Embracing Urban Temporality

how we can use temporality to provide homes for the urban poor

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The world is increasingly urbanised. Especially in those countries that are in rapid development, the migration to the city is extreme. This is the case for Addis Ababa, the capital city of Ethiopia. Its population growth exceeds the number of newly built housing, and the housing that exists is unfit for a majority of the urban population. People create their own solution and move to informal neighbourhoods: neighbourhoods where they build their own houses and earn their money on the streets.

While the conditions in the informal settlements are far from optimal, people can live their life and create their own opportunities. Somehow, they make a living that they cannot make in formal housing units: either due to the rent they cannot afford to pay, or due to the inability to earn an income in the way they do in the informal neighbourhood. In this way of living the life in the informal neighbourhoods, temporality plays an important role. People are versitale, can adapt to different situations, different circumstances. They can build up a process, starting something from scratch with the resilience to improve it, one step at the time. The streets are vital: pedestrian flows are economic opportunities. Converting any moment, any place into an opportunity that fits the situation the best: from a kitchen to a shop through the window, from a outdoor stall to an outdoor cooking spot, from a place of moving and travelling, to a place for gathering and meeting. Spaces can transform, dwellings can transform, adapt to circumstances, adapt to serve the opportunity that seems most succesful. It is this temporal element that makes them resilient.

But these people are also vulnerable. With the current neighbourhood conditions, a lack of good quality housing, a lack of a well patterned street-network, a lack of services and hygiene, a lack of legal ownership, the dangers are clearly visible: fire, flooding, eviction and disease are potential enemies, created by their living situation. These people, of which there are so many in a city like Addis Ababa, deserve a home that caters their needs, actively engages them to use their abilities to improve their neighbourhood with the right acces to services, streets, economic opportunties. How can we use the theme of temporality to create such dwellings?

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RESEARCH

THEORETICAL FRAMEWORK

The world is urbanising at a fast rate. While currently already 56% of the world population lives in cities, it is estimated that this will grow quickly, leading to more than 67% by 2050 (Ritchie, 2018 & Statista, 2020). In the whole of Ethiopia, with a country population of 108 million and an urban population of 23.4 million, every year an additional 1.1 million people move the city. In the capital and main city, Addis Ababa (population 4.78 million), the urbanisation rate is set at 2.1% per year (UN Habitat, 2017) and an absolute growth of 100 thousand people per year.
With this population growth, the city borders extend outwards, into the former agricultural lands. This growth of surface area is not unlimited: Addis Ababa has a fixed boundary. Outside this boundary, land is property of the different regions in Ethiopia, and not of the city itself. Growth of surface area can pose a different problem as well: a population sprawl over a large area results in a higher relative cost, or a lower quality, of infrastructure and services (Glaeser, 2012). Thus, for these, it would be most efficient to provide a high density, and a structured pattern of expansion.
But in Addis Ababa, the (less structured) informal urban is playing an important role. According to UN Habitat (2010:5), up to 80% of Addis Ababa can be classified as a 'slum', using the UN Habitat slum definition. Of the people that move to the city, a large amount will end up in informal settlements, part of which are slums. The UNCHS (United Nations Centre for Human Settlements) estimated in 2003 that 40-70% of the urban growth in developing countries is informal (Abagissa, 2019:1). The amount of people living in informal settlements in Ethiopia by 5,4% a year. This means that in between 2015 and 2020, the population living in informal settlements in the whole of Ethiopia increased by 5,4 million (UN Habitat, 2020).

To cope with this informal built environment, it is necessary to understand the processes that define these areas. African cities are very much different than European cities, and in this situation, we cannot completely legitimatise to compare the urbanisation in countries in Africa with the urbanisation in countries in Europe, as stated by Pieterse (2010) and Myers (2018). The danger is very much apparent that there is a tendency of seeing the current state of European cities as a goal for African cities, while the other directions are overlooked. While African cities certainly could have improvements, it is important to consider not only the urbanisation of these cities in Africa from a Eurocentric perspective, but also compare them within their own referential framework. By doing this, the urban life of the people and systems that play a role in these cities can be better understood. How do people live in informal settlements, how do they dwell, generate income, have their social life? In other words: how do the complex systems of the city take shape in informal areas? What is the difference between formal and informal settlements, and how can these be defined? These questions lie at the heart of the project, and are investigated via two important keywords: informality and temporality.

It results in an overall project question that combines the lack of knowledge of the informal and temporal with the ambition to create suitable housing for the urban poor population:

> *how can the urban use temporality, as one of the aspects found in urban informality, in accommodating space for as many dwellers as possible, while adding basic quality of dwelling as well as living to those who are either naturally attracted or condemned to these places, most of the latter being the urban poor?*

Improving density

There are multiple ways in achieving a high density in a certain area. Visagie & Turok (2020) list several aspects of measuring and defining density: which unit is used (amount of households, firms, workers, buildings), spatial scale (density of a plot, neighbourhood, precinct, city), process of densification (vertical, horizontal) and the type of impact (what is the goal: social, physical, environmental, economic). Increasing a building density has consequences for an area, of which some can be very straightforward, others complex and unpredictable: increasing the pressure on the services and street networks, possible overcrowding certain areas, possible property rise. The most present consequence is the increasing pressure on services and street networks. With an already underdeveloped street network in many informal areas, this requires special attention. Since the temporal activities and relations form an important part of informal areas, these activities need space as well. UN-Habitat (2012) stresses the importance of a well-functioning street network as a basis for improving informal areas, supporting incremental growth, providing social spaces, and tools for inclusion, security and prosperity.

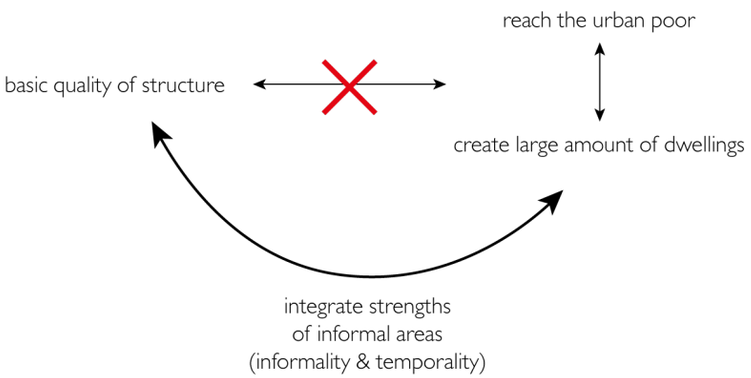

Figure 1: gapping the bridge between quality of structure, reaching the urban poor and creating a high density and large amount of dwellings (own figure)

Figure 2: street importance in an informal settlement (own figure). On the left, and incomplete street network, ; on the right, the same neighbourhood with a completed street network. Analysis old versus new: road circuitry (0-1, higher is better): 0.06 vs 0.23; Road complexity (0-3, 1 is normal): 1.07 vs 1.44; Node connection (0-1, higher is better): 0.39 vs 0.49. Theory by Haweck and James (2007).

Informality

Different aspects are playing a role in the informal urban. Following Okyere & Kita (2015), these can be categorised in the economic, legal, social forces, behavioural and sustainability. The economic includes labour flows and income generation. The legal investigates relations between official and unofficial, legal and illegal activities. This includes occupation, transfers, interaction or negotiation. The social forces aspect deals with social activities and actions. The behavioural aspect is one that relates well to temporality, but here it will mainly focus on mobility: moving from the informal to the formal and the other way around, blurring the boundaries of these worlds, adding complexity and nuance to these definitions. Lastly, sustainability deals with the ability to deal with the vulnerability to climate change and weather events.

A different approach to understanding the informal was done in the 1960s, when researchers started seeking an on-location understanding of self-build and self-help in squatter housing (Pugh, 2001:402). Charles Abrams was one of these, describing the poor condition of the dwellings, and blaming the government for neglecting these areas. During the same time, John F. Turner focused on the qualities of life in these areas, and mentions the self-fulfilment and the freedom of shaping your own house and home. Turner sees the incrementalism of these neighbourhoods as a strength, being affordable, flexible, and facilitating the human creativity in seeking value in life. In this regard, it is in contrast with the top-down approach of many (socialist) governments in providing standardised housing for the urban poor population, aiming for income equality. With his approach, it is essential that people are given basic services and tenure rights (Pugh, 2001), either actively, or by creating a 'tacit agreement' between state and neighbourhoods (Streule et al.,2020). Thus, the informal is defined by which activities can happen, and how these aspects of the informal can be used in creating dwellings for people. Streule et al. (2020) further define the informal rather as popular urbanisation (originating from urbanización popular, as defined by Latin-American scholars), focussing on "the crucial role of everyday experiences and on the agency of subjects in their production of space" (Streule et al., 2020:658). Popular urbanisation can challenge the well-known (hegemonic) standards of producing a space, mainly based on market mechanisms or state strategies. Moreover, experiences and processes of learning are constantly shaping popular urbanisation, and thus constantly change the way in which a space is defined and shaped.

Lutzoni (2016) also emphasises the relation of informality with the lives of people (behaviour), and the freedom to define their own space (popular). In her article, temporality plays an important role in informality. Informal settlements are relational spheres in which in-between space materialises. The informal is "an intermediate space between two conditions in which different forms of creativity may become manifest" (Lutzoni, 2016:5). Lutzoni not only describes the informal areas as being mainly in the Southern Hemisphere, but rather sees it as a phenomenon which is integrated in every city in the world.

The focus with informality should not be on the borderlines, where the formal is separated from the informal, but on borderlands, where the two coexist together in a hybrid space. Even more: these borderlands should not be designed as a single place accommodating a multiplicity of events, but rather designed for accommodating 'fracture phenomena', consisting "no longer of the transformation that lasts, but that of transformations that serve as a foundation" (Michel Foucault, Lutzoni, 2016:9). Thus, the act of transformation should be the heart of the design. The quality of the space is therefore not determined by the quality of the design, but rather by the quality of the relations existing between two spheres, being a home with another home, a home with a workspace, or a workspace with a transportation hub. Since a relation is something that is flexible and therefore temporal, the borderland should accommodate temporal processes, and embrace temporality.

Temporality emerges out of informality as an important element. It relates to the built environment not by its physical, but relational way of designing a space. In this design process, the poles of these relations, as well as the activities that take place, are as important as the space itself.

Temporality

Following Lombard (2013), temporality can be understood as looking at an area as a process, rather than an output. In this way, the traditional forms of the 'static' city, the built environment as seen as the output, become the background of the 'kinetic' landscape (Lutzoni, 2016). The temporality in the urban is built upon the static: landscape, roads, existing structures. An

example of this interrelation between static and kinetic is the Torre David. An existing, deserted high-rise building is occupied by people informally, creating their own dwellings, shops and facilities in the concrete frame of an unfinished tower. More importantly, this interrelation is not necessarily manifested in something physical: temporality is very much related to "instability, indistinctiveness, dynamism, mobility, recyclability and reversibility" (Lutzoni, 2016:2). While this built environment might be the basic background of the urban life of the people living in informal areas, it is much more defined by their economic relations, social activities, dynamic locations, and sudden changes in the environment. It is in constant reaction to its environment, gradually building up an area.

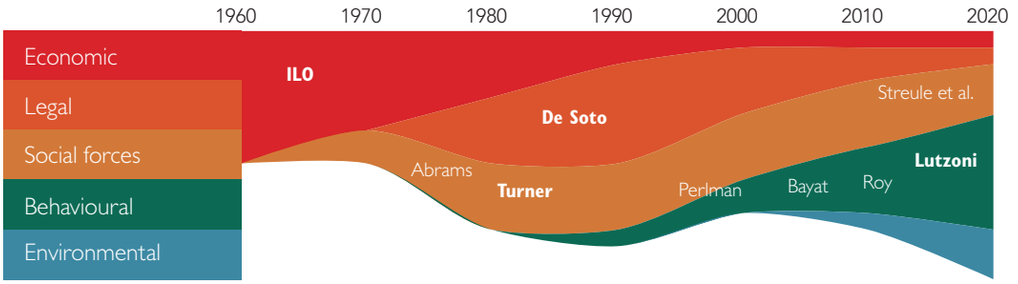

Figure3: The understanding of informality over time (own figure).

Figure 4: Torre David, as a framework of individuality (own figure). The different units gradually develop and elaborate in complexity as well as quality. They change and adapt over time to their most effective shape.

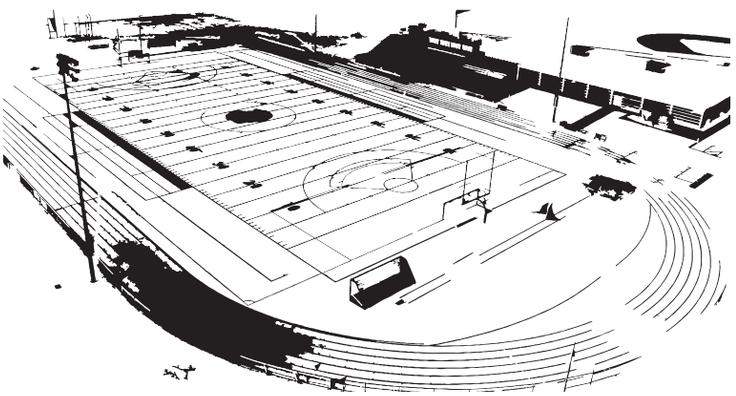

Figure 5&6: the difference between 'transformation that lasts' (upper, multifunctional sports field) and 'transformations that serve as a foundation' (lower, La Rambla) (own figure). While the sports field allows different activities and transformation of its space, the space of La Rambla is shaped by these tranformational activities, or 'fracture phenomena'. It is a difference between an allocated, multifunctional space (sports field, parking space, clearly defined road) and an open, transformative space (sidewalk area, square, boulevard). These spaces are important for the informal activities to take place, and facilitate borderlands.

LOCALISATION

Addis Ababa has its limits

With the population growth of Addis Ababa, the city borders extend outwards, into the former agricultural lands. This growth of surface area is not unlimited: Addis Ababa has a fixed boundary. Outside this boundary, land is property of the different regions in Ethiopia, and not of the city itself. Growth of surface area can pose a different problem as well: a population sprawl over a large area results in a higher relative cost, or a lower quality, of infrastructure and services (Glaeser, 2012). Thus, for these, it would be most efficient to provide a high density, and a structured pattern of expansion.

But in Addis Ababa, the (less structured) informal urban is playing an important role. According to UN Habitat (2010:5), up to 80% of Addis Ababa can be classified as a 'slum', using the UN Habitat slum definition:

> *inadequate access to safe water, inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding, and insecure residential status (UN Habitat, 2003, quoted from Okyere & Kita, 2015:7)*

Of the people that move to the city, a large amount will end up in informal settlements, part of which are slums. The UNCHS (United Nations Centre for Human Settlements) estimated in 2003 that 40-70% of the urban growth in developing countries is informal (Abagissa, 2019:1).

Informal areas

These settlements are known as Chereka Bet, or moonlight houses (Abagissa, 2019), and are mostly built during the night. The consequences of the inability in dealing with this urban poor population is a strong growth of the urban land, due to the inefficient way of building dwellings, taking over agricultural and rural lands. It therefore increases the pressure on the infrastructure, and decreases the availability of land for growing food. Also the quality of built environment in these areas is low.

Since the urban population is growing rapidly and the already existing shortage of housing, mainly these informal areas accommodate spaces for urban migrants, resulting in overcrowded areas. Aside of these aspects, a relative large share of people living in this area lives below the poverty line, has no educational background, and is more vulnerable to diseases. Poor environmental quality is estimated to account for 25% of preventable ill-health (Shibata et al., 2015 & Pugh, 2001).

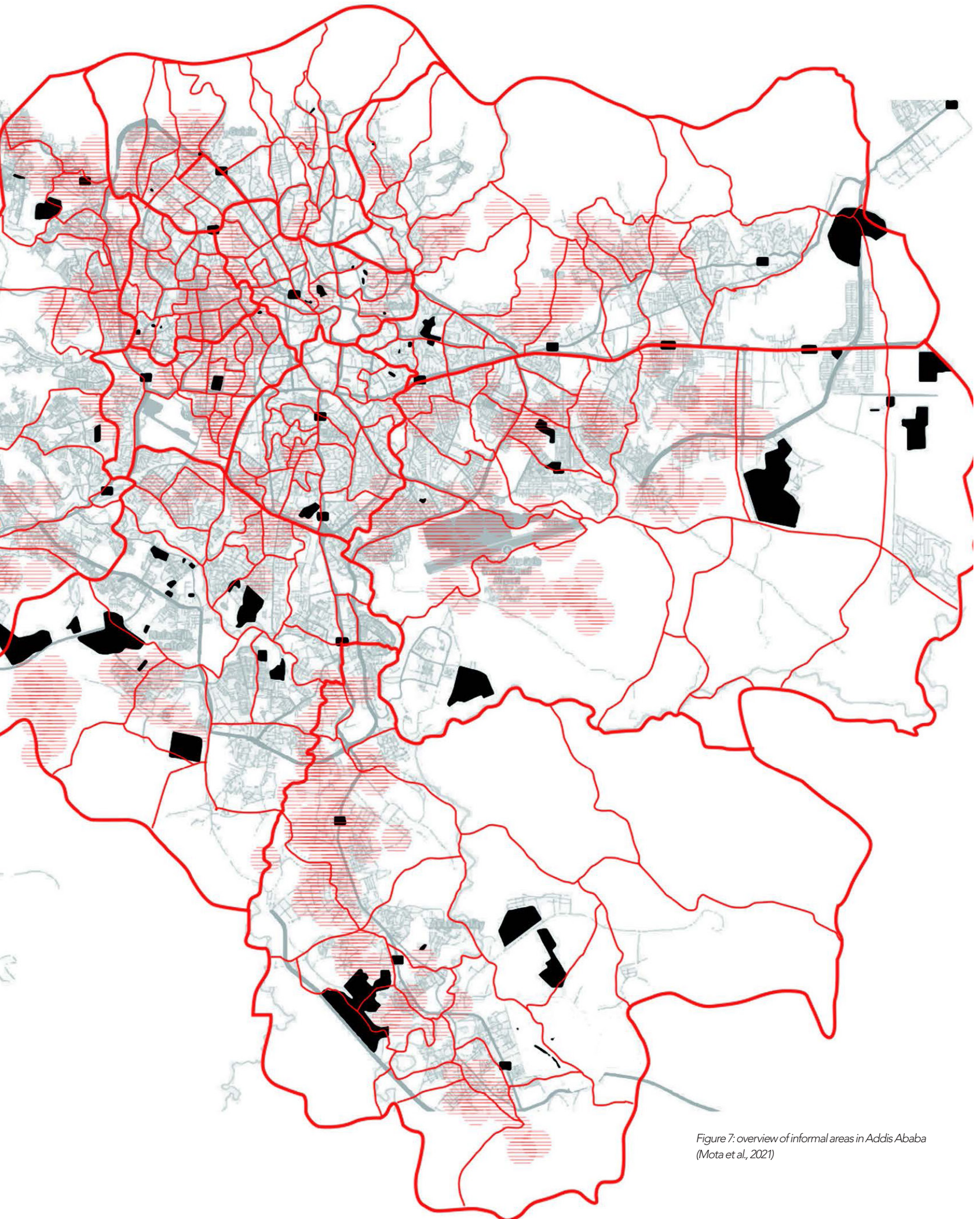

Figure 7: overview of informal areas in Addis Ababa (Mota et al., 2021)

Geographical overview of Ethiopia

As can be seen in these four images, Addis Ababa is located in the middle of Ethiopia, on 2355m above sea level. It has a subtropical highland climate, with temperatures ranging from an average of 8 degrees to 22 degrees, with extremes of 0 degrees and 27 degrees, throughout the whole year.

Addis Ababa has a high sun intensity, but varying from only 60 hours of sunshine in July, to almost 300 hours of sunshine January. The wind speeds are lower in Addis Ababa (highlands) than on the surrounding lowlands, ranging from an average of 3 km/h to 18 km/h, and an average throughout the year of 6 km/h.

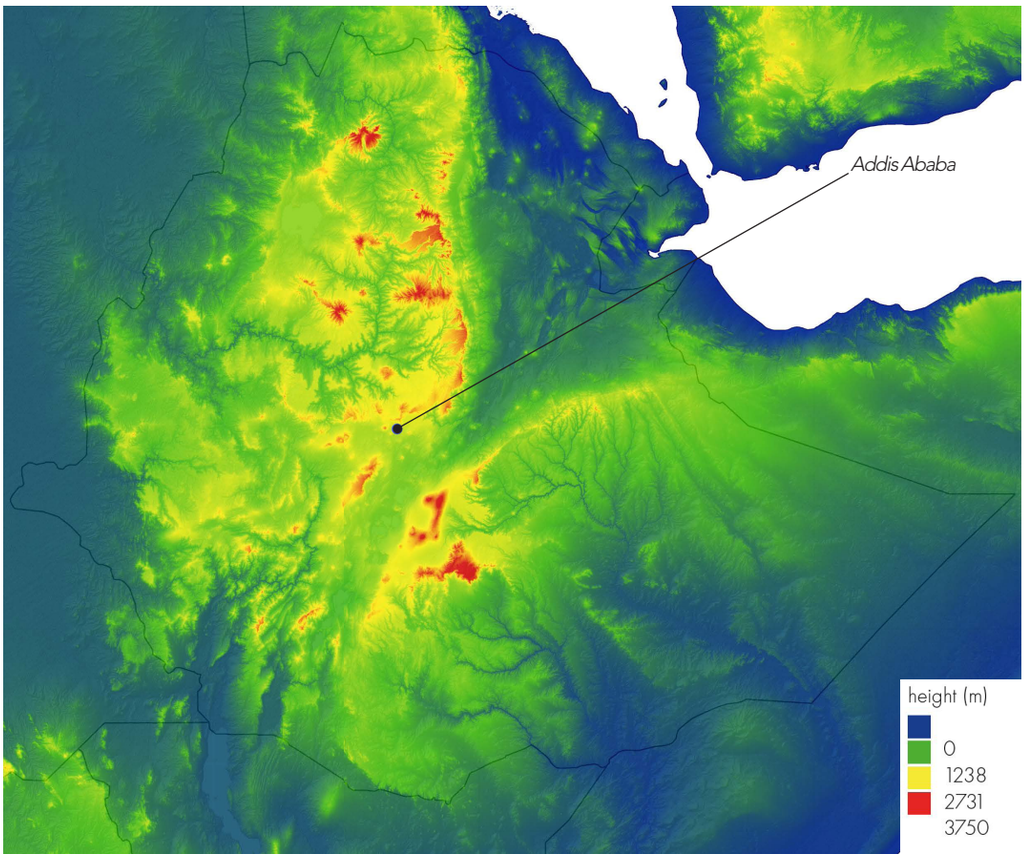

Figure 8: Ethiopia in elevation (Mota et al., 2021:9-10)

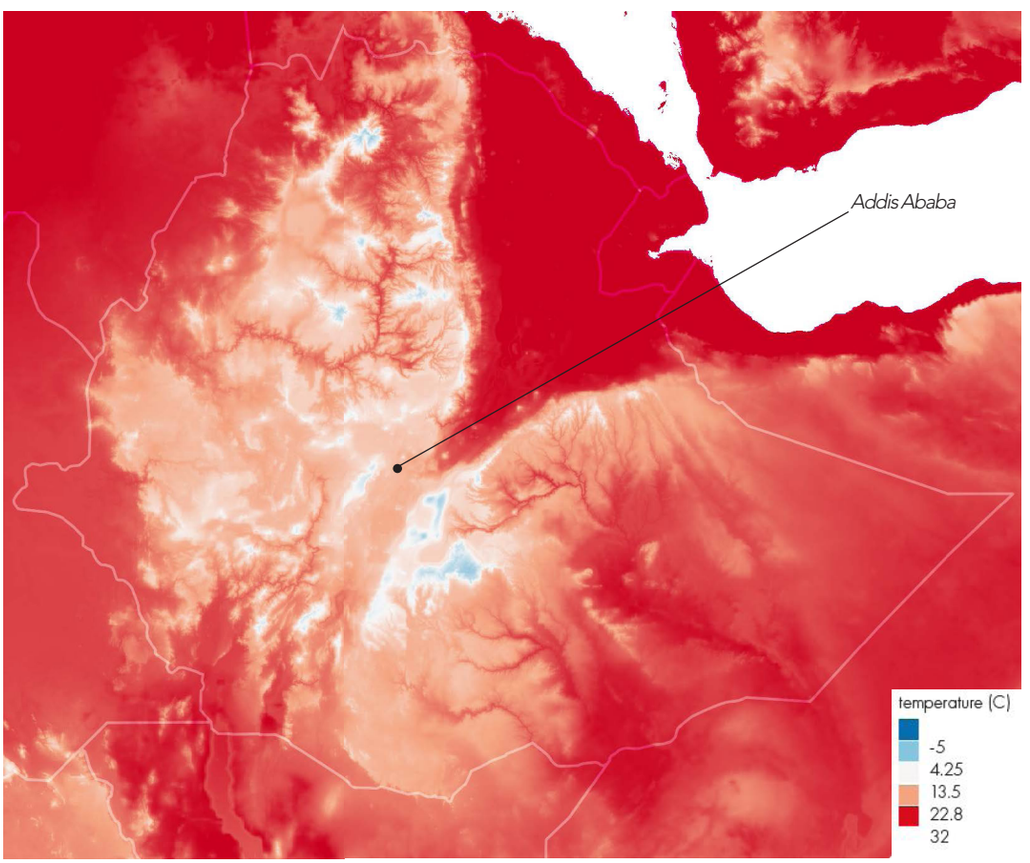

Figure 9: Ethiopia in temperature (Mota et al., 2021:11-12)

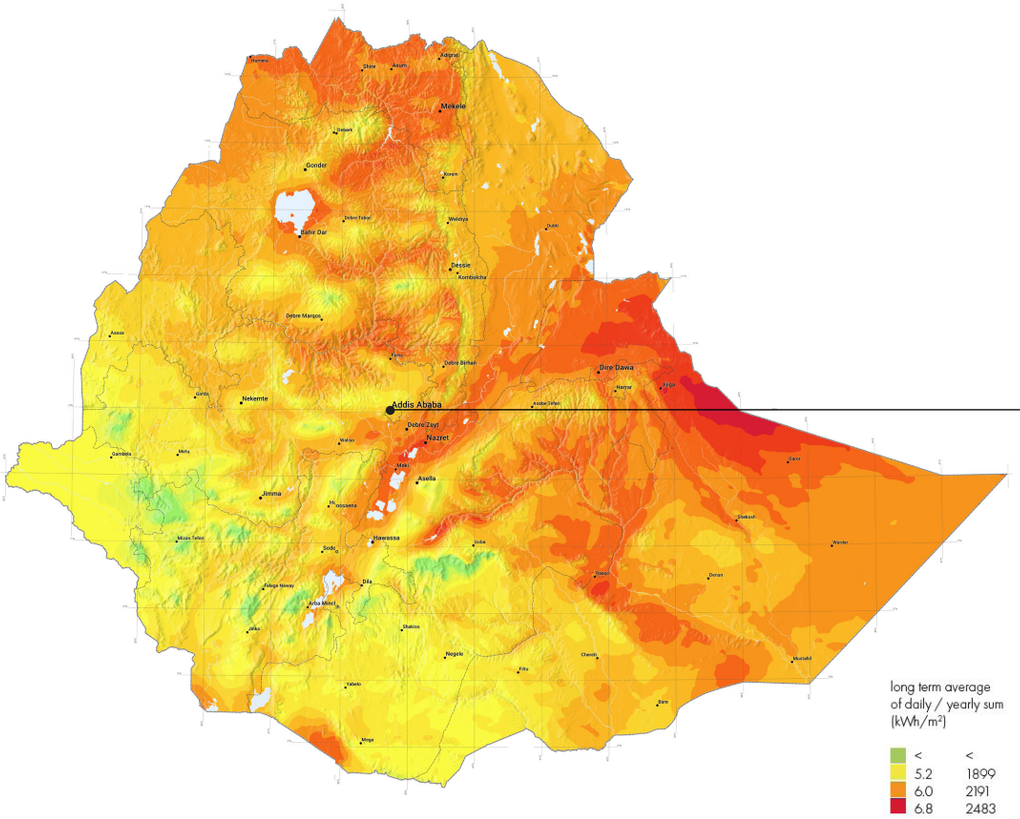

Figure 10: Ethiopia in sun intensity (Mota et al., 2021:14-15)

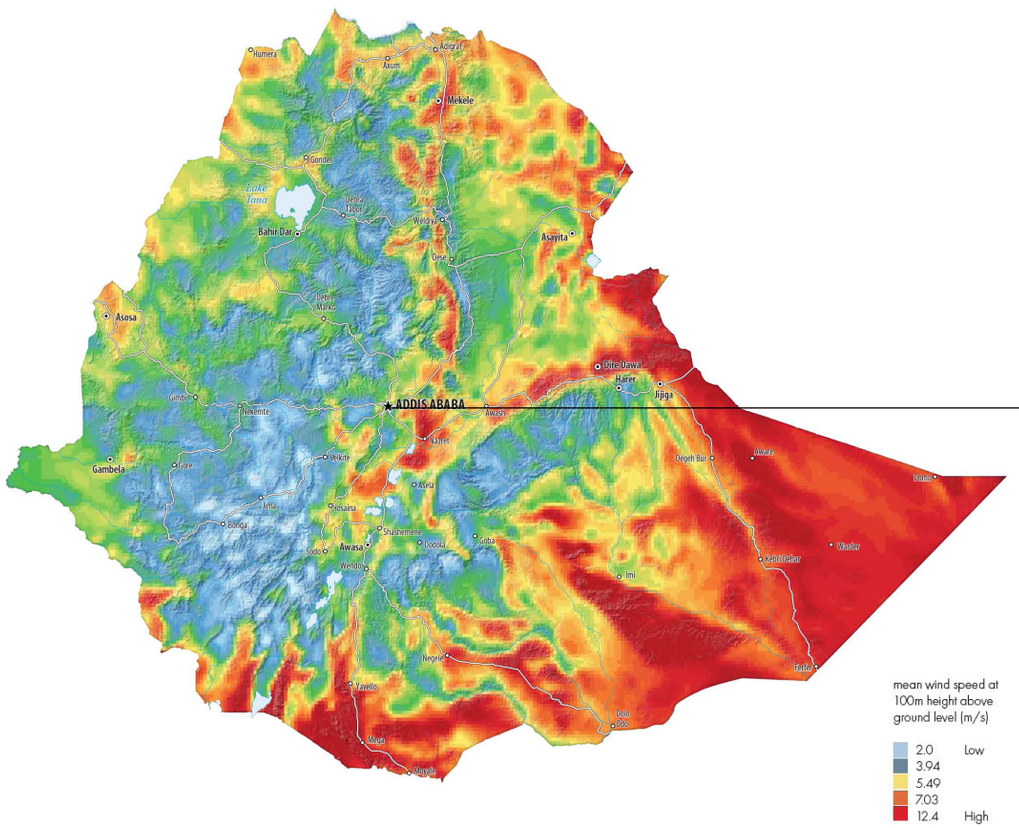

Figure 11 Ethiopia in wind intensity (Mota et al., 2021:18-19)

CASE STUDY - BUILDING PROGRAMMES

Addis Ababa has had several attitudes regarding these informal areas (Abagissa, 2019:14-18), aiming at leaving them as they are, demolishing them, or regulating them. In the mean time, the city also wanted to create adequate housing, and has developed several strategies in the past decades. This difference between attitudes and building programmes is very important: the attitude reacting to the phenomenon, without tackling the real cause of the issue: a lack of housing. The building programmes try to do just that: creating affordable housing for the urban poor, so they don't end up in informal areas, creating their own homes. The building programmes that will be discussed here are the Sites and Services programme (during the '70s) and the Cities without Slums program (2000 and onwards).

Attitude: laissez-faire

The laissez-faire attitude simply regards the informal areas as a temporal phenomenon, and is characterised by a full neglecting of the development. This attitude was mainly normal during the 1950s and '60s. While the attitude fortunately turned out to be temporal, the informal areas did not.

Attitude: demolishing

While the laissez-faire attitude neglects it, the demolishing attitude tries to exterminate the phenomenon altogether. Of course, by only tackling the phenomenon and not the cause, this attitude was doomed to fail.

Attitude: regularising

The regularising method that governments used, from the latter part of the 20th century onwards, was a more effective approach. However, while giving people a legal basis for their dwelling, the quality of life is still low. Therefore this attitude sometimes goes hand-in-hand with upgrading informal settlements, improving the street network, and quality of dwelling. While this is a very effective approach to improve the quality of living, as well as mobilising the people living in these informal areas, it does not tackle the cause of informal areas. With new informal areas emerging rapidly, and the informal population growing extensively, the attitude is playing catch-up with these developments. A more active approach is needed as well, creating the building-programmes.

Building programme: sites and services

In the 1970s and '80s, the sites and services program was used to combine a basic quality of dwelling with flexibility of the dwelling units, and mobilising the dwellers themselves to build their own house. A plot was provided with only a one room and detached to it a kitchen room and pit latrine (Mota, 2015). The building programme was very effective in providing affordable dwellings for citizens, as well as accommodating for incremental growth, and thus changing dwelling conditions. However, the programme did not provide a high density (each family owning a plot of ca. 160m^2), making it therefore harder to integrate it in a city-centre.

Building programme: Cities without Slums

The Cities without Slums programme, or Integrated Housing Development Programme (IHDP) started as a reaction to the current shortage in available dwellings. However, the result of this program falls short of the set ambitions. Aiming at building 400.000 housing units between 2006 and 2010, Addis Ababa managed to build (only) 80.245. While this is a respectable number, it is not enough to provide housing to all the citizens already looking for a dwelling, as well as all the newly arriving citizens.

There is not only a shortage of housing units, these units built by the Cities without Slums program are also unaffordable for a large part of the population. As stated in a report by UN Habitat (2017:51), 45% is perceived as 'not affordable', an additional 20%

as ‘unaffordable over time’ and 15% ‘somewhat affordable’, leaving only 20% for the category of ‘affordable’. On top of that, even in the specially allocated dwelling units in the condominium projects, almost half of the inhabitants of a condominium dwelling has fallen short of paying their mortgage. The consequence of the construction of these units is the relocation of the people previously living on the site, leaving them vulnerable to losing their income. 57.9% states that their ability to earn income has been affected, and even 86.5% states that they are not able to sustain their business at the new location (UN Habitat, 2017:66). Same problems appear in maintaining social relations.

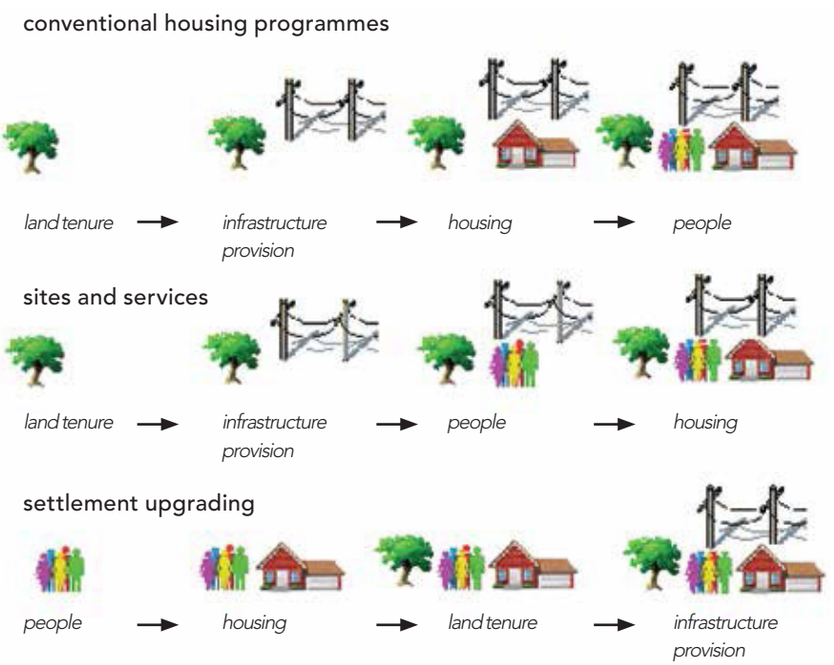

Figure 12: development of different housing strategies (UN Habitat, 2012:20)

Figure 13: condominiums in the IHDP city development (Mota et al., 2021:404-405).

SITE

Geja sefer

The site is located in the centre of Addis Ababa, close to the commercial heart of the city. The density is very high, and the current developments are mostly commercial. Also recent condominium projects, such as the one in Lideta, are touching the border of the sefer.

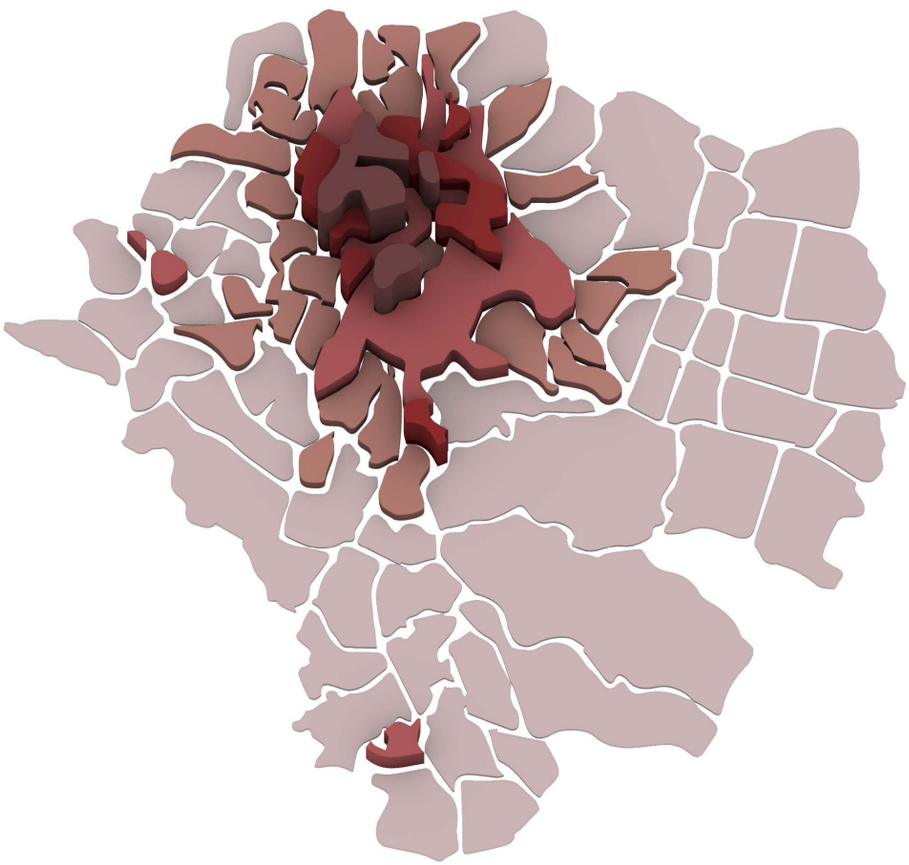

Figure 14: Density of Addis Ababa (Mota et al., 2021:29)

Figure 15: Geja location (own figure)

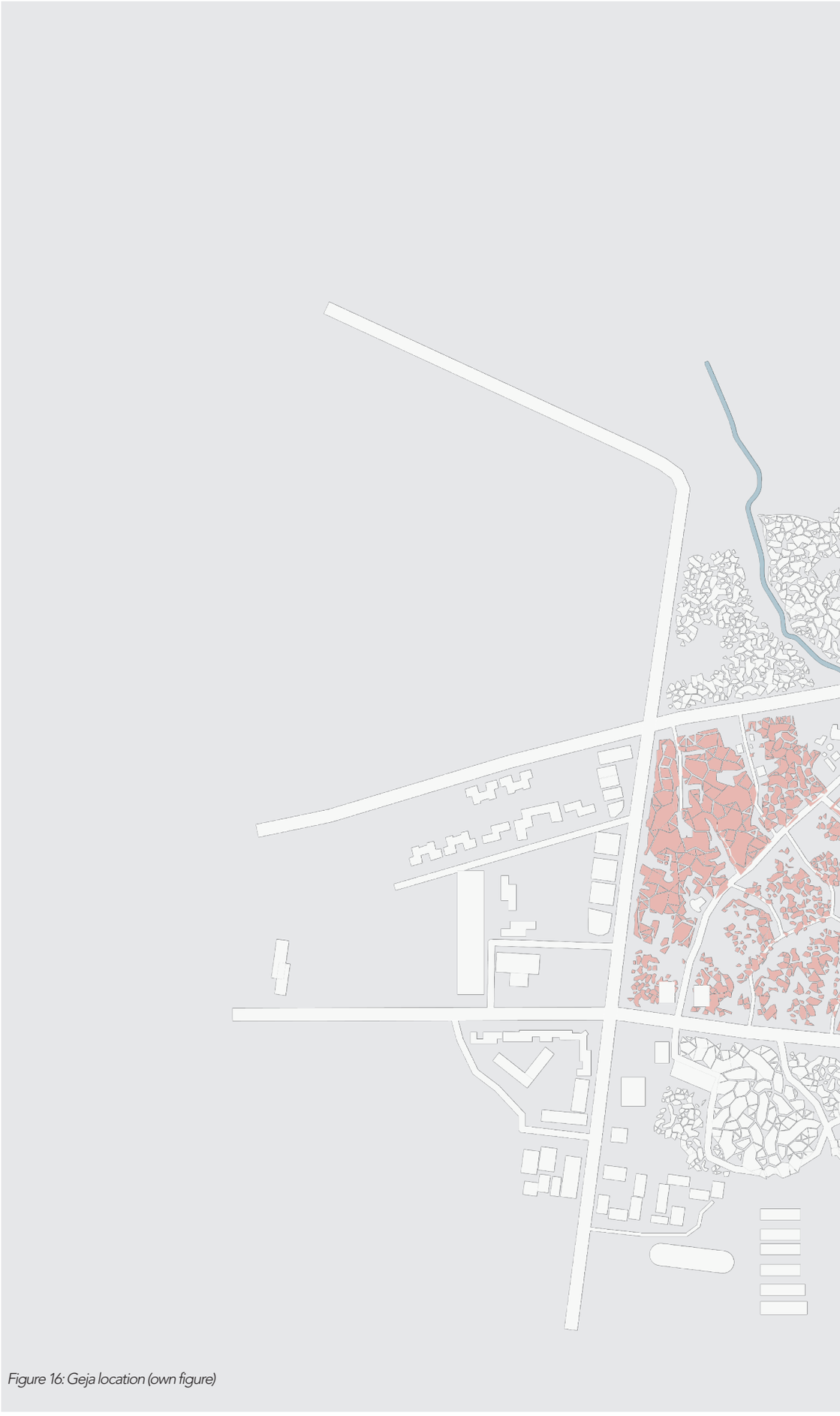

Figure 16: Geja location (own figure)

Map of Geja sefer

The sefer is enclosed by large commercial, four-lane roads. Inside, there are a few larger streets, dividing the sefer in different sectors. Most of the sefer is rather unorganised, informal settlement. The top part, in the northeast, there is a more regular grid, corresponding to the grid of the Merkato area to the north of the sefer (with a piece of less organised informal land in between). Through the middle of it, running from north to south, is a river. Two ends, coming from the northeast part en the northwest part, meet in the southeastern part of the sefer. Around the river, open spaces and green can be found.

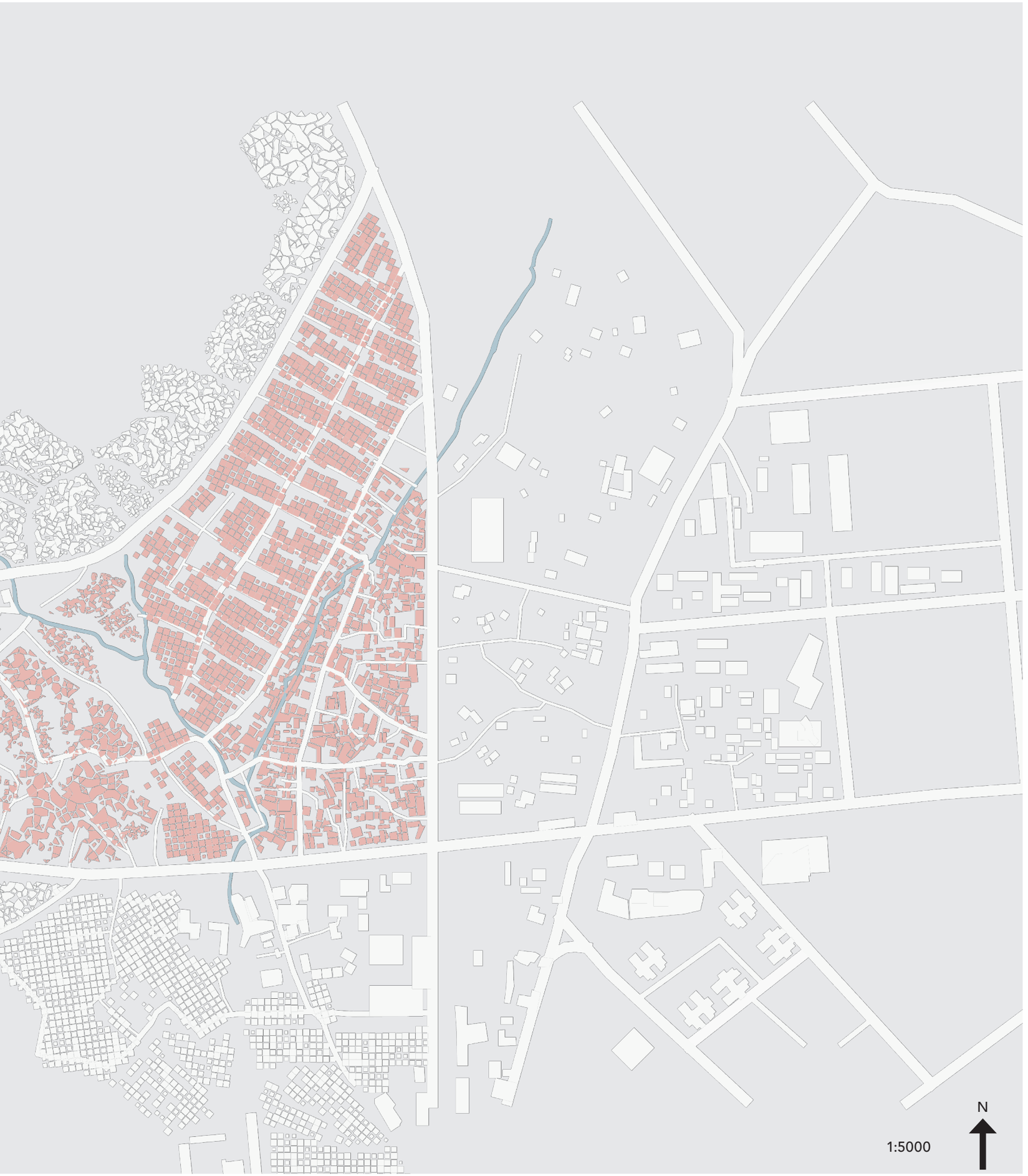
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Figure 17: project location (own figure)

Zoom in-Geja

The focus of the project is on the southeast part of Geja sefer. To the north and the west, the sefer continues. However, at the south, the commercial road (Burundi street) seperates the sefer from the city centre, commercial, developments. To the east, a same large commercial road (Dej Wolde Mikael street) forms the border of the sefer. While currently being wasteland, this area will soon be built full of high-density and commercial development.


Dej Wolde Mikael Street

Figure 18: Burundi street (Radotin, 2021)

Geja sefer

From the Burundi street, the sefer is directly located along the street. The street itself, as well as the pedestrian area, forms the borderland of the sefer: the area where both formal and informal overlap.

figure xxx Burundi street

figure 19, Burundi street (Radotin, 2021)

figure 20: Burundi street (Radotin, 2021)

figure 21: view inside sefer (Radotin, 2021)

figure 22: view from Burundi street to sefer (Radotin, 2021)

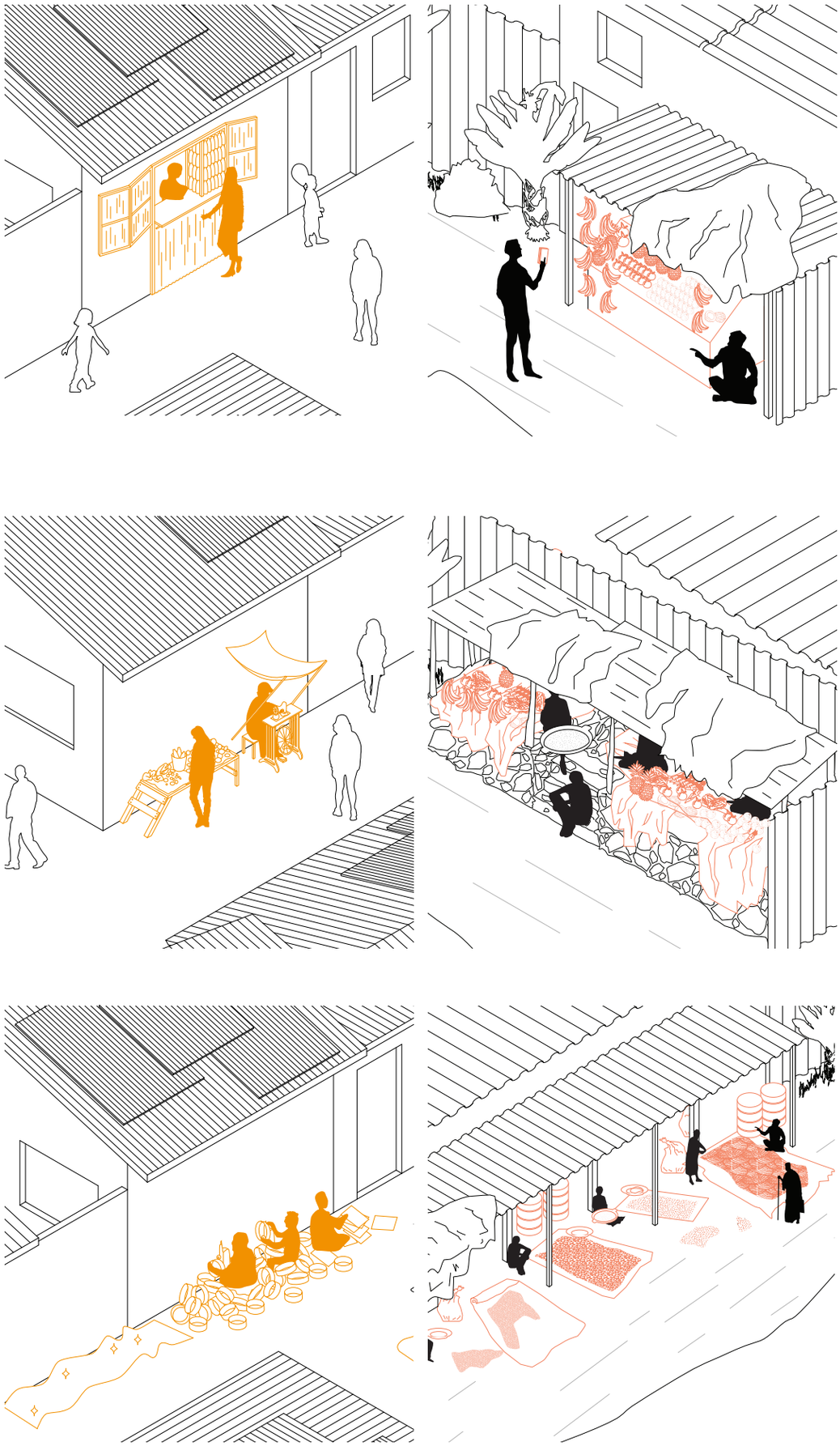


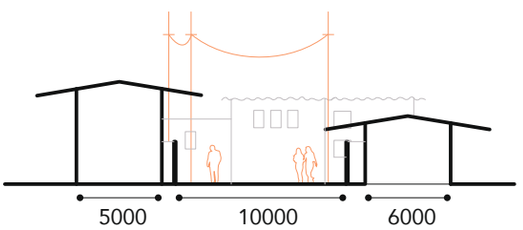
Figure 23: informal street activity (Mota et al., 2021:286)

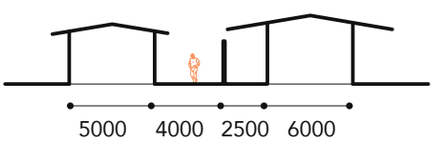
Sefer patterns - street

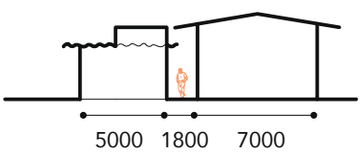
Inside the sefer, the street plays an important role. Multiple activities take place and provide opportunities for generating income. This income generating activities rely on a high density: the more people there are, the more you can sell.

The income generating activities are as simple as possible, selling items directly from the home itself (window shop), or via a stall of a carpet outside of the house.

The width of the street is very minimal, ranging from 1.8 meters, to 4 meters. When activities take place, the street naturally is narrowed, making smooth access harder, but the economic density greater. The structures along the street, mostly informal and self-built, are generally one-storey in height.







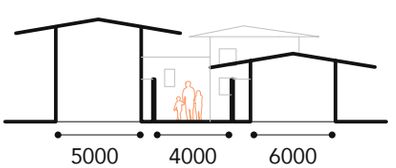
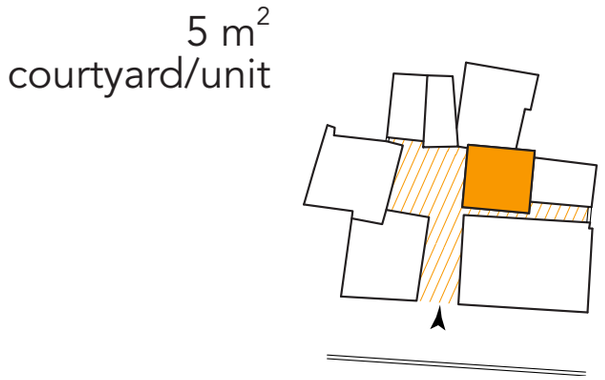
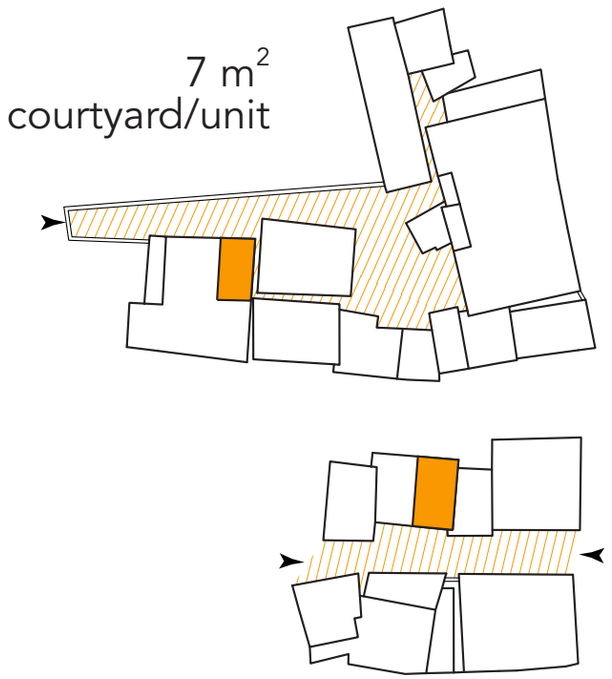
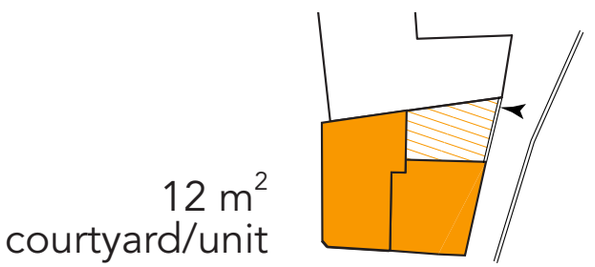


Figure 24: informal street section (Mota et al., 2021:287)



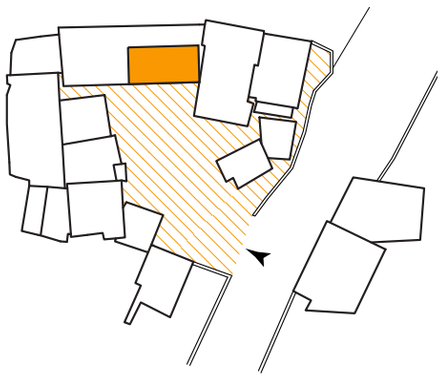




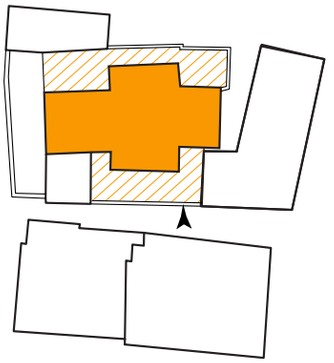
Sefer patterns - court

The courtyards in the sefer serve a different function: while streets are very important for economic activities, the courtyards are important for social and household activities, lacking a constant flow of people needed for these economic activities. Household activities include cooking and preparing food, washing and drying of clothes and garbage collection. Social activities include playing, meeting/gathering and sitting. The size of the courtyard can vary, along with the number of dwelling units attached to the courtyard. Of course, the larger it is, the more opportunities there are for (larger) social activities, or even small scale economic activities.

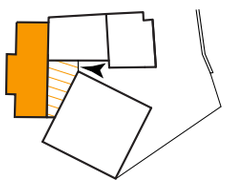
Figure 25: courtyard catalogue (Mota et al., 2021:279)



13 m^2
courtyard/unit

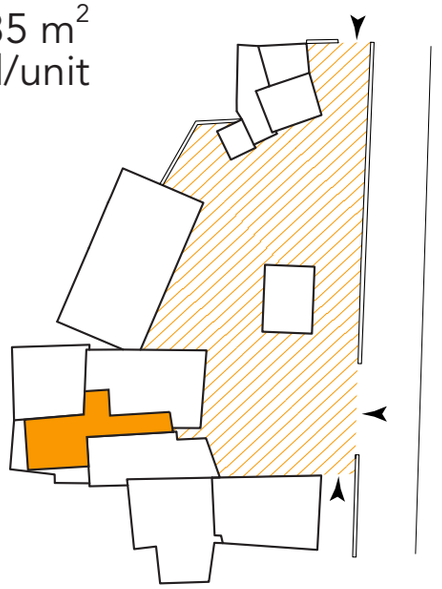


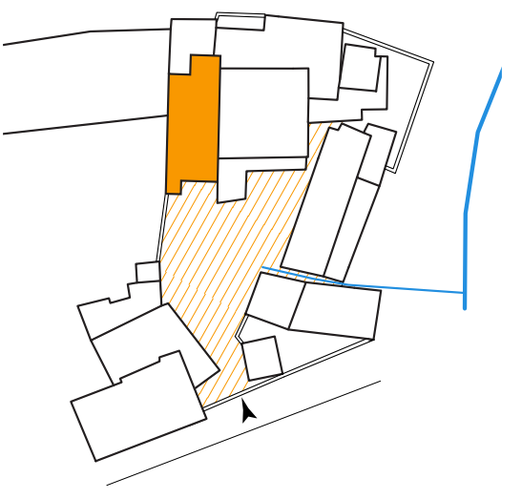
25 m^2
courtyard/unit



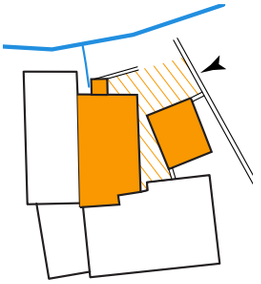
14 m^2
courtyard/unit

35 m^2
courtyard/unit

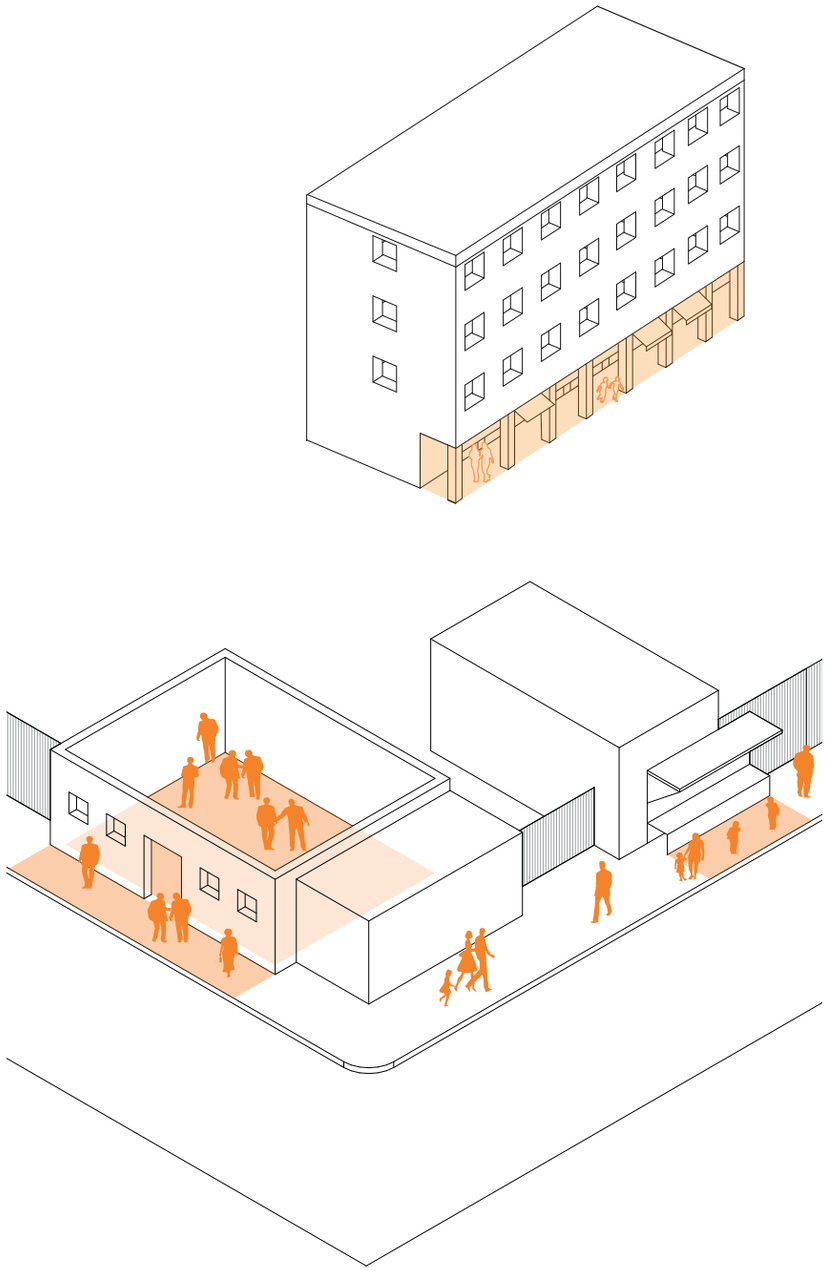




16 m^2
courtyard/unit



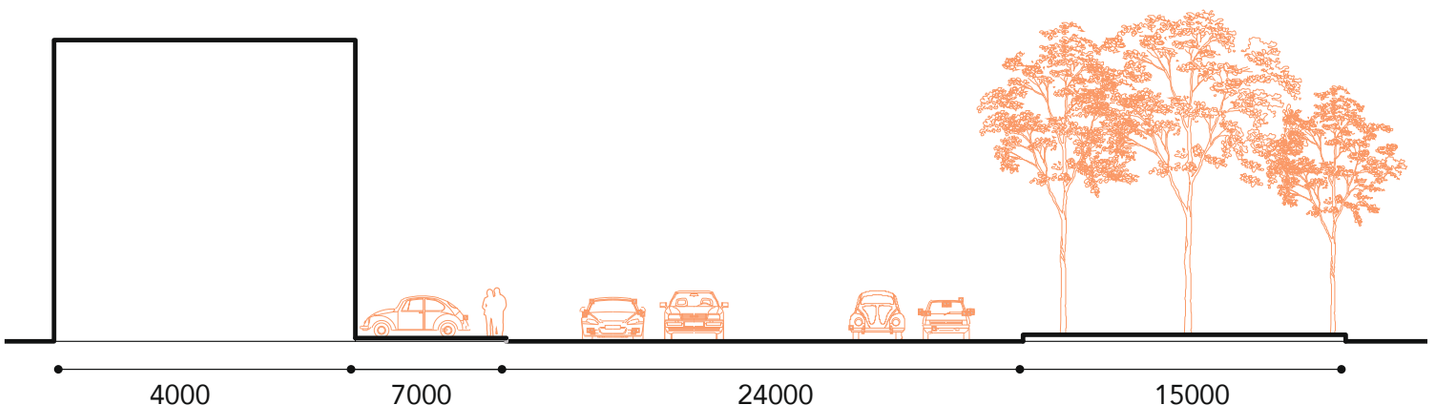
47 m^2
courtyard/unit



Sefer patterns - commercial street

The commercial street from the outside border of the sefer. With that, it also function as the previously mentioned borderland: the area between the formal and informal, and play an important role. Especially the pedestrian area at these places are important, for here activities take place that integrate the formal and the informal. These activities can be economic in character, such as shoe-shining, or a market stall, or social in character, such as a gathering or meeting space. The buildings along these road can be very different in character: formal building, or even high-rise towers are alternated by informal dwelling units and self-built housing.

Figure 26: main (commercial) road (Mota et al., 2021:282)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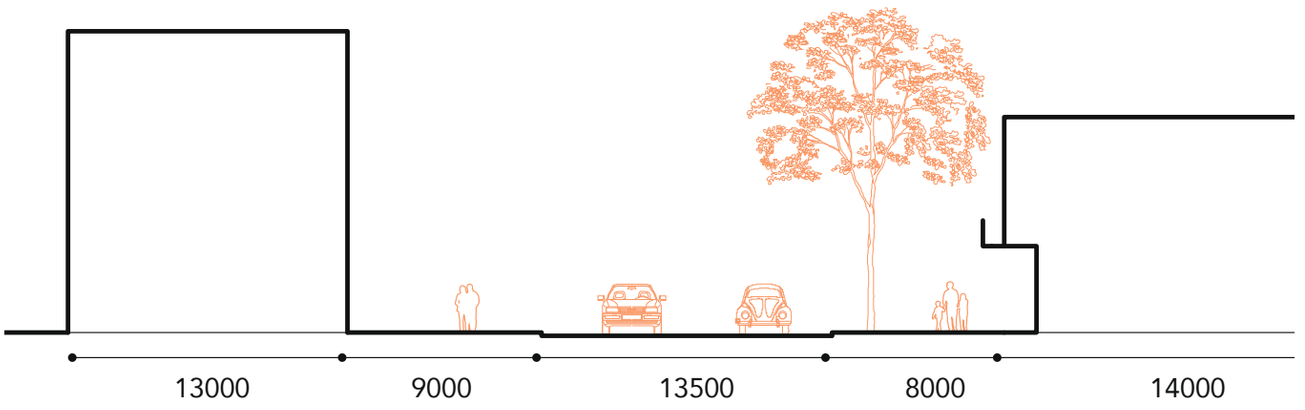
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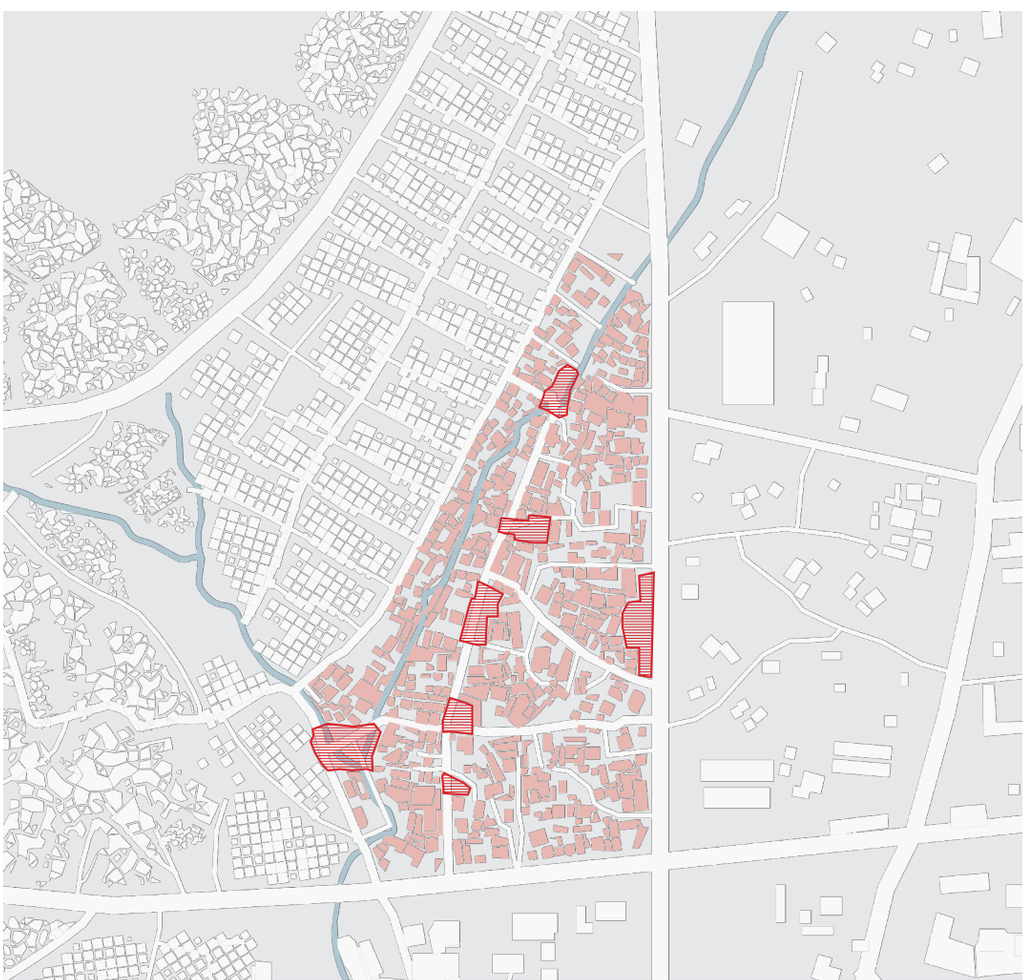
1:5000



1:5000

Figure 27:&28 current building pattern; open spaces in the area (own image)

Masterplan - analysis

As stated before, the dwellings in the Geja sefer are mainly informal and self-built. As such, they follow an irregular pattern, with an incomplete and complex street network. However, a few larger patterns can be distilled.

First of all, there is the small river running through the sefer, along with it a narrow area of greenery. Secondly, there are a few larger streets that run straight through most of the sefer. Finally, there are some open spaces, mainly at or near these larger cross roads.

As a basis of the project, the informal pattern cannot be used. However, the river, larger streets and open spaces can be kept and strengthened. To give a clear structure to the neighbourhood, as well as to maintain the history and identity of the neighbourhood.

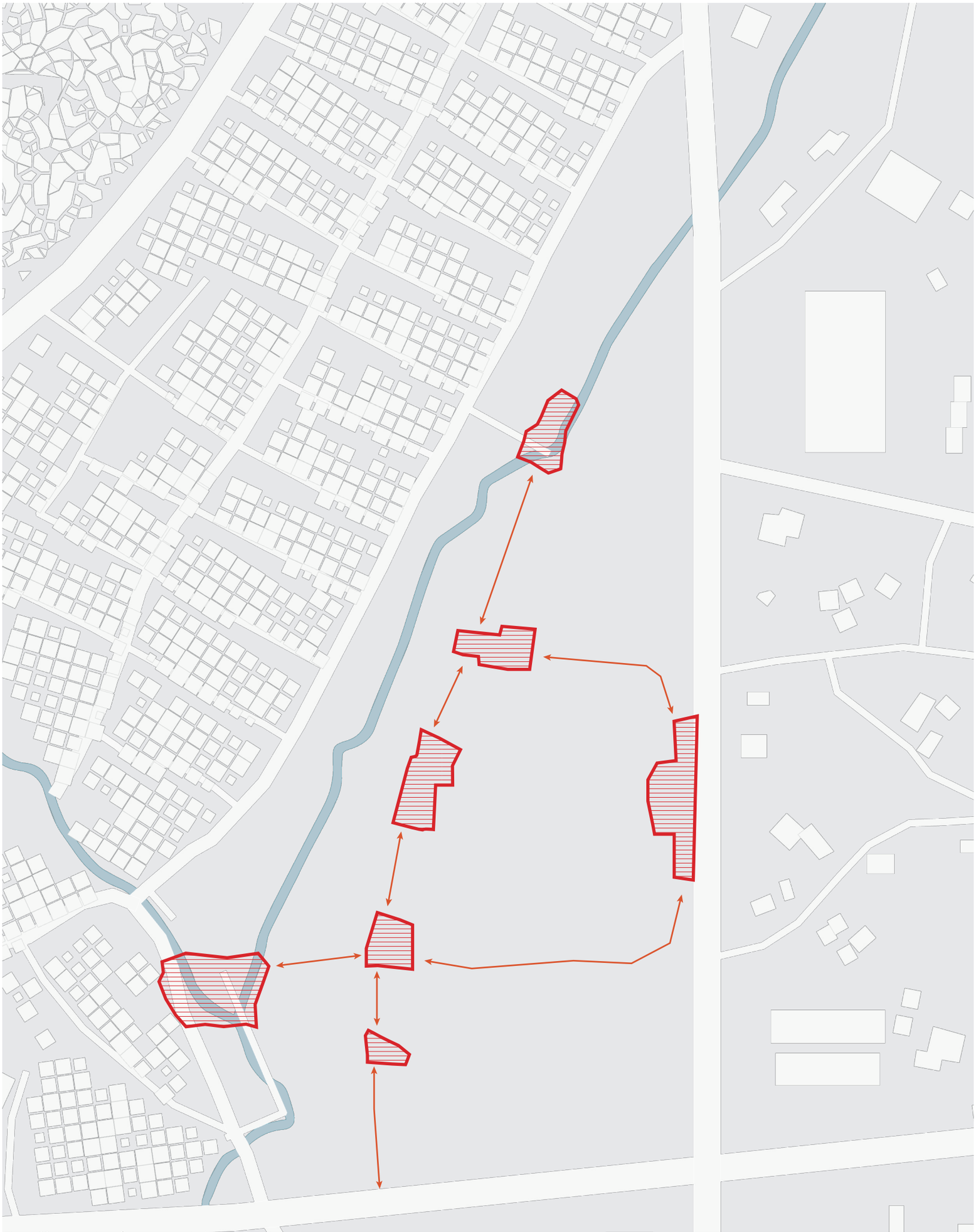


Figure 29: connection of open spaces in the area (own image)

1:2000

Context - analysis

The city centre is taking over the informal neighbourhoods fast, pressuring the area for building highrise, high density dwellings. Already, developments in the west, where the Lideta neighbourhood is rebuilt, are intruding the Geja sefer. But also from the south, where a large area of the informal area is rebuilt, and the southeast, where large condominium blocks are increasingly common.

The commercial part of the city centre is equally, or even more powerful. Along the main roads, large building blocks appear. From thin, shining towers to luxury slabs, it serves the increasing commercial needs of the growing city.

Without a plan, the Geja sefer will fall prey to these developments, not withstanding both the commercial pressure, as well the pressure for high- and middle-income housing. The area, being informal as it is, has no legal status and thus is vulnerable to demolition and replacement.

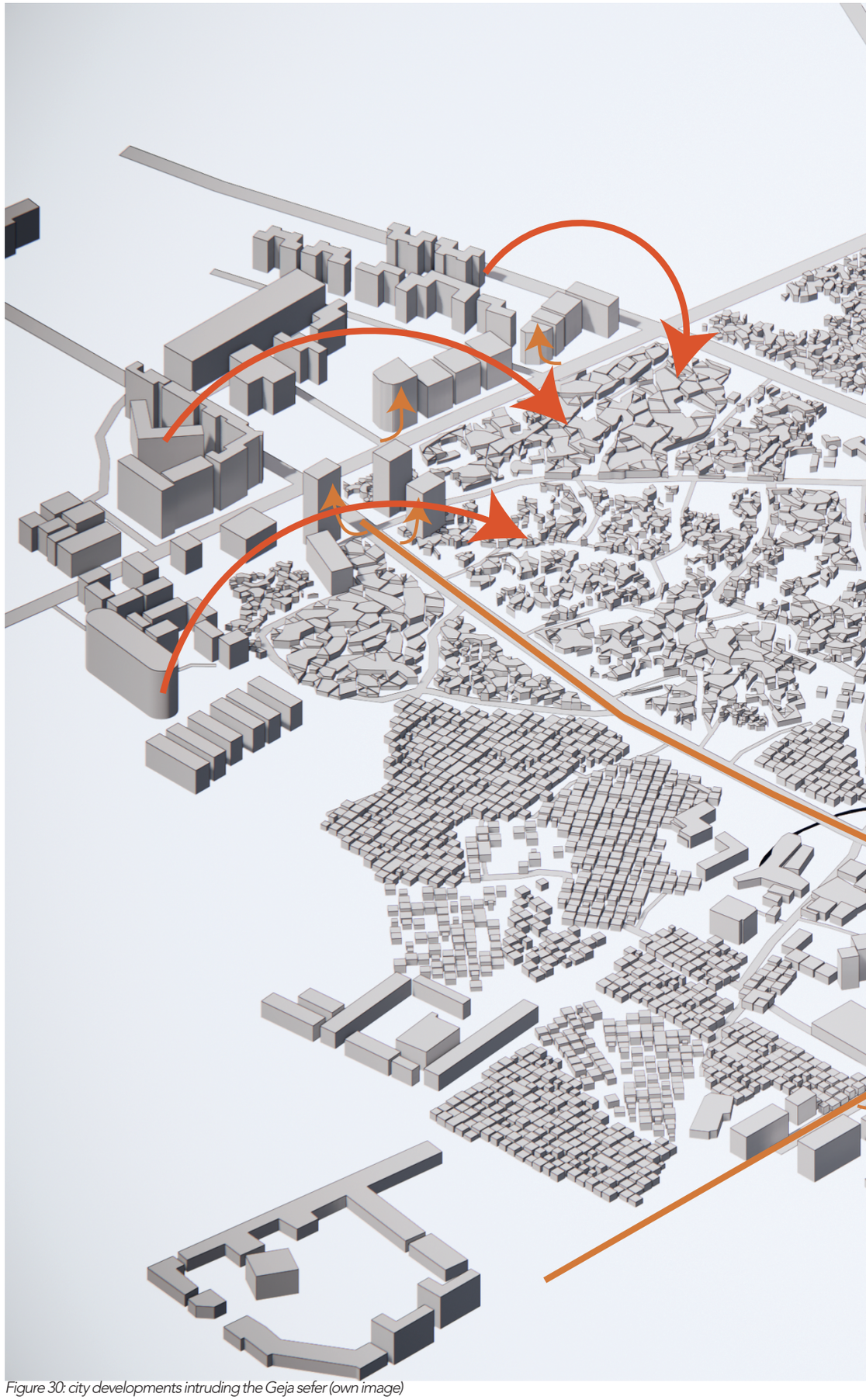
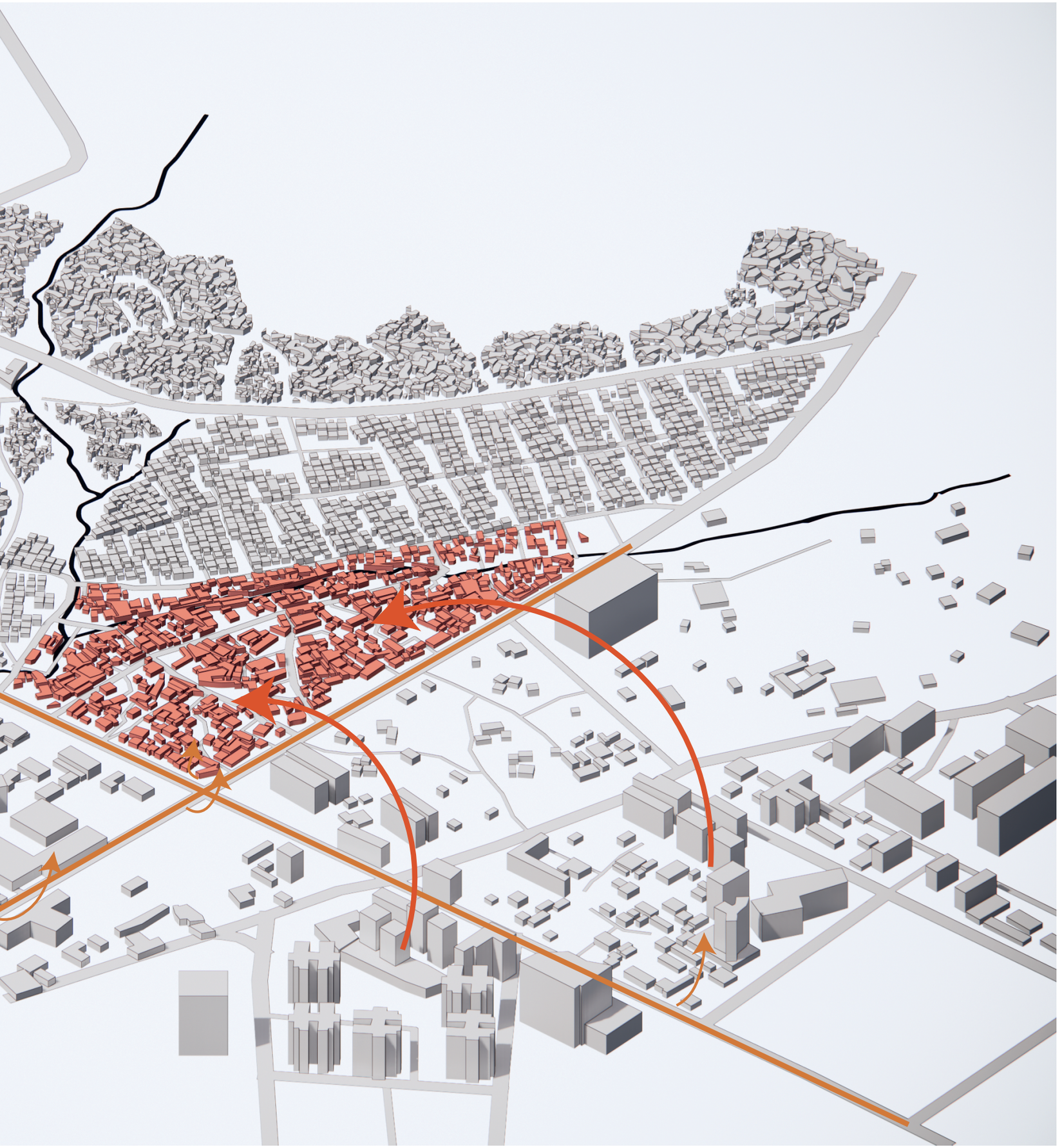


Figure 30: city developments intruding the Geja sefer (own image)



DESIGN

DESIGN APPROACH & PRINCIPLES

Strategies

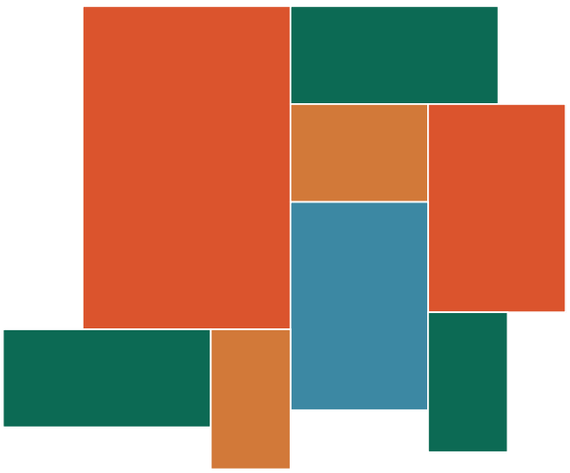
In starting the design process, there are a few principles that I've found to be important, when designing with temporality. Especially since the idea of temporality is hard to integrate with the built environment itself: where temporality is flexible, changable and fluid, the built environment needs to be fixed and solid.

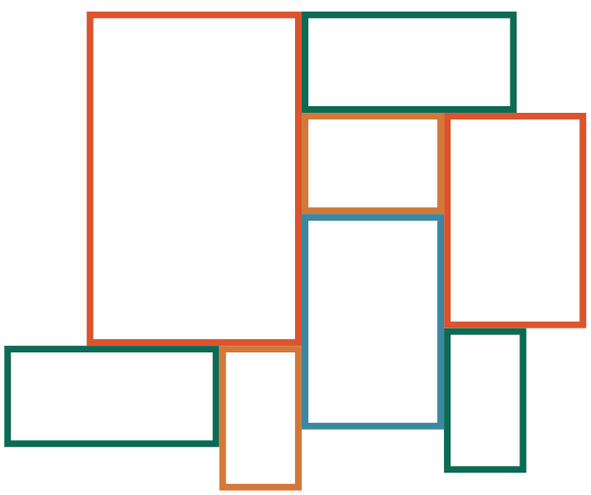
The idea to achieve temporality in the built environment is most directly done by allowing for flexibility in the design: changes that can easily be made, different time spans of different parts of the building. Simple said: the design can change appearance. But I believe there is another, more abstract approach to temporality. With these principles I want to show how the design process changes when designing for temporality.

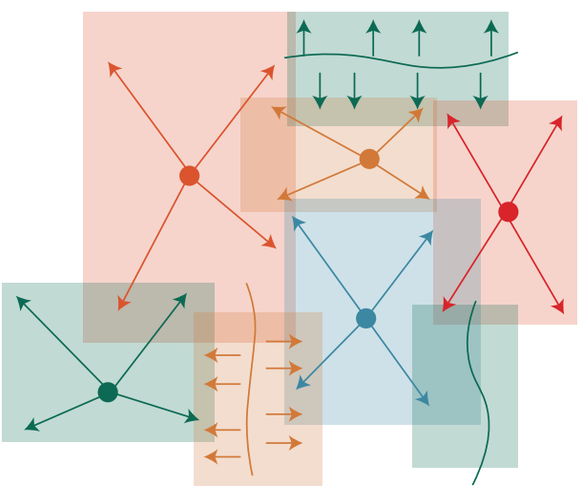
First of all, I want to repeat the quote by Lutzoni, already stated in the theoretical framework. Informality as "an intermediate space between two conditions in which different forms of creativity may become manifest" (Lutzoni, 2016:5). While the quote concerns informality, I believe that the understanding of informality very closely relates to the idea of temporality. It is about an intermediate space. The intermediateness shows its dependance on other spaces, and the influence that other spaces have on the space itself. It leads to a relativity in space, that is very much integrated in temporality as well, however here more in time.

The first principle that changes the way of designing is the change from zoning to layering. Where zoning gives a certain space a clear function, shape or idea, the layering desing starts at elements that flow through the space. So rather than to start from the space and colour it in, it starts at the elements and gives these the space that they need. Therefore, the different spaces naturally connect with each other through these elements. Even more, an overlapping of different elements, shapes or ideas can define one space, creating more diverse spaces and allowing for more flexibility over time. The design itself is not dependant on its actual resultant shape: it is the different elements that shape it.

The second principle changes the designing process by looking at the inner forces rather than the outer skin. While for the built environment, this is rather abstract, the principle infers that not the final, exact shape is important, but much more the idea and the force of the idea that allows for shape. An example of this principle is a simple road. Rather than looking at a road as a surface on which different elements are places, it can be seen, and built, as line element, connecting two places A and B, with a certain width. It is dependant on the flow of people, bicycles, or cars that determine how wide the street is, and can also change in time: different times of the day, different times of the year. A pedestrian area can function as an extended part of the square and be used for sitting, meeting, chatting, or relaxing, or, when the flow of people is greater, it can be used by people, moving from one place to the other, or even slow traffic like bicycles. Another example is the car traffic in Paris along the Seine: during the year, it is an important infrastructural piece with a lot of car traffic, but during the summer holidays, it is transformed and serves as recreational space.





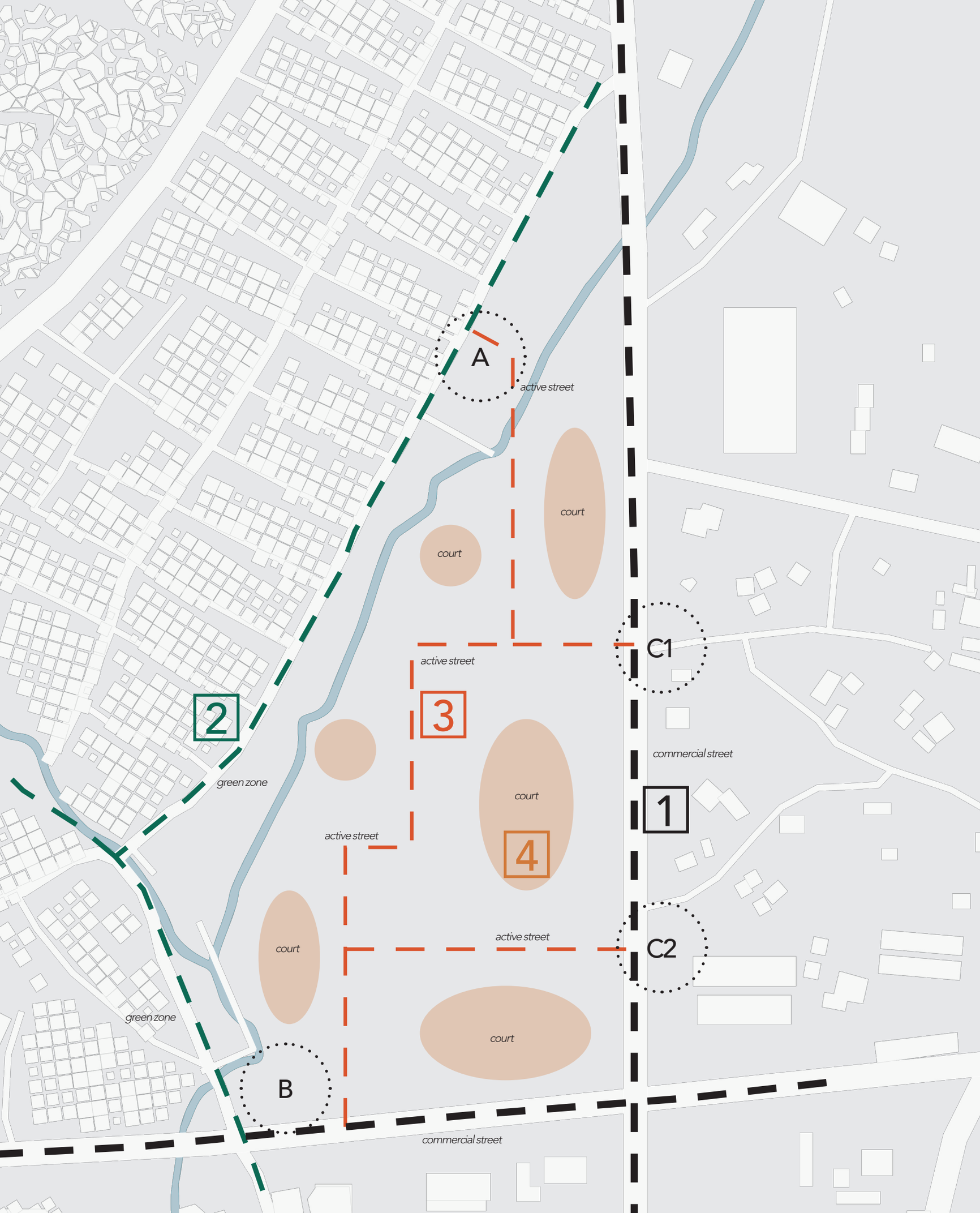


MASTERPLAN

Different sectors

The masterplan, based on the elements that are shown in the analysis, there are different structuring elements. The first, and most obvious one is the commercial street that forms the border of the Geja sefer. The second one, is the street that runs through the Geja sefer, defining different sectors of the neighbourhood, and forming the west and north border of the project. It runs parallel to a river, and is called the green zone. The third is the pattern of roads that is already visible and can be strengthened to connect the different open spaces. In this, it forms the active street. The last element originates from the three previous ones: the spaces in between, serving as courtyards.

The different elements, mainly first, second and third, cross at certain locations. In these locations, different characters mix, and therefore an ‘intermediate space’ originates, relative to both, or all of them. Two of these spaces (A&B) have been worked out: a square to the north, where the active street crosses the green zone, and a square in the south, where the three of them come together. Both of these places form entrances to the active street.


A
active street
court
court
C1
active street
3
2
commercial street
green zone
court
1
active street
4
C2
active street
court
court
green zone
B
commercial street

2 green zone

- recreational space for the whole neighbourhood
- spacious: horizontal opennes
- no dwellings
- infrastructure as single lines elements: cars, pedestrians, cycles

3 active street - informal

- street is economical hart of neighbourhood
- dense: open vertical
- plenty of opportunities for temporal activities
- provides opportunities for informal economy
- vertical frame is fixed, dwellings are temporal

4 inner court

- building plots are fixed: can extend vertically
- buildings are closely related to ground floor
- open spaces accommodate household activities

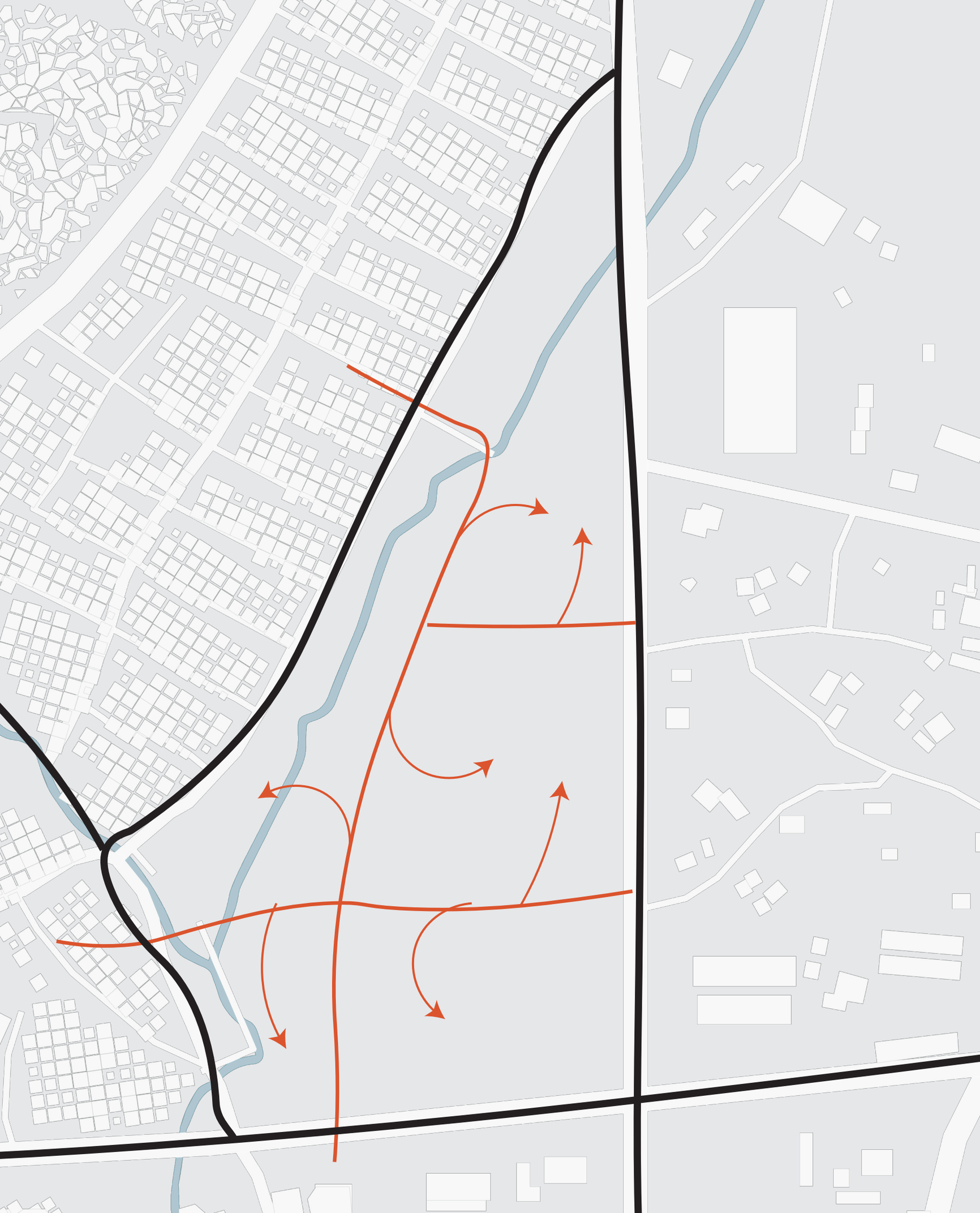
1 commercial street

- buildings are fixed
- roof terraces accommodate personal space
- space for cars
- space for pedestrains at the street
- direct boundary between street and building
- boundary is differentiated to accommodate space for temporary activities related to the commercial

Development process

Different than the number order would suggest, the development of the project starts from the active street. This street is the main design element and drives the other elements in the project. All the informal and formal activity evolves around this element. Therefore, in this booklet, this element will be elaborated first. After this, and rightly behind, are the courtyard areas. From the courtyard it is a small step towards the commercial street and the buildings next to this. Finally, the green zone is elaborated.

While this development process comes close to which elements will be built first, it is not the same. The phasing will be elaborated at the end of all the individual elements.



ZONE 3: ACTIVE STREET

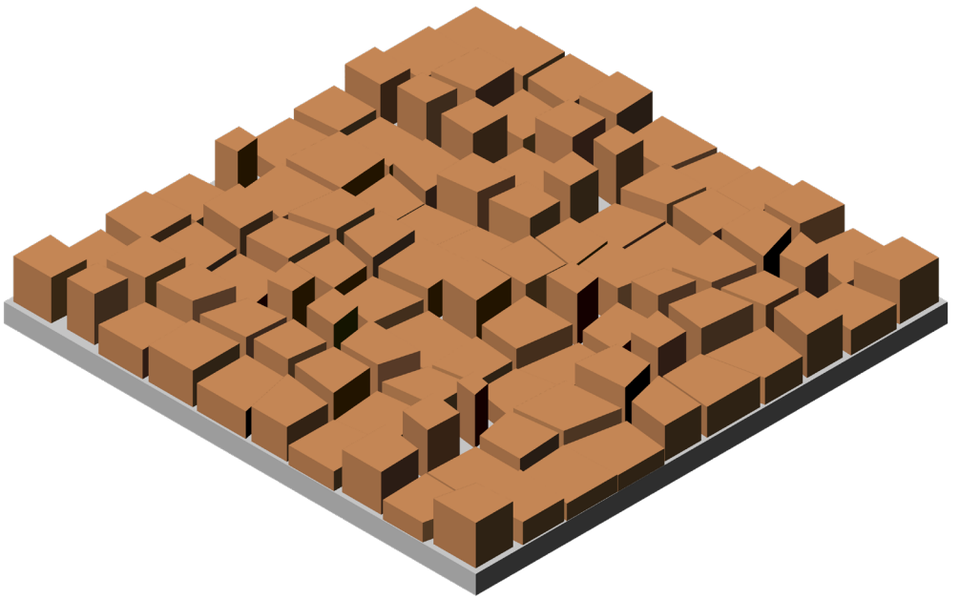
The active street is the principal element of the project. It is based on the structure of the existing informal neighbourhood. It gives people a chance to live their live as they know it, in an informal way, but at the same time make them resilient for the threatening developments in the city center and gives them a basic quality of built environment. At the same time, the street increases the density drastically, increasing the ability to generate income from the dwellers' own houses, and give them the opportunity to shape their home in such a way that it fits their needs the best.

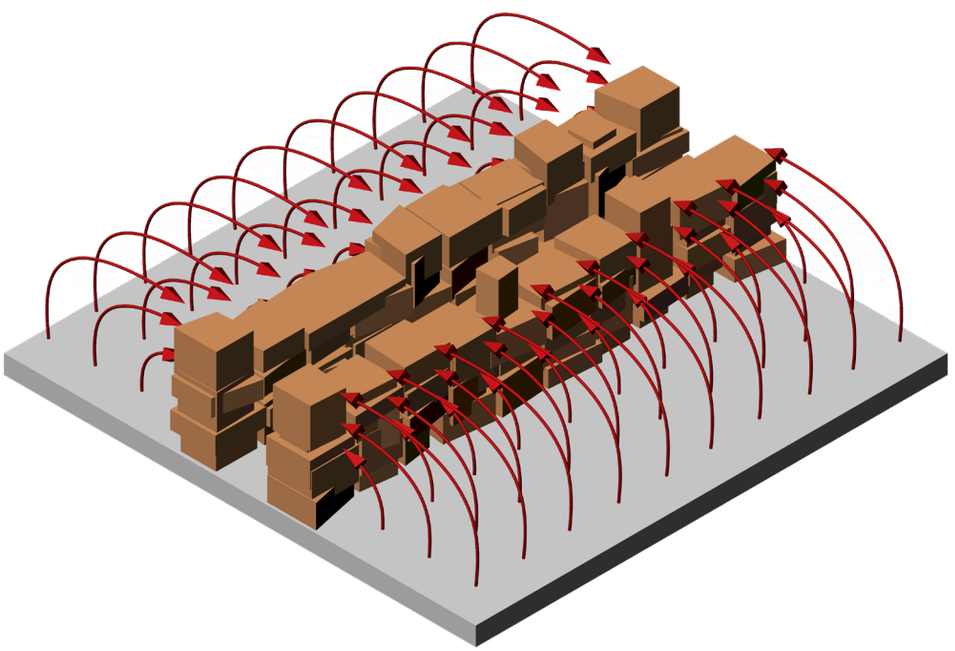
The street itself is for slow-traffic only: no cars are allowed here. They can reach the buildings via a road at the rear. The active street itself can therefore be used for shops and stalls, increasing the economic activity.

Principle

The main goal of the active street is to facilitate housing for the informal inhabitants, former and new. With this, it also needs to support their way of living: generating income, having social activities and space for household activities.

The current informal housing, as in many informal areas, is spread out over a horizontal plane, almost everywhere one-storey high. By squeezing all these homes together, a street is created: surrounded by higher buildings, the street needs to extend to these higher levels as well to maintain their informal abilities.





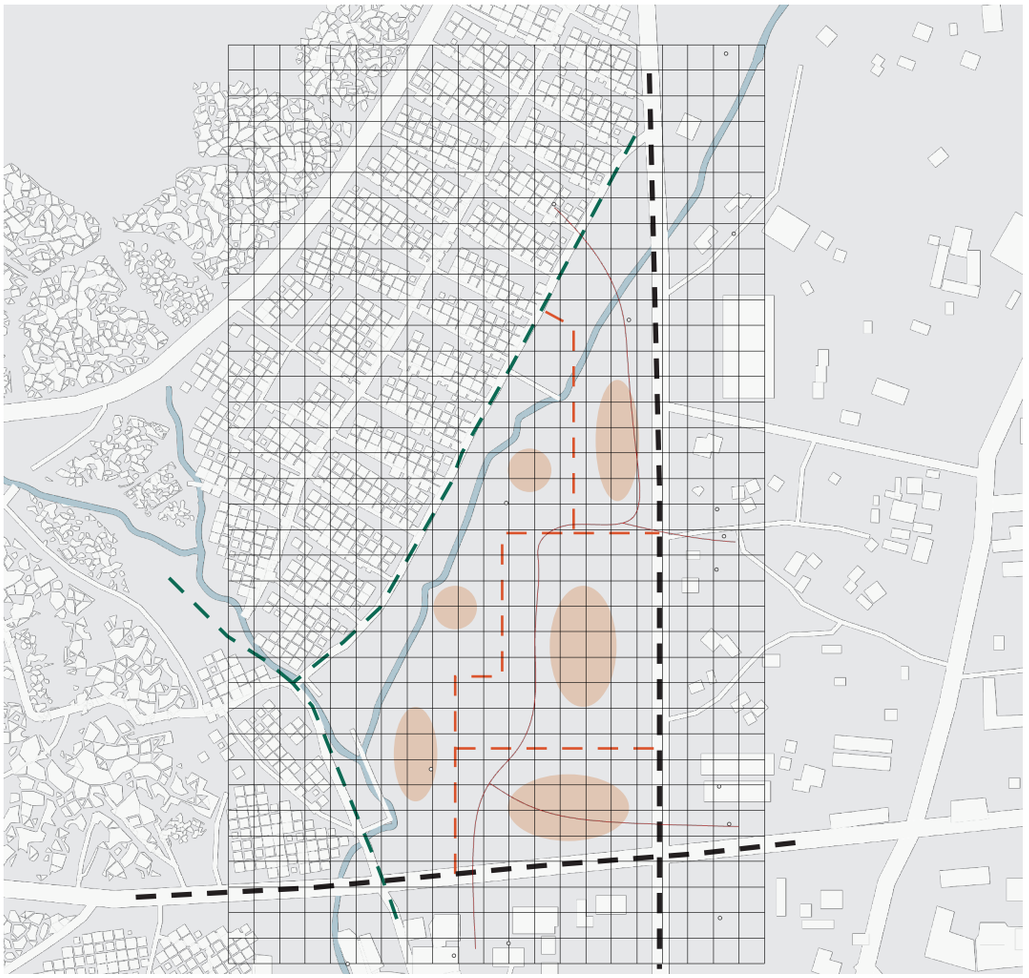
Principle

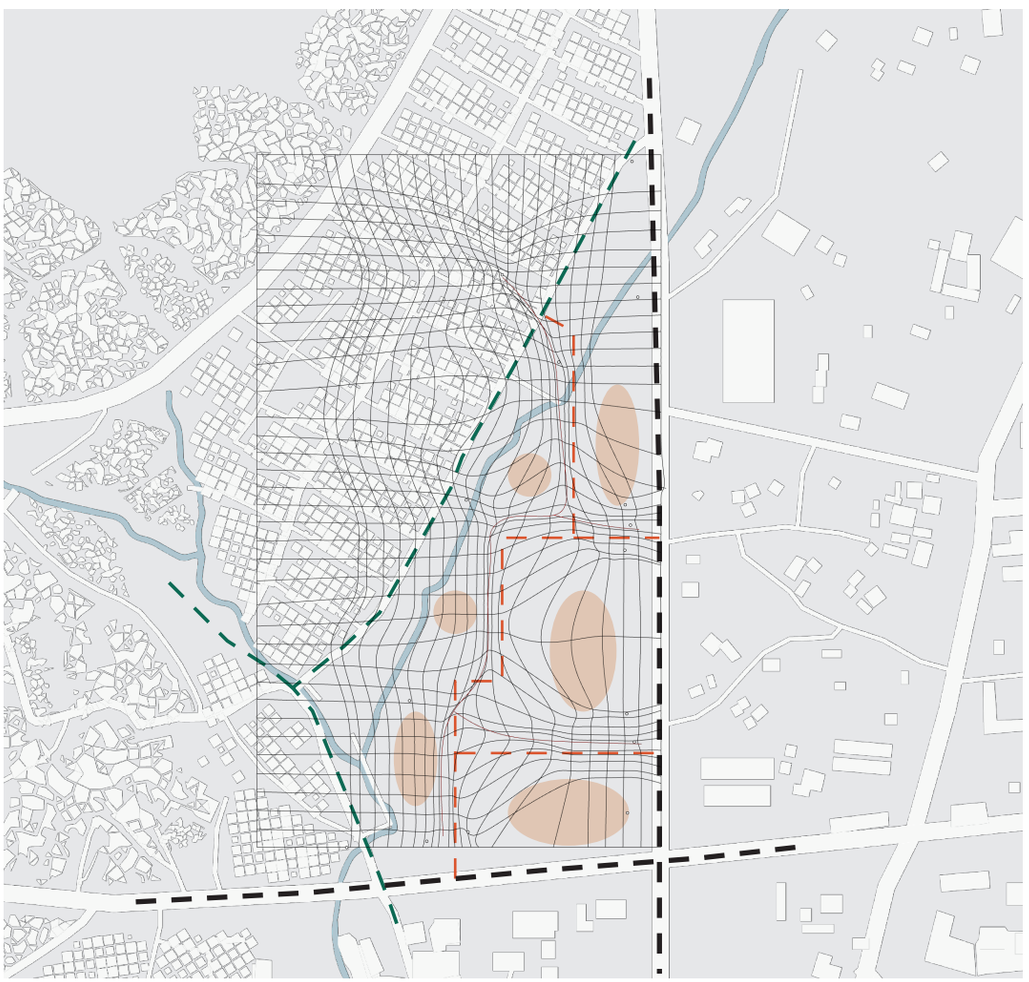
Based on the existing structure, the active street connects the open spaces with eachother.

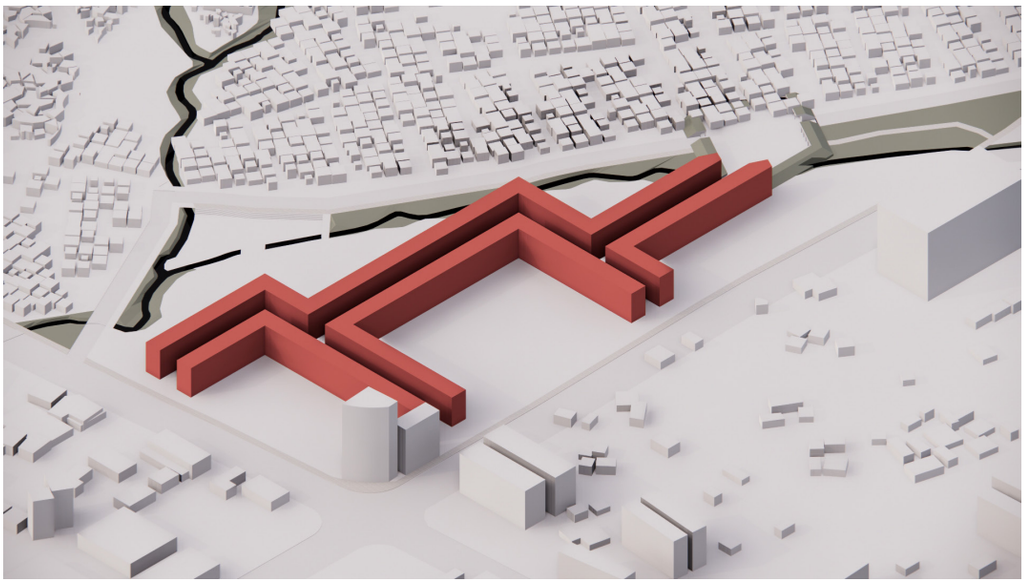
A third, theoretical principle is important in the layout of the active street. This one is based on the stem and web theory by Candilis, Josic and Woods. Their constant search of a healthy city development have created the idea of the web: “the web is an urban planning instrument that allows for the structuring of an urban environment. A matter of weaving a fabric from threads or yarn in which different programmatic elements can evolve.” (Avermaete, 2005:318). The web shows a constant balance between something fixed (web structure) and something flexible (weaving of the elements in the web). Maintaining the open character, by building it on top of a structuring element in the design. The web also provides many different cross relations: there is no priority of a certain axis, therefore no formality and no rigidity in the design.

In this project, it shows the importance of the cross connections: the active street is not an element that should float in space, as a linear, one-dimensional element, as figure suggests. Rather it should connect and be integrated in the neighbourhood. Allow for crossconnections and hooked two-dimensionally to its neighbouring built environment.

While the web, as used by Candilis, Josic and woods, is a rational grid, in the project it is slightly warped: the density of the grid is higher along the active street, increasing the tension and density of this area, and releasing it of the other ones. However, this tension is not confined, but spreads out through the crossconnections and openings of the street.

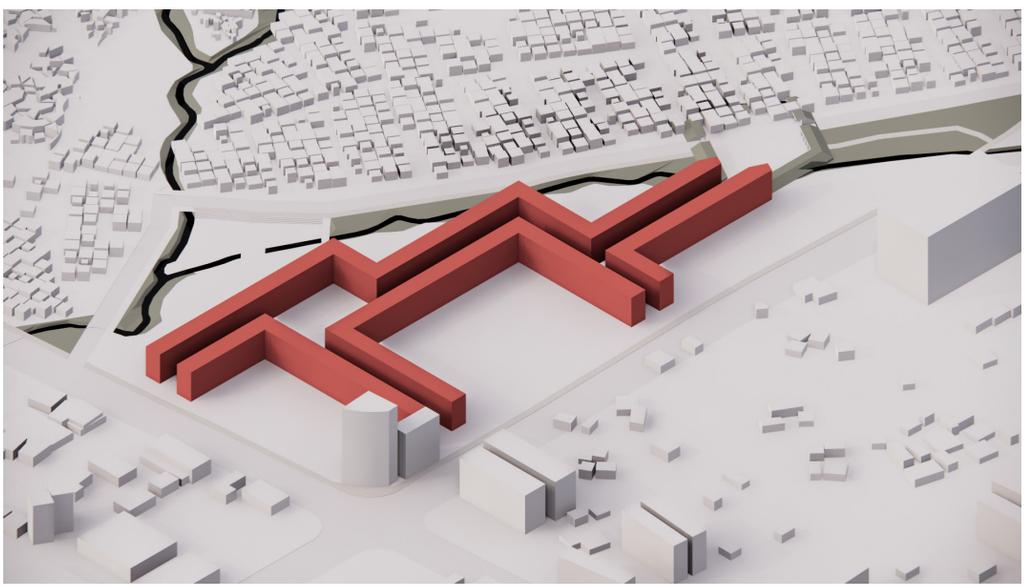






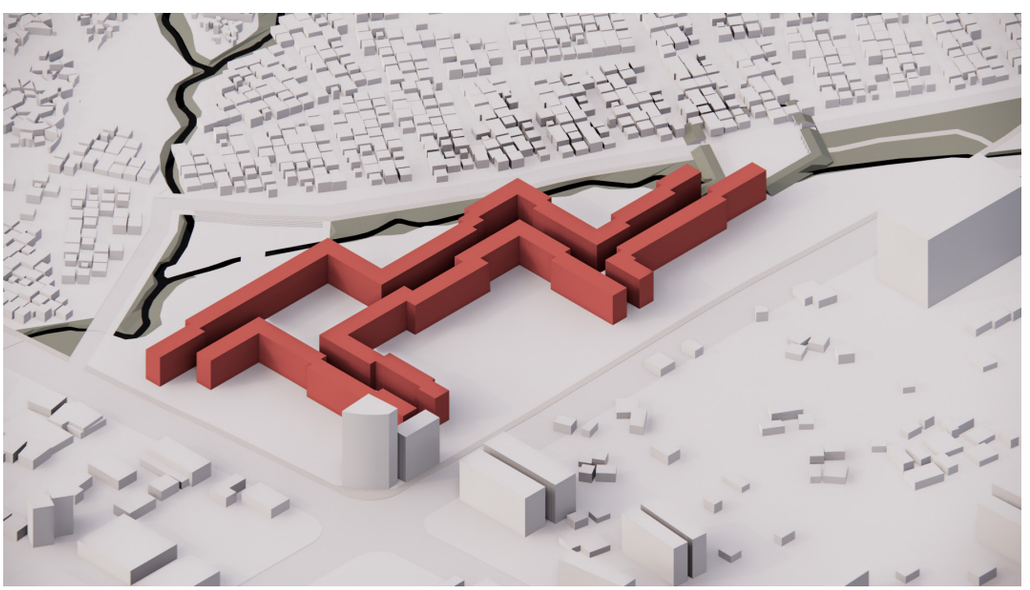
Step A

The basic structure of the active street. Based on the existing street patterns, but laid down in an orthogonal grid. It is a six-storey structure, where the informal dwellings are stacked together, pressuring them into a lively and vital active street.



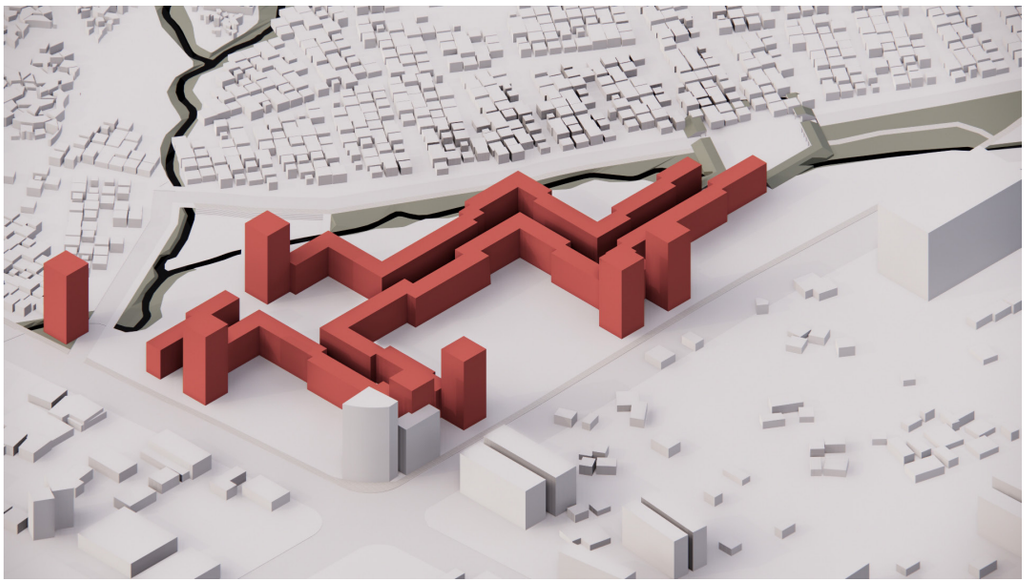
Step B

The first alteration: creating a large square in the centre of the neighbourhood where two active streets cross and connect.



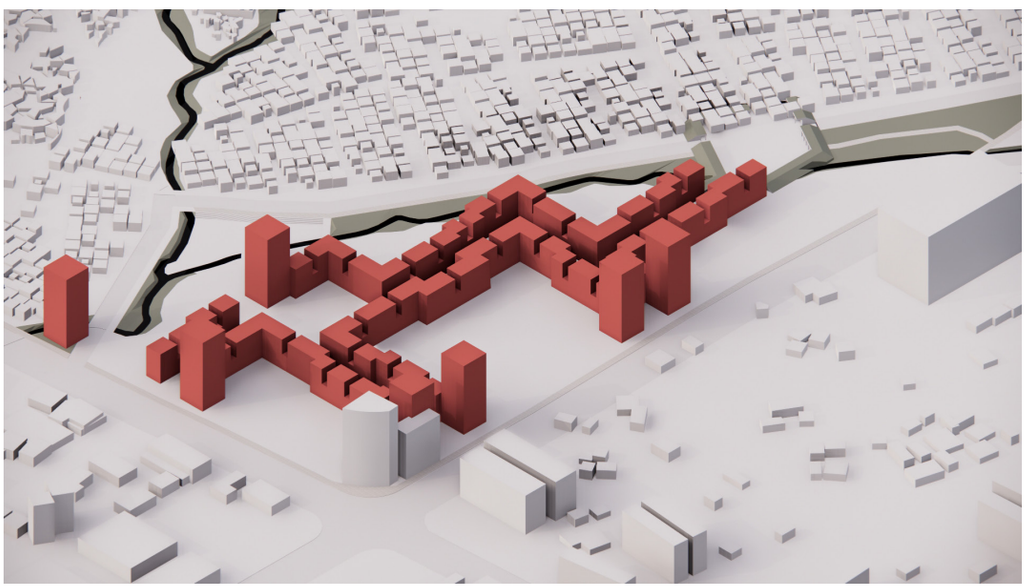
Step C

Allowing for alterations in the shape. Instead of following the rigid, orthogonal lines from the first steps, small arterations are made, based on the forces shown before, following the shape of the powercurve. It therefore creates setbacks, widenings and narrowings of the street, which create differences and gives each part its own identity.



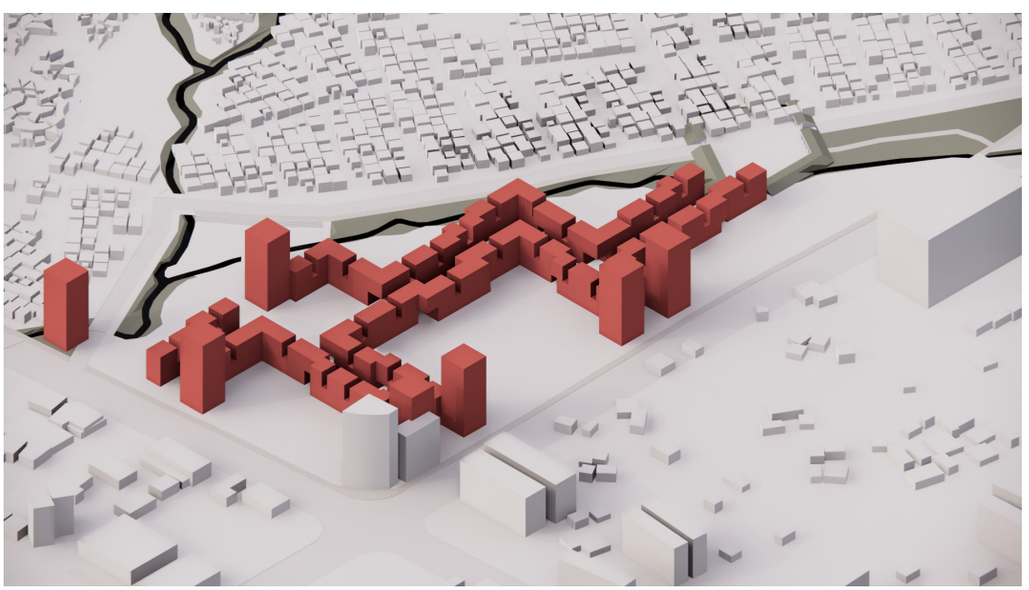
Step D

The entrance of each street is accentuated by a tower. With this, it not only show the entrance, but also connects the commercial world of the outer street with the more informal world of the active street.



Step E

In the upper part, small indents give further detail to the shape, and brake down the overall rigidity. Also, they give extra space for the dwellers living on the upper floor to have activities: both social or household related, or economic.



Step F

The final step opens the active street up to the courtyard behind them. At the corners, or hitch, the lower floors open up and the economic flow locally spreads out behind it. It brings in the people from behind, marking the entrance, and giving the active street more economic potential as the number of people it serves increases. It also creates these intermediate spaces where both characters meet: the active street and the courtyard.

Organisation actors

There are several actors involved in the project development. First of all, there is the city government, which has to arrange the building plot and masterplan design. It consists of the Addis Ababa City Administration, the larger body, and the Addis Ababa Housing Development Project Office, of the subcity Lideta, which organises the design, construction, housing transfers and administration of the specific plot.

The second actor is the financier, consisting of the Commercial Bank of Ethiopia, lending out money for mortgages, and the Housing Investment Group, which purchases a part of the project and rents it out to dwellers.

The third actor is the contractor, financed by the financier and indirectly by the dwellers. It consists of supervisors and specialists, both local firms that contribute to the local economy. They set up workshops and supervise the overall construction process, where dwellers can actively participate with so-called sweat equity. There are specialists which install the services and provide structural support.

The fourth, and obviously most important group, are the dwellers. Both current and new, for the active street these are mainly part of the informal economy, earning their income in an informal way. They can actively contribute to the building process (sweat-equity) and build their own individual apartments themselves.

Finally, there is the building regulation group, regulating the self-built apartments, providing the right materials and construction plans, and checking the built quality afterwards.

Government

Addis Ababa City Administration (AACA)

-selecting new sites

-allocating government resources

Addis Ababa Housing Development Project Office (AAHDPO) - subcity Lideta

-Design, construction, housing transfer and administration

Building regulation group

Building supervisors

-regulation new construction by dwellers

-allocation and provision of building materials

Control group

-built environment quality check

-fire safety and acoustic insulation

Financier

Commercial Bank of Ethiopia (CBE)

-providing mortgage

Housing Investment Group

-property investment and renting out of dwellings

Contractor

Building supervisors (i.e. Habtamu intern/K2N consultants)

-setting up building workshops

-constructing permanent part of the active street

Specialists (i.e. PACE consultants-Ethiopia)

-installation of services, structural components

Dwellers

Current dwellers (484 households)

-informal

Projected dwellers (1016 households)

-493 units on ground, first and second floor

-522 units on upper floors

before construction

masterplan

AACA

- selecting new sites
- allocating government resources

Building supervisors

- setting up workshops

AAHDPO

- design, construction, housing transfer and administration

building block

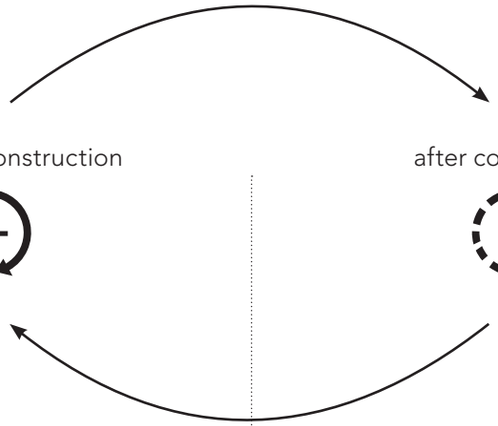
CBE & Housing Investment Group

- providing mortgage
- property investment and renting out of dwellings

apartments

Organisation scale & phasing

There are different scales and different phases of the building process. The previously mentioned actors have their own specifc scale and phase, sometimes overlapping. The scales, from large to small: the masterplan (AACA and CBE & Housing Investment Group); building block (AAHDPO, Building supervisors, specialists, dwellers); and individual apartments (dwellers, building supervisors and control group). The different phases are: before construction, during construction of building block, during construction of individual apartments (finished building block) and after construction. These last two phases can repeat themselves: individual apartments can be changed by the dwellers themselves, so the apartment always fits the current needs of the dwellers.



main construction

apartment construction

after construction

Building supervisors & specialists

- constructing permanent part of the active street
- installation of services, structural components

Current dwellers

- constructing building blocks (sweat equity)

Current & new dwellers

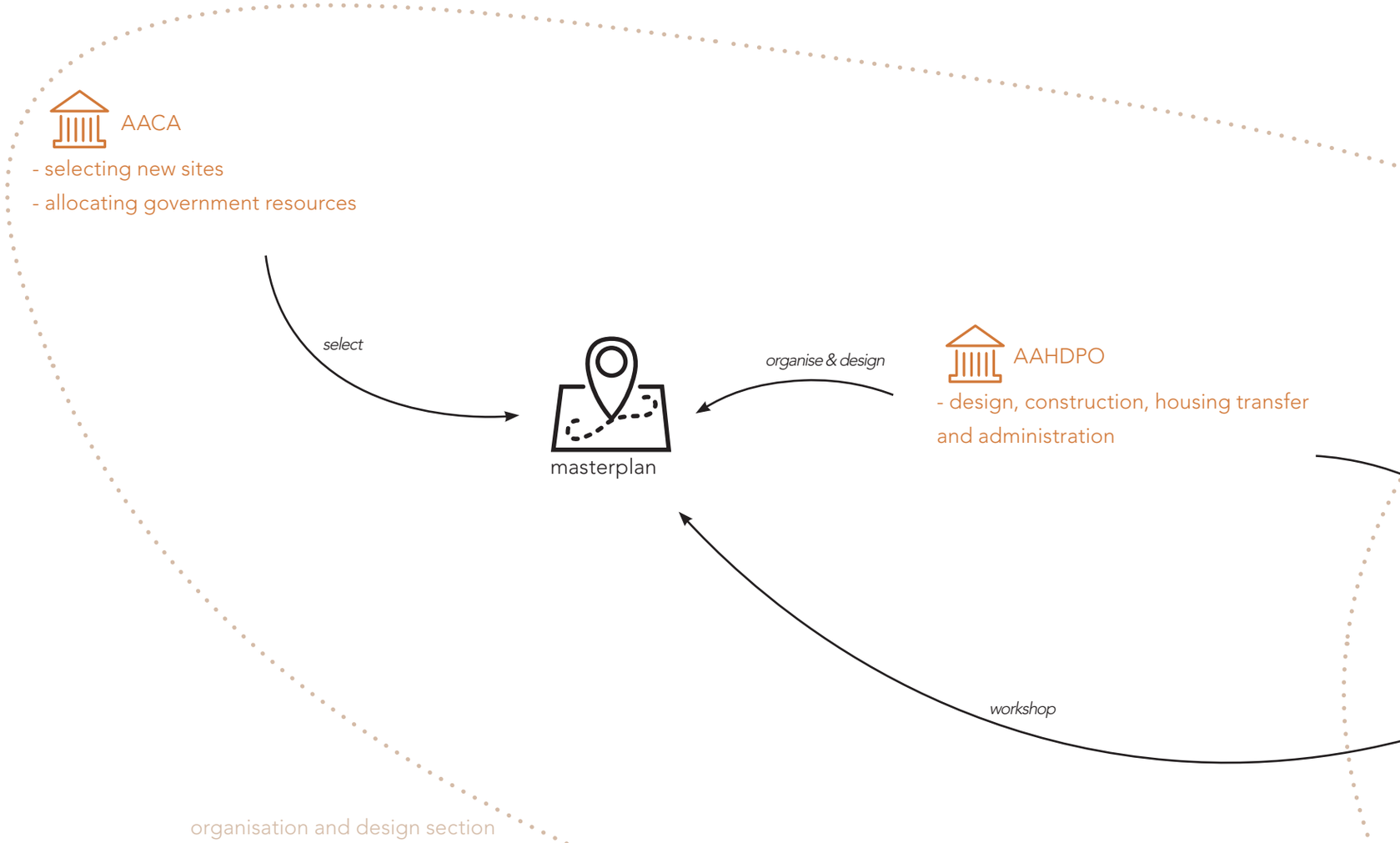
- constructing individual apartments

Building supervisor

- regulation new construction by dwellers
- allocation and provision of building materials

Control group

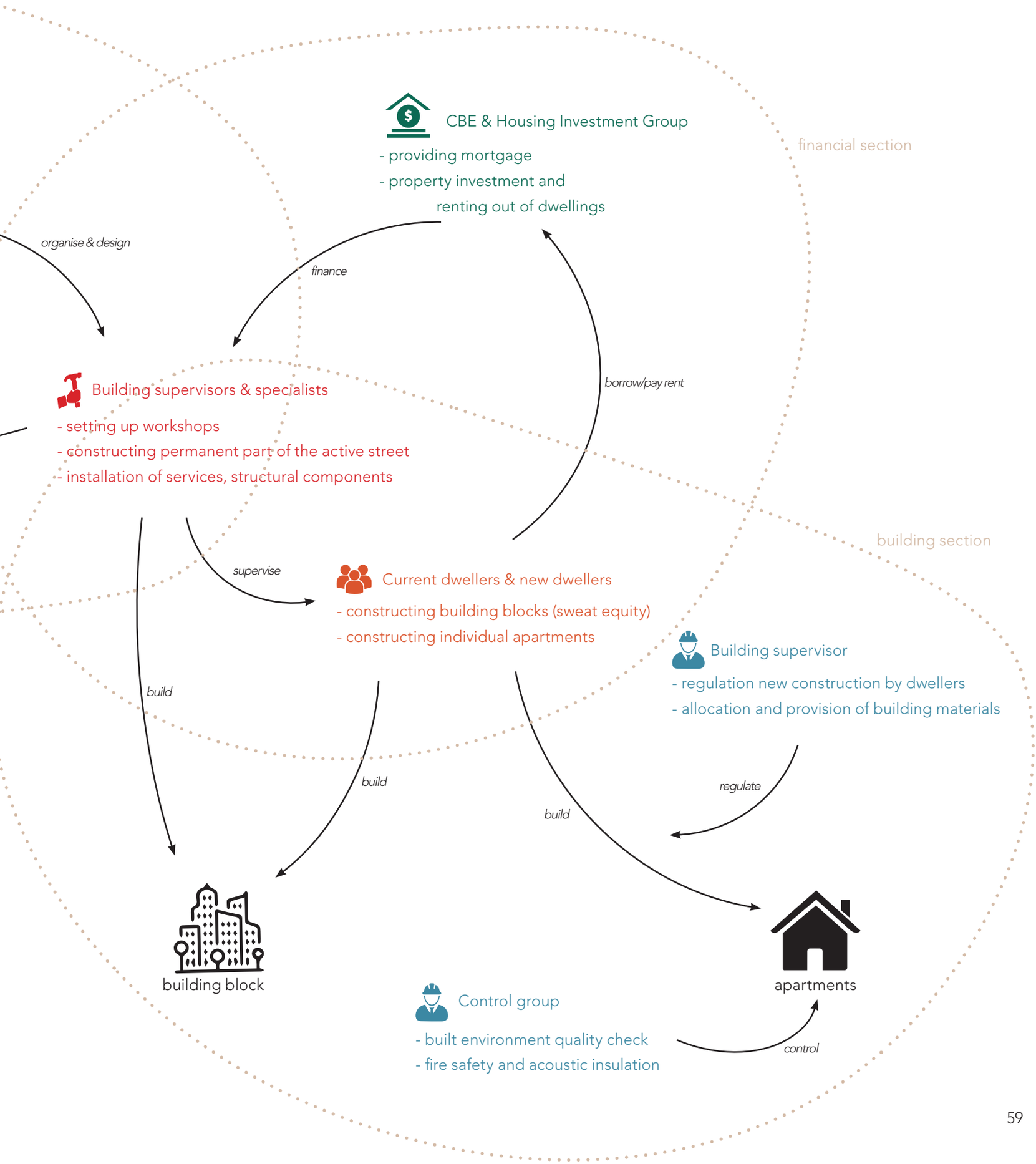
- built environment quality check
- fire safety and acoustic insulation



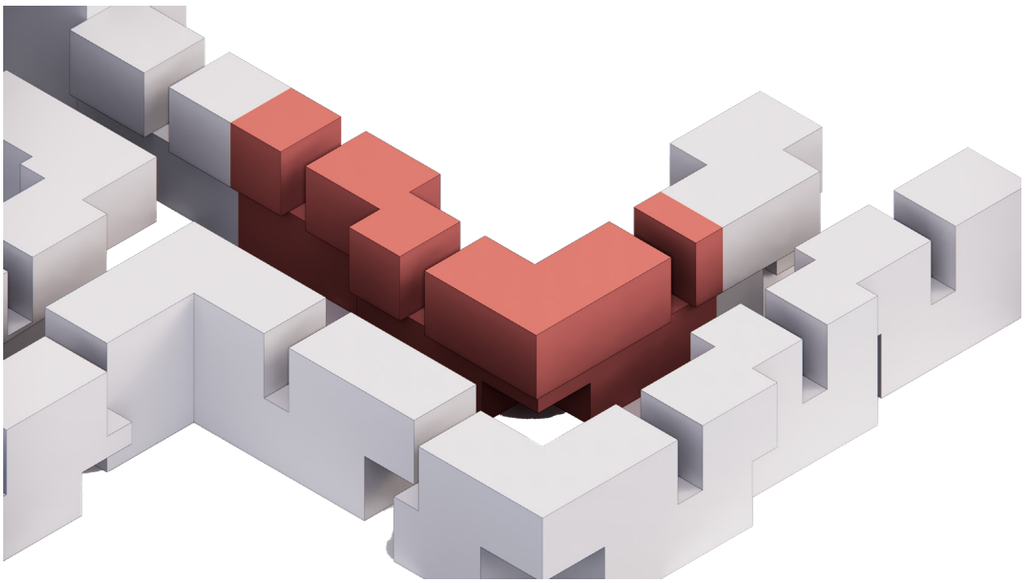
Organisation relations

All actors are in relationship to eachother. They fulfil different function and have different actions, and have different relations with the other actors.

Mainly, there are three largers sections of the relationary scheme: the organisation and design section; the financial section; and the building section (both building block and individual dwellings).

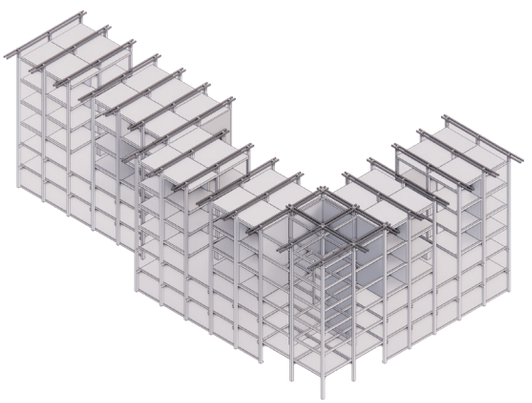

financial section
CBE & Housing Investment Group
- providing mortgage
- property investment and
renting out of dwellings
organise & design
finance
borrow/pay rent
Building supervisors & specialists
- setting up workshops
- constructing permanent part of the active street
- installation of services, structural components
building section
supervise
Current dwellers & new dwellers
- constructing building blocks (sweat equity)
- constructing individual apartments
Building supervisor
- regulation new construction by dwellers
- allocation and provision of building materials
build
build
build
regulate
building block
apartments
Control group
- built environment quality check
- fire safety and acoustic insulation
control

BUILDING BLOCK



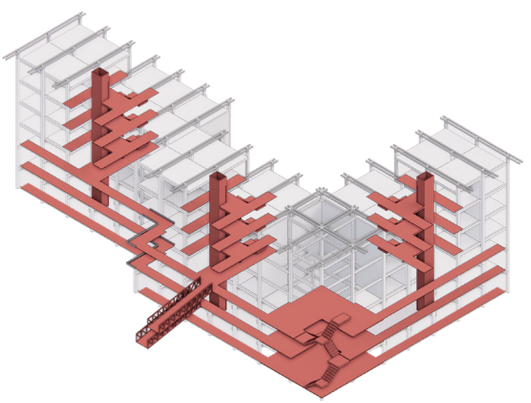
Structure

The structure of the building is prebuilt. It provides a framework for the individual dwellings, which are built by the inhabitants themselves. It integrates the circulation and the services, and guarantees fire safety and acoustic insulation for its walls and floors.

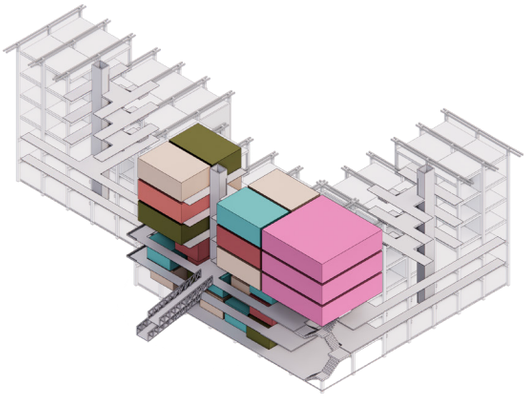


Circulation

The circulation is mainly through the galleries: on the first three floor (including ground floor), the gallery runs parallel to the street. The gallery provides space for economic activities and can be widened by the dwellers themselves if they choose to. On the upper three floors, the circulation is via the indent in the building block, creating a small open area with dwellings on either side of it. It provides space for activities.

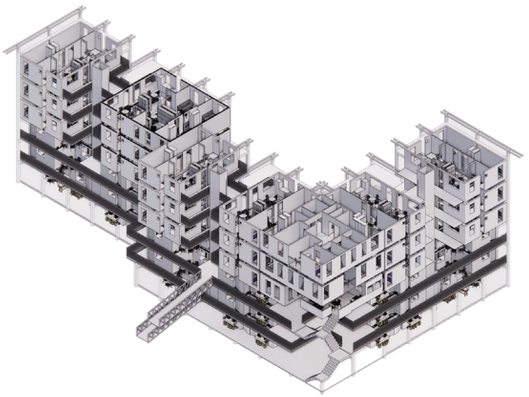


The vertical circulation happens at the corners (first three floors) and at the indents (upper three flroos). This is vertically disconnected to create a horizontal flow and increasing the traffic on the galleries, therefoer increasing the economic opportunities for those that live there.



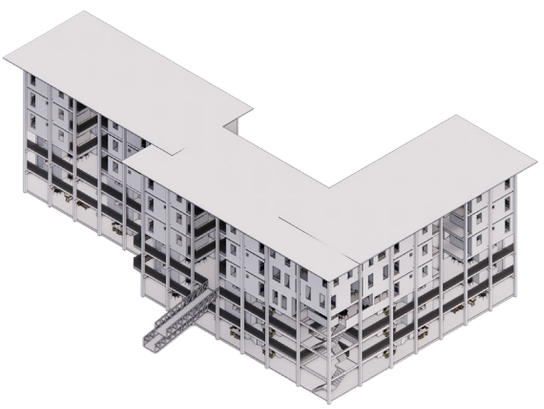
Units

The individual apartments are placed inside the structure, along to the circulation space (galleries and indents). On the lower three floors the apartments are directed from street to back, attached to the galleries. On the upper three floors the apartments are directed from indent to corner, attached to the vertical circulation of the indent. An elevator is placed inside the indent, to unlock all the floors for disabled.



Dwellings

The individual apartments with their dwelling plans. The lay-out is such that all the services (shafts, pipes) run in between the dwellings on the lower floors and on fixed places on the upper floors.



Completing with a roof

Materiality

The main structure basically consists of two materials: eucalyptus wood and hempcrete. The eucalyptus wood provides the structural support: glued-laminated (glulam) columns and beams for the main structure, normal eucalyptus beams for the secondary structure and planks. Hempcrete blocks are attached to the floor, to ensure acoustic insulation and fire safety between the different dwellings. Also, this material is used for the dwelling dividing walls.

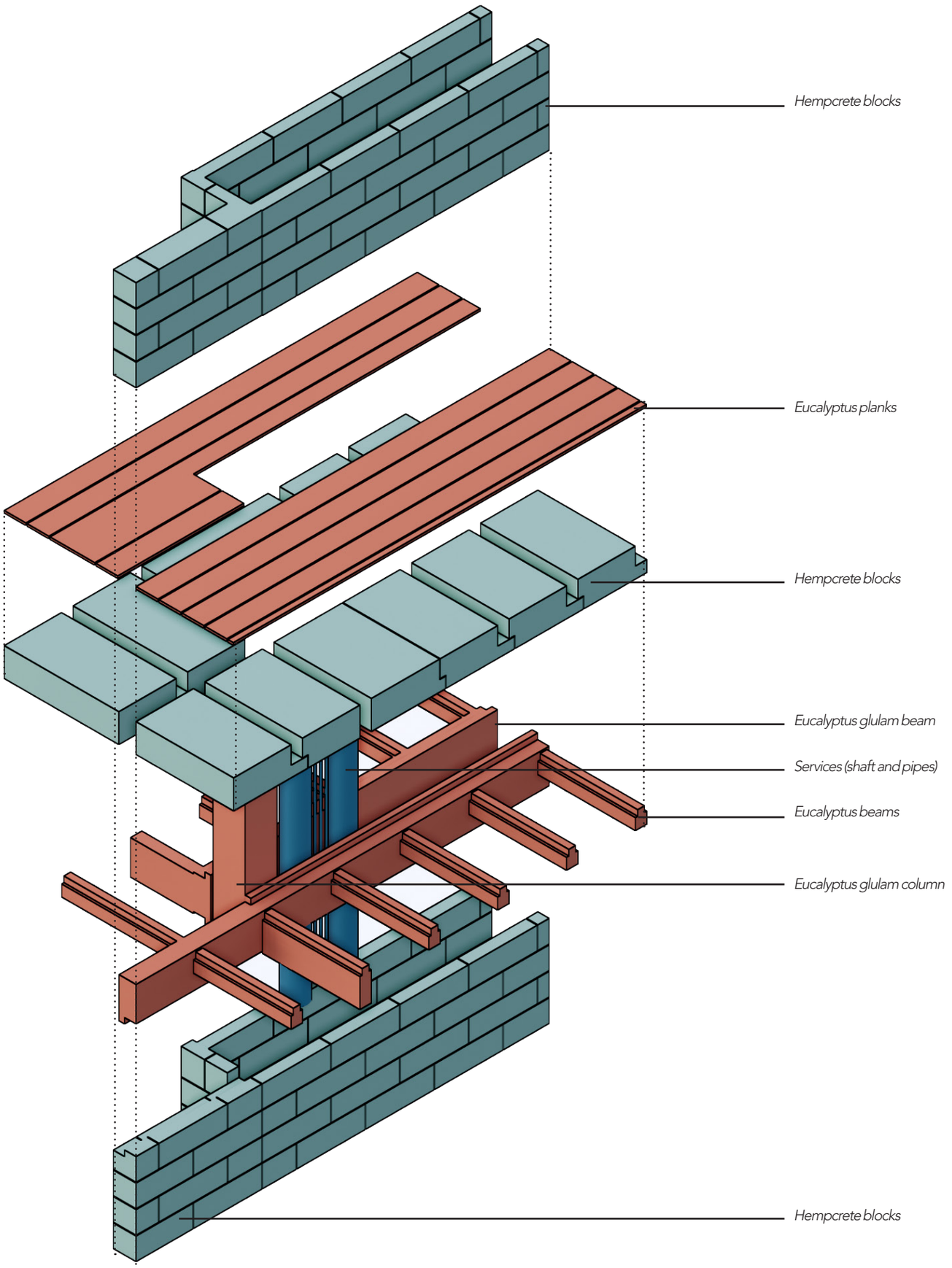
Glued-laminated eucalyptus beams are not common in Ethiopia. Normally, they are produced in technologically intensive factories. Since there are none of these factories close by Addis Ababa, it has to be produced in a different way. However, it can be produced manually, with a more labour-intesive method, but equal overall quality.

While eucalyptus is not the general wood species for applying in glued-laminated structures, it can be applied without problem, as shown in the studies mentioned to the side. In Southern America, there are already many projects which make use of glued-laminated eucalyptus beams and columns.

With eucalyptus plantations all over the country, this structural material has minimal transportation costs and is very sustainable. Especially when compared to the commonly used concrete structures.

Hempcrete, created from hemp hurds and a lime binder, is a material that can also be produced locally. Even so, it is easy to apply, it can be molded into blocks or it can be cast in-situ by means of tamping it onto a wall or floor. It is also a very pleasant indoor material, breathing and regulating indoor humidity. Even more, it is fire resistant and insulates well acoustically.

By applying only two main materials, the overall complexity of building is kept to a minimum, making it easy for the dwellers themselves to take part it the building process, and built their own individual apartments. For the building regulation group, controlling the fire safety and acoustic insulation between dwellings, it simplifies the regulation: when hempcrete is used for the dwelling dividing walls, the fire safety and acoustic insulation are naturally taken care off, no further actions have to be taken.


Hempcrete blocks
Eucalyptus planks
Hempcrete blocks
Eucalyptus glulam beam
Services (shaft and pipes)
Eucalyptus beams
Eucalyptus glulam column
Hempcrete blocks

Glulam eucalyptus wood

There are several steps to be taken to make sure that the manual glued-laminated eucalyptus wood achieves the same strength as the industrial one. The following steps are part of the process:

1. *strength grading (visual)*
2. *wood drying*
3. *finger jointing*
4. *planing*
5. *glue spreading*
6. *clamping station*
7. *curing*
8. *cutting station*

Strength grading

The first step of the process is the visual grading of the eucalyptus wood. The eucalyptus, already cut into planks, is checked on knots, splits or shakes, which can weaken the strength of the piece of wood.

Wood drying

The next step is the drying of wood, so it achieves a 12.5% humidity. The environment where the wood pieces are drying needs to be controlled.

Finger jointing

Different pieces of wood are attached to eachother in length, to achieve long pieces of wood. To do this, finger joints are used at either ends of the piece. The finger joints enlarge the surface area of the endsurface, and thus strengthen the glued connection.

Planing

After glueing the pieces at the length, the pieces of wood are planed, before attaching the glue onto, to create an even surface.

Glue spreading

The glue can be spread out with the help of hand roller, glue guns, spray guns or glue spreaders. A glue density should be achieved of 160 g/m^2.

Clamping station

The pieces of wood are attached onto each other, to achieve the right width and depth of the column or beam. With the help of clamping jigs, screws and bolts, a pressure of 0.8MPa for 200 minutes should ensure that the pieces are glued together solidly and create the combined strength of a glulam columns or beam.

Curing

After the pieces are glued together, the wood needs to be curing for 7+ days.

Cutting station

In the end, the long pieces can be cut in the dimensions that are needed.

Thus, the facilities that are necessary for creating glulam eucalyptus wood are

1. *finger jointing machine*
2. *planing device*
3. *glue and glue spreaders*
4. *clamping jigs*
5. *cutting machine/miter saw*
6. *controlled space for drying and curing*

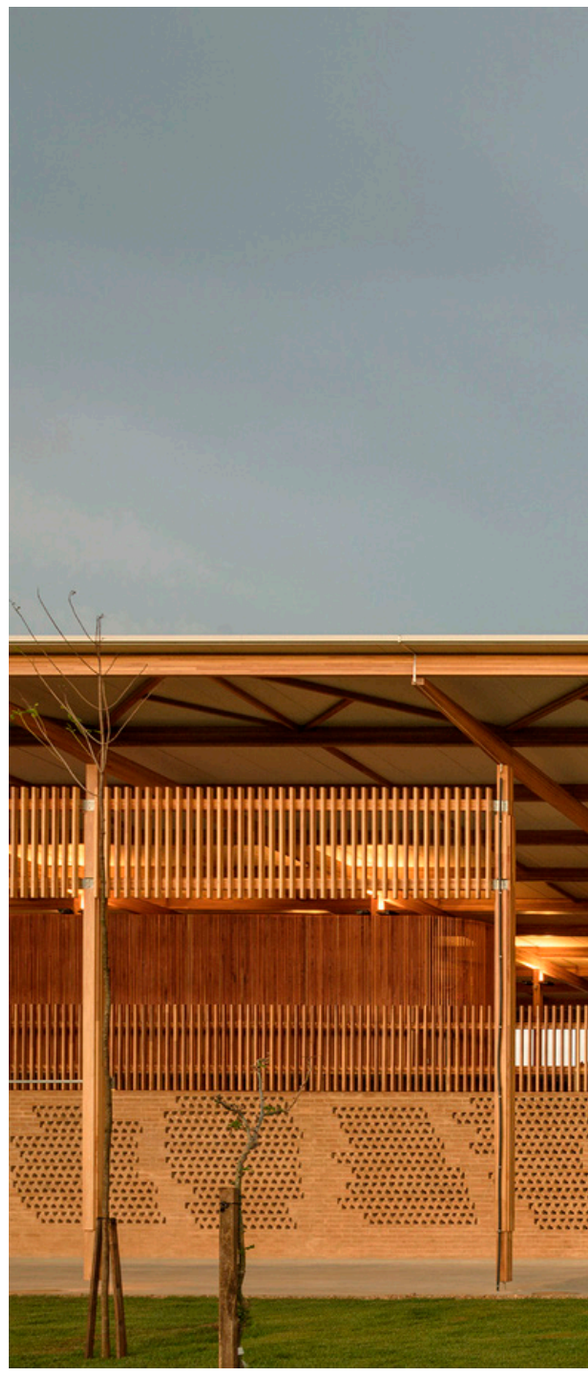


Image source: Leonardo Finotti (Baldwin, 2018)

Dwelling options

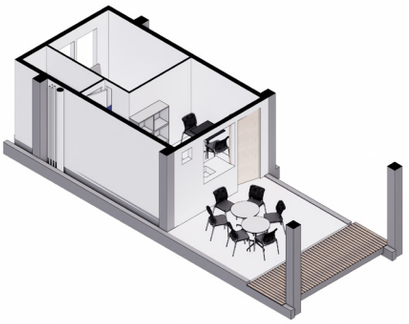
In the building block, the dwellers build their own individual apartments. However, these options are not limitless: they can choose from a number of options.

The first choice is picking the spot. There are different options: on the lower floor (0-2, closer connection to the street), or upper floor (3-5). Then a single unit, or a double unit, either next to eachother, or stacked on top of eachother. Logically, this cannot change over time, unless a spot comes free and a household moves to a different spot.

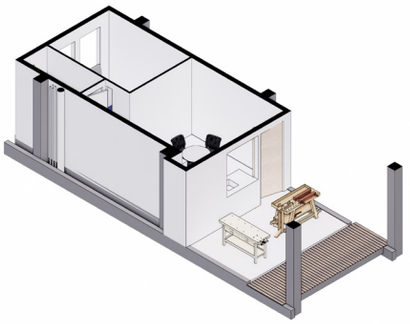
The apartments themselves, however, can be changed over time, depending on the need. It can be built as small as possible, with a large open area in front, raising the economic opportunities as one can create seating spaces, workshops, or stall outside. On the other end, the apartment can be built to the edge of the gallery, maximising the indoor space, but lowering the economic opportunities. Depending on ones life, more formal or informal, larger household size or smaller, the apartment can adapt to a household.

Generally, the single units have one bedroom, and the double have two to three bedrooms. The kitchen is always at the gallery, or entrance area, and the bathroom always at the back. While the bathroom is fixed, and thus change as the apartment type changes, the kitchen is dependant on the loaction of the facade and thus is moved with it if the apartment is enlarged or reduced in size.

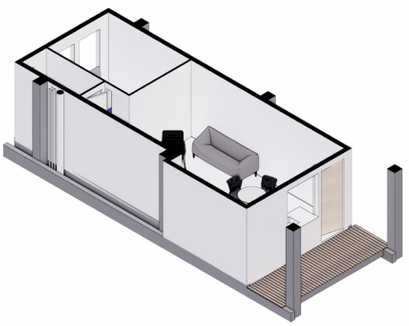
The corner block has its own typology: either, a group dwelling unit is placed here, or it serves as a public amenity. It starts from the 3rd floor, therefore leaving the lower three floors open to activities.



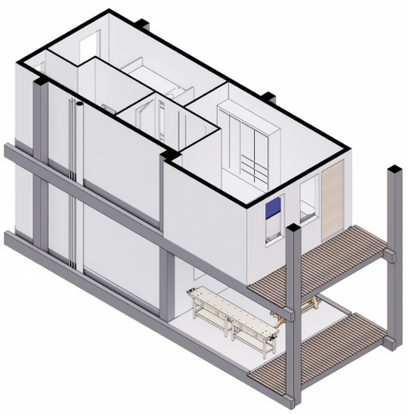
1-bedroom



1-bedroom

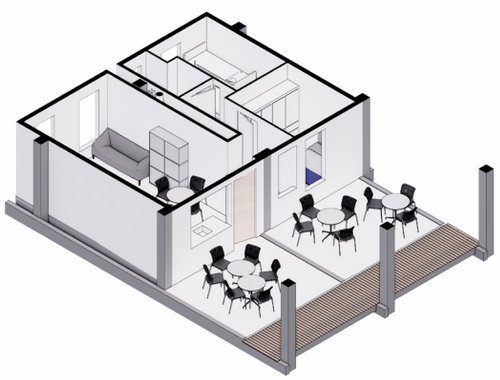


1-bedroom

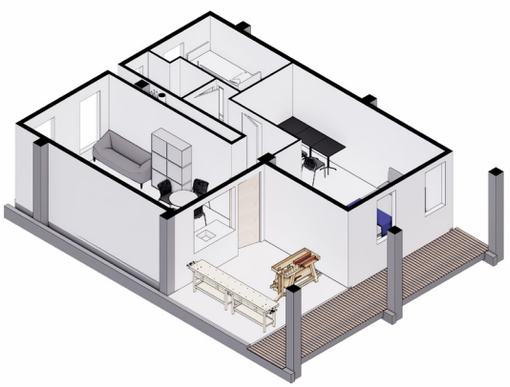


2-bedroom

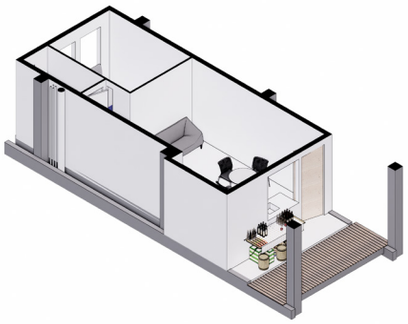
alternative access



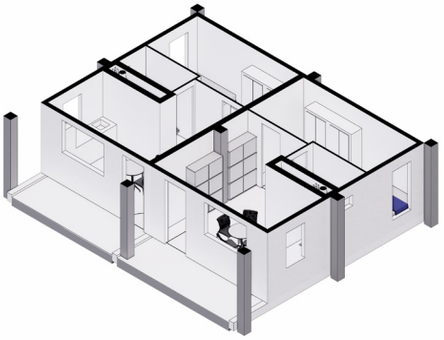
2-bedroom



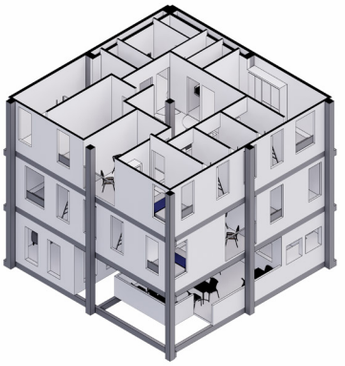
2-bedroom



1-bedroom

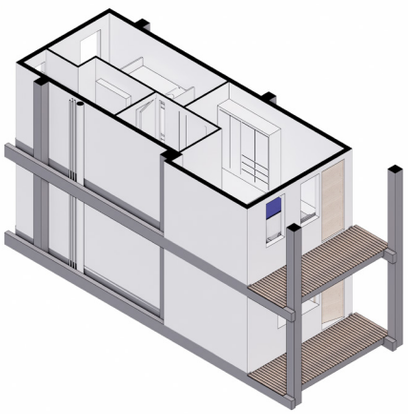


1-bedroom



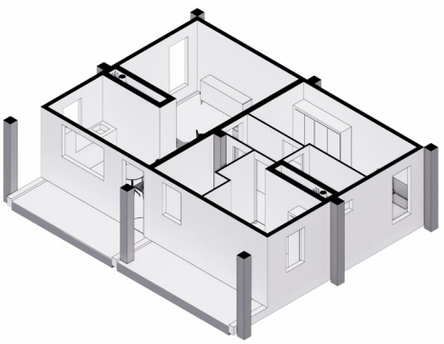
corner dwelling

group housing

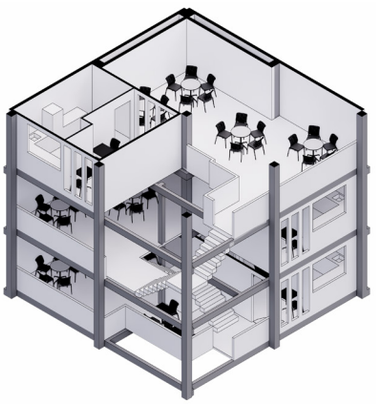


2-bedroom

alternative access

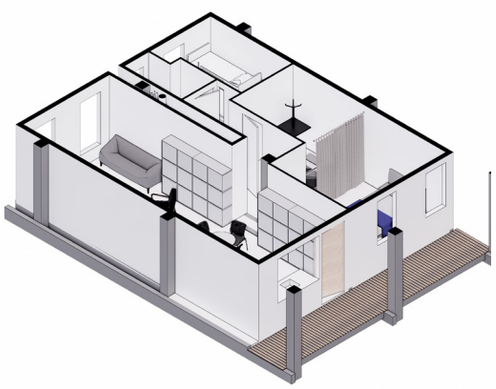


3-bedroom



corner

amenity



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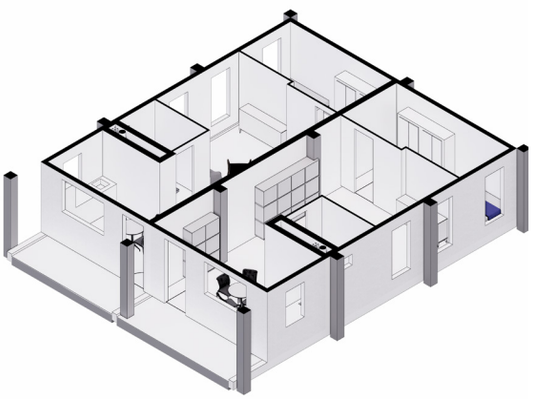
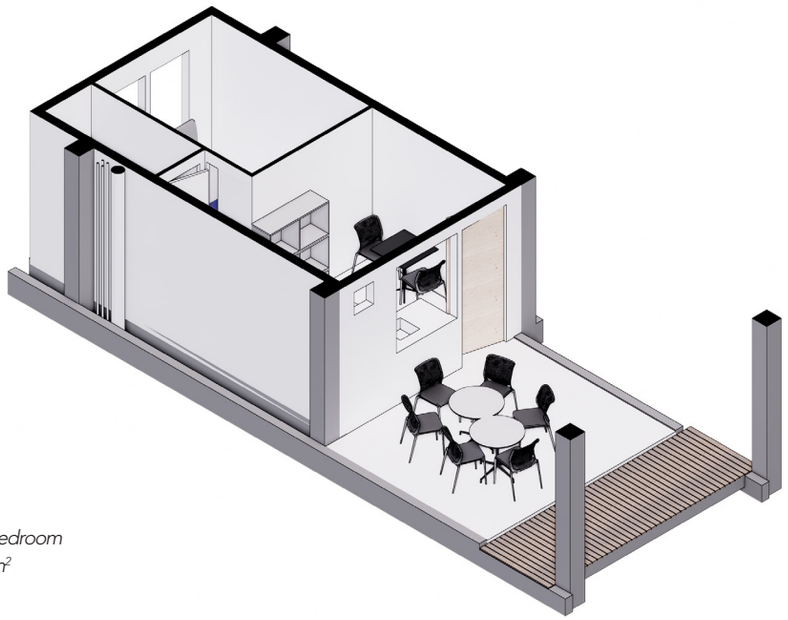
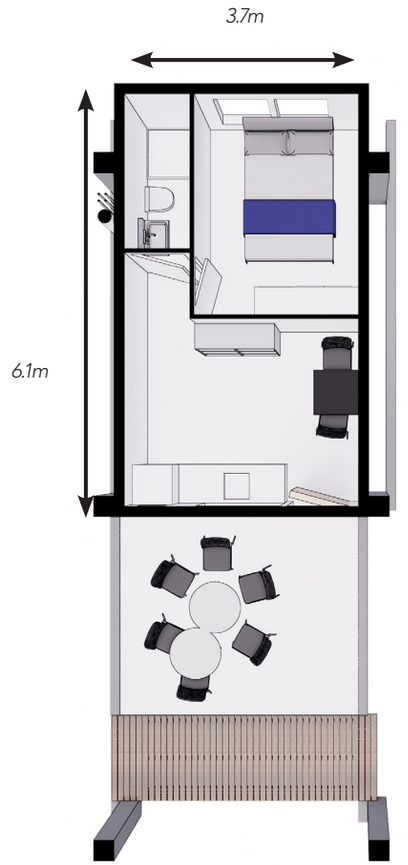
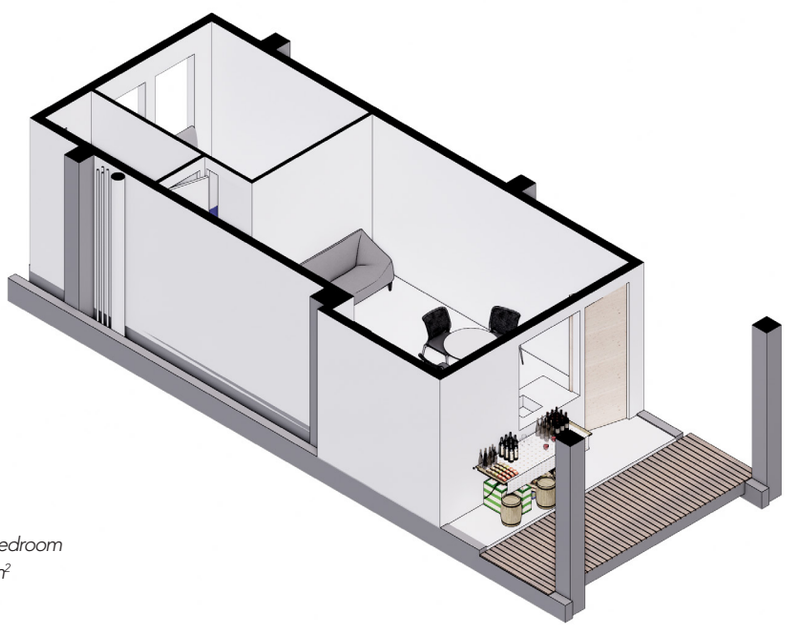


1-bedroom

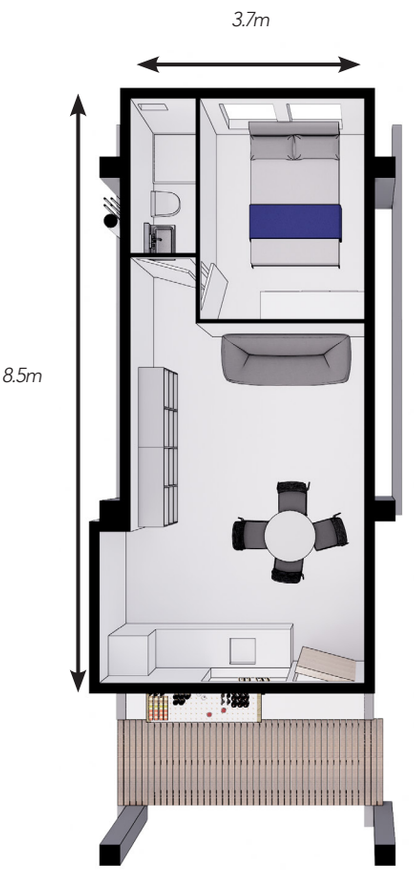


1-bedroom
19m²

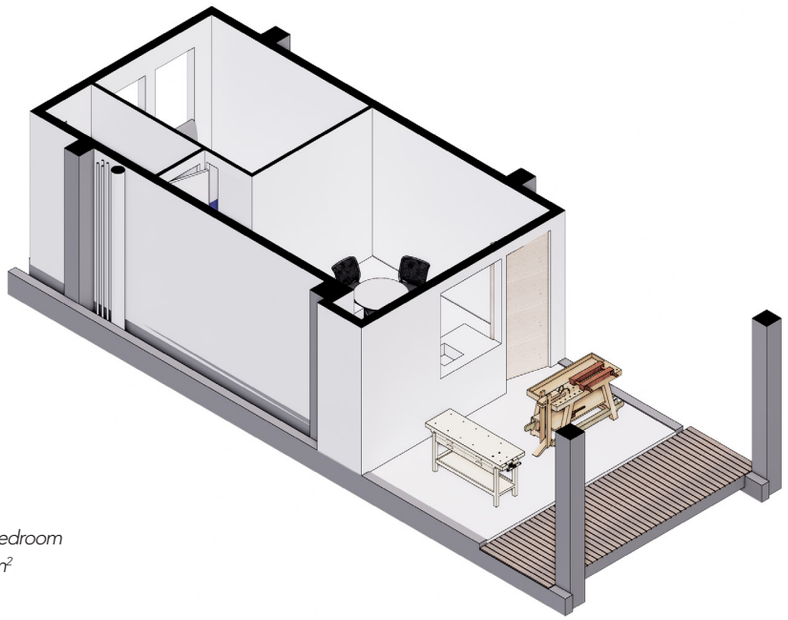




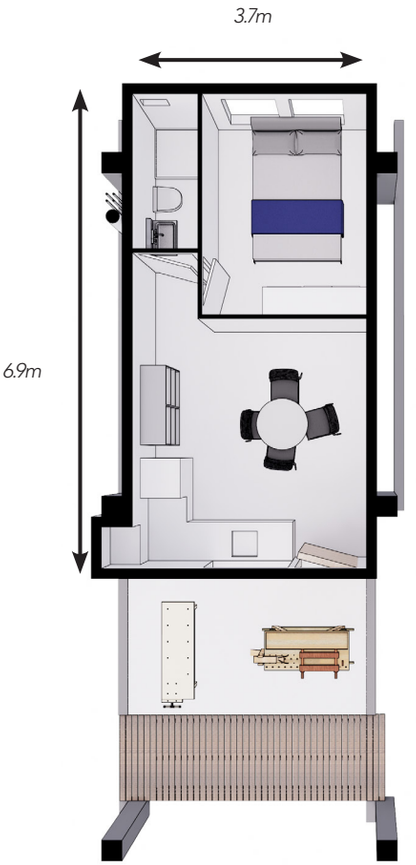
1-bedroom
31m²

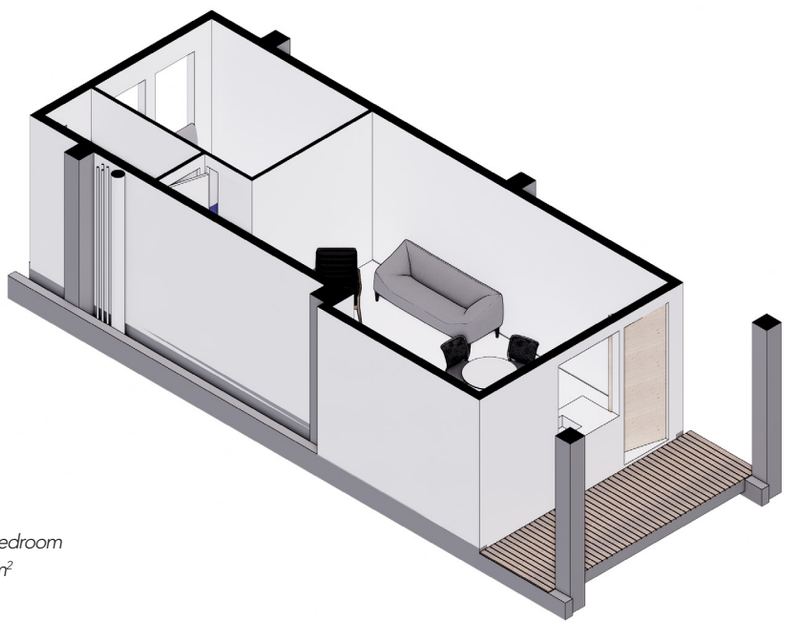


Lower floor - 1 unit

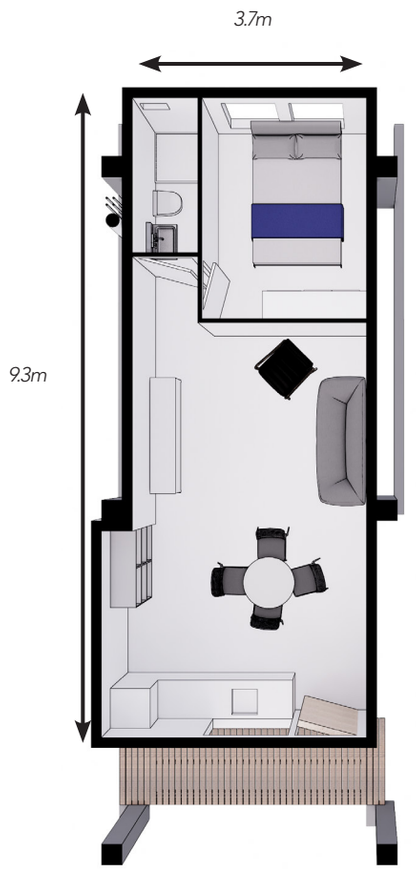


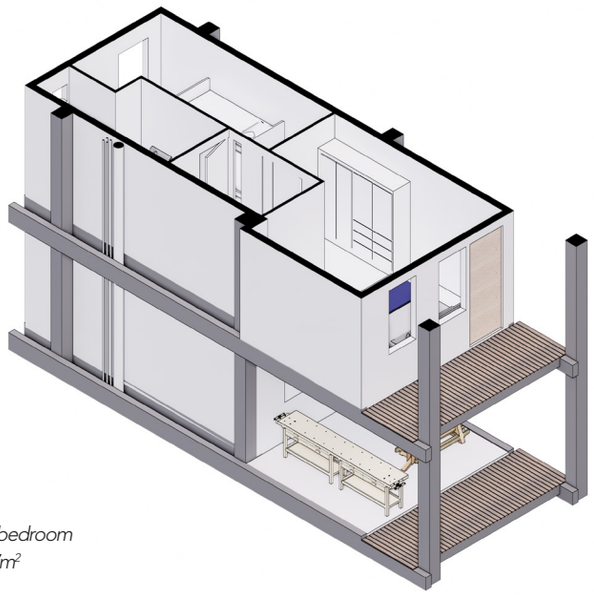
1-bedroom
26m²



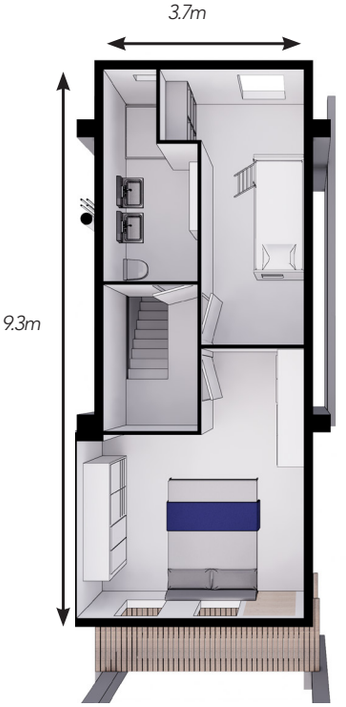


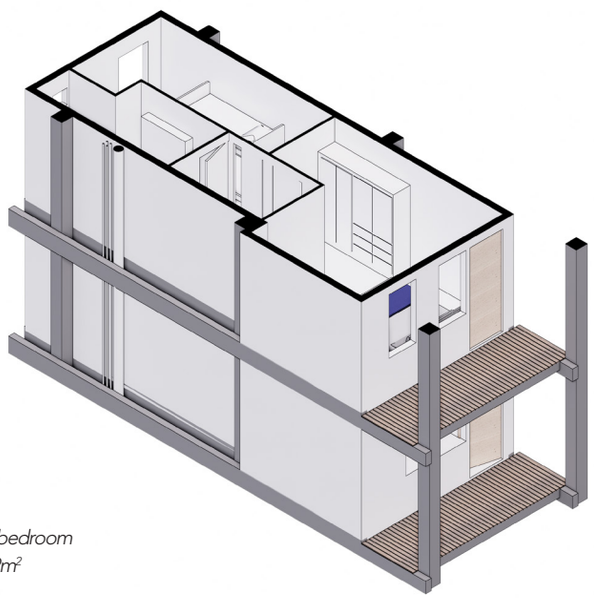
1-bedroom
34m²



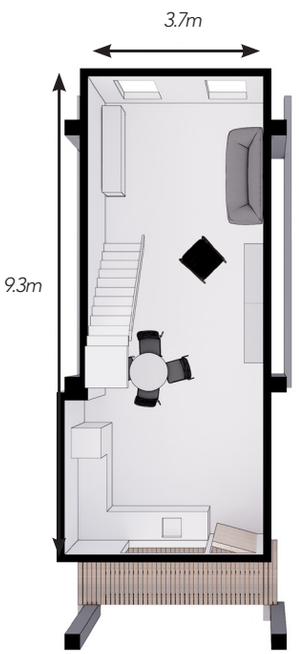


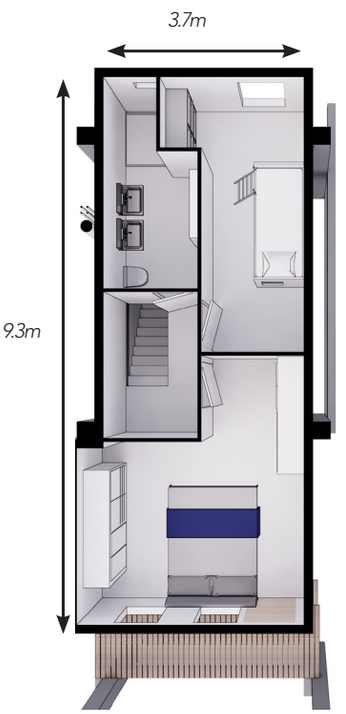
2-bedroom
57m²

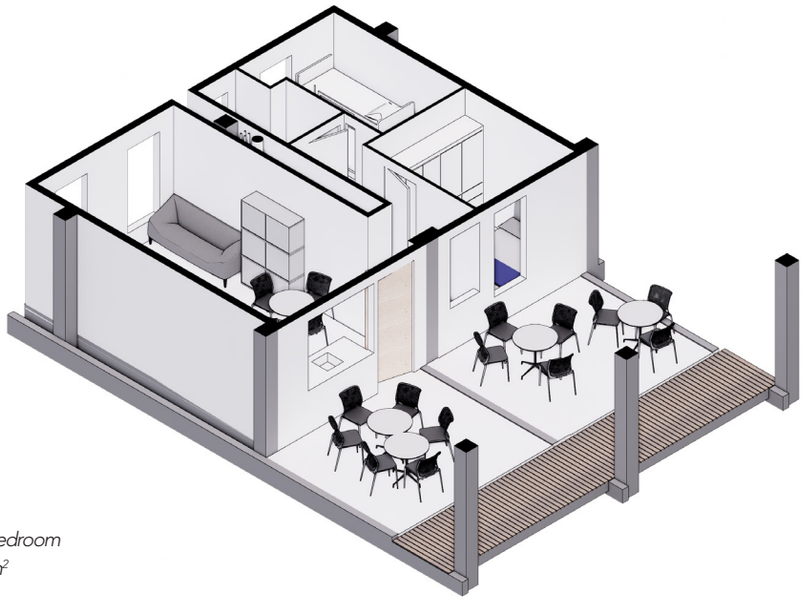




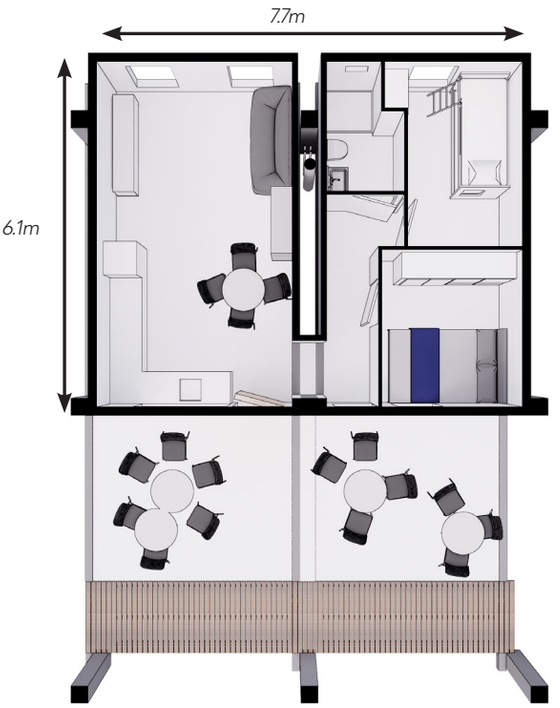
2-bedroom
69m²



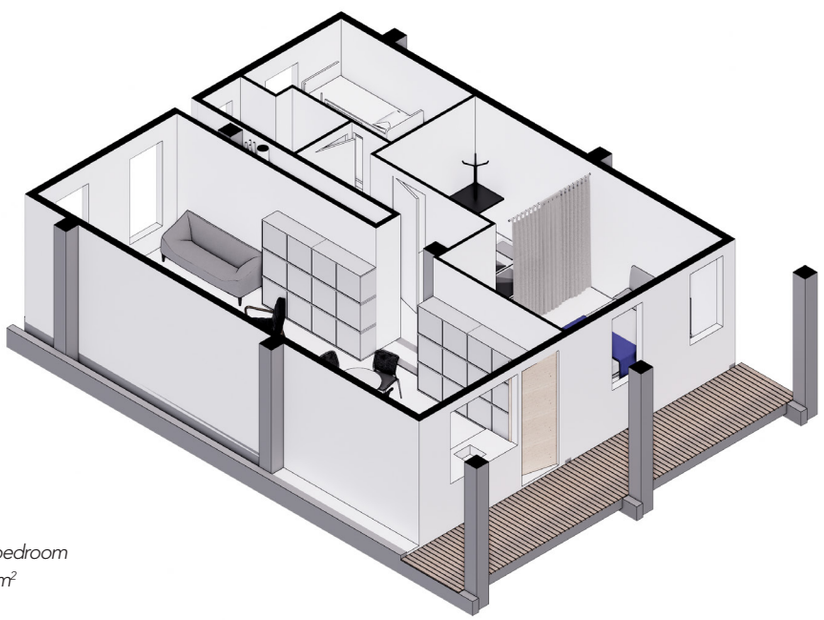




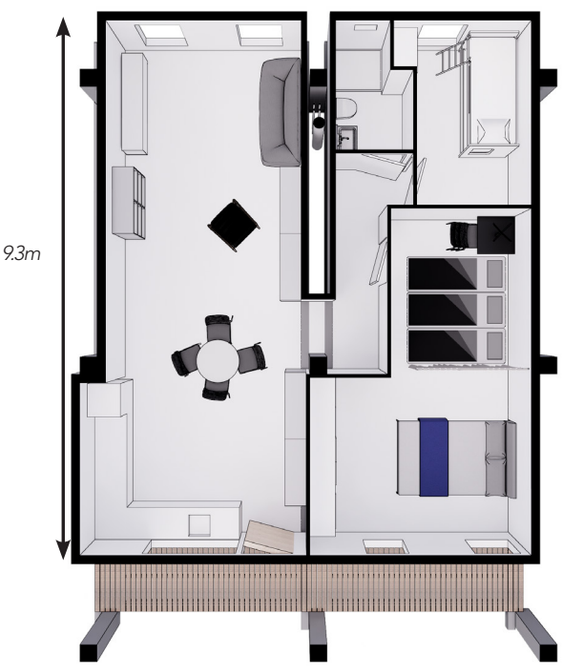
2-bedroom
47m²

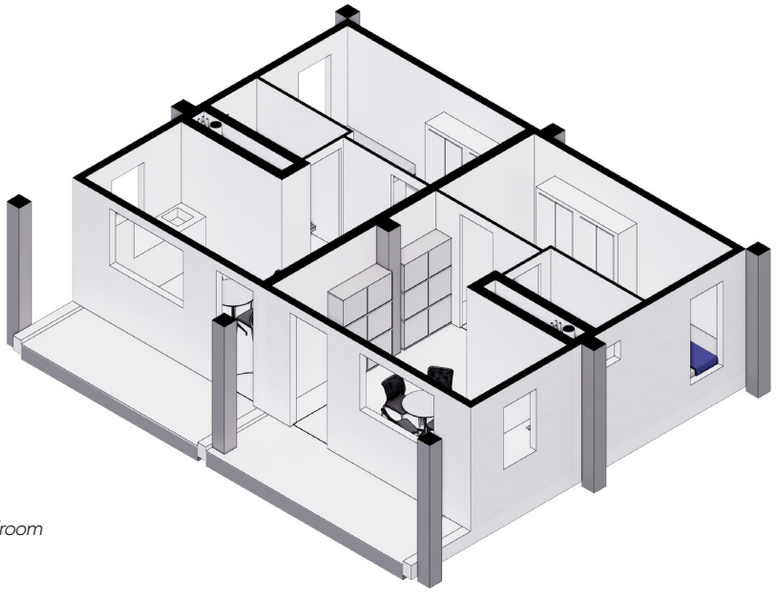


2-bedroom
57m²

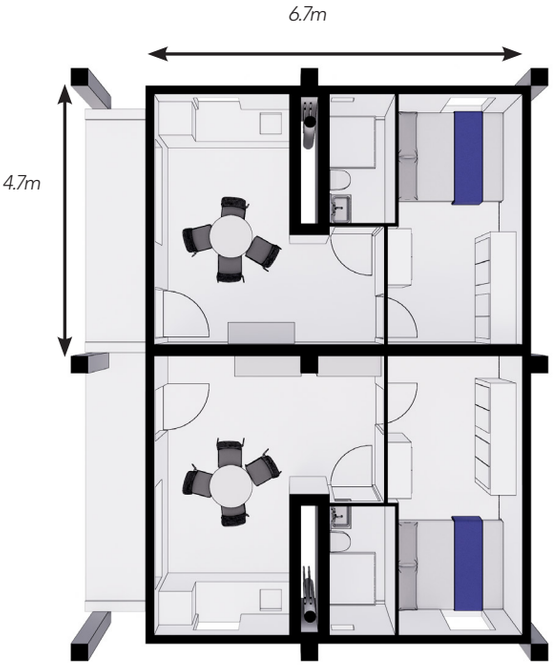


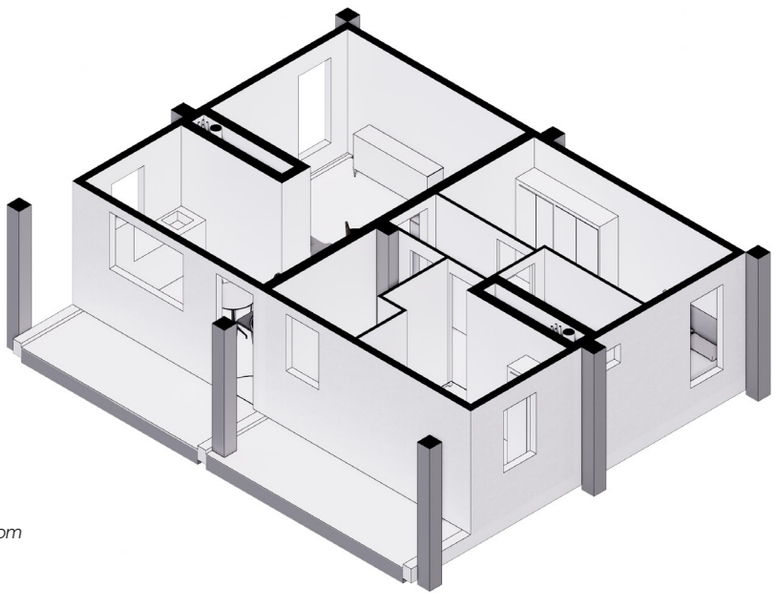
2-bedroom
72m²



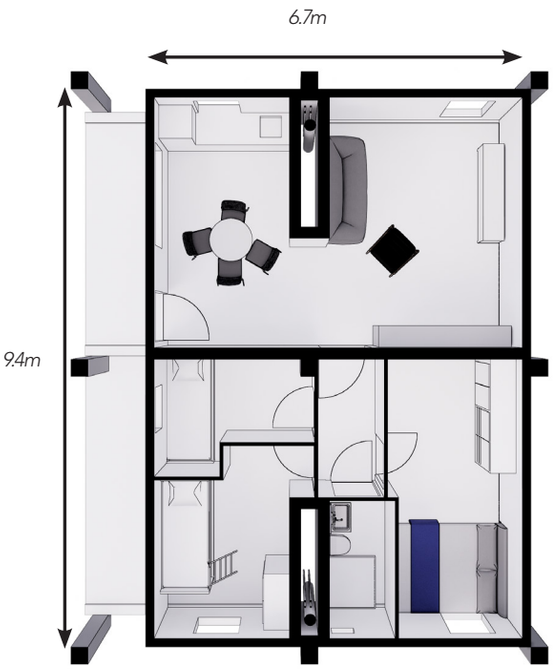


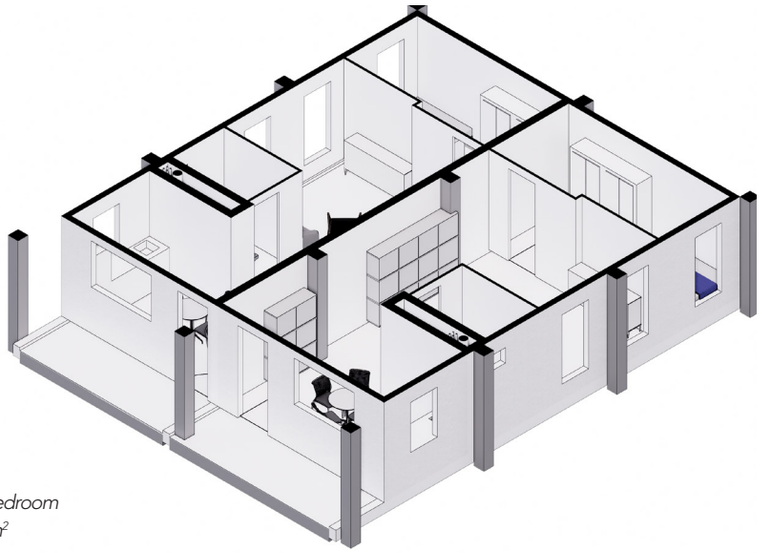
2x 1-bedroom
2x 27m²



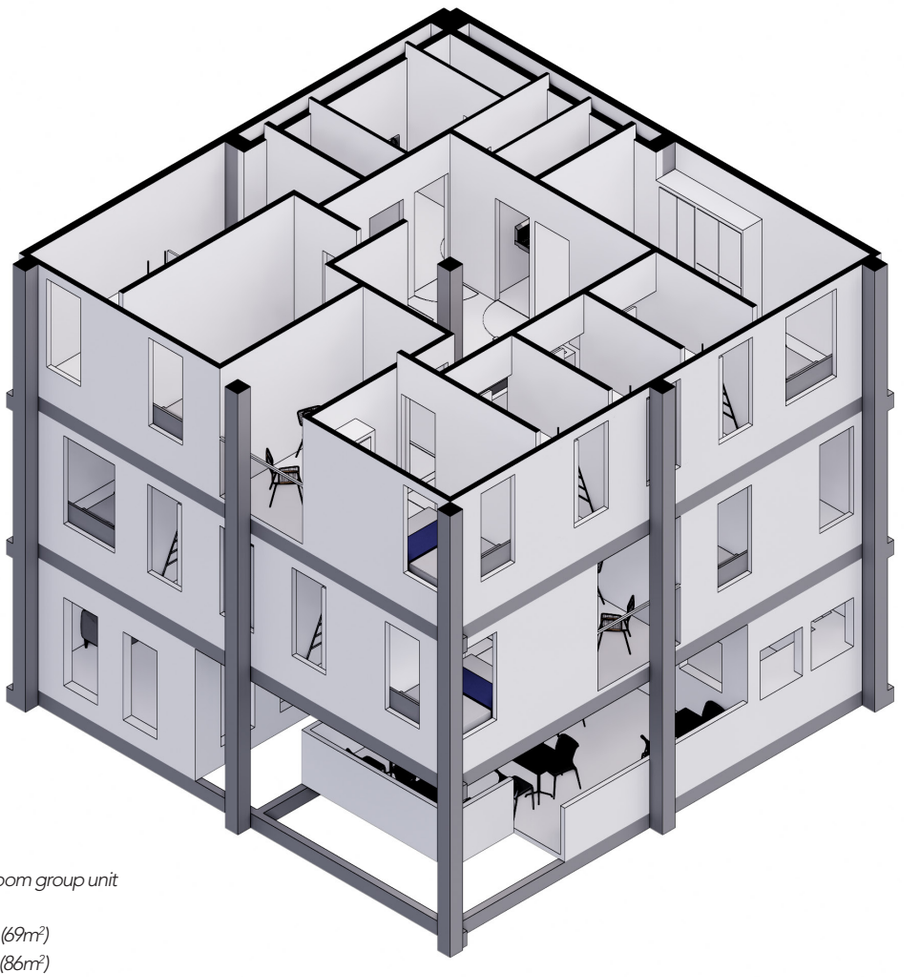


3-bedroom
54m²





2x 1-bedroom
2x 45m²

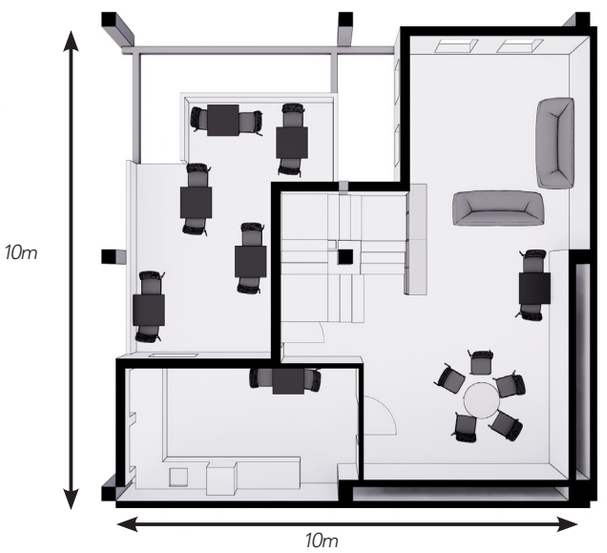


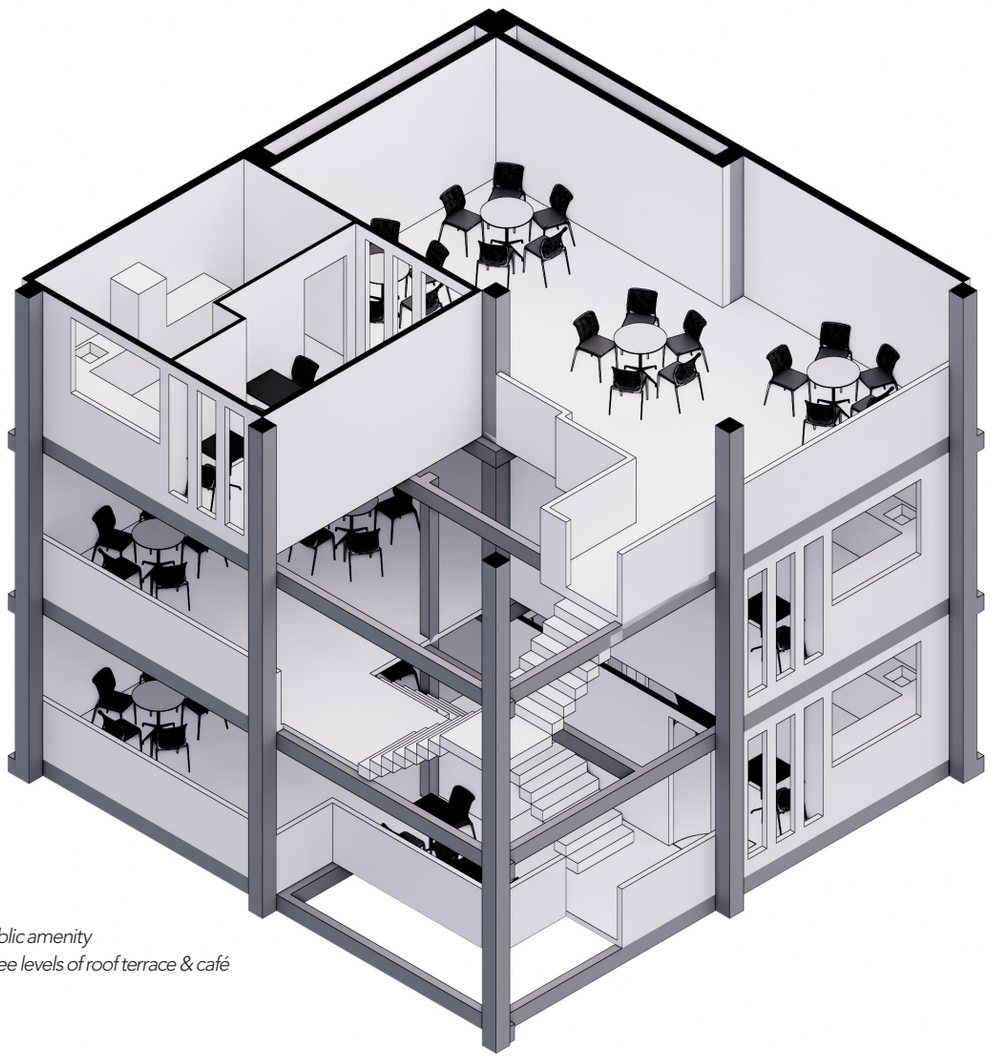
14-bedroom group unit
241m²
3rd floor (69m²)
4th floor (86m²)
5th floor (86m²)

5th floor

4th floor

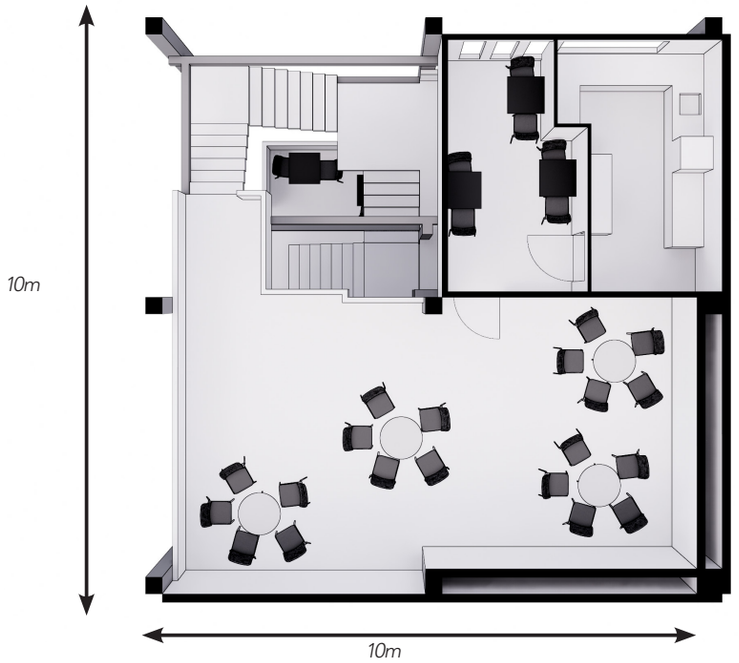
3rd floor



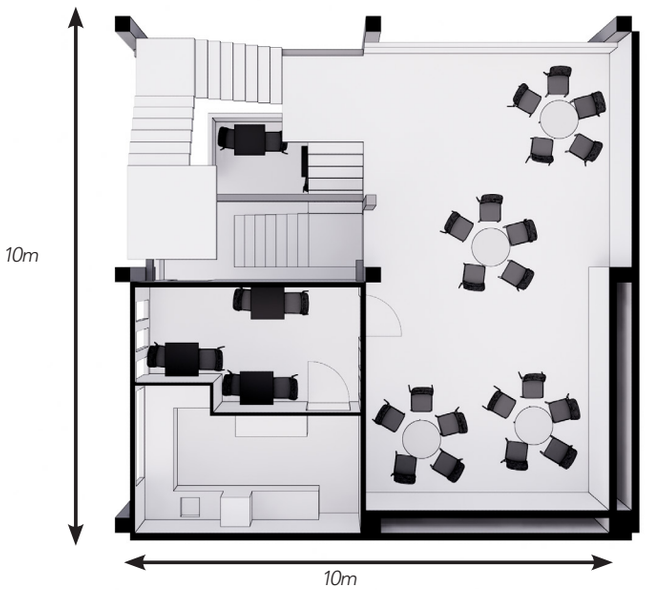


public amenity
three levels of roof terrace & café

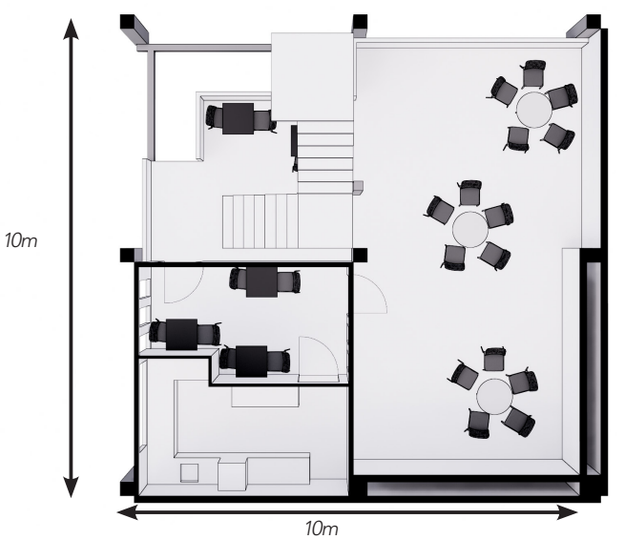
5th floor



4th floor



3rd floor



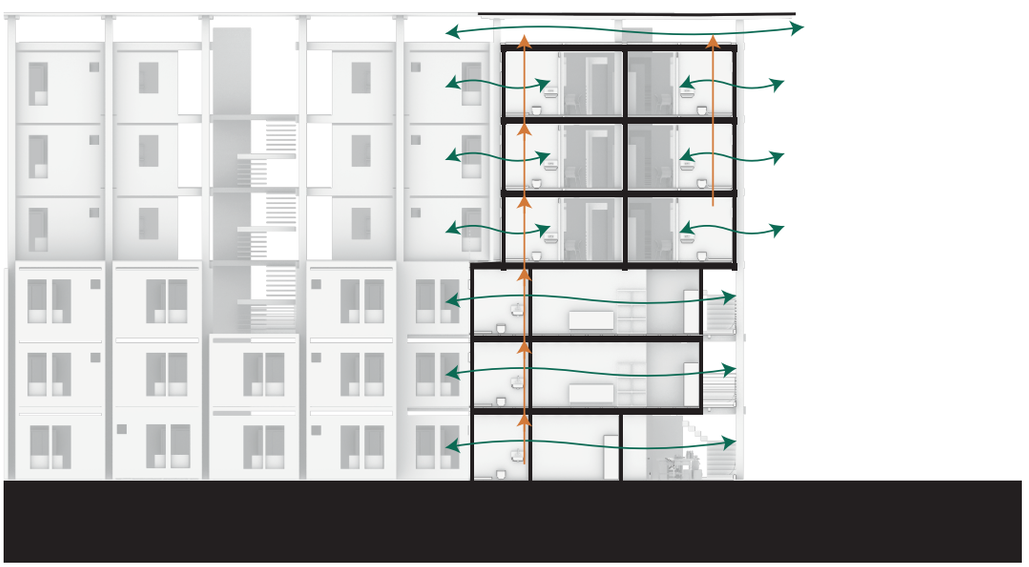
Water and sewage

The shaft areas are located right on top of eachother, and thus make the vertical connection of the water pipes, as well as the sewage shaft, very direct. On the front sight, in the section on the right, the piping does make a turn, but since there is a lot of space in the shaft to it, this should be no problem.

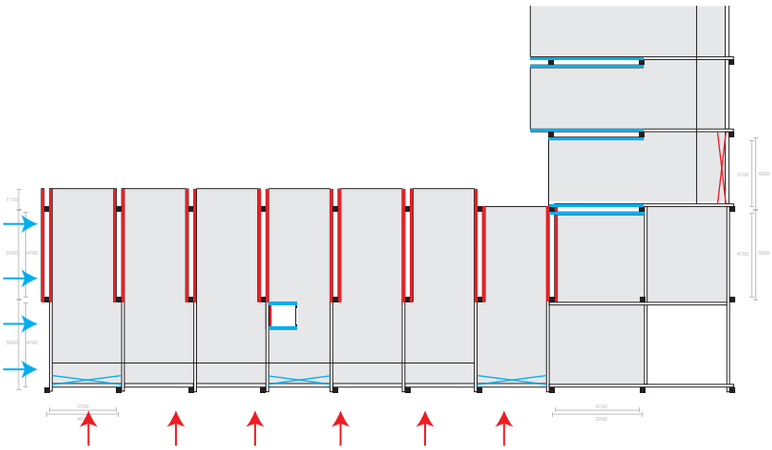
Rainwater run-off

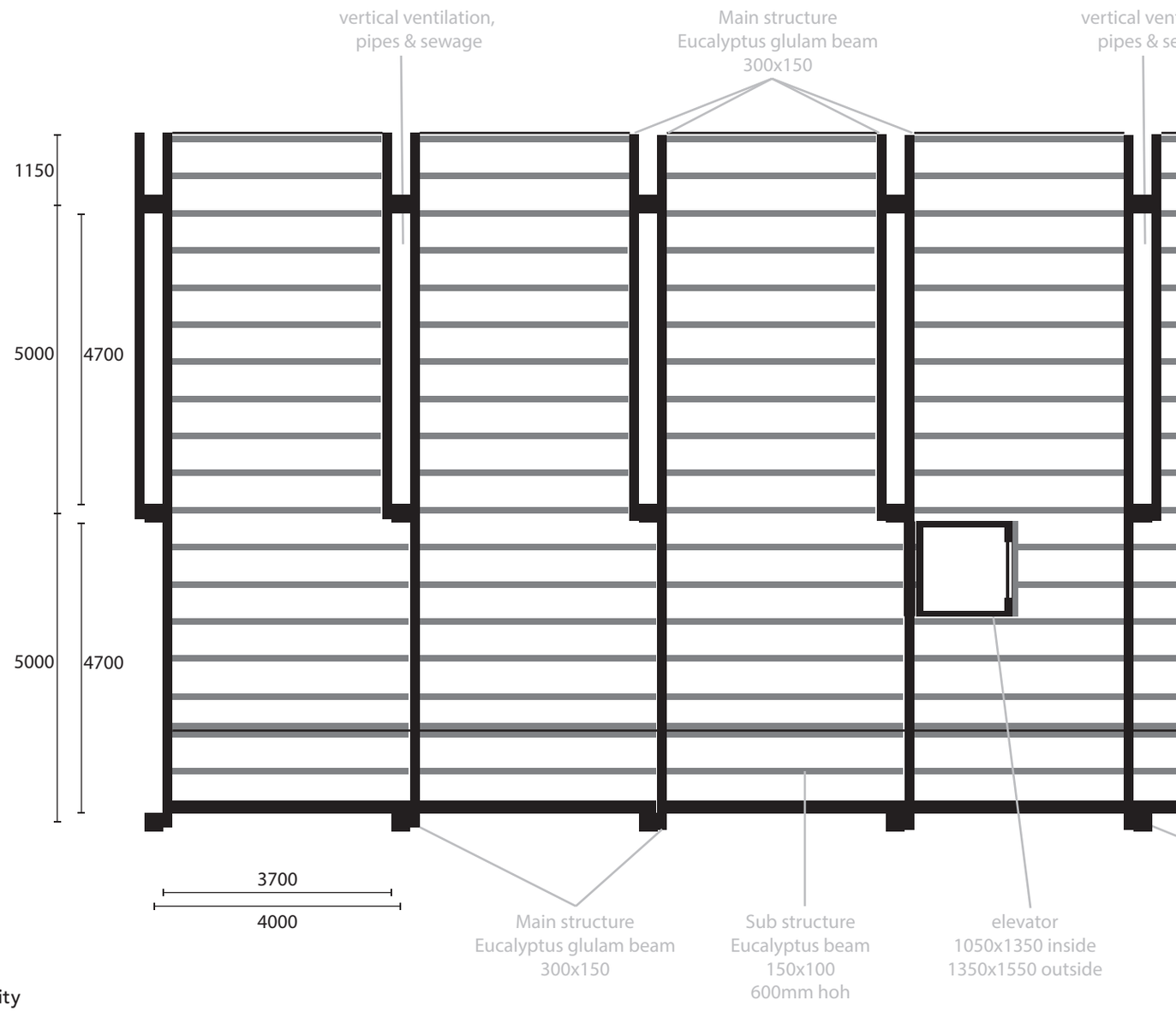
The upper roof is not waterproof. The water runs through, and is collected by the roof underneath. It is directed towards the shafts where it is guided downwards, and is absorbed by the ground. All the ground materials are open, and thus easily infiltrable by rainwater.

Sun energy absorption and harnessing
The upper roof's main goal is to absorb the sun energy and ventilate it outwards, protecting the upper dwellings from overheating. Also, the roof can be used to put solar panels on them, and harness the sun energy in such a way. This can be done collectively, by a group of dwellers, where the electricity can be transmitted and wired via the shafts again.

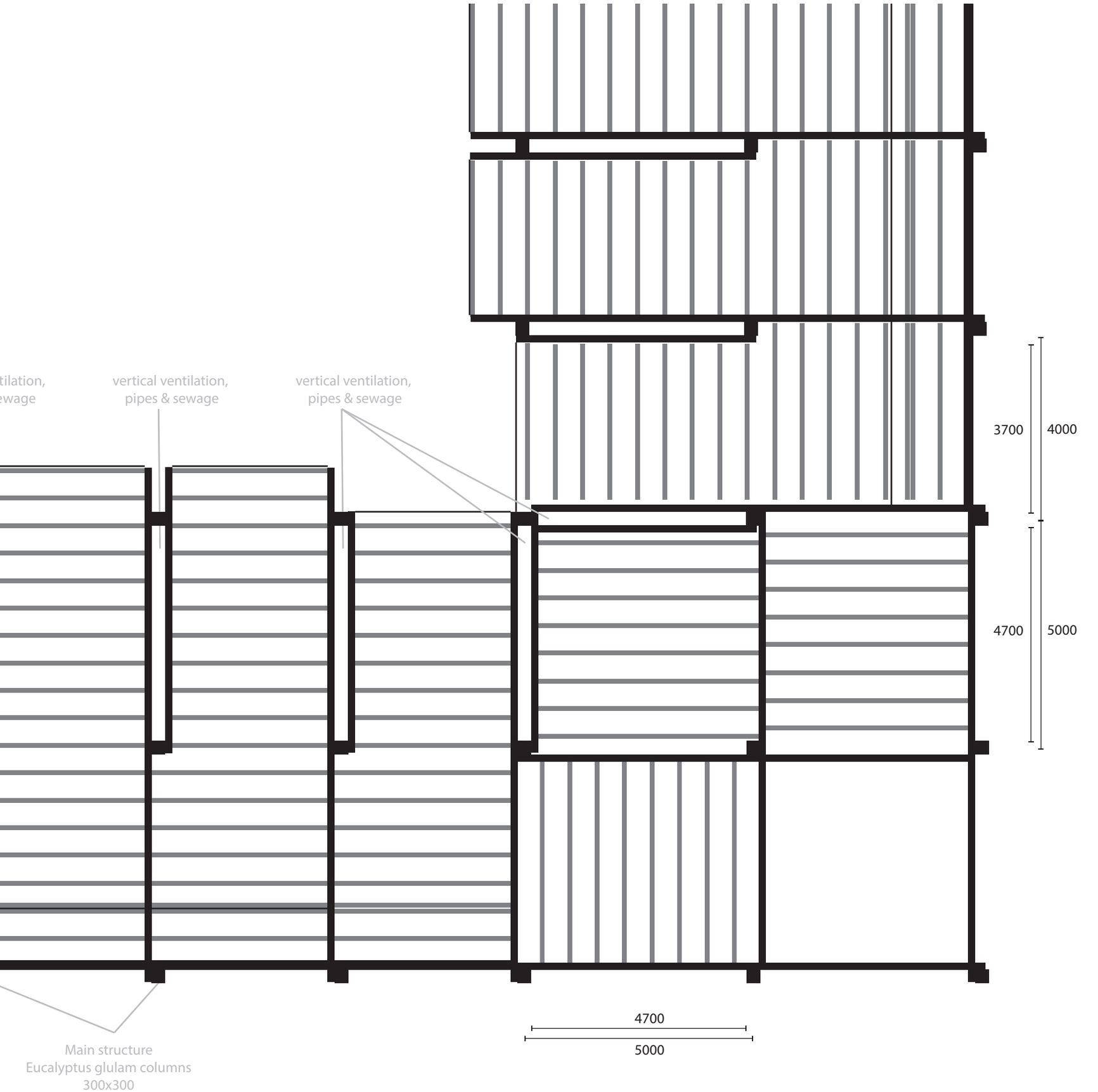


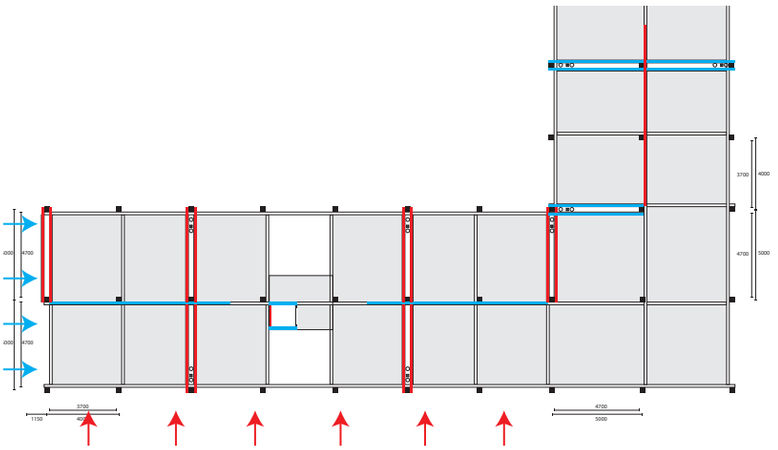
Vernitaltion
The dwellings on the lower three floors can have cross ventilation. The dwellings on the upper three floors don't have this opportunity. However, they have more facade space and thus plenty of opportunity for ventilation. If necessary, an extra extraction unit (mechanical) can be placed at the bathroom, either attached to the facade or to a shaft in between the dwellings. Since all bathroom, and kitchens as well, are located next to the facade, this is up to the dwellers themselves.

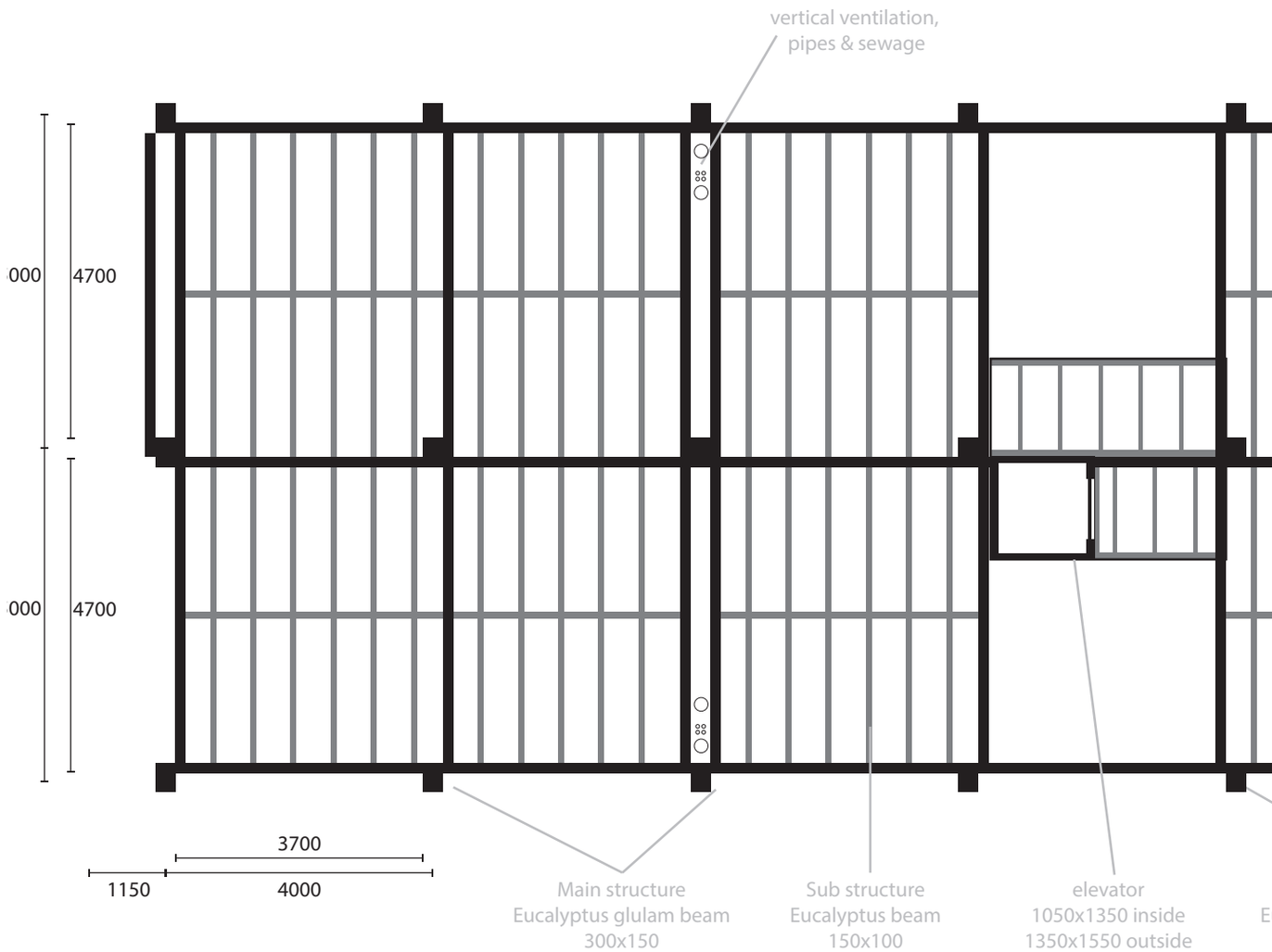




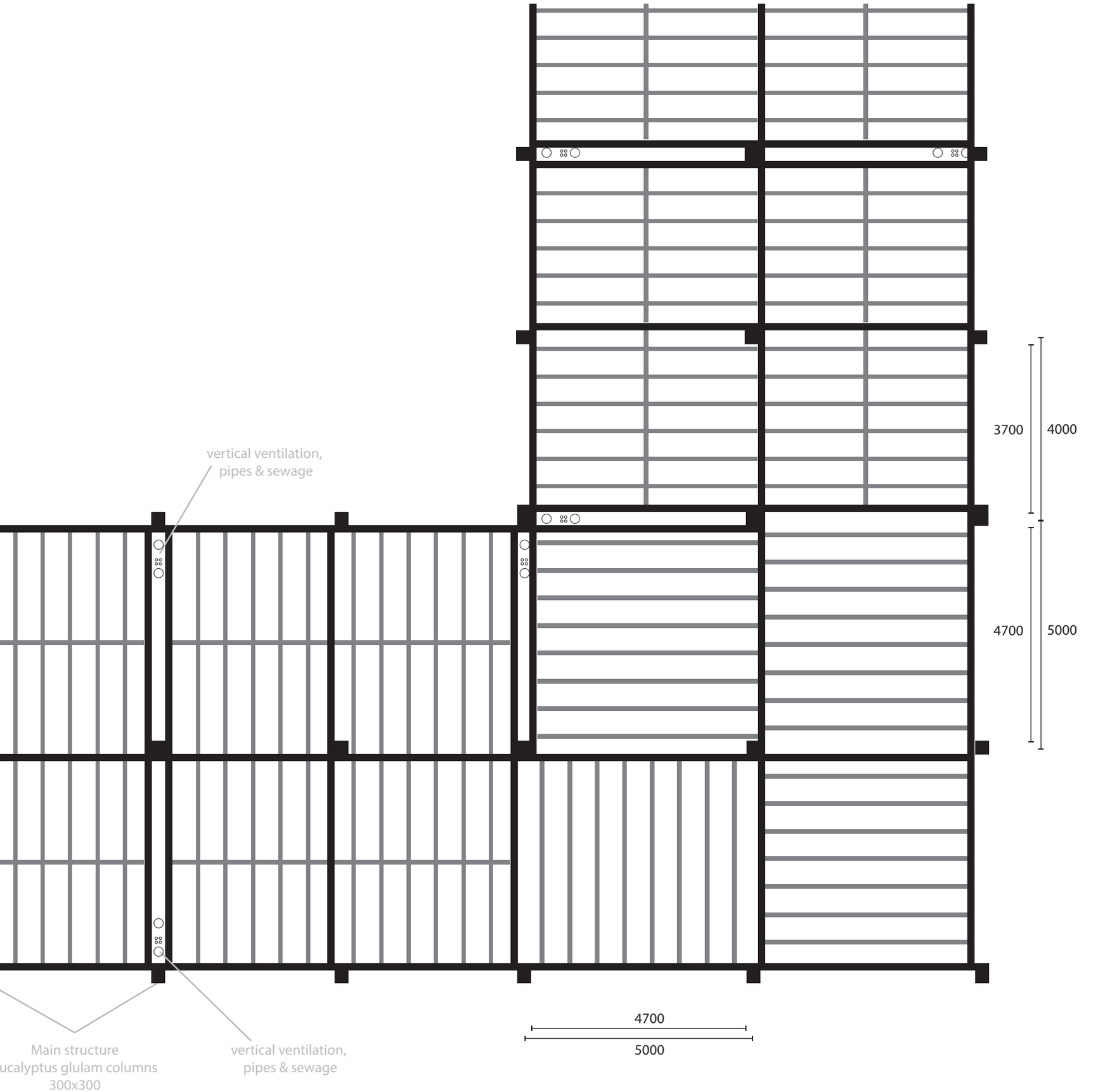
Structural plan and stability
lower level: 0-2


tilation,
ewage
vertical ventilation,
pipes & sewage
vertical ventilation,
pipes & sewage
3700
4000
4700
5000
4700
5000
Main structure
Eucalyptus glulam columns
300x300





Structural plan and stability
upper level: 3-5

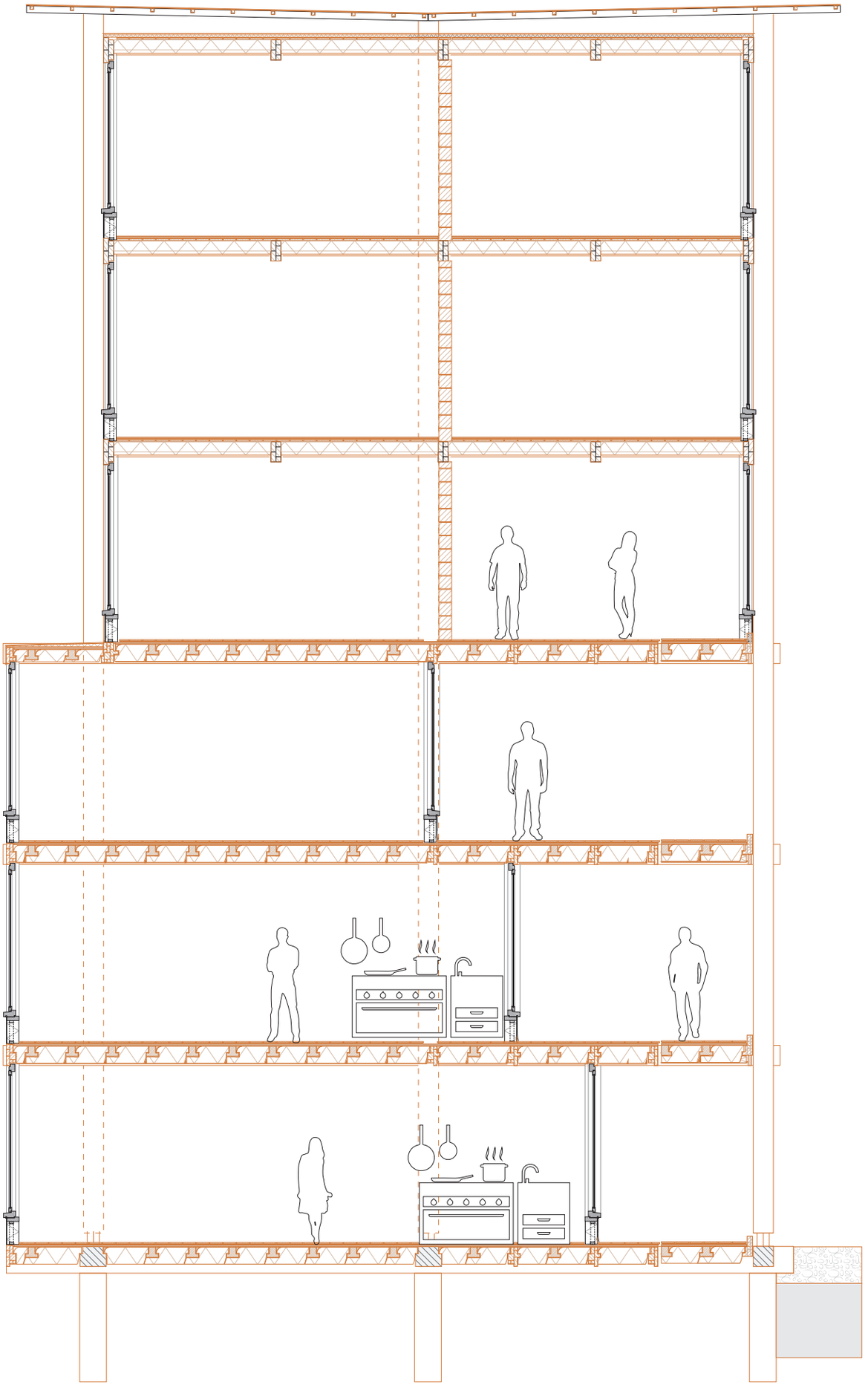

vertical ventilation,
pipes & sewage
3700
4000
4700
5000
4700
5000
Main structure
ucalyptus glulam columns
300x300
vertical ventilation,
pipes & sewage

BUILDING FRAGMENT

Fragment 1:20; scaled to 1:80

The building fragment shows the complete build-up of the building block in cross-section. The apartments on the first three floors are shown in their length direction, clearly showing the different depths of each apartment, while the apartments on the upper three floors, rotated 90 degrees, are shown in cross-section.

Two colours are used for the fragment, as well as for the details that will be shown in the next section: orange is the part of the building that is prebuilt (possibly with help of the dwellers, sweat-equity). Black is the part of the building that the dwellers build themselves, and can change easily over time.



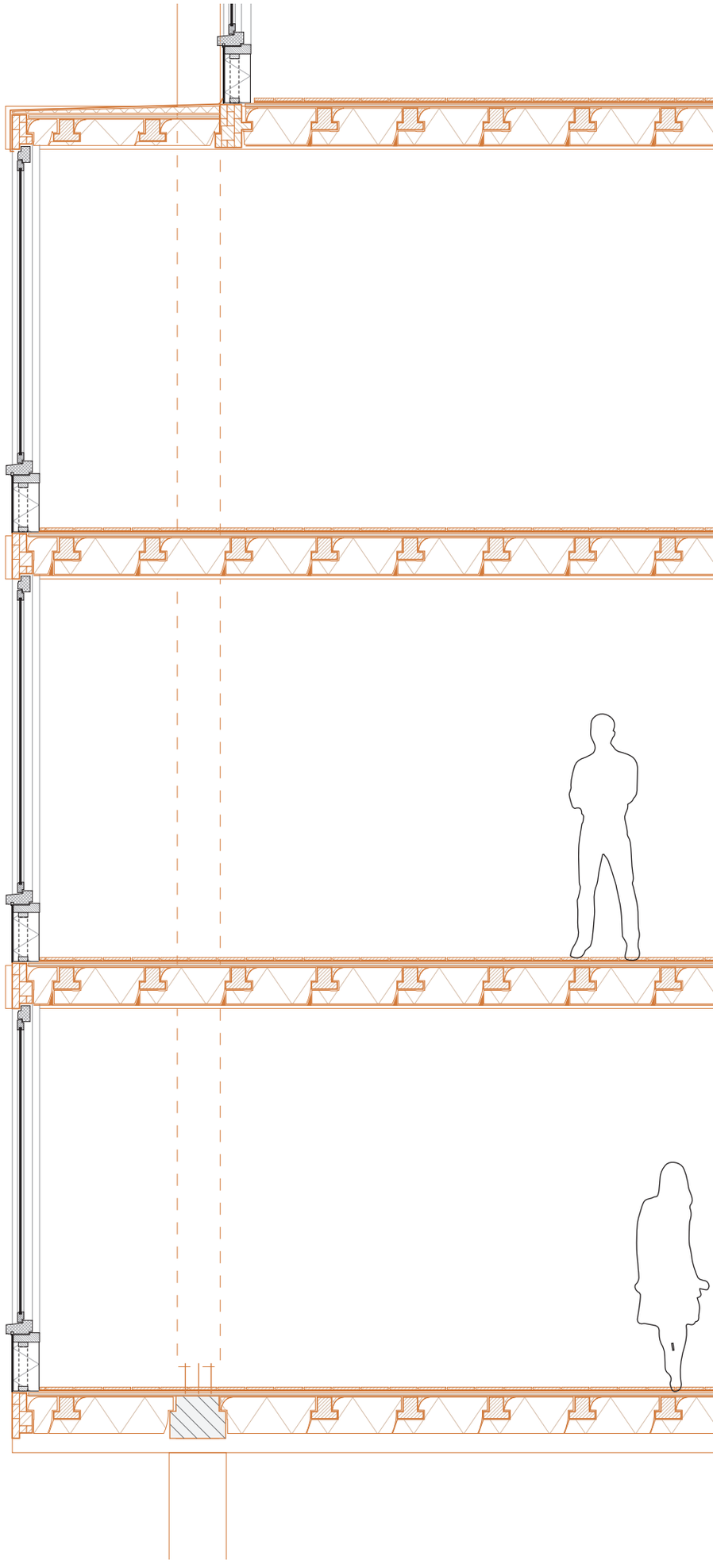
Lower fragment 1:20; scaled to 1:40
Zooming in to the lower fragment, the floor build-up and the different facades become visible. The floor consists of wooden eucalyptus beams, spaced 600mm apart, with hempcrete blocks in between, laid on top of the beams. There is a wooden deck of eucalyptus planks to span between the beams, a rubber layer is laid above and a eucalyptus plank finishes the floor built-up. The rubber layer both serves as a waterproof layer (outside), and once it is inside, it serves as acoustically insulator, mainly for contact sound.

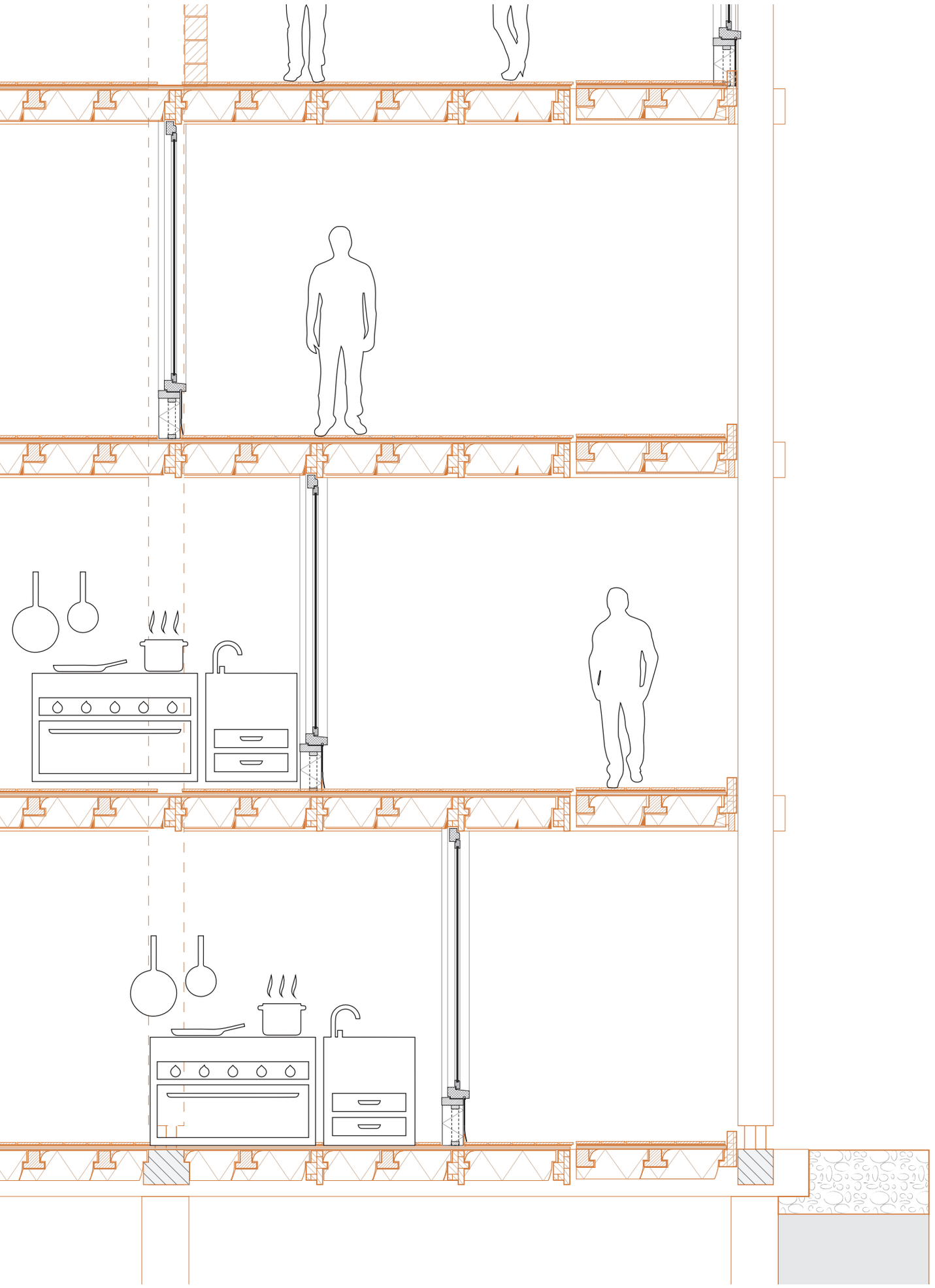
The wooden beams are at specific places varying in size: four bigger beams (glulam) show the optional facade placement: only on these places the facade can be put. Thus, there are limited options for the depth of the apartment. This is shown most clearly on the ceiling, where the glulam beam sticks out and the facade can be attached to.

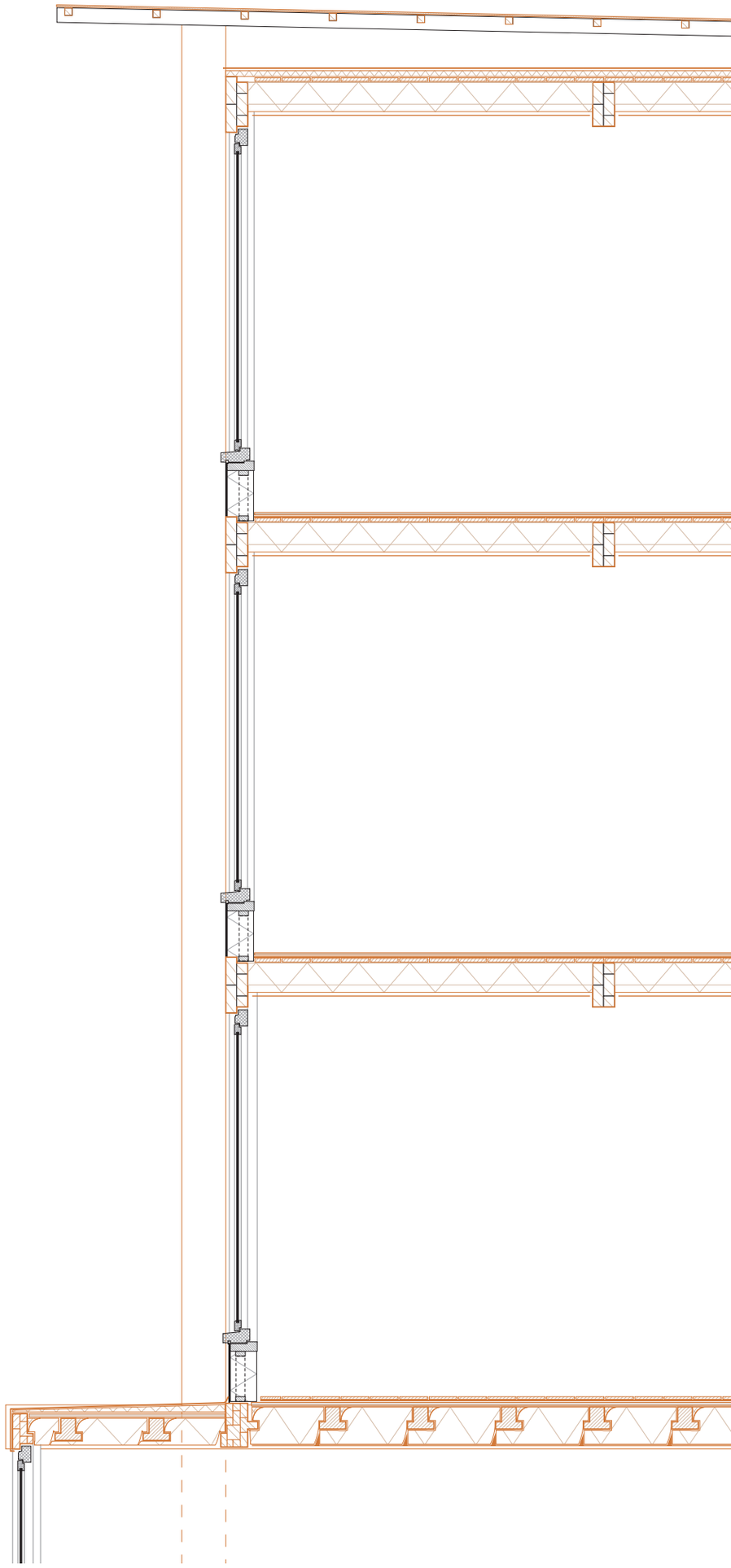
The glulam beams are cutting through the hempcrete insulation, and thus through the fire safety. The glulam beams are oversized, therefore allowing for a carbon layer to be formed and therefore they are fire resistant as well. The rubber layer on top prevents contact sound directly cutting through the floor at these spots.

The construction of the gallery is seperated from the floor. Since it is much more exposed to rainwater, it is sloped so that rainwater can runoff easily. Also, this makes it clear what the maximum depth of the apartment unit is.

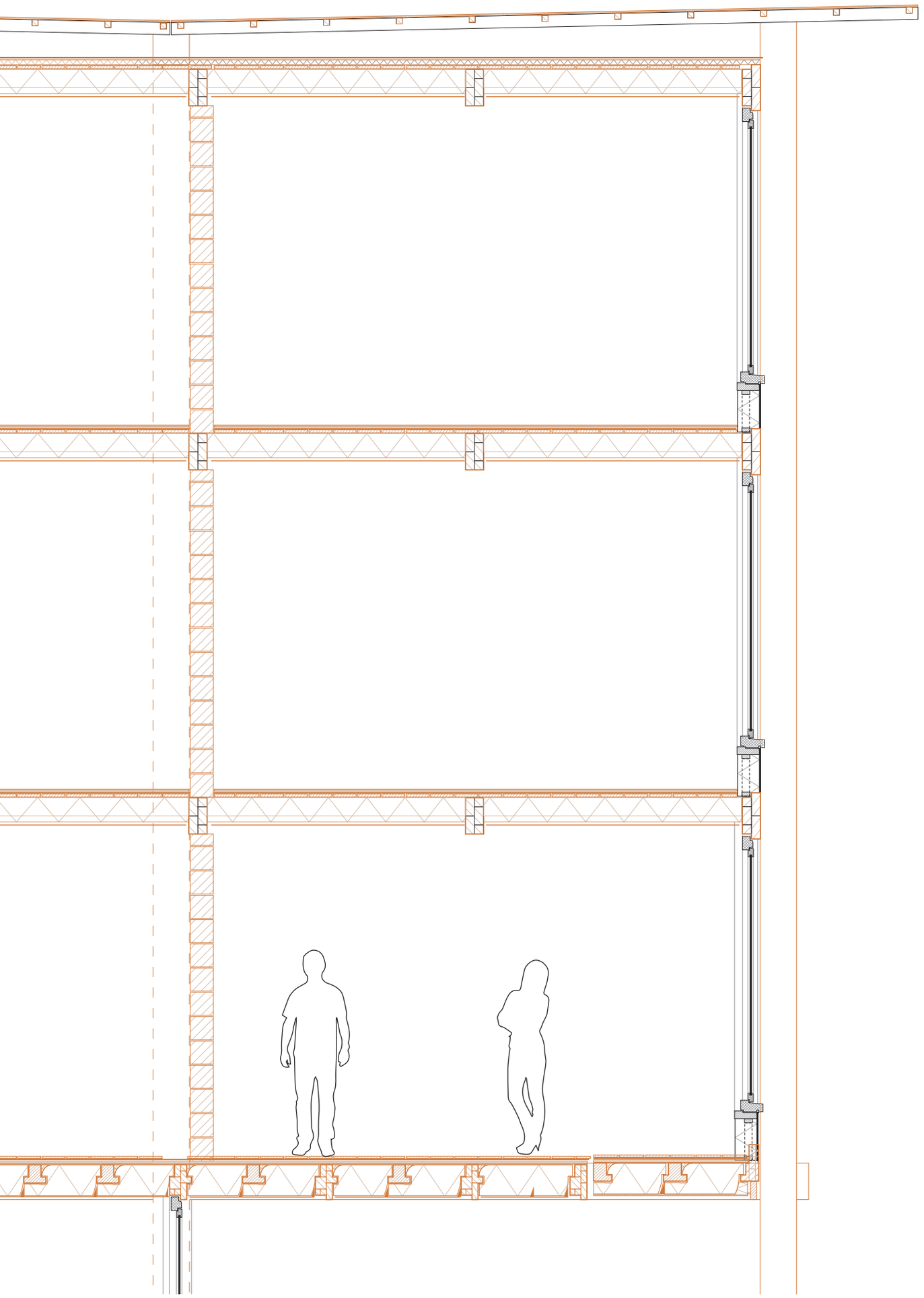
The foundation is built in concrete.

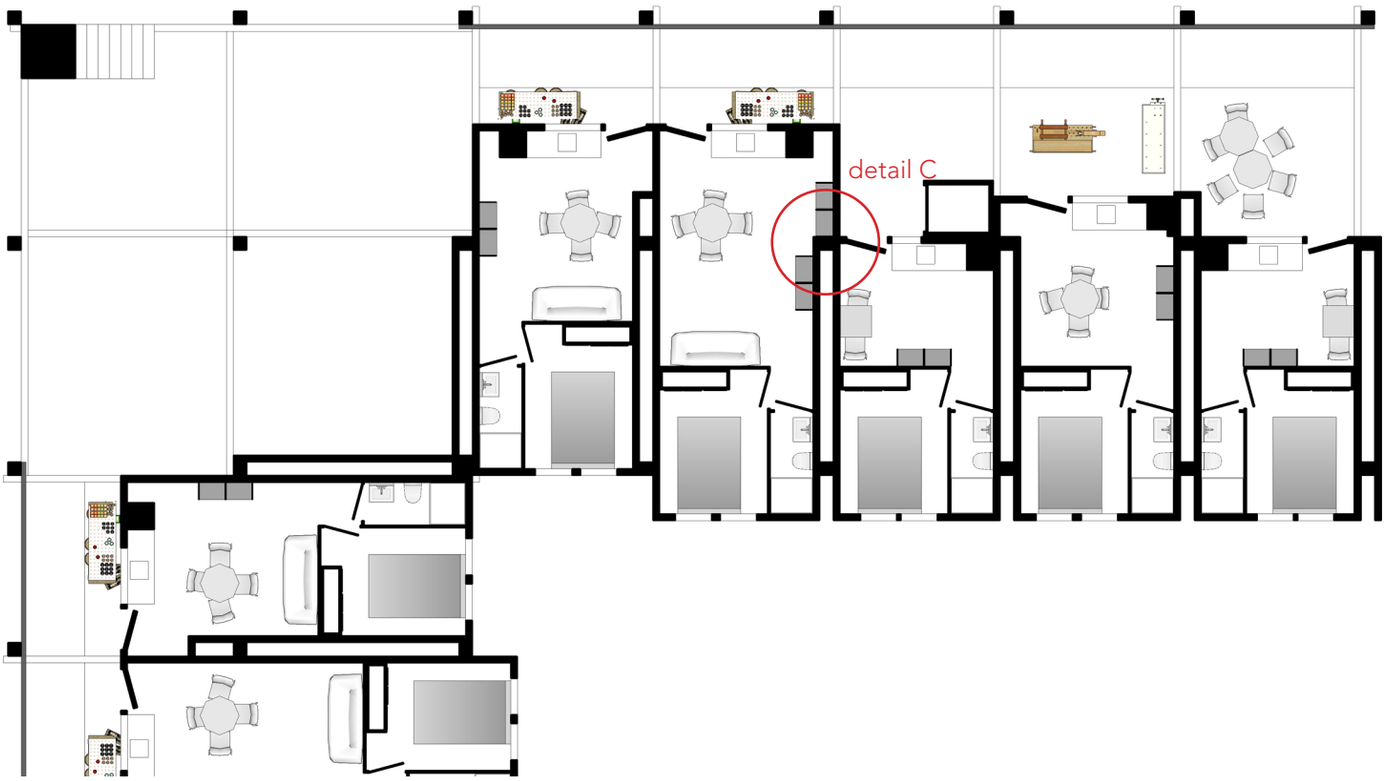






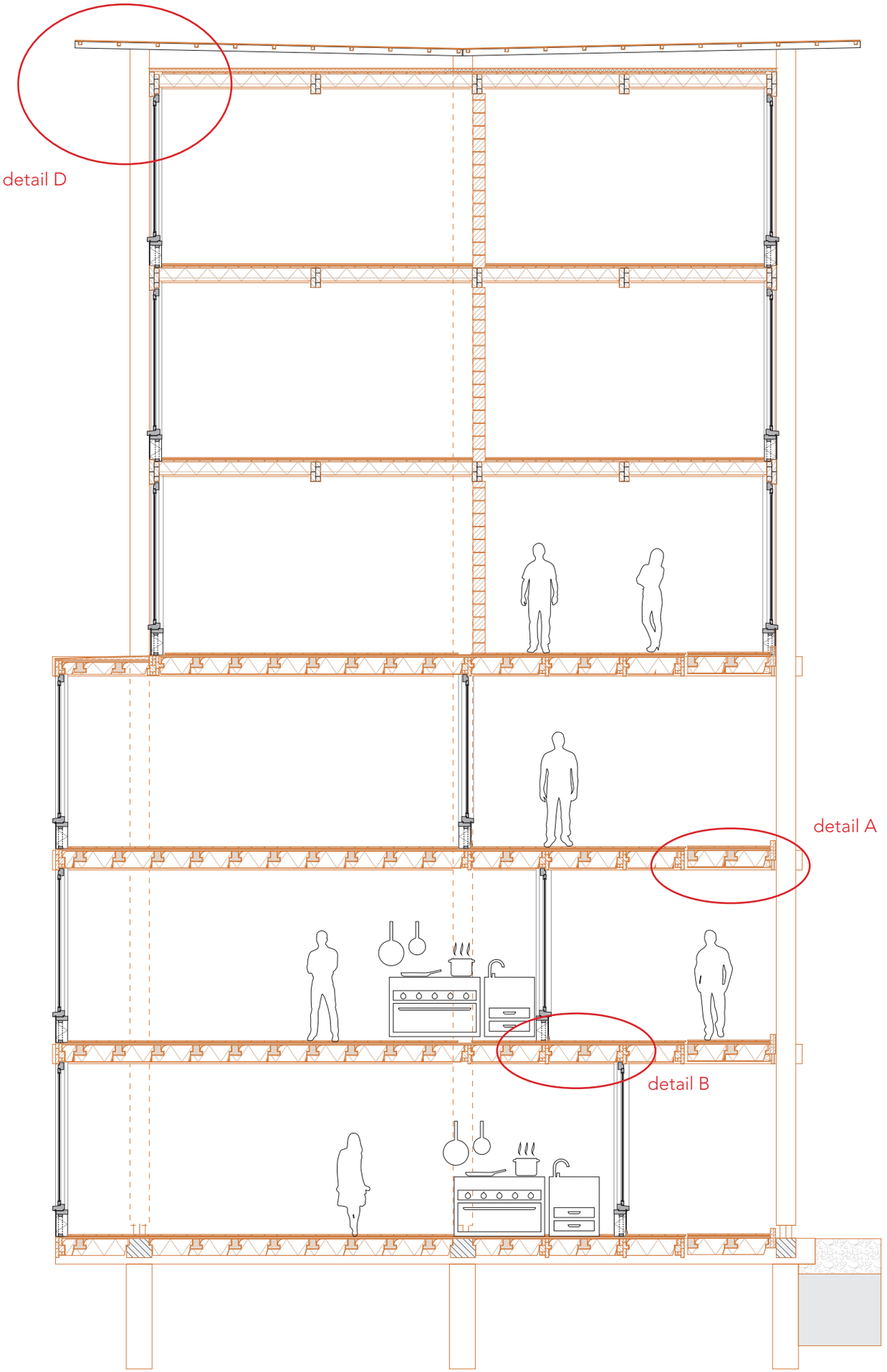
Upper fragment 1:20; scaled to 1:40
For the upper fragment, the floor beams change direction along with the apartments. They span in the other direction here. There is a glulam beam that supports the dwelling dividing wall. Otherwise, the same principle of the lower floor also applies on these floor, while 90 degrees rotated: eucalyptus beams, 600mm apart, with hempcrete blocks in between. A three piece layer of eucalyptus planks, rubber layer and eucalyptus plank finish on top.

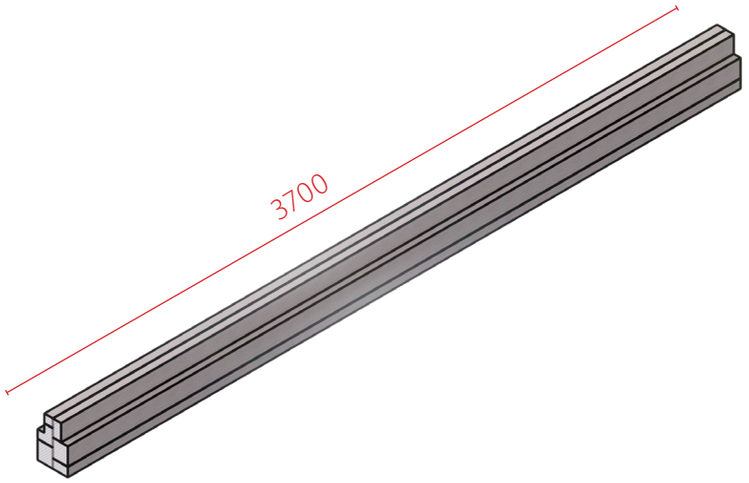


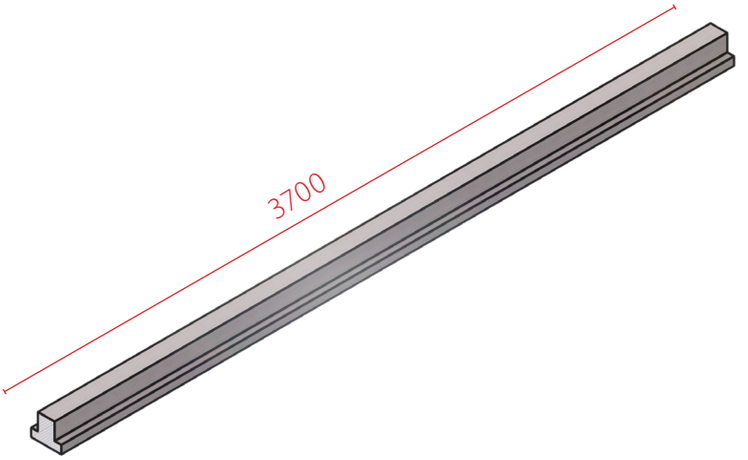


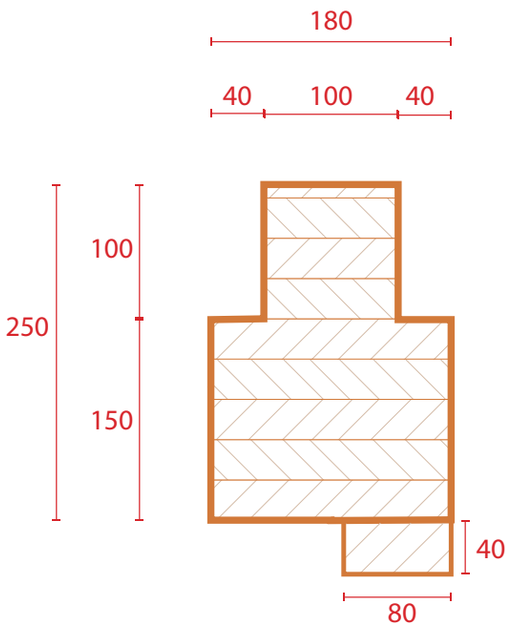
Details

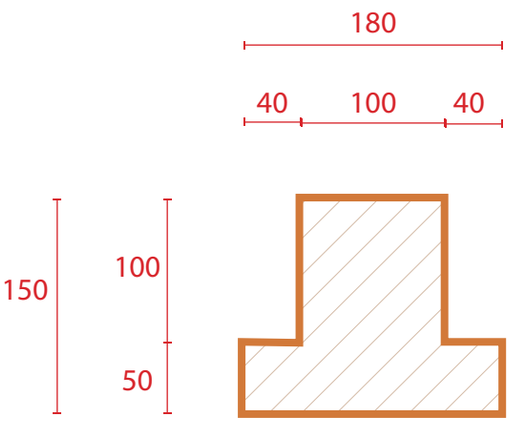
In this section, several parts of the building are shown in detail. Detail A shows the floor connection to the gallery, as a vertical detail. Detail B shows the floor continuity and the facade placement., including different option for the facade, depending on individual possibility and preference. Detail C shows the dwelling dividing wall, the shaft and the part that can be built by the dwellers themselves, both as a horizontal and vertical detail. Detail D shows the roof.


detail D
detail A
detail B





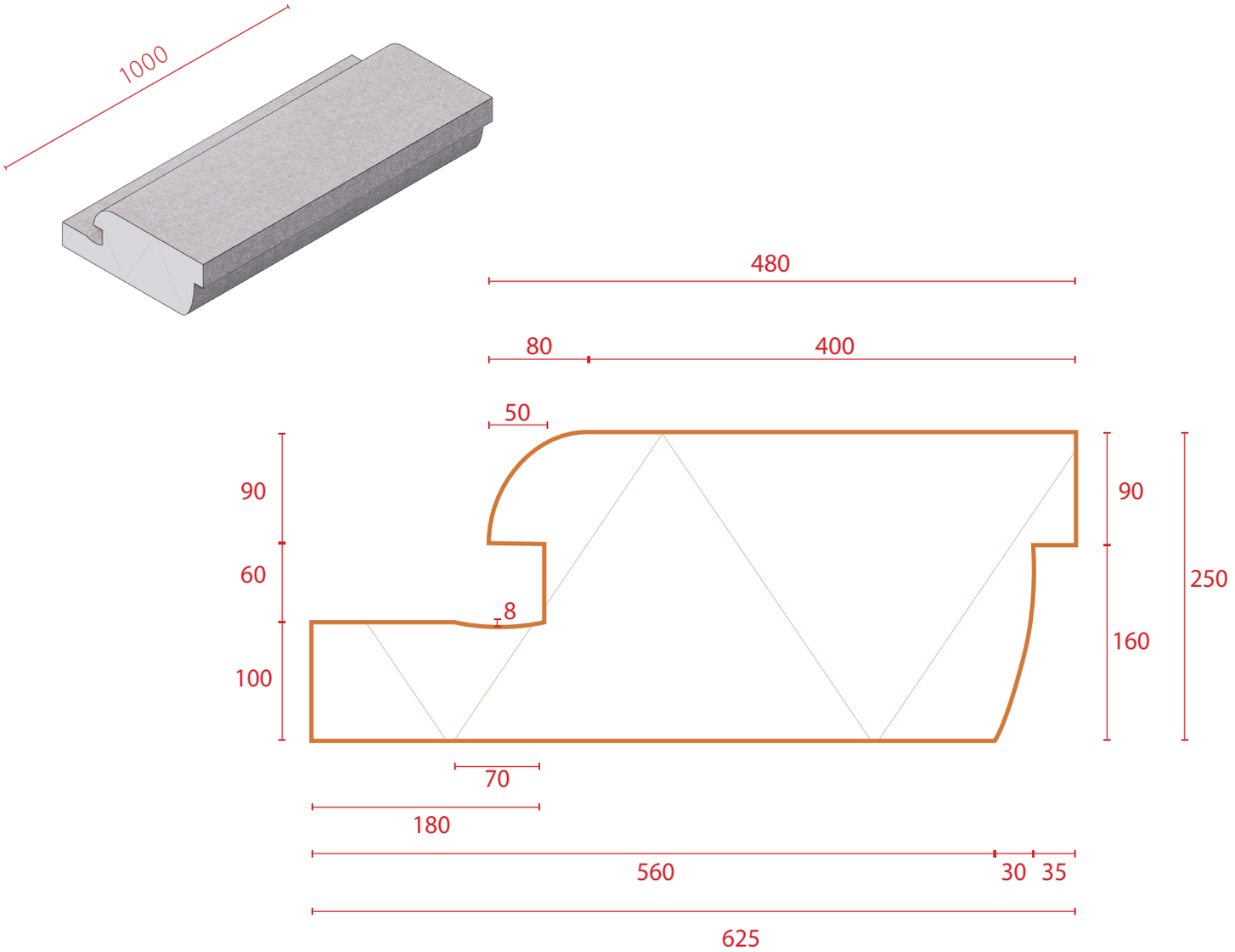




Floor - wooden beams

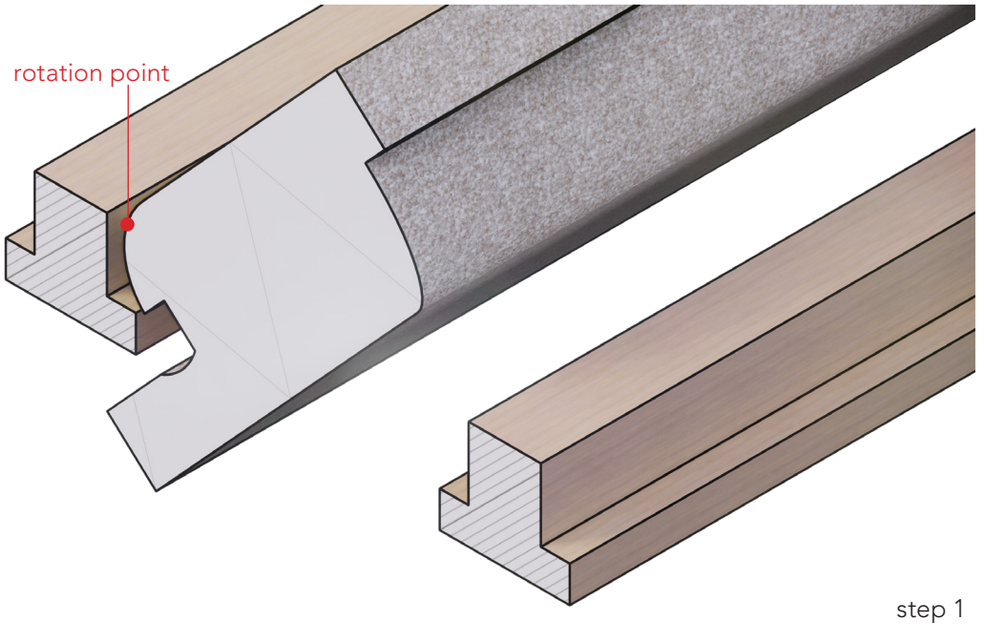
The floors are made of two materials: eucalyptus wood for the structural part, and hempcrete for the insulation. For the wooden beams, there are two options: a normal eucalyptus beam, or a glulam eucalyptus beam. The glulam eucalyptus beam is especially made so that people can build their facades on top of it: it is higher and therefore stands out at the bottom, so people know where to put their frame. Also, it is oversized for fire safety.

On the bottom of the glulam beam, and extra strip of eucalyptus wood is attached. This strip of wood gives a clear localisation where the facade can be place and makes it easy to attach the facade to the ceiling.

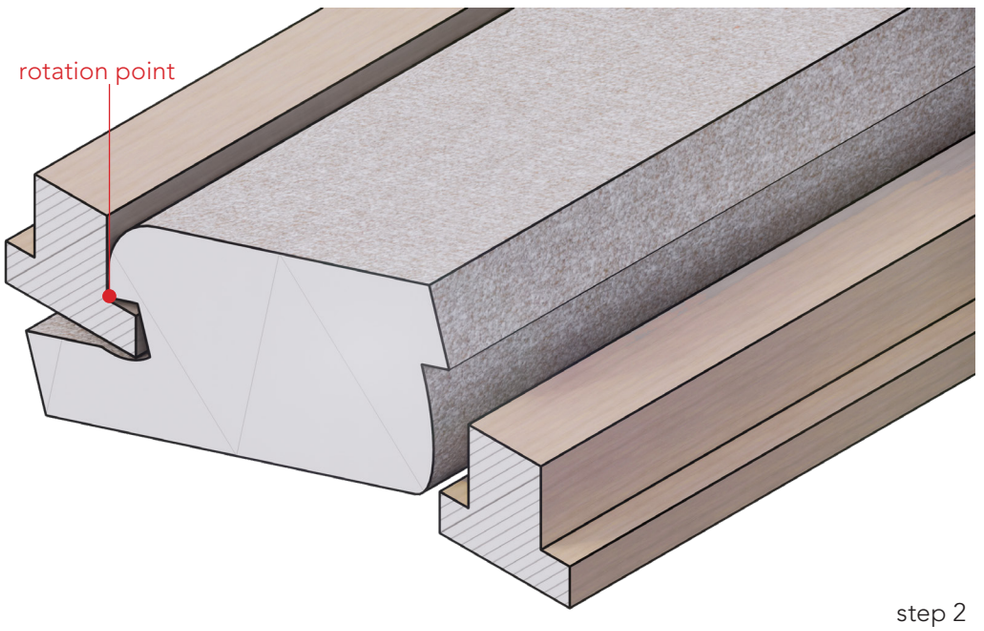


Floor - hempcrete blocks

The fire and acoustic (airborne sound insulation) is ensured by hempcrete, prefabricated blocks.



step 1



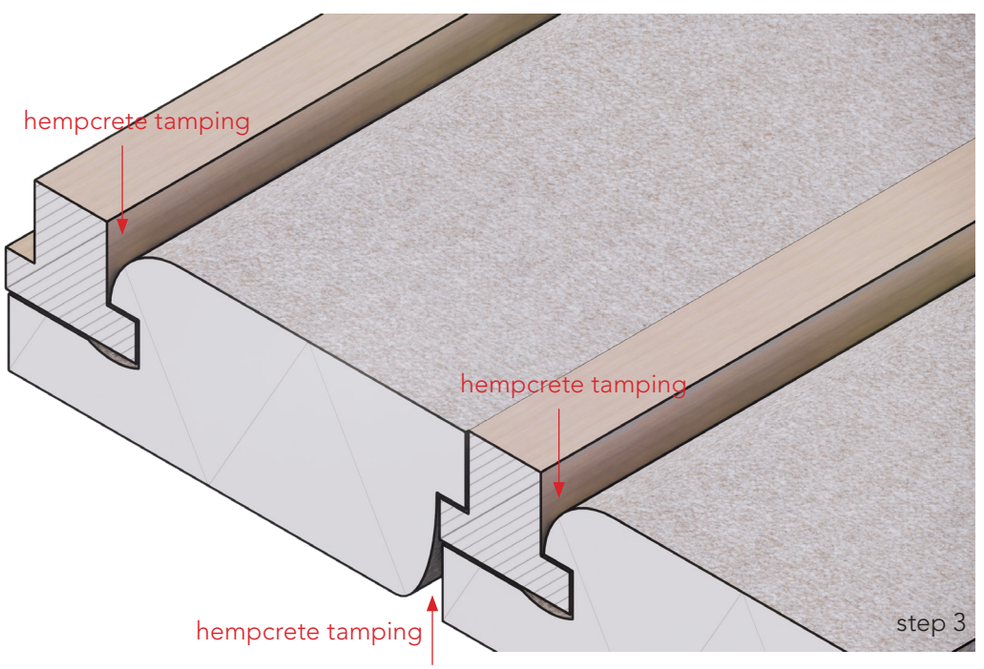
step 2

Floor - construction

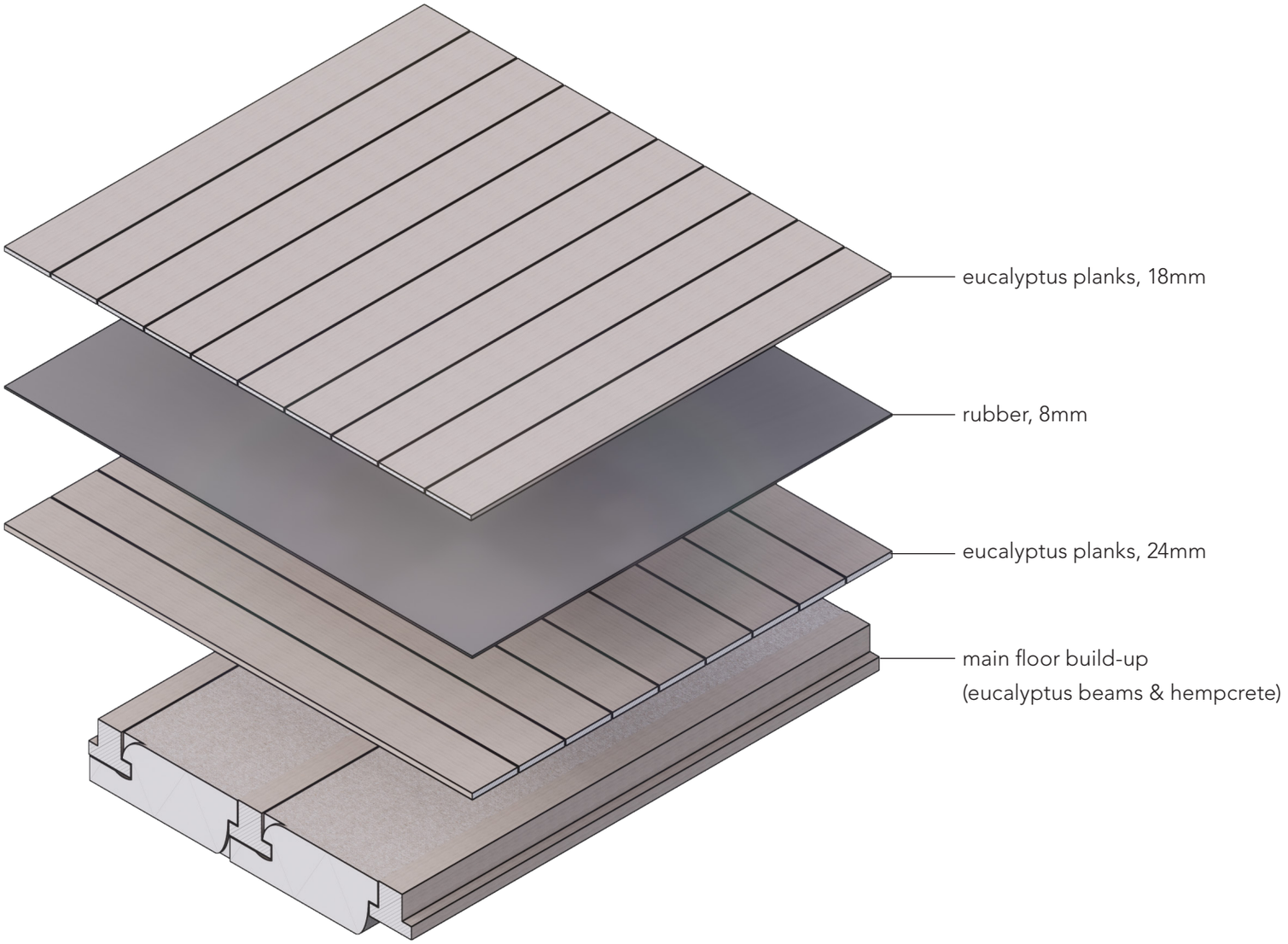
The hempcrete has several rounded edges to ensure that it can be placed in between the beam structure. It is pushed in, and rotated so that it can lay on the edges of the beams, and continues underneath to ensure fire safety and acoustic insulation.

The gaps that appear because of these rounded edges are later filled with hempcrete (in-situ tamping), to ensure a full coverage of the insulation material and a plain ceiling.

In the case of the glulam eucalyptus beams, which have an extended height, the same blocks are used, but the left underneath part is simply cut off. The oversized glulam also ensures fire safety insulation.

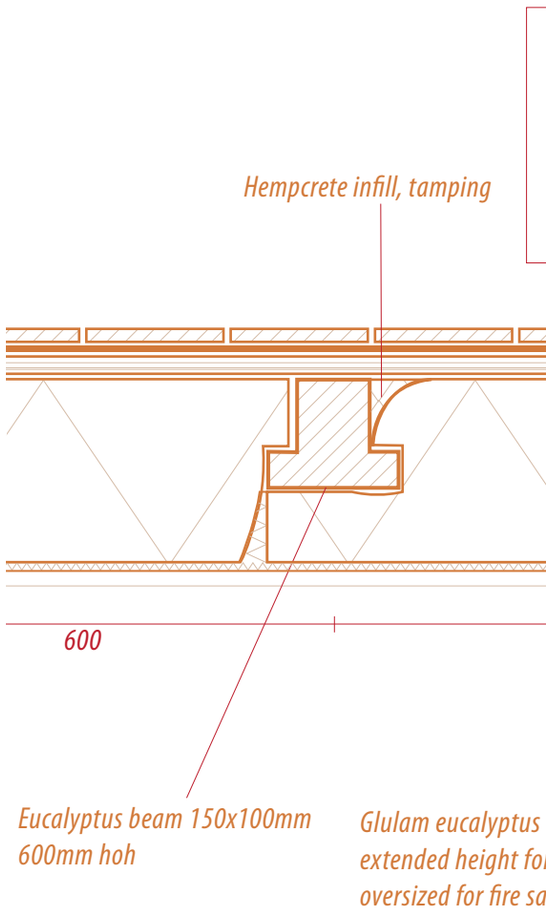


step 3



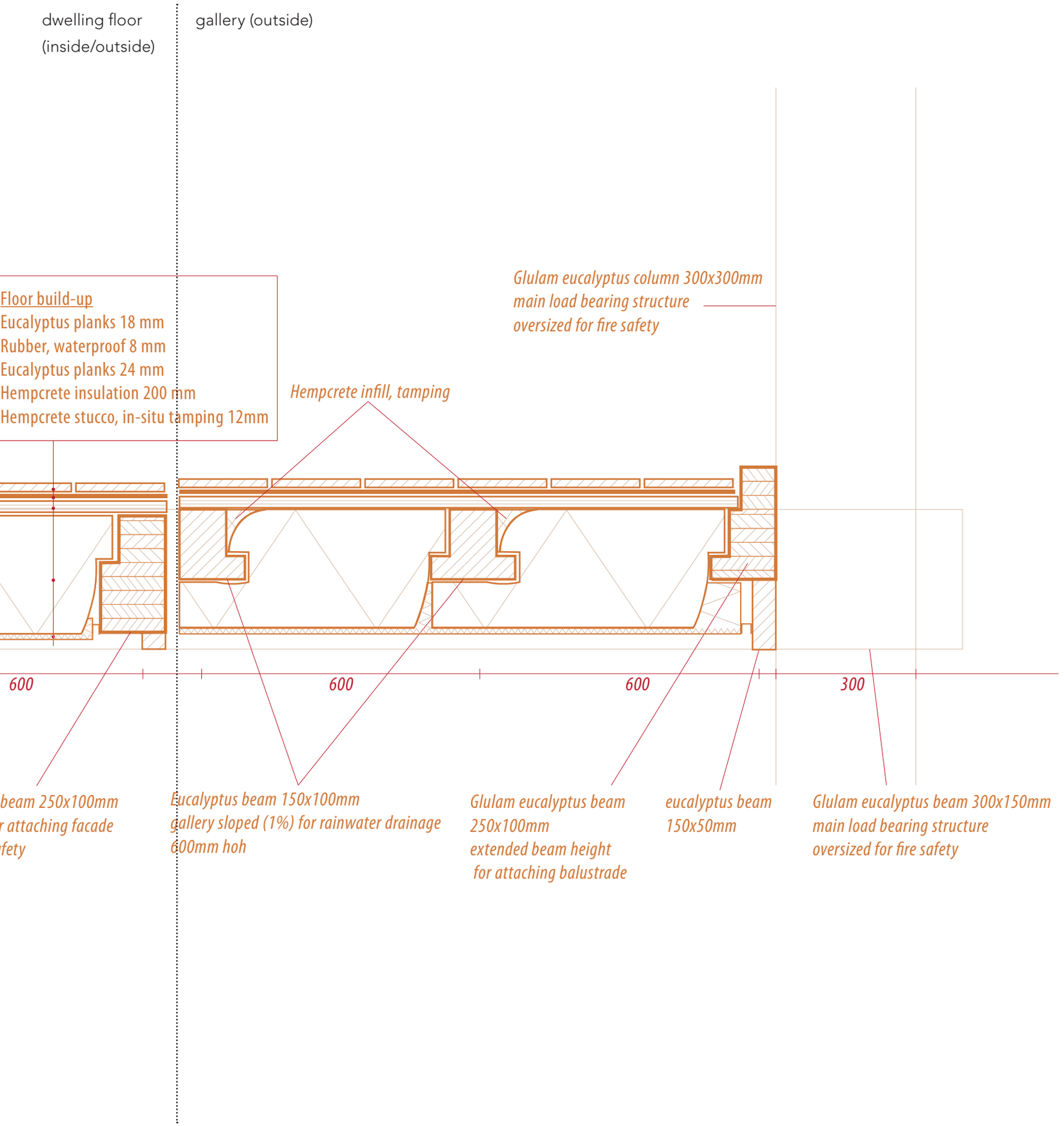
Floor - deck

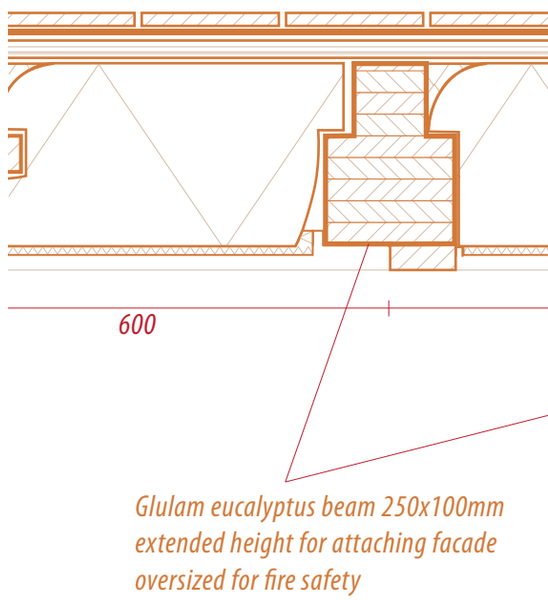
The deck of the floor is made up of three layers and two materials: eucalyptus planks and a rubber layer.



Detail A - 1:10

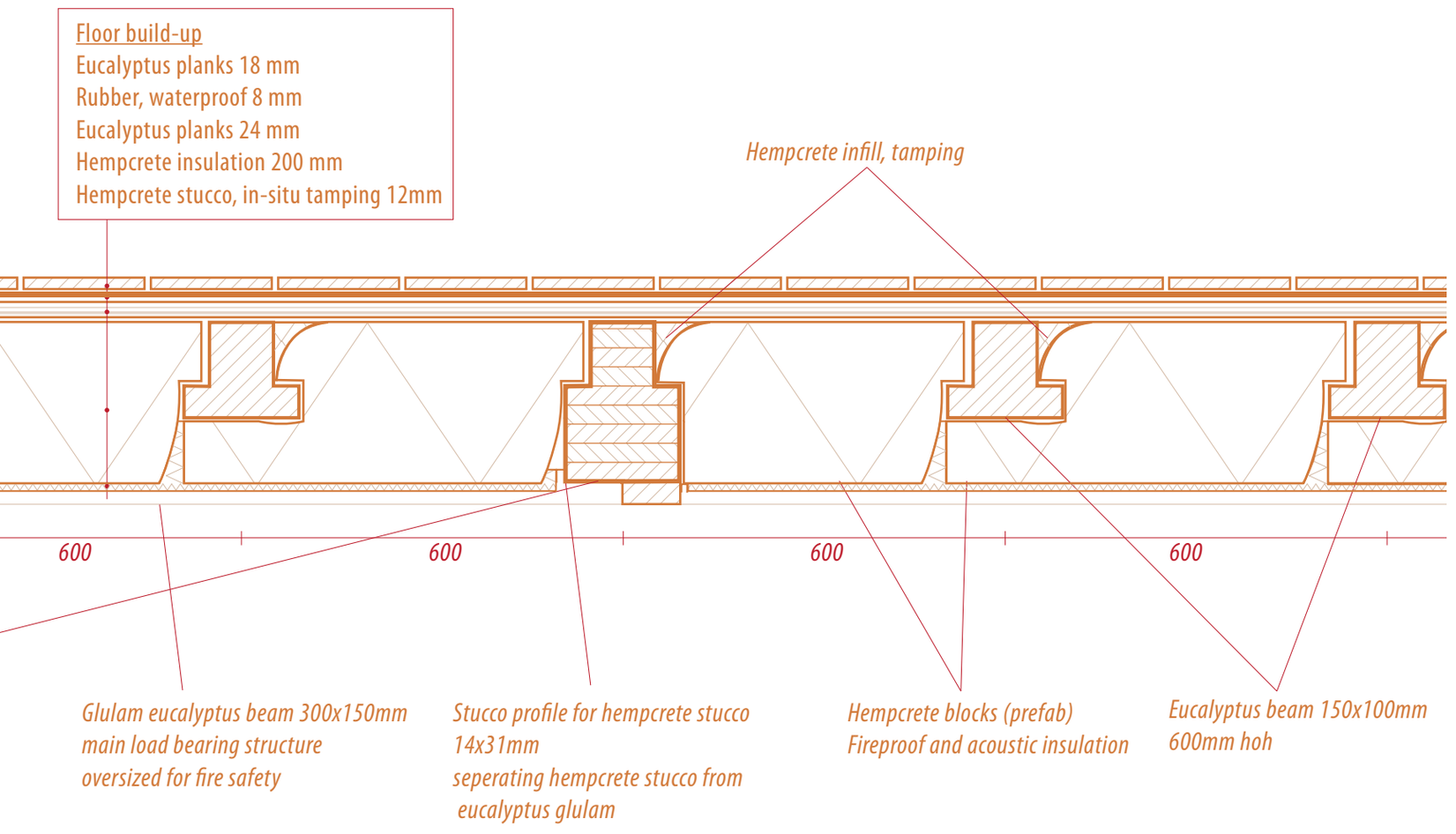
On the right hand the gallery is shown, closest to the exterior. The left part is the floor where people can build their dwellings on. These are seperated, so to make clear until where people can build, but also because the gallery floor is sloped (due to its proximity to the exterior).

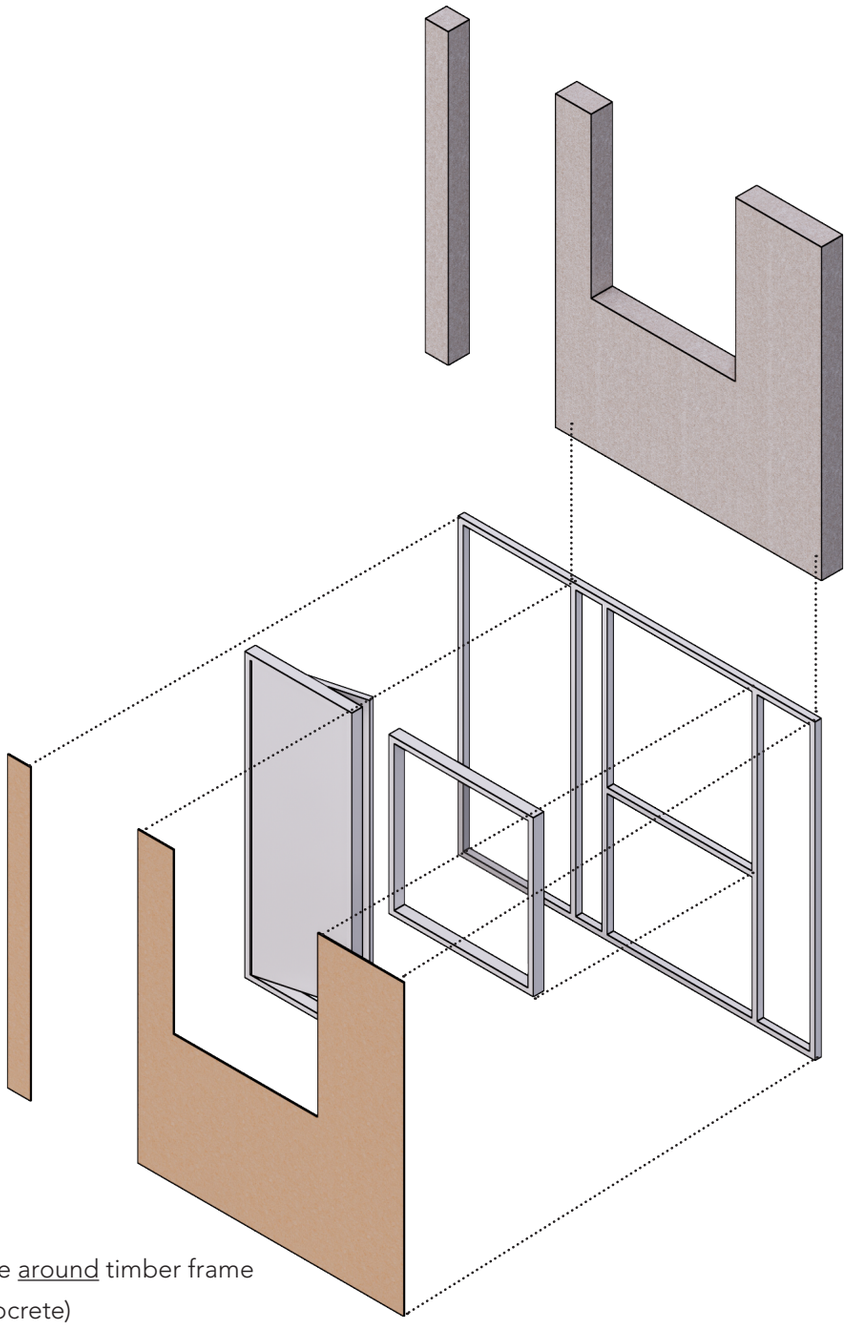

dwelling floor
(inside/outside)
gallery (outside)
Floor build-up
Eucalyptus planks 18 mm
Rubber, waterproof 8 mm
Eucalyptus planks 24 mm
Hempcrete insulation 200 mm
Hempcrete stucco, in-situ tamping 12mm
Glulam eucalyptus column 300x300mm
main load bearing structure
oversized for fire safety
Hempcrete infill, tamping
600
600
600
300
beam 250x100mm
r attaching facade
fety
Eucalyptus beam 150x100mm
gallery sloped (1%) for rainwater drainage
600mm hoh
Glulam eucalyptus beam
250x100mm
extended beam height
for attaching balustrade
eucalyptus beam
150x50mm
Glulam eucalyptus beam 300x150mm
main load bearing structure
oversized for fire safety



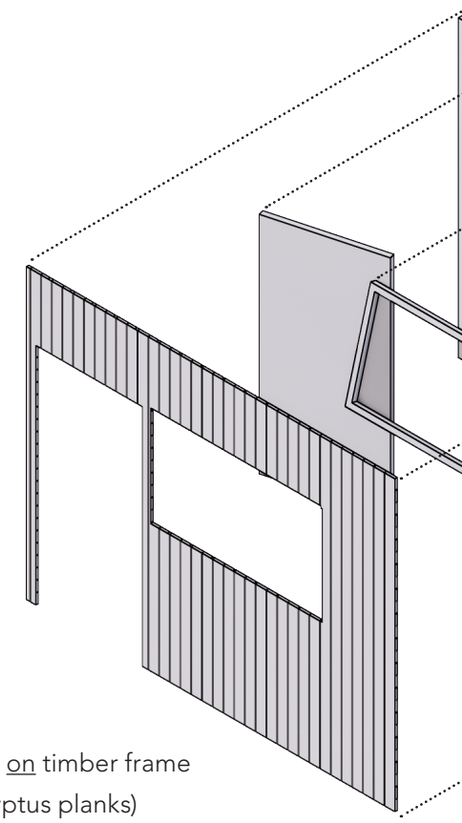
Detail B - 1:10

The floor where people can build their own dwellings on, has larger glulam eucalyptus beams at several places. These are the spots where people can build their facade on. This is clearly visible at the ceiling, but hidden from the floor. By taking a plank out, the facade can also be integrated in the floor.


Floor build-up
Eucalyptus planks 18 mm
Rubber, waterproof 8 mm
Eucalyptus planks 24 mm
Hempcrete insulation 200 mm
Hempcrete stucco, in-situ tamping 12mm
Hempcrete infill, tamping
600
600
600
600
Glulam eucalyptus beam 300x150mm
main load bearing structure
oversized for fire safety
Stucco profile for hempcrete stucco
14x31mm
seperating hempcrete stucco from
eucalyptus glulam
Hempcrete blocks (prefab)
Fireproof and acoustic insulation
Eucalyptus beam 150x100mm
600mm hoh



facade around timber frame
(hempcrete)



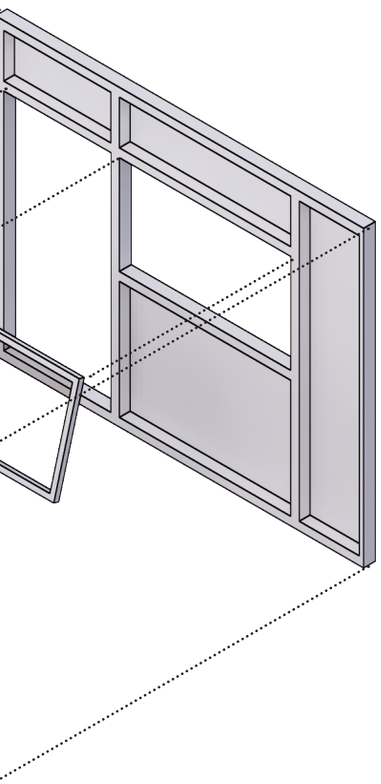
facade on timber frame
(eucalyptus planks)

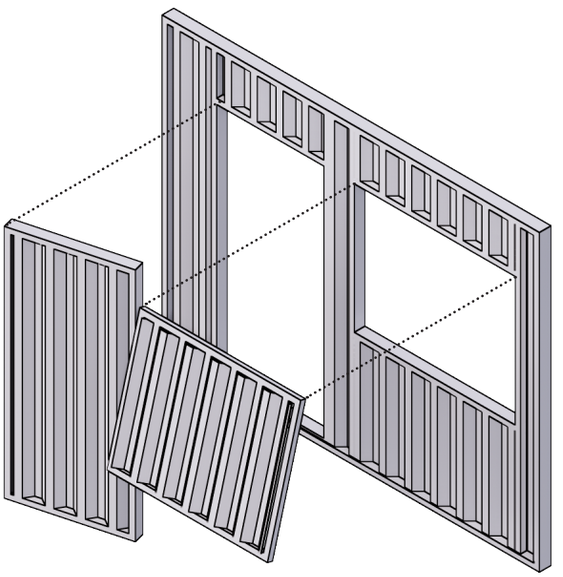
Toolbox - facade options

There are different options for the facade, depending on peoples preference and financial abilities. They all, however, depend on a timber frame as structural component. It keeps the structure light, and is easy to use.

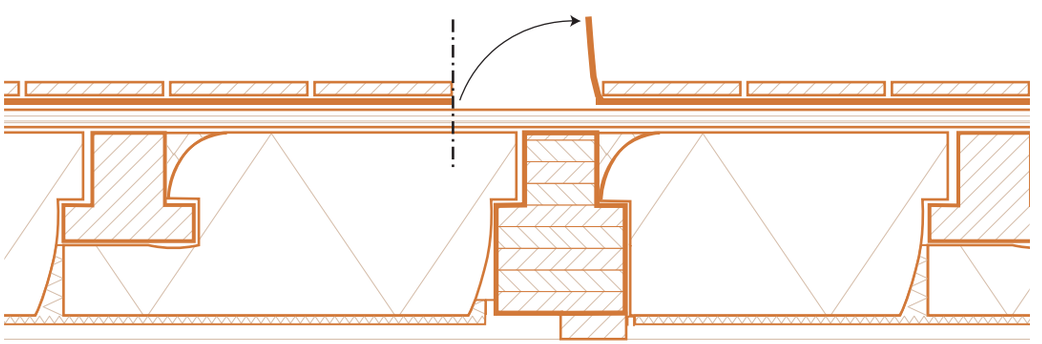
Facade placement

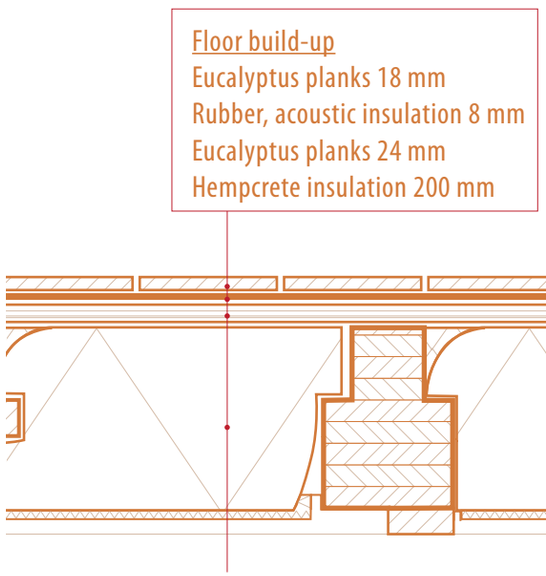
The facade is placed by taking a plank out, cutting the rubber at the inside and bending it outwards, place the timber frame and with it the facade on the glulam beam and at the ceiling against it (so to garanty the right placement, and make it easy to attach).
Then, the rubber can be attached to the facade, and keep the whole waterproof.





facade in timber frame
(corrugated steel)

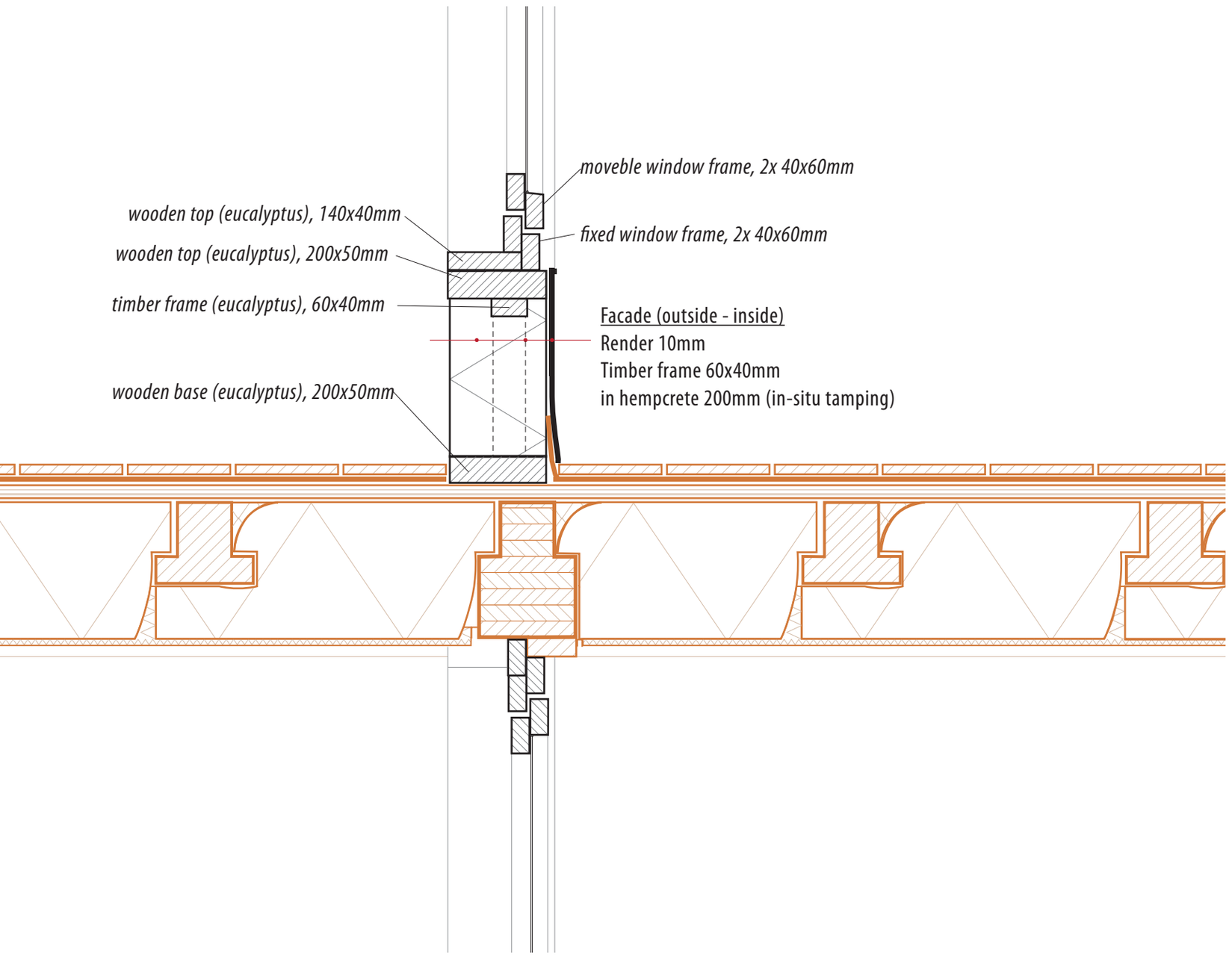




Detail B - 1:10 - option 1

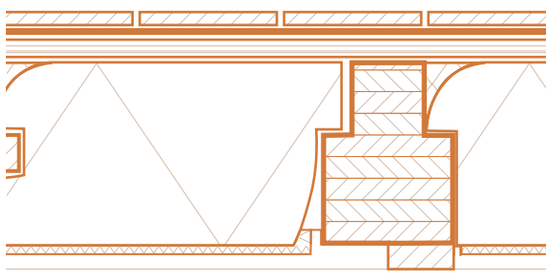
The first option is a hempcrete wall around a timber frame. Hempcrete is a lightweight, easy applicable material. A timber mold can be placed on the floor, a timber frame inside it, where the hempcrete can be poured into. The window frames are made by attaching two pieces of eucalyptus wood together and attaching the window to it.

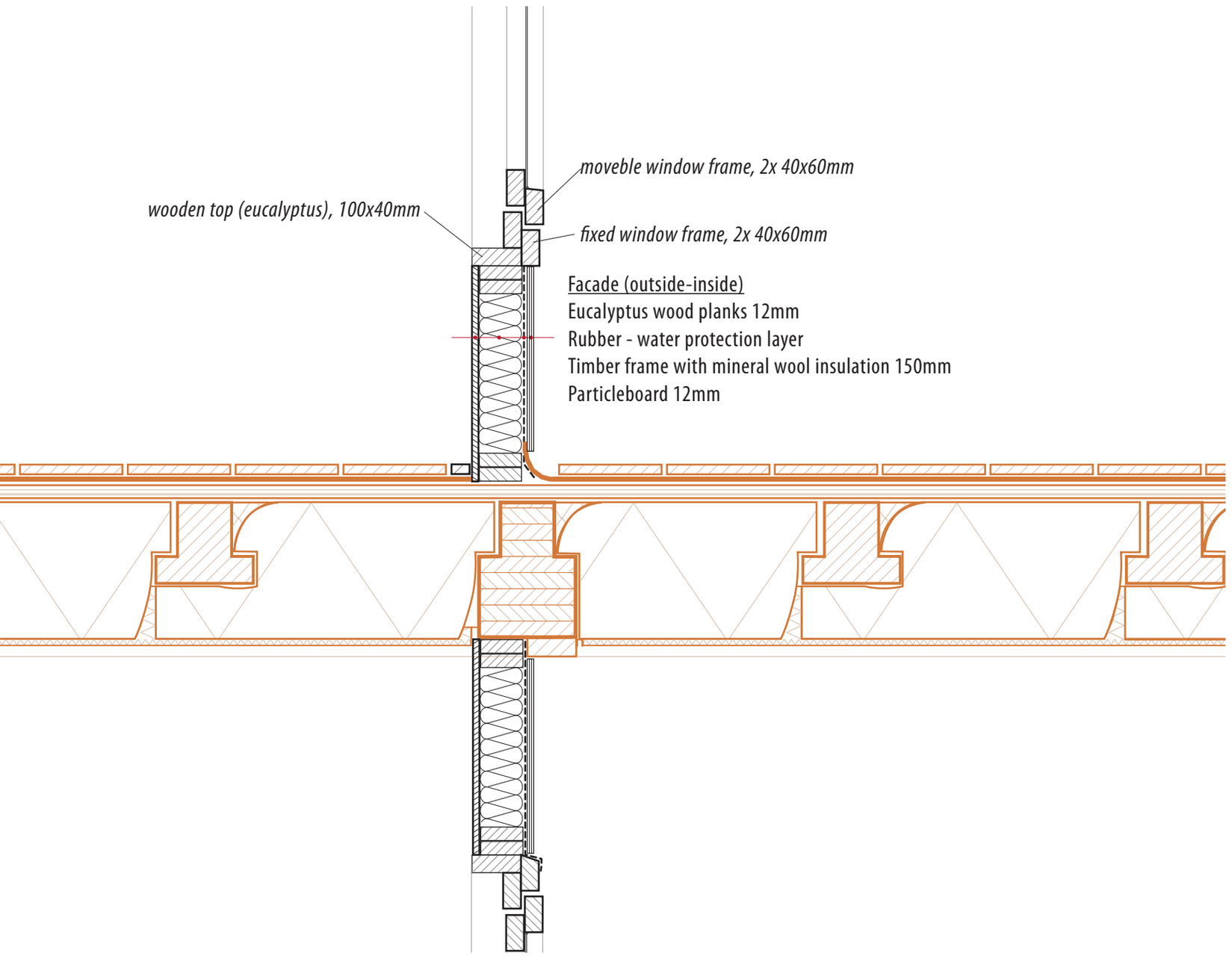
The wall, built with hempcrete, insulates well and is very easy for the inhabitants to build themselves.

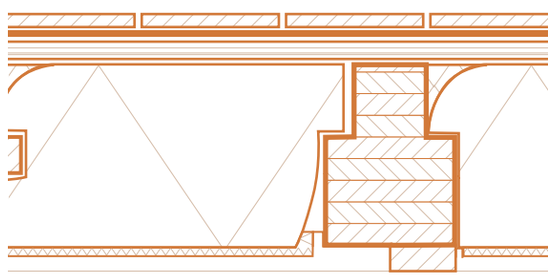

moveble window frame, 2x 40x60mm
wooden top (eucalyptus), 140x40mm
fixed window frame, 2x 40x60mm
wooden top (eucalyptus), 200x50mm
timber frame (eucalyptus), 60x40mm
Facade (outside - inside)
Render 10mm
Timber frame 60x40mm
in hempcrete 200mm (in-situ tamping)
wooden base (eucalyptus), 200x50mm

Detail B - 1:10 - option 2

The second option relies on placing the finish material to a timber frame, creating a timber frame structure, possibly with insulation inside. While being a less common method to Ethiopian people, it gives more flexibility in the finish material of the facade (the wooden planks are easily interchangeable by tiles of any material), and thus can give people more opportunities to identify their building. Depending on personal wishes, this can give extra visibility in the street as well, and thus increase the economic potential of the place.



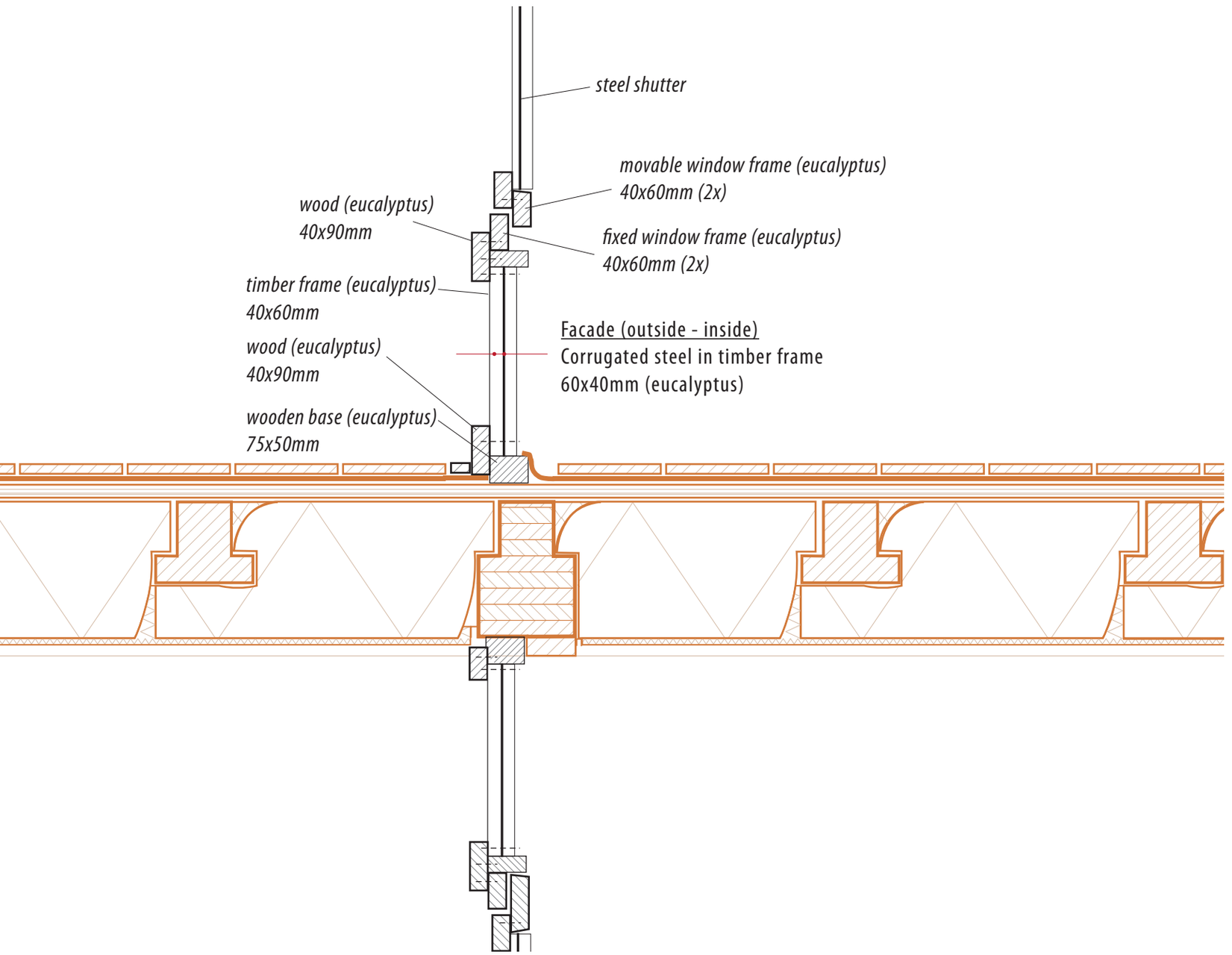

moveble window frame, 2x 40x60mm
wooden top (eucalyptus), 100x40mm
fixed window frame, 2x 40x60mm
Facade (outside-inside)
Eucalyptus wood planks 12mm
Rubber - water protection layer
Timber frame with mineral wool insulation 150mm
Particleboard 12mm

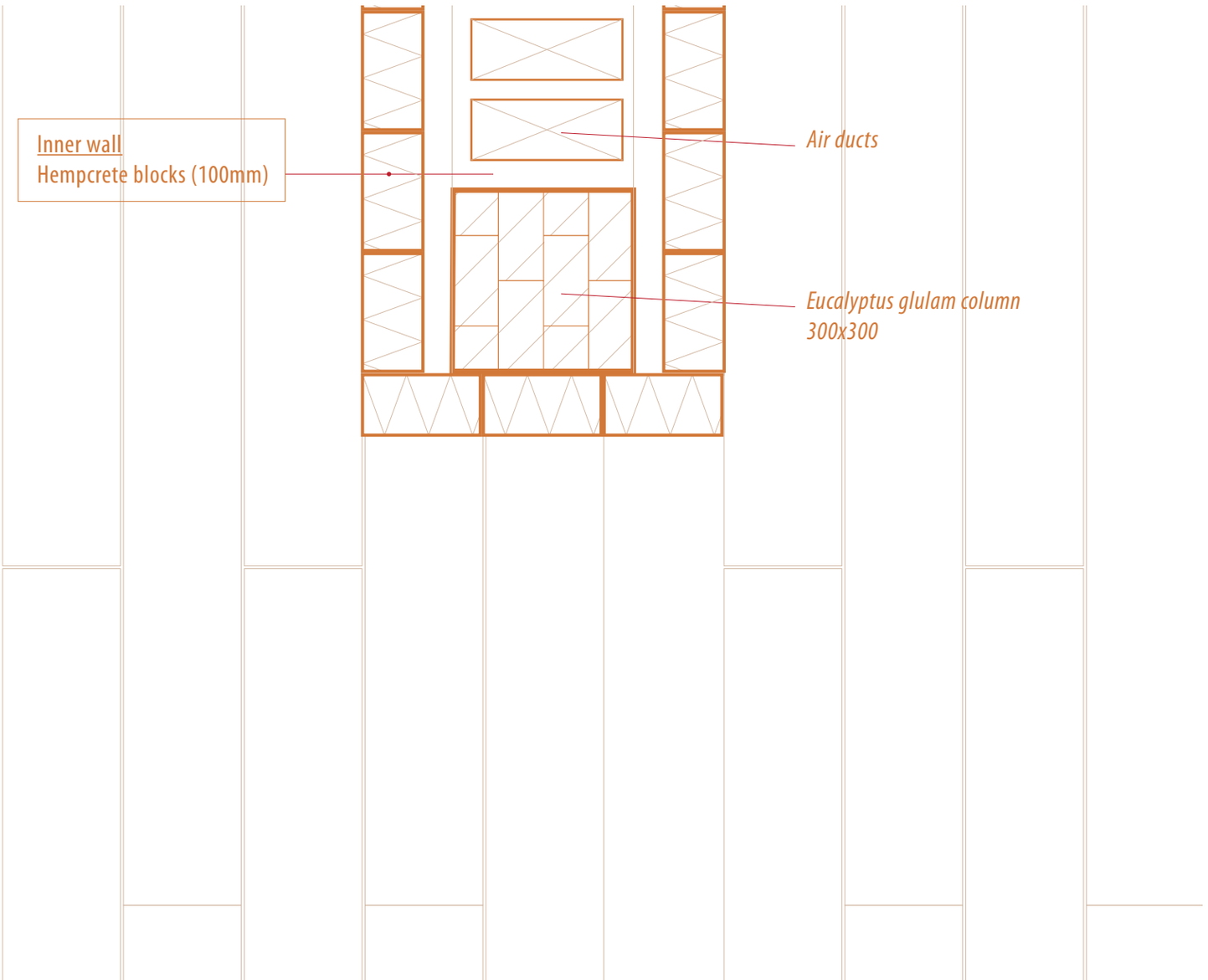


Detail B - 1:10 - option 3

The third option is the absolute cheapest and minimal solution for building a facade. It consists of a timber, with a piece of corrugated steel attached to it. The windows can be made from the same corrugated steel, creating shutter instead of glass windows.

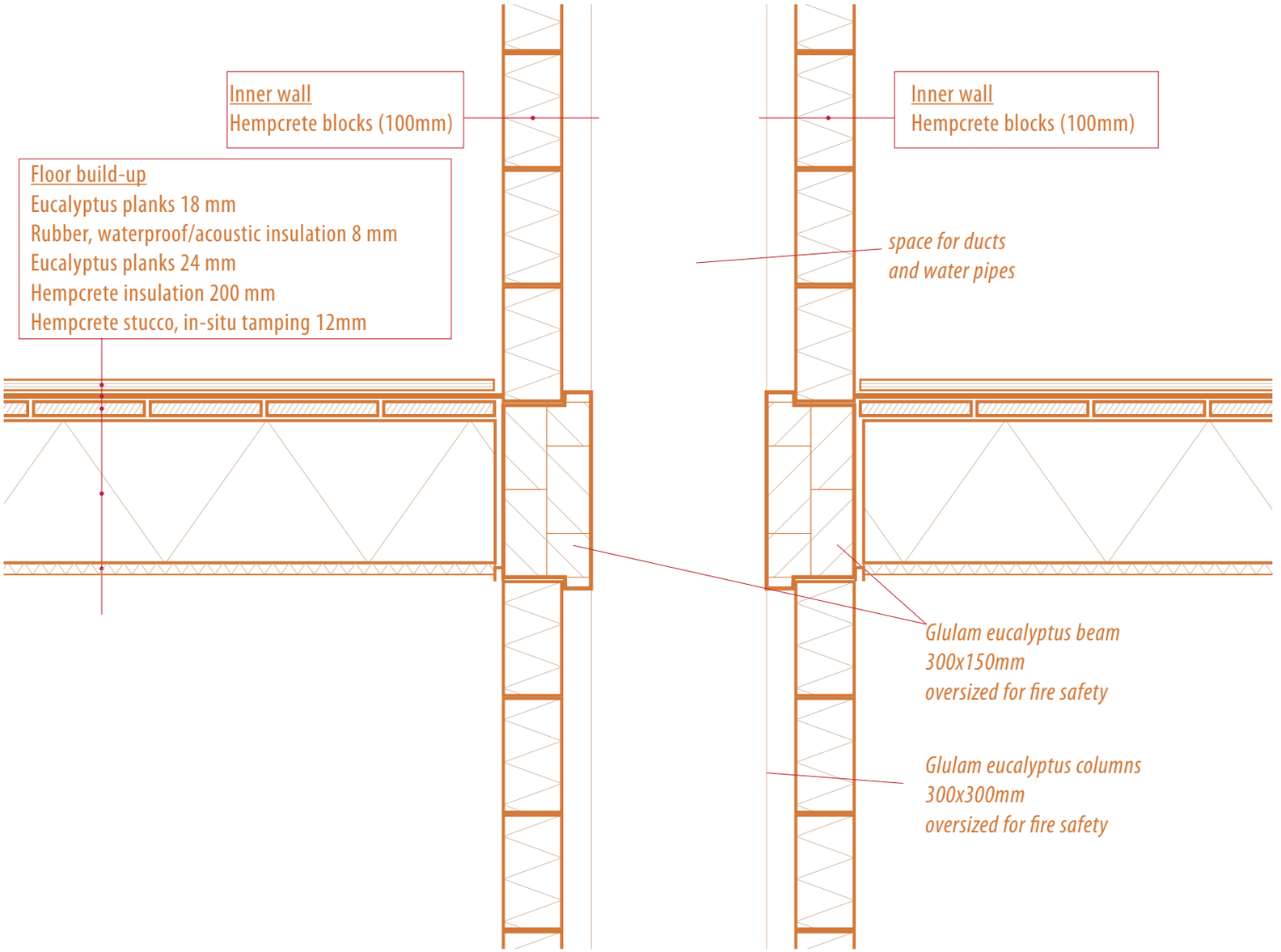
This facade is a temporal solution, on the way to something better, for those who have nothing to spare and start with the minimum. It is easily built, but also easily replaced by something better and more durable.

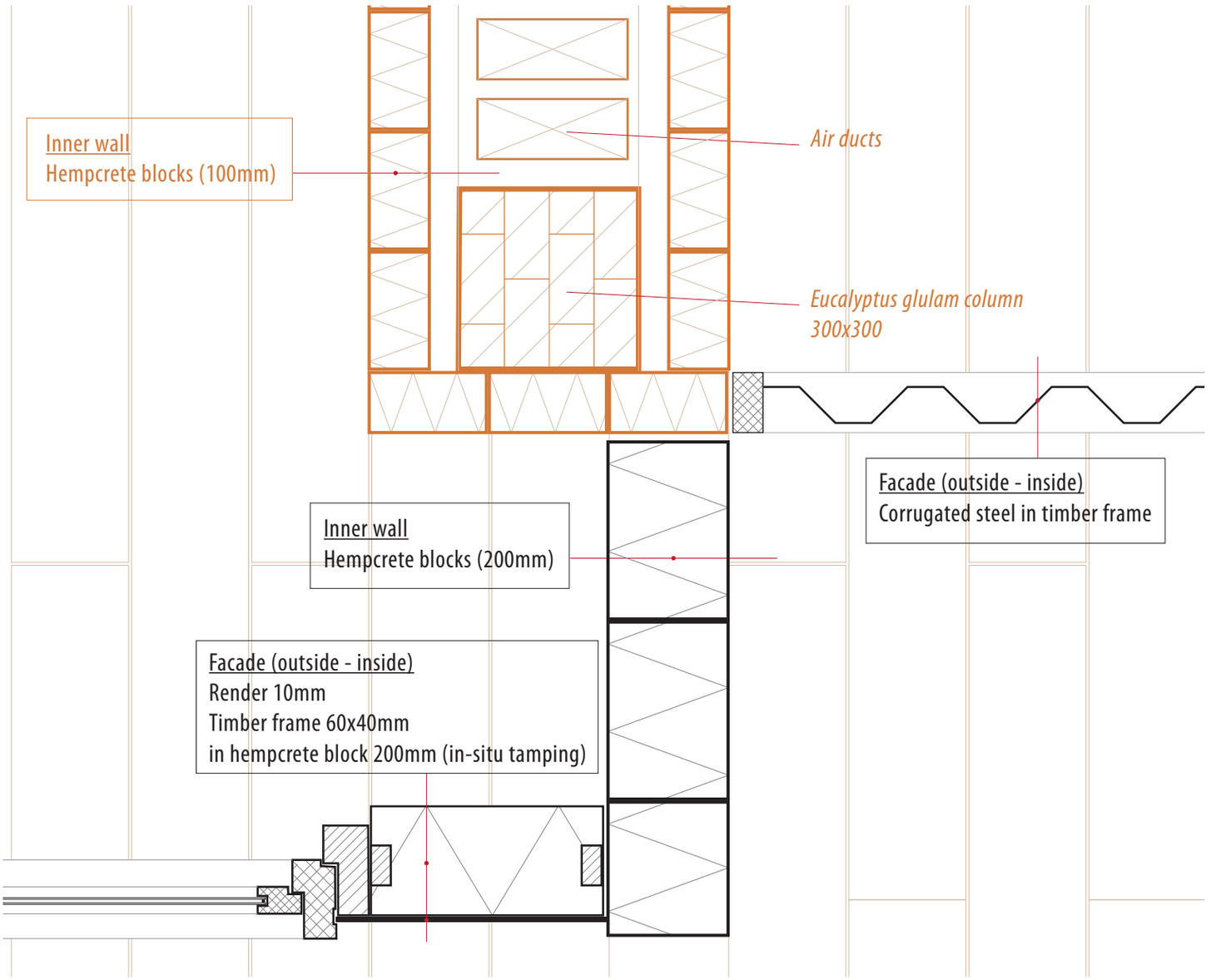

steel shutter
movable window frame (eucalyptus)
40x60mm (2x)
wood (eucalyptus)
40x90mm
fixed window frame (eucalyptus)
40x60mm (2x)
timber frame (eucalyptus)
40x60mm
Facade (outside - inside)
Corrugated steel in timber frame
60x40mm (eucalyptus)
wood (eucalyptus)
40x90mm
wooden base (eucalyptus)
75x50mm



Detail C - 1:10 - with shaft

The rear part of the dwelling dividing wall is prebuilt. It consists of two elements of a hempcrete block wall, with a shaft in between. This shaft is connected to all bathrooms of the dwellings, and runs all the way to the top.

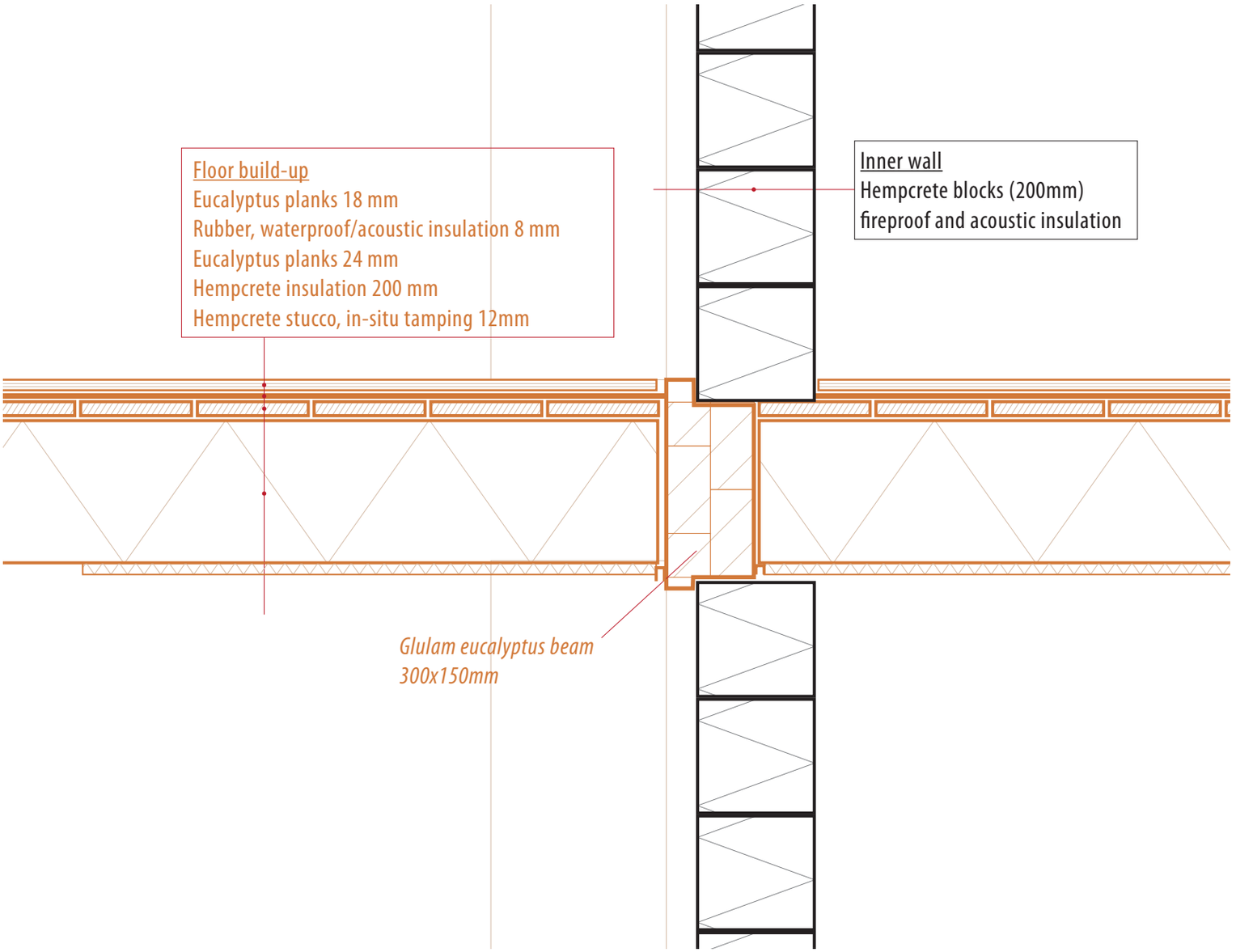

Inner wall
Hempcrete blocks (100mm)
Floor build-up
Eucalyptus planks 18 mm
Rubber, waterproof/acoustic insulation 8 mm
Eucalyptus planks 24 mm
Hempcrete insulation 200 mm
Hempcrete stucco, in-situ tamping 12mm
Inner wall
Hempcrete blocks (100mm)
space for ducts
and water pipes
Glulam eucalyptus beam
300x150mm
oversized for fire safety
Glulam eucalyptus columns
300x300mm
oversized for fire safety

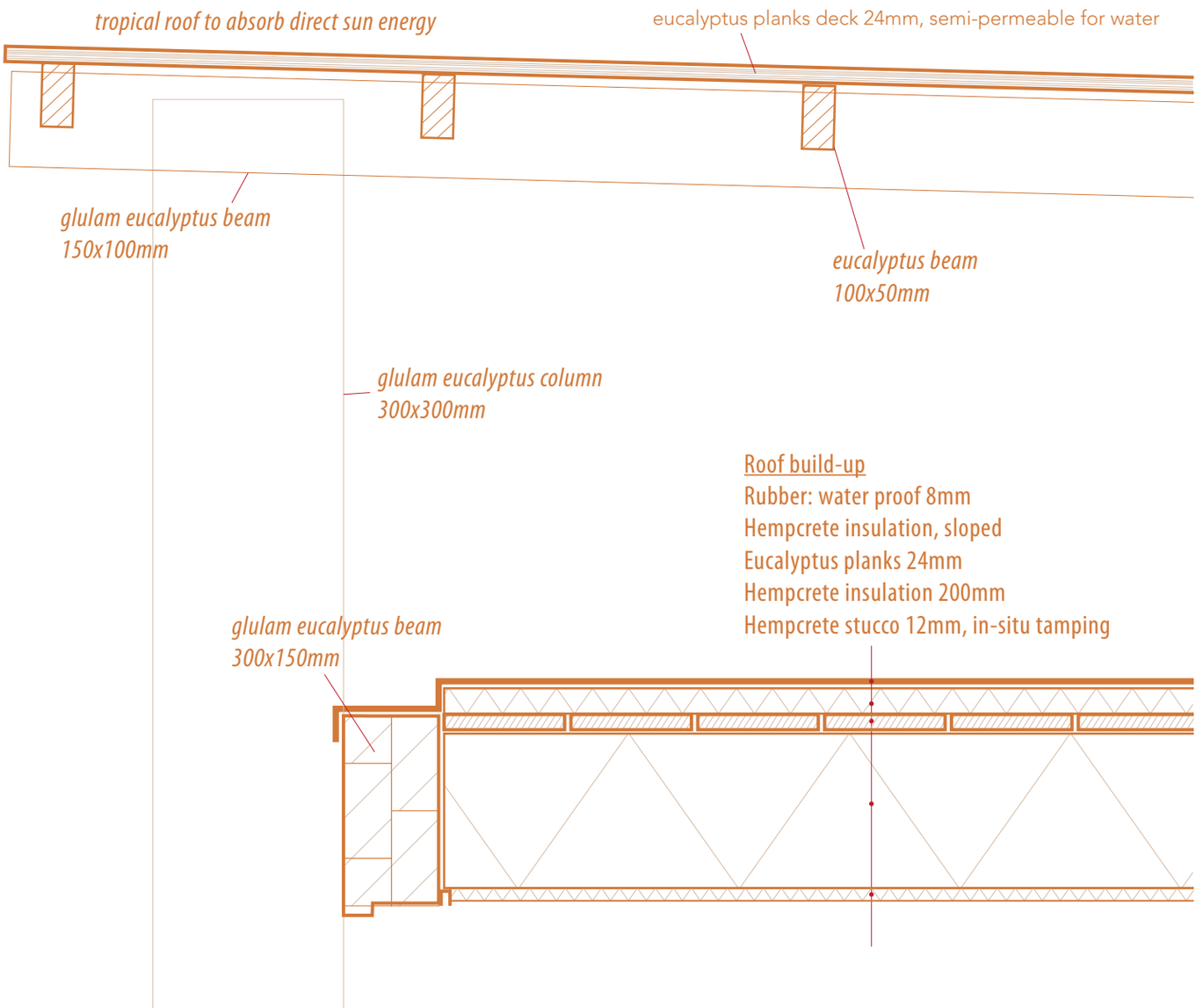


Detail C - 1:10 - without shaft

The front part of the dwelling dividing wall is not prebuilt, and therefore has to be built by the inhabitants themselves. It can be done by one of the two, wishing to extend his/her dwelling, or can be done collaberatively by both of them. Either way, only one wall has to be built, therefore being slightly wider.

Again, the location of the beam is shown at the ceiling. It sticks out and the hempcrete blocks can be attached to the glulam eucalyptus beam.

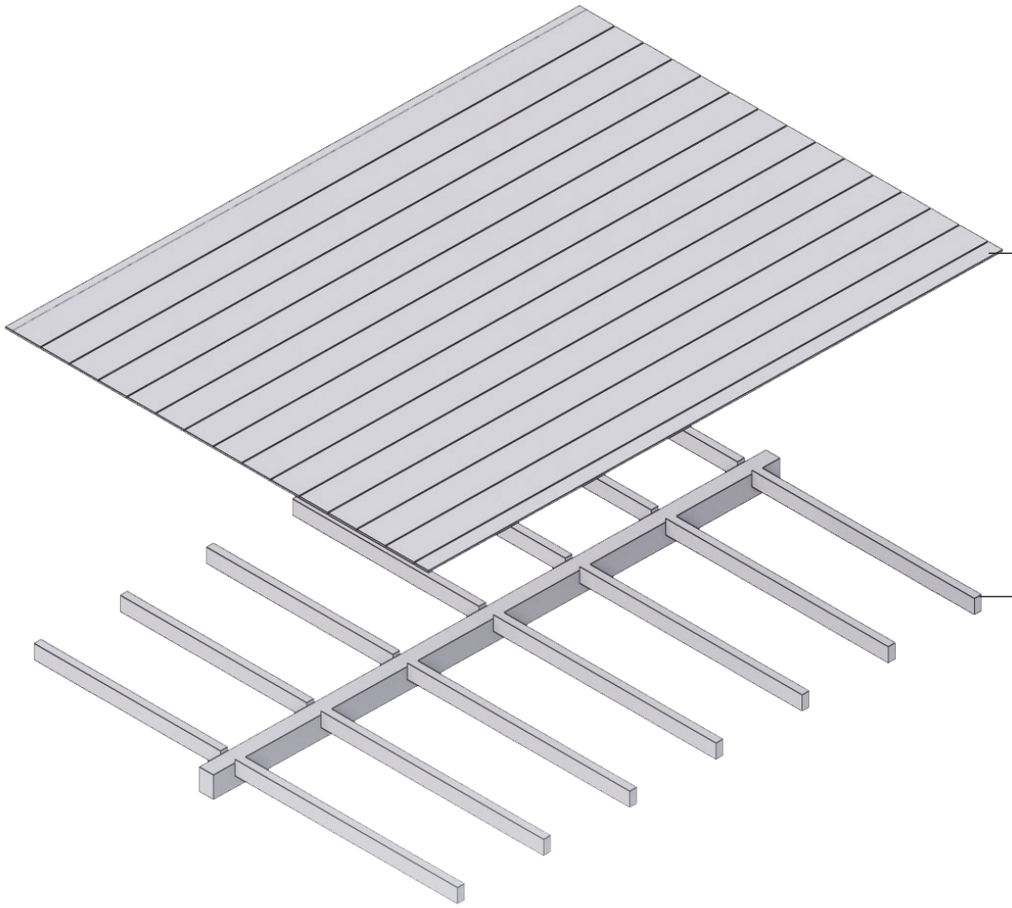

Floor build-up
Eucalyptus planks 18 mm
Rubber, waterproof/acoustic insulation 8 mm
Eucalyptus planks 24 mm
Hempcrete insulation 200 mm
Hempcrete stucco, in-situ tamping 12mm
Inner wall
Hempcrete blocks (200mm)
fireproof and acoustic insulation
Glulam eucalyptus beam
300x150mm



Detail D - 1:10 - roof

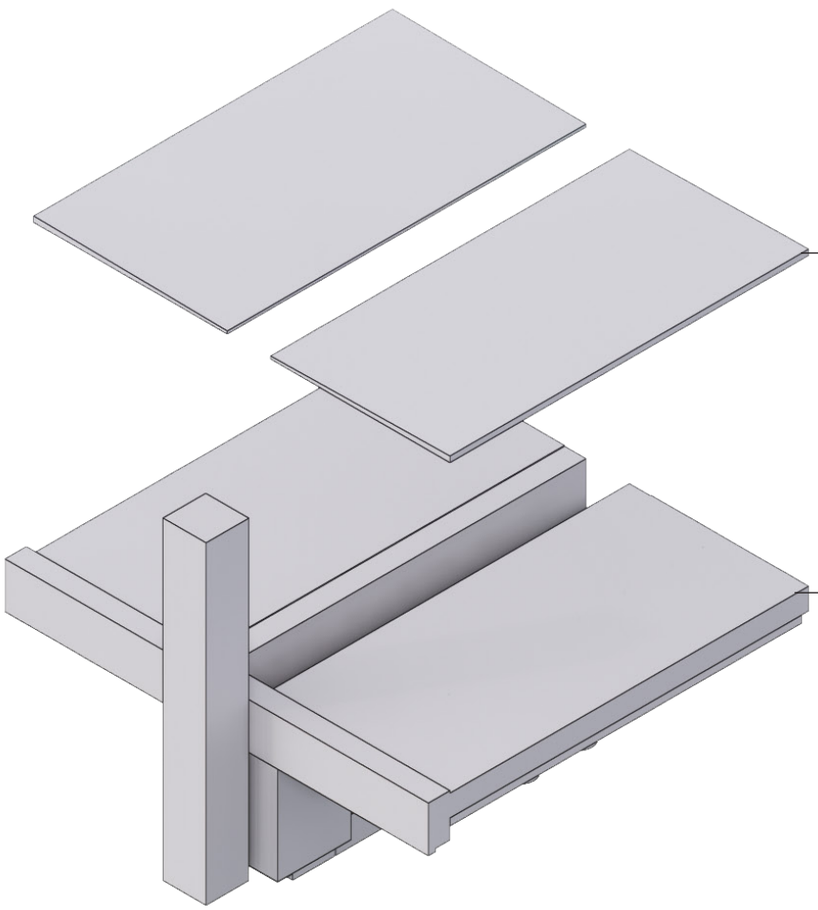
The roof follows the same build-up as the other floors: eucalyptus beams carry the hempcrete insulation. On top, the same rubber layer is added for water protction, but underneath it is an extra layer of hempcrete insulation, sloped, for the water run-off.

There is a climate roof above, absorbing the sun energy and accentuating the shape of the building. Water can run through. In-between there is a space for ventilation of the sun energy, absorbed by the upper roof.



wooden planks (eucalyptus)

wooden beams (eucalyptus)



sloped hempcrete + water protection

basic floor build-up

AMENITIES

The active street also offers space for amenities. However, not every amenity fits in the active street grid, and not every amenity fits in the active street character. Only those that contribute to the livelyhood and activity of the active street can have a place, where, in turn, they can be a stable element in the building block. In this way, they can become generators for the development of the rest of the building block, and attribute to the livelyhood not only on the ground floor, but also on higher floor.

There are multiple categories for amenities: on the basis of the space they need, and on the basis of how much they contribute to the active street.

There are those that need a large space, and don't actively contribute, such as schools, kindergarten, religious, police station, etc. There are also those that do actively contribute, but that do not directly fit in the street itself. The main share of amenities of that kind, can also take place in the outside: the large square in the middle of the active street is designed for exactly these kinds of activities: festivities, open-air theatre, large gatherings, community or social meet-ups.

Then there are those that require smaller space. Smaller outside, such as post office, drug store, etc., or smaller inside, such as cafes, bars, workshops, or small enterprises.

All the amenities that are not directly located in the active street, can be linked very directly to it: either through passages on higher floor, or through the openings in the active street. These parts of the area will be worked out in further detail in the next section: courtyards.

The amenities in the active street also have their own specific location in the building block. The next page show the different categories of amenities in the active street, and their respective locational options in the building block.

needs large space close to active street	needs large space open air	needs small space close to active street	needs small space inside active street
elementary school	festivities	sports centre/fitness	café/restaurants
kindergarten	open air theatre	post office	galleries/workshops
church/chapel		drugstore/pharmacy	garages
police station		doctors office	library/book shelves
theatre		garage	computer work place (wifi)
library		ateliers	bakery
garden & parks		community space	butcher
cinema		clubs	clubs

Lively areas, cafes, bars, meeting spaces

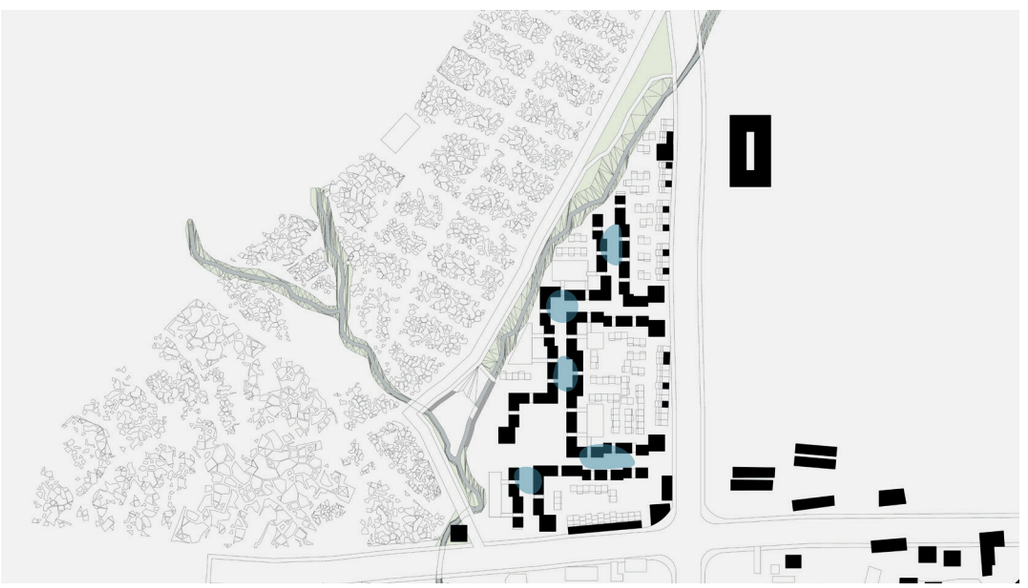
The most lively areas in the active street, are located on those areas where they attract the most people: corners, crossroads, entrances. They consist of cafes and bars, or meeting spaces, where people can spontaneously decide to sit down, get a drink, or by serendipity meet peers and get together. These spaces are located at the edge of the building block, but be located anywhere all the way up to the top of the building. In this way, it can also draw people to upper stories, and increase the economic potential of these dwellings

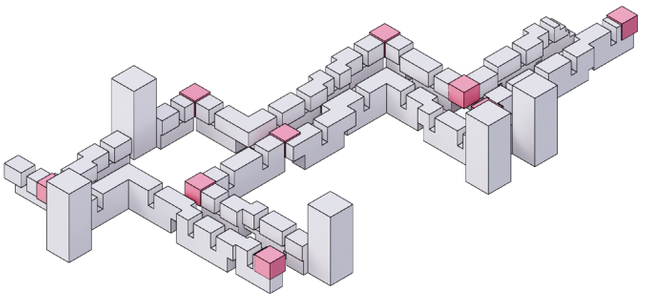
Active areas, sports, workout, workshop

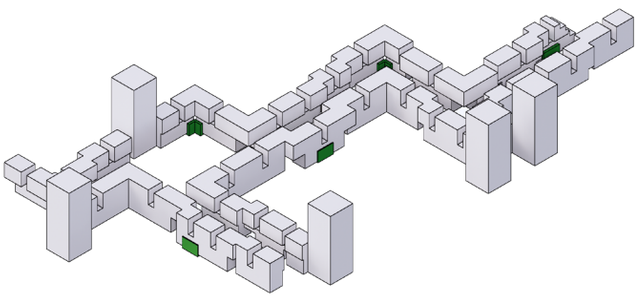
These spaces require relatively a little more space, and are more connected to active open zones: these can be sports places (workout/fitness spaces) or more industrial zones like workshops, car repair shops, etc.. They are connected the to backside of the building block, either to the green zone or to the courtyard. These spaces are mainly located on the lower floors.

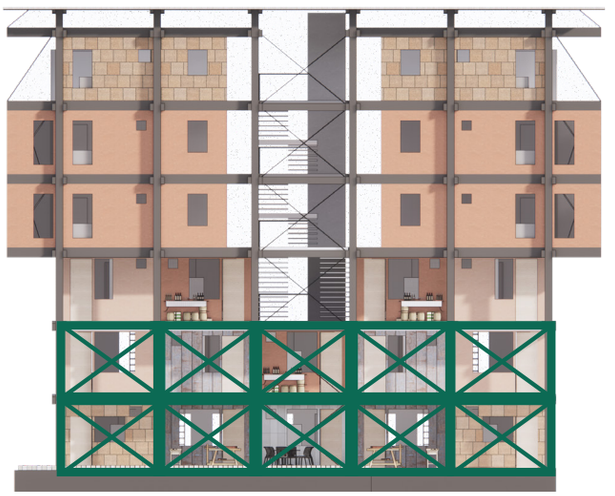
Sitting spaces, library, wifi location

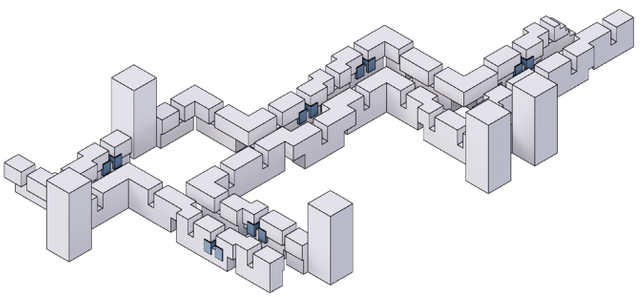
The more quiet spaces are located in those parts of the active street that are not next to a square, cross road or corner. These spaces, located right in the middle of the building block, can draw people into the active street itself, but are further away from the noisy distractions and or circulation patterns, and are therefore more suitable for these activities











ZONE 4: COURT

The court is right behind the active street, enclosed also by either the commercial street or the green zone. It is more open and friendly in character, with buildings up to three storeys high. The connection with the active street at their specific places gives the buildings around it more economic opportunities and therefore shows the more lively part of the area. On the other hand, right in the centre of each court, there is a meeting area, a slightly larger open space and a place where people can sit and relax.

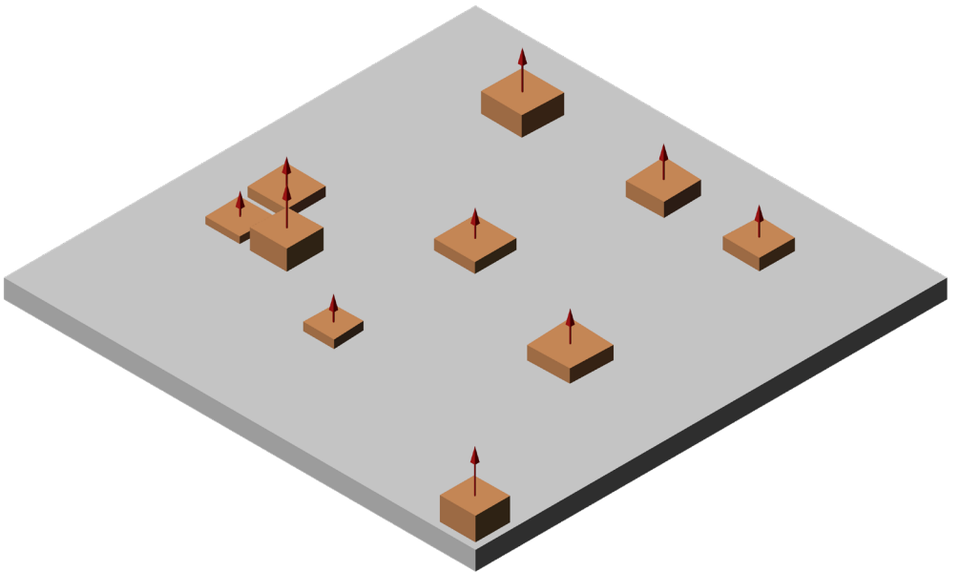
The open spaces around the dwellings are mostly used for household activities like washing and drying of clothes, cooking, and so on, but also social activities like playing, sitting, eating and drinking.

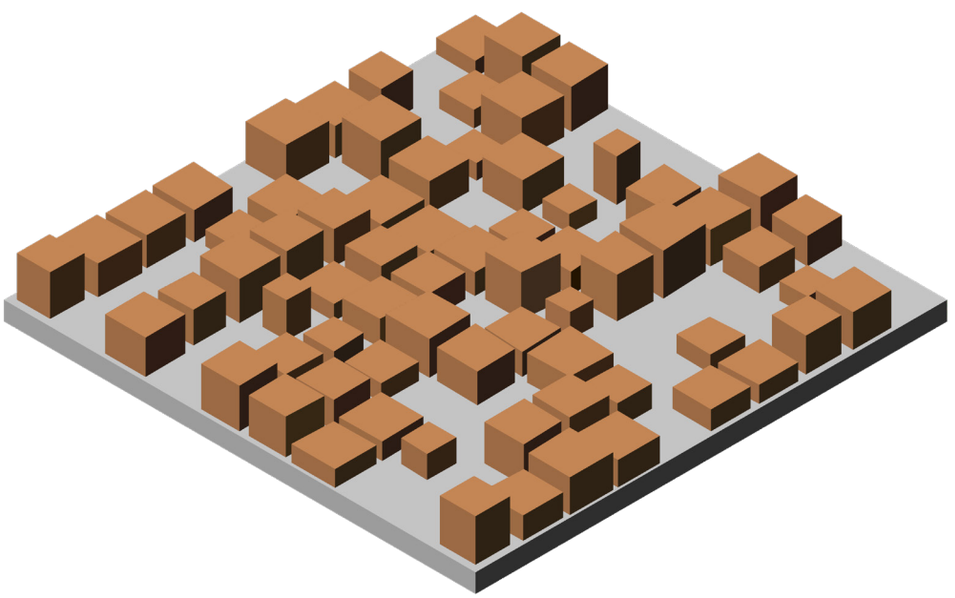
On the outer perimeter of the court, as a linear element between the court and the active street, there is a slightly larger zone. This zone is both for buffering between the six-storey high buildings of the active street, but also the only street in the neighbourhood where car traffic is allowed. As such, they give access both to the rearside of the buildings of the active street, and the dwelling units in the court.

This street is multifunctional in character: playing, meeting, walking, cycling is still very much allowed on this street, as long as cars, ambulances or fire trucks could pass through.

Principle

The court, being less dense than the active street, has a different principle of development. It is based on housing rising from the ground, and all the dwellings are ground-bound. People own or rent their plot, and can built it up to three storeys in height, according to their own preferences and needs. It can also change and vary over time. Therefore, the flexibility and temporality in built environment is mainly in the vertical expansion of the dwelling units.





Step A

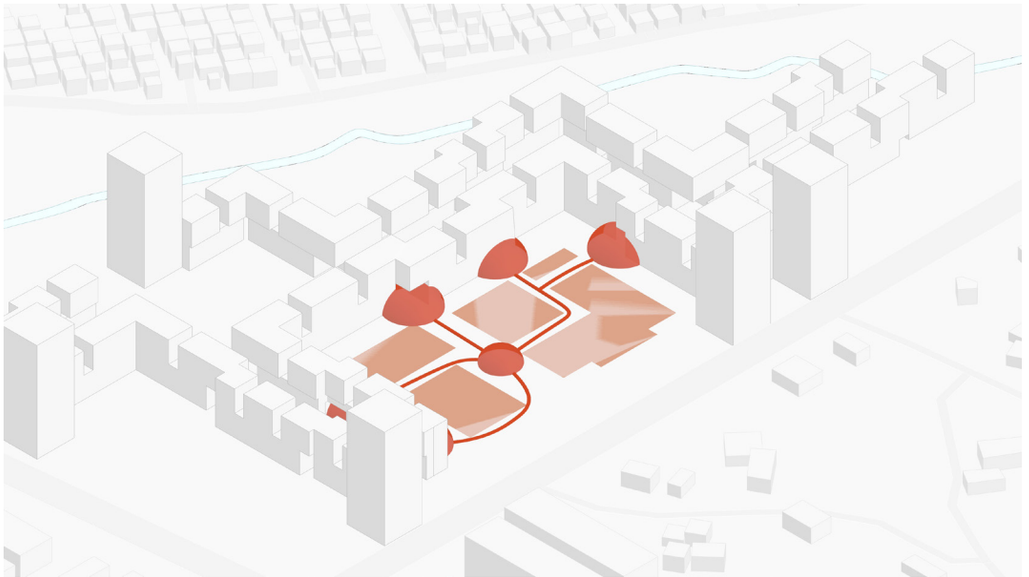
The first elements that shape the court are the connections to the active street. The character of the active street extends outward and into the court area.

Step B

In the middle, there is an open space, mainly for social activities. It forms the center of the neighbourhood.

Step C

A buffering zone is added between the buildings of the active street and the buildings of the court. It is used as a car infrastructure, connecting the active street as well as the court with the commercial road.



Step D

Connecting the openings with the center, and taking into account the buffer zone between, plots emerge in which dwellings can be built.

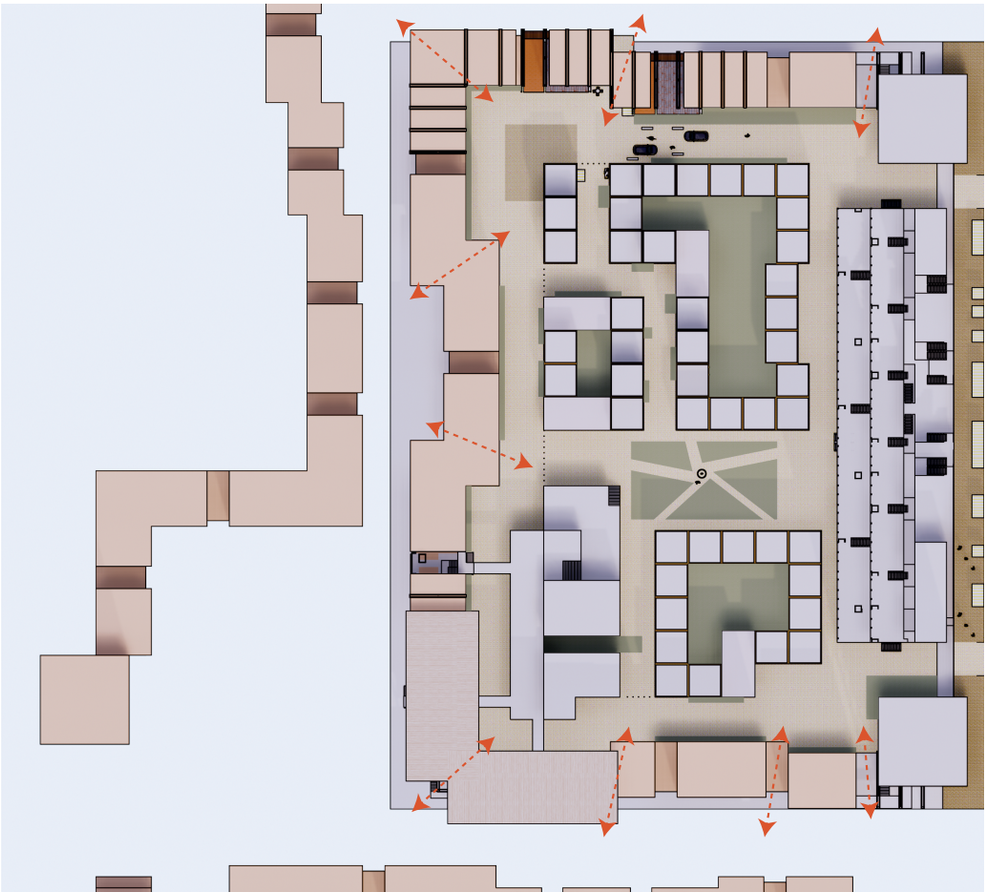
Step E

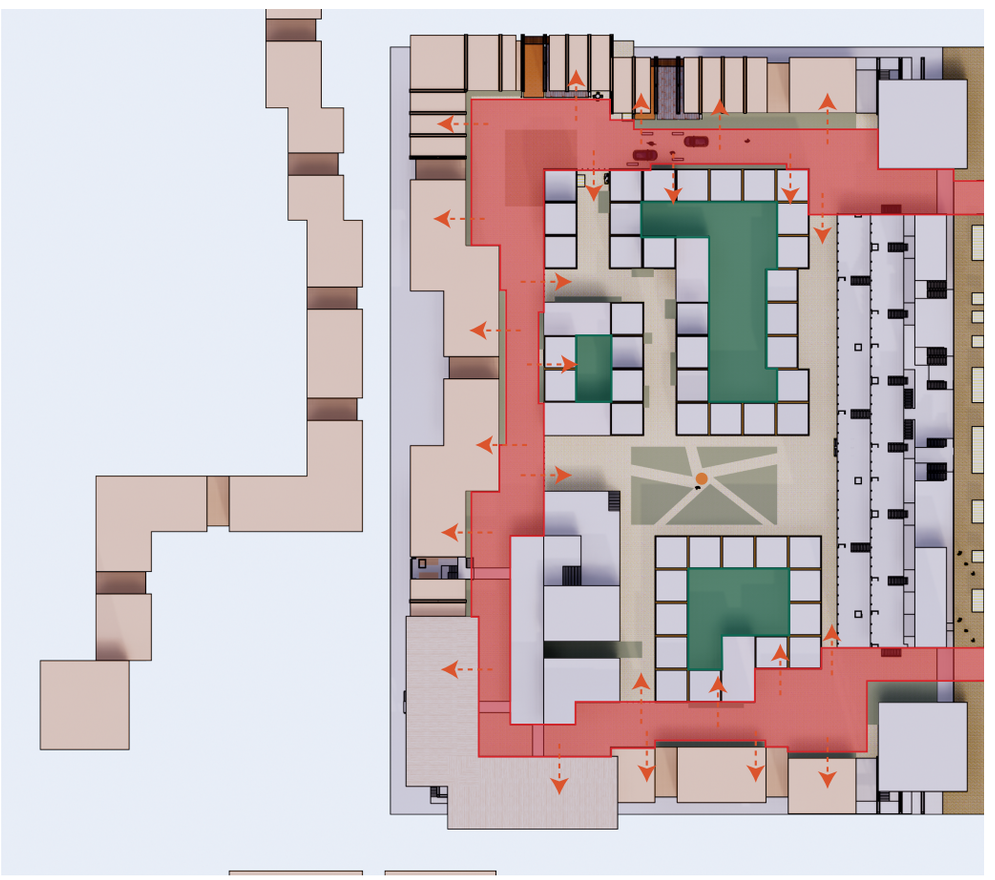
The dwellings, individual in height, are located next to the newly formed streets. In the middle there is an open space which is a communal garden for all of the adjacent inhabitants.

Step F

Some of the plots, however, can be used for amenities. These are the amenities that do not actively contribute to the economy of the active street, and therefore are not necessarily placed at the active, but right behind.

The amenities are well connected with the active street, both at ground level (via the corners) and at higher levels (via the indents). In this way, the active street can either spread out onto the amenity, extending its life outwards, and breaking down the rigidity of the street.



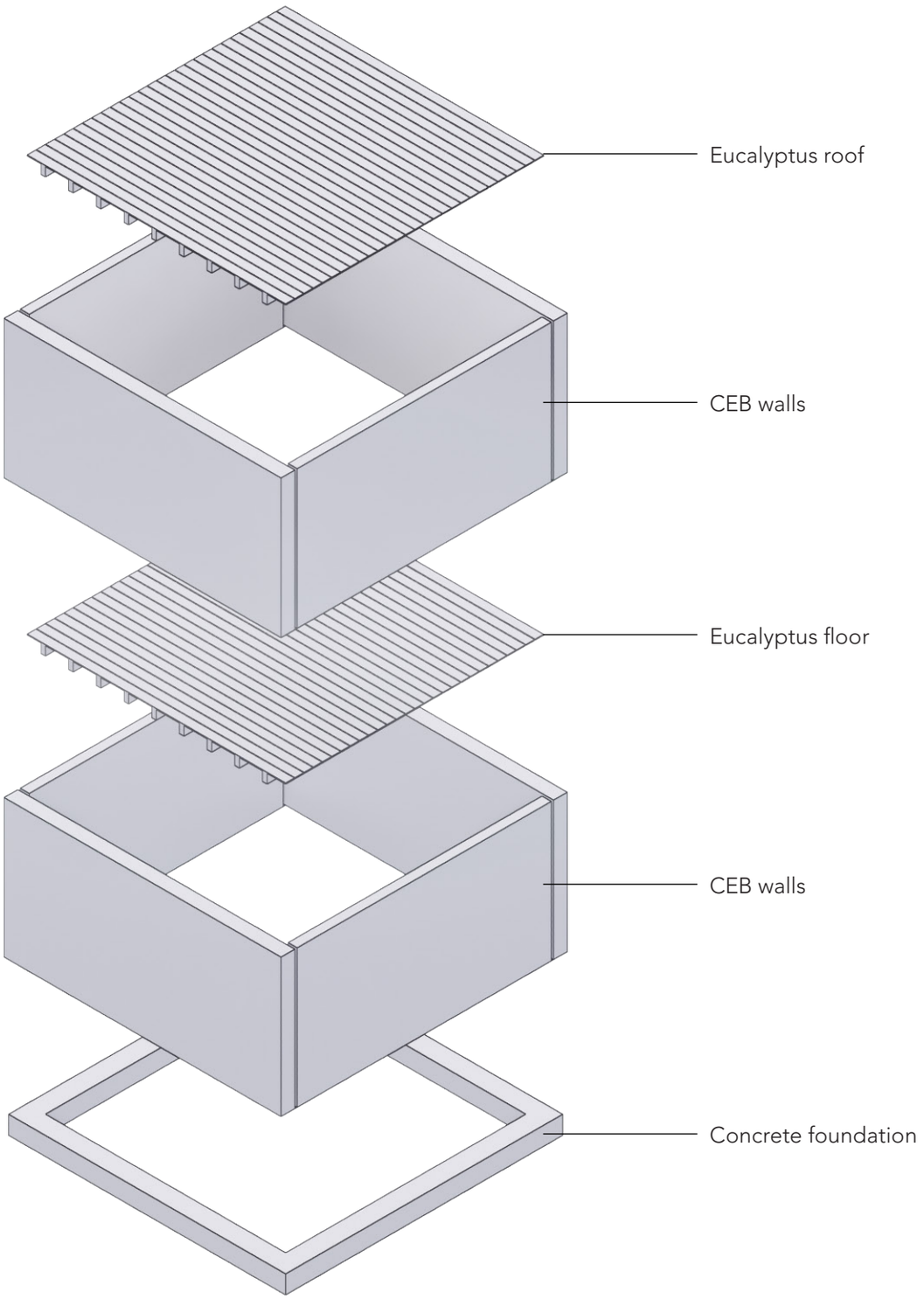


Schemes

The court is in close relation to the active street. Its connections shape the courtyards street patters, and the boundary road, between the active street and the courtyard dwellings, functions as car access for both neighbourhoods. This road is not only for cars: also pedestrians use it, and when there a no cars, it can be used for playing or household activities.

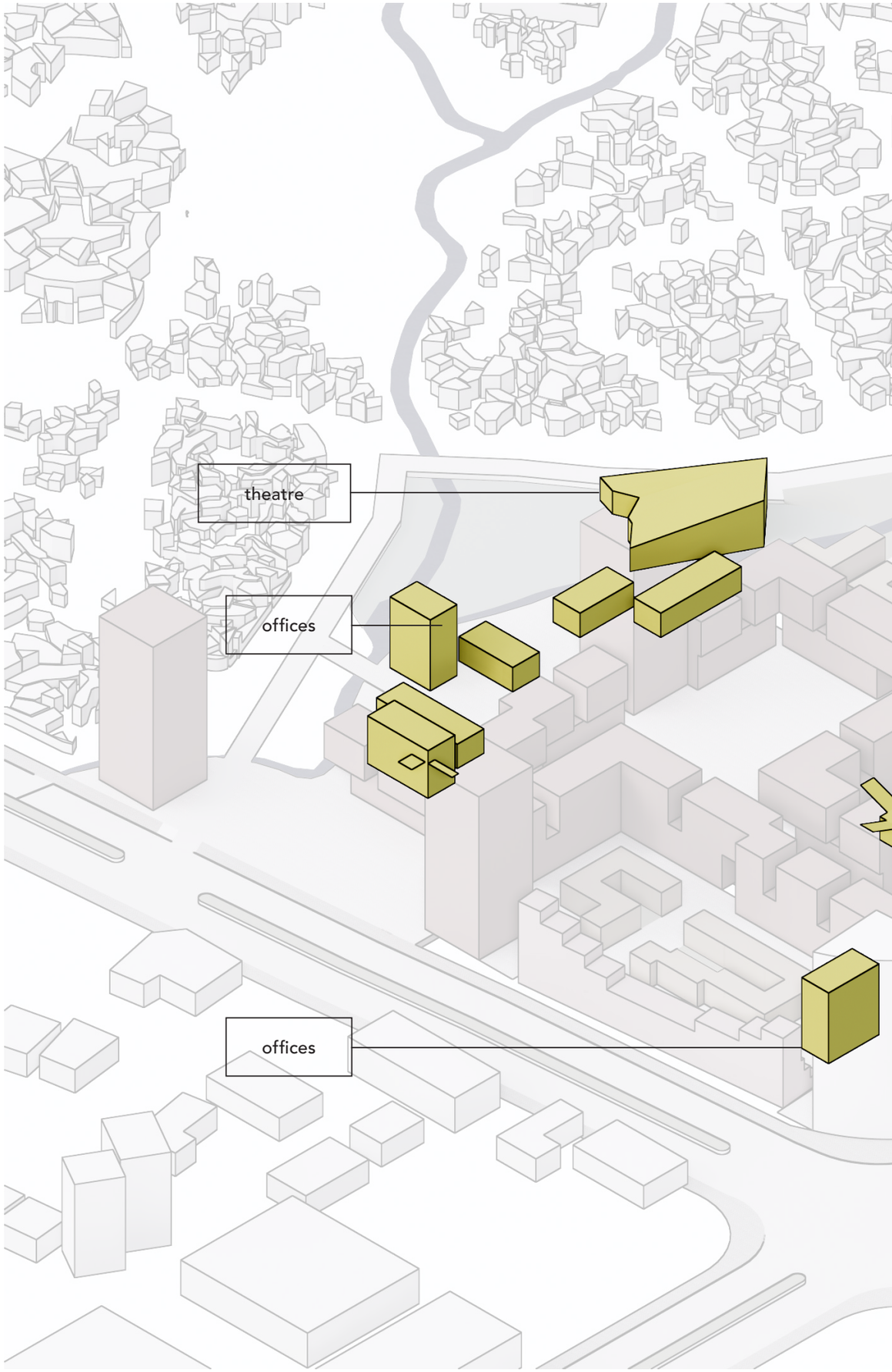
Materiality

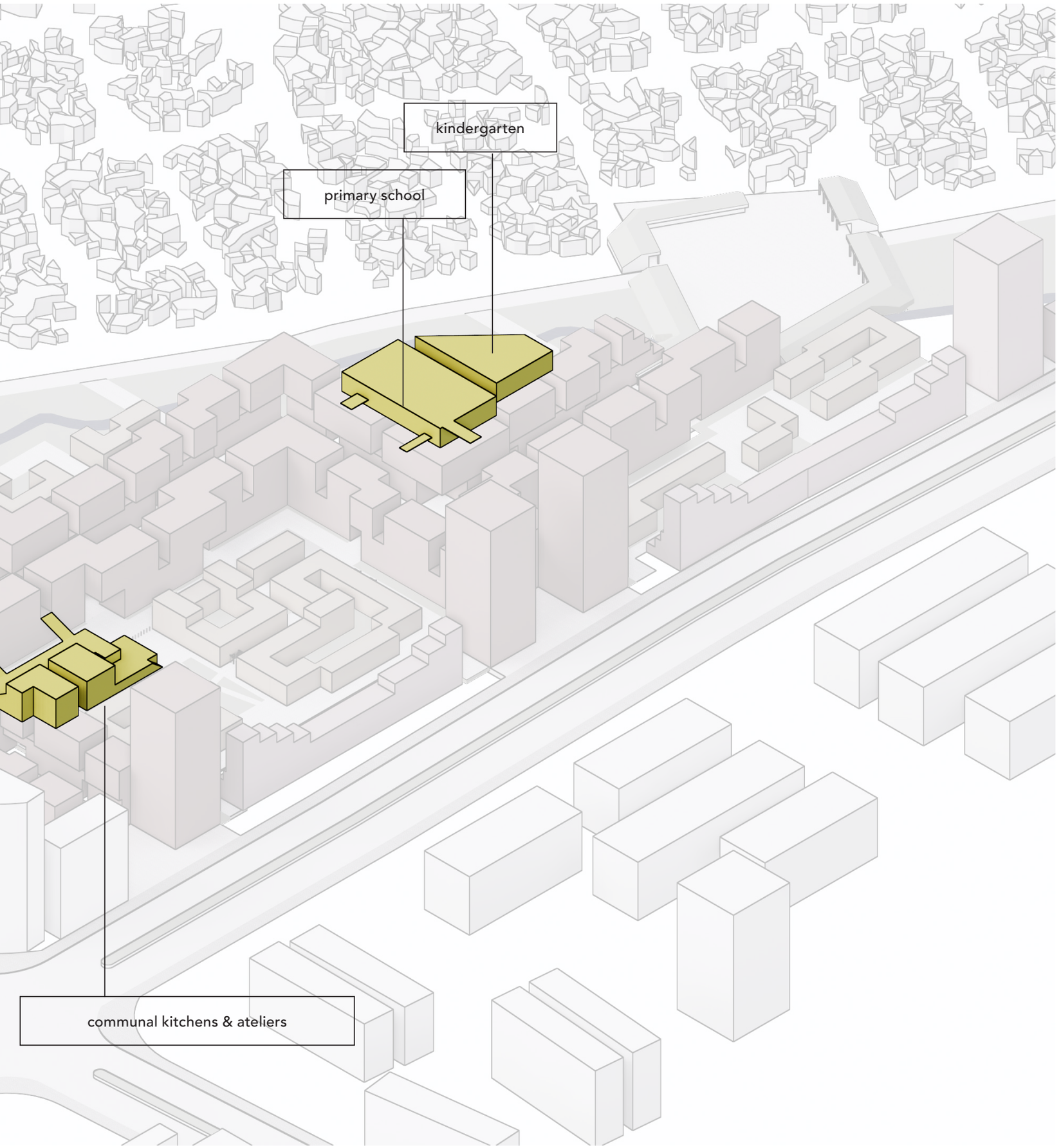
The courtyard dwellings are built in CEB walls, with Eucalyptus floors and roofs, laid down on a concrete foundation. Since the dwellings are ground-bound, they can extend vertically. This reflects in the building materials: the walls are heavy and last long, the floors and roof is lighter, and easier to change or adapt.


Eucalyptus roof
CEB walls
Eucalyptus floor
CEB walls
Concrete foundation
Vertical flexible direction

AMENITIES

In the courtyards, there are amenities that are either connecting the active street with the courtyard, and let the activity of the active street flow over. Examples are offices or communal workshops. On the other hand, there are more directed towards the (quieter) green zone, which are mainly used for schools and kindergarten.




kindergarten
primary school
communal kitchens & ateliers

ZONE 1: COMMERCIAL STREET

The commercial street zone is the zone that is located next to the commercial street. This street, being one of the main traffic roads in the proximity, is a busy and car-oriented road. The housing along this road responds to this inner city dense traffic, but also keeps an eye on what is going on behind it, aware of not disconnecting the neighbourhood from the commercial street, and thereby taking away the interaction, and thus the opportunities for the people living inside.

Step A

The first step is the reaction to the commercial street. In order to increase the potential of the site, and respond to the commercial part of the city, the building height can go up to increase the amount of apartments.

Step B

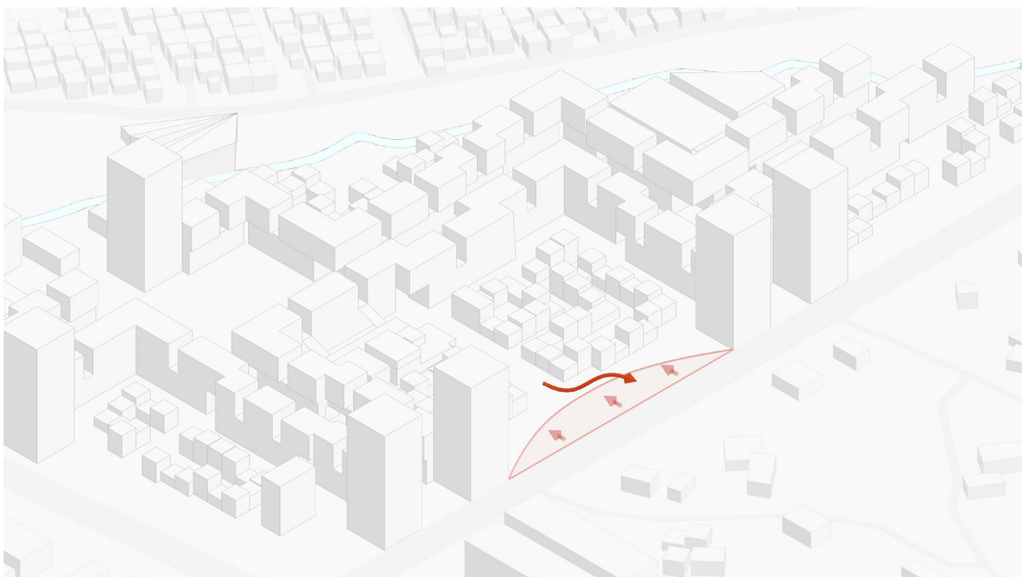
Apart from the commercial street, it also responds, sideways, to the entrances of the active street. Since these are marked with towers, there exists a clear space between these, which is covered by exactly this spot.

Step C

The shape of the building therefore responds to the height of the towers, raising its edges, and lowering the middle.

Step D

On the horizontal plane, the amount of pedestrian area is increased, to give space to temporary activities. It responds to the entrance of the active street: where the active street flows out onto the commercial street, here the commercial street flows into the courtyard area.

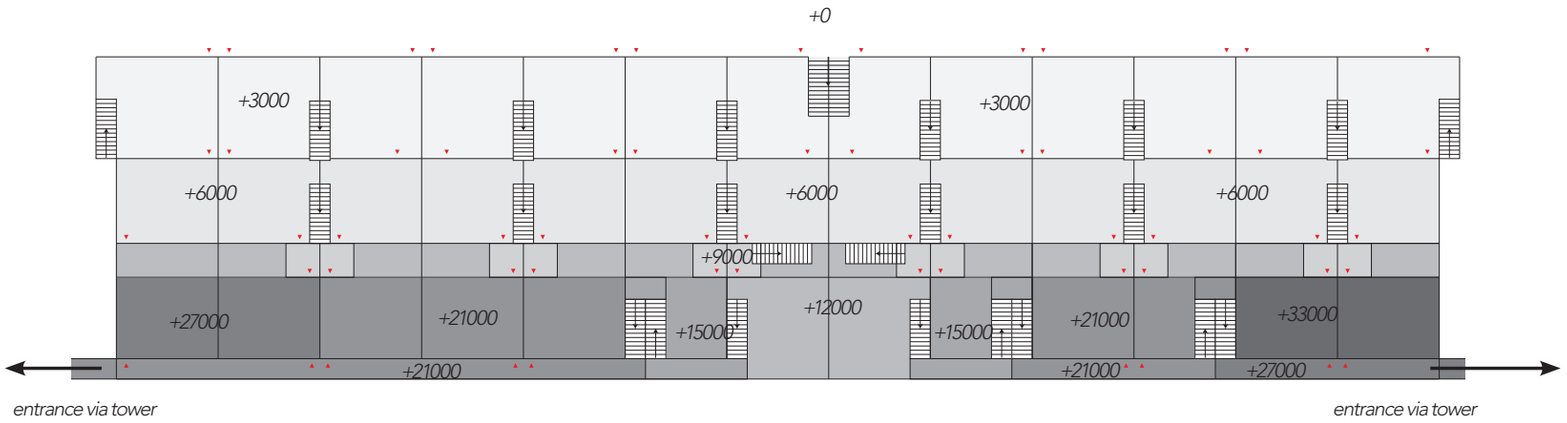


Step E

However, the courtyard area responds by flowing over these. As this side of the building is stepped, creating layered horizontal terraces, the courtyard area also extends towards the commercial street, up and over the pedestrian area.

Step F

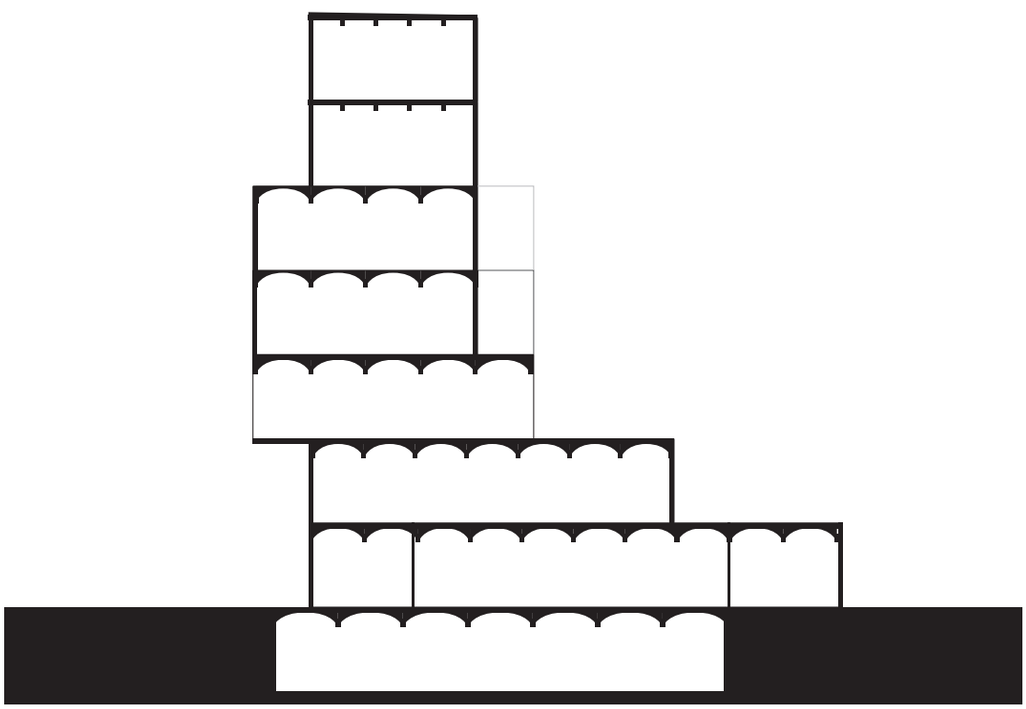
It creates a two-dimensional terracing, both in x and y direction. The flexible direction of these buildings are mainly in perpendicular to the commercial street: the depth of the apartments can vary, and the amount of terrace space can vary.

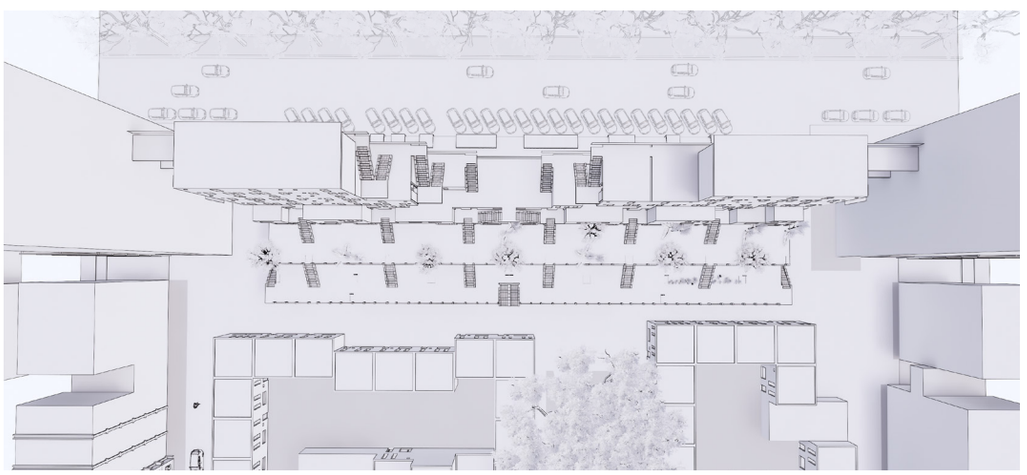


Schemes

The two sides of the building differ clearly in character. However, blocks push through the facade of the front, along the commercial street, creating an irregular pattern as seen from the front. At specific spaces, the dwelling is left out and an open outdoor space is created, usable for social or economic activities (a restaurant, a bar, etc.)

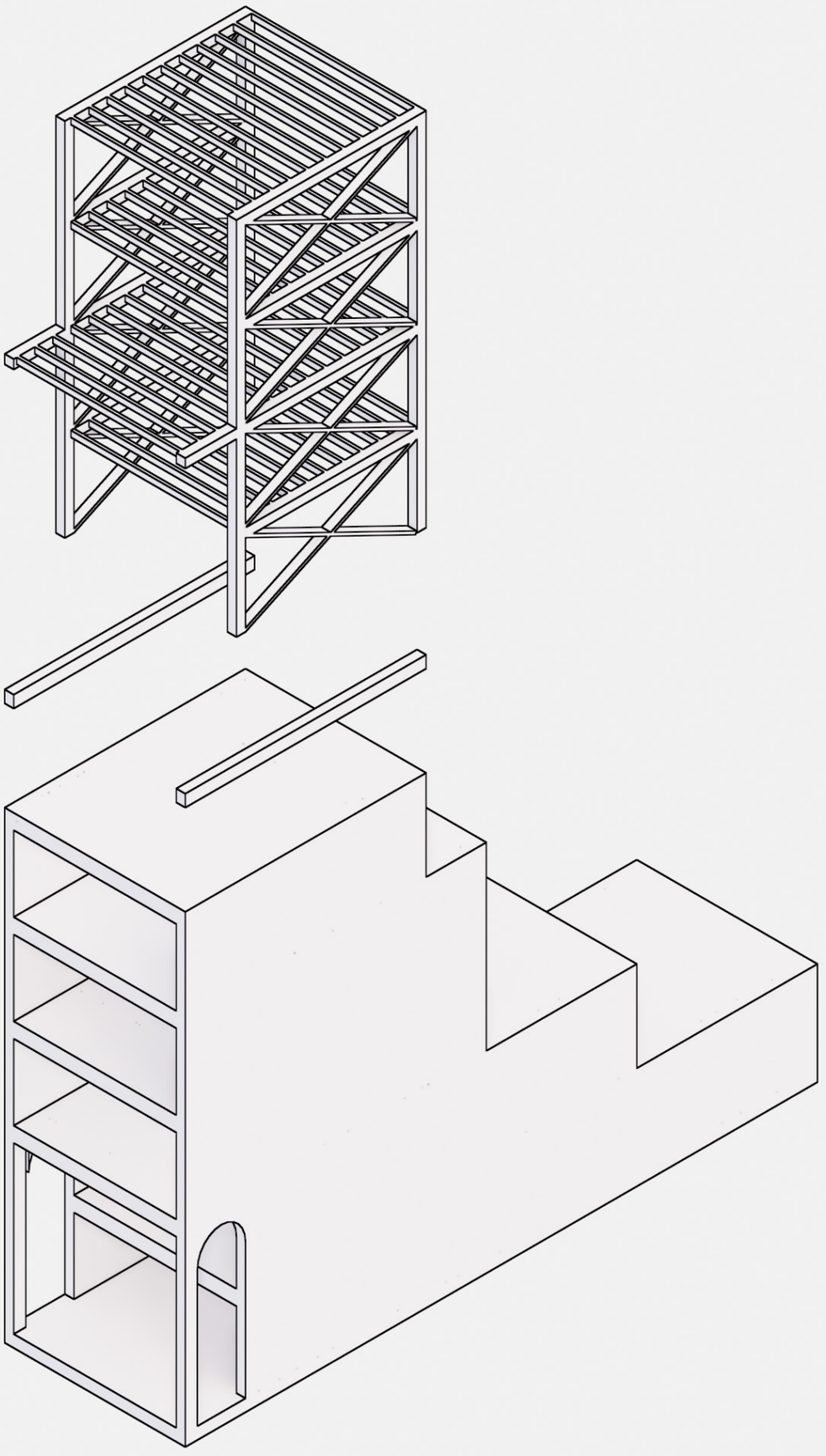
On the rear side of the building, the terraces go up all the way to the top, making the whole roof accessible. It connects to the towers, where the already present infrastructure (elevators, staircases) for the vertical circulation add to the option one can take from point A to B, but also create opportunities for the mixture of the different dwelling types: people living in the tower may find their most direct route down to the courtyard is via the terraces of the commercial street building.



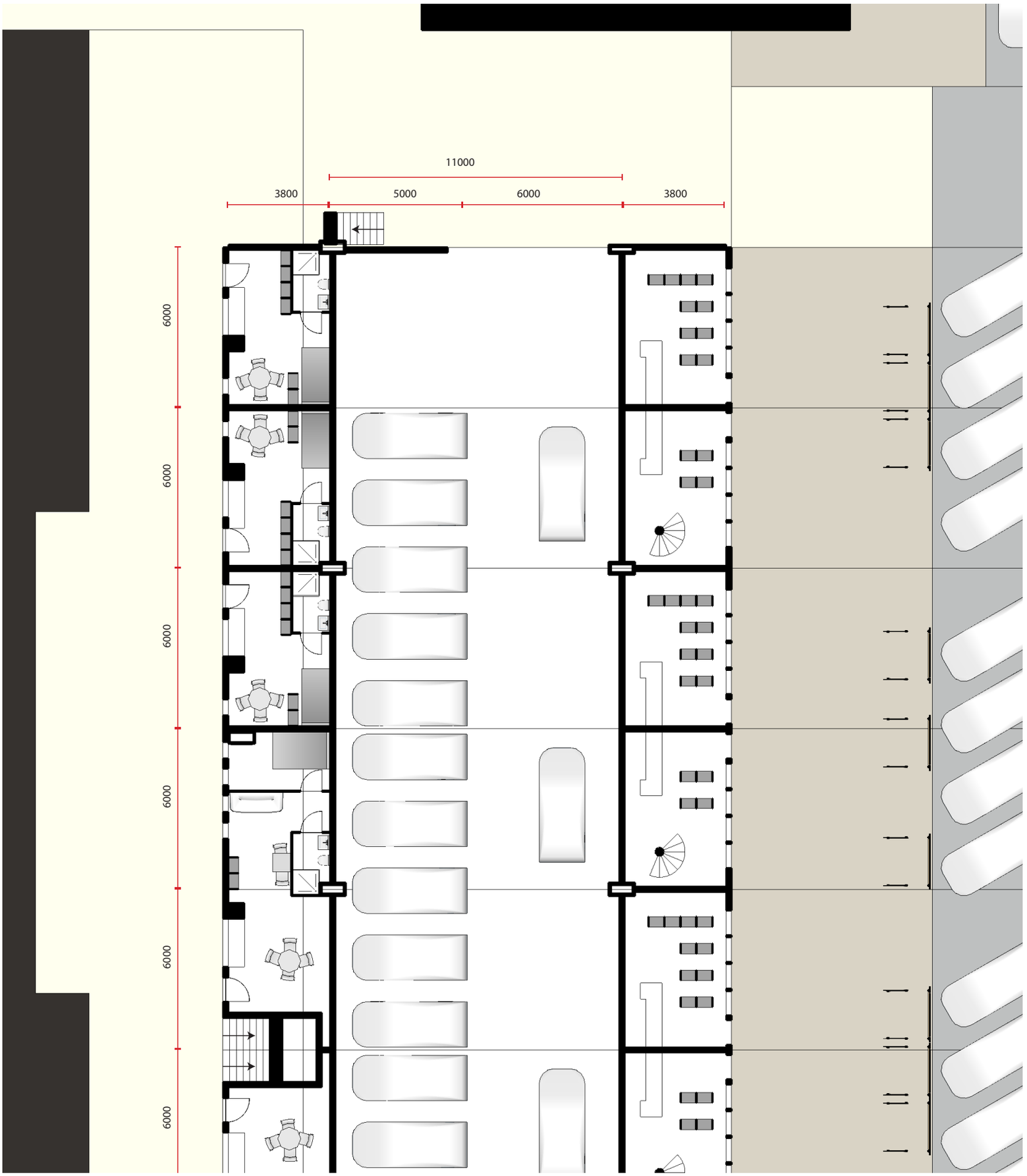


Materiality

The main materials of the building blocks are compressed earth block (CEB) for the lower floors, and timber (eucalyptus) frame for the upper stories. The floors are made of CEB vaults on eucalyptus beams. It is clear that the flexible direction in this zone is the horizontal one, perpendicular to the street. On the terraces at the back of the dwellings, people can extend their personal garden and make it their own.

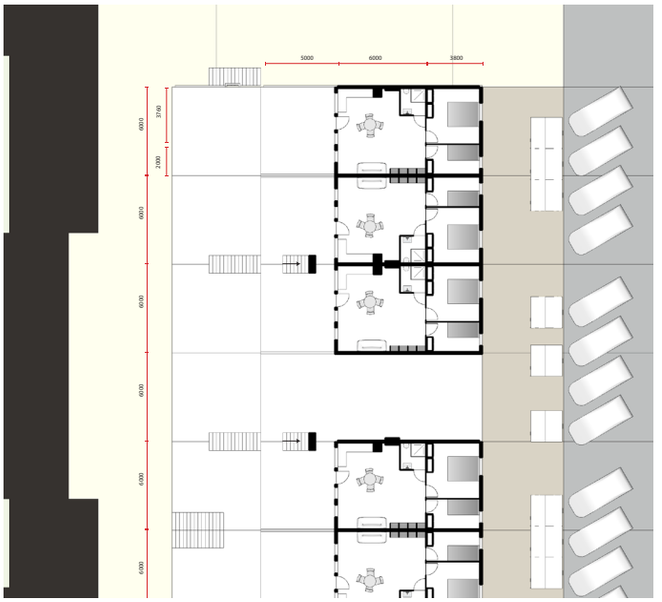


Level 0

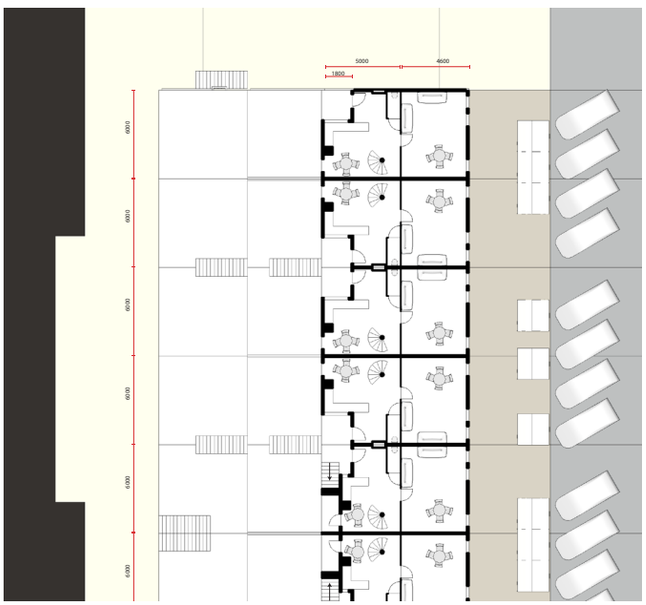


Level 1

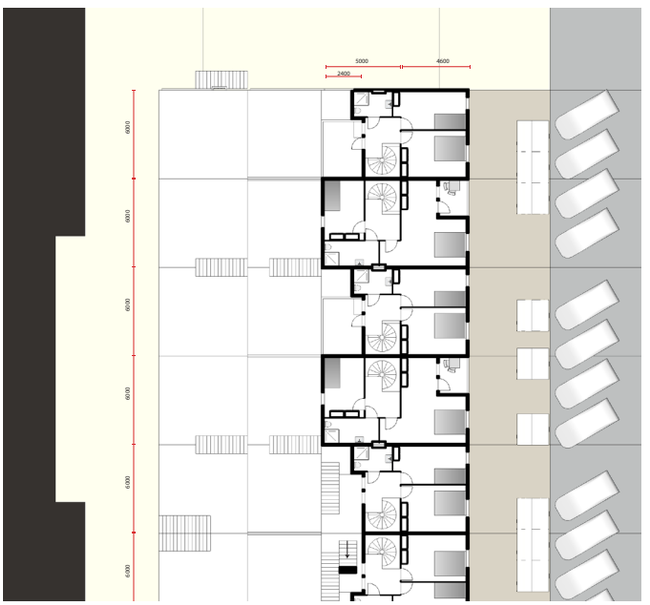
Level 2



Level 3



Level 4



Level 5

Level 6

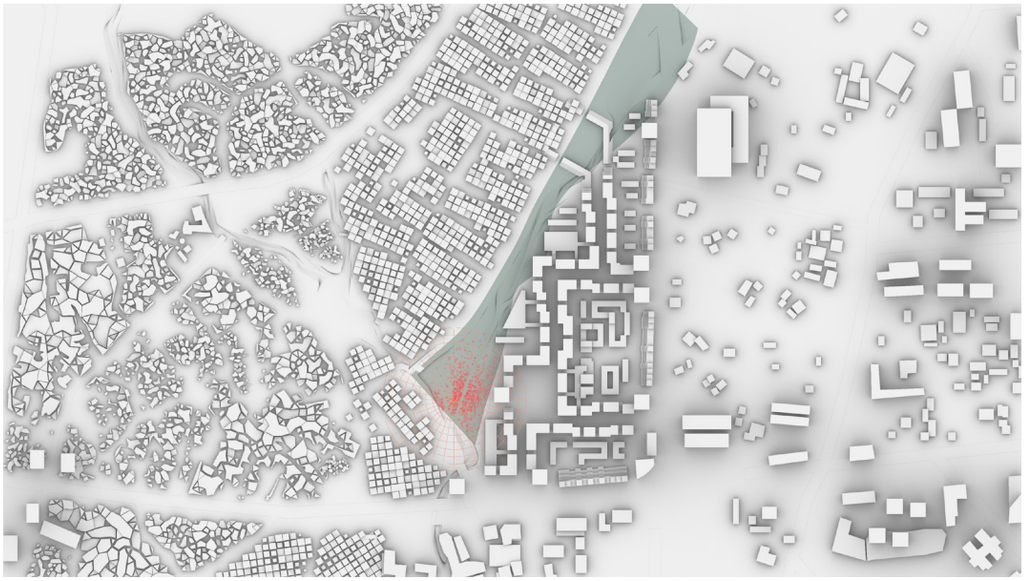
ZONE 2: GREEN ZONE

The green zone is a place in the centre of the Geja sefer. It surrounds a river, and is populated by trees, smaller bushes and grasses. It serves as a recreational zone for the whole neighbourhood, active street until commercial zone. It also functions as a buffer between the different parts of the Geja sefer, therefore catering not only the recreative needs of the people in the project area, but also in the other parts of the Geja sefer.

There are different sections in the green zone. The different sections respond and interact with the other zones: active street, commercial street and courtyard areas, including amenities.

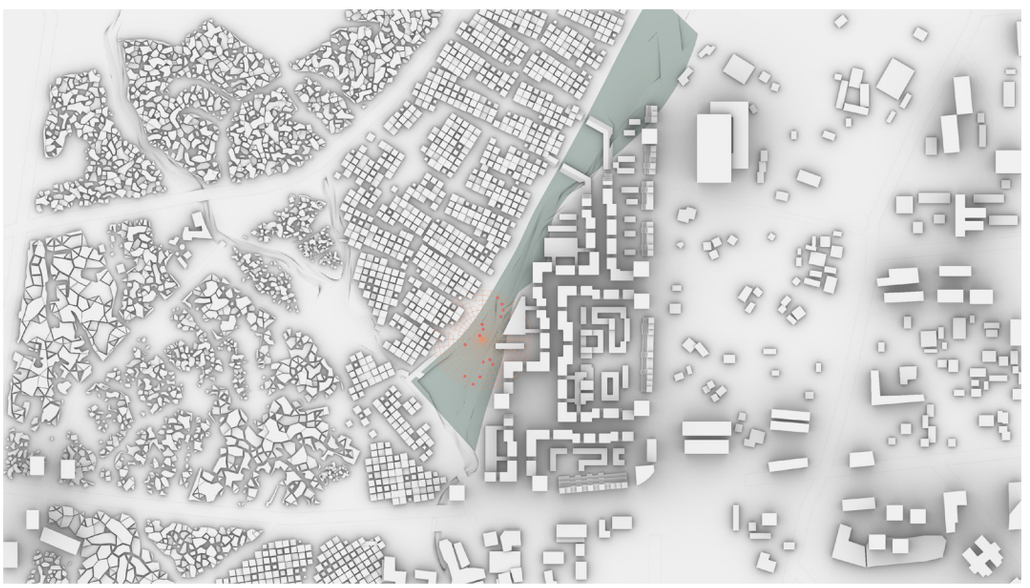
Wetlands

In the southern part of the neighbourhood, right in the middle of Geja sefer, the two parts of the river meet. At this point, a larger area of green is created, along with lower space that can be flooded in the wet season.



High trees

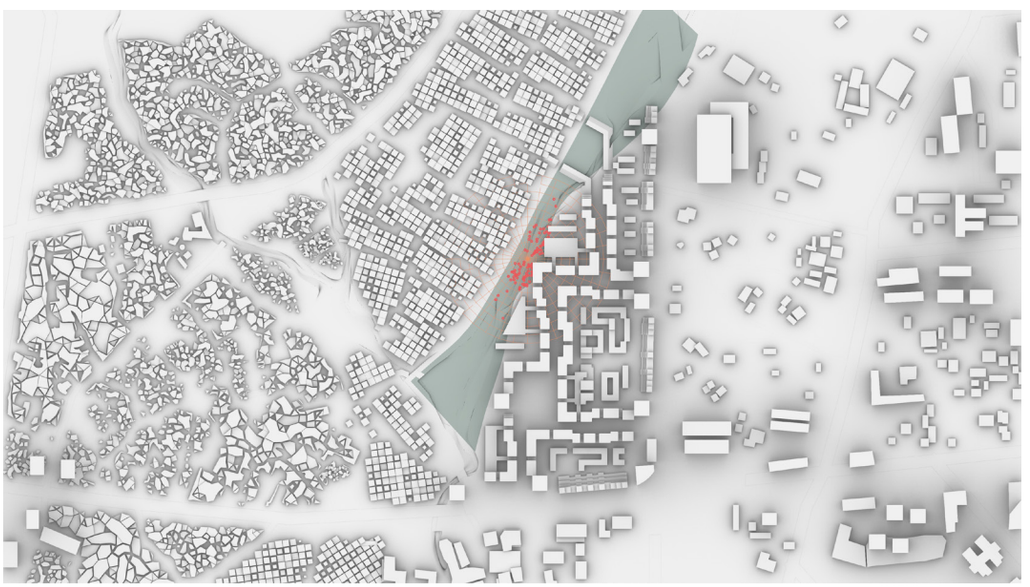
Just above it, high trees shape form a natural bording. They react to the higher towers that are located at the southern entrance of the active street, but create an unblocked view at eye level and an open green area with a lot of recreative space.

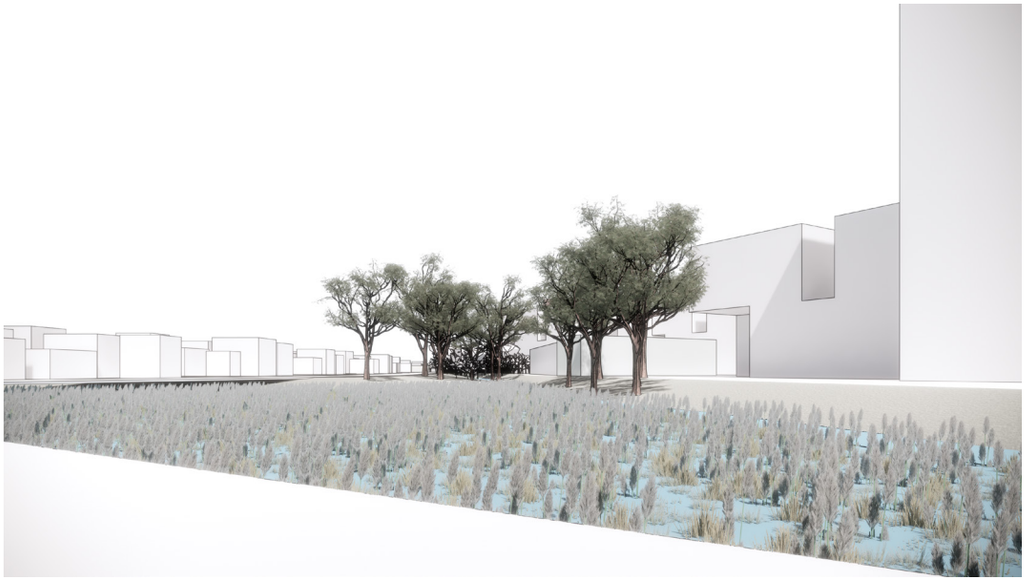


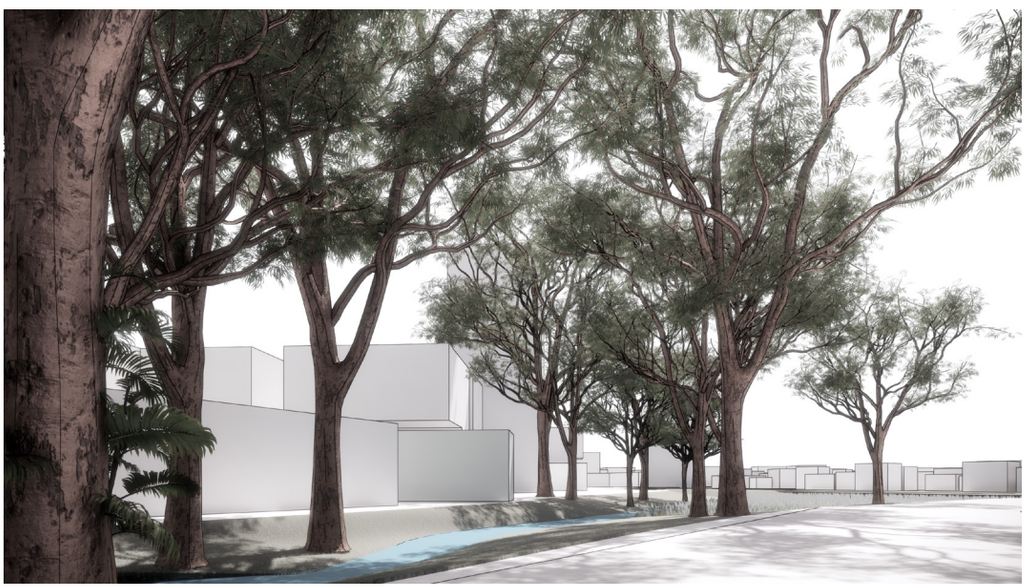
Bushes - dense

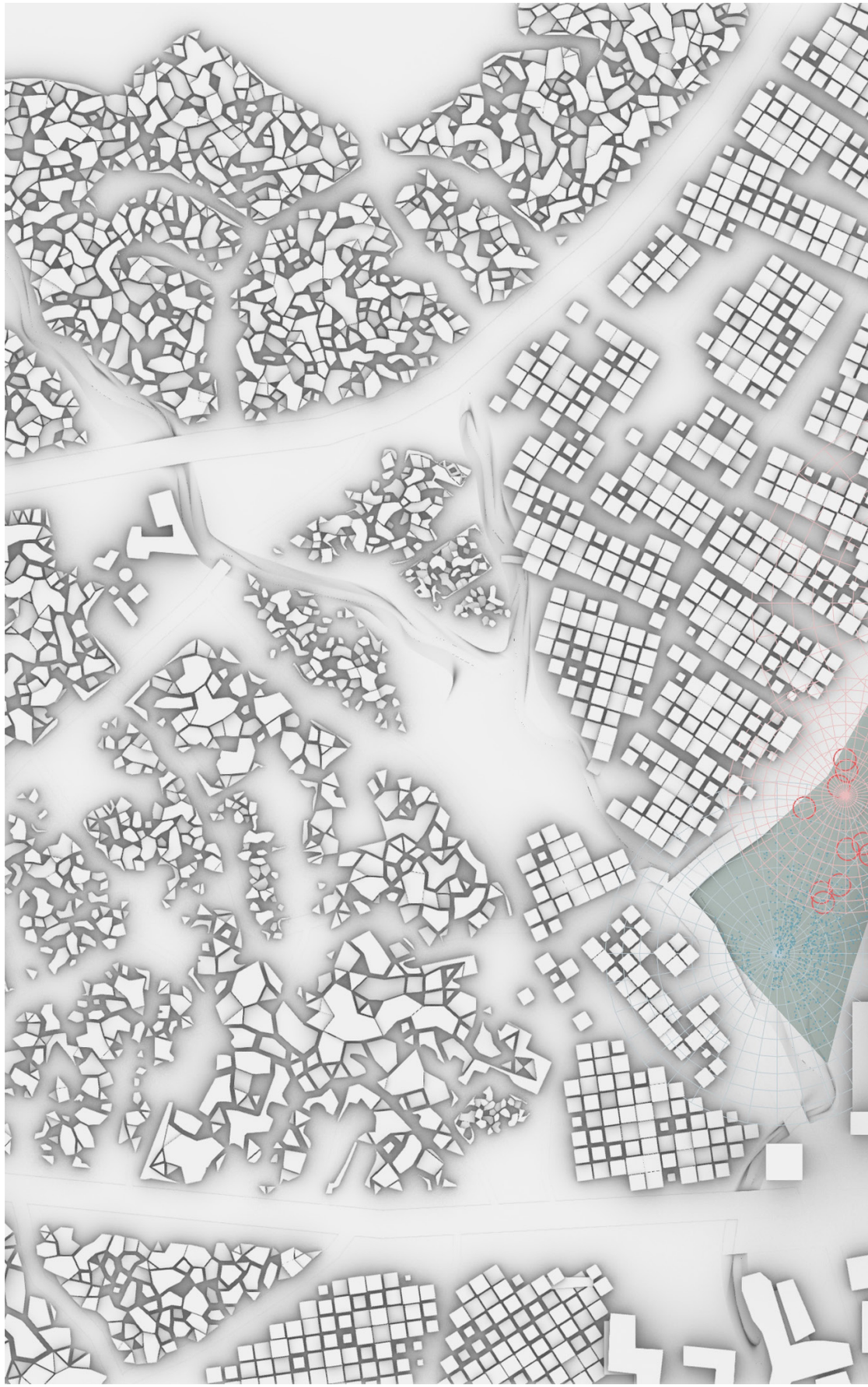
Interreacting with the corner that touches the green area, a dense amount of green bushes is originating right from this point. It seperates different sections of the green area in eye-level, therefore ensuring a friendly and enclosed atmosphere of the courtyards that are located in between the green zone and the active street.

However, these bushes are small in size, and therefore form, as seen from a distance, a less important presence as compared to the higher trees to the south.



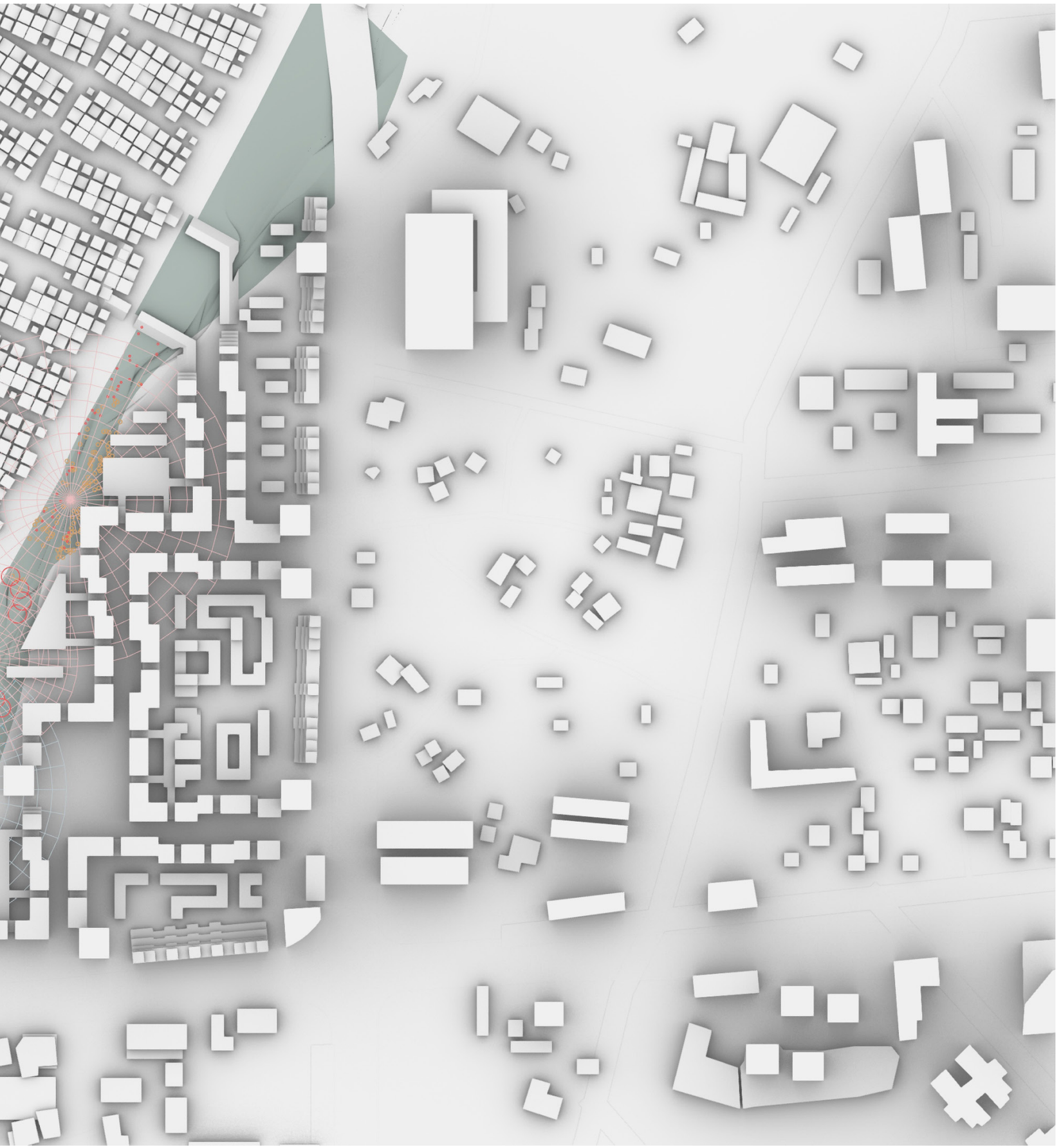


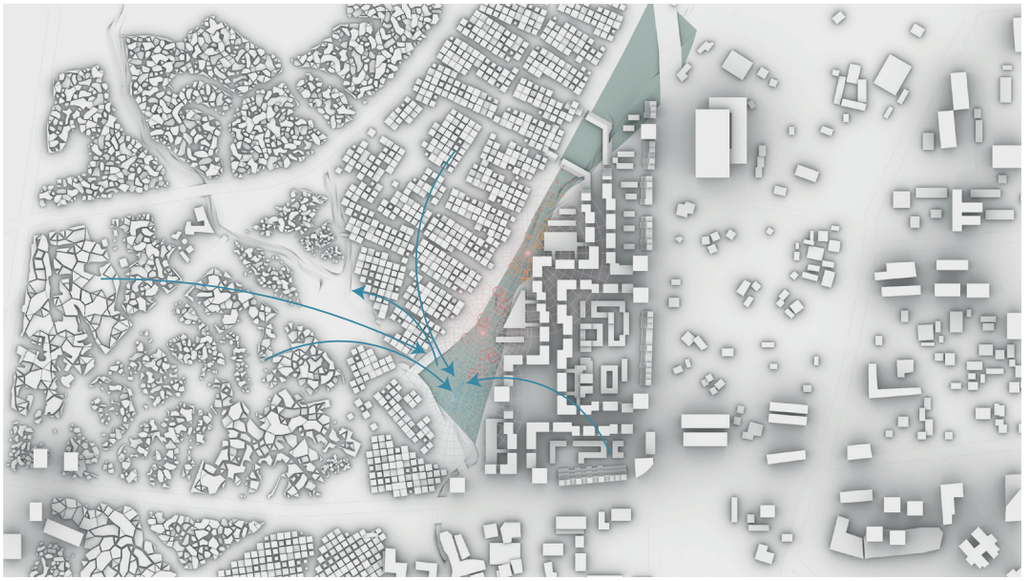




Combined

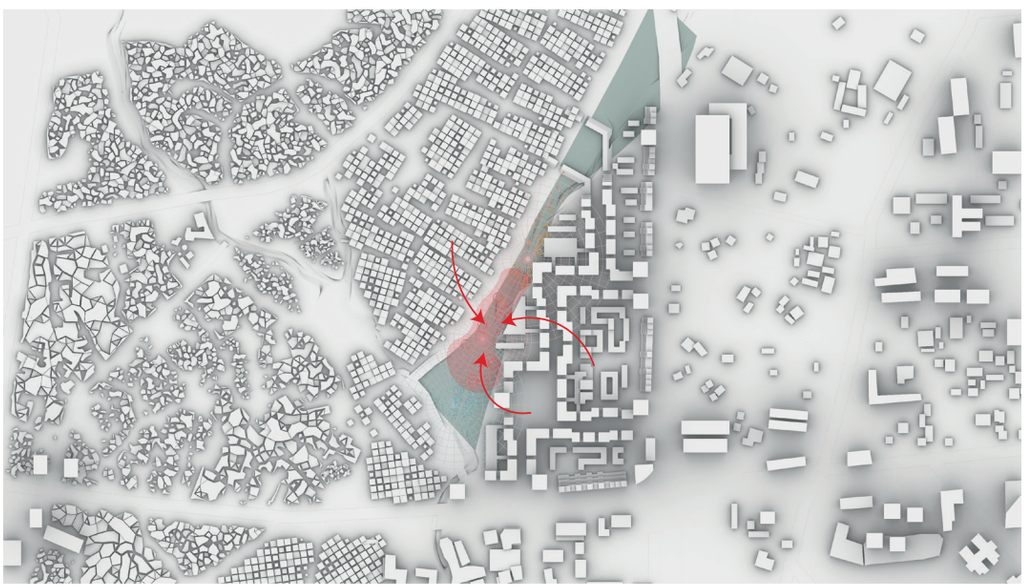
The combined image clearly shows the overlapping areas, the trees intruding the wetlands, the bushes intruding the trees, and vice versa. It therefore creates and open and flowing space, which can perform different functions of greenery: nature, recreation, unwind. In order to develop this area further, a more detailed plan can be made, along with the precise planting and pathways, in cooperation with a landscape architect.





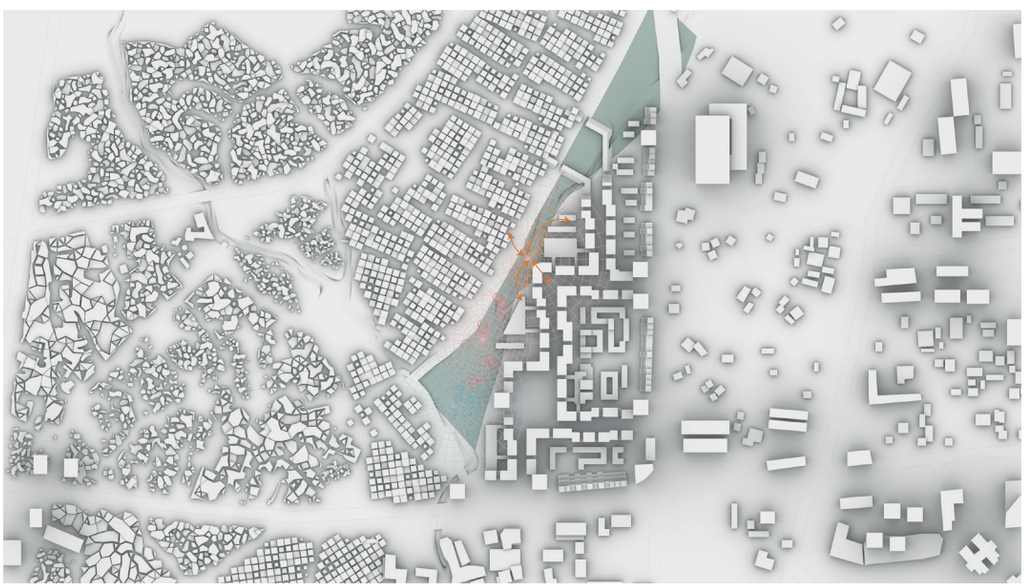
Wetlands

The wetlands serve as the middle point of the green zone, and the Geja sefer as a whole. It therefore also attract people from all over the sefer. In further development, this area can be extended towards the northwest.



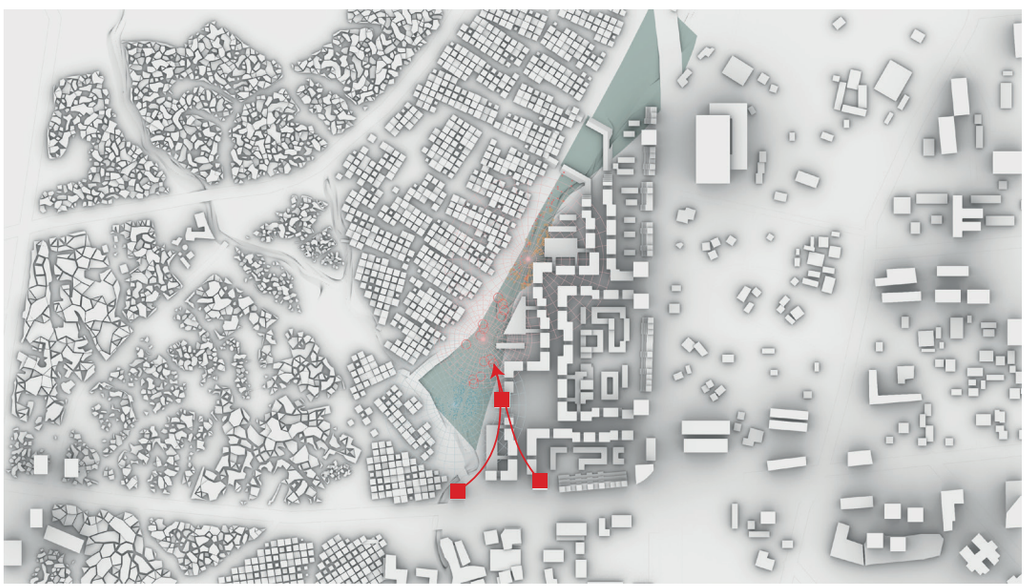
High trees

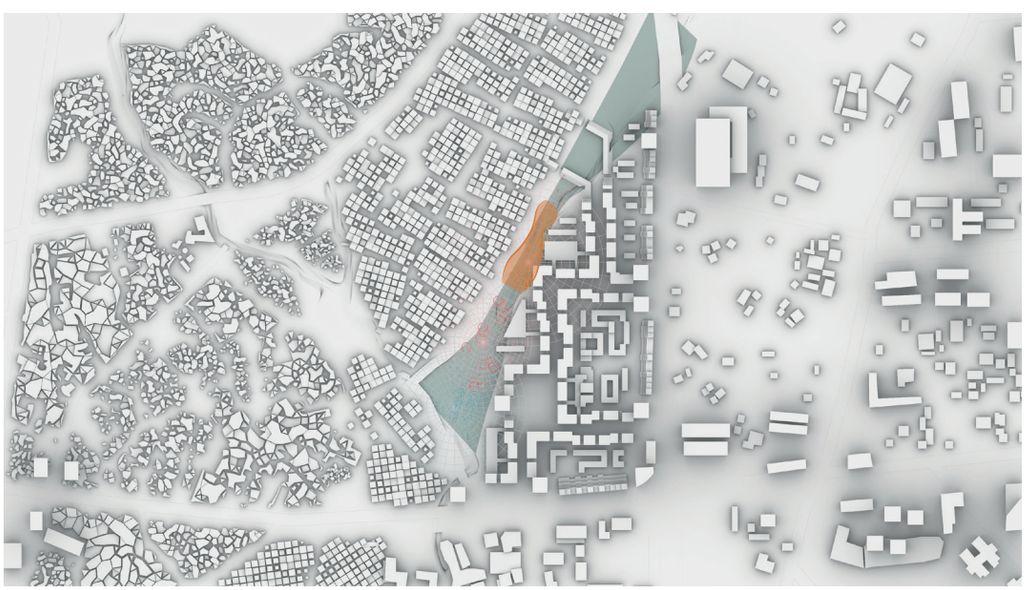
The area right above, where open grassland it populated with higher trees, mostly responds to the area directly surrounding it: the height of the towers to the south and the surrounding buildings and large square in the close proximity. It serves as a recreational space for the people living in the whole neighbourhood.

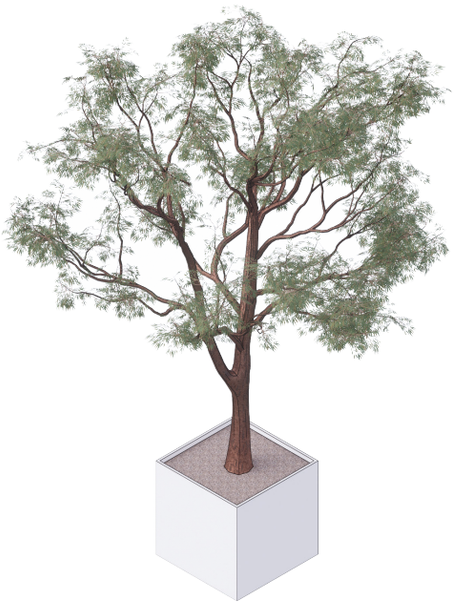


Bushes - dense

The bushes hava a double function: it gives enclosement to the courtyard and amenities closeby, but also serves as a quiet recreational space for the direct surroundings.







Higher trees species

The street that are used in this area are trees that have a straight trunk and mostly evergreen. Examples are:

Dobera Labra
Eucalyptus
Cordia Africana
Acacia Abysinnica
Acacia Lehai
Faidherbia albida

Smaller trees & bushes species

The smaller trees and bushes consist of more densely green, smaller tree trunk and more green at the lower level. Examples are:

Palm trees
Milettia ferruginea

Wetland grass species

The wetland grasses need to be suitable to water overflowing. Examples are:

Cyperus latifolius

Leersia hexandra

Hygrophila auriculata

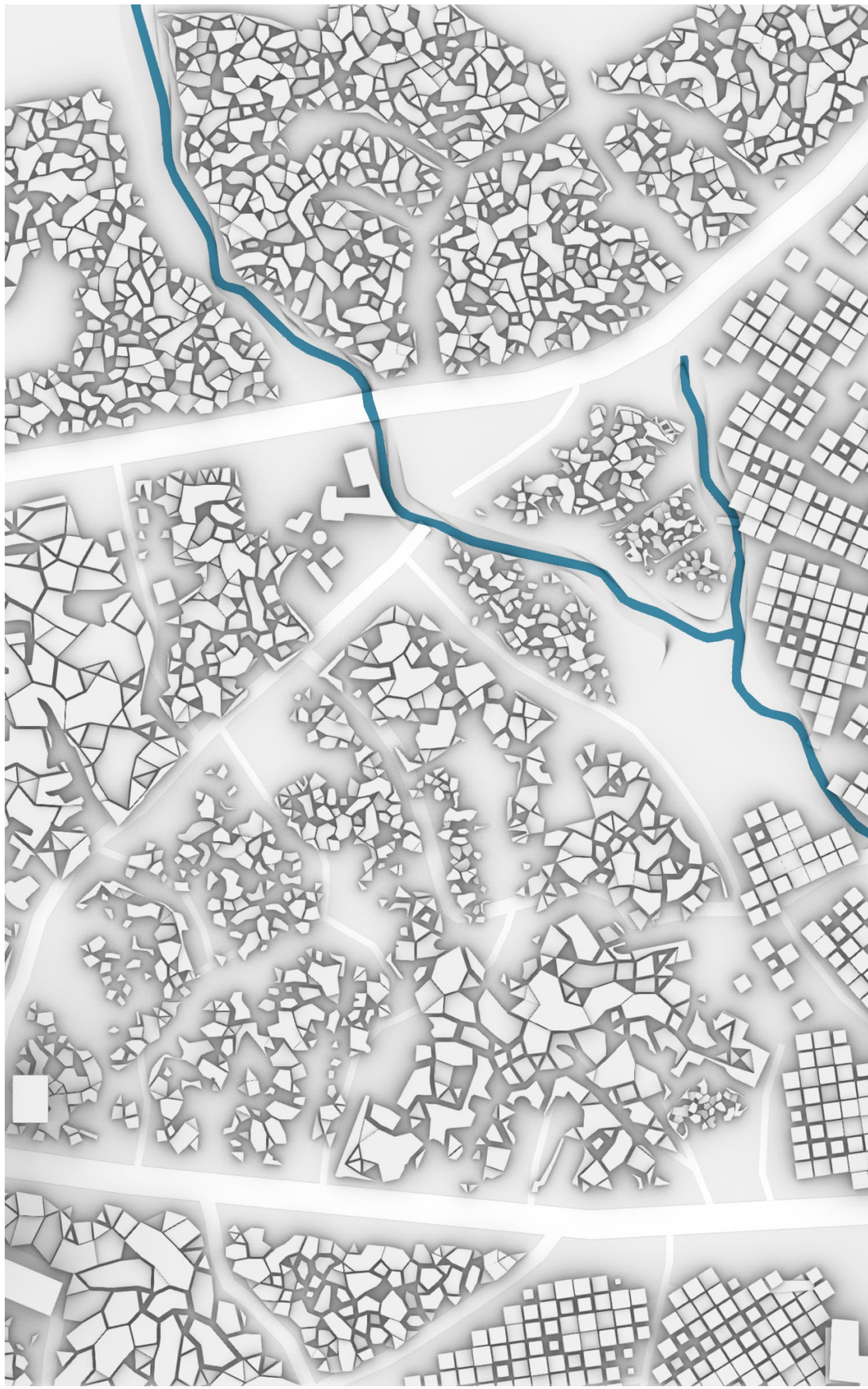
Cyperus brevifolius

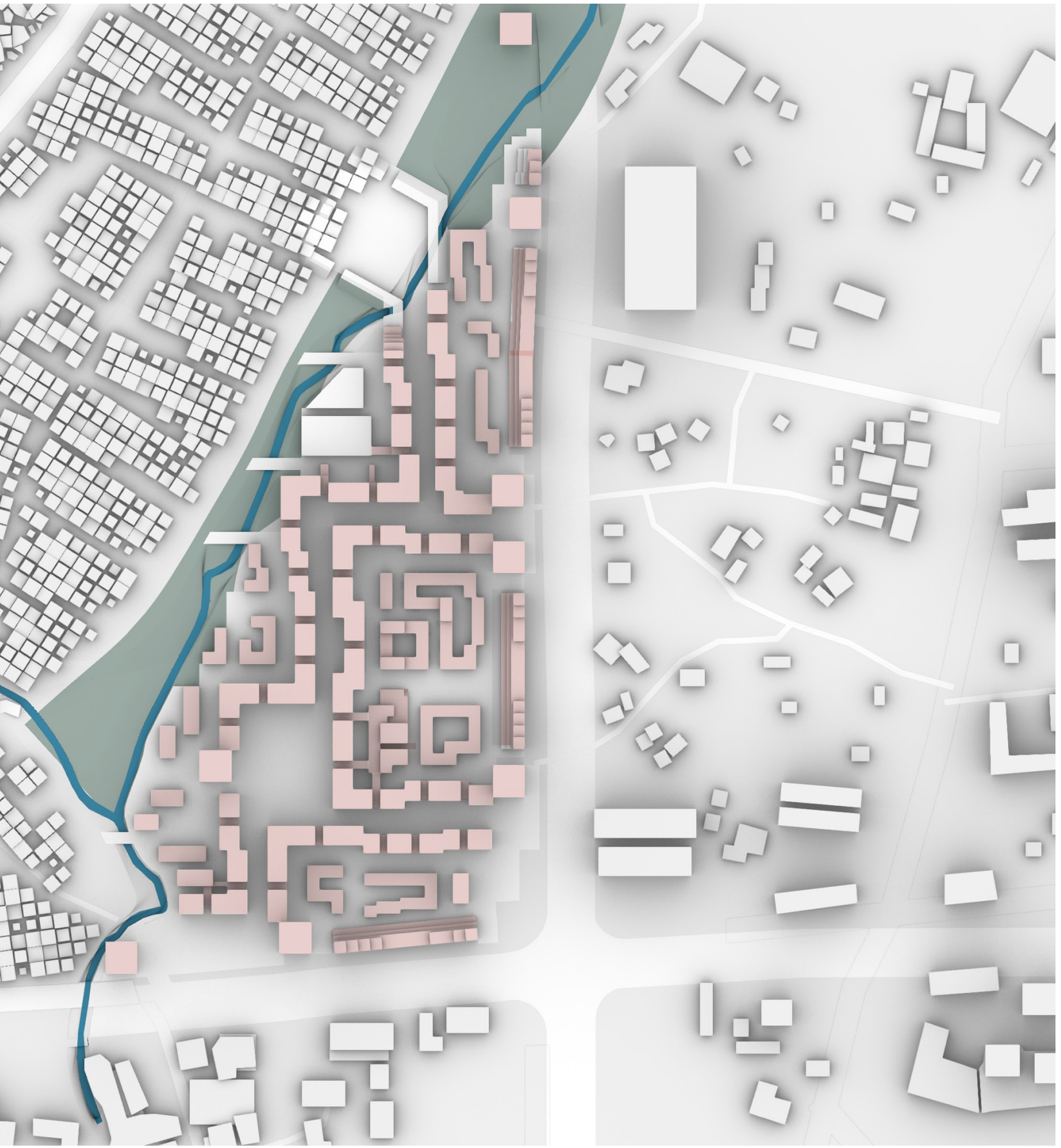
(Abebe & Geheb, 2003)

INTEGRATION

The full masterplan, with the different zone, different dwelling types, and different atmospheres. In the next pages, the integration will be shown through the following perspectives:

1. housing typologies
2. public spaces
3. active street flow and overflow
4. active street input
5. commercial street flow and overflow
6. green zone input
7. phasing
8. masterplan extension



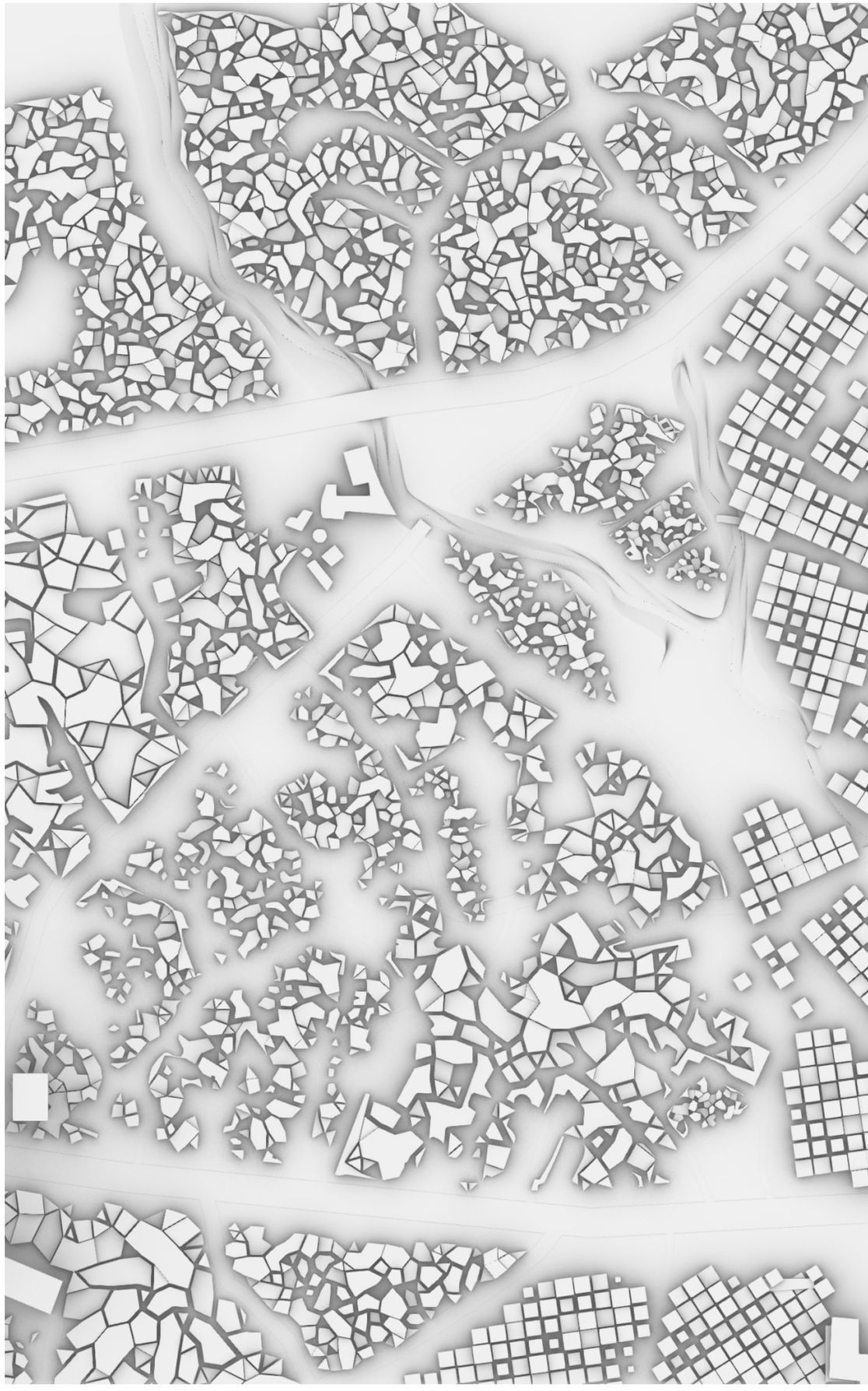


Housing typologies

The housing typologies generally follow the pattern of the masterplan. In the active street (red) there are apartments, small in size, partly self-built, meant for people living in the informal economy. Most of these are low to very low income groups.

The courtyard buildings (orange), are ground-bound, have more space and closer connection to the ground floor for household activities, but further away from economic activity. They are therefore meant for people, either in the informal economy with a side shop, or with a formal job. The vertical extendability and quietness of the street make them also very suitable for families, but this vertical extandablity makes it also cheaper to afford. The people that these dwellings are most suitable for belong to the low to medium income group.

The commercial street dwellings, as well as the apartments in the towers, are the closest to the commercial street, and thus most well connected to the formal world. However, most of them are elevated from the ground floor and far away from street activity itself. As such, they are less suitable for people part of the informal economy, and will be more appealing for people with a formal job. The proximity of the informal economy of the active street, as well as the outdoor space of the terraces, gives extra opportunities for the inhabitants.

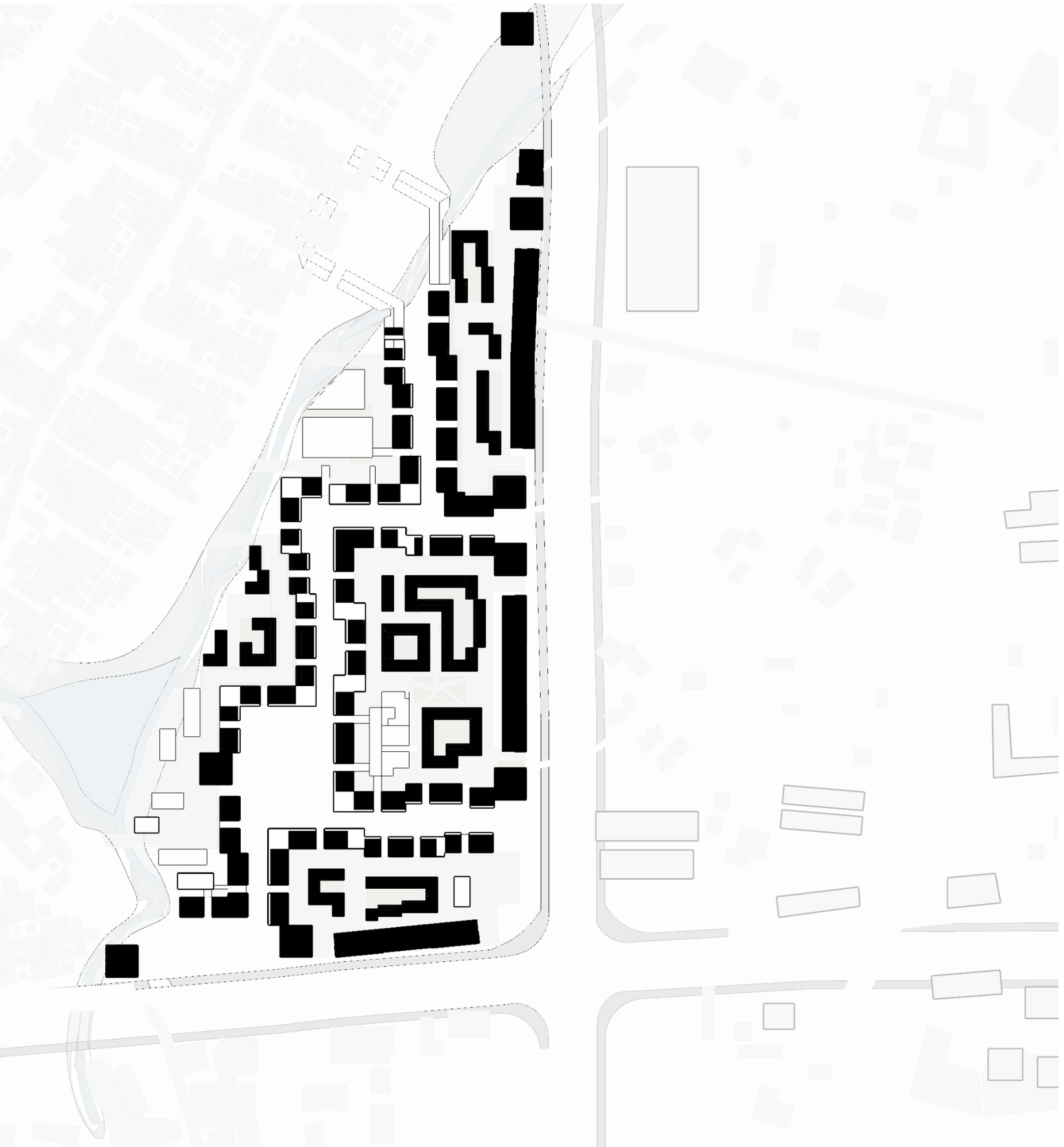


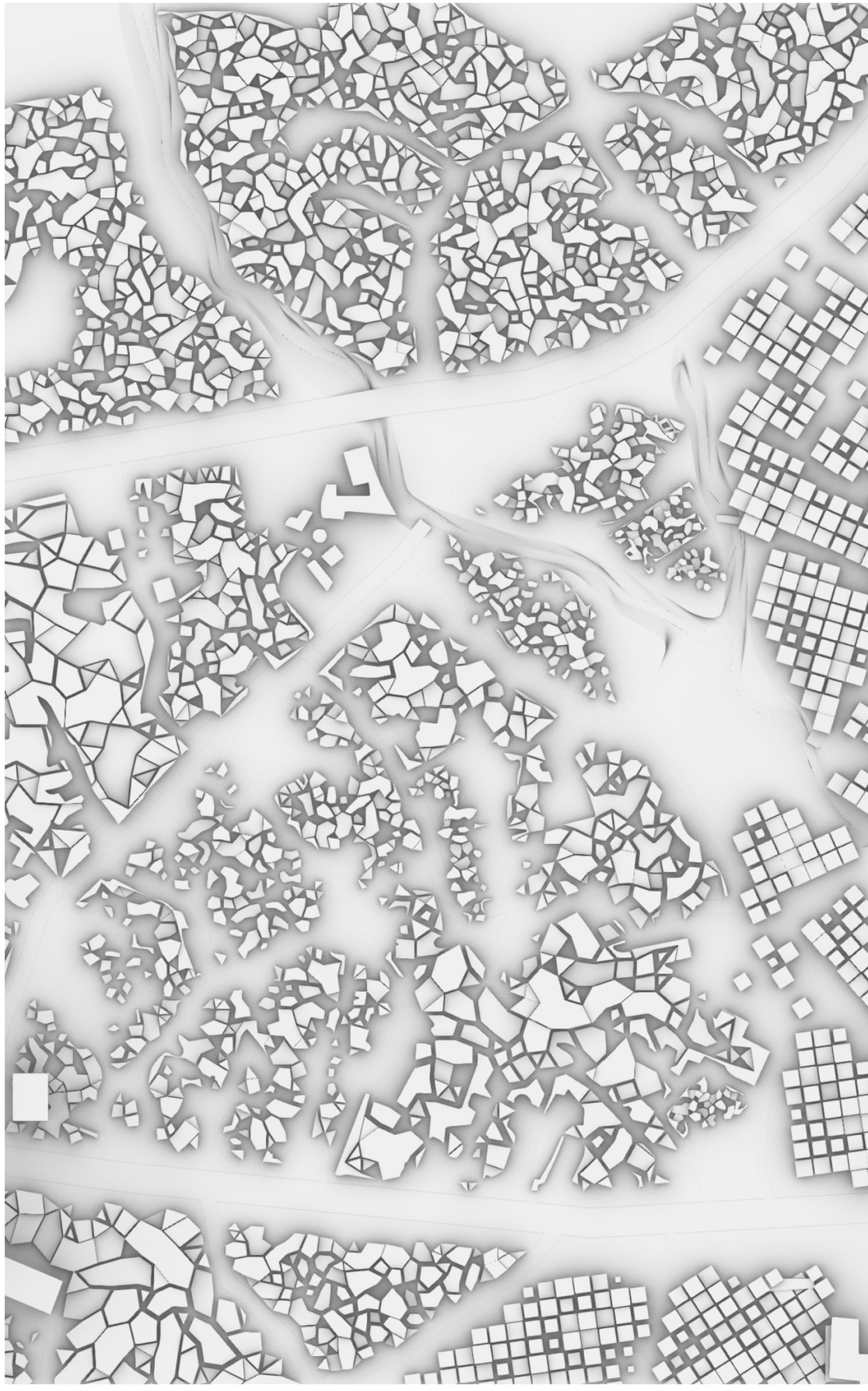
Public spaces: ground floor

Looking at the publicly accessible space on the ground floor, the structure of the active street is barely visible anymore. Due to the cross-connections, it serves as an open and hybrid space. Of course, the structure will still remain clearly visible seeing it at eye-level, because the buildings of the active street run over at the top.

Public spaces: third floor

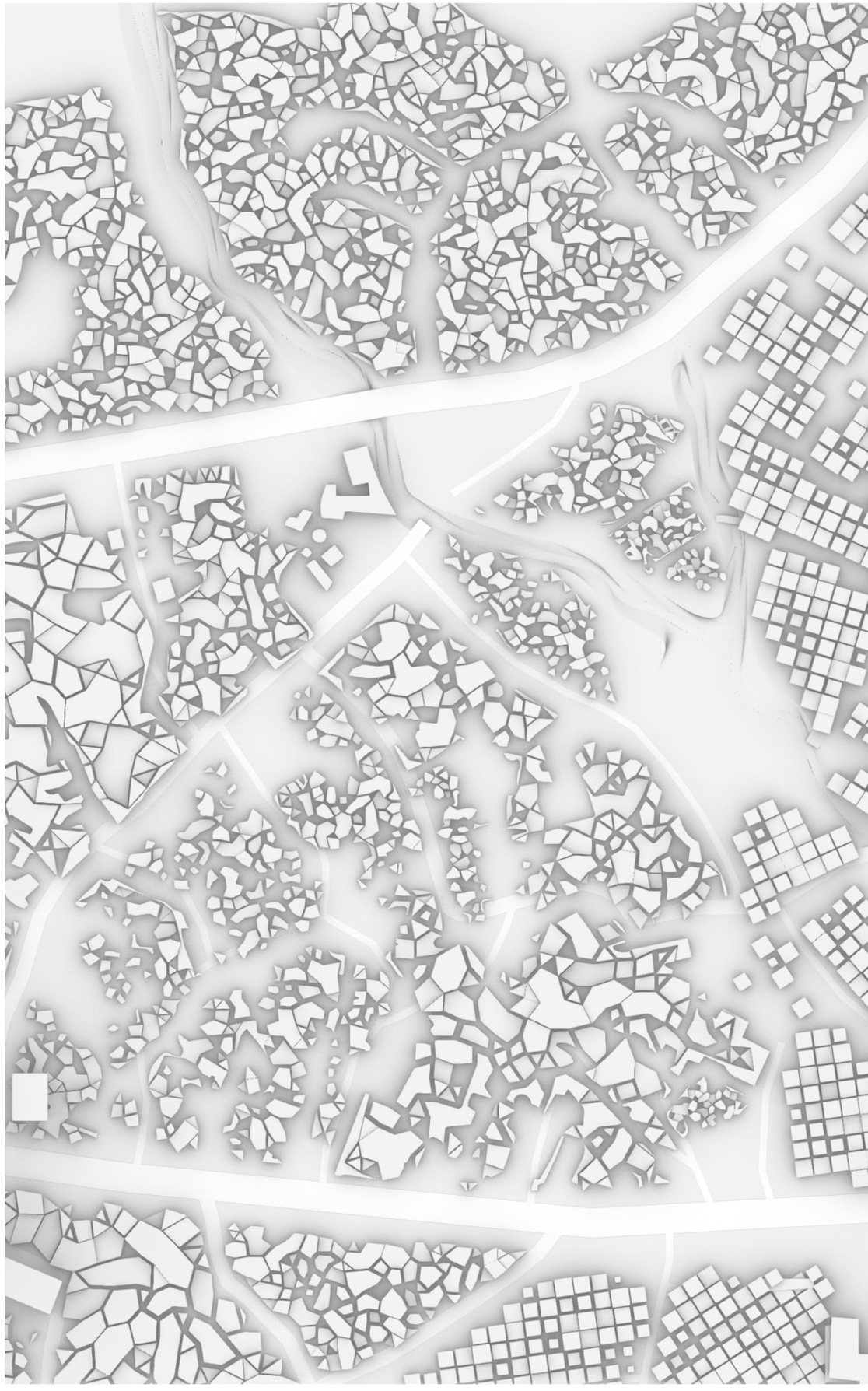
On the third floor, a different pattern becomes visible. Some of the amenity roofs now become accessible, as well as the indents in the active street buildings.





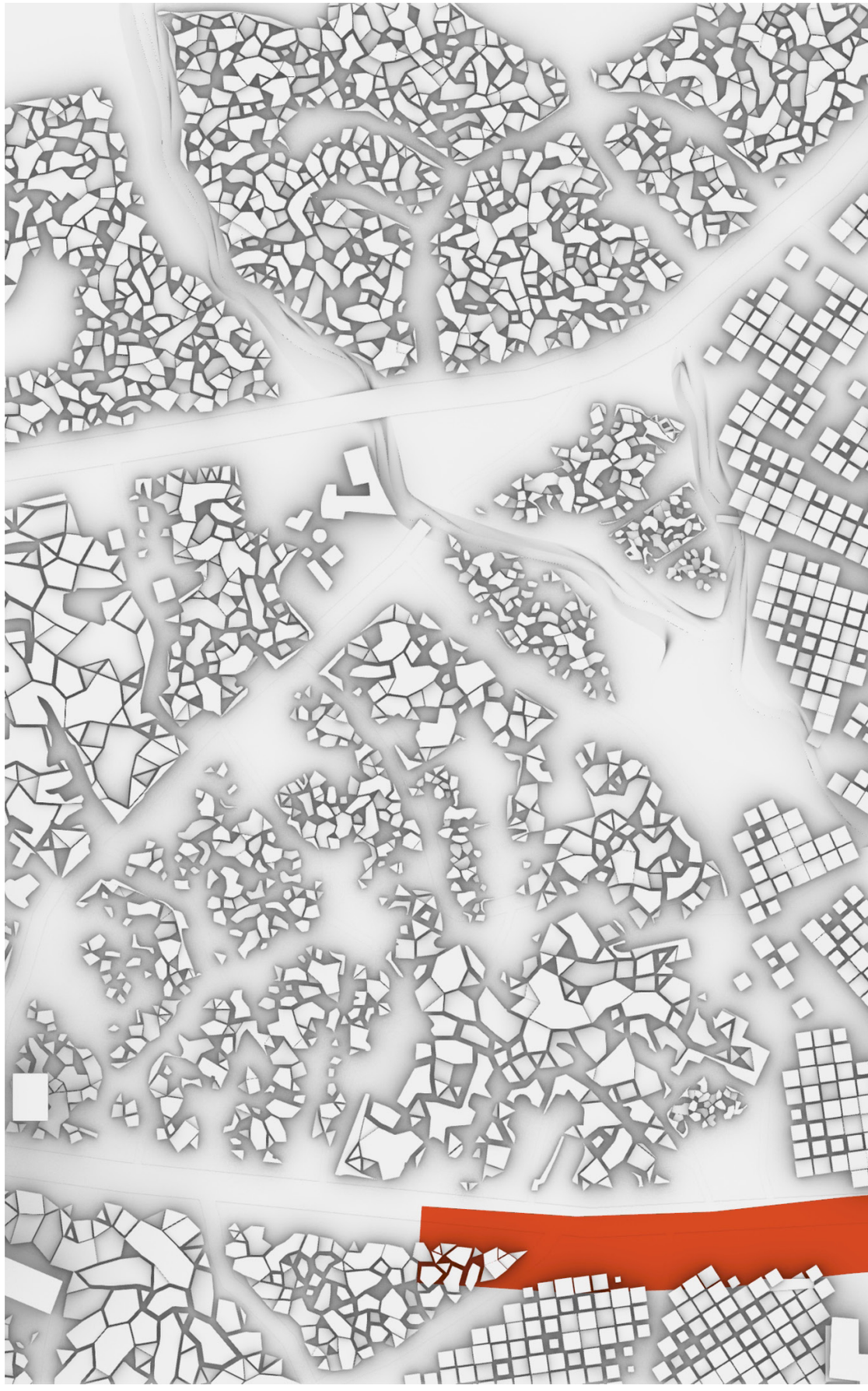
Active street flow and overflow

As mentions before, the active street is not confined to its direct boundaries. It locally overflows its boundaries, into the courtyards, or onto the commercial street. It therefore crumbles down the strict boundary of the active street, and also makes the street more accessible: it draws people actively from outside its borders. Because the high density inside the active street, which will remain higher compared to these overflow zones, the active street will remain the main economic axis, and it prevents that the active street is weakened by the overflow zones: the tension is kept.



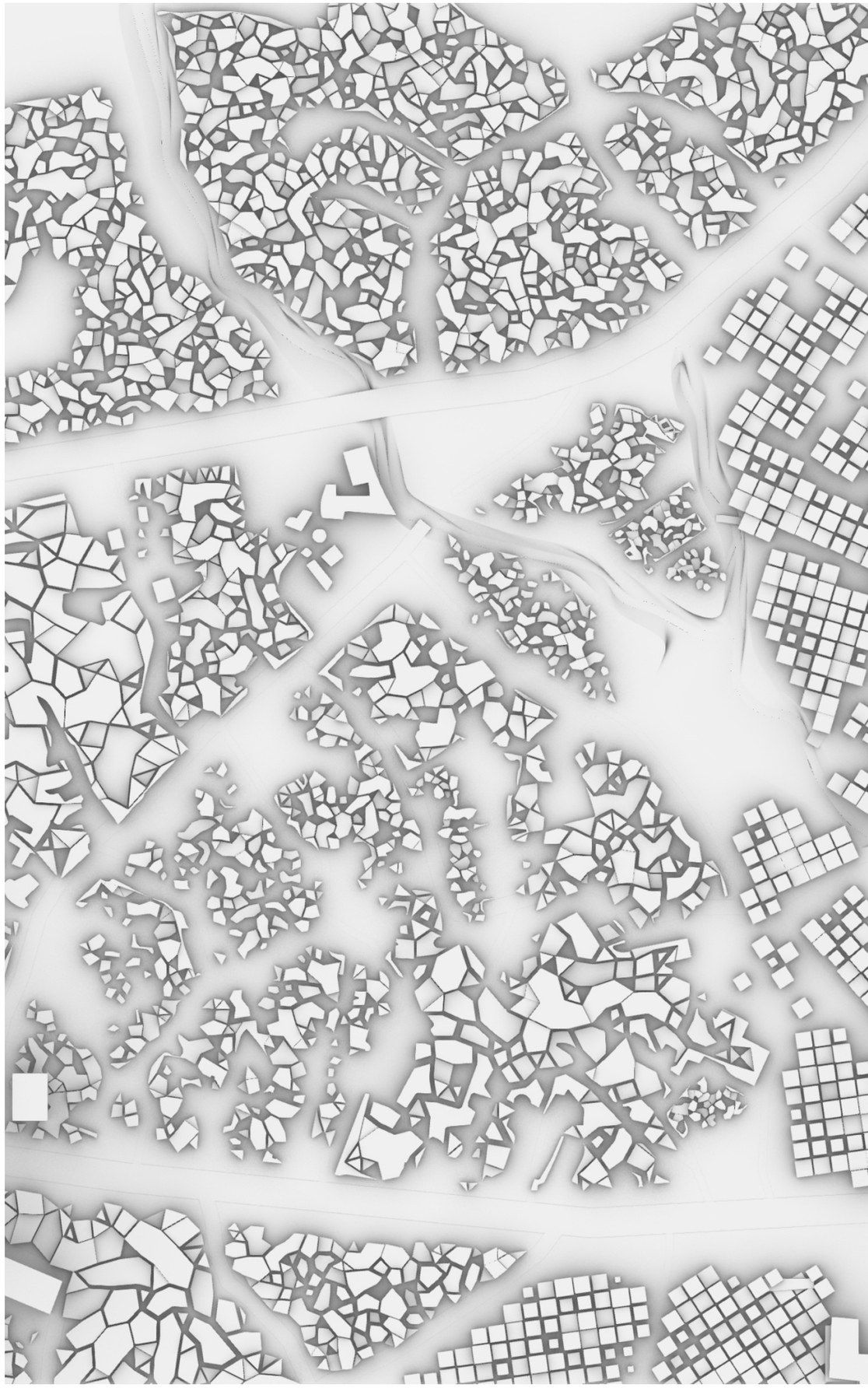
Active street - input

The active street not only serves the people from the active street, but actually serves has a higher area: also inhabitants of the courtyard, as well of the people living in the dwellings next to the commercial street, will visit the active street. The total density of the area therefore improves the economic opportunities for the people living at the active street. It also adds diversity to the whole neighbourhood, and the economy of the active street: by having people visit the active street with different purchasing powers, the economy also caters for these different needs.



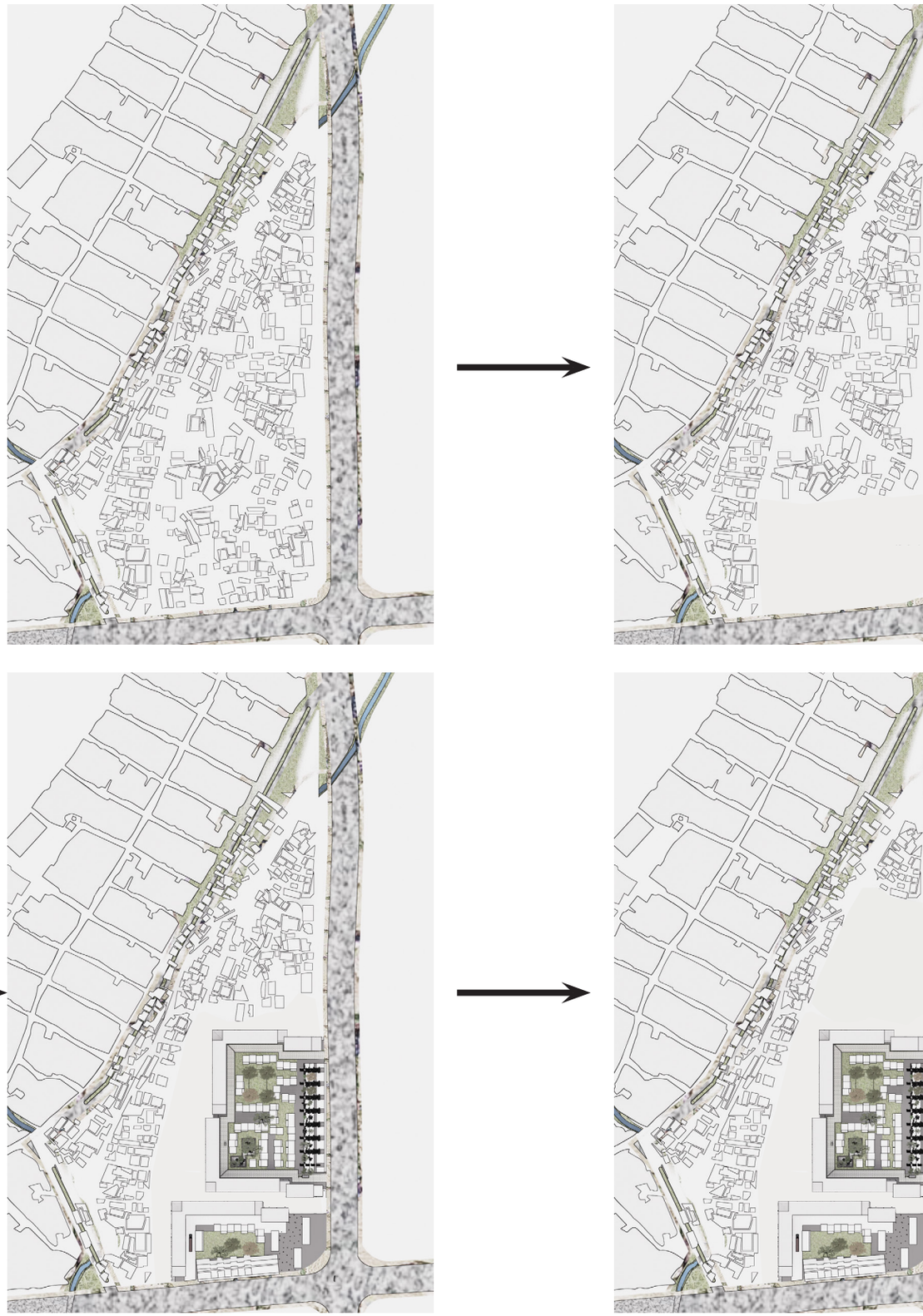
Commercial street flow

The commercial street, with its buildings aligned and activities, also intrudes the neighbourhood, extending its formal activities and buildings into the neighbourhood at entrances of the active street, larger squares, and through the buildings next to it.



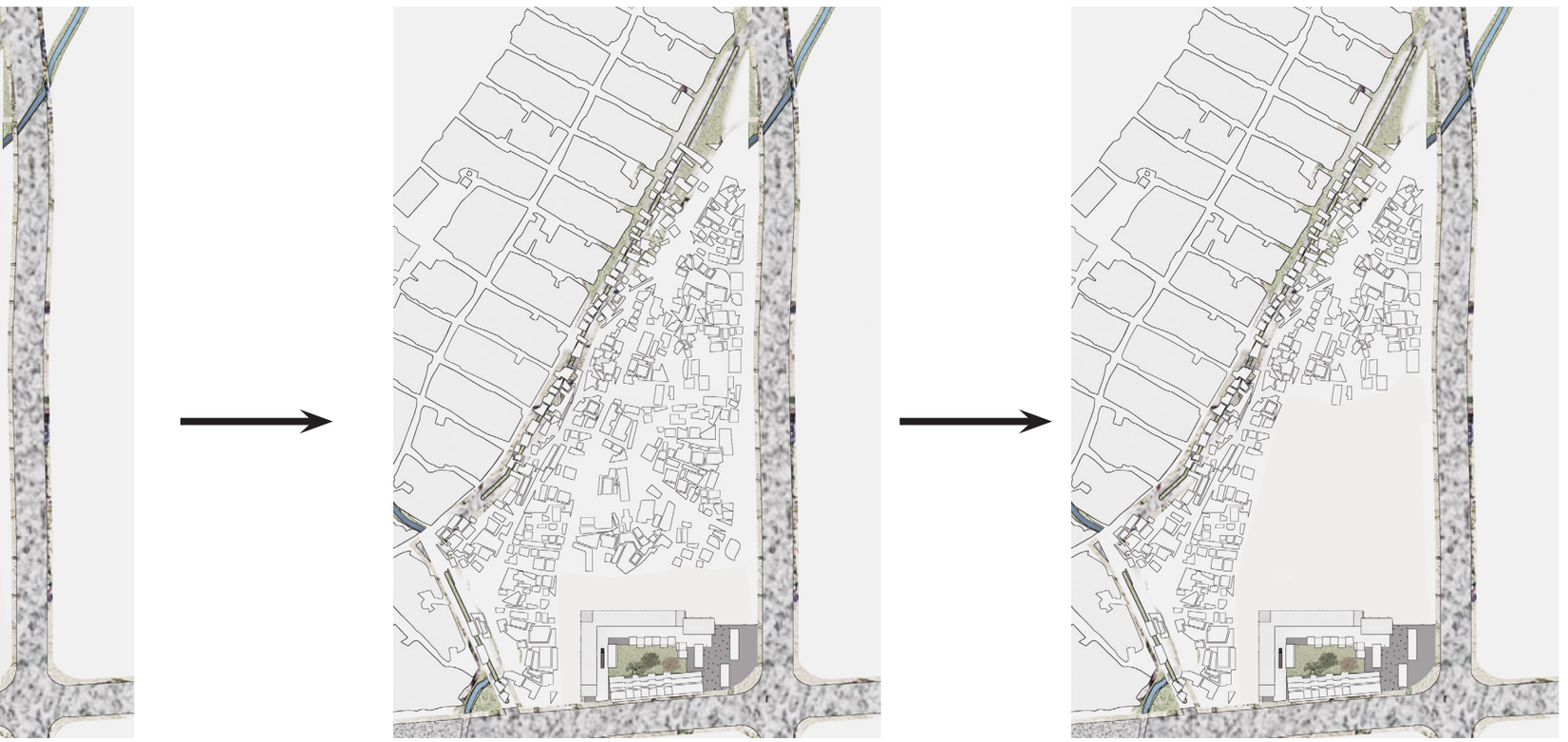
Recreational zone serves the whole neighbourhood

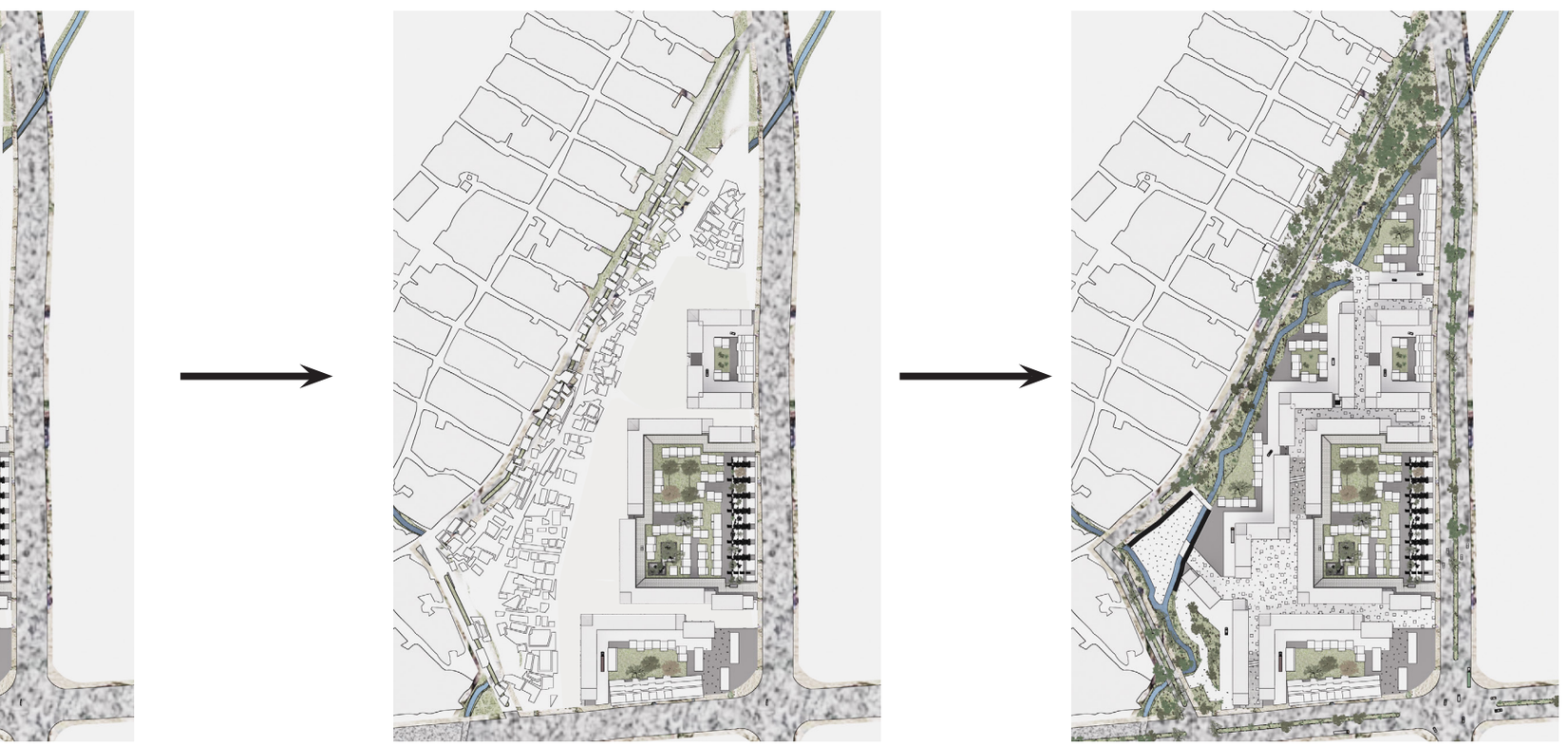
The green zone, widened and enlarged, now caters the recreational needs of the whole neighbourhood. Especially the people in the active street this area can be extensively used: playing, meeting or easing down.

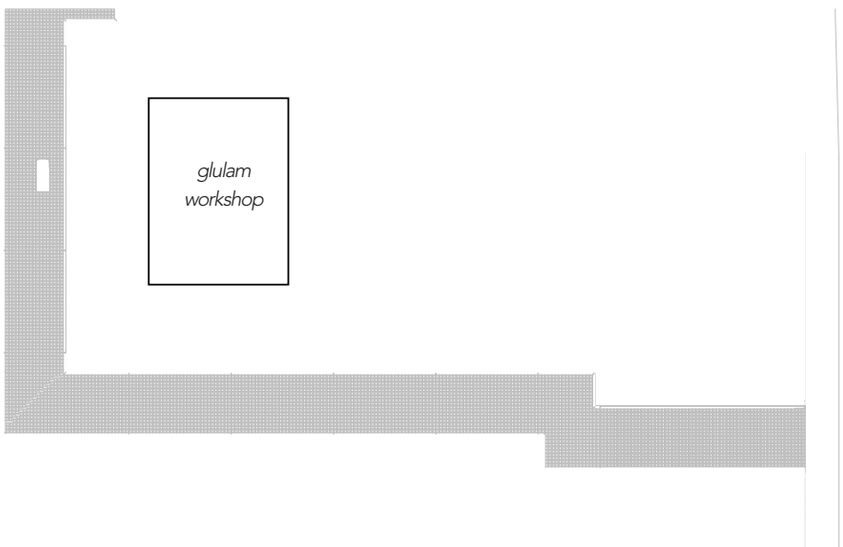


Phasing - masterplan

The phasing of the project is done cluster by cluster: by temporarily relocating one part of the neighbourhood, the first part of the project can be built. Since this first part can house enough people of both the first and second cluster, the next cluster can relocate already to its new housing inside the neighbourhood. In this way, a minimal impact is done on the current inhabitants. Another advantage of this cluster by cluster process is the reuse of workshops: for the construction are a couple different materials used, of which the main ones are eucalyptus glulam, compressed earth block and hempcrete. By setting up workshop specifically for these materials inside the cluster, these workshops can be moved onto the next cluster if one cluster is finished. By taking the same step every time, the workshop will be suitable for the realisation of the whole project.



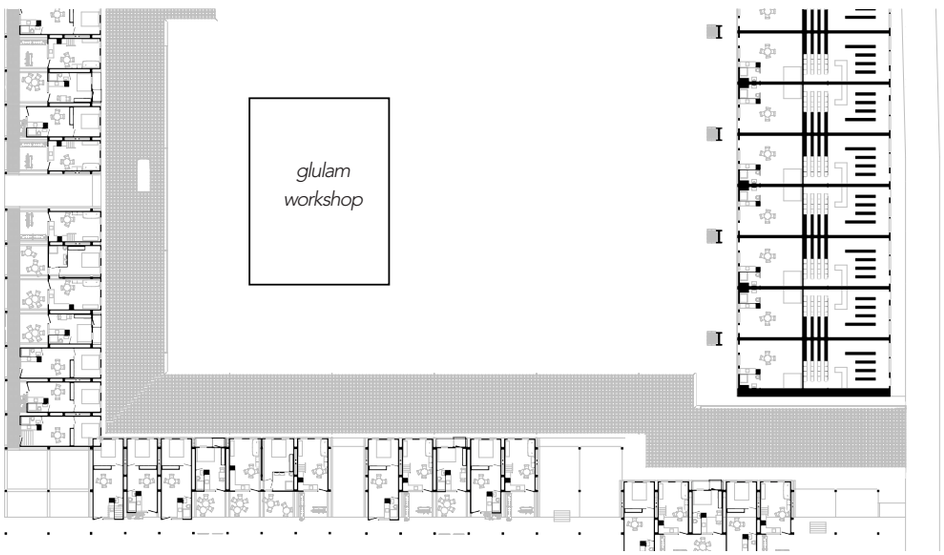




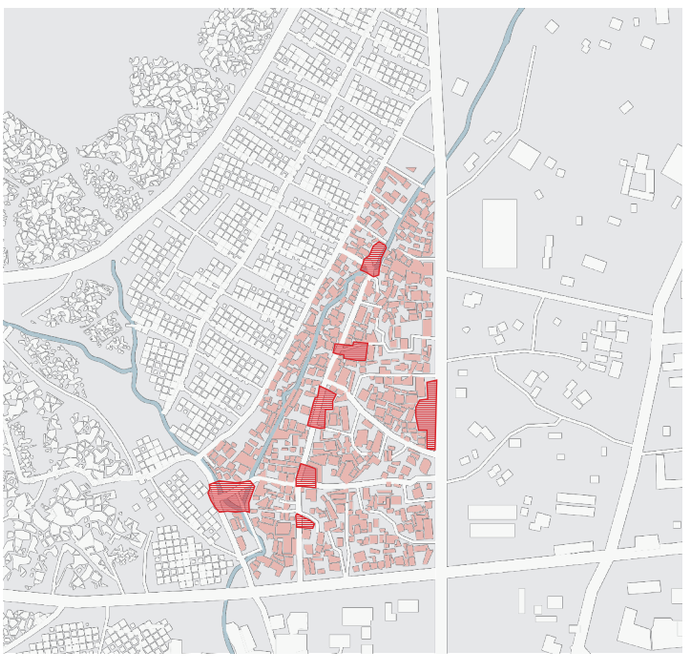
Phasing - cluster

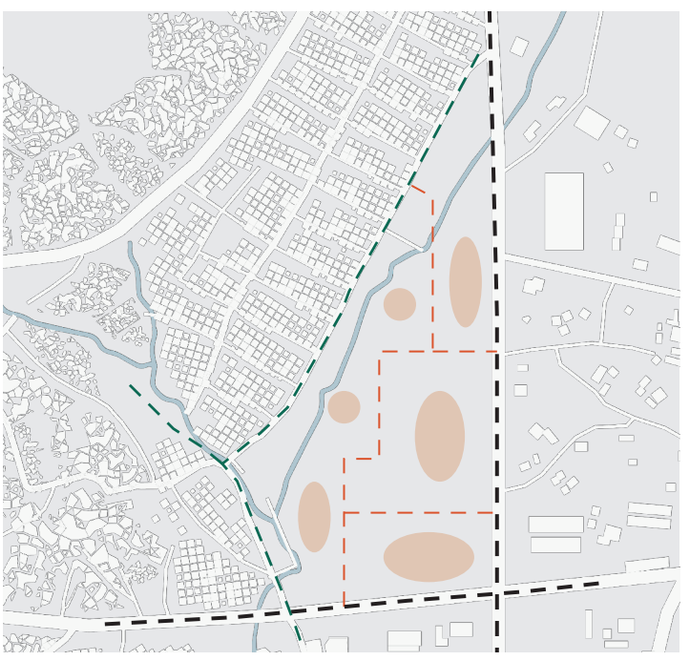
The cluster development starts with the biggest infrastructural element: the road between courtyard and active street. Along this road, a workshop is being built, in this case the glulam workshop. The next step is the construction of the dwellings of the active street. In these dwellings, the current inhabitants can be relocated. The next step is the construction of the commercial street dwellings: keeping the courtyard as open as possible for as long as possible so to have the most opportunities for construction, but also developing the dwellings that are targeting the middle to high income groups, therefore bringing diversity to the site and generating a bit more revenue as compared to the dwellings along the active street.

The final step is the construction of the courtyard dwellings. With these finished, the glulam workshop can disassemble and be relocated to the next cluster.


glulam
workshop


glulam
workshop





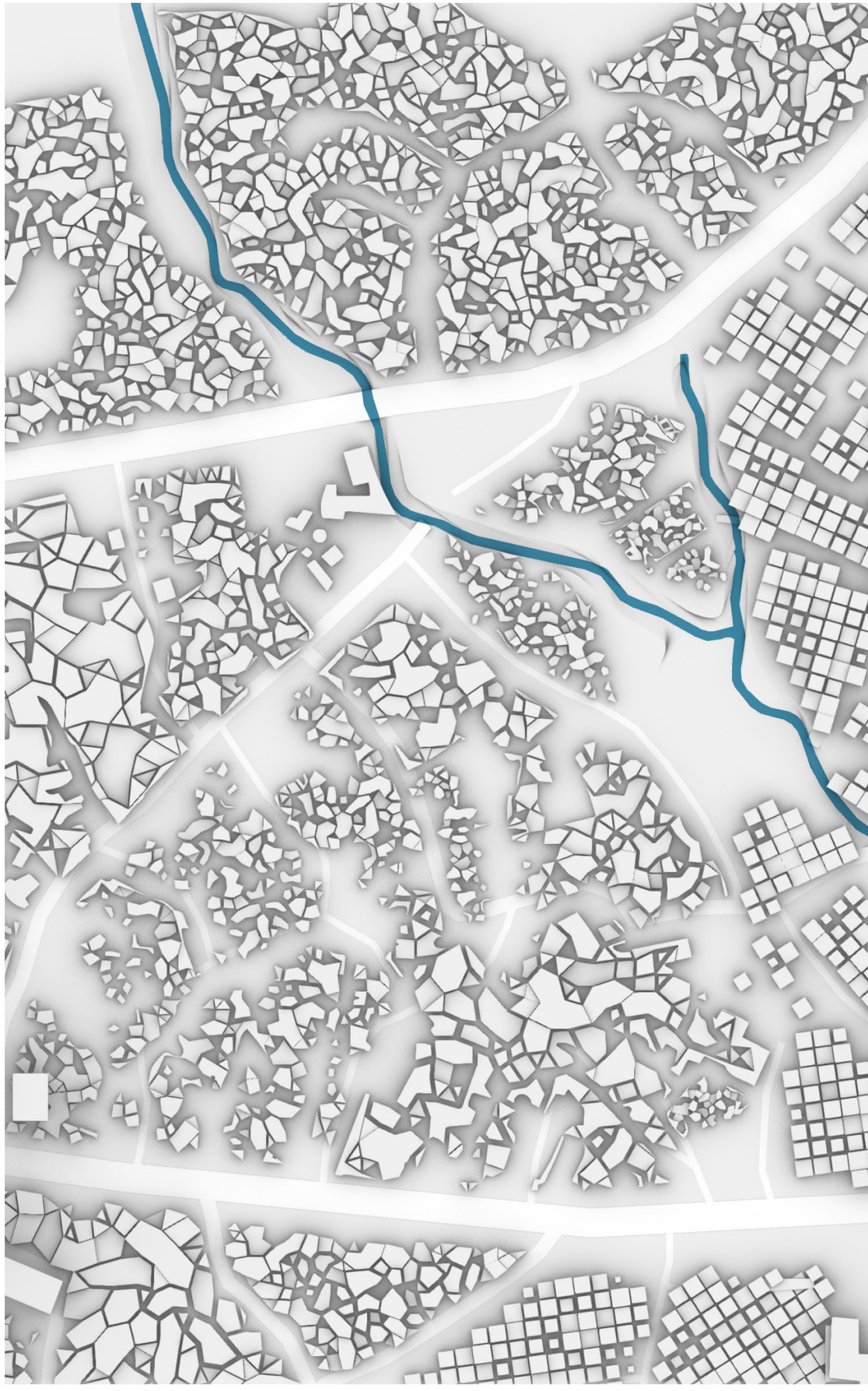
Extension

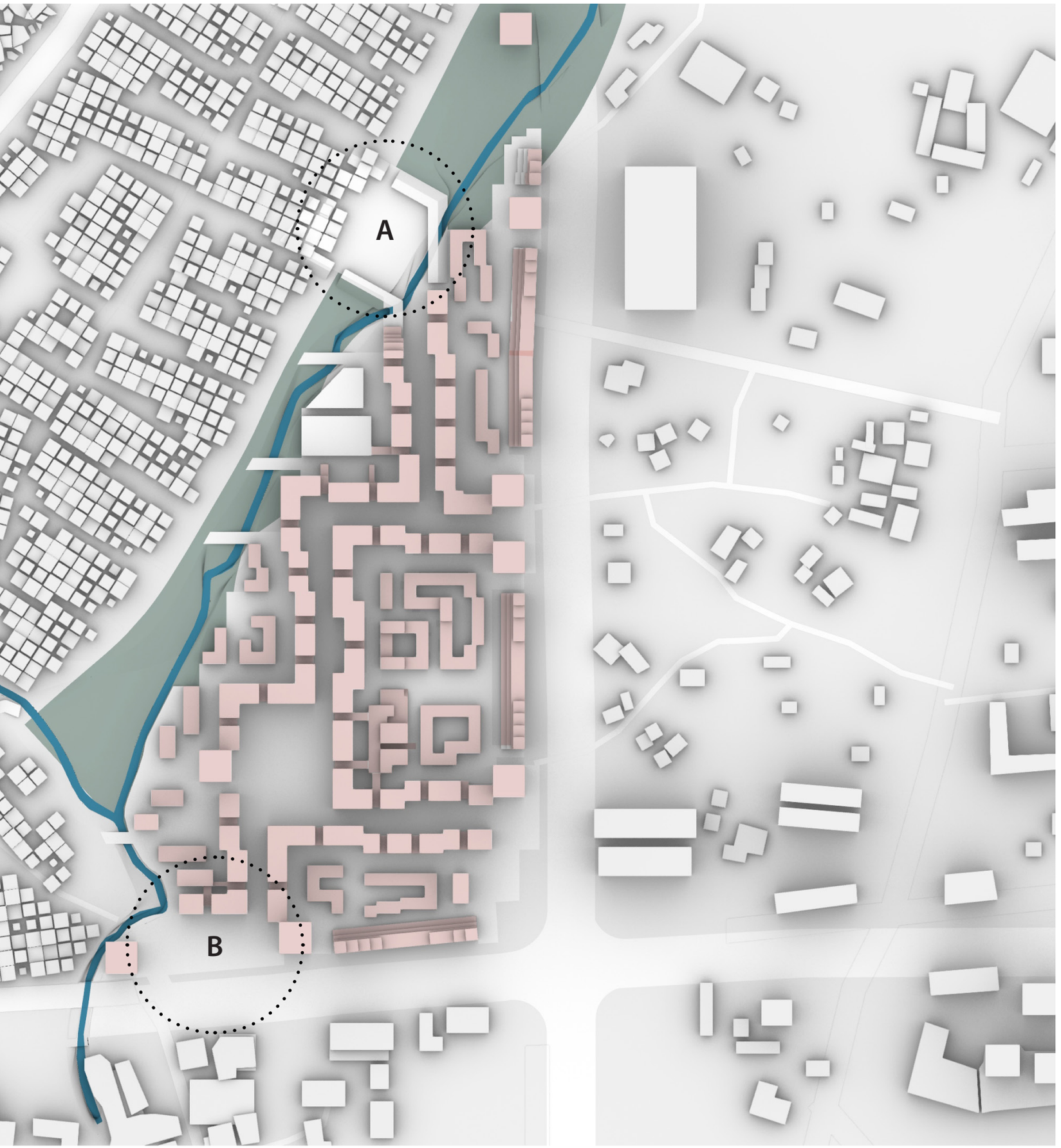
Following the same logic as before: laying down the basic structure on top of the existing structure of roads and open spaces, connecting the open spaces, forming the basis for the active street, place courtyard housing right behind, facing the commercial roads with terraced housing, and a green zone in between. This green zone now serves both part sides of its area, integrating both parts of the neighbourhood.

The steps in shaping the building blocks also apply: the active street based on its powercurve and forces, pulling and pushing it, creating a less rigid street. The courtyard buildings aligned to the connections to the active street. The commercial street buildings rising up at the side of the large road, and at the other side stepping gradually down towards the courtyard housing.

POINTS OF INTEREST

Two points will be further developed: there is the zone in the north where the active street meets the green zone (A) and there is the zone in the south where the active street, the commercial street and the green zone come together. While they are manifested in different ways, the principle for both is the same, as seen in previous parts of the project, and also applies when looking at other points of interest: layering instead of zoning, forces instead of outside boundary. For these zones, an extra principle comes into play: the use of opposites to create an intermediate space. The idea is not to let each atmosphere stop where the other starts, but let them overlap: there is always an element that belongs to one atmosphere at the other end of the zone.

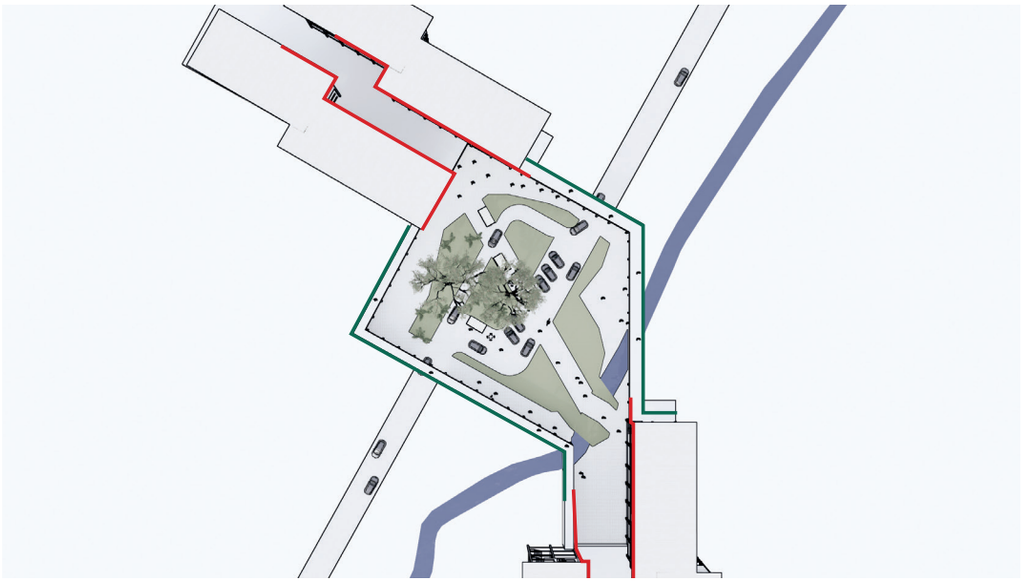


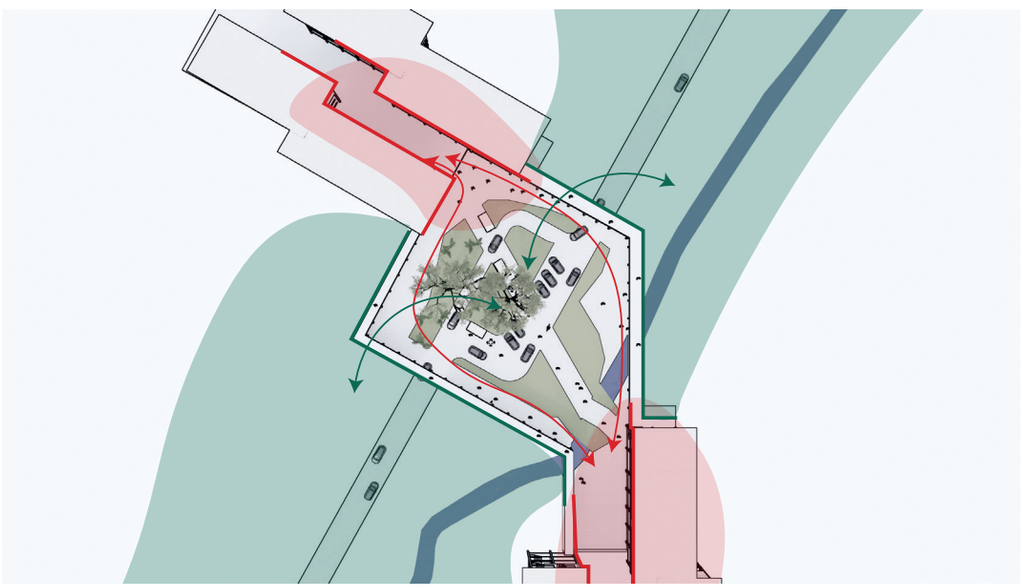

A
B

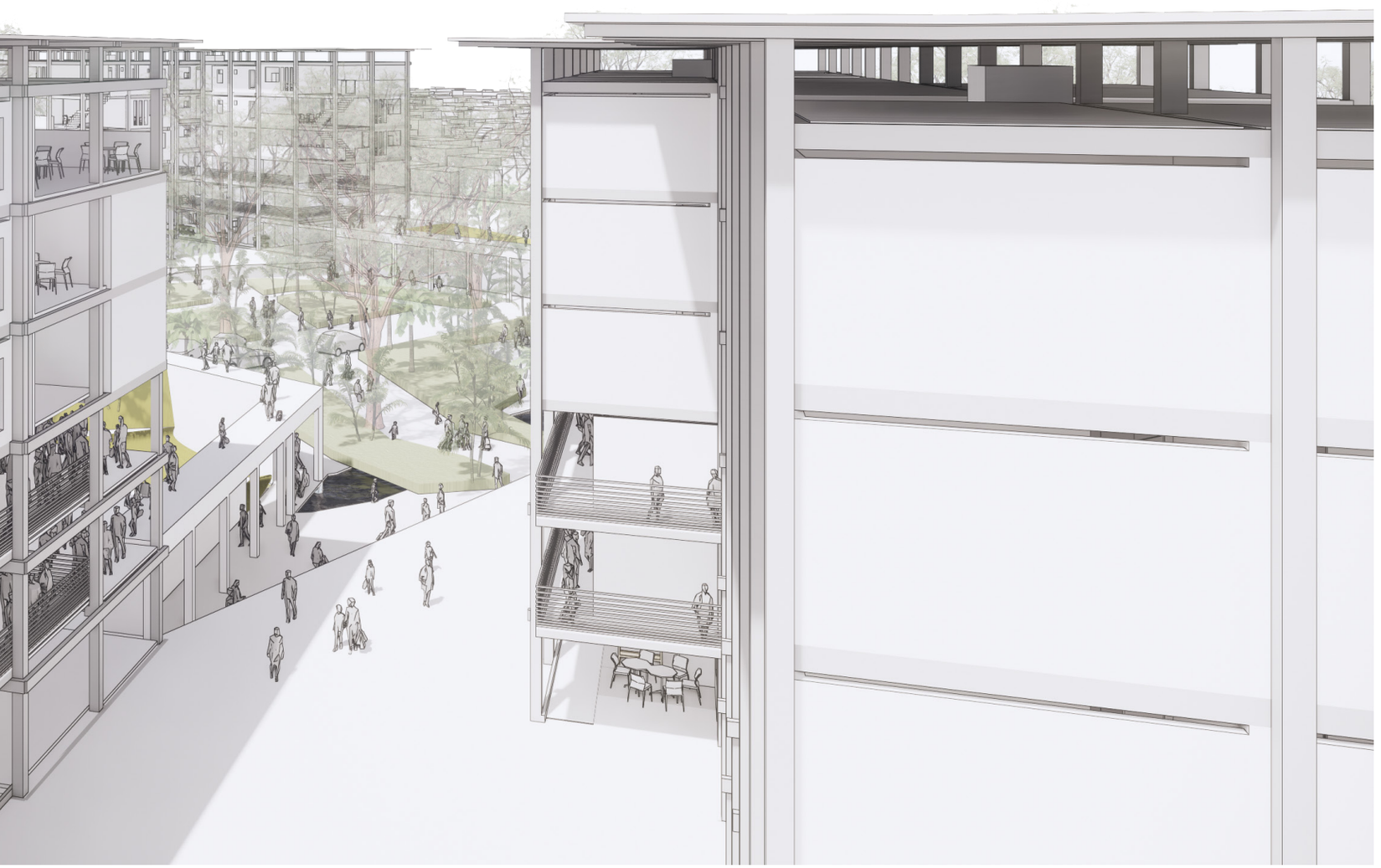
Point A

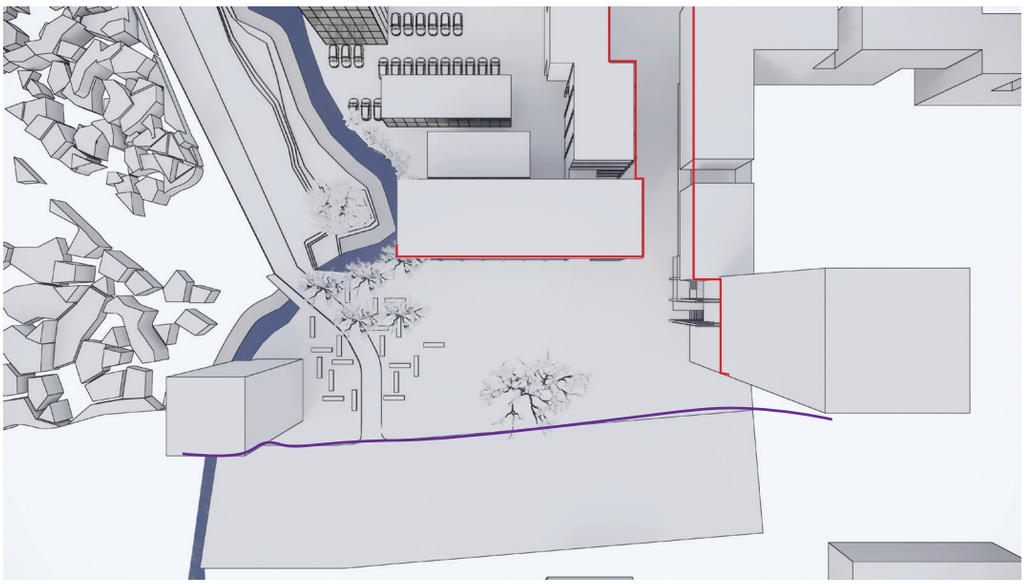
The square in the north is a combination of the active street and the green zone. Both are continuing onwards: the active street in a (yet to be) developed extension of the masterplan, the green zone towards the commercial street. In creating this overlapping space, both of them want to continue onwards as unhindered as possible. But while the active street sinks half a storey down and creates a ambient enclosed square, continiuing in one fluid movement, the green zone actually hops on and over. It infiltrates spaces of the square, but also creates its own momentum by rising upwards before the sunken active square. It not only accentuates the enclosed environment of the square, but also creates a friendly overview from the edge, which is in its own connected to the first floor levels of the active street buildings.

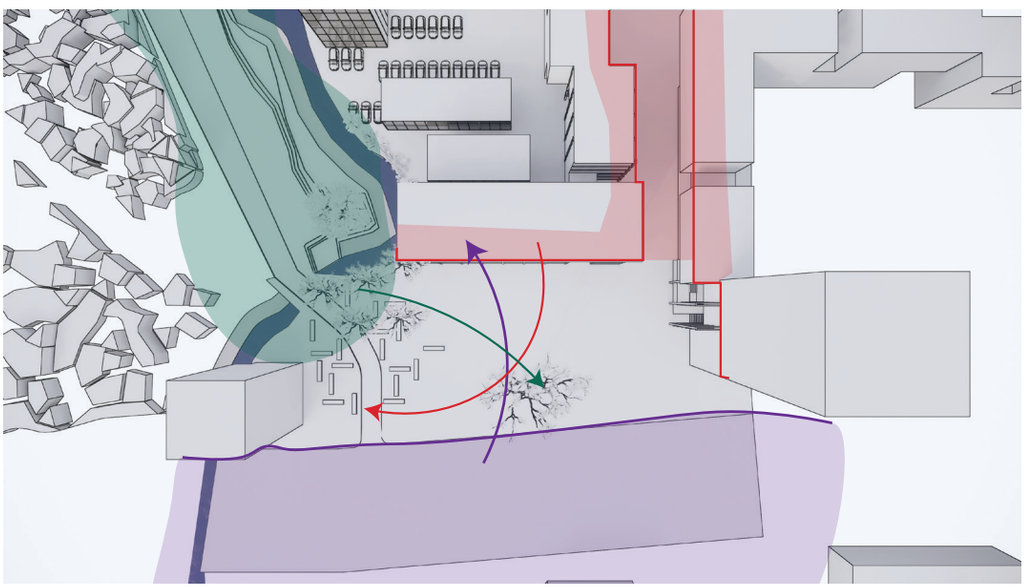
In allowing cars easy passage through the square, both ways of the street are seperated, so to slow down traffic and create space for the meeting of the two different traffic types: the cars can slow down, stop, take a break, or buy something at a temporary stall. The pedestrians can interact, sell or hop-on.











Point B

Where the square in the north has two overlapping atmospheres, the square in the southwest has three: the commercial, the active and the green zone.

REFLECTION

My understanding on the "how and why"

The studio topic, Addis Ababa: Living Lab, was a very interesting starting point and guiding principle of the graduation project. Diving into a completely different world, different context and different processes, it was a joy to investigate the completely new urban and architectural patterns like living, mobility, working and social. This was also one of the things that formed a barrier: however interesting it was, it was hard to completely understand them, without having been there.

In the project I wanted to incorporate the informal world in a built, formal, solution. I chose a specific aspect: temporality. It is an important element in the informal areas. The project aims for the integration of peoples' behaviour in the project, for facilitating opportunities and chances to improve ones life in the city. At the same time, the project aims for providing an improved basic quality of the built environment, while remaining its (economic) accessibility.

My reflection upon the feedback of my tutors & my translation

I would like to thank the tutors for the feedback they have given me during the graduation project. They connected my ideas to relevant (referential) theory, showing possibilities and strengths of this (different) urban world, in particular with the element of temporality, connecting it to ideas like kinetic city (Mehrotra), the stem and web (Candilis, Josic, Woods), and of course at the start with papers taking a broader view on urbansim (Schmid, Lefebvre), or regarding the urbanism from a non-Western perspective (Pieterse). The tutors also helped in shaping my project, pointing me on how to fully empower the elements that I use (power of the street, power of the building).

Overall, in the feedback, I found the on-campus tutoring much more preferable than the tutoring via zoom. The tutoring via zoom, while being helpful, offered less possibilities to search together for a solution, to get feedback on my thinking process and possible flaws therein.

In general, reflecting on my translation of the feedback, I experienced that letting go of ideals is not easy. During the project, there were ideals that have become too fixed at certain moment, which made me neglect the full range of possibilities. Examples are: wanting to preserve existing buildings, or neglecting a certain amount of structure in the masterplan. Elaborating on this last one: I was trying to keep a certain level of the chaotic-like structure of an informal neighbourhood, and by doing that, accommodating differences, accommodating a place for all. The dualistic view in my mind, at that time, was, by giving more structure to the masterplan, led to a neglection of freedom and flexibility for the people, and thus endangered the way in which their way of living could be integrated in the project. By opening up for other possibilities, it gives space for different qualities and achieving the ideal in different ways.

I think, looking at my response to feedback, that I find more abstract or theoretical feedback very inspiring, and that it shapes a situation in which I can adapt quickly. Ideas like the power of the street (how to preserve the tension), power of the building (how do they shape the street) immediately show me why a certain choice in a specific part of the design does not correspond to my goals and principles. Also regarding theory, it was very inspiring and helpful to look at references, like the stem and the web, or looking at the idea of 'streets in the sky'. It helped me to place my ideas in context, and become aware of the strengths and weaknesses of such ideas.

How I've learned from my own work

In the project, I learned about the background of this different world, the power of the informal and the temporal.

I will, in every project that I will do, take with me the way in which I developed my design process and thinking in this project. For me, it is building towards a more relationary approach, in which not the manifestation (physical design, how it looks, static) is leading, but the idea behind it (what it does, dynamic, temporal) is empowering the specific built environment.

In the process, I have been stuck, got loose, turned into a different direction, and got stuck again a few times. It made me conscious of the times that I get stuck, the times that I postpone choices, the times that progress is delayed. Some of these moments were moments in which I was overwhelmed by the complexity and the ideals that I had set for myself. The process has learned me a lot in recognising these moments, and how to deal with these: temporarily abandoning an ideal, and looking at the core of this ideal: why is this so important, and can I realise it in a different way. The quickest way of learning in these moments is experimenting and trying, learning what I like about variants, and why, and what I like less.

PROJECT ASPECTS

Aspect 1: the relationship between research and design

In the project, the research (being the qualities of the informal, and mainly the temporal aspect) is manifested in the physical design by ways of layering: there are layers that are solid, fixed, and there are layers that remain open and flexible. These are in constant tension with eachother: the project does need to work; cars and ambulances should be able to reach all the dwellings, it should be structured so that it doesn't become a chaos, it needs to create nice places, not a large congestion, it should be affordable, simple and efficient and not complex and illogical. While this relation between research and design is abstract, I have increasingly learned ways of how to deal with this, how to approach an issue, and make these principles affect choices in the process.

Aspect 2: the relationship between my graduation topic, the studio topic, the master track and the master programme

One of the things that I like most about the studio is the applicability and the universality of the theme. Housing is everywhere and always around us, an integral part of the built environment. Especially by looking at global housing, doing research into different environments than my own, makes me question the living patterns of the world directly around me. It makes me wonder about the architecture that is being built, and about the way we use this built environment as a society. The topic I chose, temporality, is an integral part the informal way of living. This informal way of living is an important aspect of dwelling in the third world countries, and therefore for me a deciding element if a new-built project succeeds or not. But the aspect of temporality also relates to the cities in this part of the world: we should always design by relations, allow for change, and take into account that a project appears different at different times.

Aspect 4: elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results

The studio title: Addis Ababa, Living Lab, implicates that the project is more than a single dwelling project alone. Taking place in a city where the need for dwellings is extremely high, and the current dwelling system (IHDP) is not suitable for the people that need it most, providing housing that doesn't allow for the lifestyle of the people that need it. However, the city doesn't need a single project that allows for these lifestyles, but is more benefited by a housing system that can be copied and scaled up. In the project, I tried to manifest this system not as something fixed, a rigid output, but more as a guiding principle, relating one location to the next, relating one place to the next. By doing this, I want to avoid the rigid manifestation of dwelling that excludes the lifestyle of many people and find a way to make dwellings for these people that need housing the most, have the least to spare, in a place that still gives them enough opportunities to earn their living. I think this is a very relevant aspect, not only in Addis Ababa, but in cities all around the world, especially non-Western cities. The urban population is growing very rapidly in these countries, and the percentage of people living below the poverty line is high. Therefore, the housing shortage is increasing rapidly, and needs to be dealt with in a way that tackles the situation at heart: providing a house, opportunities for economic activities, cultural activities, social activities. In other words, providing appropriate places for the urban poor.

Aspect 5: discussion of the ethical issues and dilemmas that I encountered in doing research, elaborating the design and potential applications of the results in practice

There are several aspects that I encountered, both consciously and unconsciously. Starting with the intent of the project, where I chose, or realise, that

I want to improve the living condition of the poorest part of the urban population, by creating a built environment which is both affordable and of a proper quality. I want to do this in an as independent way as possible.

It put the focus on parts of the society where the dwelling conditions are the poorest: the informal neighbourhoods. A difficult question arose along the way: can I keep this urban condition, or do I need to demolish the homes of these people in order to make space for something better? At this point, the first realisation came that I could not keep the homes intact if I really wanted to improve them. But I wanted to incorporate the qualities that I saw in these places: an open environment, accommodating a way of living for people who had absolutely nothing. An informal, sometimes chaotic, way of placemaking. Not the most efficient, but by its irregular nature it seemed to me very open for differences: different people, different living conditions, different jobs. I wanted to keep the chaos, but I had to realise that this chaos was not helping my design. It lacked efficiency, overview, therefore safety and orientality, among others. Also, I had to realise that sometimes, this chaos isn't as much accommodating for differences as I seemed to think. Something very stable can accommodate better than something chaotic, something moving all the time. This relates to the issue mentioned before (aspect 1): a constant tension between the solid and the open; the fixed and the flexible, the stable and the chaotic.

BIBLIOGRAPHY

Abagissa (2019) Informal Settlements in Addis Ababa: Extent, Challenges and Measures Taken. Journal of Public Administration, Finance and Law, 2019:15.

Abebe, Y.D. & Geheb, K. (2003) Wetlands of Ethiopia. Proceedings of a seminar on the resources and status of Ethiopia's wetlands. IUCN.

Baldwin, E. (2018) Projeto dos brasileiros Aleph Zero e Rosenbaum vence o Prêmio Internacional RIBA 2018. Retrieved on 20-05-2021 from https://www.archdaily.com.br

Bassi, M., Tossuti, F., & Van der Meulen, A. (2016) Dejach Wube Sefer. Addis Ababa Global Housing Studio. Unpublished.

Cavalcanti, A.R.C. (2017) Work, Slums and Informal Settlement Traditions.

CIA (2020) The World Factbook. Published online at cia.gov. Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/geos/et.html

De Man, M. & Cherry, Y.Y.S. (2016) Geja Sefer. Addis Ababa Global Housing Studio. Unpublished.

Friesen, J., Taubenböck, H., Wurm, M. & Pelz, P. (2018) The similar size of slums. Habitat International 73: 79-88.

Glaeser, E. (2012) Triumph of the city. Pan Macmillan, London.

Haweck, K.A. & James, H.A. (2007) Node Importance Ranking and Scaling Properties of some Complex Road Networks. Res. Lett. Inf. Math. Sci., 2007, Vol11: pp23-32.

Holtslag, M., Chang, E., & Lelieveld, M. (2016) Basha Wolde Chilot. Addis Ababa Global Housing Studio. Unpublished.

Iovene, M., Smith, N.B., & Seresinhe, C.I. (2019) Of Streets and Squares: Which public places do people want to be in and why? Cadogan.

Kamalipour, H. (2016) Urban Morphologies in Informal Settlements.

Krämer, A., Khan, M.B., & Kraas, F. (2011) Health in Megacities and Urban Areas. Springer Verlag.

Kim, S., Choi, J., & Kim, Y. (2010) Determining the Sidewalk Pavement Width by Using Pedestrian Discomfort Levels and Movement Characteristics. Journal of Civil Engineering, Vol. 15 (5): 883-889

Lirebo, D. (2006) Informal Settlements in Addis Ababa. Addis Ababa University.

Lombard, M. (2013) Struggling, suffering, hoping, waiting: perceptions of temporality in two informal neighbourhoods in Mexico. Environment and Planning D: Society and Space 2013, vol. 31: 813-829.

Lutzoni, L. (2016) In-formalised urban space design. Rethinking the relationship between formal and informal. City Territ Archit, 3:20.

Mota, N. (2015) Banks, Sweat and Shelter in Addis Ababa. Site and Services in Performance. ETH Zürich.

Mota, N., Mooij, H.A.F. & Grossman, V. (2021) Addis Ababa as Palimpsest. Delft University of Technology.

Myers, G. (2018) The Africa Problem of Global Urban Theory: Re-conceptualising Planetary Urbanisation. Doi:10.1183/9789004387942_011

Pieterse, E. (2010) Cityness and African Urban Development. Urban Forum (2010) 21: 205-219. DOI 10.1007/s12132-010-9092-7

Pugh, C. (2001) The Theory and Practice of Housing Sector Development for Developing Countries, 1950-99. Housing Studies 16:4, 399-423.

Okyere, S.A. & Kita, M. (2015) Rethinking Urban Informality and Informal Settlement Growth in Urban Africa: A Literature Discussion. Journal of Sustainable Development in Africa, Volume 17, no. 6: 101-124

Resilient Cities Network (2020) Addis Ababa. Retrieved from https://resilientcitiesnetwork.org/networks/addis-ababa/

Ritchie, H. (2018) Urbanization. Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/urbanization

Roy, A. & Alsayyad, N. (2004) Urban informality. Transnational perspectives from the Middle East, Latin America and South Asia. Lexington Books, Oxford.

Roy, A. (2005) Urban Informality: Towards an Epistemology of Planning. Journal of the American Planning Association, 71:2, 147-158.

Rudotin (2021) Baraccopoli su Burundi street. Retrieved on 20-05-2021 from https://mapio.net

Schmid, C. (2018) Journeys through planetary urbanisation: decentering perspectives on the urban. Environment and planning D: society and space. 2018, Vol 36(3): 591-610. http://dx.doi.org/10.1177/0263775818765476

SDI (2020) Know your city. Retrieved from: http://knowyourcity.info/

Shibata, T., Wilson, J.L., Watson, L.M., Nikitin, I.V., Ansariadi, La Ane, L., Maidin, A. (2015) Life in a landfill slum, children's health, and the Millenium Development Goals. Science of the Total Environment, Volume 536: 408-418.

Statista (2020) Degree of urbanization (percentage of urban population in total population) by continent in 2020. Retrieved from: https://www.statista.com/statistics/270860/urbanization-by-continent/

Streule, M., Karaman, O., Sawyer, L. and Schmid, C. (2020) Popular Urbanization: Conceptualizing Urbanization Processes Beyond Informality. International Journal of Urban and Regional Research

UN Habitat (2010) Condominium Housing in Ethiopia: The Integrated Housing Development Program. United Nations Human Settlements Programme.

UN Habitat (2012) Streets as Tools for Urban Transformation in Slums: A Street-Led Approach to Citywide Slum Upgrading. United Nations Human Settlements Programme.

UN Habitat (2017) The State of Addis Ababa. United Nations Human Settlements Programme.

UN Habitat (2018) Pro-Poor Climate Action in Informal Settlements. United Nations Human Settlements Programme.

UN Habitat (2020) Slum population projections 1990-2020. Retrieved from https://data.unhabitat.org/datasets/a33be64975f445c59b2b163734424c45_0/data?page=9

Van Gameren, D. & Mota, N. (2020) Global Housing. Dwelling in Addis Ababa. Jap Sam Books.

Visagie, J. & Turok, I. (2020) Getting Urban Density to Work in Informal Settlements in Africa. International Institute for Environment and Development. Vol. 32 (2): 351-370.

Yang, T., Li, M. & Shen, Z. (2015) Between Morphology and Function: How syntactic centers of the Beijing City are defined. Journal of Urban Management 4 (2015): 125-134

Zapulla, C., Suau, C. & Fikfak, A. (2014) The Pattern Making of Mega-Slums on Semantics in Slum Urban Cultures. Journal of Architecture and Urbanism. Volume 38 (4): 247-264

Zhang, G., Chen, S.S., Gao, Q., Shen, Q., Kimirei, I.A. & Mapunda, D.W. (2020) Morphological Characteristics of Informal Settlements and Strategic Suggestions for Urban Sustainable Development in Tanzania: Dar es Salaam, Mwanza and Kigoma. Sustainability 2020, 12, 3807