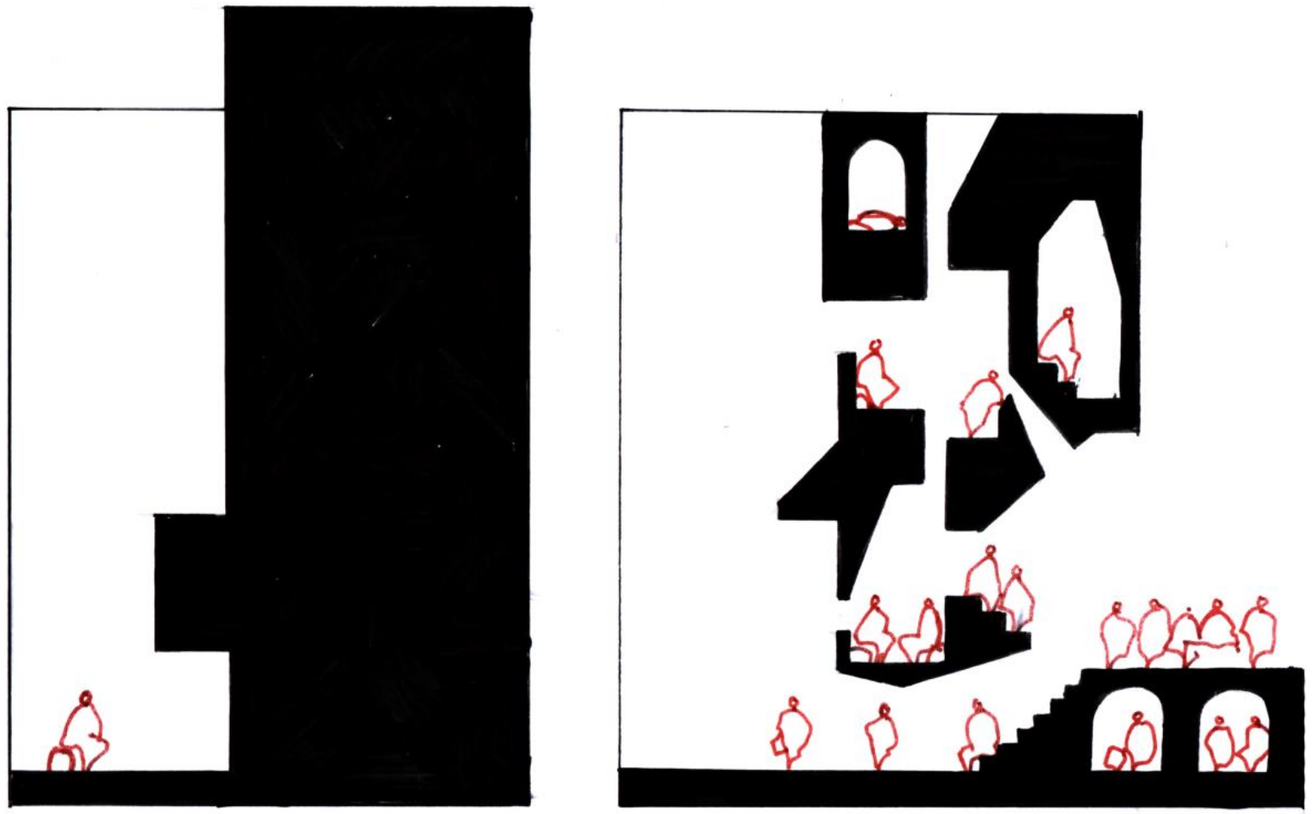

THE ACT OF REFUGE

Facilitating spatial practices of mobile urban dwellers in the inner city of Pretoria

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DECLARATION

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this dissertation, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this dissertation is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

Wian Jordaan
17-01-2022

Submitted in fulfillment of part of the requirements for the degree of Master of Architecture (Professional), Department of Architecture, Faculty of Engineering, Built Environment, and Information Technology (EBIT).

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THANK YOU

TO COENET,
for your unwaivering love, endless patience and always believing in me
- for being my place of refuge -

TO MY PARENTS,
for your support and encouragement

TO HANO AND CAMERON,
for a friendship built by maquettes

TO ARTHUR AND SILINDZILE,
for inspiring me

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AUTHOR Wian Jordaan

STUDY LEADERS Prof Arthur Barker
Silindzile Shongwe

COURSE COORDINATOR Prof Arthur Barker

RESEARCH FIELD Memory, Legacy and Identity

CLIENTS
- Tshwane Metropolitan Municipality
- Independant higher education institutions
- Department of Higher Education
- Queen street Mosque

PROGRAMME
Cooked food market
Communal kitchens
Tertiary education facilities
Library and study centre

STUDY AREA Pretoria Central

SITE LOCATION
Madiba Street
Queen Street
Lil1an Ngoyi Street
Church Street

COORDINATES 25o74'49.6"S, 28o19'21.7"E

THE ACT OF REFUGE

Facilitating spatial practices of mobile urban dwellers in the inner city of Pretoria

ABSTRACT

In the inner city of Pretoria, the mobile urban dweller is confined to the sidewalk - a space of transition that promotes anonymity, indifference and transience. The mobile urban dweller has a desire for a place of refuge - a place to dwell, a place to call their own, a place to escape the disorder of the street. The intention of this dissertation is to explore how a place of urban refuge can be created by facilitating temporary acts of refuge for the mobile urban dweller. The contemporary built environment in the city have fallen victim to a function-, form- and aesthetic - driven approach to space-making. This approach neglects people's everyday lived experiences, and creates a disjunction between how space is conceived and how it is used. An alternative approach to space-making were developed to explore how architecture can facilitate everyday spatial practices, in order to mediate between the lived and conceived spatial dimensions.

KEYWORDS

Refuge, urban, arcade, courtyard, place, dwelling, spatial triad, spatial perception

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01 INTRODUCTION

CHAPTER

A story of the mobile urban dweller



Fig. 1: Experience on the sidewalk (Author 2021)

Douglas is traveling to work in the city, wedged between the shoulders of strangers in a tightly packed taxi. Their faces, voices, smells, sounds and moods are somewhat familiar, but not much else. Upon arrival, the crowd disperses into the city's never-ending corridors. Douglas joins the synchronized rhythm of the street, dodging obstacles and strangers. One by one they escape into small openings of fortified walls.

In a room that was once an office, then a church and now a classroom, Zandile struggles to place herself. She can barely hear the muffled sounds of the street as she observes from above.

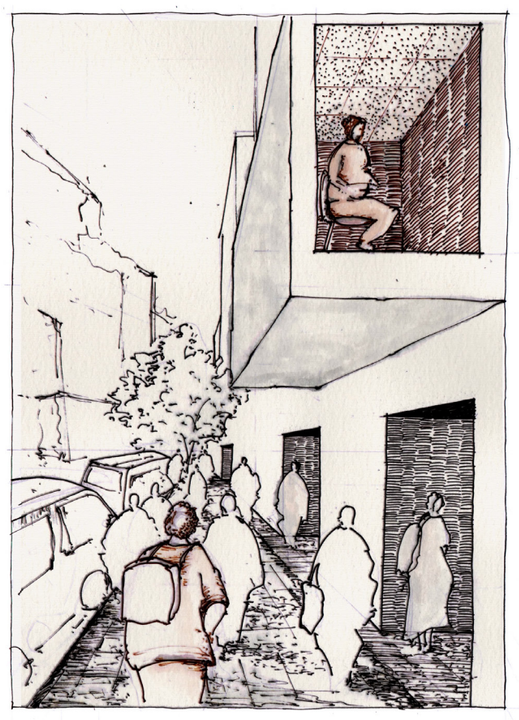

Fig. 2: Detatchment from the steet (Author 2021)

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The clock calls everyone back into the realm of the street. It is time for lunch, time to escape and time to socialise. For Abdou it is time for prayer. The mosque, like the city, is in a constant state of flux - contracting and releasing. The familiar crowd quickly gathers, but dissipates equally as fast.
From the Mosque, Abdou takes a detour to buy a fresh magwinya (vetkoek) from Grace's stall. The movement of strangers pushes him closer into her nook. "Business is bad today" she says, prompting him to buy a few extra. Wandering the streets for lunch, Zandile bumps into a lady selling sandwiches. Her face seems oddly familiar, she might have bought from her before.

Douglas and his friends are approaching their favourite spot, where Naaila has been preparing food for them all morning. In the shade of a broken gazebo on the side of the road, they feast. In that moment, the world beyond fades away.



Fig. 3: Taxi operators' encroachment and appropriation of the sidewalk(Author 2021)

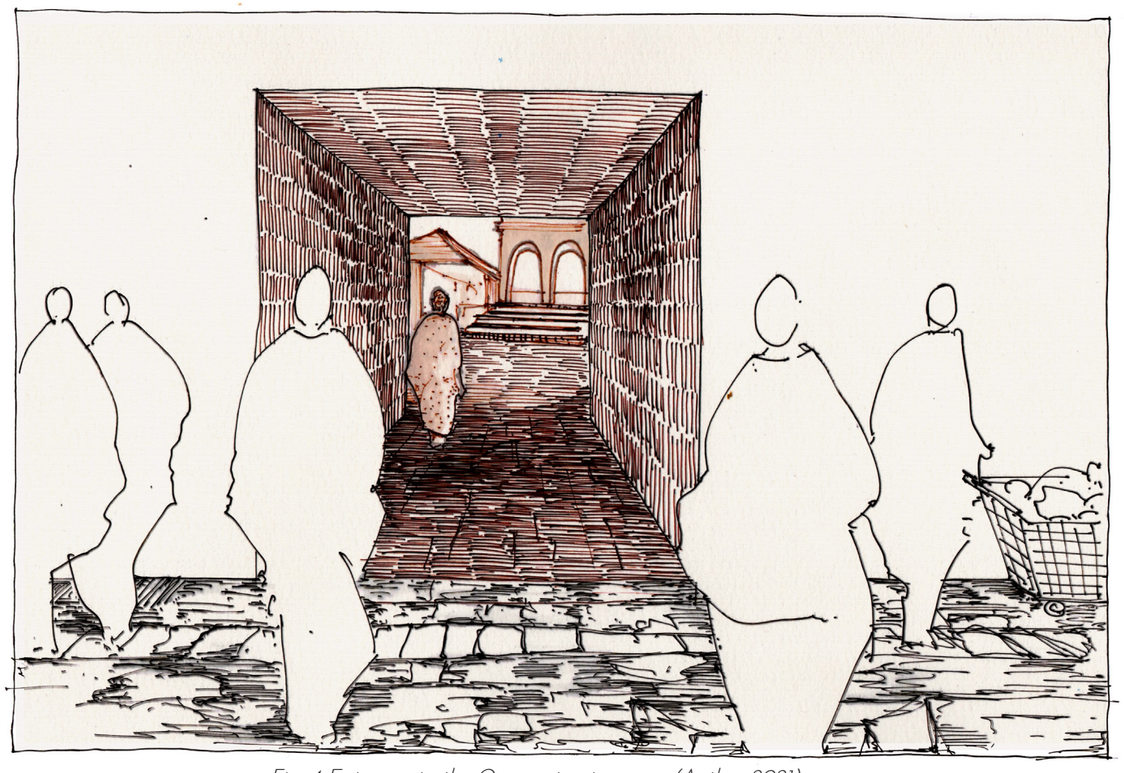

Fig. 4 Entrance to the Queen street mosque(Author 2021)

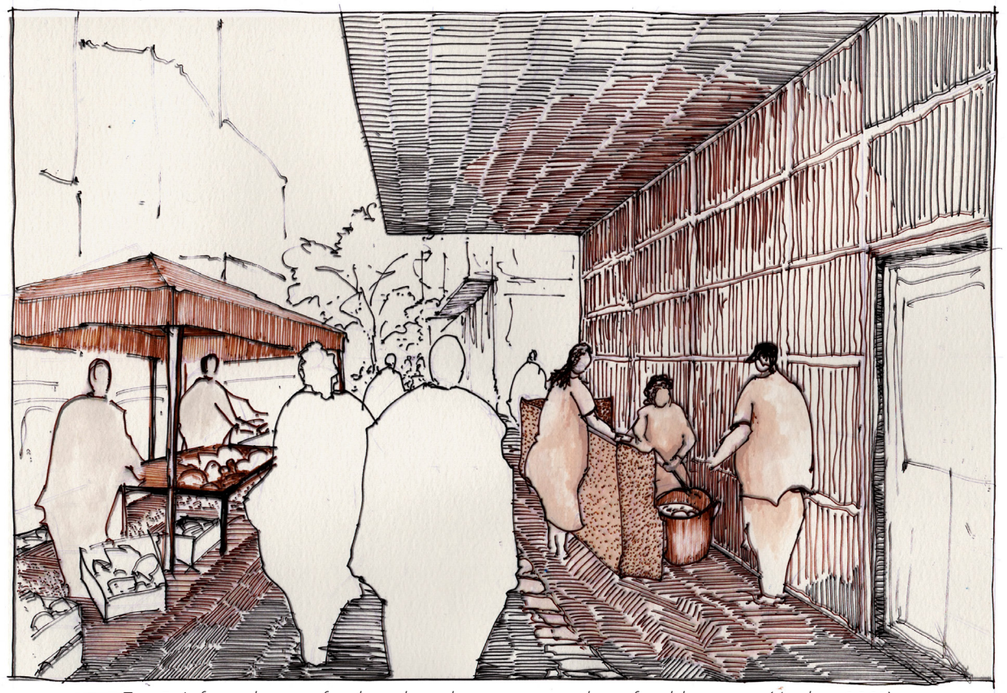

Fig. 5: Informal street food traders claiming ownership of public space (Author 2021)



Fig. 6: Informal street food traders creating an informal place of refuge (Author 2021)

This is a story of Pretoria's daily 'migrants' and their current relationship with the inner city, the proposed site and one another. It describes their experience of anonymity, transience, detachment from place and their desire for refuge - a place of dwelling, intimacy and belonging.

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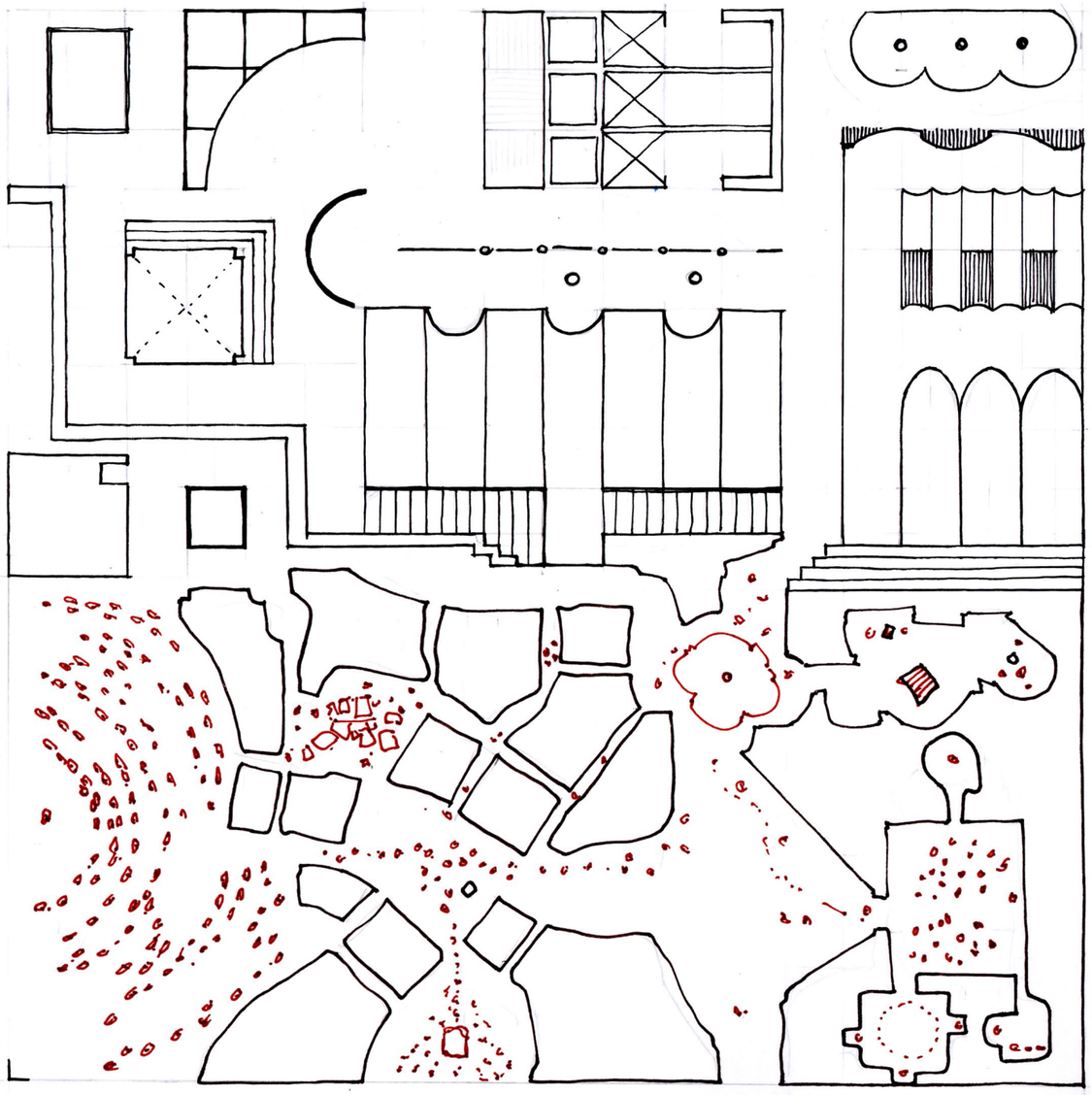

Fig. 7: Form driven space (top) vs activity driven space (bottom) (Author 2021)

1.1
GENERAL ISSUE

The process through which contemporary urban architecture is produced is driven by function, form and aesthetics, resulting in architecture that operate as self-contained isolated objects (Perez-Gomes 2002: 29; Van Rensburg & Da Costa 2008a: 34). This approach to space-making neglects the social landscape of everyday spatial practices and people's lived experiences (Merrifield 1993: 524; Sennett 2018: 78-83).

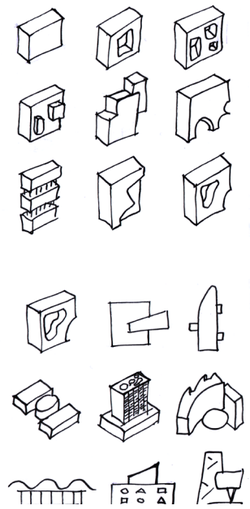

Fig. 8: Form driven architecture (Author 2021)

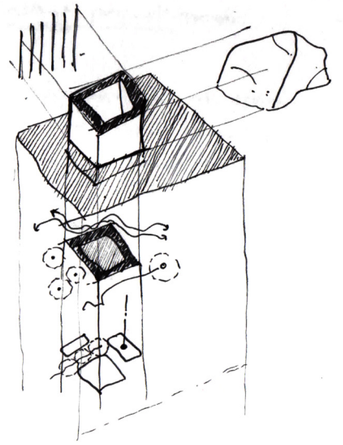

Fig. 9: Architecture conceived in isolation (Author 2021)

Sennett (2018: 63-89) argues that the contemporary urban condition can be characterized by the disjunction between the formal built environment and the way people dwell in the city, everyday spatial practices and people's attachment to place. In the inner city of Pretoria, the formal built environment has been conceived as static objects, that attempt to order, rationalise and control the complex dynamics of urban life according to architects' visions (Bremner 2010: 22-31; Pallasmaa 2005:29), rather than engaging with the existing lived complexities and dynamic social behaviour of the street (Van Rensburg & Da Costa 2008b: 45).

If urbanism were to be interpreted as a way of life, the urbanity of the street, a place of connection, diversity and openness, is being undermined by the built fabric's anti-urban tendency towards separation, control and privatisation (Vaetisi 2013:3; Wirth 1938:1).

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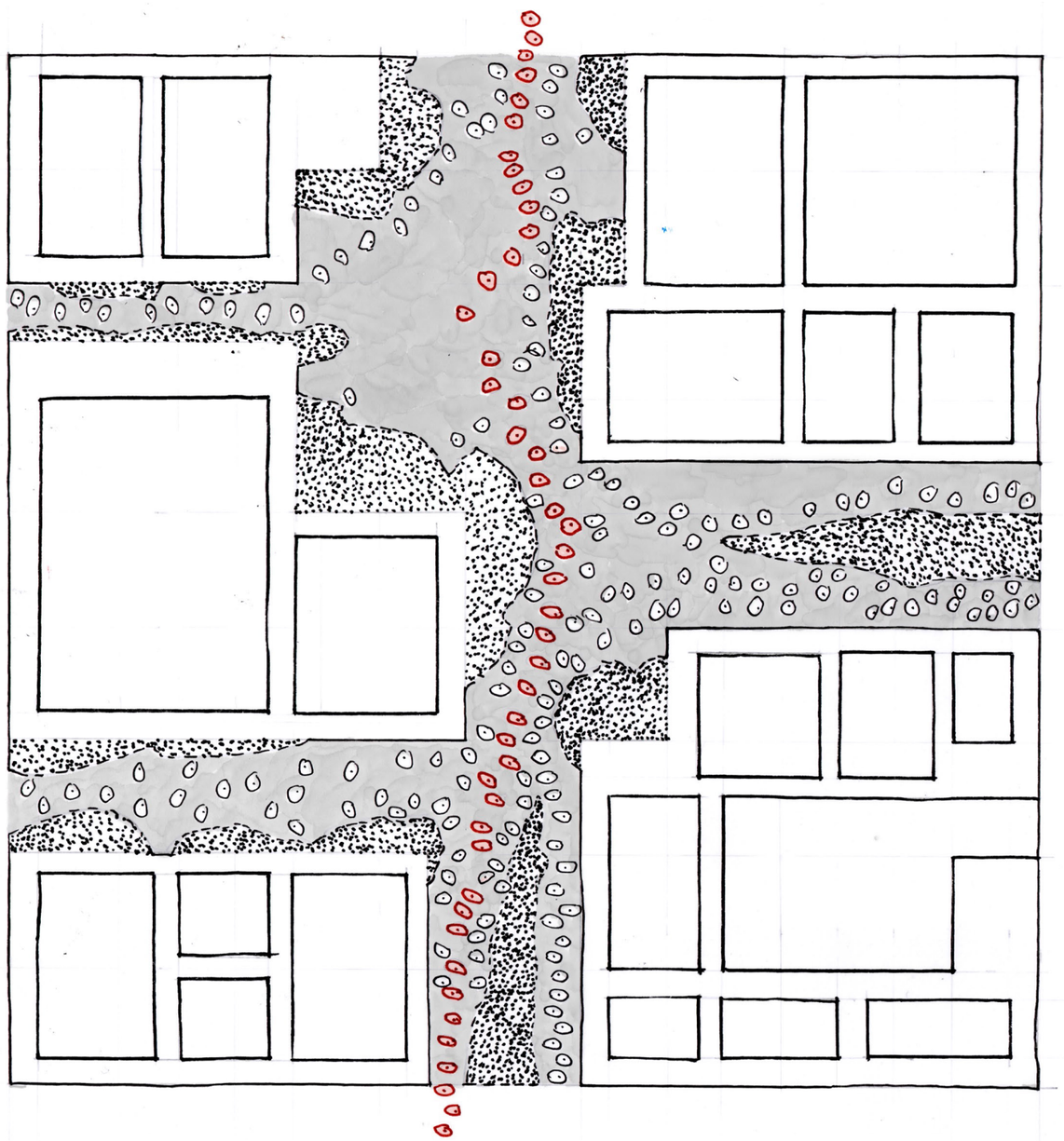

Fig. 10: Spatial realm of the mobile urban dweller (Author 2021)

1.2
URBAN ISSUE

The legacy of past urban planning and development practices such as Apartheid spatial planning policies, modernist urban visions, urban sprawl and lack of inner-city housing (Bremner 2010: 10-15; Mbembe & Nuthall 2004: 357) has created a condition where the majority of workers, students and shoppers live outside the bounds of the inner city of Pretoria (Simpson, McKay, Patel, Sithole, Berg, Chipp, 2012: 37-58). The experience of the daily commuter in the city can be described as mobile, transient and fluid. It is necessary to differentiate between the needs of the mobile urban dweller, a temporary inhabitant of urban space, and a permanent resident.

The mobile urban dweller moves through the inner city of Pretoria as a stranger, with few memories and short histories with the places they pass through (Bremner 2010:150). The experience of the destination is now dominated by the experience of the route (Bremner 2010: 104). The route promotes movement rather than dwelling and anonymity instead of social interaction. Philosopher Karsten Harries (in Nesbitt 1996: 394-392) argues that the act of dwelling is essential for man to understand his purpose and his place in the world. In the context of mobility, the term dwelling can be defined as the temporary act of staying, to pause, linger, rest and engage with the place you inhabit.

Fixed boundaries and clear distinctions between public and private realms in the inner city of Pretoria confine the mobile dweller to the street (Van Rensburg & Da Costa 2008b:37). Even though informal spatial practices on the streets surrounding the site provide some opportunity for social interaction and temporary dwelling, the transitional nature of the sidewalk and mobile urban dweller's alienation from the built fabric, have created an indifference to place and others. Anonymity, social disconnection and strangeness are common in any city (Sennett 2018:70; Wirth 1938:1). However, in the context of the Pretoria, these qualities are exacerbated by the mobile urban dweller's detachment and indifference to place.

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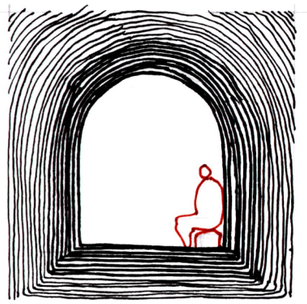
1.3
THE DESIRE FOR REFUGE

Douglas, a government worker, steps outside the comfort of the office to re-join the fast-paced rhythm of the street. The sidewalk is narrow and filled with unfamiliar faces. The continuous motion push and pull him forward. There's barely a chance to pause and breath. Thankfully his refuge is not far away. Under the shade of a broken gazebo and behind protection of fabric walls he sits and dines with friends. A place that they claim as their own, even if its only temporarily. A place to rest, laugh and share stories.

Zandile, a college student, moves through the city as a stranger. At first the anonymity is oddly comforting. No one knows her or expects anything from her. She fears the exposure of the street, to be seen, confronted or be out of place. Alone in an empty classroom she finds peace and comfort. It is not long before she realised that the act of turning inward and isolating herself from the uncertainty of otherness, has detached her from the city.



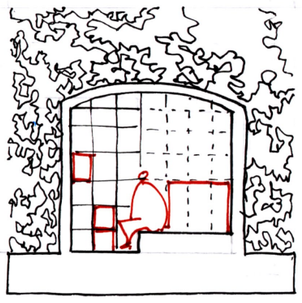
Fig. 11: The desire for refuge (Author 2021)



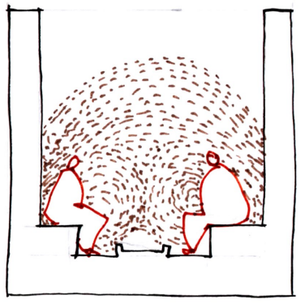
SPATIAL INTIMACY



FAMILIARITY



CONTROL



DWELLING

Fig. 12: Characteristics of refuge (Author 2021)

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1.4
THE NEED FOR EXPOSURE

The mobile urban dweller has a desire for refuge in the inner city. A place to dwell, a place to call their own and to escape the anonymity of the street. A desire to create attachments to place by restoring the intimate relationship between space and the body, and between oneself and others (Harries in Nesbitt 1996:394-392).

Sennett (1992: 12-15) argues that the neutrality of the modern city has made us fear difference. We are reluctant to expose ourselves to things beyond our control. When we are confronted with difference, we react with indifference (Sennett 1992:125). However, it is through exposure that we find ourselves. By seeing and engaging with differences on the street and with other people, we determine who we are in relation to the world around us (Sennett 1992:12-15). A place of refuge is typically defined as a sanctuary, a place that isolates and protects you from the dangers of the outside world. In the context of the inner city, a place of refuge has a responsibility beyond protection. It must confront the desire to turn inward with the need for exposure.

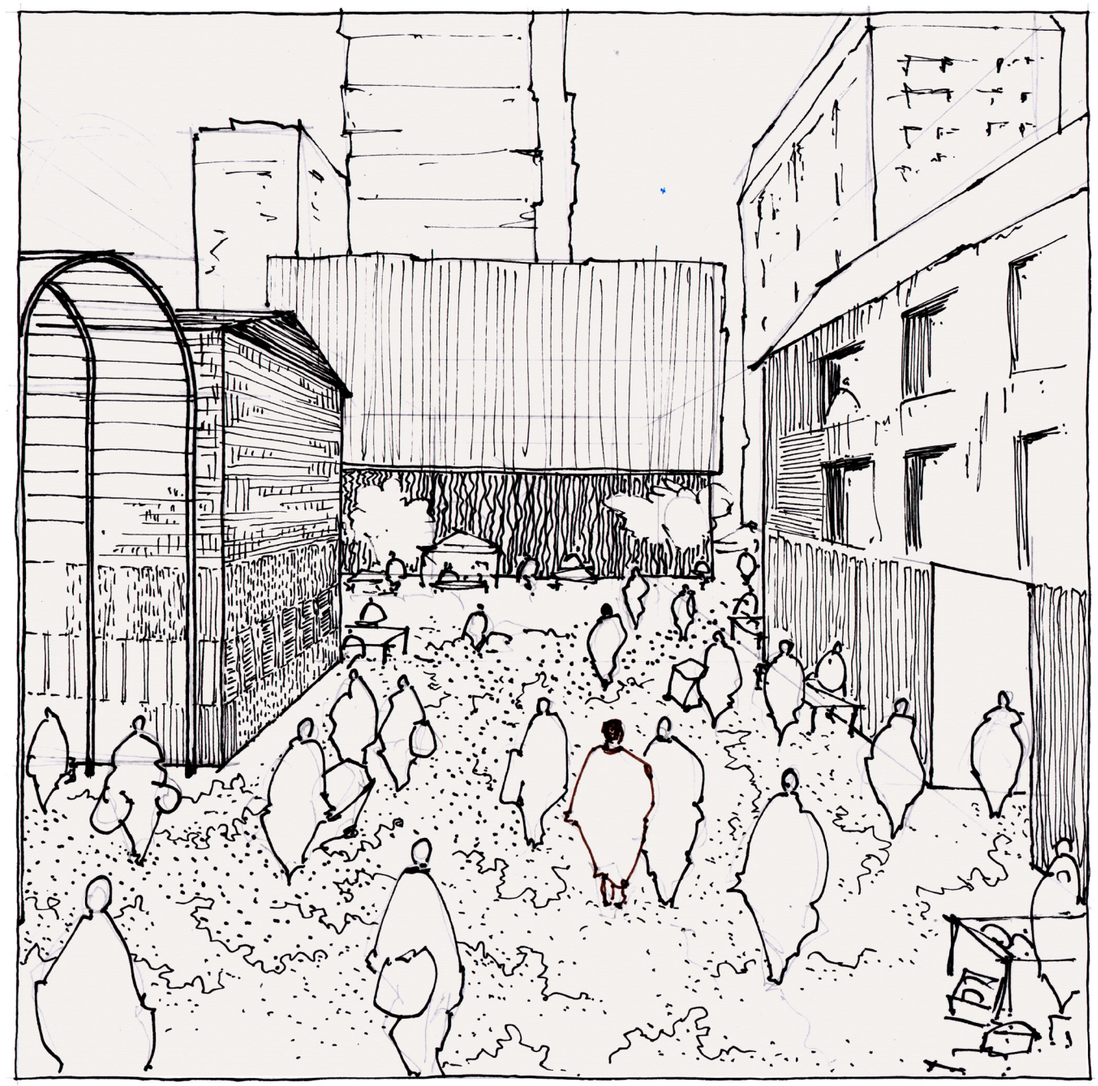
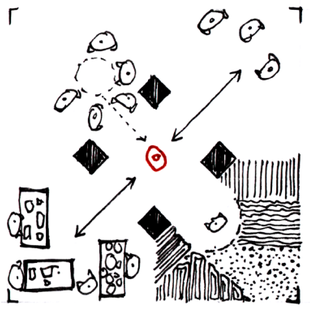
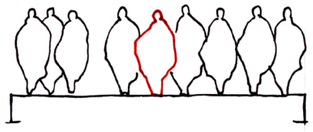


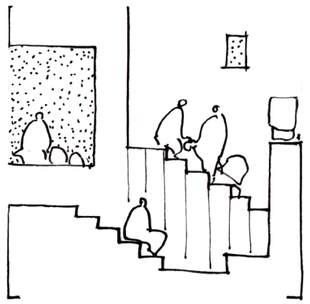
Fig. 13: The mobile urban dweller's desire for exposure (Author 2021)



INTERACTION



ANONYMITY



AMBIGUITY



DIFFERENCE

Fig. 14: Characteristics of exposure (Author 2021)

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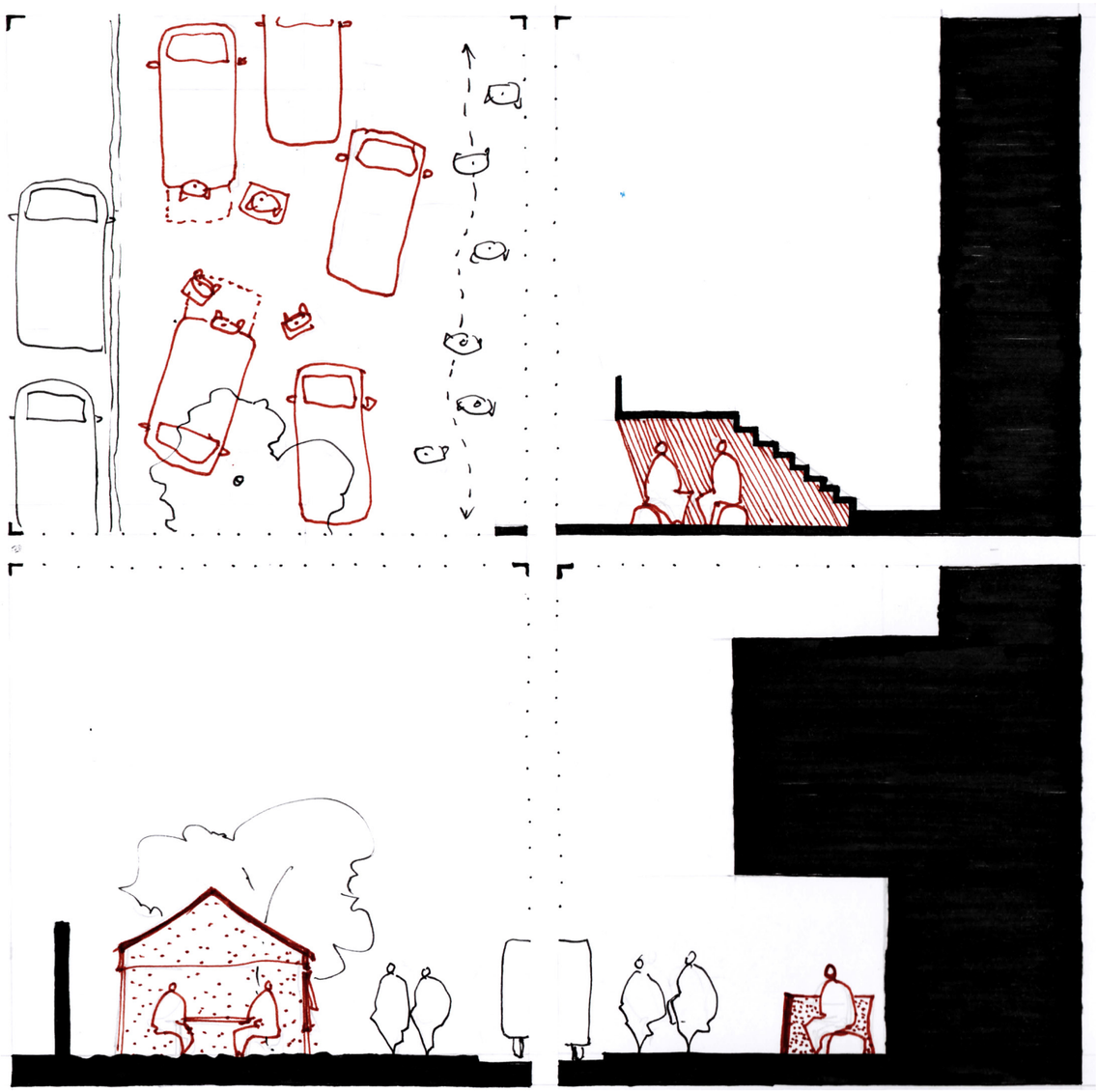

Fig. 15: Acts of refuge in the public realm of the city(Author 2021)

1.5
ARCHITECTURAL ISSUE

This project will explore how architecture can create a place of temporary refuge for the mobile urban dweller in the context of the inner city of Pretoria. In a complex context where there are many different types of users, the architecture must be able to accommodate a plurality of contradictory interpretations of refuge and exposure.

Existing typologies of refuge in the inner city of Pretoria were identified and divided into three categories: refuge as isolation, refuge as a place for the public to dwell, and refuge that create an alternative reality to escape in. The majority of these places do not respond to the mobile urban dweller or accommodate different types of refuge for different users. In the context of the site, which links to the surrounding arcade network, this project will explore how a space of transition can also be a place of refuge.

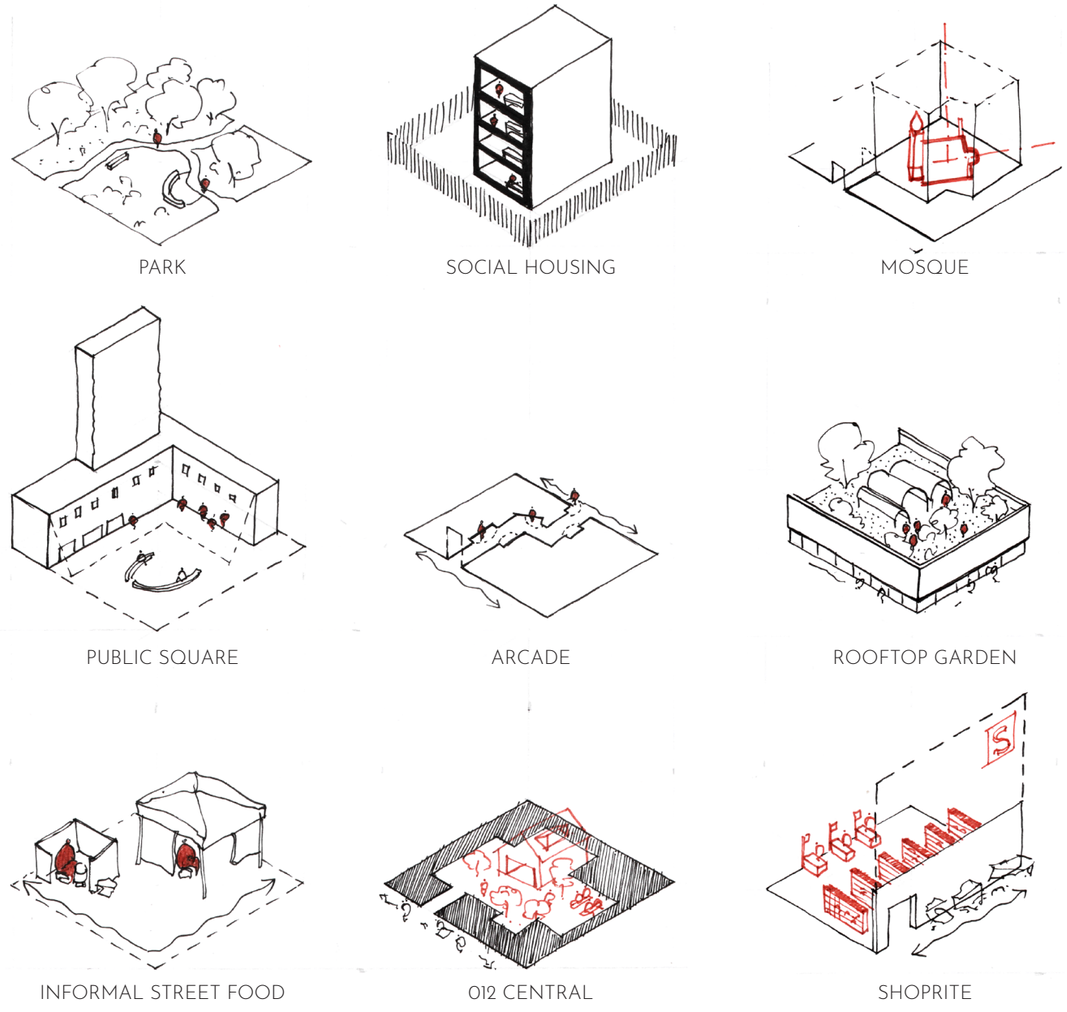

Fig. 16: Existing typologies of refuge in the inner city of Pretoria (Author 2021)

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1.6
RESEARCH QUESTION

How can architecture facilitate temporary acts of refuge for the mobile urban dweller in the inner city of Pretoria?

1.7
METHODOLOGY

A qualitative approach, based on a relativist ontology and an interpretivist paradigm (Scotland 2012), were used to investigate the existing spatial practices and subjective experiences of mobile urban dwellers in and around the selected site. The physical and ethnographical characteristics of the study area were investigated by conducting a field study (Du Toit 2010). Salkind (2010) argues that field studies allow researchers to examine and interpret the existing phenomena, behaviour and dynamics of a site. Unobtrusive observation of people, activities and the context formed the primary method of data collection. The intention of the field study was to gain insight into how the existing built environment, in the inner city of Pretoria, affect the experience and behaviour of city dwellers. The observations were guided by intuition rather than a predetermined criteria, which gave the researcher the freedom to discover problems and opportunities unique to the site and context. The theme of urban refuge were not the initial focus of the dissertation. The decision to focus on refuge were informed by the spatial practices of mobile urban dwellers, an initial reading of the selected site and the researchers subjective experience in the city during visits.

The theoretical framework, context analysis and design explorations were guided by the spatial theories of Henri Lefebvre (1991). Based on Henri Lefebvre's (1991) spatial triad, a new approach were developed to explore how the lived and conceived spatial dimensions in the inner city can be reconciled through the spatial practices of everyday acts of refuge. Guided by intuition, this approach made use of typological investigations for context analysis, spatial explorations and design informants.

1.8
DELIMITATIONS AND ASSUMPTIONS

In this dissertation, priority was given to the needs of the specific mobile urban dwellers identified on site, above the needs of other potential users of the building. Four different personas were created to represent a diverse range of users' needs that the design ought to respond to. These personas were informed by the users observed on site, but remain subjective and can not be universally applied.

The design was heavily influenced by the particular context (physical, urban, users, etc.) of the site. For future projects in the inner city, the approach that was developed is more valuable than the particularities of the design solution.

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02

CHAPTER

THEORETICAL FRAMEWORK

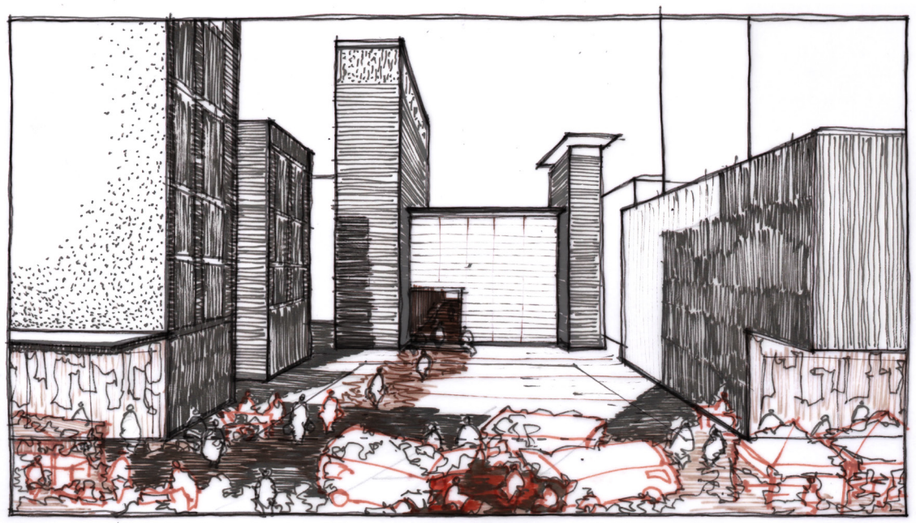

Fig. 17: Three spatial dimensions of the site overlaid (Author 2021)

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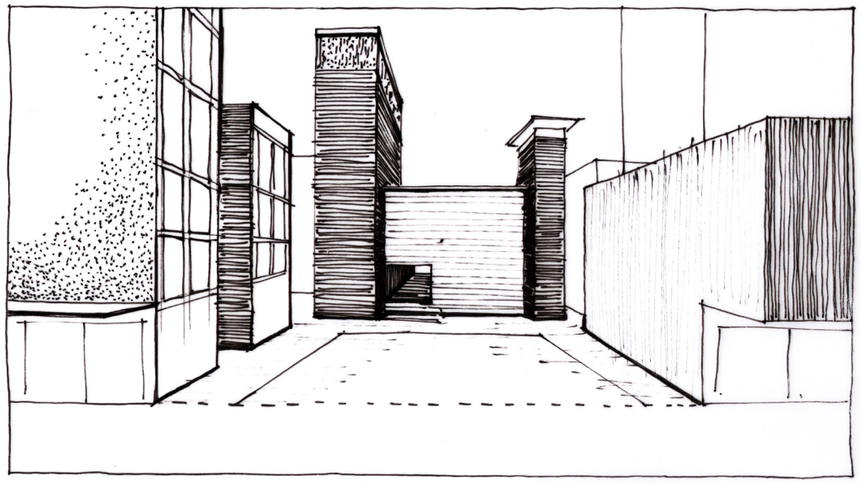

Fig. 18: A reading of the site as conceived space (Author 2021)

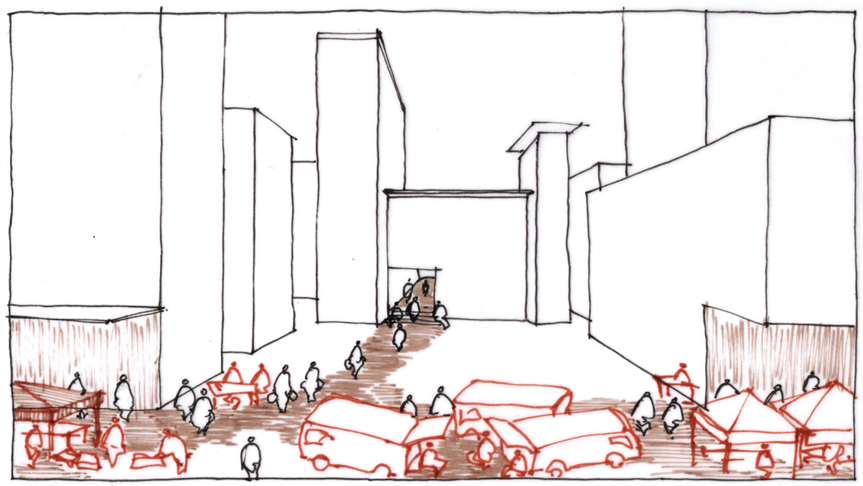

Fig. 19: A reading of the site as perceived space (Author 2021)



Fig. 20: A reading of the site as live space (Author 2021)

The larger intention of this dissertation is to re-conceptualize how urban space is conceived, with greater emphasis placed on the experience and socio- spatial behaviour of the mobile urban dweller. A series of themes have been extracted from the quotidian spatial theories of Henri Lefebvre (1991), which explores a possible mediation between architecture and social practice (Van Rensburg & Da Costa 2008b: 50).

2.1
SOCIAL SPACE

Soja (1985:90) argued that urban space ought to be considered as both the material realisation of social life and the medium through which social relations are generated. Lefebvre (1991: 68-90) argued that space should not be understood as an independent material product in itself, but rather as a series of three interrelated social processes (Schmid 2008: 27-28). Social space is *conceived* through abstract thought, *perceived* through the spatial practices of everyday life and *lived* as an experience through the body (Van Rensburg & Da Costa 2008a: 39). *Conceived space* is the process through which space is imagined, conceptualised, defined, ordered and represented (Schmid 2008: 35-52). *Perceived space* refers to spatial practices and how the activities of everyday life are structured by *conceived space* (Merrifield 1993:524). *Lived space* refers to the dynamic lived experiences of the body in space (Lefebvre 1991:93). Our attachment to place, our spatial behaviour and how space is conceived are interrelated processes.

Lefebvre's (1991) spatial framework is too vague if not applied to the specific realities of a site (Schmid 2008:41). In the inner city of Pretoria, *conceived space* is given priority over the existing spatial practices and lived dimension of space. This imbalance, has created a fractured relationship between how built form is produced, and how space is used and appropriated by users.

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2.2
DIALECTIC THINKING

The spatial triad proposed by Lefebvre (1991:68-106) explored the dialectical relationships between the three dimensions of space (conceived, perceived and lived), which have previously been thought of as separate entities in Cartesian thought (Merrifield 1993: 517-518). A dialectic way of thinking implies that social reality can only be understood in relation to its own negation, its opposite and its inherent contradictions (Schmid 2008: 30-33). This is in opposition to analytic thinking, a process through which phenomena are broken into separate parts and logically ordered (Merrifield 1993: 518-520). The reductionist approach of analytic thinking is a manifestation of modern society's desire for clarity and certainty, and our inability to cope with complexity (Sennett 2018:11; Venturi 1966:16).

In the urban condition, space should be explored as relational and be capable of tolerating contradiction. Refuge can therefore not be designed without an understanding of exposure. In this study, a relational approach requires that the concepts of refuge and exposure not only be placed in contrast with one another, but exist within the same space simultaneously.

2.3
PLURAL PERCEPTIONS OF SPACE

The disjuction between the built environment and the mobile dweller's needs indicate a fractured relationship between the object and the subject. The object is prioritised and the subject is made universal and anonymous (de Certeau 1988: 93). Architects must acknowledge and embrace the contradictions between logic and perception, the differences between architectural intention and appropriation, and the unpredictability of a dynamic urban condition (Holl, Pallasmaa, Perez-Gomez 1994:5). Norberg-Schultz (in Nesbitt 1996:429) argued that the meaning of a place will differ, depending on the subject's interpretation, perception, experience and association with space.

Based on observations on site, four types of mobile urban dwellers were identified, each with different needs in terms of refuge and exposure. The theory of 'loose space' (Franck & Steven 2007: 9) will be explored in the design process to challenge the over-determining and prescriptive nature of conceived space. Urban space needs to be loose enough to accommodate different activities, spatial practices and spatial experiences, simultaneously and over time.

2.4
RITUALS OF EVERYDAY LIFE

Sennett (1990) argued that the way in which we use and appropriate space is more representational of our identity and attachment to place than any visual or formal representation. The form and aesthetic-driven approach to space making in the city of Pretoria should be replaced with activity-driven solutions that celebrate the rituals of everyday life (Van Rensburg & Da Costa 2008a: 34). A process through which space can actively reproduce itself through event, experiences and everyday activities.

The shift in priority towards spatial practices rather than conceived space, require new methods of urban analysis to understand the existing socio-spatial relationships in the city (Van Rensburg & Da Costa 2008b: 52). The process of 'rhythmanalysis' (Lefebvre 1992) will be used as a method to investigate everyday urban life in terms of cyclical and linear rhythms (Meyer 2008:148).

2.5
CONSTRUCTING THE SITE

When the city is read as a whole, the complexity of the urban condition is overwhelming and illegible. Andrea Khan (1995:199-200) argues that the urban condition should not be analysed through a process where complexity is reduced and divided into separate layers, in an attempt to produce a clear, objective and coherent image of place. Conventional site analysis gives precedence to that which is visible, clearly defined and easily understood.

The site should be constructed rather than analysed (Kahn 1995:201). Constructing the site is a subjective process of extracting place-specific qualities on multiple scales and from multiple perspectives to construct a new version of the site (Kahn 1995:201).

The selected site was 'constructed' through the lens of the mobile urban dweller. Therefore, it is only one version of the site.

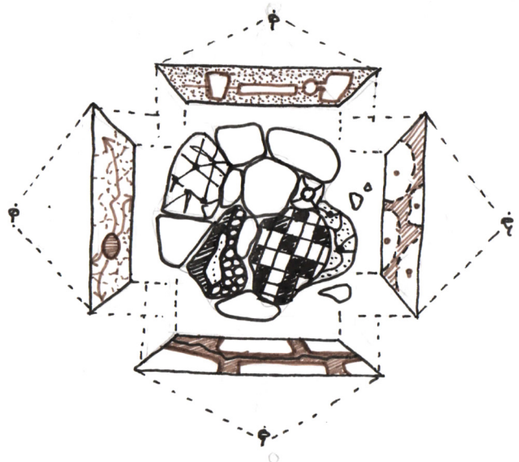

Fig. 21: Constructing the site from multiple perspectives (Author 2021)

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03 CONTEXT

CHAPTER



Fig. 22: Existing act of refuge (Author 2021)

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3.1
CONTEXT - CONCEIVED SPACE

A study was conducted through the lens of conceived space to document the development of the north-east quadrant of the inner city of Pretoria. The drawings were informed by photography from Google Earth, archival aerial photographs and historic photographs (Hansen 2016).

Over time, the social functions of the historic town centre were removed or relocated to the periphery, as a result of the inner city's transition into a commercial and government precinct. These include churches, the market hall, taxi ranks and church square as a place of trade and communion (Clarke, & Corten 2011: 886 ; Jansen 2012).

Informal social functions have organically emerged in the form of informal street trading and new schools and churches in appropriated office buildings.

The typologies of public space shifted from intimate arcades and street verandas to large open public squares. After the 1990's public space were gradually formalised, privatised and fenced off.

Over time, development shifted from a fine grained urban fabric, to large scale monumental objects.

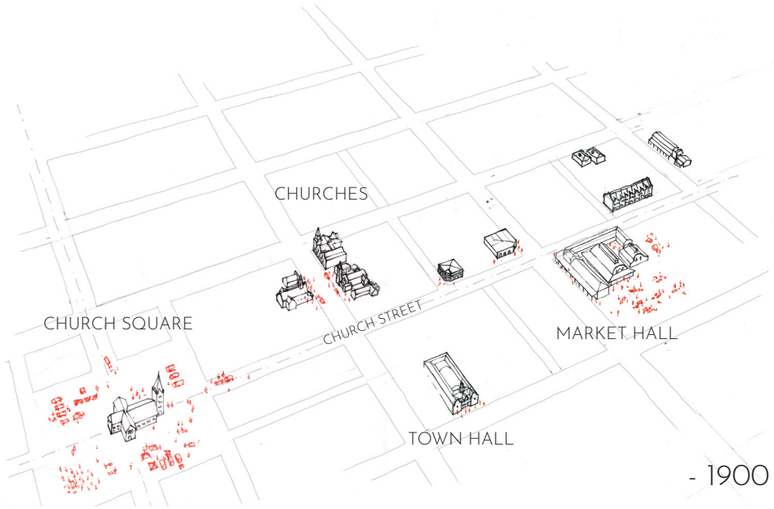

Fig. 23: Social functions of historic town centre (Author 2021)

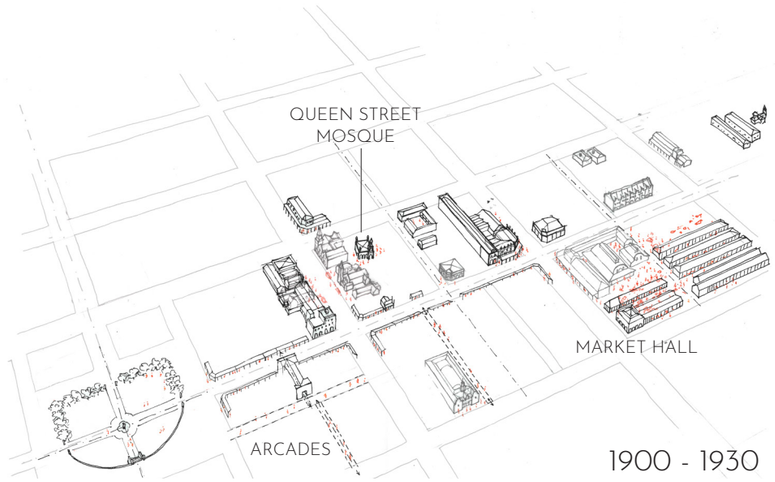

Fig. 24: Street varandas and arcades provide refuge (Author 2021)

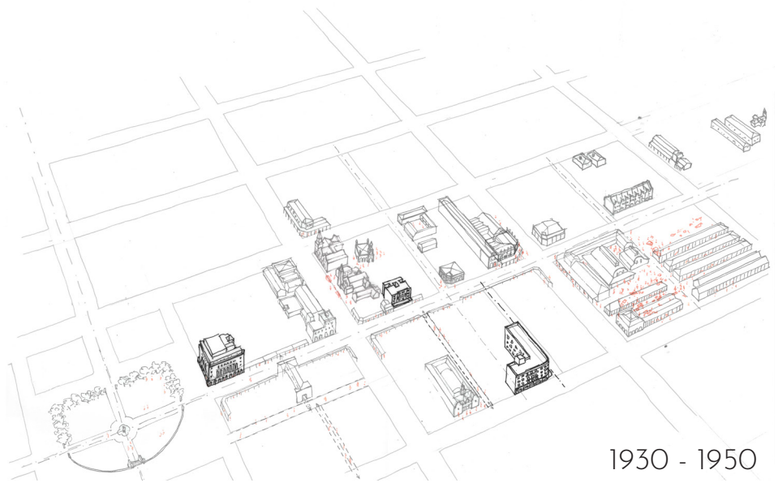

Fig. 25: Multi-storey mixed retial and office typology (Author 2021)

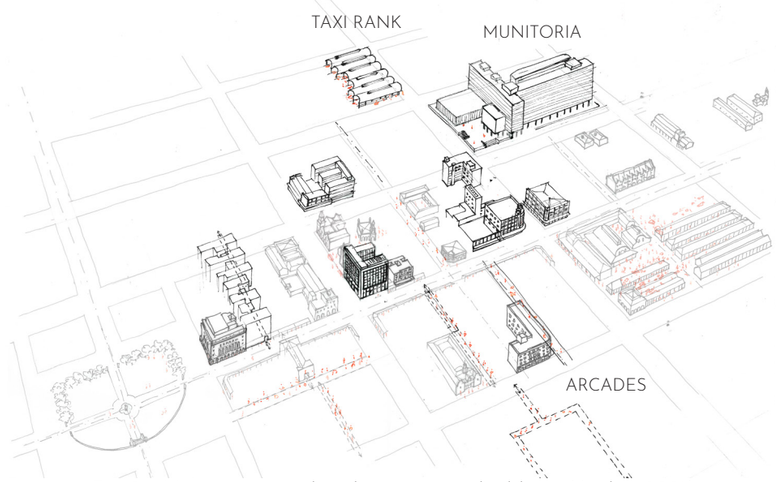

Fig. 26: New commercial and government buildings (Author 2021)

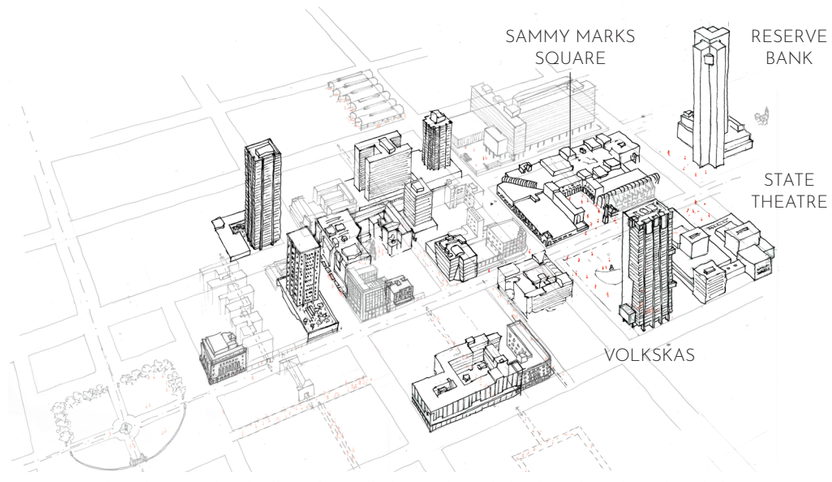

Fig. 27: Churches, maket hall and small shops demolished and replaced with large scale late-modernist office buildings(Author 2021)

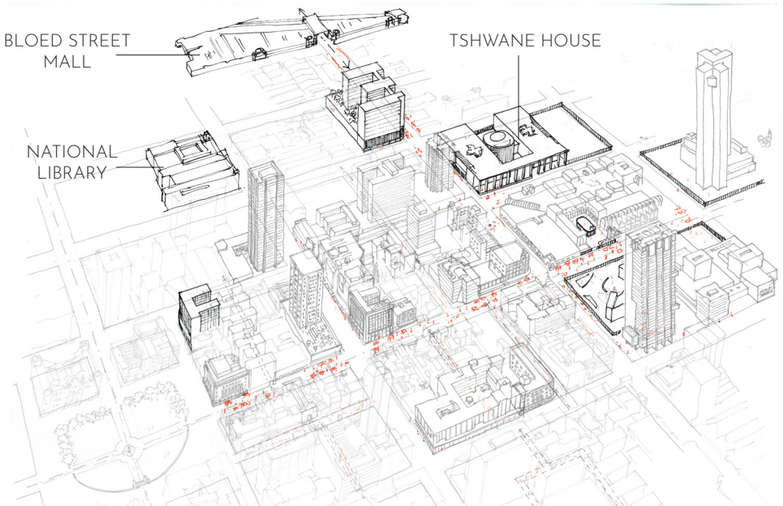

Fig. 28: Controlled and privatized public spaces and informal street trading (Author 2021)

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Fig. 29: Tshwane 2055 urban vision (Author 2021)

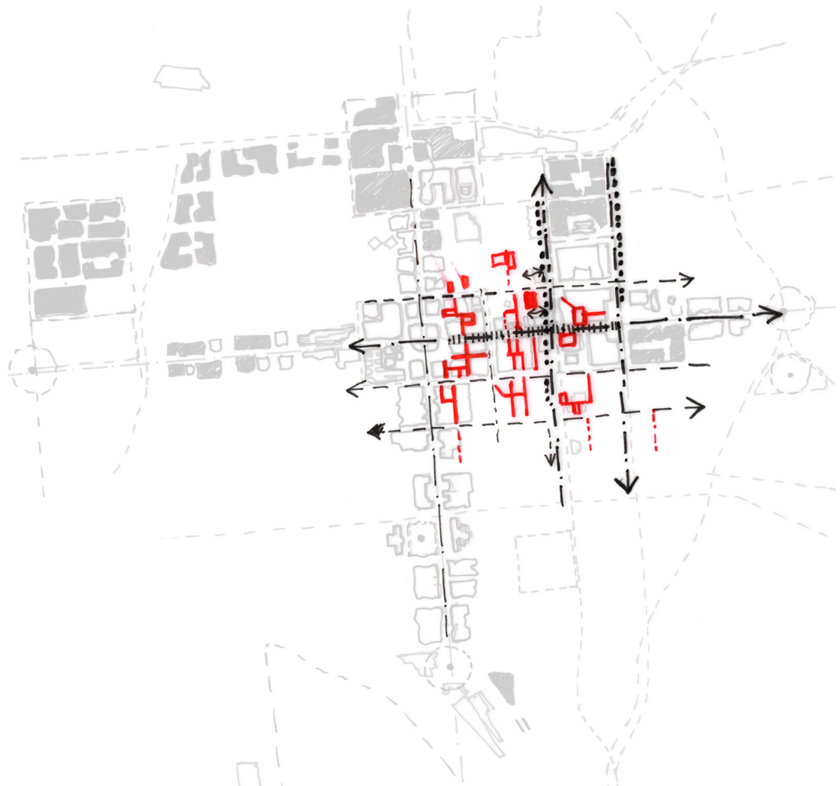

Fig. 30: Existing movement and arcade network (Author 2021)

URBAN VISION

Tshwane's 2055 urban vision (City of Tshwane 2013) proposes new, large scale development around the periphery of the city. Grand urban gestures such as the celebration of axes, gateways and large new precincts ignore the reality of how the city is experienced by the urban dweller.

The proposed urban vision aim to revitalise the public realm within the inner core of the city, through tactical architectural interventions around the existing arcades, courtyards and leftover spaces.

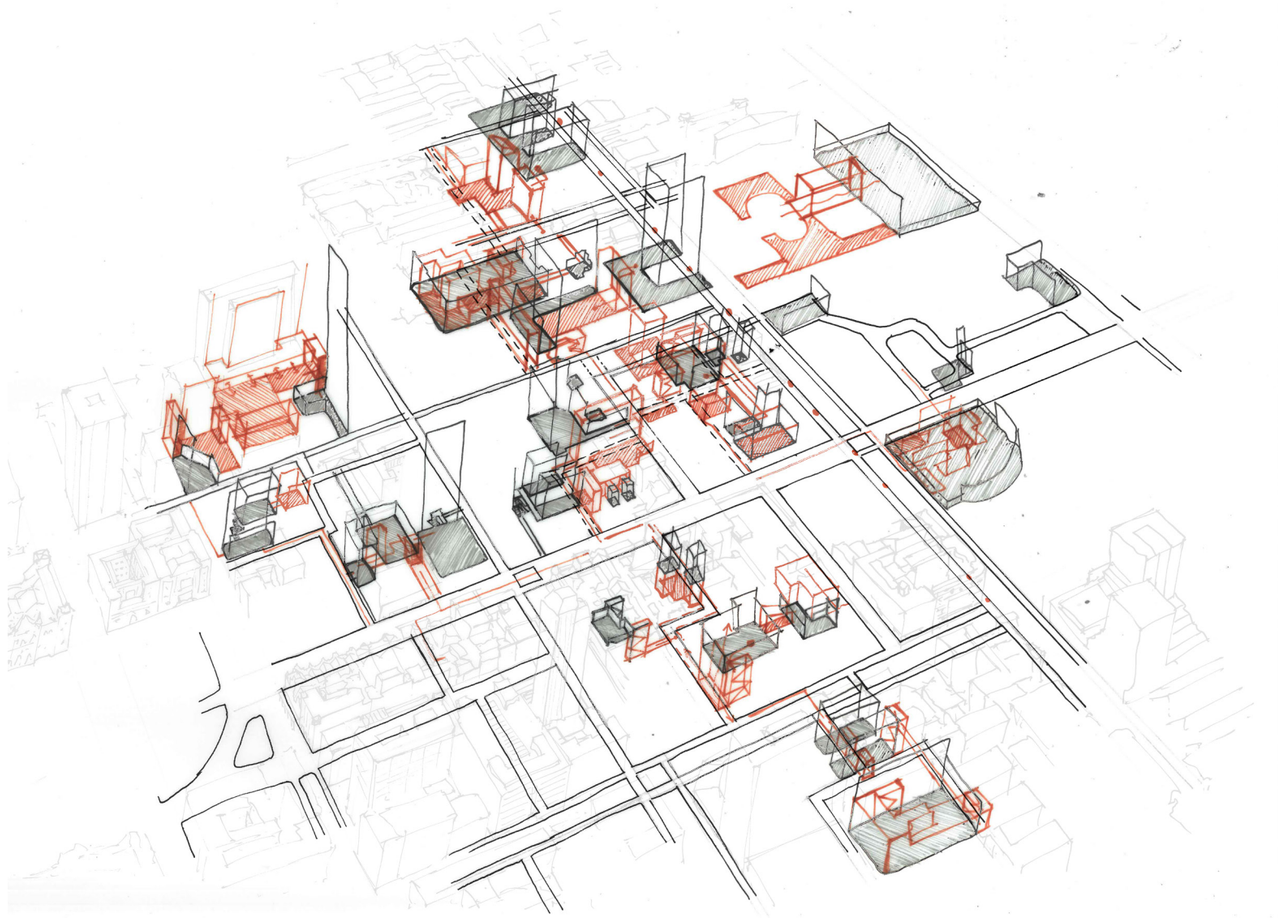

Fig. 31: Proposed urban vision (Author 2021)

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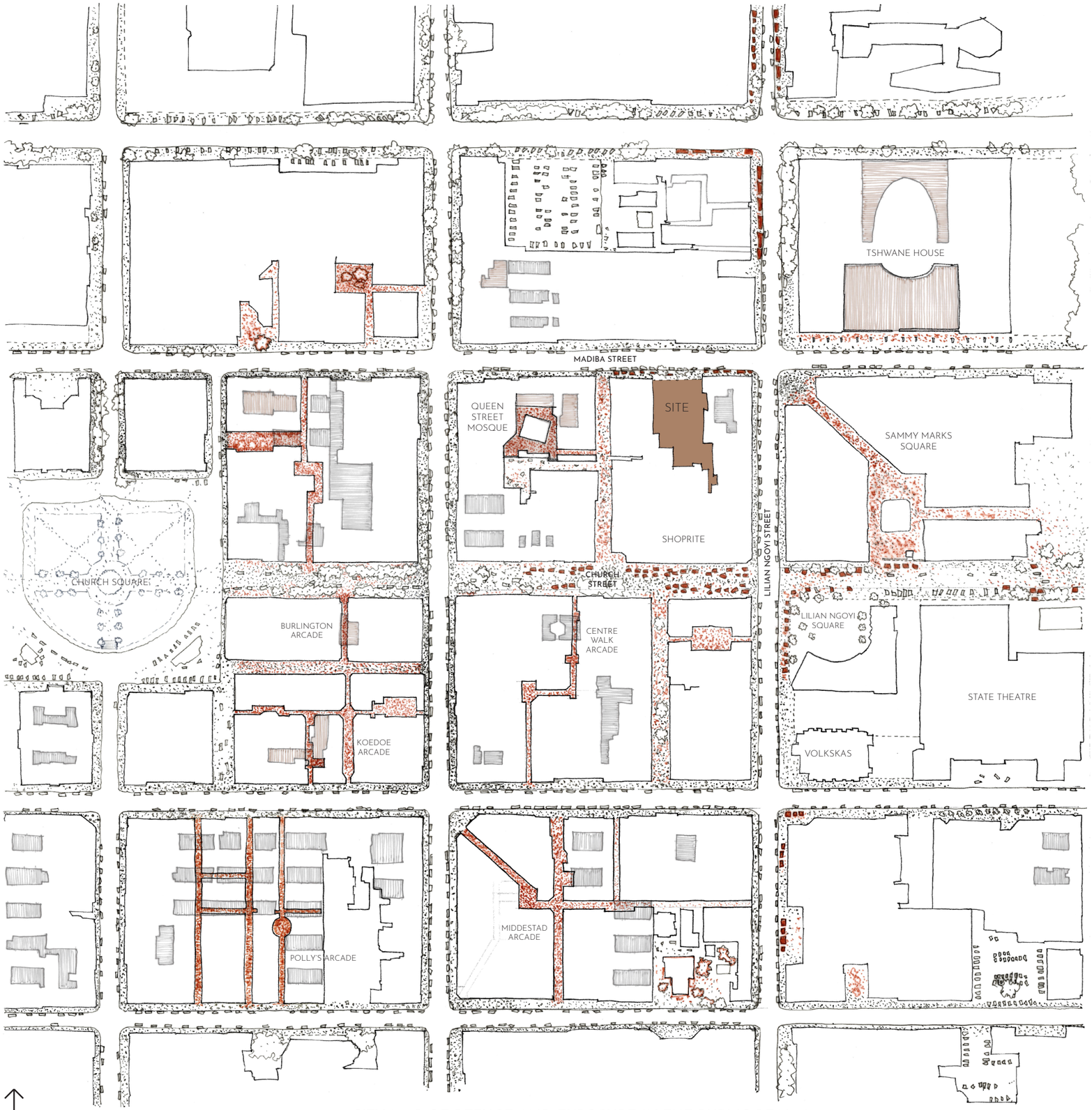

1: 1000 CITY MAP OF REFUGE AND EXPOSURE IN THE PUBLIC REALM

Fig. 32: Map of the the existing public realm and private courtyards within the north-eastern quadrant of the inner city, in terms of refuge (red) and exposure (black) (Author 2021)

Fig. 33: Site model (Author 2021)



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CENTRE WALK

The Centre Walk arcade has been designed in a similar manner to contemporary shopping malls in Pretoria. The space is perceived as an interior due to the lack of natural light and the sterile internal finishes. The arcade is spatially uniform and functions as a space of transition.

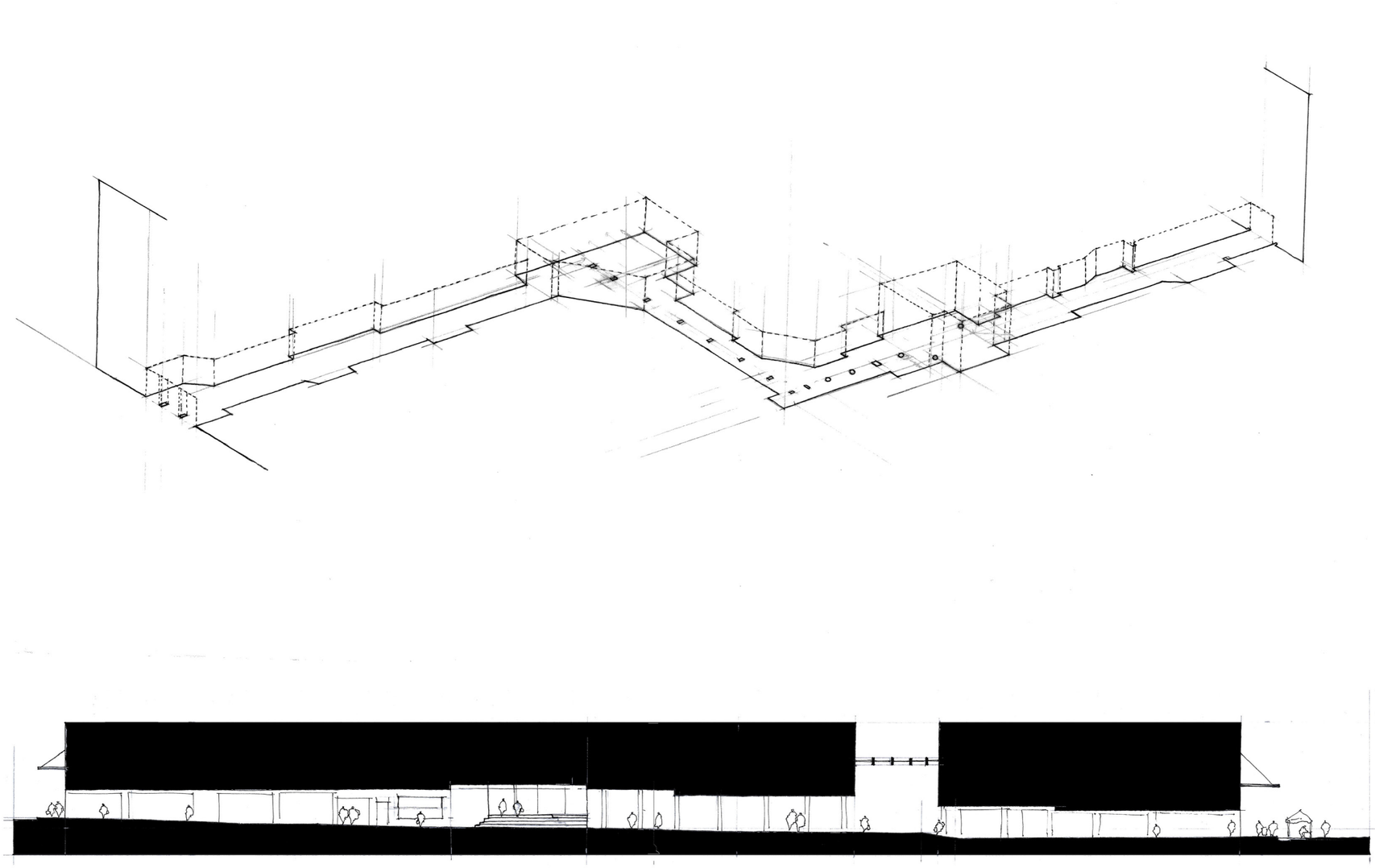

Fig. 34: Spatial sequence of Cente Walk arcade to scale (Author 2021)





Fig. 35: Photographs of the interior of Centre Walk arcade (Author 2021)

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MIDDESTAD ARCADE

The Middestad arcade is a hybrid space, with one part open and exposed to the outside and the other part functioning as an internal shopping centre. The external portion of the arcade feels like an extention of the public realm. This is primarily due to fact that it is uncovered and exposed to natural light, as the materiality resembles that of an interior. The external portion is also much more spatially complex.

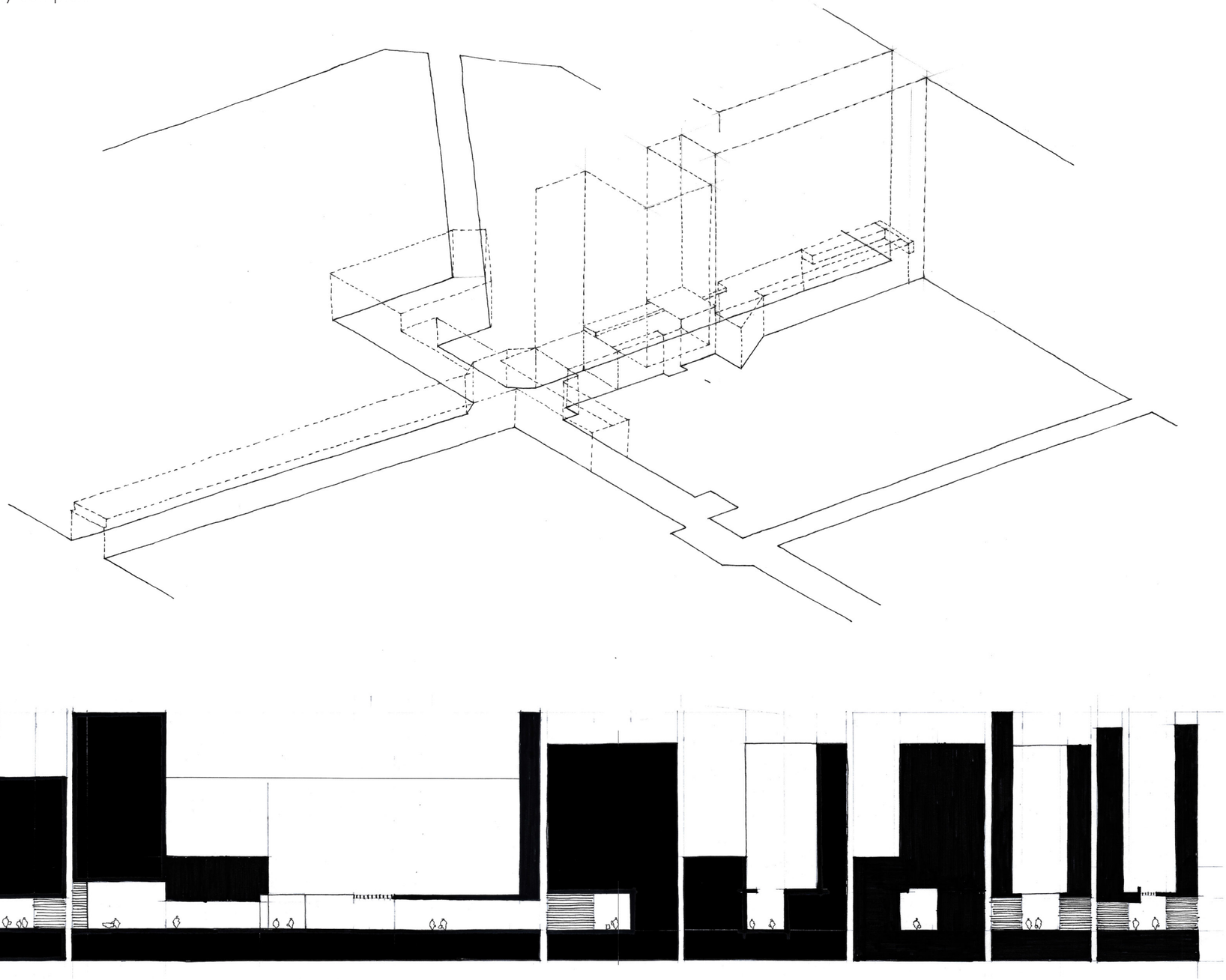

Fig. 36: Spatial sequence of Middestad arcade to scale (Author 2021)





Fig. 37: Photographs of the interior of Middestad arcade (Author 2021)

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4 - 5

1 - 9

POLLY'S ARCADE

Polly's Arcade, designed by Norman Eaton in the late 1950's, provides a linear shortcut between Francis Baard and Nana Sita Street. The stone patterned floor guides the urban dweller into the arcade. The interior has no shopfronts or edge activity. The original skylight were covered up, which created an interior that is dark and uninviting.

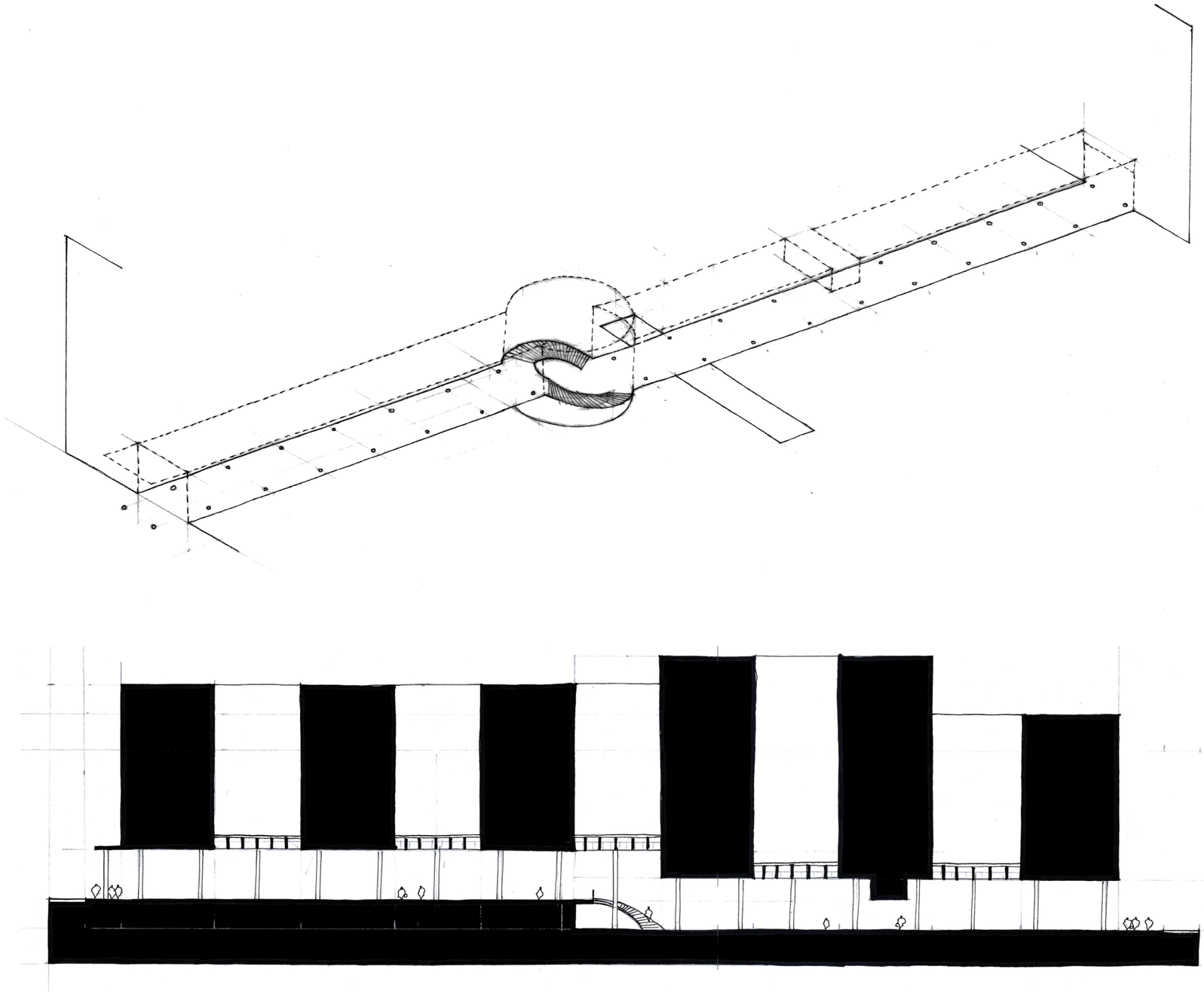

Fig. 38: Spatial sequence of Polly's Arcade to scale (Author 2021)





Fig. 39: Photographs of the interior of Polly's Arcade (Author 2021)

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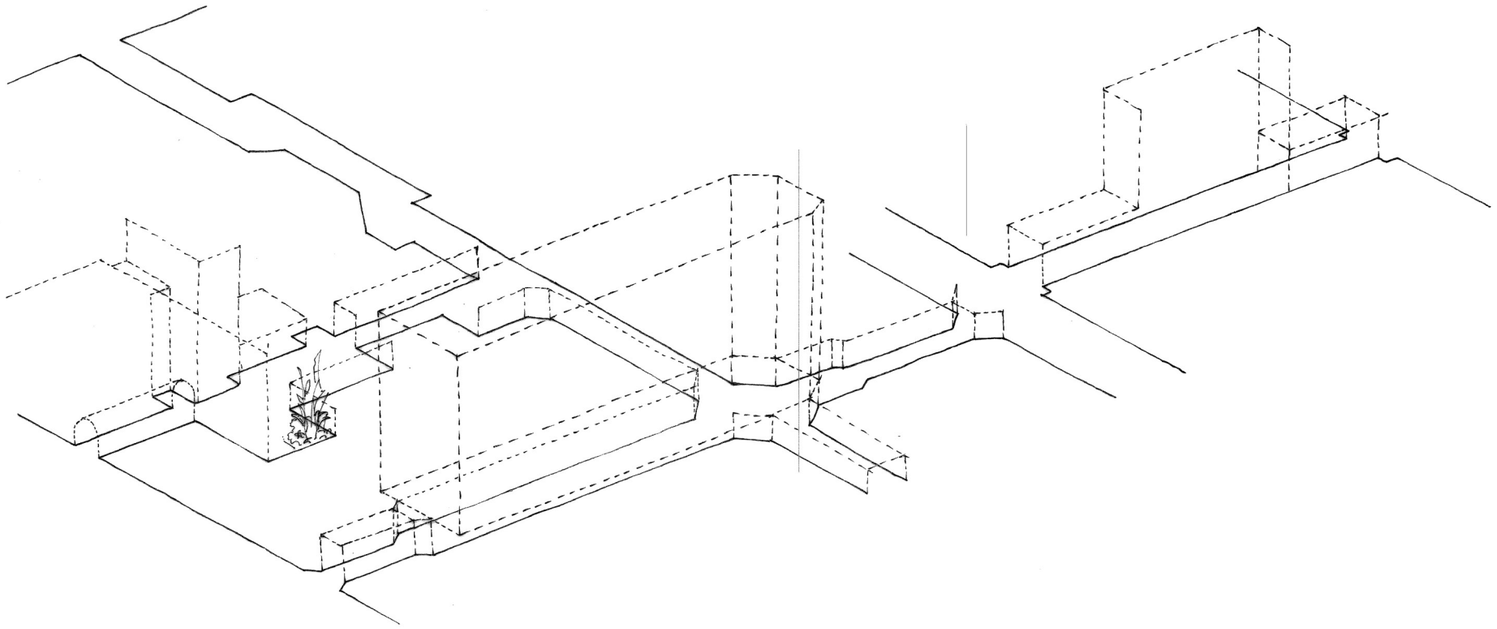
KOEDOE AND BURLINGTON ARCADES

Koedoe arcade is the most spatially complex arcade in the city of Pretoria. The arcade contains a large internal atrium, dark narrow passages, an external courtyard and a link to Burlington arcade. Burlington arcade is a partially enclosed, narrow and short passage with small shops along its edges. The courtyard of Opera plaza is treated as a public space, but is separated from the street by a small and narrow passage.



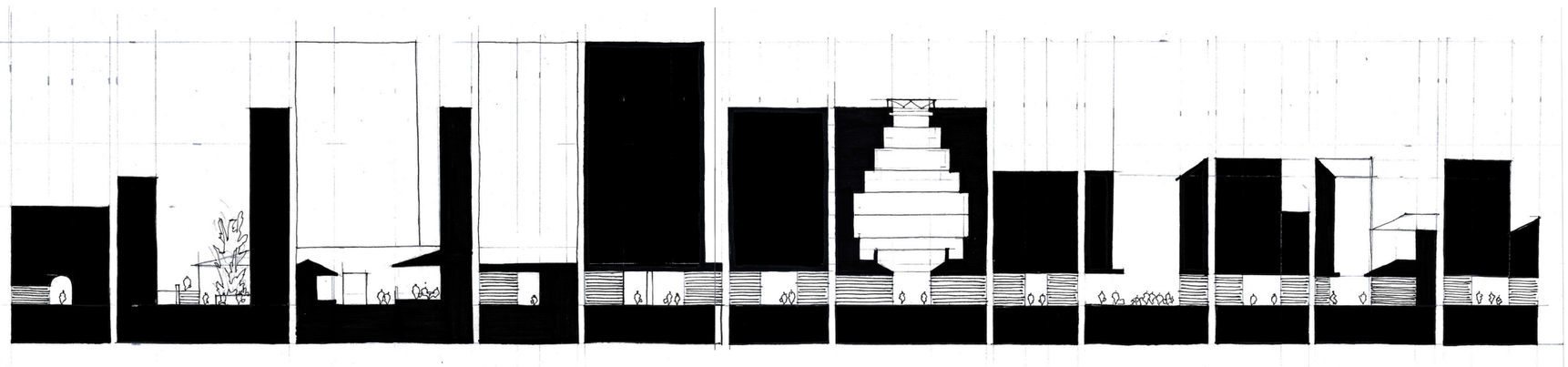


Fig. 40: Spatial sequence to scale (Author 2021)





Fig. 41: Photographs of the Koedoe arcade and Opera plaza (Author 2021)

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3.2

THE SITE

The site is located on Madiba Street to the north of Church Street and west of Lilian Ngoyi Street. The block contains the Queen Street Mosque and an internal pedestrian street. It is in this block that the arcade network stops.

The site selected due to its potential to link to the arcade network to the south, based on its proximity to high informal street activity and the presence of open residual space within the block interior.

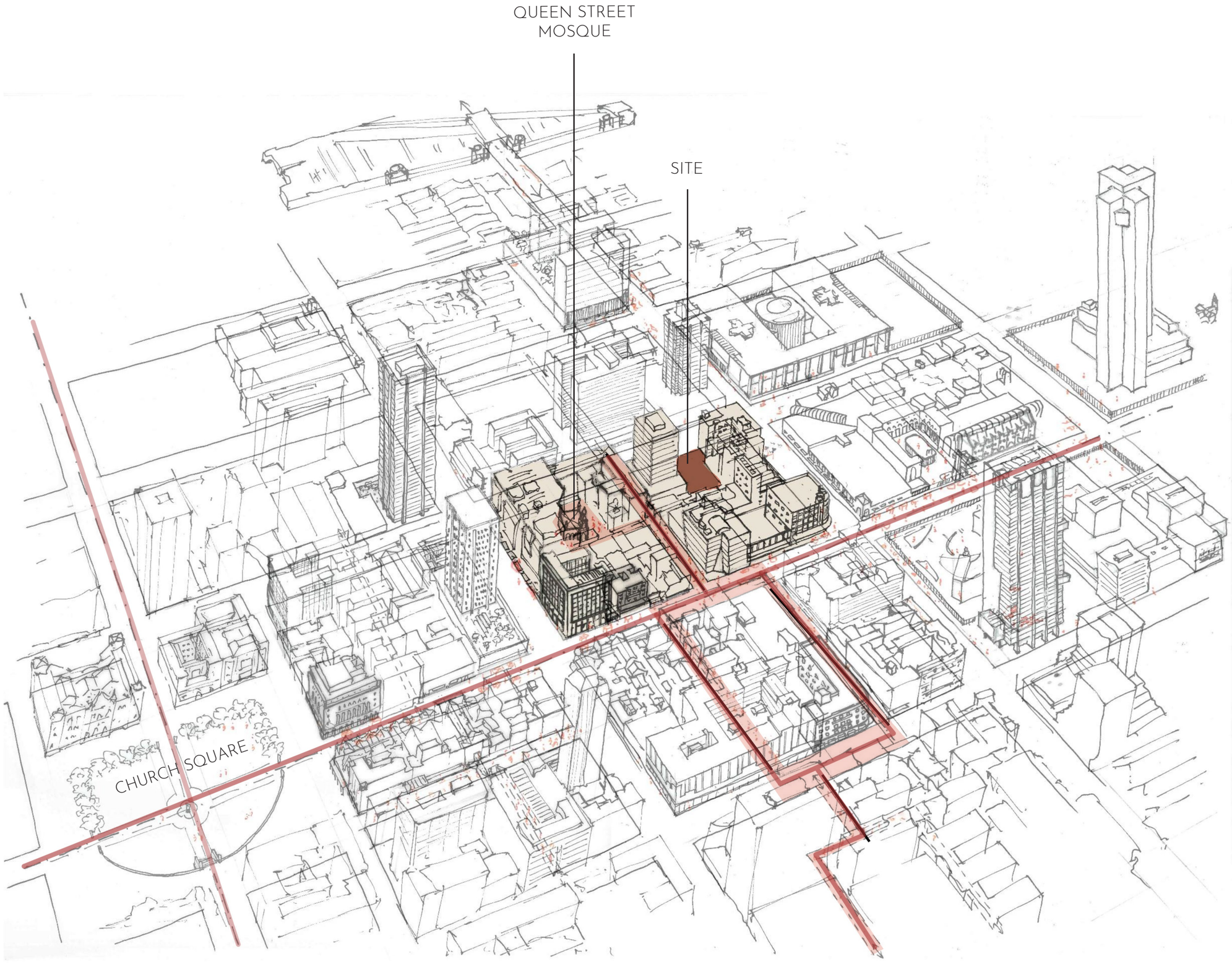

Fig. 42: Location of the site (Author 2021)

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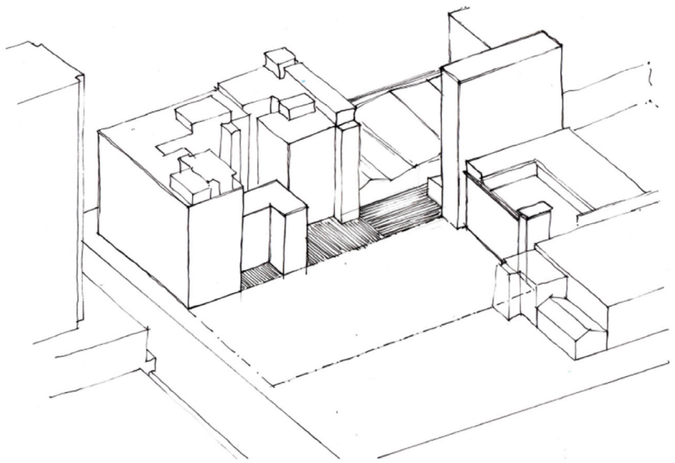
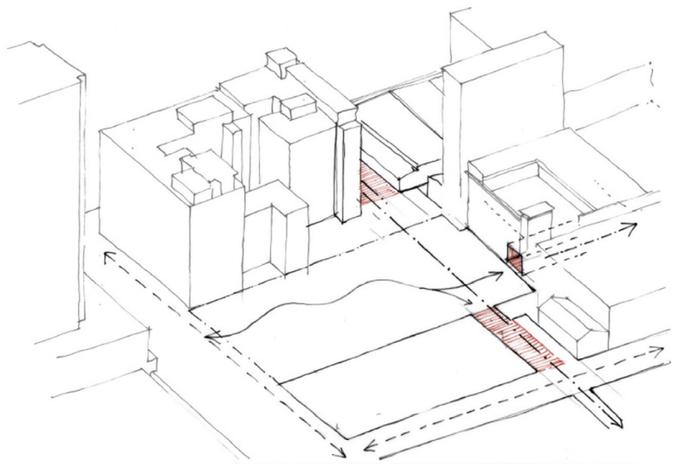
THE SITE VISION

The design aims to create new links to the surrounding arcades, courtyards and streets. Existing structures to the west and east of the site will be partially demolished to create new openings. The Shoprite to the south of the site currently have two entrances. One on church street and another that spills out onto the site. The Shoprite is currently used as a threshold between the Madiba street and Church street.



SETBACKS HAVE POTENTIAL FOR SHARED COURTYARDS



POTENTIAL FOR NEW ARCADE CONNECTIONS

Fig. 43: Site diagrammes(Author 2021)

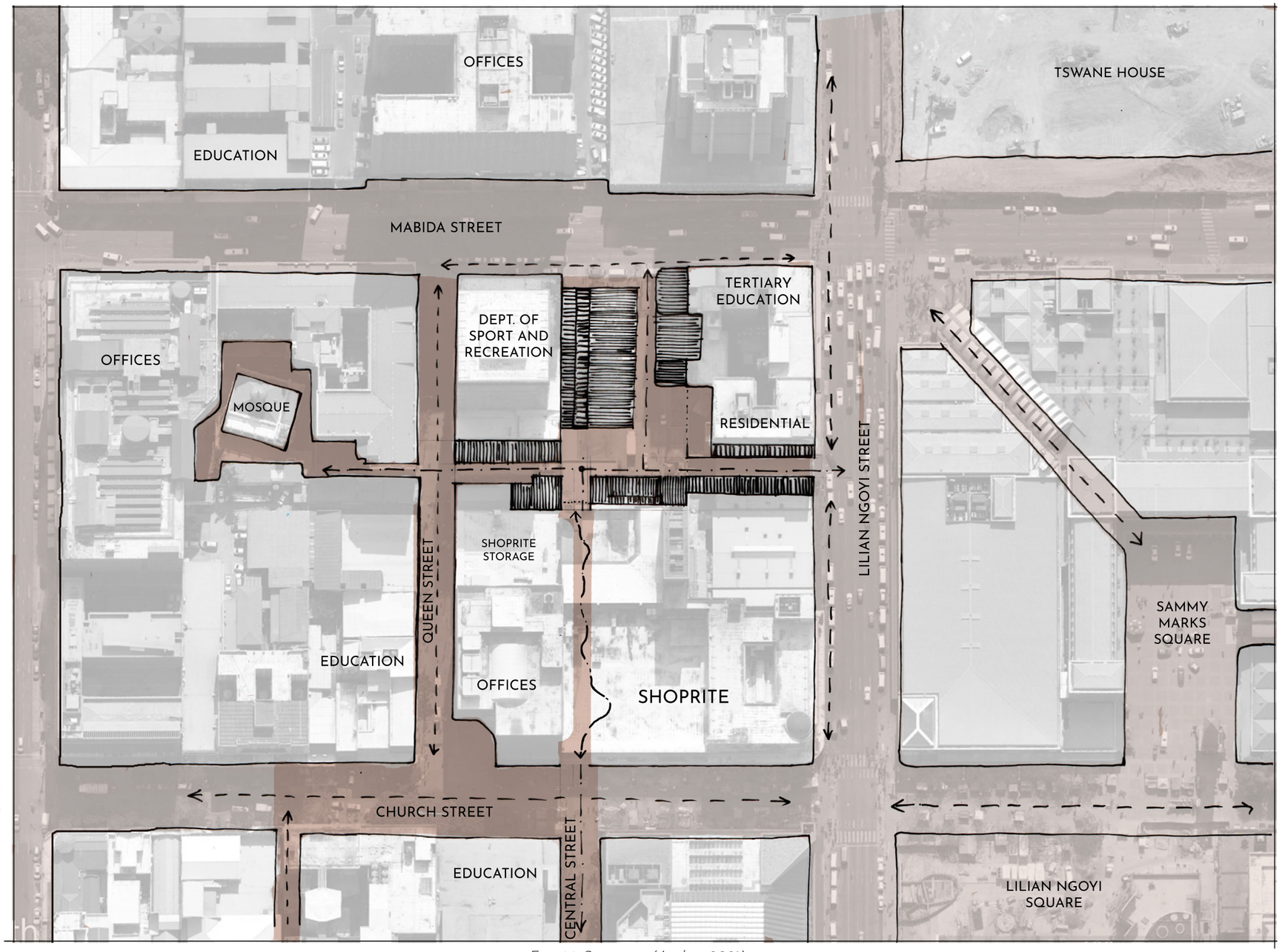


Fig. 44: Site vision(Author 2021)

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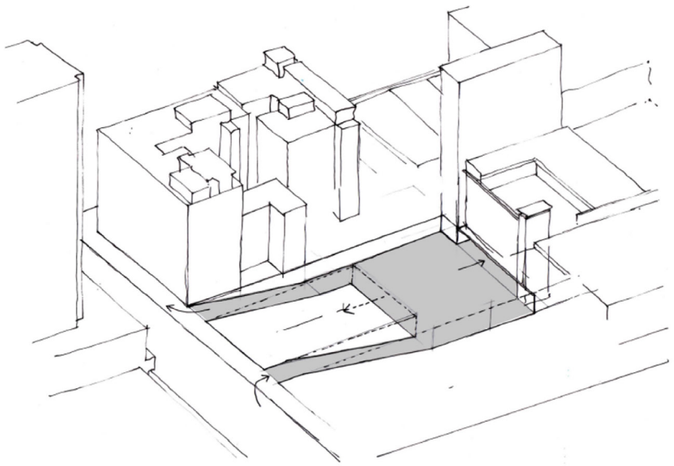
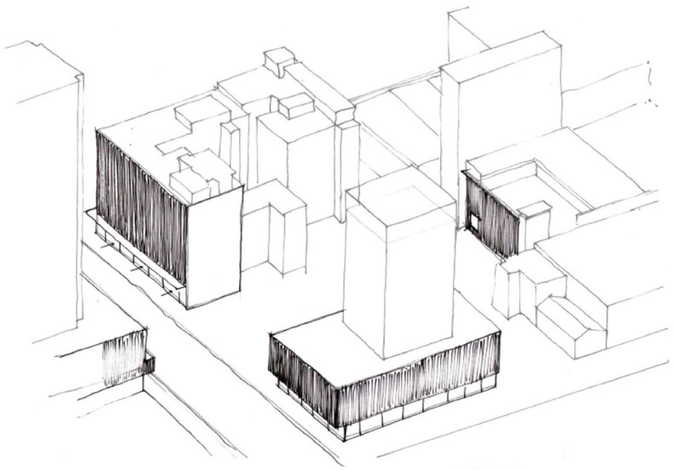
THE SITE AS LATENT SPACE

The site currently functions as the delivery yard for the Shoprite. It is framed by two ramps on either sides that lead trucks down into a basement delivery area no longer in use. The existing basement is located underneath the Shoprite and a portion of the proposed site. The site is contained on three of its edges by multi-storey buildings. The edge face the street is set back, which created the opportunity for taxi operators to approriate the sidewalk was parking.



EXISTING BASEMENT FOR DELIVERIES TO SHOPRITE



STREET EDGE TYPOLOGY
SOLID FACADE WITH OPEN GROUND FLOOR

Fig. 45: Site diagrammes (Author 2021)









Fig. 46: Photographs of the existing site conditions (Author 2021)

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ACTS OF REFUGE ON SITE

Temprary acts of refuge were observed on site. Workers take refuge from the sun underneath a staircase to socialise and eat lunch. Informal traders claim their portion of the sidewalk to sell food and goods. In front of the site, taxi operators use their taxis to demarcate space for them to occupy. They temporarily claim ownership of a portion of the sidewalk that serve as a place of refuge.



Fig. 47: Photographs of acts of refuge on site (Author 2021)

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Fig. 48: Photographs of the block's edges (Author 2021)

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3.3
CONTEXT - SPATIAL PRACTICES

Through the lens of perceived space, the existing spatial practices around the site were observed, interpreted and represented from different users' perspectives.

STRANGER

The first map from the perspective of the stranger, explored the contrast between the street and the urban interior. The street is a place of anonymity, transition and indifference. The arcades, internal courtyards and leftover spaces provide a sense of refuge, control and intimacy.

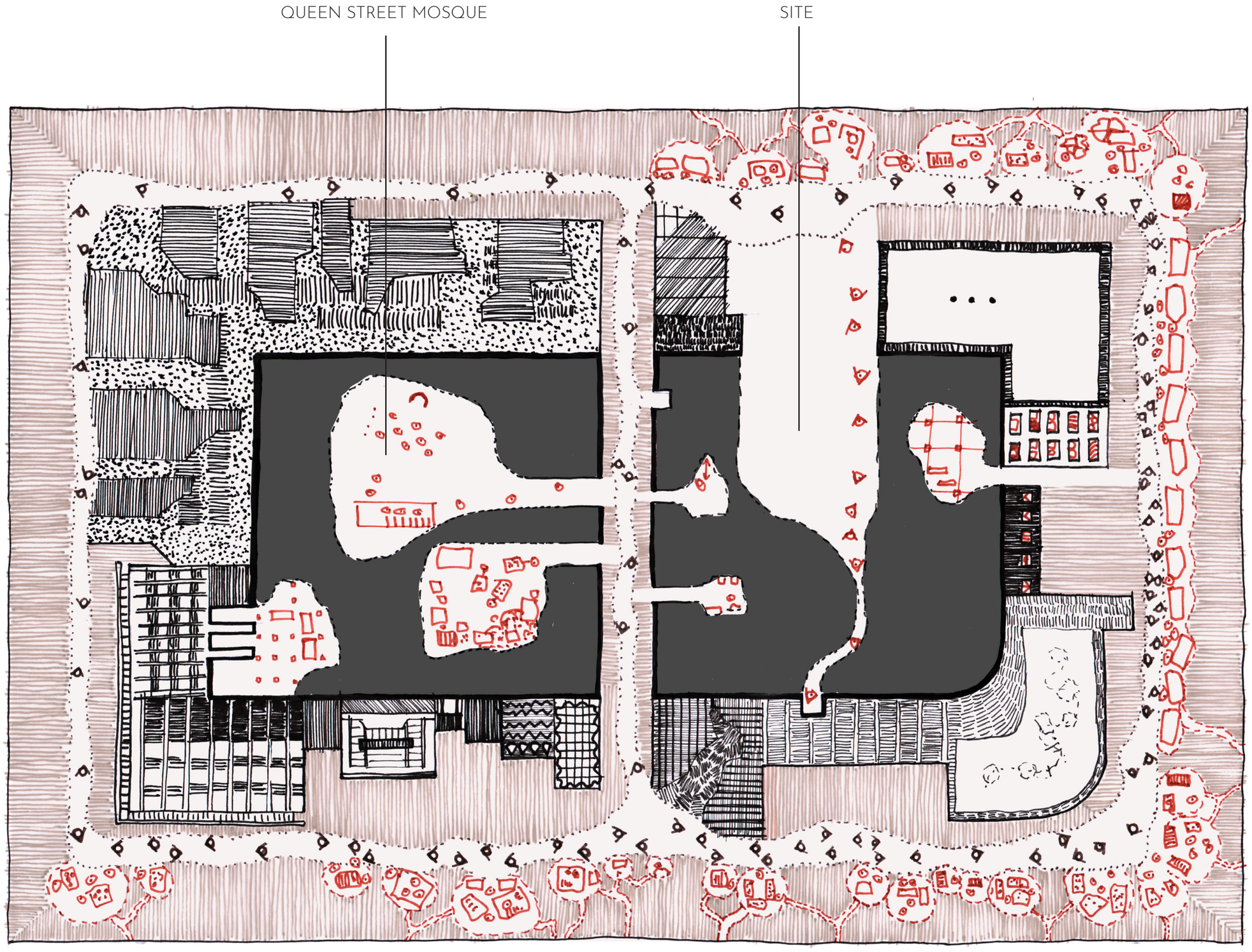

Fig. 49: Refuge and exposure (Author 2021)

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INFORMAL STREET FOOD TRADER

The second map from the perspective of the street trader, explored the hierarchy of spatial ownership and encroachment on the sidewalk over time.

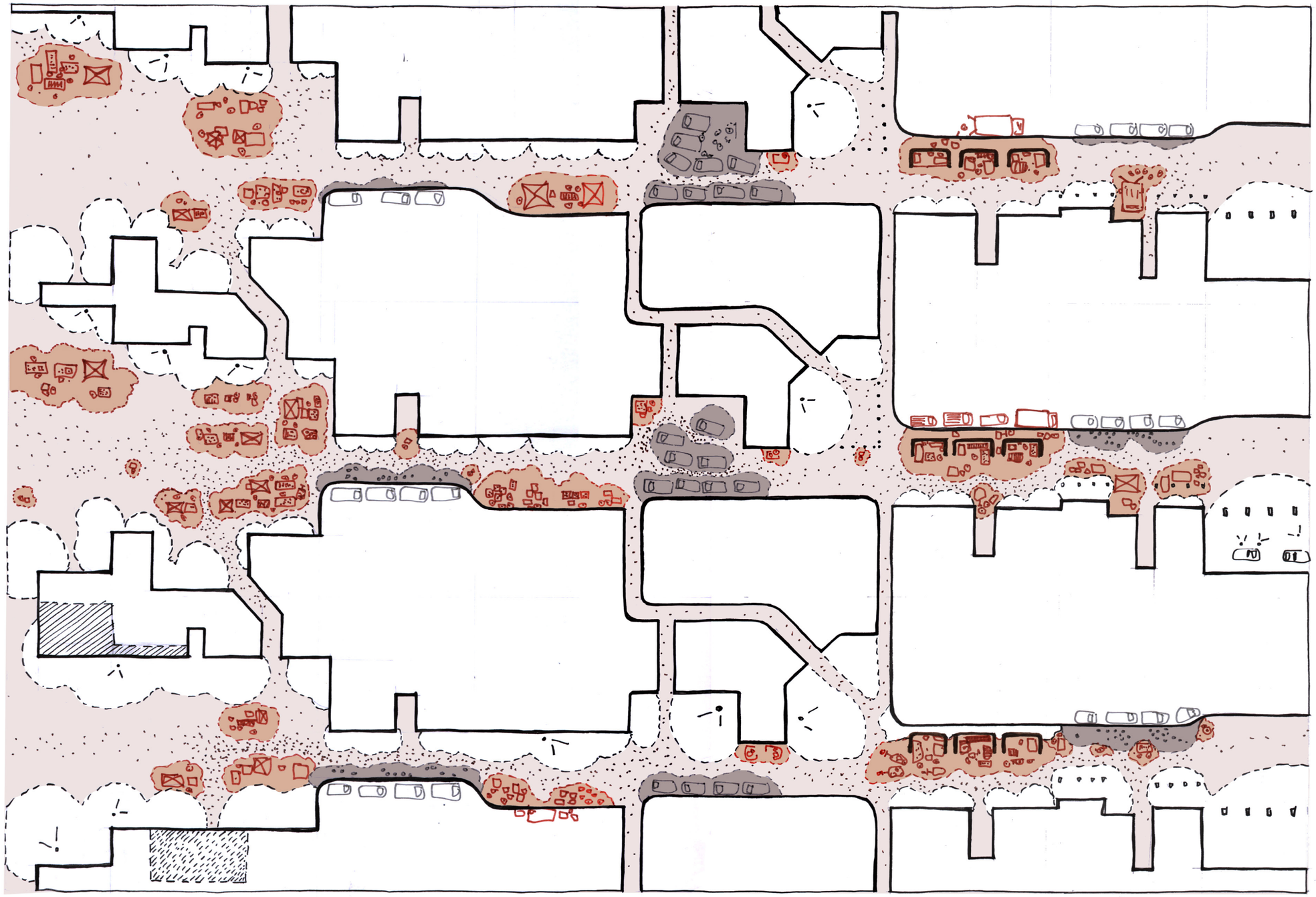

Fig. 50: Hierarchy of spatial ownership (Author 2021)

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TRANSIENT WORKER

From the perspective of the transient worker, the mapping identified the site as an in-between place of dwelling along existing routes in the city.

The existing spatial practices have identified an inherent potential within the site to accommodate different acts of refuge such as temporary dwelling, claiming spatial ownership and escaping exposure.

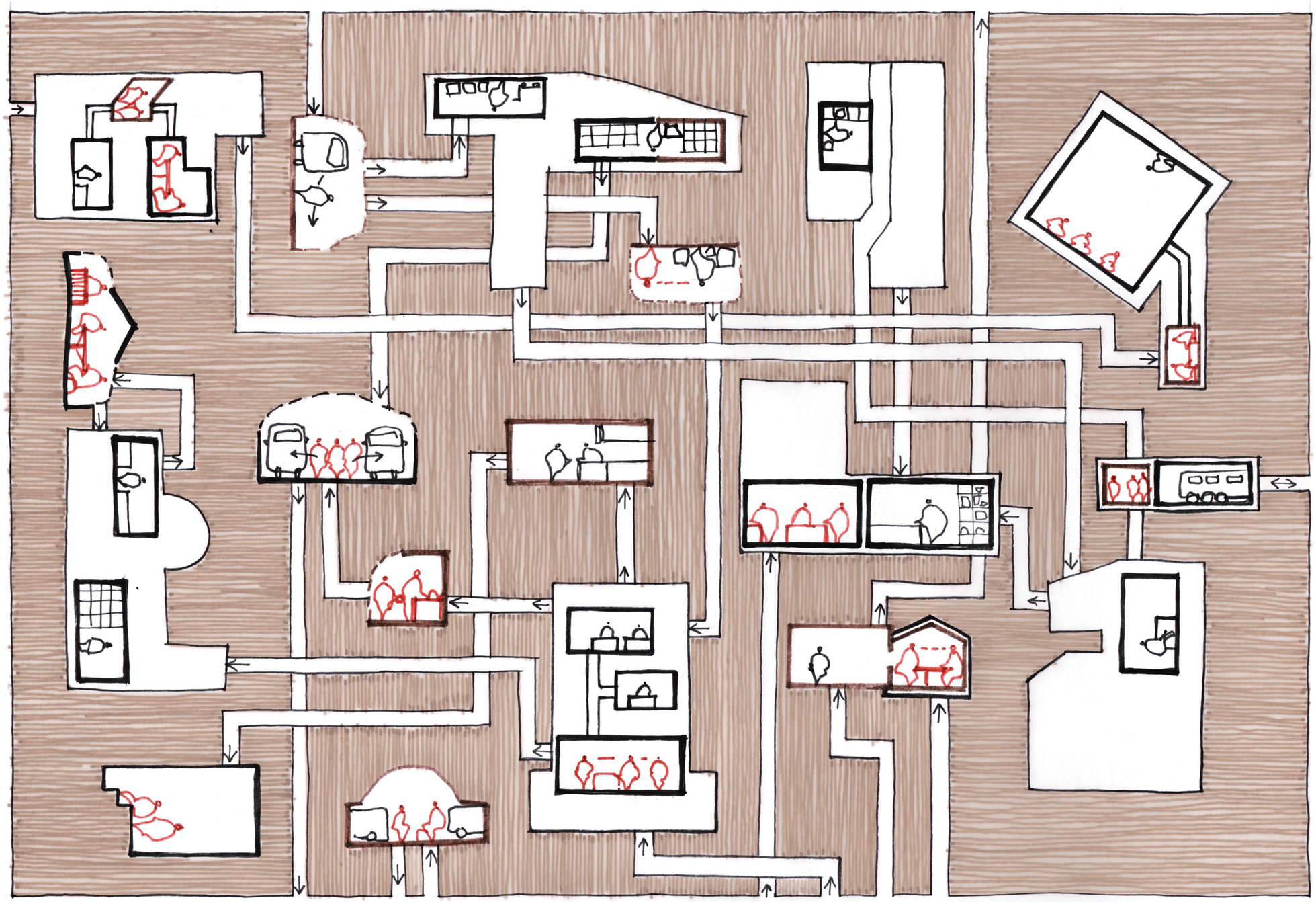

Fig. 51: An in-between place of dwelling (Author 2021)

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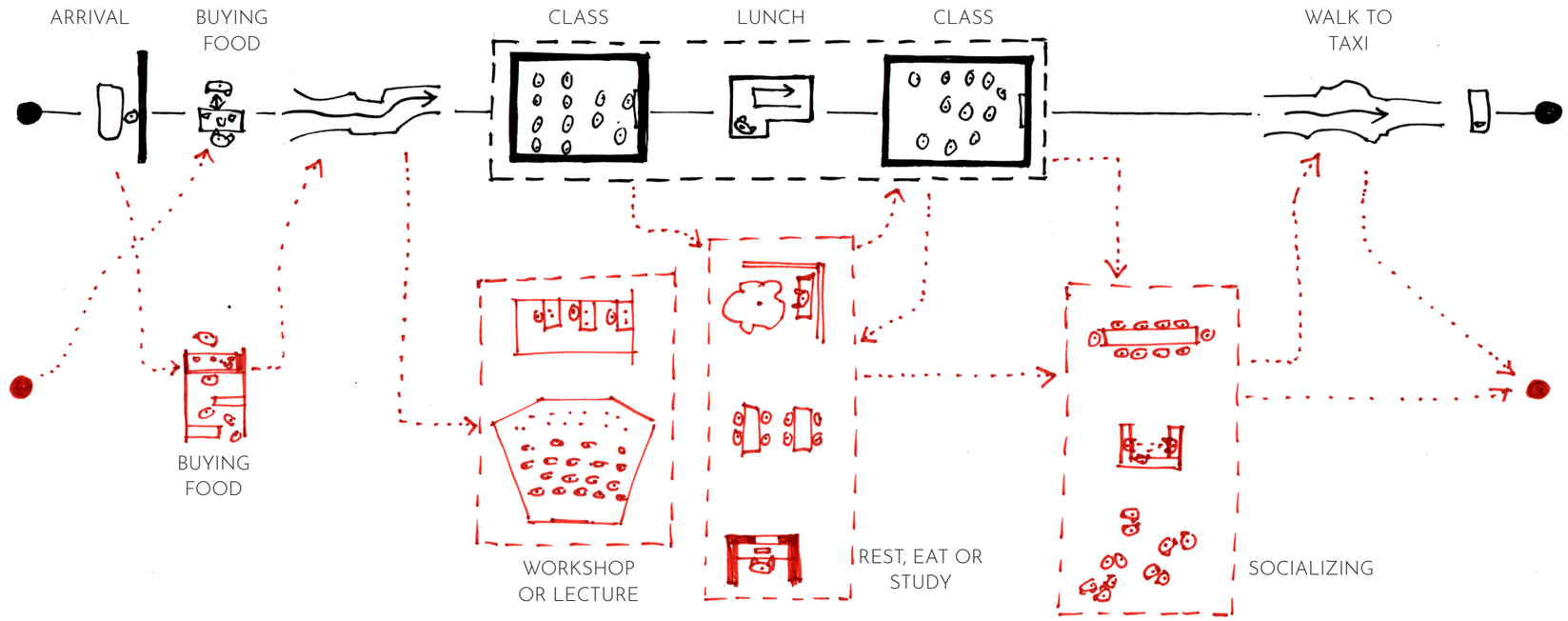
3.4
CONTEXT - LIVE SPACE

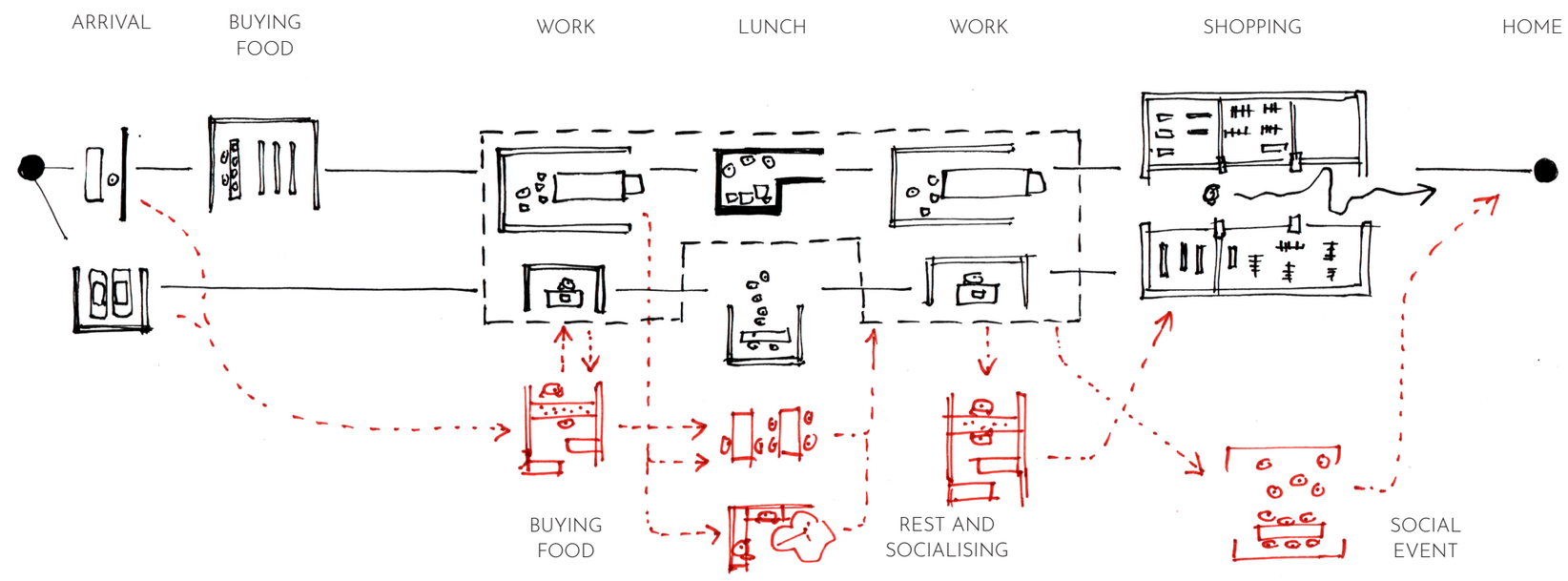
Through the lens of lived space, the method of 'rhythmanalysis' (Lefebvre 1992) were used to study the exiting everyday rhythms and routes of the mobile dweller around the site. The potential for new activities and programmes as an extension of their daily routines were also explored (coloured in red).

Four types of mobile urban dwellers were identified. The student is in need of a place to study, read, eat lunch and hold events. The worker desires a place to buy food, rest, eat lunch and meet friends. The street food trader is in need of a place to cook, to sell food, socialise and rest. The mosque visitor from the nearby Queen street mosque requires a place for community gatherings, social events and festivals.



THE STUDENT

Fig. 52: Daily routine of the student (Author 2021)



THE WORKER

Fig. 53: Daily routine of the worker (Author 2021)

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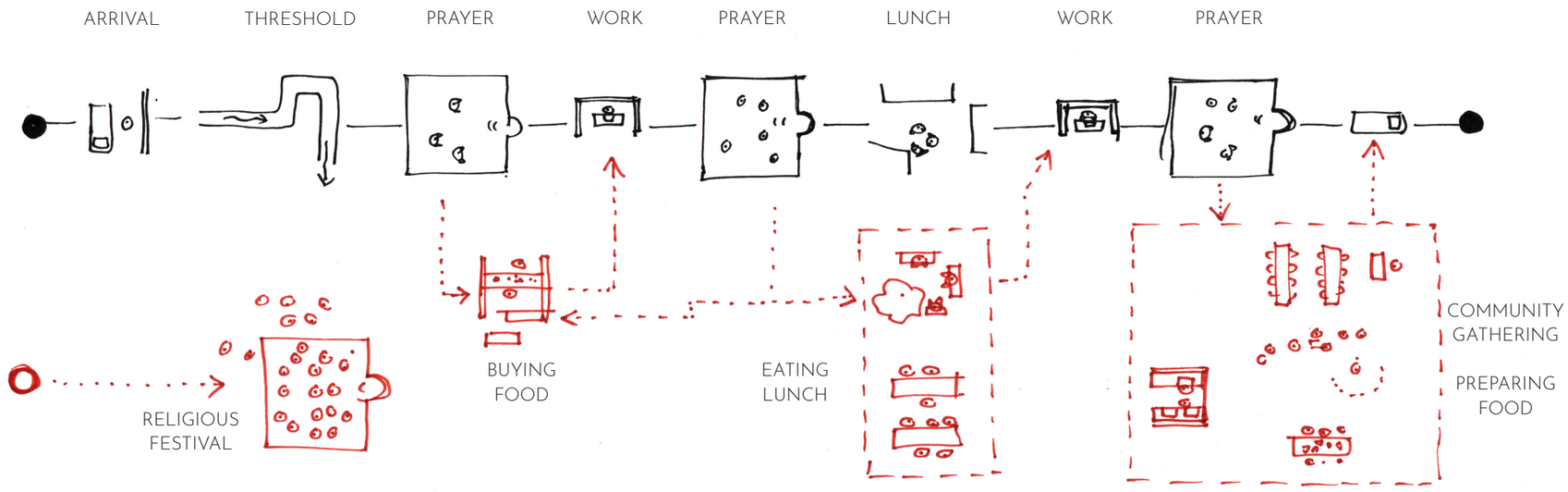
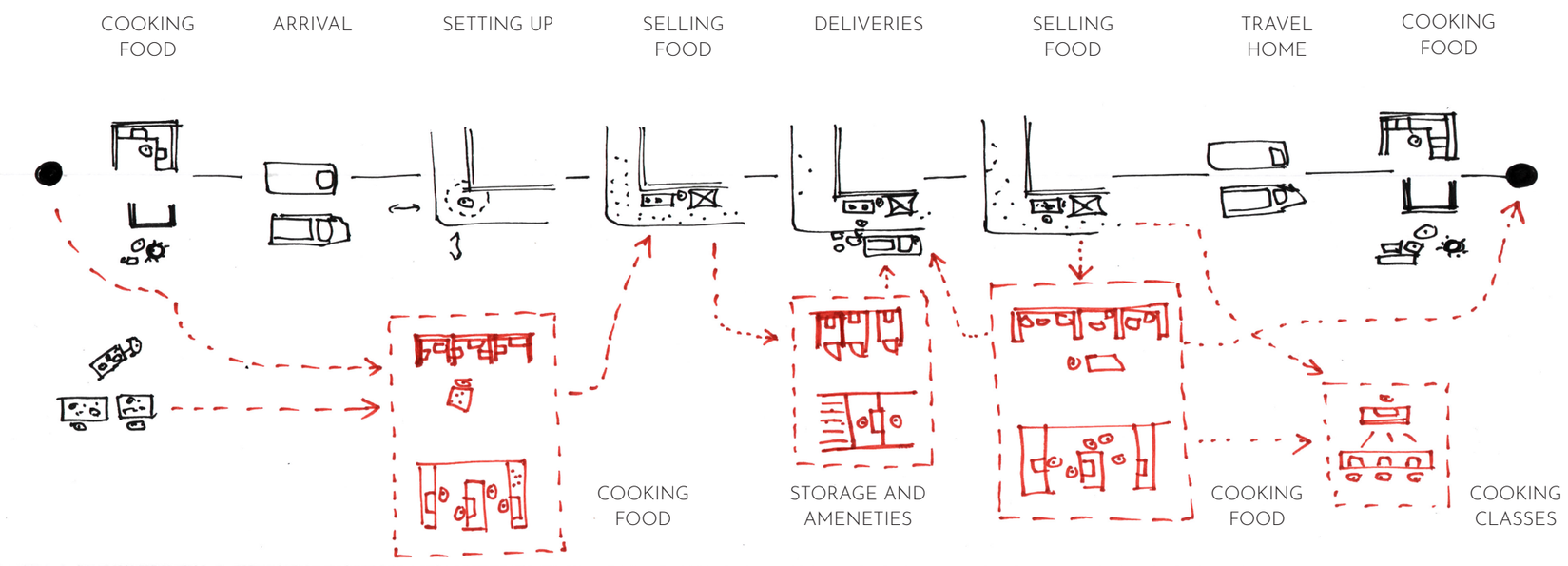


MOSQUE VISITOR

Fig. 54: Daily routine of the mosque visitor (Author 2021)



THE STREET FOOD TRADER

Fig. 55: Daily routine of the street food trader (Author 2021)

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04 CONCEPT

CHAPTER

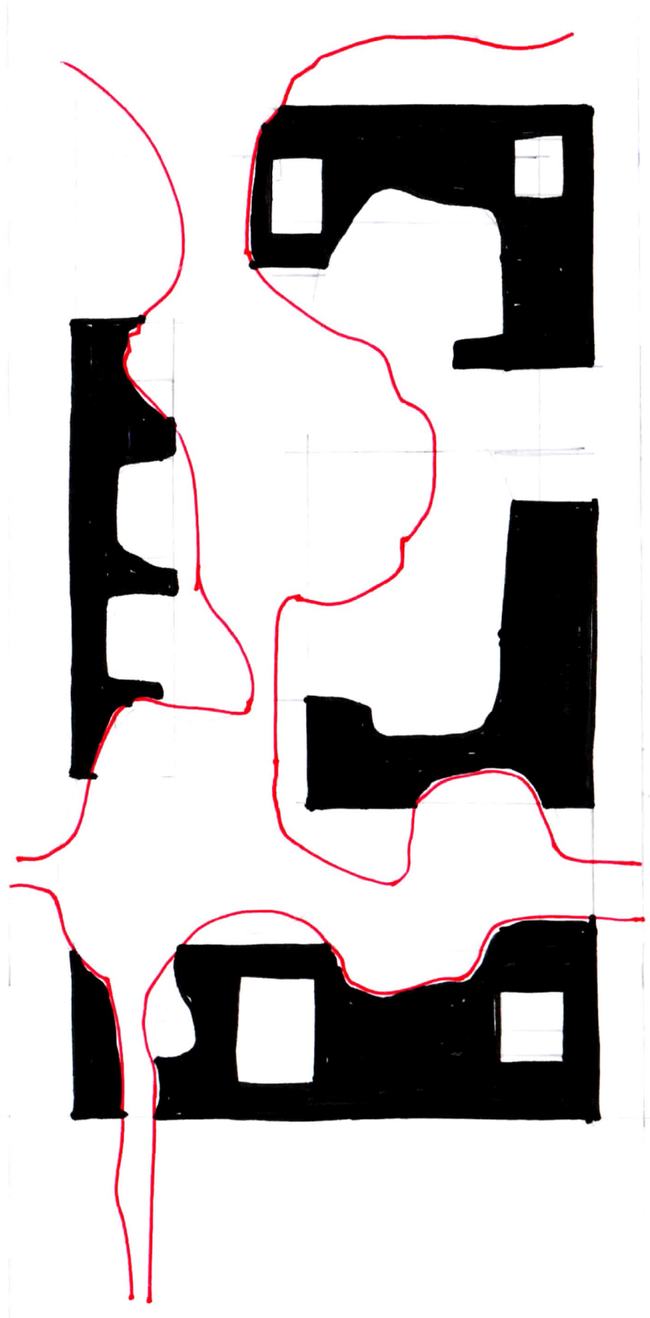

Fig. 56: Intersection of refuge with exposure (Author 2021)

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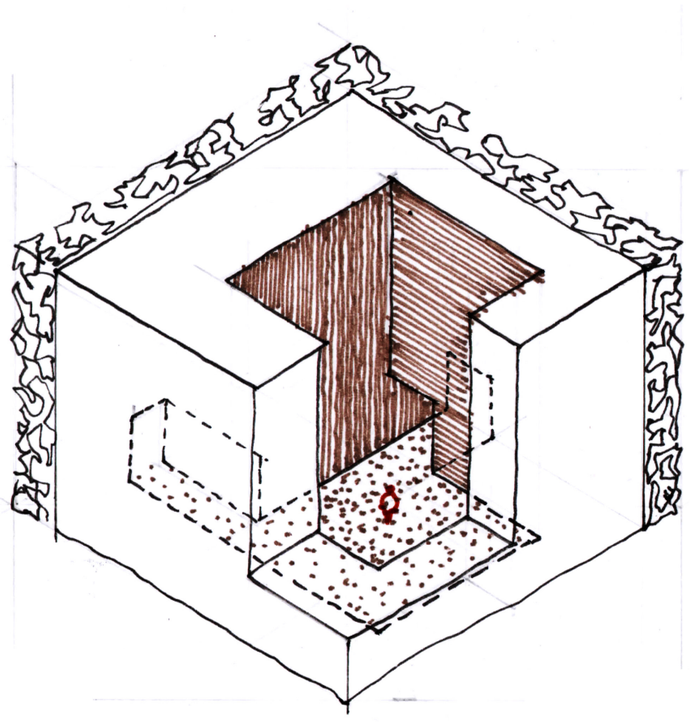
4.1
ARCHITECTURAL INTENT

The concept of refuge is explored through three perspectives (Lefebvre 1991): (1) Conceived space - **space** as refuge, (2) Spatial practices - **the act** of refuge, and (3) lived space - **the feeling** of refuge.

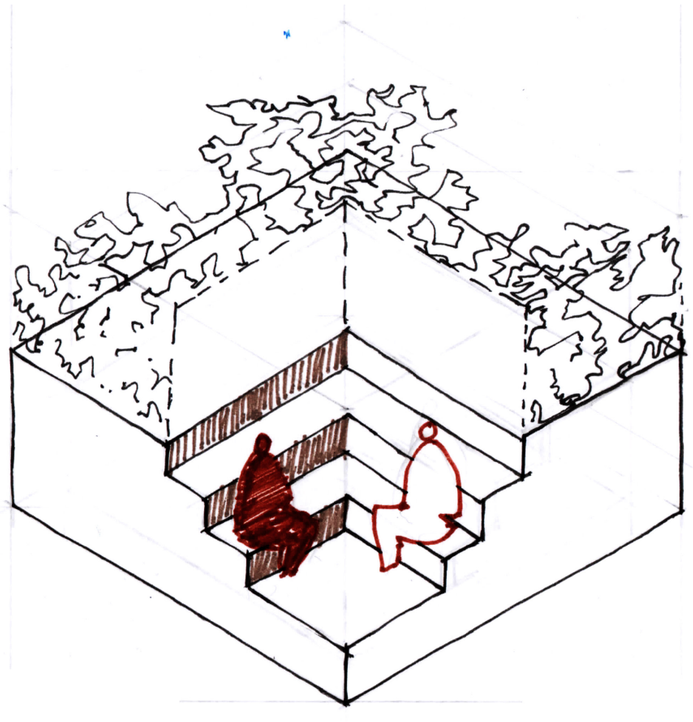
Based on the analysis of the arcades within the city and the informal spatial practices of the street, it is argued that the spatial qualities of refuge such as spatial intimacy and enclosure do not automatically create a place of refuge. It is the act of taking refuge that transforms a space into a place of refuge.

The conceived, lived and perceived dimensions of space function interdependantly. The design will therefore explore how different spatial and experiential characterisitcs can be used to affect the user's perception of space, in order to facilitate the act of refuge



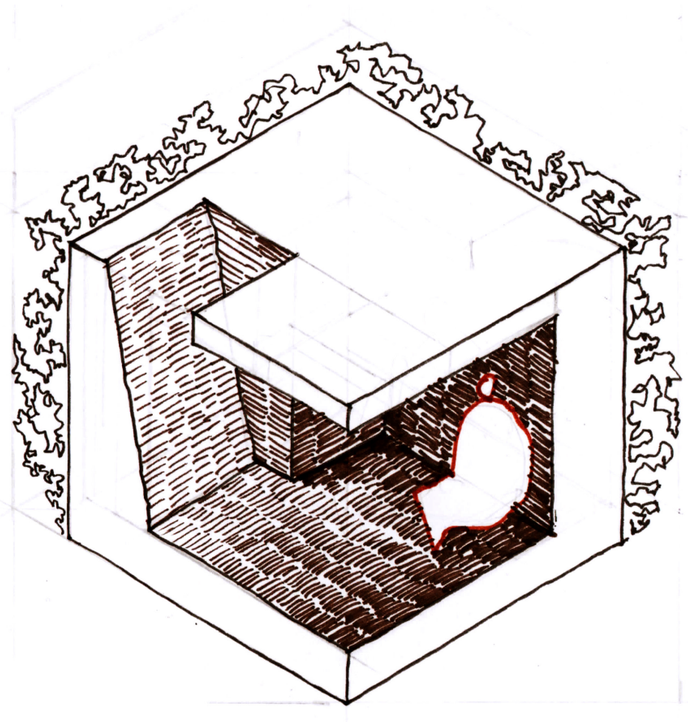
SPACE AS REFUGE

SCALE
ENCLOSURE
SEPERATION
BOUNDARY
ORDER



THE ACT OF REFUGE

DWELLING
LOOSNESS
CLARITY / ABIGUITY
APPROPRIATION
SPATIAL OWNERSHIP



FEELING OF REFUGE

LIGHT
FAMILIARITY
INTIMACY
PROTECTION
CONTROL

Fig. 57: Three dimensions of refuge (Author 2021)

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4.2
ARCHITECTURAL CONCEPT

The architectural concept is a continuation of the dialectical approach undertaken in this dissertation. The design will explore the spatial contradictions inherent in the coexistence of refuge and exposure. The confrontation between refuge and exposure were conceptualised on three levels:

1. URBAN TYPOLOGIES:

The confrontation of the city's courtyard typology (enclosed, private refuge space) and the arcade typology (an extension of the public realm into the interior).

2. SPATIAL ARTICULATION:

The manipulation of the envelope as a solid edge to enclose space within, or as openings to promote interaction. The envelope can also be an element that mediates between open and solid.

3. SPATIAL PRACTICES:

On a experiential level, the design must accomodate the spatial practices and activities of both refuge and exposure, simultaniously.

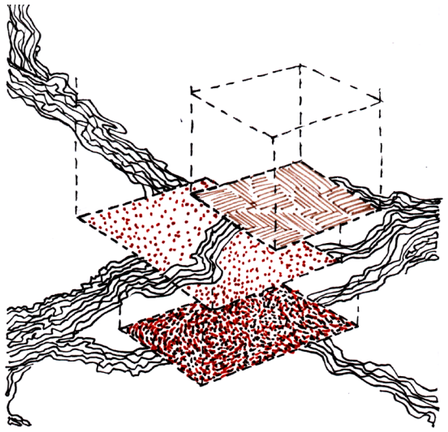

Fig. 58: Urban level (Author 2021)

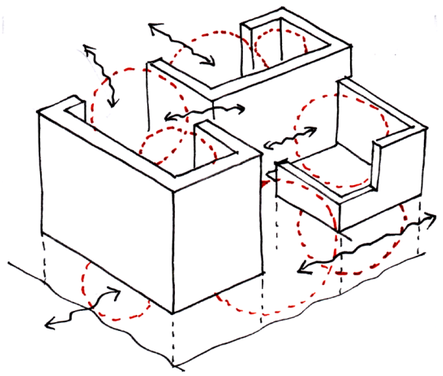

Fig. 59: Spatial level (Author 2021)

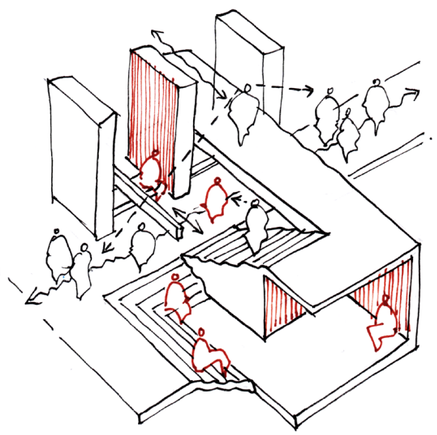

Fig. 60: Spatial practices (Author 2021)

In the context of the site, the design concept proposes to use multiple smaller buildings to create partially enclosed courtyards on multiple levels within the site. A public arcade on ground floor will extend into upper and lower levels to intersect with the courtyards to create public spaces of refuge.

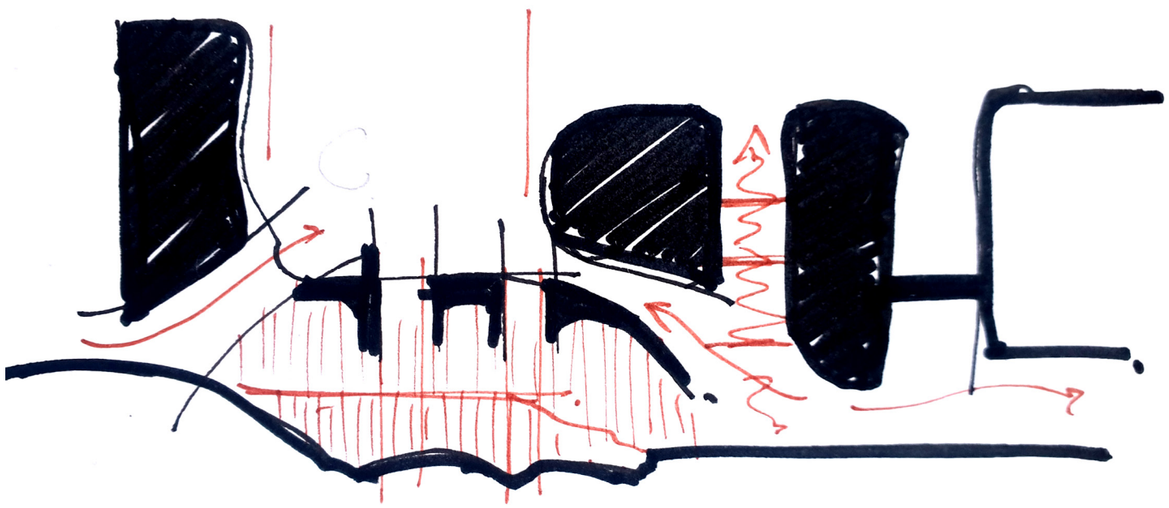

Fig. 61: Concept sketch (Author 2021)

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4.3
PROGRAMME

The programme responds to the needs and rituals of the four mobile urban dwellers. The proposed programme is an extension and in support of the existing programmes in the surrounding context which includes: a local bakery, Shoprite, informal street food traders, the Queen Street Mosque, small colleges in appropriated office buildings and Lilian Ngoyi Street as a public transport node.

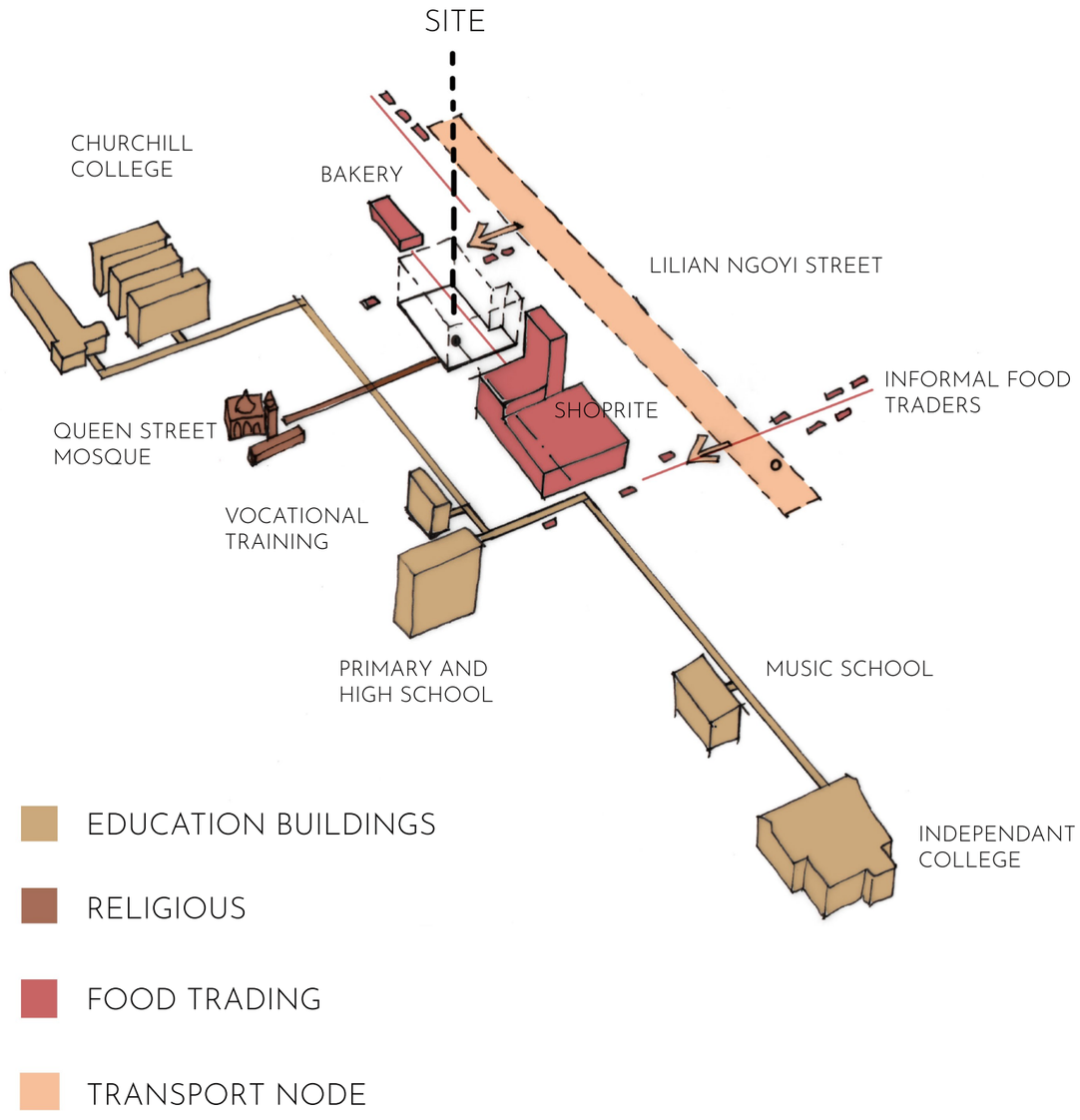

Fig. 62: Programmes of surrounding context (Author 2021)

THE PROGRAMME CONSISTS OF THREE COMPONENTS:

The cooking component is public and includes communal and rentable cooking facilities for street food traders, a dining hall and informal public eating spaces.

The educational component provide additional facilities to small colleges and vocational schools in the form of a library, workshop spaces, classrooms, an event hall and recreational space.

The last component of the programme serves the mosque. A community gathering space, a soup kitchen and a large space for religious festivals will accomodate the social functions of the mosque.

Spaces such as the refectory, event hall, communal kitchens, courtyards and classrooms are shared among the different users to encourage interaction between users and contradictory activities.

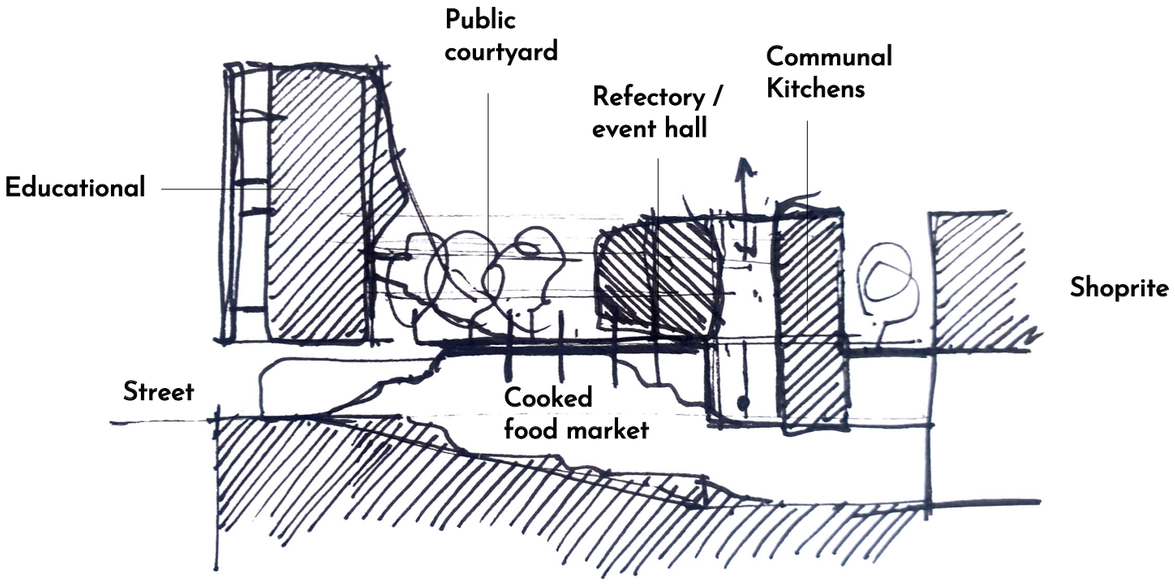

Fig. 63: Programmes of the new building (Author 2021)

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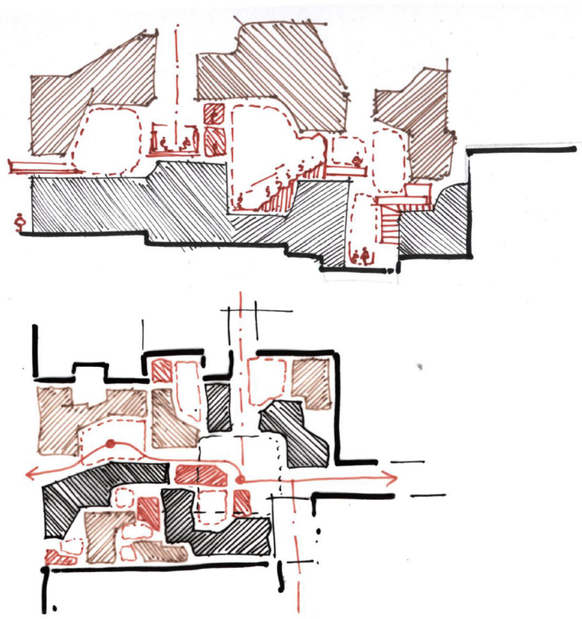
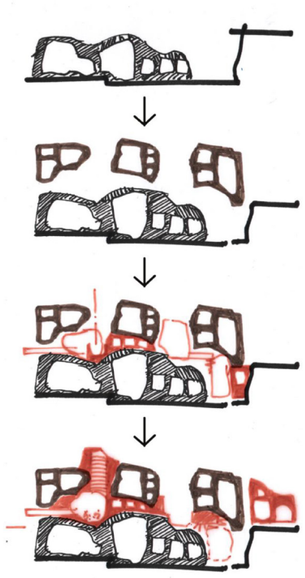
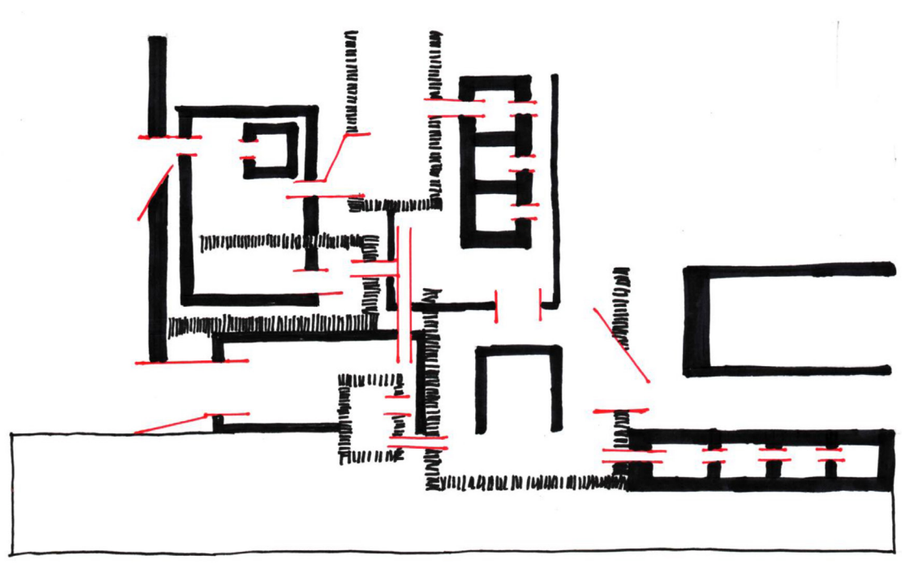
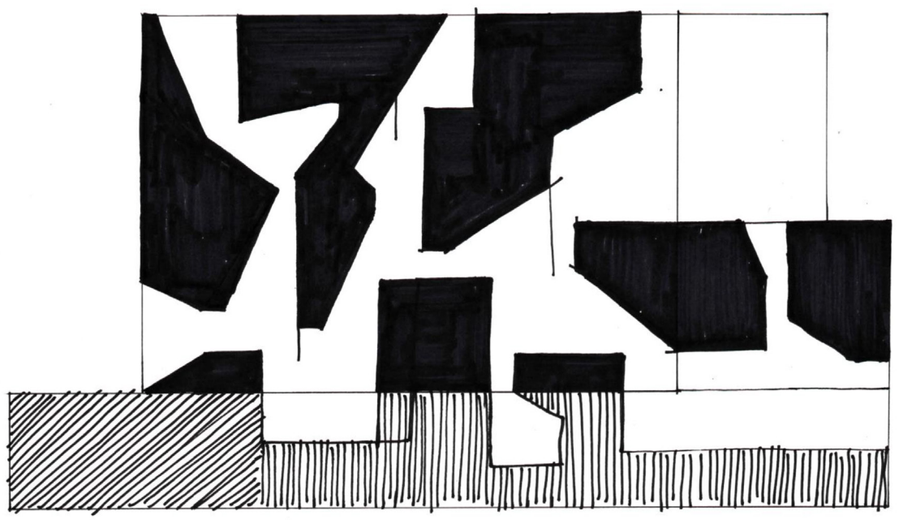
4.4
CONCEPT ITERATIONS









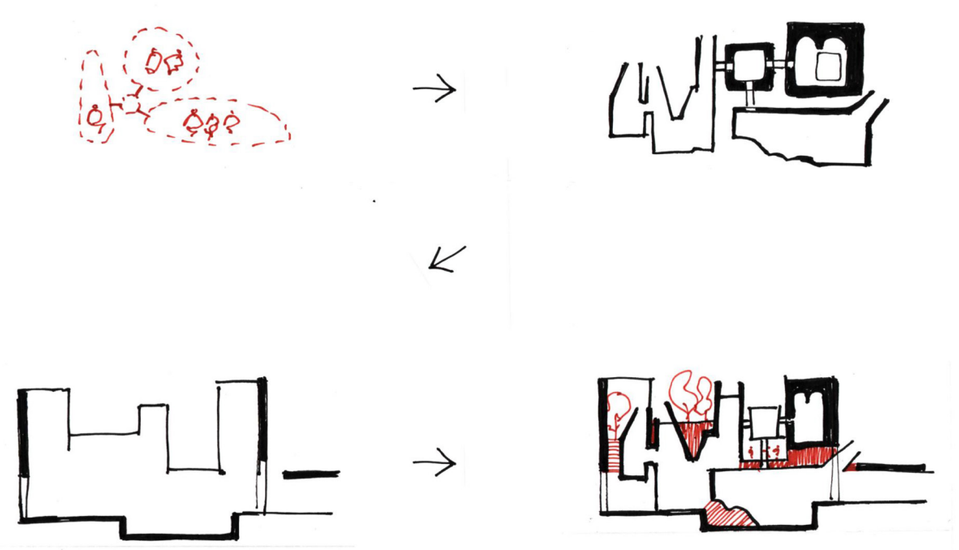


Fig. 64: Concept iterations (Author 2021)

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05 CHAPTER SPATIAL EXPLORATIONS

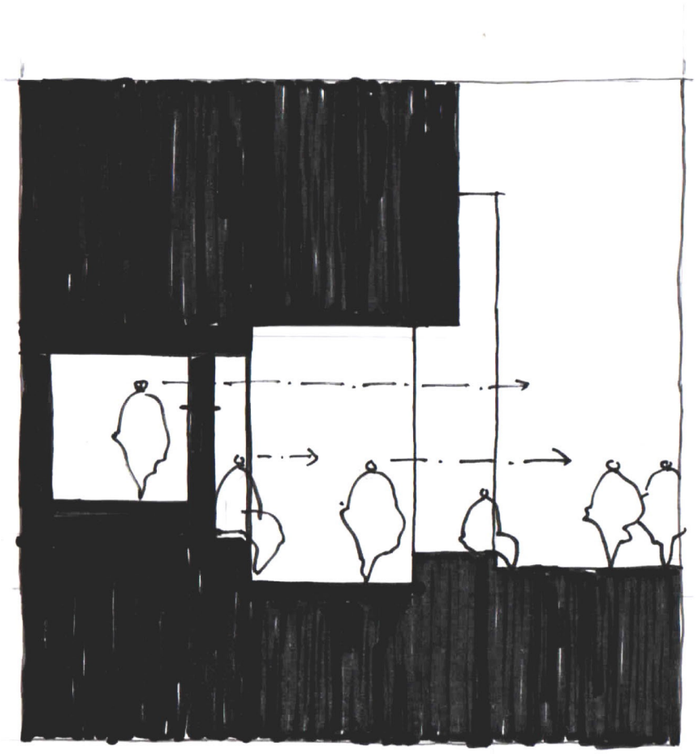

Fig. 65: Prostect and refuge (Author 2021)

Lefebvre (1991) argues that space is produced by three interrelated processes. Space is *conceived* through abstract thought, *perceived* through the spatial practices of everyday life and *lived* as an experience through the body (Van Rensburg & Da Costa 2008a: 39). Lefebvre's (1991) spatial triad was used to develop three design processes that explore how refuge can be created in terms of: the feeling of refuge (lived space), space as refuge (conceived space) and the act of refuge (perceived space).

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5.1

LIVED SPACE - FEELING OF REFUGE

On a sidewalk of Madiba Street in Pretoria's CBD, Douglas is walking to work. He is part of the continuous flow of movement, anonymous among the crowd and detached from his surroundings. The sidewalk is a space of transition and spontaneous interaction. The sidewalk is not a space that belongs to him alone, it belongs to everyone. Informal traders, security guards and taxi operators each claim their space on the sidewalk, leaving no space for Douglas to dwell.

He breaks away from the crowd to seek refuge in the arcade. Refuge from the movement, disorder and strangeness of the street. His pace slows down, he pauses, lingers and familiarises himself with his surroundings. In the corner of courtyard there is a place he can temporarily call his own. A place to sit, breathe, rest, meet friends and stare at strangers. However, the sense of refuge is only temporary. Soon he must return to his journey through the city.

INTENTION

The first design process placed emphasis of the lived dimension and the experience of refuge and exposure through the body. It explored the process of designing the building as a series of sequential spatial experiences that provide the mobile urban dweller with different levels of intimacy, familiarity and enclosure.

INFORMANTS AND APPROACH

Four different personas of mobile urban dwellers were created based on four user types identified on or around the site. Douglas is a government worker who would use the building as an arcade and a place to buy lunch. Zandile is a student of a nearby collage who would use the new library and classrooms to study. Abdou is a member of the Queen Street Mosque and will use the building for community gatherings and festivals. Grace is an informal street food trader that require a place to cook and sell food. Each persona has different requirements in terms of refuge and exposure which simulates the diversity and plurality that urban architecture must respond to.

Lefebvre (1992) proposes the method of rhythmanalysis to study the temporal order of rhythms of everyday life (Meyer 2008:148). A rhythm in terms of lived space is considered to be the alternation between activity and rest, disorganization and uniformity, repetition and difference (Elden 2004; Meyer 2008:149). In this case rhythmanalysis was not only used as an analytic tool, but as a design tool as well. The rhythm of change between refuge and exposure over time were drawn out according to the sequence of the users' daily routine.

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DOUGLAS - **WORKER**

Douglas has a desire for refuge from the disorder of the public realm and requires spontaneous social interactions with strangers to counteract the feeling of isolation experienced in the city.

OFFICE | CHURCH STREET MARKET | APPROACH | BUYING LUNCH | EATING ALONE | EATING WITH FRIENDS | SHOPRITE | SOCIAL EVENT

ACTIVITY

TYPE OF SPACE

ENCLOSURE AND EXPOSURE

INTIMACY AND FAMILIARITY

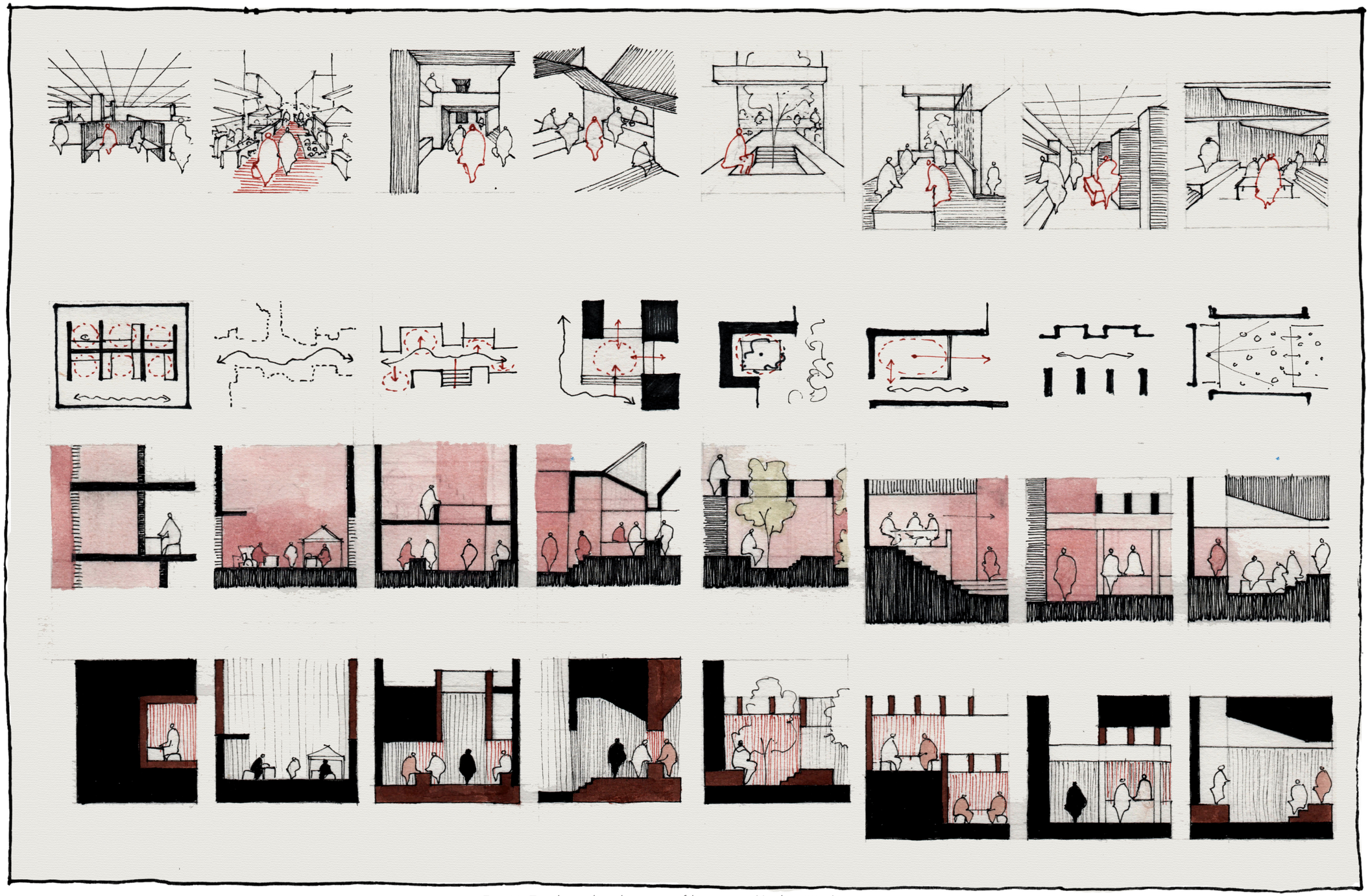

Fig. 66: Typological explorations of live space (Author 2021)

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ZANDILE - **STUDENT**

Zandile wants to escape the exposure of the street. She enjoys the anonymity and desires a space of isolation. Her need for exposure is in the form of social connection among peers, friends, and her community. The education component of the building will provide classrooms, a library and study rooms as spaces of refuge for the student.

ARRIVAL IN CITY | BUYING FOOD | APPROACH | ATTENDING CLASS | EATING LUNCH | STUDYING | SOCIAL EVENT | FAREWELL

ACTIVITY

TYPE OF SPACE

ENCLOSURE AND EXPOSURE

INTIMACY AND FAMILIARITY

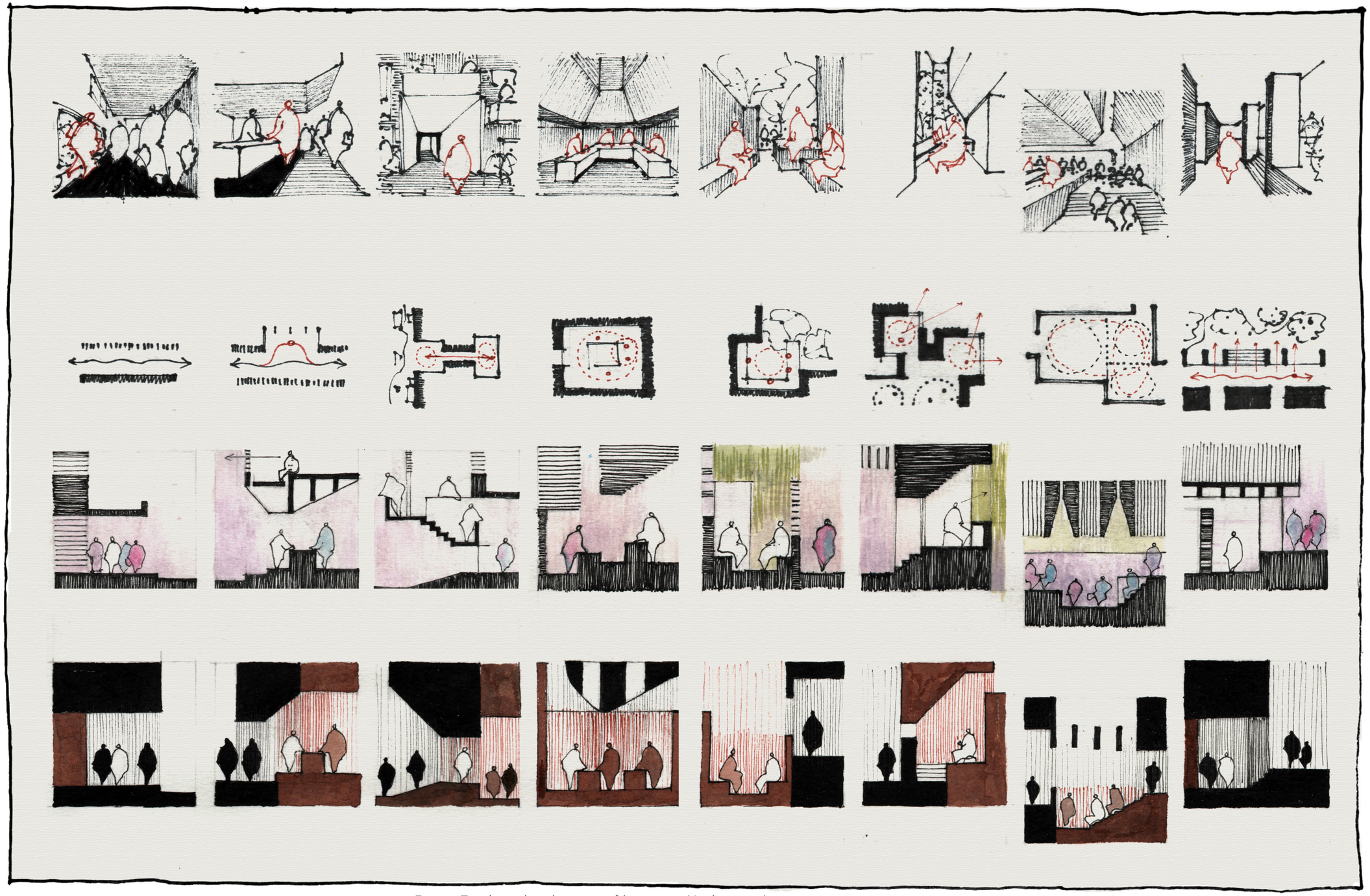

Fig. 67: Typological explorations of live space (Author 2021)

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GRACE - **INFORMAL STREET FOOD TRADER**

Grace has a desire to escape from the anonymity of the street and requires a place of refuge which provides a sense of ownership, belonging and control. A place to call her own. As an informal trader she needs adequate exposure to the public .

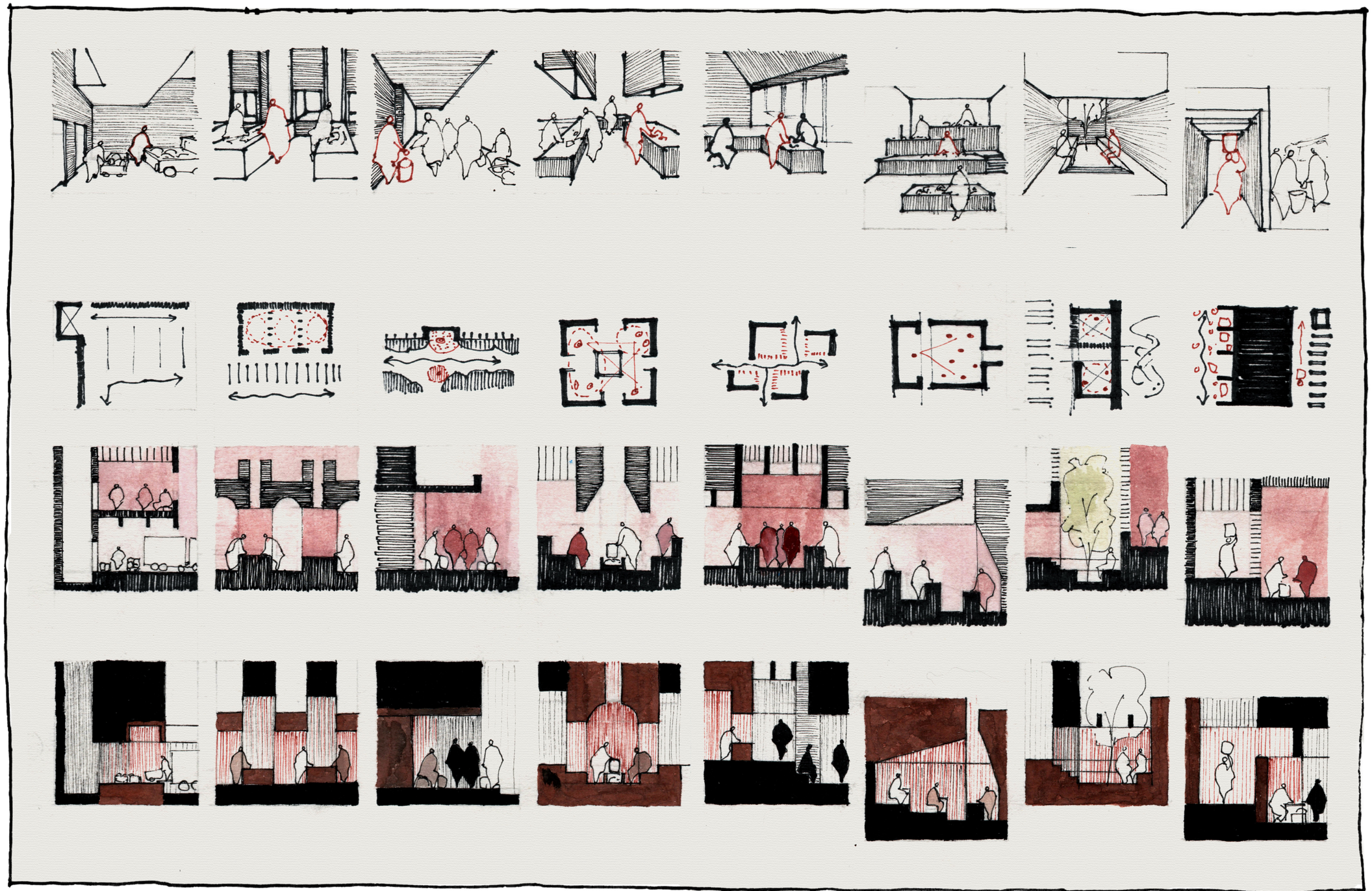

Fig. 68: Typological explorations of live space (Author 2021)

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ABDOU - **MOSQUE VISITOR**

Abdou requires a place of refuge that provide a place of permanence in opposition to the temporality of prayer rituals at the Queen Street Mosque. The mosque has limited capacity to cater for the 'profane' activities of its members, such as community gatherings, cooking and festivals.

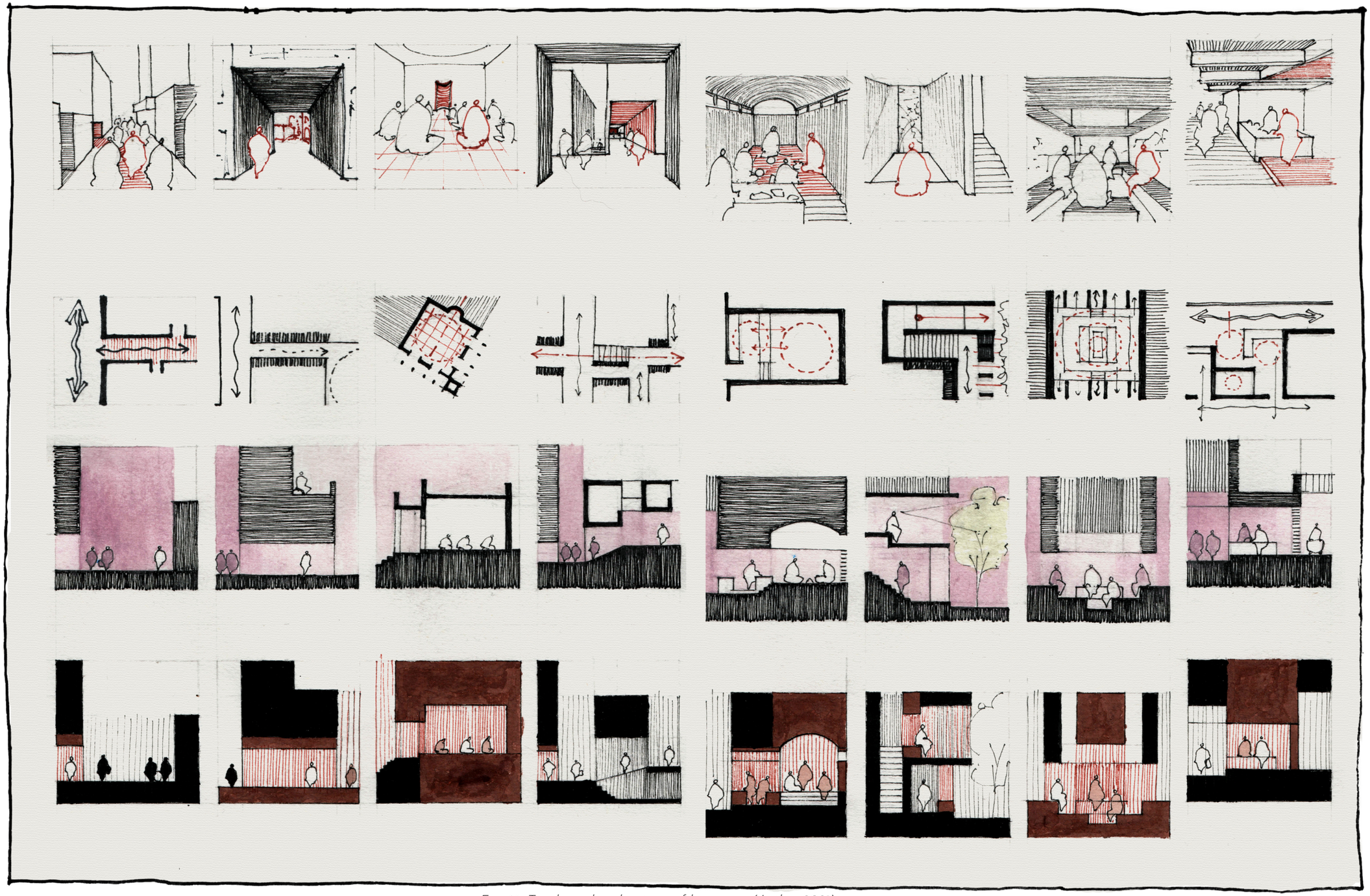

Fig. 69: Typological explorations of live space (Author 2021)

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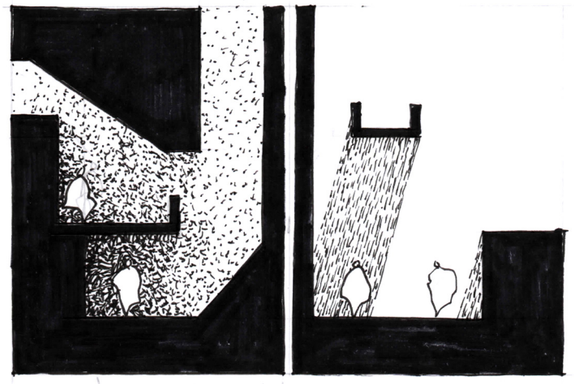
The process of designing refuge as sequential spatial experiences over time (daily) has illustrated the differences and commonalities in spatial and programmatic requirements of the different users. Certain spaces such as courtyards, arcades, dining hall, communal cooking spaces and food market, are shared spaces. Shared space will have to accommodate the different activities and levels of intimacy and exposure required by the users.

Even though this approach to space-making is derived from the particularities of the site's users, it remains typological and a-contextual in relation to the physical built fabric of the site. It has produced a series of fragmented spaces with no relation to a larger whole.

PRINCIPLES

A series of design principles, specific to the lived spatial dimension, were identified to guide further design development. These drawings show the spatial strategy in terms of refuge (left) and exposure (right). The drawings only indicate the extremes, whereas in reality the design must mediate between the feeling of refuge and exposure.

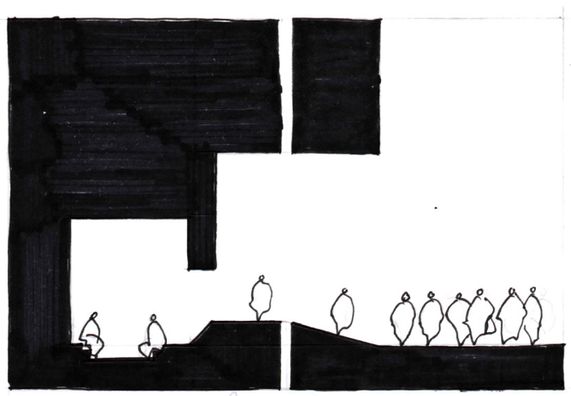
REFUGE EXPOSURE



LIGHT

The feeling of refuge can be associated with darker spaces and soft, indirect light. The feeling of exposure is hightened by direct natural light and overlit spaces.

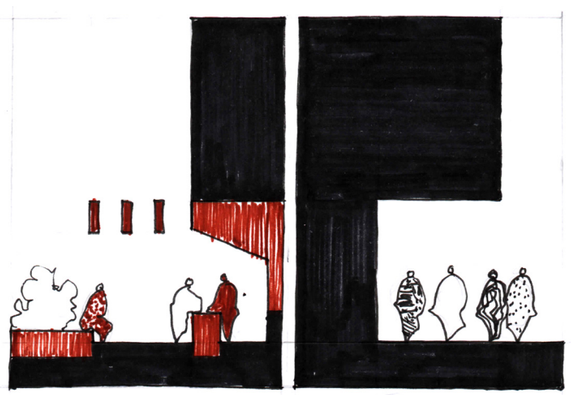
REFUGE EXPOSURE



INTIMACY

Spaces of refuge require a high degree of spatial and social intimacy. Small and enclosed spaces with well defined thresholds provide a sense of intimacy.

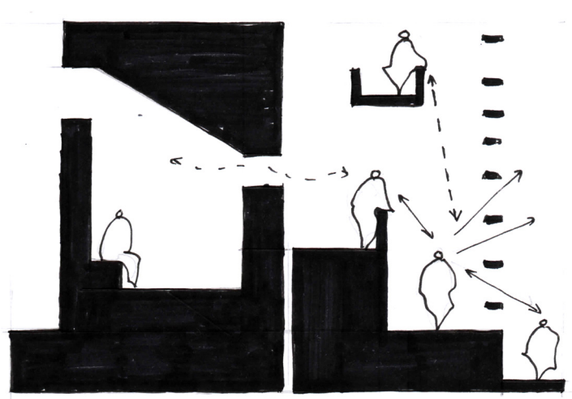
REFUGE EXPOSURE



FAMILIARITY

A sense of familiarity is fundamental to our attachments to places. Familiarity depends on the time spent and frequency of interactions with a space and people.

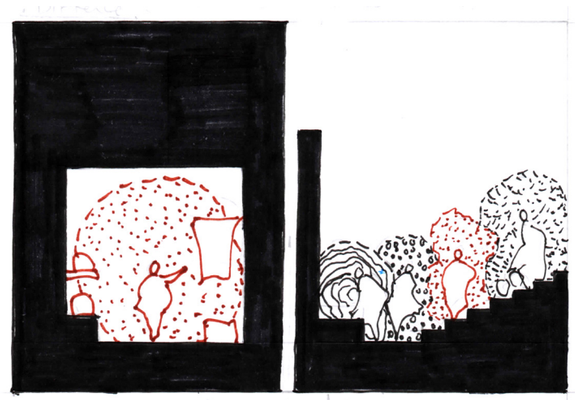
REFUGE EXPOSURE



ENCLOSURE

A space of refuge provide limited interaction with people and things outside.

REFUGE EXPOSURE



SENSE OF CONTROL

Clear spatial boundaries create a sense of spatial control.

Fig. 70: Spatial principles of live space (Author 2021)

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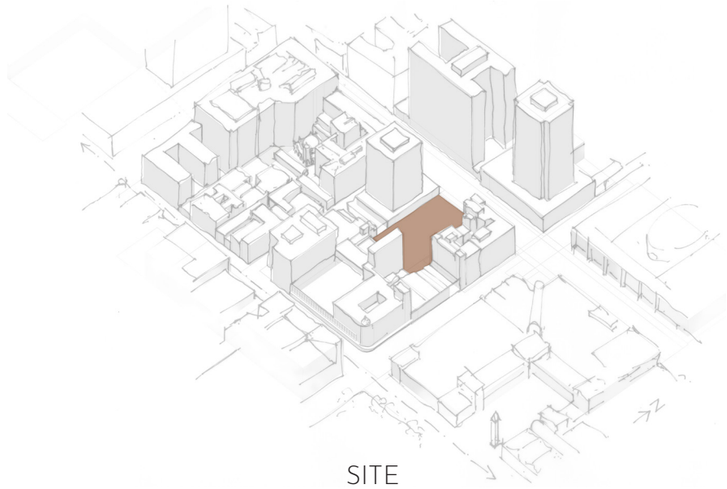
5.2
CONCEIVED SPACE

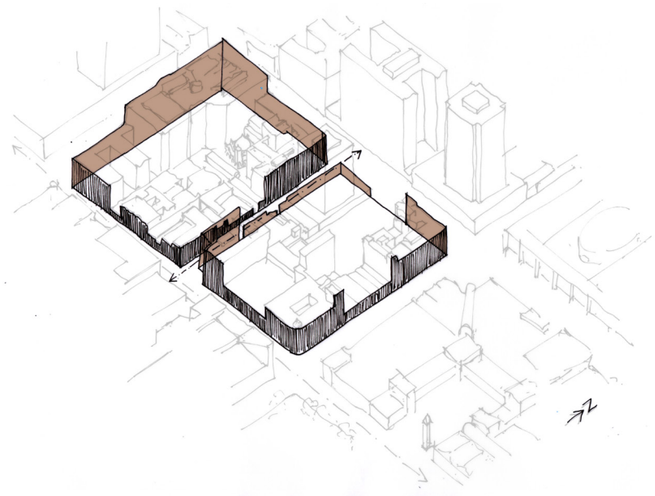
In the following section the conceptualisation of the design through the lens of *conceived* space will be explored. A re-interpretation of the inner city's urban typologies, such as the courtyard and arcade typologies, served as the main informants for conceptualising refuge and exposure on an urban scale.

The average inner city block size in Pretoria is 240m long (E-W) and 140m wide (N-S), measured between the outside edges of the sidewalk. This is abnormally large in comparison to the average block size of other cities such as Johannesburg (80m x 80m), Cape Town (70m x 65m), Barcelona (120m x 120m) and Philadelphia (90m x 150m) (Kamell 1982: 71-72). The courtyard and arcade typologies in the inner city is a result of Pretoria's long and deep blocks. The eastern section of the inner city is characterised by a network of arcades and mid-block pedestrian streets, primarily in a north-south direction. These were introduced not only to provide pedestrians a shortcut and safe thoroughfare between busy streets, but also to increase the amount of street facing shopfronts and corner shops, which could be charged a higher rent (Allers & Breytenbach 2015: 28). The courtyard typology was introduced to increase access to natural light and ventilation.

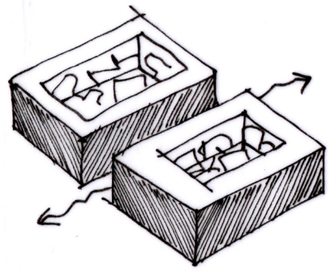
The city block of the chosen site is an example of how spaces of refuge were created by enclosing the edges of a site to define a space of refuge within. Queen Street arcade divides the enclosed block into two smaller blocks, extending the public realm into the block interior. The Queen Street Mosque (1928) was constructed in the middle of the block and then later enclosed by buildings along its perimeter (Jansen 2012), to create a private courtyard from the leftover open space.

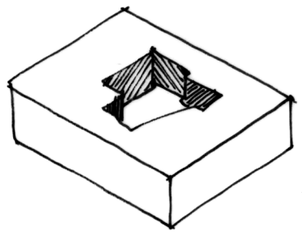


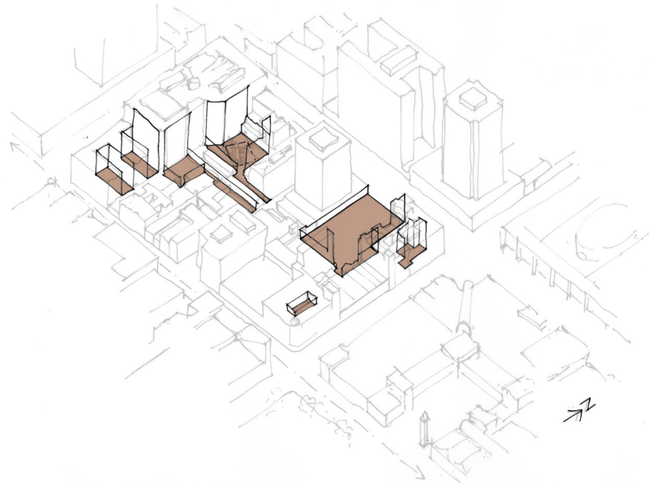
SITE



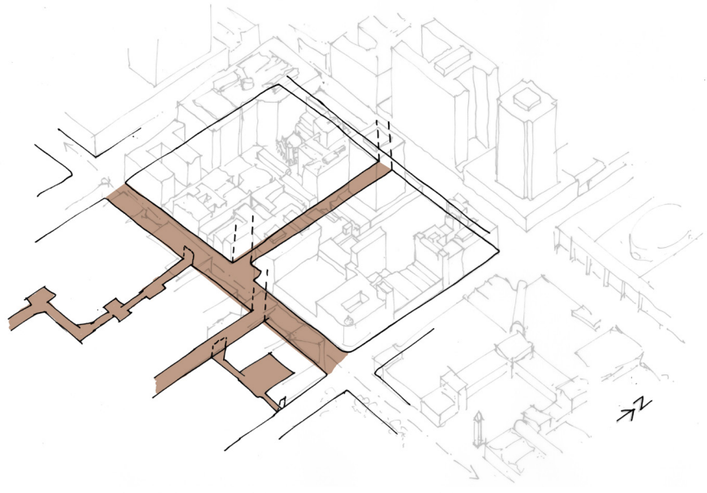
STREET WALL BLOCK
ENCLOSED URBAN EDGE



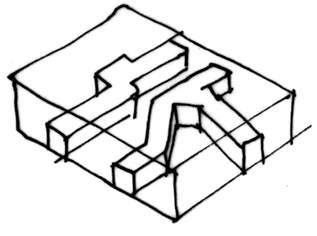


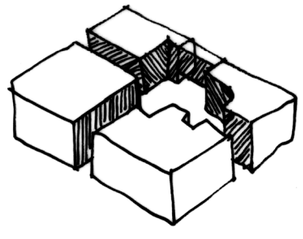


COURTYARDS AND LEFTOVER SPACE

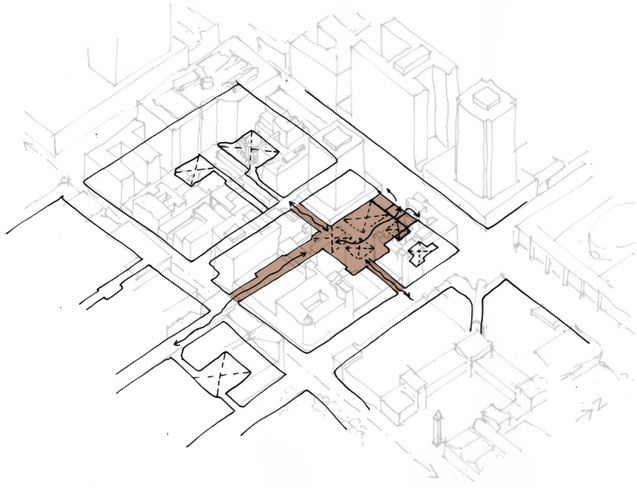


ARCADES AND PEDESTRIAN STREETS





The new intervention will create new arcades to link to the Mosque and continue existing arcade network and re-interpret the Pretoria's courtyard typology to create a place of refuge within.



NEW INTERVENTION

Fig. 71: Urban block analysis through the lens of conceived space (Author 2021)

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REFUGE - URBAN ENCLOSURE

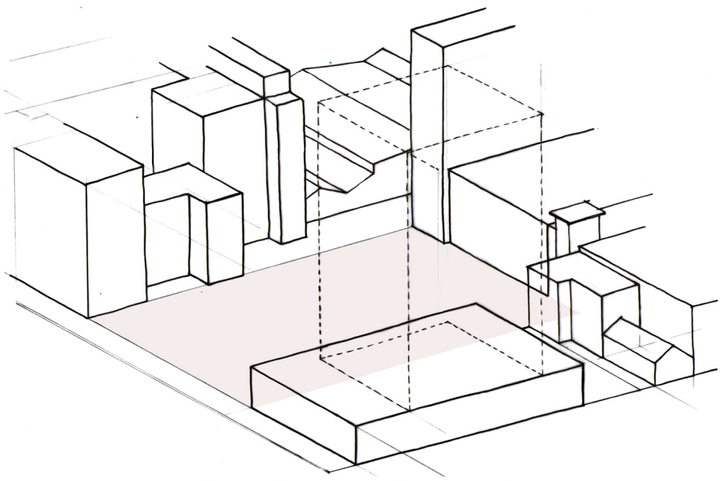

Fig. 72: Existing site (Author 2021)

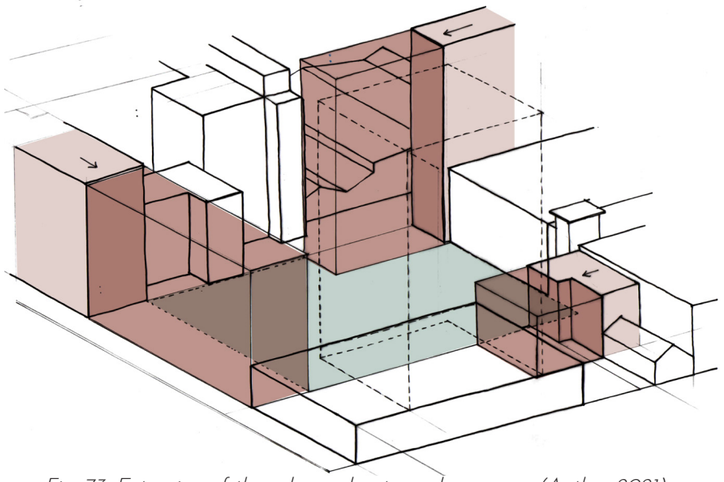

Fig. 73: Extension of the urban edge to enclose space (Author 2021)

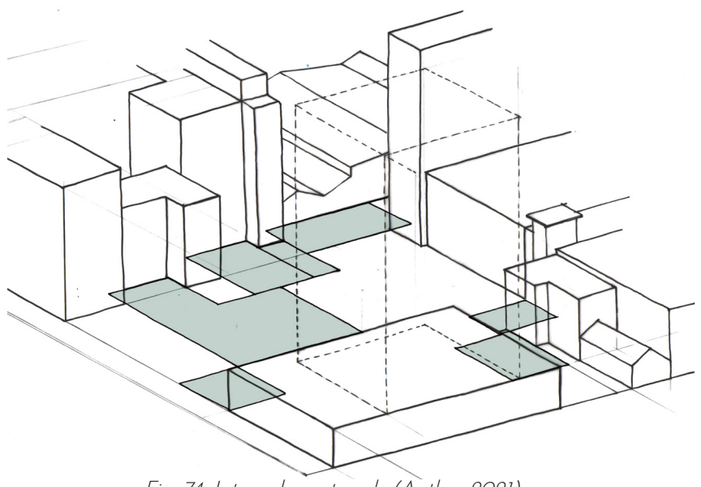

Fig. 74: Internal courtyards (Author 2021)

The notion of enclosure is continued by considering architectural form as an extension of the massing of neighbouring buildings, to define and enclose space within the site. Not only does it create spaces of refuge between masses but also more secluded and formal refuge space within the mass itself. The building aims to weave itself into the existing urban fabric by enclosing the leftover spaces between the surrounding buildings and the site, to create new open courtyards.

The concept of the building as edge and extension supports the proposed urban vision in which architectural form should define space within or between (emphasis placed on space) rather than acting as an object in space (emphasis placed on the architectural object).

EXPOSURE - INTERNAL STREET

Exposure in the city is greatest in public spaces such as the sidewalks, Church Street market and public arcades. The majority of public spaces in the city have become formalised, fenced off, controlled (Sammy Marks square and the majority of the arcades) and in some cases completely inaccessible (Lillian Ngoyi square). The city is in desperate need for space for the public realm beyond the sidewalk.

In an attempt to balance the internalised nature of refuge with public exposure, the design will consider architecture as an insertion. An internal street and internal public realm will extend the sidewalk and the existing arcades into the site and into the building. The street will extend through the building to connect to the arcade system, extend upward to create a semi-public courtyard above and extend down into a sunken cooked food market space. The arcade typology challenges how interior and exterior spaces in the city are treated as seperate and independent realms (Hertzberger 2005: 74). The arcade turns the building inside-out by bringing the public realm into the interior to facilitate the activities of urban street life in an partially enclosed space of refuge.

The intersection between insertion (arcade) and extension (courtyards), creates a direct confrontation between refuge and exposure.

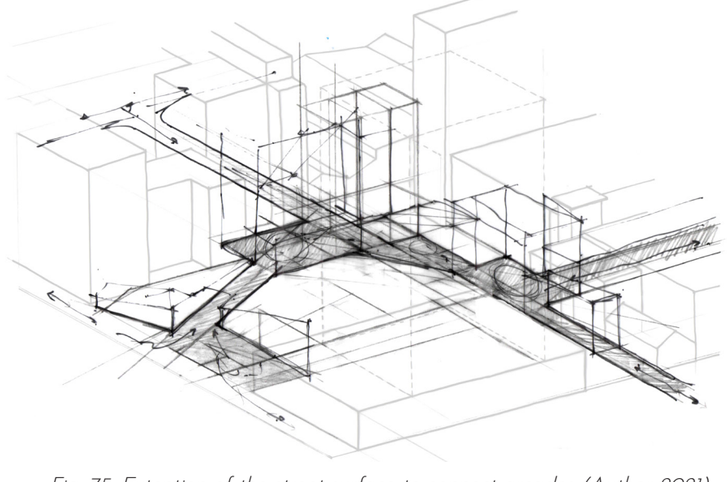

Fig. 75: Extention of the street surface to connect arcades (Author 2021)

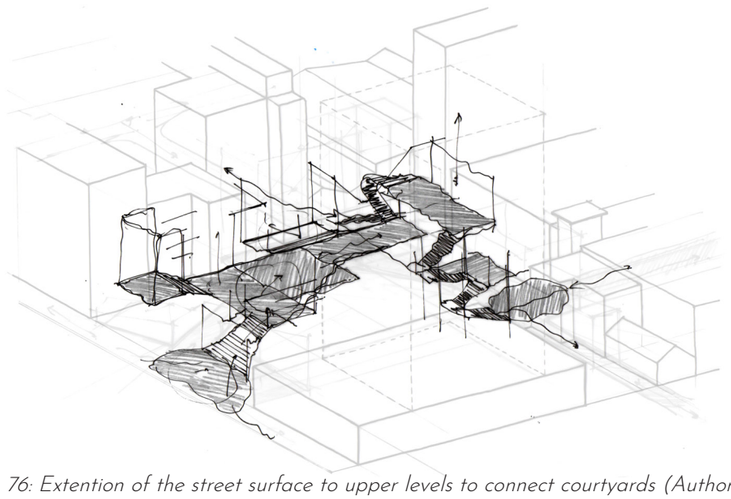

Fig. 76: Extention of the street surface to upper levels to connect courtyards (Author 2021)

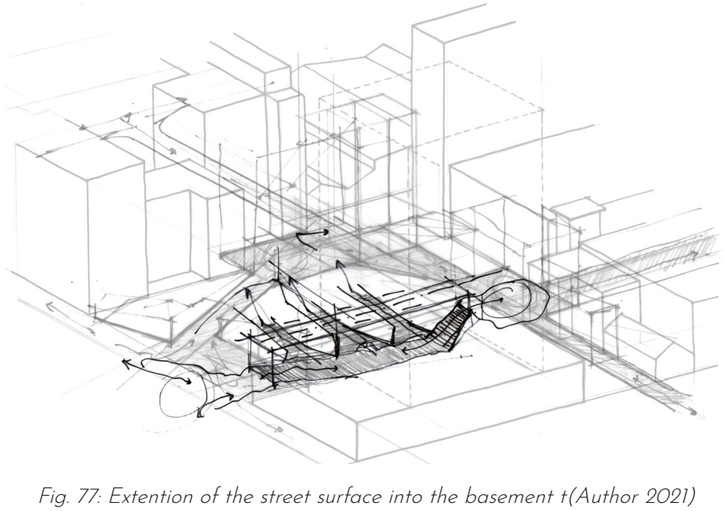

Fig. 77: Extention of the street surface into the basement t(Author 2021)

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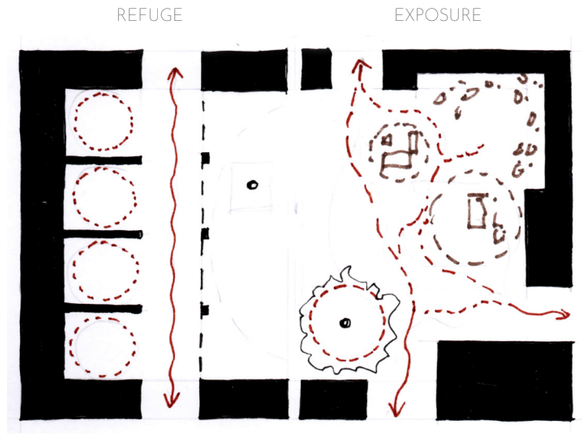
Herman Hertzberger (2005: 65) used the arcade typology in the design of Centraal Beheer office building in Amsterdam (1958) to create internal streets that divide, connect and order space within the building. The internal street was illuminated from above in line with traditional arcade design (Boettger 2014: 30) and to replicate an external street condition where light comes from above (Hertzberger 2005: 74). Hertzberger used exterior materials such as exposed precast concrete bricks and glass bricks in the internal street to challenge the user's perception of space. Even though the building was private, the internal street was designed to allow public circulation from a proposed train station (never built) through the building into the city (Hertzberger 2005: 80). The success of the internal street lies within its use and activities. It was far more than a corridor to move through, it was place to dwell, sit, work and socialise.

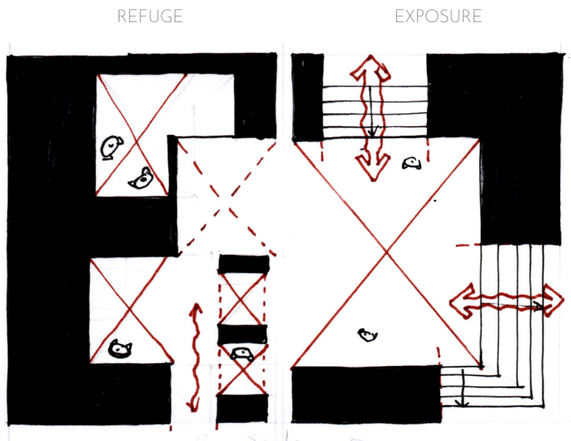
The arcades within the inner city of Pretoria have lost their former sense of place and are underutilised as a space of transition (Allers & Breytenbach 2015: 28). Reasons for this include: the decrease or complete removal of shopfronts (Polly's arcade), the absence of natural light, sterilisation and commodification of space (Noordvaal arcade, CentreWalk arcade) or the appearance that the arcade is an interior or private space which creates the perception that pedestrians aren't allowed in. But above all, the existing arcades have limited social and funtional spaces. They function primarily as transition spaces with nowhere to sit, eat, socialise or play. The arcades might provide a sense of enclosure and separation from the street, but they do not accommodate the act of refuge.

PRINCIPLES

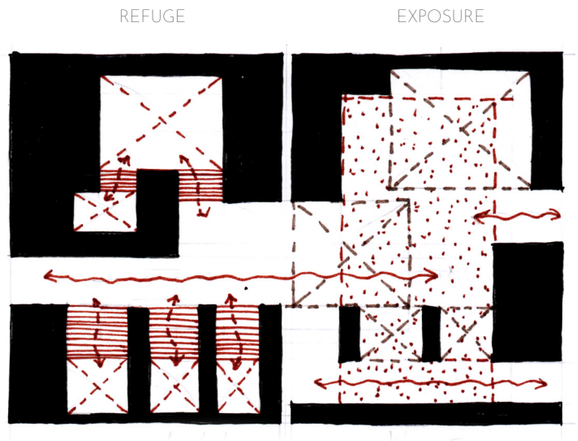
A series of design principles, specific to the conceived spatial dimension, were identified to guide further design development. These drawings show the spatial strategy in terms of refuge (left) and exposure (right). The drawings only indicate the extremes, whereas in reality the design must create space where refuge and exposure intersects..



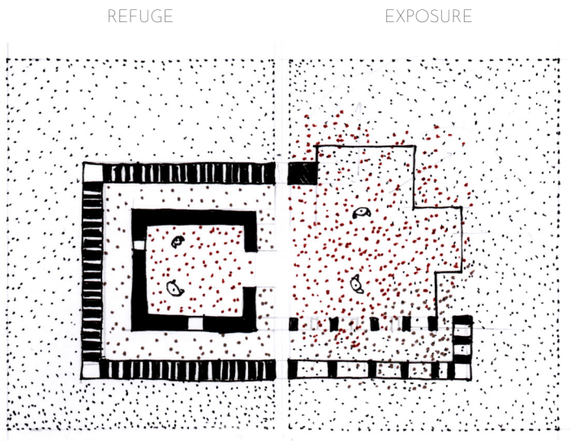
ORDER



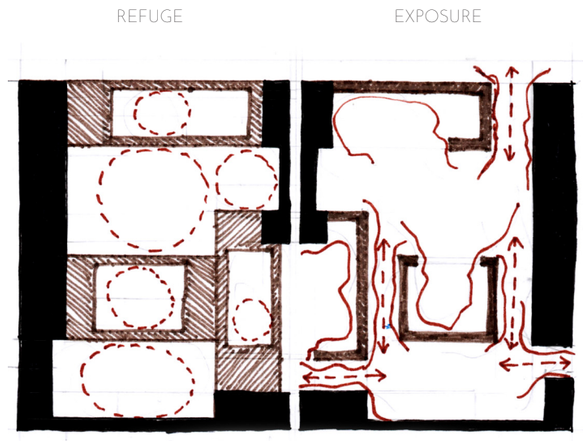
SCALE



ISOLATION AND CONNECTION



BOUNDARY



ENCLOSURE

Fig. 78: Spatial principles of refuge and exposure through the lens of conceived space (Author 2021)

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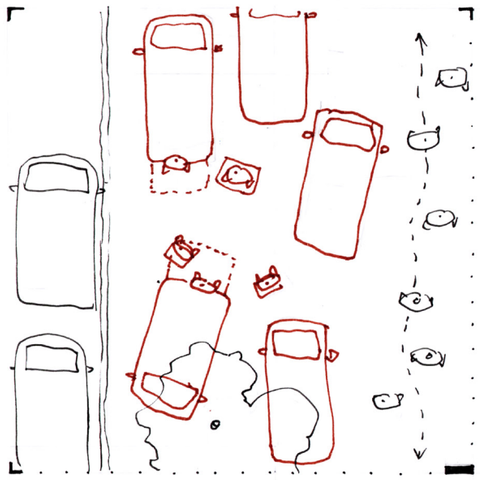
5.3
PERCEIVED SPACE - ACT OF REFUGE

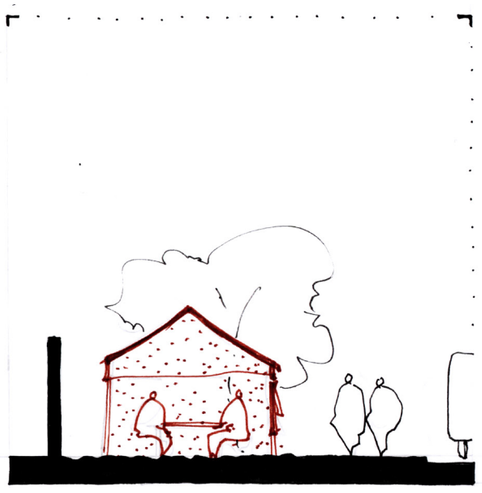
The following section will explore the effect of design decisions on the users' perceptions of space and subsequently their behaviour, activities and spatial practices. Spatial practices refer to how everyday life is structured by conceived space (Schmid 2008: 38). The aim is to bring together the contrasting approaches to design thus far: the phenomenological process of designing the experience of refuge and the process of analysing context to inform how architectural form is conceptualised. This section will develop an approach to facilitating the temporary act of refuge.

The types of activities and appropriate spatial characteristics were informed by the existing spatial practices of the mobile urban dweller on site.

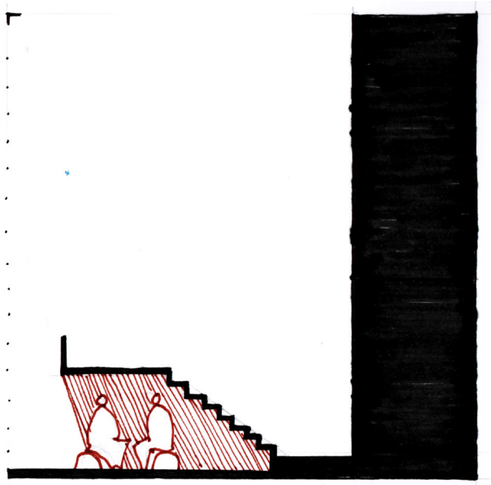
Taxi operators use parked taxis to claim ownership of a portion of the sidewalk in front of the building. The taxis create a temporary boundary to define a space to sit, eat, socialize and wash their vehicles.



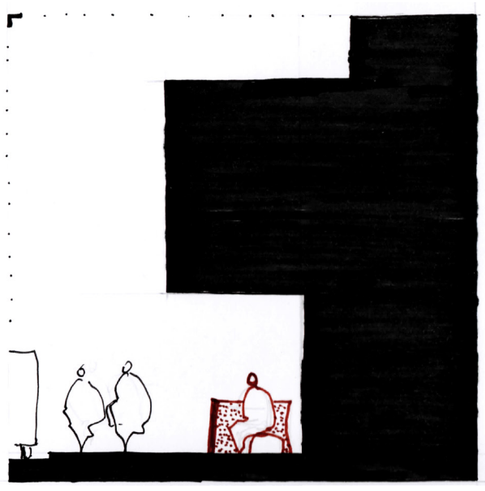
On the sidewalks surrounding the site, street food traders erect gazebos and temporary structures to create a private and shaded area for their customers to eat.



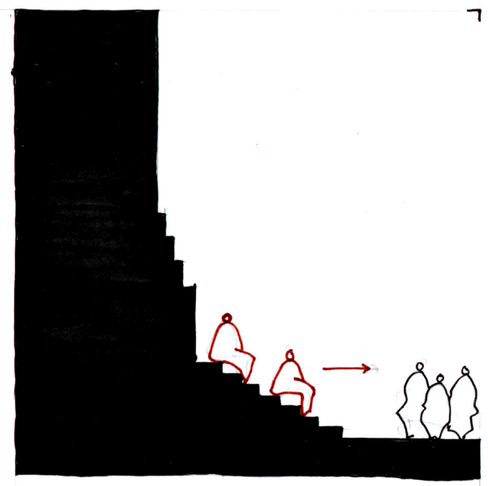
The exisitng open site provides little protection from the harsh summer sun. Some of Shoprite's employees take refuge underneath a small staircase to eat their lunch. The space underneath is dark and intimate compared to the rest of the site, which allows them to hide in plain sight.



On the sidewalk in front of the site, Grace cooks and sells her amagwinya (vetkoek) behind cardboard shelter.



Public staircases are appropriated as seating and places to eat. These spaces are most comfortable when they are separated from the flow of movement and provide a solid boundary behind.



The pedestrian takes refuge in an arcade to escape the disorder of the street.

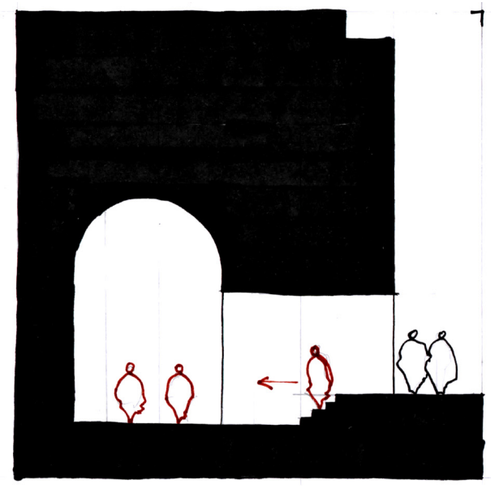


Fig. 79: Existing acts of refuge (Author 2021)

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PROSPECT – REFUGE THEORY

The theory of prospect and refuge argues that people feel comfortable in spaces where they can observe an environment without being seen (Dosen & Ostwald 2013: 9). It is this in-between condition where someone can feel safe while being exposed to stimulation and excitement (Dosen 2016: 4). A place where refuge and exposure are experienced simultaneously. Dosen and Ostwald (2013: 18) argue that the thing being observed (the outlook, view or vista) is more important than the way in which it is framed, which provides the sense of refuge. Even though this theory is primarily focused on observation and visual connection, it does provide some insight in how it effects people's use of space. In an open public space people tend to occupy the edges, a colonnade or space under an overhang, as it satisfies the desire for protection and the opportunity to observe others. Two aspects are important here: the place where a person positions themselves in relation to the thing being observed and the type of boundary that provides the feeling of safety. It can be a change in elevation, a permeable screens, columns as a barrier, a solid edge or even darkness.

LOOSE SPACE

Space becomes loose when ordinary people activate, use and appropriate space according to their needs and desires (Franck & Steven 2006: 3). Loose space requires accessibility, freedom of choice and most importantly, people's ability to recognize and explore the inherent potential of a space themselves (Franck & Steven 2006: 2). Loose space creates the possibility for temporary spatial appropriation, the temporary act in which people carry out activities or the temporary adaptation of the physical environment, for a purpose other than a space's intended use (Lara-Hernandez, Melis & Thompson 2020). This process of redefining pre-determined urban space, provides the urban dweller with spatial authorship without them requiring ownership (Panas 2009). Sennett (1990) argues that the way in which people use space (individually and collectively) is representational of a society's identity. Spaces of exposure must promote looseness in order to be an extension of the public realm.

Bremner (2010: 74) argues that looseness should not be seen as a quality of space, but rather a type of spatial practice. It is people's actions that make a space loose. There is however certain spatial qualities that promote unpredictable activities, spontaneous events and chance encounters (Franck & Steven 2006: 5). Spaces that are controlled and prescriptive, restrict certain behaviour and limit the inherent possibilities. The sense of anonymity in public spaces promote looseness, because strangers are more tolerant and less likely to impose restrictions on people's behaviour (Franck & Steven 2006: 5).

Synchronous space can be defined as space in which a diverse range of activities occur simultaneously and differnt users interact spontaneously (Sennett 2018: 206). Market places, public squares and transport interchanges are examples of synchronous spaces, where the dynamic flow of movement does not occur in a pre-determined sequence. Synchronous space promotes loosness, as it indicates to the user that the space is not prescriptive and they have the freedom to appropriate.
Spaces of refuge are controlled, ordered and predictable, but the inserted spaces of exposure must promote looseness in order to be an extension of the public realm.

SPATIAL OWNERSHIP

The mobile nature of urban dwellers has detached them from space in the public realm. People have a sense of spatial ownership when they have control over space, take personal responsibility over space and actively participate in the personalisation of space. This is much easier to achieve when space is privately owned by the user. Hertzberger (2005:14) interprets spatial ownership in the public realm as territorial claims over space. In the context of the site, informal traders, taxi operators and shopkeepers claim ownership over public space on the sidewalk. Claiming spatial ownership is predominantly a temporary activity, but is also permanently enforced by certain shops, banks and government buildings, by restricting any hawking or lingering. The informal appropriation on site is a result of spatial looseness. The design must facilitate users to temporarily demarcate space as their own to create a temporary sense of spatial ownership and an attachment to place.

PERCEPTION OF PUBLIC SPACE

The public realm provides freedom of choice and opportnuity (Franck & Steven 2006: 15) which encourages the act of refuge. The proposed design is an attempt to extend the public realm into the interior. Internal spaces are perceived as private and restrictive and therefore discourage appropriation and use by the mobile urban dweller. In order to facilitate acts of refuge in a public environment, enclosed spaces such as the food market, arcades and courtyards must therefore be designed to be perceived as external spaces. This is achieved through the use of exterior materials, natural light, openings to the exterior and spatial organisation.

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SPATIAL ORDER

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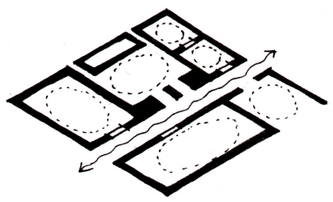
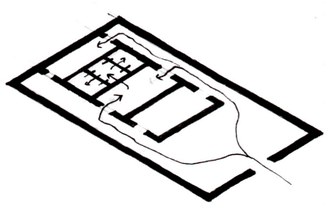
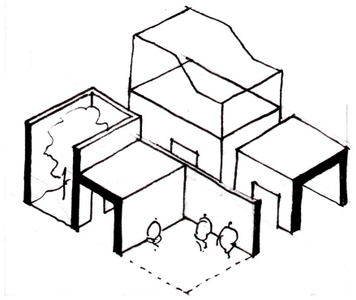
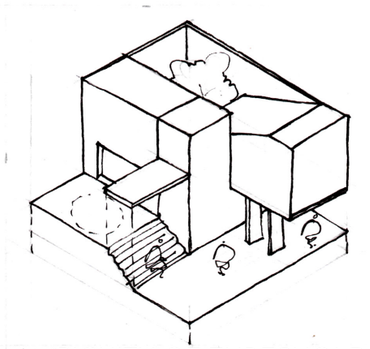
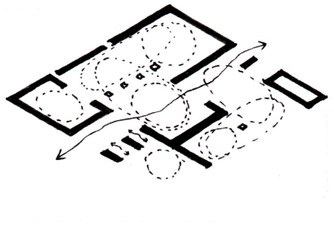
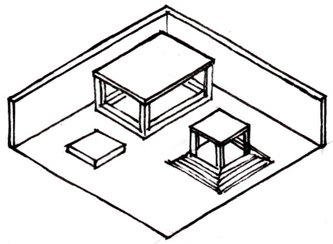
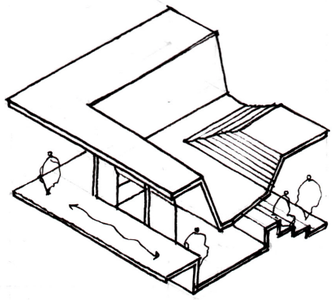
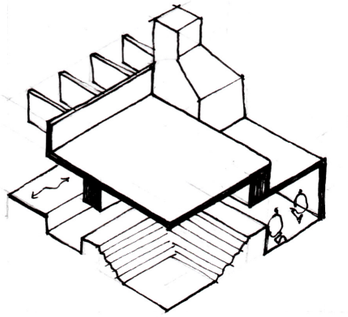
REFUGE				
	SPATIAL CLARITY	BAGRVARED CHURCH - JORN UTZON	SEPARATION OF DIFFERENT TYPES OF SPACES	AMBIGUITY OF THRESHOLD AS INBETWEEN CONDITION
EXPOSURE				
	SPATIAL AMBIGUITY	FRIENDSHIP CENTRE - URBANA	BLURRED BOUNDARIES BETWEEN DIFFERENT SPACES	POCKETS OF REFUGE WITHIN A LARGER SPACE

Fig. 80: Design explorations of refuge and exposure in terms of spatial order (Author 2021)

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APPROPRIATION

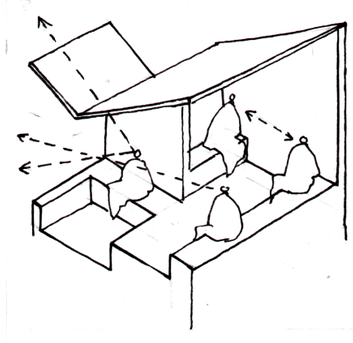
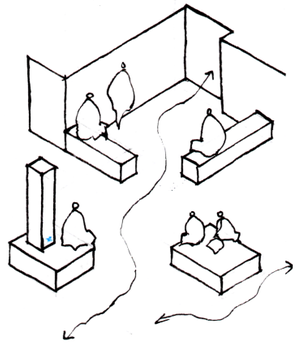
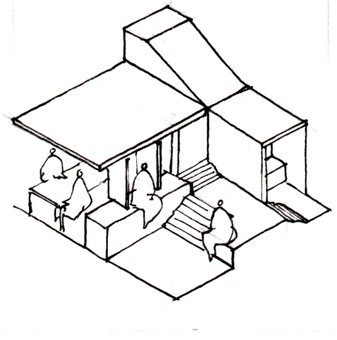
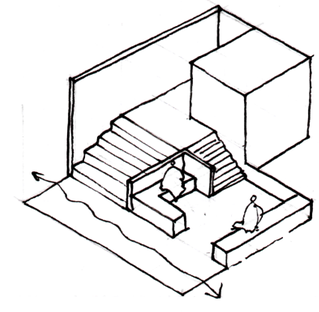
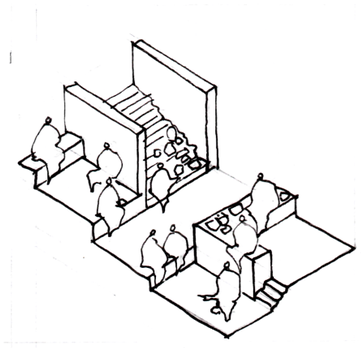
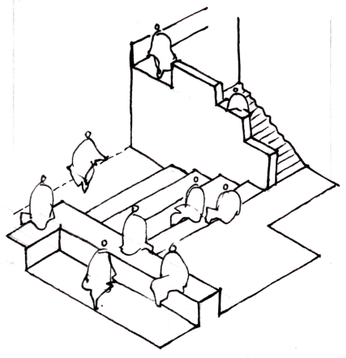
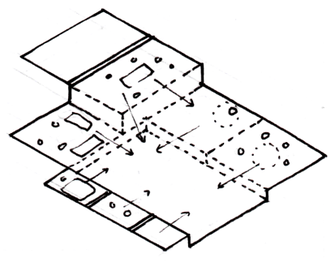
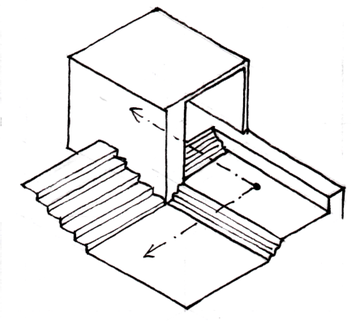
	CONCEPT	PRECEDENT	APPLICATION TO CONTEXT	MEDIATION
REFUGE				
	PREDETERMINED CHOICES	HERMAN HERTZBERGER	DIFFERENT TYPES OF REFUGE TO CHOOSE FROM	THRESHOLDS AS SPACES FOR APPORPRIATION
EXPOSURE				
	SPATIAL LOOSNESS	HERMAN HERTZBERGER	FLEXIBLITY IN USE	THRESHOLD SPACES AS MEDIATOR

Fig. 81: Design explorations of refuge and exposure in terms of appropriation (Author 2021)

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SPATIAL ORGANISATION

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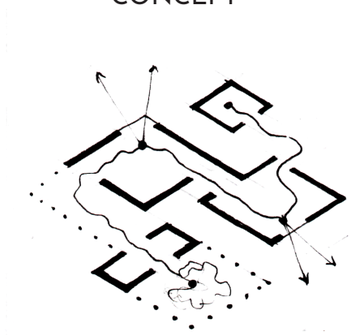
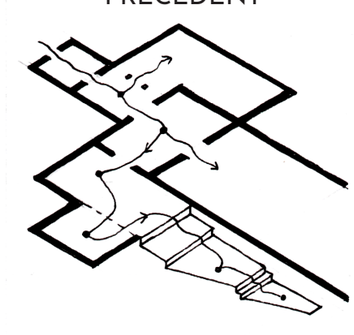
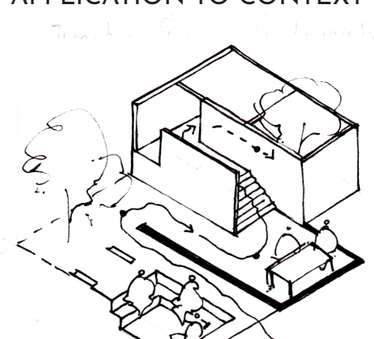
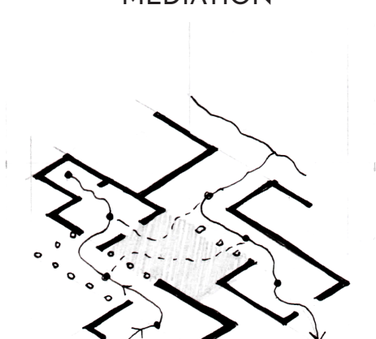
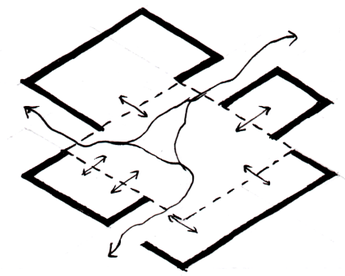
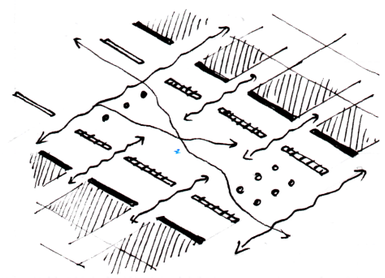
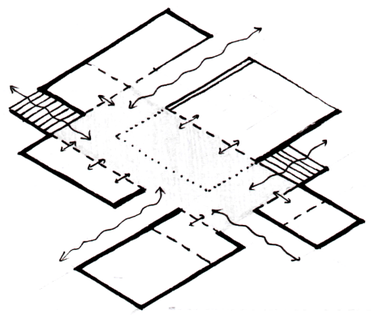
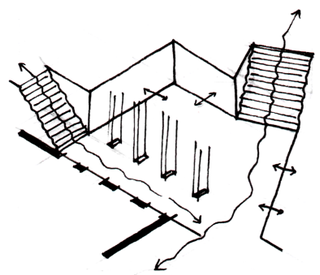
REFUGE				
	SEQUENTIAL SPACE	CAVONA MUSEUM - CARLO SCARPA	TRANSITION FROM PUBLIC TO PRIVATE	OPPORTUNITY TO DEVIATE FROM THE PRESCRIBED PATH
EXPOSURE				
	SYNCHRONOUS SPACE	NIAMEY GRAND MARCHE, NIGER	INTERSECTION	OPPORTUNITY TO CHOOSE BETWEEN DIFFERENT ROUTES

Fig. 82: Design explorations of refuge and exposure in terms of spatial organisation (Author 2021)

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PRINCIPLES

The following design principles indicate how the perception of space can be manipulated to facilitate the act of refuge.

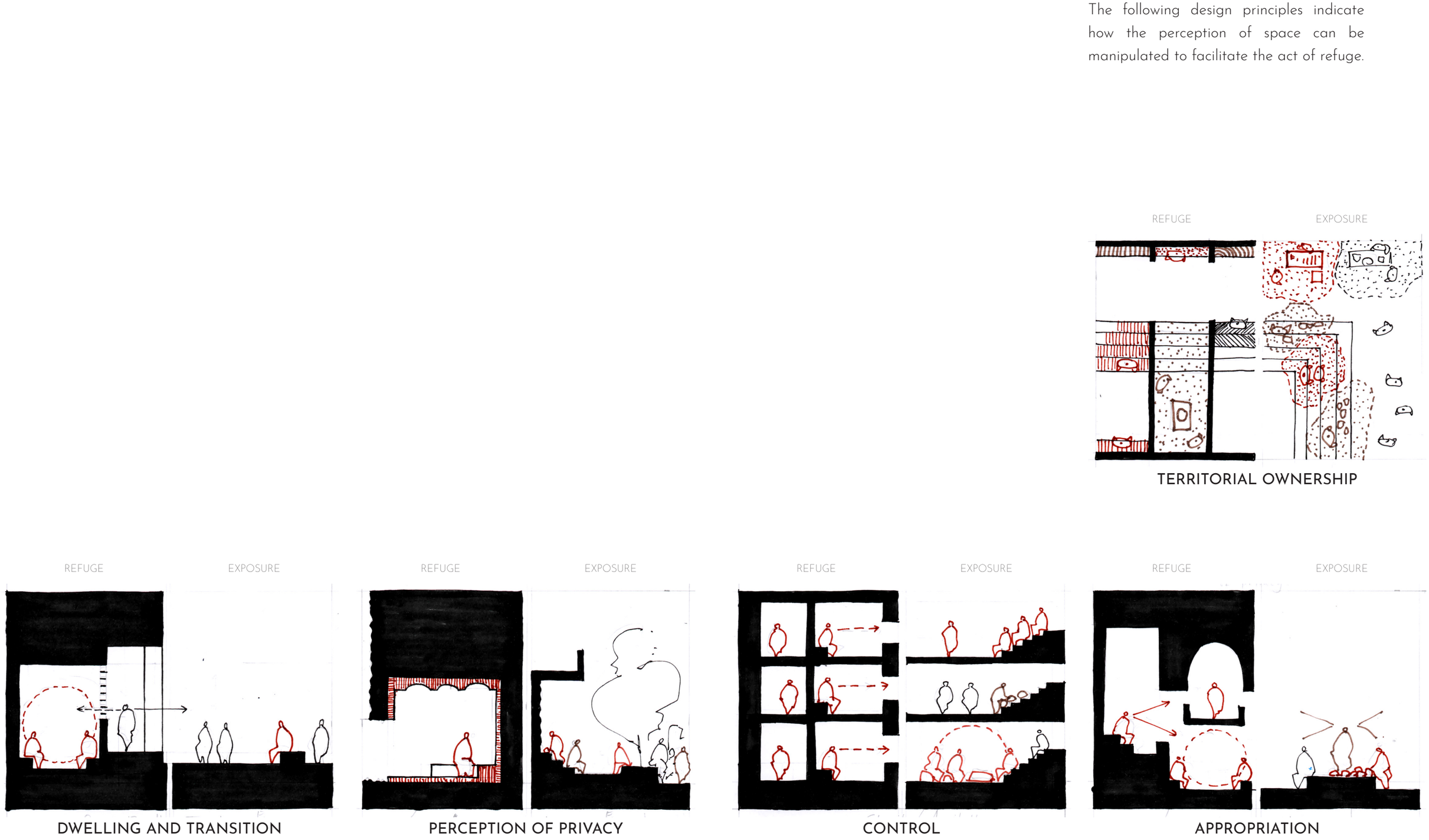

Fig. 83: Spatial principles through the lens of perceived space (Author 2021)

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06 A PLACE OF URBAN REFUGE

CHAPTER

It's Tuesday afternoon in the inner city of Pretoria. Douglas is navigating the overcrowded streets in search of lunch. The sidewalk is a place of anonymity and detachment, occasionally interrupted by unwanted conversations and unfamiliar activities. The absence of control is unsettling.

Underneath a solid concrete façade, a generous opening invites Douglas to escape the disorder of the street. Deep overhanging beams, a continuous paved floor and a folded brick ceiling entice him to enter the building. As he walks down the cascading stairs a large sunken down courtyard slowly reveals itself. The space is flooded with natural light from above. Deep recessed walls and floating concrete overhangs partially enclose the courtyard. Douglas takes a seat under the dappled shade of a white stinkwood. In the background he can see people cooking, eating and laughing around the glow of a fire. He notices a group of children running on the walkway above, behind the chimneys. As his eyes wander, he catches a glimpse of the chaos of the street. He gets up to buy some chicken from Naaila, a mielie from Grace and a cooldrink from a street trader displaying his drinks and snacks on the stairs. As lunchtime approaches and the crowds start streaming in, Douglas decides to take refuge at an empty table at the back of the room. A peaceful place to eat his lunch and feel in control. The light streaming in through the perforated brick wall is accompanied by the sound of a couple arguing. He can't help but overhear. Two ladies next to him sit and gossip as they peel and prepare vegetables for the kitchen. In the city, the act of refuge is always accompanied by a sense of exposure. It is the degree to which Douglas exposed himself and was exposed to others.

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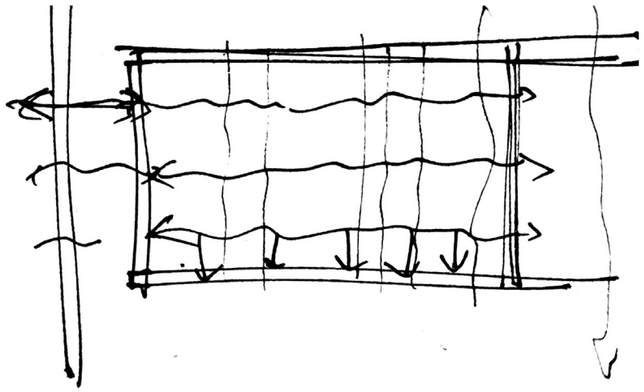
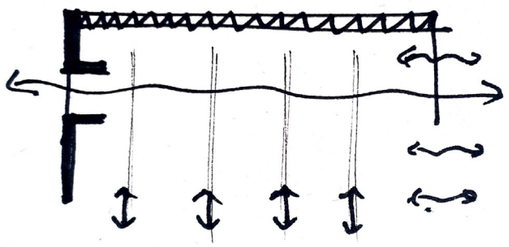
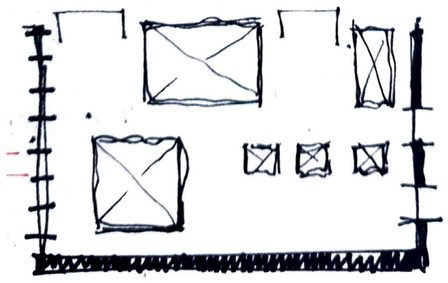
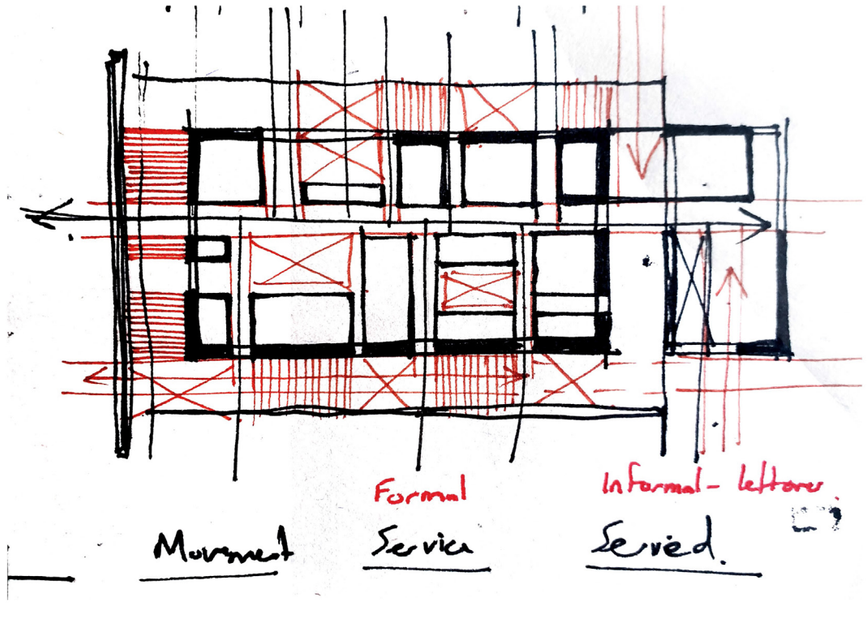
6.1

DESIGN ITERATIONS









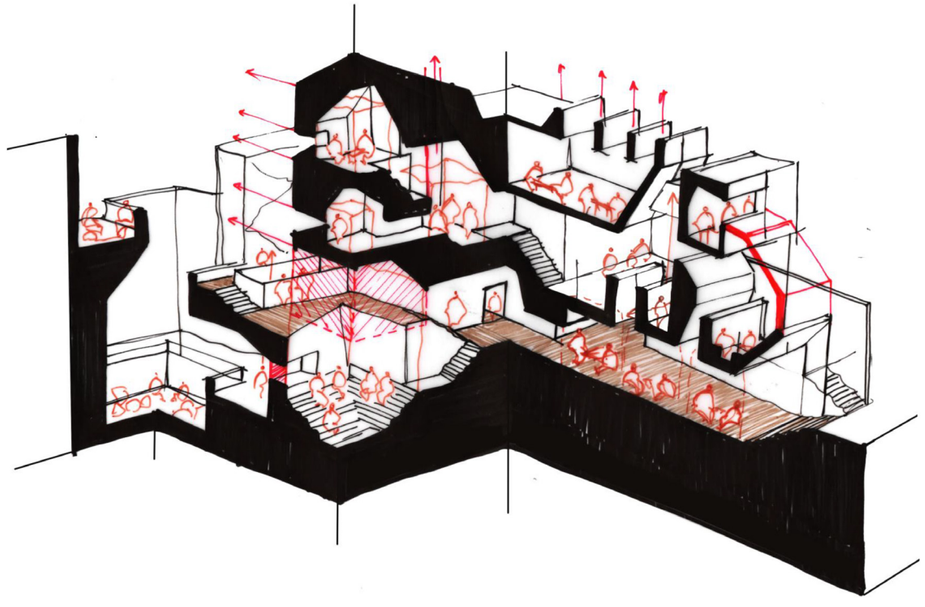






Fig. 84: Initial design explorations of enclosure, connection and spatial fragmentation (Author 2021)

Fig. 85: Initial model explorations (Author 2021)

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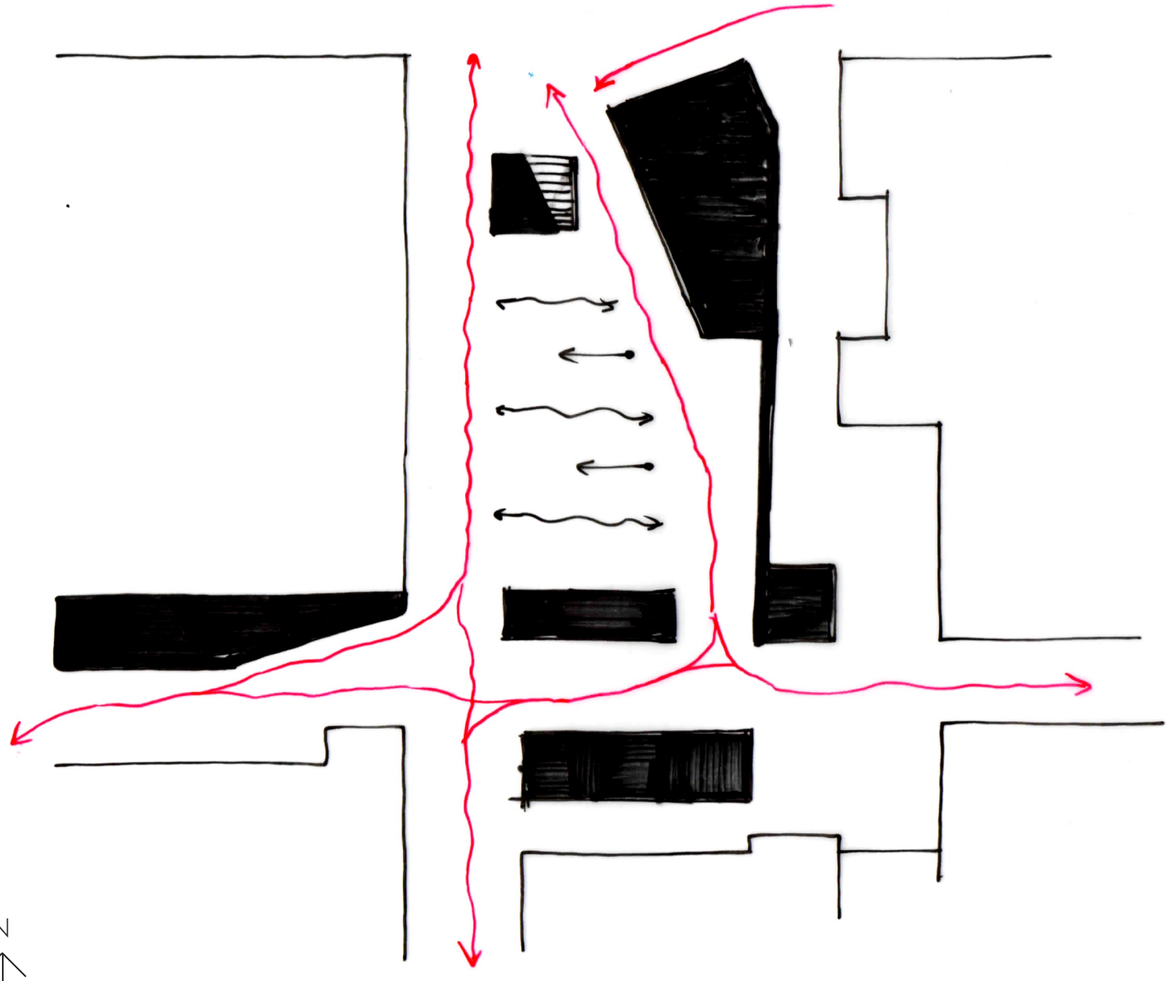
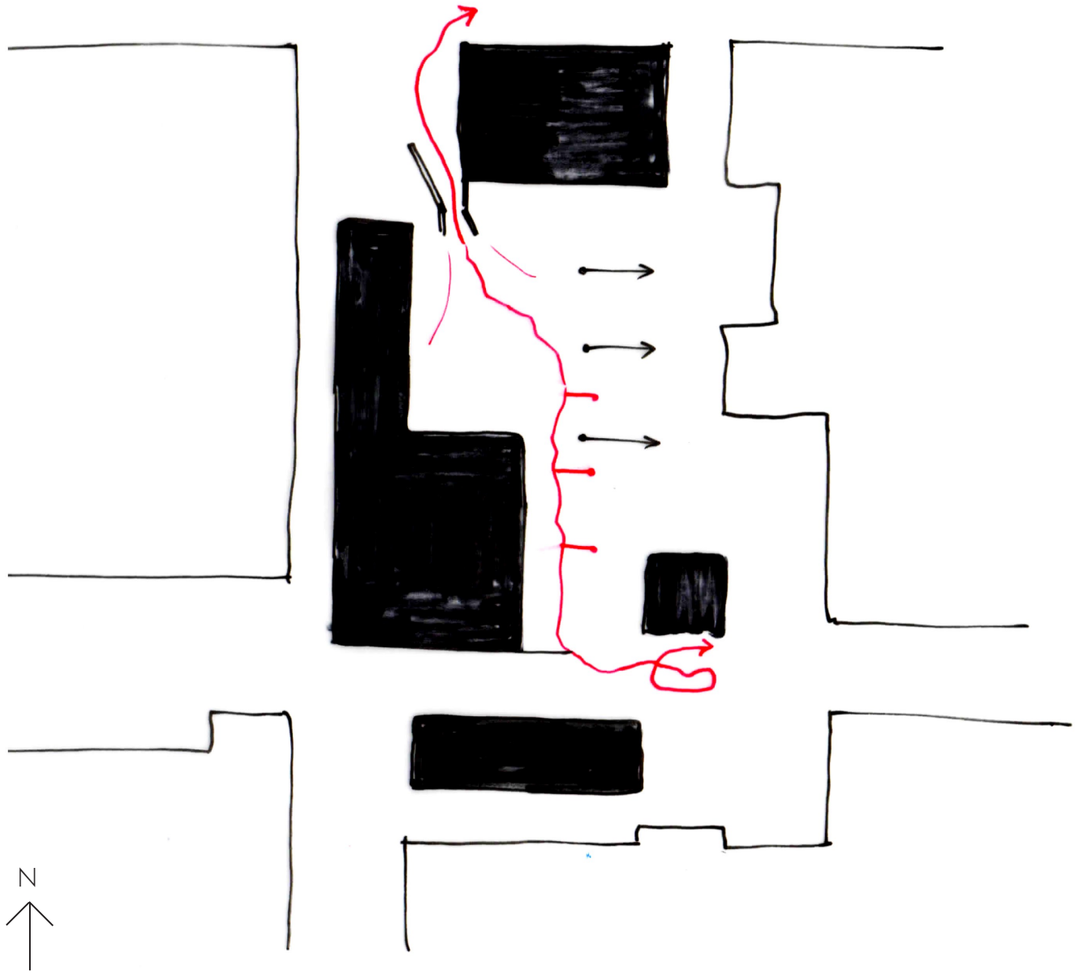
ITERATION 1

STREET



GROUND FLOOR PLAN

STREET



FIRST FLOOR PLAN

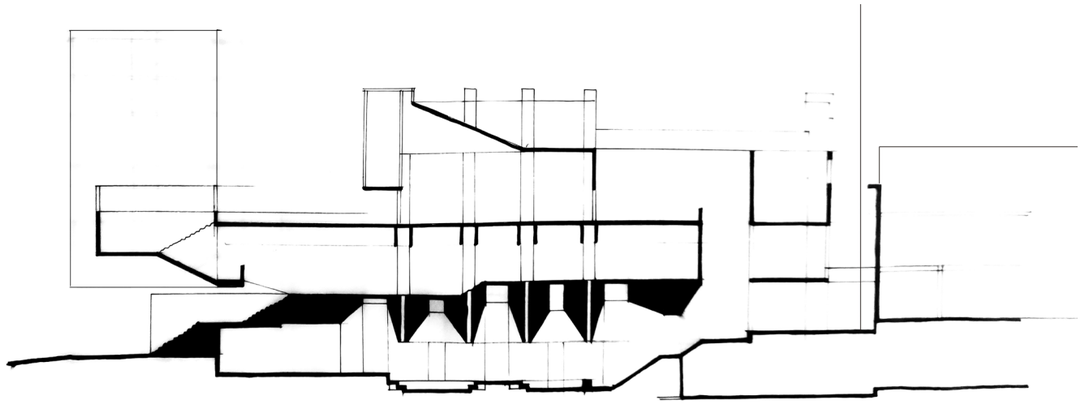


Fig. 86: Iteration 1 (Author 2021)

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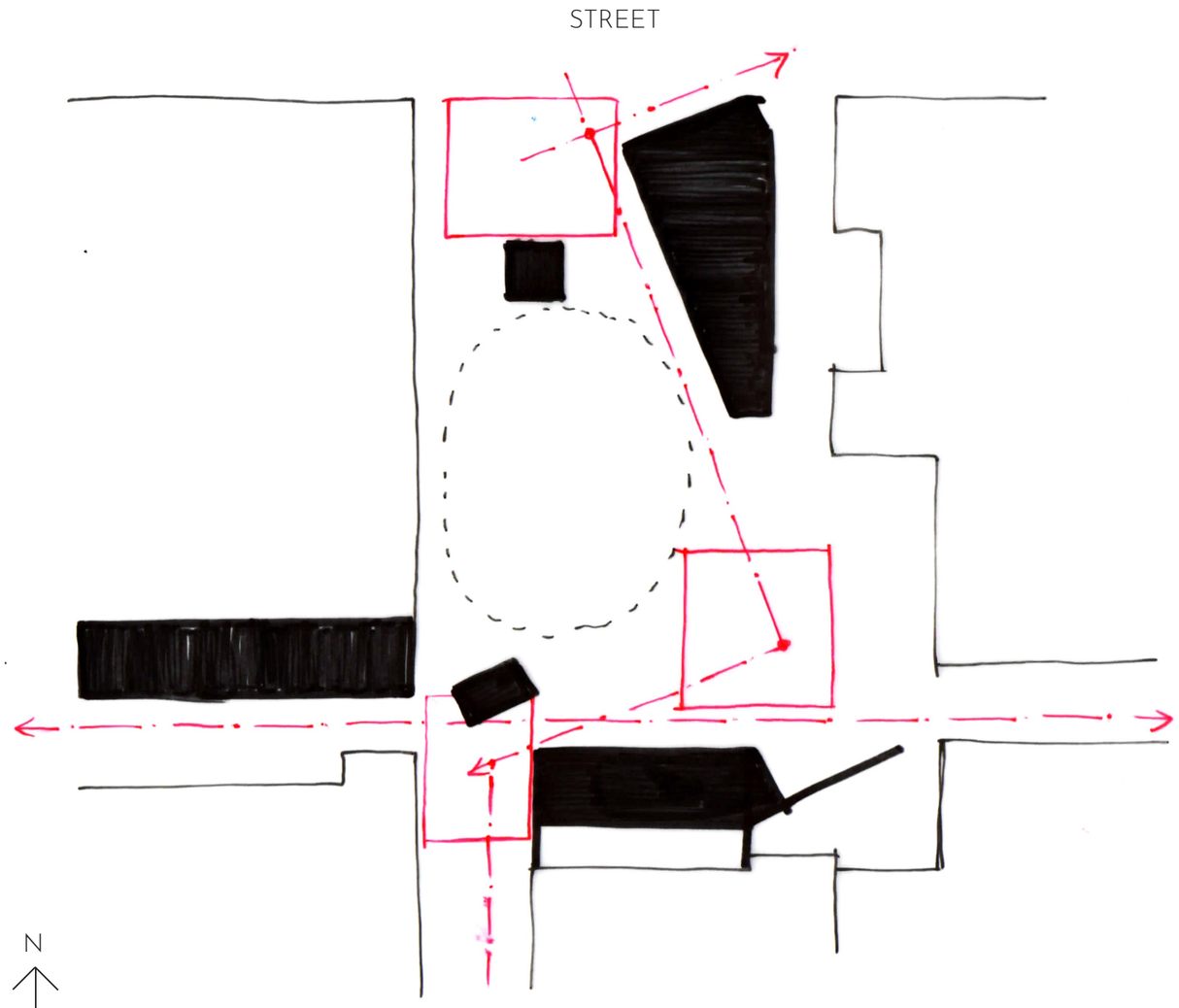
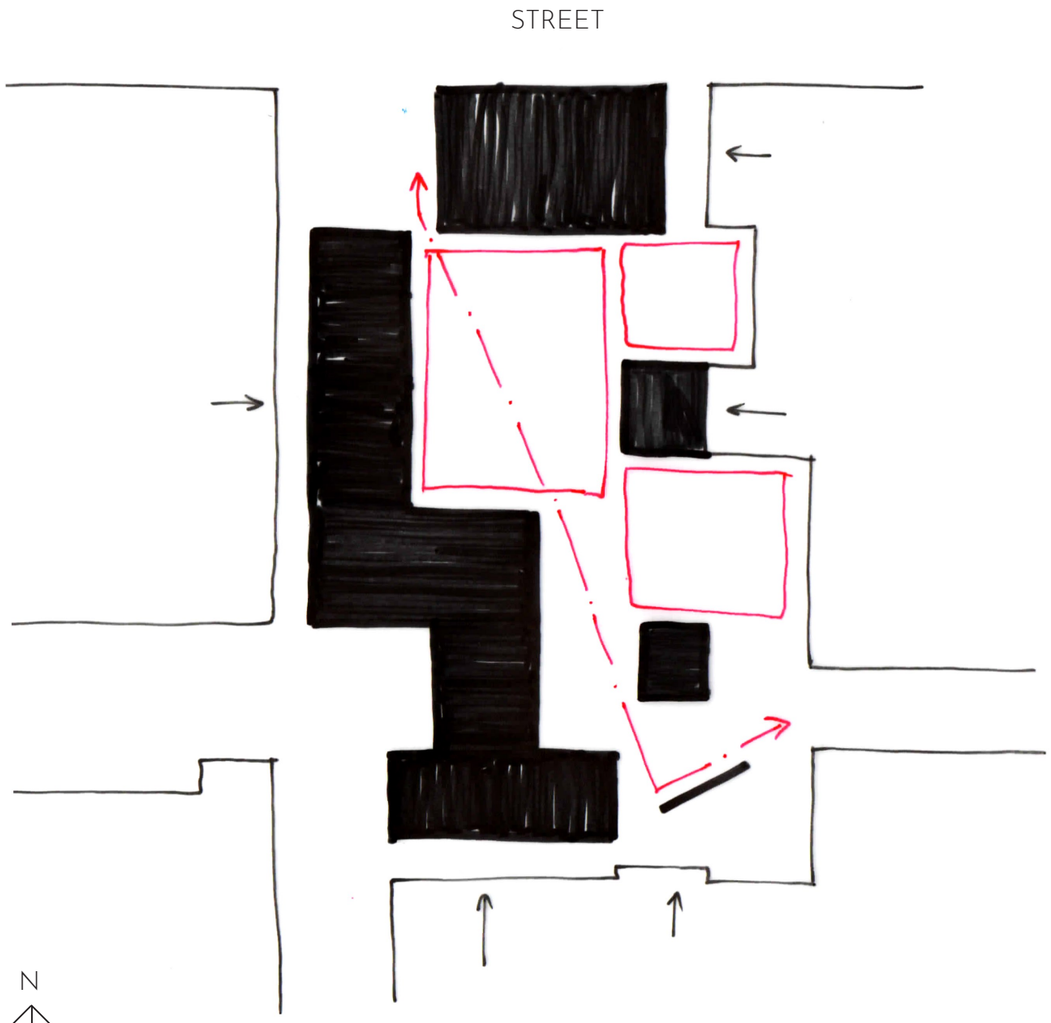
ITERATION 2



GROUND FLOOR PLAN



FIRST FLOOR PLAN

Fig. 87: Iteration 2 (Author 2021)

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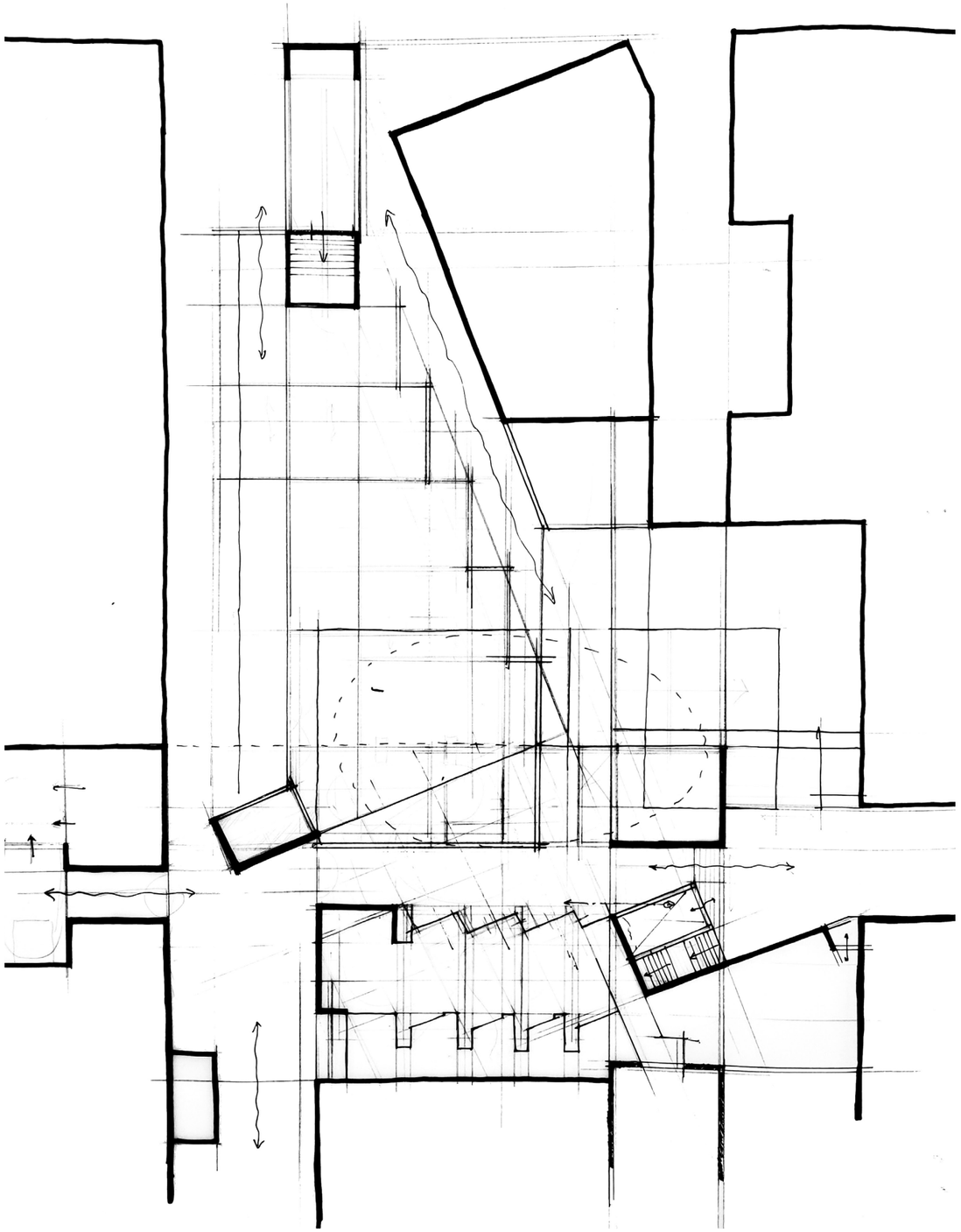
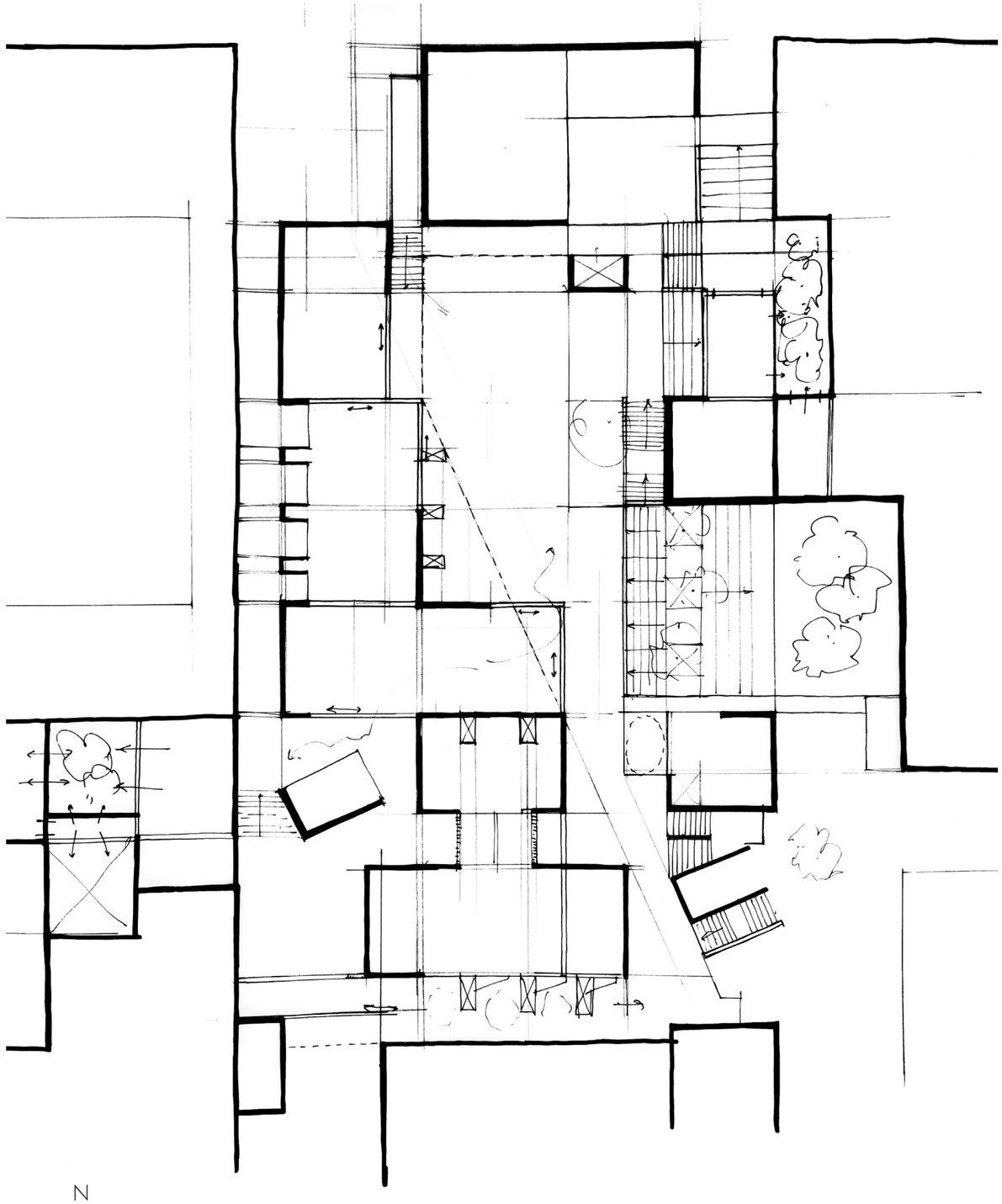
STREET



GROUND FLOOR PLAN

N

STREET



FIRST FLOOR PLAN

N

Fig. 88: Iteration 2 (Author 2021)

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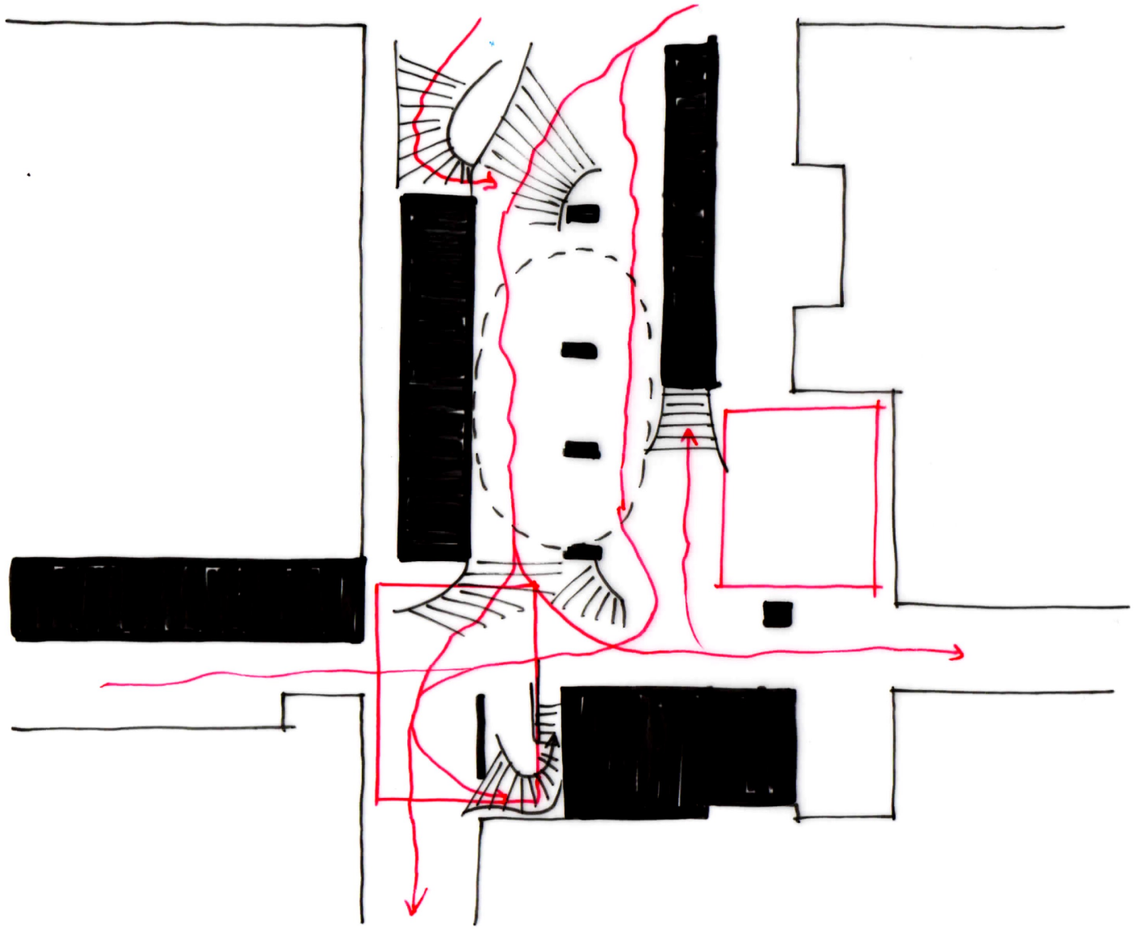
ITERATION 3

STREET



N

GROUND FLOOR PLAN

STREET



N

FIRST FLOOR PLAN

Fig. 89: Iteration 3(Author 2021)

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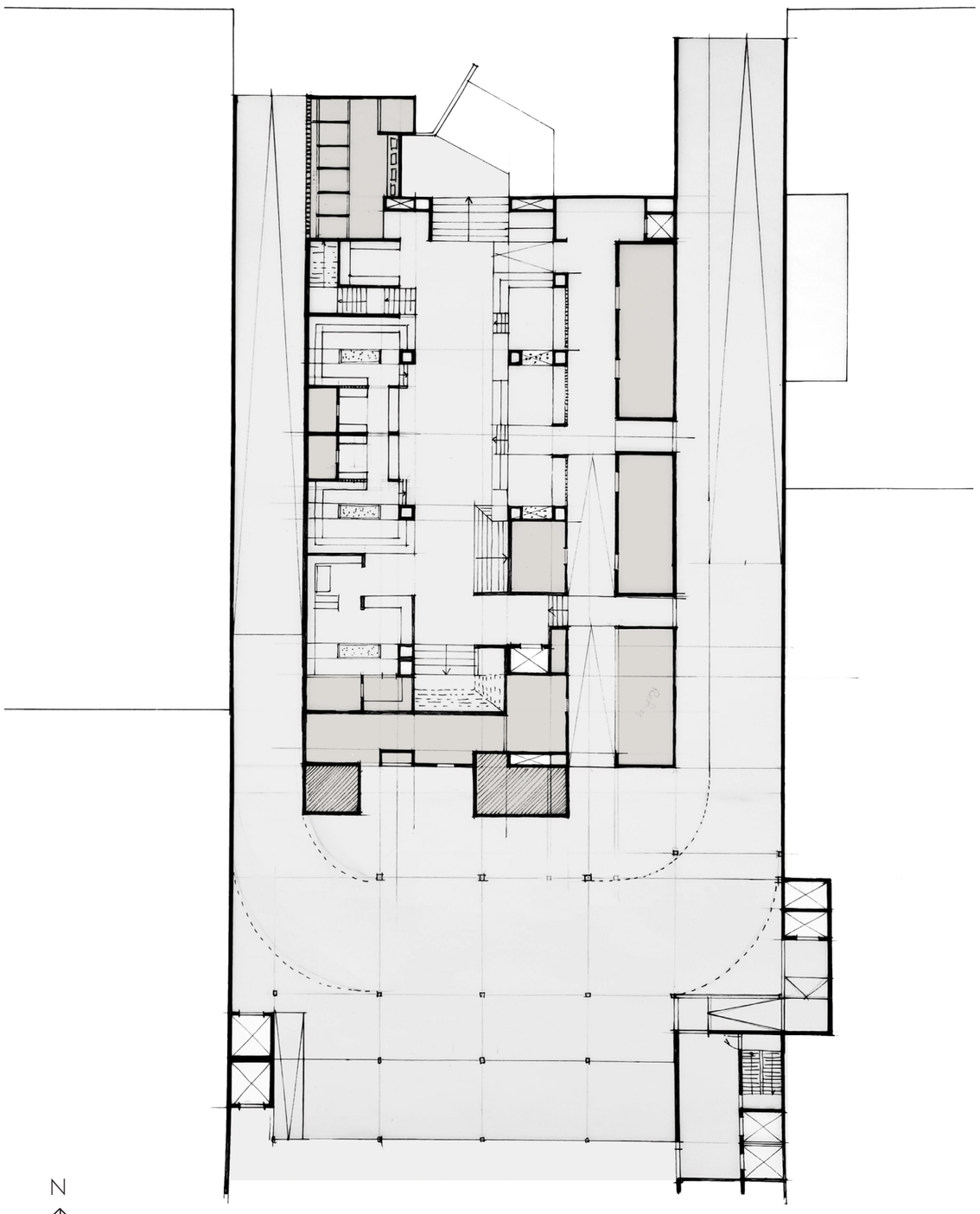

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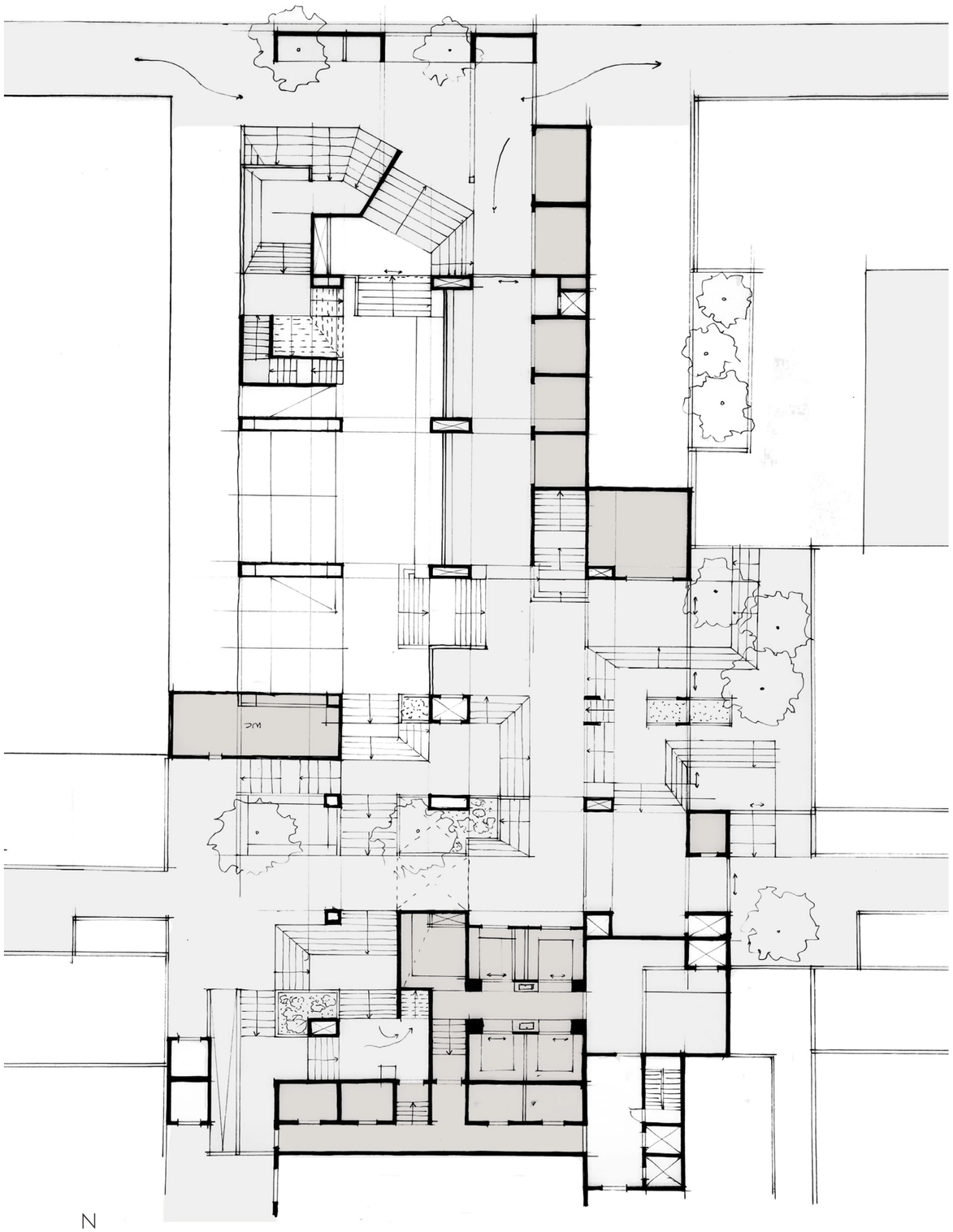
BASEMENT PLAN



N

GROUND FLOOR PLAN

Fig. 90 Refinement of iteration 3 (Author 2021)

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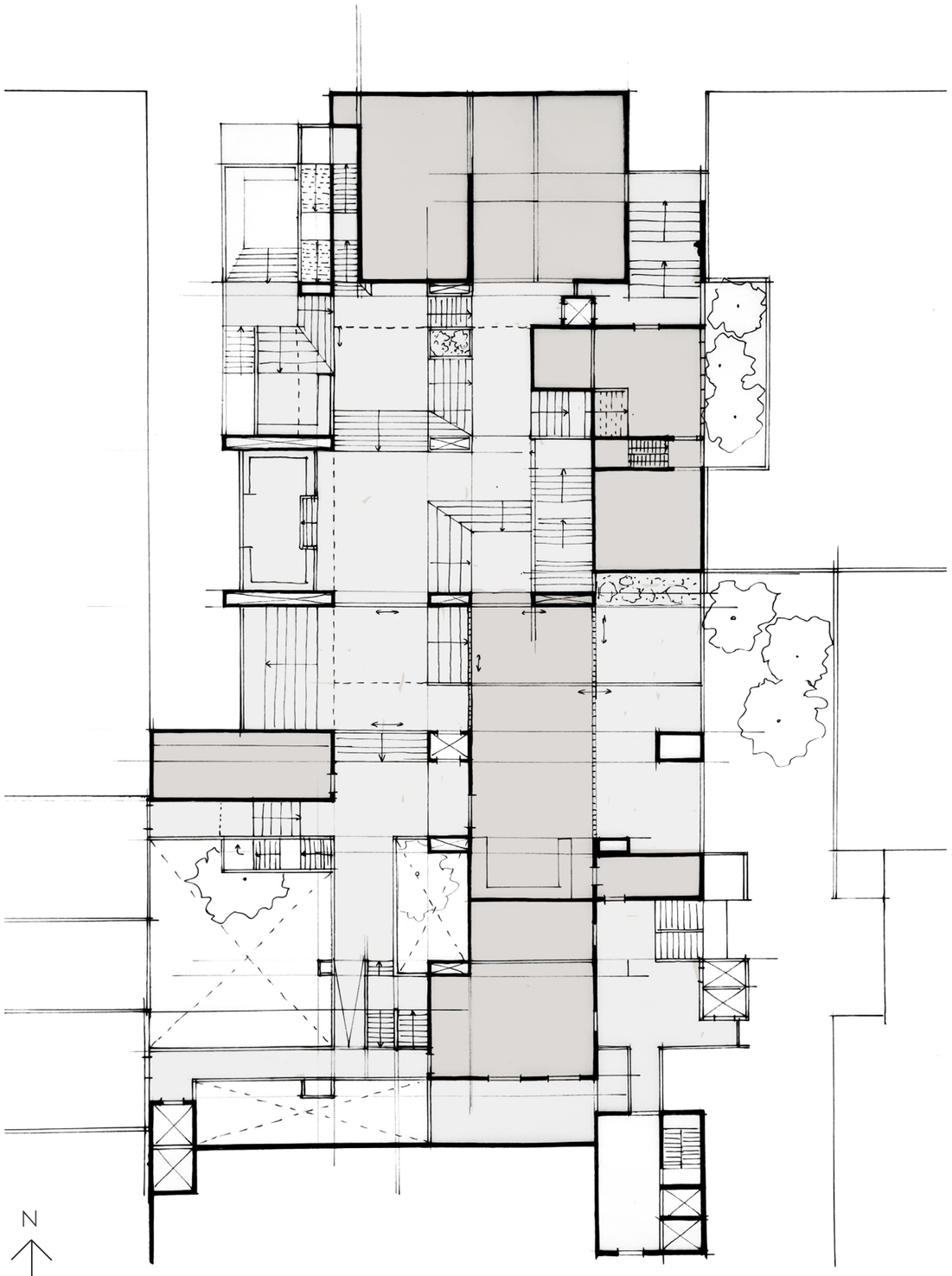
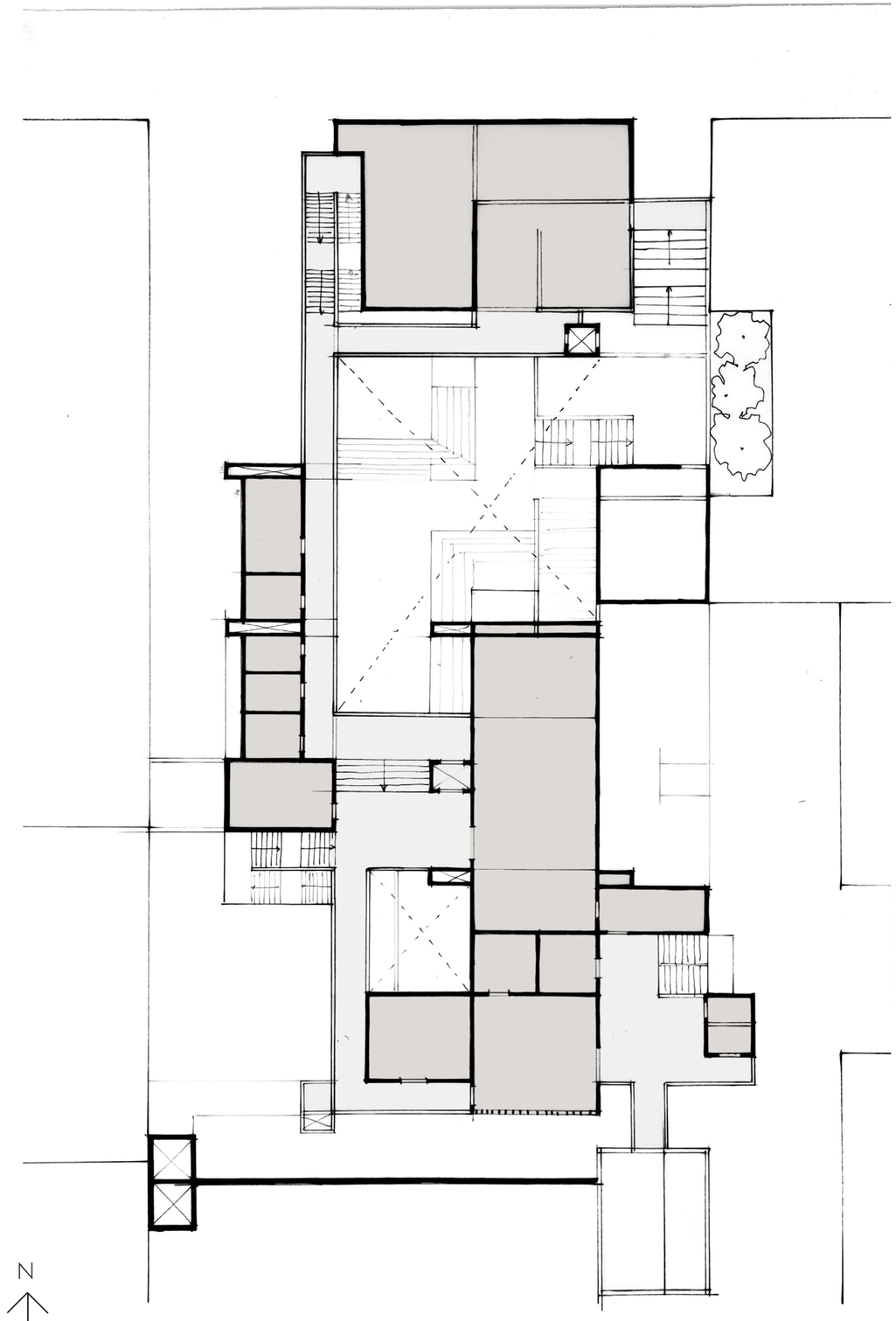


FIRST FLOOR PLAN



SECOND FLOOR PLAN

Fig. 91: Refinement of iteration 3 (Author 2021)

© University of Pretoria

SECTIONAL EXPLORATIONS

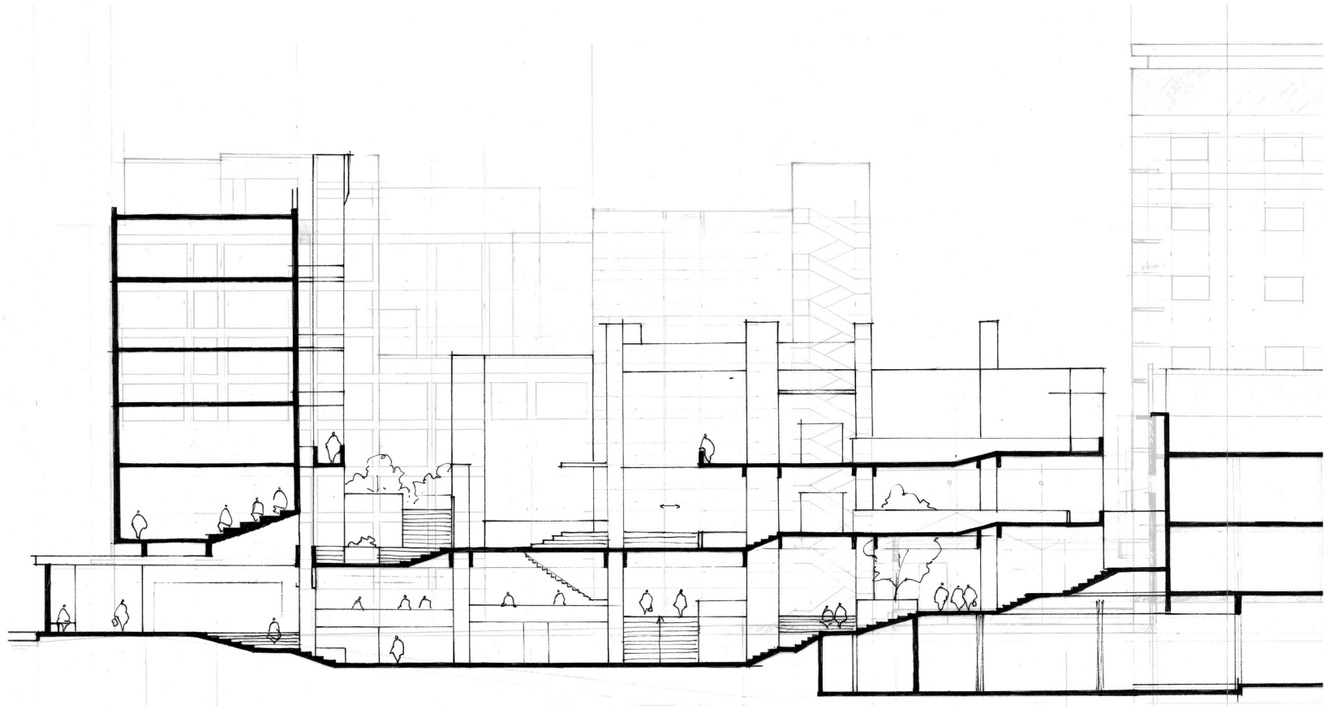


Fig. 92: Logitidunal section of iteration 3(Author 2021)

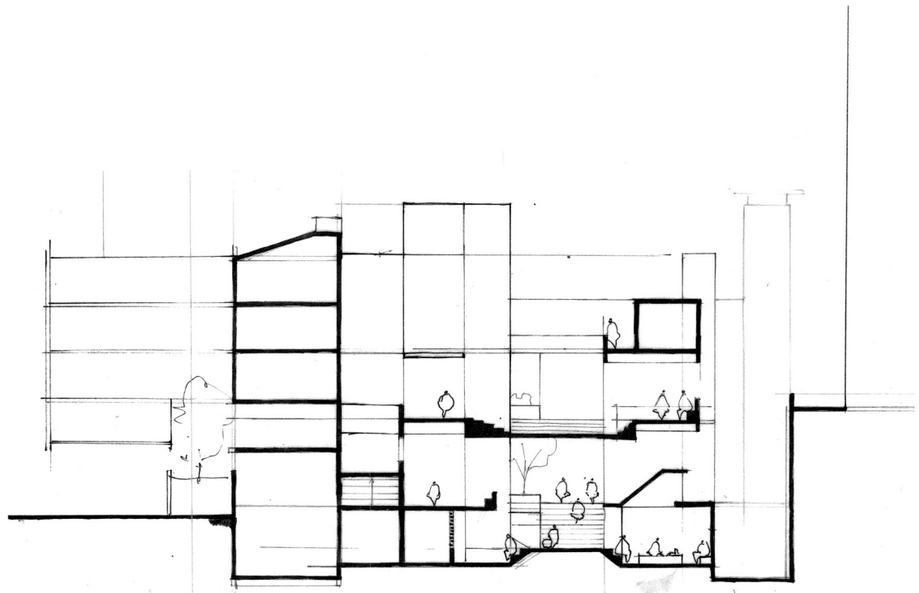


Fig. 93: Cross section of iteration 3(Author 2021)

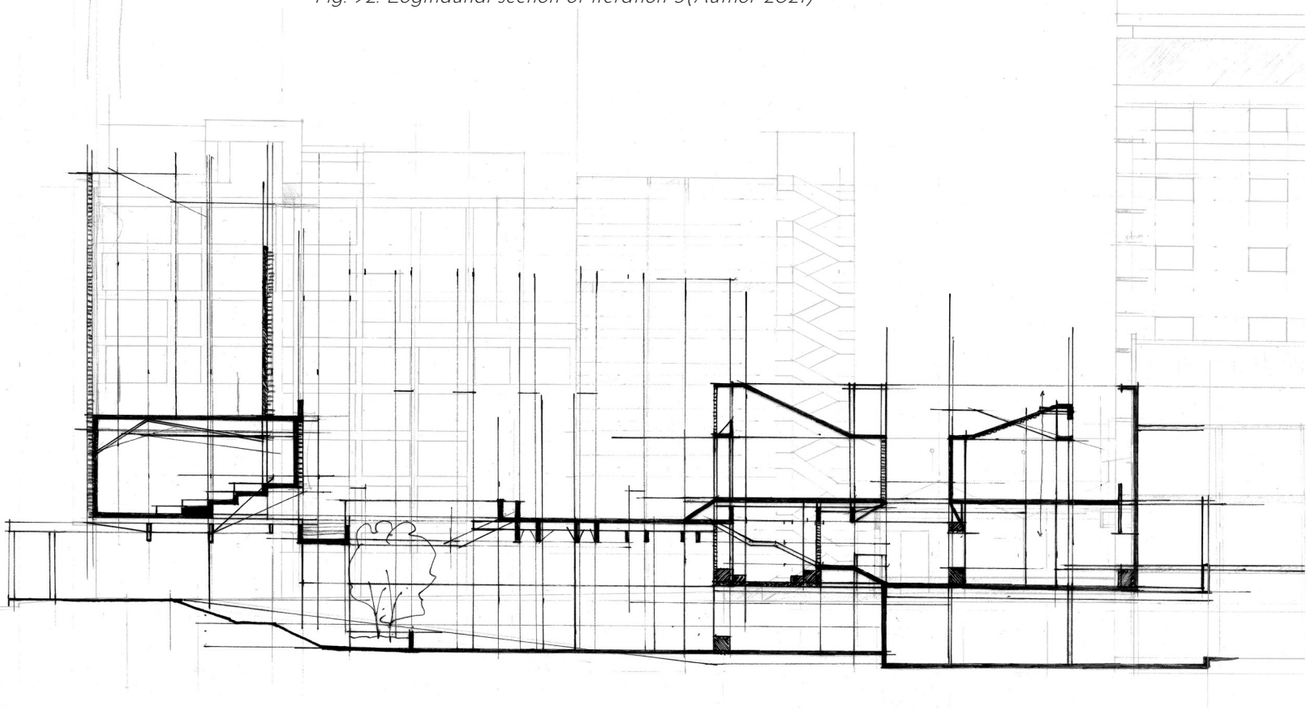


Fig. 94: Logitidunal section of iteration 4 (Author 2021)

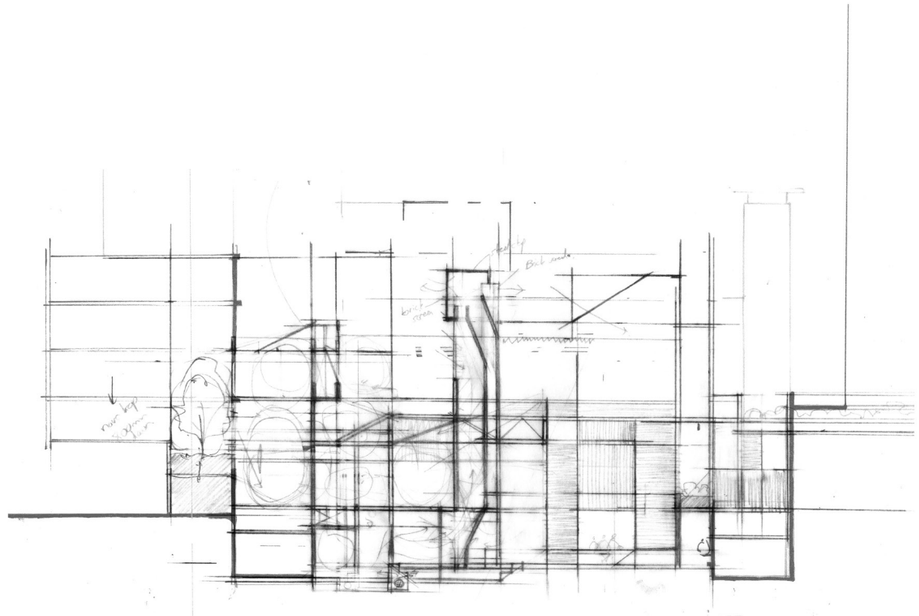


Fig. 95: Cross section of iteration 4(Author 2021)

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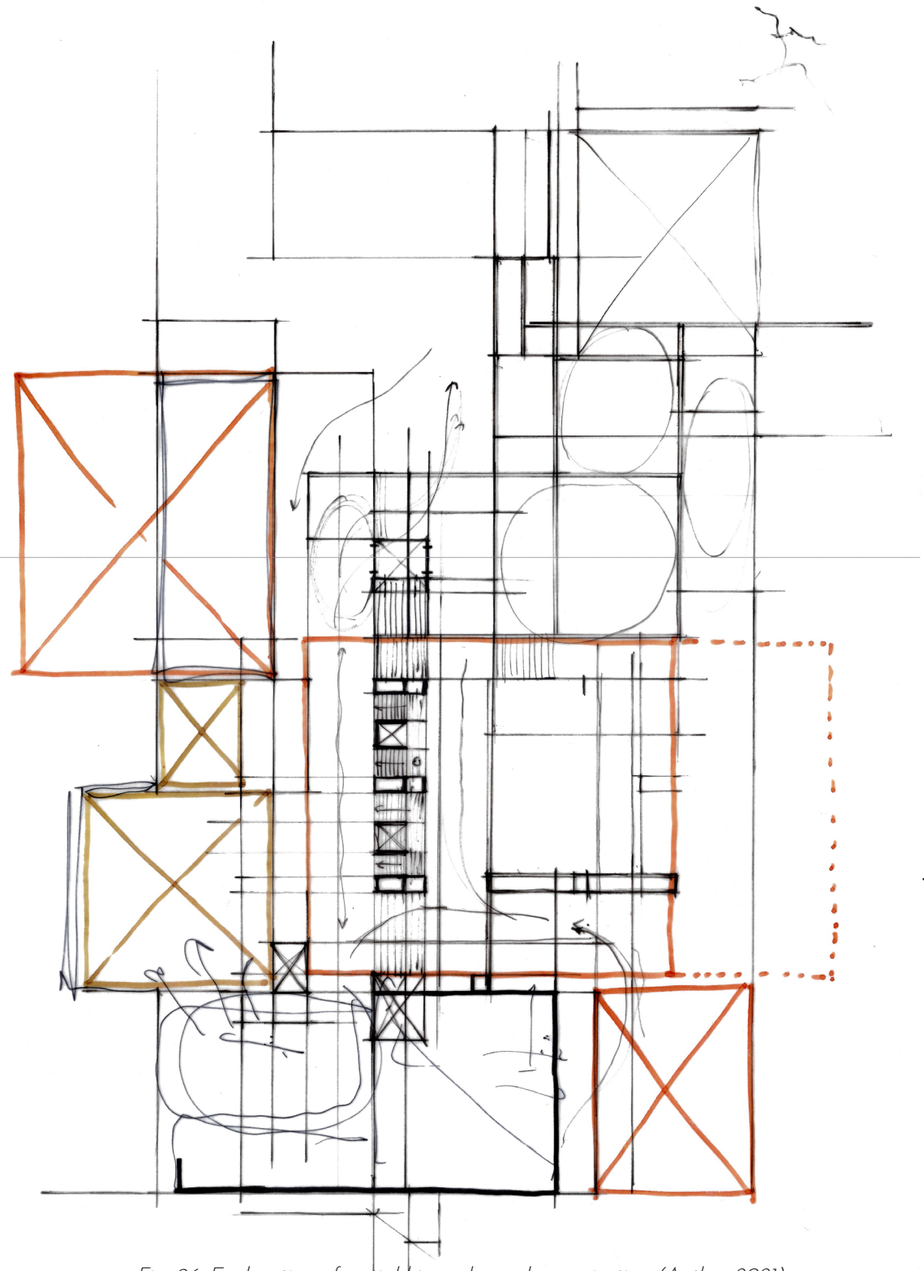

Fig. 96: Exploration of patial hierarchy and organisation (Author 2021)

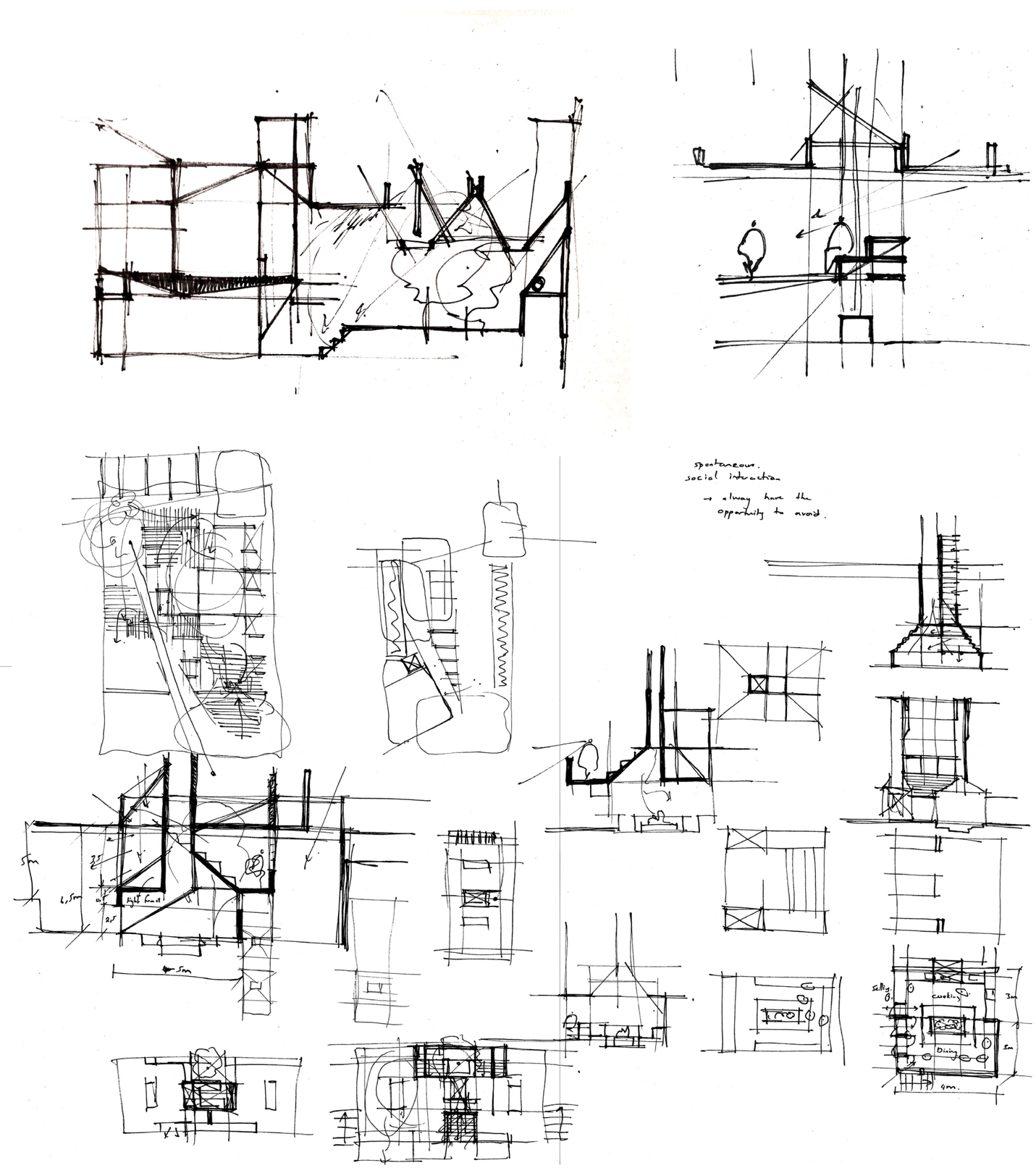

Fig. 97: Process sketches (Author 2021)

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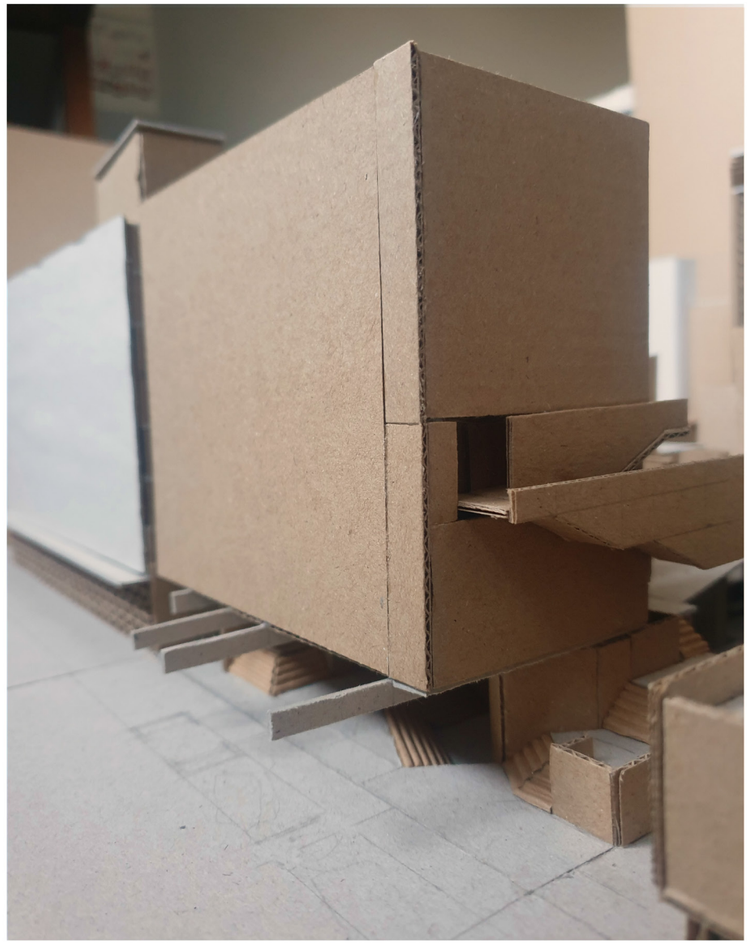
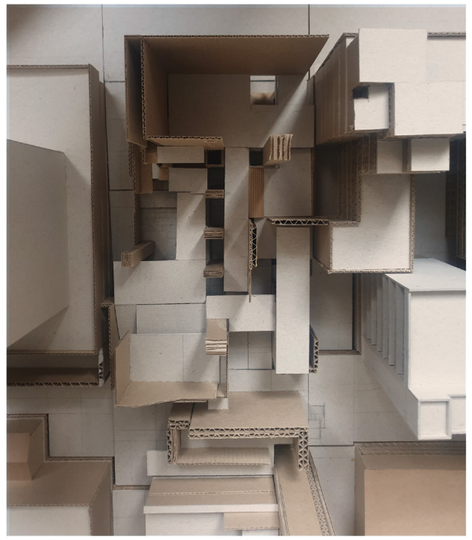
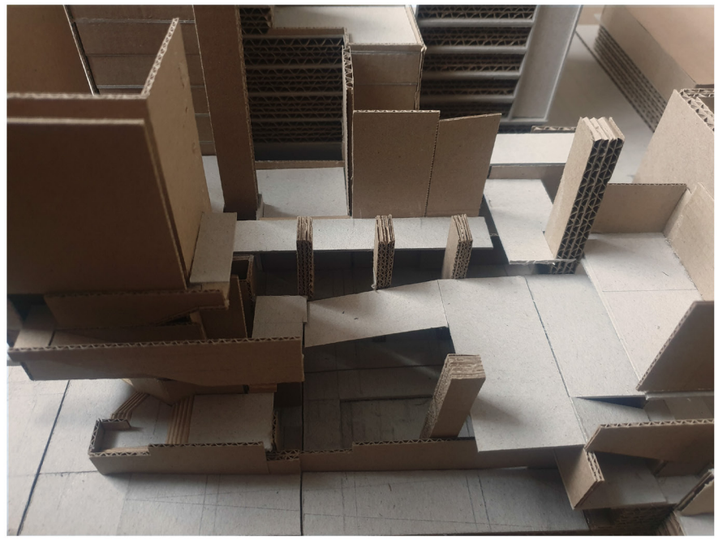
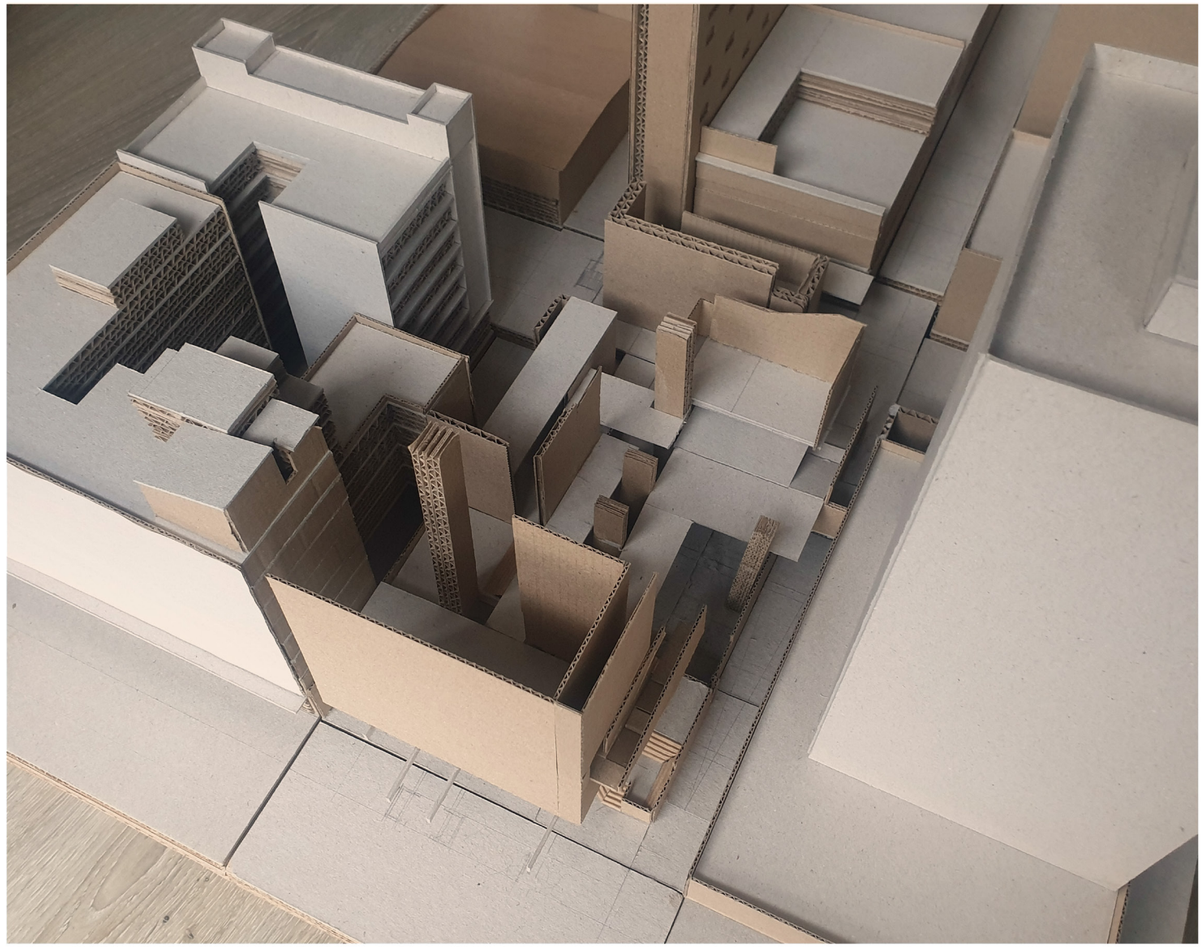
ITERATION 4









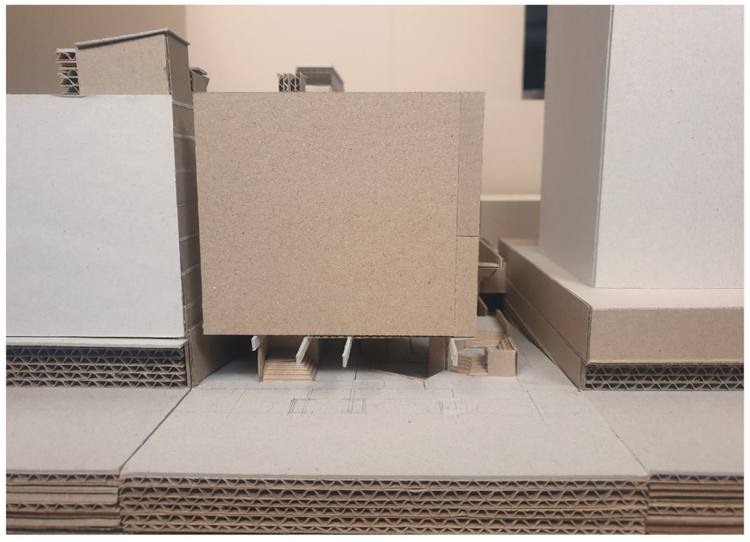


Fig. 98: Model explorations (Author 2021)

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6.2

FINAL DESIGN DOCUMENTATION

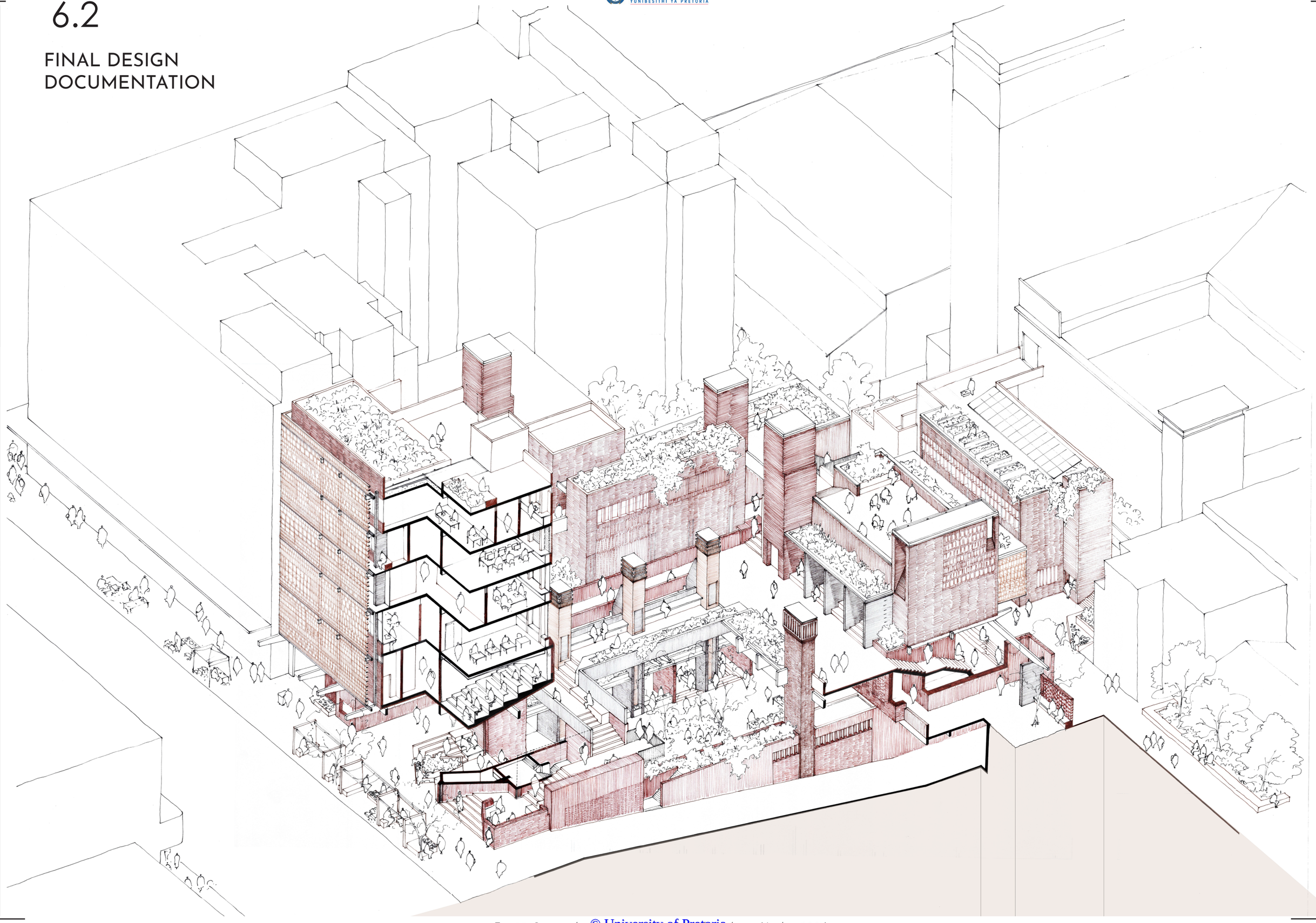

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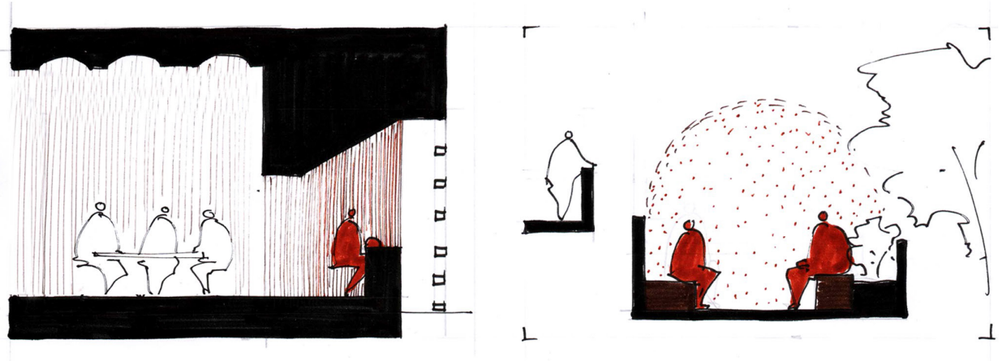
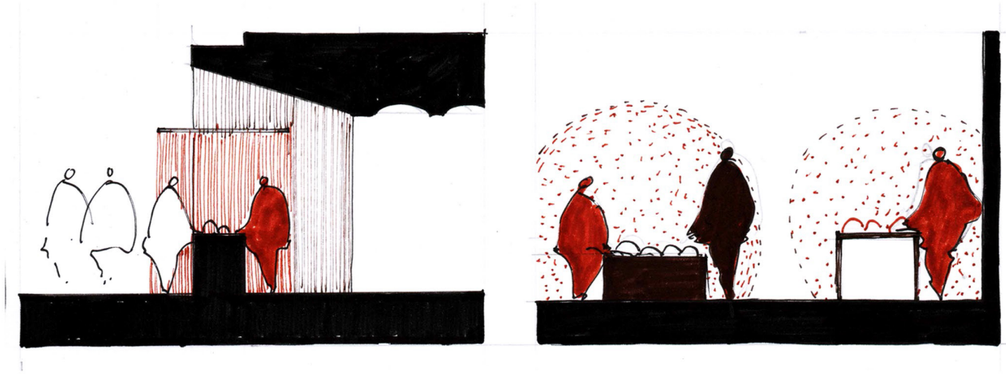
Fig. 99: Sectional axonometric drawing of final design (Author 2021)



FORMAL

EATING - STUDENT

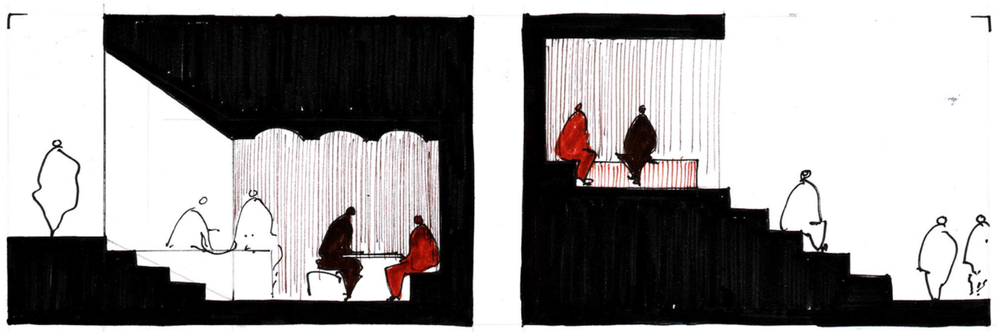
INFORMAL



FORMAL

SELLING FOOD

INFORMAL



FORMAL

EATING - WORKER

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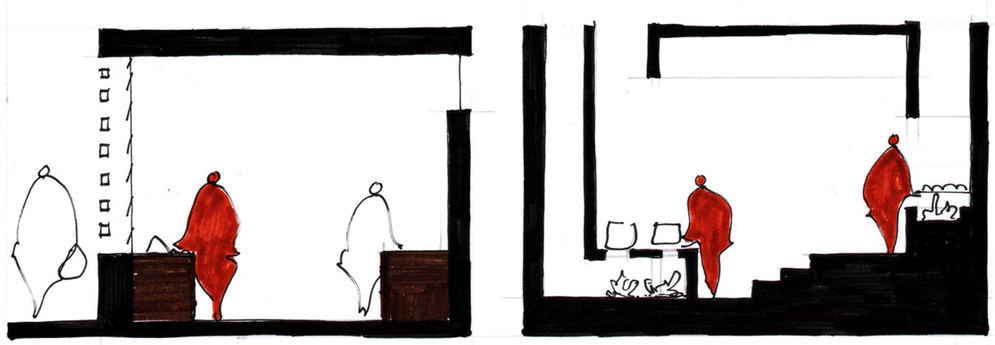
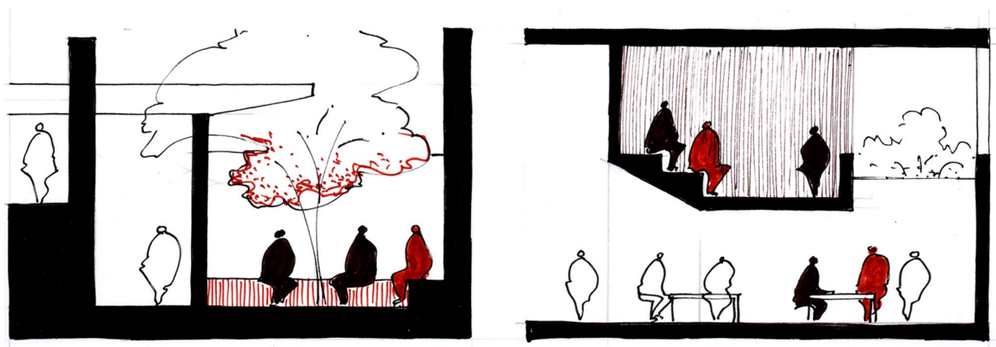


FORMAL

COOKING

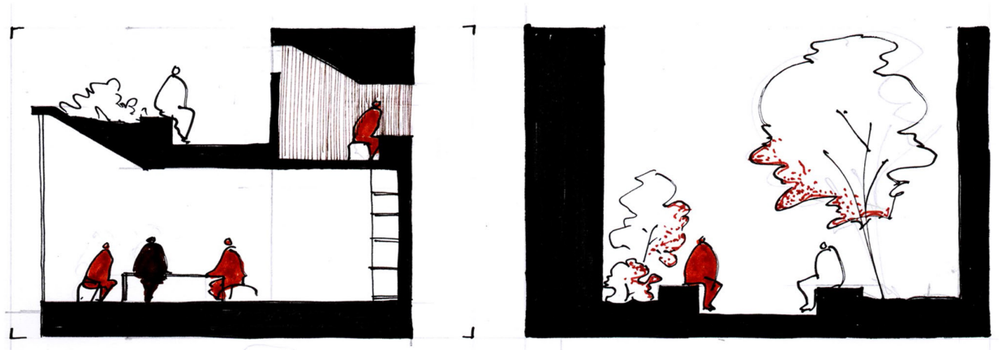
INFORMAL



FORMAL

GATHER - MOSQUE VISITORS

INFORMAL



FORMAL

STUDY

INFORMAL

Fig. 100: Acts of refuge (Author 2021)

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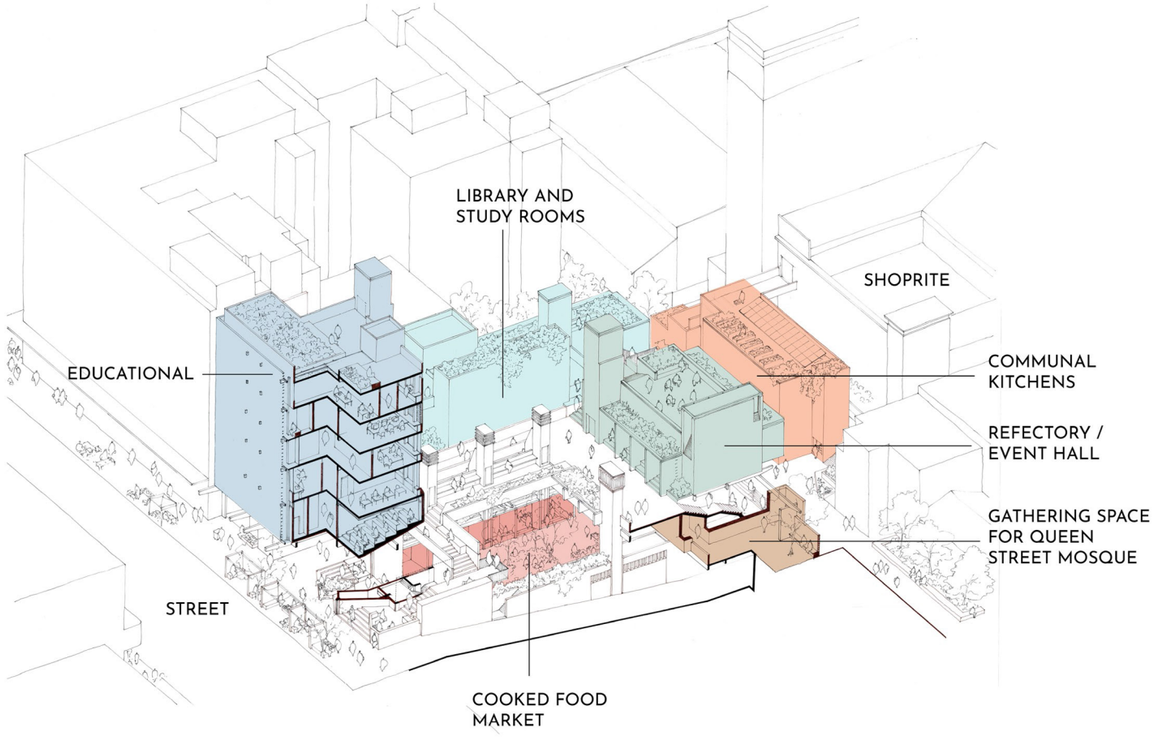
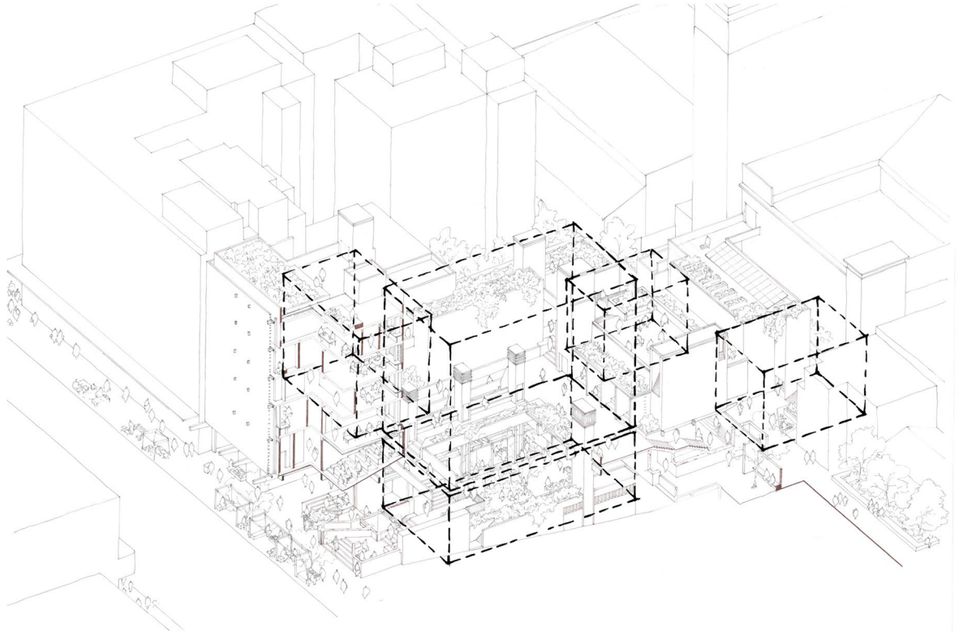
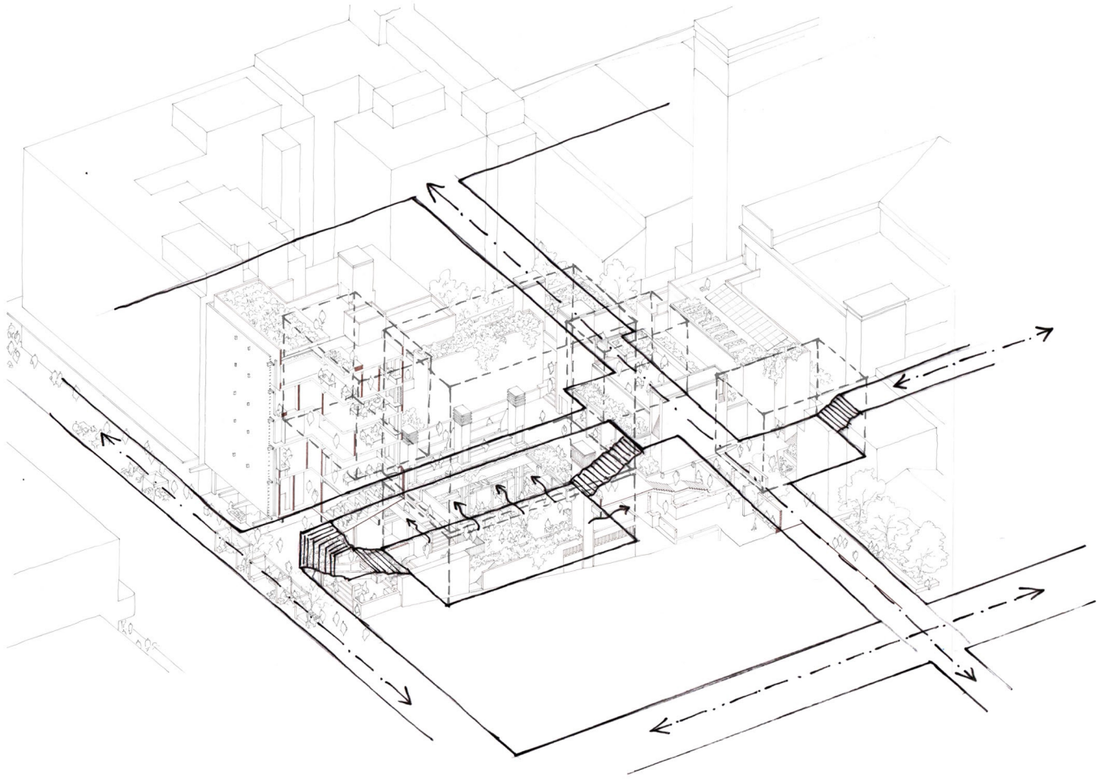


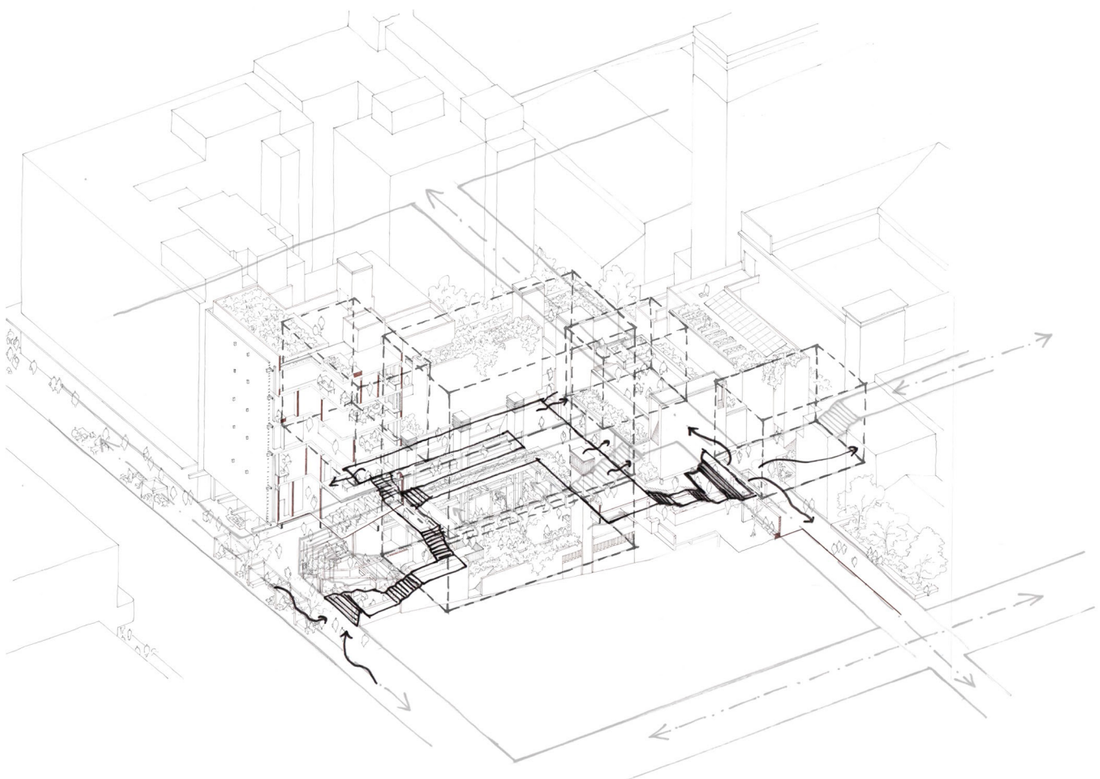
PROGRAMME



COURTYARDS



ARCADES



EXTENTION OF STREET SURFACE

Fig. 101: Final design diagrammes (Author 2021)

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GROUND FLOOR PLAN

Fig. 102: Sequential spatial progression of refuge - ground floor plan (Author 2021)

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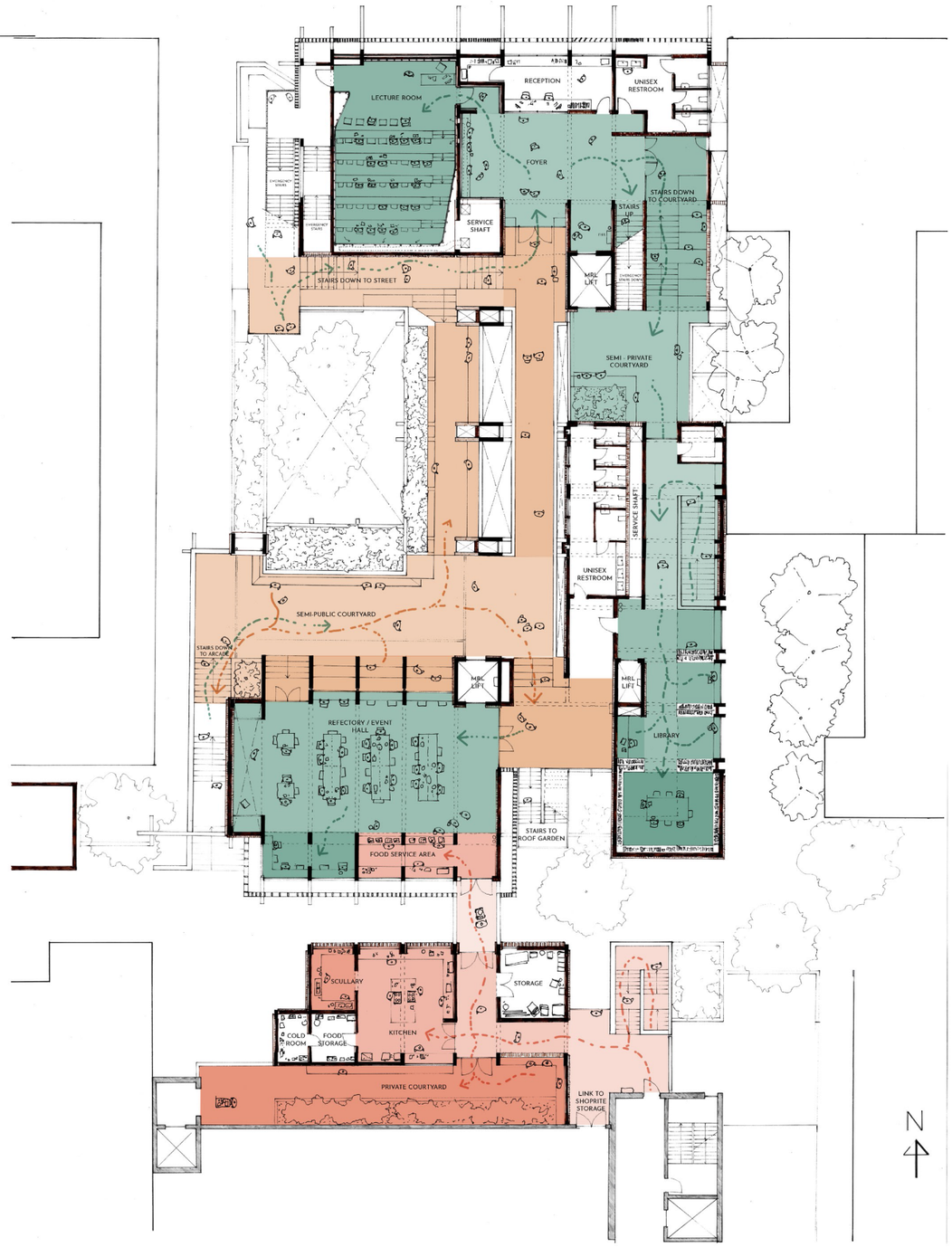
BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

Fig. 103: Sequential spatial progression of refuge - basement floor plan (Author 2021)

Fig. 104: Sequential spatial progression of refuge - first floor plan (Author 2021)

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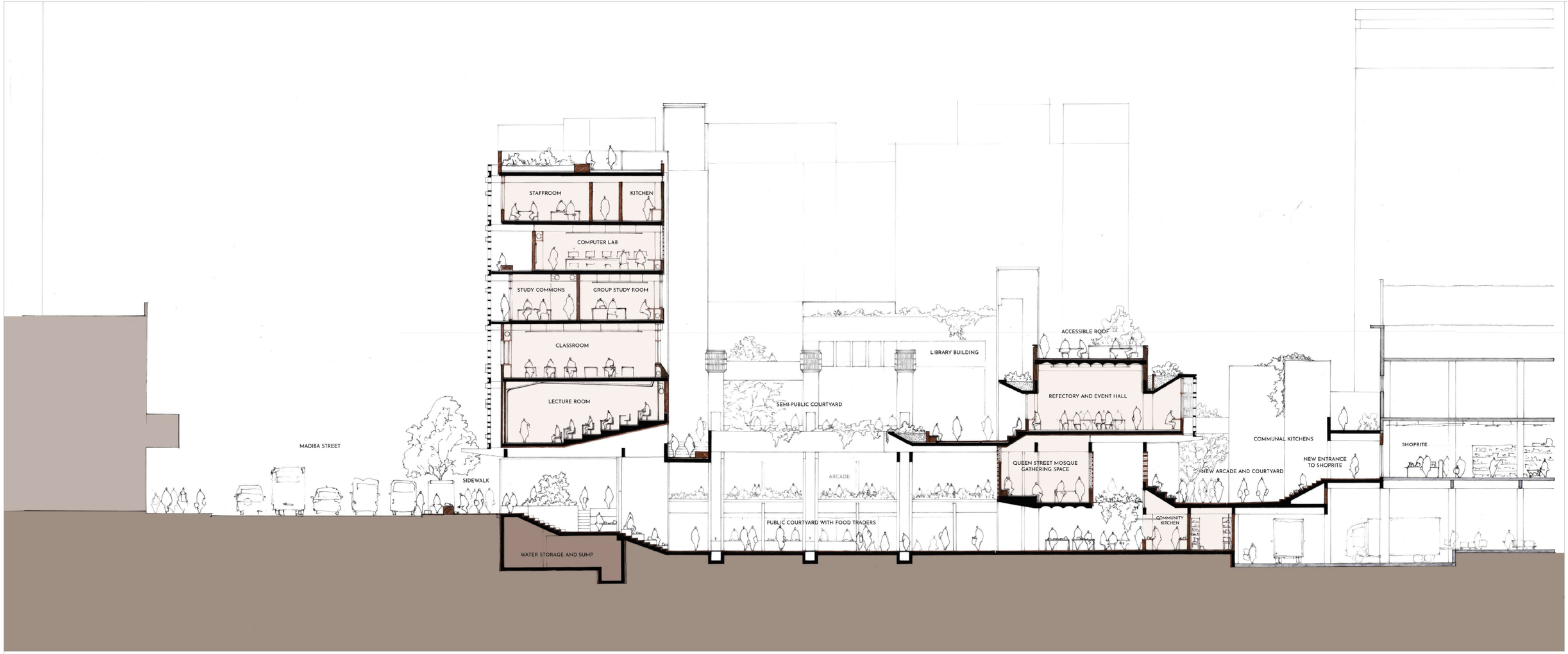
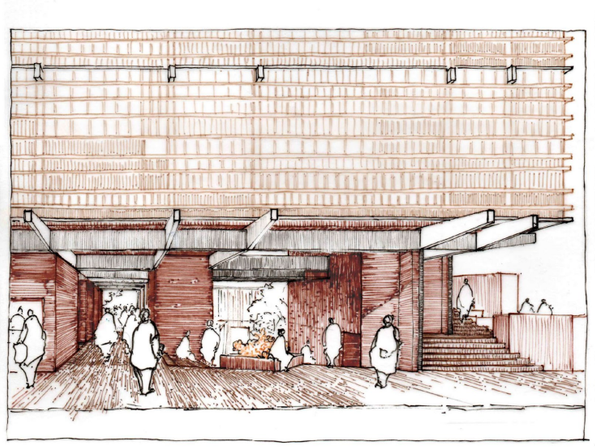
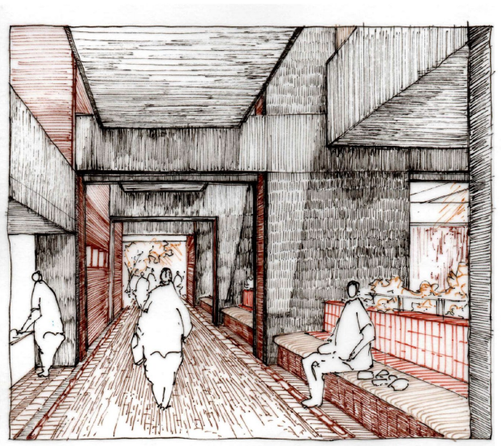


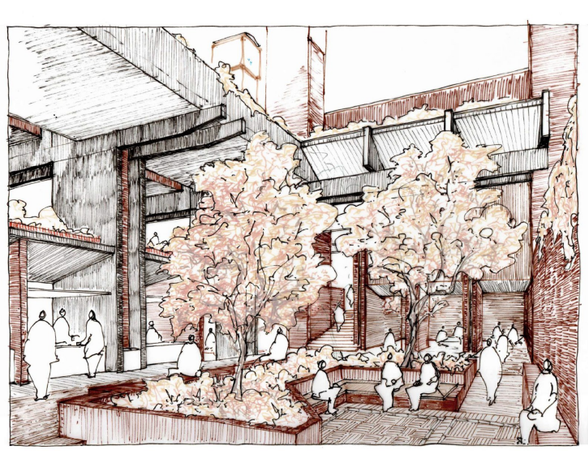
Fig. 105: 1:100 Longitudinal section (Author 2021)



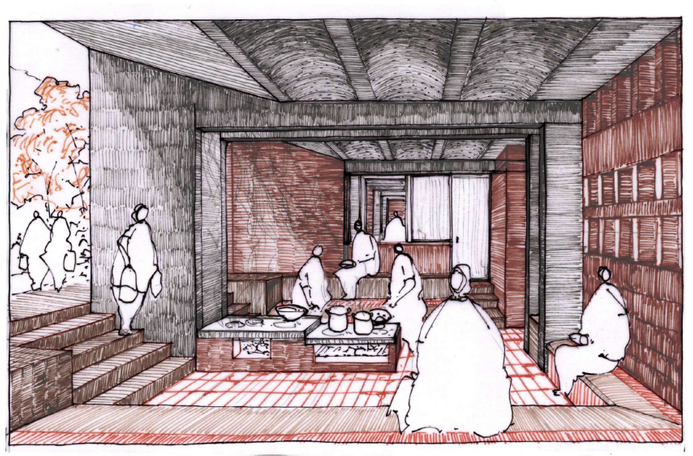
ENTRANCE



ARCADE - GROUND FLOOR



COURTYARD - BASEMENT



COOKING / EATING - BASEMENT

Fig. 106: Perspective drawings (Author 2021)

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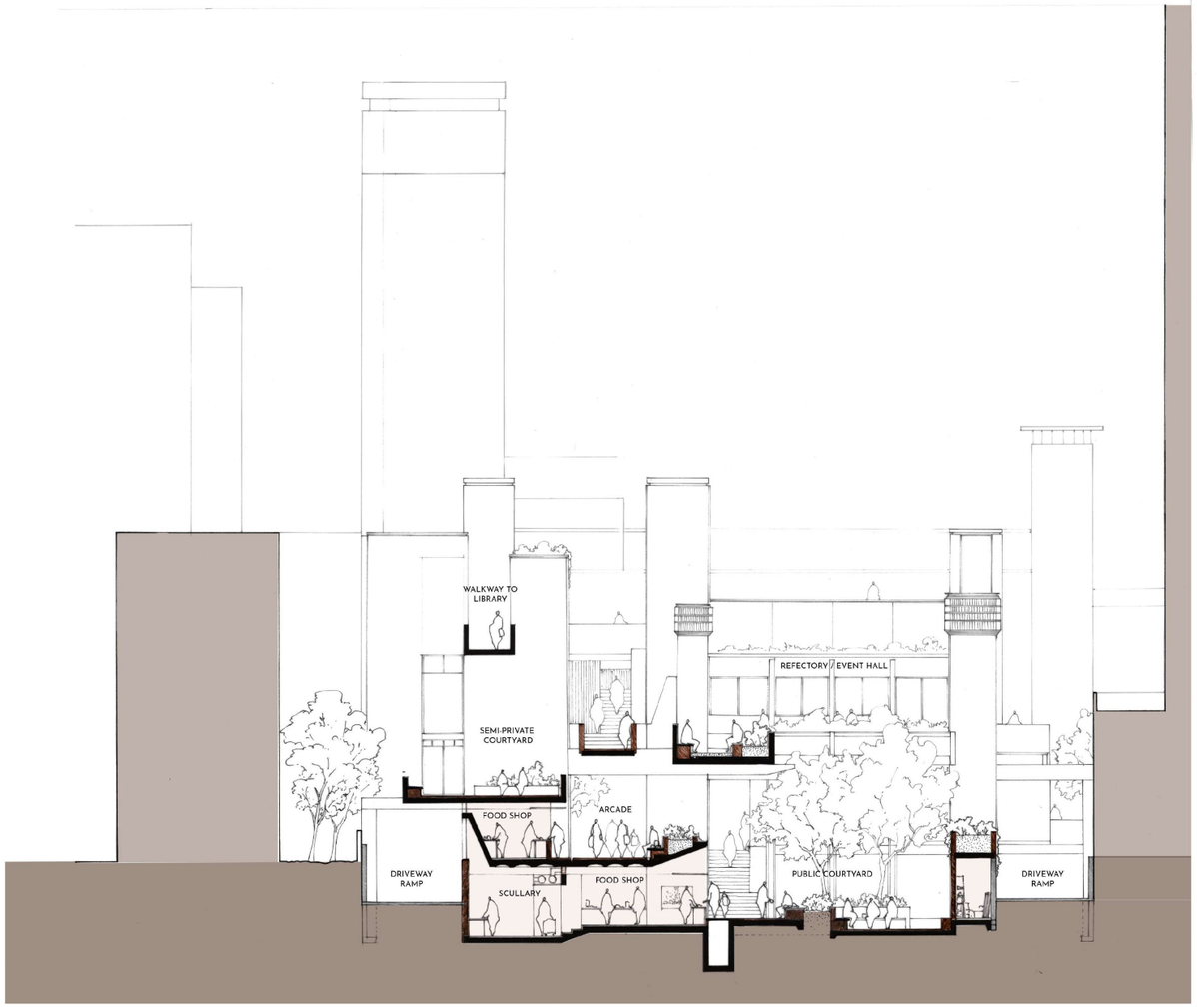


Fig. 107: 1:100 Cross section through courtyards (Author 2021)

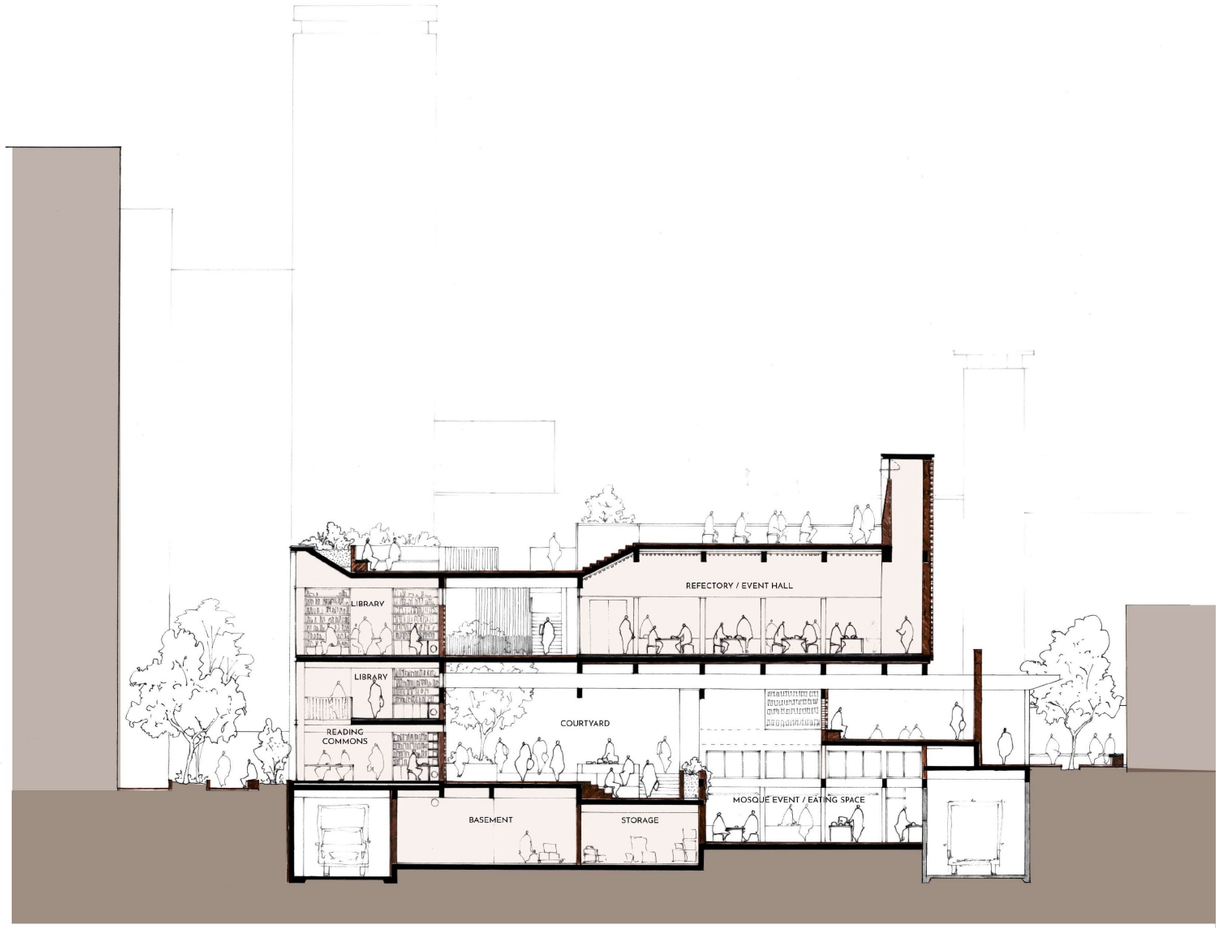
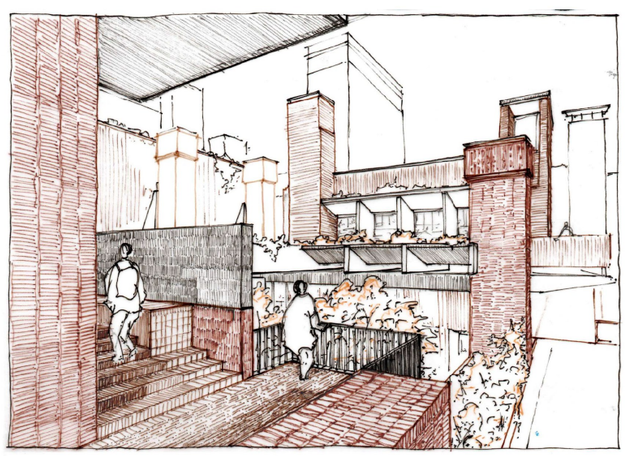
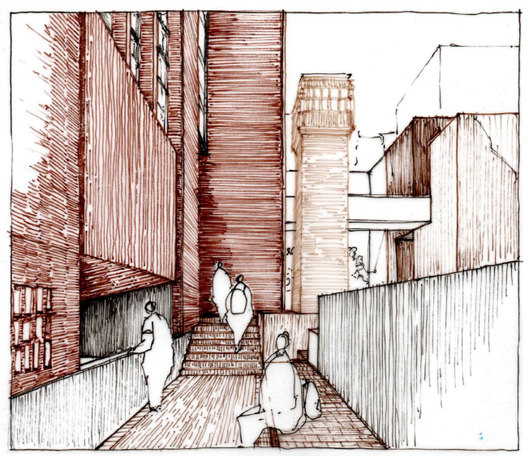


Fig. 108: 1:100 Cross section through library and refectory (Author 2021)



STAIRS UP TO FIRST FLOOR FROM STREET



TOWARDS EDUCATION BUILDING ENTRANCE



LIBRARY

Fig. 109: Perspective drawings (Author 2021)

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MADIBA STREET

QUEEN STREET

LILIAN NGOYI STREET

ENTRANCE TO RAMP DOWN TO BASEMENT
GATE
STEPS UP TO FIRST FLOOR
EMERGENCY STAIRS
STEPS DOWN TO COURTYARD
GATE
SERVICE SHAFT
SPAZA SHOP
SECURITY
GATE
EXIT RAMP DOWN TO BASEMENT
FIRE
EMERGENCY STAIRS
MRL LIFT
FOOD SHOP
PUBLIC ARCADE (COVERED)
OPEN COURTYARD
FOOD SHOP
LIBRARY ARCHIVE
SERVICE SHAFT
KITCHEN
STORAGE
LIBRARY RECEPTION
FOYER
SHARED COURTYARD
MRL LIFT
MRL LIFT
READING COMMONS
MOSQUE GATHERING SPACE
STEPS UP TO FIRST FLOOR
VOID
STEPS DOWN TO COURTYARD
GATE
INFORMAL SHOP
INFORMAL SHOP
RETAIL
RETAIL
MALE PUBLIC RESTROOM
FEMALE PUBLIC RESTROOM
LINK TO QUEEN STREET MOSQUE
GATE
NEW ARCADE
GATE
NEW ARCADE
SECURITY
KITCHEN
KITCHEN
KITCHEN
WC
WC
WC
LPG STORAGE
KITCHEN
RETAIL
RETAIL
RETAIL
RETAIL
NEW SHOPRITE ENTRANCE
SECURITY
FOOD STORAGE
FOOD STORAGE
FOOD STORAGE
FOOD STORAGE
STORAGE
REFUSE AREA
SHOPRITE

N

1:100 GROUND FLOOR PLAN

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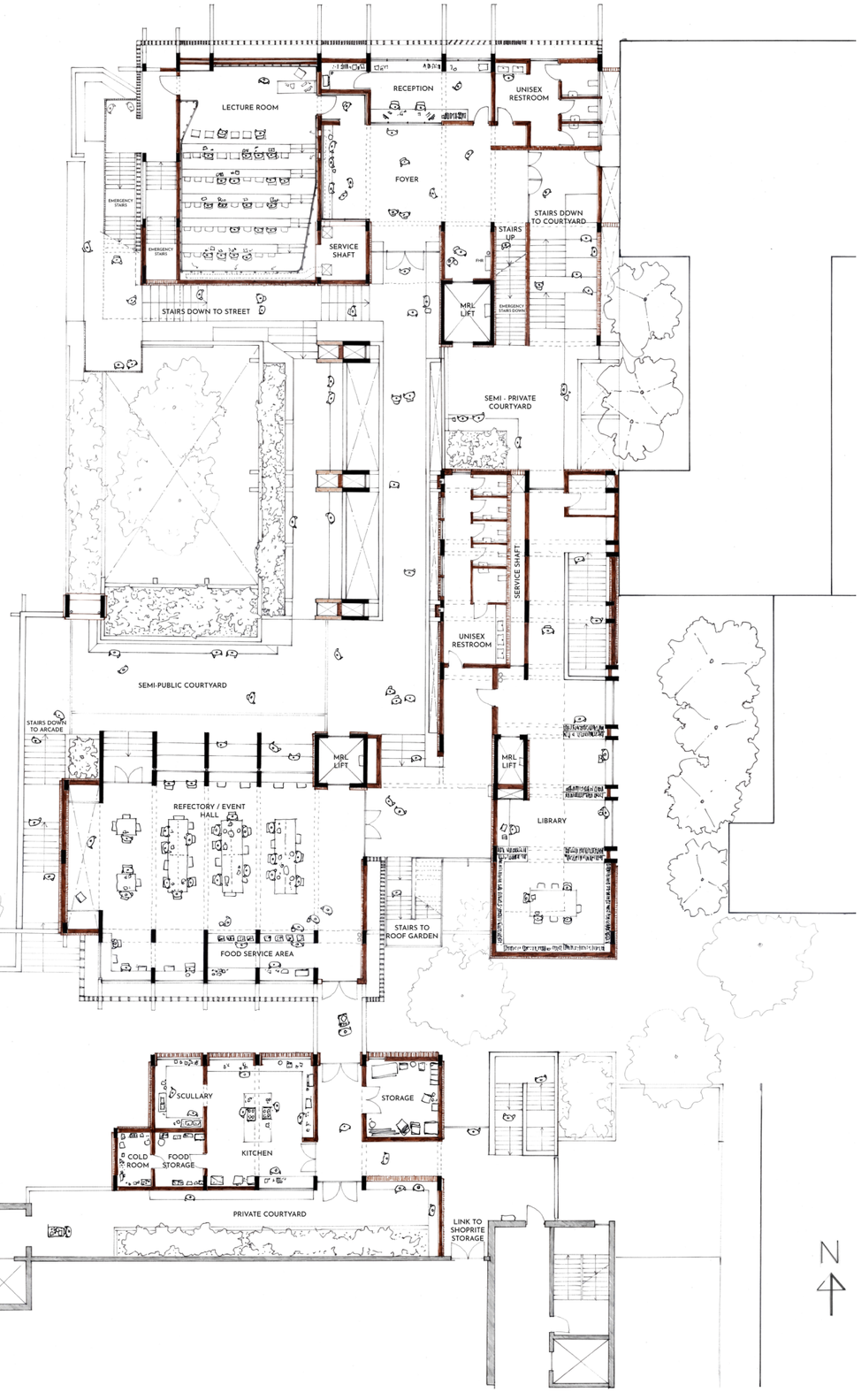

1:100 BASEMENT FLOOR PLAN

1:100 FIRST FLOOR PLAN

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Fig. 110: Model photo from north-east (Author 2021)

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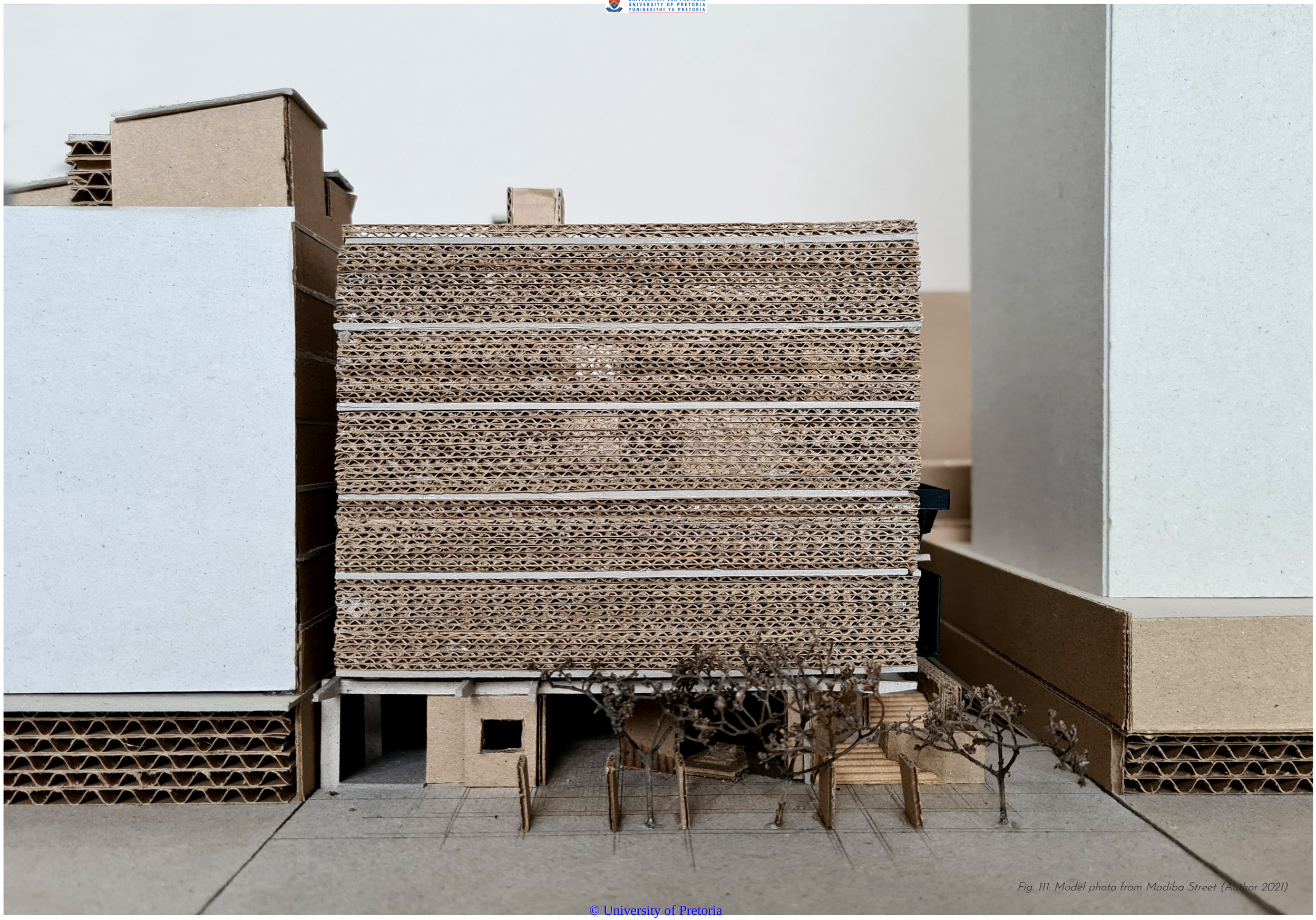

Fig. 111: Model photo from Madiba Street (Author 2021)

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Fig. 112: Model photo from north-west (Author 2021)

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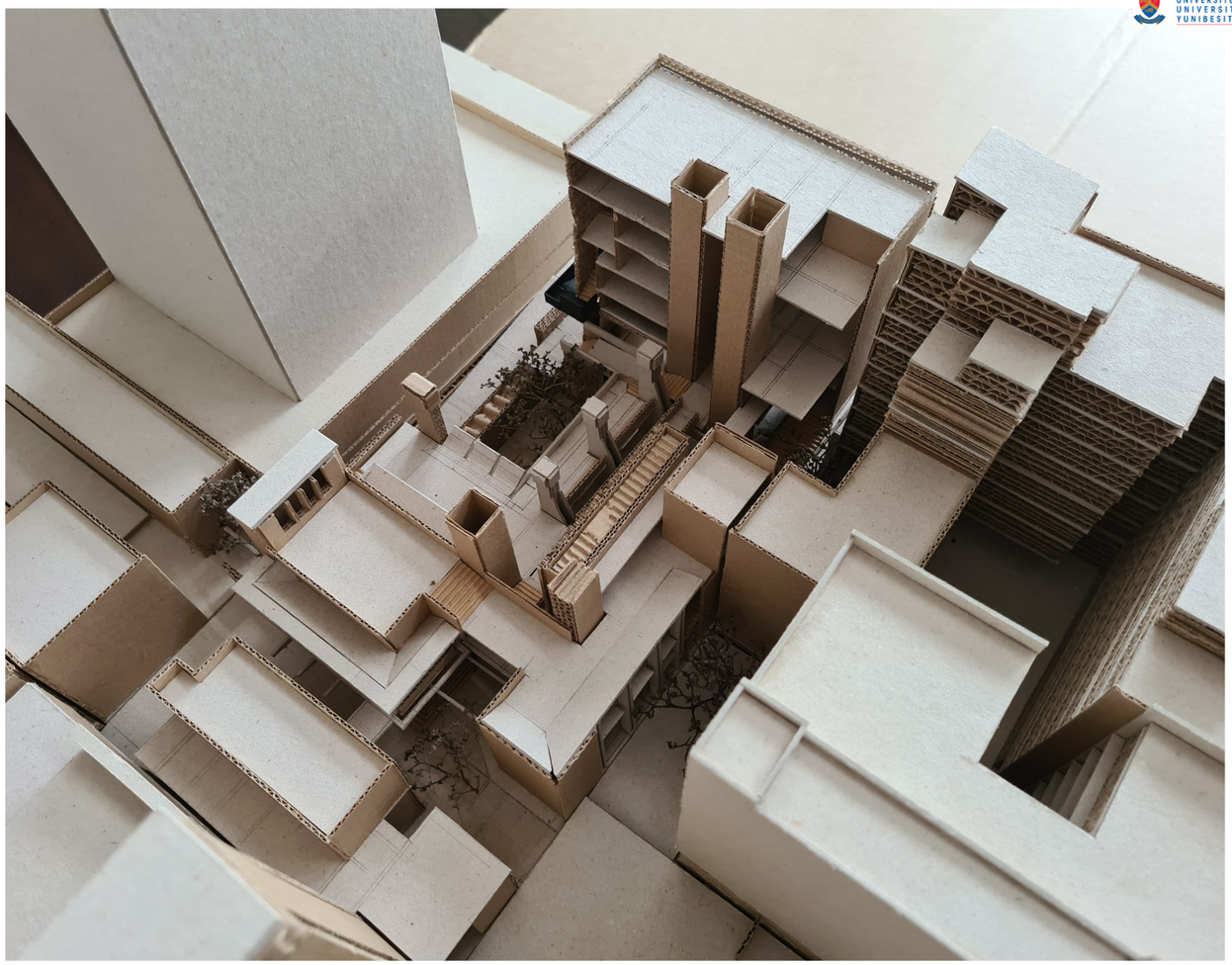









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Fig. 113: Model photos (Author 2021)

07

CHAPTER

TECTONICS OF REFUGE

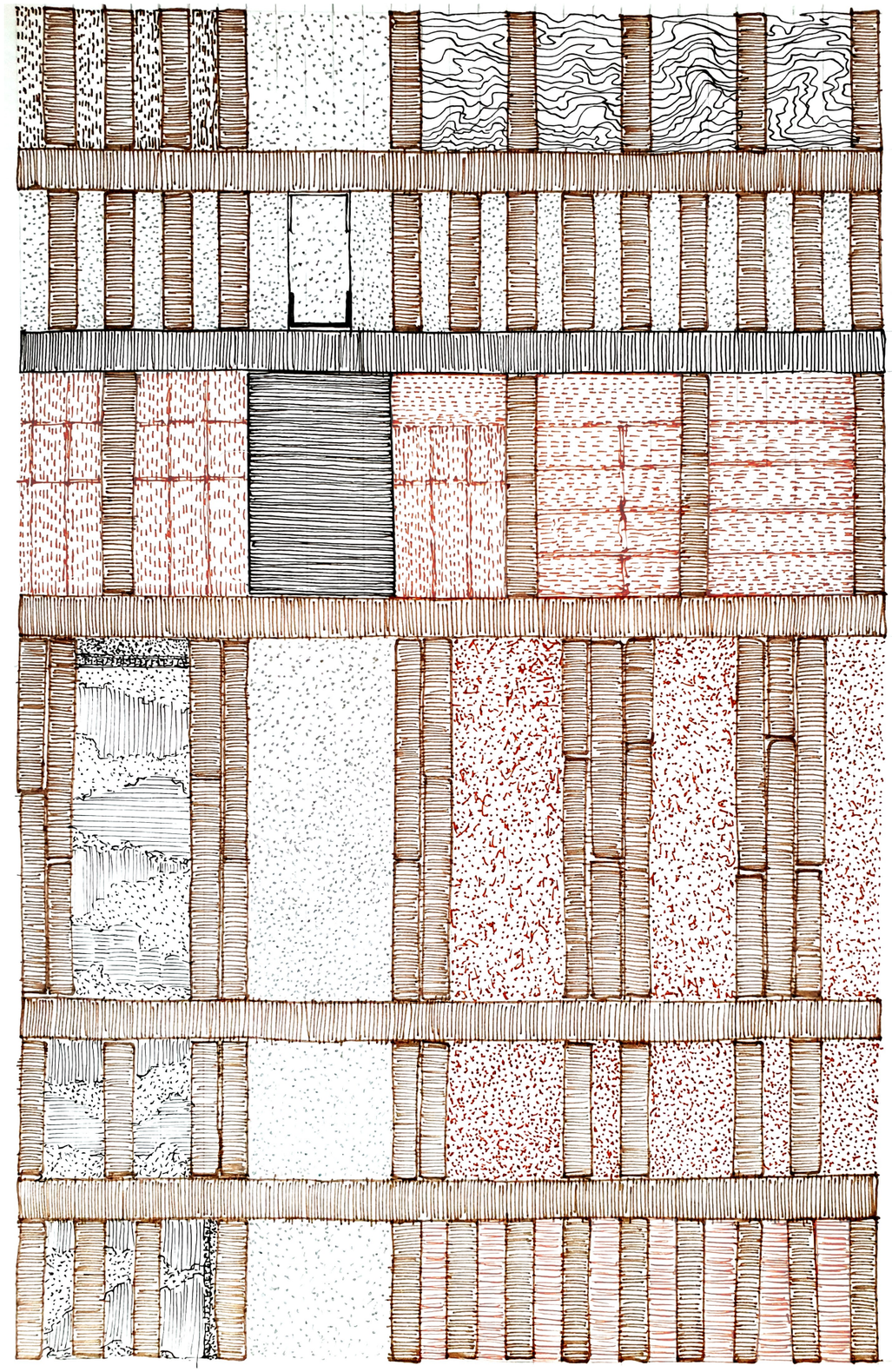

Fig. 114: Precast concrete front facade (Author 2021)

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7.1

TECTONIC INTENTIONS

The intention of the dissertation is to explore how temporary acts of refuge can be facilitated by manipulating how space is perceived by the mobile urban dweller. In terms of technology, the perception of space is influenced by articulation of the envelope, materials, light and structure.

7.2

TECTONICS OF A DWELLING

In *Four Elements of Architecture*, Gottfried Semper (1851) argued that the tectonics of the primordial dwelling can be divided into four basic elements: (1) the earthwork or mound, (2) the hearth, (3) the roof, and (4) the envelope. The hearth is seen as the original gathering space, a place of dwelling that require protection. The earthwork separates man from the ground, the lightweight roof provide protection from the rain and sun, and a lightweight membrane encloses the interior (Frampton 1996: 5). Frampton (1996: 5) argues that the primordial hut can be classified into tectonic (light) and stereotomic (heavy) components based on the procedures through which they are assembled. The articulation of the four elements of a dwelling, based on a Caribbean hut, should not be universally applied to all structures but be specific to the venacular building materials, techiques and processes (Frampton 1996:6; Hale 2005:62).

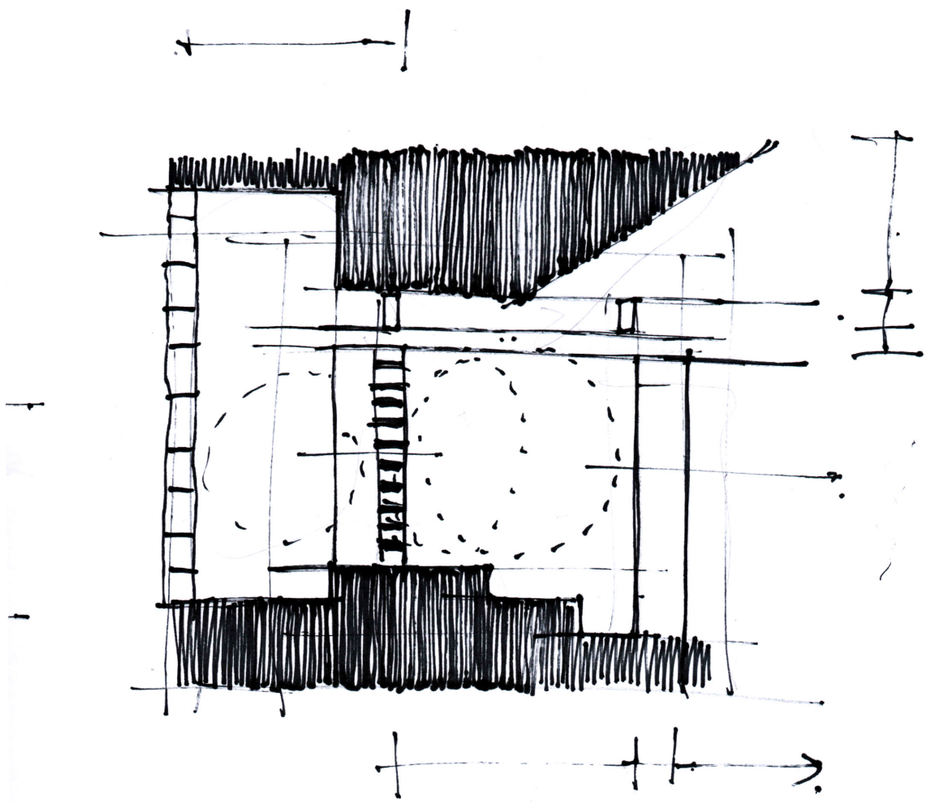

Fig. 115: Tectonics of enclosure (Author 2021)

7.3

TECTONICS OF ENCLOSURE

The hearth, the roof, the envelope and the ground, each play a different role in the creation of shelter. In this dissertation, emphasis will be placed on how the articulation of these four elements can facilitate the act of refuge.

1. OVERHEAD PLANE

The overhead plane is used to manipulate the scale, intimacy, light, and the direction of movement in a space. The overhead plane consists of two main components: reinforced concrete slabs to create usable space above, and deep concrete beams to support the floor slabs. The heavy and stereotomic qualities of concrete are contradicted by its light and tectonic articulation.

2. GROUND PLANE

The floor plane in public spaces of the building is treated as an extension of the sidewalk and the arcades. This is achieved through the continuity of the brick paver in walkways, courtyards and staircases. Changes in level not only affect scale and spatial hierarchy, but also affect how space is used. Sunken seating creates an intimate space of gathering, looking inward towards one another. Extruded benches and plinths create seating that face outwards, promoting observation rather than interaction. .

3. HEARTH

Cooking and eating are primary acts of temporary refuge in the inner city. Built-in fire cooking areas, eating areas and chimneys aim to accommodate the mobile urban dweller's need for shelter, belonging and social interaction.

4. THE ENVELOPE

The confrontation between refuge and exposure is articulated in the envelope.

THE SOLID EDGE:
Solid walls provide a sense of enclosure, separation and protection. A solid edge at the back of a space gives users a safe space to observe from.

THE INHABITED EDGE:
Deep columns and walls are used to widen the edge into an inhabited space. This space serves either as an intimate place of refuge or as a threshold between two spaces. Even though this in-between condition separates two spaces, the openings between columns maintain a direct connection and some degree of continuity.

THE PERMEABLE EDGE:
Precast concrete and brick screens are used to give the illusion of a solid edge from the outside while providing natural light and views from the inside. The screen satisfies the desire for refuge and privacy and provide varying degrees of exposure.

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7.5

TECTONIC ARTICULATION AND MATERIALS OF THE SITE

Four main materials characterise the materiality of the neighbouring buildings and the city's public arcades: Concrete, brick, ceramic tiles and steel. Cast in situ reinforced concrete is primarily used for structural columns, floors and overhangs, but is often painted or hidden behind brickwork. Precast concrete elements are used for screens and pavers. The Shoprite building has a smooth plastered front façade and an exposed facebrick rear façade. The buildings of this block have two faces. The block's rough internal envelope with exposed brickwork, concrete and steel is hidden behind an external skin of billboards, glazing, smooth paint and ceramic tiles.

The pedestrian streets are lined with alternating patterns of brick pavers and cobblestones. This changes to ceramic tiles upon entering one of the arcades. The ceramic tile floors provide a cleaner, neater and domestic appearance over external paving, but the space is immediately perceived as an internal and private space. Ceramic tiles and mosaics are also widely used for external walls, columns and artistic expression.

STREET FACING EDGE ARTICULATION

EDGE ARTICULATION OF THE BLOCK INTERIOR



Fig. 116: Photographs of the site (Author 2021)

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7.5
MATERIALITY

Exposed brickwork, concrete and ceramic tiles make up the primary materials used in this scheme, along with timber and steel as complimentary materials. The material selection and articulation attempt to respond to the existing urban fabric and aim to enhance the user's experience of refuge.

Off-shutter cast in situ reinforced concrete columns, beams and slabs express how the structural elements of the edge and overhead plane enclose and expose internal space. The project will explore how different types of formwork, pigments and aggregates can be used to manipulate the texture and colour of the exposed concrete. The concrete is contrasted with the warmth of facebrick walls and paved floor surfaces. Differentiation of brick bonds, patterns, openings and textures will be used to contrast the continuity and uniformity of the brickwork. The stereotomic nature of brick and concrete enhances the sense of refuge, enclosure and intimacy experienced by the user. Exterior materials such as the brick and concrete are used in the internal public spaces. These spaces appear to be outside and therefore perceived as being public rather than private. The interior face of brick walls will be bagged and painted to mediate between the exterior and interior conditions. Ceramic tiles are selectively used for public seating, cooking spaces, hand wash stations and planters to encourage temporary acts of refuge.

As a continuation of the existing material language of the site, the exposed brickwork is partially concealed by an external skin facing the street. This skin will be a permeable screen constructed with custom made precast concrete bricks. From street level the screen must be perceived as a solid mass, as a continuation of the solid facades of the neighbouring buildings and to create the perception of a solid wall protecting a place of refuge within. The screen must also manipulate natural light, ventilation and views. A screen made of standard precast concrete elements and bricks has small deep openings which restricts views and limit solar heat gain in winter months. By designing custom concrete bricks, the size, texture and colour can be altered. Recycled sand, cement and aggregates from demolished buildings on site, can also be used to manufacture the concrete bricks off-site. Galvanised mild steel will mainly be used for trimmings and above-ground level staircases. External doors and window frames will be custom built from Mukarati timber to match the Meranti joinery of the interiors. The warmth of natural timber aims to soften interior spaces.

Fig. 117: Photographs of matrials found in context (Author 2021)

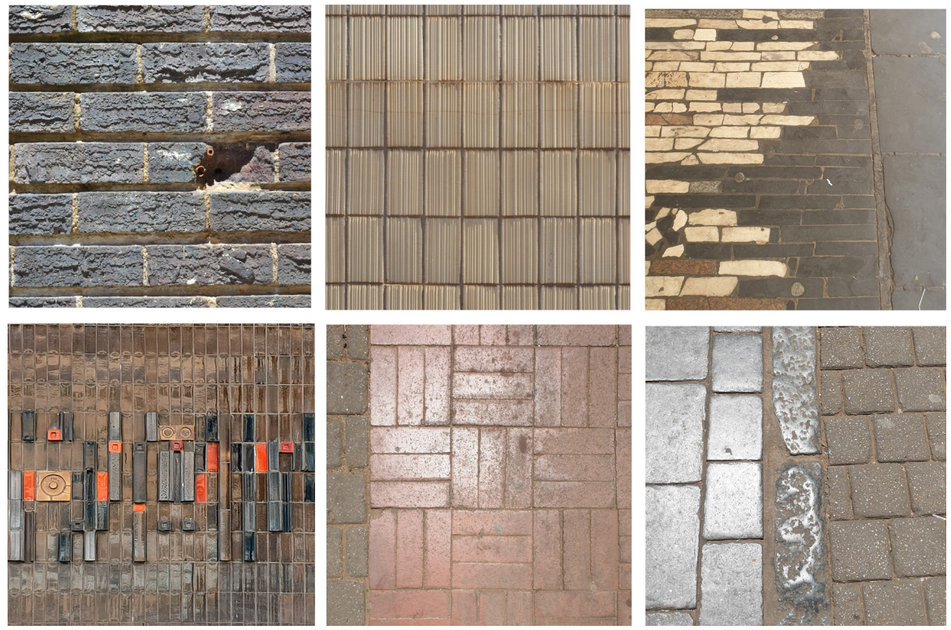
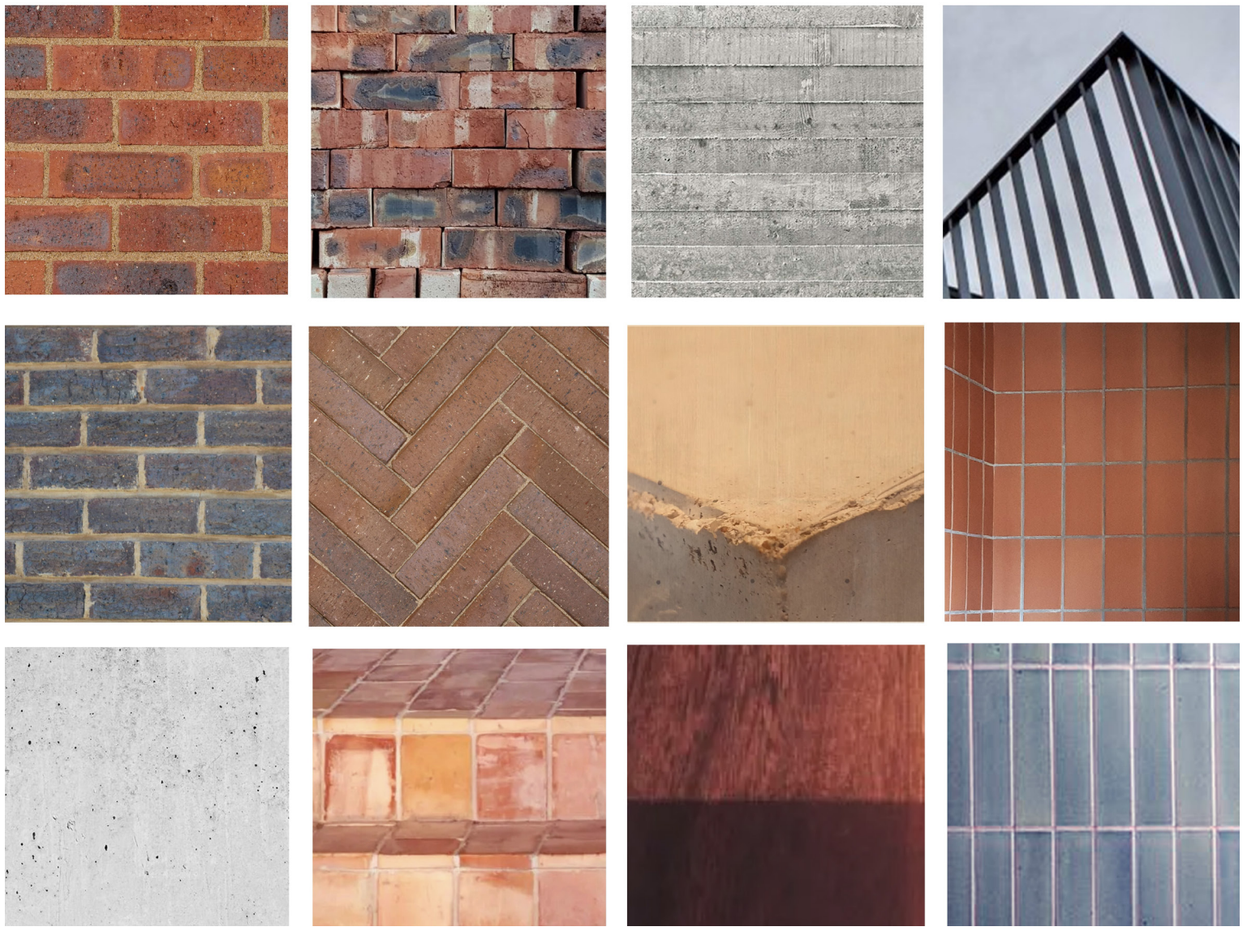


Fig. 118: Proposed material palette(Author 2021)



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7.6
TECTONIC ARTICULATION

At a spatial level the design is a reinterpretation of the arcade and courtyard typologies of Pretoria. The following section will explore the tectonic articulation of spaces of transition and spaces of dwelling (lingering, sitting, eating and socializing).

TRANSITION SPACE

The primary role of the ceiling plane is to indicate the direction of movement. As one continuous element the ceiling plane folds up and down to pull the user into a particular space and change the scale of threshold spaces. Concrete beams, spanning in the cross direction of the walkway, prompts the user to engage with the spaces on either side.

The pattern of the floor plane must emphasise the direction of movement. Steps and stairs continue the floor material and pattern to encourage users to access the lower and upper public levels.

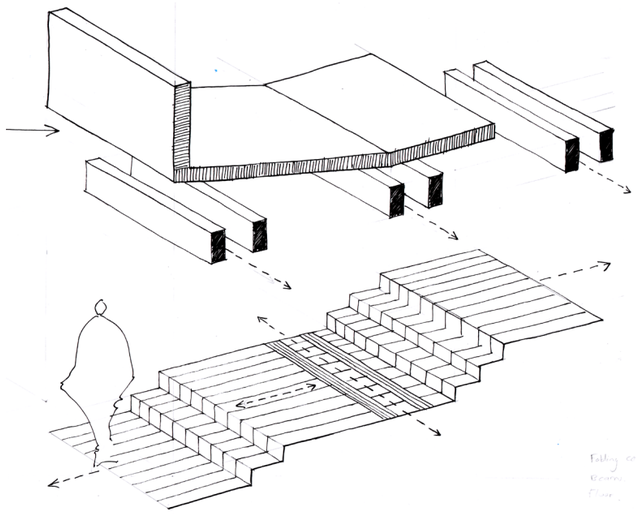

Fig. 119: Transition space (Author 2021)

DWELLING SPACE

Spaces of dwelling require a sense of intimacy and enclosure. The ceiling plane folds down to reduce the scale of a space and folds up to frame a particular view. It mediates both the user's sense of refuge and exposure to others. The space between deep columns or fin-like walls can be used as a place of refuge or as a threshold into a space of refuge. The floor plane steps up and down to create seating and spaces of gathering. Rounded corners and coloured ceramic tiles articulate a seat as a separate element. A shift in paving pattern and strips of tiling indicate the change from a space of transition to a space of dwelling.

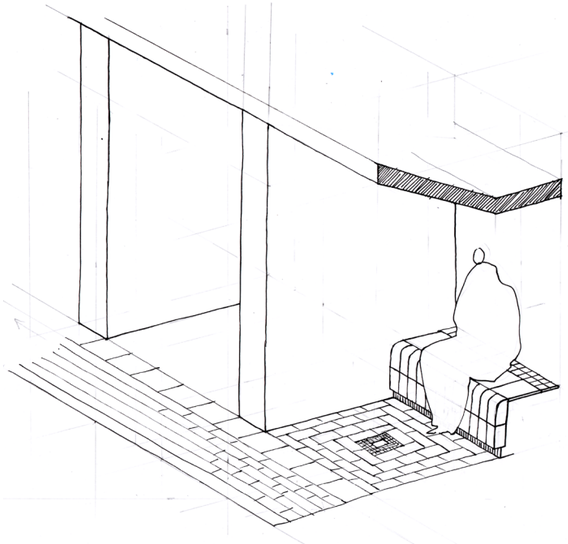

Fig. 120: Dwelling space (Author 2021)

CONTINUATION AND DIFFERENTIATION

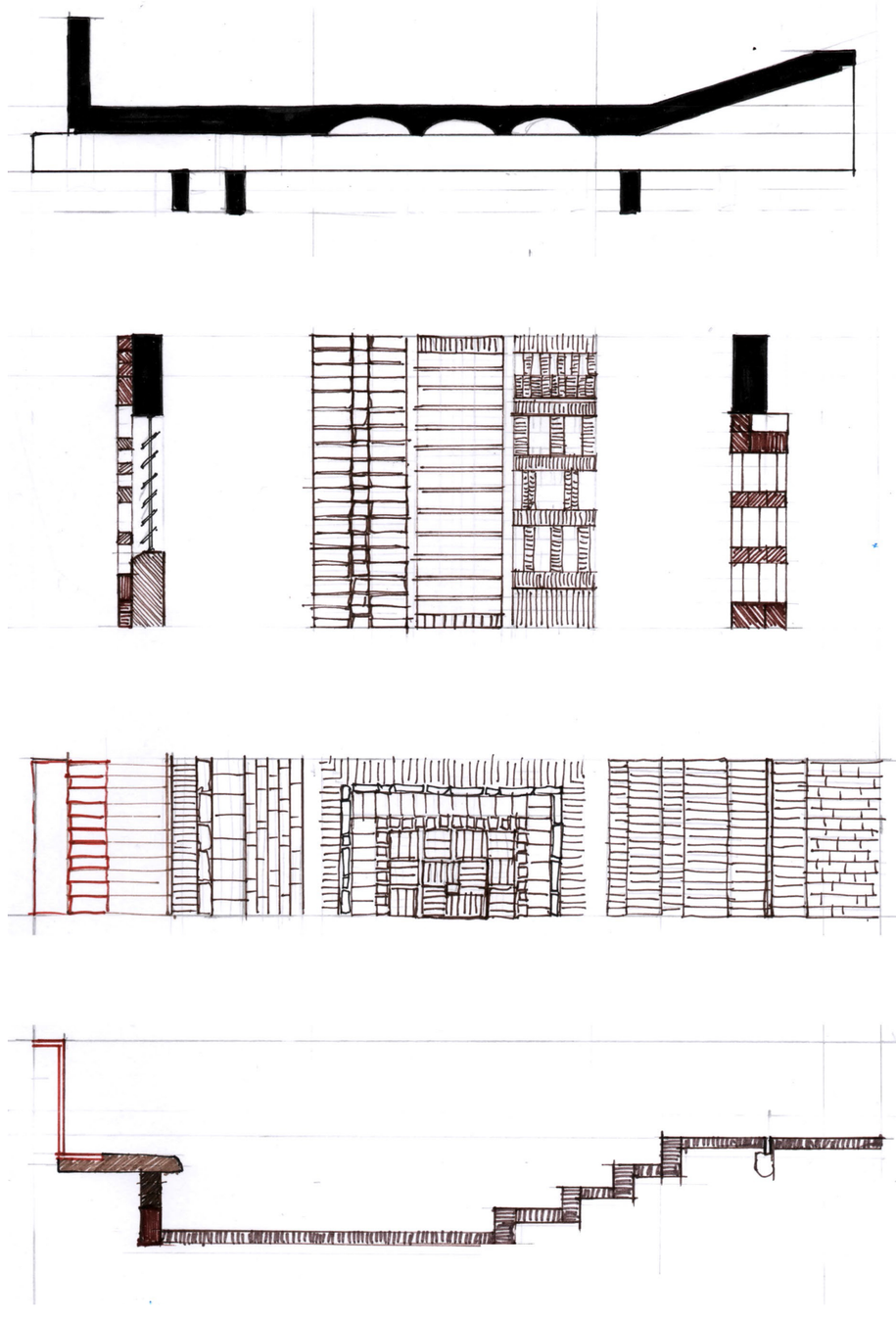

Fig. 121: Continuation and difference in the articulation of overhead plane, envelope and ground plane (Author 2021)

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7.7

STRUCTURAL SYSTEM

The edge conditions of spaces are the primary mediator between internal refuge and external exposure. The vertical structure is therefore located on the edges of a space to create an unrestricted open space within. The structure should enable variations in edge conditions such as openings, screens or solid walls.

ITERATION 1 – WALLS AND BEAMS

The first iteration explored an external structural skin supported on a two-way concrete beam system to create large open space underneath. A five-storey external brick skin would require a frame or buttress system for lateral support. Perforations in the building's skin would be severely limited in order to maintain the wall's structural integrity.

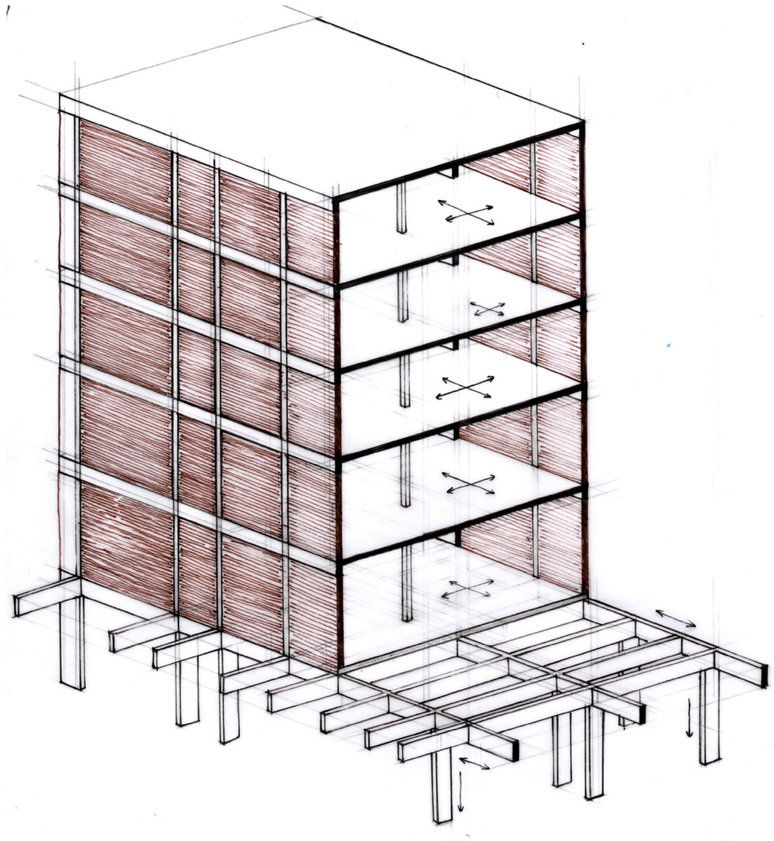

Fig. 122: Stucture iteration 1 (Author 2021)

ITERATION 2 – STEEL FRAME

The second iteration explored the use of a steel portal frame to contain the structure within the building envelope. A non-structural external skin would hang from the steel frame as a separate element. The skin would accommodate variations in openings and screens, independent from the primary structure. The concrete slabs cannot span the 12m width of the building without internal columns. Steel beams would span across the width of the building between the steel columns to support the one-way concrete slabs. In order to span 12m the steel beams at every level would need to be 750mm deep. A steel system is therefore uneconomical and impractical.

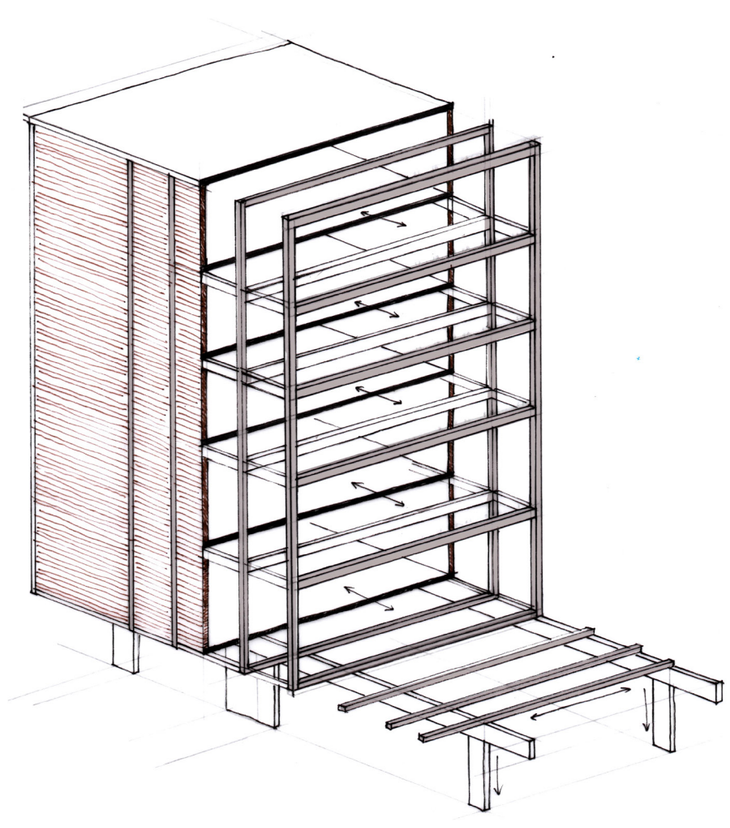

Fig. 123: Stucture iteration 2 (Author 2021)

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ITERATION 3 – CONCRETE FRAME

The final iteration is a reinterpretation of the typical concrete frame structural system. The concrete frame, with infill brick walls, is used by neighbouring buildings similar in scale to the proposed building. A concrete frame is economical, quick to construct in a constrained site and allow for flexible internal configuration of spaces.

The use of deep fin-like concrete columns on opposite edges of the building reduce the internal span to 8m, which eliminates the need for internal columns. Exposed concrete beams span between the columns across the internal space to frame openings and connections between the street, the internal space and the courtyard. The deep columns create an intermediate space between the external and internal condition. The envelope of the main building facing the street consists of an external screen that respond to the city and an internal skin between the columns that respond to the needs of each individual space.

All the main spaces use the same structural logic: structural columns along two opposite edges of a space, connected with beams spanning across the space to support and overhead slab.

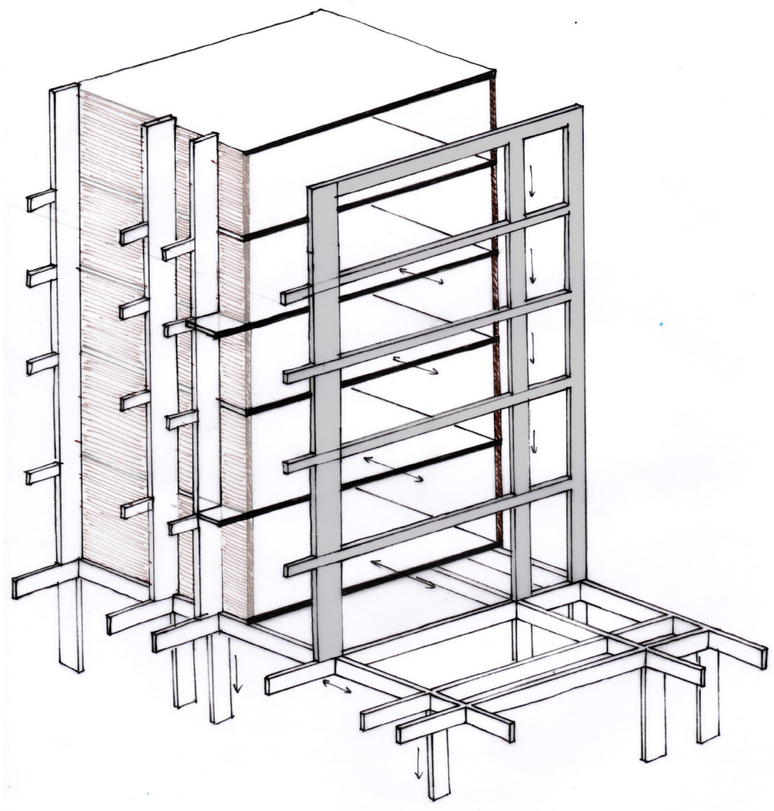

Fig. 124: Stucture iteration 3 (Author 2021)

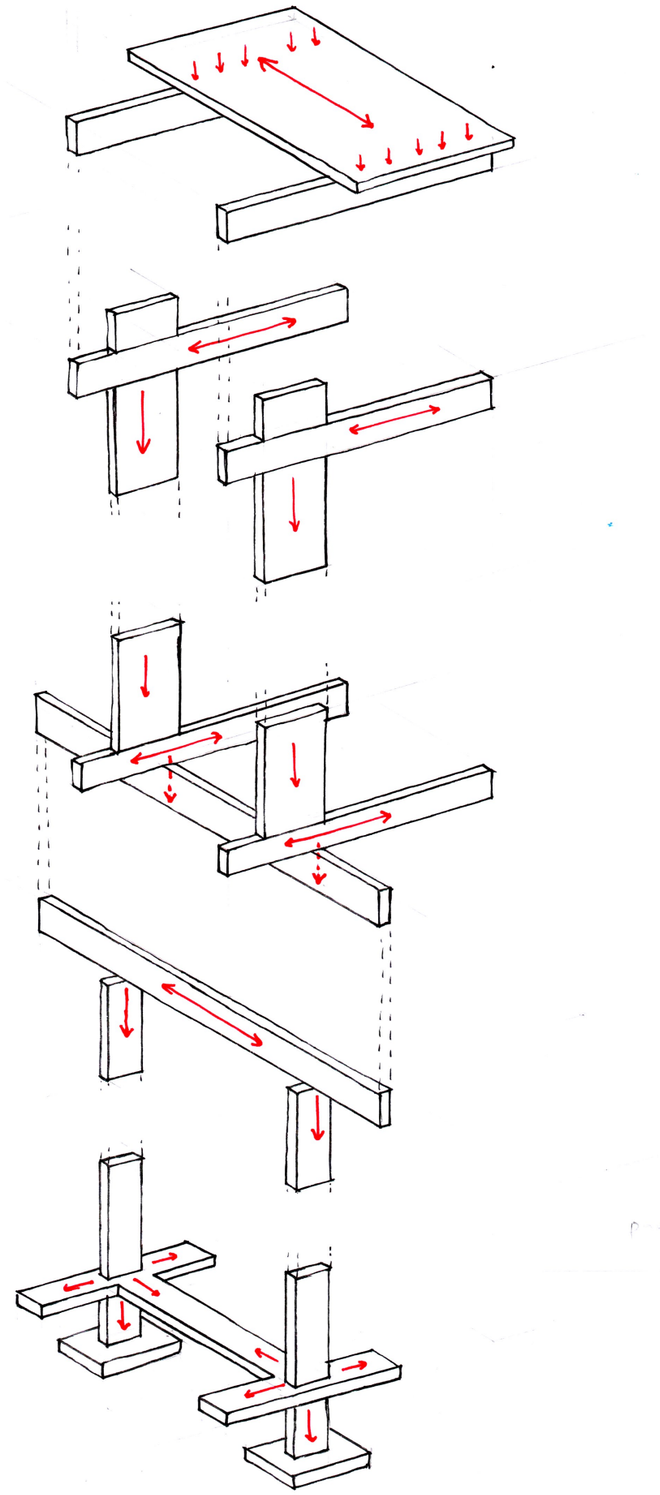

Fig. 125: Stuctural logic (Author 2021)

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7.8

TECNOLOGY EXPLORATIONS

THE ENVELOPE

Technological explorations of the envelope were primarily focused on the the precast concrete screen that form the front facade of the education building. The intention of the screen was to give the appreance of a solid facade, but still allow natural light and ventilation to enter the interior, and views out towards the city. This acts as a critique and reinterpretation of the existing typologies surrounding the site, where the facades above ground floor are solid and unresponsive to the street. The apprearance of the screen as a solid element, reinforces the users' perception of the building as a place of refuge. Lightweight materials such as steel, polycarbonate panels and glass could not provide the appearance of solidity. Bricks and standard precast concrete elements were considered but had limitations in terms of size and variations of openings that could be created. Therefore, custom made precast concrete 'bricks' were designed. The elements are larger that standard bricks to be able to create large openings and variations according to the internal spaces' requirements. Multiple iterations of the precast bricks were cast to explore different mixes, colouring and recycled aggregates.

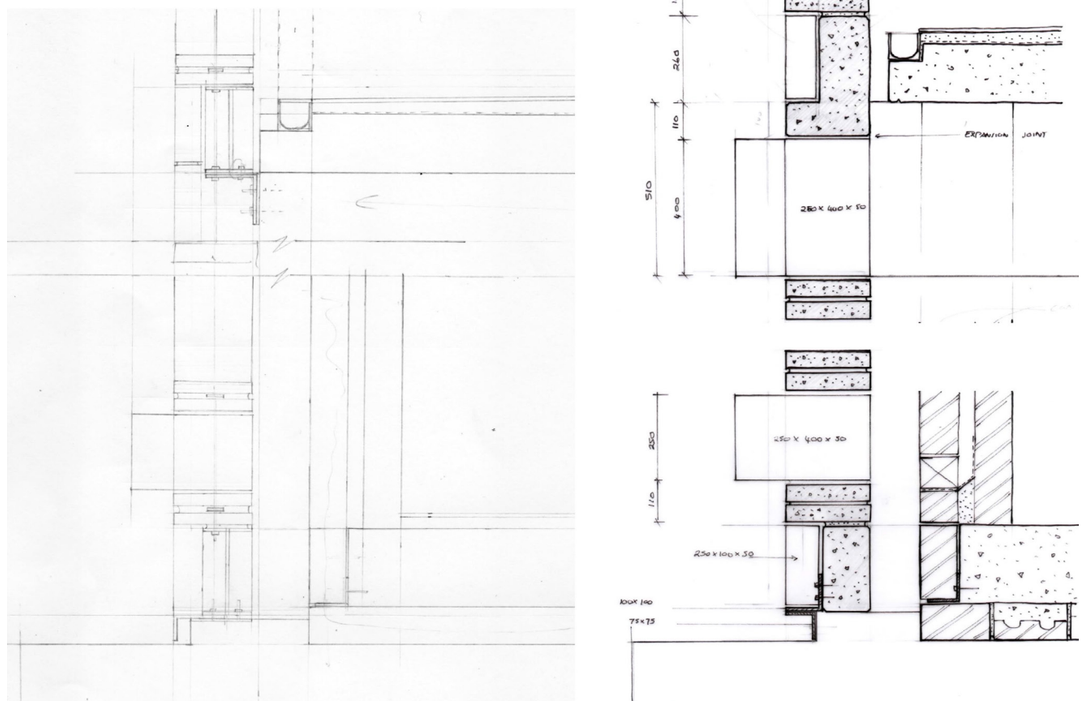
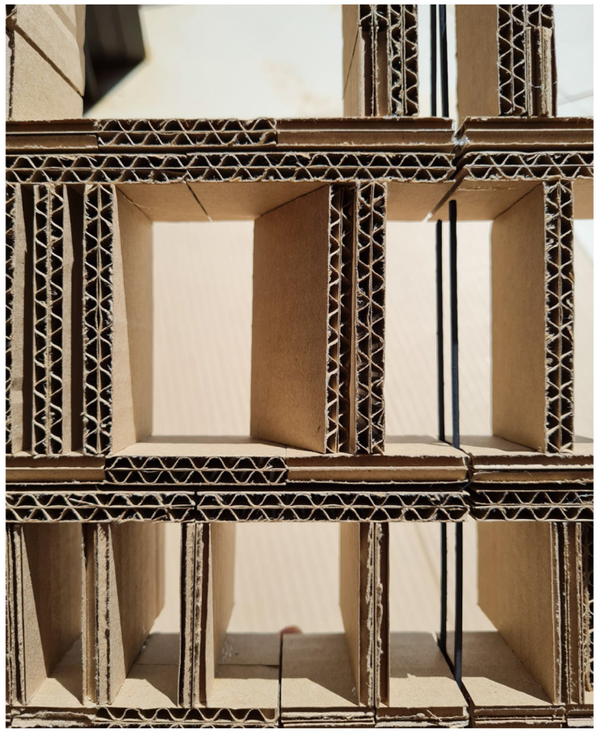


Fig. 126: Exploration of precast concrete screen (Author 2021)



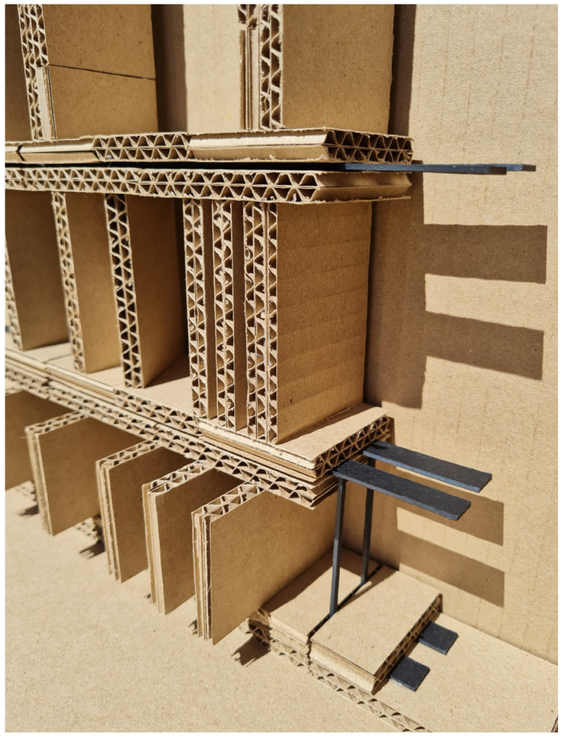


Fig. 127: 1:5 model of the screen's structural system. An iteration using steel reinforcement. (Author 2021)



Fig. 128: Full scale precast concrete brick castings (Author 2021)

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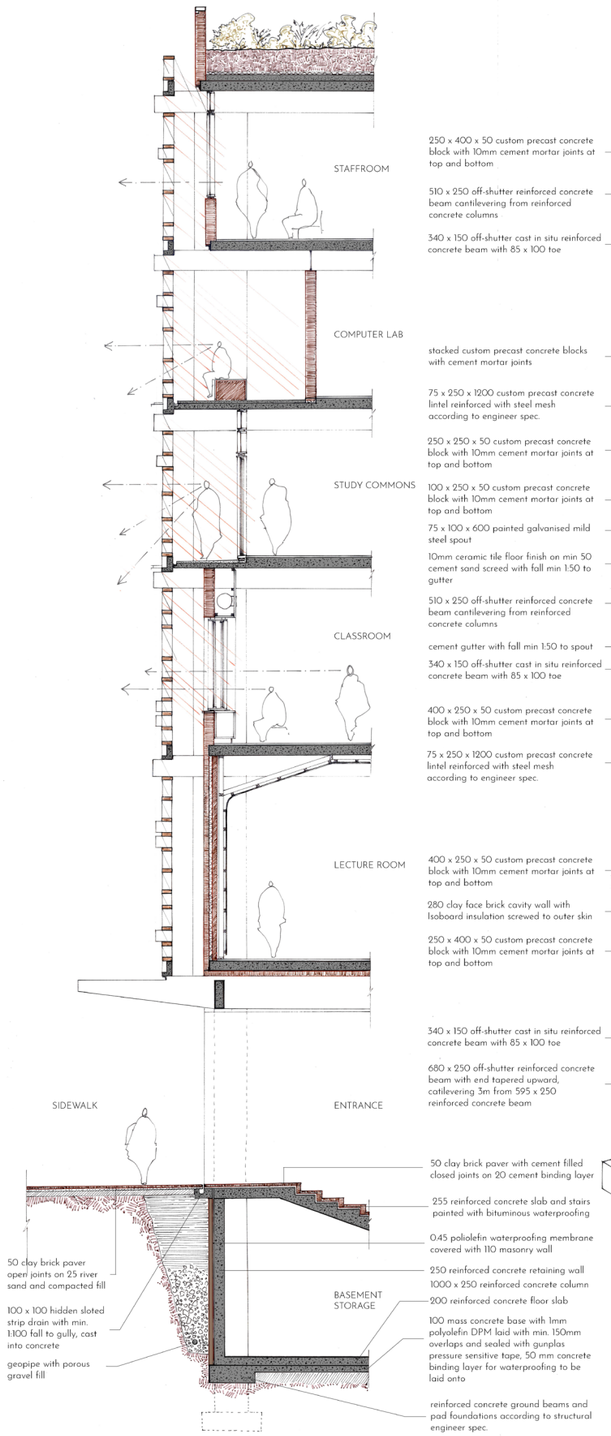
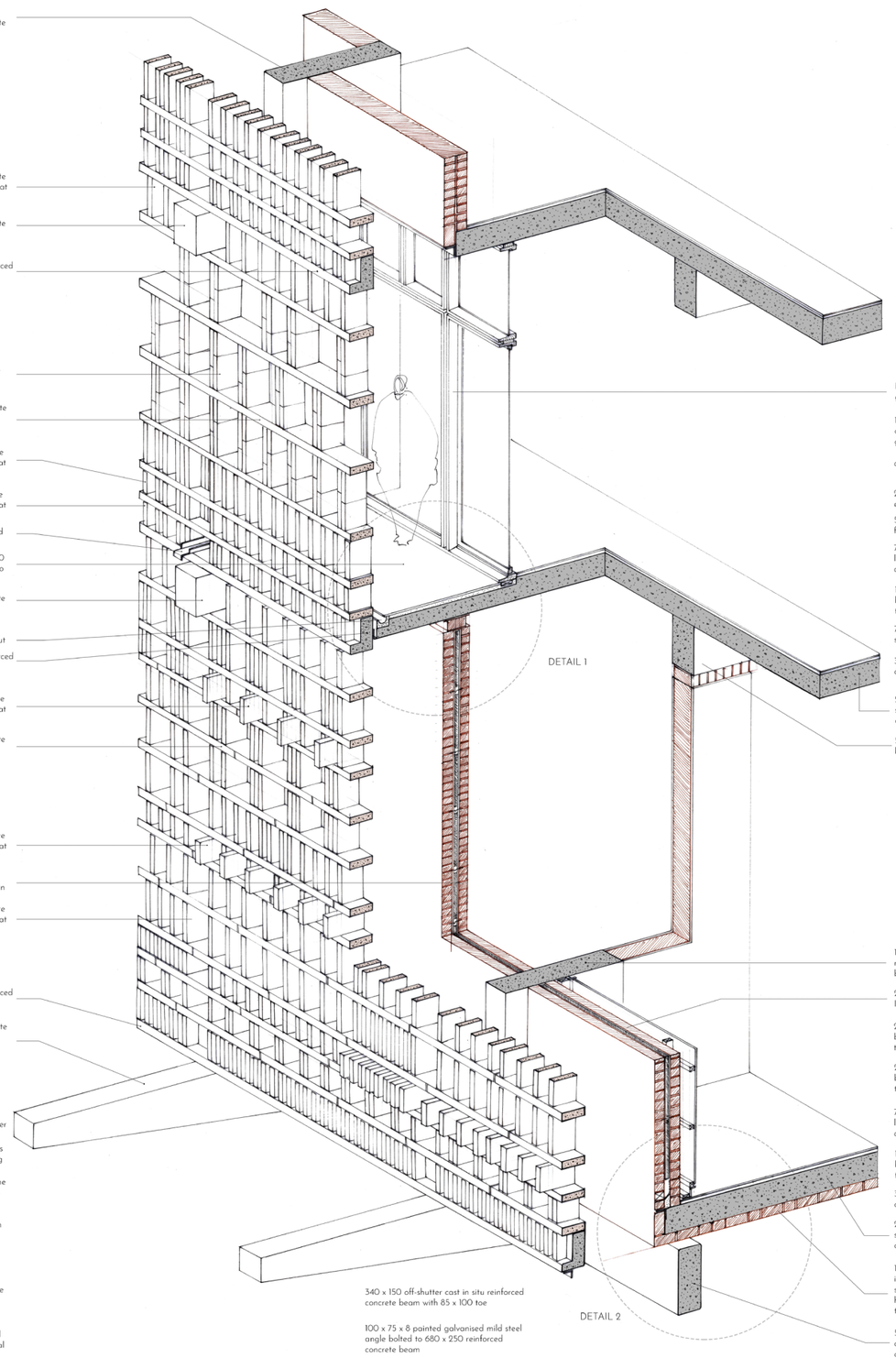
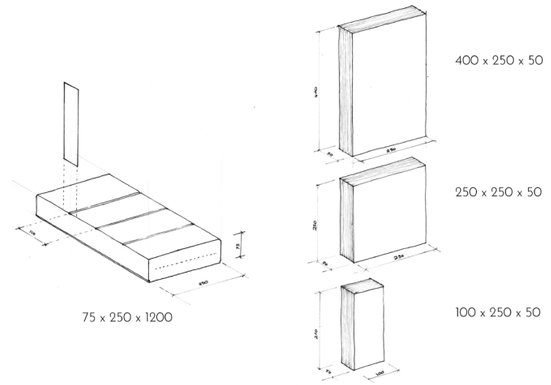


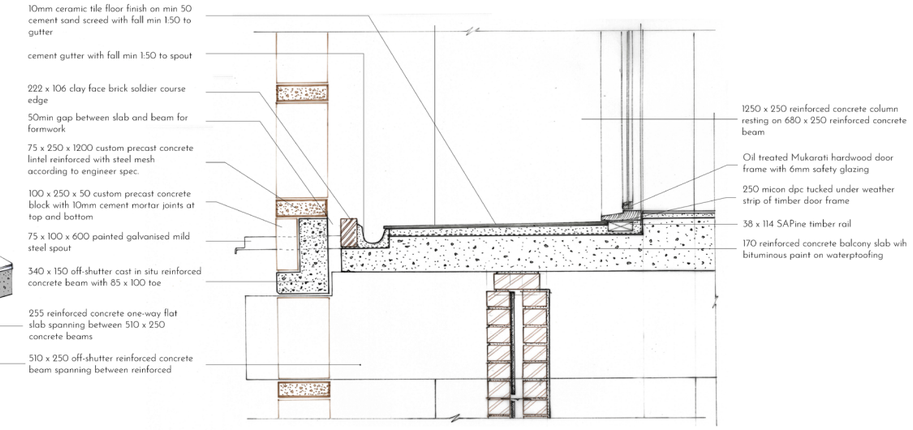
1:50 SECTION OF NORTH FACADE



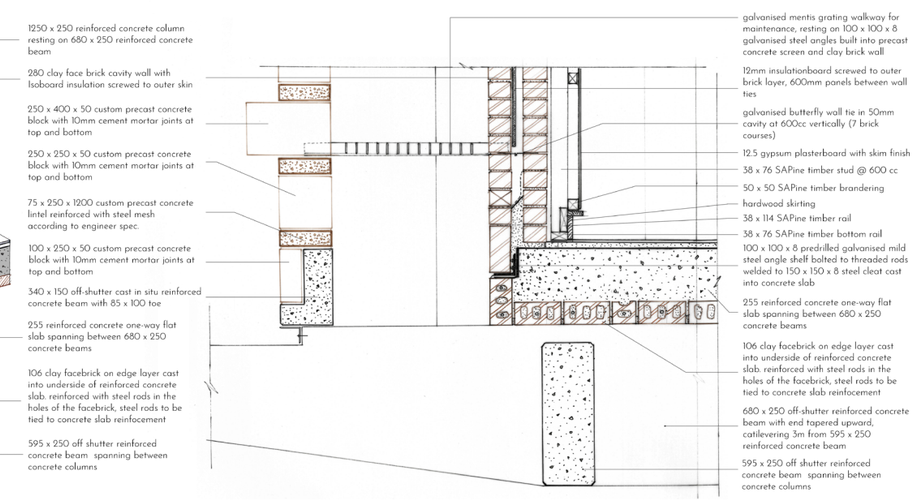
1:20 SECTION OF PRECAST CONCRETE SCREEN



PRECAST CONCRETE SCREEN COMPONENTS



DETAIL 1
1:10 SECTION OF PRECAST CONCRETE SCREEN AND BALCONY



DETAIL 2
1:10 SECTION OF PRECAST CONCRETE SCREEN AND BRICK EDGE ARTICULATION

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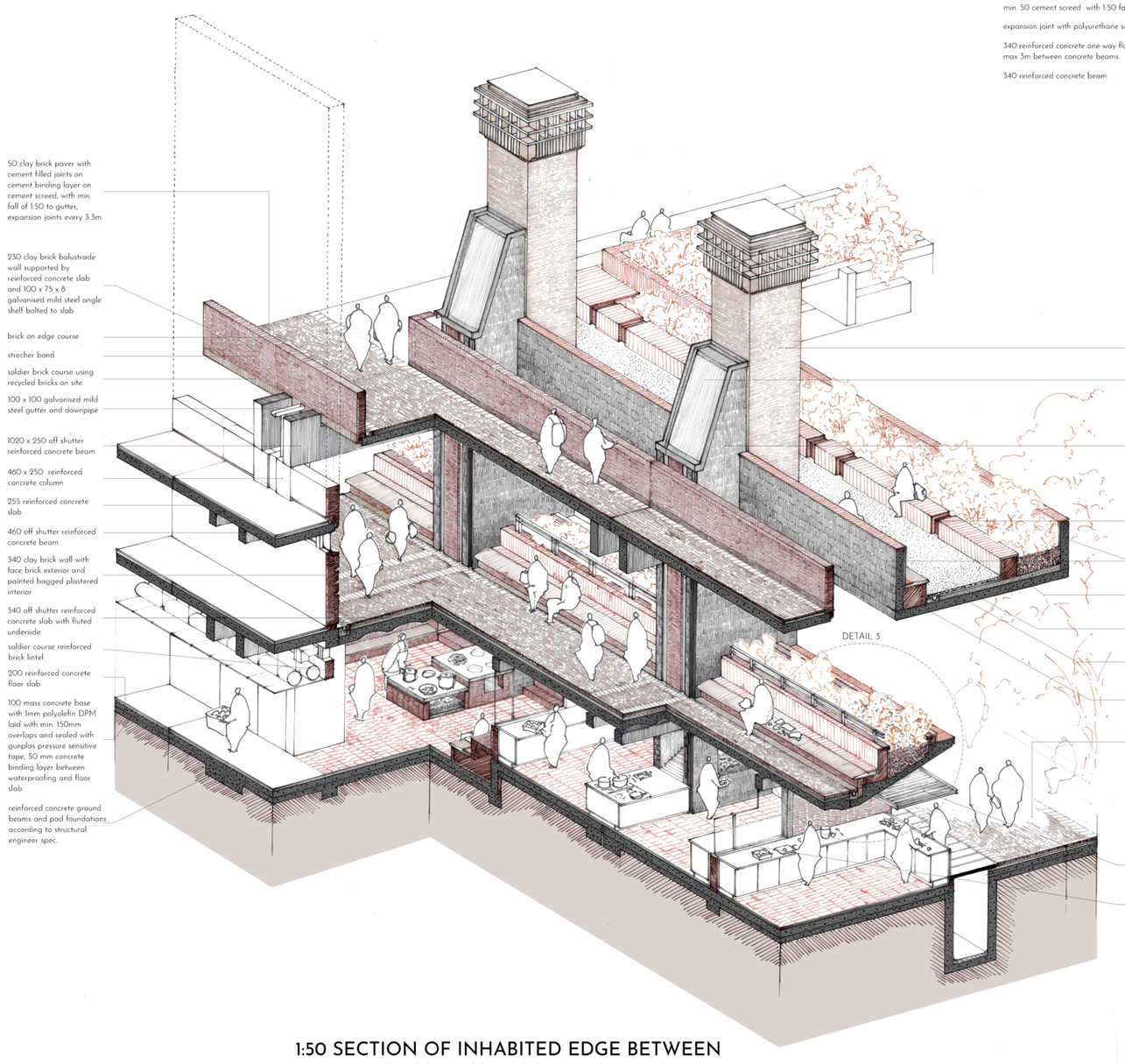
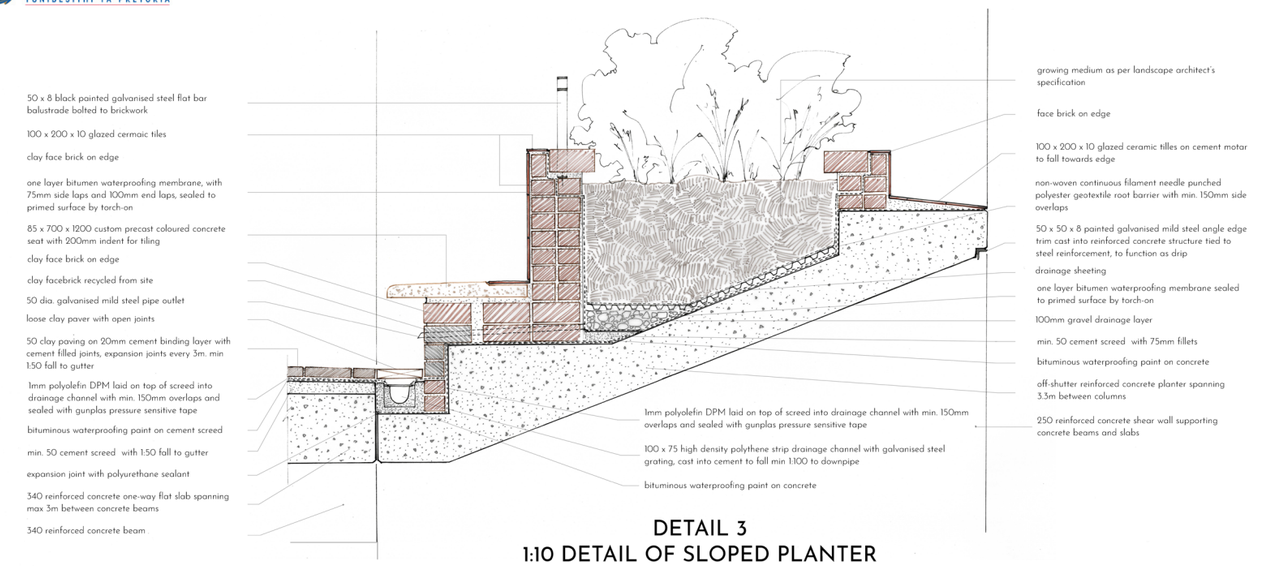
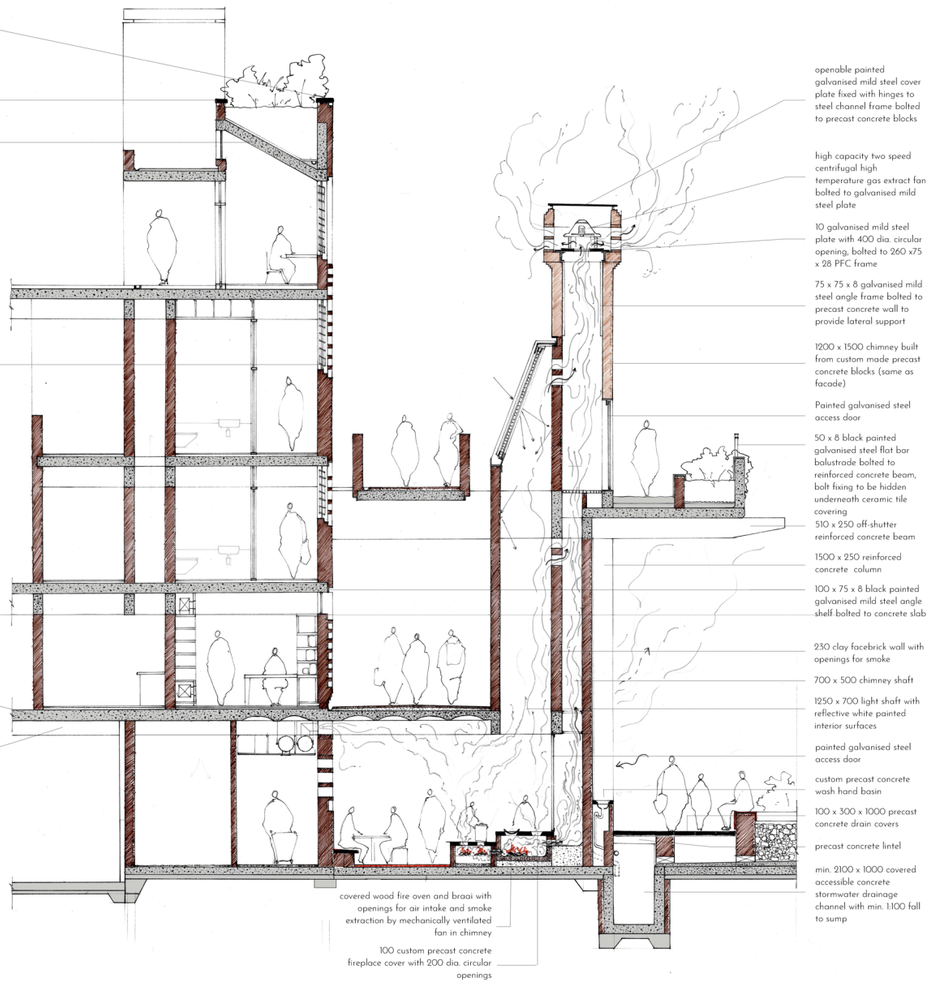


1:50 SECTION OF INHABITED EDGE BETWEEN ARCADE AND COURTYARD



DETAIL 3
1:10 DETAIL OF SLOPED PLANTER



1:50 SECTION THROUGH CHIMNEY AND COOKING SPACE

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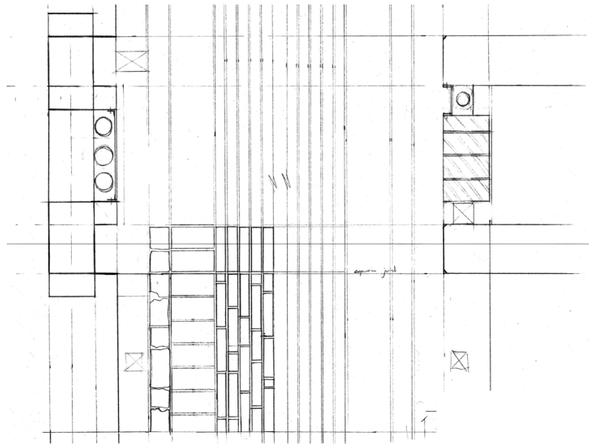
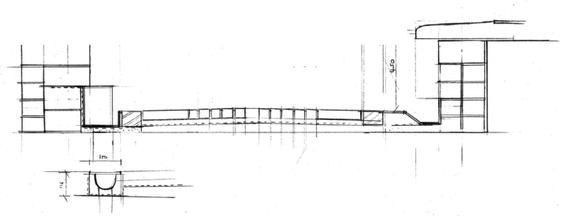
GROUND PLANE

The articulation of the paving, stairs and seating in public spaces affect the way in which spaces are used and appropriated. Brick pavers are used for external stairs as a continuation of the public surface into the courtyards. Custom made precast concrete seating facilitate the act of dwelling and socialising. Ceramic tiles rather than exposed brickwork are used where dwelling is promoted.





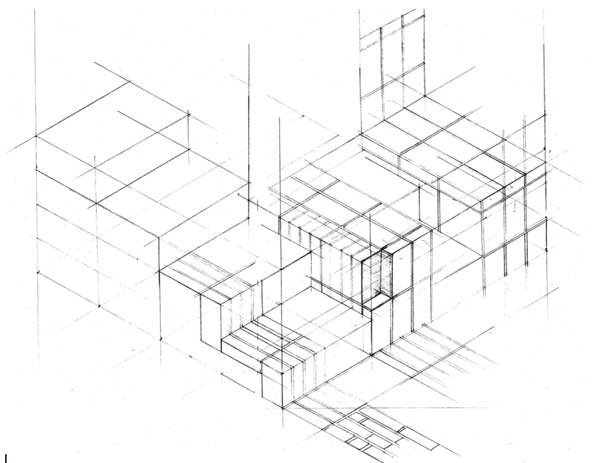
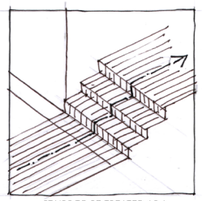
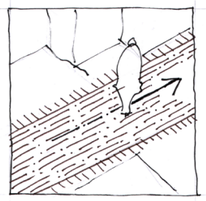


Fig. 129: Explorations of the ground plane (Author 2021)

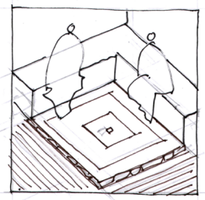
FLOOR PLANE ARTICULATION INTENTIONS



STAIRS TO BE TREATED AS A CONTINOUS SURFACE EXTENDING THE GROUND PLANE UP OR DOWN

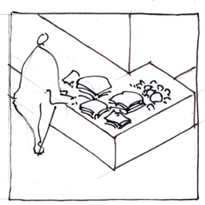


PAVING OF TRANSITION SPACES IN LINEAR ROWS TO IN DIRECTION OF MOVEMENT

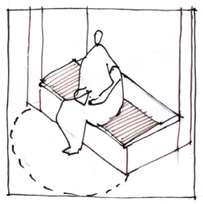


PAVING OF DWELLING SPACES RADIATING FROM A CENTRAL POINT SIGNIFYING A PLACE OF GATHERING

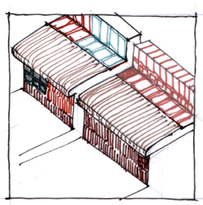
SEATING ARTICULATION INTENTIONS



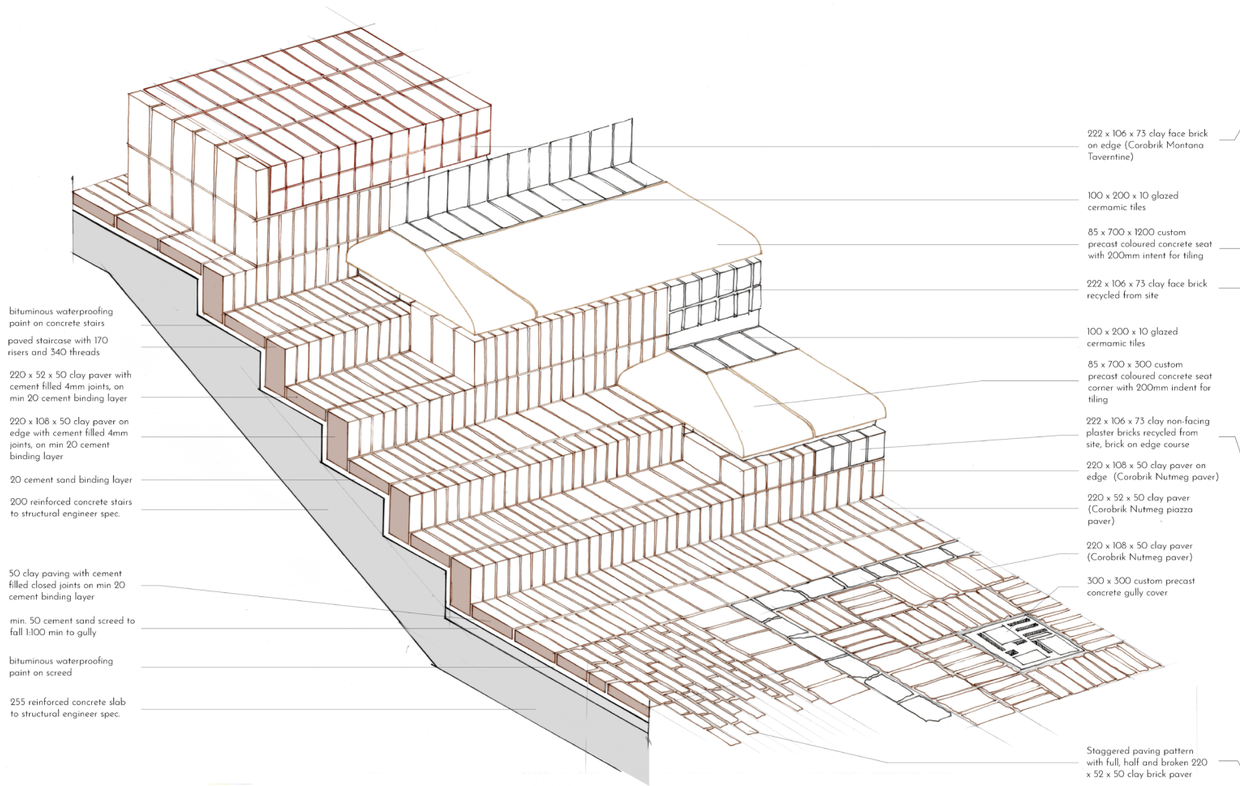
BRICK PLINTHS ALLOW FOR INFORMAL APPROPRIATION



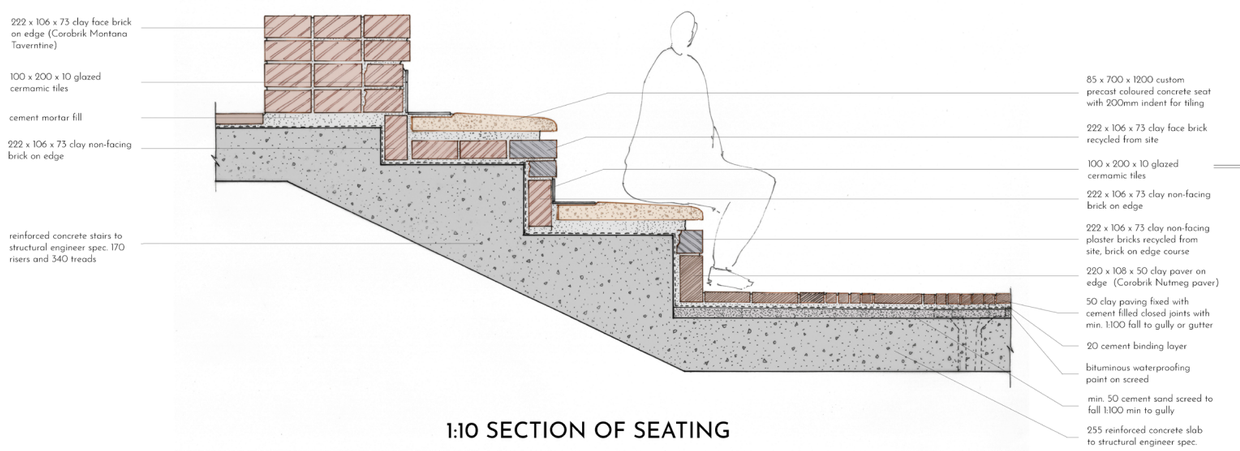
PRECAST CONCRETE SEATING DEMARCATES SPACE FOR ACTS OF RESTING/GATHERING



DIFFERENTIATION OF TILES AND RECYCLED BRICK USED FOR SEATING PROMOTE THE USERS' ATTACHMENT TO PLACE



1:10 SECTION OF STAIRS AND SEATING



1:10 SECTION OF SEATING



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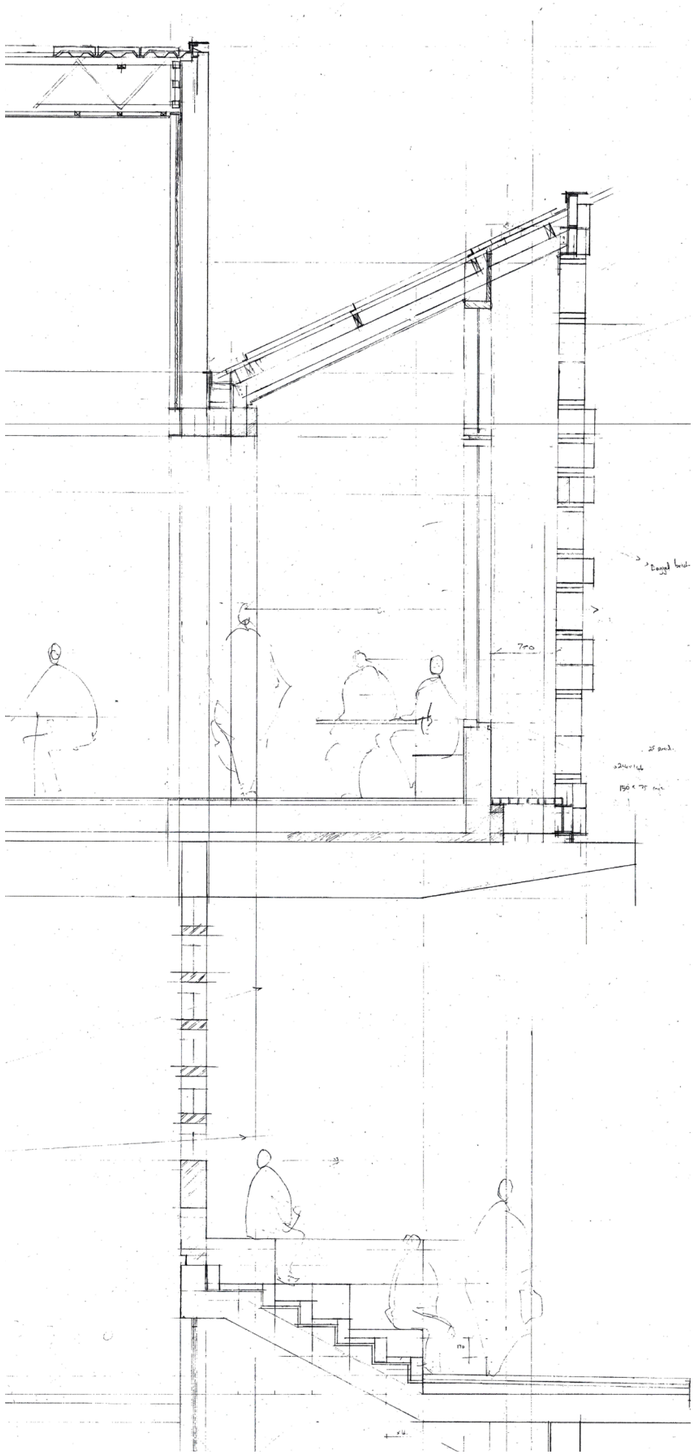

Fig. 130: Iteration 1 of the refectory/eating space (Author 2021)

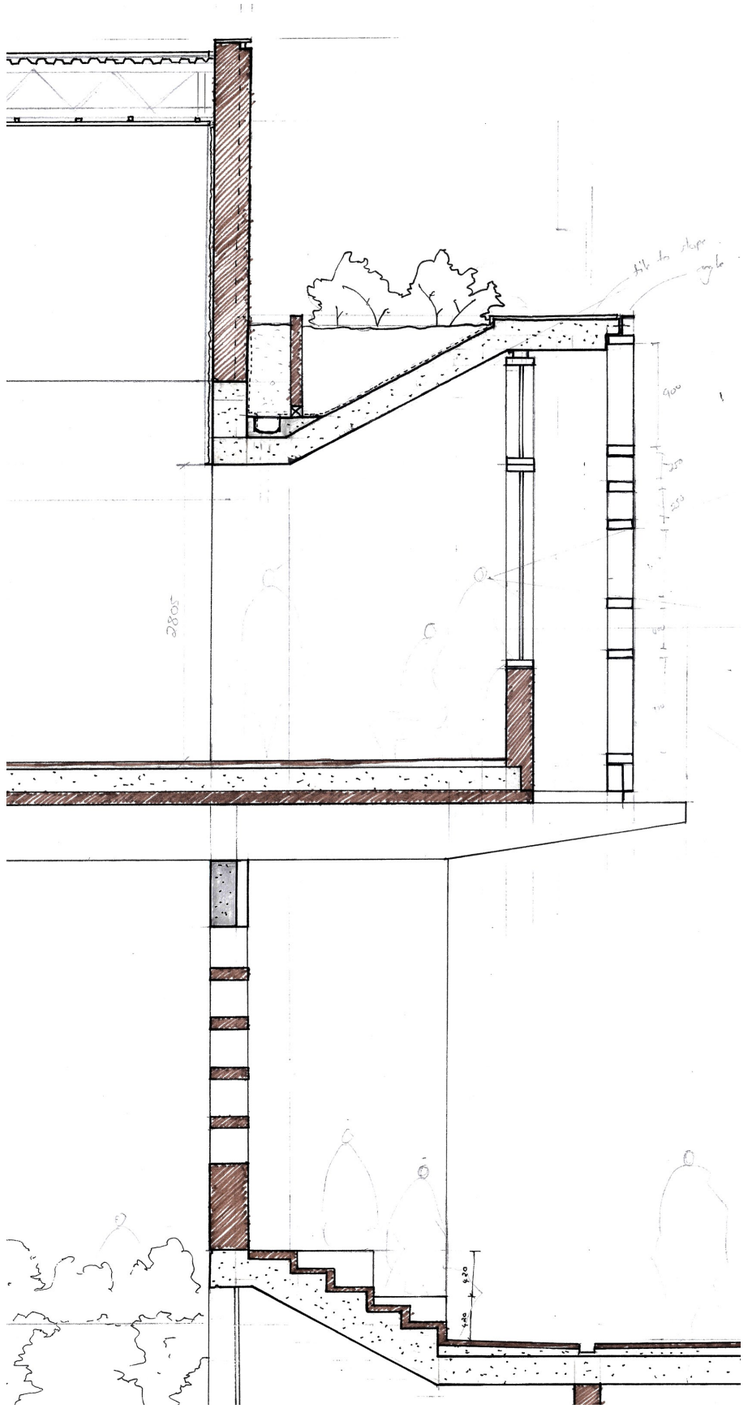

Fig. 131: Iteration 2 of the refectory/eating space (Author 2021)



Fig. 132: 1:20 section model of iteration 3 of the refectory/eating space (Author 2021)

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7.9

SHADOW STUDY

The site is partially enclosed and surrounded by multi-storey buildings to the east, west and north (across the street), which restricts access to direct solar radiation and natural light. The site is predominantly shaded during winter months and receives full sun during summer months. In an ideal condition, direct sun exposure is necessary in winter months for solar heat gain of interior spaces; and summer months open spaces and building fenestrations should be shaded.

The design must therefore mediate between the ideal condition and the climatic limitations of the site. In winter months a shaded site (especially towards the street edge) is unavoidable, as is the result of surrounding buildings, and any new intervention will worsen the condition. Emphasis was placed on providing cool shaded spaces during the summer months. Shade in public spaces promote lingering, socialising and sitting - acts of refuge.

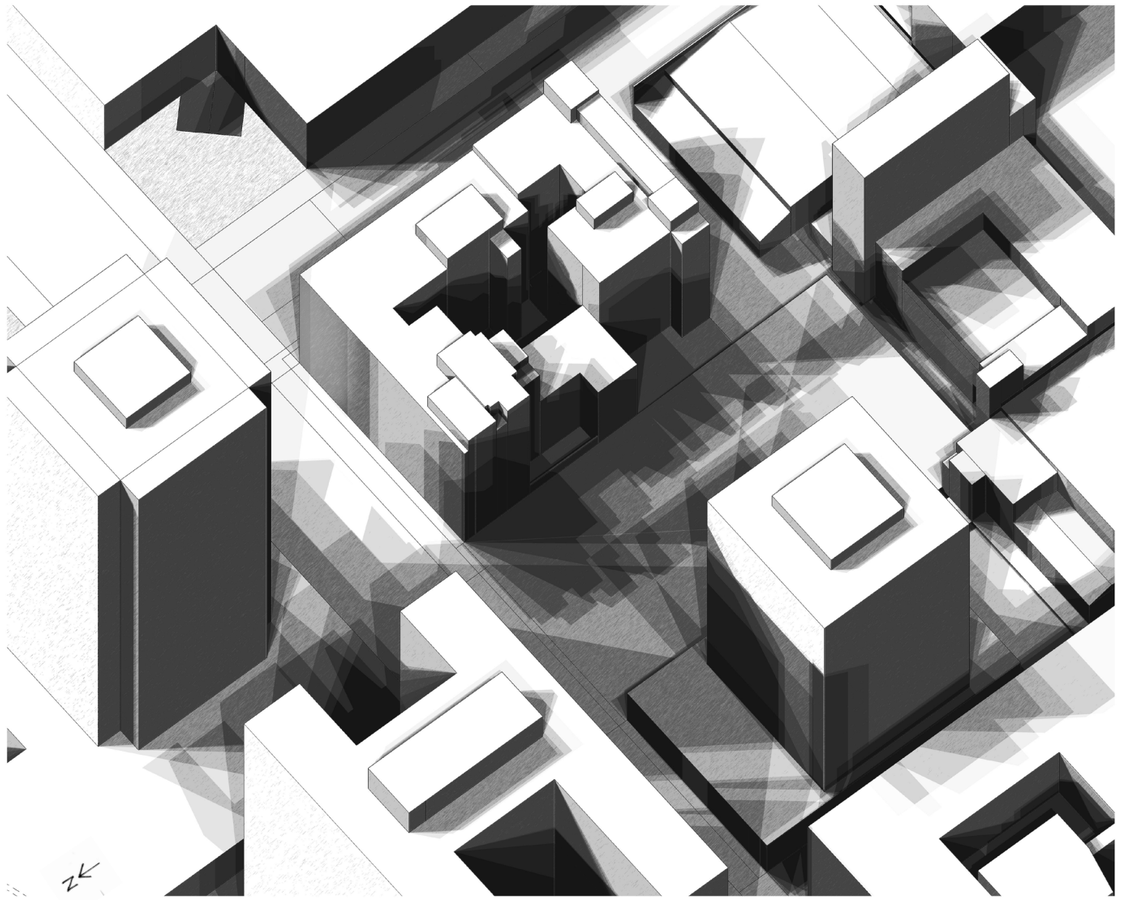
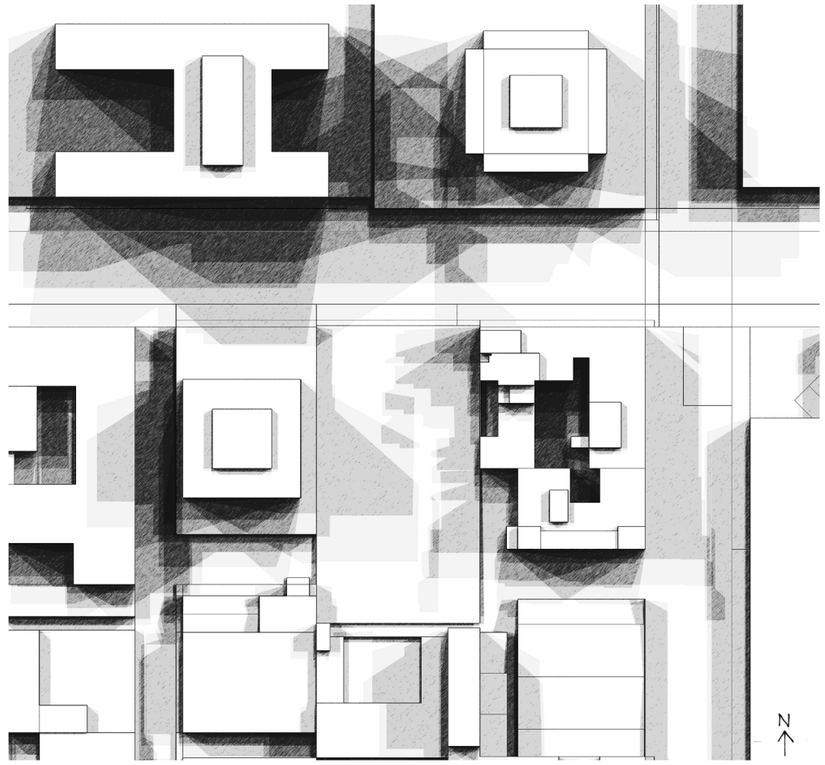
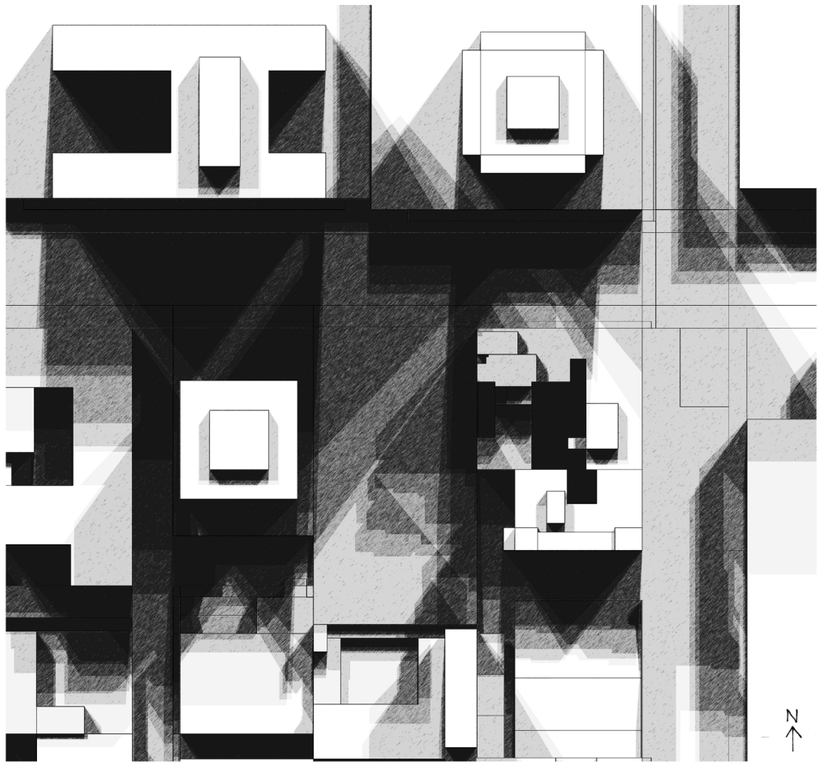


Fig. 133: Shading of the existing site(Author 2021)



EMPTY SITE
OVERHEATED PERIOD
21 September - 21 March



EMPTY SITE
UNDERHEATED PERIOD
21 March - 21 September

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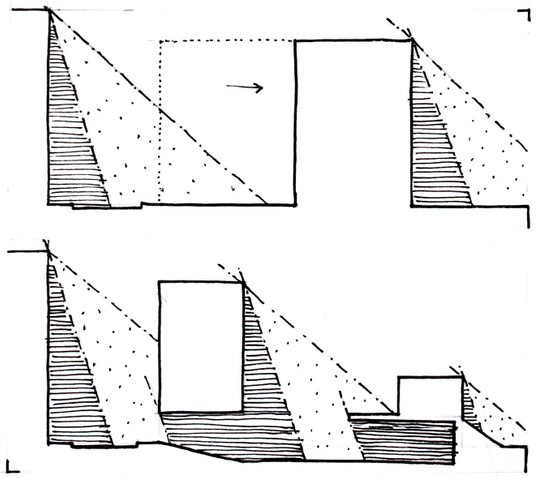
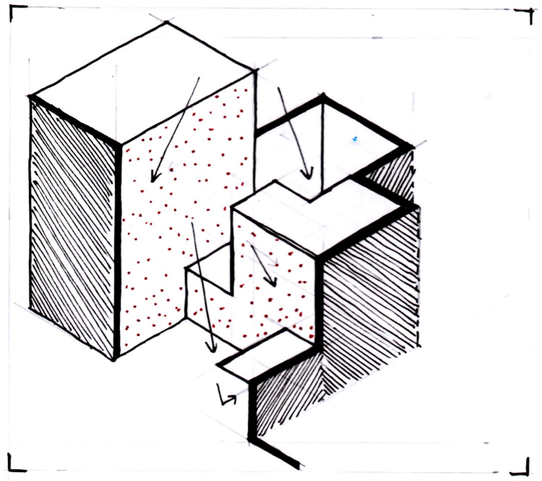
DESIGN DECISIONS



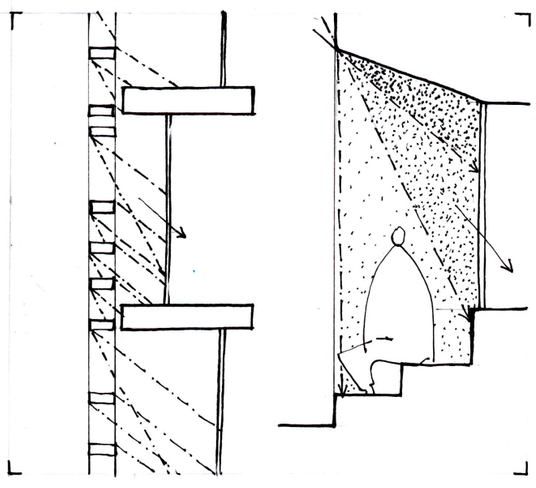
SHADED OPEN SPACES

The largest mass is positioned on the street edge to create shaded public spaces underneath and behind. Spaces that required sun exposure in winter months were placed towards the back of the site.



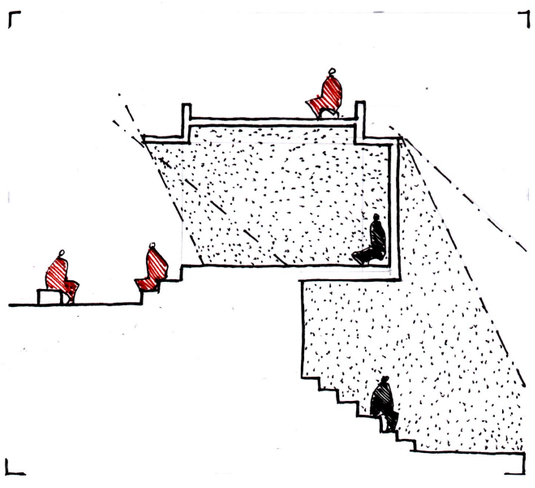
COURTYARDS

The design consists of smaller fragmented spaces placed around internal courtyards to increase access to indirect natural light, views and ventilation.



EDGE CONDITIONS

Screens and deep overhangs on the northern edges provides shade for interior and exterior spaces in overheated months, and sun exposure in underheated months.



CHOICE

People's desire for shade or sun are different and constantly changing. Therefore, the design provides different conditions for users to choose from.

Fig. 134: Design principles related to shading (Author 2021)

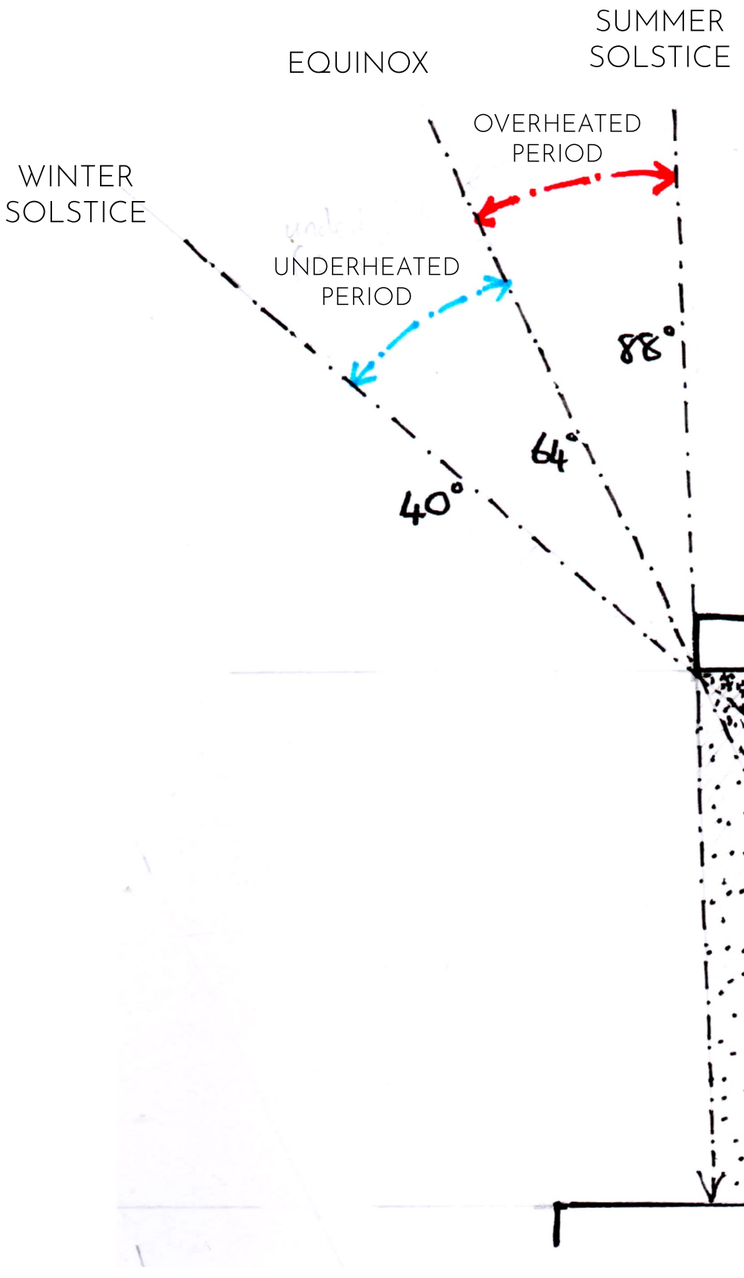


Fig. 135: Solar angles of Pretoria (Author 2021)

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SHADOW STUDY OF THE DESIGN

The central courtyard is shaded but provides indirect natural light to the basement and interior. The front building is stopped short on the western corner to capatalise on the setback of the neighboring building.

Access to direct sun exposure on the front facade is unevenly distributed. Bathrooms, services and fire stairwells are positioned on the east and west sides of the building, which receives little to non direct sunlight.

Buildings towards the back of the site has access to direct sunlight in winter months.

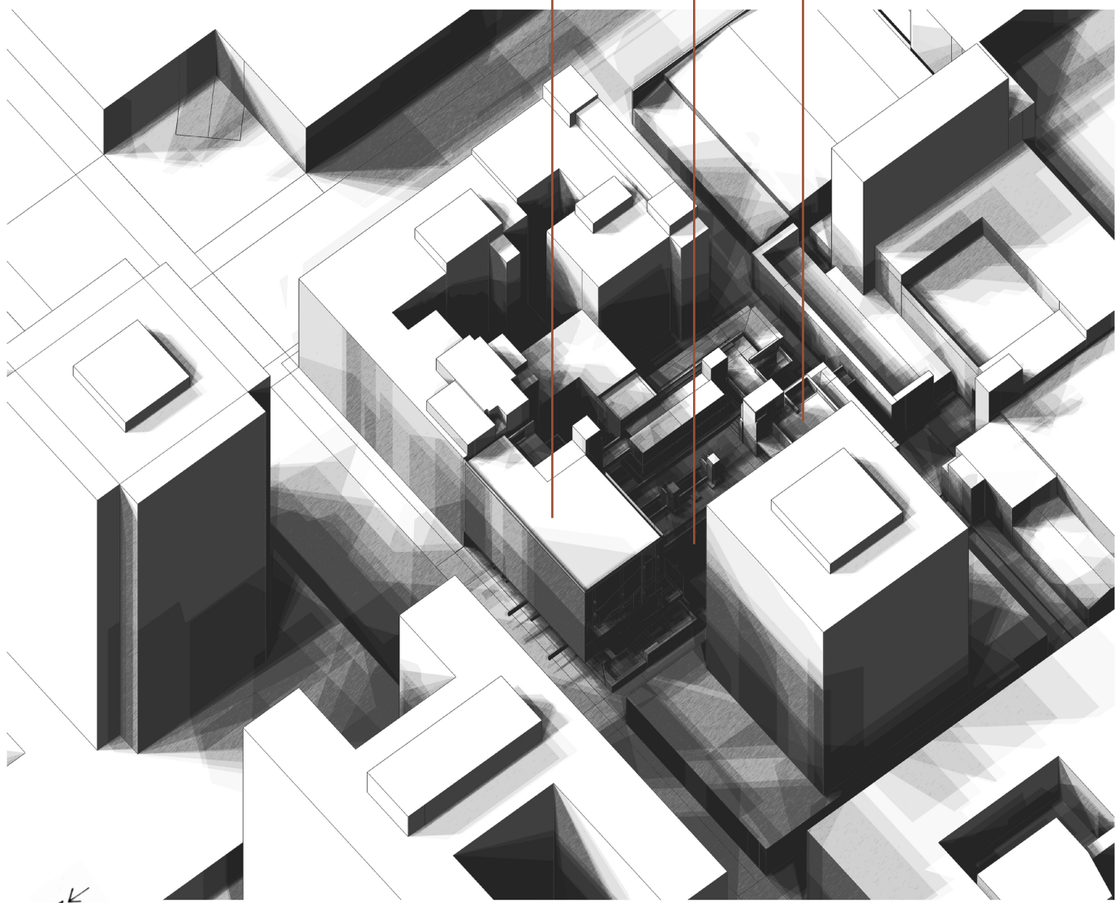
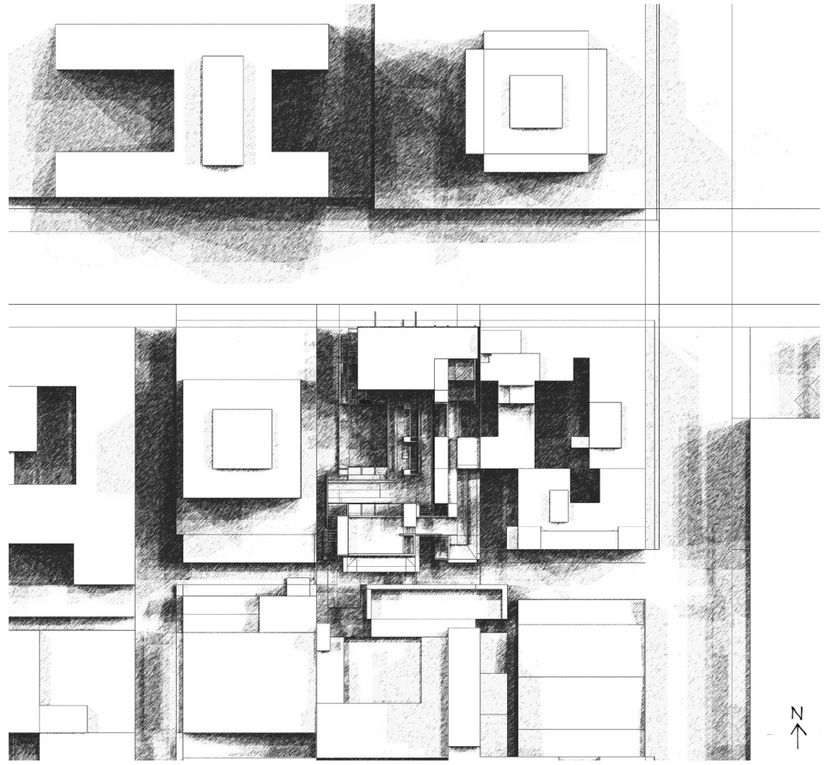
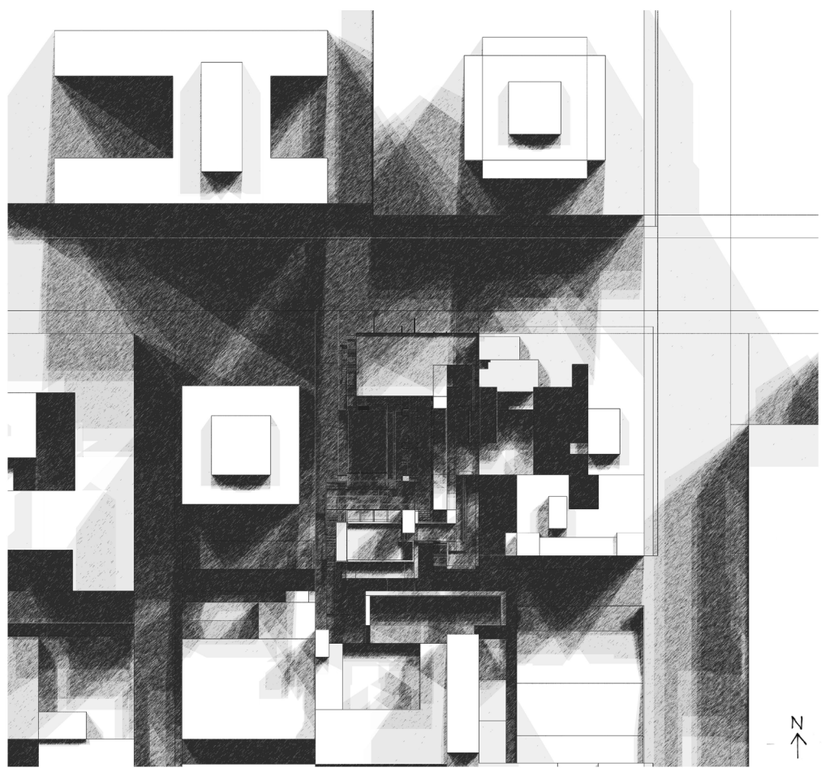


Fig. 136: Shading of the proposed design (Author 2021)



BUILDING IN CONTEXT
OVERHEATED PERIOD
21 September - 21 March



BUILDING IN CONTEXT
UNDERHEATED PERIOD
21 March - 21 September

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7.10
DAYLIGHTING

PERCEPTION OF LIGHT

Natural light plays an important role in whether a space is perceived as a public external space or a private interior. Public spaces require high levels of illumination and exposure to direct natural light, in order to be perceived as public. Spaces of refuge should be darker and dependent on soft, indirect light. However, spaces of refuge should not be too dark to discourage people from entering, or too dark to accommodate activities such as cooking or eating. In spaces of refuge the feeling of being exposed can be reduced by placing the light source at the back of a space. Those within the space can then comfortably observe others outside, while the outside observer looking in, can only see their silhouettes.

STUDY AREA

The daylighting analysis and iterations were focused on the basement cooked food market as the main space of public refuge. This space contains cooking spaces that require high levels of lux, but has very limited access to natural light.

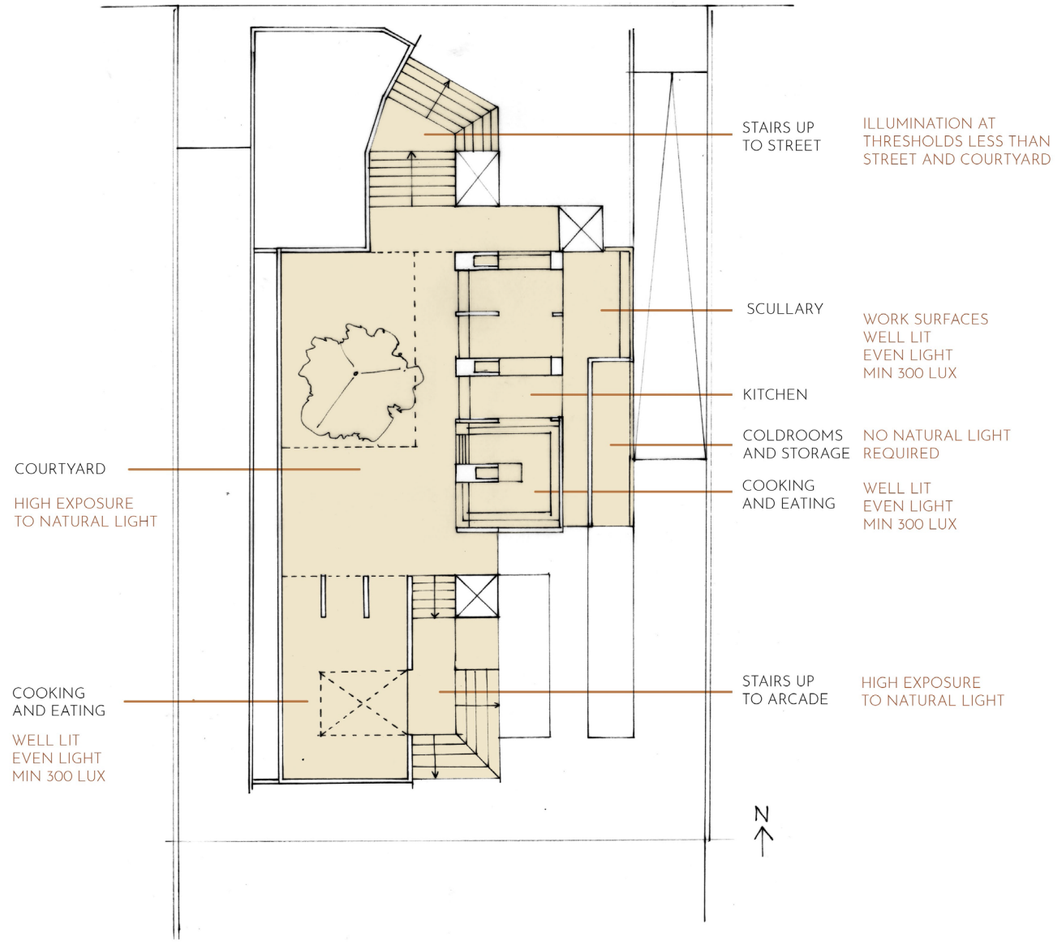

Fig. 138: Basement level indicating area of study (Author 2021)

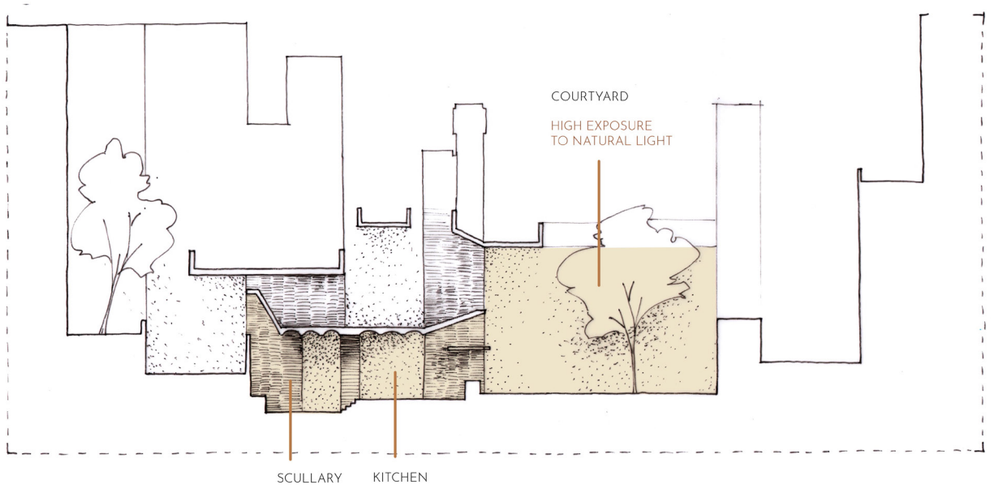

Fig. 137: Cross section indicating area of study (Author 2021)

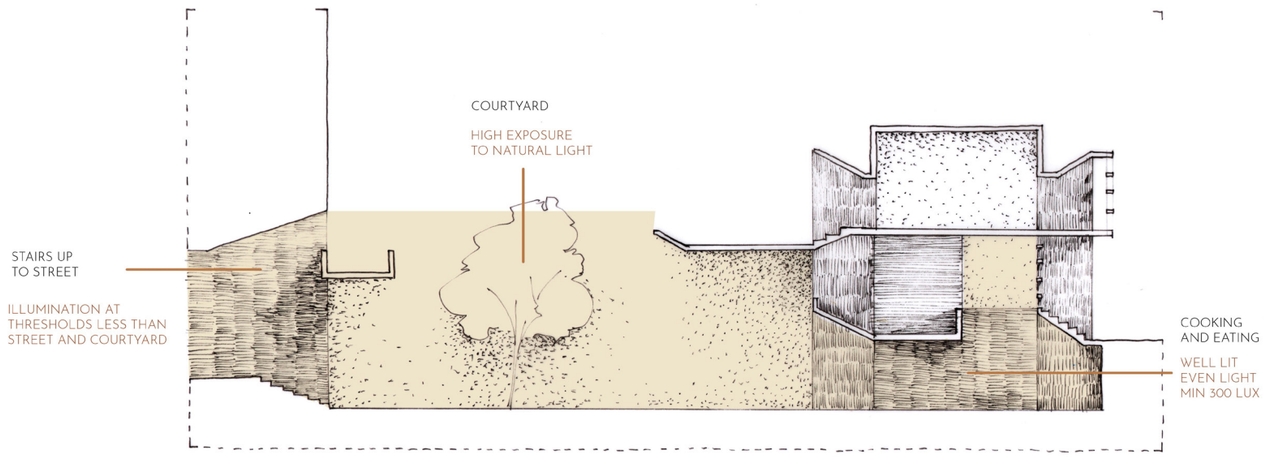

Fig. 139: Long section indicating area of study (Author 2021)

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DAYLIGHTING ANALYSIS

Using Sefaira's daylighting software, two types of simulations were completed to analyse the levels of illuminace of each of the design iterations. The first simulation is a visual test that indicate what portion of a space is overlit, well-lit, or underlit according to the following perameters: (1) an underlit space receives less than 300 lux more than 50% of occupied hours. (2) An overlit space receives more than 1000 lux of direct natural light for more than 250 occupied hours per year. (3) lux is measured at a height of 800mm above floor level.

The Spatial Daylight Autonomy (sDA) value and the Annual Sunlight Exposure (ASE) value were also calculated in the first simulation. The sDA refers to the percentage of floor area receiving 300 lux for more than 50% of occupied hours (Hugo 2019: 13). The sDA can be seen as the percentage floor area that is well or overlit. An adequate sDA value according to the Green Star Council falls between 60% - 90% of the occupied space (Hugo 2019: 13).

The ASE refers to the percentage of floor area which is exposed to direct sunlight, receiving more than 1000 lux for more than 250 occupied hours per year (Hugo 2019: 14). The ASE can be seen as the percentage of floor area that is overlit. A high ASE value can indicate a high level of glare and should be as low as possible, preferably below 10%. Because the space being analysed include exterior spaces, the sDA values were calculated for each space individually.

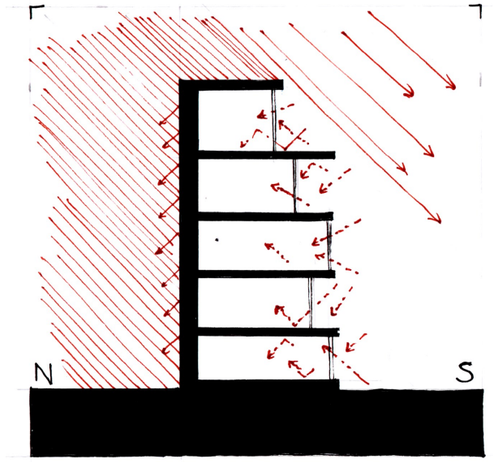
The second simulation measured the percentage of occupied hours per year, where the level of illuminance is at least 300 lux measured at 800 mm above floor level. 300 lux provides adequate illuminace for general spaces within kitchens (IESNA 2000:662), but the countertops and work surfaces should ideally receive up to 500 lux. Eating areas can be comfortable at between 150 and 200 lux (IESNA 2000:663).

The analysed spaces are located in the basement, they have to accommodate multiple activities that require different lux levels and will be used during early mornings and late afternoons when daylight levels are low.. Therefore, it is not realistic to expect natural light alone to achieve 500 lux or 100% annual illuminace. Daylighting will be improved as much as reasonably possible to reduce the building's energy demand, but natural light will be supported with artificial light sources, especially in critical areas.

DAYLIGHTING GOALS

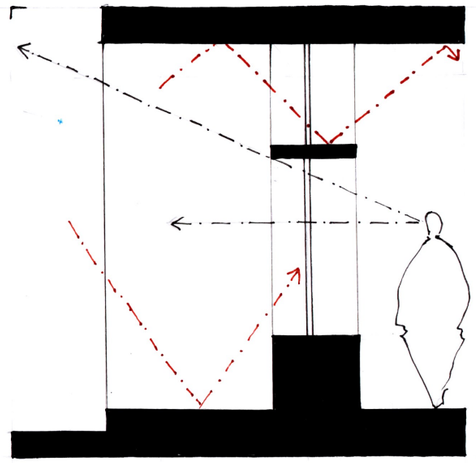
- sDA of 60 - 90%
- ASE of less than 10%
- Annual illuminace between 70 - 100% in critical areas
- High illumination of work surfaces
- Reduce glare
- Even distribution of light
- Refuge spaces to avoid overlighting
- Spaces of exposure to avoid underlighting

DAYLIGHTING STRATEGIES



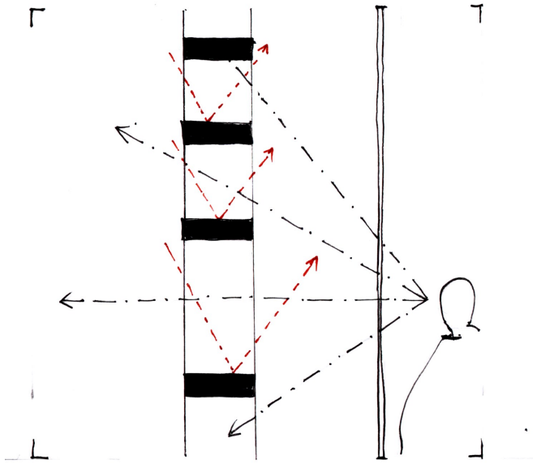
INDIRECT LIGHT

Indirect light is prefered over direct sunlight because it reduces glare, is more evenly distributed, more comfortable and consistent. Fenestration in the design aim to face south or into shaded courtyards.



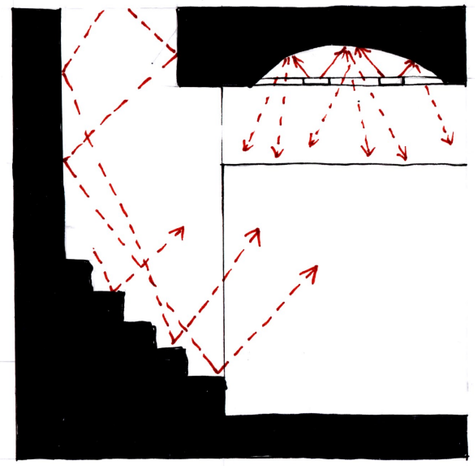
LIGHT SHELVES

Light shelves and deep edges are used to reduce glare by limiting the user's view of the sky (IESNA 2000: 453) and creating a shaded space in front of fenestration to reduce contrast between internal and external illuminance.



SHADING DEVICES

Screens are designed to shade windows, limit the user's view of the sky and reflect direct light, while framing a view for the user.



LIGHT REFLECTION

Internal light wells with rough white interiors provide soft and diffused light over cooking surfaces. Artificial light shining upward onto vaulted ceilings distribute the light evenly throughout the space.

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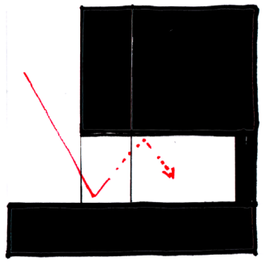
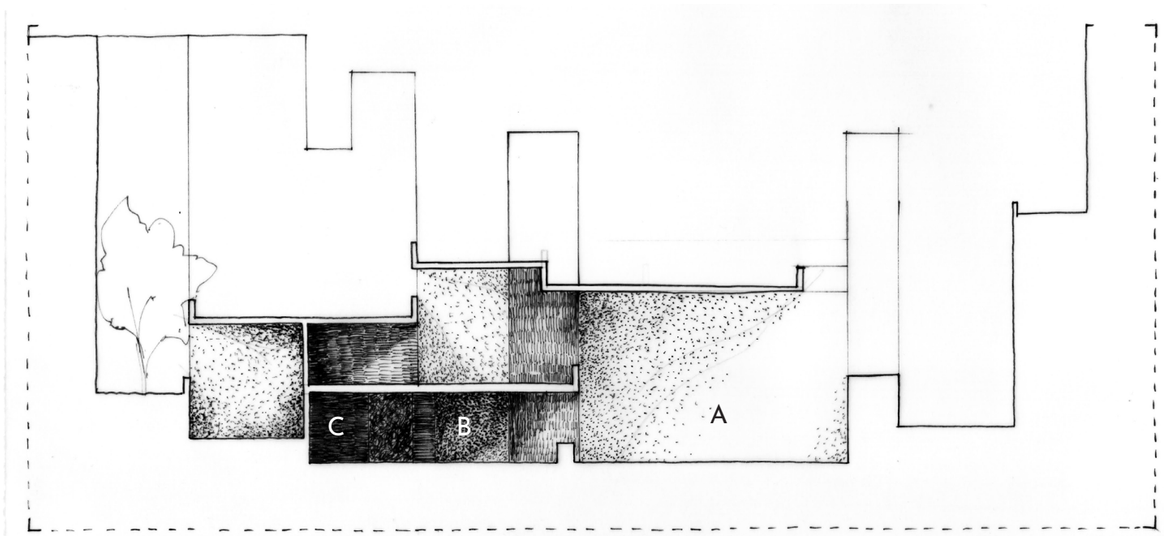
BASE MODEL



The base model indicates an overlit courtyard, which is the intention, but also severly underlit cooking and eating spaces. The 'internal' spaces are deep with small openings and the light source (opening in courtyard) is too small. The largest issue to address is the low illuminace in the cooking spaces surrounding the courtyard.



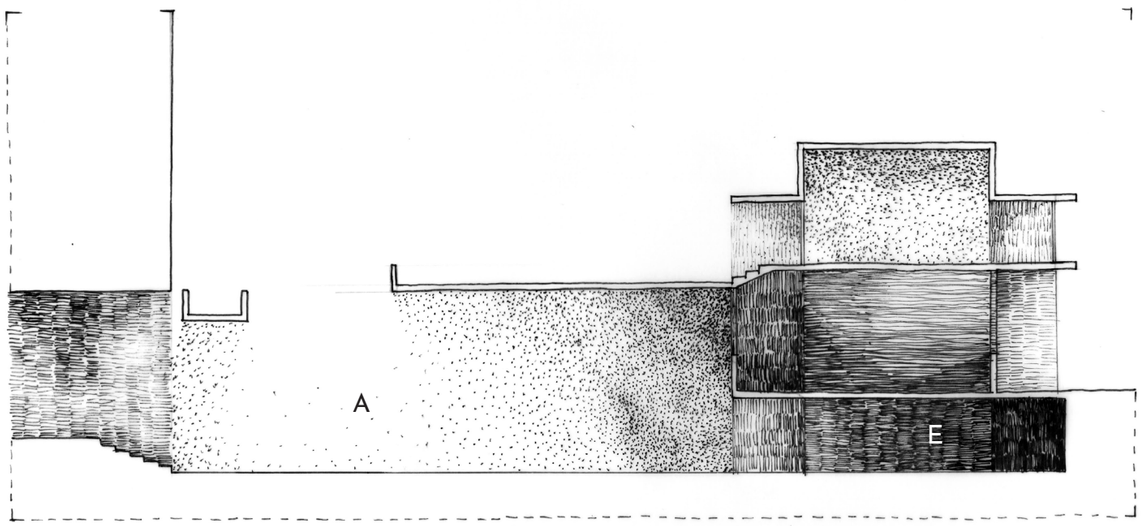


Fig. 140: Sections of daylight of base model(Author 2021)

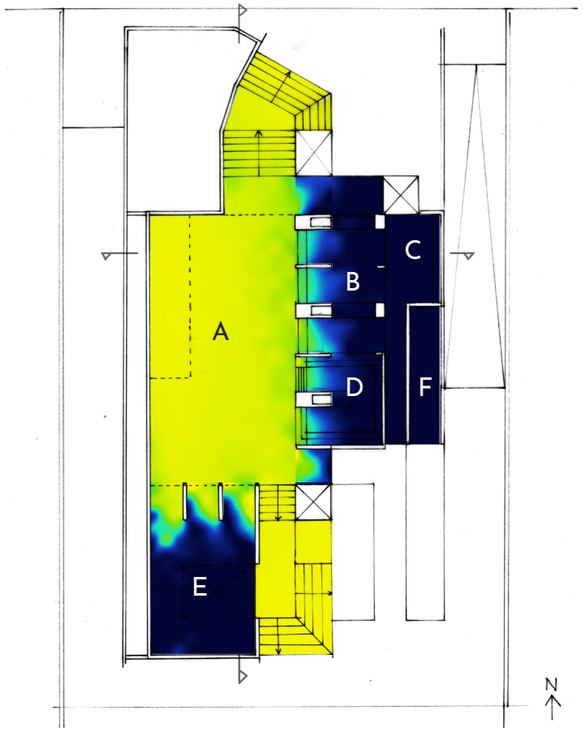


Fig. 141: Illuminance of base model adapted from Sefaira (Author 2021)

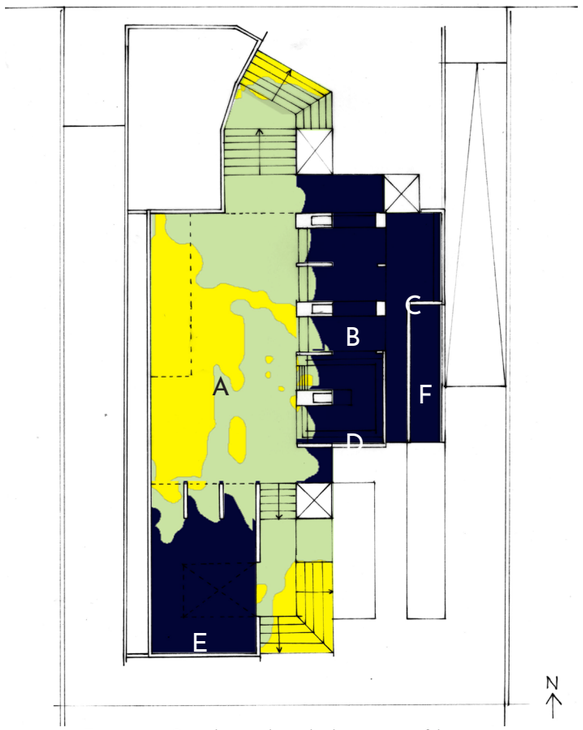


Fig. 142: Overlit and underlit areas of base model adapted from Sefaira (Author 2021)

ANNUAL ILLUMINANCE

Internal spaces : 0 - 30 %

- 0%
- 25%
- 50%
- 75%
- 100%

Percentage of occupied hours per year, where the level of illuminance is at least 300 lux measured at 800 mm above floor level

OVERLIT AND UNDERLIT AREAS

	sDA	ASE
A - Courtyard	100 %	40 %
B - Kitchen	22 %	0 %
C - Scullery	0 %	0 %
D - Cooking / eating	23 %	0 %
E - Cooking / eating	16 %	1 %
F - Storage	0%	0%

- OVER - LIT
- WELL - LIT
- OVER - LIT

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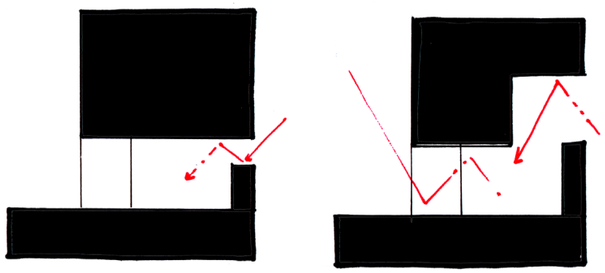
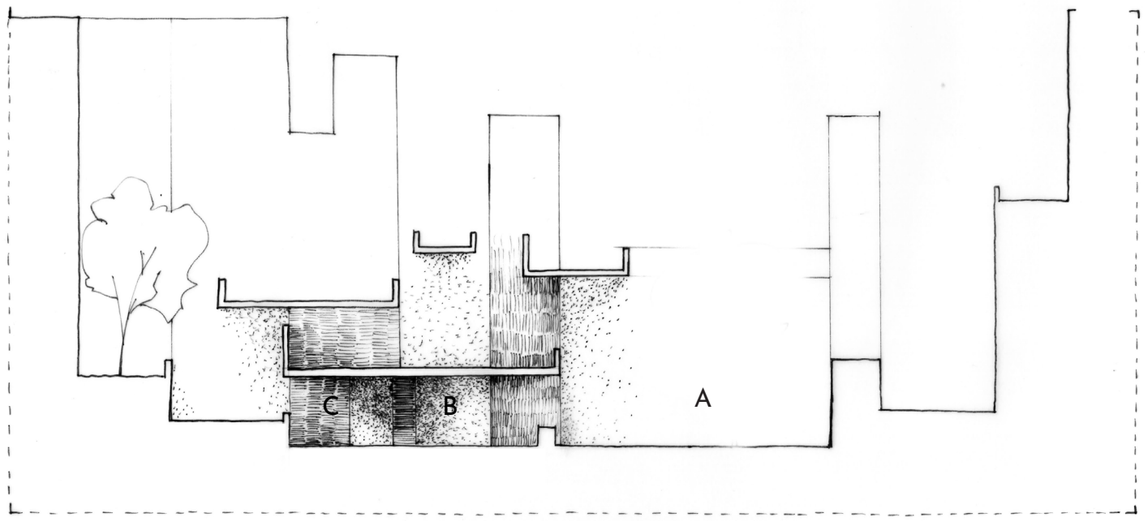
ITERATION 1 - OPENINGS



The first iteration aimed to increase illumination by creating new openings or enlarging extisting openings.



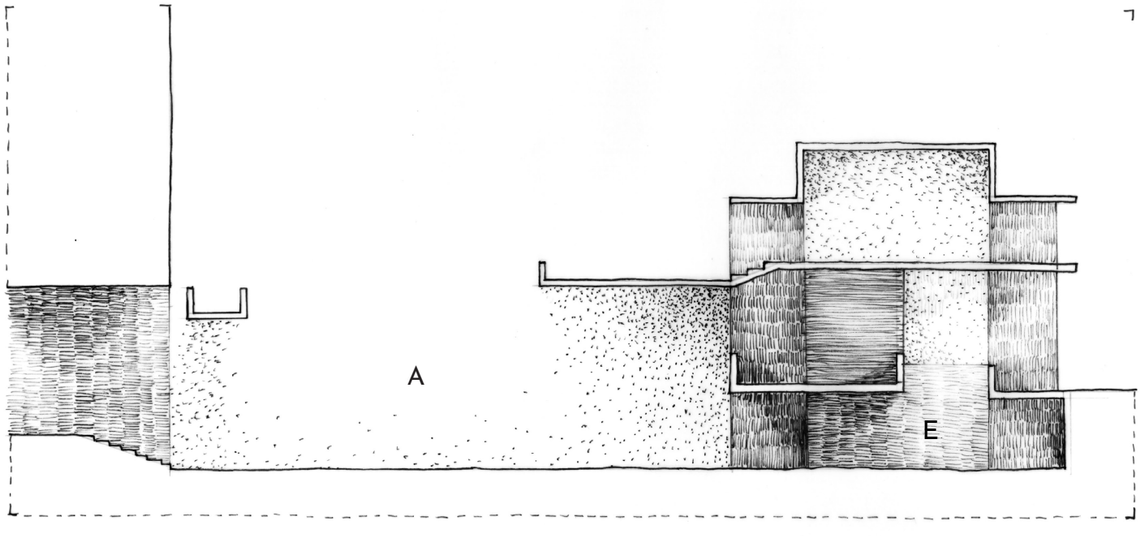


Fig. 143: Sections of daylight iteration 1(Author 2021)

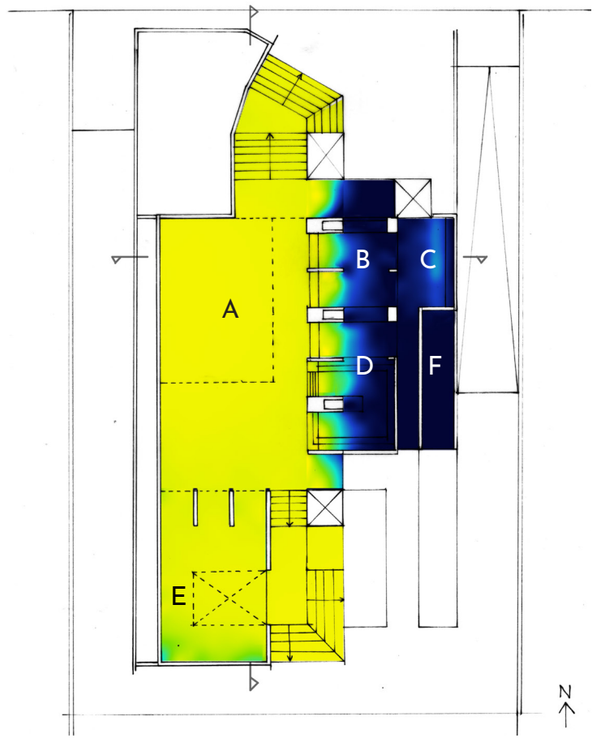


Fig. 144: Illuminance of iteration 1 adapted from Sefaira (Author 2021)

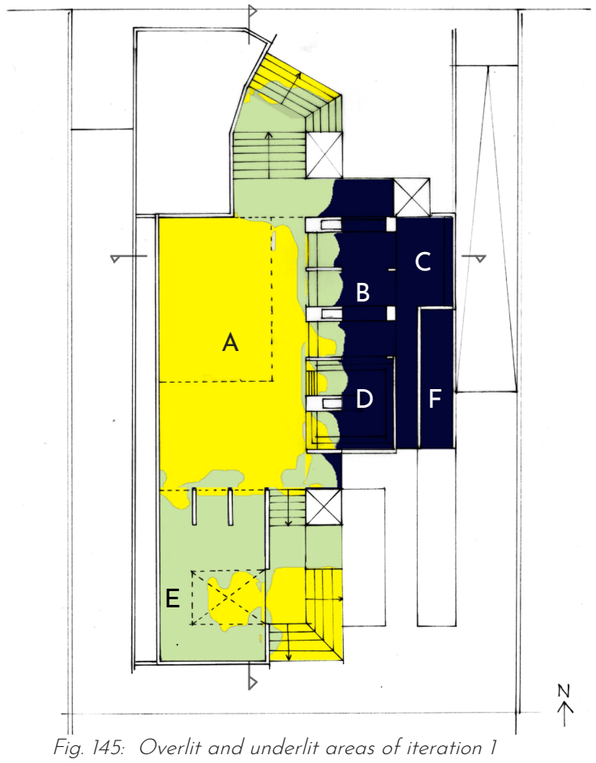


Fig. 145: Overlit and underlit areas of iteration 1 adapted from Sefaira (Author 2021)

ANNUAL ILLUMINANCE

Internal spaces : 50 - 70 %

Illuminance in space E was improved by creating a shaded opening for indirect light to enter. The roof opening in the courtyard was enlarged to improve to increase illuminance in spaces B and D, but it is still underlit towards the back.

- 0%
- 25%
- 50%
- 75%
- 100%

Percentage of occupied hours per year, where the level of illuminance is at least 300 lux measured at 800 mm above floor level

OVERLIT AND UNDERLIT AREAS

	sDA	ASE
A - Courtyard	100 % (-)	85 % (+45)
B - Kitchen	48 % (+26)	12 % (+12)
C - Scullery	0 % (-)	0 % (-)
D - Cooking / eating	47 % (+24)	19 % (+19)
E - Cooking / eating	97 % (+81)	13 % (+12)
F - Storage	0% (-)	0% (-)

- OVER - LIT
- WELL - LIT
- OVER - LIT

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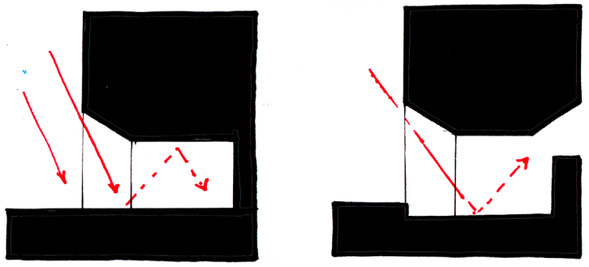
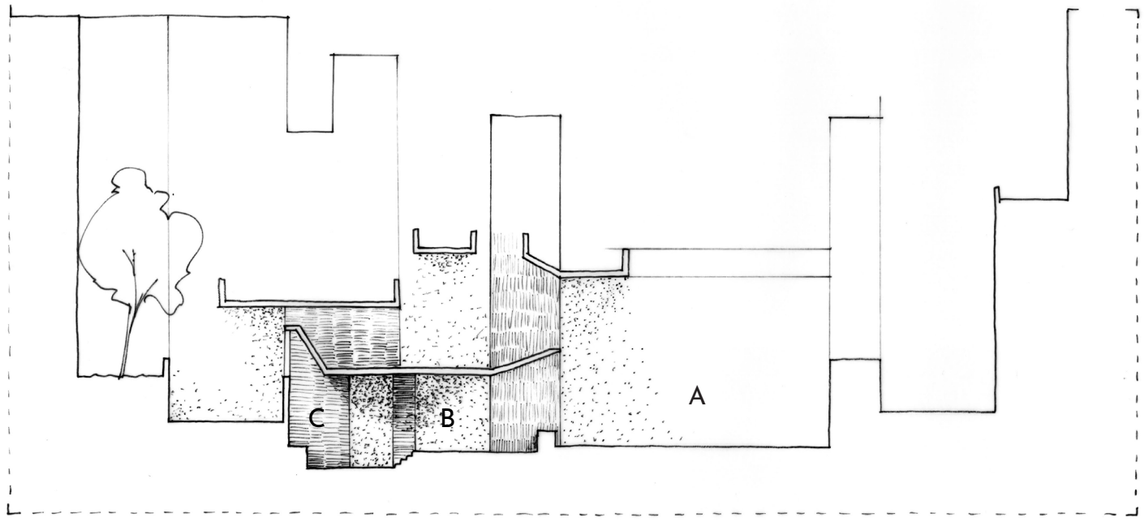
ITERATION 2 - SLANTED CEILINGS



The second iteration explored how to improve light penetration in the cooking spaces (B, C and D). The depth of the spaces could not be altered but the ceilings could be sloped to increase the opening sizes and the floor levels could be lowered to allow light to penetrate deeper into the spaces.



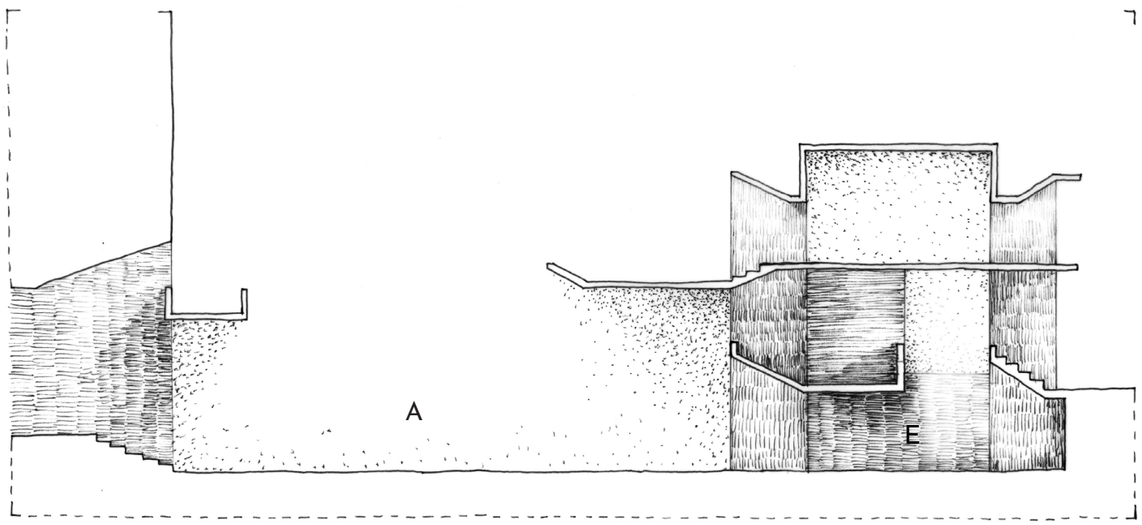


Fig. 146: Sections of daylight iteration 2(Author 2021)

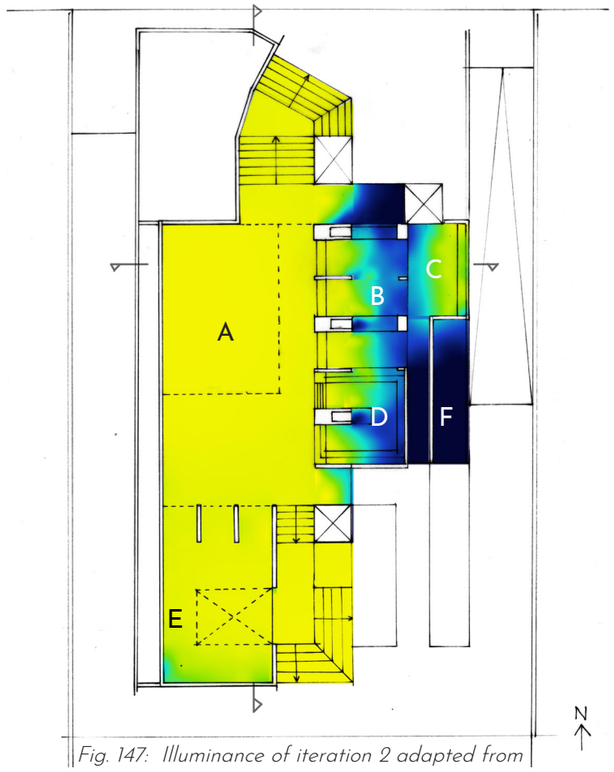


Fig. 147: Illuminance of iteration 2 adapted from Sefaira (Author 2021)

ANNUAL ILLUMINANCE

Internal spaces : 70 - 80 %

Illumination of cooking spaces were improved in B, C and D but this resulted in some work surfaces being overlit. The countertop do require higherlux levels but should be protected from surface glare. Space F consist of dry and cold storage and do not require access to natural light.

- 0%
- 25%
- 50%
- 75%
- 100%

Percentage of occupied hours per year, where the level of illuminance is at least 300 lux measured at 800 mm above floor level

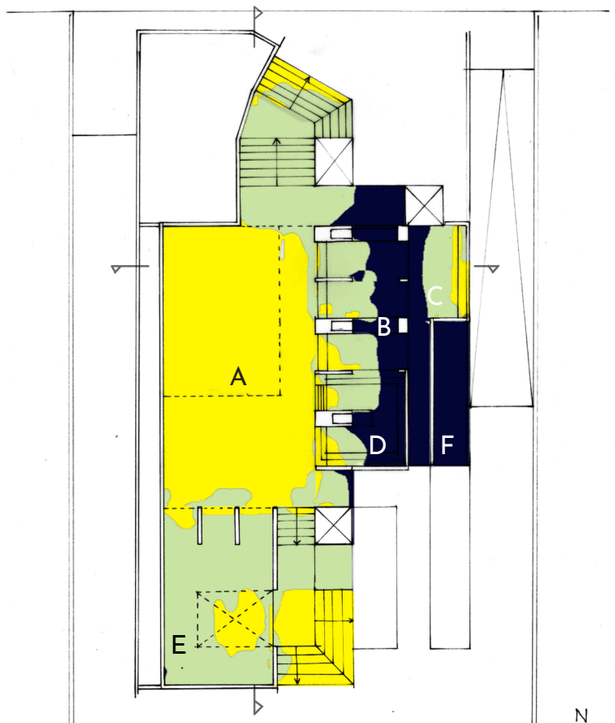


Fig. 148: Overlit and underlit areas of iteration 2 adapted from Sefaira (Author 2021)

OVERLIT AND UNDERLIT AREAS

	sDA		ASE	
A - Courtyard	100 %	(-)	85 %	(+45)
B - Kitchen	71 %	(+49)	15 %	(+15)
C - Scullery	29 %	(+29)	13 %	(+13)
D - Cooking / eating	75 %	(+52)	19 %	(+19)
E - Cooking / eating	93 %	(+77)	13 %	(+12)
F - Storage	0 %	(-)	0 %	(-)

- OVER - LIT
- WELL - LIT
- OVER - LIT

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ITERATION 3 - GLARE CONTROL

The third iteration explored various methods of improving the even distribution of light, controlling glare and increasing illuminace in critical areas

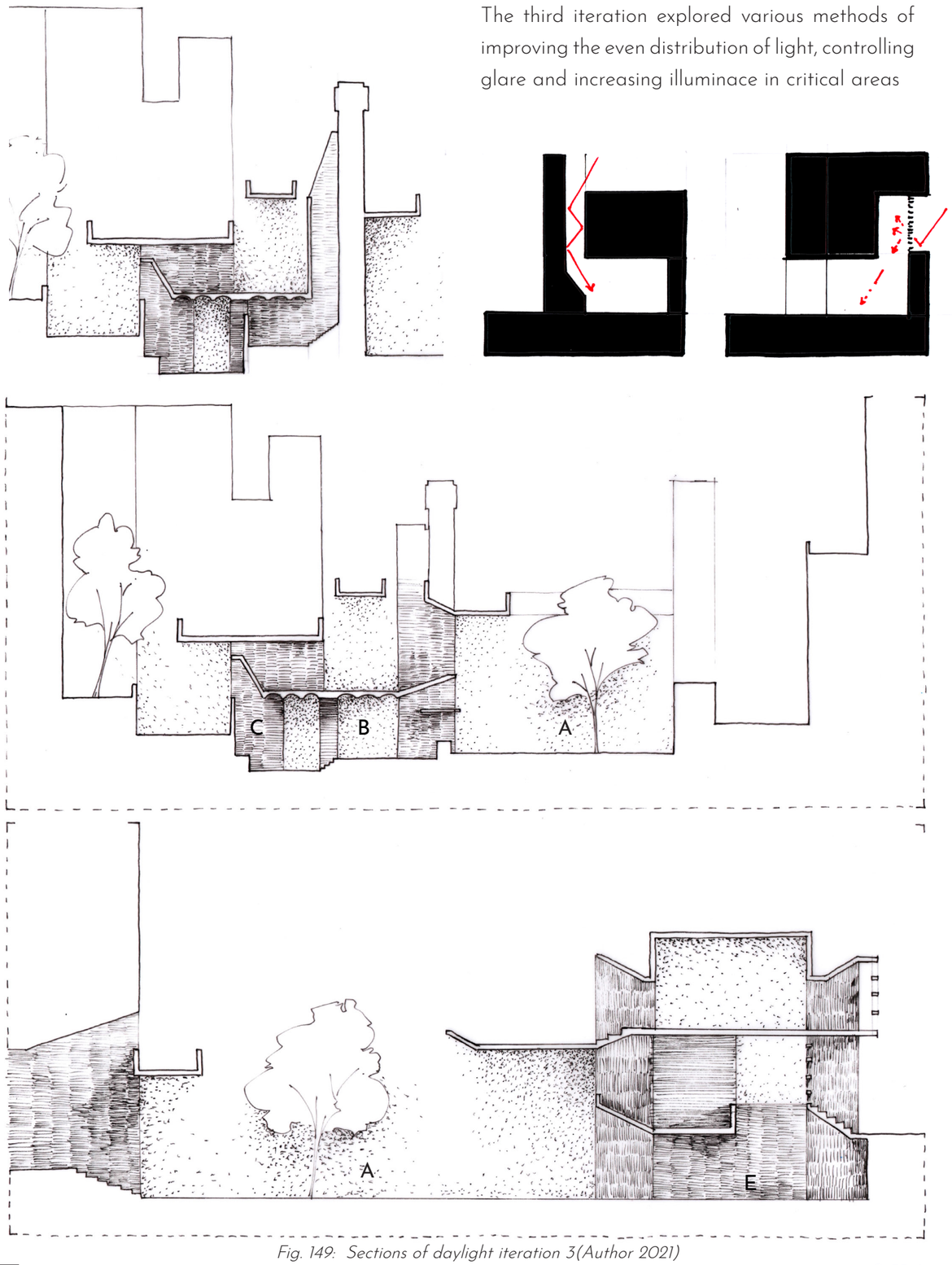

Fig. 149: Sections of daylight iteration 3(Author 2021)

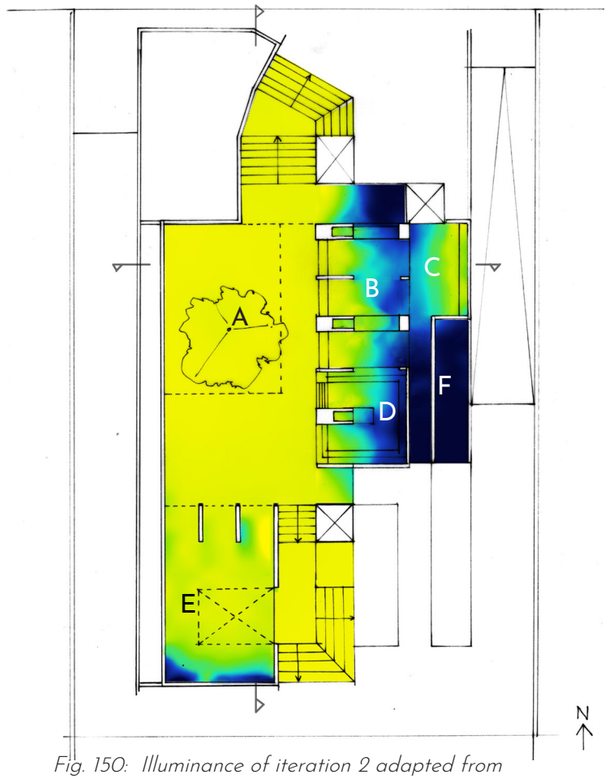

Fig. 150: Illuminance of iteration 2 adapted from Sefaira (Author 2021)

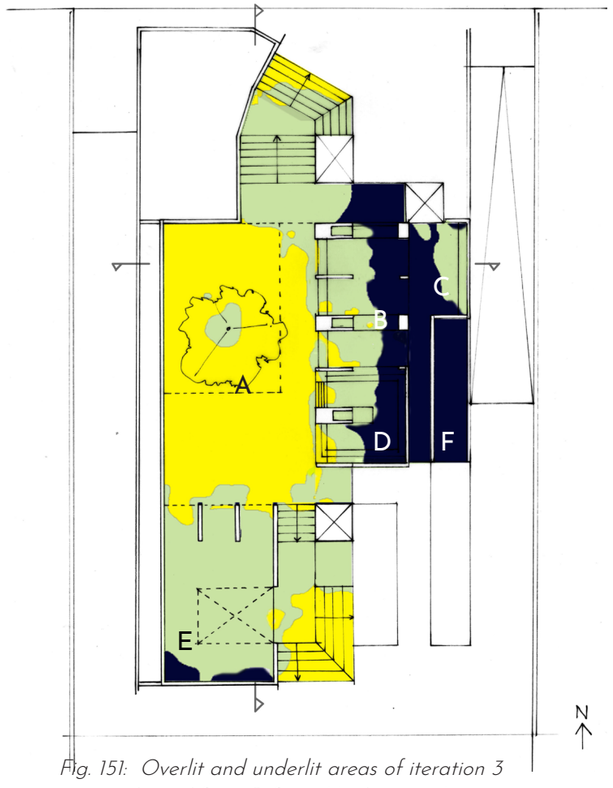

Fig. 151: Overlit and underlit areas of iteration 3 adapted from Sefaira (Author 2021)

ANNUAL ILLUMINANCE

Internal spaces : 60 - 70 %

Lightwells were added in spaces B and D to improve illuminace of underlit countertops with a diffused light source. Lightshelves were added above the countertops facing the courtyard to reduce surface glare and allow reflected light to penetrate deeper into the space. Overlighting in space E was reduced by intoducing a vertical screen to partially enclose the opening.

- 0%
- 25%
- 50%
- 75%
- 100%

In critical internal spaces the average sDA were improved from 15% to 70% (goal between 60% and 90%) and the average ASE only slightly worsened from 0% to 8% (goal below 10%).

OVERLIT AND UNDERLIT AREAS

	sDA		ASE	
A - Courtyard	100 %	(-)	76 %	(+36)
B - Kitchen	63 %	(+41)	5 %	(+5)
C - Scullery	71 %	(+71)	13 %	(+13)
D - Cooking / eating	61 %	(+38)	12 %	(+12)
E - Cooking / eating	86 %	(+70)	1 %	(-)
F - Storage	0%	(-)	0%	(-)

- OVER - LIT
- WELL - LIT
- OVER - LIT

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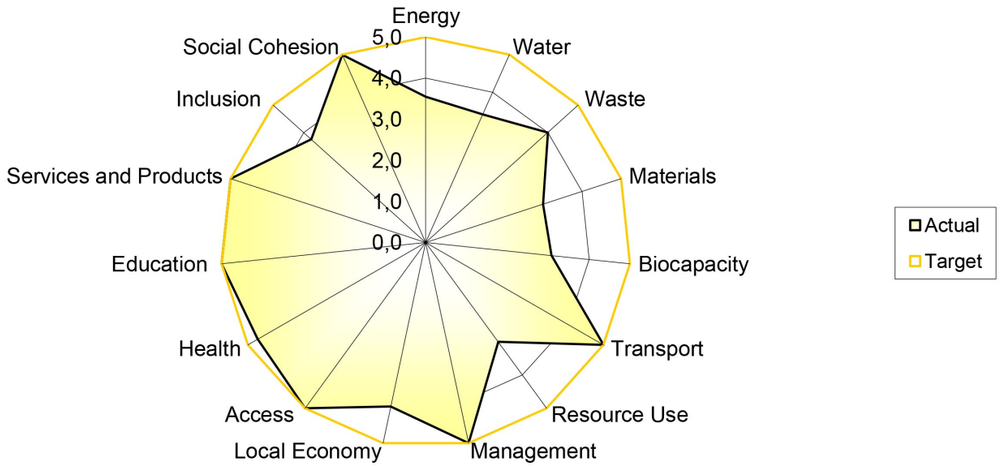
SB SBAT REPORT	Achieved 4,2

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance	Score
Environmental	3,4
Economic	4,4
Social	4,7
SBAT Rating	4,2

SB5 EF and HDI Factors	Score
EF Factor	3,8
HDI Factor	4,4

SB6 Targets	Percentage
Environmental	68
Economic	88
Social	94

BI Building Information	Target 5,0	Achieved 4,2

BI 1	Building Targets	Target	Achieved
EN	Energy	5,0	3,5
WA	Water	5,0	3,4
WE	Waste	5,0	4,0
MA	Materials	5,0	3,0
BI	Biocapacity	5,0	3,1
TR	Transport	5,0	5,0
LE	Local Economy	5,0	4,1
MN	Management	5,0	5,0
RE	Resources	5,0	3,0
SP	Services and Products	5,0	5,0
AC	Access	5,0	4,7
HE	Health	5,0	5,0
ED	Education	5,0	5,0
IN	Inclusion	5,0	3,8
SC	Social Cohesion	5,0	5,0

BI 2	Priority Key (Not Performance Key)		
VH	Very High	5,0	
HI	High	4,0	
ME	Medium	3,0	
LO	Low	2,0	
VL	Very Low	1,0	
NA	None / Not Applicable	0,0	

Fig. 152: SBAT report of the final design aided by the Sustainable Building Asssement Tool (Author 2021)

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7.11

FIRE PROTECTION

The building includes space for cooking with fire, contain multi-storey structures and have to ensure public safety. Therefore, fire protection was selected as the primary service to resolve.

The aim is to not only comply with the necessary SANS 10400 (SABS 2011) regulations but also to use fire protection as a design tool to achieve the design and tectonic intentions.

Fire protection will be discussed in three parts: (1) fire prevention, (2) fire control, and (3) public safety.

FIRE PREVENTION

For fire prevention, the cooking spaces within the basement will serve as the area of focus. The primary aim was to ensure that the users can safely cook with the use of fire. The design focused on preventing a fire, extracting smoke from the cooking spaces and ensuring adequate fire resistance of structural elements.

The design provides the opportunity for informal street food traders to cook food over fire with the use of flammable materials such as charcoal or wood. These spaces are located in the interior of the building on the basement level. The cooking over fire occurs in two types of places: either in a built in steel braai with a chimney, or in a custom built fire pit. The pit is however not completely open. A custom precast fire resitent concrete countertop covers the pit. The concrete cover has holes at the top to accommodate pots, pans or grids, and ensures that the fire is contained within the pit. The pit can function either as an fire oven, stove or braai.

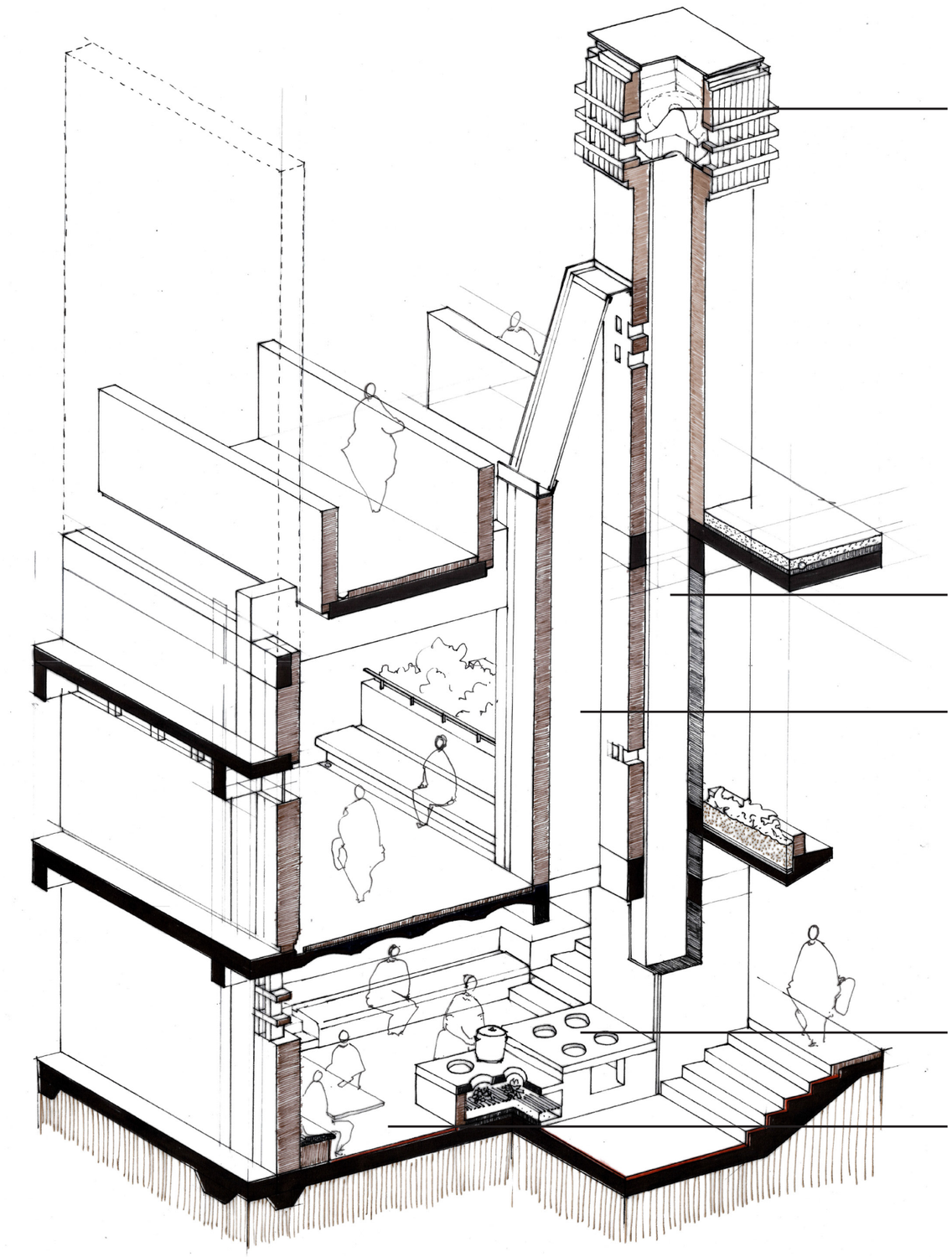

Fig. 153: Axonometric section of the cooking space and chimney (Author 2021)

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Smoke in the interior spaces are managed by a mechanically ventilated chimney that extracts smoke directly from the pit (underneath the concrete cover) and from the space in general. Mechanical ventilation at the back on the space extract any smoke not extracted by the chimney. The cooking spaces are also open to the internal courtyard on one side to allow fresh air into the spaces.

The cooking spaces are enclosed by 230mm brick walls, reinforced concrete columns, beams and slabs to provide a fire resistance of 240 minutes which is double the required 120min according to SANS 10400 Part T section 4.6.1 (SABS 2011: 24) and 120 min of structural stability required (SABS 2011: 27). The design does not use steel for any primary structure, only to support glazing or screens, and for trimmings. The galvanised mild steel elements need to be painted with intumecent paint as a passive fire resistance measure.

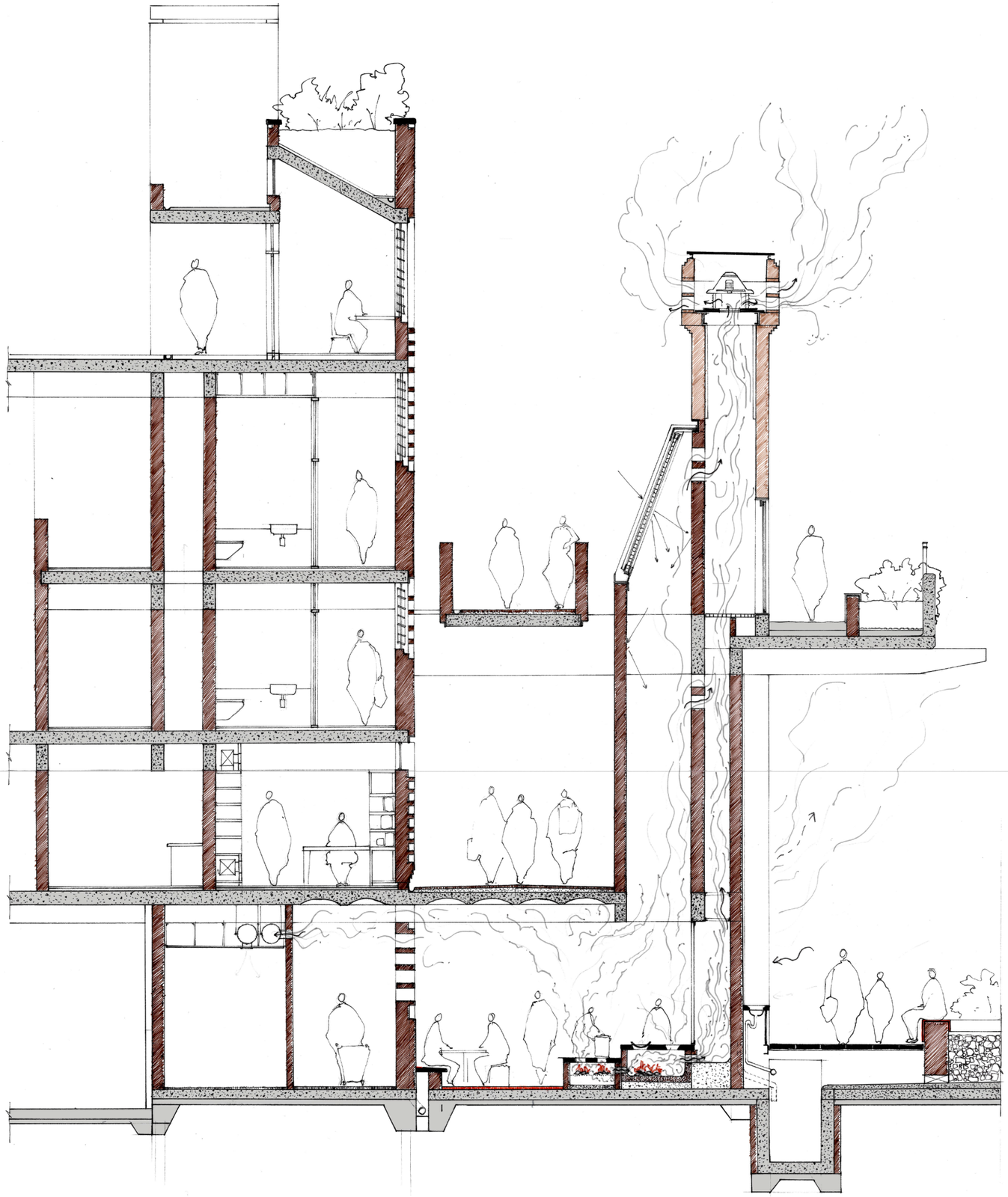

Fig. 154: Section of the basement cooking space and chimney (Author 2021)

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FIRE CONTROL

In the event of a fire, systems need to be in place to extinguish and prevent the fire from spreading. According to SANS 10400 Part T section 4.36 (SABS 2011: 49), the building does not require an automatic sprinkler system in any part of the building other than the existing basement for goods delivery. SANS 10400 Part T section 4.34 (SABS 2011: 48) requires one fire hose reel for every 500m^2 of the floor area in any storey that can reach any point in that area with a 30m hose length. The plans indicate the position of fire hose reels, the demarcation of different areas (max 500m^2) its serves and reach of the hose reels. In compliance with SANS 10400 Part T section 4.34 - 4.38 (SABS 2011: 48-50), each area is provided with 1 fire hose reel and 2 x 4.5kg portable fire extinguishers, or 2 x 9kg portable fire extinguishers (in the eating hall and library) where water supply is unavailable. One fire hydrant (FH) must be provided for every 1000m^2 with at least one per storey (SABS 2011: 48).

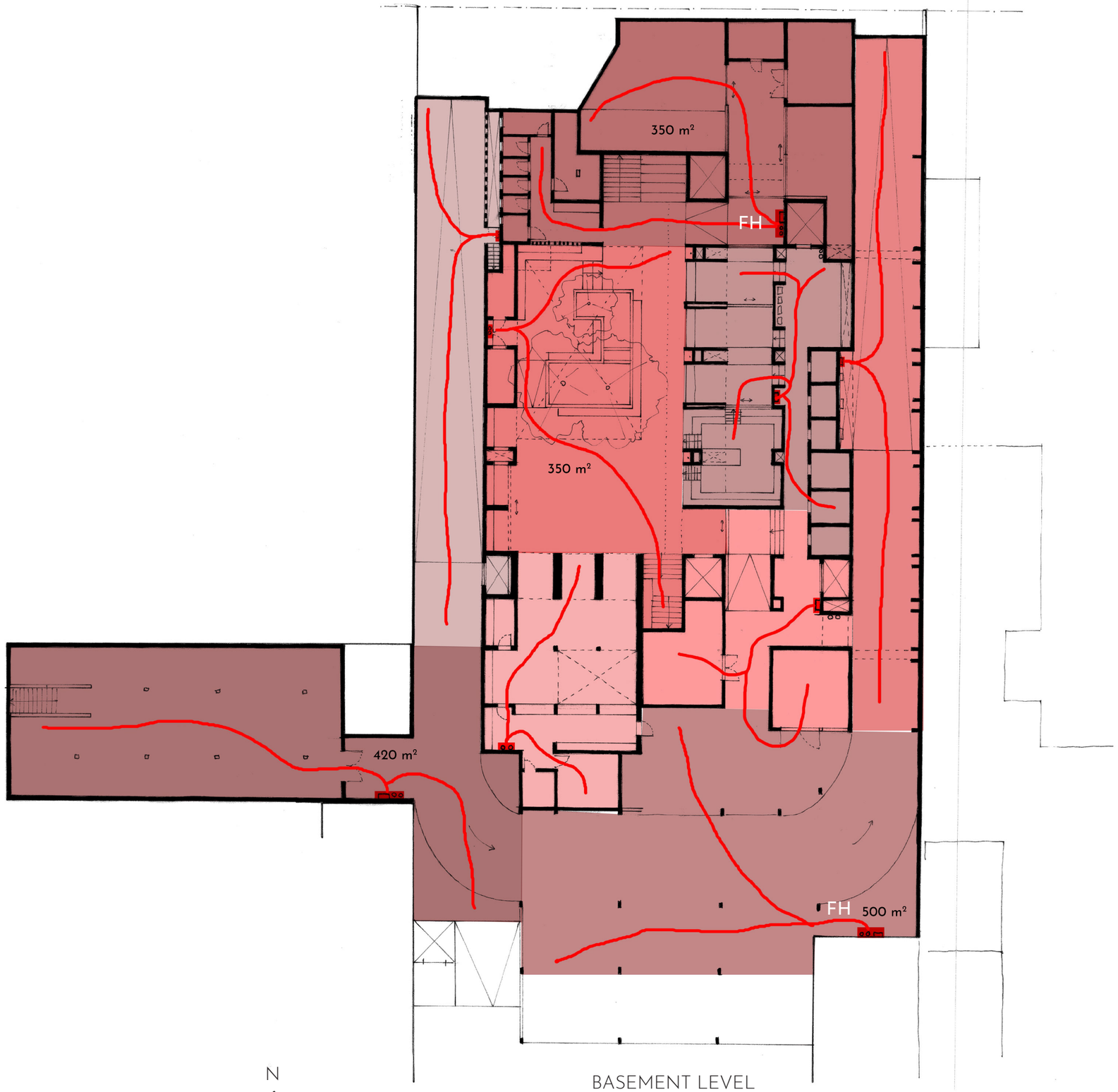

Fig. 155: Plan of basement level indicating fire protection areas(Author 2021)

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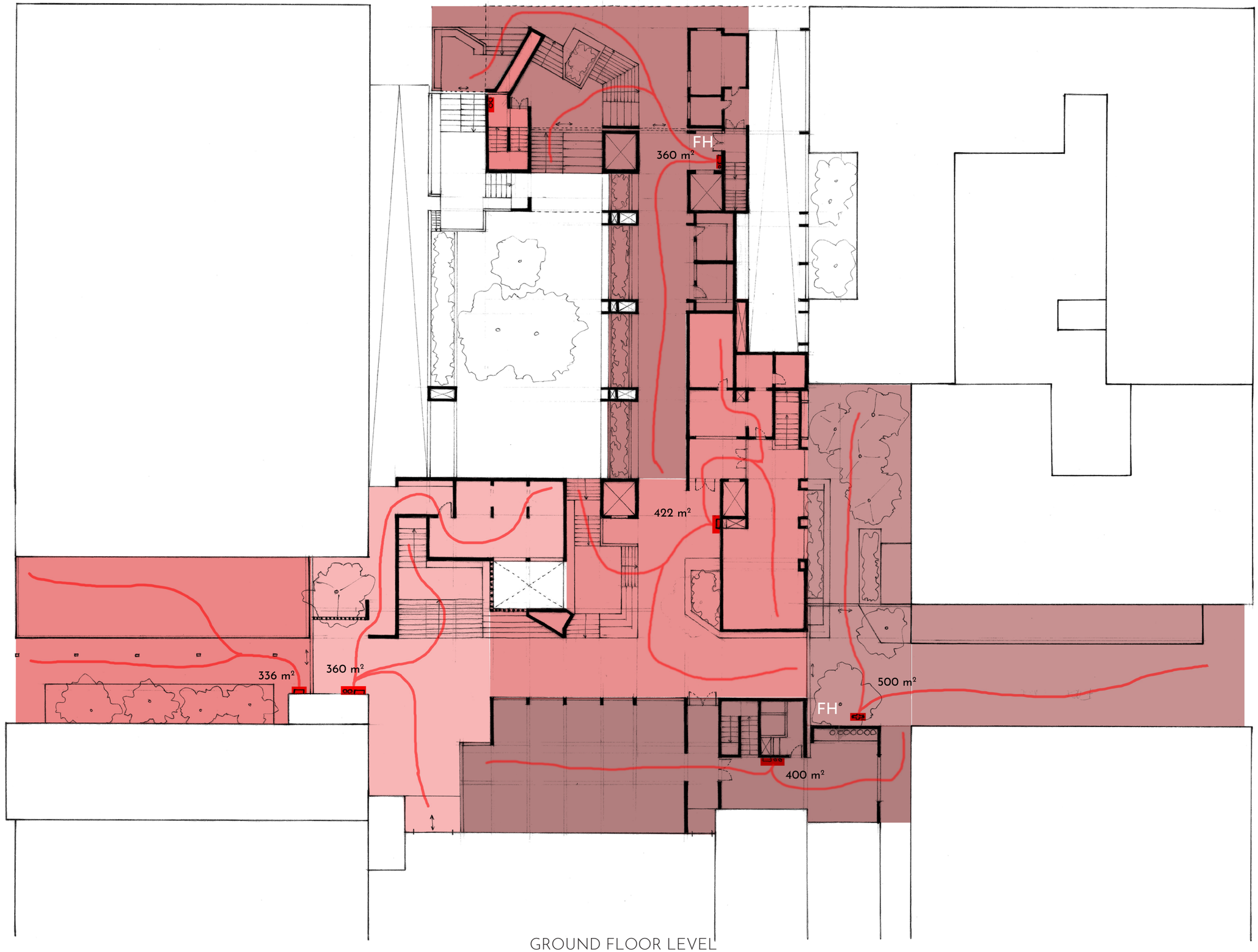

GROUND FLOOR LEVEL

Fig. 156: Plan of ground floor level indicating fire protection areas(Author 2021)

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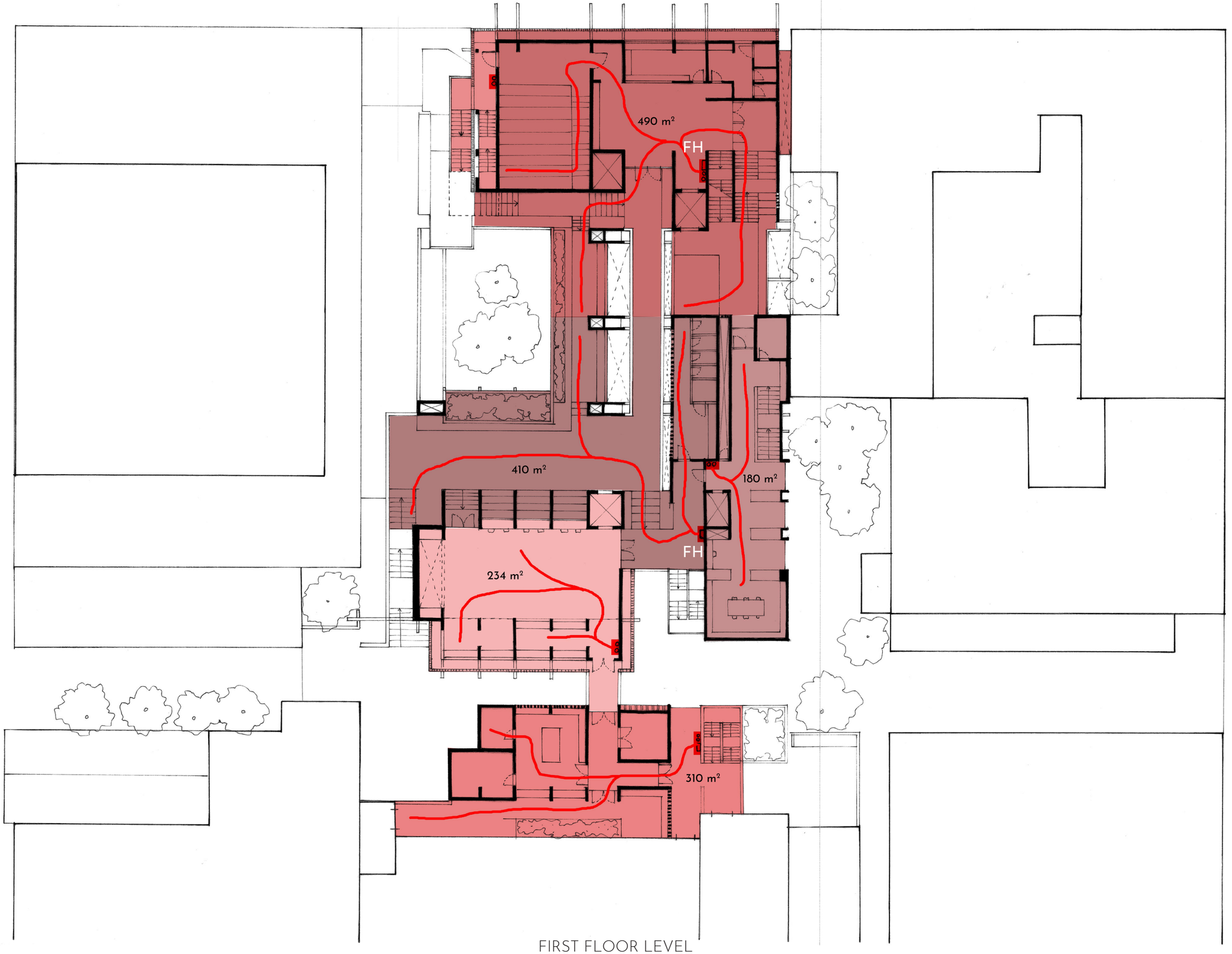

FIRST FLOOR LEVEL

Fig. 157: Plan of first floor level indicating fire protection areas(Author 2021)

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PUBLIC SAFETY

To ensure public safety in the event of a fire, the design must provide safe and accessible escape and emergency routes. The design consist of multi-storey, public accessible buildings, which according to SANS 10400 Part T section 4.16 (SABS 2011: 40) requires at least two escape routes, of which an emergency route must form part of. The total allowable travel distance with a room to an exit door or feeder route (red line in drawings) may not be more than 15m (SABS 2011: 40). The maximum travel distance from the furthest point to an access door (leading an emergency route) or escape door (leading to an open space on ground floor) is 45m (combined length of red and orange line in drawings).

Uncovered open courtyards and circulation spaces (green) allow occupants to safely travel to the street or open space on ground floor. The path of travel to access doors or escape doors should be through feeder routes (orange) with the opportunity to travel in two different directions.

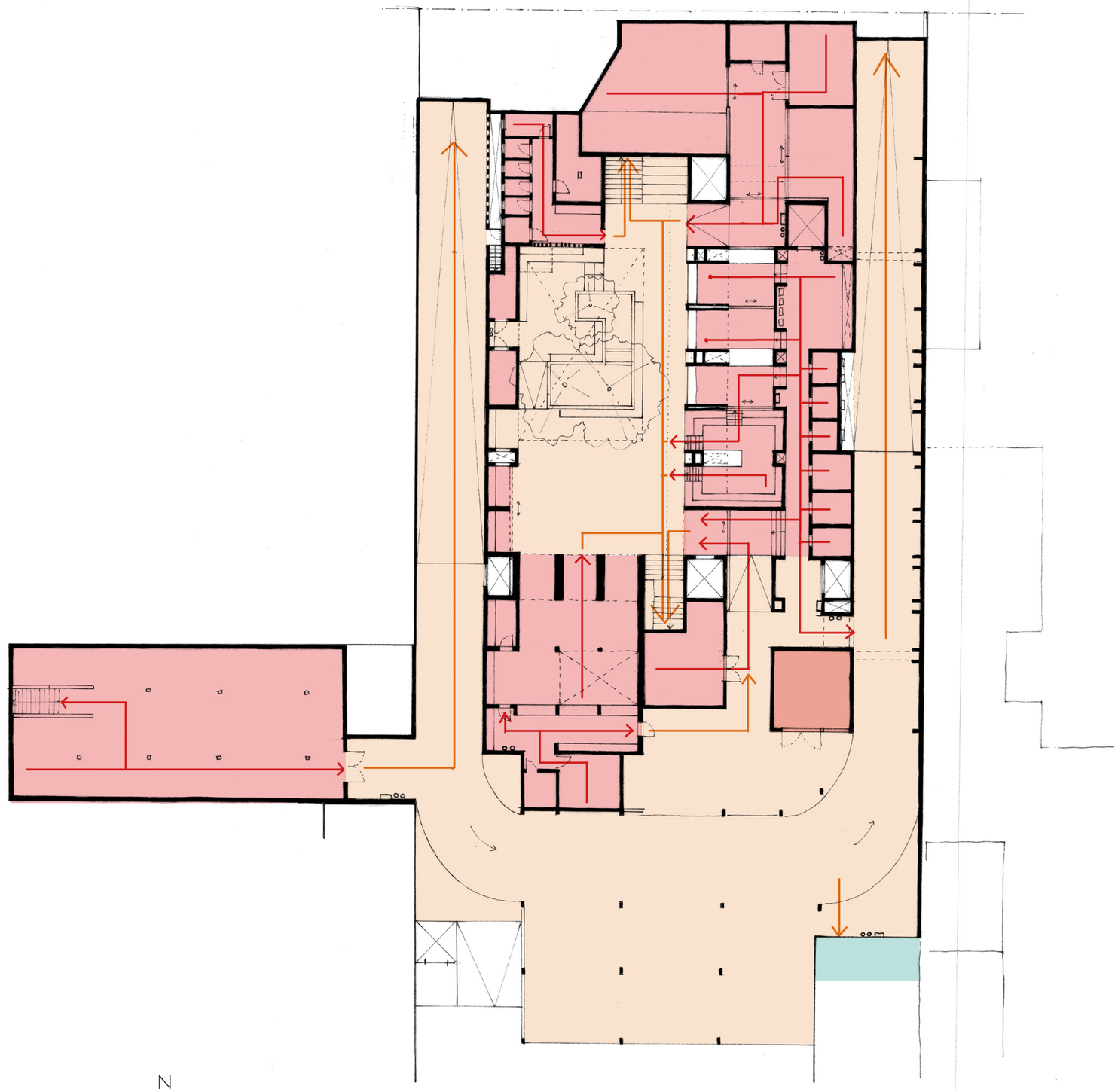

Fig. 158: Plan of basement level indicating escape routes (Author 2021)

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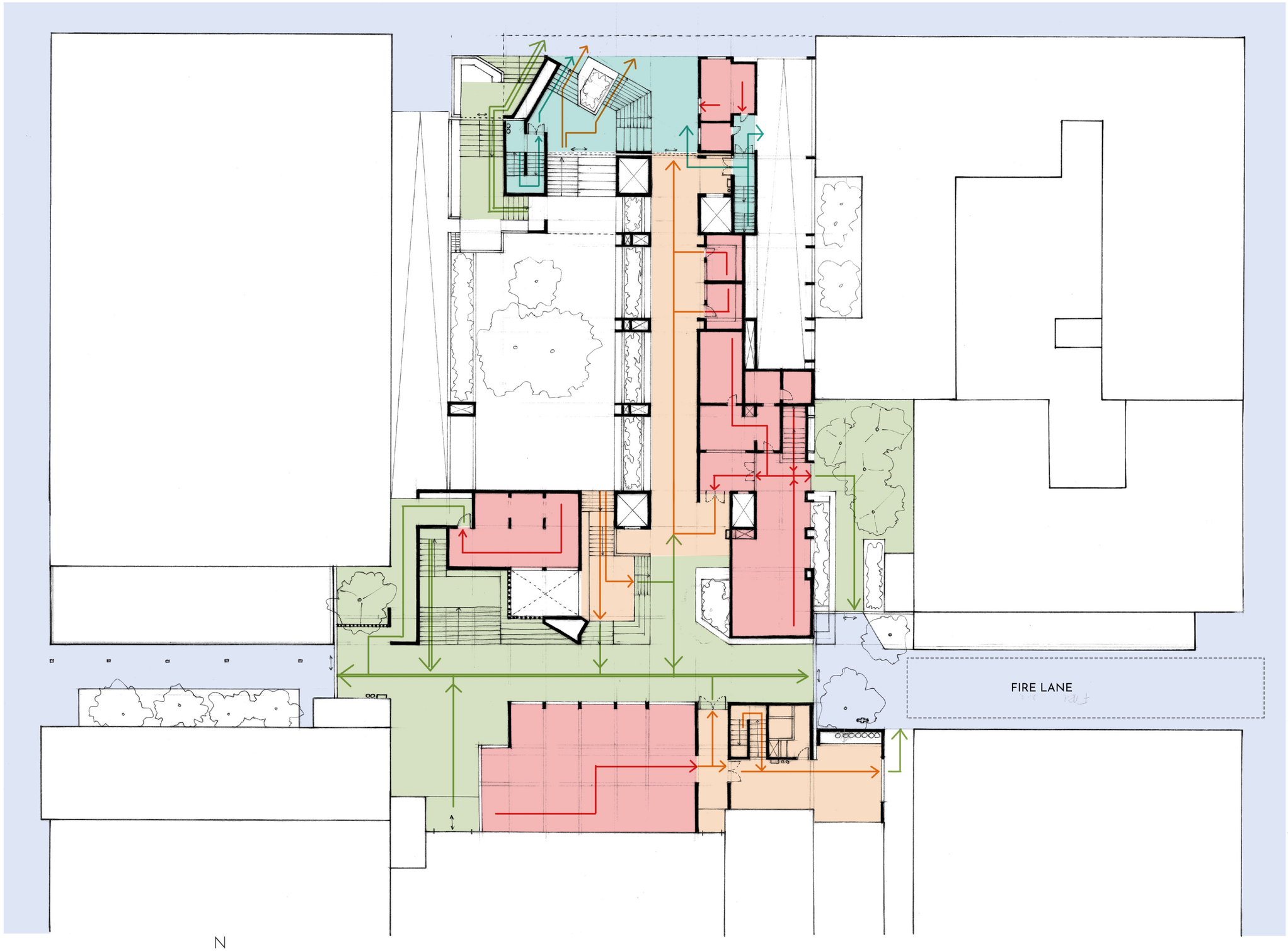

GROUND FLOOR LEVEL

Fig. 159: Plan of ground floor level indicating escape routes (Author 2021)

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Fig. 160: Plan of first floor level indicating escape routes (Author 2021)

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Emergency stairways were designed to not only comply with the required regulations but also to express the design and tectonic intentions. The emergency stairway of the 6-storey education building will be used as an expample of how refuge and exposure were incorporated.

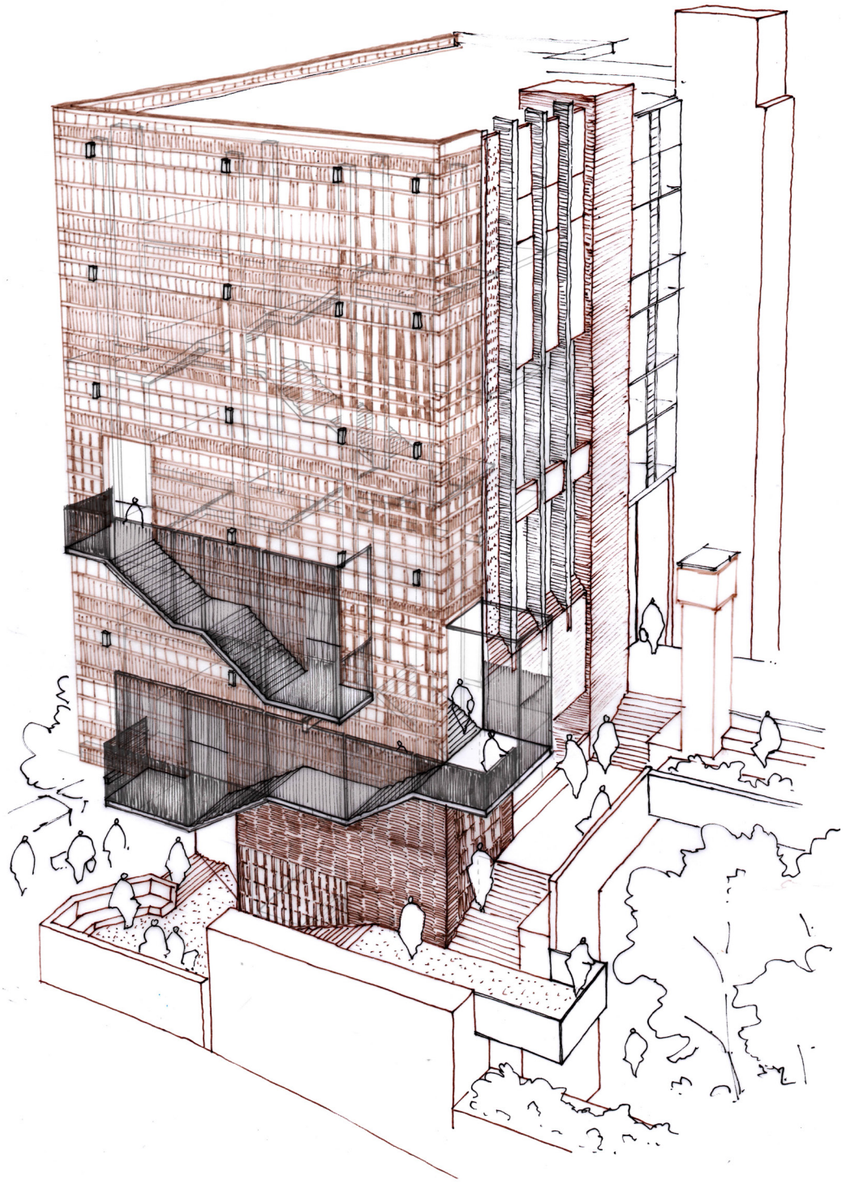
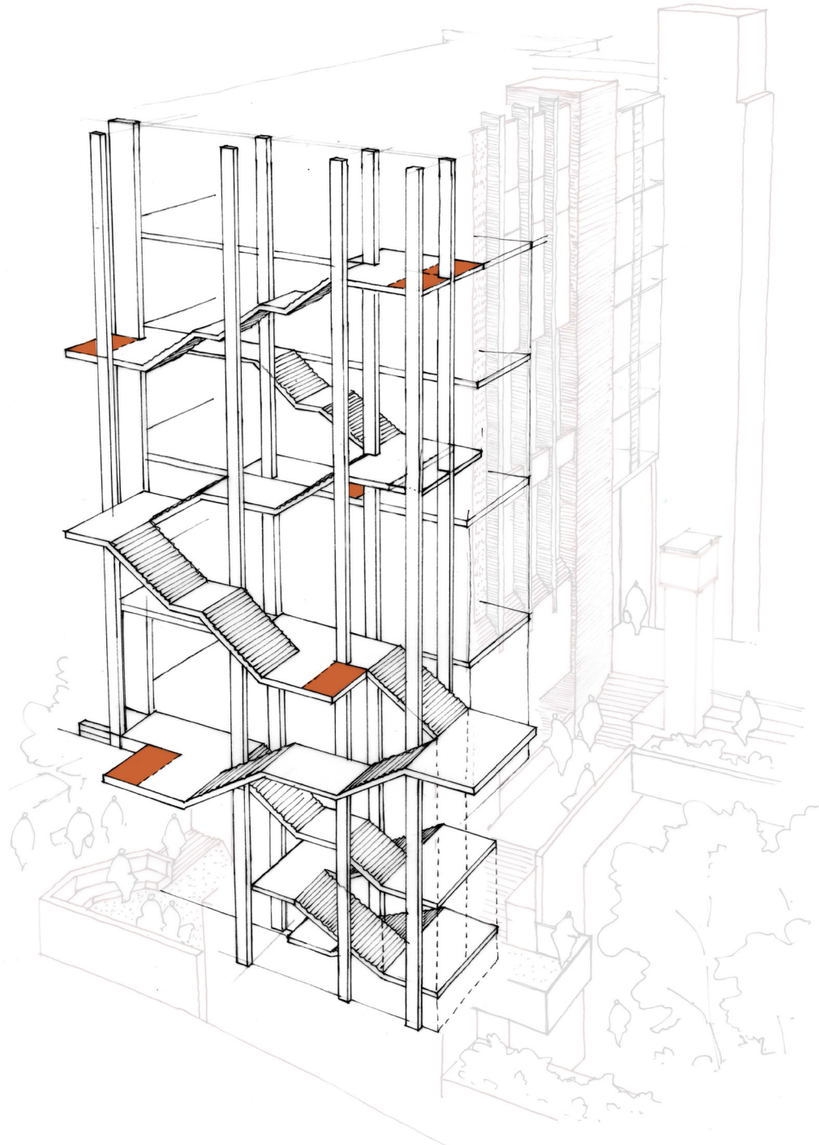


Fig. 161: Education builing emergency staircase (Author 2021)



The cast in situ reinforced concrete staircase is supported by concrete columns and beams. As an emergency staircase is must comply with SANS 10400 part S (SABS 2011) which limits the height of a flight of stairs between landings to 1530mm. Indicated in brown, is the positions of refuge areas within the emergency staircase at each storey to accommodate a wheelchair.

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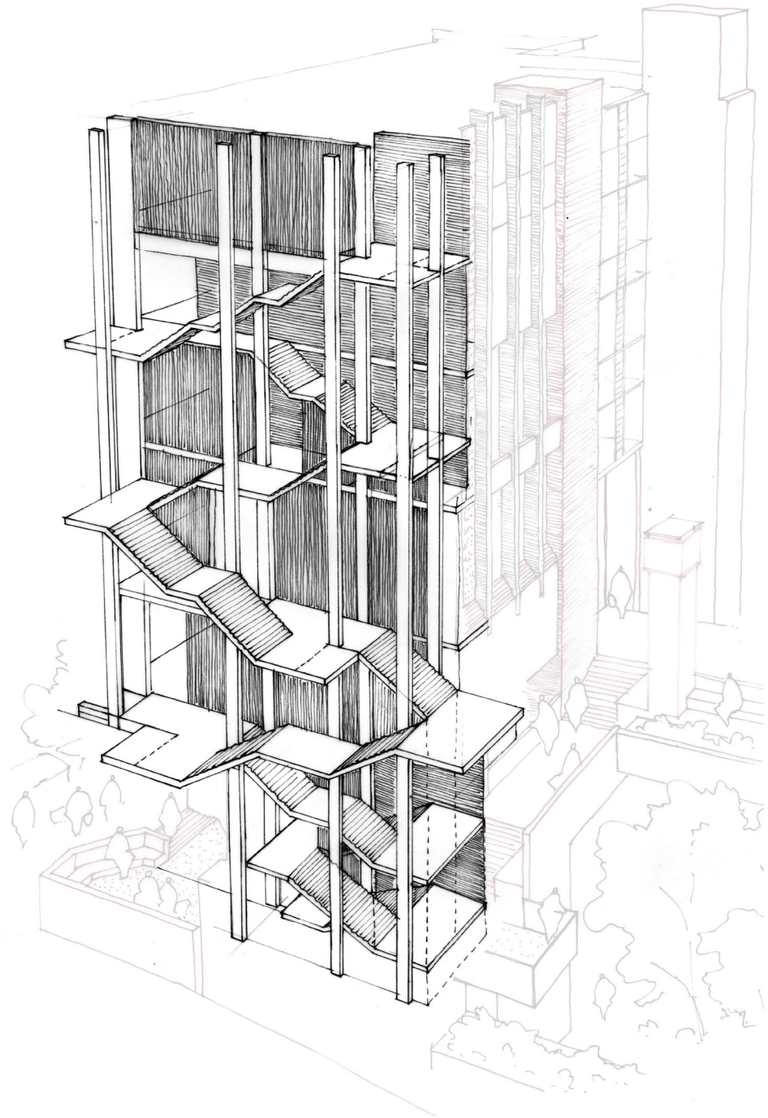
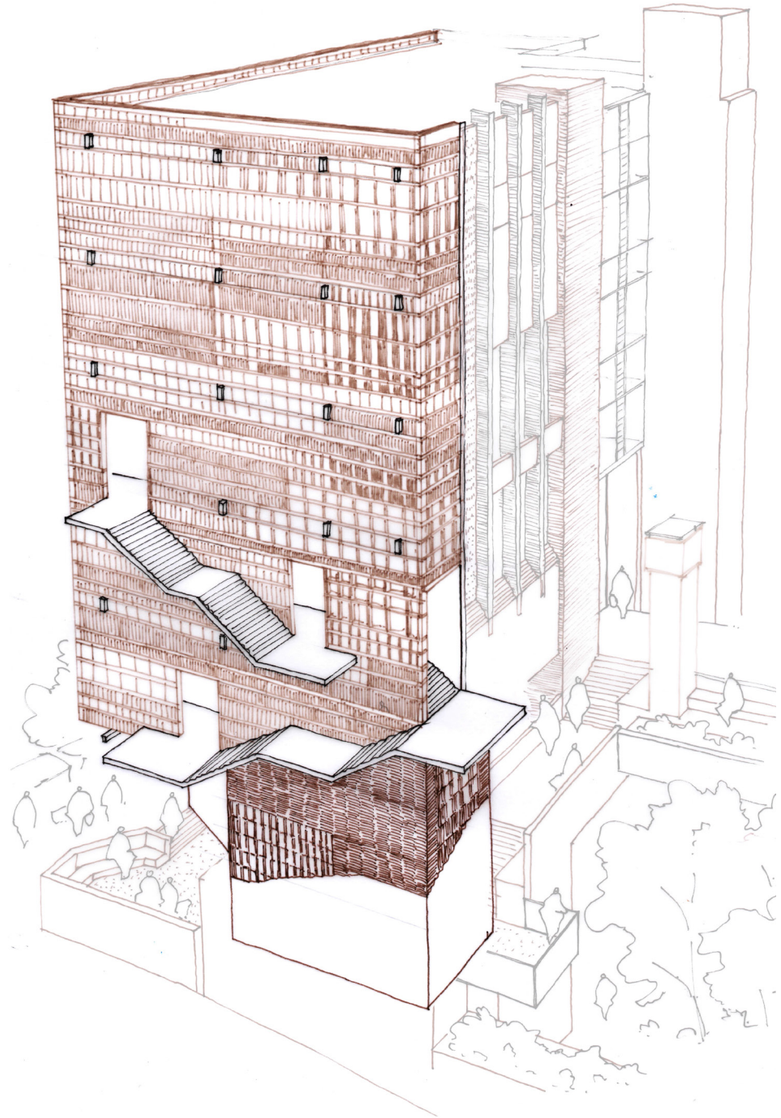
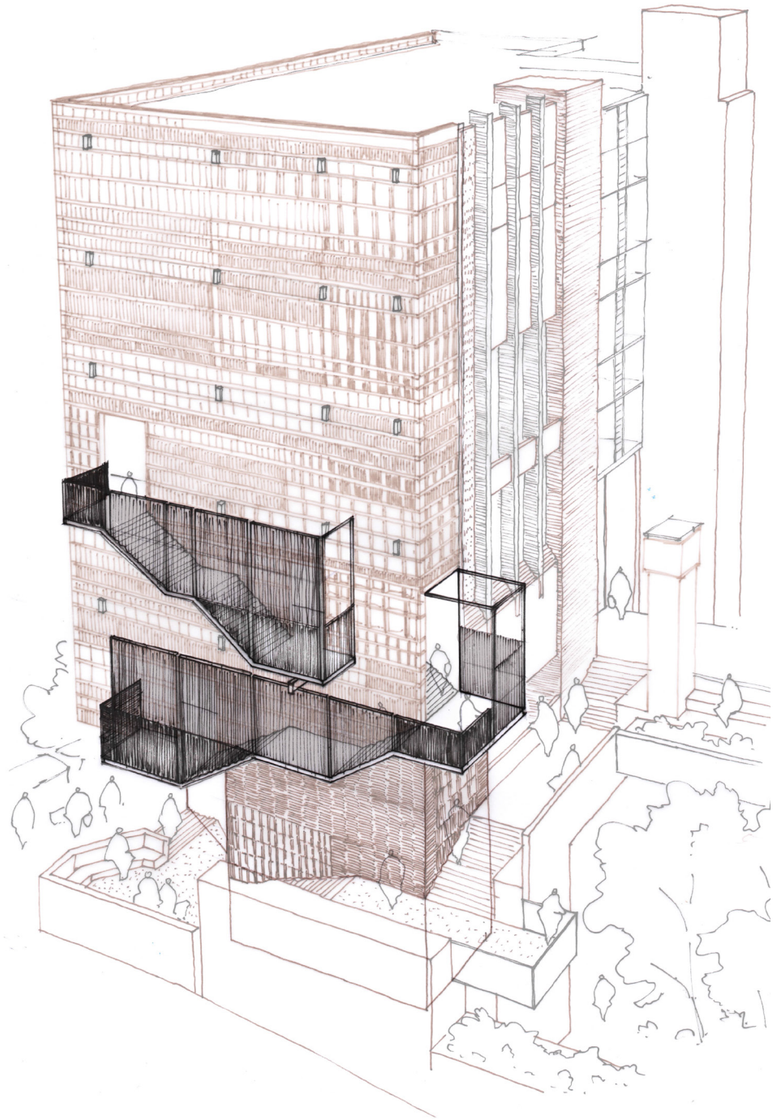


On the side facing the building, the staircase is enclosed with 230mm brick walls, with a minimum fire resistance of 120min, and class B fire doors (SABS 2011: 40).



On the other three sides of the external staircase is enclosed by a precast concrete screen that allows natural ventilation. The staircase steps out in front of the screen to create a sense of intimacy on the circulation space below, and to contrast the screen's sense of refuge with exposure. The lower portion of the staircase that leads to the street is enclosed by brick walls.



The portion of the staircase that extrudes beyond the concrete screen is partially enclosed with a galvanised mild steel balustrade / screen to allow for visual interaction with the city without creating a sense of vertigo. As the building is higher than 18m, any external stairway must be partially enclosed to prevent the occupants from experiencing vertigo.

Fig. 162: Education builing emergency staircase (Author 2021)

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08 CONCLUSION

CHAPTER

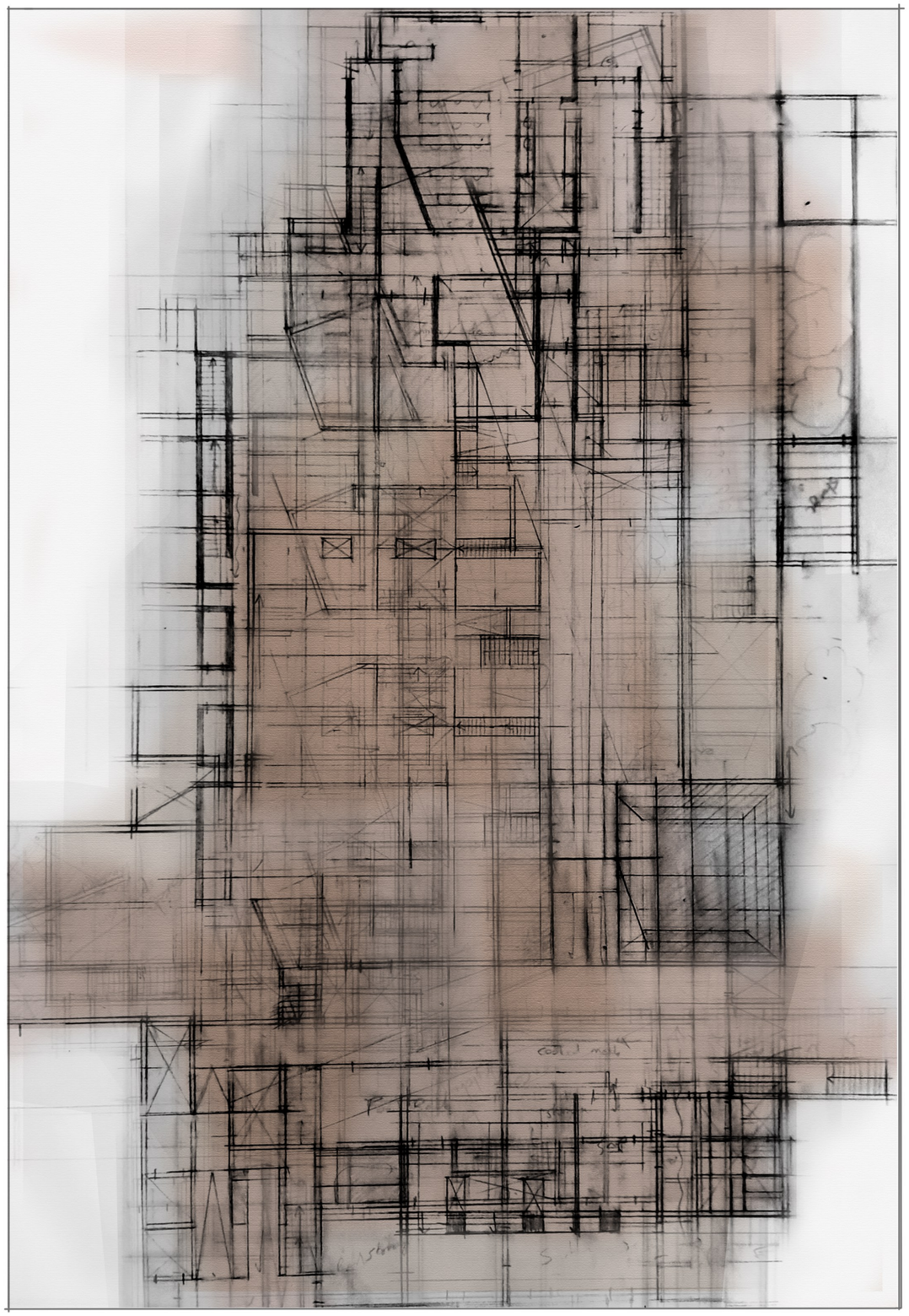

Fig. 163: Overlay of process drawings (Author 2021)

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The intention of this dissertation was to explore how architecture can facilitate temporary acts of refuge for the mobile urban dweller, in the inner city of Pretoria. Spatial and technological explorations were guided by the dialectical relationship between refuge and exposure, in the context of the inner city.

The intention of the architectural solution was to create a place of temporary refuge that would address the mobile urban dweller's experience of anonymity, transience and indifference to place. This was achieved by using Lefebvre's (1991) spatial triad as a theoretical framework to develop a new method of analysing, conceptualising and designing a place of urban refuge. According to this process, refuge was explored from three different perspectives: (1) the experience of refuge, (2) the physical characteristics of refuge space, and (3) the act of refuge. This approach created a design that not only responds to our shared human desire for spatial refuge, but also reinterprets refuge according to the particularities of the users, their exisitng spatial practices and the built fabric of the site.

This dissertation aimed to address some of the gaps in architectural research related to the fundamental and universal human need for refuge and exposure. In the dissertation it is argued that it is the act of taking refuge in a space, that transforms an ordinary space into a place of refuge. The spatial characteristics of refuge such as intimacy, familiarity, privacy, isolation, enclosure and order, can not create a place of refuge on its own. It can however be used to effect how space is perceived and subsequently how it is used by the occupants.

Even though the architectural solution is highly specific to its site and the selected user groups, it has the potential to serve as a prototype for future development in leftover inner city spaces and buildings that aim to respond to the city's courtyard and arcade typologies. The arcade and courtyard typologies were re-imagined and combined to challenge the conventional boundaries between public and private space in the inner city. The research has identified and explored the needs of the mobile urban dweller, which is a user group often ignored by inner city projects.

The dissertation questions the fractured relationship between the architectural object and the spatial needs of its users. It proposes an alternative approach where architecture acts as a facilitator of the user's existing spatial practices and everyday rituals, opposed to a form or aesthetic-driven approach to space-making.

It is important to reflect on the process through which this dissertation was produced. The process did not initially start out by exploring refuge as the primary theme of inquiry. The site was selected, the initial theoretical framework was developed and the users and programmes were identified prior to an in depth understanding of refuge. Based on Lefebvre (1991)'s spatial triad, the theoretical framework guided my interpretation of the site and its users' needs. According to the particularities of the site, the need for refuge was identified and conceptualised. The reason why the sequence of events are important, is because the architectural solution might not be a typical example of a place of refuge. However, it is precisely for this reason that the dissertation has achieved its aim. The confrontation between a wide variety of informants and concepts that are not typically paired with one another, have created a process that challenged the conventional approaches to space making in the inner city of Pretoria.

As I reflect on my design process during the course of this year, I have realised that it is primarily guided by intuition. I would argue that a process driven by intuition, is a form of architectural research, as it is informed by the designer's experience and creativity to solve complex problems. As one transitions from the academic to the professional realm, we are forced to rely on intuition, rather than research to guide our design decisions.

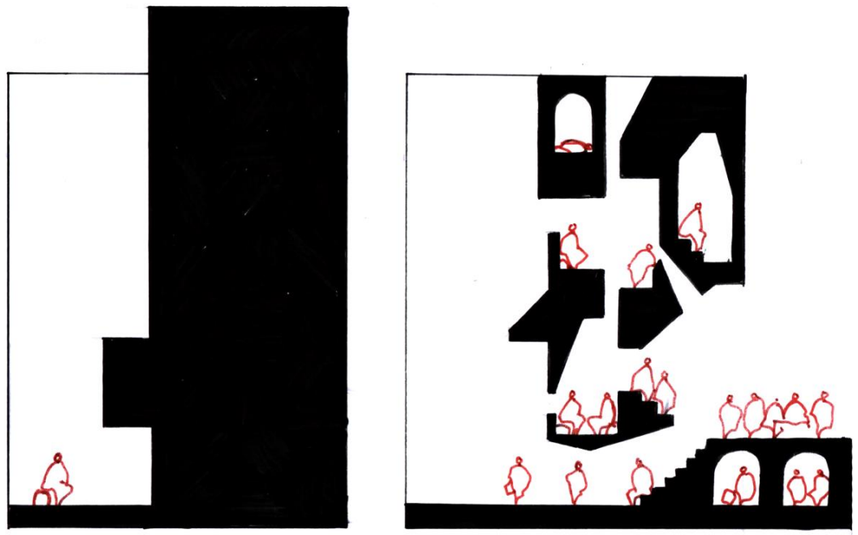

Fig. 164: A place of refuge (Author 2021)

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Fig. 165: Photo of final exam pinup (Author 2021)

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09
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Faculty of Engineering, Built Environment and Information Technology

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

9 June 2021

Reference number: EBIT/79/2021

Ms A van Aswegen
Department: Architecture
University of Pretoria
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Dear Ms A van Aswegen

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Conditional approval is granted.

This means that the research project entitled "Masters Professional Mini-Dissertation in Architecture, Landscape Architecture and Interior Architecture (Group / Blanket)" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

Conditions for approval
This application is approved based on the summaries provided.
Applications from each student (including application forms and all necessary supporting documents such as questionnaire/interview questions, permission letters, informed consent form, etc) will need to be checked internally by the course coordinator/ supervisor. A checklist will need to be signed off after the checking.
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The Committee wishes you every success with the research project.

Kai-Yin

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