



Empowering the Urban Females

Addis Ababa Living Lab

Romy Bijl

Empowering the Urban Females

by Romy Bijl

Creating a gender sensitive neighbourhood, where (migrated) women are integrated in the daily urban life, where they can walk the streets safely and where women and men have access to the same opportunities.

Global Housing Studio: Addis Ababa Living Lab
Msc3/4 Dwelling Graduation studio AR3AD105 (2020/2021)
TU Delft - Faculty of Architecture and the Built Environment

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Ethiopian women draw their vision of an empowered woman. (iDE, 2019)



Preface

In this booklet you will find my graduation report for the Global Housing Studio: Addis Ababa Living Lab. During my academic career at the TU Delft, I have chosen two other dwelling studio's, the Dutch Dwelling Studio in Amsterdam and the Global Housing Studio in Ghana. Those choices derive from my fascination for how people all over the world life, eat, work, play and dream. The dwelling studio gives the opportunity to fully engage with a new culture and forces me as a student to let go of presumptions and to be able to discover all its layers. While living on the northern part of the globe, housing is a human right and having a roof above your head is usually considered normal. However, complex situations in other countries, where having an adequate house is not for everyone, makes me well aware of this favoured position. The rapid growth of the cities causes unequal growth of its people, where the poor often pull the short straw. As an architecture student within this studio, I have the chance to think along new possibilities to cater for these people through an inclusive built environment.

The choice to focus on women within this studio also came from a personal consideration. Eventually, being a women myself, I have often experienced the feeling of unsafety when walking alone through the city, during the day or in the evening. When reading several interviews of women in Addis Ababa about their experiences, I could recognize in a way their struggles and fears, even though this is a completely different context.

I'd like to thank my four mentors, Harald, Vanessa, Nelson and Stephan for giving a me new way of looking at global housing architecture. Walking through cities all over the world will never be the same. I'm also thankful for the constructive remarks which helped me to improve my design every week.



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I. BACKGROUND

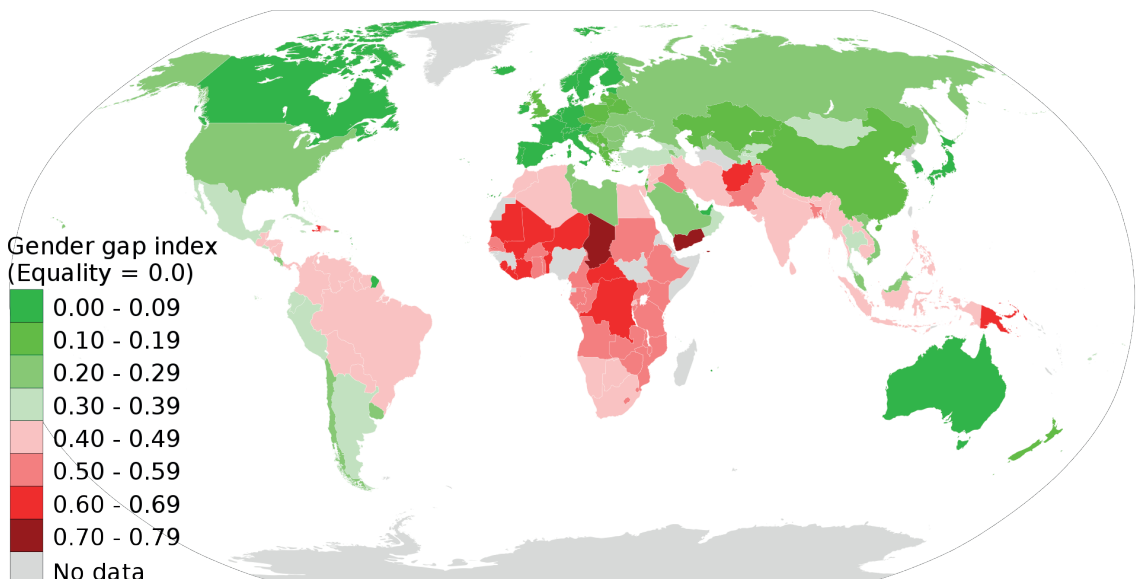
Addis Ababa as arrival city for women

With almost 110 million inhabitants, Ethiopia is the largest and most populous country in the Horn of Africa. In the current trend of global urbanization, Ethiopia's cities are rapidly growing. A tripling of the urban population is to be expected in 2050, putting a big pressure on the housing stock and employment opportunities.¹ Addis Ababa, Ethiopia's capital is growing at 3.8% per year, as more and more people from smaller villages or rural areas search for a better life standard. They follow the trend of the shift towards industrial-focused jobs or seasonal jobs during draught.²

70 percent of the migrants is coming from rural areas or small towns. The poverty and the lack of opportunities in rural areas has been a cause, especially for young people, to leave their rural homes. Economic drivers are also the lack of education, the lack of access to public services and the low productivity of small agricultural plots. The country, with so many different population

groups, each having its own religion, customs and traditions, is rich with a deeply rooted culture. Despite the diversity, they all share some common values, such as respect to elderly and the pride of childbearing. Yet, certain traditions are based on gendered divisions; women mostly being providers of care, and men filling the more powerful role of public income earners. Typical tasks that are executed by women are preparing meals, such as baking the traditional injera and drying herbs outside the house, taking care of the family, washing clothes by hand, and preparing the coffee ceremony.³ In rural areas, to some extent, traditions of arranged marriages still exist. The pattern of men being in charge of the 'hard work' and women of the 'domestic work', the latter being quite physically demanding as well, is still a current phenomenon. These historical values and gendered bias make that Ethiopia is ranked 173th out of 189 in the UN Gender Inequality index.

Gender Gap Index 2019 (Kamalthebet, 2019)





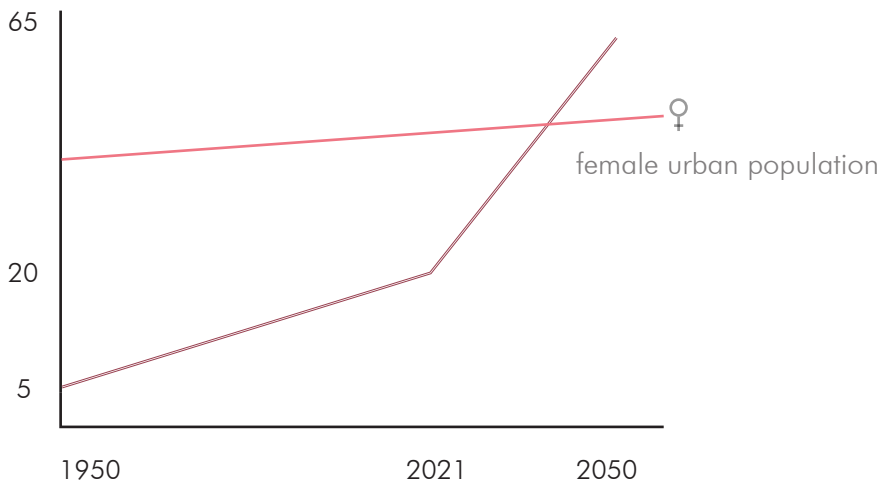
Gender gap and migration motives

Statistics show that among the relatively young migrants, 60% are female, coming from different social and cultural backgrounds.⁴ Women in Ethiopia, and to a larger extent those living in rural areas, suffer from a lower social status in the patriarchal society. Traditional practices, attitudes and beliefs that strengthen damaging gender roles contribute to hold down women's presence in social development. Harmful traditional practices, like child marriage, disproportionately affect rural women and girls. As a consequence, more and more women choose to escape their homes due to gender-related issues, such as the abovementioned traditional division of labour, domestic violence or early and forced marriages.⁵ The aspirations of personal empowerment and a better life standard are the main motives to migrate to Addis Ababa. Furthermore, the disadvantages regarding education, job opportunities and access to social and health services are drivers as well.⁴

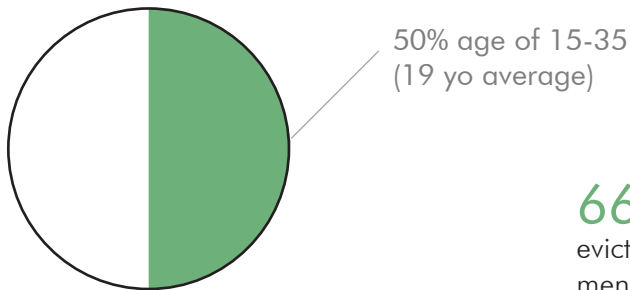
The gender gap can be derived from numerous indicators, such as the morbidity rate of 75.5% for women, against 25.5%

for men. The land is distributed as 81% for men and 19% for women. The literacy rate in 2013 was 38% for women, compared to 56% for men. Ethiopia appears to be on track to achieve gender parity in primary school enrolment by 2015, but the gender gaps are still larger in rural areas. Furthermore, gender disparity increases at higher levels in education, where the enrolment of adolescent girls is lower than boys. In 2015-2016, the share of women who enrolled an undergraduate level was 34%.⁶ The 2005 National Labour Force Survey reveals that women represent 47 per cent of labour force in Ethiopia, with highly unequal participation: 68.5% of employed women were unpaid family workers and 24.8% were self-employed in informal jobs. In addition, women's illiteracy and inability to meet the initial payment required to qualify for agricultural credit has limited their access to credit facilities. Moreover, despite the widespread involvement of rural women in agricultural work, there is a persistent belief that "women don't farm," which discounts their vital contribution to Ethiopia's key economic activity.⁵

% people living in urban areas (Ethiopia)

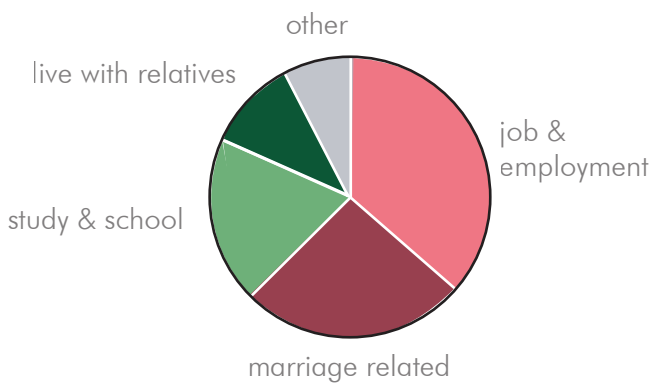


50% of female population is a migrant (Addis Ababa)



66% of women fear eviction, compared to **50%** of men.

Reason for rural-urban migration for women



90% of migrant youth rents an apartment. **75%** shares this apartment with friends or housemates.

30% of migrants can't rely on relatives or friends for food & shelter provision.

Adulthood aspirations vs. reality

Transitions to adulthood in general occurs in phases that follow up the next; leaving the parents' house and finding a job. Most choose to live together with their spouse and start a family. For many girls in the rural parts of Ethiopia, from as young as 13 or 14 years old, there are actually little to no transitions into adulthood. Girls are generally excluded from secondary education, due to financial restrictions and the need for an extra hand in the household. Without education, their opportunities in the cities are limited to informal work, such as housemaids, bar girls or coffeeshop assistants, which often is an entry to sex work. Moreover, leaving the parental house to escape gender issues often leads to homelessness, or living in unhealthy informal settlements, which is not likely to solve the problem.⁷ Research shows that girls escaping child marriage rarely live with a parent, and therefore are less likely to have someone to borrow money from. The way female migrants inhabit Addis Ababa mainly occurs in three phases. At the first arrival, most girls are staying in guesthouses around bus stations

until they have found a job. Jobs are mostly found in the informal sector as a domestic worker. Eventually, many domestic workers become sex workers, because they can earn more money and it gives them greater independency. Women who are sent away by their families to live with a relative often experience the same fate of ending up as a domestic worker, where their mobility is limited and they are restricted from attending school. Also, they struggle to build a social network as they are not native in the area.⁴ They often don't get any payments while working as a domestic, just food and a room to stay. While for some girls it gives them a form of freedom, for others it is just another form of obstruction of their adult life.⁸

Female urban migrants are twice as likely then male migrants to enter informal areas, as it is the most and sometimes only accessible place for them to live.⁶ Here, the living conditions are hazardous and unhealthy, without proper sanitation and electricity. With the increasing amount of people migrating to the city, there is a lack of safe and affordable housing.

Girls at condominium site. (Konjit Seyoum, 2013)



Arat Kilo condominium site. (Countess, 2018)



Current mass housing strategy

Over the past decades, the government has been performing a mass housing strategy as an attempt to live up to the housing deficit of 1 million homes. Several so-called condominium-sites are constructed throughout the city. However, the strategy consists of standardized blocks, but this 'one size fits all' approach does not correspond with people with varying lifestyles, coming from different areas in different household compositions.⁹ Furthermore, the condominium schemes are unaffordable for the low income groups, as people often struggle to afford the mortgage payments. This is even more difficult for single women or women headed households, due to their lower status in the society.¹⁰

The condominium system works with a lottery, where people are assigned for an apartment in a location which is picked, mostly, at random. A common problematic consequence is that people are being ripped out of their carefully built up social and economic circle. For (single) women, this is even more a problem, as they rely much more on their social networks and informal economic activities in and around the house. Women are particularly held back by the burdens of employment, housework and childcare. For those reasons single-headed, female-headed households are often assumed to be worse

off than two-parent households.¹¹ Women, especially those under 18, who come from rural areas to Addis Ababa, face more adversities in terms of lacking education, social connections, work or a home, due to gendered norms and beliefs. As research shows, young girls and women are often worse off than boys and men. Therefore, the vulnerable position of women, either being single, being part of a nuclear family, or running a single-headed household, should be improved.

When analysing the informal areas or already redeveloped areas with condominium houses, the public space is poorly lit. Women declare they feel unsafe in areas without streetlights, because they can't assess the situation. Moreover, men are afraid their wives will be attacked, so they prefer them to stay inside in the evening.¹² Furthermore, car roads are relatively well constructed but sidewalks for pedestrians are sometimes missing, which is problematic for women, as their way of transportation is mostly done by foot (55%).⁴ In the city, the poor construction of sidewalks or the occupation of informal shops or garbage makes women feel unconfident and it averts women to go into public areas. As a consequence, the public space is mostly male-dominated.¹¹

Gender approach to (mass) housing

A gender approach deems to be key in developing new domestic and urban spaces, for as women are primary users of the home and often responsible for the domestic practices. Paradoxically, their voices and input are not always included in the production of (affordable) housing. Furthermore, women have the right to live not only in a safe home, but also to move around in a safe urban space.

The planners of living urban environments often, however, disregard the needs of women, and serve to further undermine women's effectiveness. Housing projects often use a gridiron layout that does not allow women to work in their house at the same time as minding their own or their neighbours' children. House designs and plot sizes rarely take into account that many women will want to use their houses as places of production, which is often forbidden in low income housing projects.¹³

Housing is critical to women in numerous ways, as summarized by Miraftab (2001): "Housing is a key resource for women; it is an asset important to their economic condition and central to their physical and social well-being. It is the site of child rearing and income generation and a nexus for social networks of support and community-based reliance... Housing is a significant economic asset to women that contributes to their independence, economic security and bargaining power with men in their households and in society at large. Most importantly, it helps women determine their own futures and make the decisions that affect their lives."¹⁴

The topic of women and gender issues in urban planning became more prominent since the 1970s.¹⁵ It focuses on the

importance to think of gender-sensitive planning, and what designer can do to make the future lives for women better in 'developing and developed countries'. However, the exploitation of the natural environment, acquired by developed countries, is not something that should be replicated. In developing countries, scarcity is actually leading to very innovative approaches of consumption, such as the shared economy system, pioneered by women decades ago. While in rich parts of the world, societies have developed a 'having more'-ideology, in the sense of having more material things or power.¹⁴

In the context Africa, and also typical for other developing countries, it is the women who have a direct relationship with the environment in order to sustain the community. Women are the farmers: they grow the crops, walk long distances to collect firewood and water. In most rural areas, women are the main producers, growing food not only for their families, but also for sale.¹⁶ They keep doing so even when their husband or sons left home to work in the city or in industries. It is then contradictory that women are often excluded from decision-making about the households resources. Even in cities, women tend to engage in the same economic activities as rural women. The insecurity of tenure among women in informal settlements perpetuates a feeling of dislocation and displacement and prevents them from investing too much in their living environments. It has often been stated that low income black women are the most disadvantaged of urban dwellers.¹⁷ As a result, women have a key role to play in the struggle to improve quality of life and environmental standards in our cities.

As a consequence of the rapid global

population growth, the sustainability of the environment is at stake as more people need access to safe water, more waste is produced, carbon emissions are increasing, environmentally sensitive land is degrading and more affordable houses are needed at a faster pace.

In *Women and environmental management* (1996), Zarina Patel explores the role of

women in environmental management in urban and rural systems. Multiple studies have discussed the relationship of women and the use and management of natural source. Although they all understand the relationship differently, they all propose a transitional process that will take women and environmental issues from the background to the foreground in policies for sustainable growth.¹²

(Rod Waddington, 2019)



Intersectionality

To fully understand gender issues within the complex social context of Ethiopia, another lens should be applied. When in the early 70s feminism started to shine a light on women's experiences as being a women, it could be asked 'which women are we looking at?' At that time, feminism mostly focussed on educated, middle-class white women. However, the awareness grew that a more inclusive view should be acknowledged with also other social aspects, where race is most crucial to mention, but also ability, ethnicity and sexual orientation.¹⁸

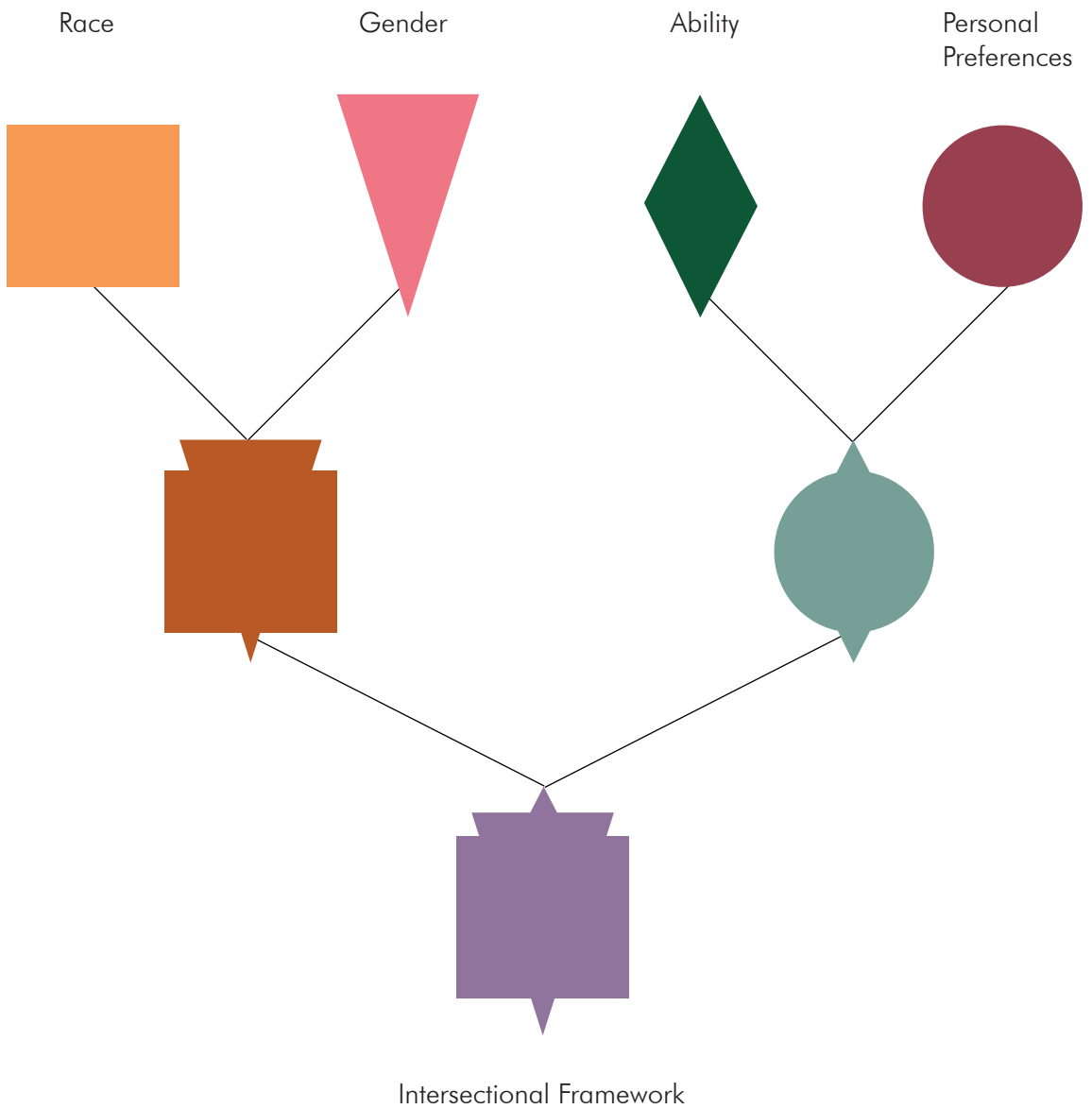
Intersectionality is another layer to understand the full range of social inequalities. It emphasizes the importance of intersectioning differences, which declares how a black women is disadvantaged compared to a black men. When addressing race, mostly black men are addressed. The same counts for addressing gender, a black female is still disadvantaged compared to a white female. As a consequence, when gender issues are addressed, white women benefit more than black women. The concept of intersectionality does make this combination and bring to light how black women are double disadvantaged and an looking through this lens is crucial for seeing this problem.

Furthermore, the division between white female movements and black female movements lays in this concept as well. During the first feminist movements in the 1970s, black and white women stood against each other and radical black women did not join white movements.

From their perspective, white women criticized lives that were far easier than those of poor working-class women, particularly consisting of black women. Women of color faced survival issues: they needed jobs that paid enough; sharing the domestic work was not at the top of their list of pressing issues.¹⁹

Most of the black women did not prescribe to white women's ideas of being powerless. In fact, they grew up to be strong and take care of their communities which they were proud of. Their trajectories were different from those of whites, partly because they were members of an oppressed racial minority. They also faced sexism in their organizations and in the movements, but they were not prone to detach from black men. Many male and female Black Power advocates argued that they could not allow for gender divisions, because the black community was just coming upon. Today, activists still learn from the past to try and work together, crossing both gender and racial borders.¹⁸

In African feminist literature, differences between western gender issues and African gender issues are described. African feminists, for example, try to go beyond criticizing patriarchal structures, they also seek for alternatives to traditional rituals to overcome their oppression, through religious, dictatorial and corrupt systems.¹⁹ A careful consideration is needed to find balance between preserving a culture and protecting female rights, at the same time being in resistance of Western cultural imperialism.²⁰



Problem statement

The general problem is the way gendered bias and traditional beliefs lead to limited opportunities and a lack of equal societal participation for women in Ethiopia. This is apparent from the unequal distribution of land-ownership, the high shares of women in informal work and the exclusion of women in decision-making processes for, for example, the built environment. To achieve their full potential, African societies should enable the empowerment of their women. African countries are creating more capital to invest in development after a decade of unprecedented economic growth. If African countries could make full use of the skills and abilities of all its people, including its women, it could make a change to communities and the economy. African women are economically active as entrepreneurs, farmers and workers. They are the cornerstone to their families' wellbeing and their children's life chances. Still, they face a number of challenges that hold them back from fulfilling this position. The gender gap not only restricts communities to grow, it is fundamentally unfair. Although the government is transforming gender relations and the gender equality is slightly improving, there is still much work to be done.

The specific problem is the problematic inhabitation of female migrants in Addis Ababa. They are more likely than men to end up living on the streets or in informal settlements. Also, their chances of a paid (formal) job is lower than for men and they often engage with informal jobs as domestics, street vendors or sex workers.²¹ The current standardised mass housing strategy performed by the government

doesn't cater for the increasing amount of female migrants in Addis Ababa. Several so-called condominium-sites are constructed throughout the city. However, the strategy consists of standardized blocks, but this 'one size fits all' approach does not correspond with people with varying lifestyles, coming from different areas in different household compositions. Furthermore, the condominium schemes are unaffordable for the low income groups, as people often struggle to afford the mortgage payments. This is even more difficult for single women or women headed households, due to their lower status in the society.²²

Lastly, the public space in and around condominium sites is perceived as unsafe. Women declare they feel uncomfortable in areas without streetlights, because they can't assess the situation. Men are afraid their wives will be attacked, so they prefer them to stay inside in the evening.²³ Car roads are relatively well constructed but sidewalks for pedestrians are sometimes missing, which is problematic for women, as their way of transportation is mostly done by foot (55%).¹⁷ Poor construction of sidewalks or the occupation of informal shops or garbage makes women feel unconfident and it averts them to go into public areas. As a consequence, the public space is mostly male-dominated.

Although urban planning is a political act and as (Western) architects we can't change laws, we could think of new methods in housing design. To find solutions for the described problem, the mass housing plan needs a second look from a gender perspective.

Research question

"In which way can the design of affordable housing with a gender inclusive approach contribute to a better integration of female rural-urban migrants in Addis Ababa?"

Sub questions

- What are the lifestyle/dwelling patterns of women being part of nuclear families in rural settlements?
- What are the lifestyle/dwelling patterns of women being part of nuclear families in urban (informal) settlements?
- How can the integration of public amenities in the neighbourhood improve the daily life of female migrants?
- How can the design of the neighbourhood, or which design tools, could improve the sense of safety in the public sphere for females and female migrants?
- How can the design of the public spaces in the neighbourhood stimulate social interactions for female migrants and accommodate a stronger sense of community in their livelihood?
- What are income generating patterns and opportunities for female migrants and how can this be translated into the design of their livelihoods?
- What are possible (cross-)subsidy schemes (owners-renters/shared economy schemes) that could work within the context to densify the area, but to maintain a considerate atmosphere?

A neutral place or a place of negotiation? It depends on the observer. (Crane, 2020)







II. RESEARCH



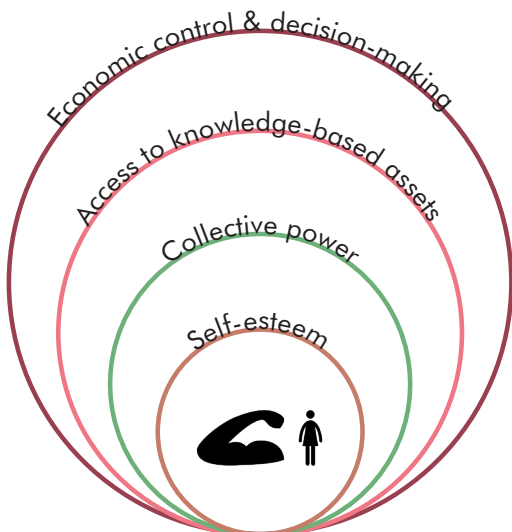
Theories

The main theories used as principles and guidelines for the design will be explored here.

Empowerment strategy

The first theory describes the concept of empowerment by J. Rowlands. To understand the terminology of empowerment and in which scales it can operate, 4 principles can be elaborated for women's empowerment.²³

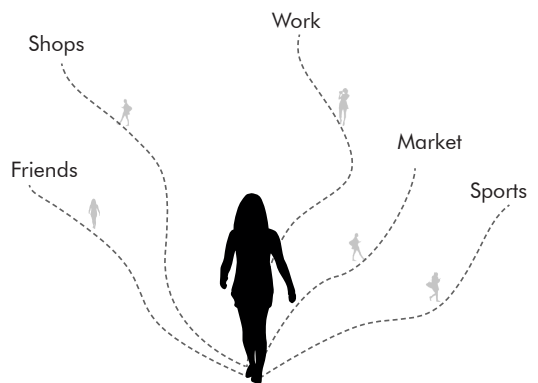
1. Power of economic control and decision making, which means earning your own money and having control over how to spend it.
2. Power over knowledge, so having education and sharing knowledge with others.
3. Then power with, which is the idea of bonding together with others to improve lives collectively.
4. And this all has a beneficial effect on your own power, which is your self-esteem.²⁴



Safe communities model

The second theory aims to search for ways to create safer neighbourhoods. Whitzman (2006) discusses the safer communities model and the manner in which it defines a vision of making public spaces safer through the use of activities, social mix, land mix, and involving users in designing strategies and initiatives to achieve the goal.²⁵

She also stresses the importance of fine-grained land use mix. Furthermore, he promotes the walkability of the streets in the day and evenings of how it ties in with planning principles which lead to creating city centres which are more accessible to women and promote alternatives to cars.²⁶



Eyes on the street

The last theory of Jacobs (1961) describes the importance of security and safety in order to achieve a well-functioning city. The concept of 'eyes on the street' is stressed as a vital aspect which creates a defensible space for all inhabitants.²⁷

She suggests that where there is a crowd of people, our streets are safer to use because if someone is in trouble the eyes on the street are ready to assist and protect from danger. She refers to this constant mix of strangers on the street as an "intricate ballet" or a dance where everyone contributes to the well being of the street in making it a liveable place.²⁸

Many cities lack this friendly congenial atmosphere that Jacobs' neighborhood

had and to this day her critique of urban planning is not solved with thin suburban neighborhood and urban sprawl still in existence. She suggests that living in high density neighborhoods increases the social character of public space because it makes it more convenient for people to get to know one each other.²⁷

This led Jacobs to advocate for mixed-use neighborhoods where she suggests that the "eyes" get stronger when there are a range of activities taking place on the street. She suggests pubs and shops are a good strategy to maintain neighborhood safety. When there are people present in a public space such as city streets, it strengthens the space and inspires social cohesion.²⁷

(The Urban Vision, 2018)



Dwelling patterns - rural



Walking and collecting water from closest water source.

(Green Economy, 2018)



Open air markets.

(Achilli Family, 2007)



Coffee ceremony, mostly performed by women, inside a tukul home. (Esleman Abay, 2020)



Woman is baking traditional bread on the fire in front on her home (Andrzej Kubik, 2019)

Dwelling patterns - rural



Turning homes into little shops.

(Artush, 2019)



Ethiopian women wash clothes in the traditional way.

(Artush, 2019)



Laying laundry out to dry in the sun.

(Artush, 2019)



Kids playing with a wheel.

(Artush, 2019)

Dwelling patterns - urban



Drying spices in the sunny, open spaces.

(Simona Subačiute, 2020)



Marking borders of house with planting and pots.

(Simona Subačiute, 2020)



Informal selling stand at the end of the street.

(Simona Subačiute, 2020)



Low income woman doing the laundry for middle income families.

(Simona Subačiute, 2020)

Dwelling patterns - urban



Making/repairing clothes on the sidewalk.

(Addisstreetscapes, 2016)



Traditional coffee ceremony set-up (a women's 'task').

(Addisstreetscapes, 2016)



Occupying unbuilt space with self-build shop structures.

(Addisstreetscapes, 2016)



Girls playing patty cake on dirty streets.

(Andrzej Kubik, 2020)

Case studies



(Municipio, 2018)

Zona 3 co-operative housing

Zona 3 is a cooperative housing development developed in the 1970s. With a total of 839 units, it consists of both houses and apartments. It is Uruguay's largest mutual-aid complex, with a wide range of amenities and services. Cultural and athletic activities, for example, are accorded a lot of weight, especially among children and teenagers. The Community Centre has a sports hall with facilities for football, basketball, table tennis, and table football, as well as a variety of activities, such as drama clubs and music courses, that are held on a regular basis. Among the amenities available in Zona 3 are a library, a daycare, a celebration room, and a dental clinic.

Micro-enterprises in construction

Half of Nepal's population (49%) lives in poor housing, with a quarter of the population living below the national poverty level. Natural disasters are common, and they have had a significant influence on people's lives and housing. Community Impact Nepal (CIN), a Nepalese non-profit social purpose organization, established Compressed Earth Bricks and Community Enterprises to address this problem in assistance. The idea helps local entrepreneurs to restore homes in disaster-affected regions while also establishing long-term micro-businesses. By encouraging women and marginalized groups to participate, the project has made a significant contribution to gender and social inclusion. Approximately half of all masons trained to build CSEB homes are from low-income families, and nearly a third (one-in-three) are women.

(World Habitat, 2020)



Self-help housing in Anantapur

In the district of Anantapur and neighboring areas in the state of Andhra Pradesh, the Community Habitat Programme assists people from low-income communities in becoming homeowners. People take part in the construction of their own dwellings once they have properly acquired the land. They are also encouraged to have a more active role in their community, as each town has a committee to oversee the construction process. To promote gender equality and social inclusion, at least half of all committee members must be female. Over 60,000 people have received land and dwellings since the initiative began in 1996.



(Rural development trust, 2012)

(Prochazka, designed in 1997)



Frauen-Werk-Stadt

The City of Vienna is famous for a new housing development planned by women, which was finished in 1997. It was the city's first significant pilot project. The city, which has a long history of building and providing social housing, realized that the majority of its housing stock was planned mostly by male architects and only catered for the nuclear family model. The city ran a design competition for new initiatives to gender sensitive urban planning and housing design. The outcome was an apartment complex designed by 4 women, which focused on the wishes and needs of women such as safety, contact with neighbours and accessibility. A few innovative design features were: adaptable floor plans for different households compositions (see image on the left), communal rooftop laundries and open kitchens with visibility and audibility.





III. DESIGN

Design principles

Hierarchy of public space

The goal of the studio is to propose an alternative to the current condominium housing scheme. The focus for this project is to not only search for a better solution, but also pave the way for vulnerable women in the city. The used theories, as described before in chapter 2, serve as the base for this new housing scheme, where the first one is the Eyes on the street concept of Jane Jacobs. The condominium housing blocks don't really interfere with their ideas, as those areas are mostly single-use and there is no appropriation of shared space. There are no protecting layers when you leave your house, but you almost immediately end up in this no-mansland zone that no one cares about. The other theory is about creating safer communities, which is a follow-up from the eyes on the street concept and describes a 'safe communities model'. It promotes the importance of walkability to mixed functions, which is even more important for women as they are responsible for the domestic burden.

To promote walkability and safety within the city, the clash of leaving your house and ending up in no-mansland could be treated with softer transitions, using different scales of more residential zones and more public zones. This hierarchy of spaces could be organized for a housing cluster shown in this diagram below, where each street or space has its own definition. To give an idea of what those spaces could be, the safer communities model with its mixed-use character can be broken down into different 'public or private spheres'.

Different spheres, different activities

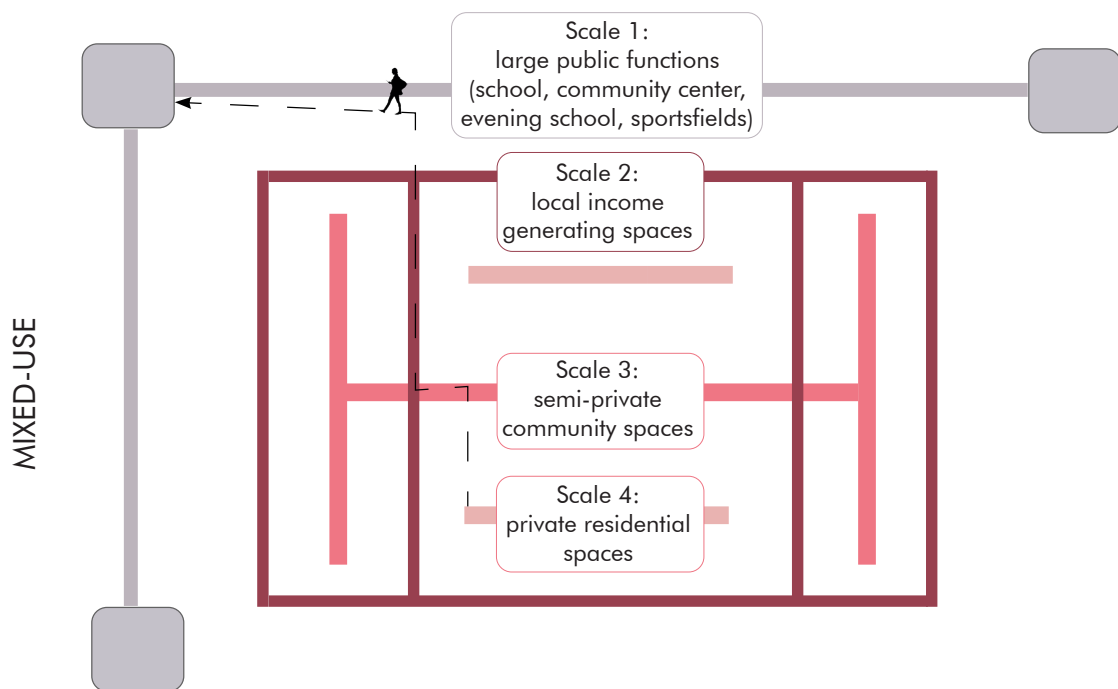
On the next page, a diagram of the hierarchies can be found. It describes the different spheres, where different activities can take place to keep those streets active and safe. It also describes how the housing units can respond to it.

The first is the public, commercial sphere. Imagining the program to be large streets or squares giving for example access to schools, commercial shops and parks. The way buildings could react to those spaces is having a commercial plinth, and active rooms such as the livingroom or kitchen facing those streets

The second is the local, commercial sphere, imaging the program to be slightly smaller streets or squares with street vendors and homeshops facing this space.

The the third layer is the semi-private neighbourhood sphere, where the program could be playgrounds for kids and seating places where neighbours can chat with eachother. The way buildings could interact with this space is having their outside living space facing this area, so you can see who is playing in front of your house or who is coming home.

And then the fourth layer is the intimate residential sphere. Which is the most private and could be used for domestic activities, such as washing clothes or making food outside. The way the building can react on this space is having the kitchens and bedrooms facing it.

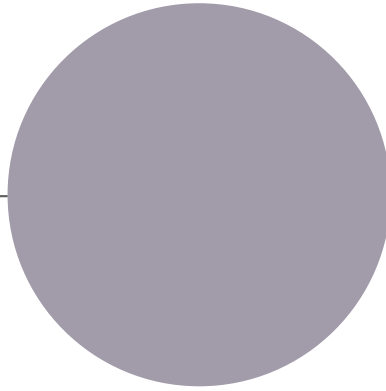


Hierarchy of spaces

How different spatial characters provide for a safe and controlled atmosphere.

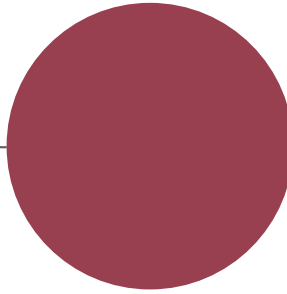
1. Public, commercial sphere

- going to evening school,
getting medicines at health post



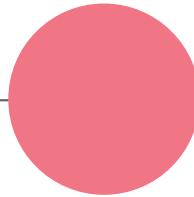
2. Local, commercial sphere

- buying food/clothes/other, drinking
coffee at a bar.



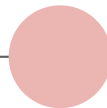
3. Semi-private neighbourhood sphere

- playgrounds, bring kids to daycare,
tapping water from the puts.



4. Intimate residential sphere

- chat with neighbour, cooking outside,
washing clothes



Activities

Activated by



Program:

- Different time of the day-functions (shops, church, evening school, day market, sport areas, parcs).

Unit configuration:

- large facade openings that light up the streets at night. Kitchen/ livingroom facing the street.



- Market square, homeshops, rentable shop spaces.

- Homeshops or rentable shop space on ground floor.



- Playgrounds, water facilities, seating areas.

- Livingrooms & porches facing the space.



- Residential street

- Kitchens & bedrooms facing the space.

Mixing different social groups

The project will be a neighbourhood with a mix of social backgrounds and income groups. This approach is a countermovement against the current tendency in Addis Ababa, where the rich create gated communities and the poor are being pushed towards the edge of the city. By creating this mix, a stable and inclusive neighbourhood can be created where different income groups (learn to) tolerate and benefit from each other. Higher income women have the benefit of lower income women running shops or food markets with affordable groceries closeby. The lower income women can also provide services such as being hairdressers, cooking fresh food or being babysitters for their family. The lower income women in their turn benefit from the higher income women as them being their costumers, provide job opportunities, they uplift the neighbourhood and can be part of the cross-subsidisation scheme.

However, combining those different social groups comes with a lot of precision, since they have different needs, wishes and concerns. The higher income groups should feel safe enough to live with lower income

groups. On the other hand, stigmatization of the lower income groups next to the higher income groups should at all times be avoided.

In the diagram on the right, the positioning of the different income groups are shown. In general, they are positioned in a gradient way, so high income is connected to middle income, middle income to low income and also low income with low income. In the diagram can be found that high and middle income groups share a courtyard and the middle and low income groups share a courtyard. The low income groups have the intimate residential streets, which is created for outside cooking, a pattern solely observed at low income groups. The low and middle income groups face the local, more informal commercial spaces. The high income faces the public , more formal commercial streets.

This scheme serves as the basic configuration, but when duplicated, it can be rotated or halved to fit in the shape of a specific area, as long as the basic rules are complied

Cross-subsidisation, uplift the neighbourhood, provide safety, job opportunities, shop costumers.

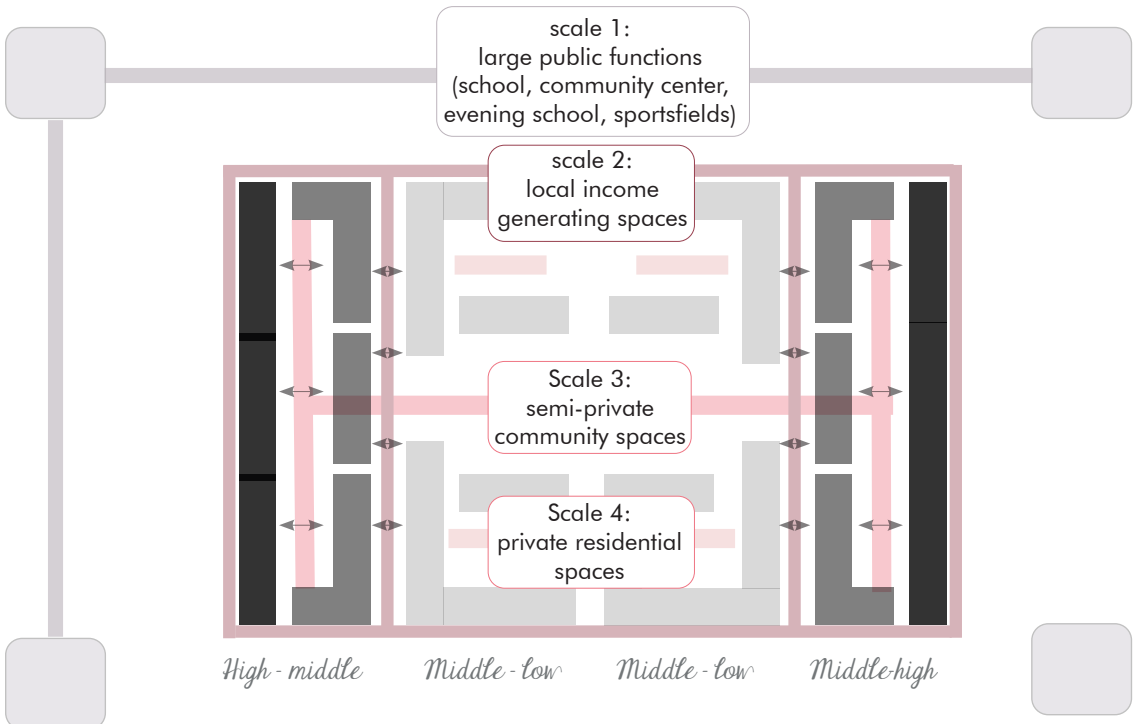
Middle-high income women

Middle-low income women

MIXED INCOME GROUPS



Vibrant neighbourhood
(markets, shops, fresh food), provide services.



Stakeholder analysis

Current inhabitants and newcomers to the city are looking for an affordable house in a safe community and healthy income generation possibilities. Amenities to provide for women’s needs are desirable within walking distance. Also, sports, social and green spaces are desired. Middle and high income who rent houses can offer money in the long run.

The FHC desires a dense area and a return on investments. The Addis Ababa Housing Development & Administration Agency (AAHDAA) can serve as the leader and the financier of the development process.

The designer offers solutions for low income inhabitants to expand and alter their home

without the need of outer investments. The new dwellers are divided based on their income. The low income dwellers can join a cooperative, to improve funding possibilities and to increase the scalability of the initiative. These cooperatives can contribute to the construction work to reduce building costs for the AAHDAA and subsequently lowering the acquisition costs for the inhabitants. The land will be leased from the municipality. A number of units in the middle and high income blocks can be bought by the dwellers, instead of renting it. This cross-subsidisation would generate a higher initial income for the development. The AAHDAA would hereby trade the ownership of a number of houses for a quicker return on investment.





Low income dwellers (cooperatives)

Aspirations: Affordable gender inclusive housing; build own house or rent a small studio.

Value: Offering labour, running local businesses.



Local businesses

Aspirations: Sustainable income generation, customers & shop spaces.

Value: Job opportunities, budget for the project by rental of shop spaces.

Middle income dwellers

Aspirations: Renting or owning a 2- or 3 bedroom apartment in a gender inclusive neighbourhood.

Value: Cross subsidy of the project. Customers of local businesses.

Commercial bank

Aspirations: Earning interests.

Value: Providing loans for the project.

High income dwellers

Aspirations: Owning a more luxurious apartment in gender inclusive neighbourhood

Value: Cross subsidy of the project. Uplifting the neighbourhood.

AAHDAA

Aspirations: Provide housing. Return on investment.

Value: Initial investment of the project. Management of construction process.

Designer



Aspirations: Participation of all income groups. Investments for the project.

Value: Framework for women cooperatives. Solutions for affordable and gender inclusive housing. Opportunities for income generation.

Management & community creation

The AAHDAA will play a key role for the overall management the project. They will grant the leaseholds for the building plots. A local contractor will be hired to take responsibility for the middle and high income buildings. For the low income houses, a Community Board for the self help housing will be assigned, consisting of someone from the AAHDAA, 2/3 persons of the construction company, 1/2 future dwellers of the self-help group and 2/3 superintendents. They will be responsible for the day-to day maganement of the process and for the communication and participation of the groups.

Through mutual self-help housing, low income households get help to achieve home ownership. The participating households not only work on their own house, but everyone works on everyone's home. No one moves in until all houses are completed, which creates a bond within the community from the start.

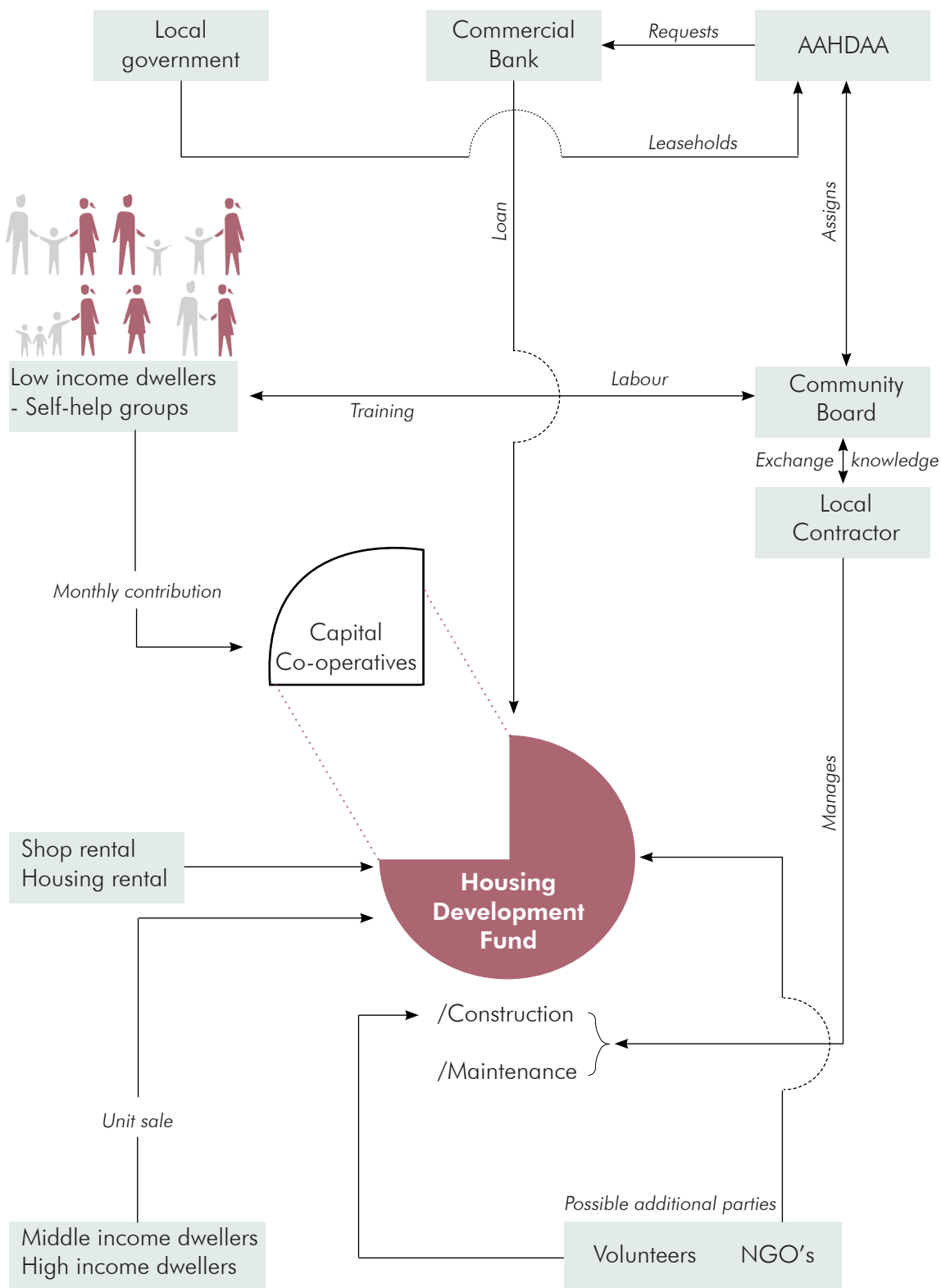
New dwellers can sign up at the

Community Board. They manage the forming of the groups and take responsibility for monthly contributions. Local knowledge and technical assistance will be provided by a superintendent. The community board will also be responsible for the management of the maintainance of the buildings after completion.

The capital of the self-help groups will be a part of the project fund. The largest share will come from a bank loan from the Commercial Bank. The AAHDAA can sell a part of the units for a quick, partial return on investment, which can be directly used for the low income units and the public function building. The rents of the other units and the rents of the shops will provide a small, constant flow of income and a small profit on the long term.

Uncertain but possible additional parties, such as NGO's, volunteers or activists, could contribute in the form of construction work, funds or donations.





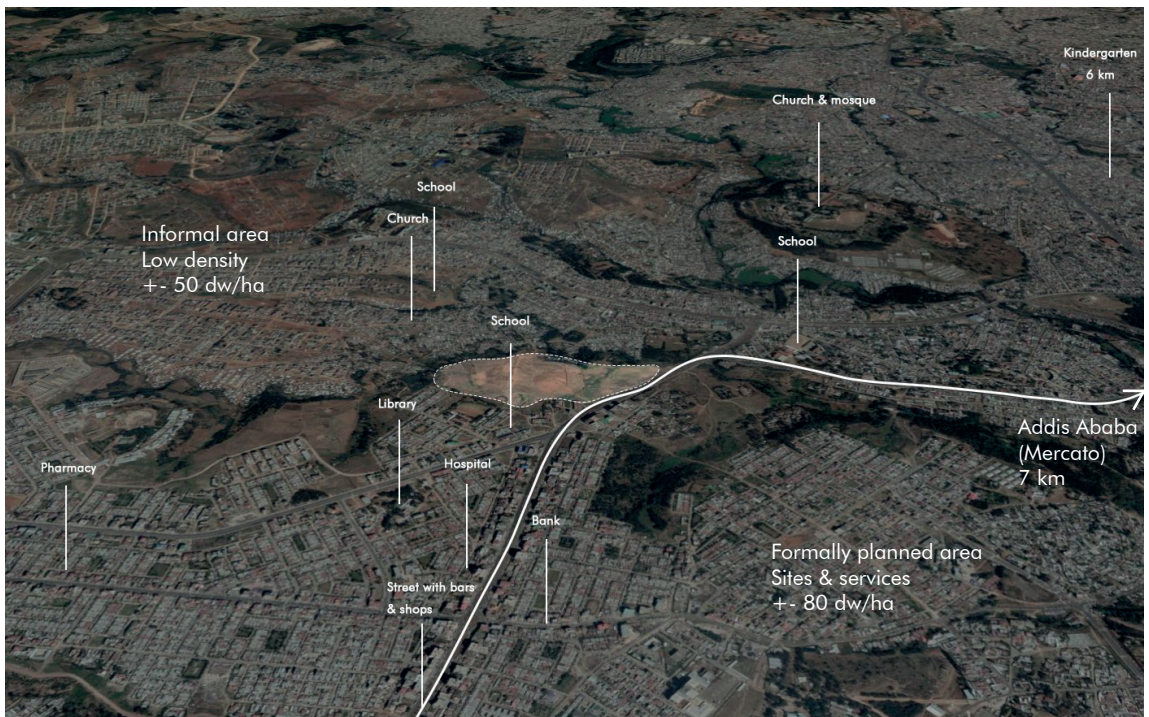
Location

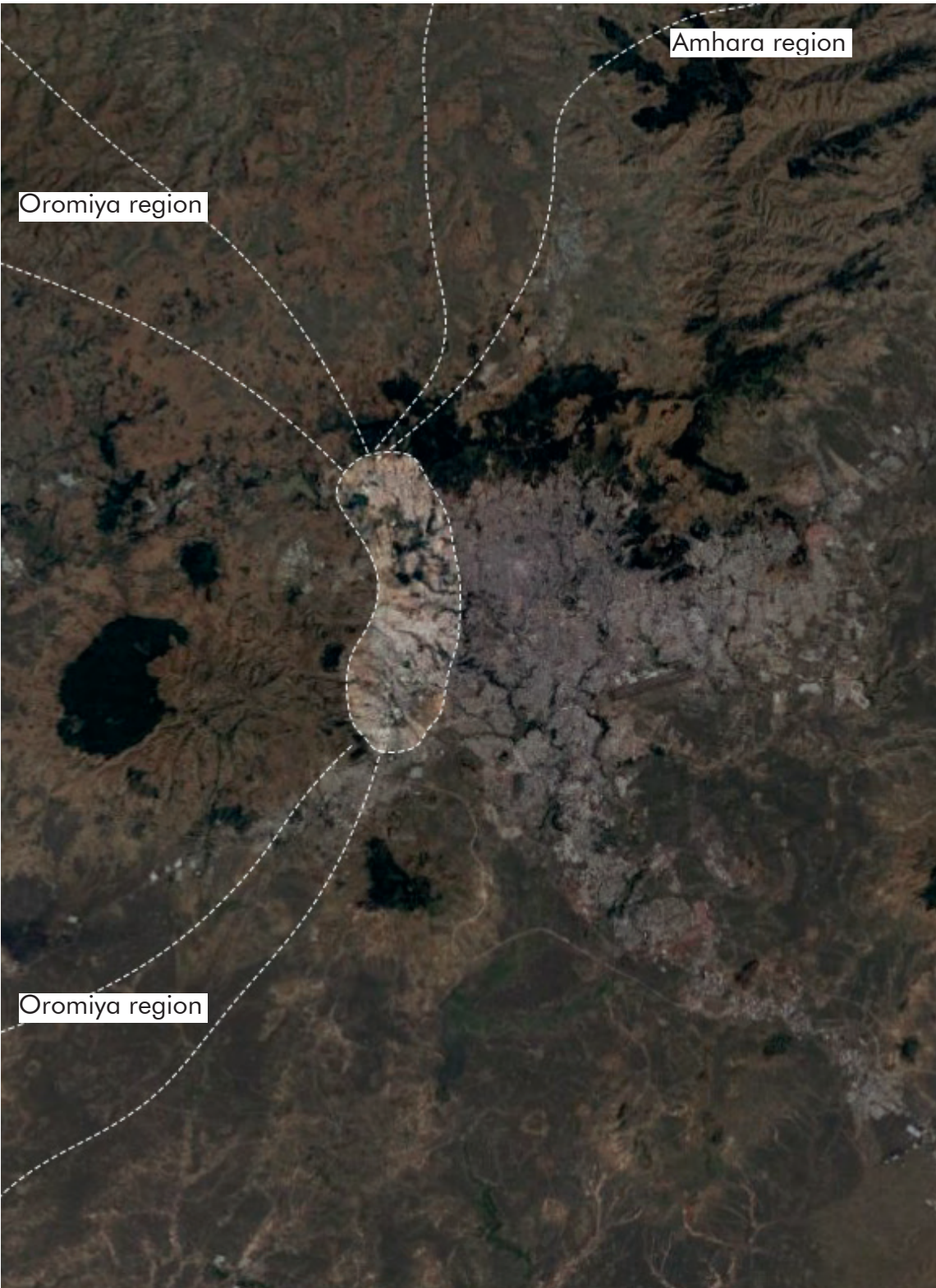
Before the concept can be implemented, the location will be explained. The project location is situated in Kolfe Keranio, a sub-city of Addis Ababa. Many migrants arrive here from the Oromiya and the Amhara regions. Interviews with women who migrated to the city, that were used for the research part, were also held in Kolfe. Therefore it seemed the ideal place to address the inhabitation problems.

An empty land of 12 ha basically in the middle of Kolfe Keranio, is chosen for a greenfield development. It borders a larger road in the east with public transport which leads to the city of Addis Ababa. A formally planned sites & services area can be found on the other side of this road. In the north, the location borders a steep green zone

with an informal housing area behind it. The empty plot and the future planned neighbourhood can be a mediator between those two worlds, bringing not only people, but especially women from different areas together in the commercial streets for their daily groceries, the playgrounds where they play with their kids and the schools where they meet other parents..

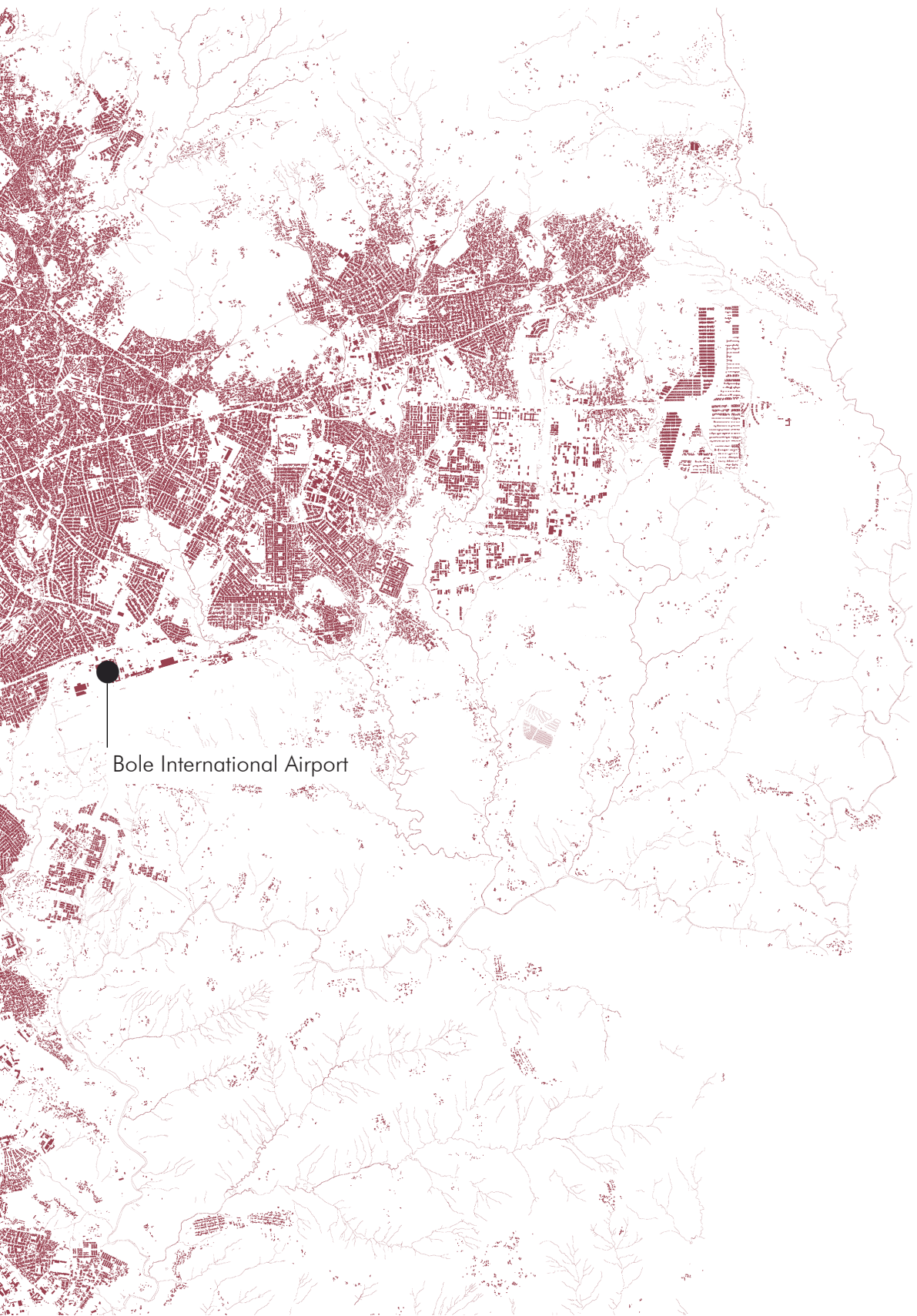
Looking at the public functions that are within the closeby area, some shops and bars along the highlighted streets can be found, and a few schools that are mostly primary schools. But, the area lacks services that could be beneficial for women, such as daycare facilities, an evening school and a local market. This will be taken into account when designing the public functions.





Overview Addis Ababa





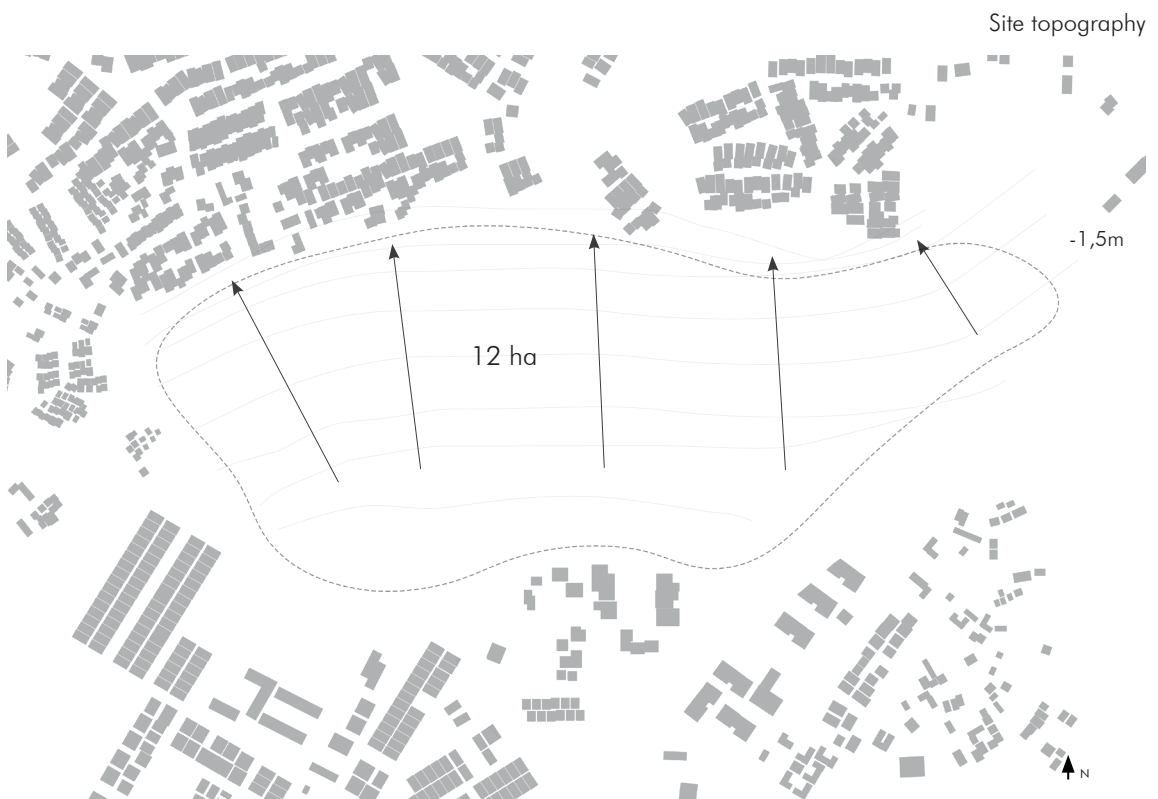
Bole International Airport

Strategy implementation

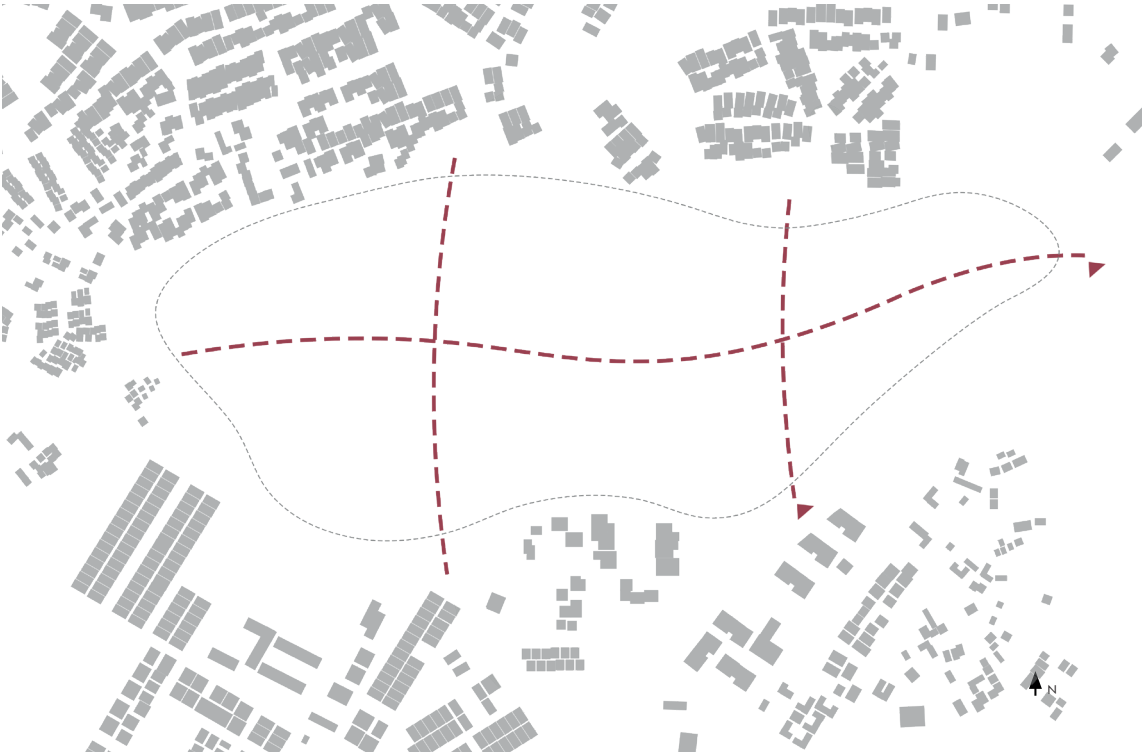
Before the scheme can be implemented the shape and topography should be defined. Shown below, the topography is sloped, following the arrow's direction. Each horizontal line represents a 1,5 m height difference.

On the right is shown how the site can connect to the current city fabric, considering main entrances to a large road and connecting streets to the surrounding neighbourhoods. The introduced axes are connecting existing roads or paths.

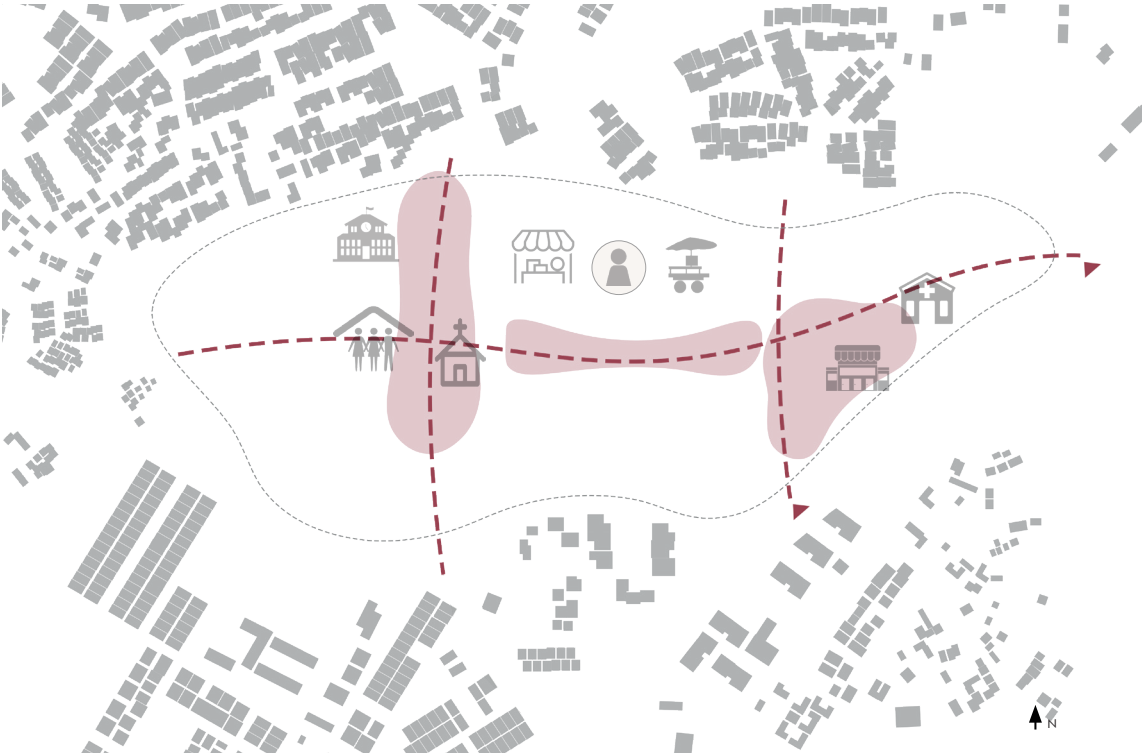
On the right at the bottom, the largest public spaces are mapped. In the west, the street connecting three neighbourhoods has functions as a school, a community center and a religious meeting place. In the east, it is facing a busier road, with functions for people from outside could be located, such as a health clinic or a large supermarket. In the middle, there is a special location in the heart of the neighbourhood. It will provide opportunities for generating income and personal development, therefore it will be called the empowerment street.



Connecting roads and access points



Public functions

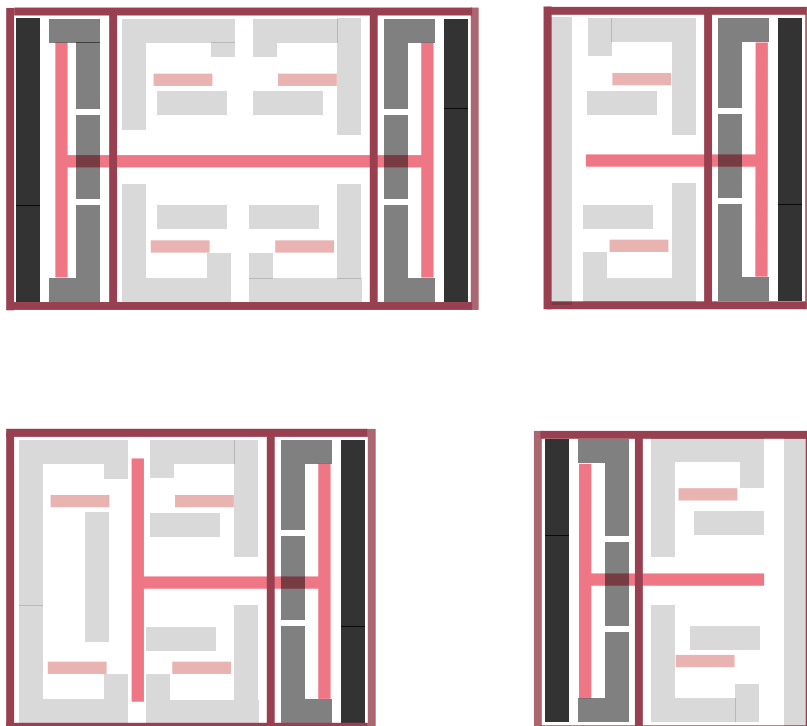


After these steps the cluster configuration can be implemented on the location, using different shapes following the basic rules of hierarchies of spaces. With those shapes, it can first be globally seen how they fit within the site, then where in which shape the buildings for different income groups can be placed. In the diagram on the right, it shows how the high income groups (black) are facing the large public, formal commercial streets with the public functions on it. the middle and low income groups (grey and lightgrey) face the local, semi-formal commercial streets. The empowerment street is accessible for all income groups, with the evening school

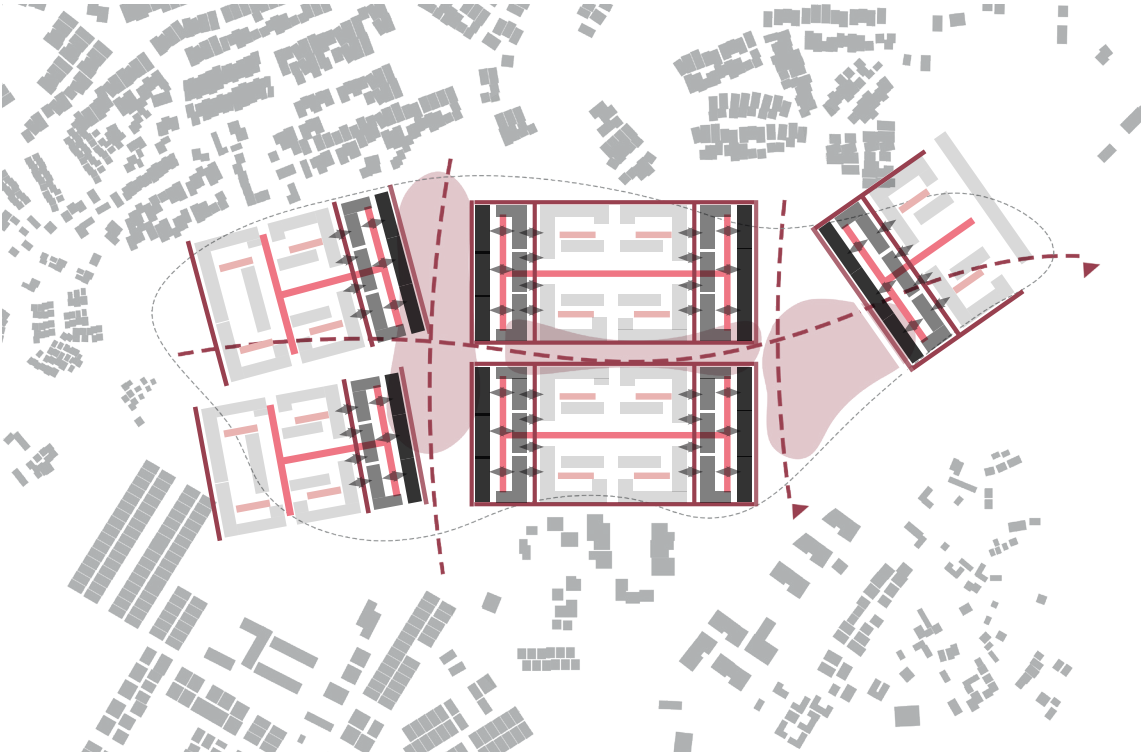
and community center in the middle and the market zones more at the edges. This basic strategy can also be used for other locations through Addis Ababa.

This conceptual masterplan is worked out as a detailed masterplan, shown on the next page. At the bottom of this page, a section shows how the topography is sloped and how it is used for the housing clusters. In the north, the topography goes very steep and there is a layer or bushes and trees with little sandpaths connecting to the other neighbourhood.

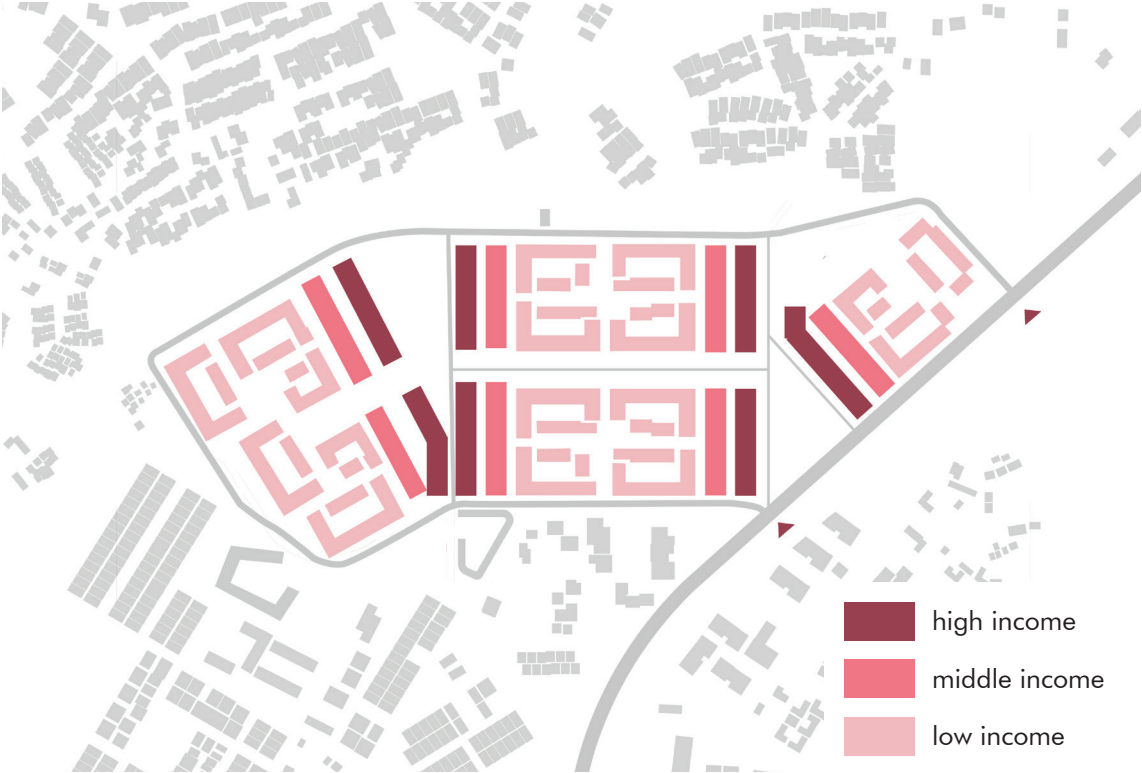
Varying shapes of the basic cluster configuration.



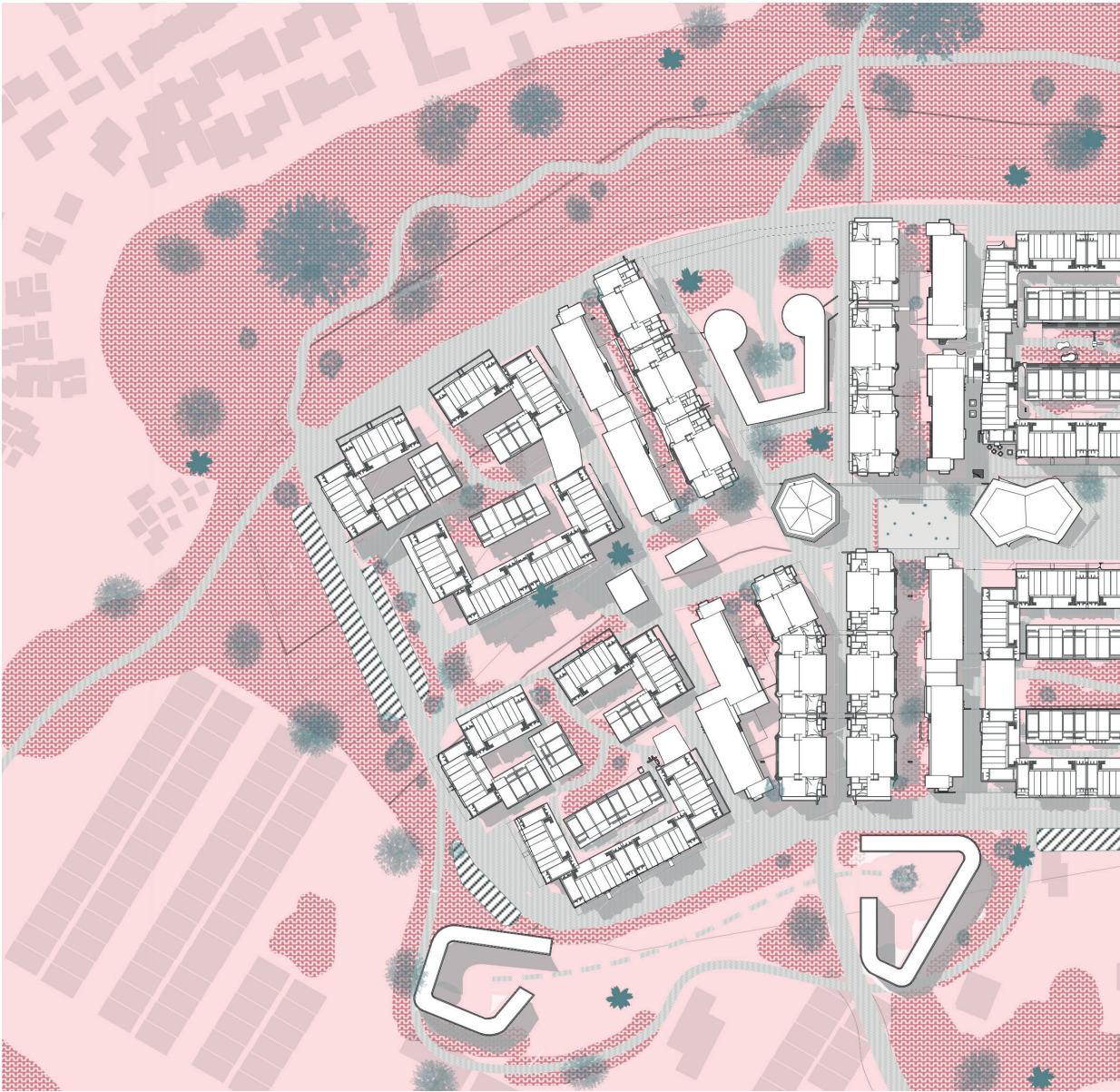
Implementation of the basic cluster.



Income groups location.

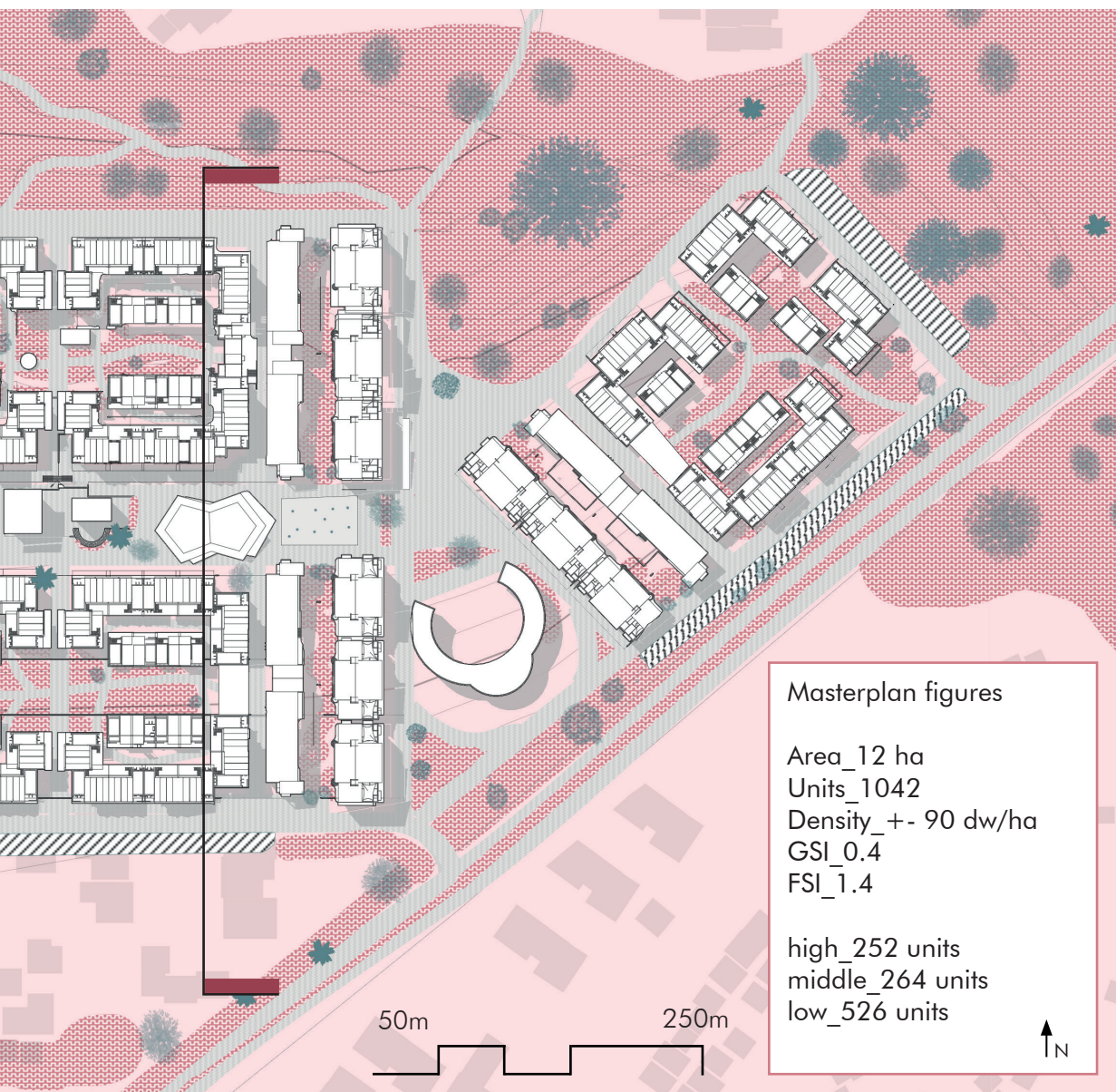


Masterplan



Section





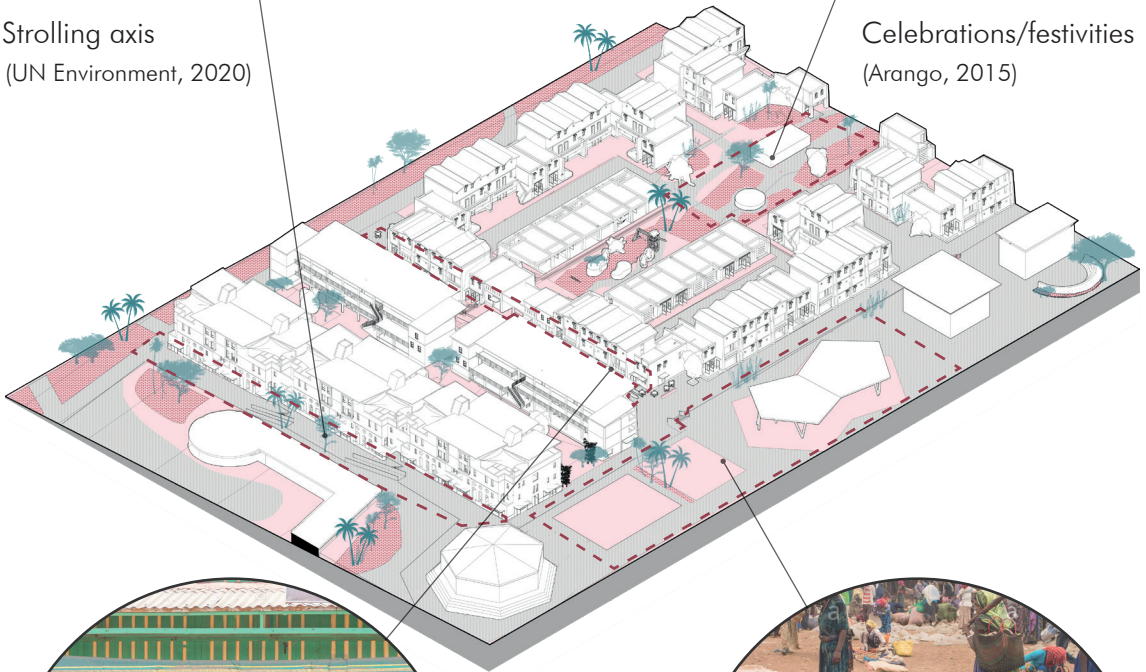
Cluster overview



Strolling axis
(UN Environment, 2020)



Celebrations/festivities
(Arango, 2015)

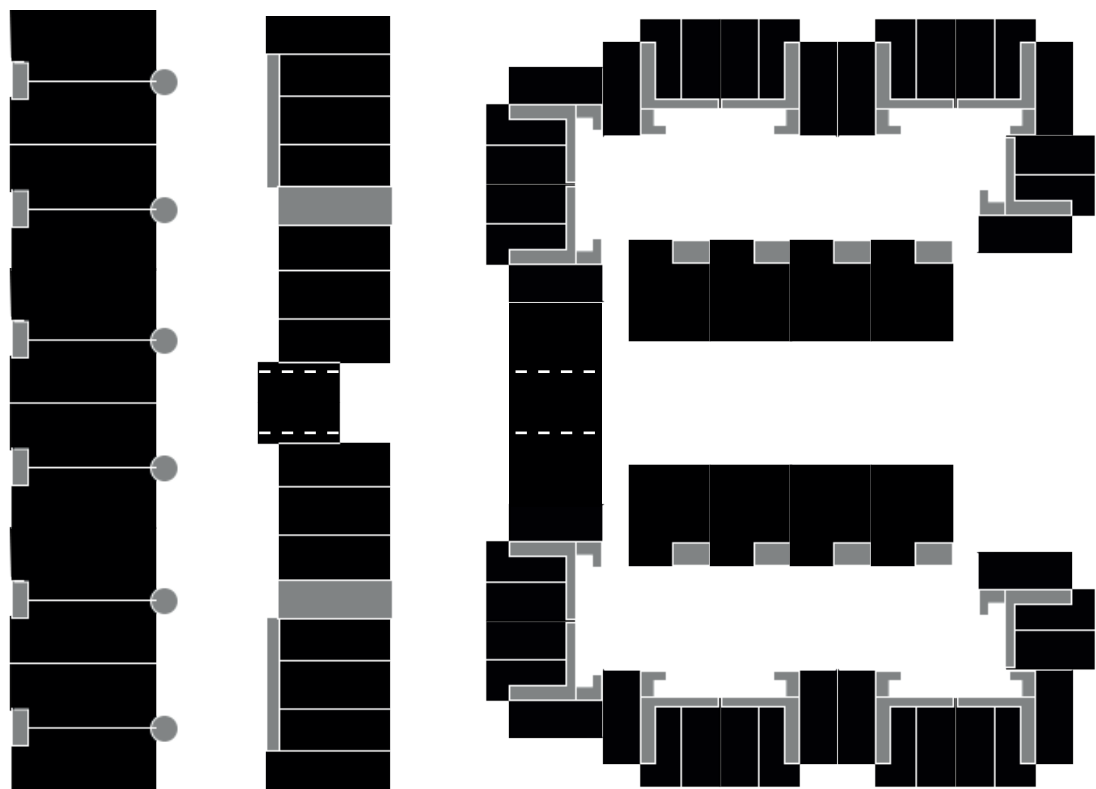
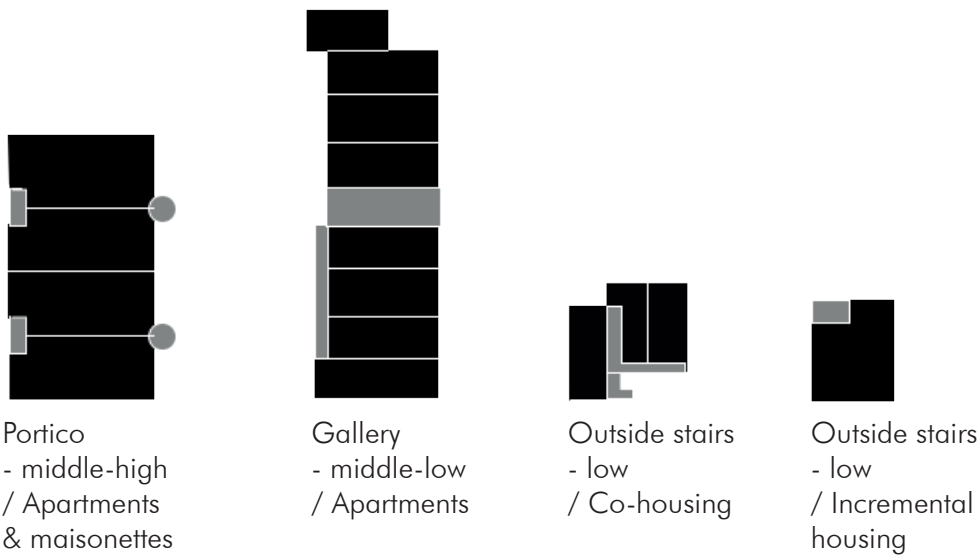


Informal shops
(Rooney, 2018)



Market/street vending
(Van Zandbergen, 2015)

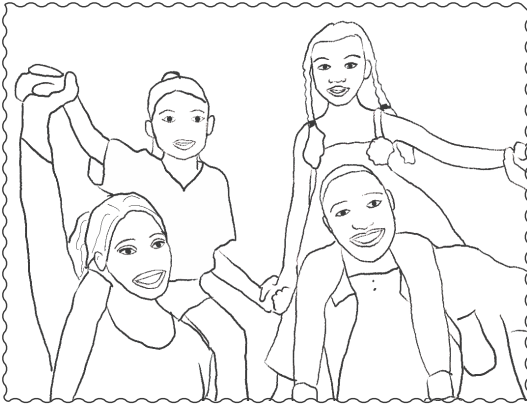
Cluster ingredients



Typical cluster

Four buildings with different (and overlapping) income groups are the main buildings of each cluster. The different typologies will be explained further in this chapter.

Dwelling types - stories of four women



Behati

34, husband and two daughters. She and her family moved to Addis Ababa because her husband works in the city. She also found work at the local primary school. She wants to live in a neighbourhood with facilities closeby, and a spacious apartment.



\$4000

Wishes

Dwelling:

- 3 bedroom apartment
- Choice of interior
- Outdoor space
- Housekeeper

Neighbourhood:

- Shops closeby
- Social contacts
- Safe playing areas
- Primary school
- Sport facilities



Nuru

24, divorced. Lives with her son, Ibo. She used to work at a pharmacy in a small village, but now wants to open her own hairdressing & beauty salon in the city. She wants to rent an apartment close to a possible rental shop area and daycare facilities and future schools for Ibo.



\$2100

Wishes

Dwelling:

- 2 bedroom apartment
- Outdoor space
- Choice of finishings

Neighbourhood:

- (Rental) shop space
- Daycare & playgrounds
- Social contacts
- Food market closeby
- Bars



Izara

26, married. They lived in an informal area in the city of Addis Ababa. Since she is pregnant and they want to start a family, they were looking for a house which can grow with them in the future. She works as a street vendor, selling coffee. Her husband works at a construction company.



\$1200

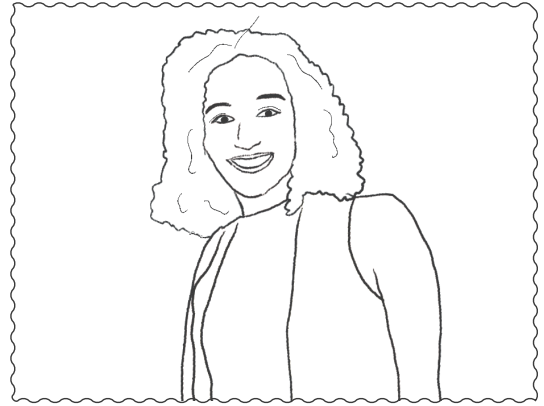
Wishes

Dwelling:

- Affordable & extendable
- Outdoor cooking space
- Storing space for street vending activities

Neighbourhood:

- Safe street vending zone
- Daycare & school
- Social contacts
- Food market closeby



Liya

18, single. Moved to Addis Ababa at age of 9 after her parents died. She has lived with her aunt, who didn't let her go to school. She escaped the house and started working at a bar. However, she doesn't like the job and wants to find a better job to pay for evening classes.



\$500

Wishes

Dwelling:

- Affordable 1 bedroom unit
- Social support

Neighbourhood:

- Job opportunities
- Evening school
- Social meeting spaces

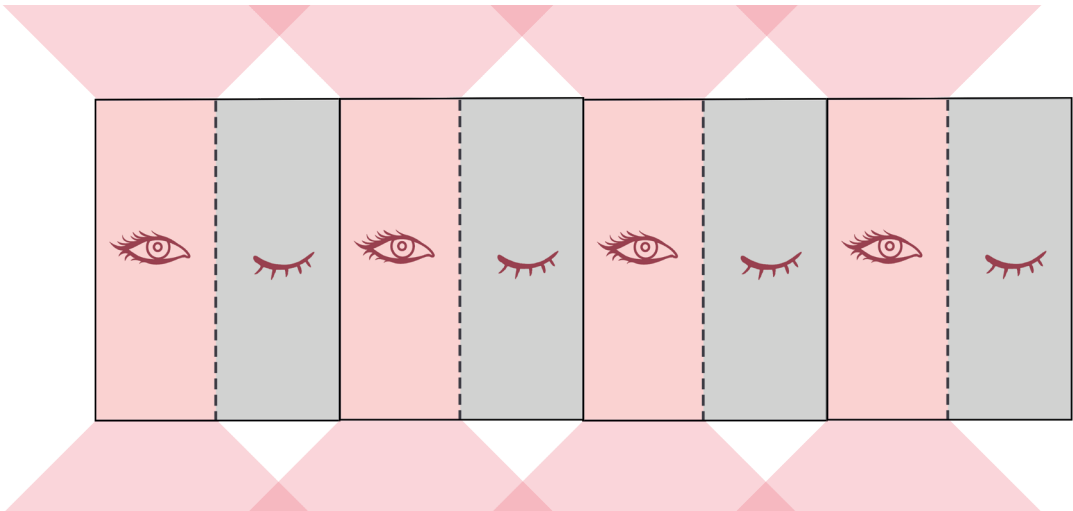
Floor plan design approach

The design of the floor plans of the dwellings can be used as an strategic element when it comes to creating safe streets and living environments connected to it. The concept of eyes on the street, with people guarding the streets also from inside their house, is implemented in the layout of the plans. The approach is a front to back active-passive floor plan scheme, which generates control over the streets and control over the (shared) courtyards. This way, nor the back nor the front will be neglected or be turned into a dangerous, deserted space.

The active side has the active rooms that are most intensively used during the day. In general, those are the kitchens, the dining rooms and the living rooms. The passive

side will house the bedrooms, bathrooms and storage rooms. Naturally, the actively used or less used spaces will differ for each income group or even per household. This strategy is used as a base for all dwelling plans within the project, where dwelling patterns for each income groups are taken into account. Moreover, the design of the facade openings is linked to the active and passive zones, with larger or openable doors and windows on the active side, and smaller, protected windows at the passive side.

When a building floor plan is showed in this chapter, the color codes (light pink and grey, as used below) will indicate the active and passive zones.



Active rooms

Kitchens, dining rooms, livingrooms, study rooms & balconies.



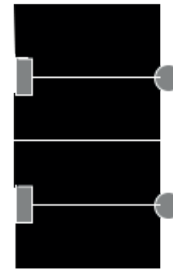
Passive rooms

Bedrooms, bathrooms & storage rooms.

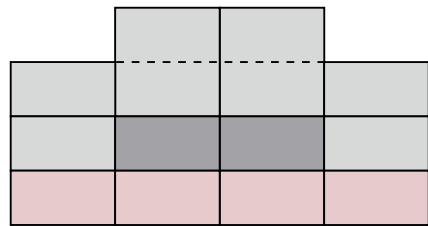
Behati - high income dweller

The portico apartment building contains apartments and maisonettes for middle to high income households. The building faces the large public spaces (scale 1 of the diagram shown on page 40). The ground floor responds to the surroundings with a (formal) commercial plinth. The upper levels house 2&3-bedroom apartments with balconies facing the busy street. At the back, there is an entrance for housekeepers or nanny's who are employed by middle or high income families.

The building will be constructed by a local contractor, whereafter a certain number of dwellings will be sold for house ownership. The other apartments will be assigned to tenants, for example for shorter stay migrants who come to Addis Ababa for seasonal work.

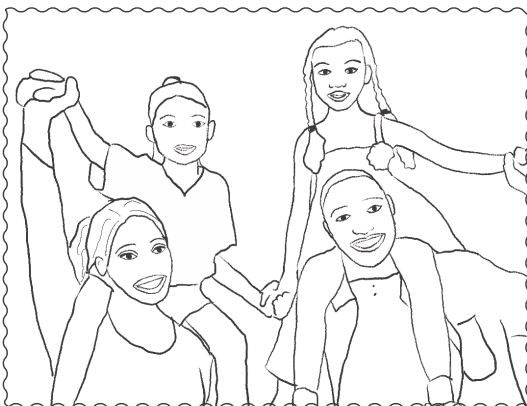


Portico
\$/middle-high
/Apartments & maisonettes



Elevation - rent / buy / commercial

The dwellers



Behati

34, husband and two daughters. She and her family moved to Addis Ababa because her husband works in the city. She also found work at the local primary school. She wants to live in a neighbourhood with facilities closeby, and a spacious apartment.

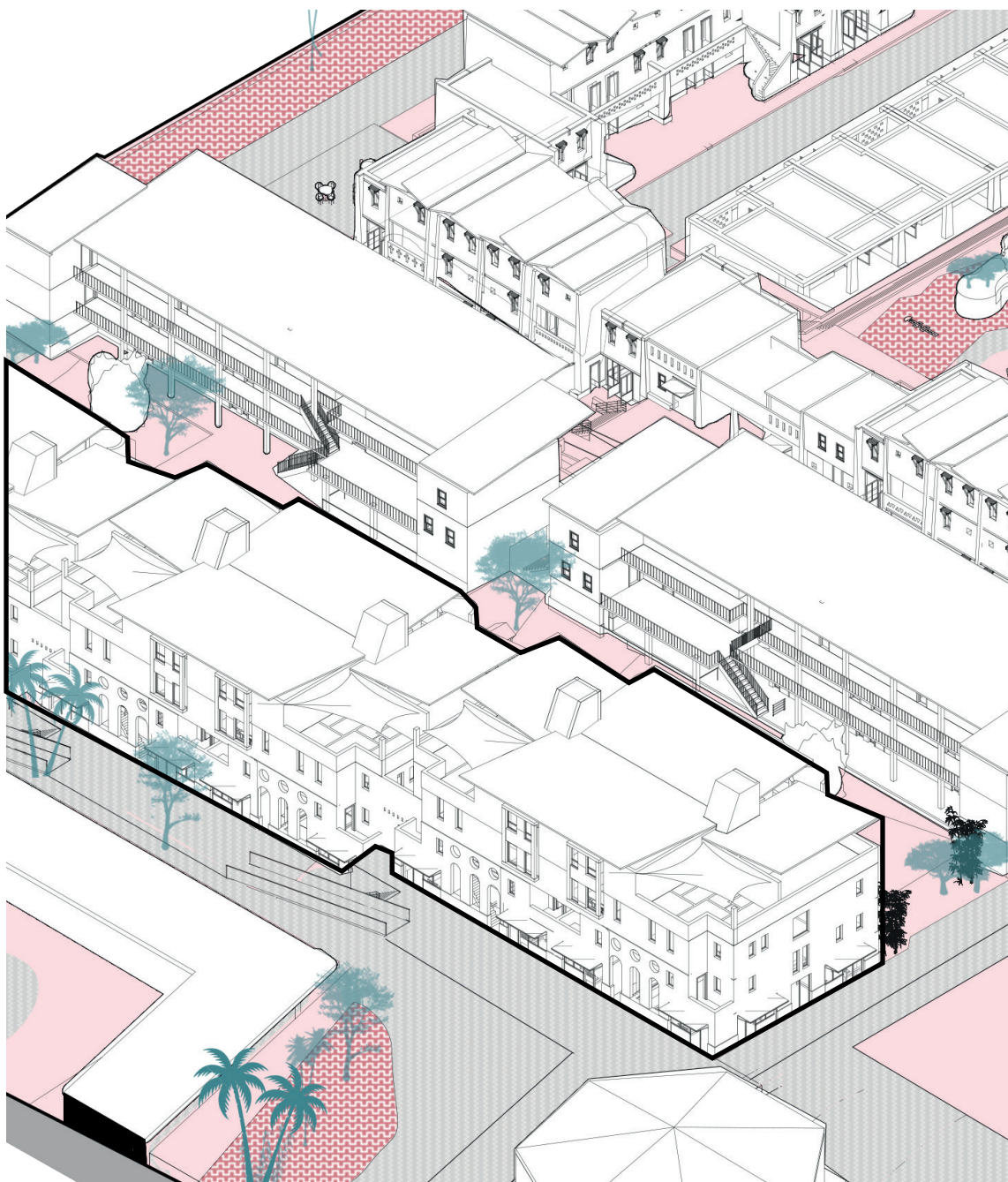


\$4000

Wishes

- Dwelling:
- 3 bedroom apartment
 - Choice of interior
 - Outdoor space
 - Housekeeper

- Neighbourhood:
- Shops closeby
 - Social contacts
 - Safe playing areas
 - Primary school
 - Sport facilities



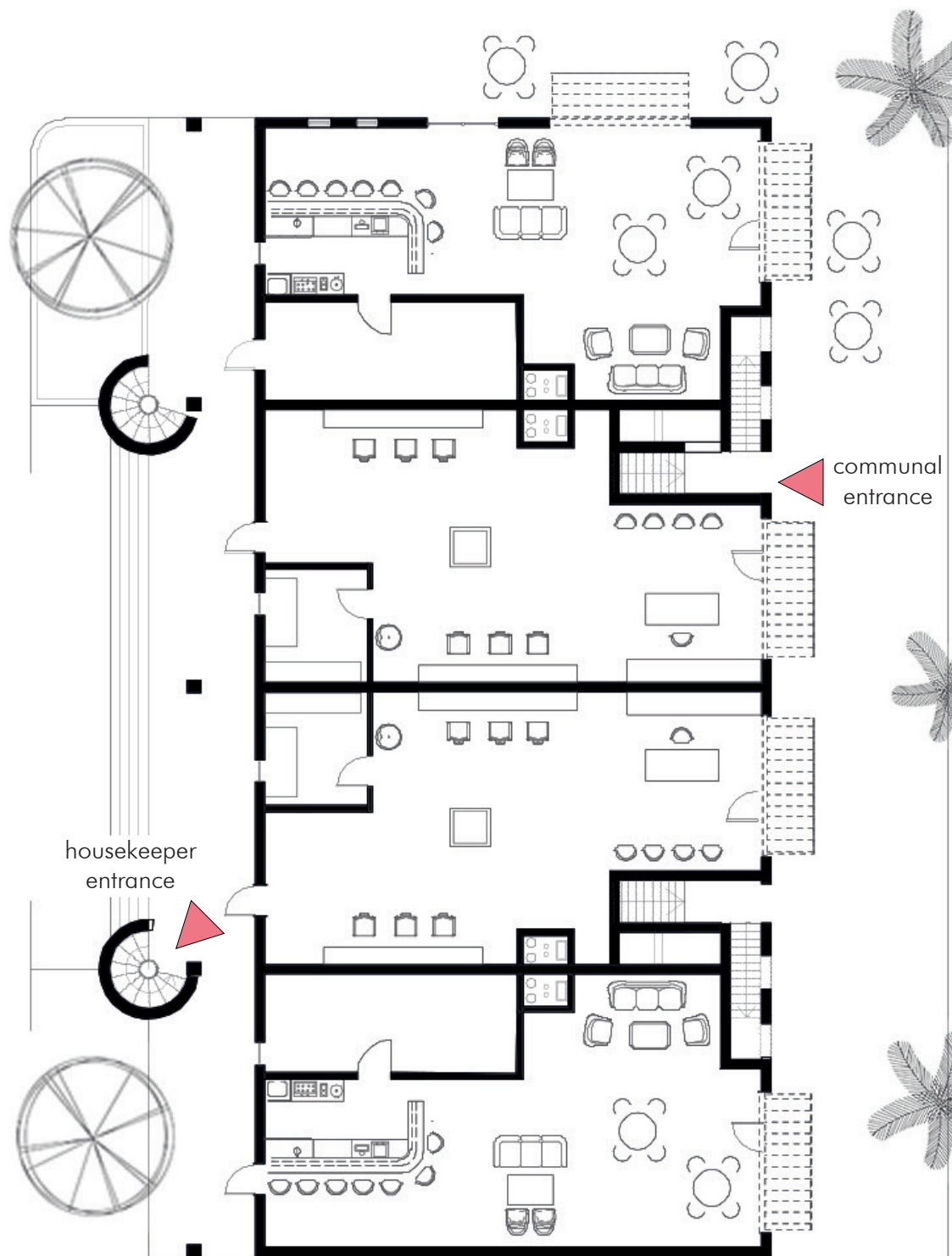
Location

Middle-high income building.



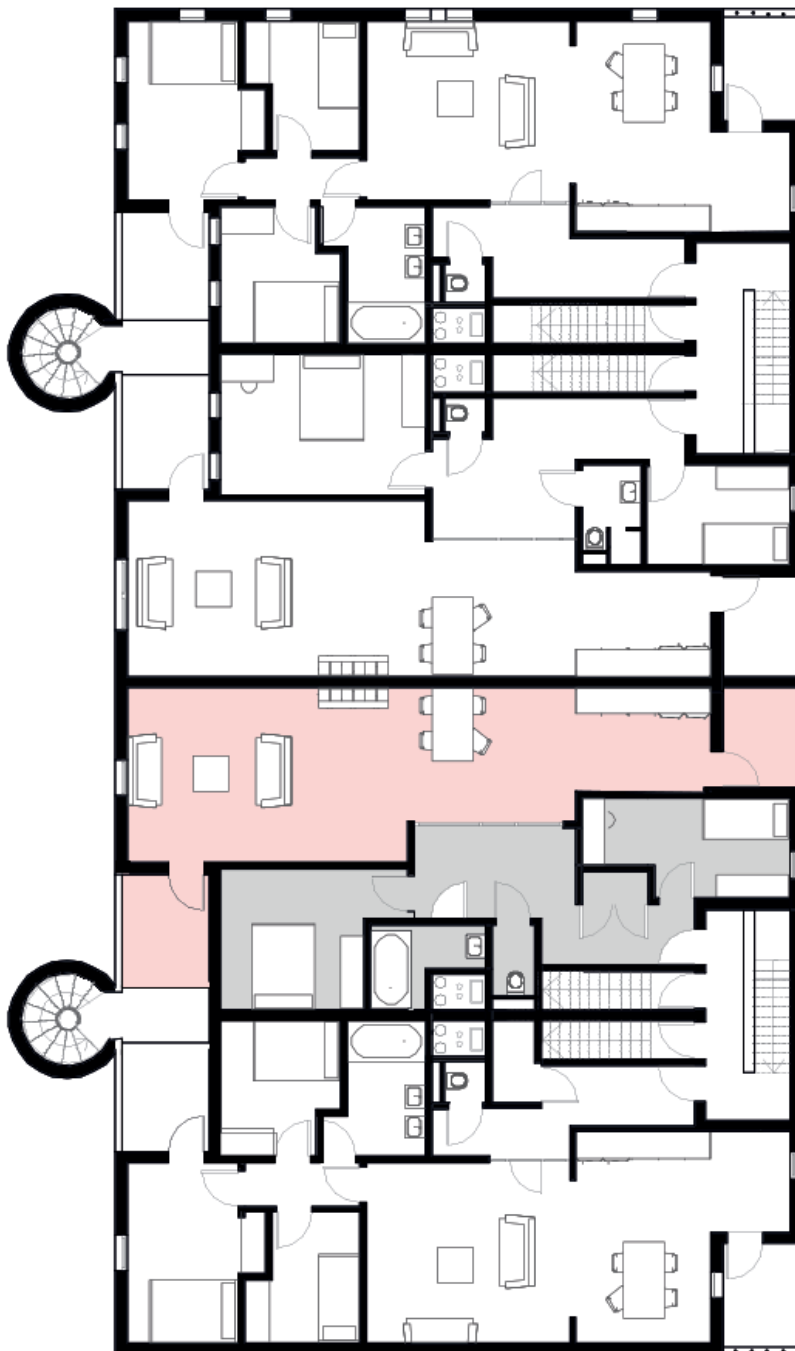
Cluster plan - Ground floor

Entrance of Behati's home.



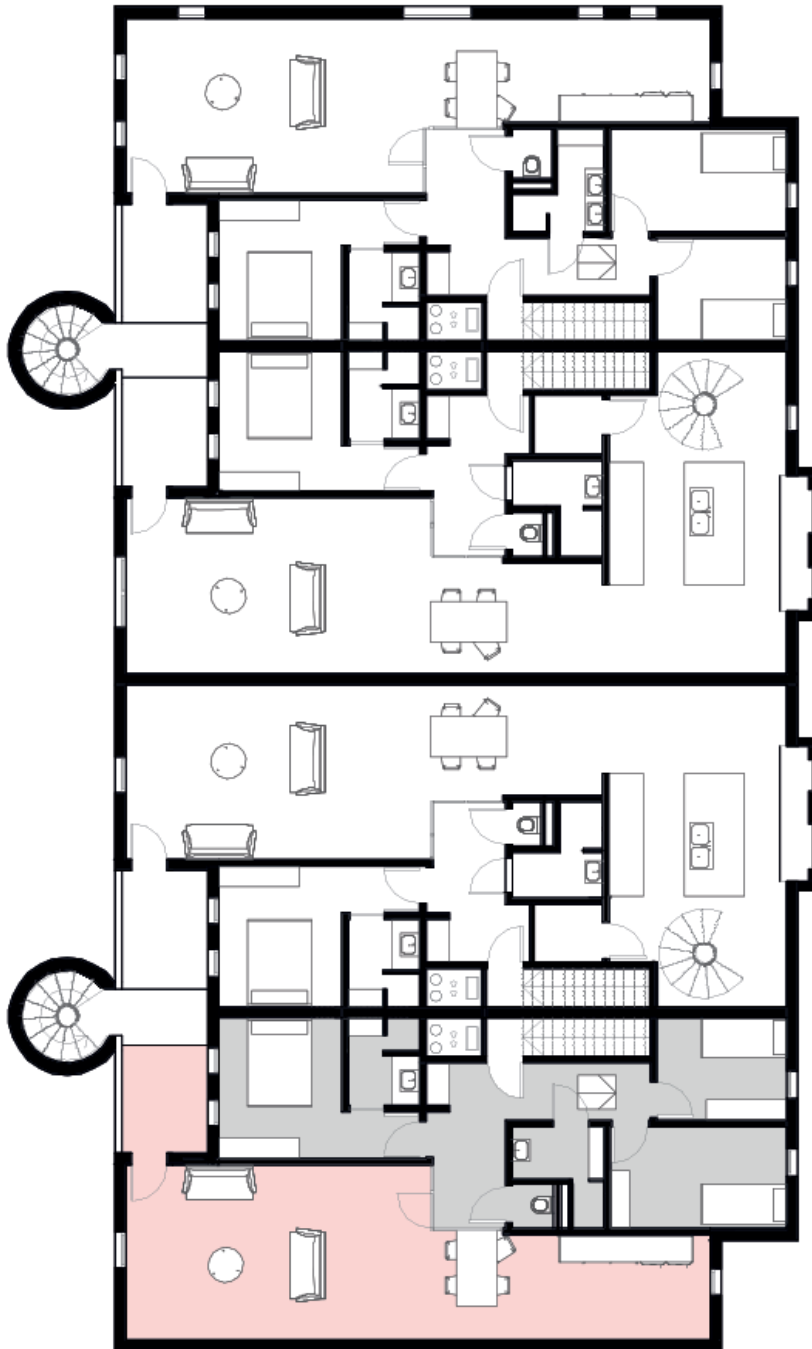
Ground floor - Commercial plinth

Portico building (middle to high income).



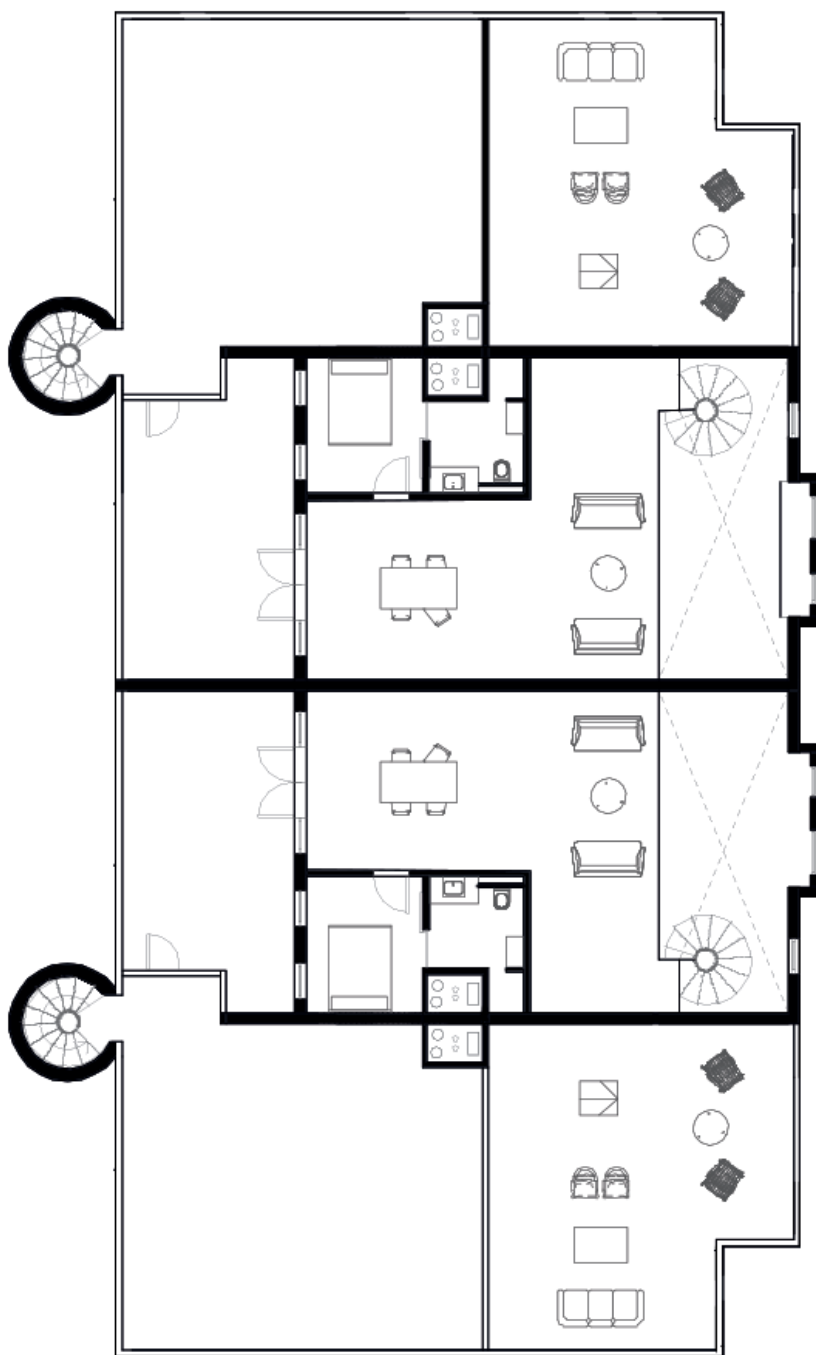
First floor - 2&3 bedrooms apartments

Protico building (middle to high income).



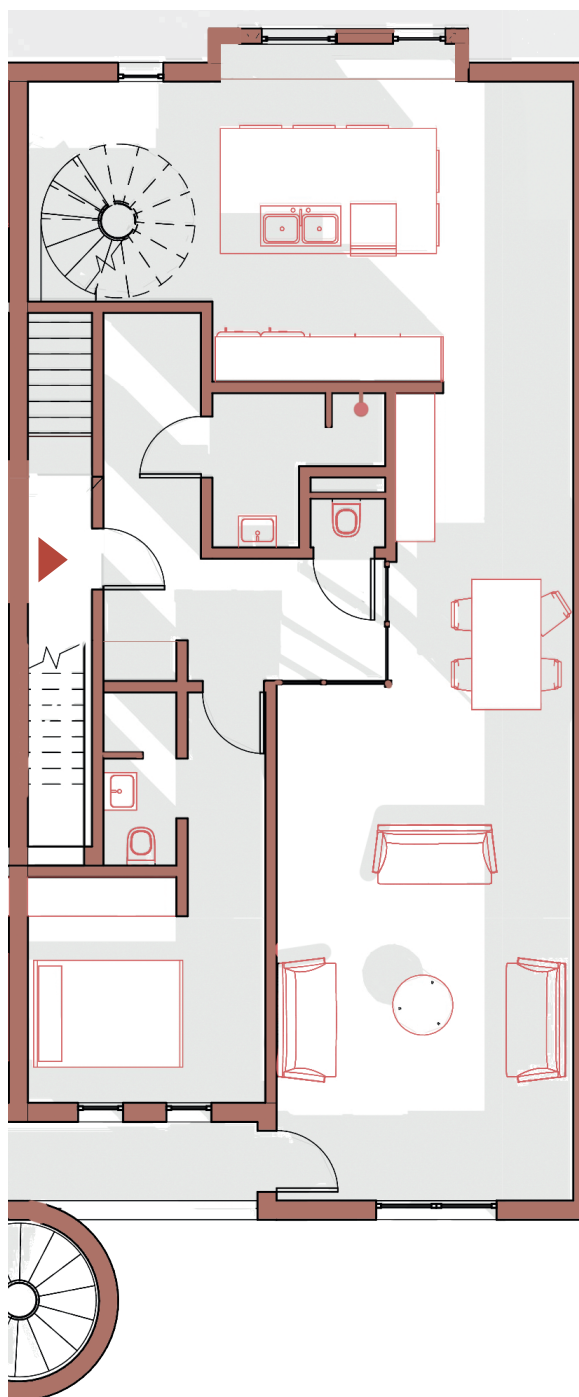
Second floor - 2&3 bedroom apartments, maisonettes

Protico building (middle to high income).



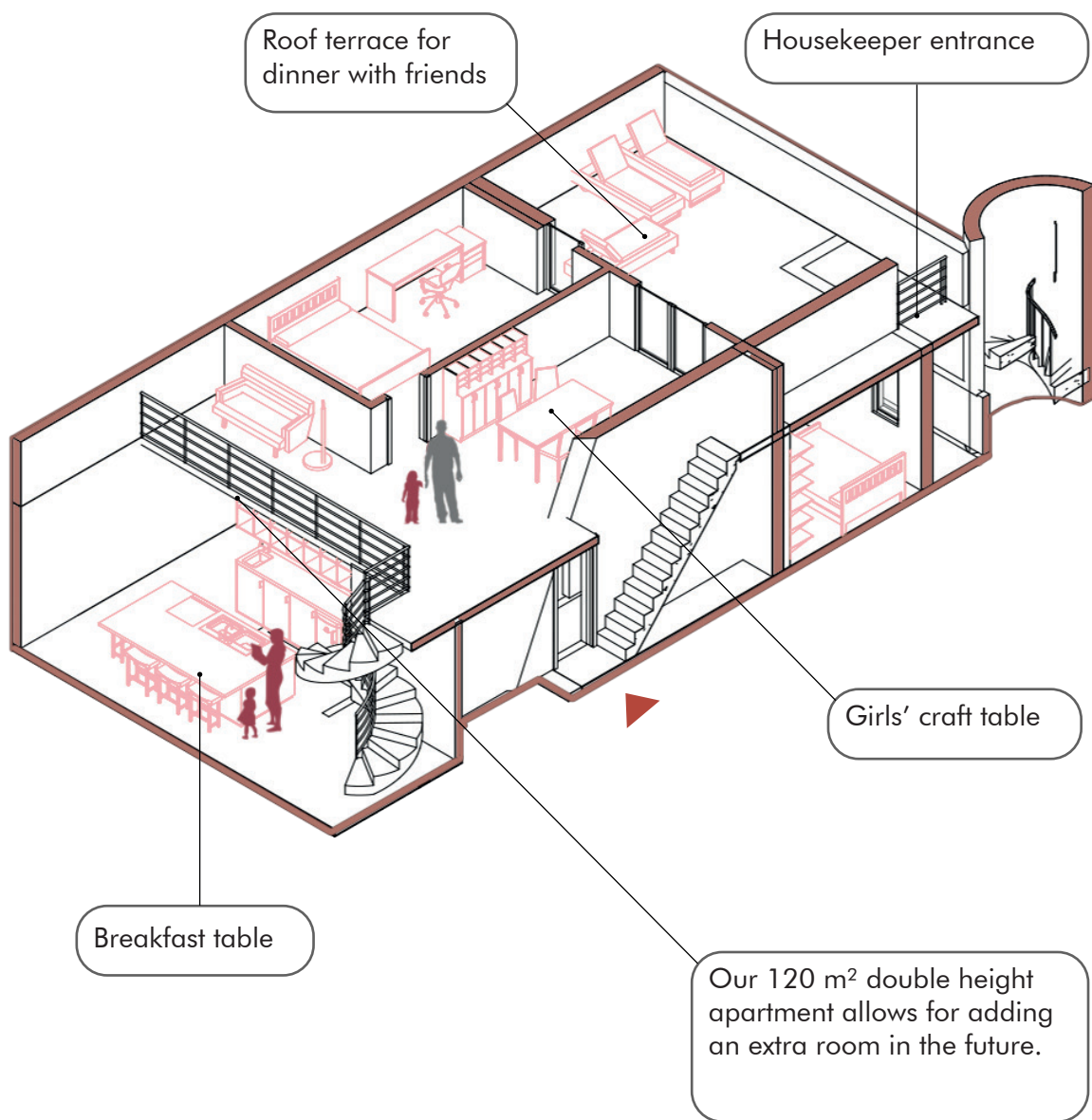
Top floor - Shared roof terraces, maisonettes, private roof terraces

Protico building (middle to high income).



Floor plan maisonette

High income unit.



Axonometric view

The family can choose the interior floor plan of their unit, as well as floor and wall finishings.



Facade

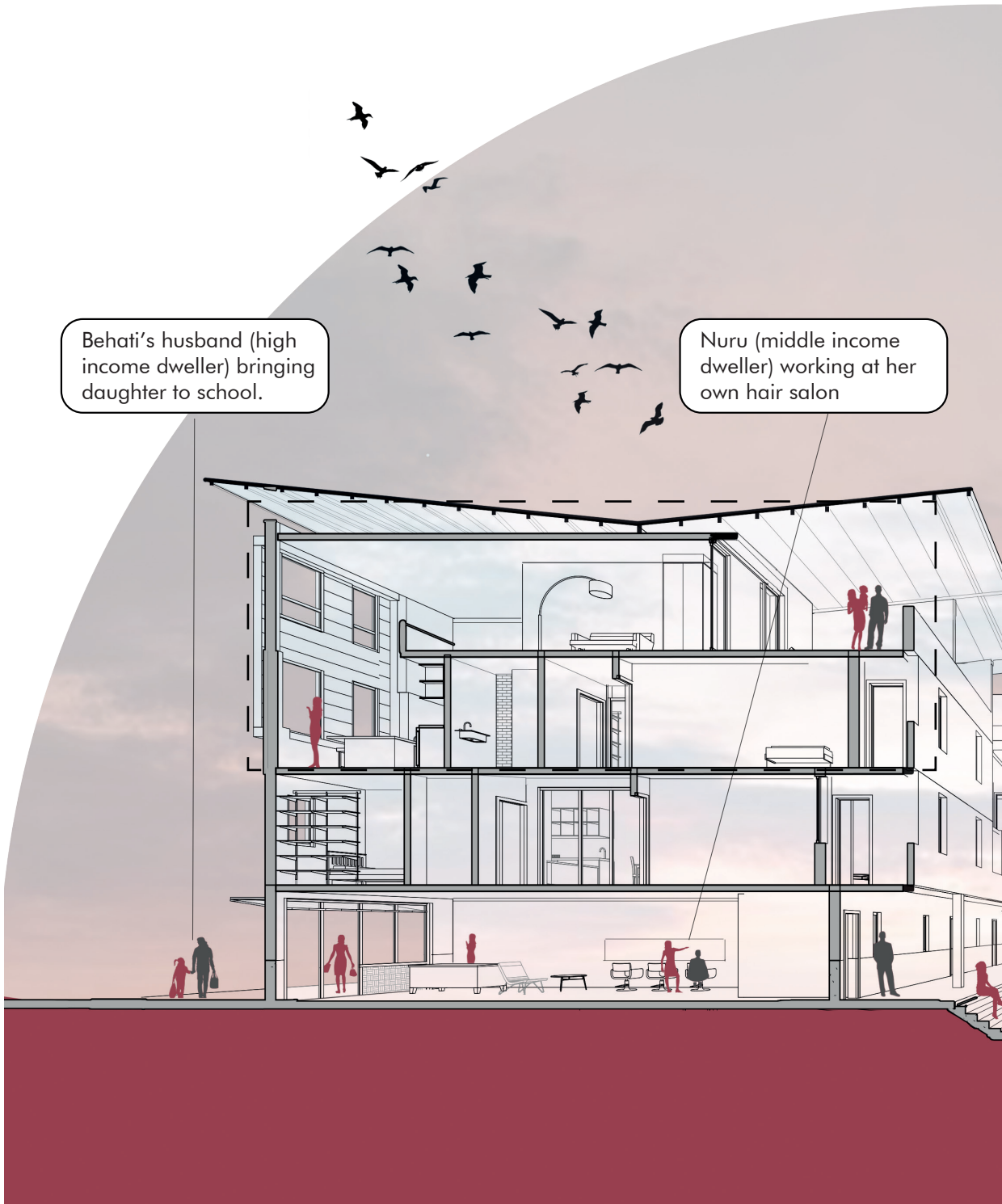
The building is build up with a concrete frame and adobe brick infill.



Section A

The residents have a private car parking at GF -1 level. The communal roof terrace can be entered from the outside stairs at the back.

Mixing income groups



Behati's husband (high income dweller) bringing daughter to school.

Nuru (middle income dweller) working at her own hair salon

Liya (low income dweller)
working as a domestic
at Behati's house (high
income dweller)



Nuru - middle-low income dweller

The units for middle and low income families are provided in a gallery apartment building. The unit sizes are varying from 28 m² studio's and 1-bedroom apartments to 54 m² 2-bedroom apartments. The ground floor studio's have a homeshop at the front which the dweller can use him/herself or choose to rent it out to someone else. The ground floor also houses a daycare for the neighbourhood and a communal activities room for all residents.

The gallery at the back connects all apartments and is widened at the central landing point, which allows for communal cooking, drying spices or a playing area for the youngest children.



Gallery
\$/Middle-low
/Apartments

The dwellers



Nuru

24, divorced. Lives with her son, Ibo. She used to work at a pharmacy in a small village, but now wants to open her own hairdressing & beauty salon in the city. She wants to rent an apartment close to a possible rental shop area and daycare facilities and future schools for Ibo.



\$2100

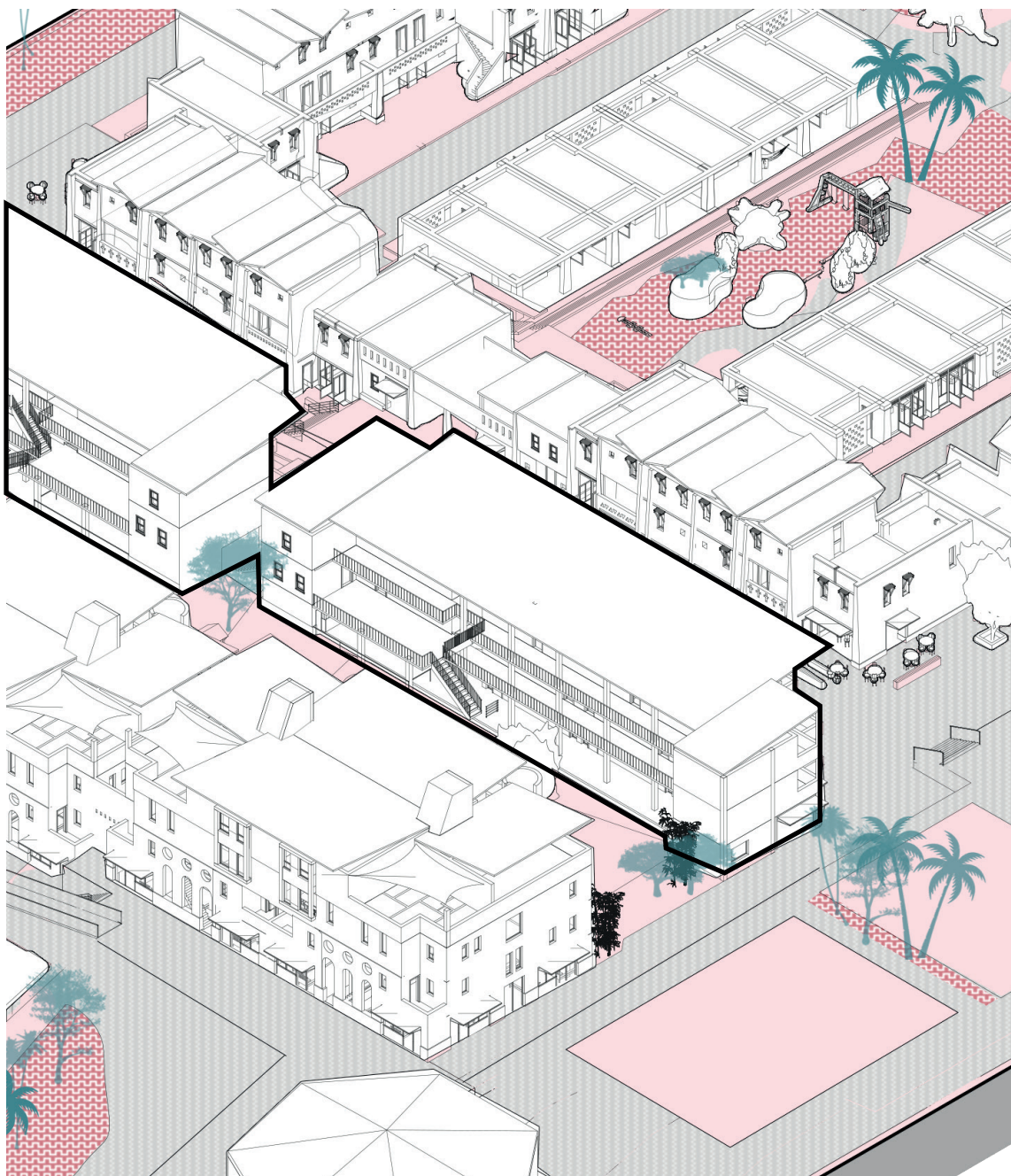
Wishes

Dwelling:

- 2 bedroom apartment
- Outdoor space
- Choice of finishings

Neighbourhood:

- (Rental) shop space
- Daycare & playgrounds
- Social contacts
- Food market closeby
- Bars



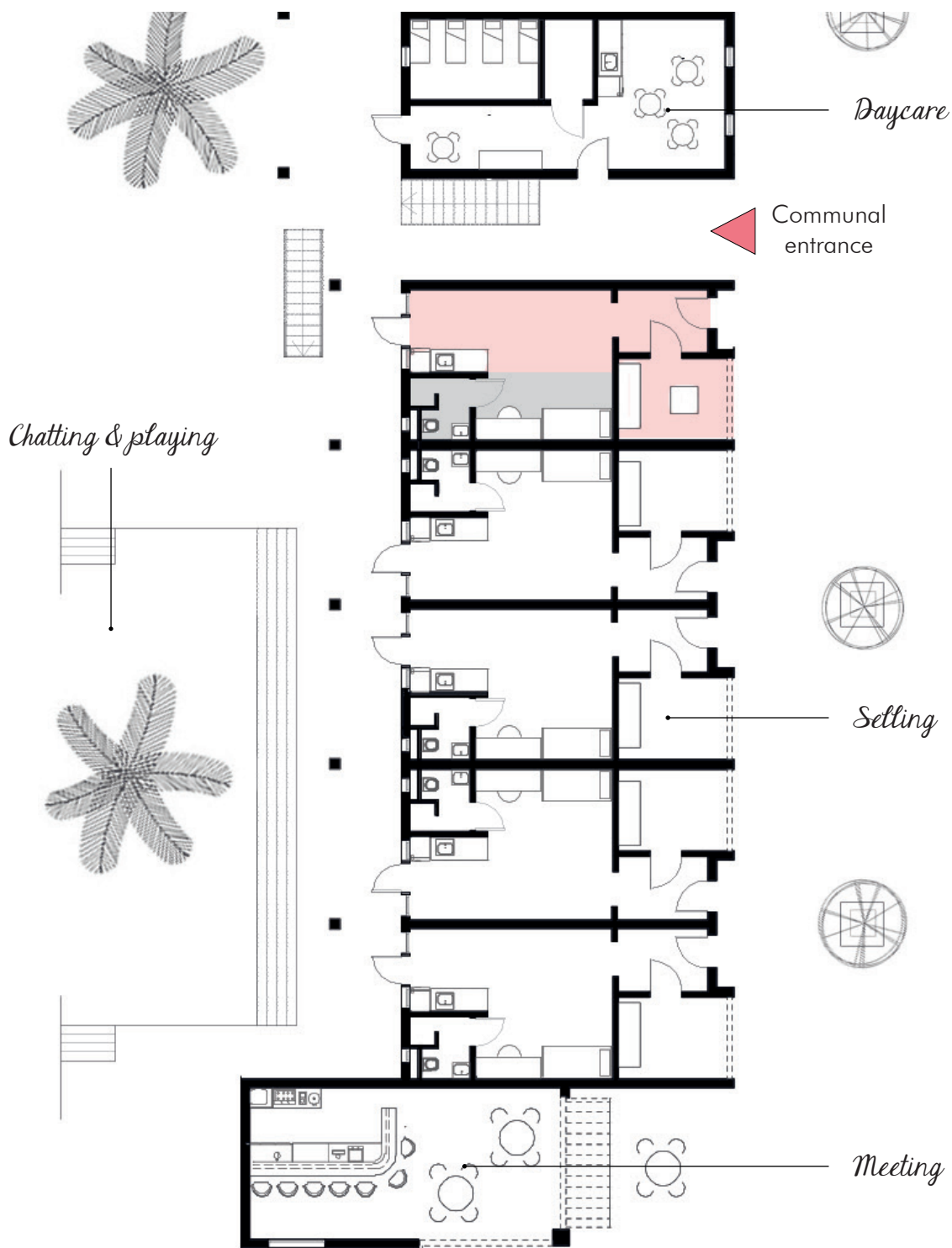
Location

Middle-low income building.



Cluster plan - Ground floor

Entrance to Nuru's home.



Ground floor - Commercial corners & home shops

Gallery building (middle to low income).

*Communal cooking/
playing area*



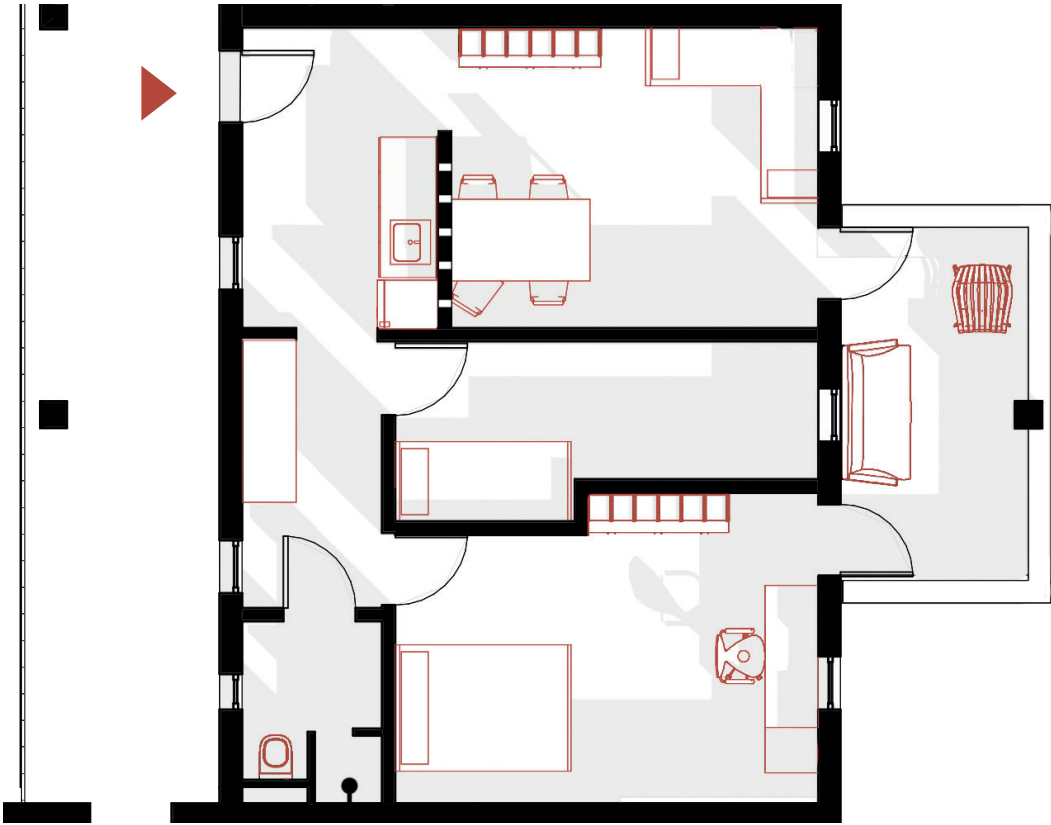
First floor - Studio's

Gallery building (middle to low income).



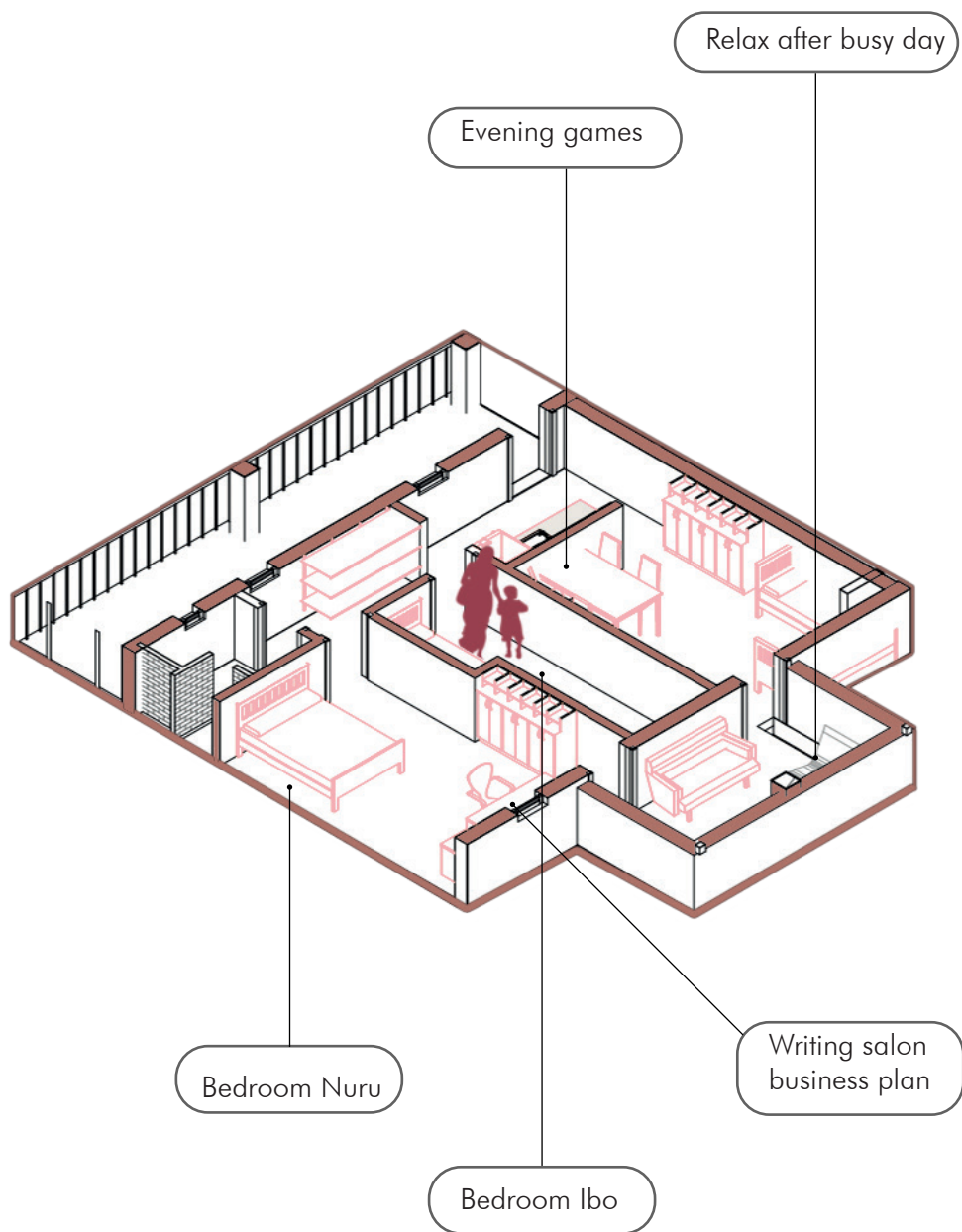
Second floor - 1&2 bedroom apartments

Gallery building (middle to low income).



Floor plan 2-bedroom apartment

Nuru and Ibo's unit.



Axonometric view

The unit layout has a fixed floor plan, but the family can decorate and choose the floor and wall finishings.

Mixing income groups



Nuru (middle income dweller)

Izara (low income dweller) working as street vendor, selling fruit & juices.

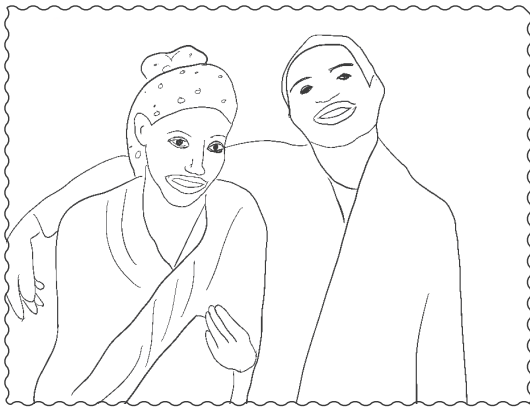


Izara - low income dweller

To provide low income families with affordable housing, they can opt for an incremental unit. The units are designed in such a way that the users finish them by themselves, according to their taste and needs. Incremental housing is a strategy of home ownership and creating a socially durable neighbourhood, as growing, extended families can enlarge their house instead of moving somewhere else.

To partly control the appearance of the houses in the neighbourhood, the community board will supervise the way users extend their house. The rule is to extend one part with the original building material (adobe). By doing this, load-bearing walls are being created and those can be filled in with self chosen materials.

The dwellers



Izara

26, married. They lived in an informal area in the city of Addis Ababa. Since she is pregnant and they want to start a family, they were looking for a house which can grow with them in the future. She works as a street vendor, selling coffee. Her husband works at a construction company.



Outside stairs
\$/low
/Incremental housing



\$1200

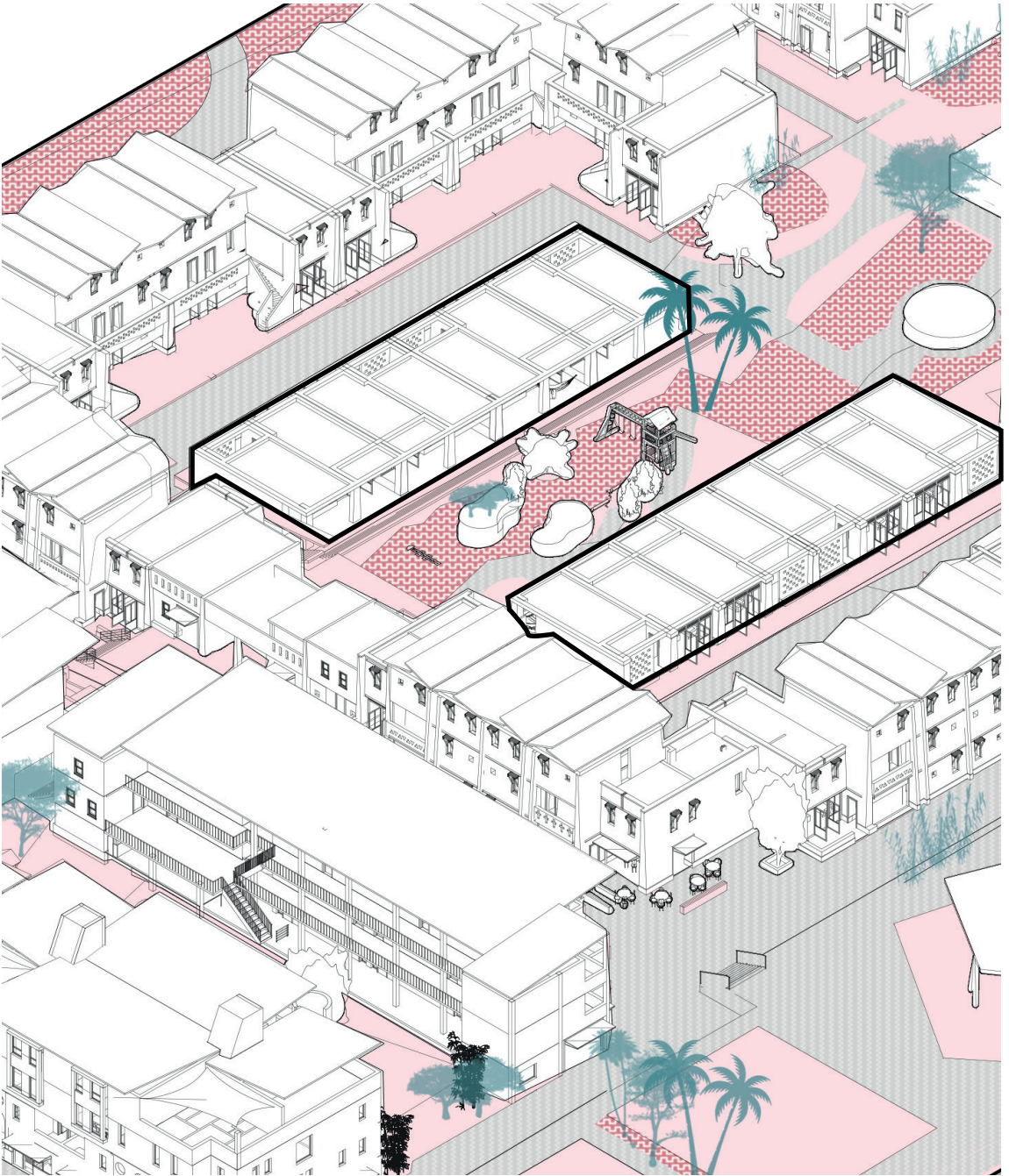
Wishes

Dwelling:

- Affordable & extendable
- Outdoor cooking space
- Storing space for street vending activities

Neighbourhood:

- Safe street vending zone
- Daycare & school
- Social contacts
- Food market closeby



Location

Low income incremental units.



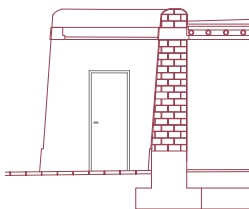
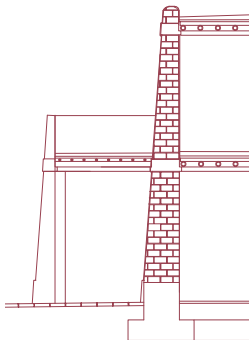
Cluster plan - Ground floor

Entrance to Izara's home.

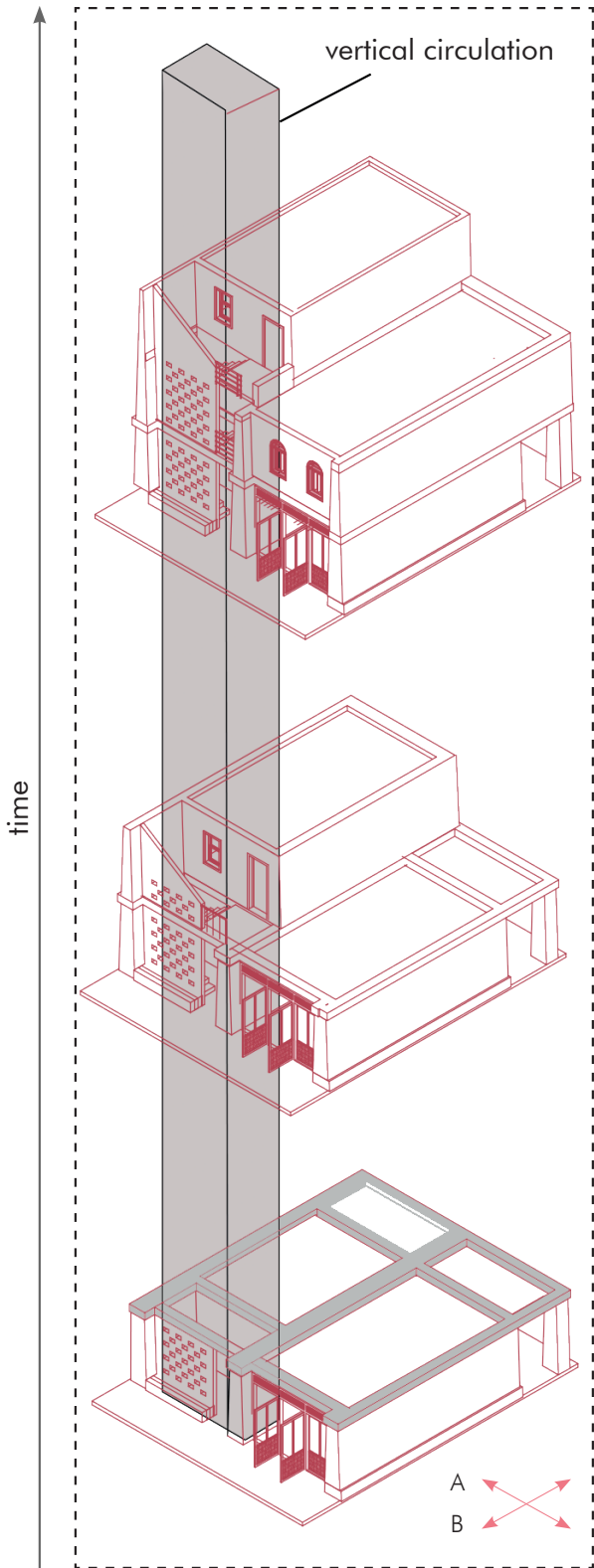
Extending the units



Section A



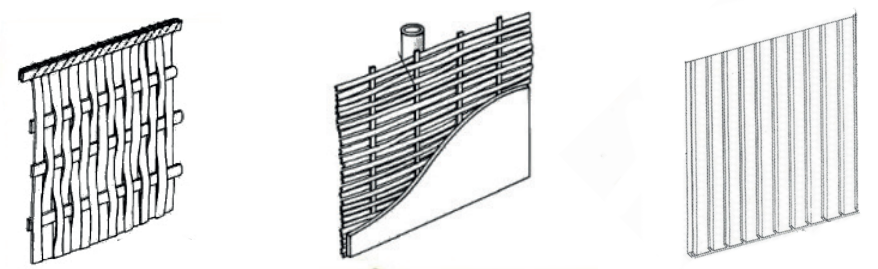
Section B



(Tesfalem Waldyes, 2008)



Woven bamboo wall, wattle & daub wall (livinspaces, 2017)
Corrugated steel sheet wall (Delune, 2021)



Common self-build materials

Woven bamboo walls, wattle&daub walls and corrugated steel sheets are the most used self-build materials.



Basic units



Possible extensions without rules



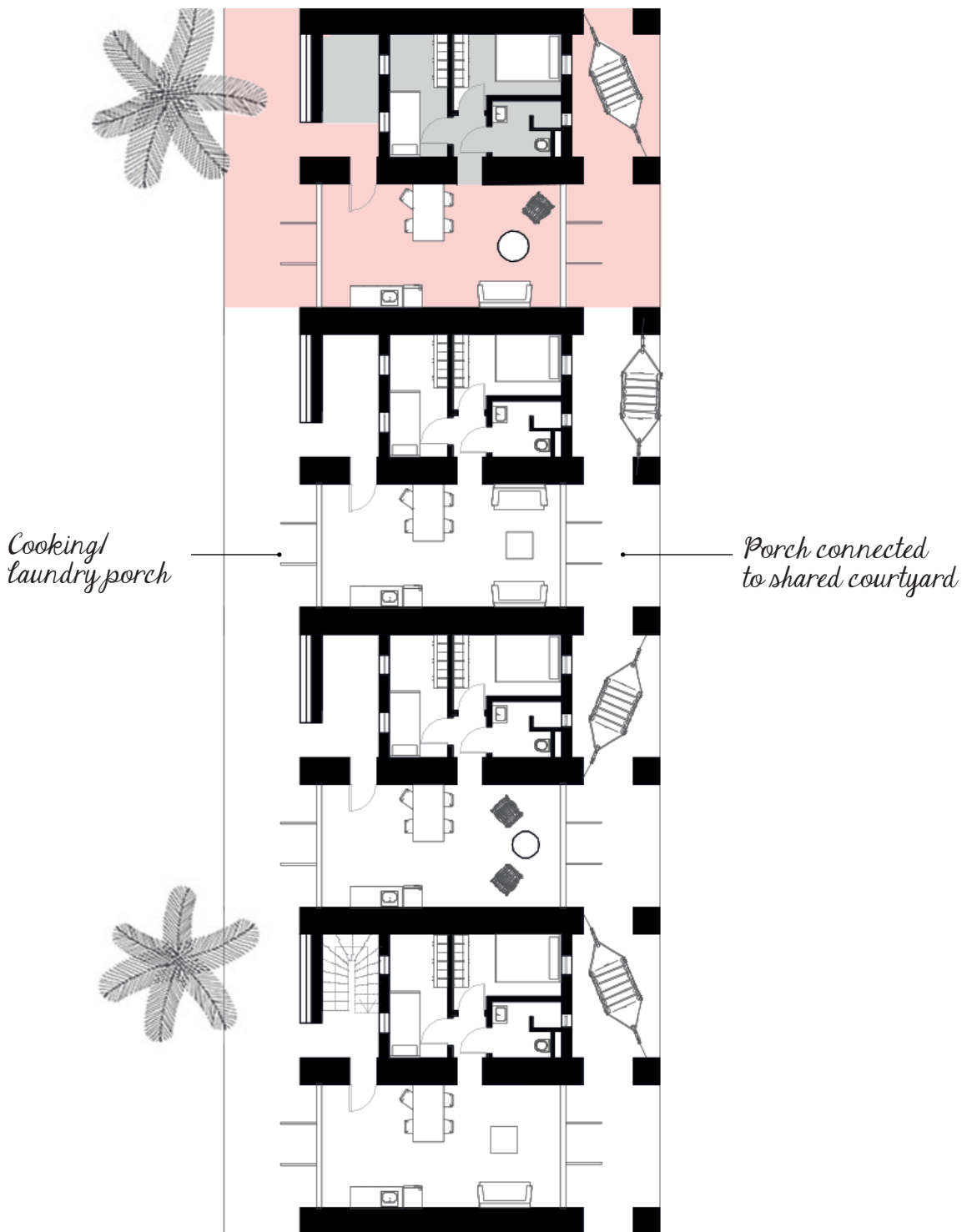
Rule of framework



Possible extensions with rules

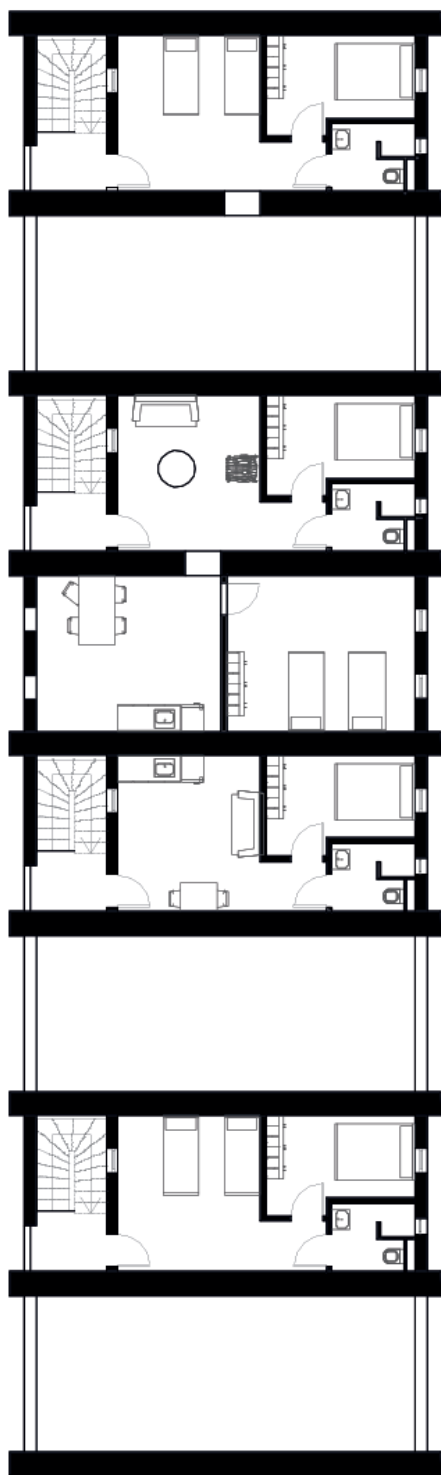
Incrementality over time

By setting the rule of an adobe framework, the appearance of the clusters can be controlled.



Ground floor plan

Incremental housing cluster.



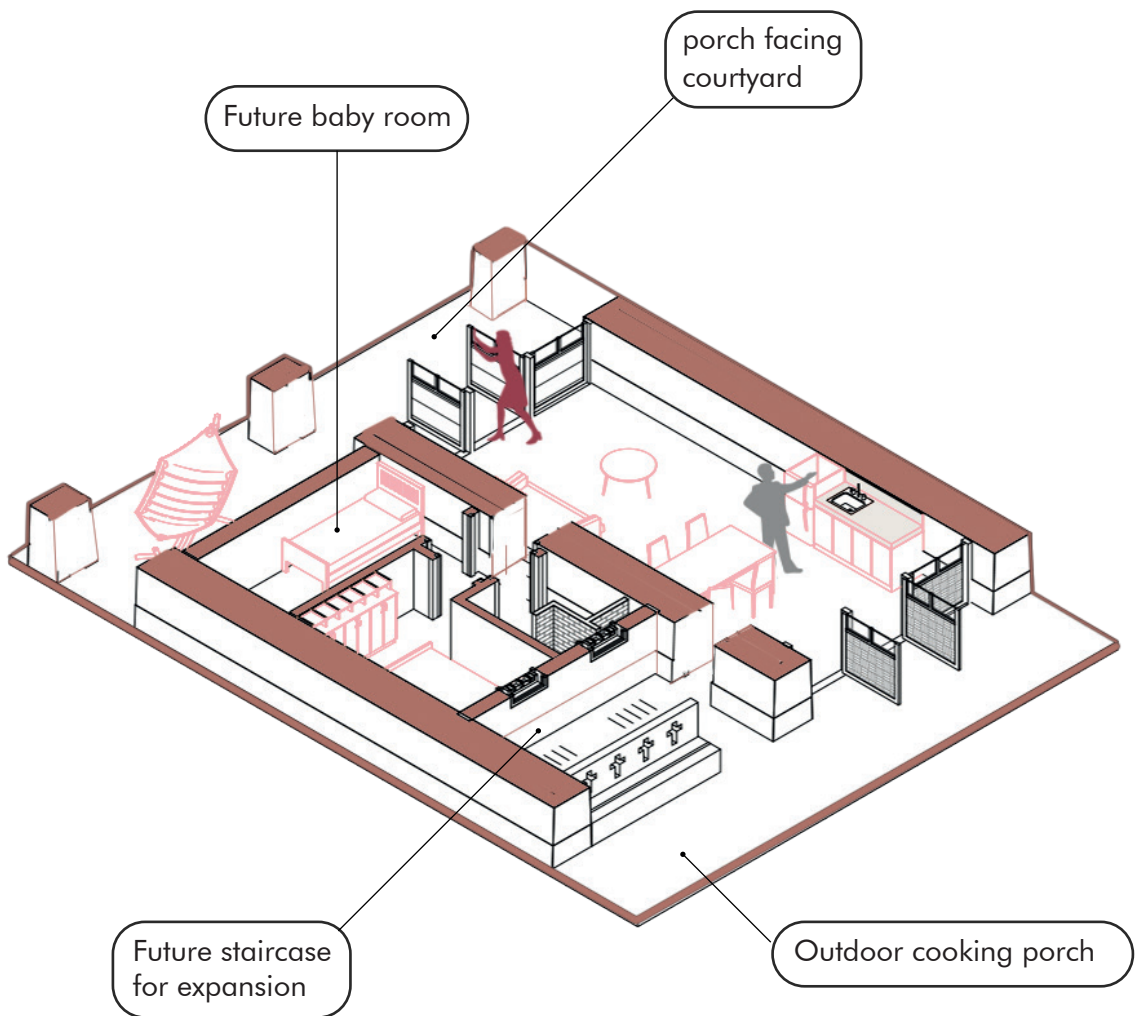
First floor plan (indicative)

Incremental housing cluster.



Floor plan

Incremental unit layout.



Axonometric view

The layout of the unit is fixed for the kitchen & bathroom. The future expansions are free of design.

Mixing income groups





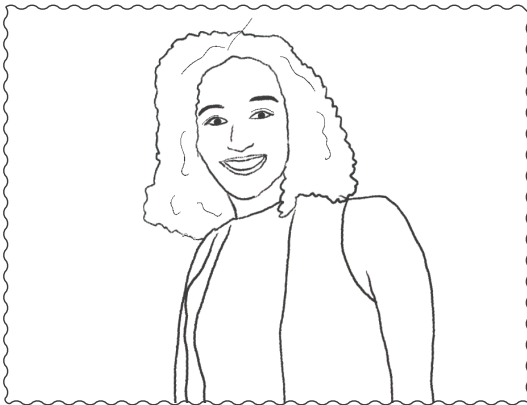
Liya - low income dweller

As described in the first chapter, for newcomers and especially female migrants who move to the city of Addis Ababa, it can be difficult to find your way. By the choice of a co-housing typology, the first and universal need of having a home could be one of the solutions to address this problem. In the co-housing units, 8 households can have access to an affordable private room. They share the communal living areas such as the kitchen, the living room and the dining room. They also own a communal homeshops where they can sell self-made products from the workshops or run their own business. Over time, if people move out, multiple rooms can be merged to create larger apartments.



Outside stairs
\$/low
/Co-housing

The dweller



\$500

Wishes

Dwelling:

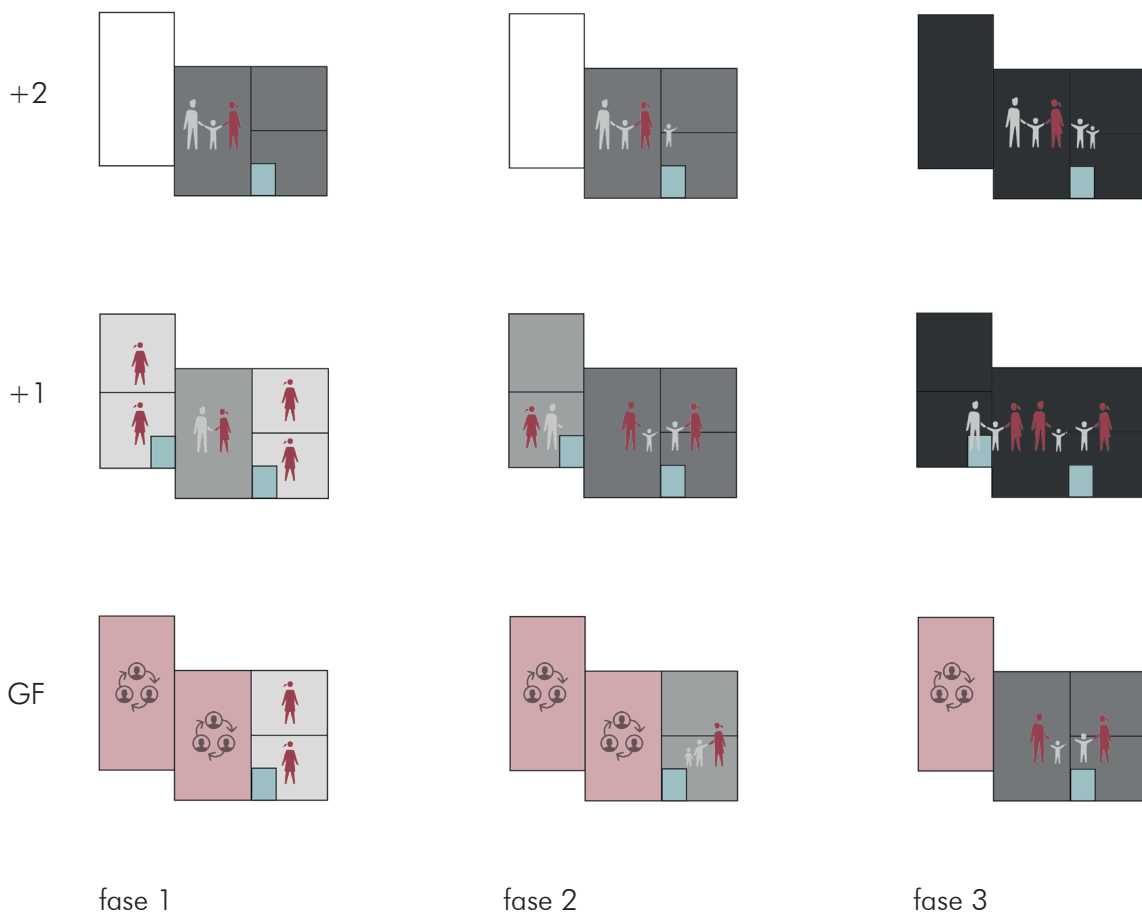
- Affordable 1 bedroom unit
- Social support

Neighbourhood:

- Job opportunities
- Evening school
- Social meeting spaces

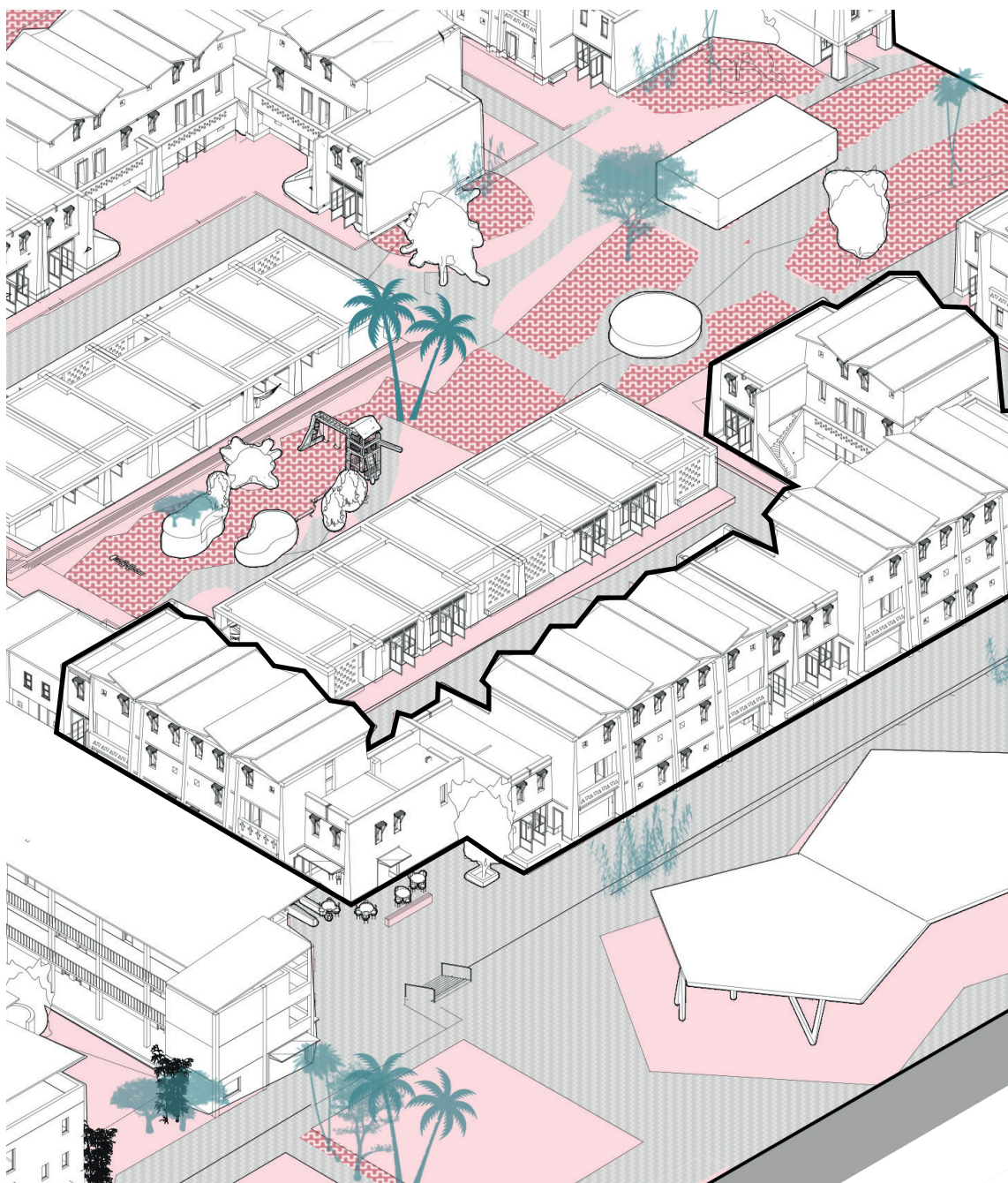
Liya

18, single. Moved to Addis Ababa at age of 9 after her parents died. She has lived with her aunt, who didn't let her go to school. She escaped the house and started working at a bar. However, she doesn't like the job and wants to find a better job to pay for evening classes.



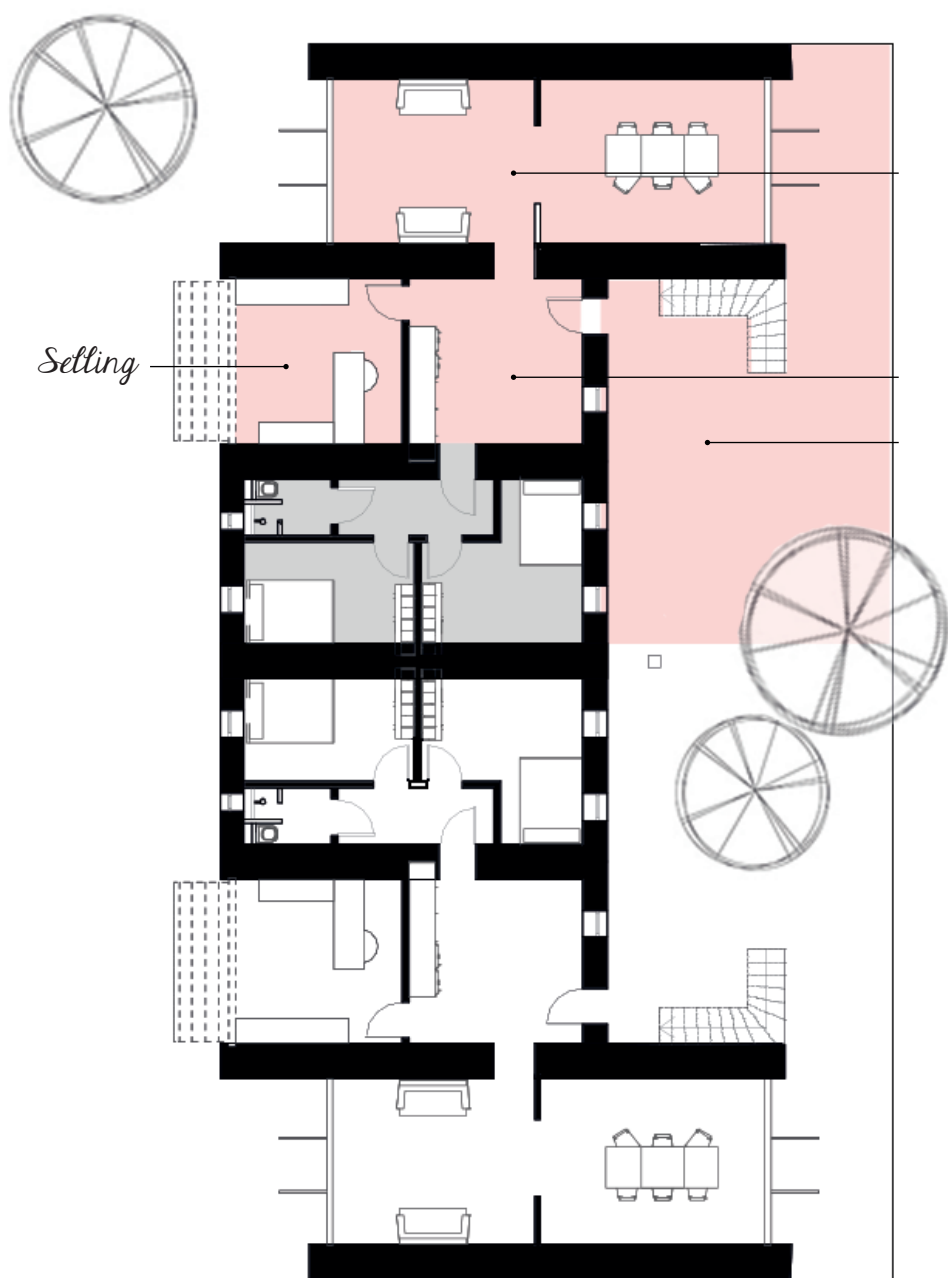
Co-housing over time

When the original dwellers decide to move to another apartment, the dwellers who stay can choose to merge rooms to enlarge their own unit.



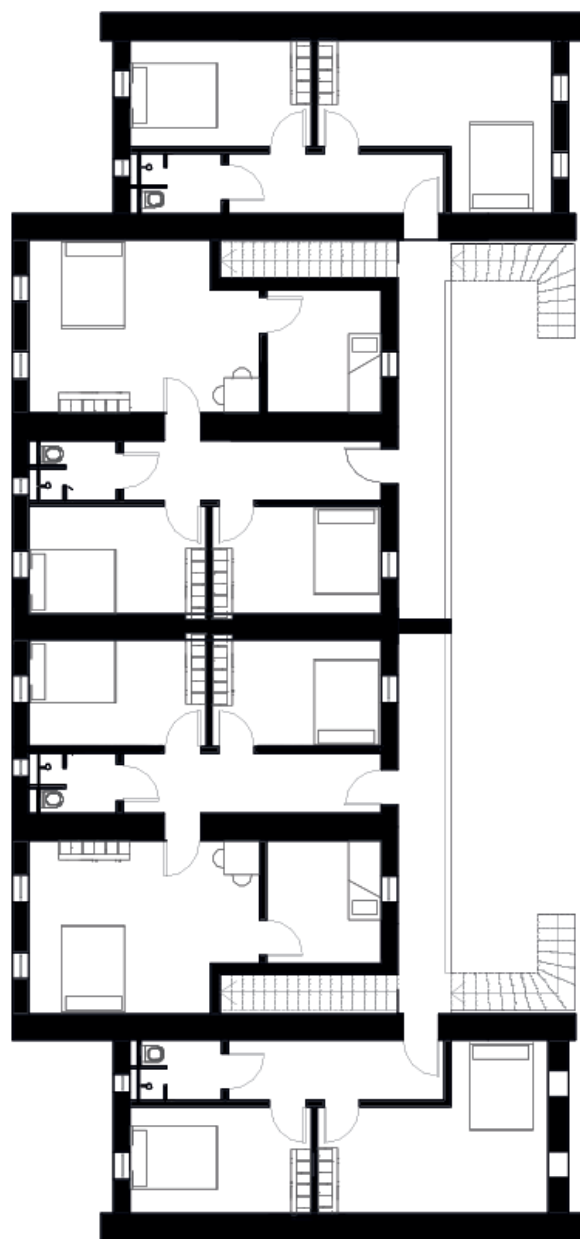
Location

Low income co-housing units.



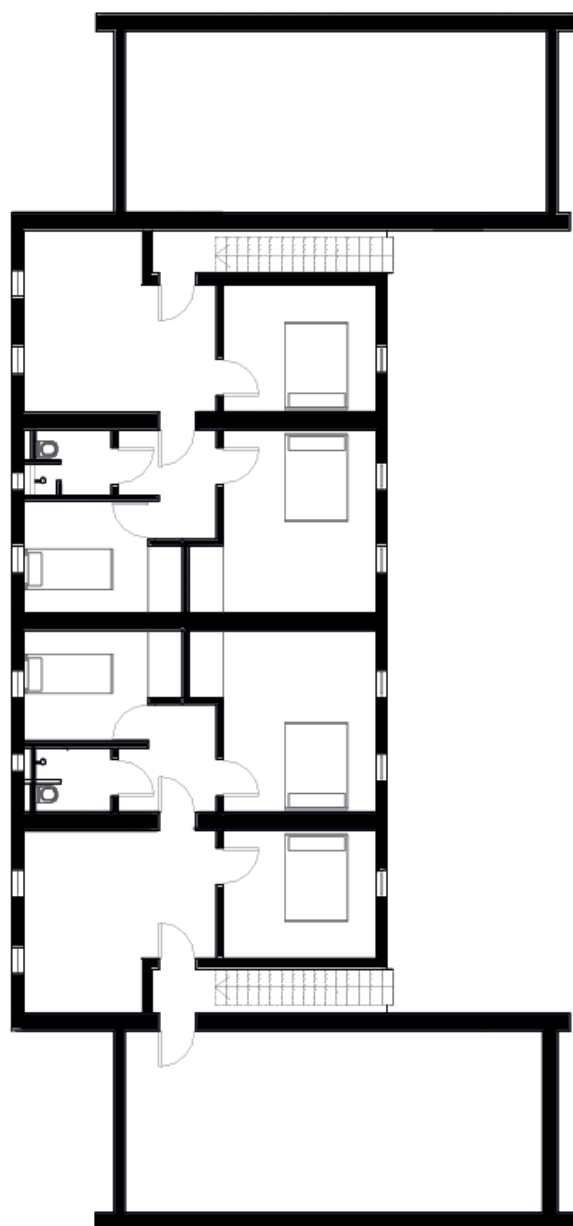
Ground floor plan

Co-housing cluster.



First floor plan

Co-housing cluster.



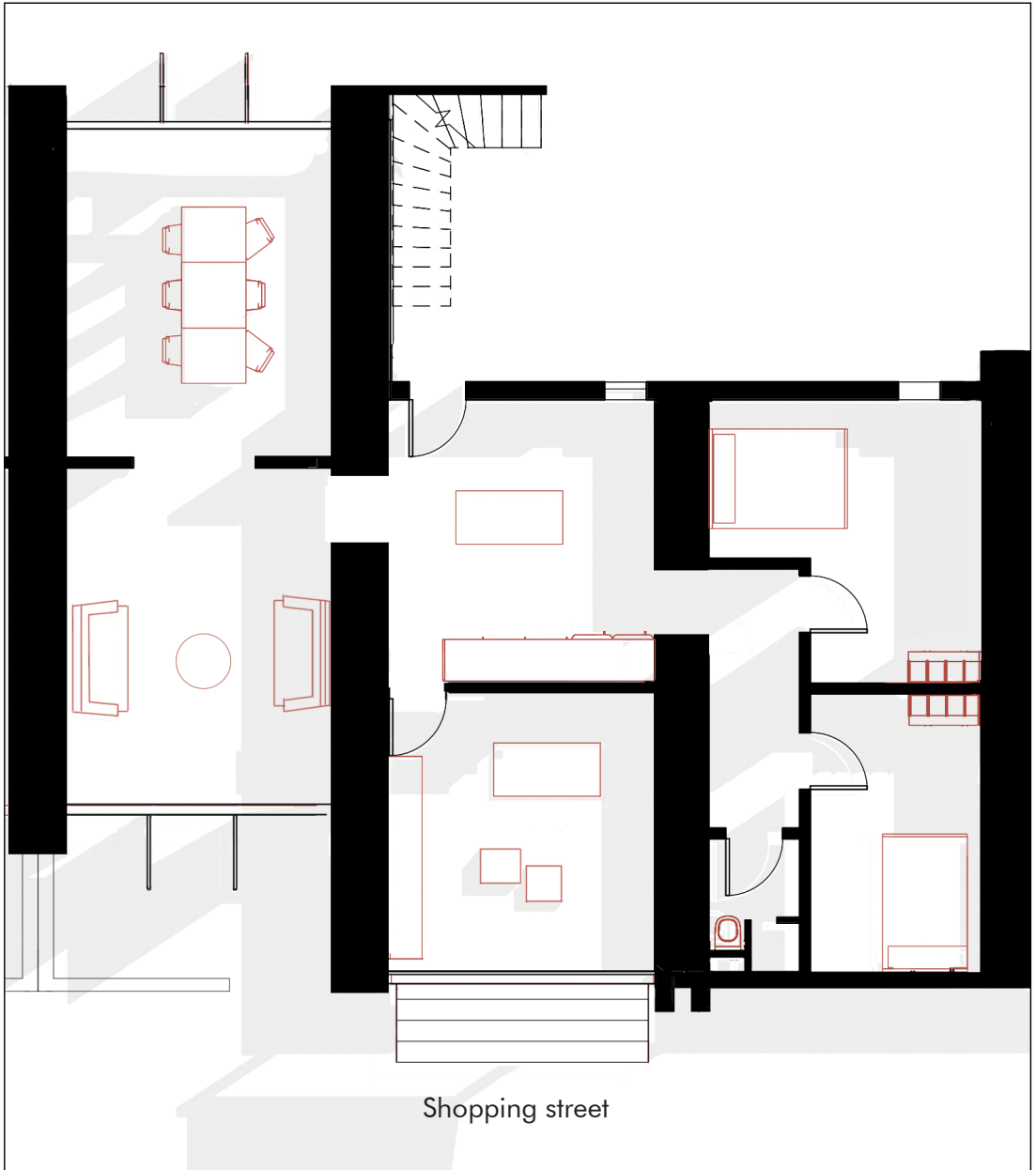
Second floor plan

Co-housing cluster.



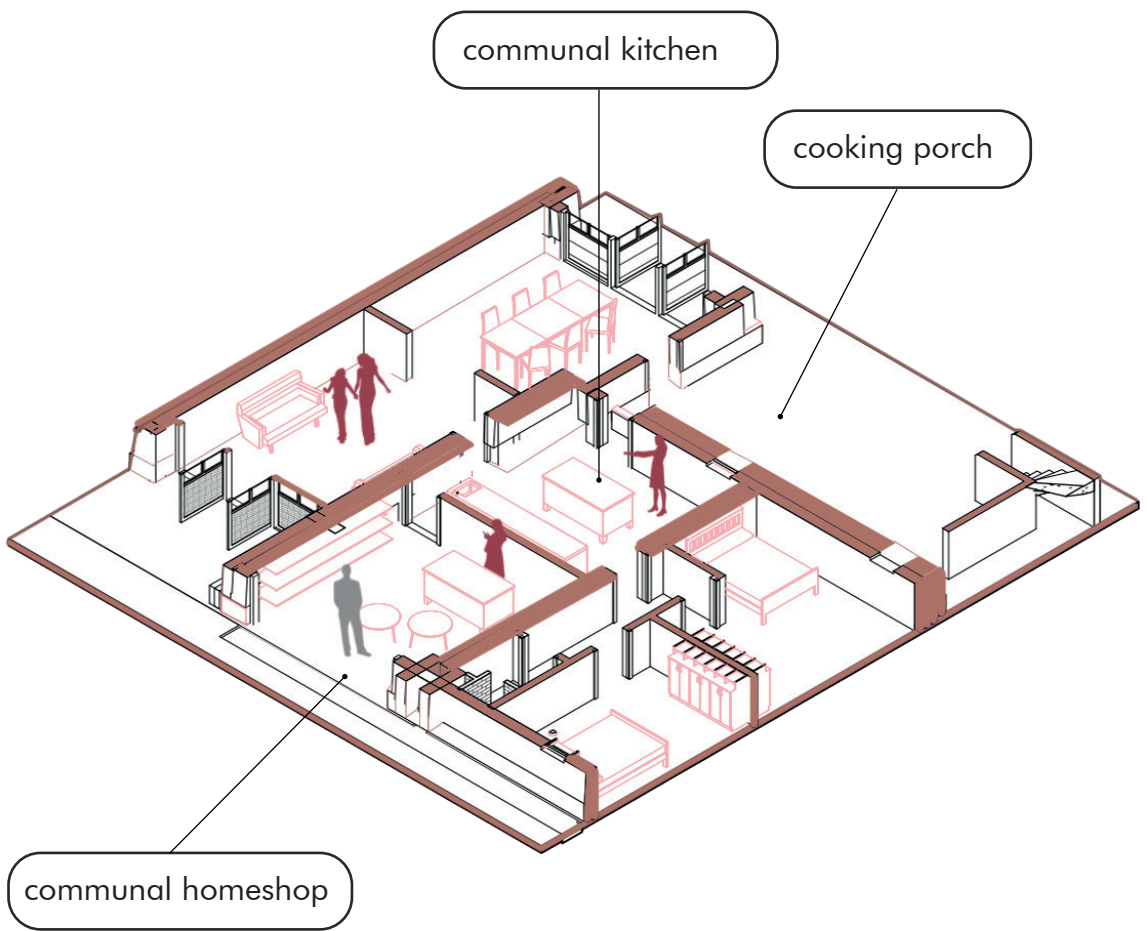
Cluster plan - Ground floor

Entrance Liya’s home.



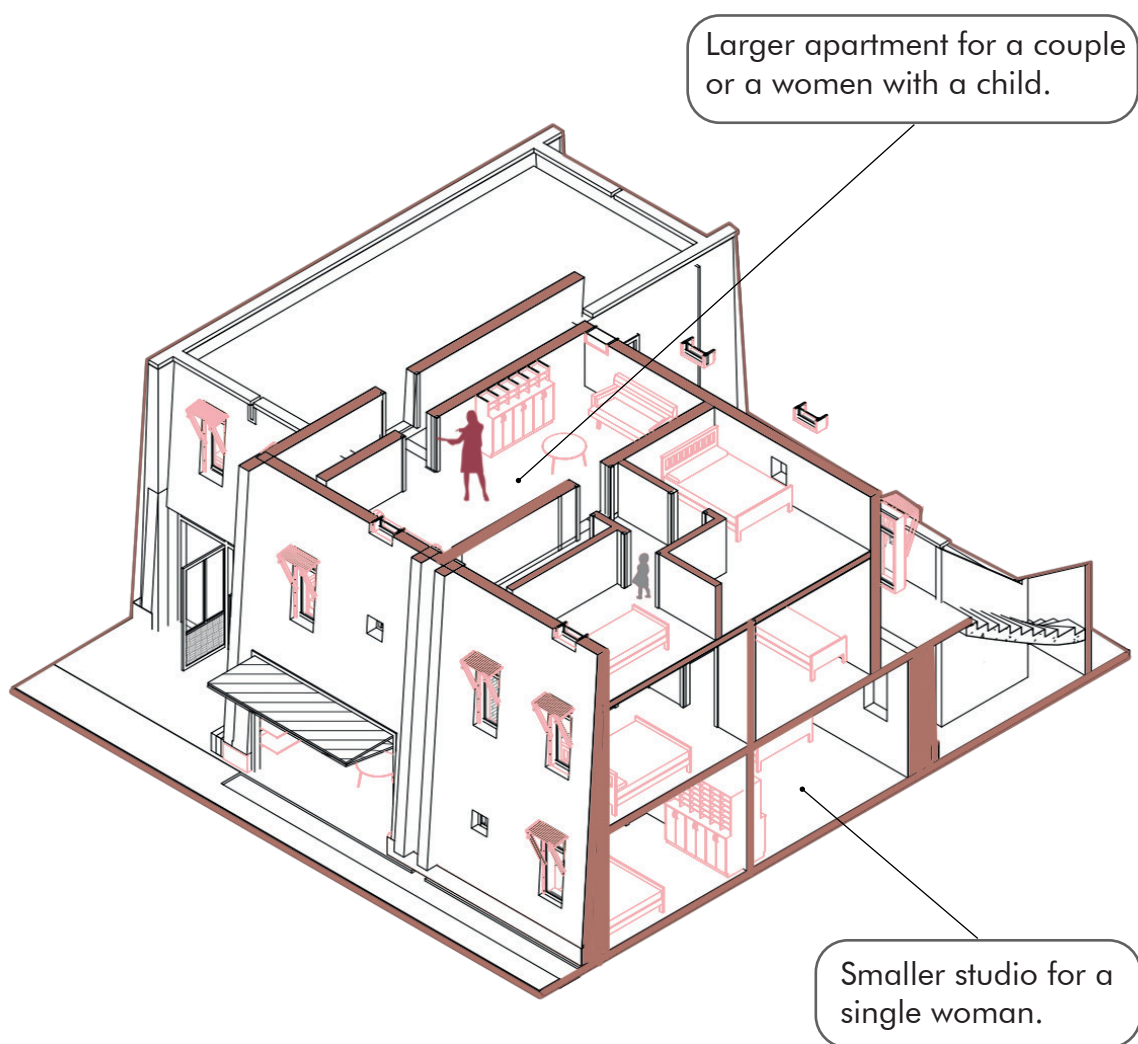
Floor plan

Co-housing unit.



Axonometric view

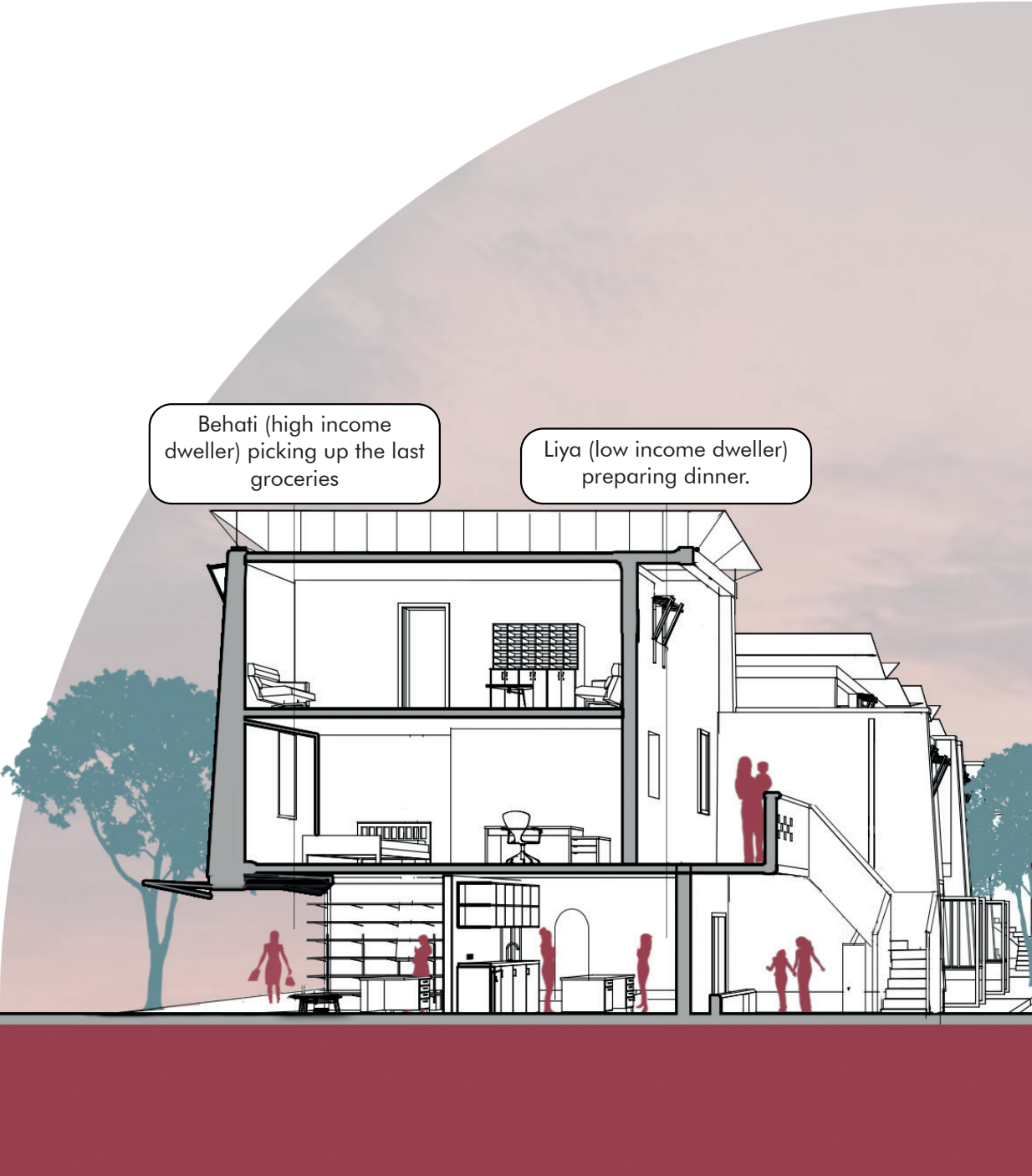
Co-housing building.



Axonometric view

Co-housing building.

Mixing income groups





Atmospheric impression of residential street





Atmospheric impression of commercial street





Designing residual spaces

The proposed housing scheme should be a replicable scheme, which means that it should be usable in different areas of Addis Ababa or even other fast growing cities in Ethiopia. Naturally, the specific site and topography should always be part of the design. However, there is always a chance of 'left-over' space where there is no room to create a meaningful housing cluster with the desired qualities. In the masterplan, those left-over spaces can also be depicted. This paragraph investigates the approach to those residual spaces and how to also make those areas of great quality and safe to walk home through.

General definitions for the term 'residual space' are described by Stevens and Frank; defining them as usually informal spaces lying outside the main stream of life and with lower levels of surveillance and control (Frank and Stevens, 2007). In addition, Ignasi de Sola-Morales refers to them as 'un-inhabited, unproductive, foreign to the urban system' spaces, prescribed by 'Terrain vague' (Morales, 1995), whereas

Groth and Corijn refers to those spaces as 'intermediate spaces' (Groth and Corijn, 2005).

Residual spaces are often uncontrolled and therefore, they have the danger of being acted upon, either in a good way or a bad way. They become appropriated by users to host varying activities. It is difficult to predict how these areas will be treated if left empty. Therefore, those spaces can't be let out of the design, since the project theme is to secure girls and women who have to walk through these streets. By designing these spaces, they can become more attractive to different groups of people, creating activity through the day.

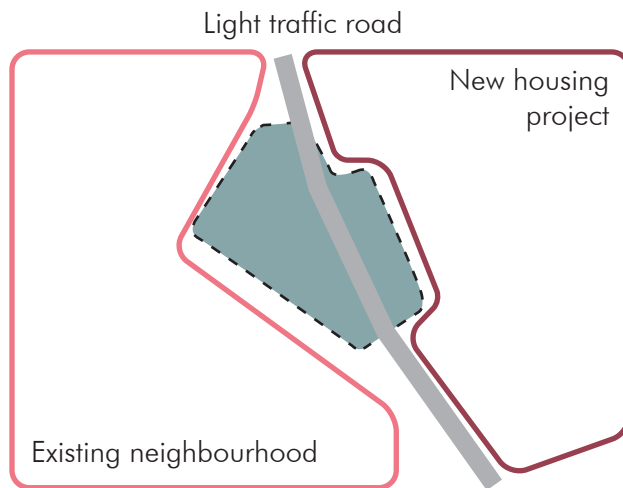
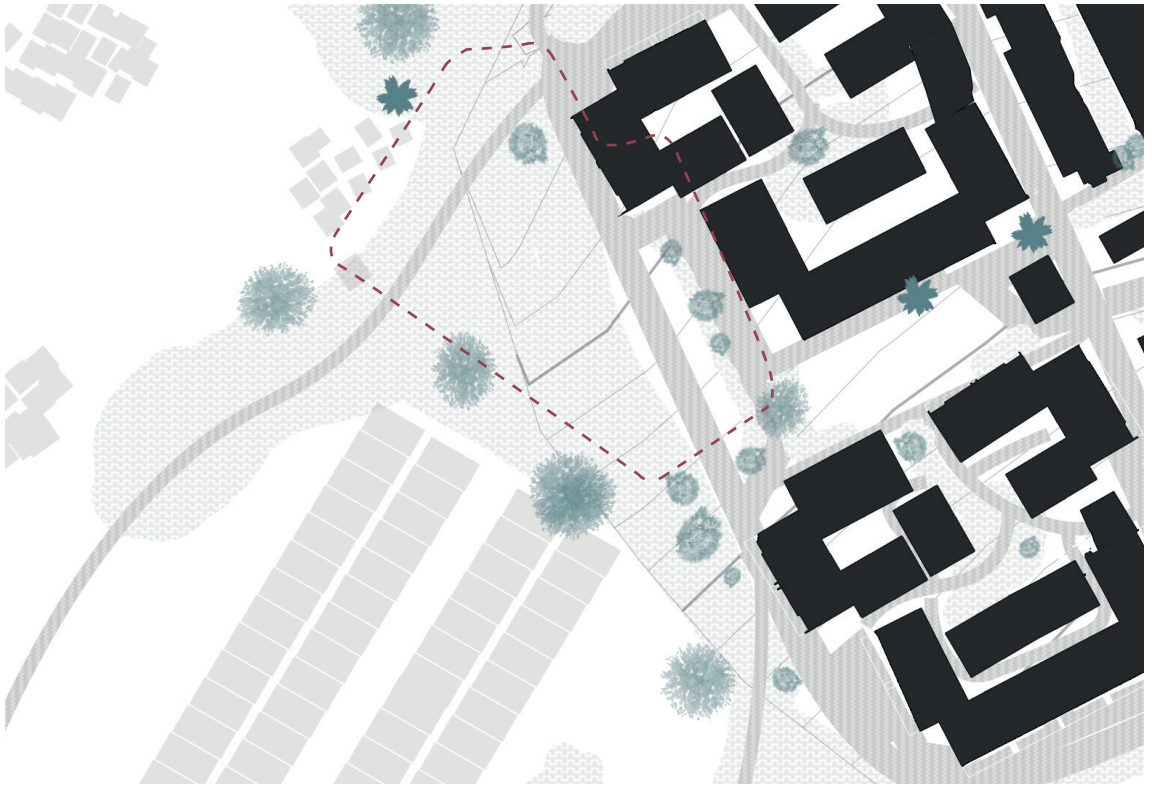
The next pages will address three different scenarios of left-over spaces; the connection to existing neighbourhoods, the connection to a steep green area and the connection to a busy road. Three areas are being depicted, and the solutions for those areas can be a reference to similar situations in other spots.



Residual spaces

The map shows the three different zones of left-over space where extra attention to the quality and safety of this space is needed.

Designing residual spaces



Situation 1: **Connection to existing neighbourhoods**
Borders_traffic road, co-housing buildings, sites&services housing.
Topography_lightly sloped
Visibility_semi-hidden
Users_locals (current en new dwellers)

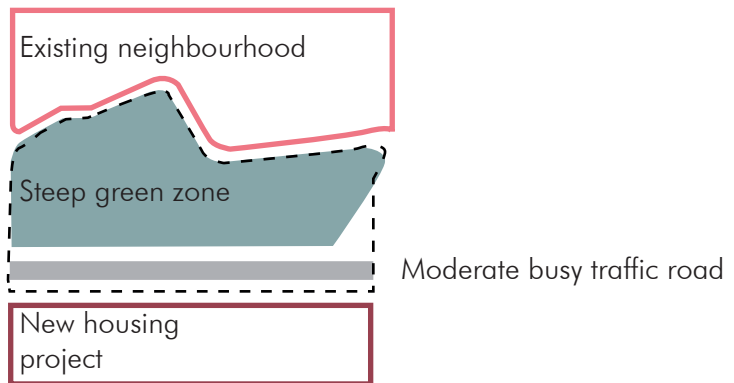
Potentials: Semi-hidden neighbourhood space & playground for local residents to stimulate interaction between different neighbourhoods.



Connection to existing neighbourhoods

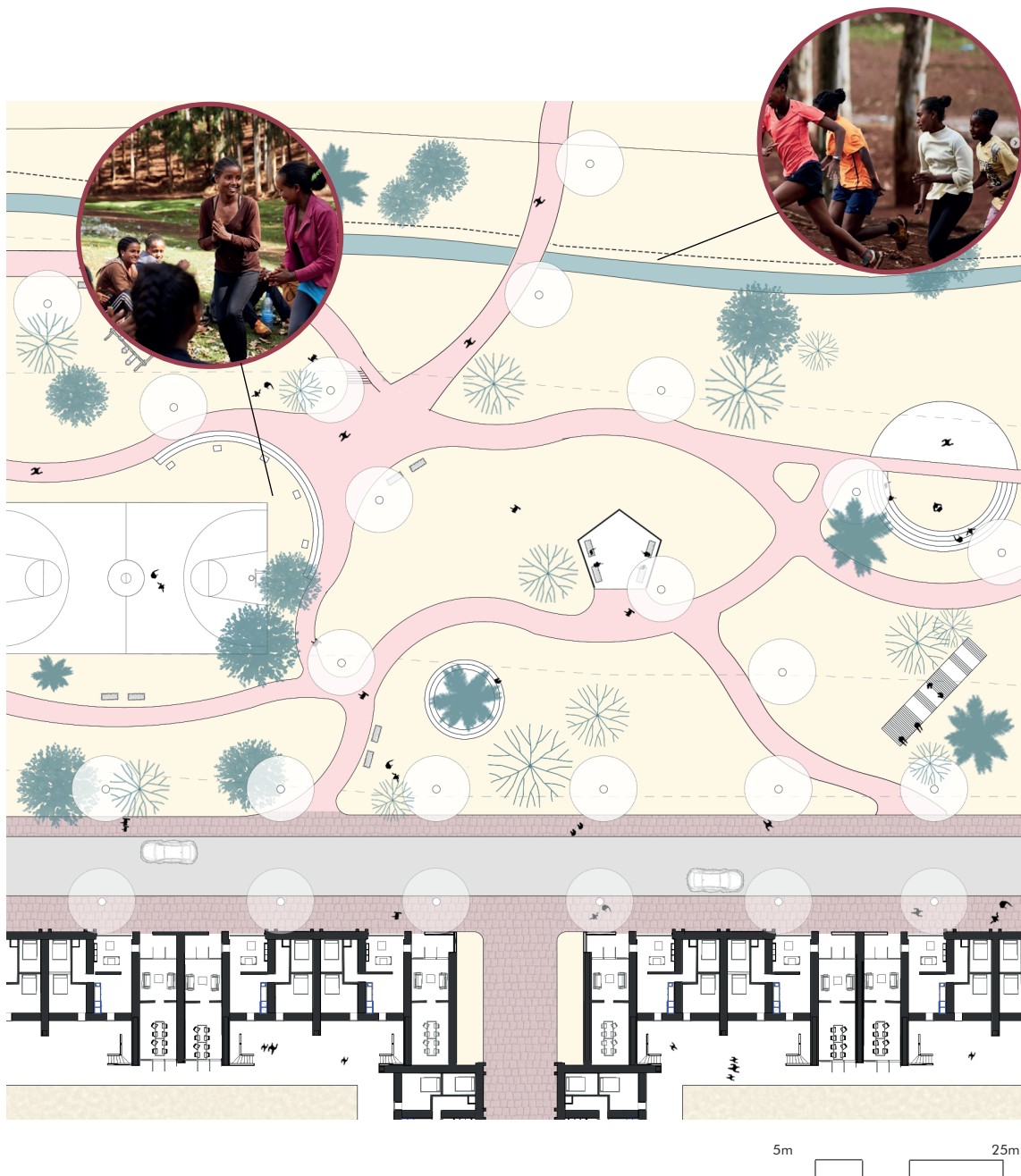
The area has been given a function by creating different zones for varying activities. Adults can meet up at the pavillion, children at the playground and people can buy stuff at the informal selling stands.

Designing residual spaces



Situation 2: **Connection to steep green area**
Borders_traffic road, housing units, informal housing
Topography_steep
Visibility_semi-hidden
Users_locals

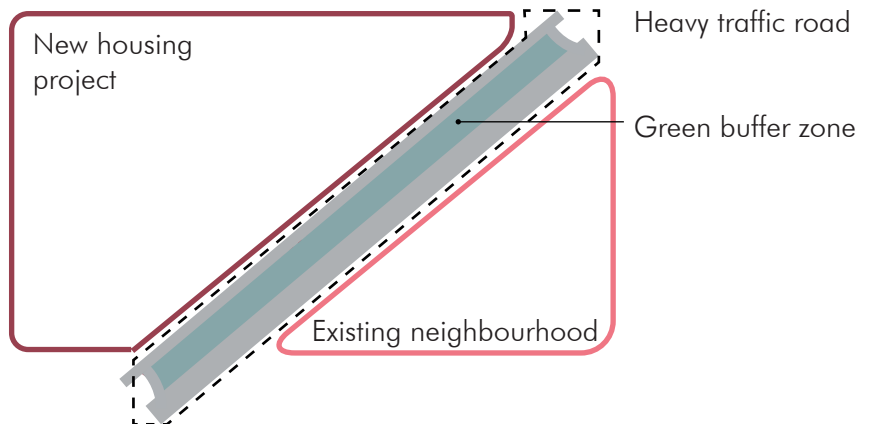
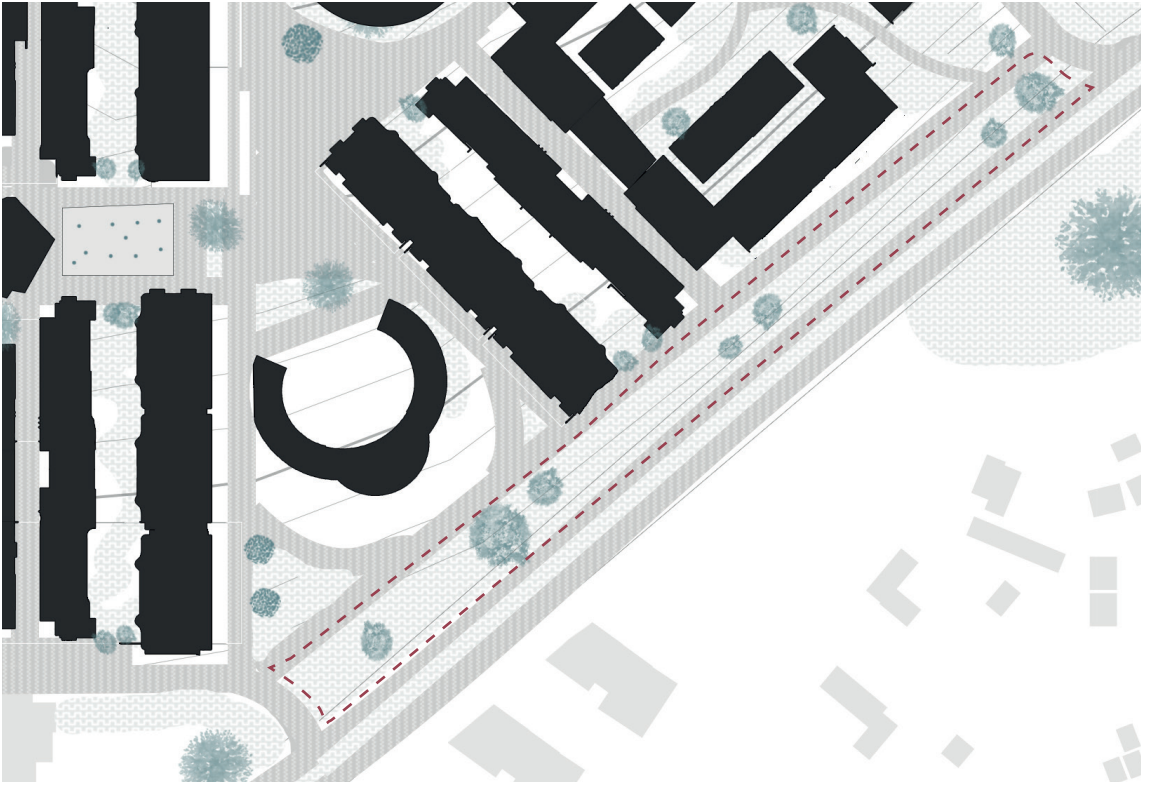
Potentials: Large open parc with paved paths and sandpaths, parc pavillions, elevated look-out points, trimming and sports zones.



Connection to steep green area

With look-out spots, seating areas, street lights and spaces of different interests, the parc attracts varying social groups. It's also a place for different outdoor and sports activities.

Designing residual spaces



Situation 3: **Connection to heavy traffic road (Kolfe Keranio Road)**

Borders_traffic road, housing buildings

Topography_flat

Visibility_exposed

Users_locals and passers bys

Potentials: Commercial plinth with bars and shops to activate the street. Green buffer protects the neighbourhood from car emissions and marks a safe zone for pedestrians.



Connection to large traffic road

The area connecting to the large road is designed with a green buffer zone to protect the site from dirt and noise. The bus stop connects to a local commercial street with bars who are open in the evenings. The street lights also create safety through visibility.





IV. BUILDING TECHNOLOGY





Building technology

Building materials and man hours are often the largest cost items in building projects. To achieve the goal of creating affordable housing, it is therefore important to find alternative solutions for reducing these costs.

To decide on the main building materials, the available and most-used materials in Addis Ababa have been studied. It became clear that the traditional low-cost houses in Ethiopia are made with earth and a eucalyptus skeleton, the so-called Chika houses. This building method is mostly used at the countryside. However, the present-day buildings in Addis Ababa are largely built with a concrete framework with an infill of cement blocks. Timber, an upcoming construction material in West-Europe, can't be found in the city. This is due to the fact that Ethiopia has seen enormous deforestation in recent decades. The government is actively combating it out of concerns of desertification and other environmental consequences.

However, Ethiopia has a significant amount of bamboo. It possesses the greatest bamboo stock on the African continent, with one million hectares of natural bamboo forest (Mekonnen et al., 2014). This wealth of bamboo, however, is now underutilized (Ibid.), due to legal (safety) restrictions and lack of knowledge. As described before, Ethiopia has a high demand on new

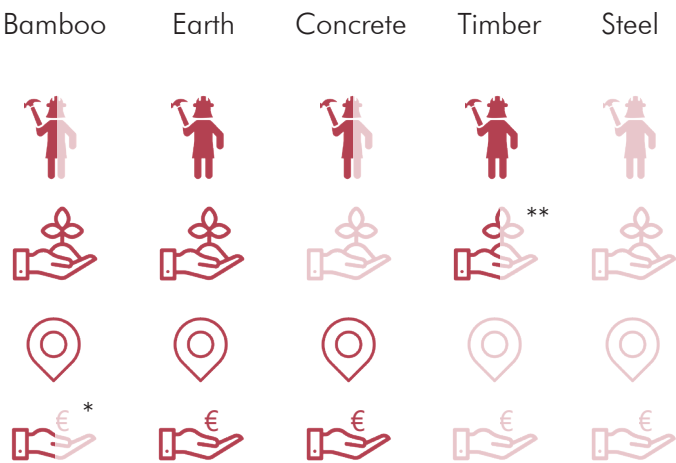
housing and with it, construction materials. Rather than being dependant on the local market, dominated by developed countries, they could benefit from their own resources. Therefore, the aim is to use local materials. Besides, there are other aspects that need to be taken into consideration as well.

Currently, in Addis Ababa, there is a trend of more and more women engaging in construction work. This trend, together with the creation of on-site workshops, where local women can make building elements, could contribute to women empowerment. In the workshops, local materials can be processed for, for example, making window shading elements, carpets, lightning fixtures or hammocks. After completion of the housing project, women can continue making those elements to sell them and generate income. Therefore, the materials should be low-tech and the processing needs to be accessible for women.

The third aspect is affordability and can be achieved with different approaches related to the previous aspects. Examples are reducing transportation costs, man hours (low-tech) and the availability of the material.

The fourth and last aspect concerns the eco-friendliness of the material, following the global urge to reduce CO₂ emissions and find renewable alternatives.

Choice of materials



* Depending on the specific usage (load-bearing or single flooring) and whether it needs fire resistancy treatment.

** Because of the deforestation in Ethiopia, timber needs to be imported. As a result, it does not stimulate local economies and increases carbon dioxide emissions.

Bamboo

Bamboo is widely available in Ethiopia but the management of the bamboo harvest needs to be improved to enjoy its full potential. Bamboo also has the capacity to store carbondioxide and can be sustainable if well designed. However, there is a lack of local knowledge of how to make the joints.

Earth

As a locally available material which is also very low-tech, earth seems the ideal for construction. Earth from or closeby the construction site can be used, so transportation costs and carbon emissions can be minimized. Earth blocks in any form can be easily stacked and it has been proven (for example in Yemen) to build-up several storeys. It also has benefits for the indoor climate, as it is able to store and release heat and regulate the humidity of rooms.

Concrete

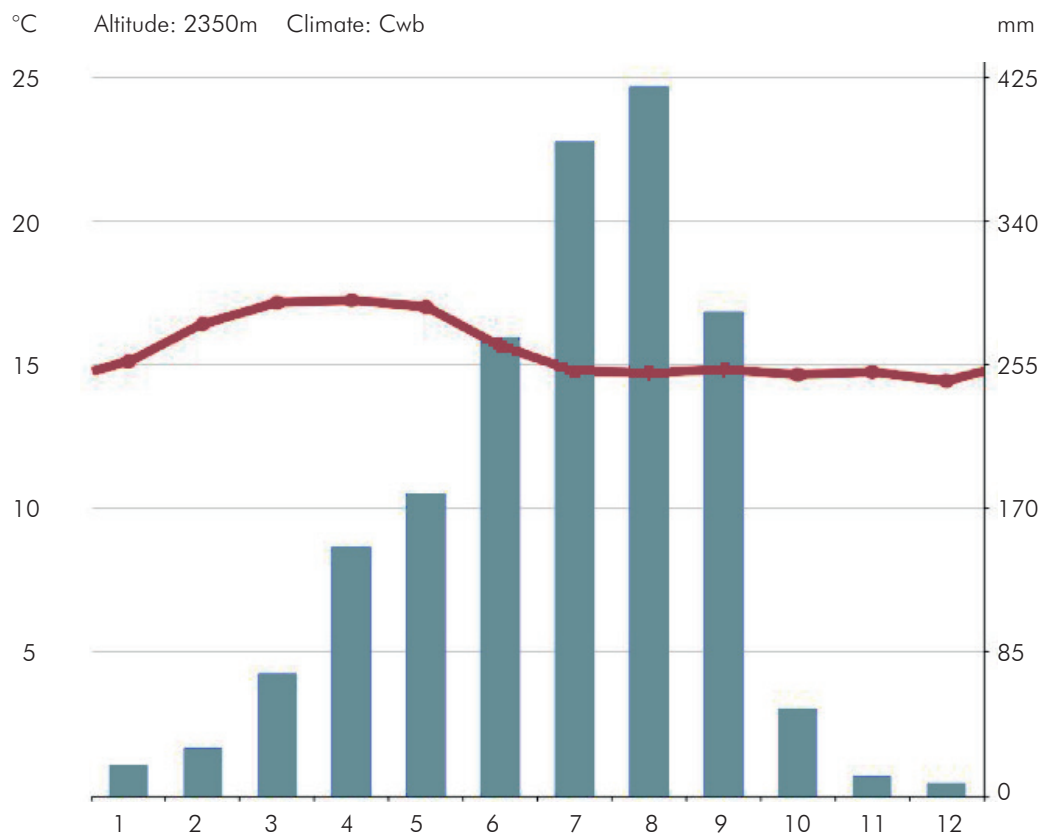
Concrete is a strong and multi-purpose material. However, it has a large carbon footprint on the environment. Moreover, the construction of concrete frameworks asks for heavy equipment. Nevertheless, Ethiopia is a large producer of concrete, so it can count on its own sources. Therefore, concrete will not fit as main structural material, but it can be used for smaller purposes, such as the foundation and the lintels.

Timber

Timber needs to be imported from other countries, and is therefore a less desirable building material as it needs to be transported and for the fact that it doesn't stimulate the local economy.

Steel

The least favourable material is steel, as it has a large impact on the environment with its carbon footprint. It's availability is increasing in Ethiopia, but it has to be manufactured in a factory, where it takes away the option to employ local people on-site. As it is also relatively expensive, this material will be avoided in the project and alternatives will be sought.



(Climate-data.org)

Temperature and precipitation

The city of Addis Ababa is located at an elevation of 2400 meters and it is situated in a subtropical highland climate. The average temperature is around 15 °C and is relatively constant throughout the year, with smaller peaks in the first 5 months of the year. However, over the night, it can drop to around 8 °C. It is therefore not so important to cater for different seasons, but more to anticipate on temperature changes during the night and day.

The precipitation graphic in blue shows the huge rainfall in the summer months, July and August. During this monsoon season, it can rain up to 400 mm a month

(compared to 80 in the rainiest months of the Netherlands, and 100 mm in New York). From November until February, it is quite dry in Addis Ababa and during this season, it has to deal with water shortages and extreme droughts. It is therefore key to manage the flooding in the summer and the drought in the winter.

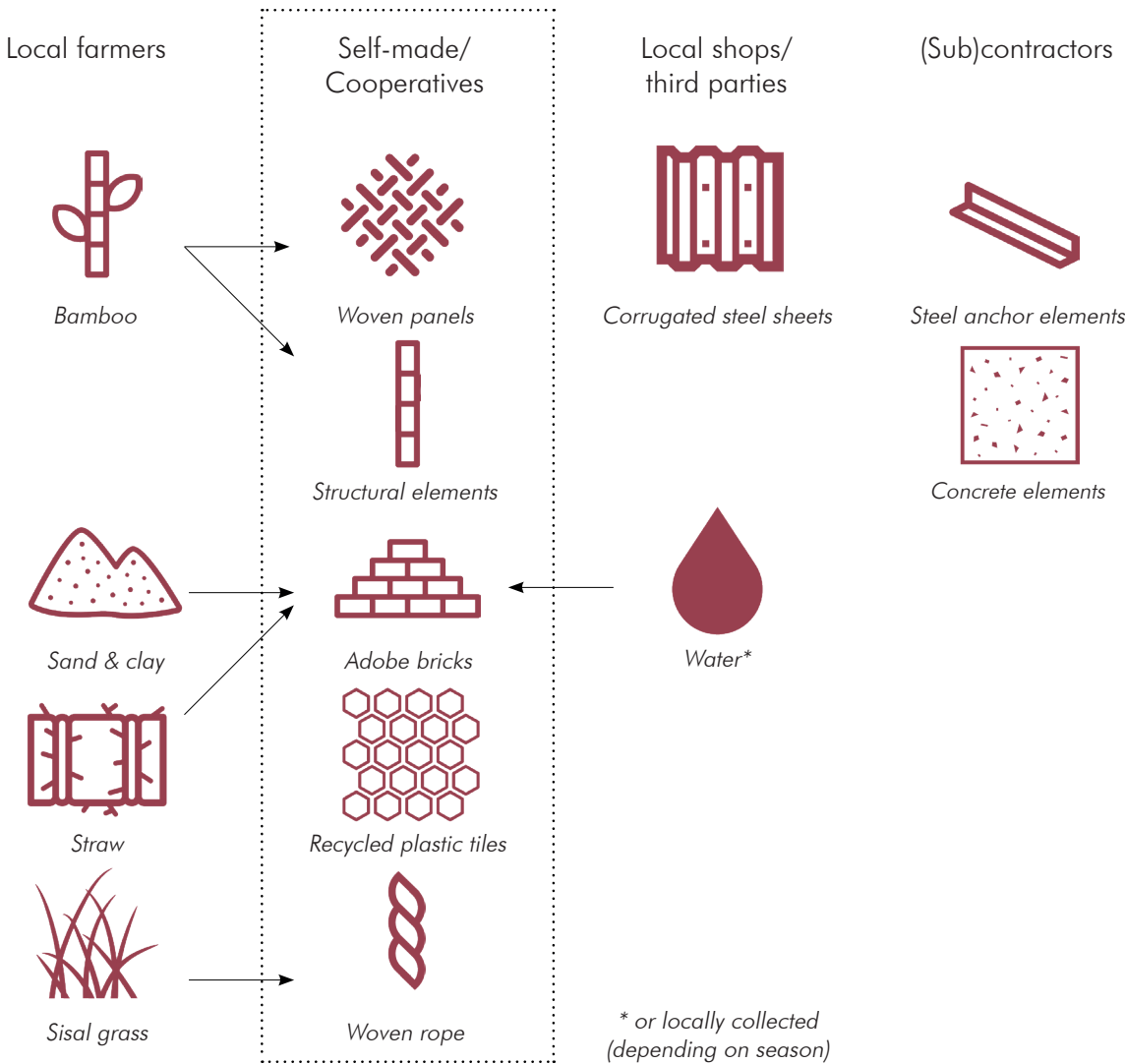
At the end of this chapter, it will be further explained how the project deals with the heavy rainfalls and seasonal droughts. It will also be explained how the building's indoor climate is managed: how the facade is shaded, how the indoor air is cooled and ventilated.

Material flows

The diagram below shows for each resource where it will be collected. If available, the materials will first be collected at local farms, close to the city to boost the local economy. These materials will be transported to the building site, such as the bamboo, the sand and the straw. Most of the material making processes will take place on-site in the workshops. The adobe bricks will be made on-site or at an empty plot closeby (see next paragraph). Corrugated steel sheets are mostly used in

urban areas and will therefore be collected from a third party (shop in the city).

The project will launch a start-up, first on a small scale, with an innovating way of making facade and roof tiles from recycled plastic. The process of these plastic tiles will be explained further in this chapter. If building laws require the invitation of professional parties, local contractors can be invited to provide for certain materials, such as the steel elements.

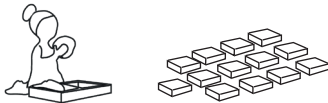


Workshops

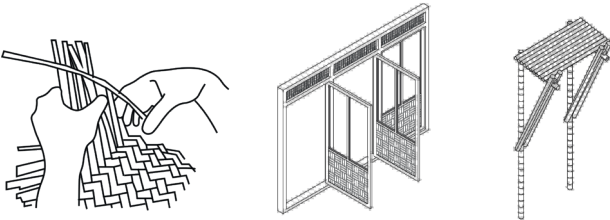
To promote income generation for women, on-site communal workshops will be built for the production of building elements, as shown below. The residents of two clusters will share a workshop together, which is located in the transition zone between the commercial street and the more domestic

areas. It therefore serves as a place for neighbours to meet and work together, and at the same time selling products at the commercial street, inspired from Merkato in Addis Ababa. Furthermore, a daycare facility for young children is located on the roof and accessible by taking the stairs.

Adobe bricks



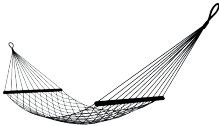
Bamboo elements



Recycled plastic tiles



Sisal rope hammocks



Adobe

To promote the engagement of women in construction work, a relatively easy to stack building system is required. As pressed earth bricks are already widely known, the search for a less used and also from a personal perspective, a research to alternative stacking methods started. As earth has been proved as environmentally sustainable, it seemed a desirable primary source. Alternatives with earth are rammed earth or adobe. The physical intensive production of rammed earth walls and the non-flexible nature of this method (walls need to be made in the right place from the start) made this a less suitable method for mass housing.

Adobe is a building material made from earth and organic materials. These can be shaped into bricks using frames and dried in the sun. Adobe structures are very durable and account for the oldest extant buildings on earth (for example the mud

architecture in Yemen). Adobe buildings also offer significant advantages in warm climates, as they remain cooler since adobe stores and releases heat very slowly. The potential of making large quantities at the same time and being able to easily and quickly build up the walls made this an interesting building method for the project.

Standard sizes for adobe bricks are 20 cm × 10 cm × 30 cm, weighing about 11 kg; and 25 cm × 10 cm × 36 cm, weighing about 16 kg. The maximum sizes can reach up to 45 kg.²⁹ To seek the optimum between construction time and the manageability for women to carry the bricks, the 16 kg brick will be used in the project.

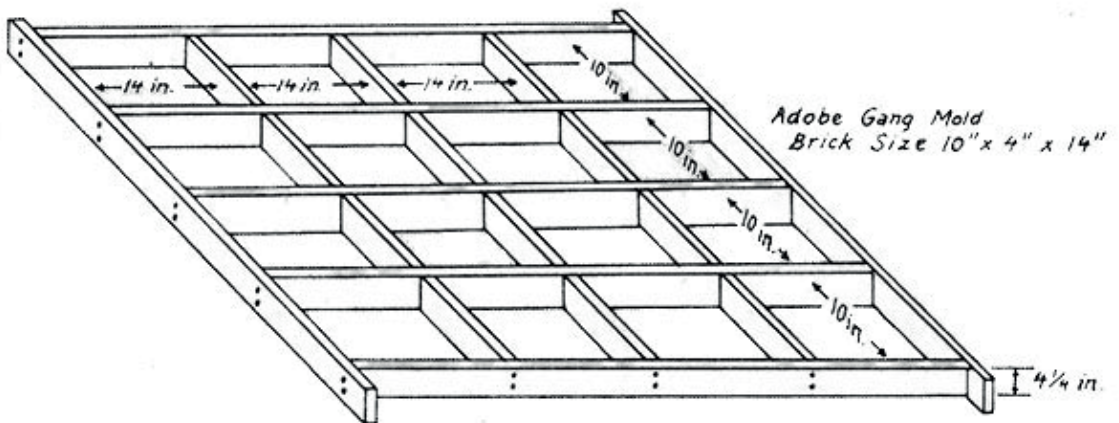
The bricks will be made on a neighbouring site, where they will be laid out to dry. After the drying process, they are transported to the project location



Adobe brick making process. (Adobe achives)



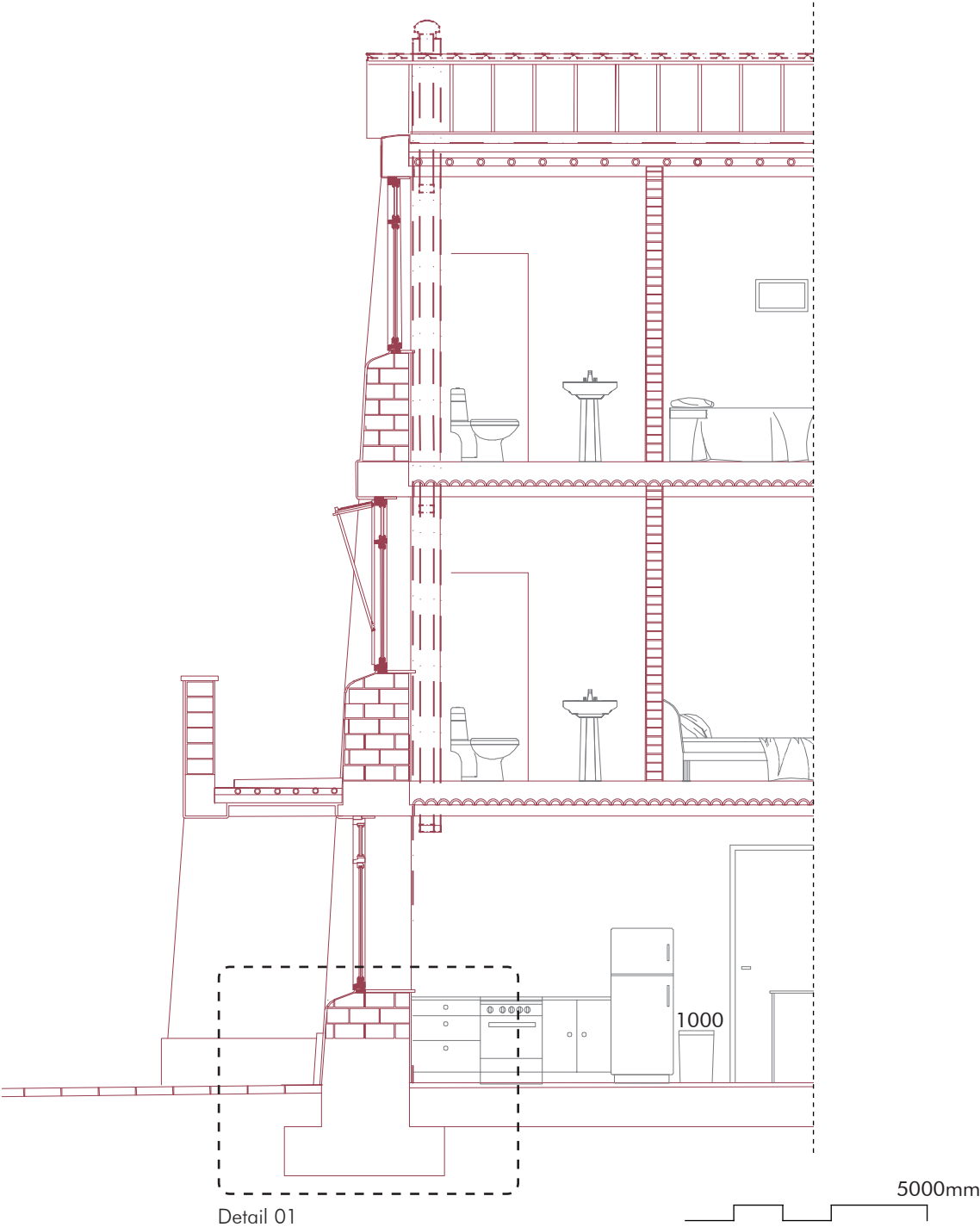
Mold for used brick size. (Duane Newcomb)



Adobe brick making

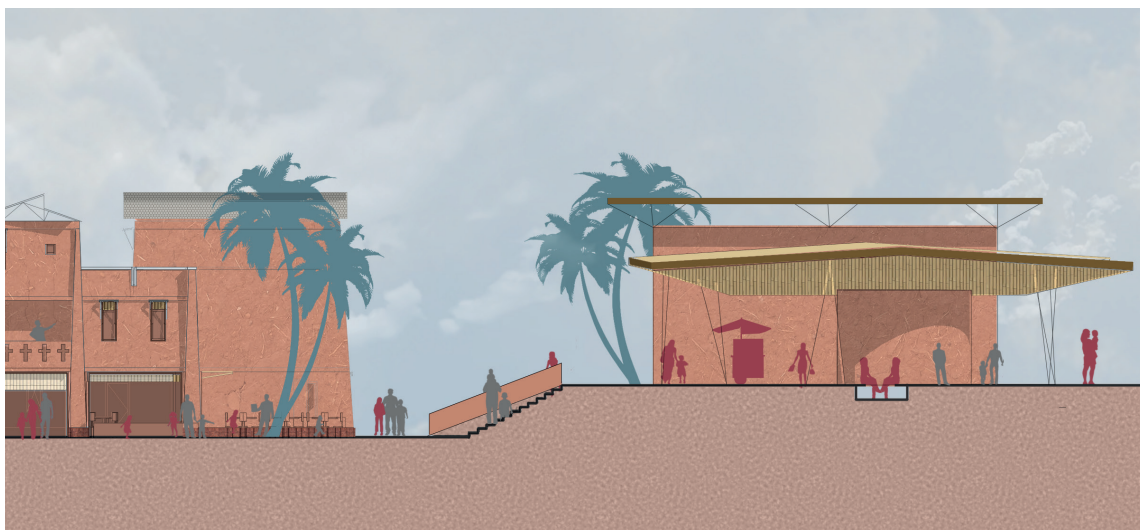
With the use of local sand, clay and water, eco-friendly and easy to stack bricks can be made by the local people.

Facade fragment



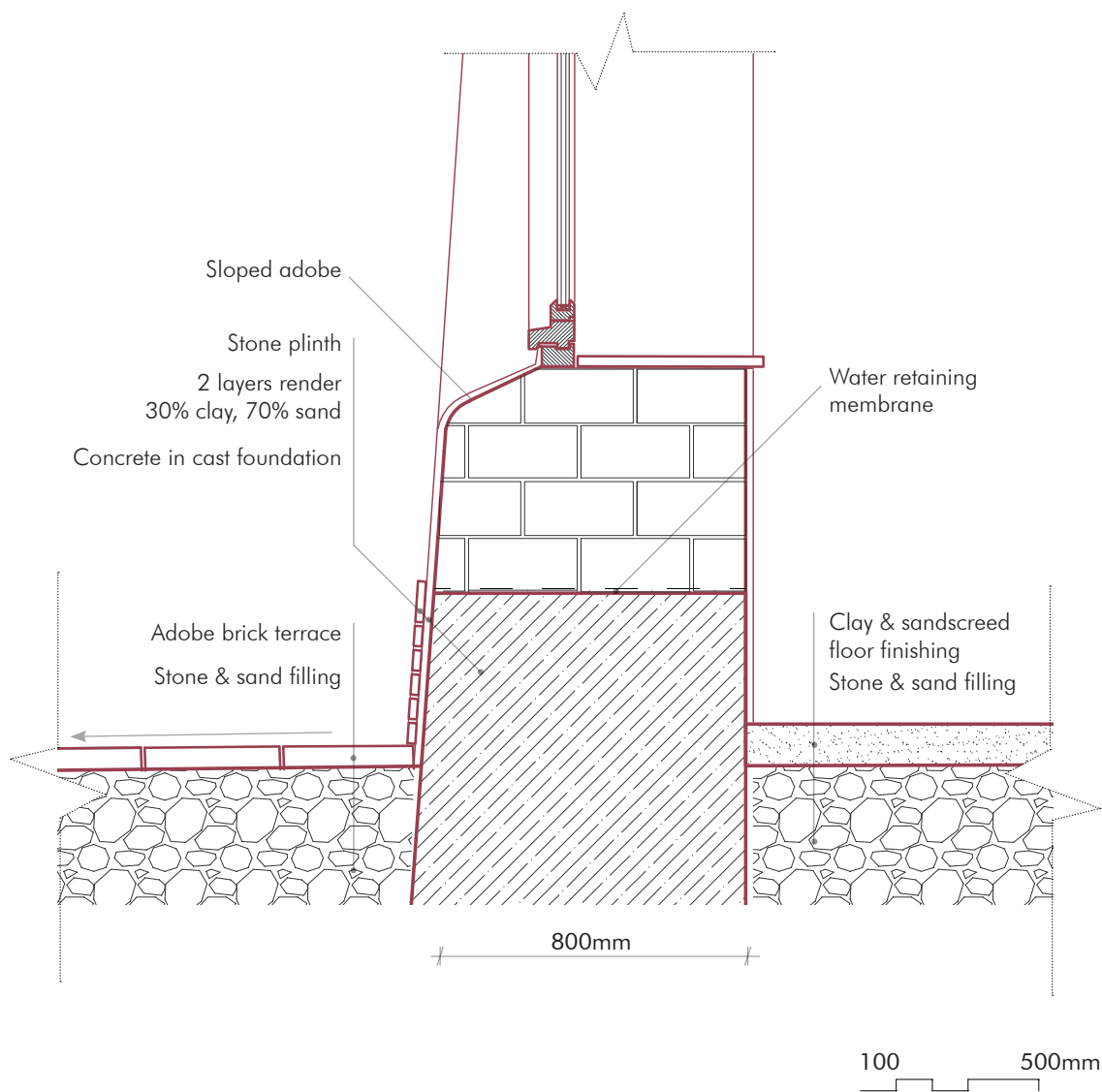
Section co-housing unit

Due to the wall height - wall base thickness ratio rule of 1/10, the adobe walls will be executed as tapered walls.



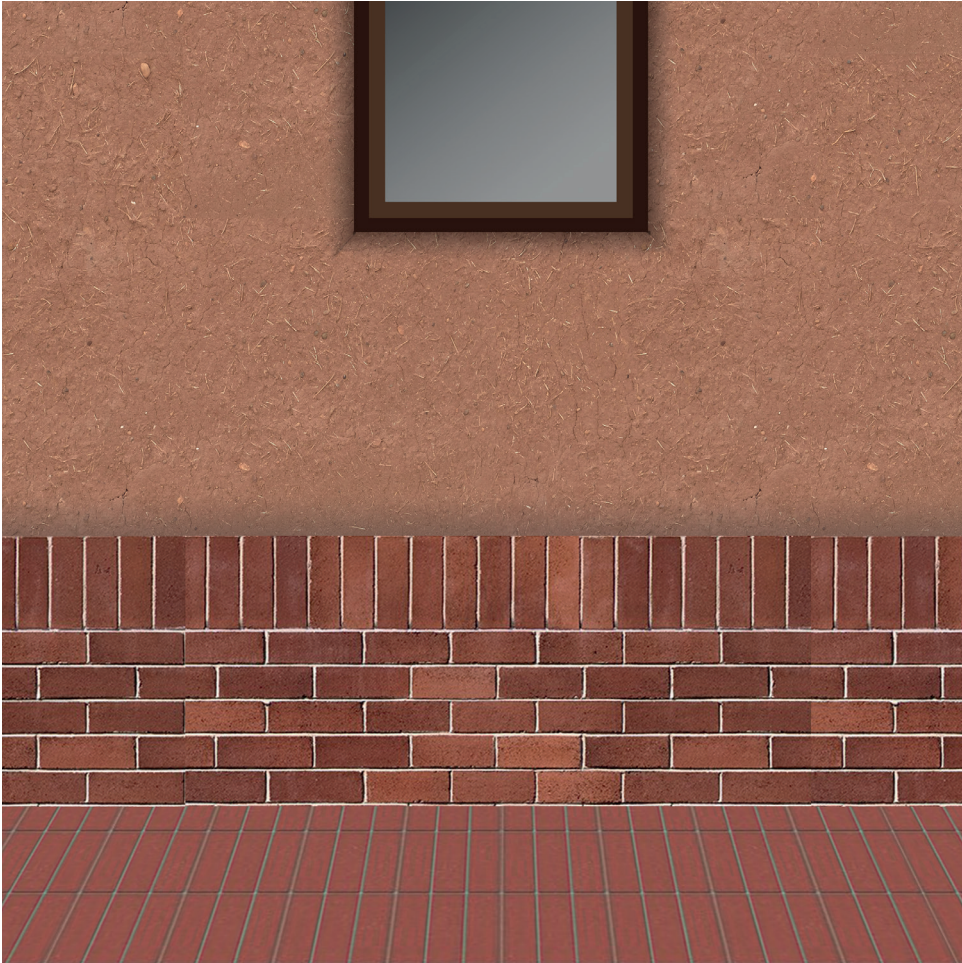
Facade fragment

Co-housing unit facing the commercial street.



Detail 01

Connection adobe wall on ground floor.



Detail 01

Connection adobe wall on ground floor.

Bamboo

Ethiopia has a large resource of bamboo, estimated at around one million hectares. There are two types of bamboo in Ethiopia: highland and lowland bamboo. Bamboo has a large tension strength and grows relatively fast.³⁰ Currently under utilized, there is great potential for this resource in large-scale construction projects that could benefit millions of rural as well as urban dwellers. Due to the fact that there is a lack of building regulations for bamboo, it is difficult to implement it on a large scale. In the project, bamboo will be used for two purposes: as lost form work for the floors and for building elements, such as door panels, balustrades, sunshading elements, floor finishings and lightning fixtures. Those elements will be made in the on-site workshops. After completion of the project, the women (and men) can continue their businesses for continuous income generation.

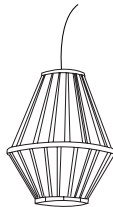
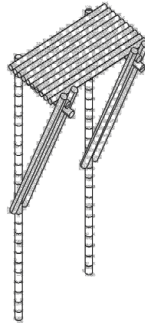
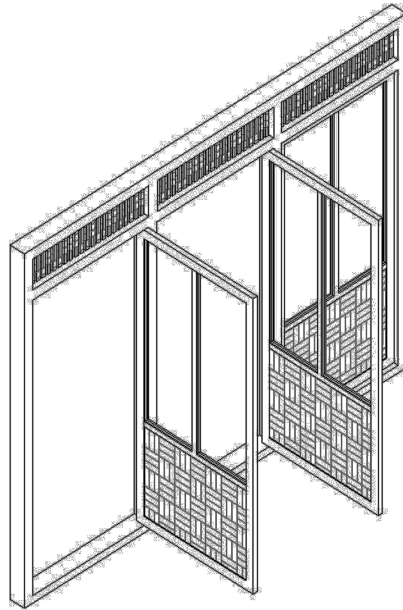
Bamboo form work

Halved bamboo poles will be used as lost form work for the casted concrete floors. The bamboo beams will be placed on a concrete ring beam, where the seams will be sealed with mortar. The bamboo will have enough tensile strength, but the constructor can choose to add a steel net to make sure the concrete resists bending. Subsequently, the concrete topping will be casted.

Bamboo brings with it two main problems when used in construction. The first one is it's attraction for termites and other insects. Therefore, the bamboo could be treated with heat. The second problem is it's flammability. To make bamboo fire-proof, it can be treated with (non-toxic) baths. (Hornaday, 2020)

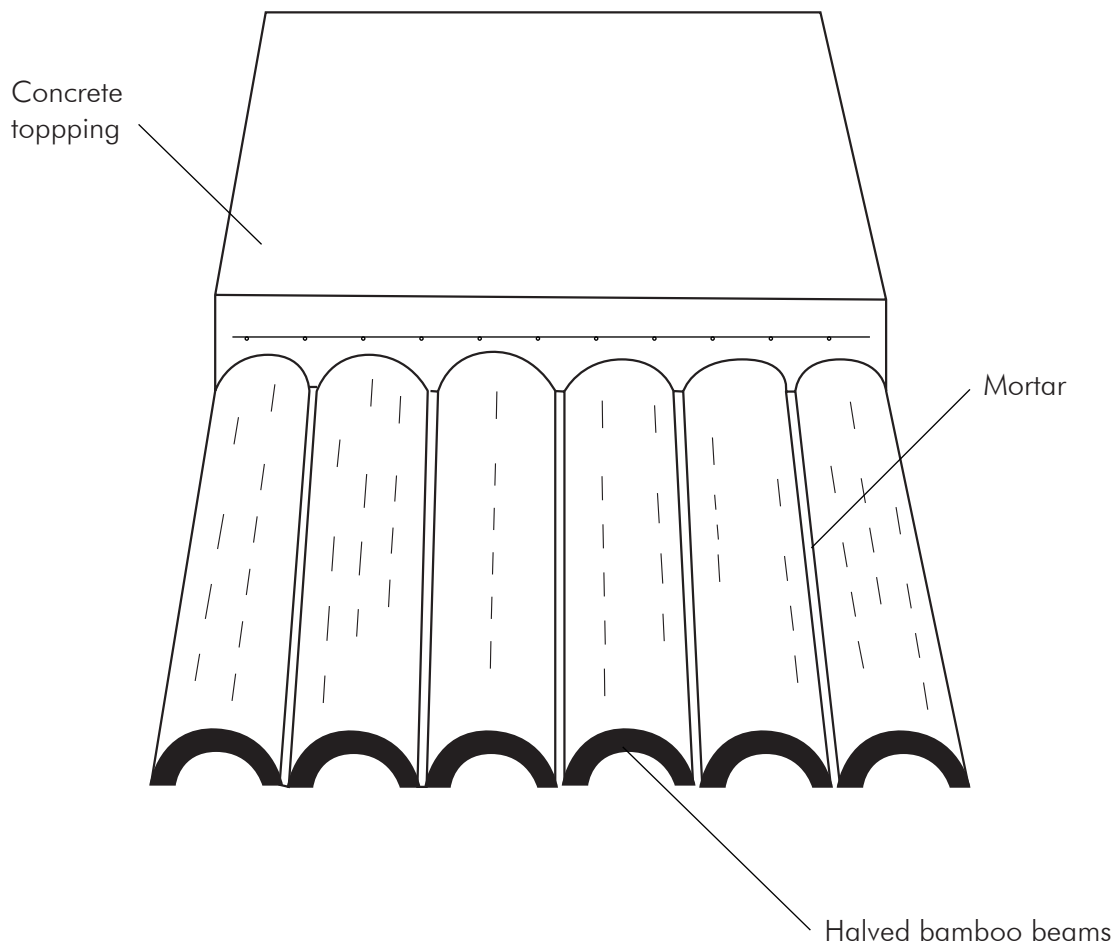
Bamboo for sale at local market. (Ariadne Van Zandbergen, 2015)





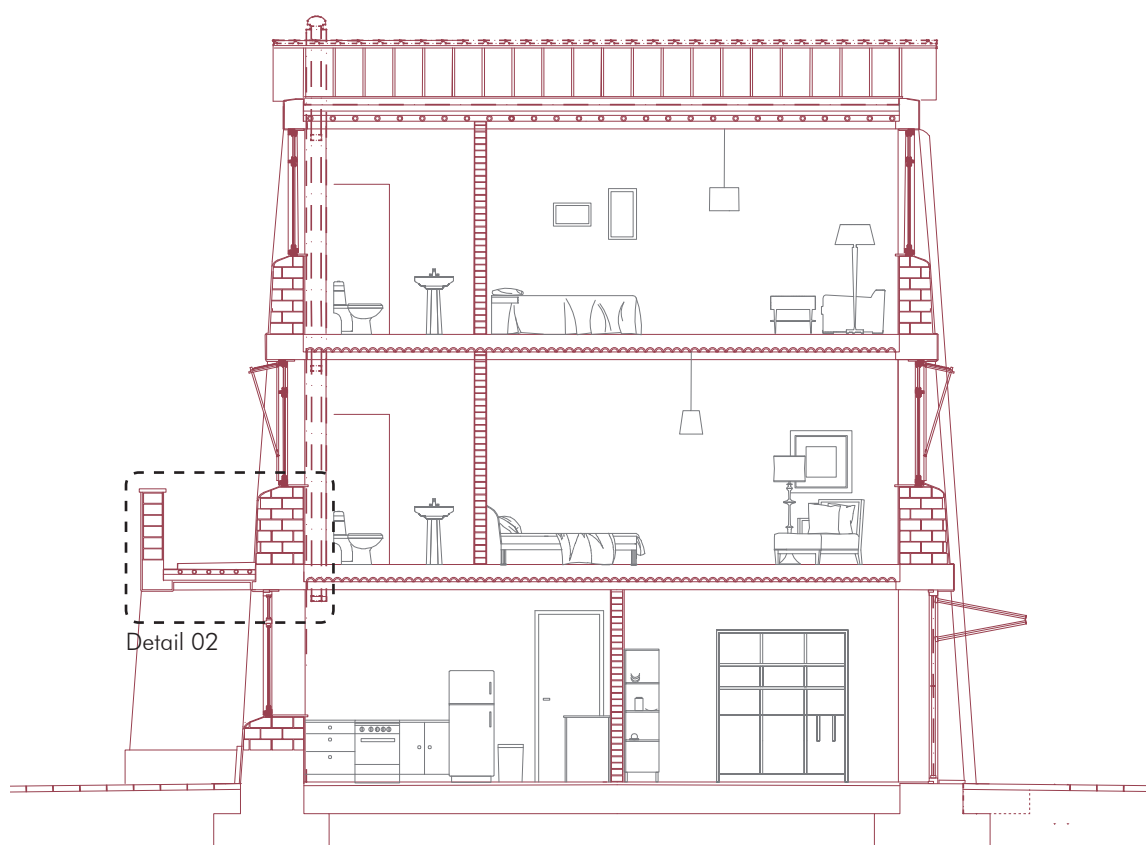
Bamboo fixtures

To stimulate the local economy and promote businesses for women, bamboo will be processed in the workshops and be used in the design for door panels, window shading elements and lightning fixtures.



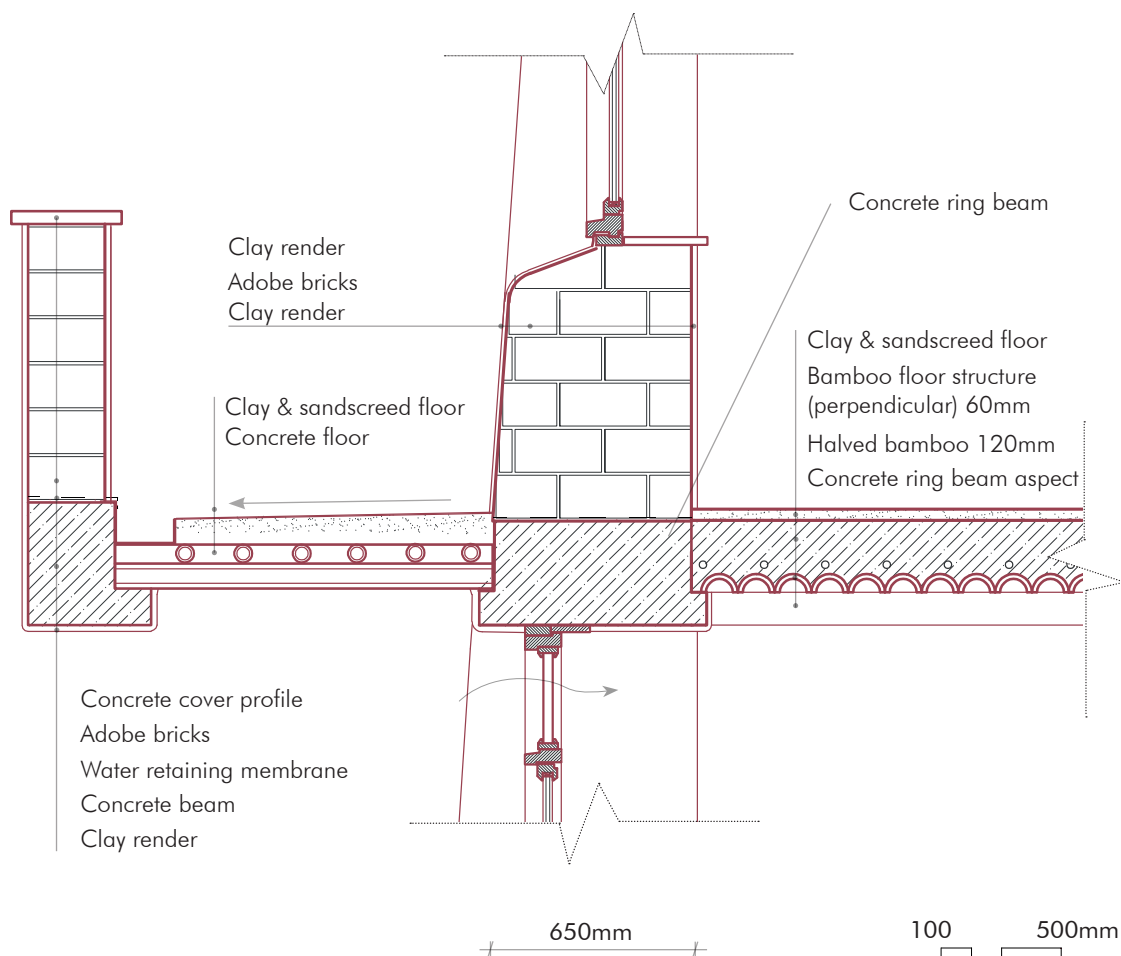
Bamboo form work

Halved 120 mm bamboo beams are topped up with concrete. The bamboo functions as form work and will be preserved to create an interesting ceiling appearance.



Facade section

Co-housing unit.



Detail 02

Connection first floor to the gallery.

Recycled plastic tiles

The UN Environment body states that every minute, one million plastic drinking bottles are purchased.³¹ While neighbouring countries such as Rwanda and Kenya face policy changes for plastic production and consumption, Ethiopia is increasing its production. In Ethiopia, the plastic consumption in kg per capita increased from 0,6 kg in 2007, to 3,6 kg in 2021.³² While waste management is slightly improving in Addis Ababa, the streets and rivers are still polluted with loads of empty cans, plastic bottles and bags. There is currently one open dumpsite where all collected waste is disposed: “Rappi” or “Koshe”, with an area of 25 hectares. The waste collecting by the municipality is transported to this dumping site, but the problem is that this site is getting full.

There are initiatives of collecting plastic and turning them into something usable, for example the people’s pavillion of the Dutch Design week in Eindhoven, where they melt the plastic to put it in a mold to make facade tiles. The designers only needed 2 small machines: a plastic shredder and a press. Looking at the big Mercato in the city center of Addis Ababa, men and women bring collected waste to repair it or to create something new. The people themselves find smart solutions for the waste problem. This pattern of behaviour will be used in the project where plastic is collected and used for making plastic roof tiles and plastic facade tiles in the workshops. As the work is not physically demanding and plastic is very light, this work could be easily performed by women.

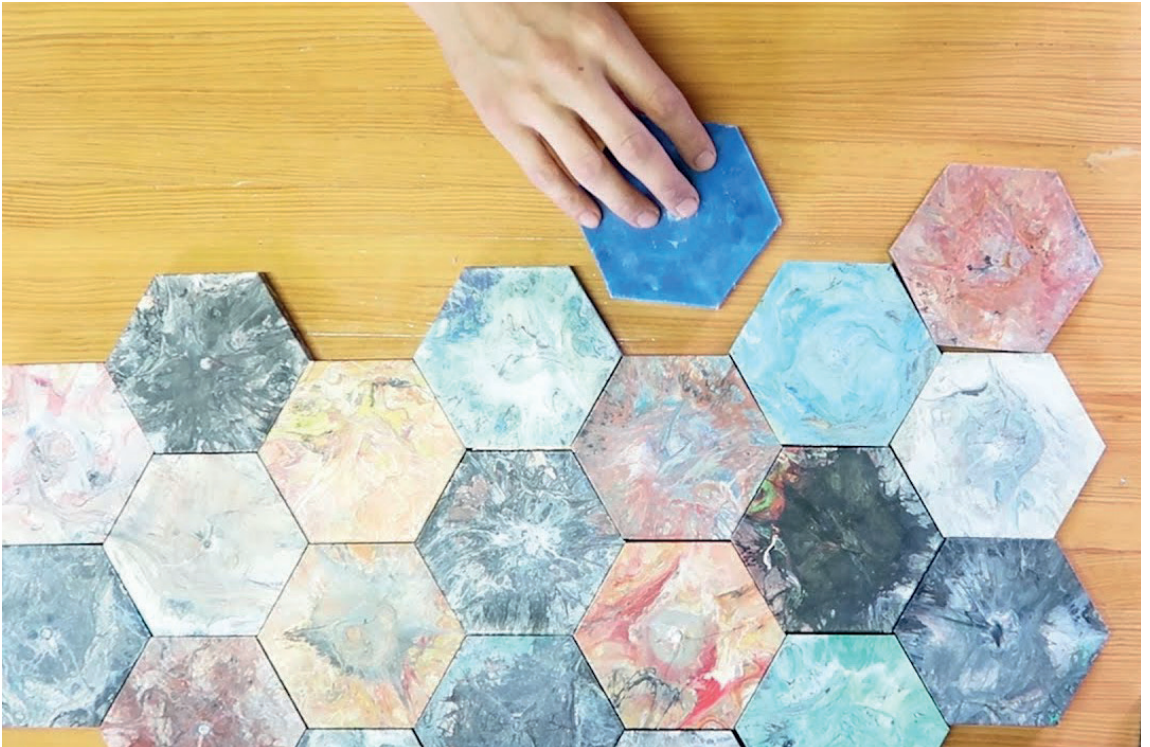
Landfill 13 km outside Addis Ababa. (Bouldry, 2019)



Roof tile reference: Recycled plastic tile facade of the People's Pavillion. (Dujardin, 2017)



Facade tile reference: Recycled plastic tile facade of the One Army initiative. (One Army, 2017)

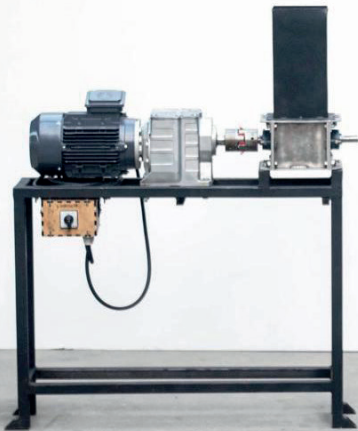


Recycled plastic tiles

An investment of \$2200 + motor is needed to buy the plastic shredder and \$250 for the injection machine. It is quite an investment, but the community can choose to buy it together, and distribute the plastic to other workshops as well, because the machine can process 50 kg of plastic/hour.

(Precious Plastic, 2020)

Plastic shredder \$2200



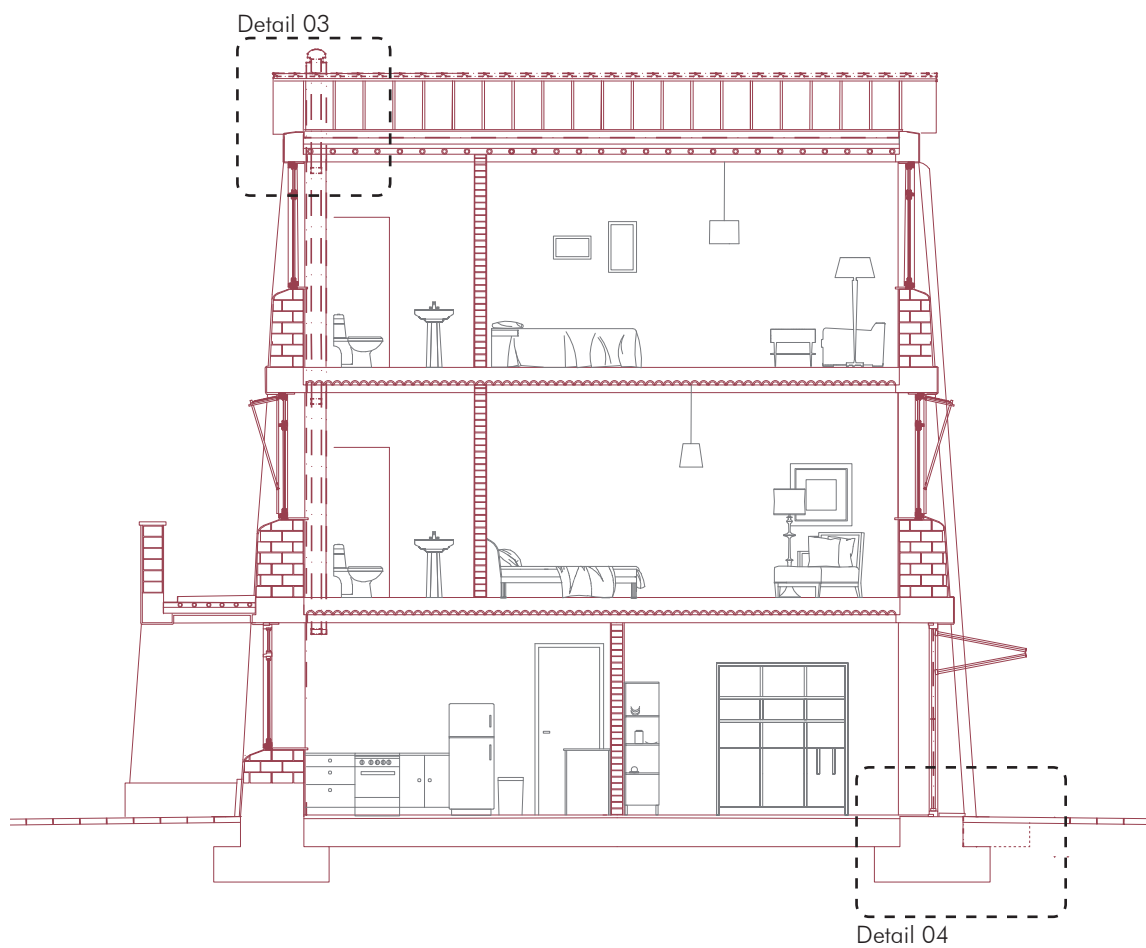
Injection machine: \$250



Machinery needed to make plastic tiles

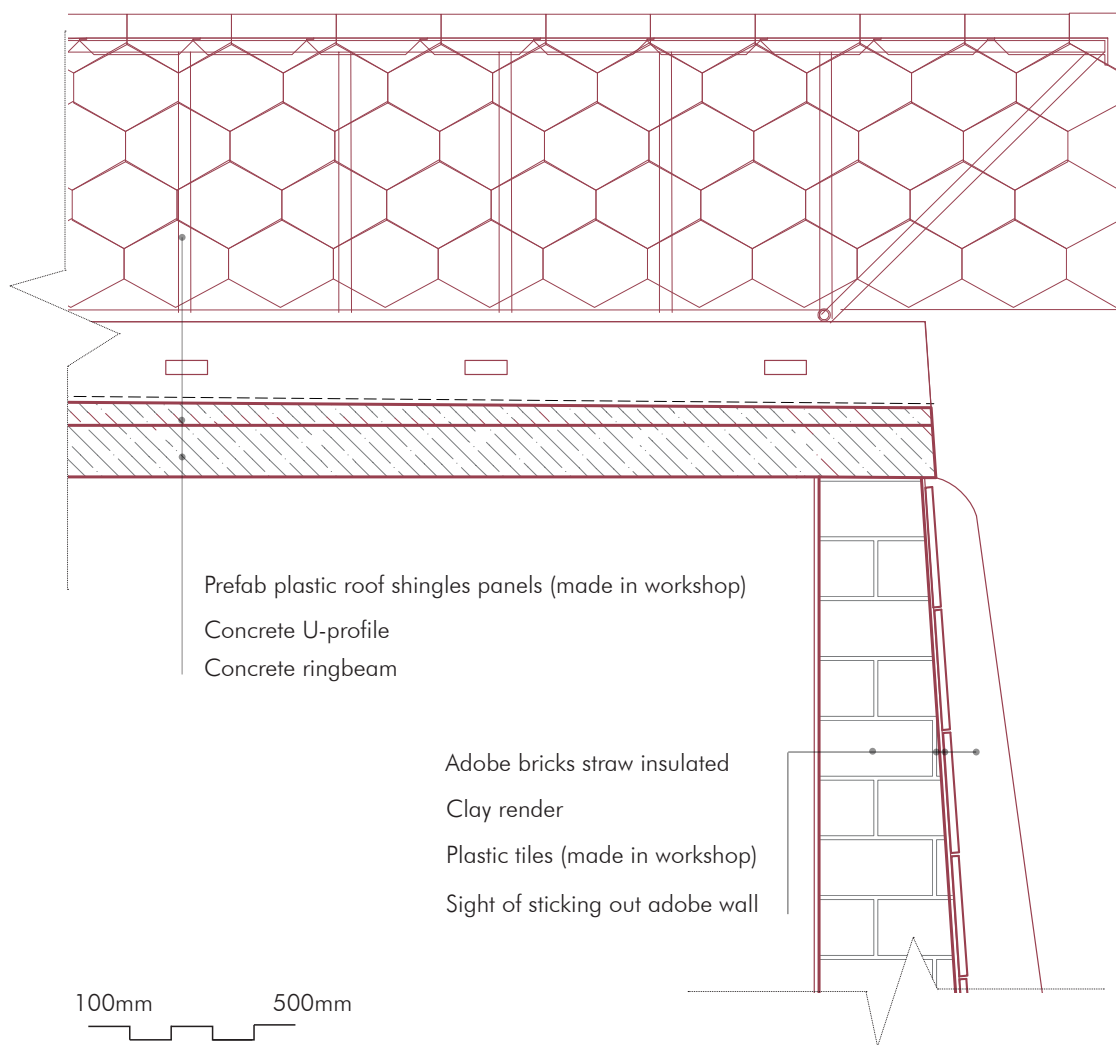
A plastic shredder is needed to shred the collected plastic, whereafter it can be put into the injection machine, which can fill the mold with melted plastic by pressing the lever.





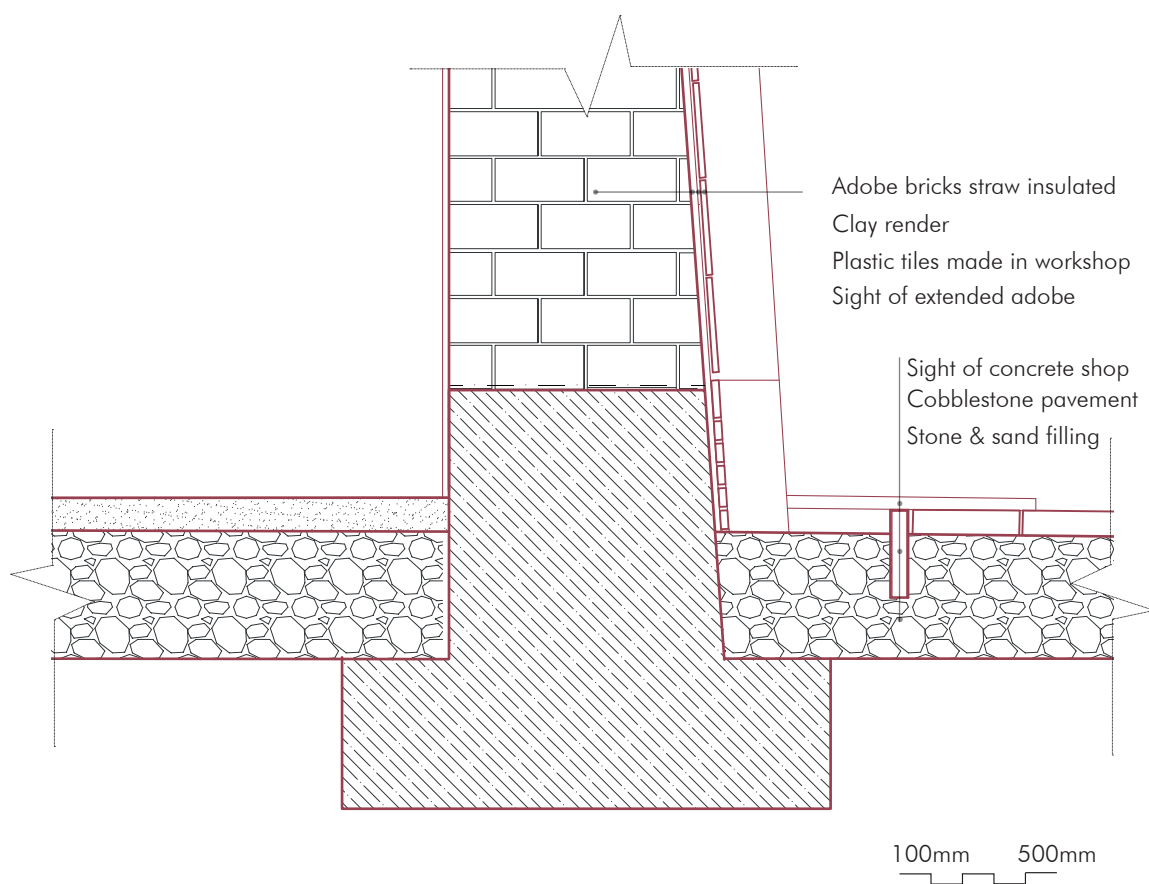
Facade section

Co-housing unit.



Detail 03

Plastic roof tiles on bamboo beams, connected to concrete ring beam.



Detail 04

Plastic facade tiles draining the rainwater to the ground floor.



Detail 04

Plastic facade tiles draining the rainwater to the ground floor.

(Rain)water & ventilation management

Addis Ababa has to deal with heavy rainfalls in the summer and a fairly dry climate in the winter. Through the year, there is either a temporary overload or a temporary shortage of (clean) water. Therefore, there is a potential in balancing the water supply between these two extreme seasons.

The buildings are too low for a profitable roof water collecting system. Therefore, an alternative and low-cost solution is proposed. The roofs will guide the rainwater along the facade into a strip of permeable ground. The water can infiltrate into the ground, where the sand functions as a natural filter (see middle left image on the right page).

Subsequently, the filtered water can be pumped up at the collective water wells. This water can be used for washing, cooking and gardening (see bottom picture on the right). This method can be very well used on the sloped topography of the location. By drilling the wells in inside the clusters, a small stream will originate due to the higher ground water levels (see middle right image to the right). To guide this stream, a water gutter will be designed through the empowerment street and through the green zone in the north.

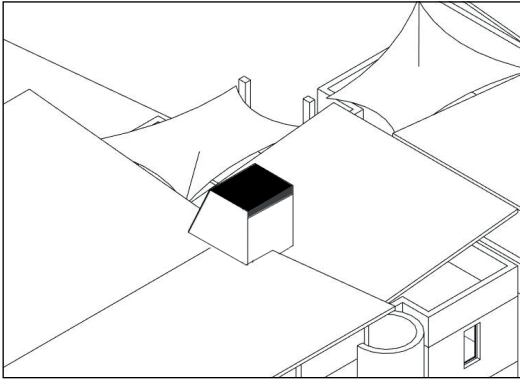
Standard drinkwater pipes will be layed through the whole site to

provide safe water at all times. The people can, however, save costs by collecting the water themselves at the communal wells.

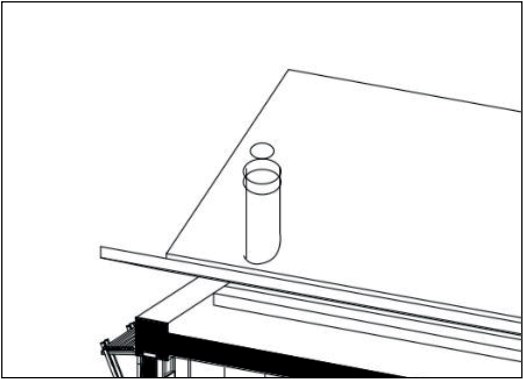
Fresh air will be naturally provided by two systems: the solar chimney and the shunt ventilation shaft. The solar chimney (see top left image on the right) is used in the middle-high portico building. It works with exposing a darkened surface to the sun, which creates a high air density. The airflow is influenced and stimulated by the air density difference between the internal, lower parts of the building and the external environment and the wind.³³ The solar chimney is located behind the internal staircases.

For the middle-low income buildings, shunt ventilation is used for extracting air from the kitchens, bathrooms and toilets. A shunt duct is a shared ventilation duct for multiple units. Rooms that are in need of ventilation should be located on top of each other to horizontally connect to the communal, vertical duct. By heating up the pipe on the roof, it extracts the air by density differences.³⁴

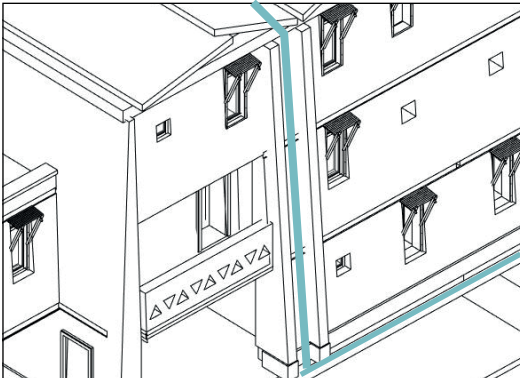
Furthermore, all buildings and apartments are designed with cross ventilation possibilities, with an open bamboo infill panel at the top of each window. Self-made bamboo sunshading elements protect the windows from direct sunlight.



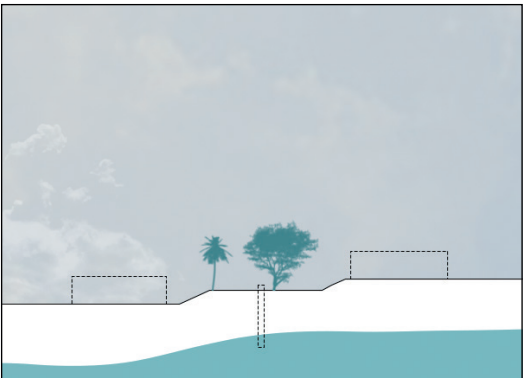
Solar chimneys



Shunt duct ventilation



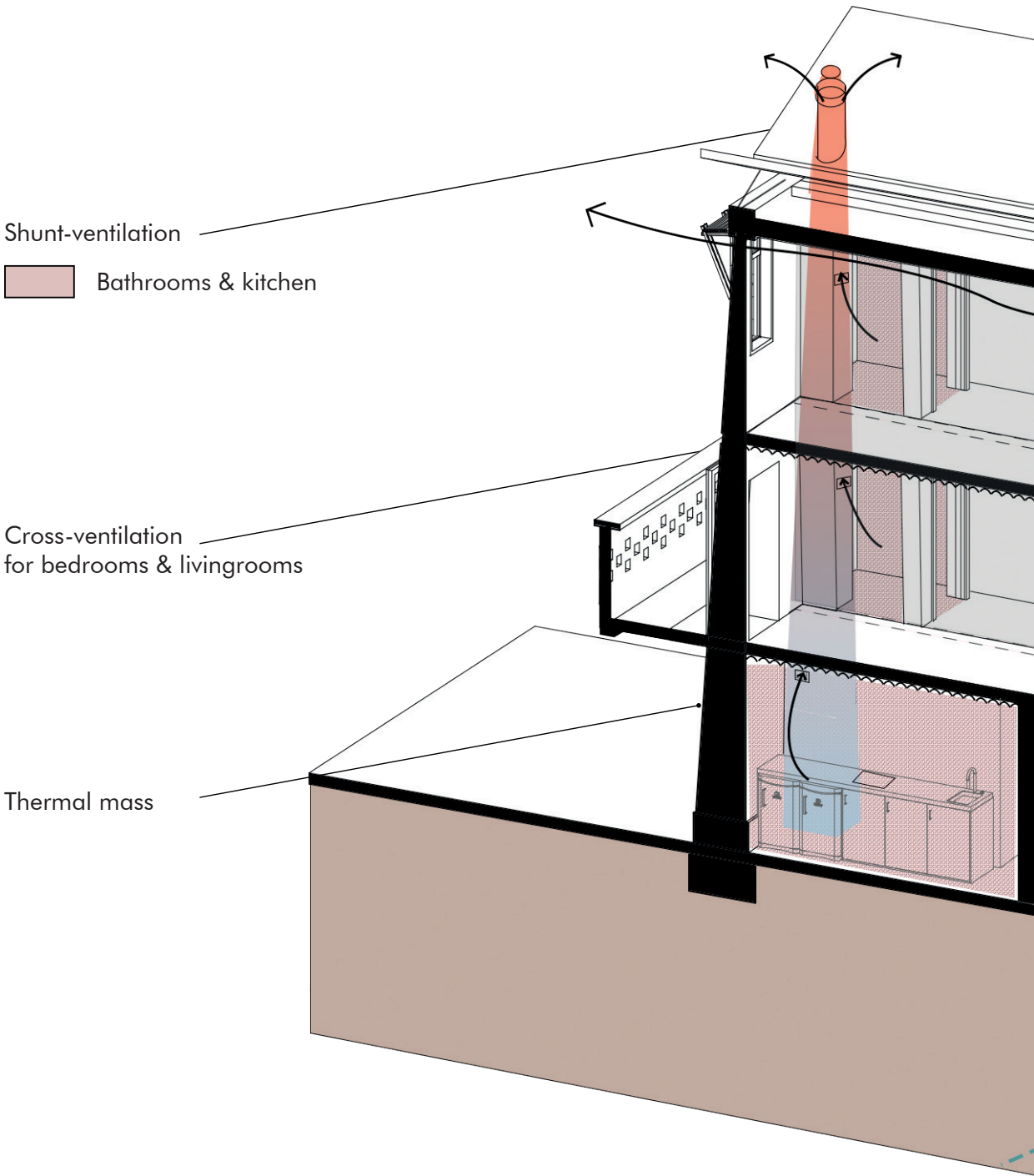
Rainwater drainage

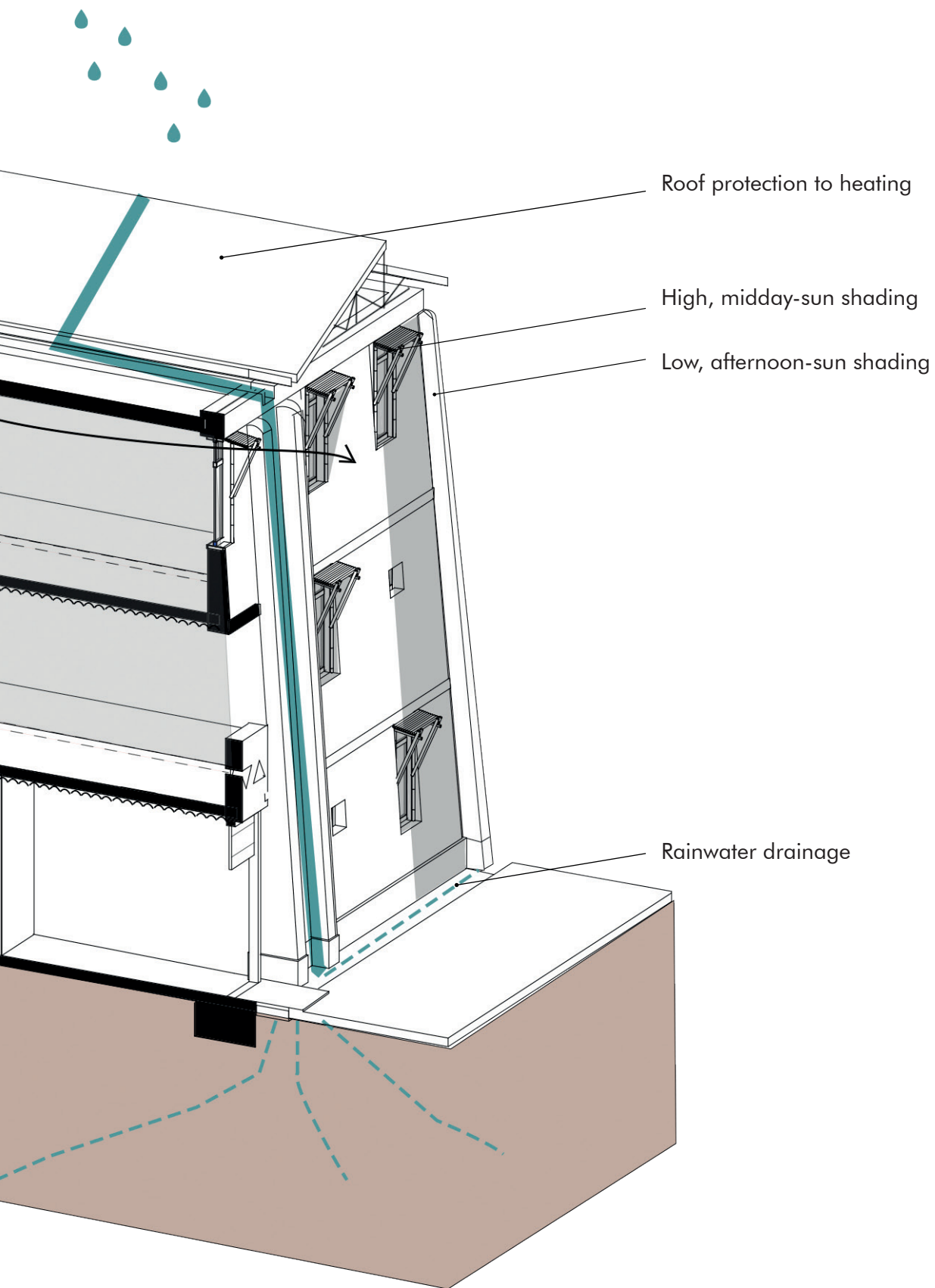


Water well



Climate principles





Sisal as natural fiber - hammocks

Sisal fibre is a crop that grows in Ethiopia. It is a stiff fibre used in making rope and twine, but also paper, cloth, bags, carpets and hats. Inspiration of using fibre in architecture has been drawn from a project in Burundi, where they made a hammock as mezzanine floor in a library. Net-making from Sisal plant fibres became a small micro-economy that bloomed in this project. An older person who mastered the weaving technique taught 4 others how to weave the rope. They now use it as a skill to gain their livelihood. The hammock serves as a reading space for kids, where they can also to play and relax. In this project, the sisal rope weaving technique will be taught to the women. They can weave hammocks for the roofed porches that face the community spaces. After completion, they can continue making hammocks or other products for selling purposes.

Scraping the leaves. (Van Zandbergen, 2017)

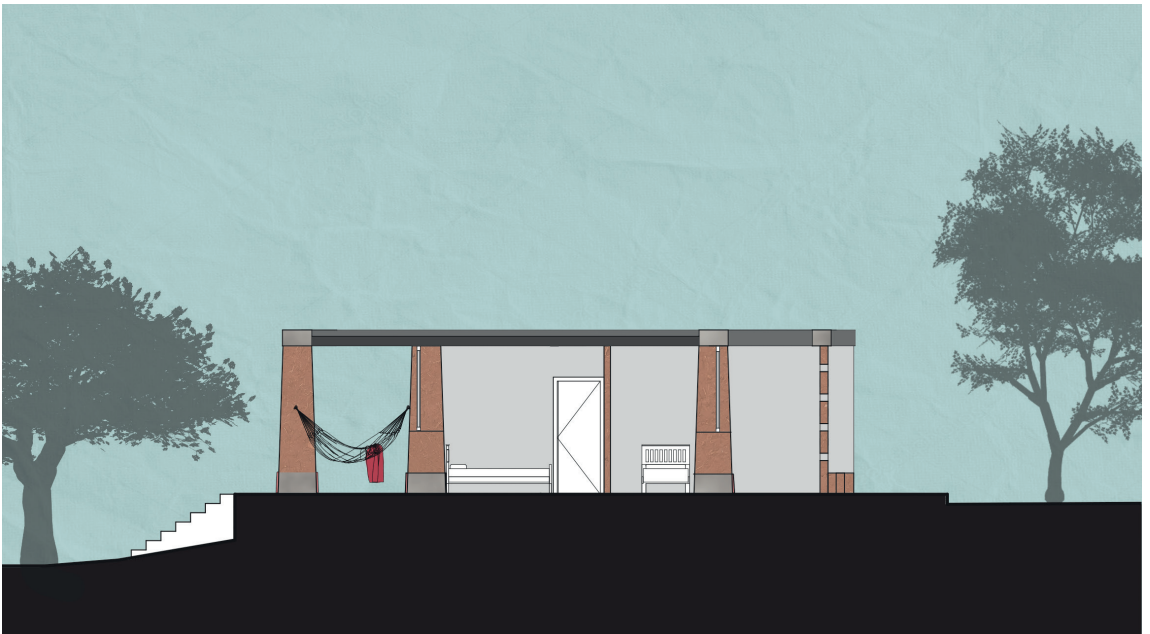


Drying the fibers. (Boethling, 2016)



Weaving bags. (Carole, 2020)





Section incremental unit

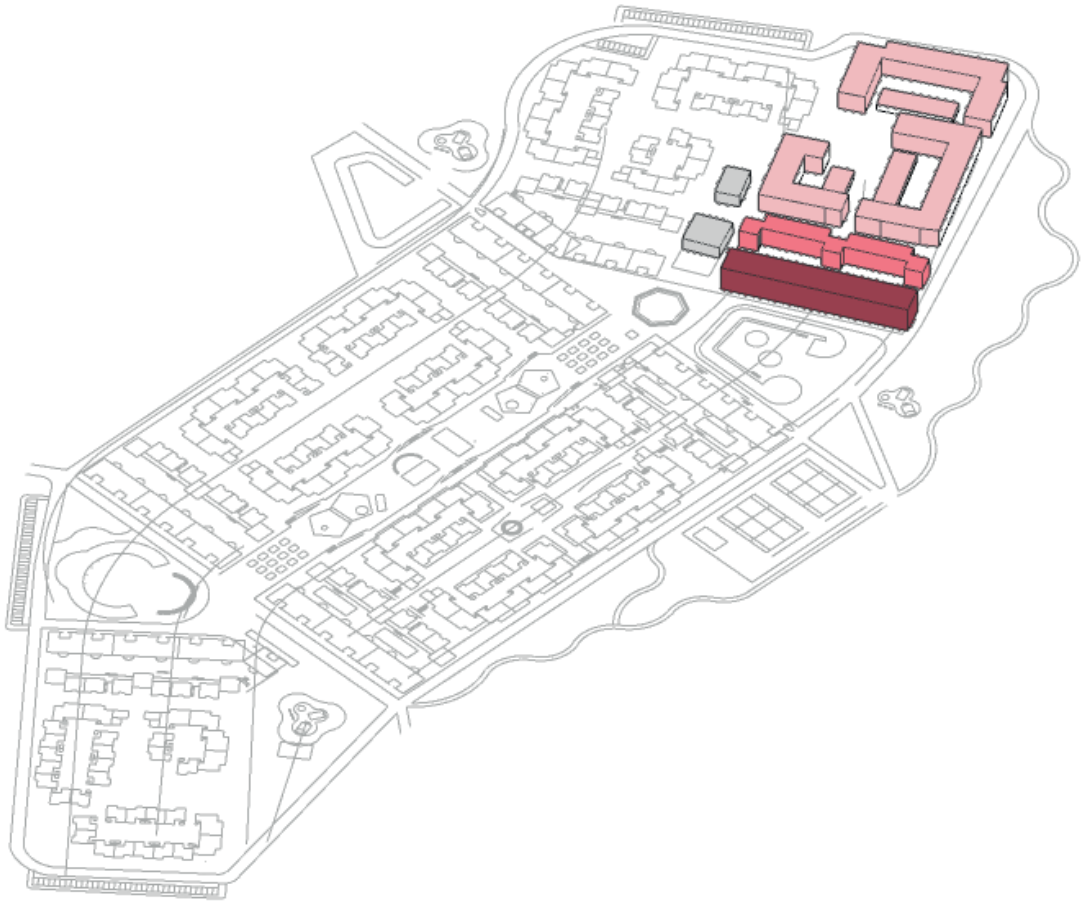
The sisal hammocks can be placed underneath the porches that face the communal courtyard.

Project phasing



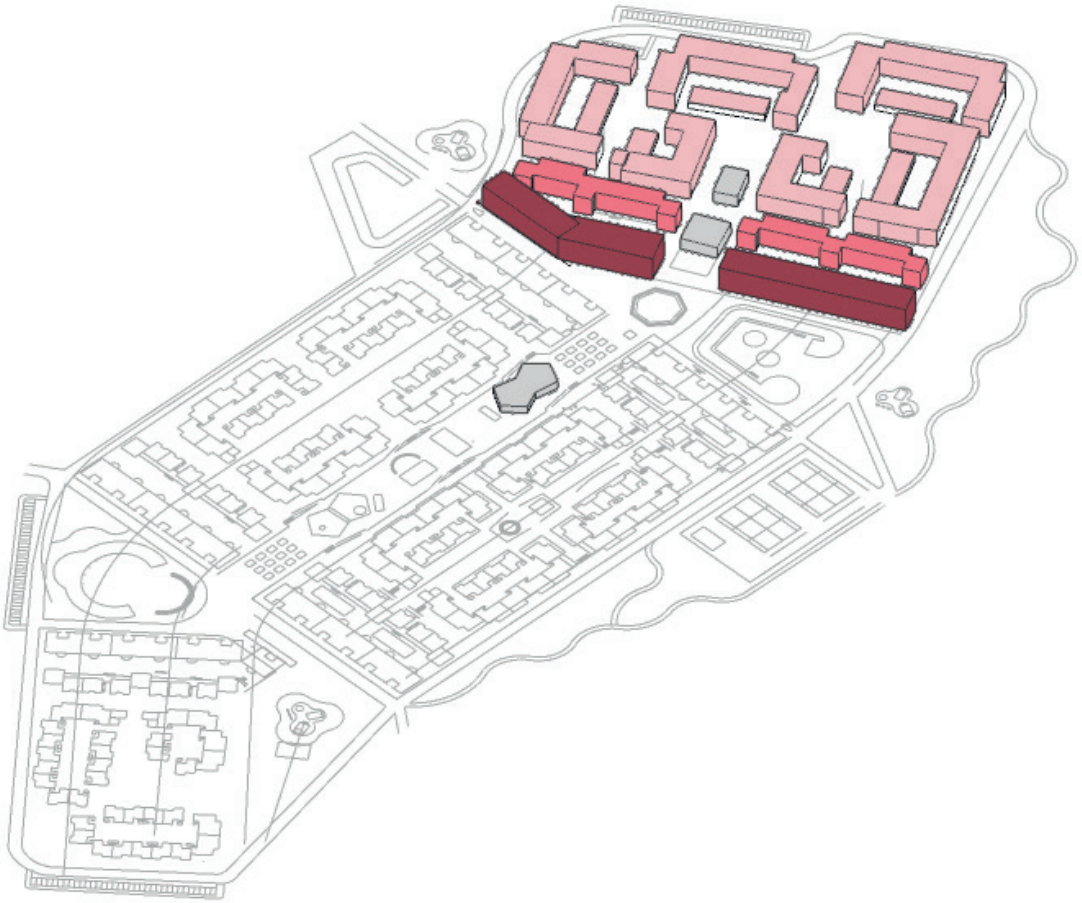
0_Infrastructure (electricity, (grey)water, internet)

After excavating and terracing the plot, it will be divided in clusters and made built-ready with water, electricity and internet services. The large light pink arrow shows the construction road connectivity. The small orange path shows the road for adobe brick transport.



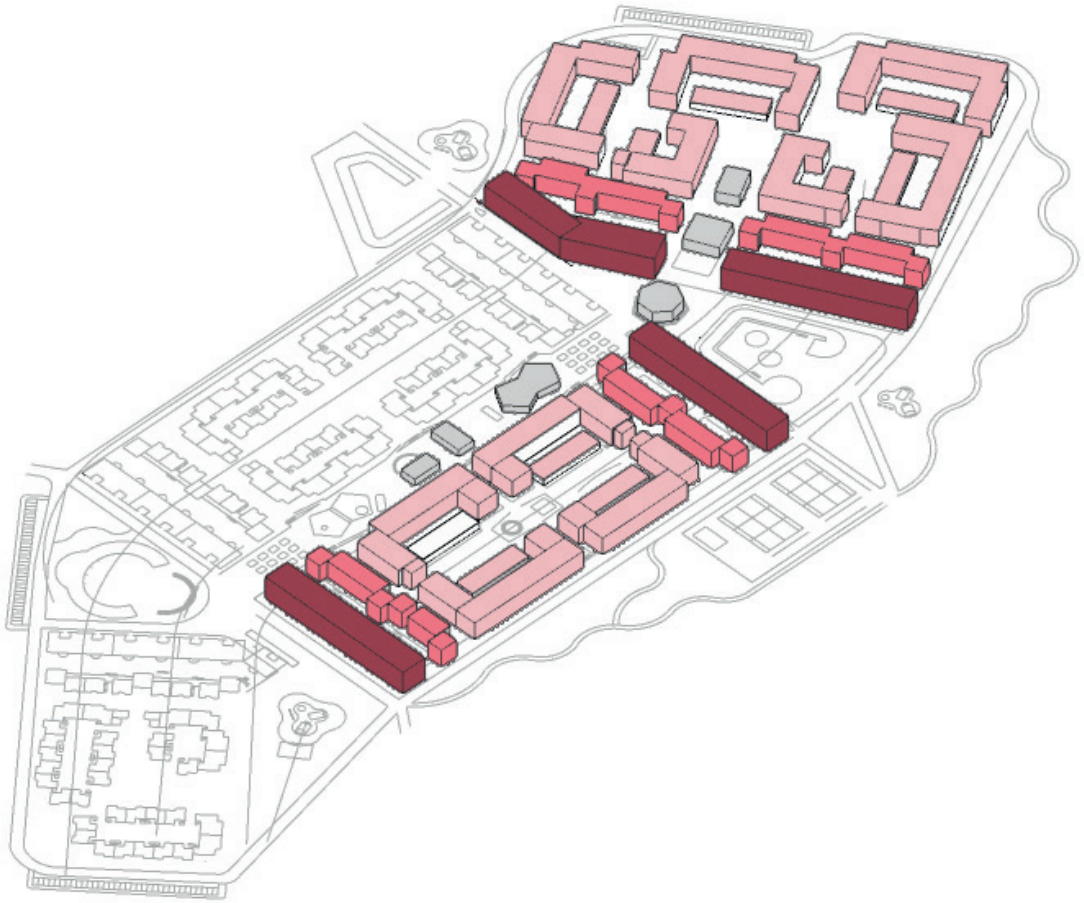
1_First cluster, community building, start empowerment street

The community building will be the place where managerial and social meetings of co-operatives can take place. During the construction phase, the empowerment street will be used as a workshop place to make the bamboo woven doors and to start with a try-out of the plastic tiles.



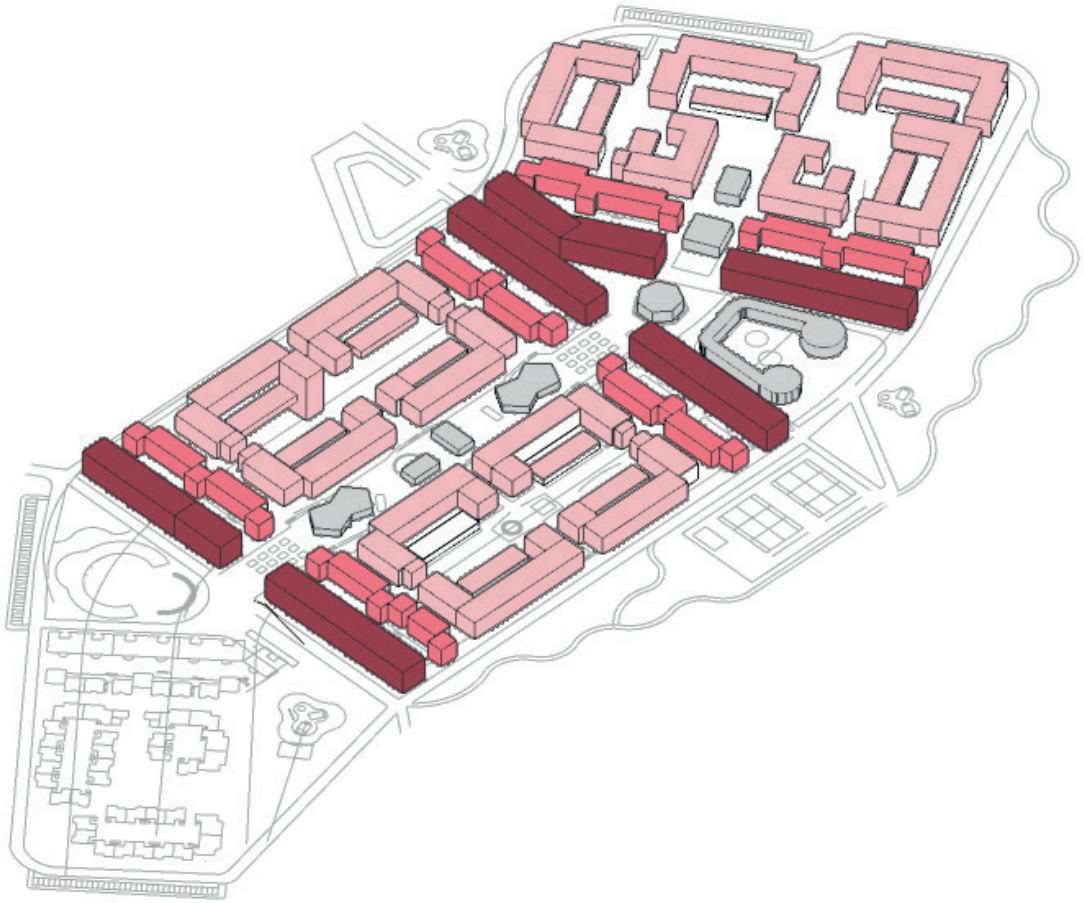
2_Two clusters and high income buildings

After completion of the first cluster, the process will be reviewed and findings will be taken into account when starting the next construction phase.



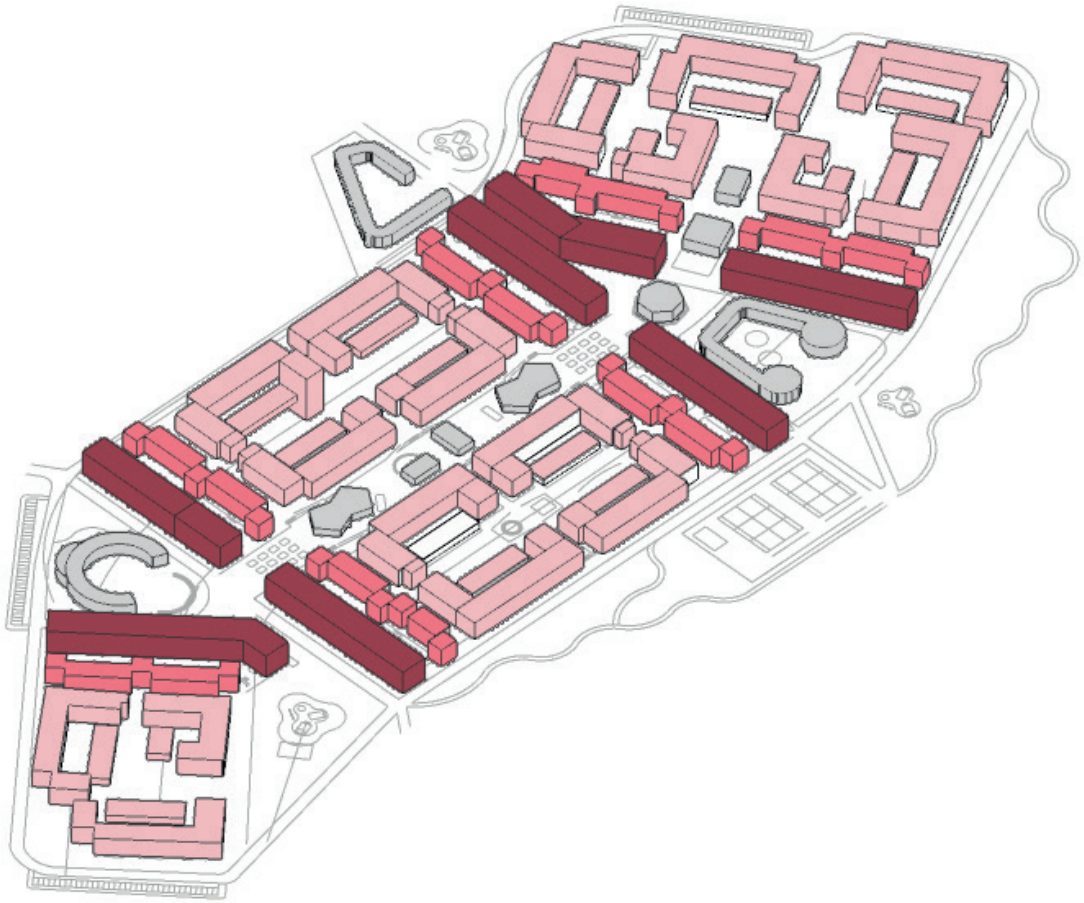
3_Two clusters, expansion empowerment street, church

Empowerment street will be expanded to make room for people who want to start their own business. The religious building will be the first meeting place for the current dwellers.



4_Two clusters, finishing off empowerment street and school

Empowerment street is finished off and with the increasing amount of inhabitants, a primary school will be built.



5_Last cluster and commercial shops

In the last phase, commercial shops, a pharmacy and police station are built. The last cluster will be finished.





V. OUTRO

Reflection paper

Relation between research & design

To get a broad understanding of the way women live and how women are positioned in the culture of Ethiopia, I watched several films ("Time to Look at Girls", "Two Women", and "A Walk to Beautiful") and I read different interviews and books. While these films were not about architecture, it showed me the social and economic struggles women face. They spoke about having fear in the streets, not being allowed to go out at night, being vulnerable at their own market stall or even not having a place to sleep.^{35 36} During the design process, I kept all these stories in the back of my head. They gave me direction in the decision-making through all scales; from the typologies to the use of materials, the location of the different income groups, the position of the kitchens, the bedrooms and the windows.

Due to the fact that we were not able to physically go to Addis Ababa and the information provided online is not endlessly, I also used sources from other contexts, from Mozambique to London, which addressed women's perception of (space in) the city.

Relation between project, studio, master track and master programme

With the prospect of 70% of all people around the world living in cities in 2050, the search of ways to provide sufficient and, even more important, affordable housing within these cities is a prominent issue. The cities are becoming more and more the places of socializing and economic opportunities. They will also be melting pots of all kinds of different social backgrounds.

While it is more than ever important to inclusively cater for these different groups, the current mass housing solution in Addis Ababa comes in a one size fits all scheme. The studio therefore aims at finding alternatives for this scheme by studying different fields within the social, cultural and political context of Addis Ababa and testing new housing solutions based on those findings. The topic I'm concerned with, the cultural imbedded gendered bias and the way it limits and excludes women, is one of the approaches to find these alternatives. The stories from not only Ethiopian women, but women all over the world, prove that a gender approach to housing design is indispensable input. I think architecture can play a key role in mapping these issues and using it as a base when thinking of design solutions.

Research method in relation with graduation studio

As mentioned in paragraph 1, an analysis of precedents has been carried out. The main goal here was to gain knowledge about women's experiences in Ethiopia's rural settings and struggles in the urban settings of Addis Ababa, through interviews and films.

Another goal was to find existing theories and strategies for women empowerment and safety design within cities. I found different strategies promoting safety design, but the concept of Jane Jacobs' 'Eyes on the Street' was the most complete in my opinion and also covered other theories, such as the Safer Communities Model by C.³⁷ Whitzman. Jane Jacobs pleads for mixed-use neighbourhoods, human scale-design which enforces social interaction,

Quotes from films & interviews:

"My husband won't let me walk down the streets in the evening."

"The clothing factory is a few kilometers outside the city center. Some of my colleagues got raped on the way home from work."

"My aunt promised me to get education, but she started beating me and made me her housekeeper."

"The place is where I'm allowed to sell products is badly watched. My stuff got stolen twice already."

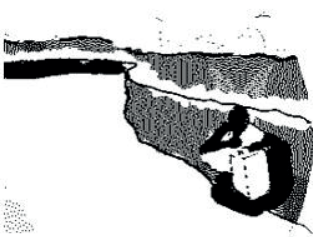
"Within those thick concrete walls, no one can hear you scream for help."



5:00



7:00



9:00



12:00



16:00



18:00

considering the placement of façade openings, which can all work together as 'street guards'.³⁸

"There must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. The buildings on a street equipped to handle strangers, must be oriented to the street. They cannot turn their backs or blank sides on it and leave it blind." - Jacobs, 1961, p. 42

Method: Ethnography

In order to interpret rural lifestyle patterns and motives for women to move to Addis Ababa, the research methodology that has been used is Ethnography. It will contribute to the design of housing that can serve as an intermediate phase between rural to urban livelihoods. The abovementioned interviews and movies have been used as input for this method. It showed how many hours of the day women are busy with basic domestic chores, such as preparing breakfast, working on the farm, getting water, bringing kids to school, preparing dinner and being responsible for the traditional coffee ceremony (see image 2). There is little spare time for own infill or self-development. (Young) women in interviews declare they don't aspire this kind of lifestyle, which motivates them to eventually migrate to more urban areas.

With not being able to go there ourselves, the lifestyle patterns of women are based on previous held interviews and movies by others, which were held in 2015-2018 with differing purposes. As an architecture student, I would possibly look at other aspects as well, such as the plans of different tukuls or the traveling time to the market, school or friends or the space needed for

cooking. For me, it was sometimes difficult to get straight facts about those aspects.

Method: Case studies

Lastly, an analysis of case studies has been performed to find solutions for self-help housing. An example is Zona 3 co-operative housing in Uruguay, which is a cooperative housing development with a total of 839 units. It is the largest complex in Uruguay built through mutual aid and includes many facilities and services. It was surprising to what scale people can build houses collectively.

Also important were references that gave inspiration on how to propose a building construction that could be (partly) made by local women. The Community Impact Nepal – case showed how women could make their own bricks to (re)build their houses. After completion, they set up an enterprise to sell those bricks as a way of permanent income generation.

A third case study was the Community Habitat Programme in Anantapur, where a piece of land is owned by a collective and together, they built their homes. They also set up a committee to control the building work and to share knowledge & forces.

Relationship with wider social, professional and scientific framework

The goal of the studio is to design an affordable housing scheme which is replicable and could be used in other contexts as well. The project results could be transferred onto a next phase, where I could foresee a proposal and discussion of the plan with local women. By not being able to go there, you cannot test the plan

and it sometimes gets more speculative. I sometimes missed the input of a client or the end-users, as you would have in a real project. For a next step, I think it would be interesting to have workshops or discussions with local women to see if they would like to live here or how they would adapt it to their wishes.

Ethical issues

With the current advocacy of 'gender-neutrality' it sometimes made me wonder if I wasn't addressing my project with too much contrast. Also, not only women are being held back by cultural norms and beliefs,

I can imagine that people from or within different ethnic groups, homosexuals or immigrants face the same kind of struggles the female migrants face. Therefore, it is important to mention that I approach the design of mass housing through a gender lens where in my case, it is focused on the target group of women. Eventually, being a woman myself, I have often experienced the feeling of unsafety, during the day or in the evening. When reading the interviews of the women, even though Addis Ababa is a completely different context, I could recognize in a way their struggles and fears. In a way, this identification was another reason why I wanted to shine a light on this target group.

*Without housing,
Women stay dependant of whoever takes care of them.
With it,
They can dream, plan and live their lives.*

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