: Converting the architectural presence into a social collaborative act, in contrast to the norm of an idiosyncratic exercise done solely by the architect and imposed onto the site (Swaranjali, 2018).

The collaborative, open-end method seems to have much more capacity for spatial fecundity[1],

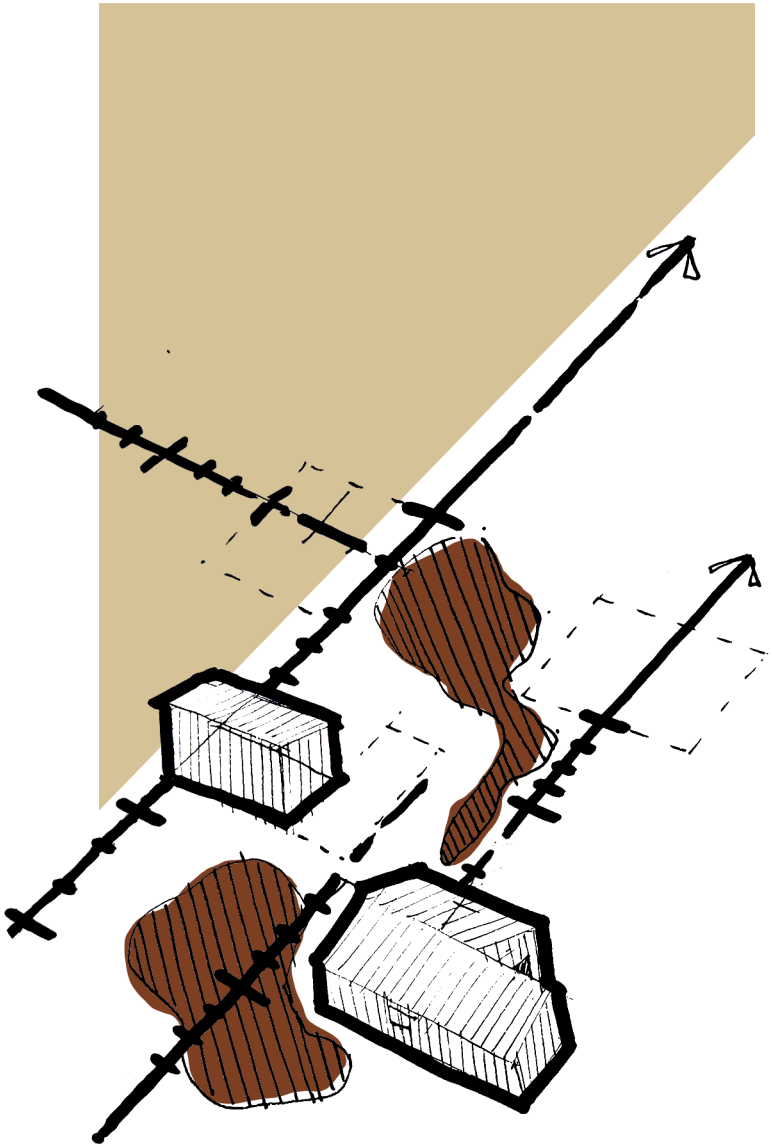


Fig. 51 The inertia of housing (Author)

1. the ability to produce an abundance of offspring or new growth, to create new ideas

Elongate**Incrementally**

Doshi argues that *'Even if it is made of bricks, housing cannot be thought of as permanent, and the most important thing is to think about the project over time. Housing is not inert. It is a living entity.'* (Mollard, 2019). In his practical methods of design and construction one can see the presence and the impact of this statement.

This is arguably why top-down government approaches, as mentioned by the urbanist Kelvin Campbell (2016) have failed. Social housing and the general evolution of cities are not treated as living entities, housing unique people, not thought of in conjunction with the implication of its change over time.

This can be seen in conversation with the Czech architectural historian, Dalibor Vesley's notion of architecture and design-learning as something which should be applied in the subjunctive[2] mood to facilitate the indeterminate and mutual.

Each house in this community has to live and breathe with the houses around it and the spaces connecting them. Thus, the use of the gerund in the thesis title, *Ris-ing*. This continuity of mutual development allows for the evolution of spaces and stories over time so that communities and the architecture housing these communities can be living entities.

Therefor it is no surprise to hear Umbert Eco describing Doshi's projects as *open works*, aiming at providing possibilities rather than answers, through a deliberate and systematic ambiguity.

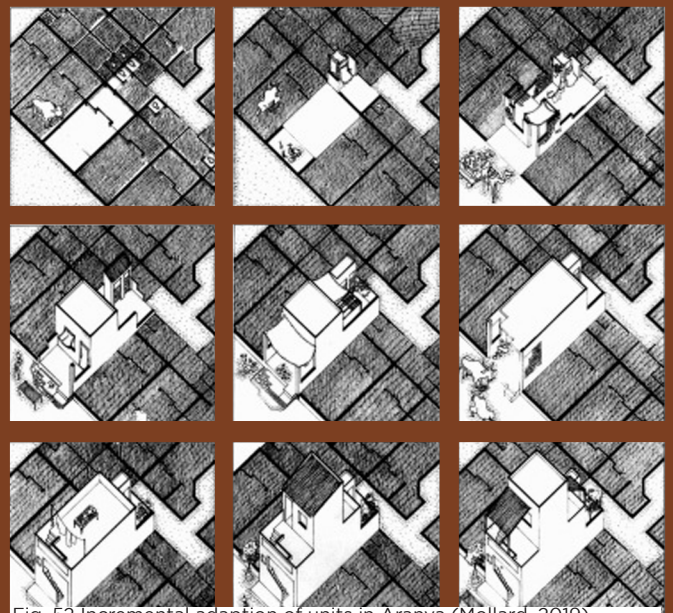


Fig. 52 Incremental adaption of units in Aranya (Mollard, 2019)



Fig. 53 Serviced plots in Aranya (Mollard, 2019)

2) Relating to or denoting a mood of verbs expressing what is imagined or wished or possible.

"For three generations governments the world over have tried to order and control the evolution of cities through rigid top-down action. They have failed. Masterplans lie unfulfilled, housing standards have declined, the environment is under threat and the urban poor have become poorer."

- Kelvin Campbell (2016) -

Aranya, is Doshi's low-cost housing develop- ment in India, initiated in 1970.

In the spirit of incrementality and self-help structures, each plot was provided a foundation, a toilet and an electrical connection. A few model homes were built but the intent was for residents to develop their own homes, thus Doshi implemented an incremental system rather than a final built solution.

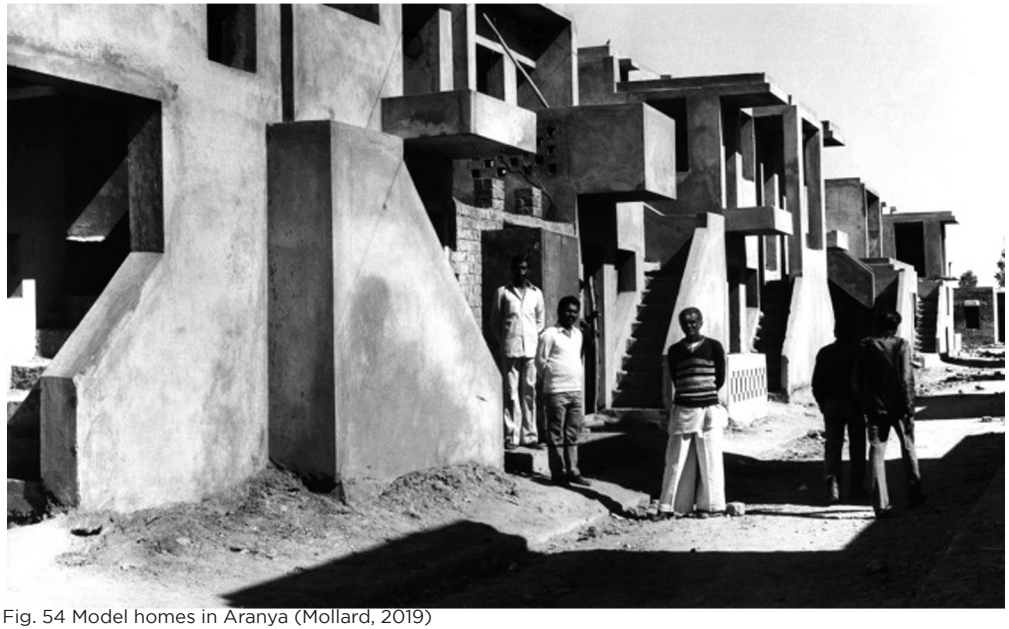


Fig. 54 Model homes in Aranya (Mollard, 2019)

‘Informal settlements are just cities in progress.’

- John FC Turner (Campbell, 2016) -

The aim is to revive architectural thought through contemplation, involvement, and emotion.

These open works echo the ideology behind the plea of American Architect Teddy Cruz to inject an ambiguity and flexibility into regulations that govern the use of urban space; to understand housing and the urban space, not in a vacuum but in its relational nature.

His investigation into Tijuana, Mexico led him to believe that a bottom-up approach of piecing together systems on ground level can develop into more complex systems, rather than applying complex top-down approaches.

In this case, contemplating and involving the individuals in the incremental process of renovating their homes into human habitats which respond to their current and future personal as well as practical realities.



Fig. 55 Exploratiojns of Tijuana model (Mollard, 2019)



But for this to be possible, an open works approach needs to be taken with regards to urban spaces, regulations, and modes of property. This shows how the social housing problem must be incrementally addressed on all levels.

According to Dr Carin Combrinck, an Architecture lecturer at the University of Pretoria, the most logical approach to the housing situation is to utilize incrementalism when approaching the problem. The gradual upgrading of residences by using a model of incremental tenure security can solidify the presence of a continuous improvement process. The incrementalism approach also allows for *formal* and *informal* processes as well as the processes of *provision* and *enablement* to meet (Combrinck, 2017).

When using incrementality in unison with self-help models (for example individuals of Haakbosdraai improving their own residences with assisted finance for materials and skills workshops) the housing problem can be transformed into an exponential system of families exploring their personal and built identity.

Due to this process' informality it does pose as a risk in terms of governing bodies by challenging the status quo. But this is necessitated by the international occurrence of governing bodies becoming increasingly remote from its people (Campbell, 2016).

Combrinck (2017) states that this process aims to shift the power relation in such a way that the end-user determines the parameters of control; the process is facilitated by the built professionals and then enforced by the state.

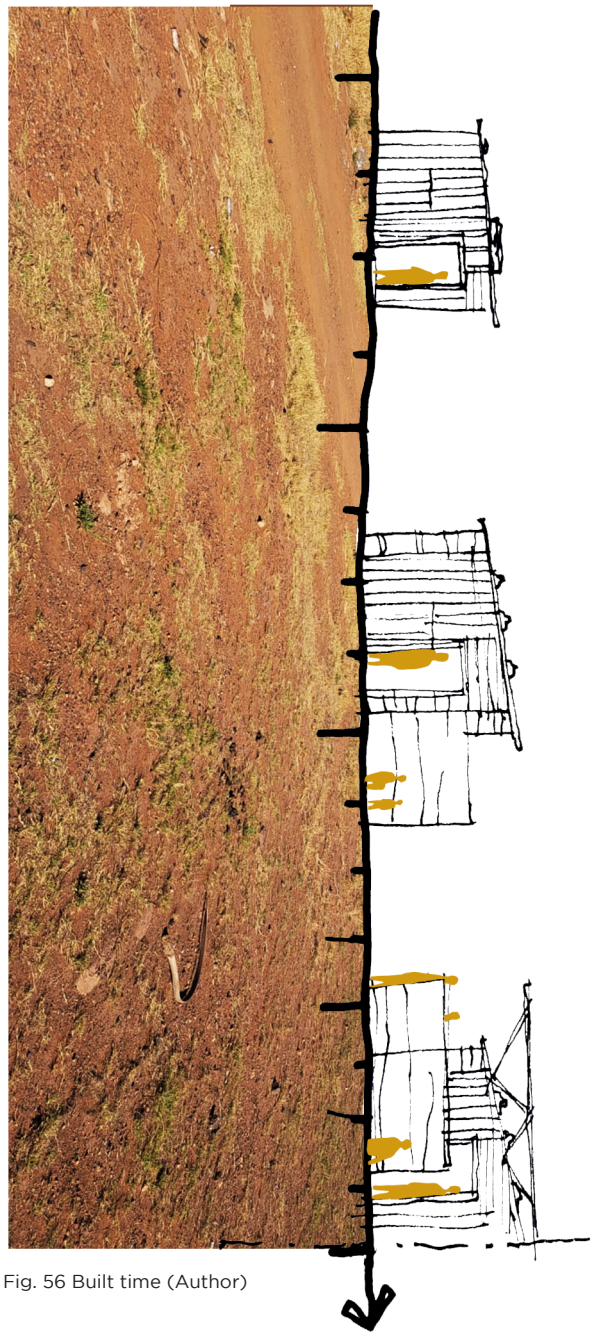


Fig. 56 Built time (Author)

This requires that interventions into a community must be treated as catalysts, providing the basic resources and skills which a community would need to develop their own community according to their own priorities.

Campbell (2016) argues that people have to be trusted to do the right thing. If this stance of enablement can be supported within a framework of clear boundaries the provision of affordable housing can become a guided system of creativity and innovation. Informal housing and settlements can be viewed as points along a timeline, a basis from which cities develop, not a problem which has to be demolished and replaced.

The development practitioner Walter Fieuw (2011) argues that in contrast to the current agenda of commodification the incremental upgrading of informal settlements will enable the right to the city. It can boom the already influential power of the township economy while establishing a community of entrepreneurship, artistic expression, innovation as well as individual autonomy. Even if such methods might require the adjustment of existing legislation, an authentic housing and urban transformation by means of in situ-upgrade can be created through individualization and regularized control in the social housing and public sector.

From a practical view one can see that this might be one of the only ways for informal housing and informal settlements to develop into appropriate and self-sufficient systems in a viable amount of time. It would not be happening at an astronomical pace, but rather thousands of homes and communities who can autonomously develop on an incremental basis, all at the same time.

But this can only take place if the communities are enabled and allowed by government as well as the built profession to have a central part in the process. As Himanshu Parikh, the engineer who worked with Doshi on his Aranya social housing project, stated; ‘No government today has



Fig. 57 A blank slate (Author)

the resources to “clean up the mess of slums” and build something else instead’.

Thus, we have to initiate a germinating[3] nature within social low-cost housing and, as with many things, the fastest way of doing things is the slow way. To accelerate this process, patience has to be exercised while continuously keeping on exploring options. With this notion of incrementality and personal involvement, these spaces have the potential to successfully grow and develop in ways impossible to even imagine achieving through the conventional routes.

3) Begin to grow and put out shoots after a period of dormancy.

I have witnessed anticipation and experienced change, I am not in a hurry

- Doshi, age 92 (1990) -

Protect**Identity**

Dalibor Vesley observed that modern making has been reduced to technical innovation and aesthetic consideration.

This is true in much of the built environment, but low-cost housing is stripped even from the luxury of aesthetic consideration. This is true for indisputable reasons. There is x amount people who require houses and only a certain amount of money available. Thus there needs to be a strong focus on effectivity and practicality.

But this does not have to exclude the additional social benefit which could be gained from amplifying identity within making, to develop a project identity. This approach is currently being either overlooked or underestimated. This becomes the new identity which arises when individuals use cultural and contextual clues and materials available to them when building spaces which can be identified with, and taken ownership of while speaking of its contextuality (Castell, 2018).

One can already see in the decentralized organisations of informal settlements and townships that the identity and power is no longer concentrated within institutions: it is diffused in global and local networks. In this project we can further elongate this identity into the physical built environment.

People will be able to say;

'I know my identity; it is my community, it is my home'.



Fig. 58 Built identity (Author)



Fig. 59 Concretizing identity (Author)

To do so one has to look first at the individual identities within the community of Haakbosdraai. As noted, just this simple act of inspection holds within it an unimaginable value. Searching for or trying to clarify one's identity, not just its current condition but also observing its future possibilities or current trajectory, is a key factor in creating the individual project identity, finding meaning through this intermittent denotation of identity.

Therefor identity in itself can been seen as the act of questioning your identity, the subsequent investigating and finally taking ownership of that identity.

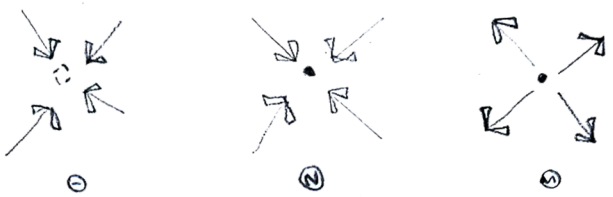


Fig. 60 Introspection, concretization, projection (Author)

When speaking of identity in terms of context, critical regionalism is the architectural approach which comes to mind.

With Critical Regionalism there is a rebellion against stagnation and disregard; by defamiliarizing and reintroducing historical knowledge and cultural issues in design, opposed to mindlessly adopting dogmas, it creates familiarity hand-in-hand with innovation.

The architecture reacts to the context and the need around it over time, just as it has autonomously been happening in informal settlements across the world.



Fig. 61 Defamiliarizing the context (Author)

This type of incremental adaptation which existis in informal housing must be allowed to seep into the formal structure of government subsidized housing.

Additionally the objective of this project is to incorporate an openness and a future vision into the semi-formal urban building solution, especially in terms of the public infrastructure. Thus, a space's and its surrounding community's reality over time is reacted to and a project identity is nurtured.

Understanding this complexity of the term *identity* creates a worldview which pricks the consciousness. It doesn't discard local creative potential in favour of a shallow homogenized world, but defamiliarizes elements to reintroduce meaning and emotional attachment through identity.

It allows for a creative solutions to the housing problem, ones which take the individual and shared identity into account, not only the basic physical needs of the archetypal low-income individual.

At this moment in the national context of RDP housing the relationship between inhabitant and home is purely economic, clinical and generally superficial.

To negate this tendency the way of building and answering the housing problem has to be adapted. Users need to be seen for what they are; real people; part of a community and living with real problems. Individuals should be allowed to tell and shape their own stories and, through this, create a sense of ownership and attachment to the built structure.

The individual lives should be lived into the design of the structure, reacting to the spaces and the community over time.

"... so that we build the houses ourselves, do something better than what they are doing through these RDP houses."

- I24, Calvin, m, Sebokeng -

- (Beier, 2023) -



Fig. 62 Kids playing soccer on the open lot adjacent to haakbosdraai (Author)

The building and strengthening of ties between social activities and physical structures translates into specific architectural elements.

This can be seen in Doshi's Aranya housing project where the underlying plinth was provided with steps and ledges, shared landings, tiny balconies, and open terraces added onto it.

All these design elements are not just there out of practical necessity; it is there because the design allows the fostering of a community identity, for the interaction and social exchange which can take place in, on or surrounding these elements. Aranya relies on the construction of pauses and the creation of elongated thresholds extending a family home far beyond its physical walls – in fact, in his design, there is no single wall demarcating the entrance. Public life is allowed to seep into, extend and permeate living spaces. In this same way the development of the individual units into the urban realm, existing with a connection to urban public infrastructure, the personal identity can intertwine and grow simultaneously with a community identity.

The built identity in the context of Haakbosdraai is met by the current built identity of shanties. In some circles there is a negative connection with the word a shanty, but when looking at the origin of this identity one can give pride back to this type of housing. The term shanty originated from the French word *chanter,* meaning to 'sing', from which the concept of sea shanties stemmed. These were the work songs sung by sailors on fishing boats to keep the spirits up. These workers were not the richest and therefore lived in small homes. Over time these homes became so deeply associated with the sailors that it became known as shanties.

But it is time to reclaim this word as its original definition; a chant allowing these homes' voices to grow louder over time, chanting their songs, keeping the day-to-day burdens at bay.

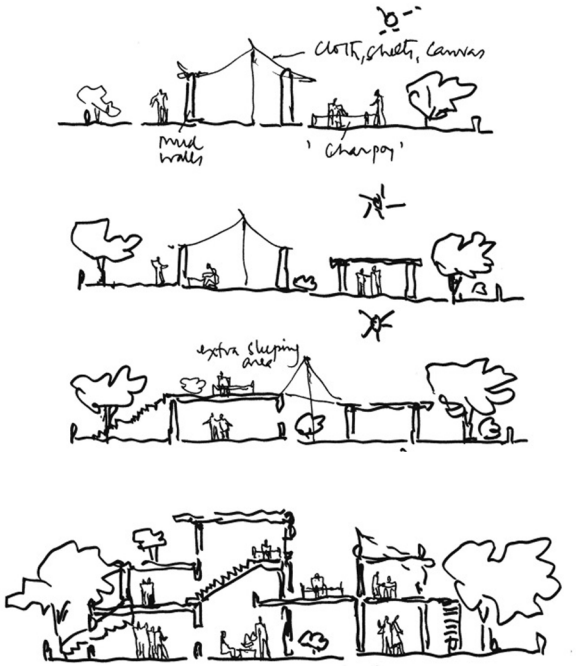


Fig. 63 Aranya; incremental design (Mollard, 2019)

In structural, current and South-African terms, a shanty refers generally to a structure made of multiple corrugated zinc plates nailed to and supported by a wooden framework; in some cases it has a concrete floor slab. The wooden supports are planted into the ground with a stone and thin cement mixture.

Although the construction in some places are rickety and the building envelope intermittent, it is a reality, a visual identity which presented itself through the conditions “of past and present, [...] layers seen together and not fragmented issues of art, architecture of life.” (Doshi, 2016).

In this light one can see the value of these structures in our built environment, the reasoning behind wanting to celebrate and remember this built identity, at the same time that it is transformed into a structure which more holistically and effectively responds to its inhabitant’s personal and physical needs. According to Dalibor Vesley, the different levels of knowledge which make for the unity of the built environment and a structure which veers away from being a commodity, are;

1. Geometric definition,
2. Material imagination,
3. and Experiential aspects.

These elements can be used in conjunction with the current building styles to allow for an architecture which is layered with meaning and identity.

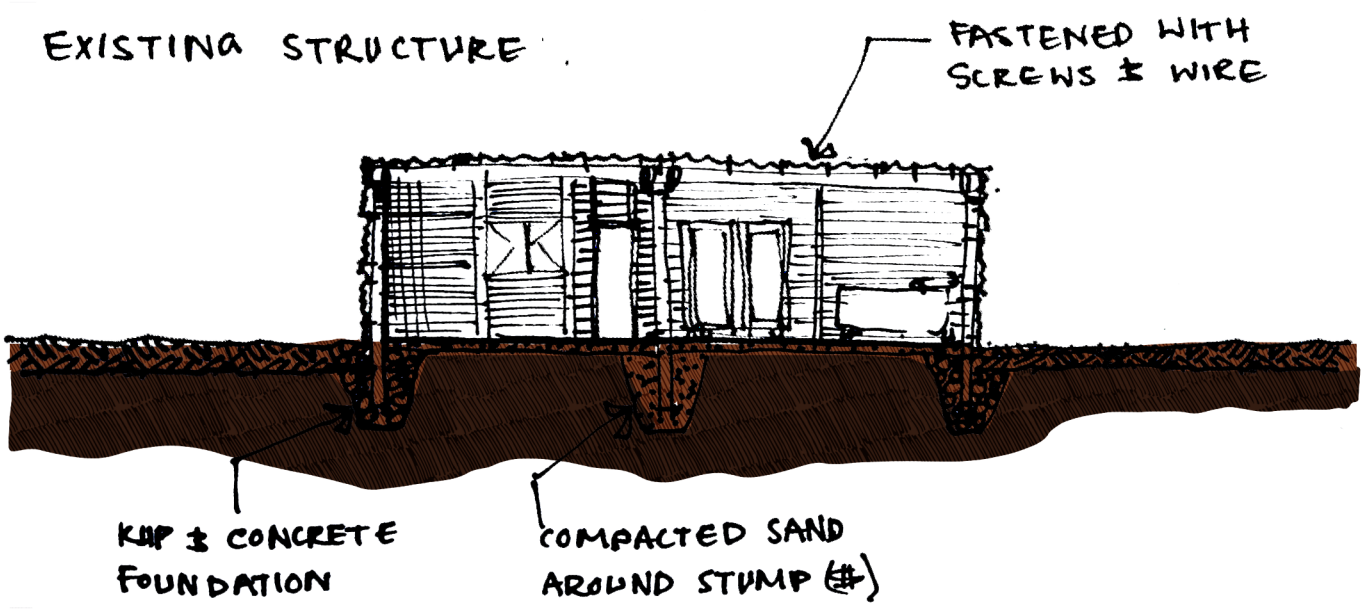


Fig. 64 Shanty construction section (Author)

"Maybe the person sleeps without food, but he stays in the house. Maybe he can sell the house, go back to the squatter camp, make a small business and then, eventually, he will come back, he will pick up."

- I28, Sibusiso, m, Soshanguve (Beier, 2023) -

The notion of veering away from commodification is very relevant when addressing the issue of RDP homeowners not living in the structures. It is worth more as a product to sell or rent out than an asset to better your own life by using it.
In studies there were found that the upkeep as well as the resulting living cost of staying in the RDP houses exceeds what inhabitants can afford and therefore these, although pragmatically adequate structures, are not viable as housing solutions. (Beier, 2023)
Ubanists say that informal housing solutions often unitentionally end up making the urban poor even poorer (Campbell, 2016).

This exposes a big problem with the design and overall functionality of the current RDP housing system.

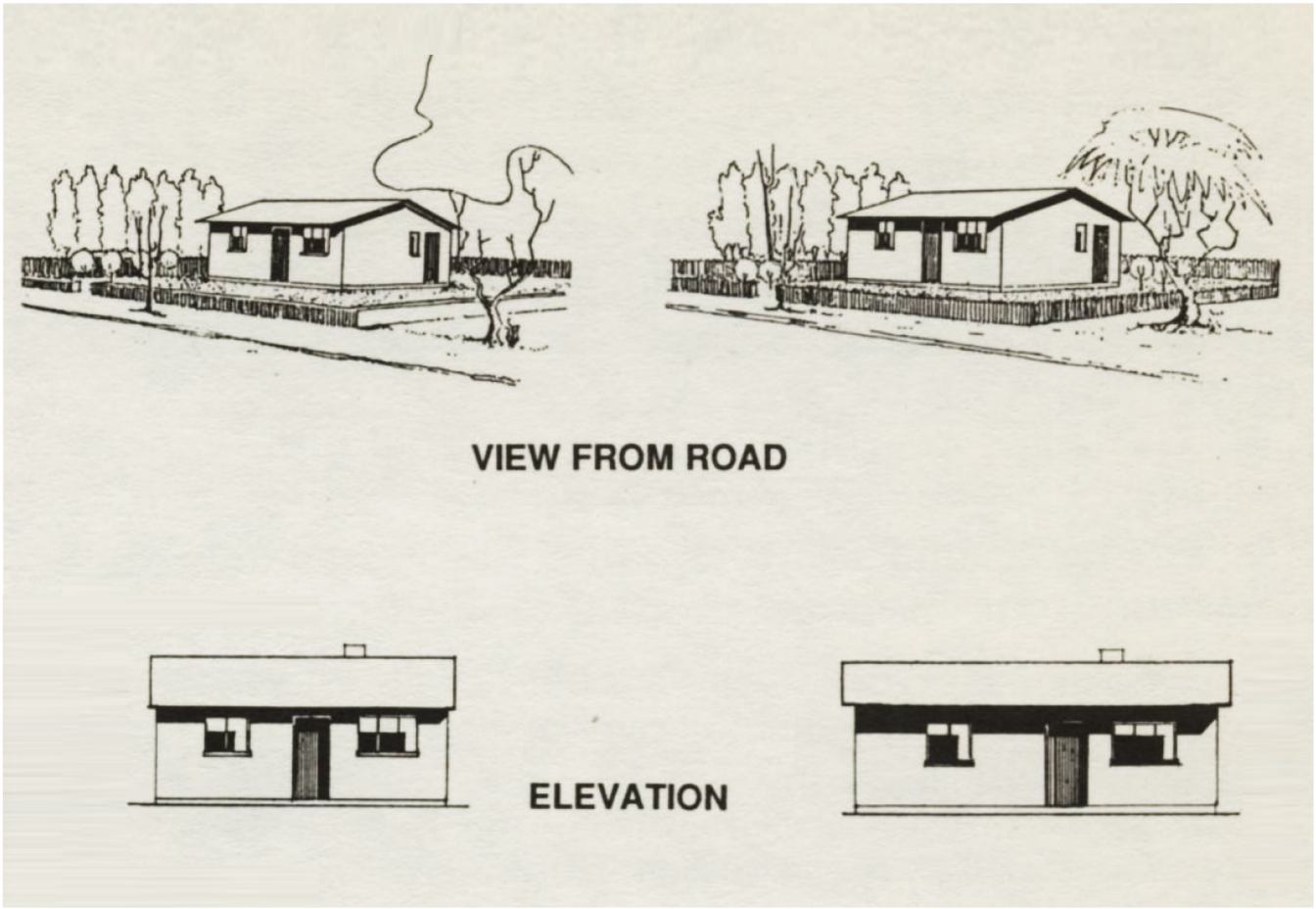
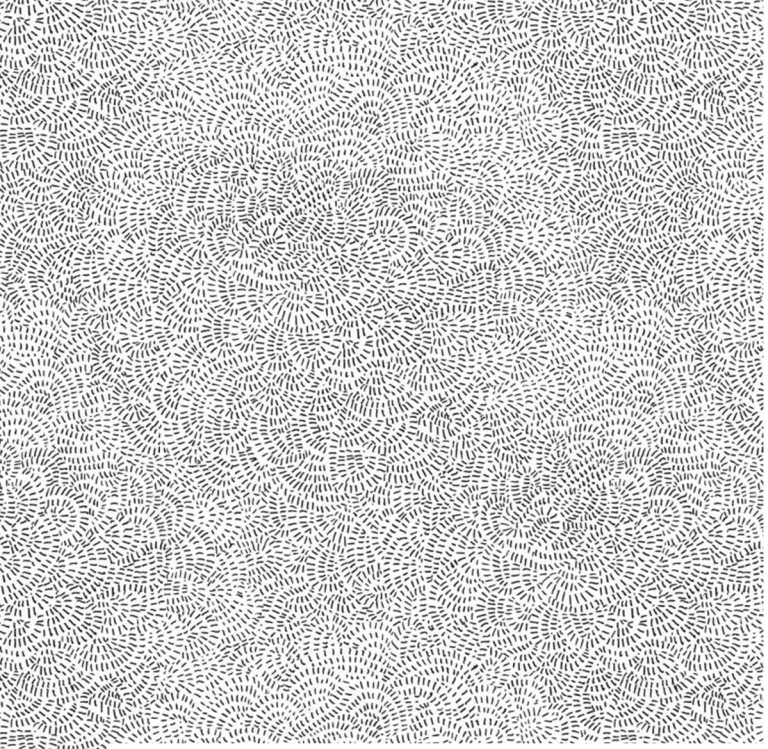


Fig. 65 NE 51 housing variations (Jennings, 1954)



"One's meditation in seclusion inevitably affect one's engagement with society at large. While there is a retreat, there is also a return"

- Mike Cadwell (1996) -

CS Studio, Carin Smuts's South African Architecture firm which focusses on community involvement in their projects, is intent on listening carefully to the end user as part of a highly interactive; integrated process transferring effective power to the users of the eventual structure.

This requires that in every project, every situation necessitates the implementation of a dedicated and original process. A wealth of information to feed into the design process is created by listening to the people. This provides architects and their work with one of the only defences against obsolescence, that of identification with the built object. People continuously use, need, and identify with the built form due to this integration of end user and process.

In conclusion, the utilizing of poetic mapping allows the the focus to be placed on truly protecting and incorporating a community's extracted identities. To leave the investigation at a superficial glance at the social situation will not cut it.

Questions have to be raised, problems addressed, concerns lifted.

This is the only way to envision the individual and the structure within a larger context: cultural, historical, social, and spatial.



Fig. 66 Thematic intersection (Author)

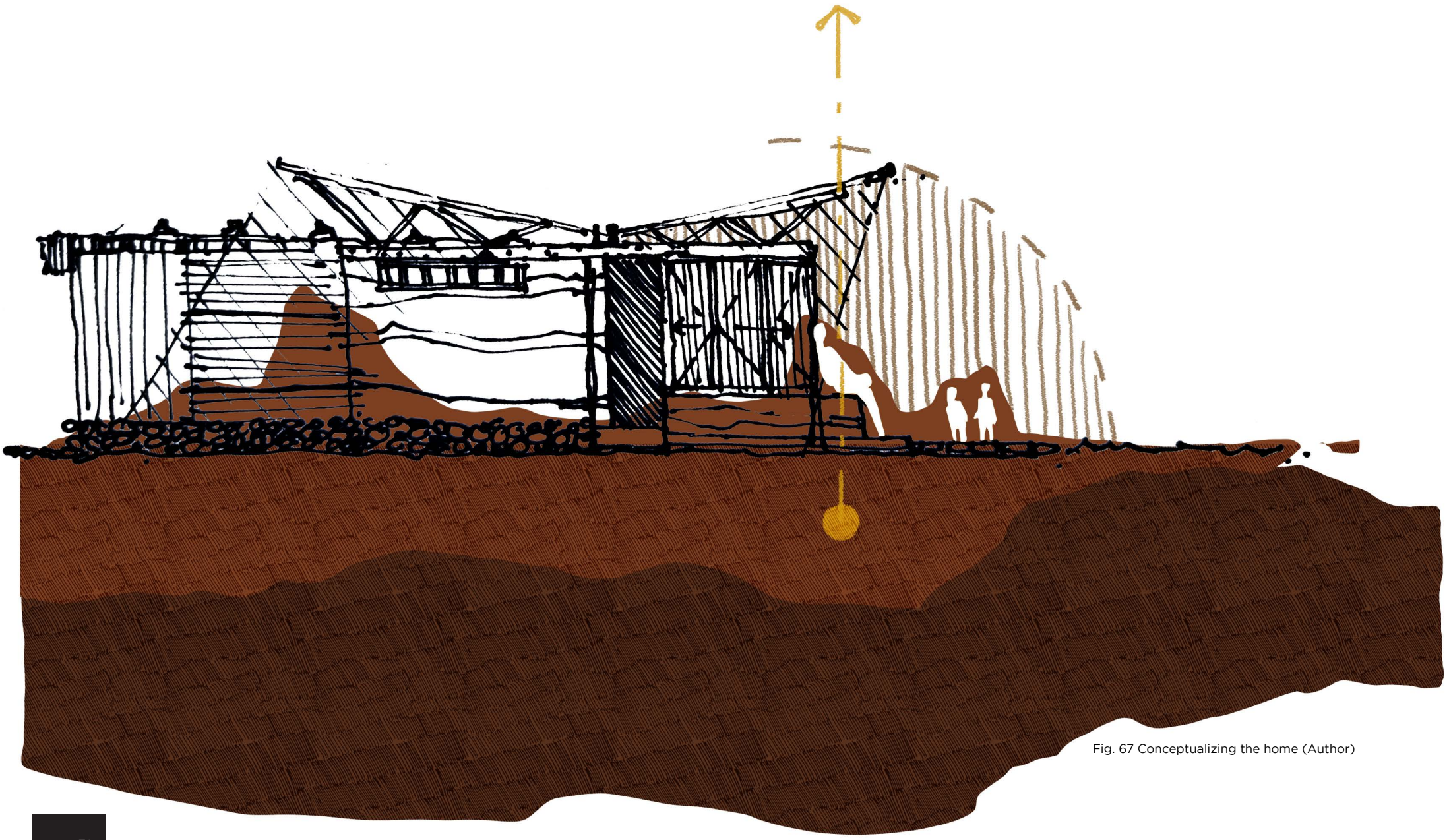


Fig. 67 Conceptualizing the home (Author)

THEORETICAL **CONCEPTS**

What is it to be alive?

To be truly alive is more than just a collection of limbs and appendages, it is more than even just breathing, it is being and experiencing that culminates in your unique identity.

In response hereto, this dissertation is a contextual and individually focused adaptive redesign of informal housing. A problem which for too long has been approached with a one-size-fits-all, *'as long as you have a roof and a toilet then its fine'*, type of mindset.

This is executed through the 3 focus group families in Haakbosdraai, a township in Postmasburg, my hometown. This process will help to uncover principles for a way of building, cemented as an active process within the community through the design of an integrated individual housing and urban design developments.The main focus is on individuality, through personal narratives, the mining history and the existing building style of shanties - all which have not been given even a first glance by current RDP housing solutions.

EXTRACT | ELONGATE | PROTECT

ExtractStories

Extraction focusses on a search for an authentic interpretation of the context through bridging the edges.

This can be seen in the materiality; the proposed use of excess soil from mine tailings as a rammed earth building material as well as the re-use and adaptation of existing zinc shanties into structures which more holistically caters to the individual and the family. This, all in search of authentic individual expressions which can continuously influence, contest, and bring about the extraction of the world that will come to exist around it.

In terms of extraction the focus is placed on **miss Maria**, my contact in the first inquiry group. She and her family has one of the only professionally built shanties in Postmasburg. Thus, a prime example from which I can extract current building knowledge of this method of building. How can this study develop, for her family, a home that learns from the existing. In contrast to this personal extraction, the urban infrastructure will portray a shared town interest, sculpted around a personal identity.

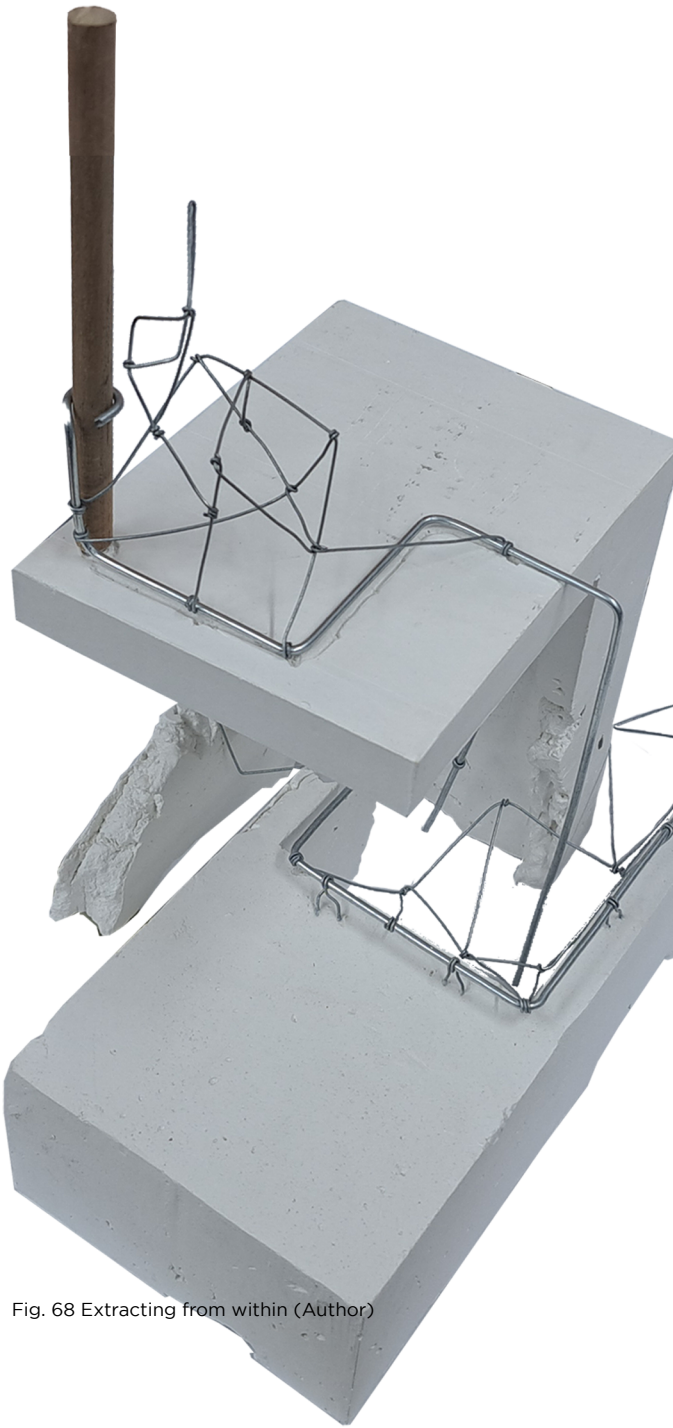
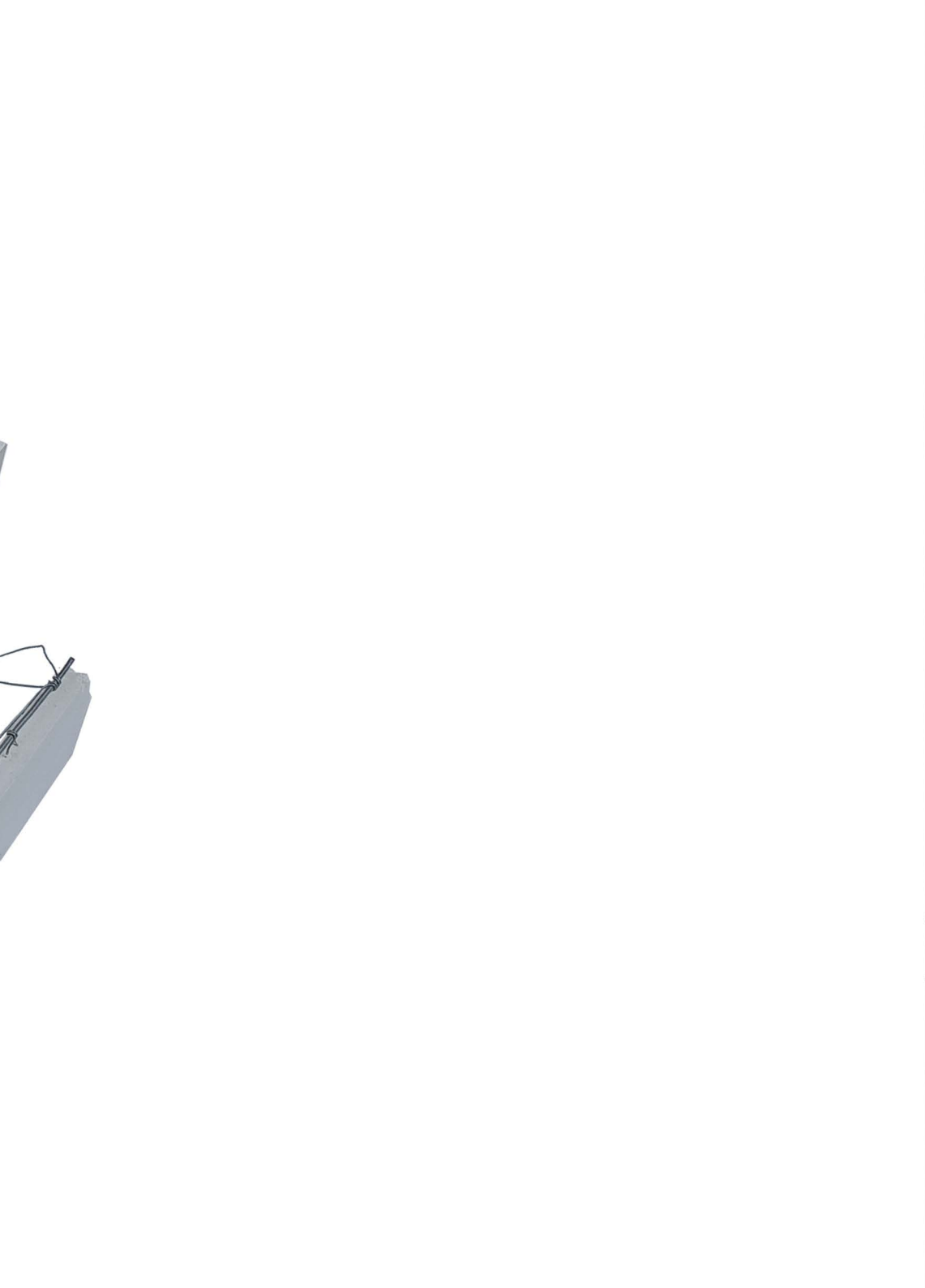


Fig. 68 Extracting from within (Author)



ElongateIncrementally

Elongating exhibits the metamorphosis of joined spaces into transitioning spaces to allow for augmented individual identities, on a micro and macro scale.

Because of the heavily overlapping spaces found in shanty design, the identity of each space is being diluted. The narratives which order each of these spaces must be journalistically examined to see how they relate to interconnecting spaces and their narratives. This allows for a transitioning and not just a blunt overlapping.

For these aspects the focus shifts toward Nonno and her developing family, an intricate arrangement of intersecting relations and spaces, of which all must be allowed to coexist while maintaining their respective identities.

On a macro scale this concept can be applied to the urban redevelopment or adjustment of spaces, the detangling of a complex, organically developed system to allow for spaces of shared identity.

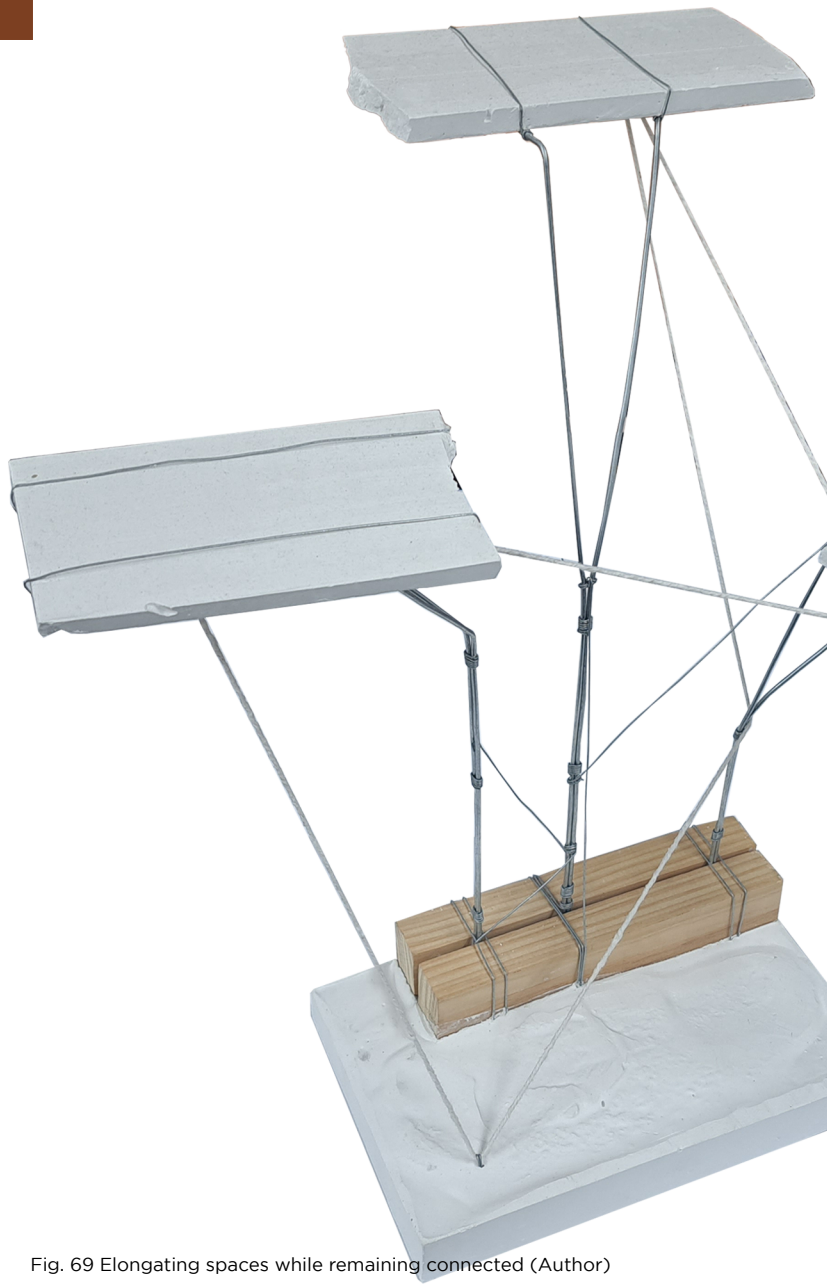


Fig. 69 Elongating spaces while remaining connected (Author)





Protect Identities

In the harsh physical, emotional as well as socio-economic context of Haakbosdraai, this design aims at not only protecting the individual from these circumstances, but also with these circumstances by drawing near. The possibility to showcase the weathered beauty and to filter these harsh conditions to access their potential must be grasped.

Therefore, one must draw the intricate being of this condition as well as the materials at hand close; its properties have to be inspected and tailored to the individual need.

These conditions must be adapted to protect inhabitants, such as Ouma Flora, to protect her wellbeing against the harshness of this environment, and also allowing the elements which create homeliness and contextuality within her household, to holistically protect her being. Furthermore it will protect the identity of building by refiguring the conventions around what urban public infrastructure is and how it links to the daily experience.

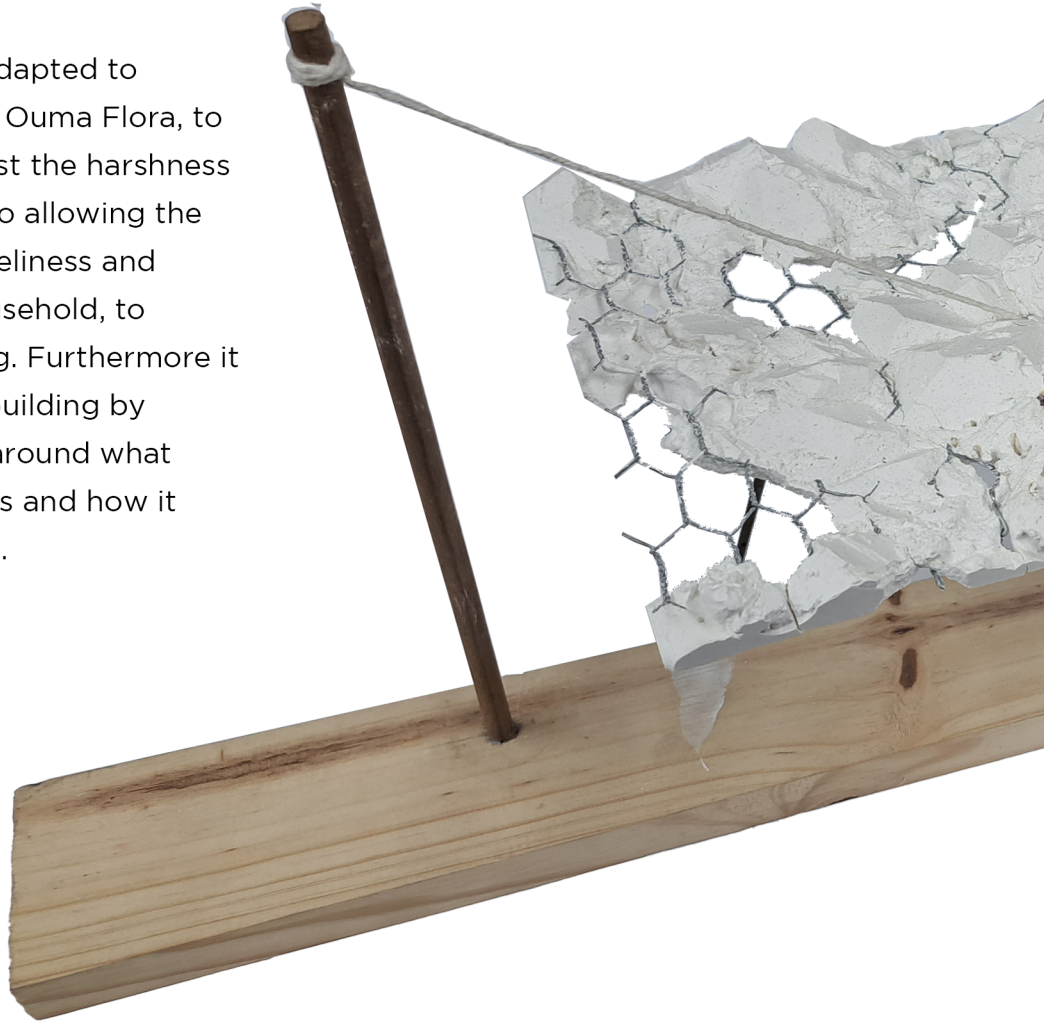


Fig. 70 Filtered protection (Author)



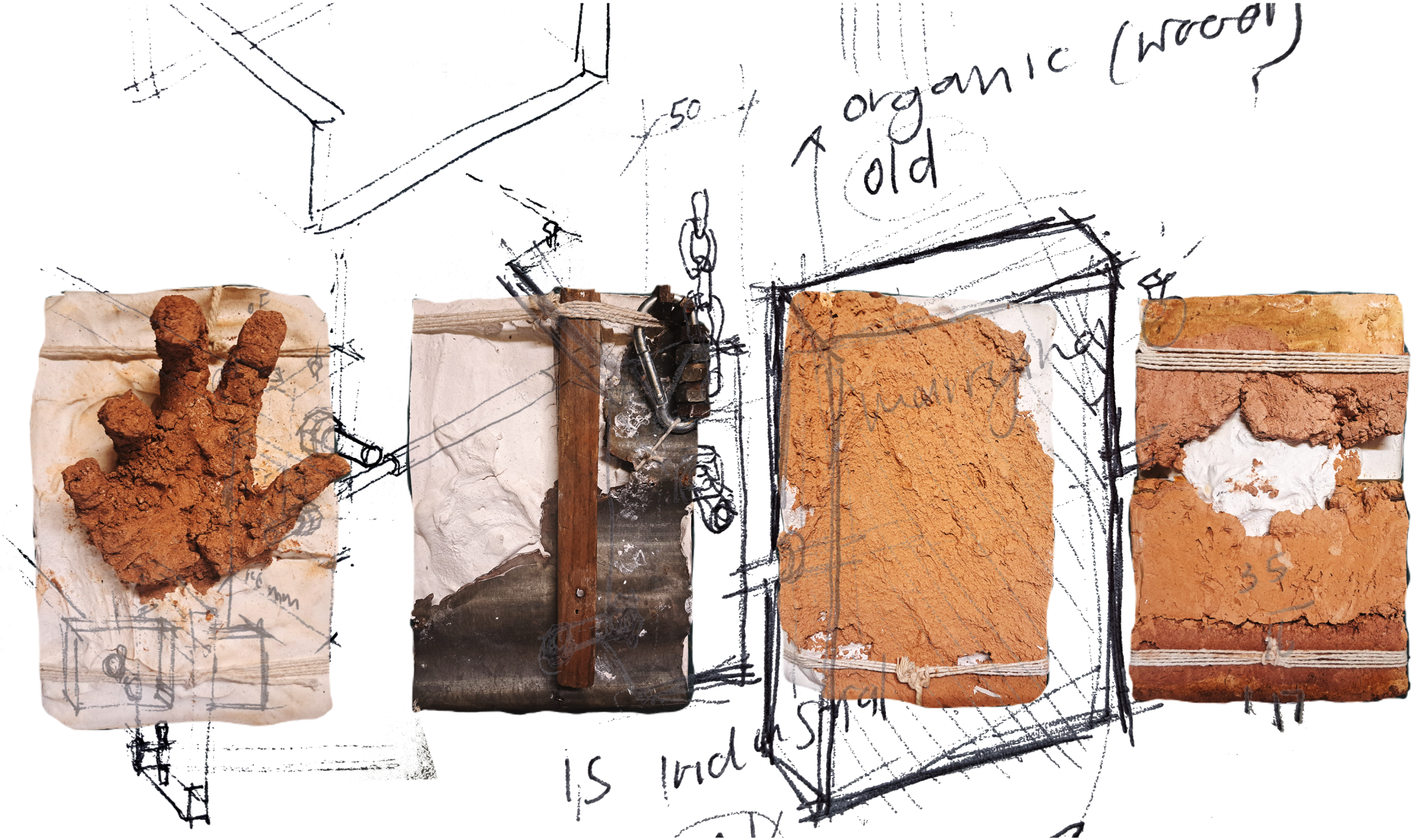


Fig. 71 Touchstone elements (Author)

THEORETICAL**TOUCHSTONE**

The touchstone embodies the moment of initiation, the catalyst creating a disrupt in the inaccessible surface of the context identity, loosening the soil to allow access to the valuable substrate.

It showcases 4 elements;

1. **The built identity**
2. **The personal identity**
3. **The contextual and**
4. **The community identity.**

The identities are obscured, facing inward. But when someone stands at the center, personally engaging with these identities, they are revealed to the outside.

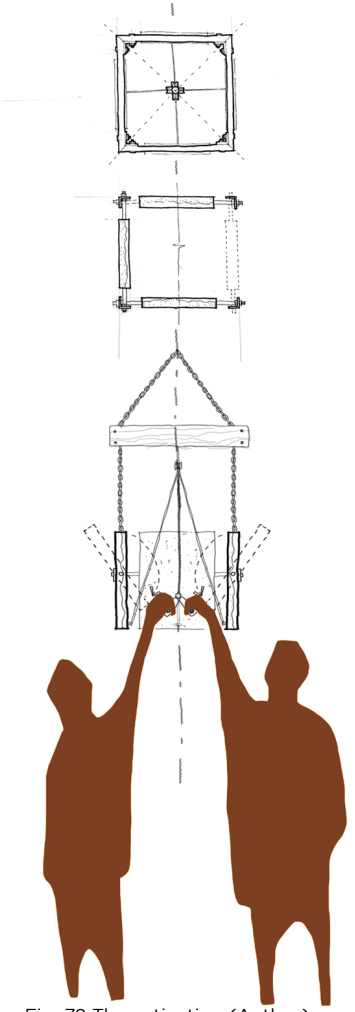
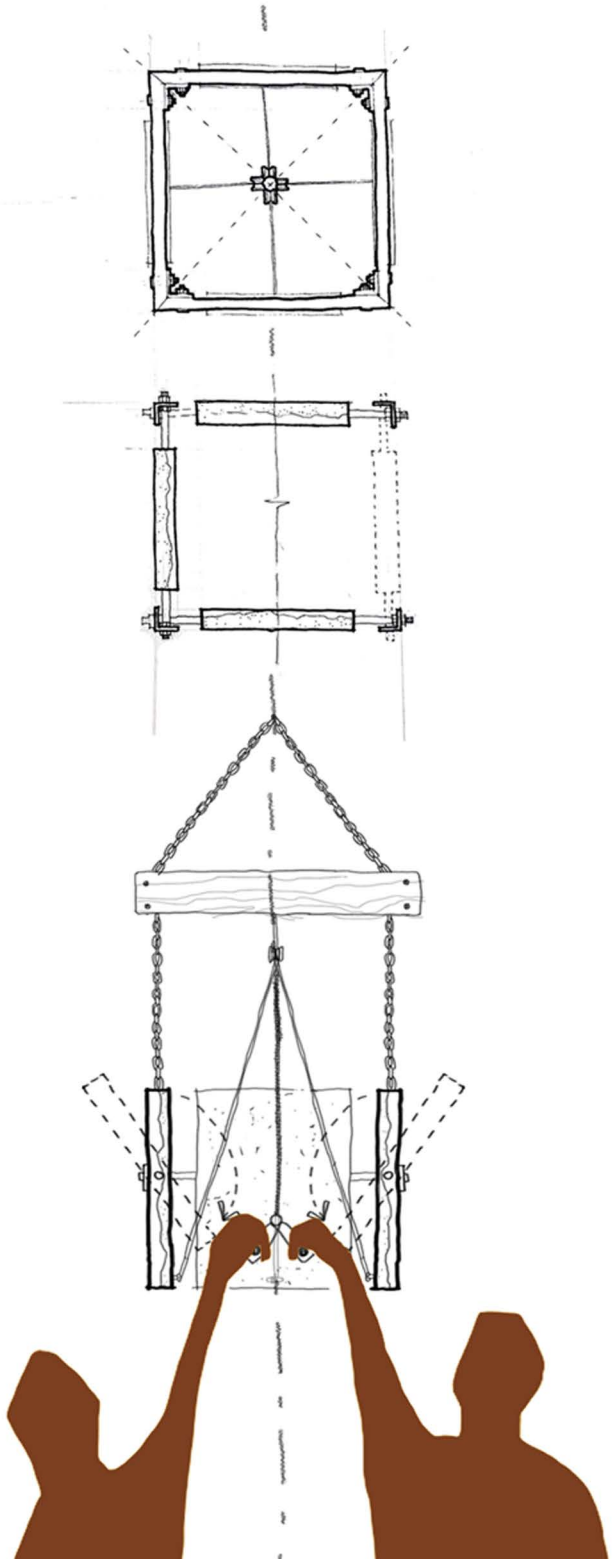


Fig. 72 The activation (Author)

For the Architect to be truly engaged within this unveiling, they have to be as close as possible to the activation.



This inspection allowed me to delineate my own identity even better, to stand at the center of my own activation, realising all the aspects thereof that I have left unexplored.

I remembered the forts me and my cousins used to build on the farm, rearranging the whole scrapyard. Recalling our childhood camping trips and the countless times where we would build miniature homes with rocks, leaves, sticks, or even soda caps; whatever we could find lying around. Reassessing the value of that which someone else has determined as useless.

Fig. 73 Touchstone detail (Author)

Me growing up in the area, walking the lay of the land. Spending time on the mines, seeing this reality of our town, always present but obscured at the edge.

Talking to miss Maria, Ouma Flora and Nonno with her two kids. Seeing the homes that people have built for themselves and the lives lived there.

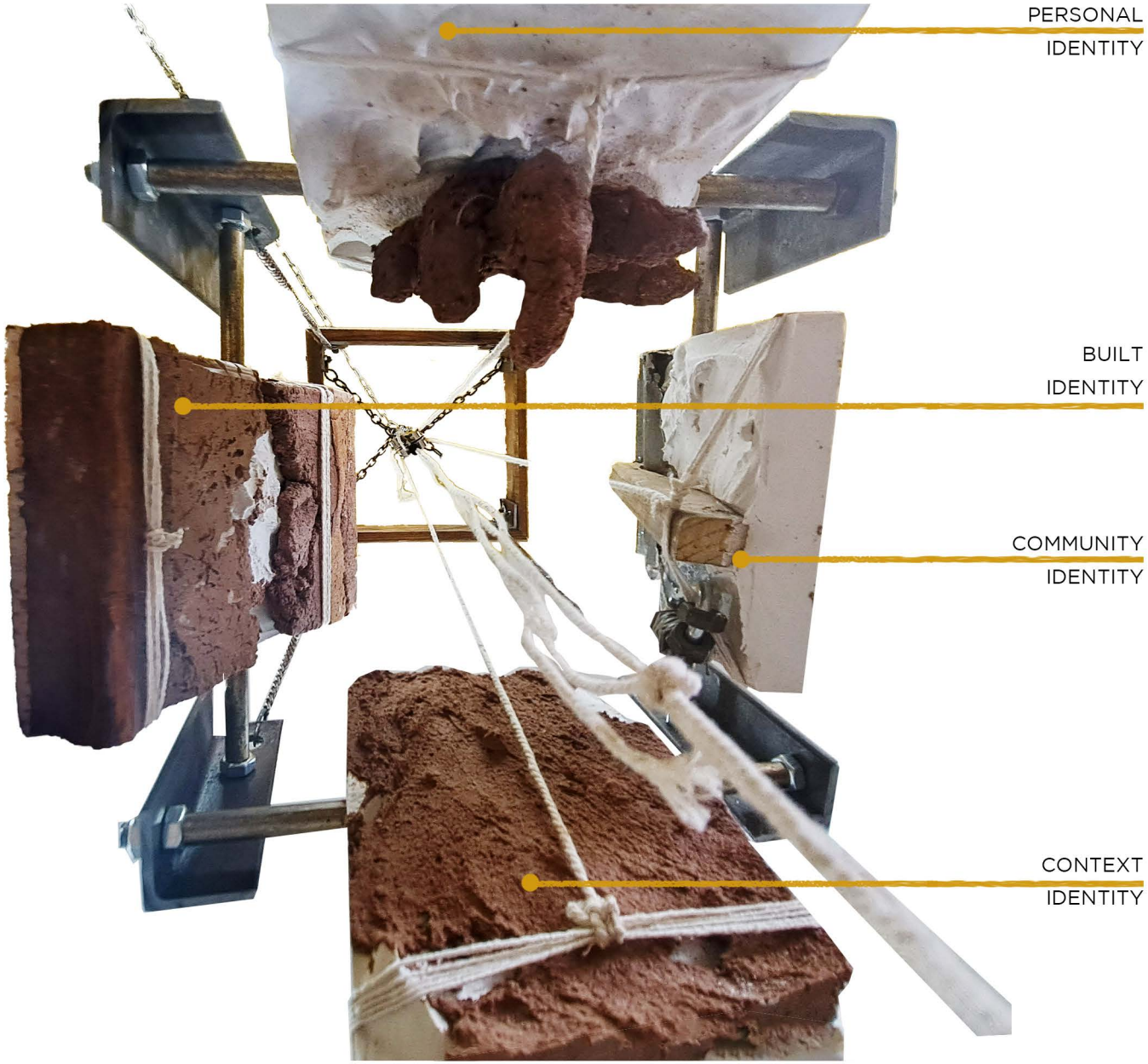


Fig. 74 The elements (Author)



Fig. 75 Bester's camp and Aranya (L. Poulsen & M Silverman, 2012)

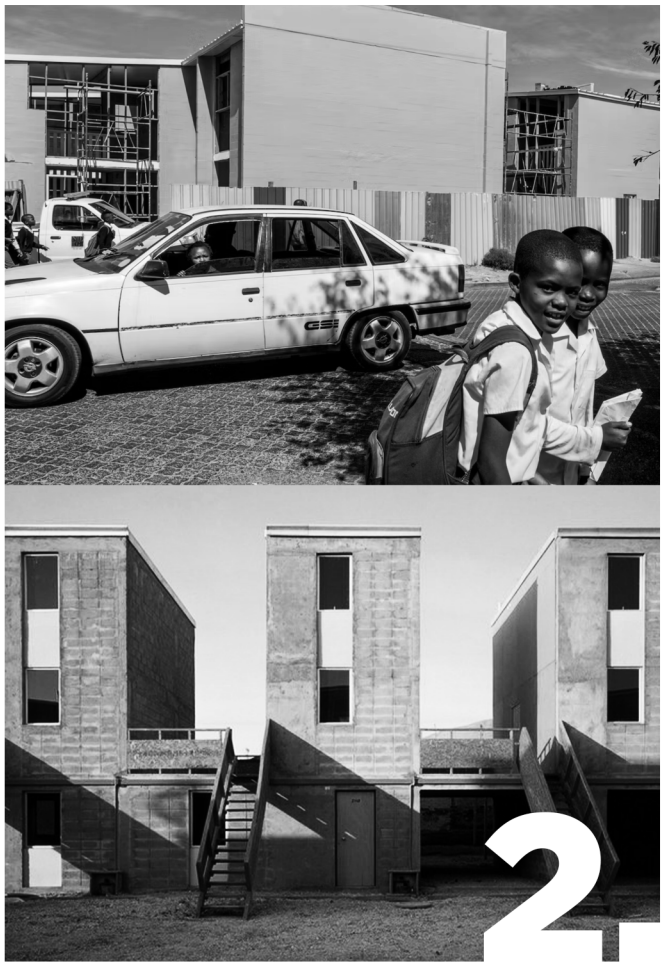


Fig. 76 Empowers shack (LOW, 14AD) and half a house (Palma, 2016)



Fig. 77 Lycee Schorge (Maretto, 2016) and earth house (Venter, 2023)

PRECEDENT STUDIES

Social housing and urban design are in themselves fields heavily dependent on learning from previously successful interventions since it takes place in such a sensitive and unpredictable context.

Because of the experimental nature of this dissertation it is even more prudent that precedents of similar

1. incremental systems

2. alternative low-cost housing solutions

3. and earth construction

be analysed and used complementary to one another.

1. Incremental**Systems**

PROJECT : The Caracas Compact
ARCHITECT : The citizens of Caracas
LOCATION : Caracas, Venezuela
South America

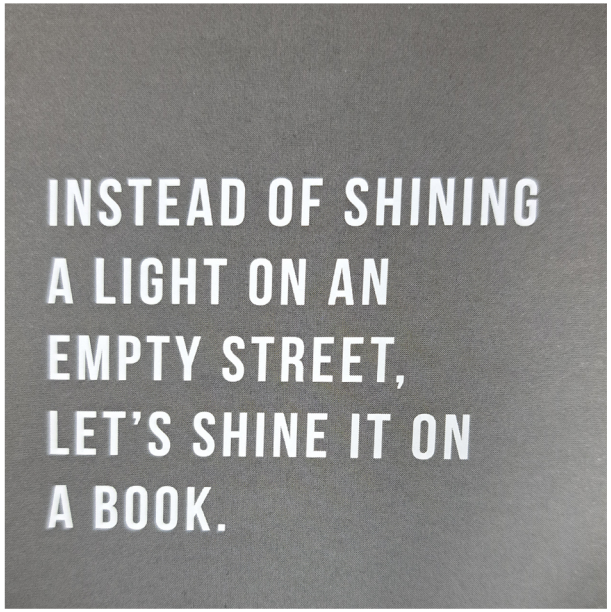


Fig. 78 Community plea (Campbell,v 2016)

Project:

Julian Blanco is an informal settlement which has been subject to several government upgrading interventions. To tackle the high crime rate, the top-down idea was to have large floodlights in the streets with fences around the base, deterring criminals. This concerned the residents, due to the ineffectivity of these type of big fixes previously applied in similar areas, as well as the clinical, prison-like feel that this would create in the area. This lacks a first-hand understanding of local ssues and the human dynamic in the area. When this project was approved without community consultation the people spoke up, demanding to be heard.

Insights:

Through workshops the community explore better ways to use the same fun- ding. With an approach of experimentation the community tests out ideas. A neighbour-hood watch is established and smaller lights installed on the front of buildings to rather light doorways first. An additional internal light is added for children to do homework by. This leads to residents fixing up their own building facades. Local businesses are con-tracted for the upkeep of lights. Education improves, the economy grows, crime falls to the lowest in the city and people start investing in their own homes. The commuinty instates the following plea/declaration.

THE CARACAS COMPACT

We, the citizens of Caracas, agree that government alone can not solve all our urban problems and that we can meaningfully contribute to build a better urban society by working together. We propose that government provides the following clear rules of responsibility, engagement and behaviour to ensure that all our skills, resources and support systems are effectively directed to help making our cities:

1. Define 'The Caracas Way'. We need a clear and simple set of protocols for all the people of our city to take positive action and solve their own problems. We must ensure that everyone has the same rules and rights. These protocols will evolve over time as we get better at doing it

2. Create a single housing staircase. This staircase should be accessible to everyone, whether they are in the affordable, open-market or informal housing sectors. The first step should be set as low as possible and subsequent steps should be easy to take. Do not treat the building of informal housing differently: it is just the first sign of responsive action. Give it time.

3. Provide freedom within constraints. We need clear boundaries within which people are free to operate and innovate. Everyone must understand how it works. Structured choices must still allow for individualinterpretations. There needs to be a rulebook with easily understood instructions and standards. Keep it simple.

4. Facilitate early occupation. We know that the people who move in first have the most difficult time. The essential elements need to be put in place that will stimulate action and allow people to start building their own homes. Technical support, temporary accommodation and access to cheap materials should be provided wherever possible.
Infrastructure can follow. Nurture the early years.

5. Focus on initial conditions. Most places develop in ways that respond to their initial conditions, so a simple order of roads and subdivisions is needed to allow people to respond effectively. Start small: provide space for community infrastructure to take root, and flourish.

6. Foster local democracy. We need to work through established democratic structures through which the community can express its collective interest. If they do not exist, we need to help people organise themselves. We need to develop ethical and enabling civic leadership, building accountability and responsibility at every level.

7. Build trust. We must re-establish the trust between government and people. This means being honest about where and what each party can deliver, honouring obligations and learning from failures as soon as possible. We must use intermediaries sparingly and keep communication simple. Trust people to do the right thing,

8. Use infrastructure to build community. Create social and economic capital at every opportunity by working with people on putting their local services in place and maintaining them. Ensure that government action leverages local community investment wherever possible.

9. Build a pattern book of potential solutions. We need examples to show and inspire people how they can progress from the early stages of site occupation to having fully developed homes. We need to work with both the shack-building and formal housing industries to develop housing prototypes that are easy to upgrade.

10. Monitor and review our actions. We must not be fixated on a single, unbending, long-term vision. We need regular and continuous feedback from people on the ground. Use many small changes to make big differences. Evolve as necessary.

Learn by doing. (Campbell, 2016)

YEAR : 1980's

PROJECT : Bester's camp

ARCHITECT : Harber Masson & Associates

LOCATION : eThekwini, Durban, South Africa

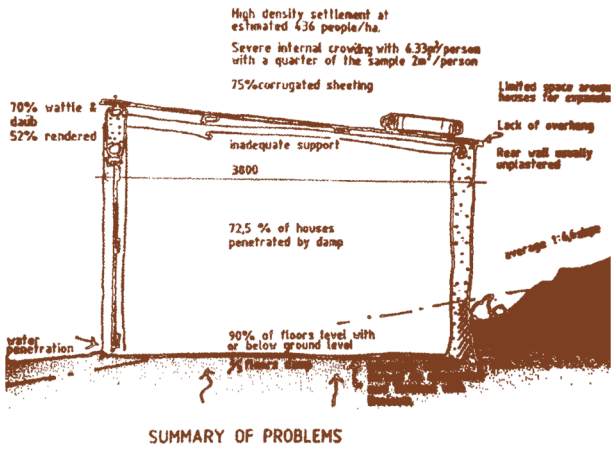


Fig. 79 Housing problems (L. Poulsenv & M Silverman, 2012)

Project:

An informal settlement developed in 1980, known as Bester's Camp. The development of this township did not focus on volume, efficiency and minimal contact. In-person negotiations with residents talking about and eventually refusing relocation, rather focussing on incremental upgrading. Short tern goals focussed on water provision, walkways, drainage, etc., where the long term goals focussed on improved and densified housing. Existing structures were analysed to adequately assess the problem: basic principles were adressed; overhangs, floor levels and alternative methods to address existing problems.

Large open areas were used to build communal buildings: a hall, library, primary school, market stalls, etc. Potential tenure security was alloted after which resident-initiated upgrading followed. Funding were granted ito materials from a local hardware store, equivalent to that of a 16m^2 masonry room. Building inspectors were available on site to assess plans offer advice.

Insights:

This process allowed for maximal community participation and ownership proving that although complicated, this type of self-help incremental process is possible. For improved quality control, more guidance from built professionals are neccesary.



Fig. 80 Bester's camp (L. Poulsenv & M Silverman, 2012)

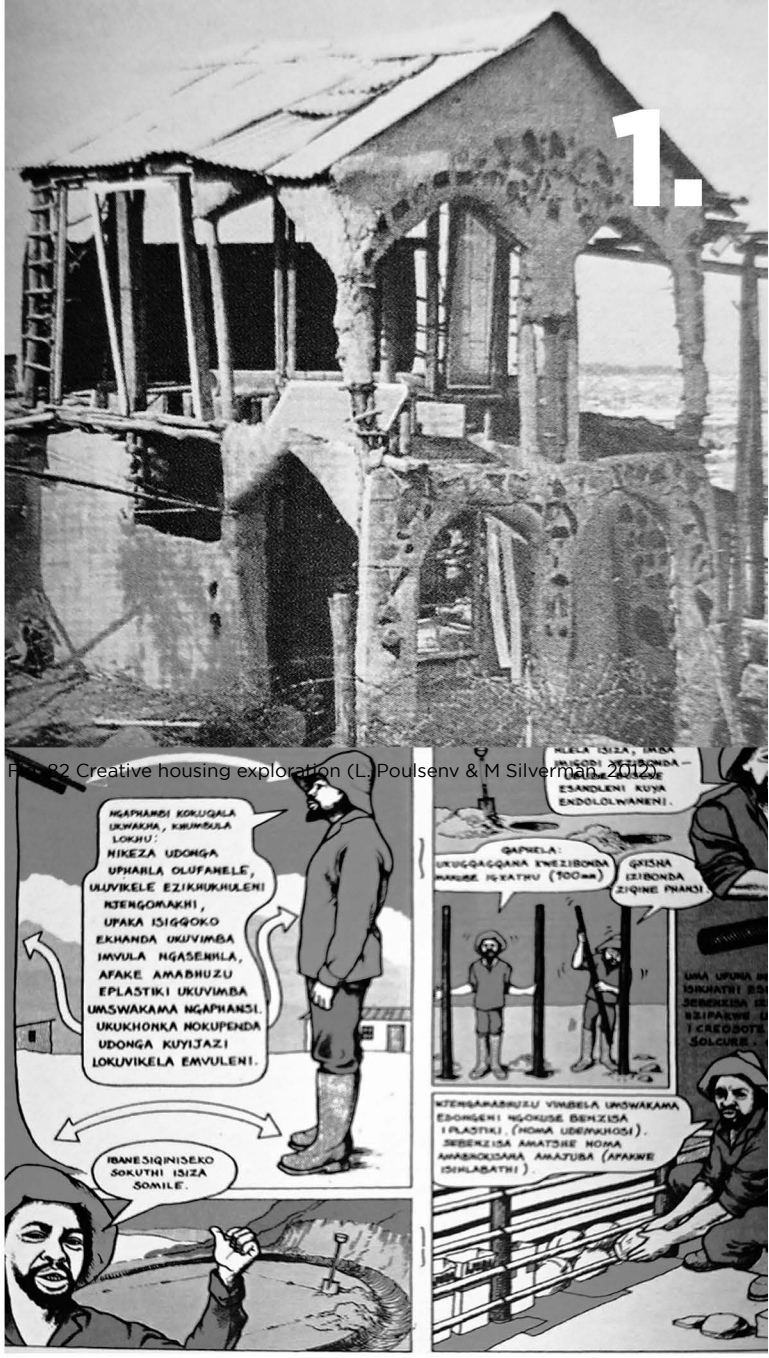


Fig. 81 A guide to building (L. Poulsenv & M Silverman, 2012)

2. Alternative,low-cost**Housing**

YEAR : 2003

PROJECT : Social housing

ARCHITECT : Alejandro Aravena/ Elemental

LOCATION : Iquique, Chile, South America

UNIT SIZE : 82m^2



Fig. 83 Social housing layout (Palma, 2016)

Project:

Housing solutions had to be provided for 100 families who occupied 5000m^2 in the city center. The land's high market value posed a problem in terms of limited funding and the resulting size of housing units which can be built. The inhabitants wanted homes which provided the possibility of expansions therefore apartment buildings were out of the question. *Elemental* decided to build 'half a good house' rather than a larger inadequate structure, with an additional space where the residents could expand their homes themselves. The provided the community with not just shelter but the tools to alleviate themselves from poverty.

Insights:

The community was asked about their needs during the design and eventually allowed to take even further ownership of their situation by being trusted to complete their own home. The design shows some indications of customization dependant on the context in which this design has been replicated. But once again there is a disregard for the reality of the informal housing which came before, the new structures laid out in a replicated grid. The decentralised nodes does provide some sense of smaller communities but the space does not allow for public functions, local shops or similar communal functions which allows self-sustaining communities.



Fig. 84 Autonomous infill (Palma, 2016)



Fig. 85 Variations of the infill housing design (Palma, 2016)

YEAR : 2016

PROJECT : EmpowerShack

ARCHITECT : Urban Think-tank

LOCATION : Khayelitsha, Cape Town, South Africa

UNIT SIZE : 48m^2

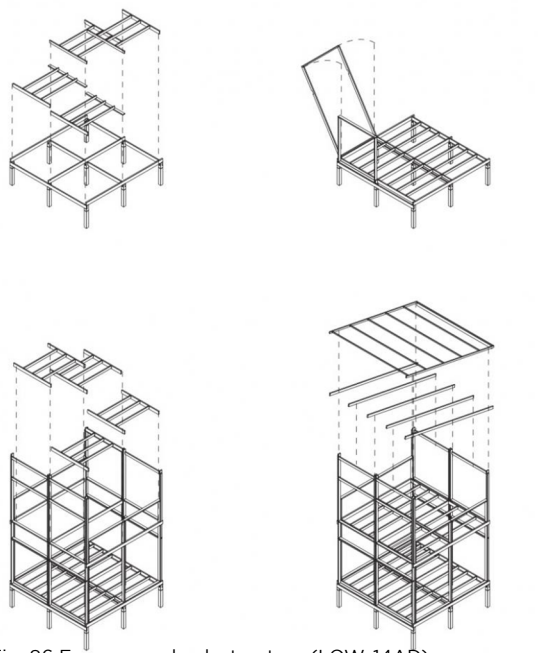


Fig. 86 Empowers shack structure (LOW, 14AD)

Project:

This housing solution consists of four main elements: a two-story home, a community participation-led design process, integrated urban systems and economic possibilities. This project required built professionals to have humility, the local government to be compliant and the participation of NGO's. The end result is the middle ground in-between multiple participants, which was partially settled trhough computer generation of the social and pragmatic data. This practical data was combined with more aesthetic and creative innovation than is normally associated or applied within these types of developments.

Insights:

The Empower shack project creates a critical and strong knowledge system with their scheduled six-monthly post-occupancy evaluations: A great technique to keep learning from this very experimentational field. This, combined with the use of new technology in unison with in-person interaction, shows the firm's wilingness to innovate and be actively involved. The design allows for human complexity with the consideration of economic possibilities within family structures. The aeshtetic considerations can be further developed but is admirable, considering the restraints.



Fig. 87 Empowers shack decoration and floorplan (LOW, 14AD)



Fig. 88 Original Empowers shack (LOW, 14AD)



Fig. 89 Empowers shack, back view (LOW, 14AD)

3. EarthConstruction

YEAR : 2023
PROJECT : Earth House SA
ARCHITECT : Juane Venter
LOCATION : Vredefort, Free State, South Africa



Fig. 90 Renders of earth house (Venter, 2023)

Project:

This project is an Airbnb focussed on natural materials and translating the context into the built experience.
The design consists mostly of earth and stone walls as well as a stone foundation. Much of the material used is sourced on site, if possible. The layout is sleek yet local, showcasing the aesthetic and identity driven qualities of the materials used. Due to the remote location, the machinery available and techniques used are very straightforward and accessible, using clever techniques to use simple methods creatively.

Insights:

The entire construction process of the building is being documented and shared via social media, which creates a user interest and participation within the process, even though they are not directly involved.
This is a valuable asset which can be integrated into the social housing process (design and building process) to increase interest and user feedback.



Fig. 91 Construction progress (Venter, 2023)



Fig. 93 Layout (Venter, 2023)

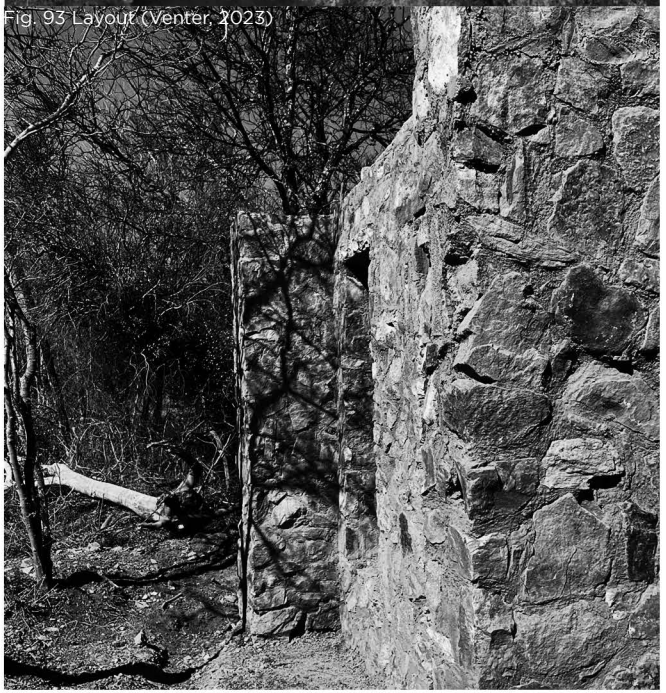


Fig. 92 Stone walls (Venter, 2023)

YEAR : 2016
PROJECT : Lycee Schorge School
ARCHITECT : Francis Kere
LOCATION : Koudougou, Burkina Faso
Western Africa

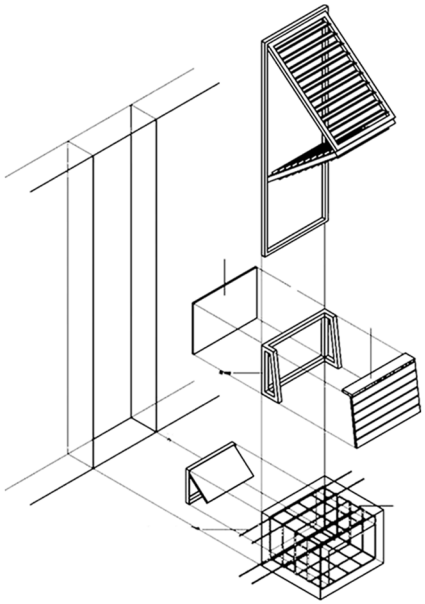


Fig. 94 Lycee Schorge passive cooling window and seating (Maretto, 2016)

Project:

The Lycee Schorge secondary school campus includes the Burkina Institute of Technology. The design can instantly be recognised as architecture which has become synonomous with Kere's work but also with the Burkina Faso context. The design is very modern while at the same time innovatively making use of local and supposedly simple materials to respond to the local climate. The design in centered around the ergonomic need and the available resources or lack thereof. Passive cooling systems is present in all of the classrooms, which also make optimal use of the available daylight with perforated plaster vaults. The materials used include local clay, locally sourced laterite stone bricks and eucalyptus wood for shading. The institute, on the other hand, is mostly built by casting a clay-cement mixture in large formworks which are re-used to make each classroom. This technique is quicker and allows for more flexibility in design.

Insights:

The use of passive design systems lowering upkeep cost is one of the primary aims of this experiment. Being able to realise this in unison with an aestetic, innovative design in a context which doesn't have access to much specialised machinery, provides confidence in the thesis project's viability.



Fig. 95 Ergonomic design (Maretto, 2016)



Fig. 96 Kids at lunch (Maretto, 2016)



Fig. 97 Modern morhology (Maretto, 2016)



Fig. 98 Ventilation and roof systems (Maretto, 2016)

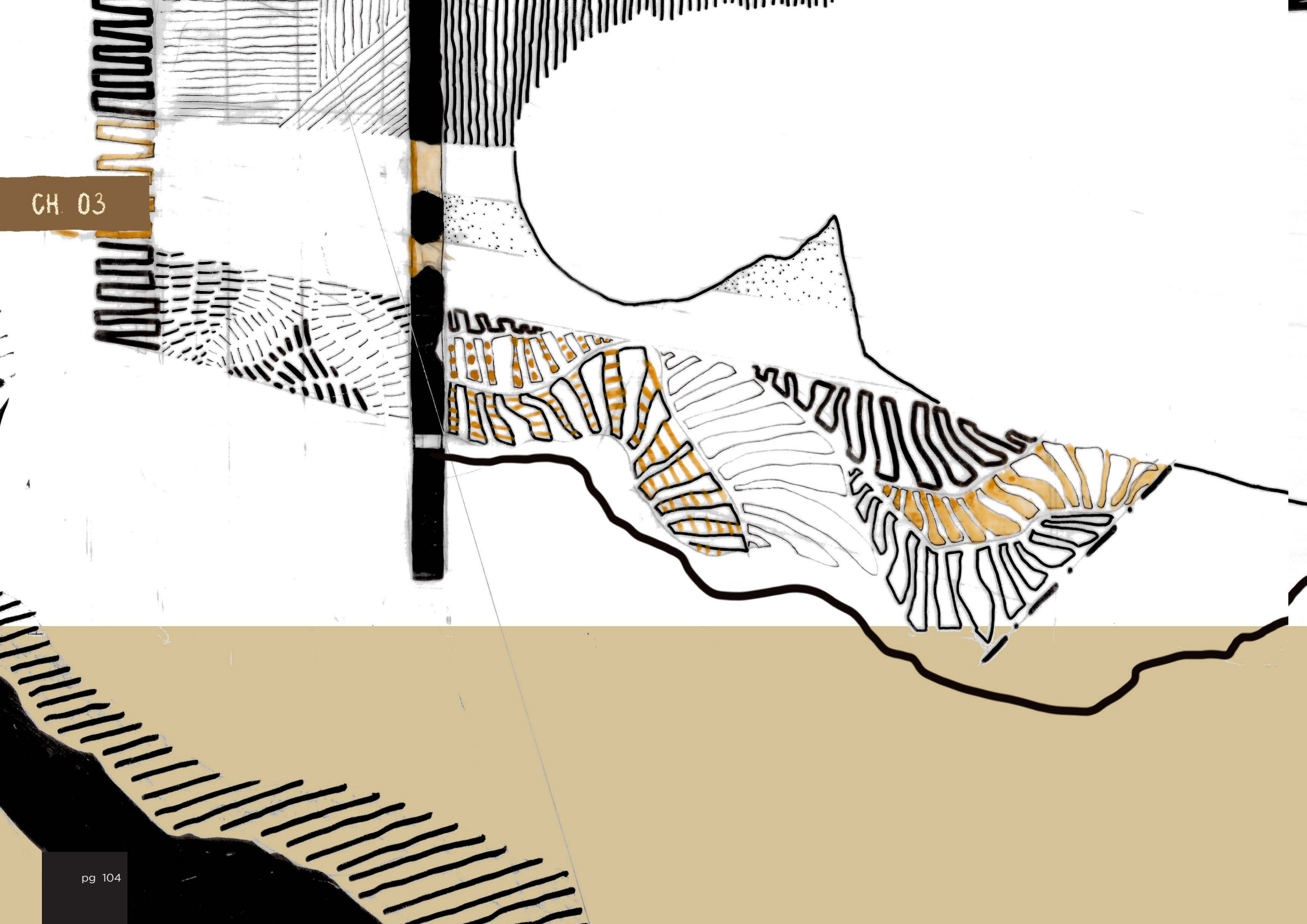

CH 03



Fig. 99 Theoretical sketch (Author, 2023)

3.1 DESIGN **PROPOSAL**

3.2 DESIGN **DEVELOPMENT**

3.2.1 Built analysis

3.2.2 Personal priorities

3.2.3 Design possibilities

3.3 DESIGN **SYNTHESIS**

3.5 PRACTICAL **SYSTEM**

3.6 **CONCLUSION**

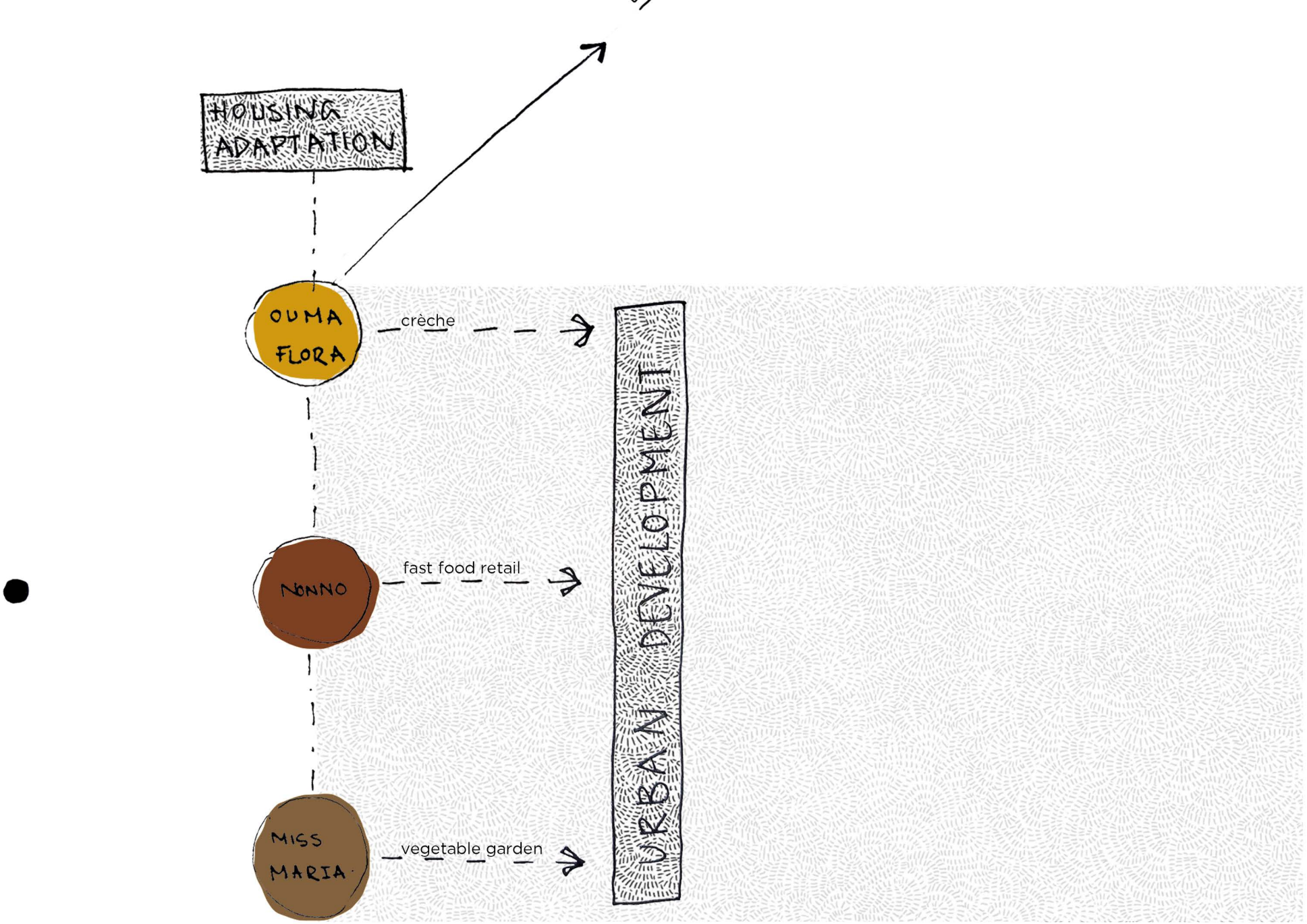


Fig. 100 Housing adaptation sketch(Author, 2023)

DESIGN **PROPOSAL**

The same problem in similar context to that laid out in the previous chapters have been addressed many a time in many different ways, some more successful than others. Whilst learning from the iterations which came before, in this experiment these factors will be approached as an oppertunity.

An oppertunity posing the question:

How can the introduction of personal *stories* complementary to *incrementality*, establish a sense of growing *identity* within the informal housing context of Haakbosdraai, Postmasburg?

This culminates within the following programme;

1. Incremental adaptive design of 3 existing shantees

2. Urban design developments linked to the families of the aforementioned adaptive designs

Ultimately generating a methodology for growth-mentality centered construction of affordable housing and urban design infrastructure.

The client for this design is **SOIC-CDT** (Sishen Iron Ore Company- Community Development Trust) which is an organization established in 2006 by Kumba Iron Ore Limited to invest in development of the communities in which the mine operates.

This company has funded multiple infrastructure projects in Postmasburg including the construction of numerous RDP type low-cost housing units

SIOC COMMUNITY DEVELOPMENT TRUST

Fig. 101 Logo(Siocr, 2023)

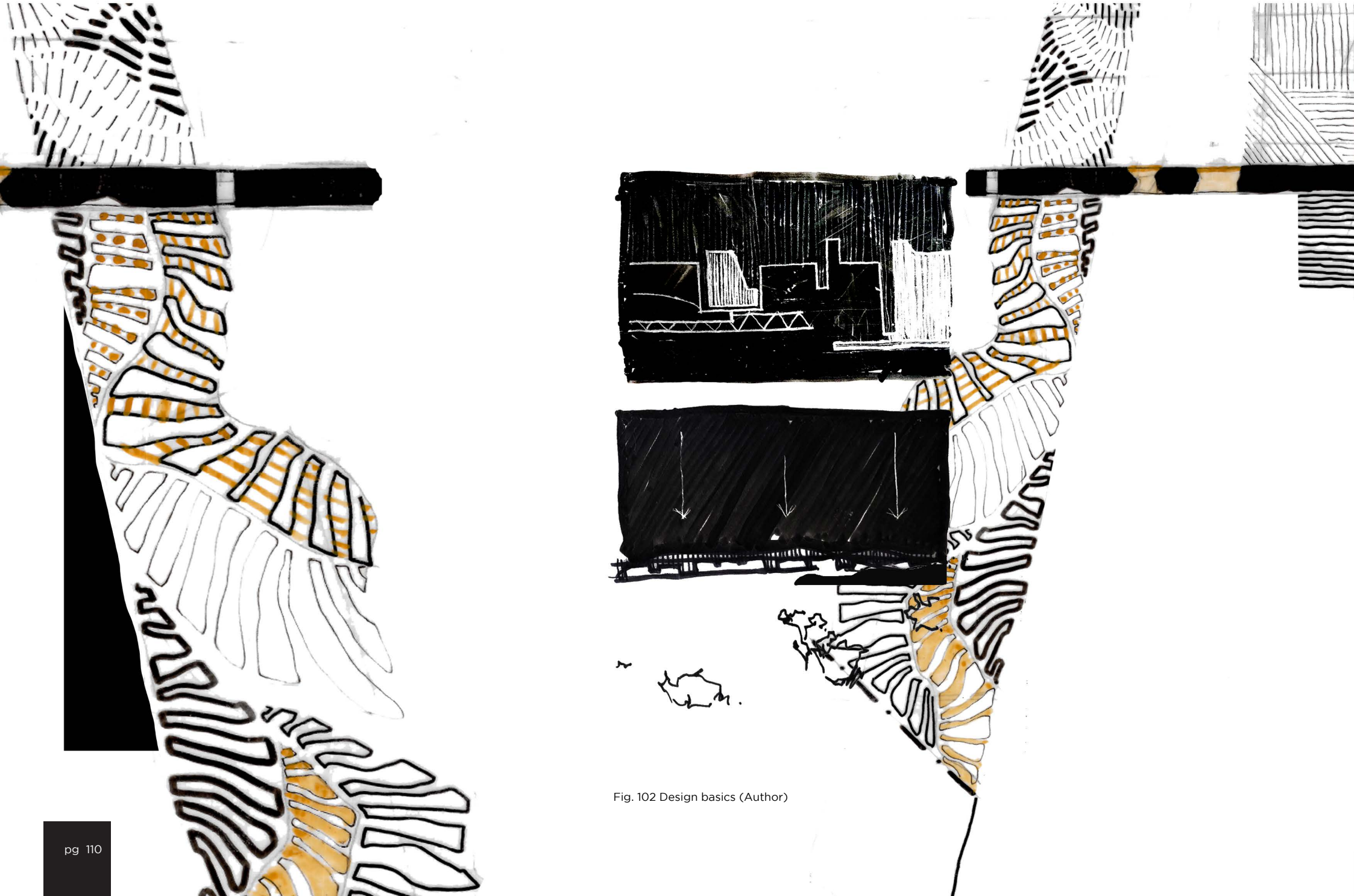


Fig. 102 Design basics (Author)

DESIGN**DEVELOPMENT**

The design, consisting of the domestic and the urban development, builds up from the personal into the public.

The stories gathered from the conversations with Miss Maria, Nono and Ouma Flora created a background for the development of their homes into into identity focussed adequate housing. The design process took on the following steps.

1. **Built analysis** of the existing
2. Layout of structural and **personal priorities**
3. General spatial layout of **design possibilities**
4. The setting out of an **incremental schedule**

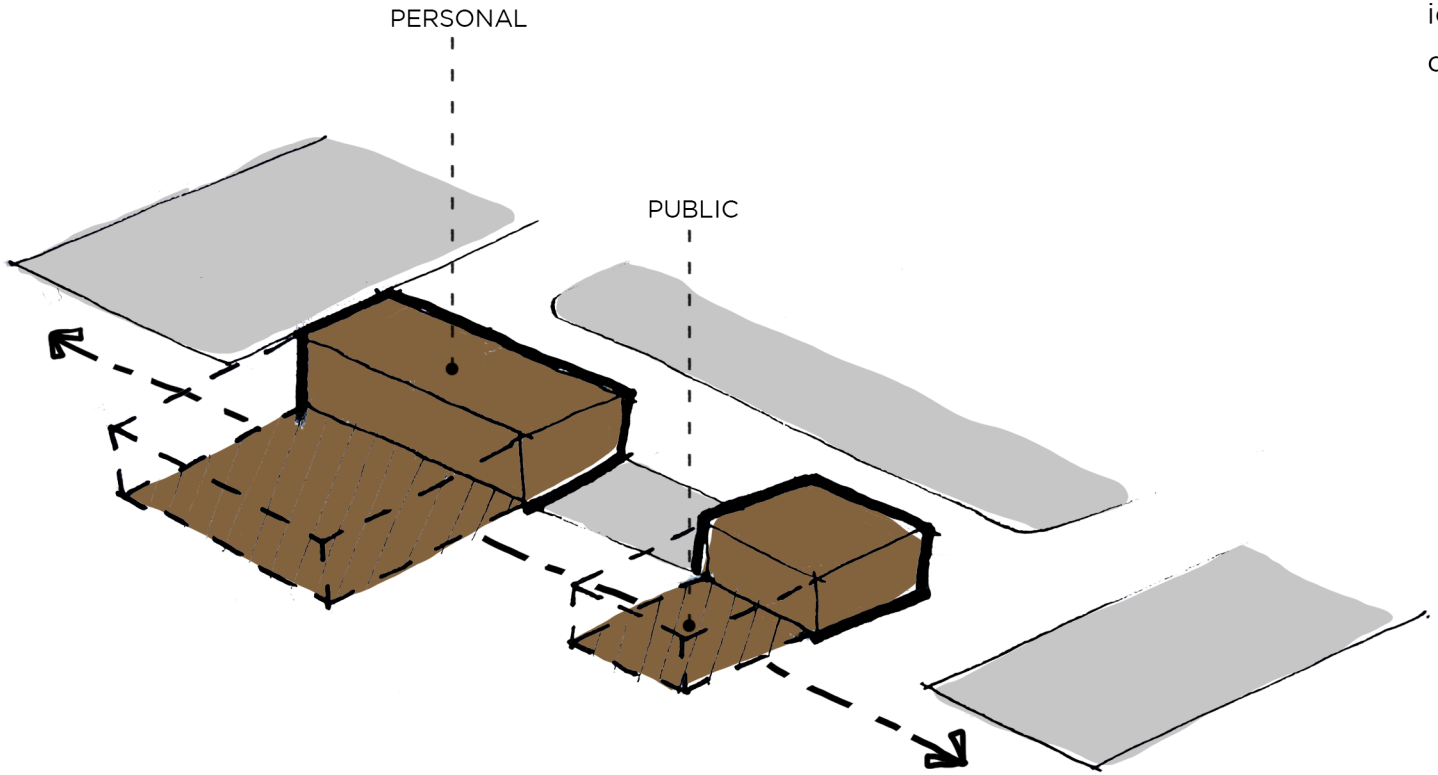
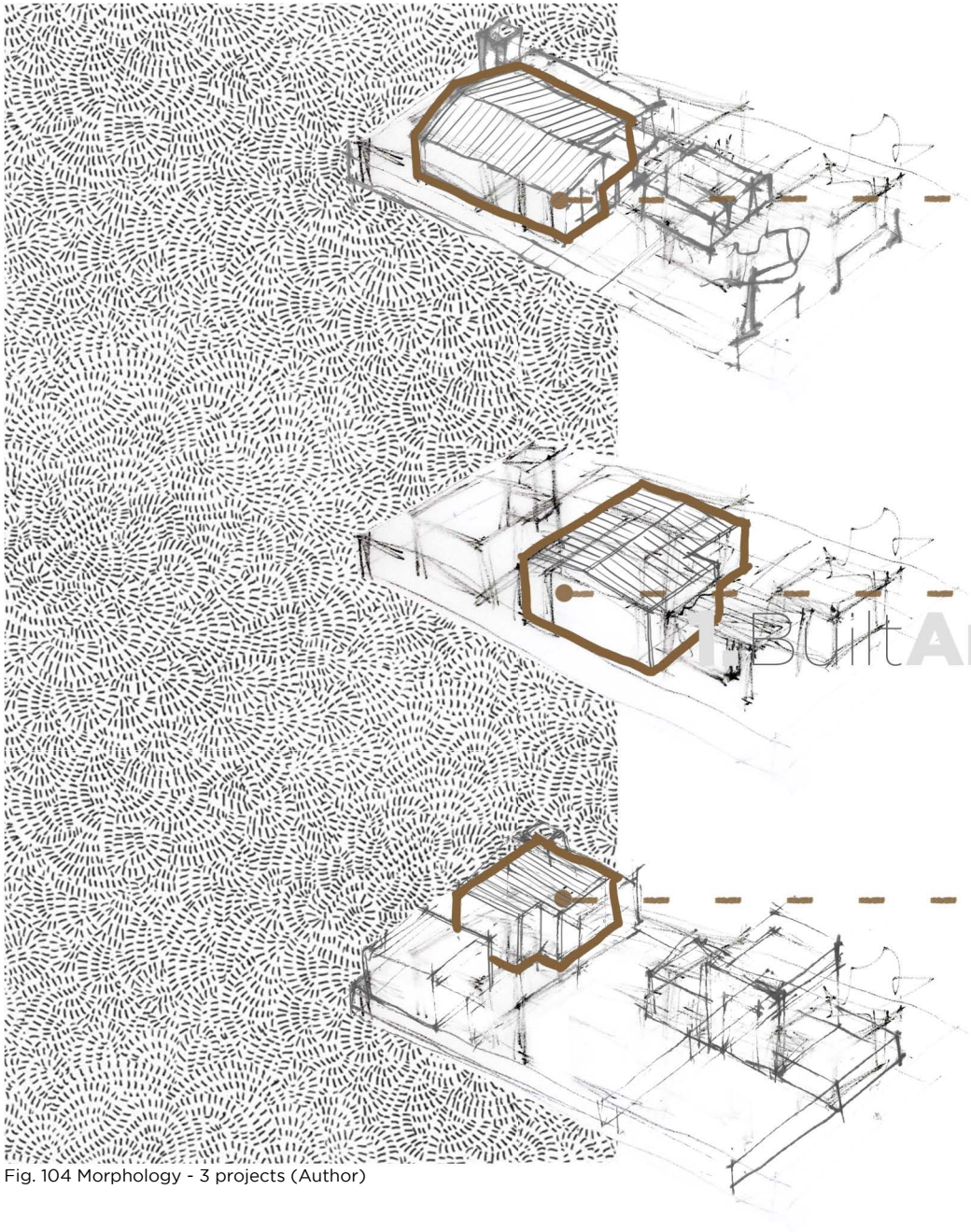


Fig. 103 Layout diagram (Author)



1.BuiltAnalysis

Fig. 104 Morphology - 3 projects (Author)

The families opened up their homes to be measured and set out with the eager help of Nonno's younger brother Pieter and his friend Benjamin.

In all of the homes the bedroom space was prioritized, taking op most of the floorspace even taking over adjacent spaces due to an increase inhabitants, e.g Ouma Flora making space for ... to sleep in her living room.

The second largest space is the living room, which takes up a lot of space but is seldom used. Only Miss Maria has a living room built well enough that it is not sweltering hot and lets in enough natural light.

The other families can be seen using spaces outside as actual socialising spaces throughout the day. These are spaces which are either in the shade of a shantee/its overhang or underneath a tree.

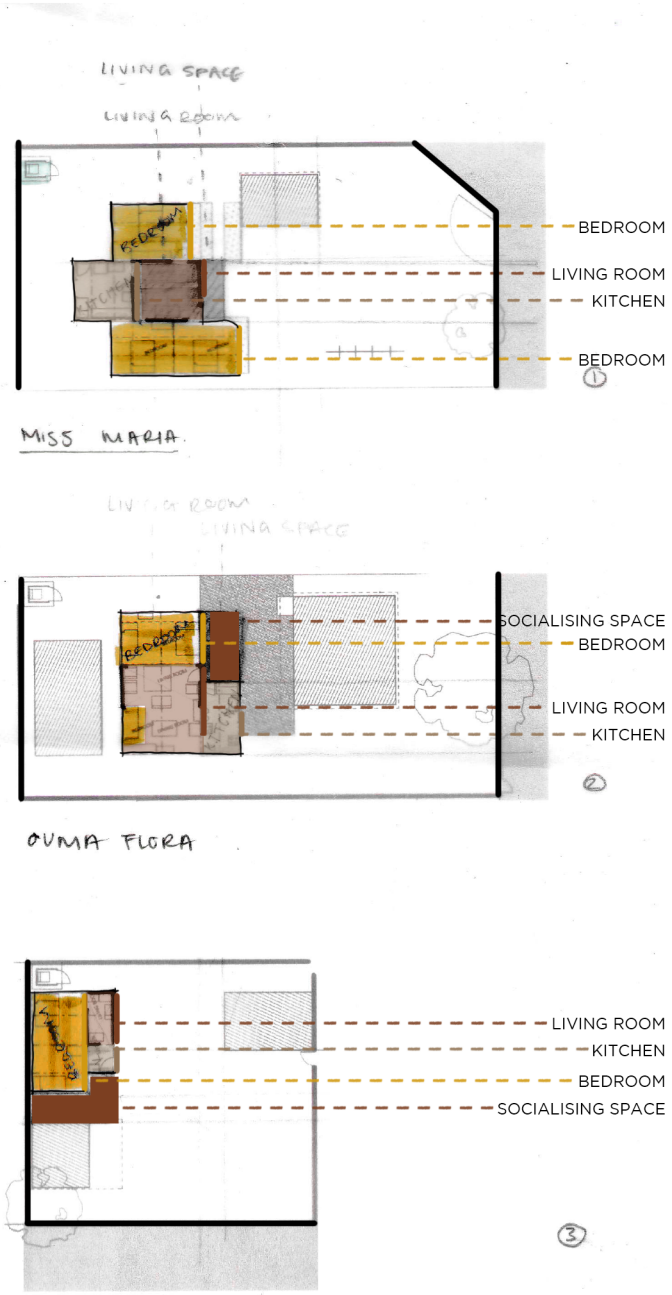


Fig. 105 Spatial layout - 3 projects (Author)

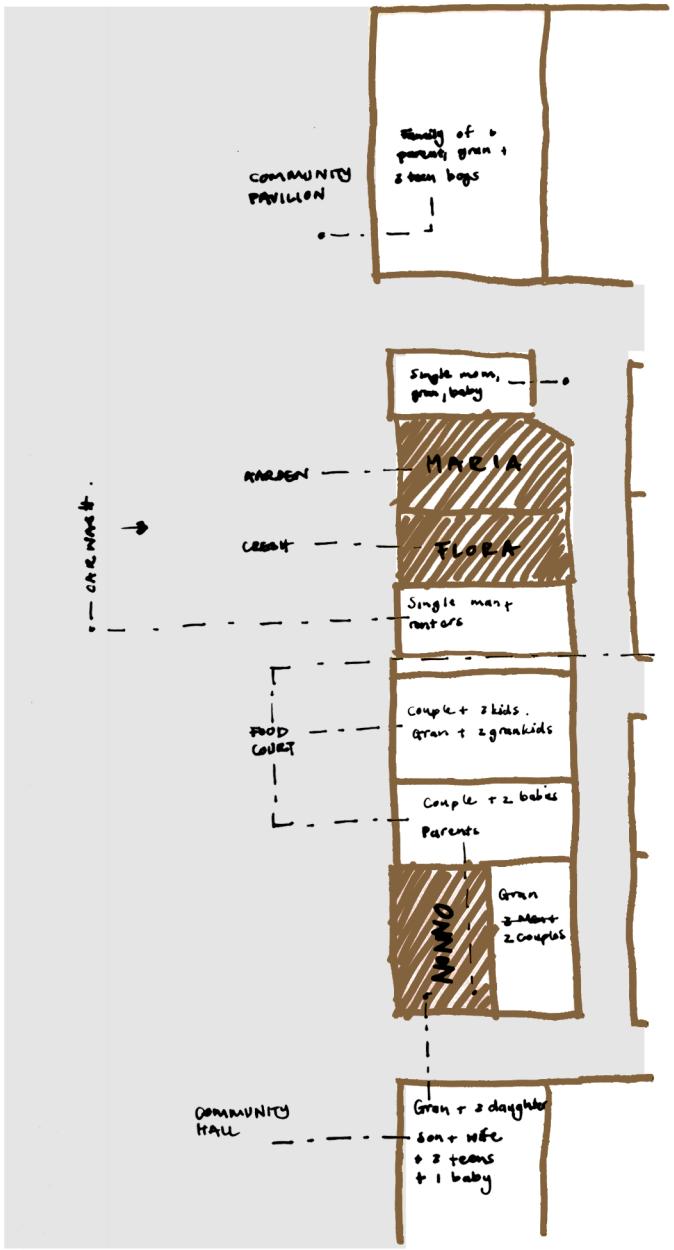


Fig. 106 Site plan (Author)

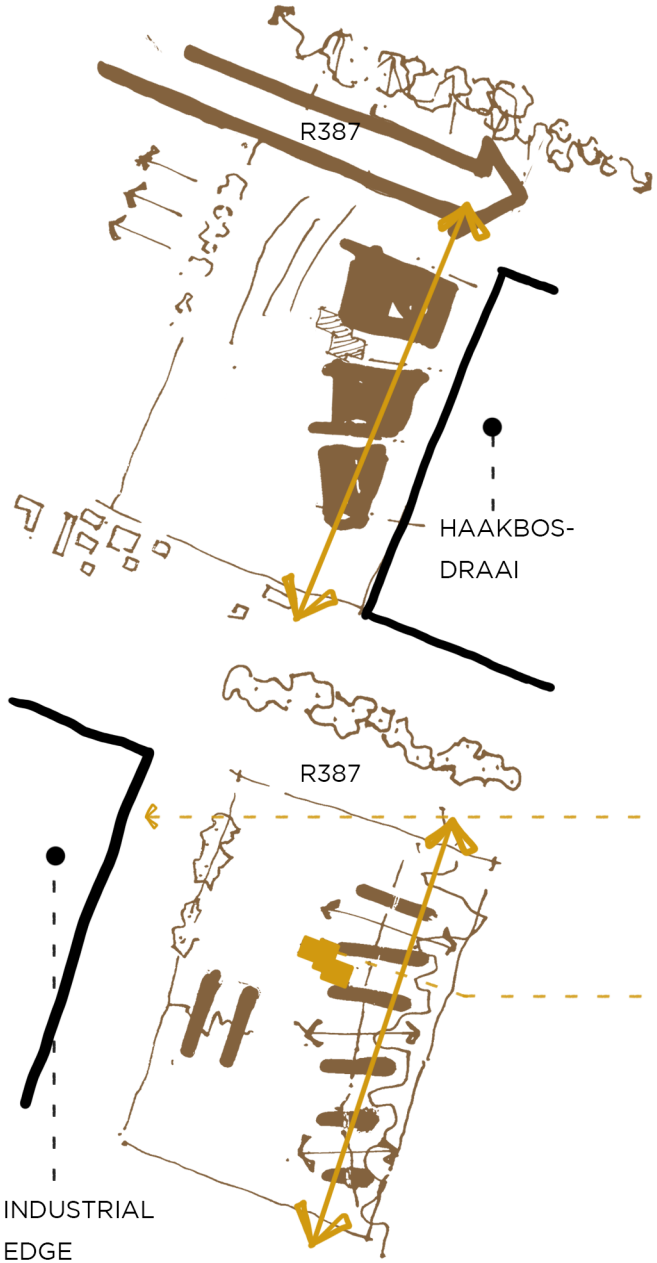


Fig. 107 Spatial implications (Author)

Haakbosdraai's Western border edges on a mostly open lot except for one structure, a tavern at the center.

This creates a linear spatial implication adjacent to the edge, along which the urban public infrastructure of Haakbosdraai can develop, eventually merging to the West with the industrial edge of Postmasburg.

There is a daily flow of people accross the site from the industrial edge to the shopping center, five hundred metre to the East, for lunch. A large amount of the inhabitants work at Rufco, Alcor or Zincover in the industrial area or on the mines of which most are a few kilometres West along the R387



Fig. 108 Existing context (Author)



Fig. 109 Built reality - 3 Projects (Author)

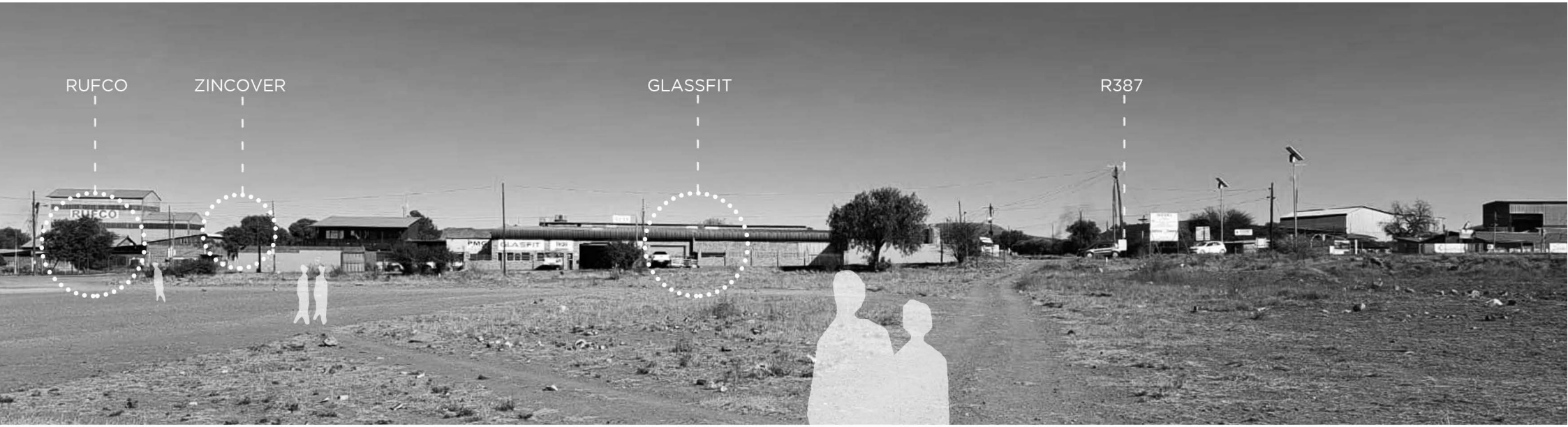


Fig. 110 Built context (Author)

2. Personal Priorities

Prioritising a client's needs are always crucial, not projecting one's own ideas about what is important onto another, but especially so in social or low-cost housing due to limited resources.

Alejandro Aravenna notes that in one instance with their social housing project in Iquique, people not personally familiar with the context or the inhabitants, commented that a satelite dish on the initial design sketches were ignorant due to the financial position of the inhabitants.

This was in fact one of the priorities highlighted in the community participation sessions, the mothers noted that they need this form of entertainment to keep their children off the street corners. Such a consequential social weight tied to a seemingly inconsiquential, financial question.

Priorities of Haakbosdraai inhabitants

1. Miss Maria

- direct and extende **family** room for them to come stay over in
- **garden** space with enough water to sutain it
- **social** space where she can entertain

2. Nonno

- **personal** space (individual bedrooms)
- **social** space for the family to gather
- **kitchen** space for Nonno to cook
- **work** space for Plaatjies to do electrical work

3. Ouma Flora

- **social** space (a stoep living outward)
- **personal** space (own bedroom and storage space)
- space for **children** (own bedrooms)

General public priorities

1. Social

- family/friends shared space
- soccer (children)

2. Water points

- general house use
- gardening (food)

2. Shops

- basic needs
- entrepeneurship



Fig. 111 Horizontal spatial implications (Author)

Responding to the edges

As a space were boudaries collide and transition, the design, especially the urban edge has to respond to mulitple identities.

The North there is a lane of tall pine trees to which the design has to respond with taller structures or elements which connects lightly to the earth.

The East responds to the extremities of Haakbosdraai, gathering the staggered informal housing with larger overhead structures while mimicking some of the disjunctedness in the buildings to not alienate the dappled mass with large imposing blocks.

The Southern edge meets the domestic infrastructure of Newtown, an adjacent, yet more formally built township.

The Western edge has to mediate the change between the large industrial vs the smaller social and urban infrastructure.

The formgiving of the project combines the stereotomic, strong weight of **earth construction** with **lighter skins** weaving accross, supported by columns.

The first providing spatial grounding within the flat surroundings, intermittantly sinking into the ground to provide even more of a connection, merging the normal state of living *on top of* the land with that of living *with* or *within* the rich substrate of this area. The screens mediate the harsh climate and allow for water harvesting.

This applies mostly to the **urban, public developments** since the domestic projects makes use of simpler methods yet still using the earth construction due to its availability and thermal properties.

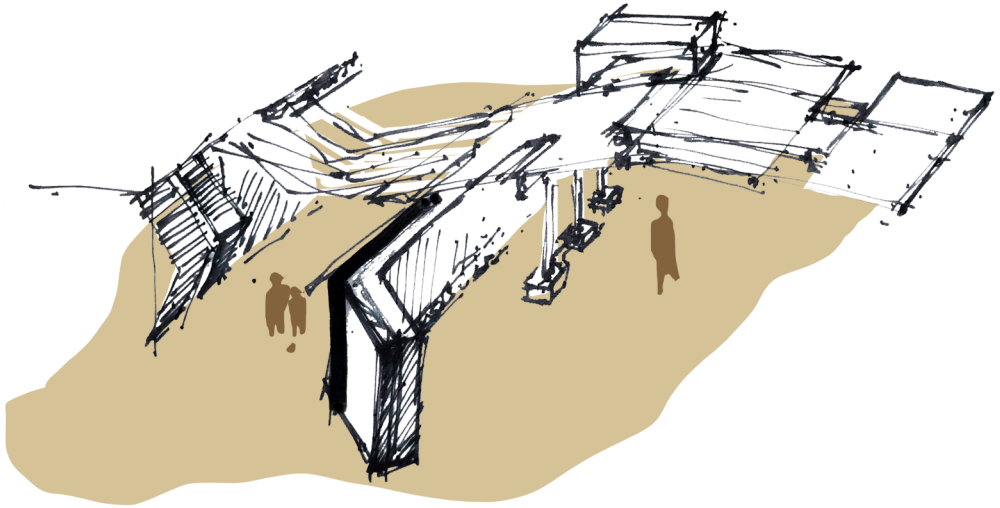


Fig. 112 Morphological direction (Author)

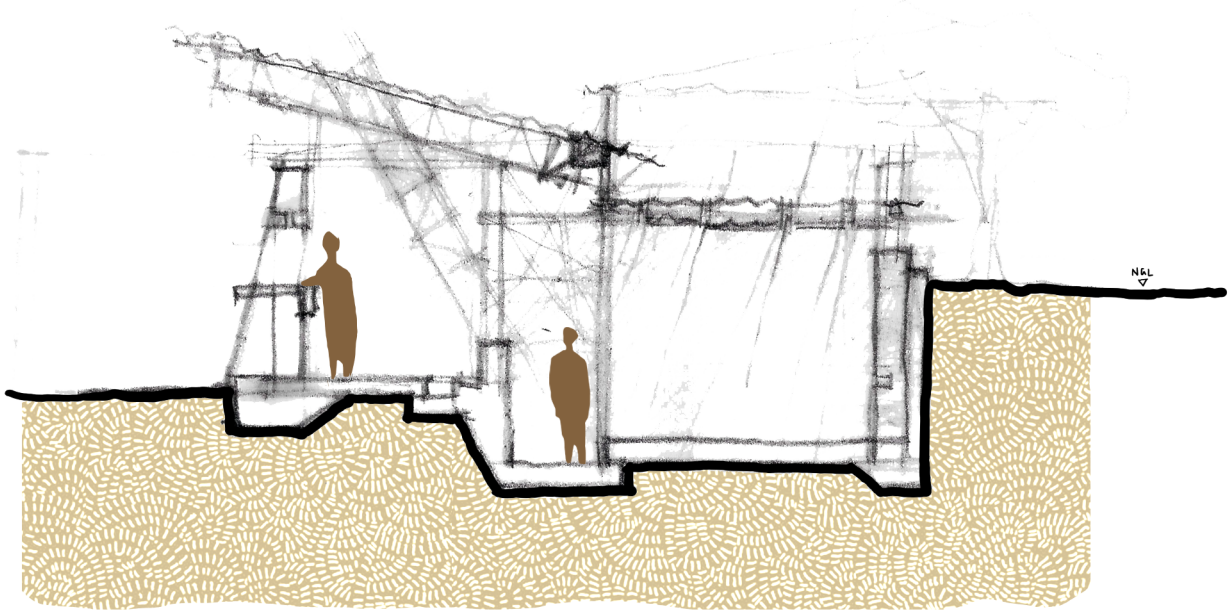
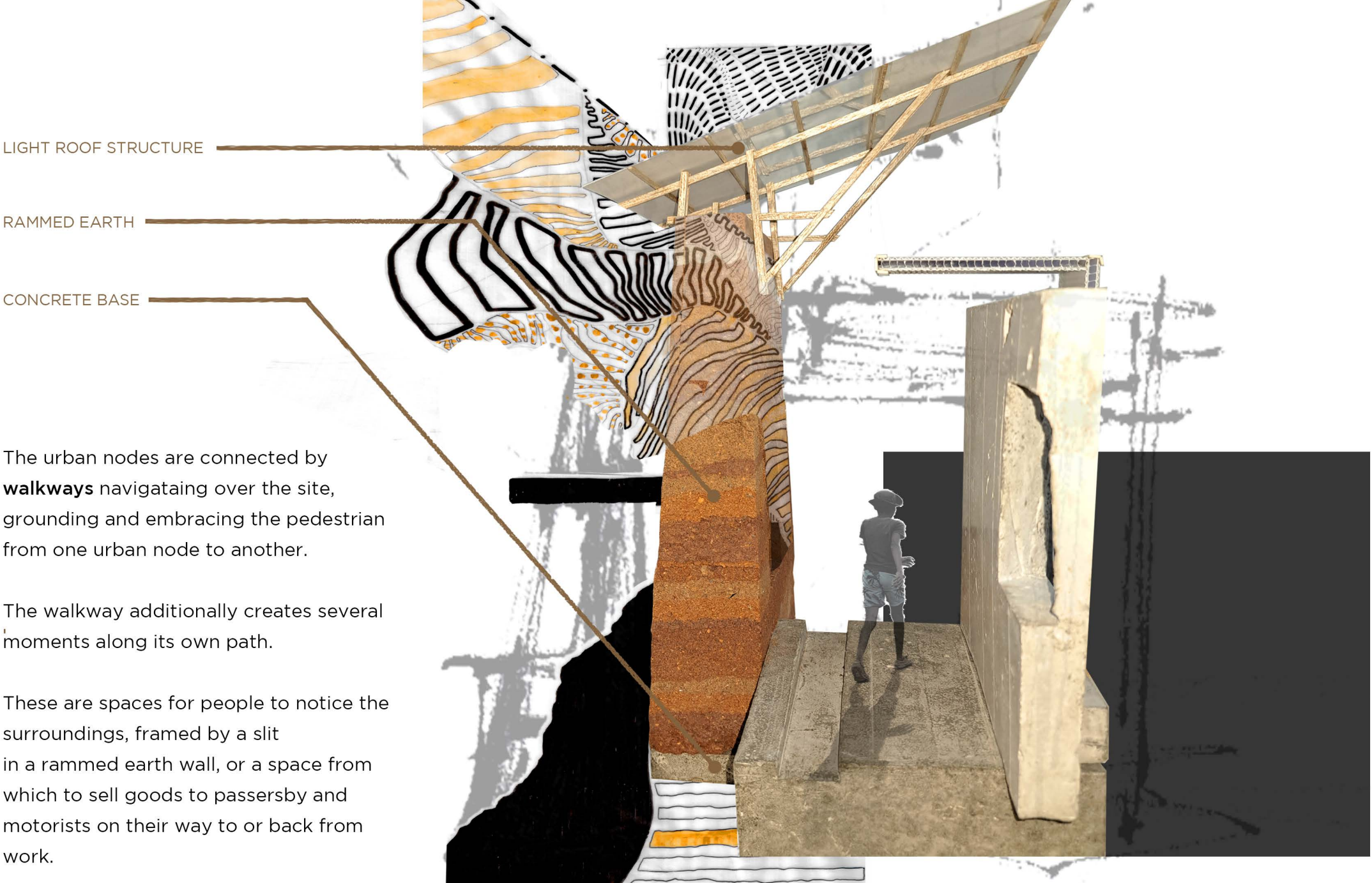


Fig. 113 Spatial language (Author)



The urban nodes are connected by **walkways** navigataing over the site, grounding and embracing the pedestrian from one urban node to another.

The walkway additionally creates several moments along its own path.

These are spaces for people to notice the surroundings, framed by a slit in a rammed earth wall, or a space from which to sell goods to passersby and motorists on their way to or back from work.

Fig. 114 Construction touch stone (Author)

The formgiving of the domestic designs rest heavily on the original structure as examined in 3.2

Earth construction is used as a compound material with the existing zinc walls formaing one side of the formwork. The rammed earth is addes either on the interior or on the exterior depending on availability of space. Most of the families already have tarps which are draped over the roofs. This can be used during the construction to keep the rammed earth covered.

Rammed earth is normally considered as more of a high end material but due to the availability of soil from the mines and the labour which will be executed by the inhabitants this becomes an excellent material. There is no extra space needed for elements to dry as with the case of adobe bricks since it dries inside the fromwork. It provides a low cost aesthetic feature due to the variety of atypical subsoil pigments that the mines excavate.

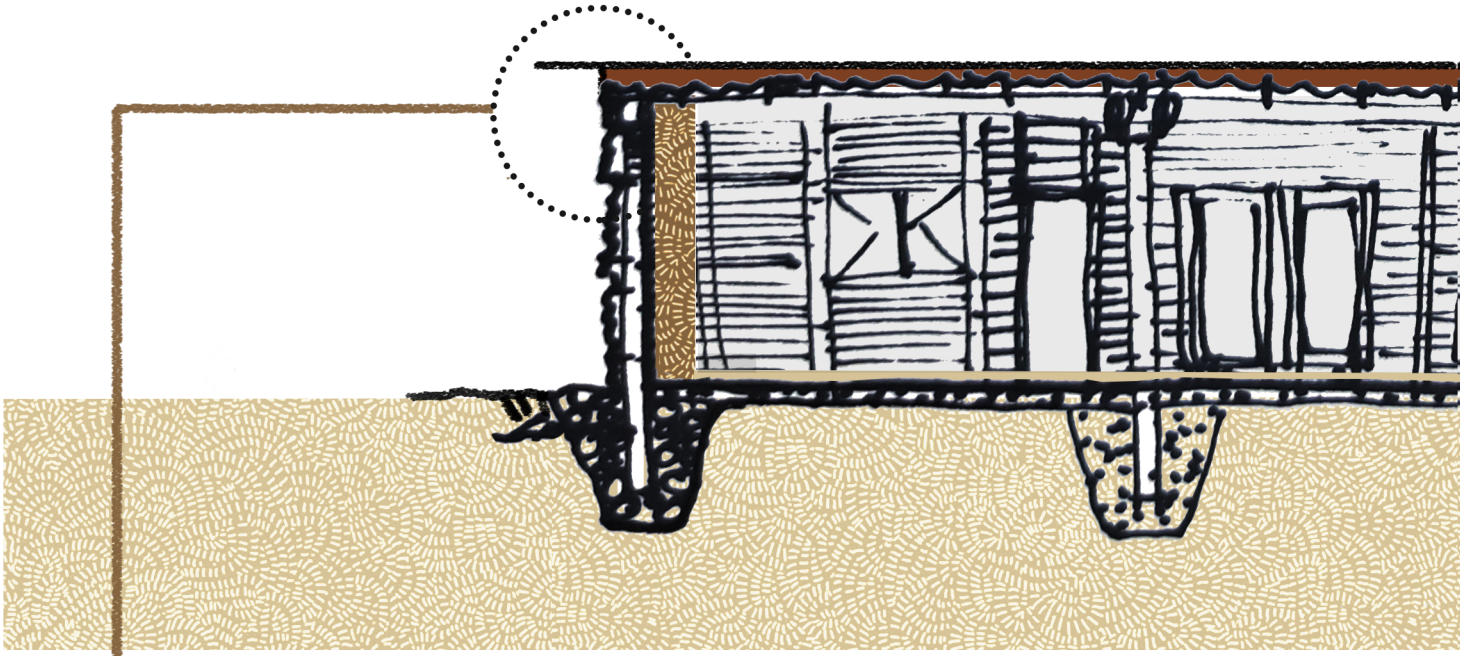


Fig. 115 Structural adaptation (Author)

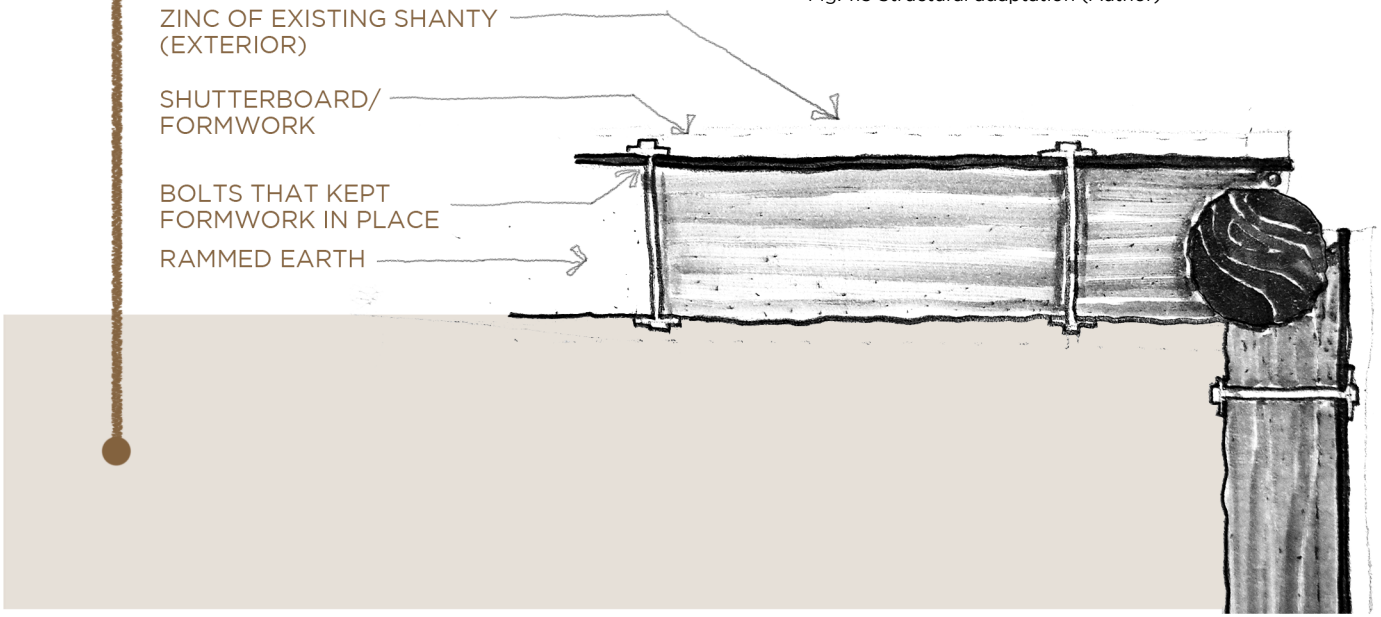
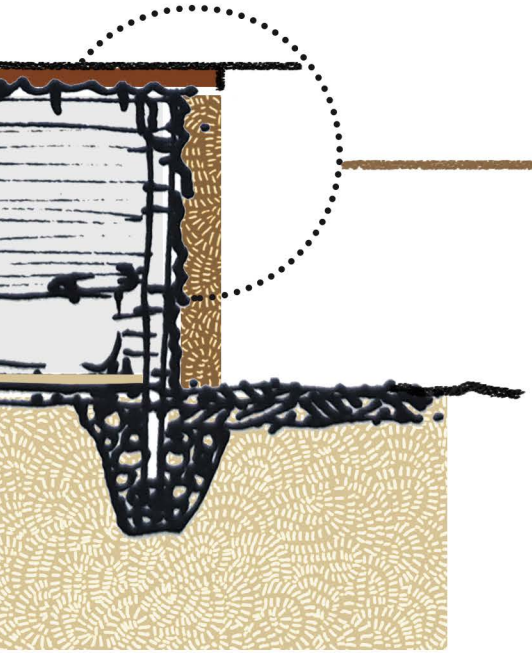
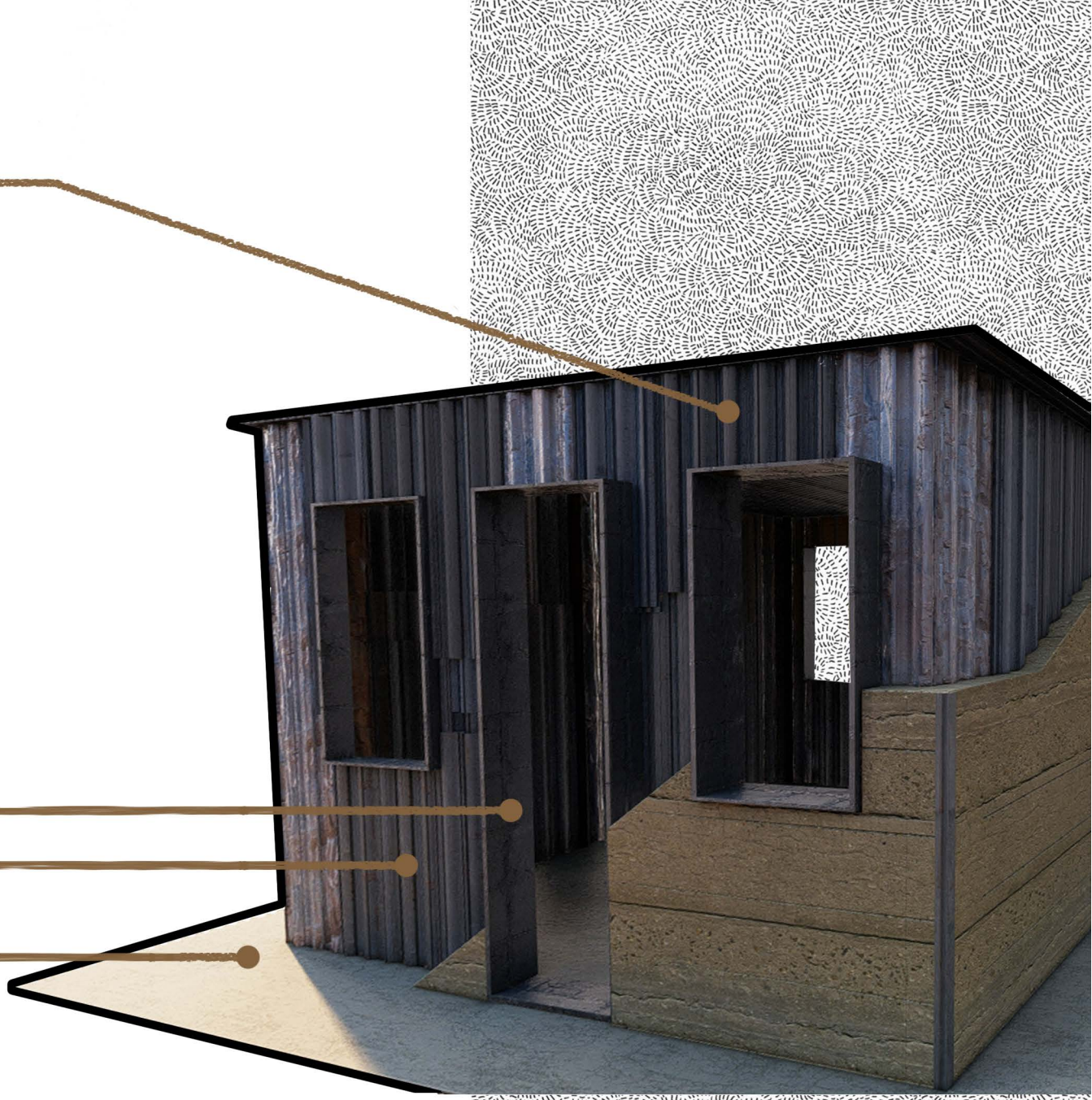


Fig. 116 Detail section; structural adaptation (Author)





PERMANENT FORMWORK
(DOOR & WINDOW OPENINGS)

ZINC OF EXISTING SHANTY
(INTERIOR)

SKIRTING TO PROTECT
RAMMED EARTH

Fig. 117 3D of generic structural adaptation (Author)



URBAN ANALYSIS
& FIRST DESIGN ITERATIONS

(INTEGRATED WITH THE URBAN FABRIC OF HAAKBOSDRAAI)

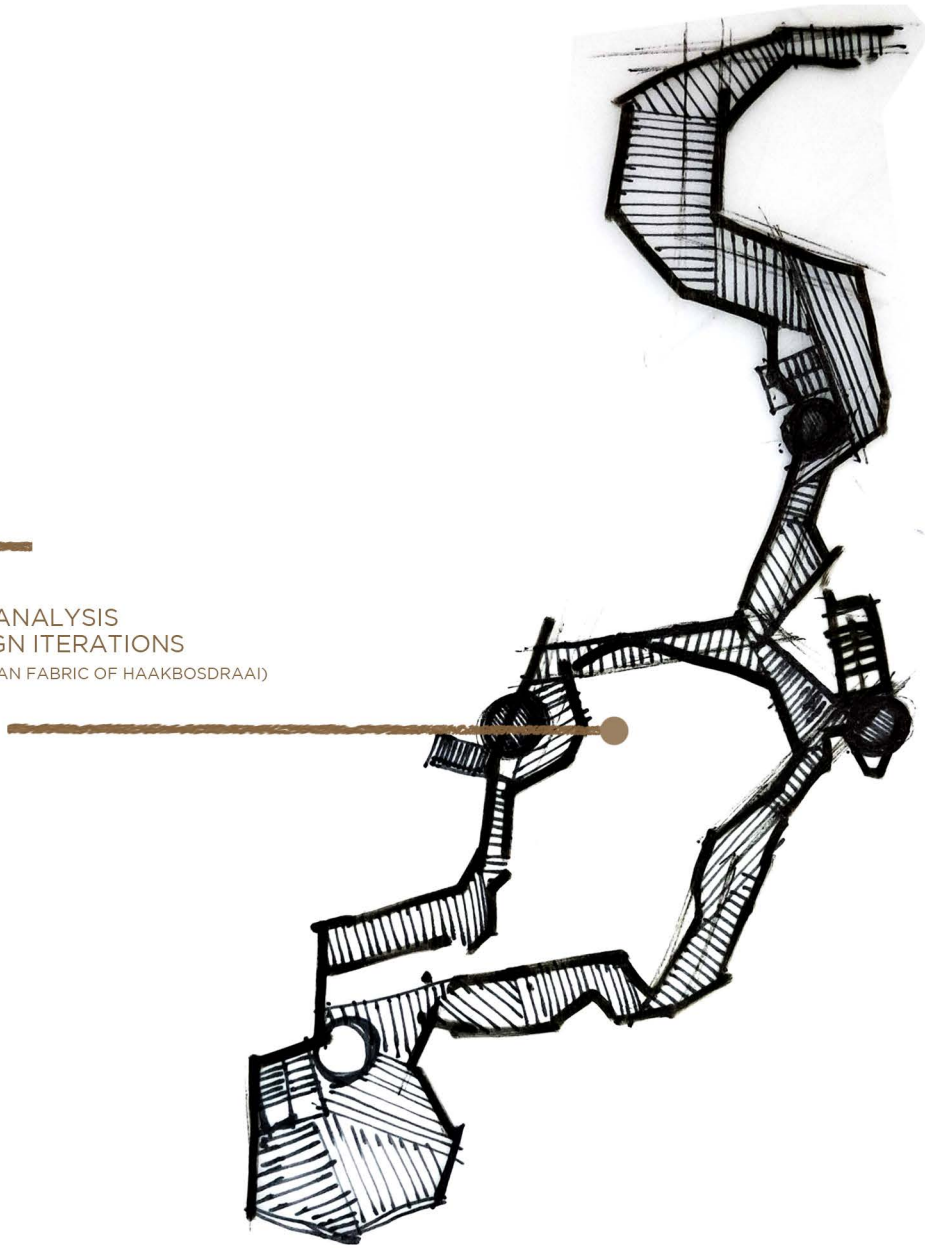


Fig. 118 Iformal spirit of urban intervention (Author)

Fig. 119 An urban system of urban tanks and roofing systems (Author)

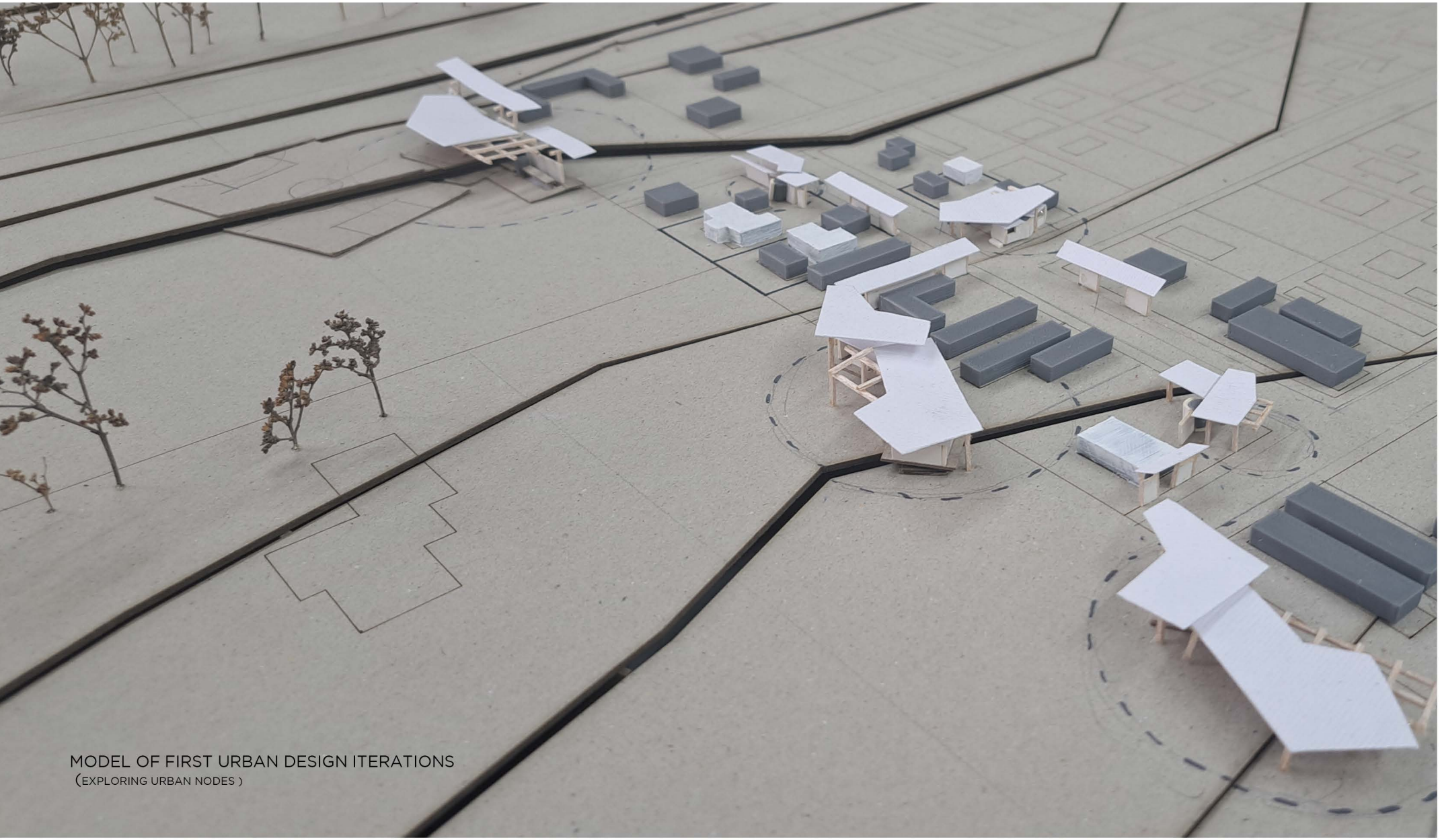


Fig. 120 Clusters of urban functions (Author)

DESIGN **SYNTHESIS**

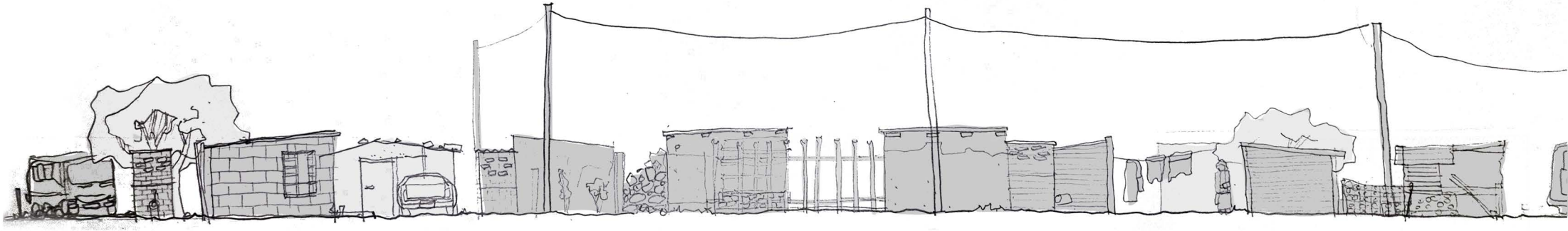


Fig. 123 Context (Author)

SINGLE STORY EXPLORATION - PLAN



Fig. 121 Adapted plan - Miss Maria (Author)

SINGLE STORY EXPLORATION - MODEL

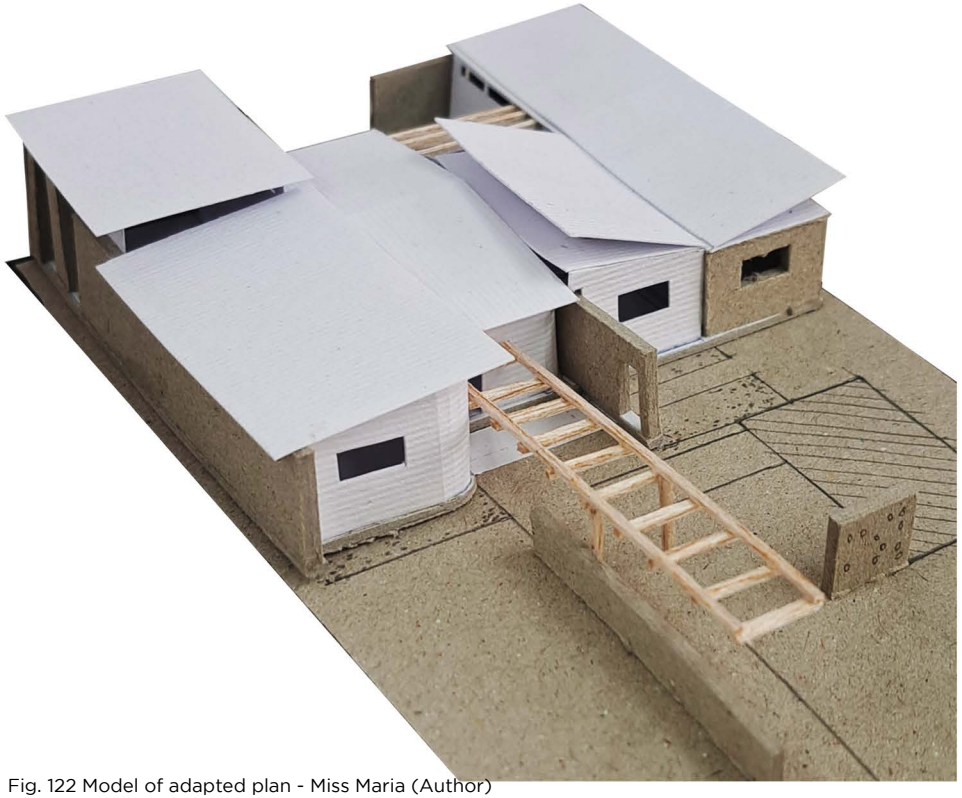
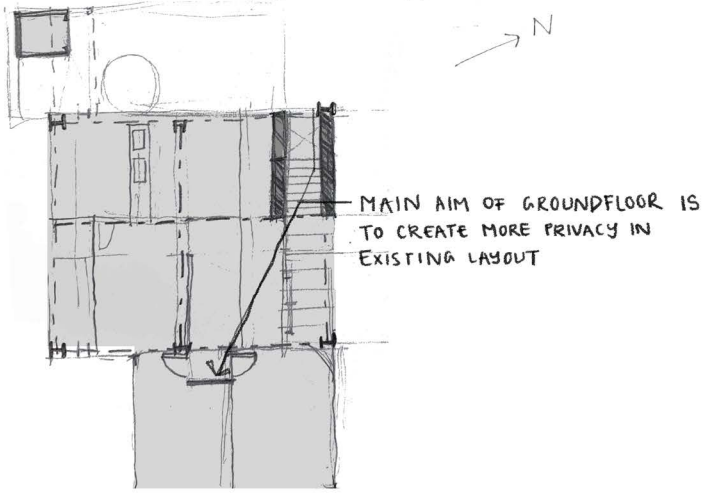


Fig. 122 Model of adapted plan - Miss Maria (Author)



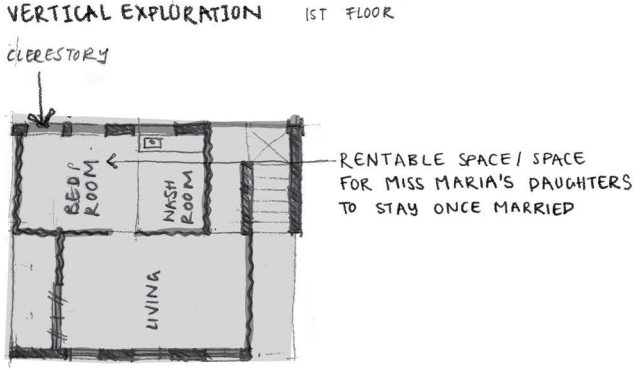
VERTICAL EXPLORATION GROUND FLOOR.





VERTICAL EXPLORATION ELEVATION

VERTICAL EXPLORATION 1ST FLOOR



I-BEAM STRUCTURE TO SUPPORT 2ND FLOOR

A COMBINATION OF MAINLY INSULATED DOUBLE LAYER ZINC AND TIMBER & RAMMED EARTH IS USED ON FIRST FLOOR



DETAILS

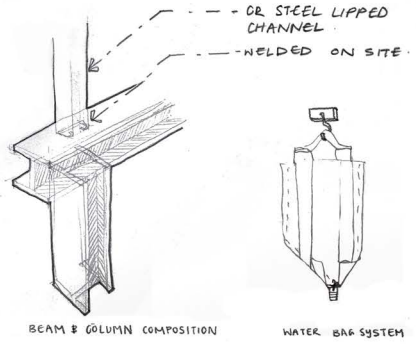


Fig. 124 Vertical explorations of the adapted plan and detail drawings - Miss Maria (Author)

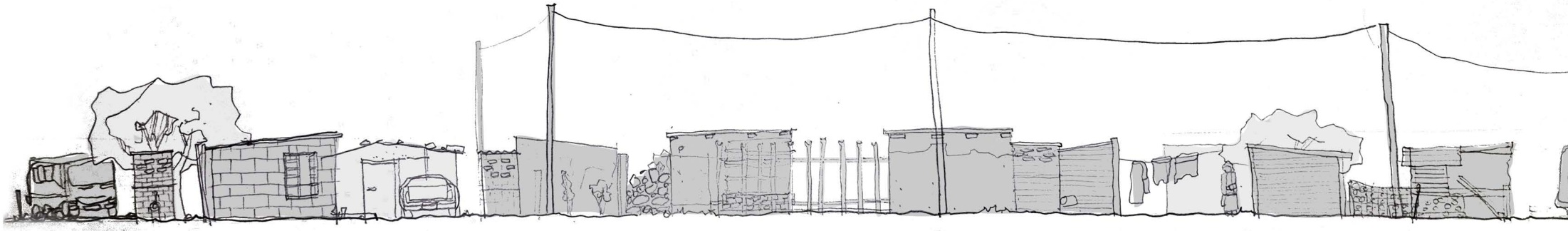


Fig. 125 Context (Author)

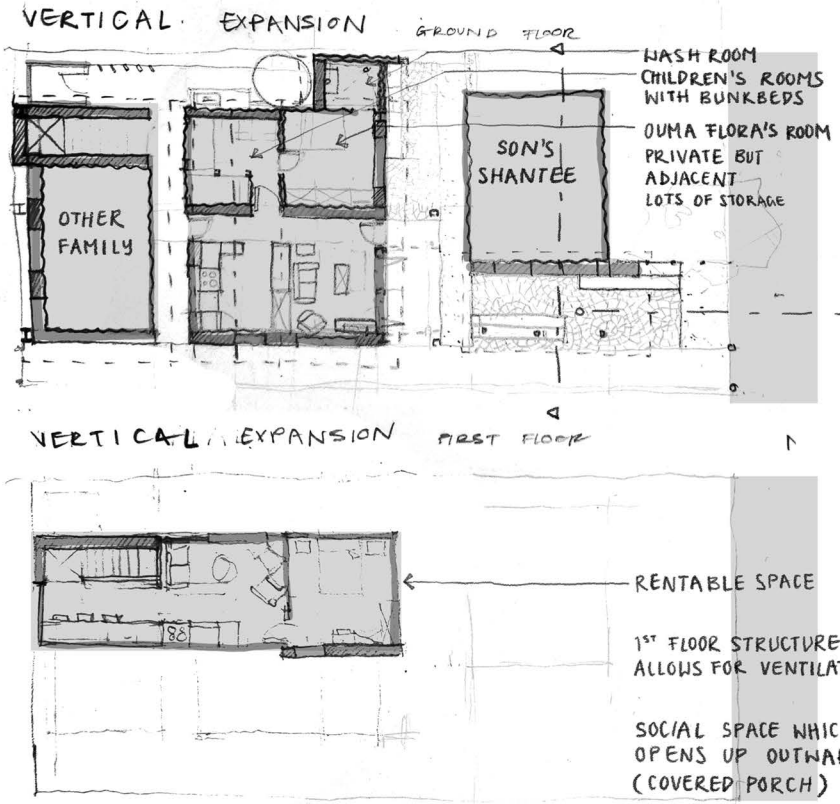


Fig. 126 Adapted plan - Ouma Flora (Author)

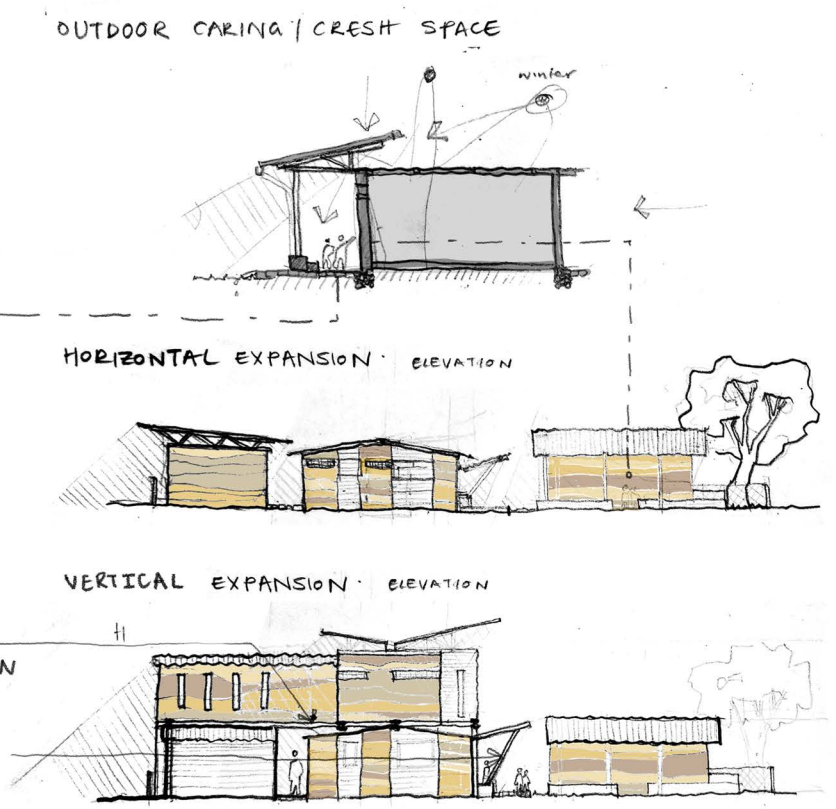


Fig. 127 Adapted plan - Horizontal vs vertical explorations (Author)





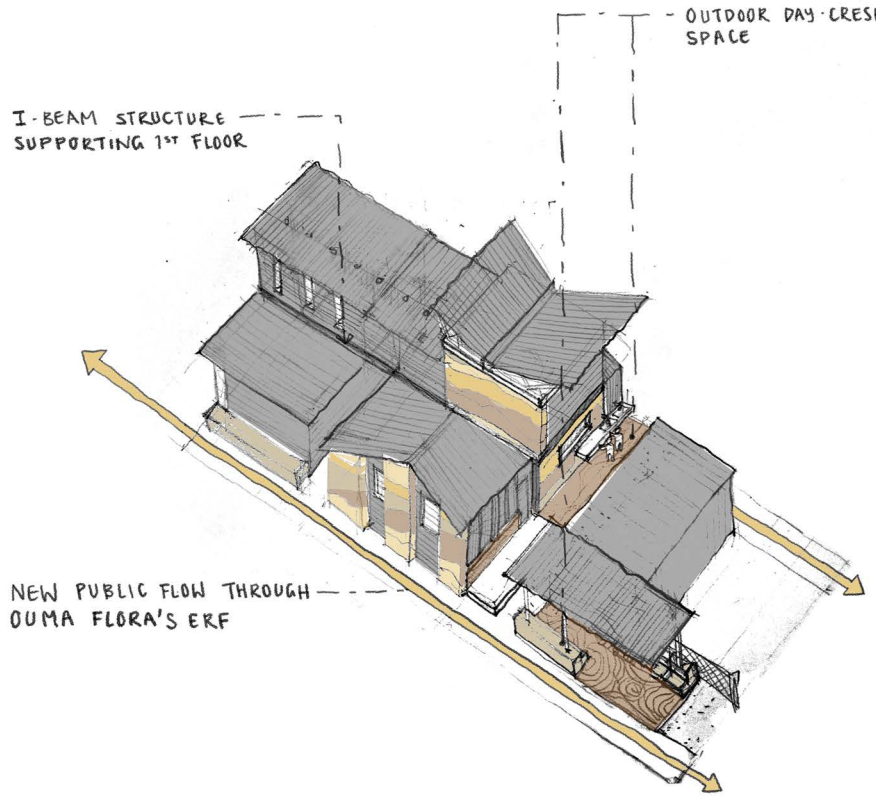


Fig. 128 Isometric of adapted plan - Ouma Flora (Author)

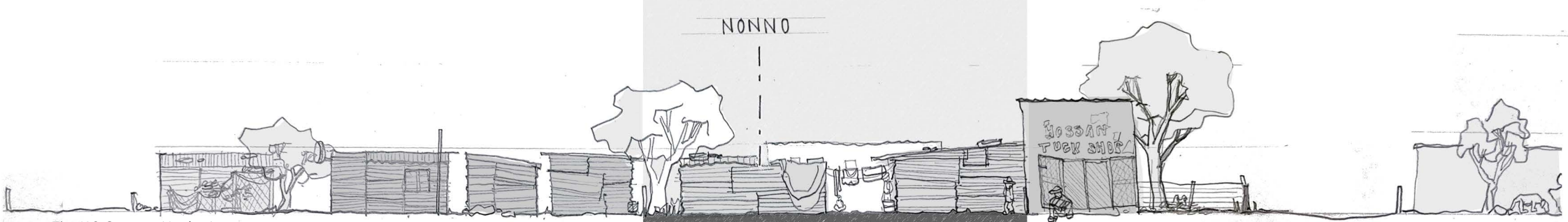
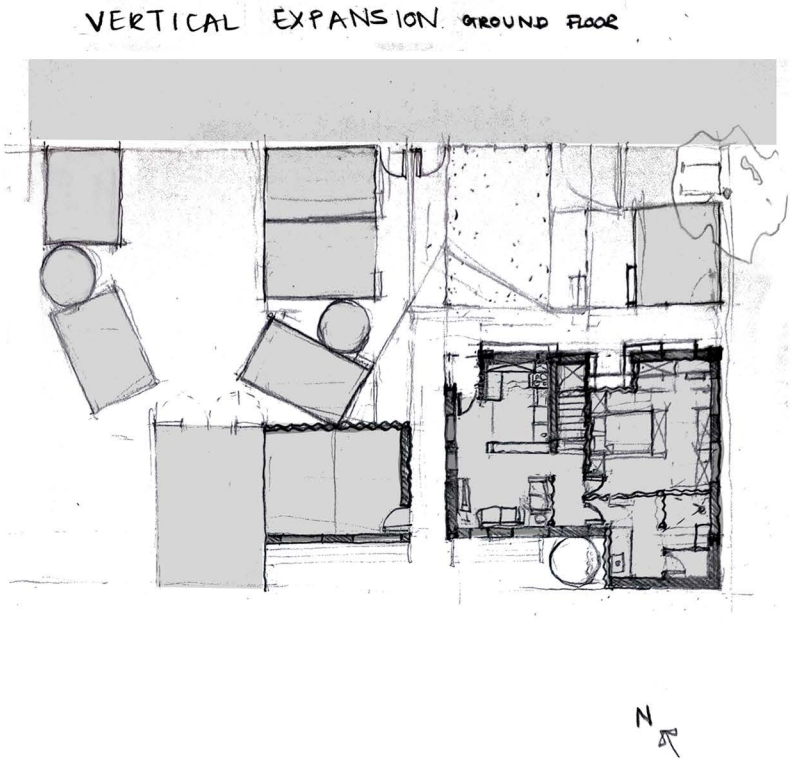


Fig. 129 Context (Author)





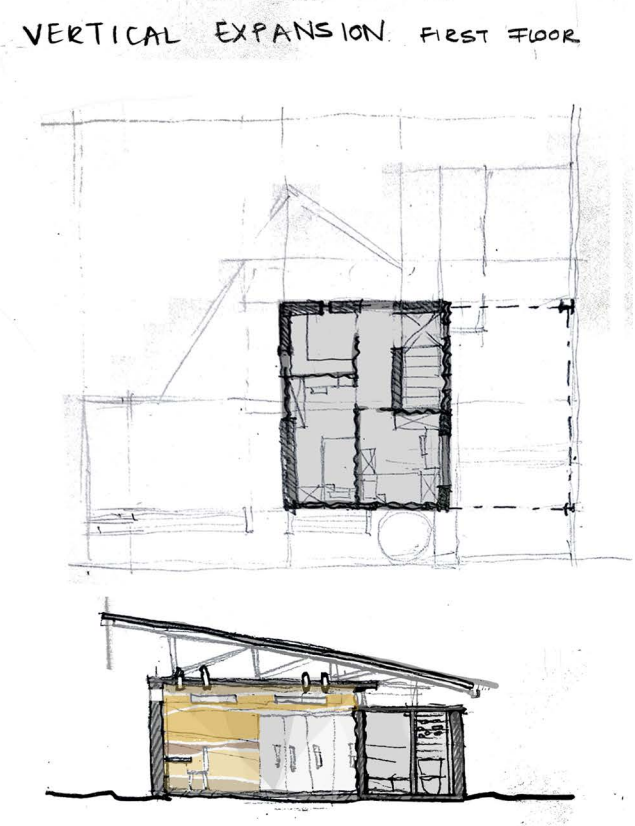


Fig. 130 Adapted plan - Nonno (Author)

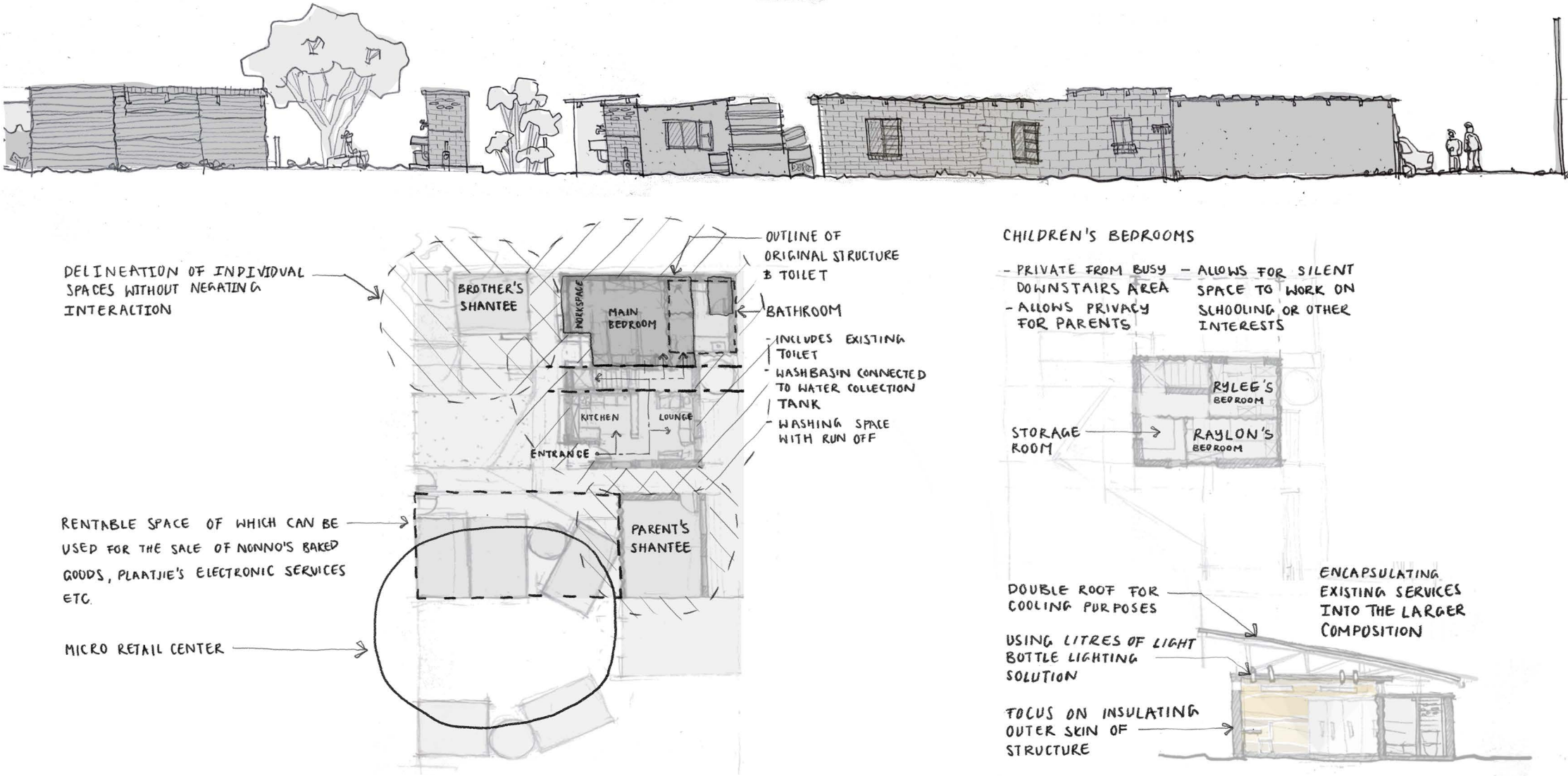


Fig. 131 Analysis of adapted plan - Nonno (Author)

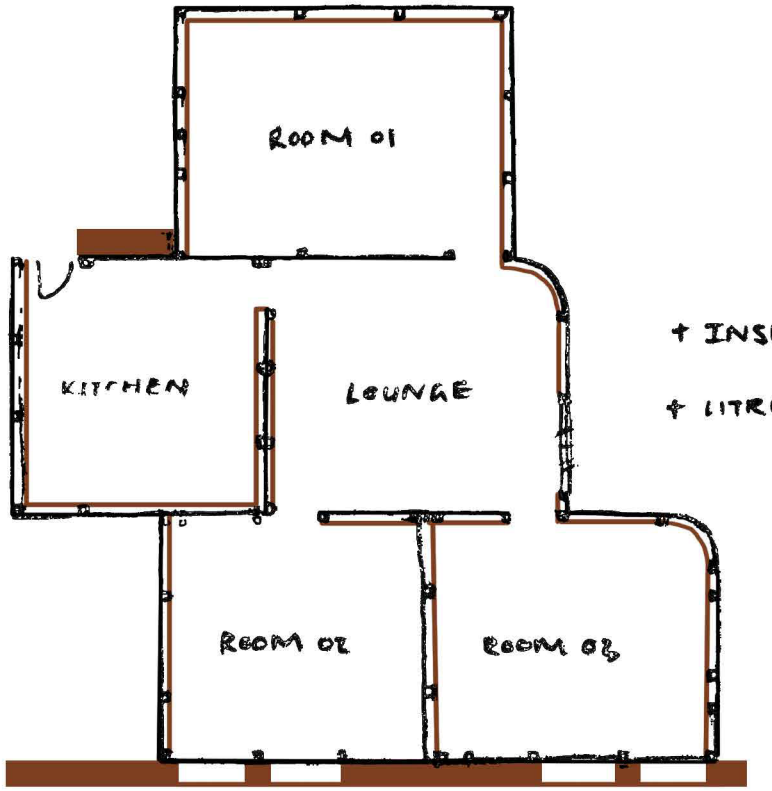
INCREMENTAL POSSIBILITIES OF INDIVIDUAL ADAPTATIONS

(STEPS DURING CONSTRUCTION TO BE COMPLETED AS THE FAMILY BECOMES FINANCIALLY CAPABLE)

MISS MARIA

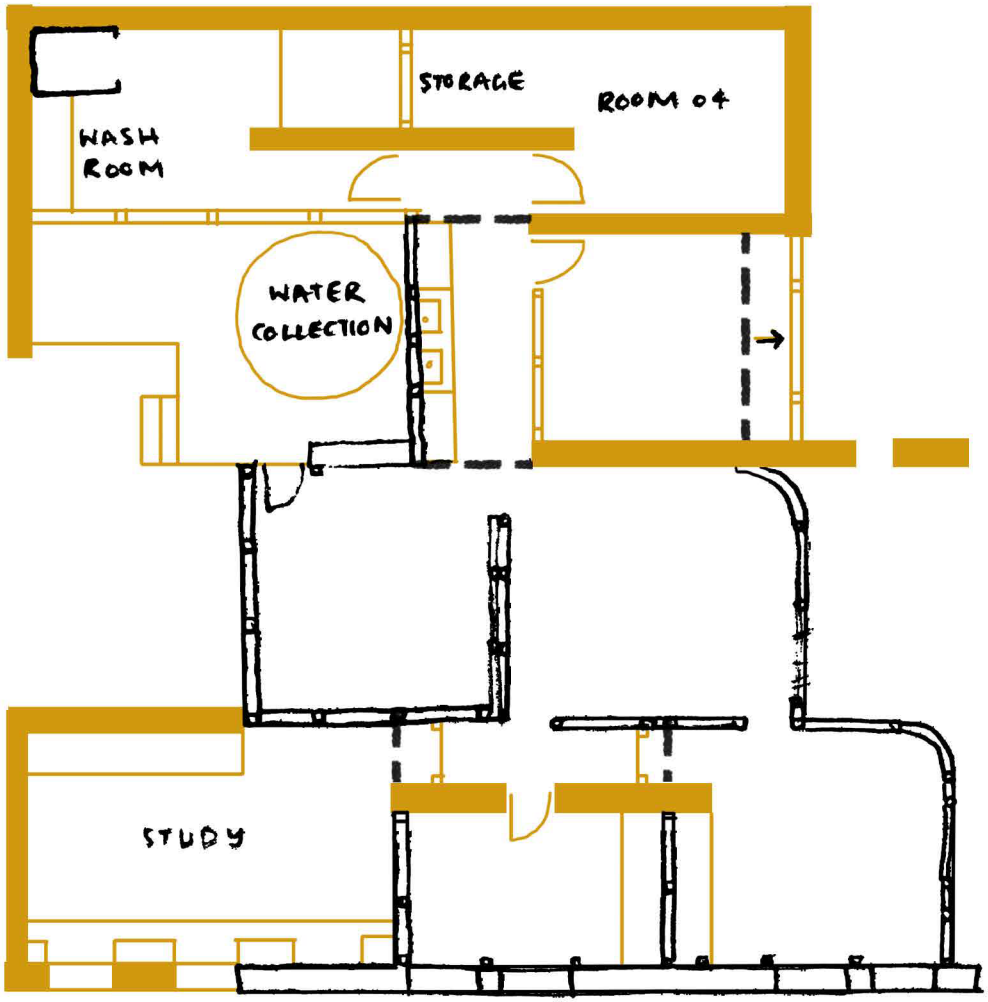


Fig. 132 Incremental stages of adapted plan - Miss Maria (Author)



+ INSULATED ROOFS

+ LITRE OF LIGHT SYSTEM


STORAGE
ROOM 04
WASH ROOM
WATER COLLECTION
STUDY



STASIE STREET

B: CAR WASH

Concrete footing

Paved skirting

ABLUTION 16 m²

OFFICE Clay floor tiles 25 m²

STORAGE Sealed concrete slab 19 m²

MECHANIC SHOP Heavy duty concrete screed 36 m²

4 110 x 2 400 Steel structure sliding door with corrugated sheeting

Grass

Paved surface

Grass

A: COMMUNITY WASHING PAVILION

Stability grid, eco-paving bases with gravel

5 000 litre JOJO water tank
300 x 300 Rammed earth columns with steel copings and square tubing at the center

WASHING STATION PLASTIC RECYCLING

OUTSIDE MULTI-USE PAVILLION SPACE
Heavy duty concrete screed
426 m²

WASHING STATION LAUNDRY

WASTE COLLECTION
42 m²

STEPPED SECTION A-A

NEW CONNECTING TAR ROAD

URBAN DOMESTIC

C: GREENERY AND CRECHE

WATER SYSTEMS ROOM

TOOL STORAGE

SEED STORAGE

GREENERY SECTION OF HALF-BASEMENT PLAN
CUT AT 0.5m

EXISTING SHEBEEN

STEPPED SECTION B-B

GREEN ROOF

FUEL SUN GARDEN SPACE

GREENERY SECTION OF FLOORPLAN
CUT AT 1.2 m

OFFICE CRECHE & GARDEN STORAGE

BATHROOM

BATHROOM

EDUCATIONAL GARDEN SPACE

PLAY AREA

CLASSROOM

GREENHOUSE

BATHROOM

BEDROOM

BEDROOM

KITCHEN

LIVING ROOM

STUDY

BEDROOM

BEDROOM

Miss Maria

BATHROOM

BEDROOM

BEDROOM

KITCHEN

LIVING ROOM

Dums Flora

D: FOOD COURT

Water collection tanks

RETAIL

RETAIL

RETAIL

RETAIL

RETAIL

RETAIL

ABLUTION

ABLUTION

SEATING AREA

E: COMMUNITY HALL

WASTE DISPOSAL

BATHROOM

BEDROOM

LIVING ROOM

KITCHEN

EXISTING SHEBEEN

SERVICE DELIVERY

STORAGE

Nonno

NEW CONNECTING SERVICE ROAD

URBAN DOMESTIC

Paved walkway

Planter boxes

Planter boxes

Planter boxes

1 260 Steel gutter above

MULTI FUNCTIONAL HALL
Synthetic rubber flooring
301 m²

COVER
Cemecrete colour - hardened dry shake screed finish
76 m²

CLEANING ROOM

Clay floor tiles
34 m²

ABLUTION

ABLUTION

ABLUTION

SERVICE ROOM
Sealed concrete slab
13 m²

STORAGE
Heavy duty screed surface
40 m²

GROUND FLOOR PLAN
1 : 200

STASIE STREET

R387

TIDIMALO STREET

Truckcell 80 Porous Paver

LEGEND

1. WASHING PAVILION
   - 1.1 LAUNDRY STATION
   - 1.2 SOCCER PAVILION
   - 1.3 WATER TANK
   - 1.4 RECYCLE STATION
   - 1.5 RAISED WALKWAY

2. CAR WASH
   - 2.1 ABLUTION
   - 2.2 OFFICES
   - 2.3 STORAGE
   - 2.4 MECHANIC SHOP
   - 2.5 CAR WASH

3. GREENERY/ CRECHE
   - 3.1 OFFICES
   - 3.2 STORAGE
   - 3.3 PLAY AREA
   - 3.5 CLASSROOM

4. FOOD COURT
   - 4.1 ABLUTION
   - 4.2 RETAIL SPACE

5. COMMUNITY HALL
   - 5.1 MULTI FUNCTIONAL SPACE
   - 5.2 FOYER
   - 5.3 ABLUTION
   - 5.4 WATER TANKS
   - 5.5 STORAGE

6. MISS MARIA'S HOME

7. OUMA FLORA'S HOME

8. NONNO'S HOME

9. EXISTING SHEBEEN

5 10 20

Fig. 1.

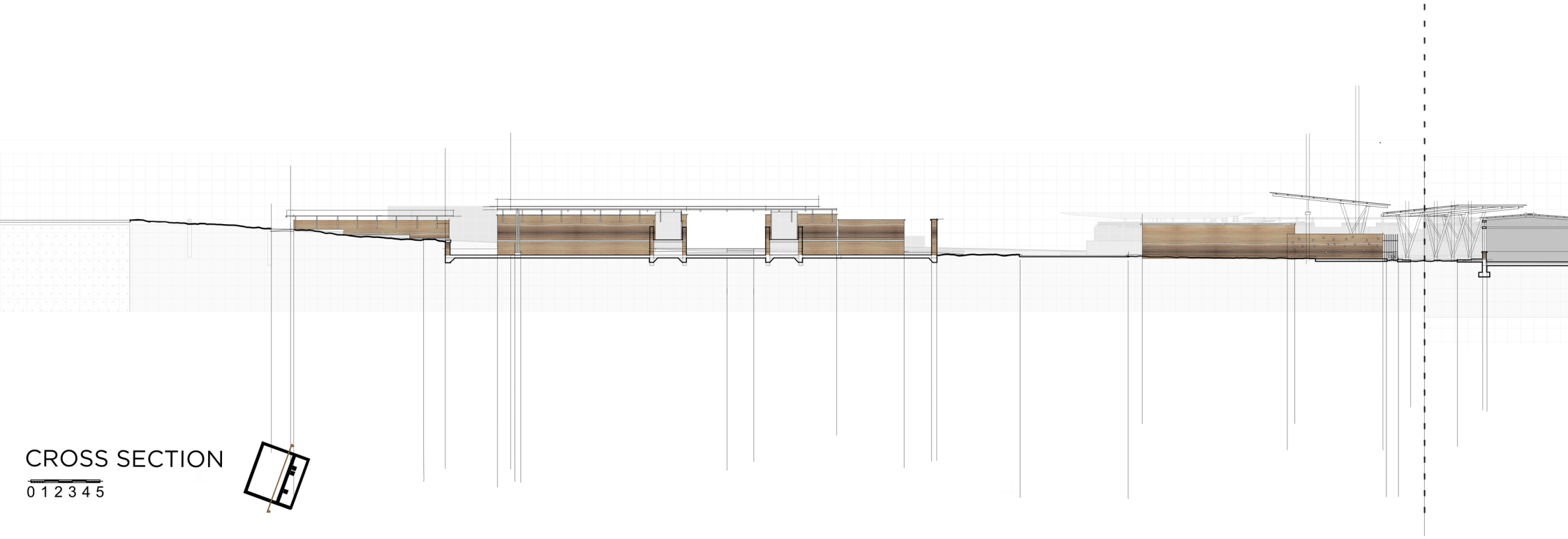
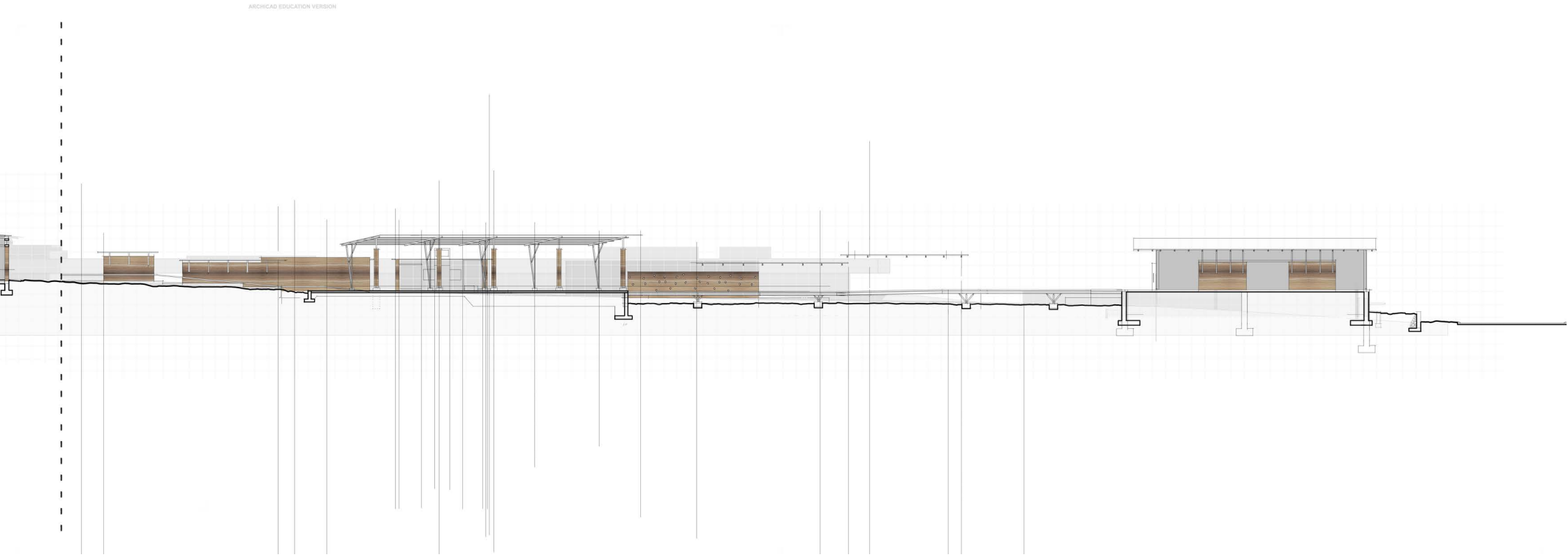


Fig. 134 Section (Author)


ARCHICAD EDUCATION VERSION

INCREMENTAL POSSIBILITIES OF URBAN INTERVENTIONS

(ONE FORMAL BIG DEVELOPMENT AND ANOTHER SMALLER PERSONAL DEVELOPMENT)

MISS MARIA AND OUMA FLORA

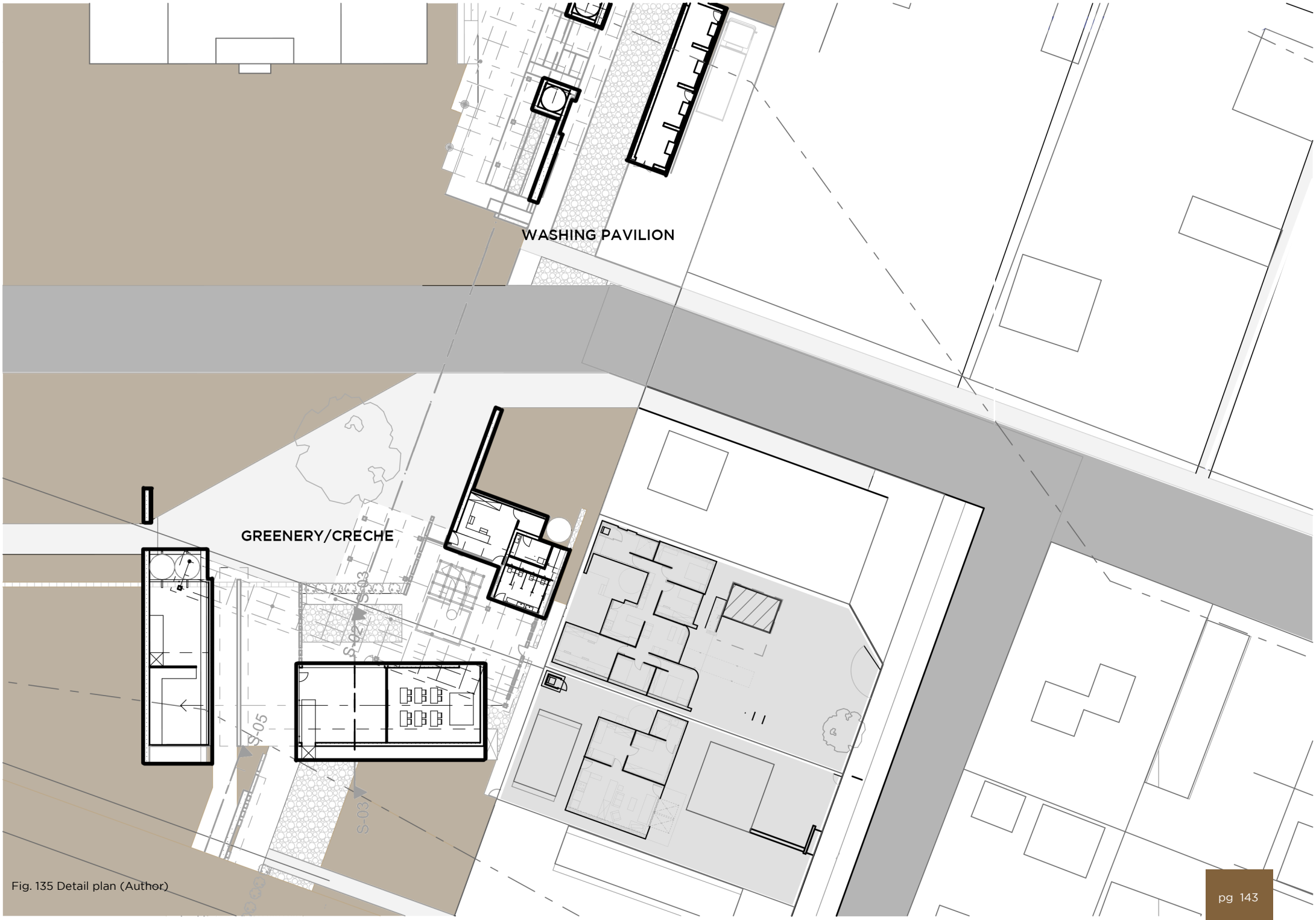
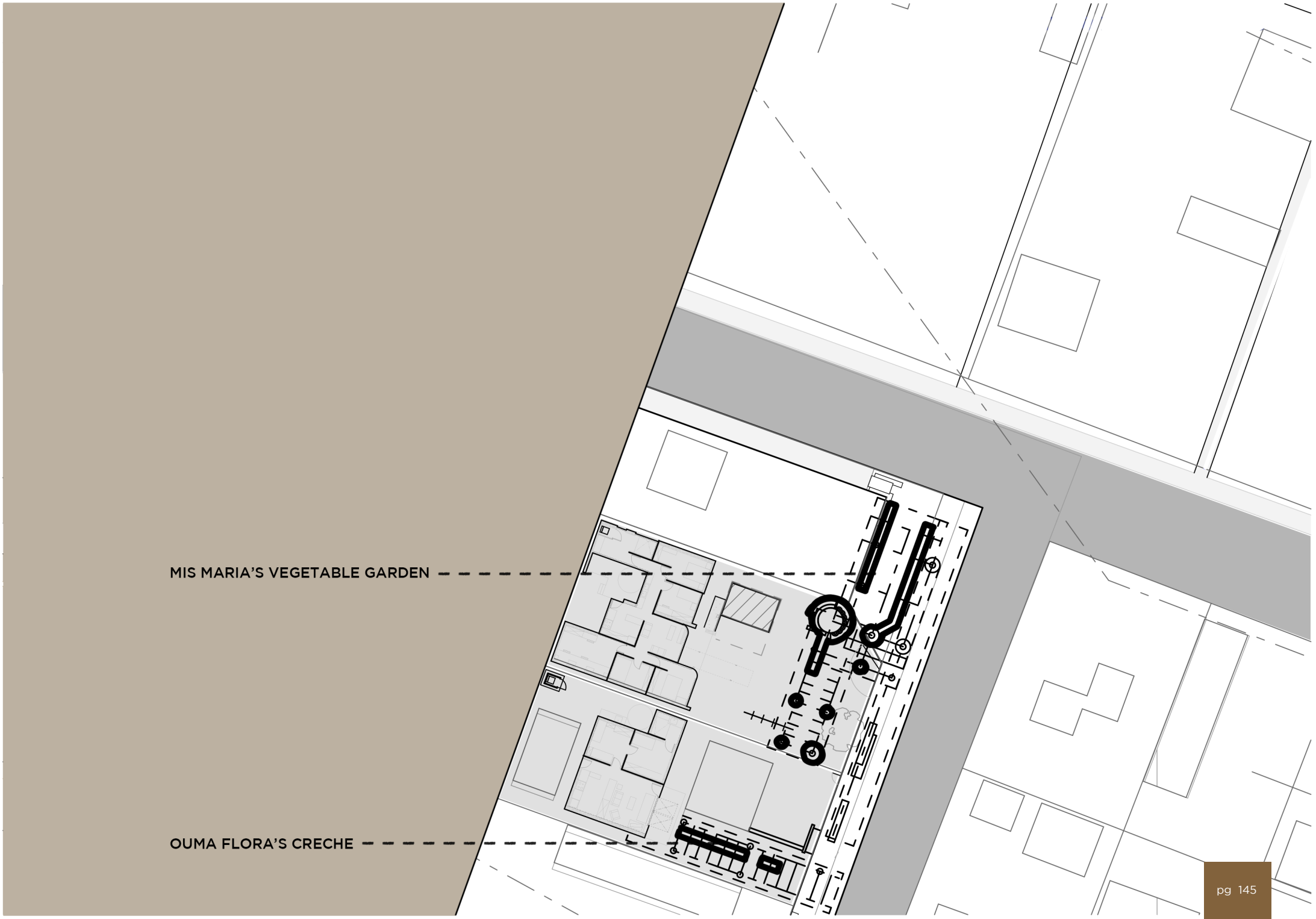


Fig. 135 Detail plan (Author)

INCREMENTAL POSSIBILITIES OF URBAN INTERVENTIONS

(ONE FORMAL BIG DEVELOPMENT AND ANOTHER SMALLER PERSONAL DEVELOPMENT)

MISS MARIA AND OUMA FLORA


MIS MARIA'S VEGETABLE GARDEN
OUMA FLORA'S CRECHE

WASHING PAVILION

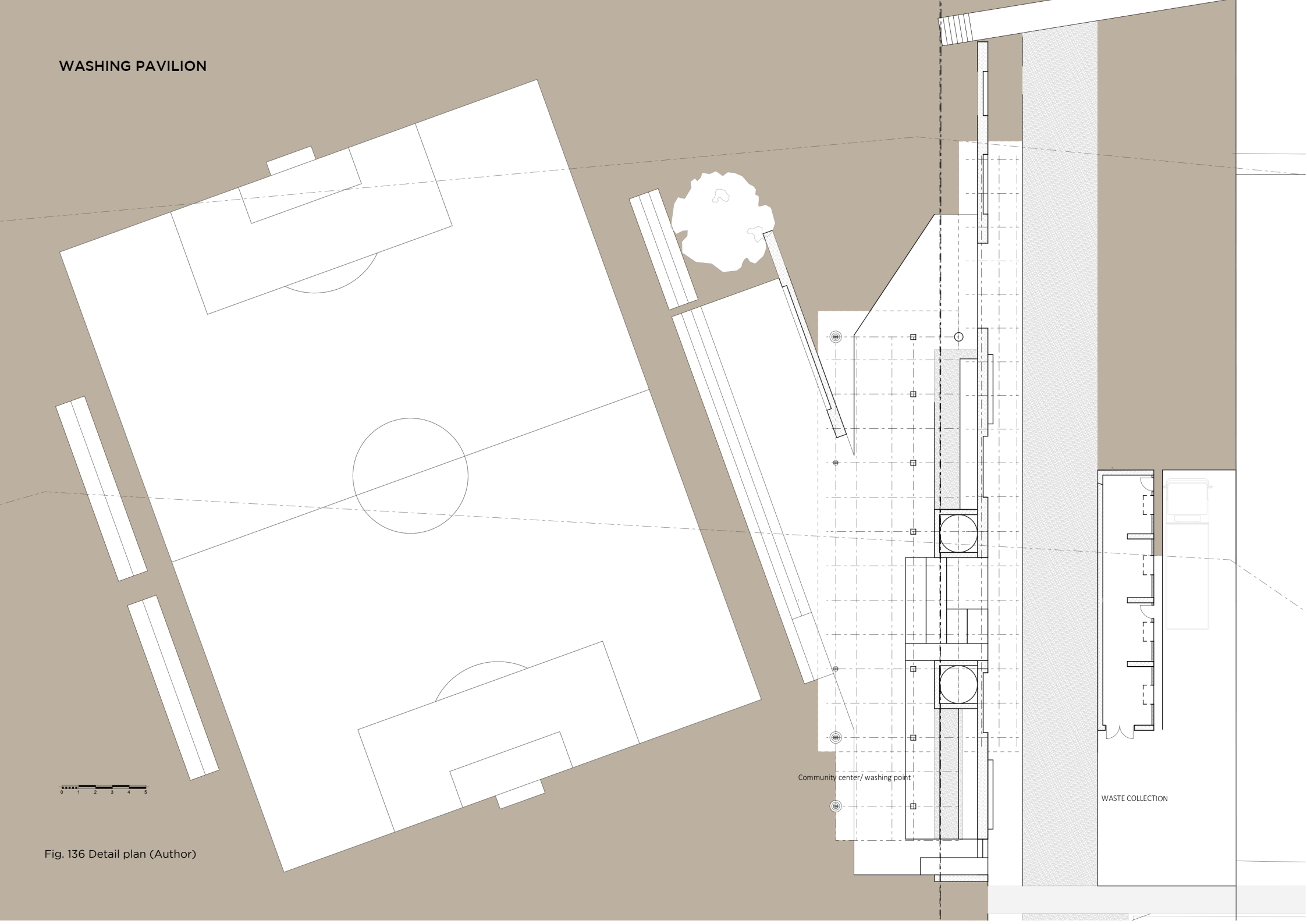


Fig. 136 Detail plan (Author)

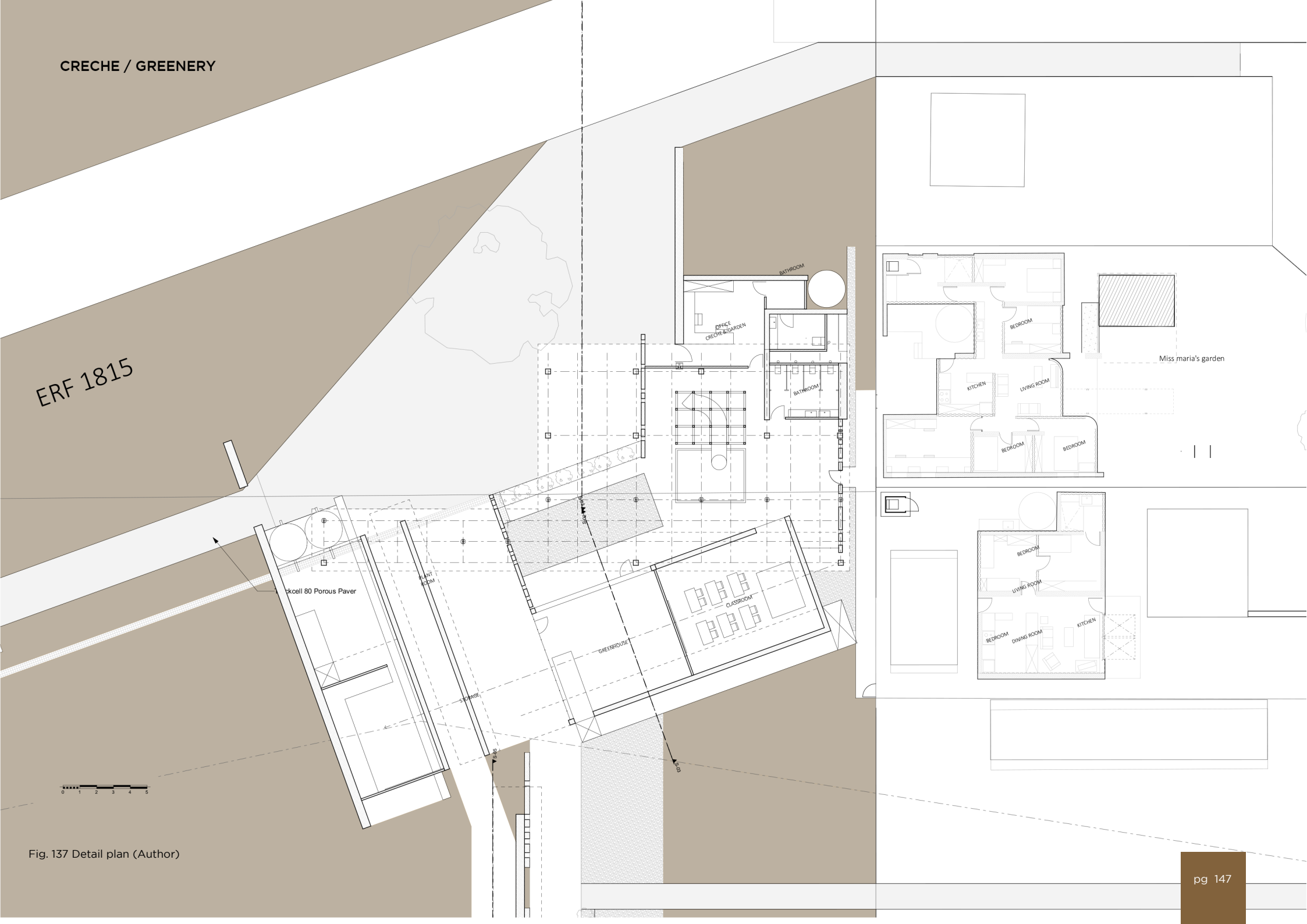


Fig. 137 Detail plan (Author)

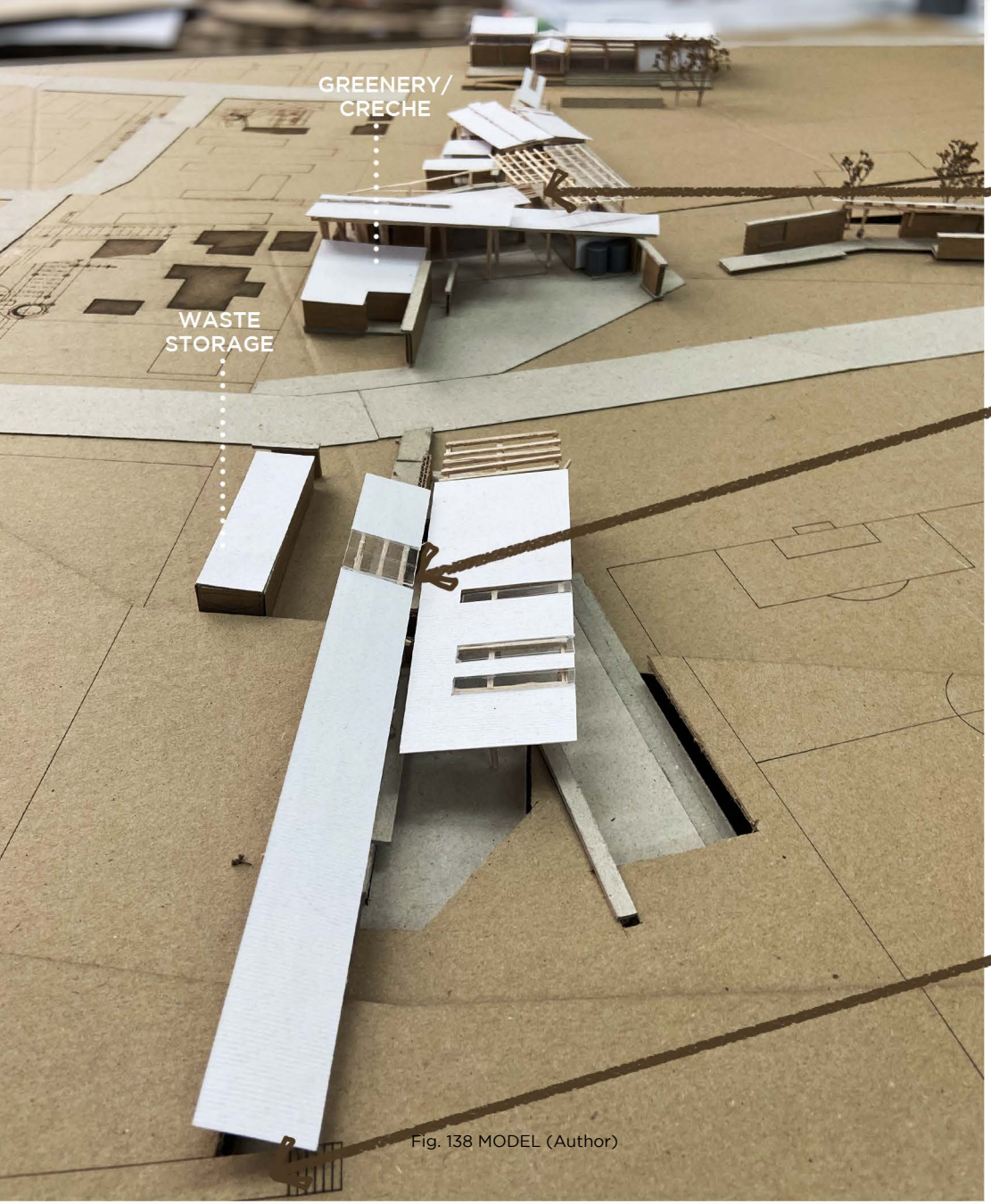
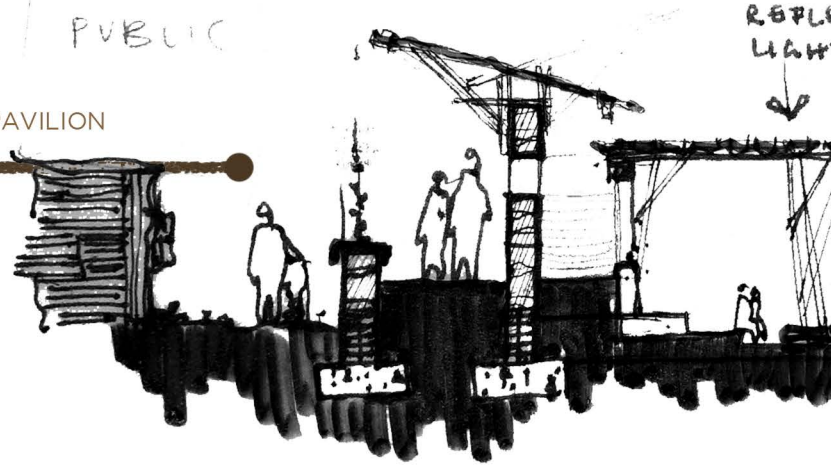


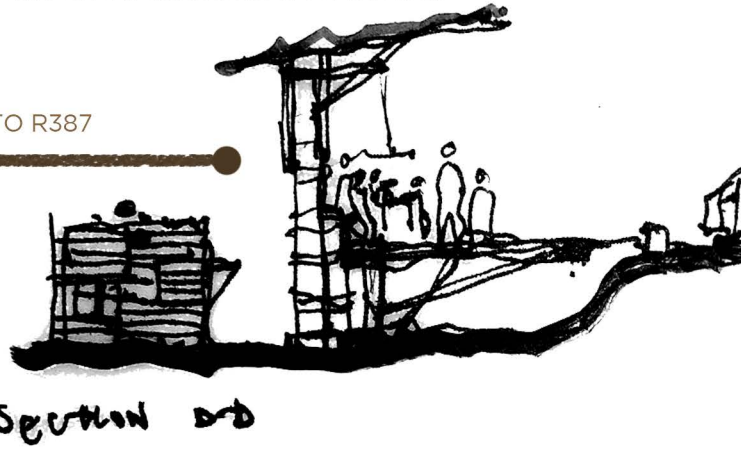
Fig. 138 MODEL (Author)



WASHING PAVILION

The pavilion is divided into a raised walkway which passes on the left and washing stations with water tanks to the right, overlooking a soccer field. The ashing stations is divided up into one for laundry and the other for washing and drying recycled plastic to use as insulation. There is a waste storage facility right behind the pavilion

WALKWAY NEXT TO R387



Miss Maria's vegetable garden/ greenery is combined with Ouma Flora's creche since the two erfs are next to eachother and due to the complementary functions; Children learning about and in turn caring for the plants. The walkway runs through the cluster of buildings, climbing as it progresses, become a vantage point.

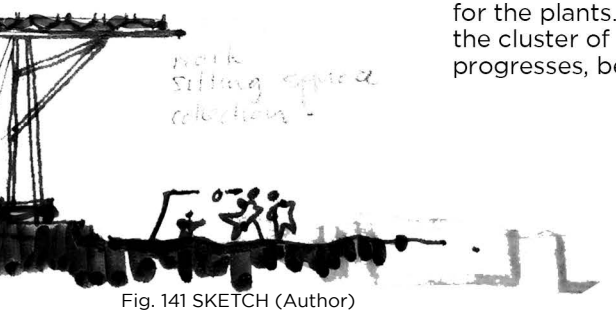


Fig. 141 SKETCH (Author)



Fig. 140 SKETCH (Author)



Fig. 139 PERSPECTIVE (Author)



MISS MARIA'S VEGETABLE GARDEN

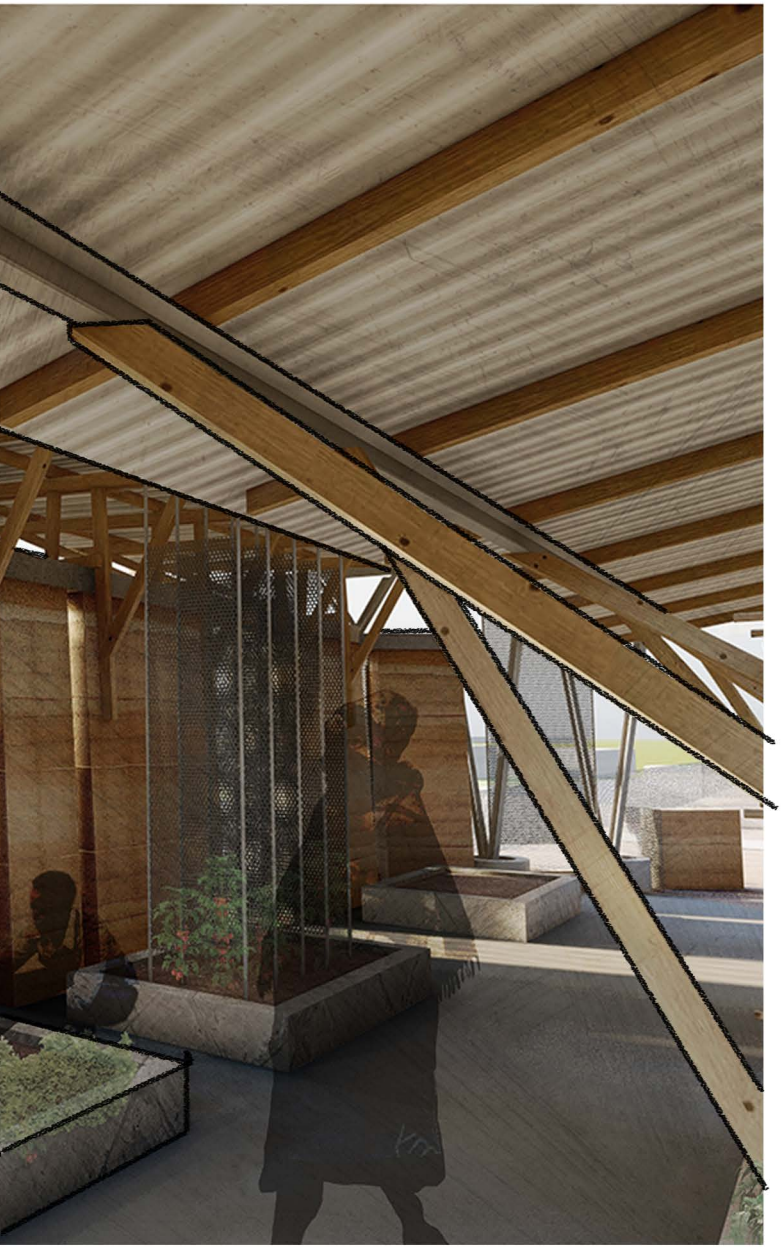
This small scale variation of the greenery develops from within Miss Maria's erf. It includes a water tank with some planters, enclosed with a few loose standing walls and a zinc canopies. This is a possibility for an incremental development solely from the inhabitant's side, if one were not to succesfully obtain external funding.



Fig. 142 SKETCH (Author)



Fig. 143 PERSPECTIVE (Author)



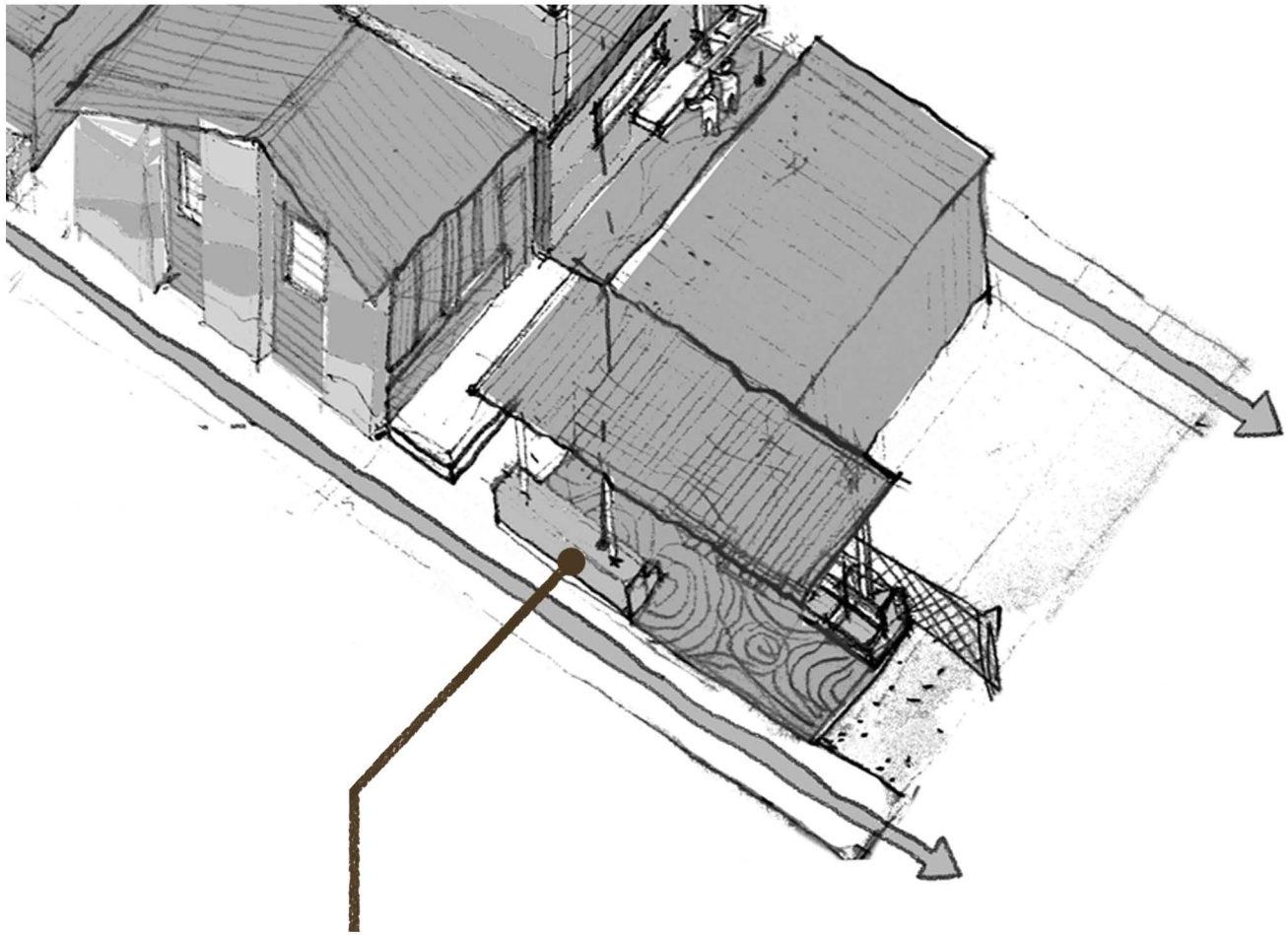


Fig. 144 ISOMETRIC (Author)

DAY CARE

A smaller way of obtaining an additional income for Ouma Flora is to create an informal daycare. This would include some covered external play areas with seating and washing facilities.

INCREMENTAL POSSIBILITIES OF URBAN INTERVENTIONS

(ONE FORMAL BIG DEVELOPMENT AND ANOTHER SMALLER PERSONAL DEVELOPMENT)

NONNO

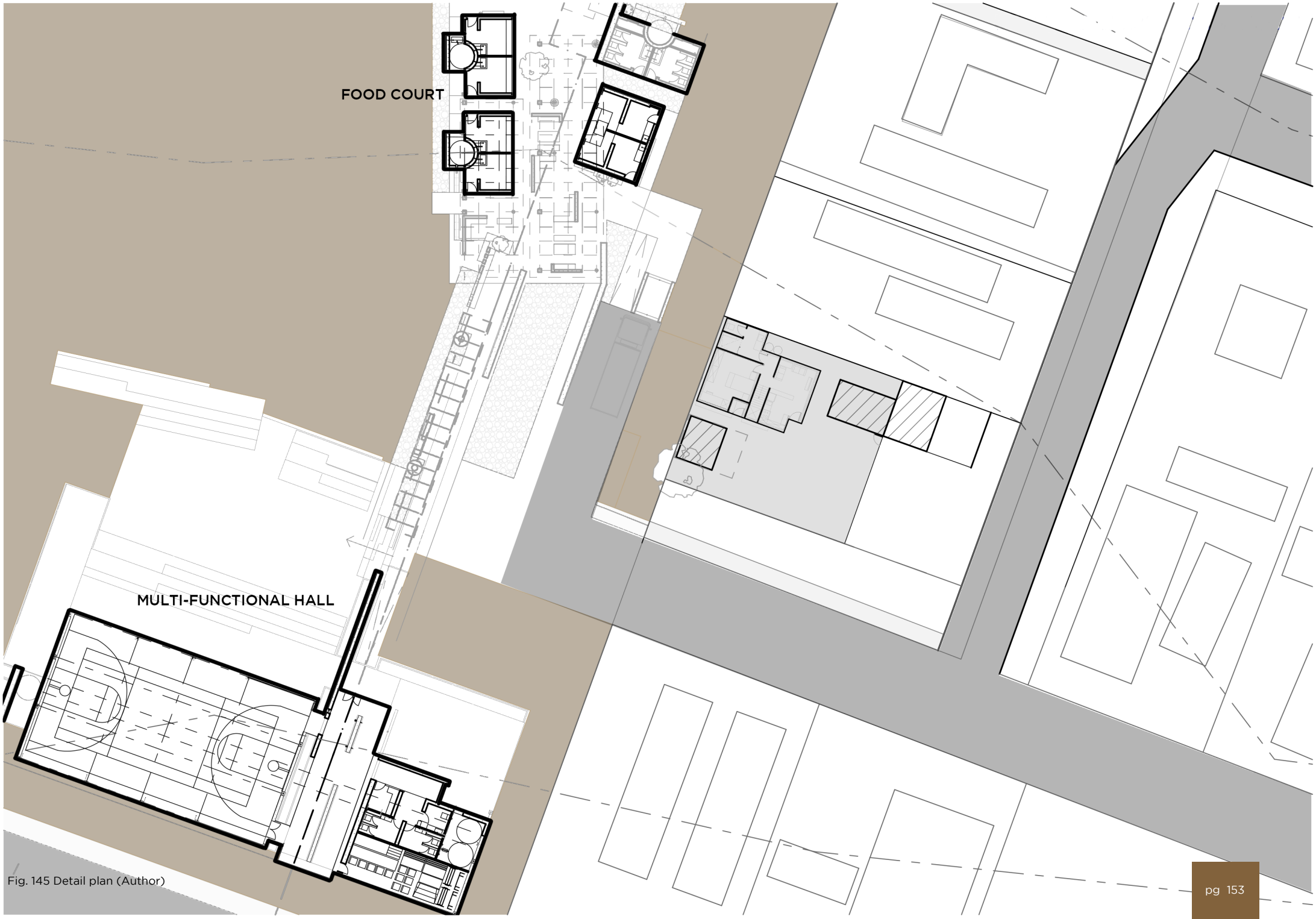


Fig. 145 Detail plan (Author)

INCREMENTAL POSSIBILITIES OF URBAN INTERVENTIONS

(ONE FORMAL BIG DEVELOPMENT AND ANOTHER SMALLER PERSONAL DEVELOPMENT)

NONNO


NONNO'S FOOD MARKET

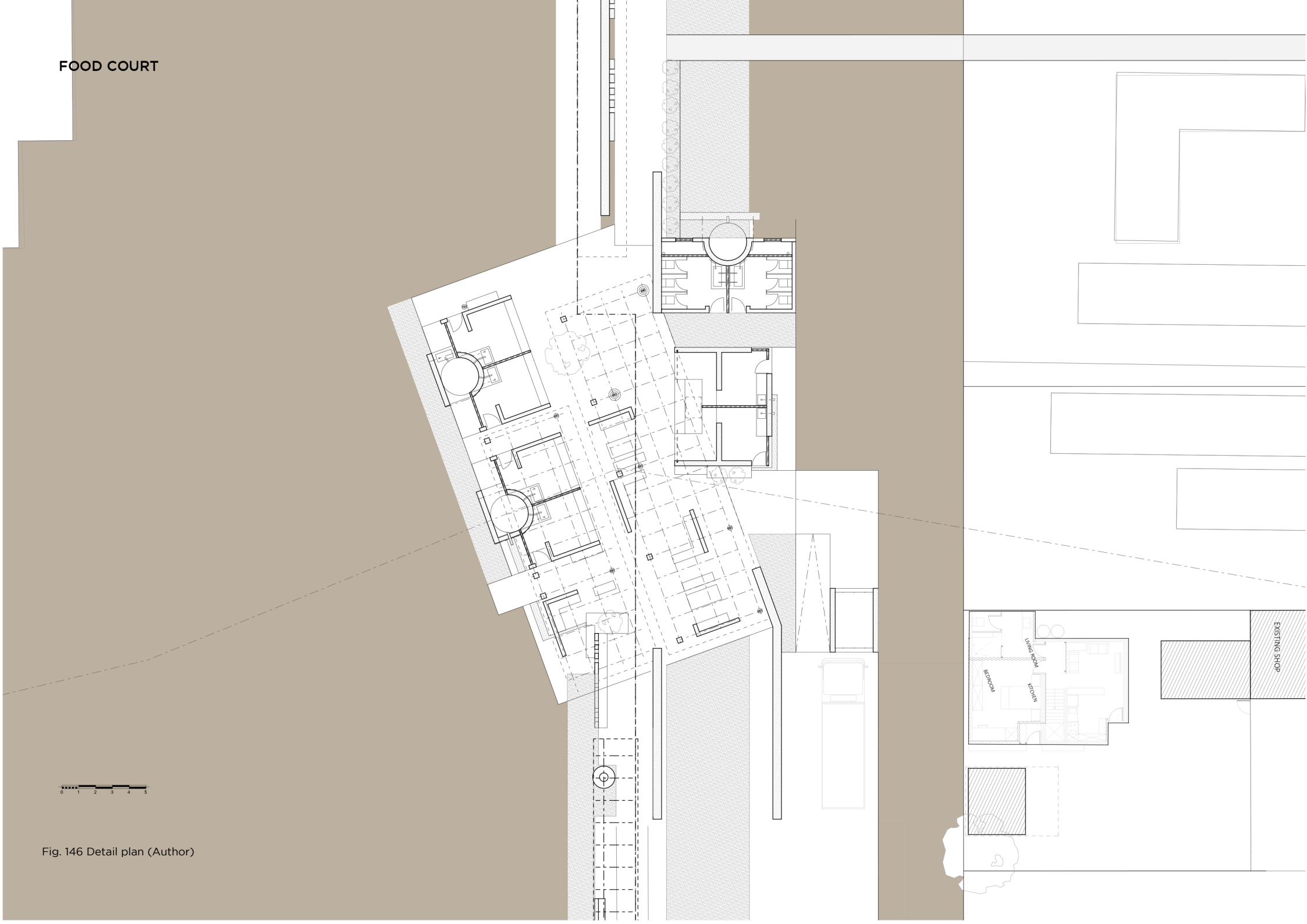


Fig. 146 Detail plan (Author)

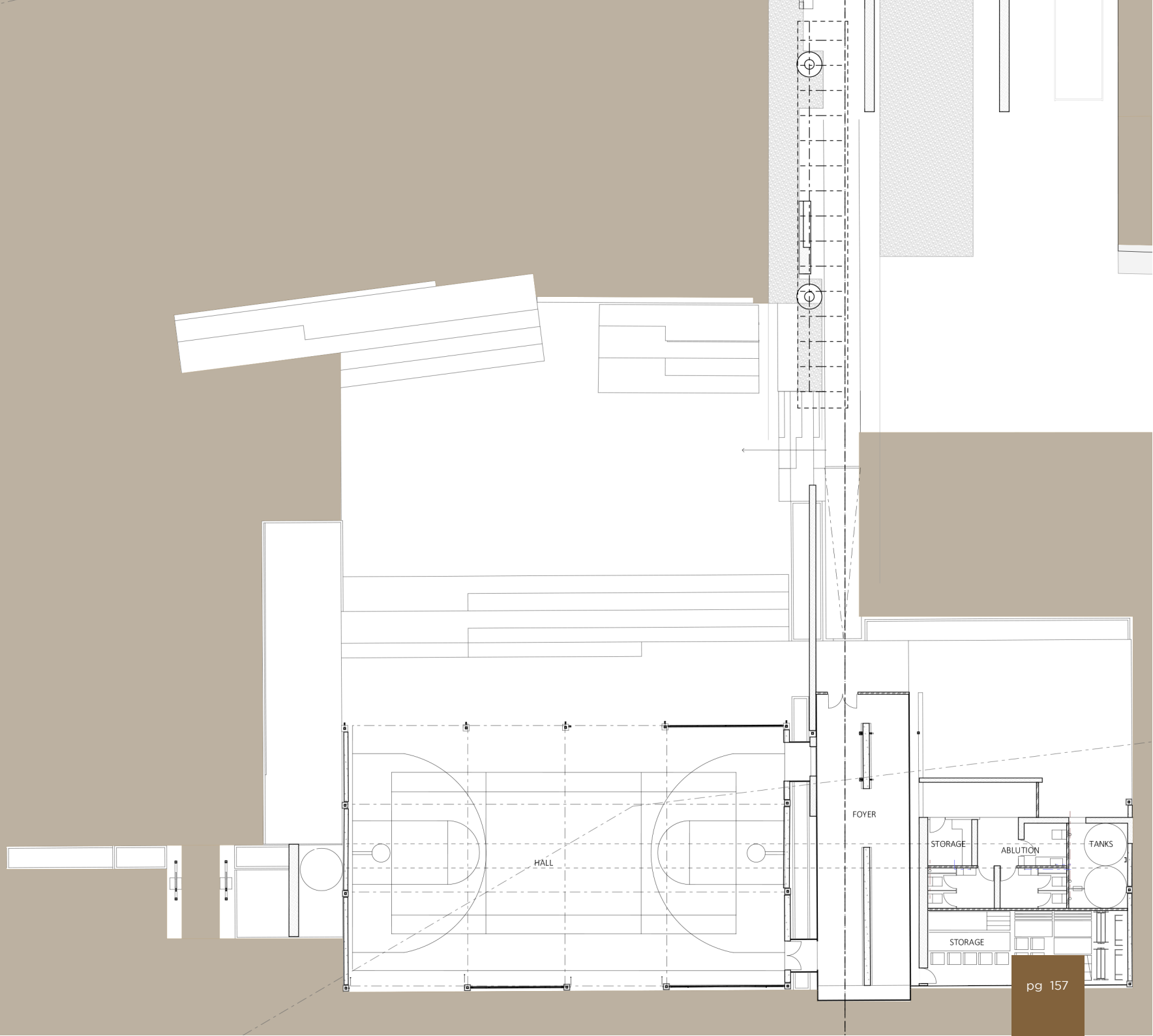


Fig. 147 Detail plan (Author)

CAR WASH

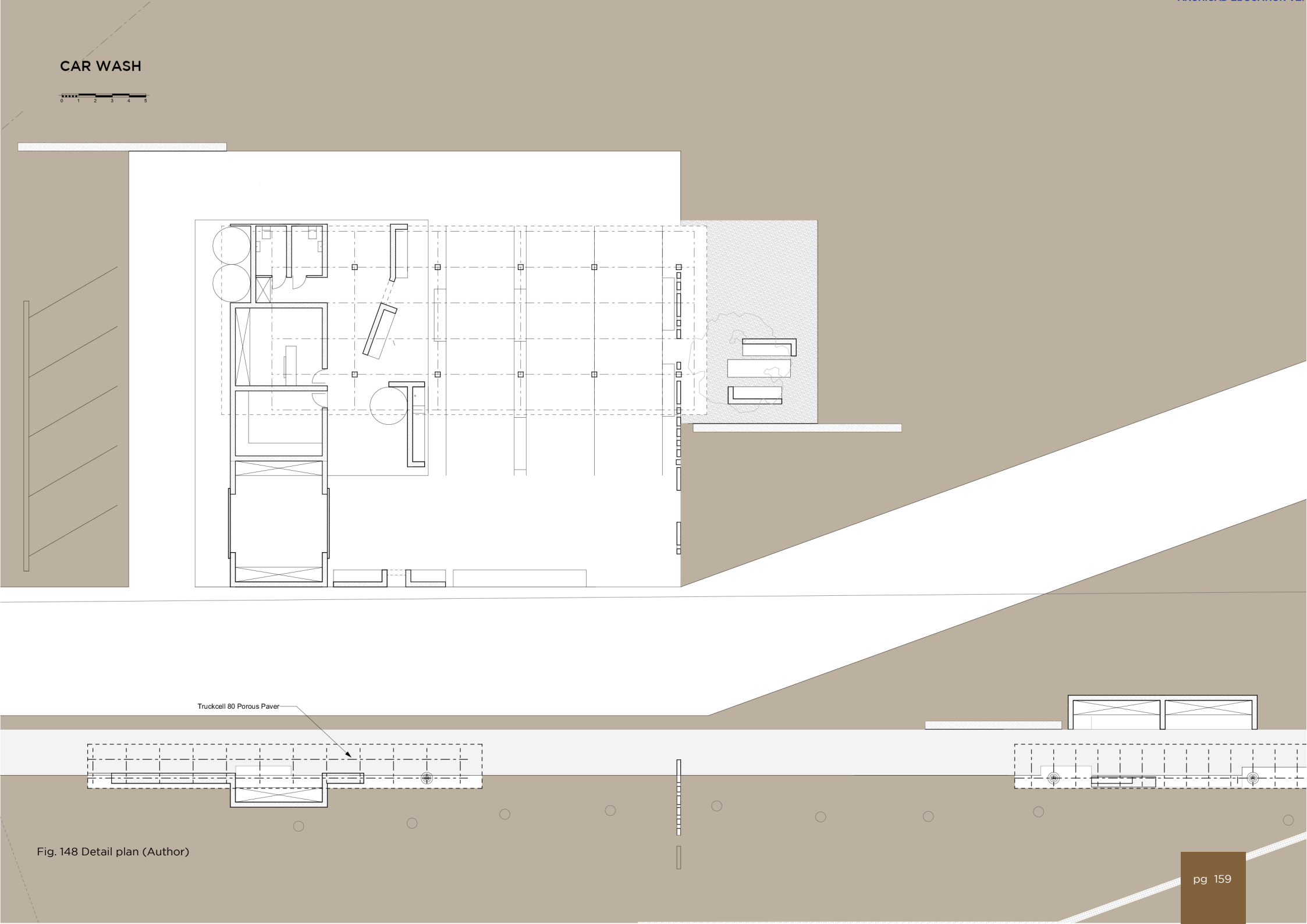


Fig. 148 Detail plan (Author)

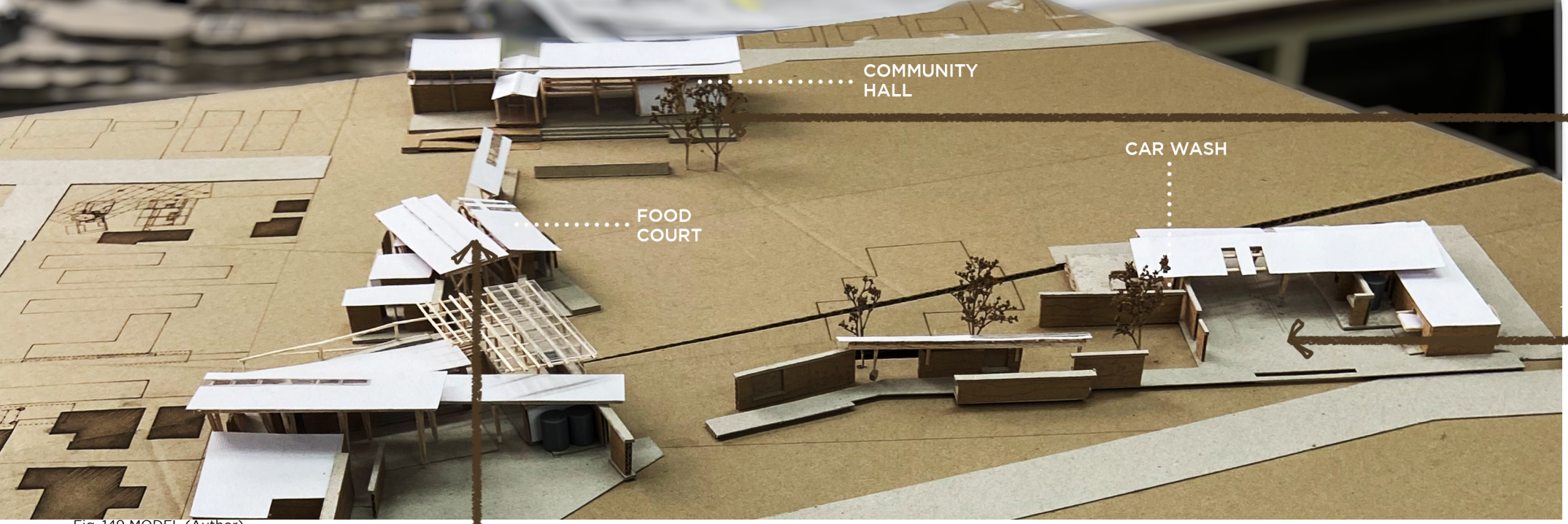


Fig. 149 MODEL (Author)

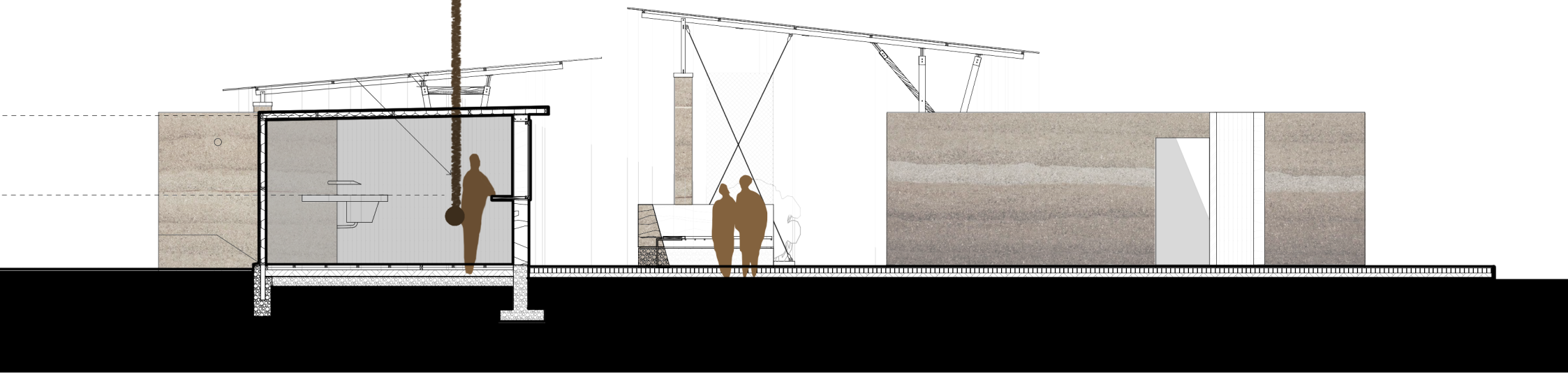


Fig. 150 FOOD COURTSECTION (Author)

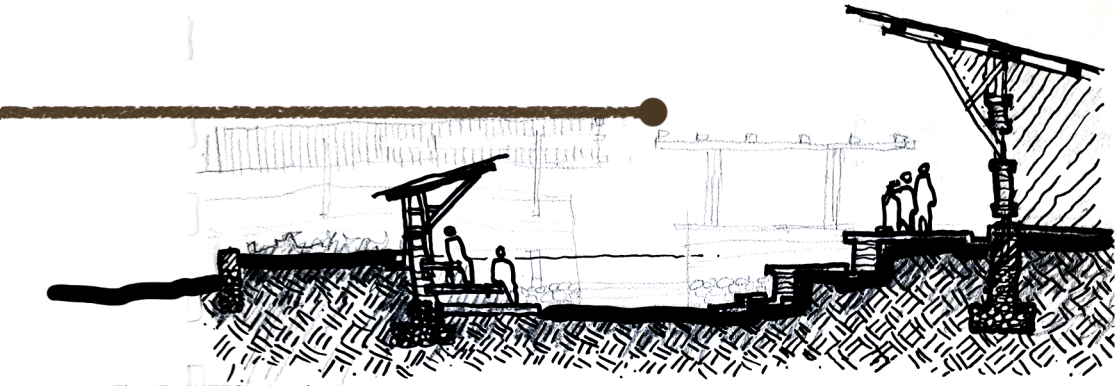


Fig. 151 SKETCH (Author)

COMMUNITY HALL

This space can be used for community gatherings, exhibition, basketball games etcetera. All the screens enclosing the hall can open up to create a stage like area. The functions are tucked in on the eastern side and the majority of the building faces north. A family close to the hall will be cotracted to take over maintenance of the space

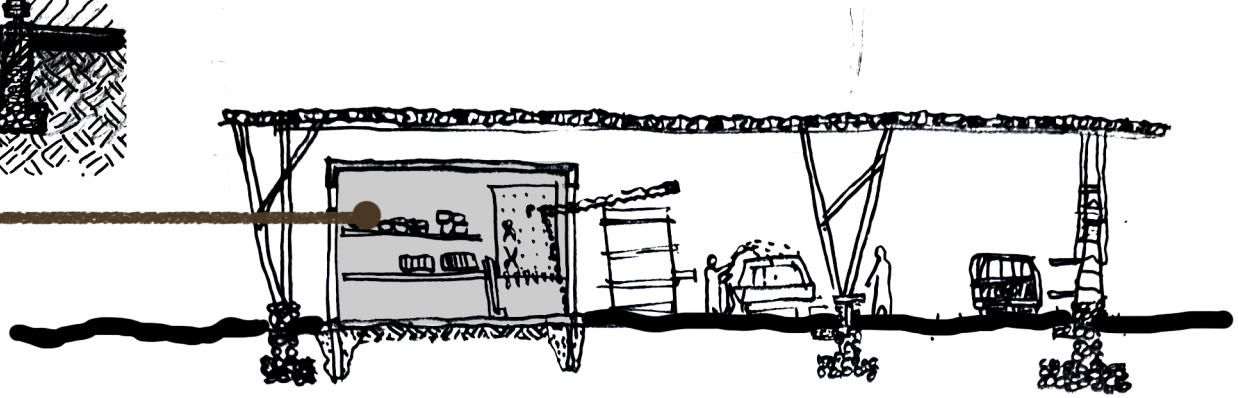


Fig. 152 SKETCH (Author)

CAR WASH

The car wash makes use of harvested water through the large canopy. The operation houses a mechanic shop as well and has a few retail spaces for hawkers to set up on weekends when the car wash is busy.

FOOD COURT

The food court is an assemblage of loose buildings which are gathered with two big zinc canopies. This space will cater to the lunch crowd which works in the industrial area as well as the inhabitants of the area. The buildings gather to create a sheltered courtyard-like space in the middle, protecting the dwellers from the harsh conditions

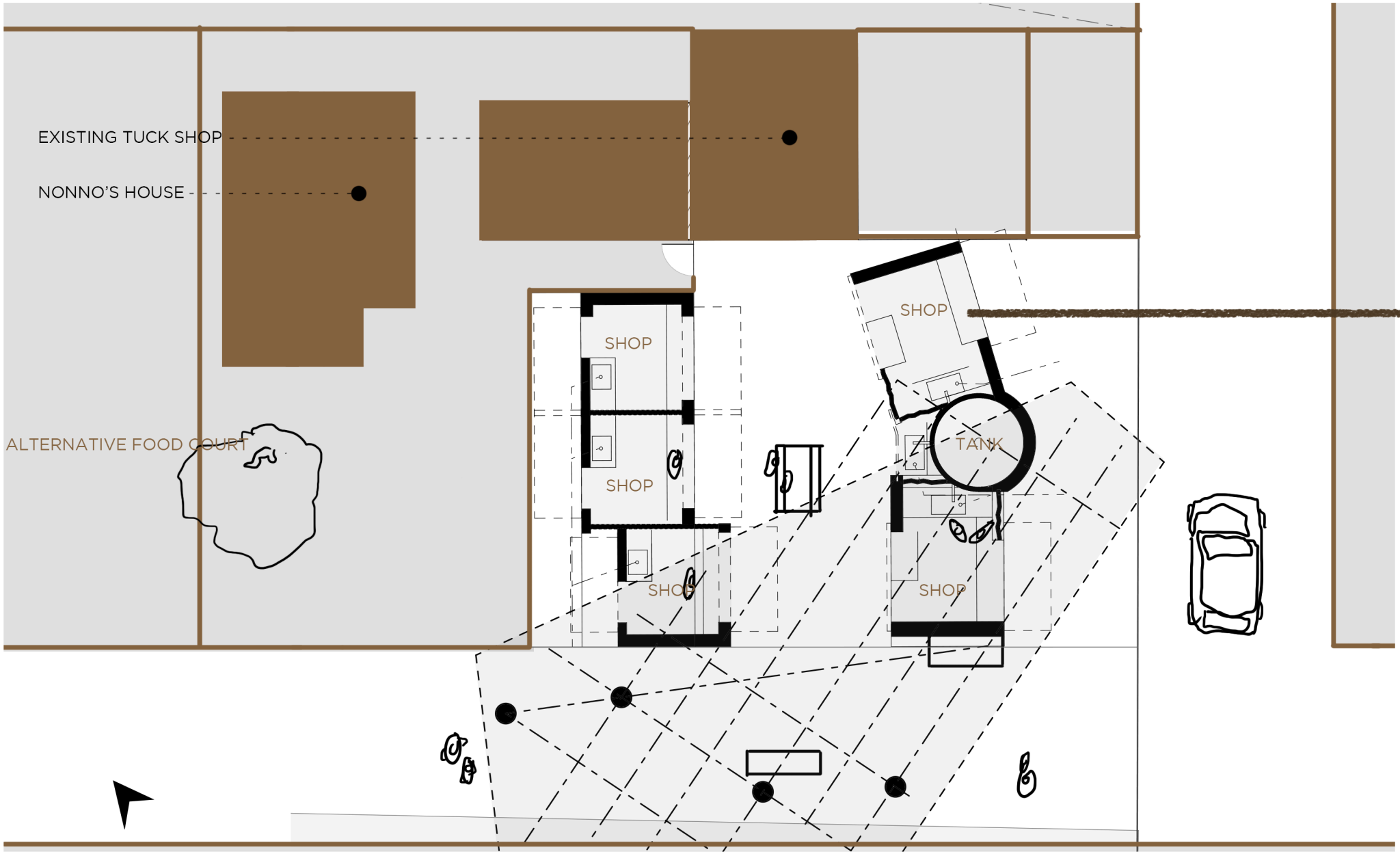


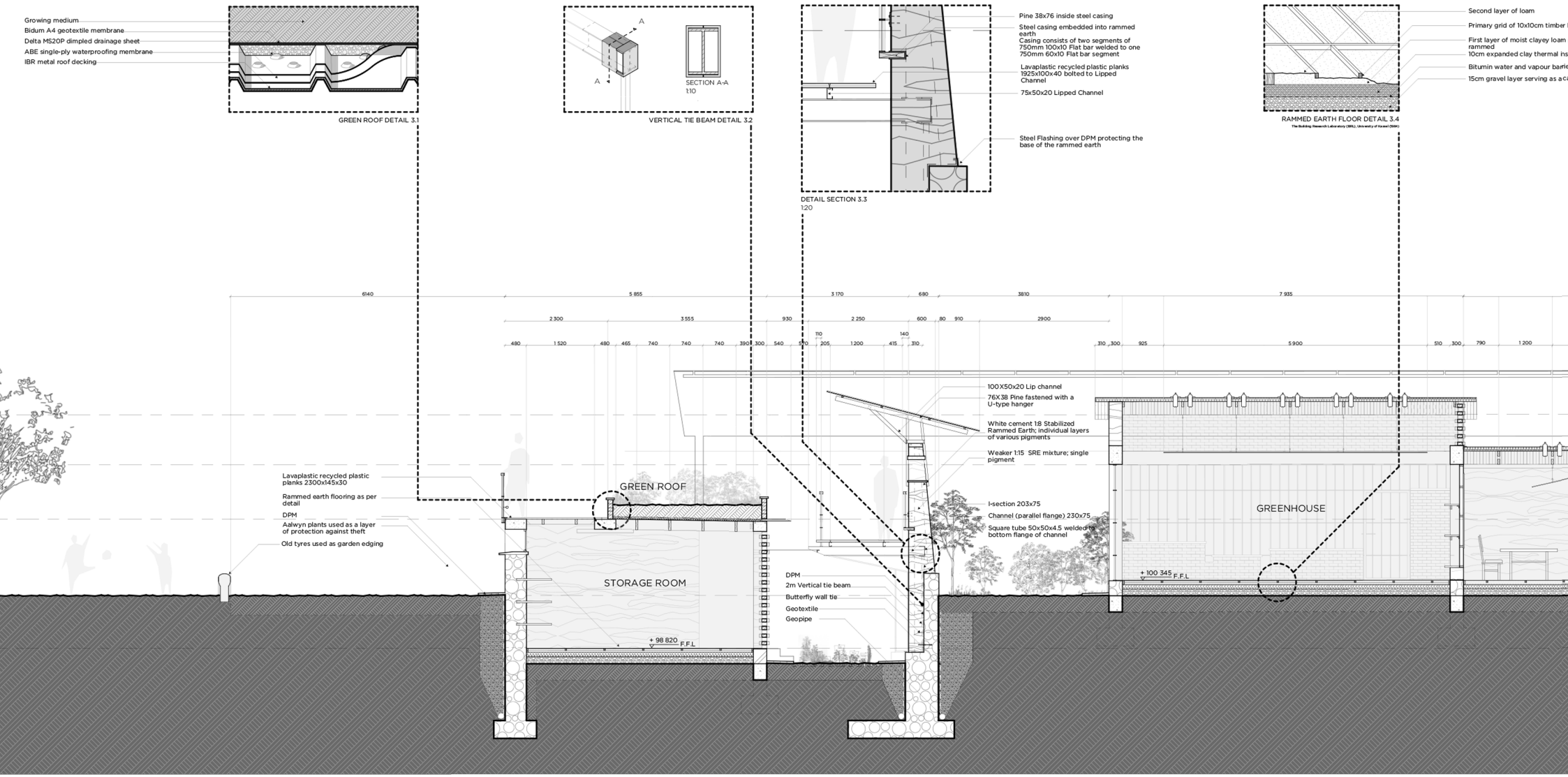
Fig. 153 SKETCH PLAN (Author)



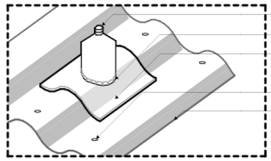
Fig. 154 SKETCH (Author)

ALTERNATIVE FOOD COURT

The space just next to Nonno's erf is already home to Hassan's Tuck shop. It has ample space in front of it which would be a great space to create some additional retail oppertunities. There is space for five small retail spaces if Nonno uses some of their erf. This will allow Nonno to rent the spaces out and alternatively ustilise them personally to sell some goods to make an extra income. The design incldes a tank for water supply and a larger zinc canopy with seating to delineate the social space

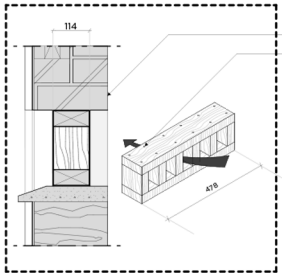

Growing medium
Bidum A4 geotextile membrane
Delta MS20P dimpled drainage sheet
ABE single-ply waterproofing membrane
IBR metal roof decking
GREEN ROOF DETAIL 3.1
A
A
SECTION A-A
1:10
VERTICAL TIE BEAM DETAIL 3.2
Pine 38x76 inside steel casing
Steel casing embedded into rammed earth
Casing consists of two segments of 750mm 100x10 Flat bar welded to one 750mm 60x10 Flat bar segment
Lavaplastic recycled plastic planks 1925x100x40 bolted to Lipped Channel
75x50x20 Lipped Channel
Steel Flashing over DPM protecting the base of the rammed earth
DETAIL SECTION 3.3
1:20
Second layer of loam
Primary grid of 10x10cm timber
First layer of moist clayey loam rammed
10cm expanded clay thermal ins
Bitumin water and vapour barrie
15cm gravel layer serving as a ca
RAMMED EARTH FLOOR DETAIL 3.4
The Building Research Laboratory (BRL), University of Kassel (1984)
6140
5 855
3 170
680
3810
7 935
2 300
3 555
930
2 250
600
80
910
2900
480
1 520
480
465
740
740
740
390
300
540
570
110
205
1 200
140
415
310
310
300
925
5 900
510
300
790
1 200
100X50x20 Lip channel
76X38 Pine fastened with a U-type hanger
White cement 1:8 Stabilized Rammed Earth; individual layers of various pigments
Weaker 1:15 SRE mixture; single pigment
I-section 203x75
Channel (parallel flange) 230x75
Square tube 50x50x4.5 welded to bottom flange of channel
Lavaplastic recycled plastic planks 2300x145x30
Rammed earth flooring as per detail
DPM
Aalwyn plants used as a layer of protection against theft
Old tyres used as garden edging
GREEN ROOF
STORAGE ROOM
GREENHOUSE
DPM
2m Vertical tie beam
Butterfly wall tie
Geotextile
Geopipe
+ 98 820 F.F.L
+ 100 345 F.F.L

battens
placed on top of the subflooring and
ulation
r
apillary break



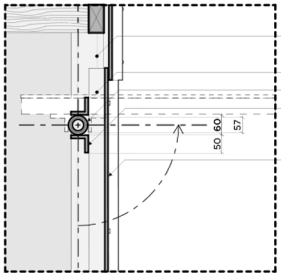
'LITER OF LIGHT' INSTALLATION DETAIL 3.5
ISOMETRIC

Silicon sealant to protect cap from sun
Sealant smeared around the bottle
Optional Duramesh Flexible Reinforcing Waterproofing Membrane with Duram Rainkote sealant
Pop-rivit light assemblage to the ridges of the original roofing
Silicon sealant inbetween existing roof and light addition



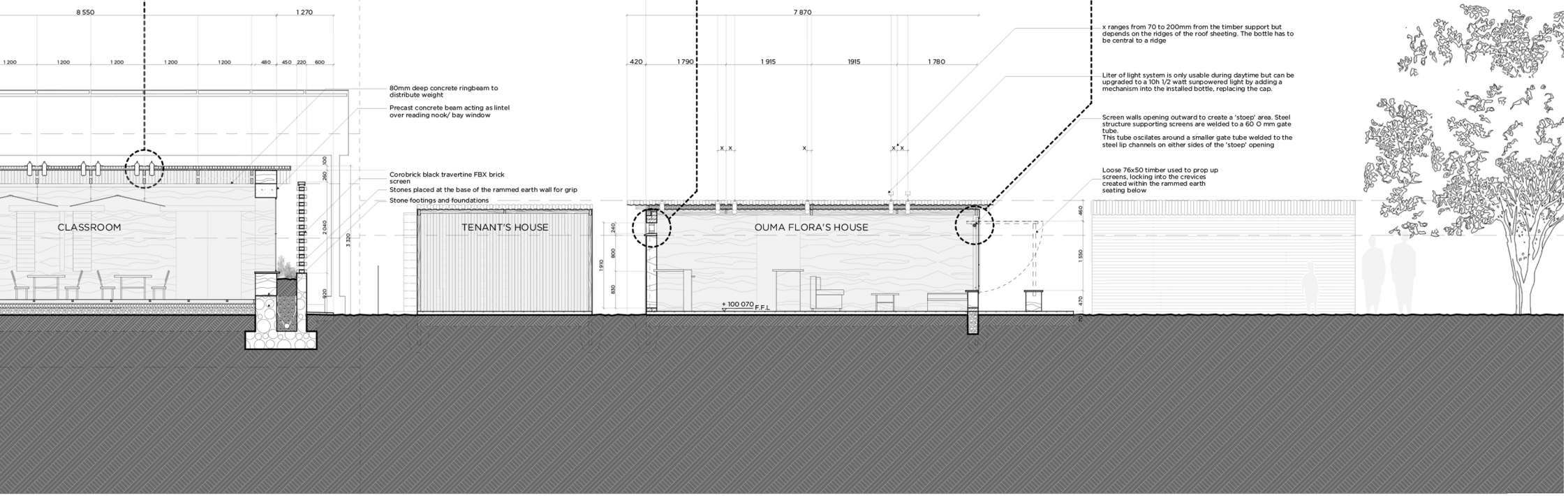
VENTILATION DETAIL 3.6
1:10

Soldier course bricks above louvre acting as a lintel
114x38 timber pieces assembled with Round Wire Steel Nails (100 x 4mm)



VERANDA MECHANISM DETAIL 3.7
1:10

100x50x20 steel Lip Channel
75x50x20 steel Lip Channel
57x2 Gate tube sections within 60x2 Gate tube
50x50x3 Angle irons welded to Lip Channel and 60mm O gate tube
Galvanised zincalume sheeting



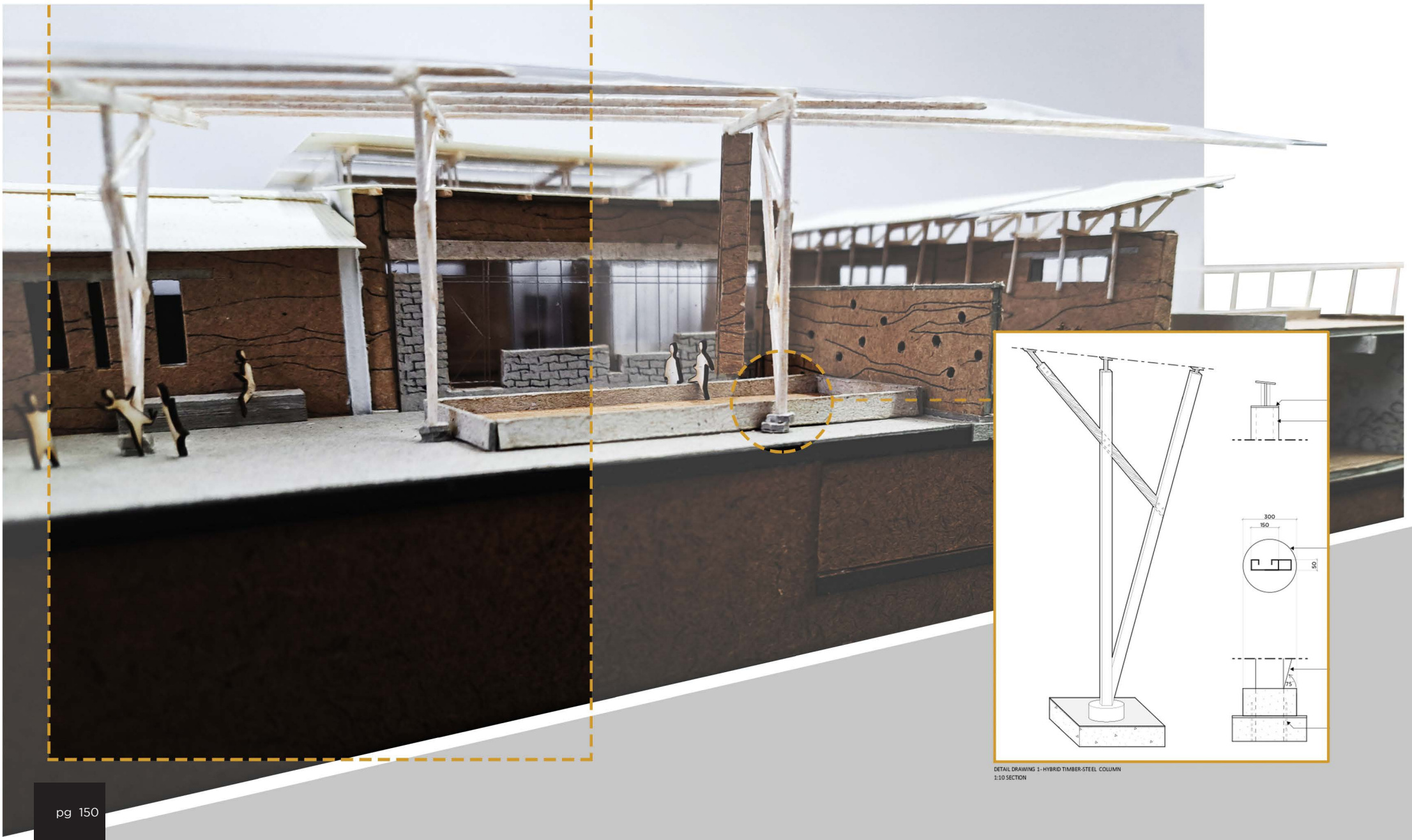
80mm deep concrete ringbeam to distribute weight
Precast concrete beam acting as lintel over reading nook/ bay window
Corobrick black travertine FBX brick screen
Stones placed at the base of the rammed earth wall for grip
Stone footings and foundations

x ranges from 70 to 200mm from the timber support but depends on the ridges of the roof sheeting. The bottle has to be central to a ridge

Liter of light system is only usable during daytime but can be upgraded to a 10h 1/2 watt sunpowered light by adding a mechanism into the installed bottle, replacing the cap.

Screen walls opening outward to create a 'stoep' area. Steel structure supporting screens are welded to a 60 O mm gate tube.
This tube oscilates around a smaller gate tube welded to the steel lip channels on either sides of the 'stoep' opening

Loose 76x50 timber used to prop up screens, locking into the crevices created within the rammed earth seating below

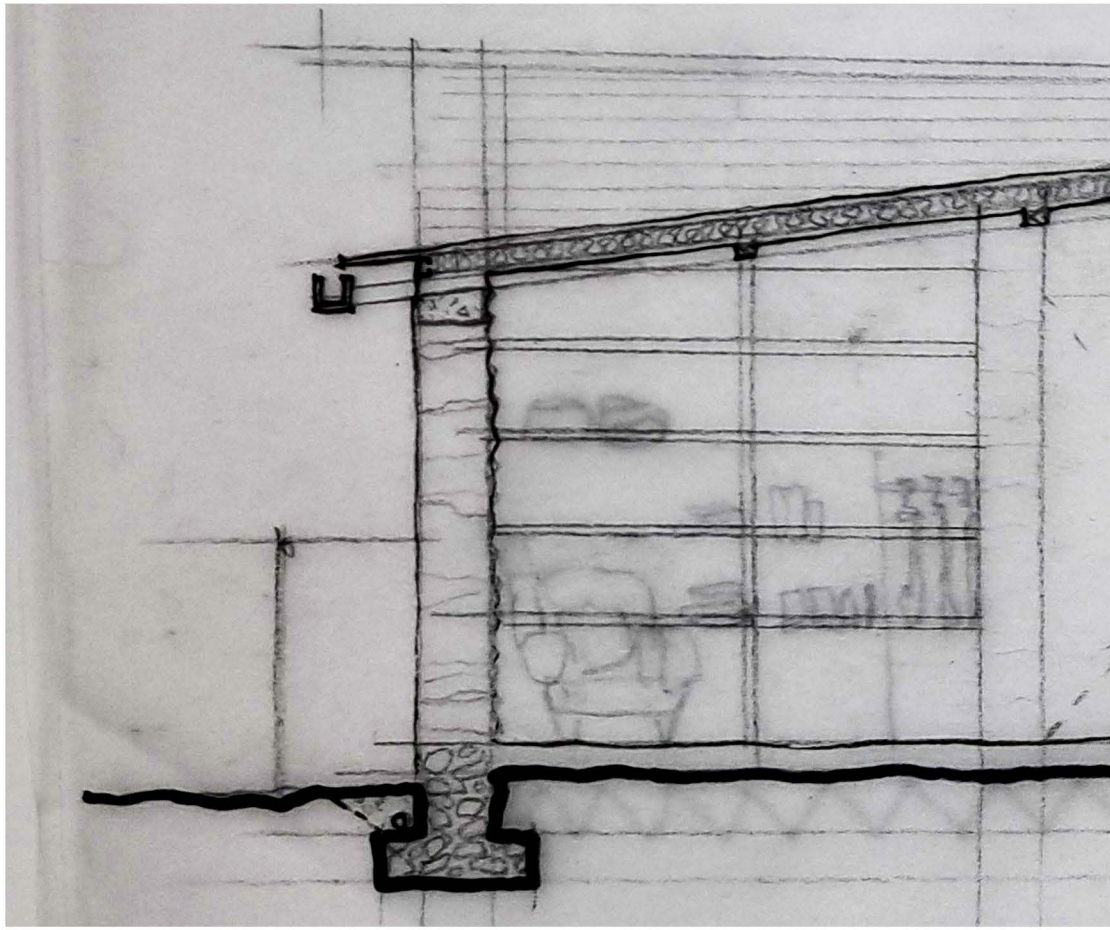


DETAIL DRAWING 1- HYBRID TIMBER-STEEL COLUMN
1:10 SECTION

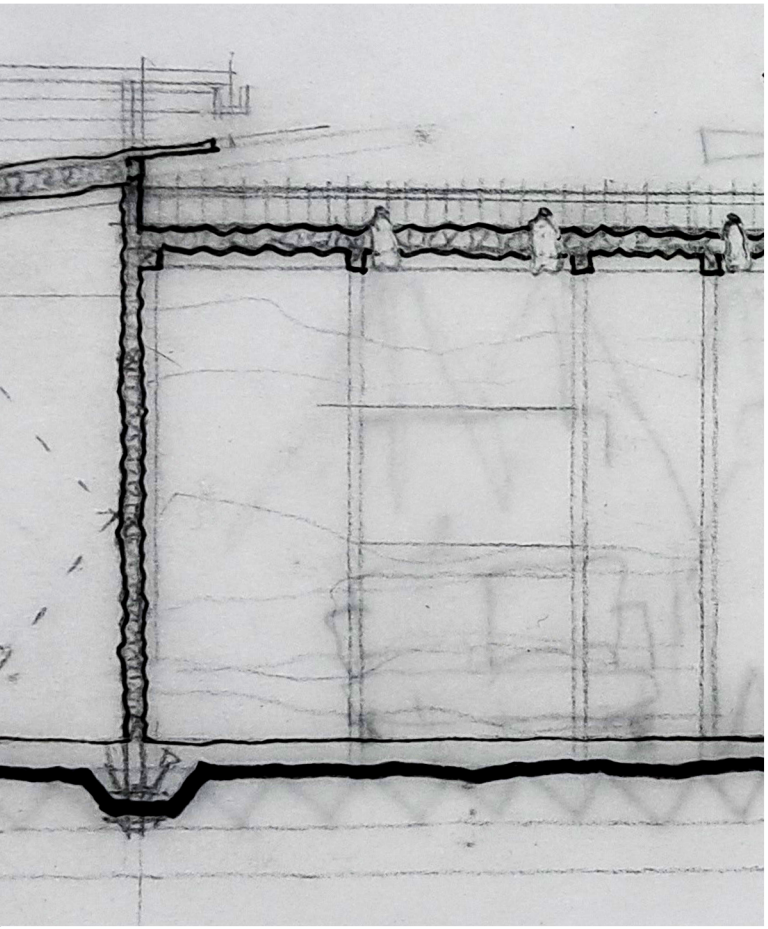








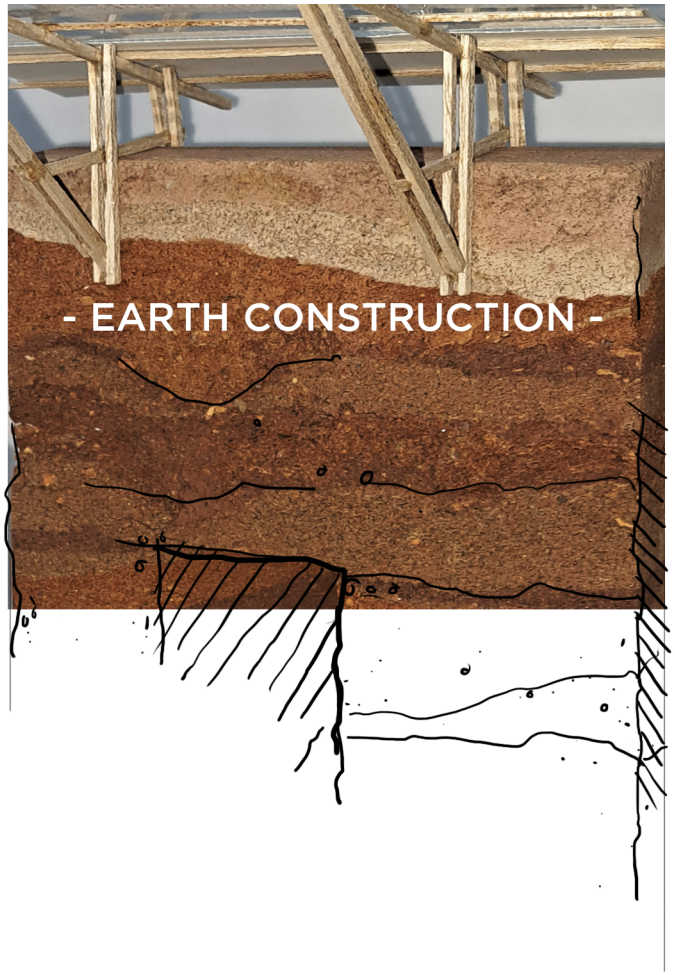
TECHNICAL **PRINCIPLES**



The construction of this design focusses on a few main principles which tie the built reality of this project with the theretical stance taken. Of these the following are the most important.

1. **Recycled** resources
2. **Adaptive** design and **Incremental** development

1. **Recycled** Resources







EARTH CONSTRUCTION

The pigmented earth and rock discarded by the local mines to reach iron ore is donated as a cheap building material. This allows the mines to invest back into the community, one of the main responsibilities, whilst solving one of their own problems; that of rehabilitating their mine heaps.

Due to the fact that rammed earth is built and cured in the same location where it is needed, unlike individual earth building units, it can be built in place next to the existing shanty walls. The earth is mixed with 7% cement to create a durable and high thermal mass building material whilst the rock is used for building stone foundations and bases to protect the rammed earth walls.

PLASTIC WASTE

Plastic waste is one of the big problems in the area, but in this case a resource. Plastic can be aquired cost-free and be used without having to be processed through high-tech recycling methods.

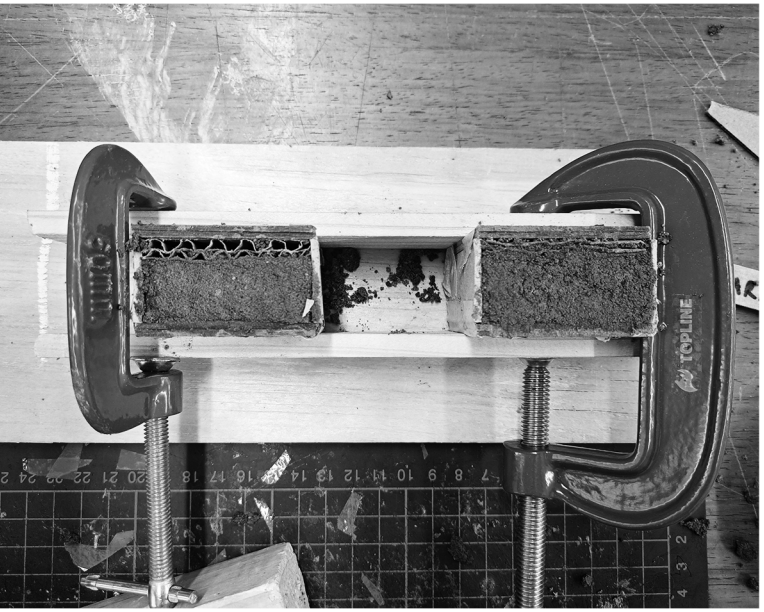
For its intended purpose in this project it only needs to be washed/ seperated from any oragnic material and then cut up into compactable sizes. It has insulating properties which makes it a perfect material to use as infill inbetween wall panels; in this case zinc corrugated sheeting.

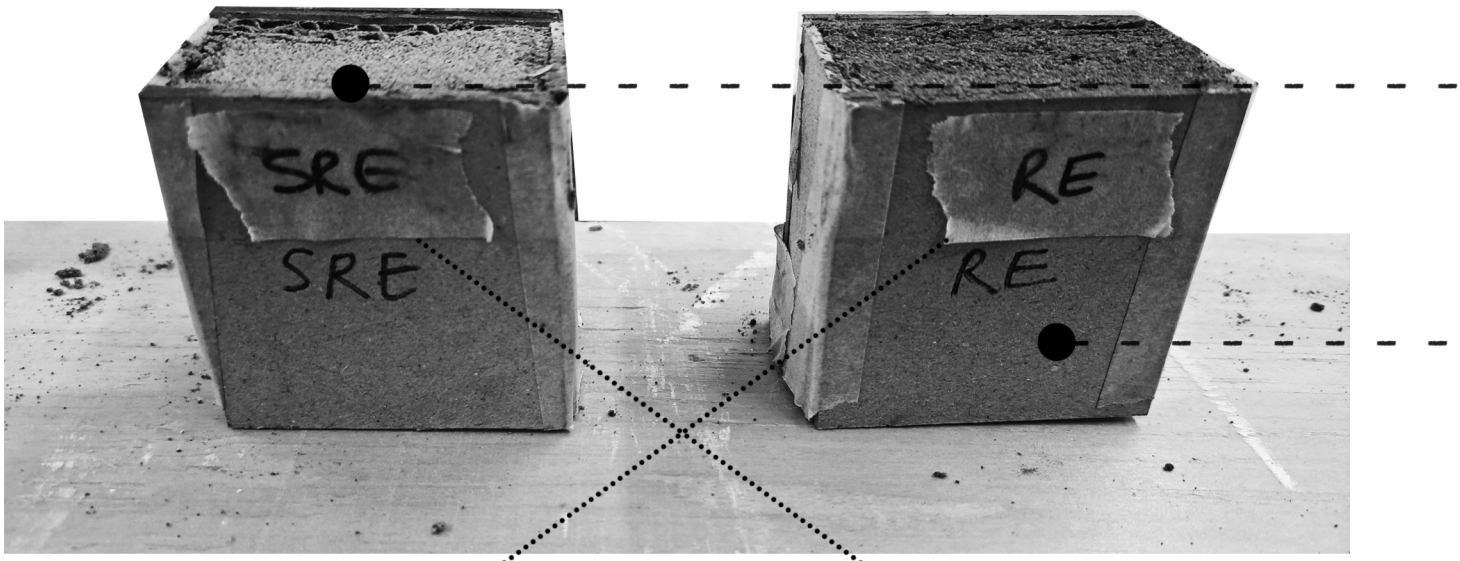
Other possibilities includes plastic bottles used as skylights, old bicycle tyres used to end off double roofing elements etc.

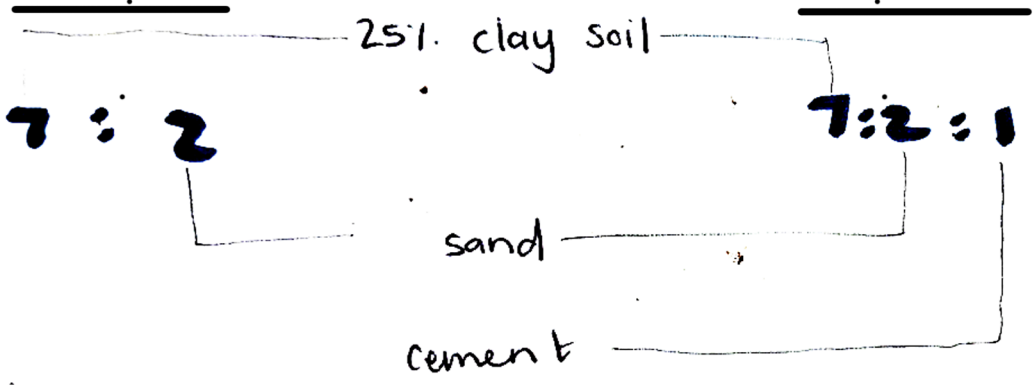
EXISTING ZINC AND TIMBER STRUCTURES

Utilizing the existing shanty structures prevents the relocation of inhabitants or the need for temporary shelter. Existing materials and the local building style can be preserved while speeding up the building process.

This preserves a built identity and maintains a continuity in terms of the built environment and the existing economic and social context.

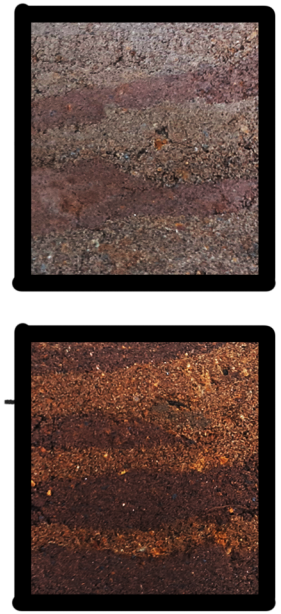






Rammed earth tests

To gain first-hand experience of rammed earth and experiment with the possibility of unstabilised rammed earth, test blocks were constructed with Postmasburg local soil. The results confirmed the suspicion that unstabilized rammed earth's surface is too easily damaged and thus not a viable material despite the lowered cost of construction. The cement stabilized rammed earth is much stronger but the bright colours of the soil loses some of its saturation due to the gray cement pigment.





RE (Rammed earth)

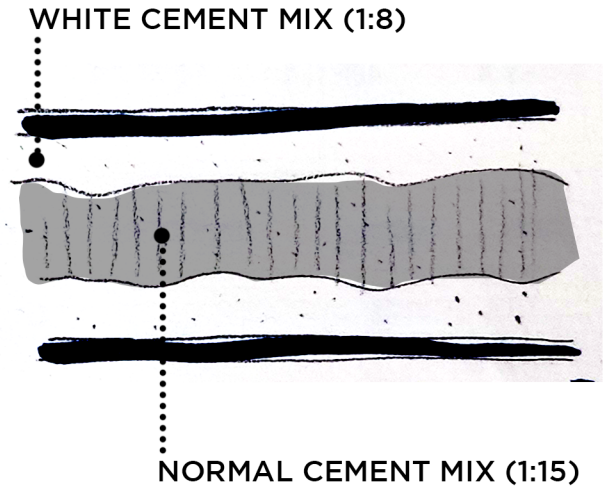
- dull colours
  light brown + soft maroon/red
- very stable

SRE (Stabilized rammed earth)

- colours are vibrant
  orange/ brown + dark maroon
- can feel more particles loosening when moving vinger accross the surface

Secondary tests were done with soil from the mine, using a white cement mixture for the extremities and a weaker regular cement mix for the interiors (Rammteck,2023).
This creates a vibrant look whilst keeping the cost down since white cement is more expensive.

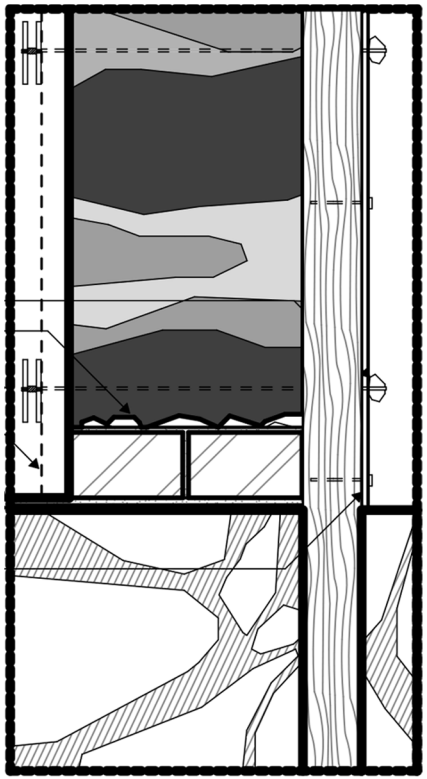
The double layer walls are used mostly in the urban development, sticking with the slightly cheaper and less complicated normal cement mixture for the domestic structures.



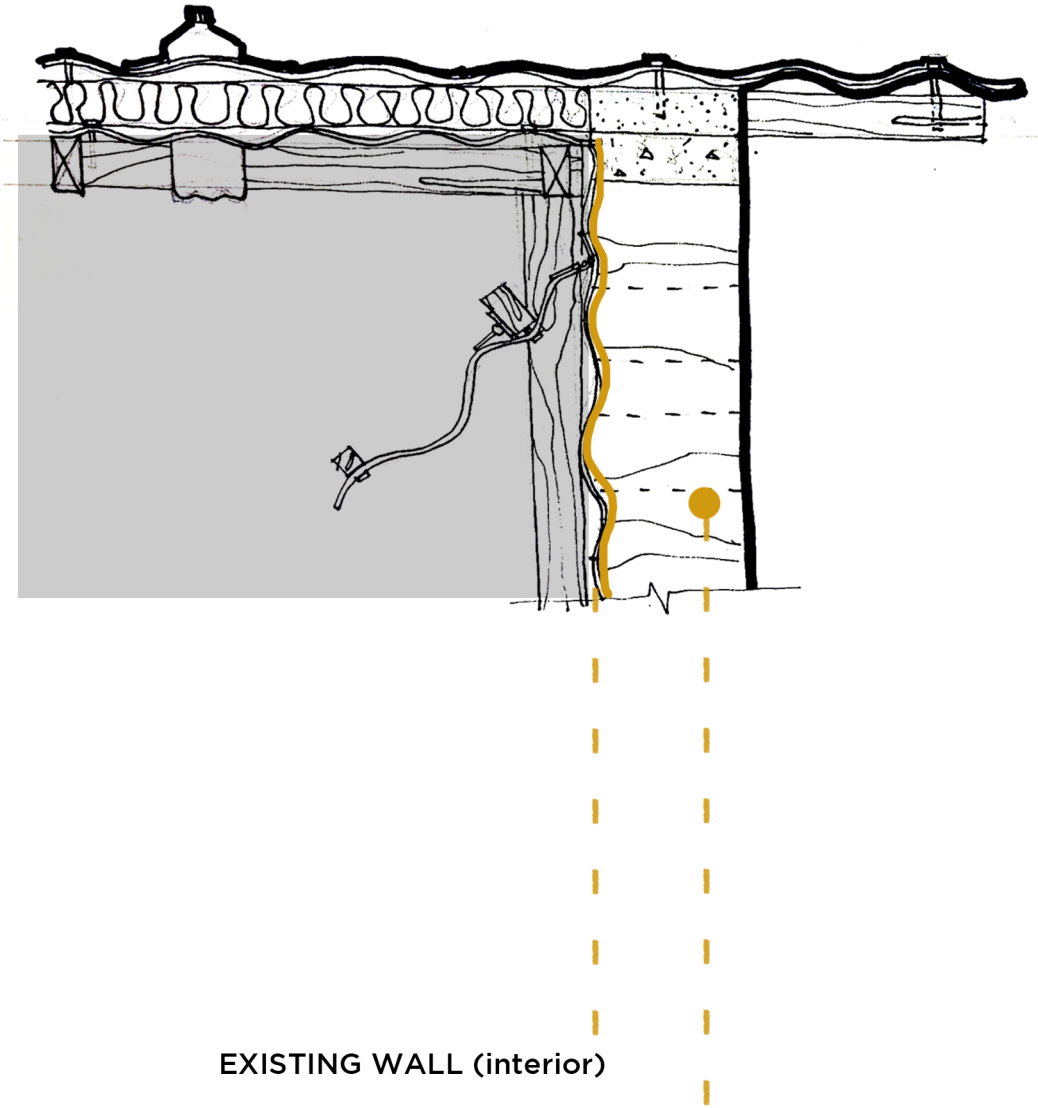
The rammed earth walls, as mentioned, can be used to either

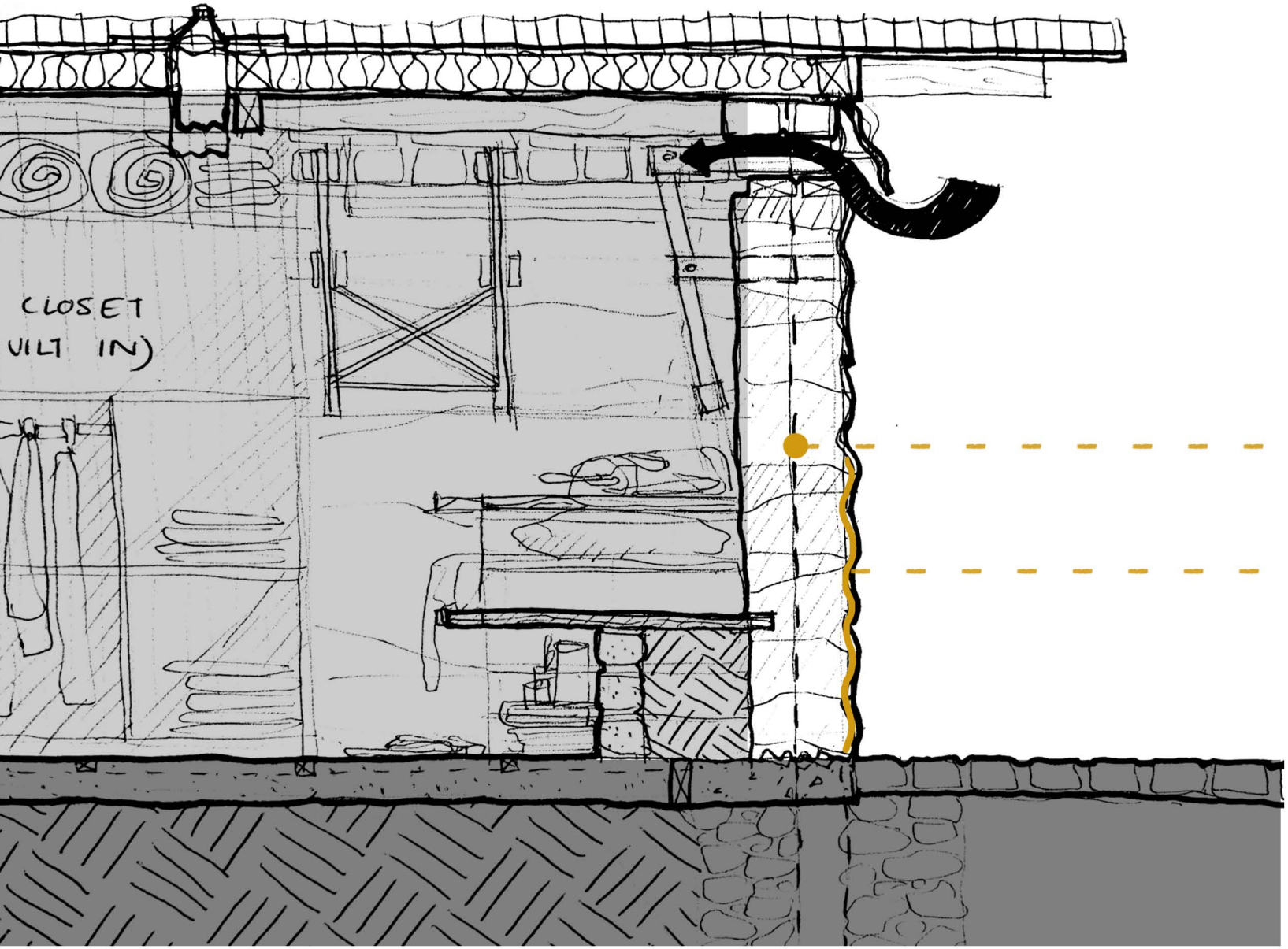
1. Externally or
2. Internally strengthen the existing walls.

Examples herof is shown to the right



RAMMED EARTH WALLS BUILT ADJACENT TO THE EXISTING WALLS, ONTO STONE FOUNDATIONS





RAMMED EARTH WALL (interior)

EXISTING WALL (exterior)



RECYCLED PLASTIC

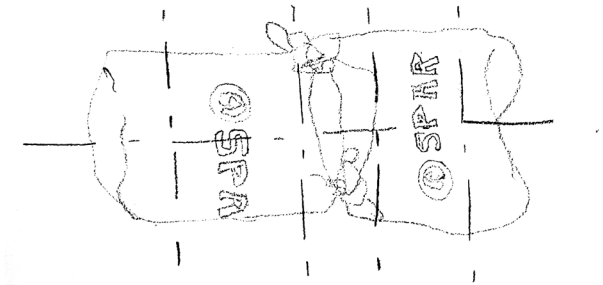
Plastic is one of the main synthetic materials used in insulation. Therefore in its untreated recycled form it can be used as dry insulation within cavity walls, with substantial resulting incresed R-values (GEOSTAT, 2017). For this use the plastic needs to be cleaned, dried and cut up as seen on the left.

This solution hasa helps both ways, creating a cheap building material and cleaning up the area at the same time

To make this method more manageable the method seen to the right is used. It consists of filling old plastic bags with the shredded plastic to make the filling of cavities easier. By further tieing it together at the handles and using a plastic sealer to close the opening and ‘quilt’ the bags, it becomes a easily instaled insulating unit.

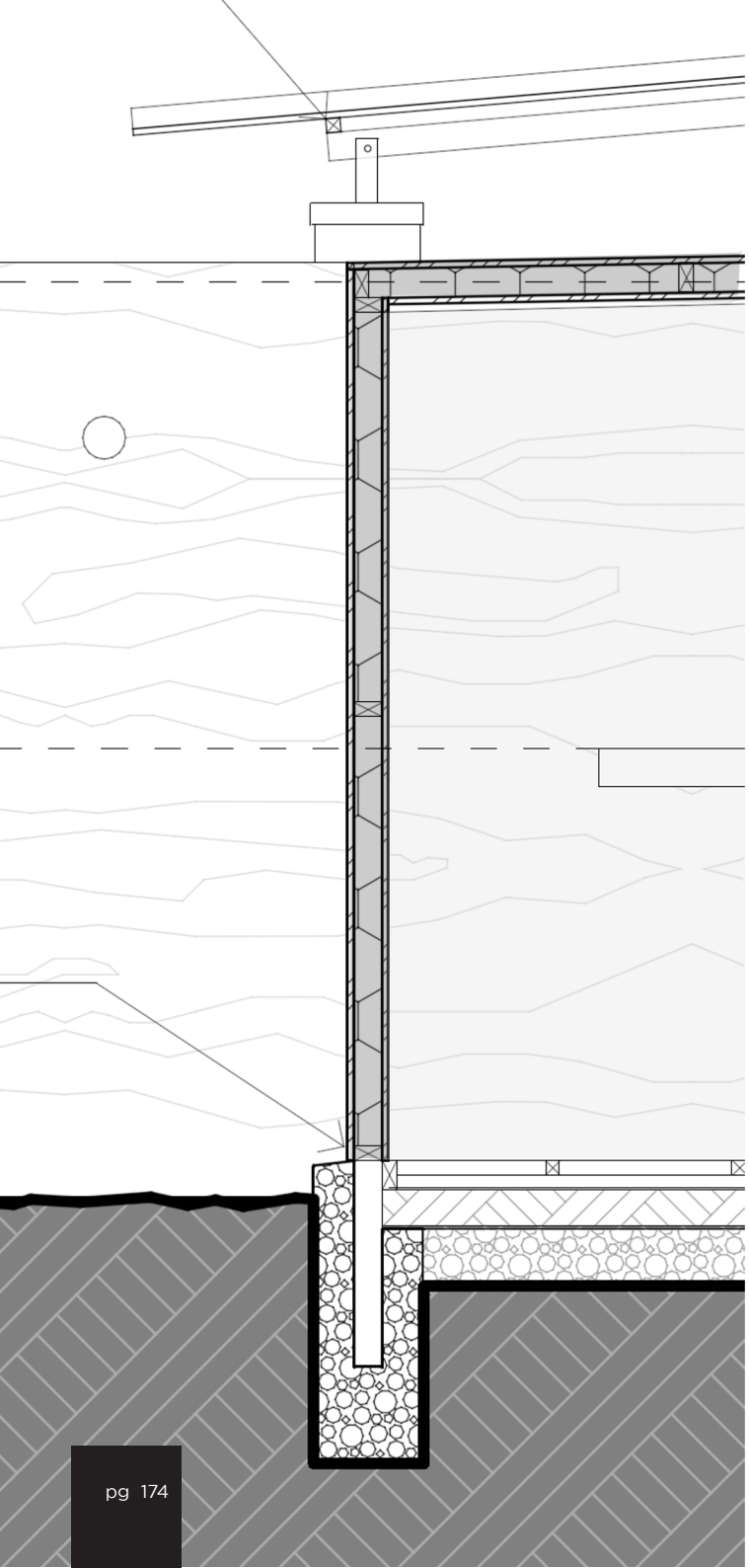


PLASTIC BAG + CLEANED PLASTIC WASTE



TIE FILLED PLASTIC BAGS TOGETHER & "QUILT" WITH PLASTIC SEALER





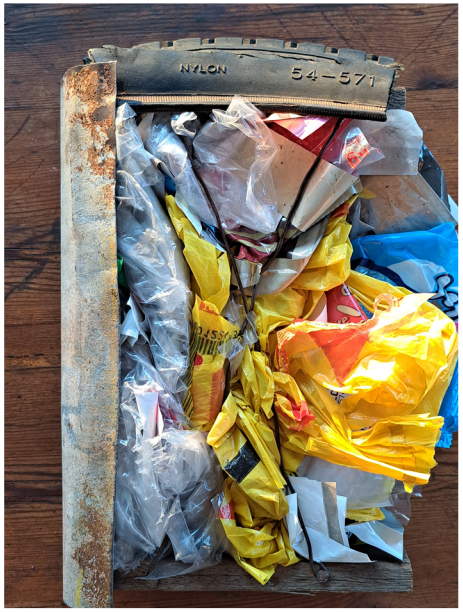
This insulation method can be used in roof or wall composites as can be seen to the left and below.
The installation method ramains the same except for access. to install this insulation on top of existing shanties temporary support has to be installed inside th house supporting the roof structure

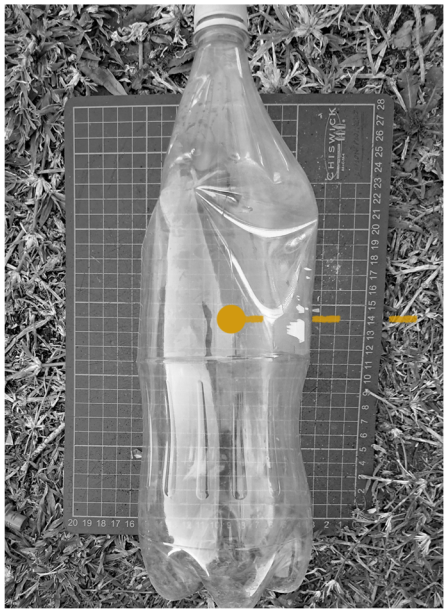
Other methods can be used in unison with this recycling method; for example using old bicycle tyres to finish off the overhang of the composite roof, or using existing systemssuch as the liter of light project.

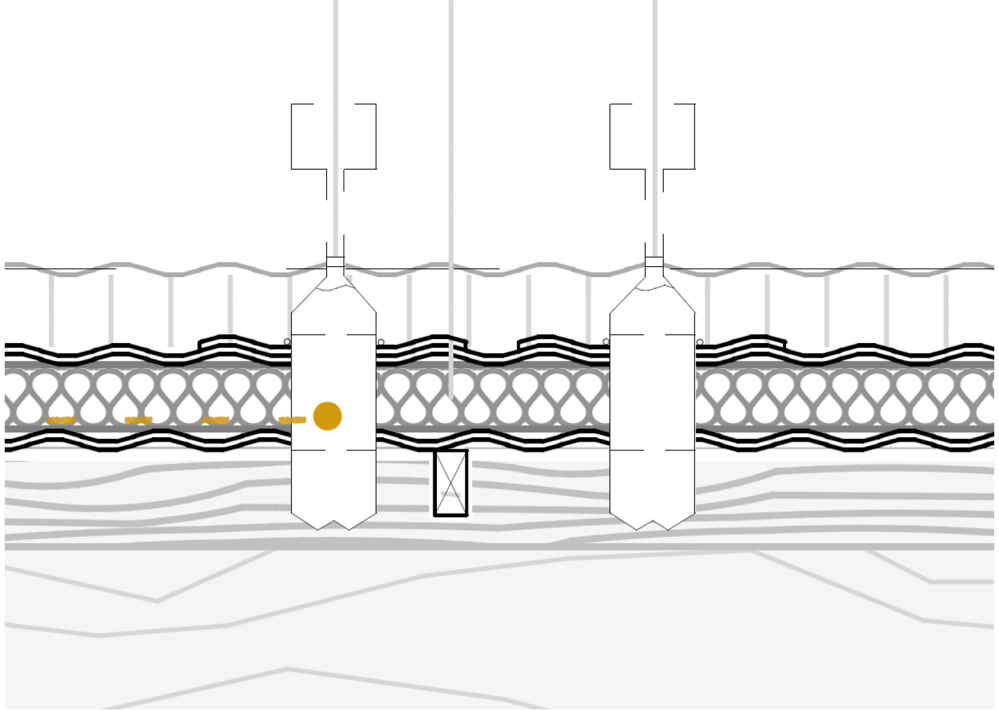
This system allows daylight as well as sun power to be utilized to light homes at an affordable price using only water, bleach and a 2-litre plastic bottle. The details of the system are shown on the right.

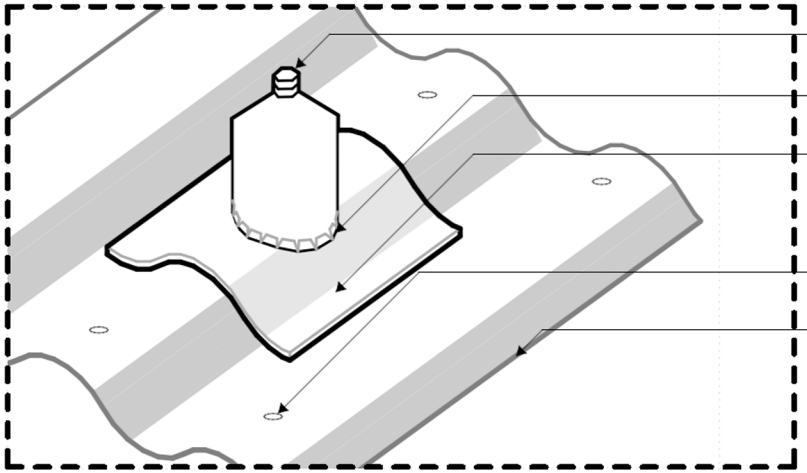












Silicon sealant to protect cap from sun

Sealant smeared around the bottle

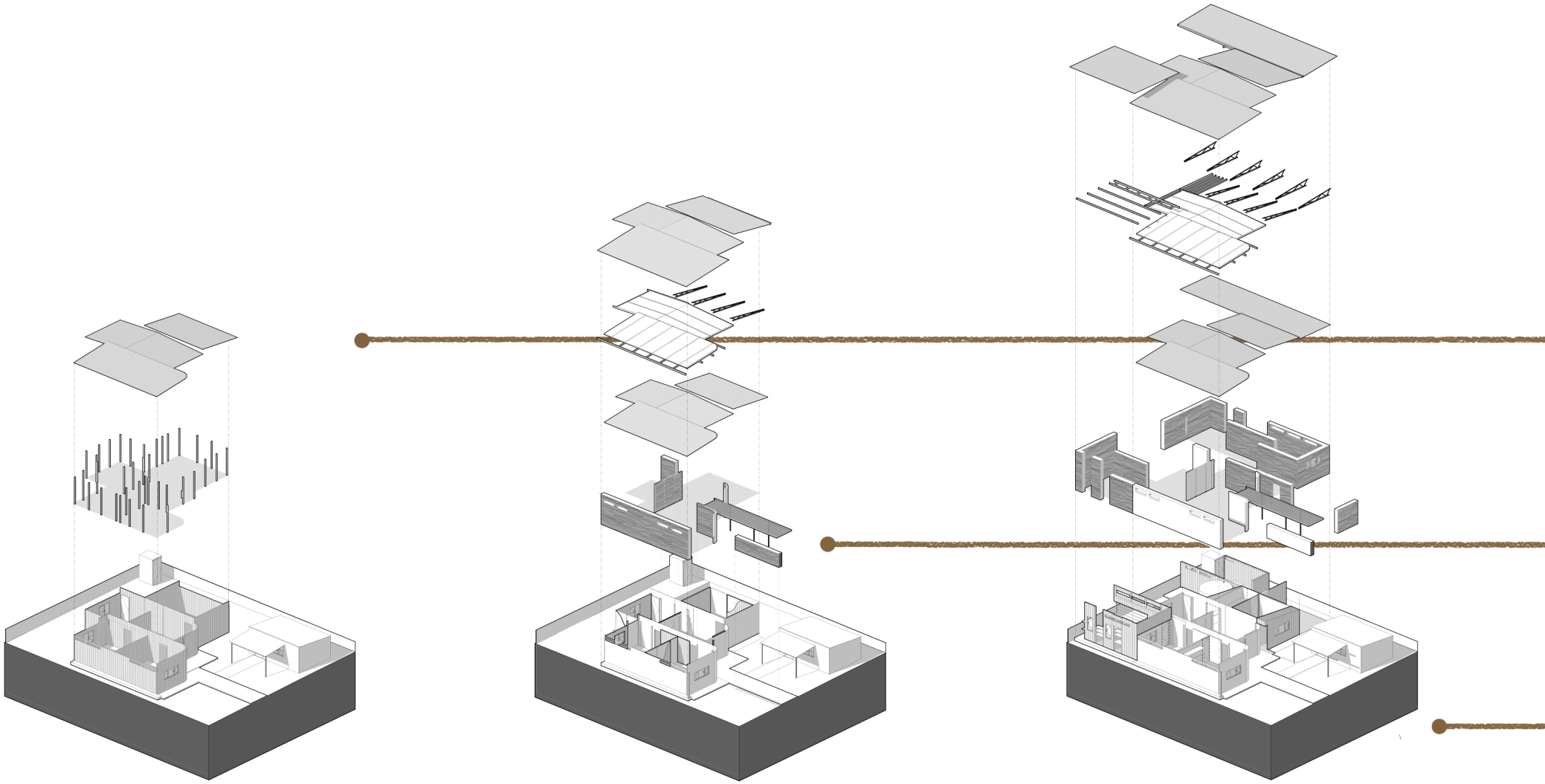
Optional Duramesh Flexible Reinforcing Waterproofing Membrane with Duram Rainkote sealant

Pop-rivit light assemblage to the ridges of the original roofing

Silicon sealant inbetween existing roof and light addition

'LITER OF LIGHT' INSTALLATION DETAIL
ISOMETRIC

2. Adaptive Design and Incremental Development



The incremental stages of housing adaptation:

Stage 1

The existing structure of Miss Maria's shanty.
Zinc corrugated sheeting supported by a timber framework

Stage 2

The insulation of the existing envelope by creating composite walls and roofing.
These vary between rammed earth and insulated double zinc walls and roofing to create a more habitable space and the groundwork for further development.

Stage 3

This stage incorporates the delineation and addition of spaces.
Additional rooms, a study and a washroom.

The adapted walls vary between:

1. Rammed earth composites

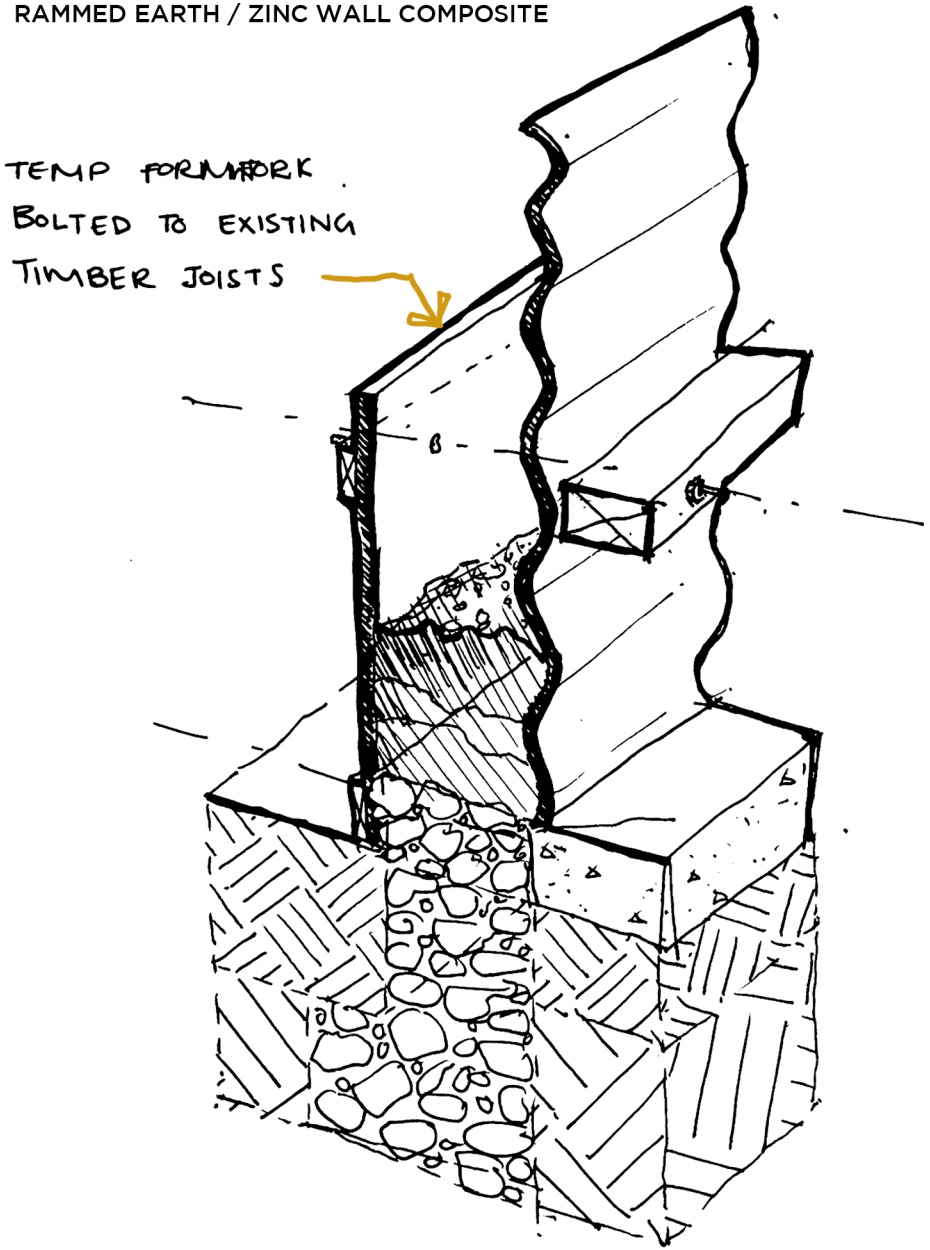
2. Insulated zinc walls

The 1 : 8 moist stabalised earth is scooped into the formwork in layers of 100mm at a time and rammed down to 50mm untill it reaches the top of the formwork. (The soil can contain a maximum of 15% clay)
Be careful of over compaction to prevent plasticity which causes cracks.

Simple rule of thumb for measuring depth is using your hand as shown below.

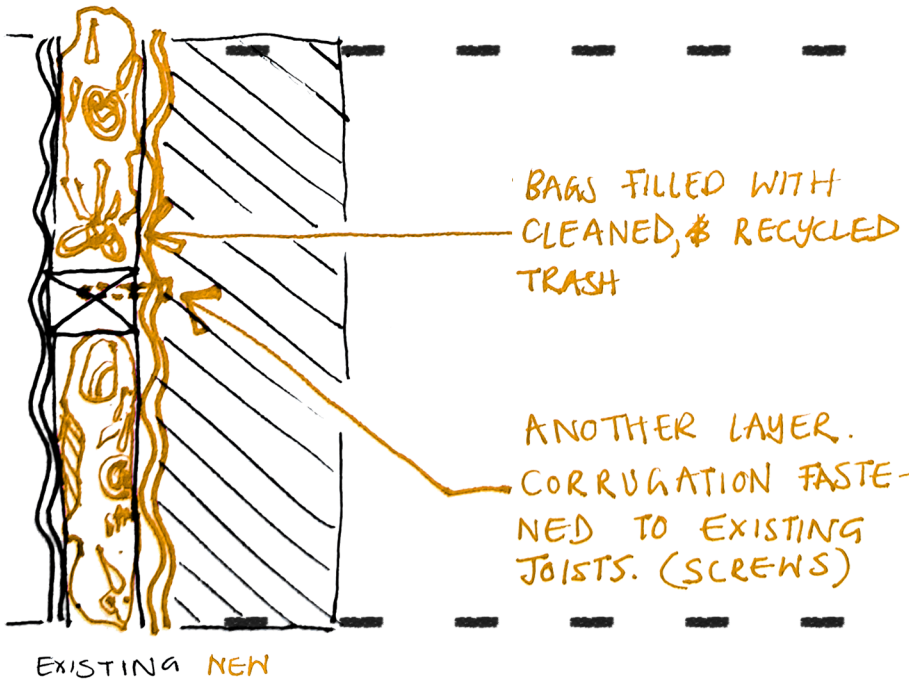


RAMMED EARTH / ZINC WALL COMPOSITE

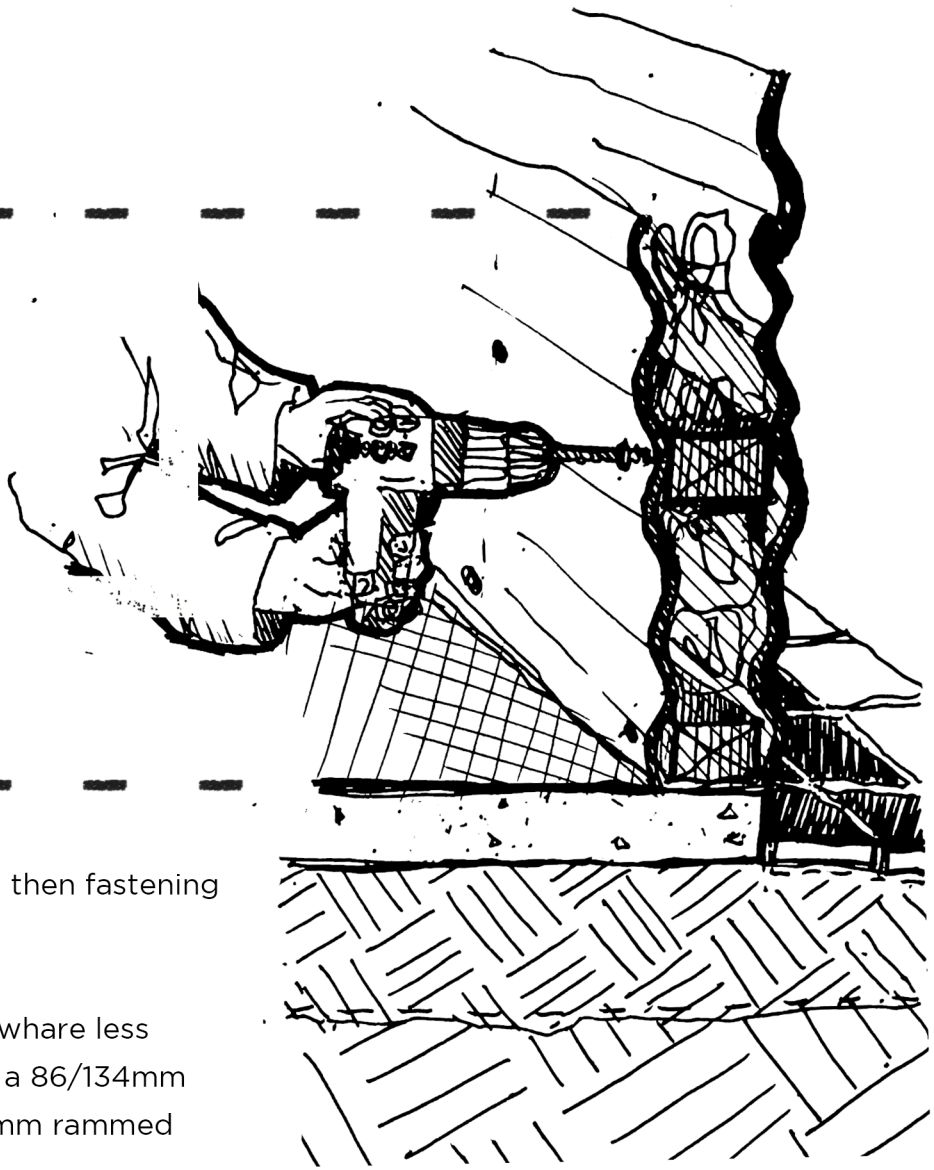


INSULATED DOUBLE ZINC WALL

PLAN



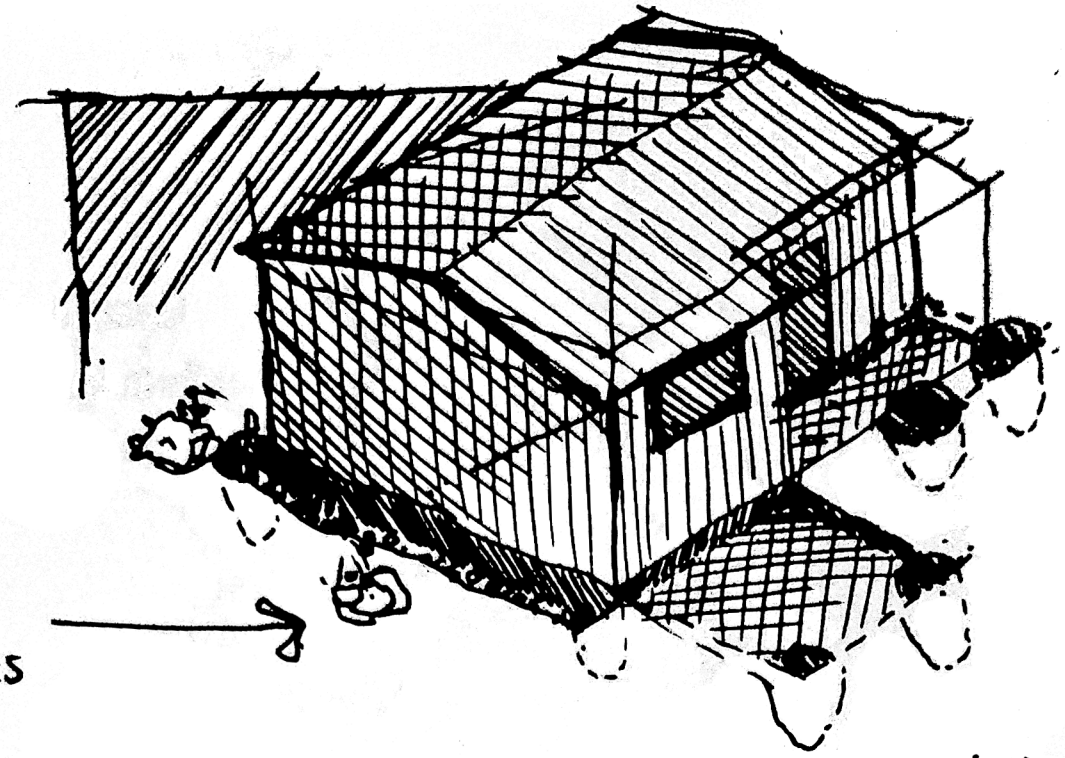
SECTION



The double wall consists of another layer of corrugated sheeting being fastened to the interior timber supports of the existing structure. Additional timber should be fastened at the base of the wall to create a isolated cavity for the bags of plastic shreds to be compacted in. The fastening and filling happens in unison, filling and then fastening to the supports.

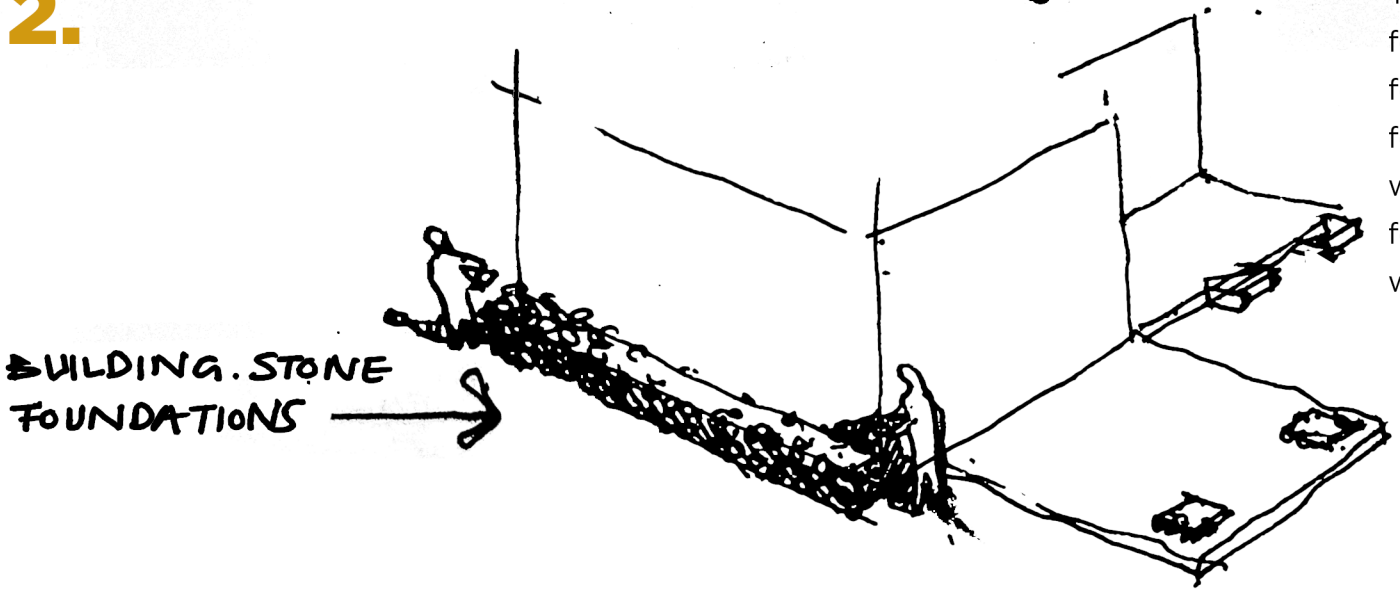
This type of wall is for areas whare less space is available, creating a a 86/134mm wall instead of the 220/300mm rammed earth walls.

1.



The first stage of construction starts with the digging of trenches and holes surrounding the existing building as weel as spaces where the footprint of the building needs to be expanded. This follows the cleaning of the building's exterior from particles which could create delamination.

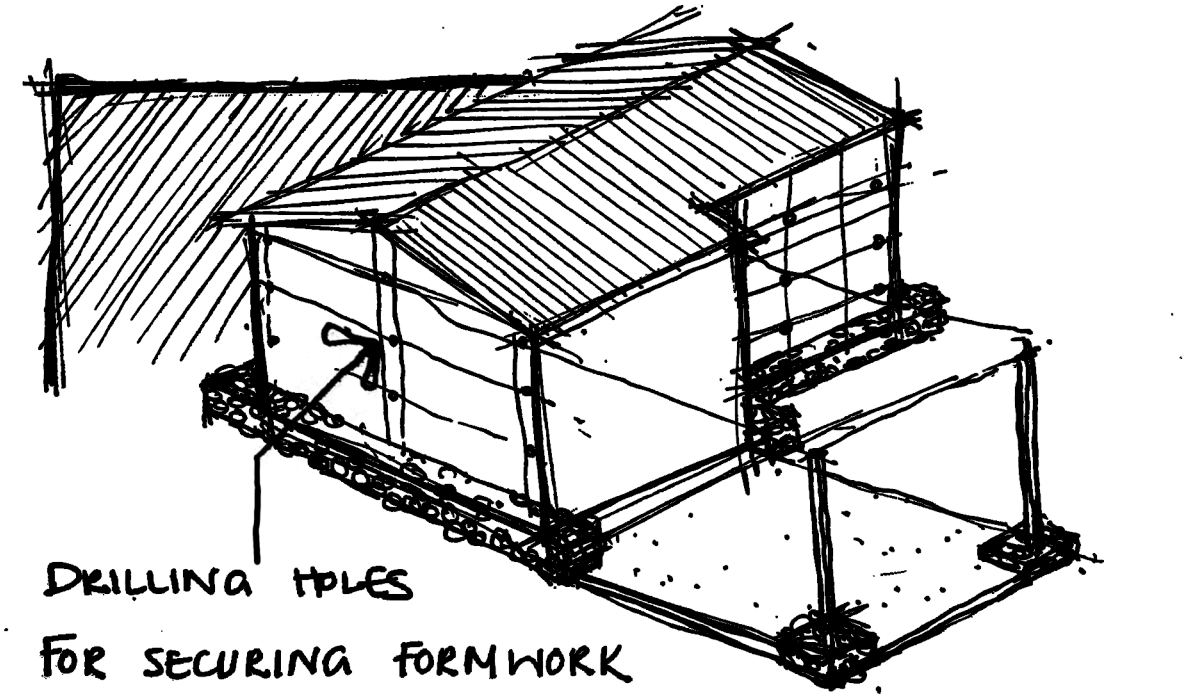
2.



Thereafter follows the building of stone foundations. This varies between long strip footings for the rammed earth walls and pad footings for the supports inbetween the non weight-bearing, zinc composite walls. The foundations shoud be 110% the width of the wall.

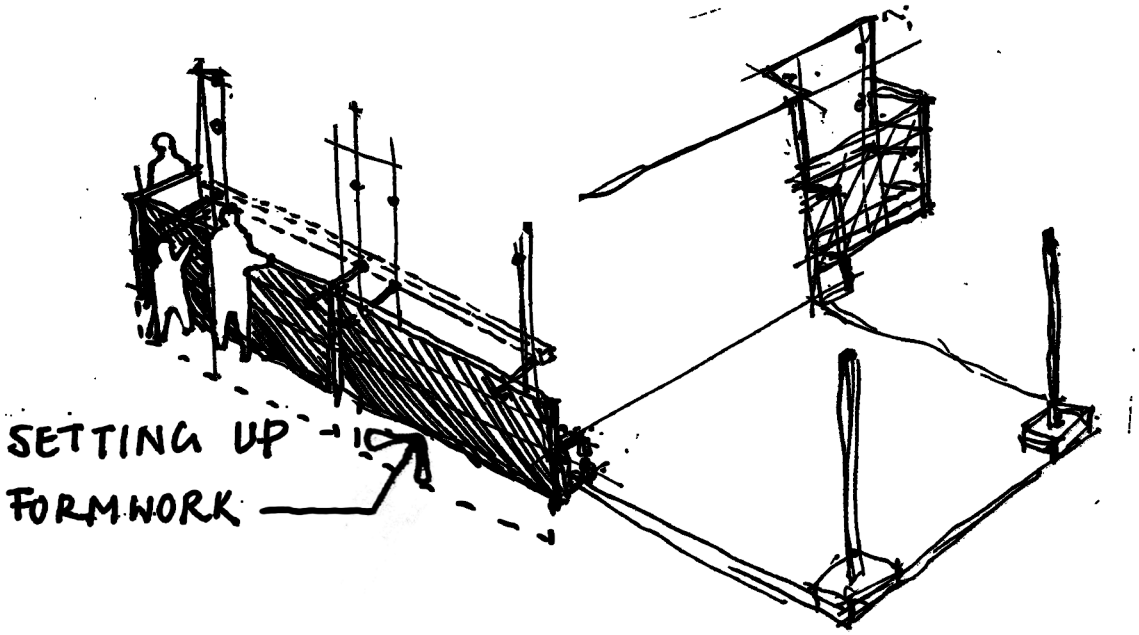
3.

After the foundation and raised footings are built, holes are drilled into the zinc in a grid pattern to provide spaces for the formwork to be fastened to the existing walls.



4.

This allows for the bottom or first level of formwork to be set up. This consists of the top of the formwork being held up by bolts to the zinc wall, with the support of a temporary timber member on the inside to distribute the pressure. The bottom is propped up tightly against the stone footings and temporarily secured into the soil.





PRACTICAL **SYSTEMS**



Fig. 155 The involved architect (Author)

As noted previously in the document, supported by the work of C. Combrinck, K. Campbell etc.: the type of incremental system which is being proposed in this document begs for alternative legislation regarding informal housing, property laws and the involvement of the built profession within low cost housing.

When specifically looking at our governing bodies, there are no policies, neither within the Architectural professional nor in the SACAP regulations, which outline a specific social responsibility for architects, no legislation which holds architects accountable for their social duty toward the built environment.
There is no system which deals with the informal sector, with the evergrowimg built reality of informal settlements and housing.

A systemically entrenched operation has been established, a formal system to which the condition of informal urbanism poses a risk, one with which the profession has yet to become fully engaged. Architects have to embrace the potential agency of change to contribute positively to the spatial redress.

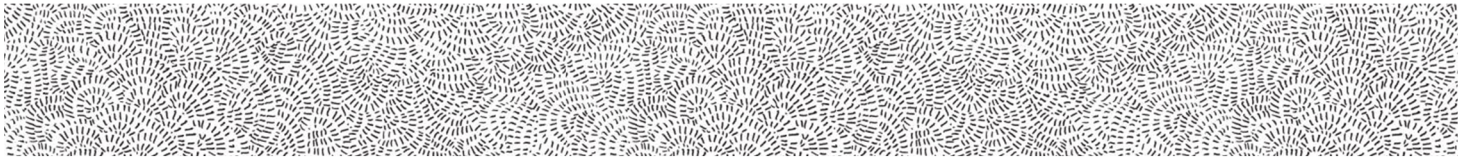
Architects have a social responsibility just as other professions have.

Architects' social responsibility should be enforced through legislation and policies.

This thesis proposes a compulsory public service year after completion of an architecture student's masters, in which one has to serve poor communities in a social-housing, service capacity. Freshly graduated students will act as a consultant for these hybrid provision/enablement housing systems. This will provide the young working class with a comprehensive understanding of the gravity of the informal housing crisis, give them with the oppertunity to manage their own project, establish a better sense of ergonomics and force them to apply creative design when faced with a limited budget.

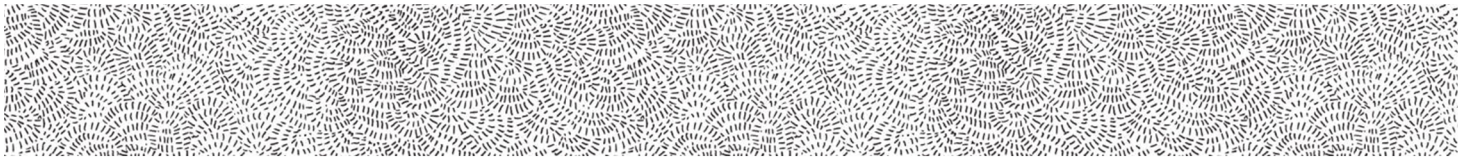
This **personal housing** model will encompass a consulted house adaptation plan with either a

1. personally-financed or
2. partial material provision/ subsidized financing,



The role of the architect needs shifting from that of purely designers to those who understand the entire context of the geography they are building in—essentially, to engage in "critical proximity" to social conflicts in the immediate area.

- (Campbell, 2016) -



with the work being executed by the beneficiaries.

The **urban development** makes use of government finance where individuals apply and the design as a collaboration between NGOs and the community.

This concretizes the role of the architect in a critically deaperate sector of our society.

The process outlined here creates the need for a few sets of design principles specifically tailored to this type of housing and urban interventions;

1. General
2. Domestic
2. Urban

PRINCIPLES

General

- Analyse the local social dynamics and issues, the hollistic context (material resources, local problems, social structure)
- Delineate the underlying causes before adressing resulting symptoms (understand the question, what feeds the problem)
- Inspect small solutions, continuous, incremental (Campbell, 2016)
- Critically analyse problems to assess posible oppertunities
- Be extensively creative in practical ways

Domestic

- Interact personally with the client
- Experience their reality, trust the client's knowledge about their circumstances and needs
- Assess the value of existing infrastructure and local knowledge systems

Urban

- Create urban functions which respond to the actual need of the community not your assumption thereof (community participation)
- Create functions which are tied to community members, use existing social and economic ties before establishing new ones
- Keep the design and the planning incremental and adaptable. refrain from masterplanning without reactingh to the changing reality of the context

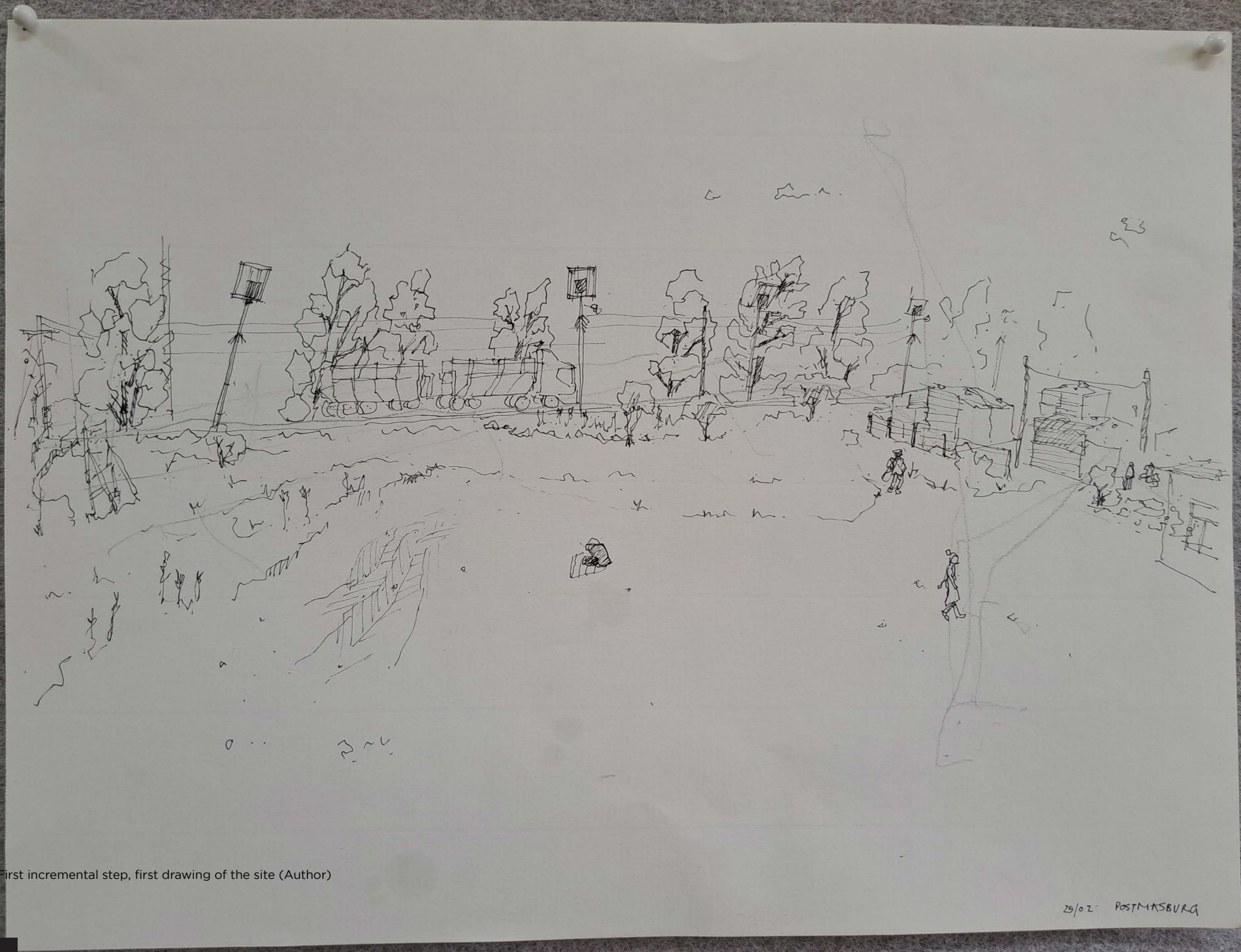


Fig. 156 First incremental step, first drawing of the site (Author)

CONCLUSION

The ultimate question;
Is there a space for architecture and design in low-cost housing?

My answer;

There has to be.
Otherwise we are just creating temperature regulated shells, safeguarding stagnance. Isolated cells, separate from the urban reality.

And Maybe this is how we should measure our success- if we manage to formulate a morality based on our common humanity
- (Krog, 1998) -

Dankie aan:

Miss Maria, Ouma Flora en Nonno wat die dokument moontlik gemaak het

en my ouers waarsonder ek dit nie sou kon voltooi nie

REFERENCE LIST

- Anglo American (2023). Operations. [online] www.angloamericankumba.com. Available at: https://www.angloamericankumba.com/our-business/operations.
- Antjie Krog (1999). Country of my skull. Cape Town: Random House Struik.
- Aravena, A. (2022). ¿Cómo vamos a vivir juntos? Paidos Chile.
- Aravena, A. (n.d.). Elemental «. [online] Elemental. Available at: https://www.elementalchile.cl/en/.
- Aravena, A. (2011). Elemental: A Do Tank. Architectural Design, 81(3), pp.32–37. doi:https://doi.org/10.1002/ad.1235.
- Artefact (n.d.). NE51/1-9. [online] artefacts.co.za. Available at: https://artefacts.co.za/main/Buildings/style_det.php?styleid=1556 [Accessed 11 Sep. 2023].
- Balkrishna, D. (2019). Revisit: Aranya low-cost housing, Indore, Balkrishna Doshi. [online]
- Architectural Review. Available at: https://www.architectural-review.com/buildings/revisit-aranya-low-cost-housing-indore-balkrishna-doshi.
- Beier, R. (2023). Why low-income people leave state housing in South Africa: progress, failure or temporary setback? Environment and Urbanization, 35(1), pp.111–130. doi:https://doi.org/10.1177/09562478221146395.
- Belfiore, E. (1983). Aristotle's Concept of Praxis in the Poetics. The Classical Journal, [online] 79(2), pp.110–124. Available at: http://www.jstor.org/stable/3297245 [Accessed 28 Jul. 2023].Block, I. (2017).
- Urban-Think Tank develops low-cost housing for South African slum. [online] Dezeen. Available at: https://www.dezeen.com/2017/12/28/empower-shack-urban-think-tank-low-cost-housing-khayelitsha-south-africa/.

- Cadwell, M. (1996). Pamphlet Architecture 17: Small Buildings.
- Campbell, K. (2016). The Radical Incrementalist. Massive Small.
- Coleman, T.J. (2017). Places Journal. [online] Places Journal. Available at: https://placesjournal.org/article/poems-as-maps/ [Accessed 13 Sep. 2023].
- Combrinck, C. (2017). Part 2 Informal settlements: An upgrade. Architecture SA, [online] Jul., pp.32–38. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/ https://repository.up.ac.za/bitstream/handle/2263/63860/Combrinck_Part2_2017.pdf?sequence=1&isAllowed=y [Accessed 4 Sep. 2023].
- Cruz, T. (2005). A Housing Urbanism Made of Waste/Maquiladora. Available at: https://www.moma.org/magazine/articles/843.Doshi, B. (1990).
- Balkrishna Doshi's Aranya. [online] www.cca.qc.ca. Available at: https://www.cca.qc.ca/en/articles/issues/12/what-you-can-do-with-the-city/58317/balkrishna-doshis-aranya.
- Frey, P. (2021). CS Studio. Carin Smuts, Urs Schmid architectes. Éditions Actes Sud.
- Gehl, J. (2020). The Best Quotes by Jan Gehl — city planner and urban visionary. [online] Medium. Available at: https://medium.com/@EnvironmentShow/the-best-quotes-by-jan-gehl-city-planner-and-urban-visionary-8860846a4aae#:~:text=%E2%80%9CFirst%20life%2C%20then%20spaces%2C [Accessed 14 Sep. 2023].
- Gernot Minke (2009). Building with earth : design and technology of a sustainable architecture. Basel ; Boston: Birkhu□ser.
- Haranani (2022). RDP Housing. Available at: https://vharananiproperties.co.za/portfolio/soshanguve-ext-19-rdp-houses/ [Accessed 12 Sep. 2023].
- Iron Ore, K. (n.d.). Who we are. [online] SIOC Community Development Trust. Available at: https://www.sioc-cdt.co.za/who-we-are/ [Accessed 7 Oct. 2023].

- Jacobs, P. (2023). How Much Does A RDP House Cost In South Africa? (2023). [online] South Africa Lists. Available at: https://southafricalists.com/how-much-does-a-rdp-house-cost/ [Accessed 22 Jan. 2023].
- Jennings, J.E.B. (1954). Housing for the urban bantu- A problem in whole engineering. The South African Institution of Civil Engineers, [online] pp.165–190. Available at: https://acrobat.adobe.com/link/review?uri=urn%3Aaaid%3Ascds%3AUS%3A3d8e85ef-2324-43be-a8dd-1babca5d2c46 [Accessed 27 Sep. 2023].
- Jonathan (2017). How much should I pay my labourers in South Africa? [online] clockworkapp.co.za. Available at: https://clockworkapp.co.za/much-pay-labourers-south-africa/ [Accessed 22 Jan. 2023].
- Kent, J. (2008). Jan Gehl. [online] Pps.org. Available at: https://www.pps.org/article/jgehl [Accessed 14 Sep. 2023].
- L. Poulsen & M Silverman (2012). The South African Informal City.
- Larousse, P. (1864). Grand dictionnaire universel du XIXe siècle.LOW, I. (14AD). Empower
- shack. Available at: https://www.architectural-review.com/buildings/family-business-empower-shack-in-khayelitsha-near-cape-town-south-africa-by-urban-think-tank-and-eth-zurich [Accessed 12 Aug. 2023].
- Low, I. (2005). House/Home: Dwelling in the New South Africa. Architectural Design, [online] 75(5), pp.38–43. Available at: https://www.academia.edu/47186577/House_Home_Dwelling_in_the_New_South_Africa [Accessed 4 Sep. 2023].
- Mahlati, Z. (2023). Government increases the money it spends on RDP, social housing. [online] News24. Available at: https://www.news24.com/news24/politics/government/government-increases-the-money-it-spends-on-rdp-social-housing-20230331.

- Maretto, A. (2016). Lycee Schorge. Available at: https://www.kerearchitecture.com/work/building/lycee-schorge [Accessed 14 Sep. 2023].
- MATLATSI, F. (2018). Question to the Minister of Human Settlements, Water and Sanitation - NW1367 | PMG. [online] pmg.org.za. Available at: https://pmg.org.za/committee-question/11599/.
- Mills, G. (1989). Space and power in South Africa: The township as a mechanism of control. [online] JSTOR. Available at: https://www.jstor.org/stable/43622104 [Accessed 11 Sep. 2023].
- Mollard, M. (2019). Revisit: Aranya low-cost housing, Indore, Balkrishna Doshi. [online]
- Architectural Review. Available at: https://www.architectural-review.com/buildings/revisit-aranya-low-cost-housing-indore-balkrishna-doshi.
- Palma, C. (2016). Half a house. Available at: https://www.theguardian.com/artanddesign/2016/apr/10/architect-alejandro-aravena-pritzker-prize-elemental-housing-iquique-constitucion-tsunami-defences [Accessed 10 Sep. 2023].
- Palma, C. (2023). 10 remarkable works of Alejandro Aravena. [online] Parametric Architecture. Available at: https://parametric-architecture.com/10-remarkable-works-of-alejandro-aravena/ [Accessed 4 Oct. 2023].
- Retief, J. (2022). Construction Skills School / EBBA. [online] ArchDaily. Available at: https://www.archdaily.com/984998/construction-skills-school-ebba [Accessed 22 Feb. 2023].
- Rudofsky, B. (2002). Architecture without architects : a short introduction to non-pedigreed architecture. Albuquerque: University Of New Mexico Press.
- SA-TIED (2019). A game of snakes and ladders with loaded dice — socioeconomic class and poverty in South Africa | SA-TIED. [online] sa-tied-archive.wider.unu.edu. Available at:

https://sa-tied-archive.wider.unu.edu/article/game-snakes-and-ladders-loaded-dice-socioeconomic-class-and-poverty-south-africa#:~:text=Socioeconomic%20class%20in%20South%20Africa&text=We%20divide%20South%20Africans%20into.

- Salingaros, N. (2014). Fundamentalismo geométrico (parte 3): habitando el sueño de Le Corbusier. [online] ArchDaily México. Available at: https://www.archdaily.mx/mx/757621/fundamentalismo-geometrico-parte-3-habitando-el-sueno-de-le-corbusier [Accessed 11 Sep. 2023].
- Seliger, D. (2011). Teddy Cruz: Lessons from Tijuana. [online] Core77. Available at: https://www.core77.com/posts/19369/teddy-cruz-lessons-from-tijuana [Accessed 3 Oct. 2023].
- Swaranjali, P. (2018). Architectural Storytelling: The Subjunctive Mode of Architectural Conceptualization and Experience in the Works of Balkrishna Doshi. Architecture and culture, [online] 6(2: Architectural storytelling). Available at: https://www.tandfonline.com/doi/full/10.1080/20507828.2018.1490880 [Accessed 13 Jun. 2023].
- The Housing Development Agency (HDA) (2015). Tsantsabane – Northern Cape Housing Market Overview Human Settlements Mining Town Intervention 2008 – 2013. [online] thehda. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://thehda.co.za/pdf/uploads/multimedia/Tsantsabane___Northern_Cape_.pdf.
- Viljoen, J. (2013). Low cost housing plan, white cty. [Photo] MVD Kalahari.
- .VPUU (2018). Active Boxes. [online] VPUU. Available at: https://vpuu.org.za/safe-node-area/active-boxes/ [Accessed 4 Sep. 2023].

EM (LARA) KOTZE
2018248043