transit city

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november 2018

global housing
mixing mumbai I
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transit city

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graduation project
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november 2018

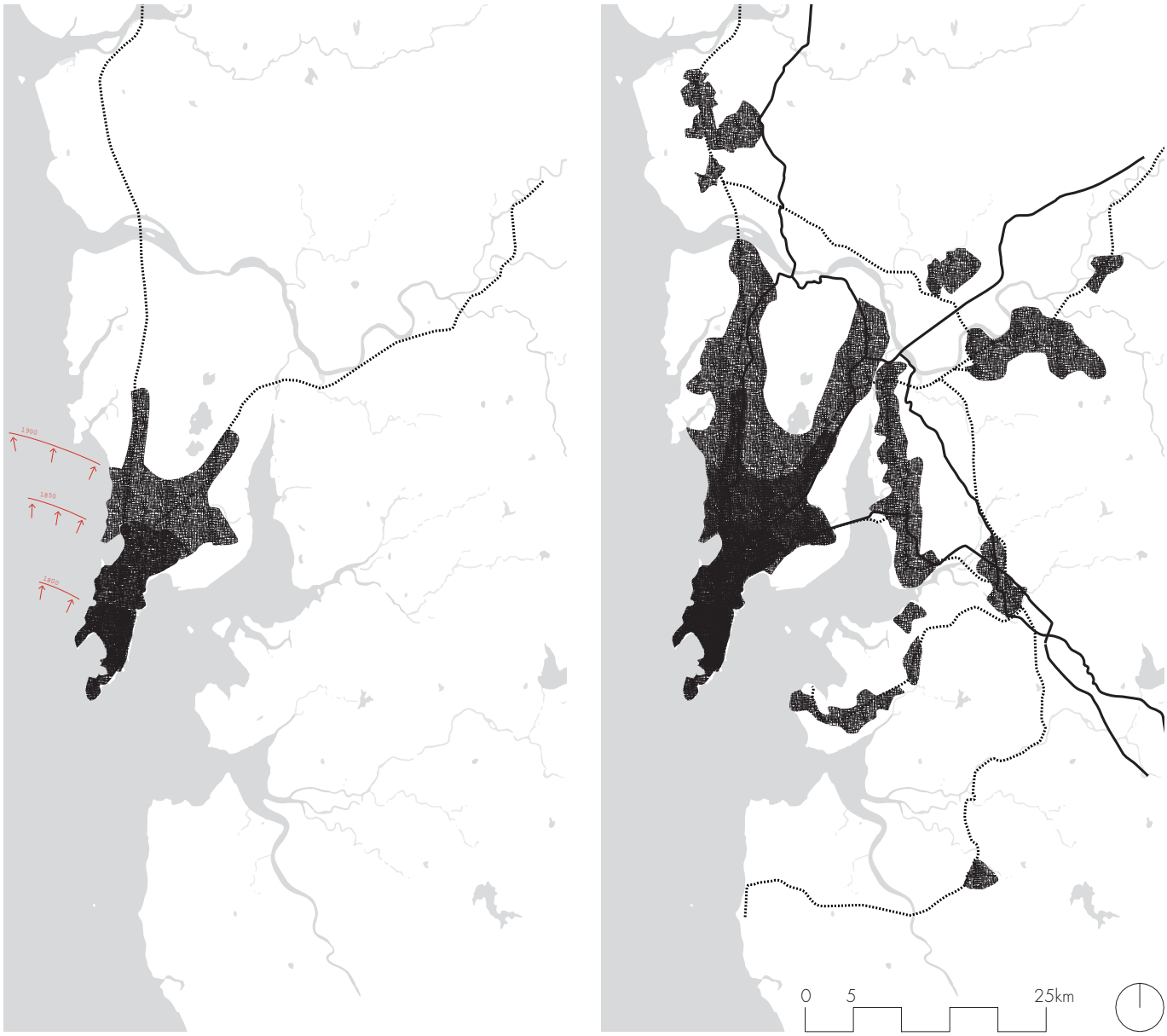
contents

introduction	7
problem statement	35
book of patterns	43
regional strategy	71
site analysis	83
urban strategy	91
design	101
building technology	125
clustering	145
masterplan	155
comparison	167
patterns	175

introduction

nala sopara and the mumbai metropolitan area

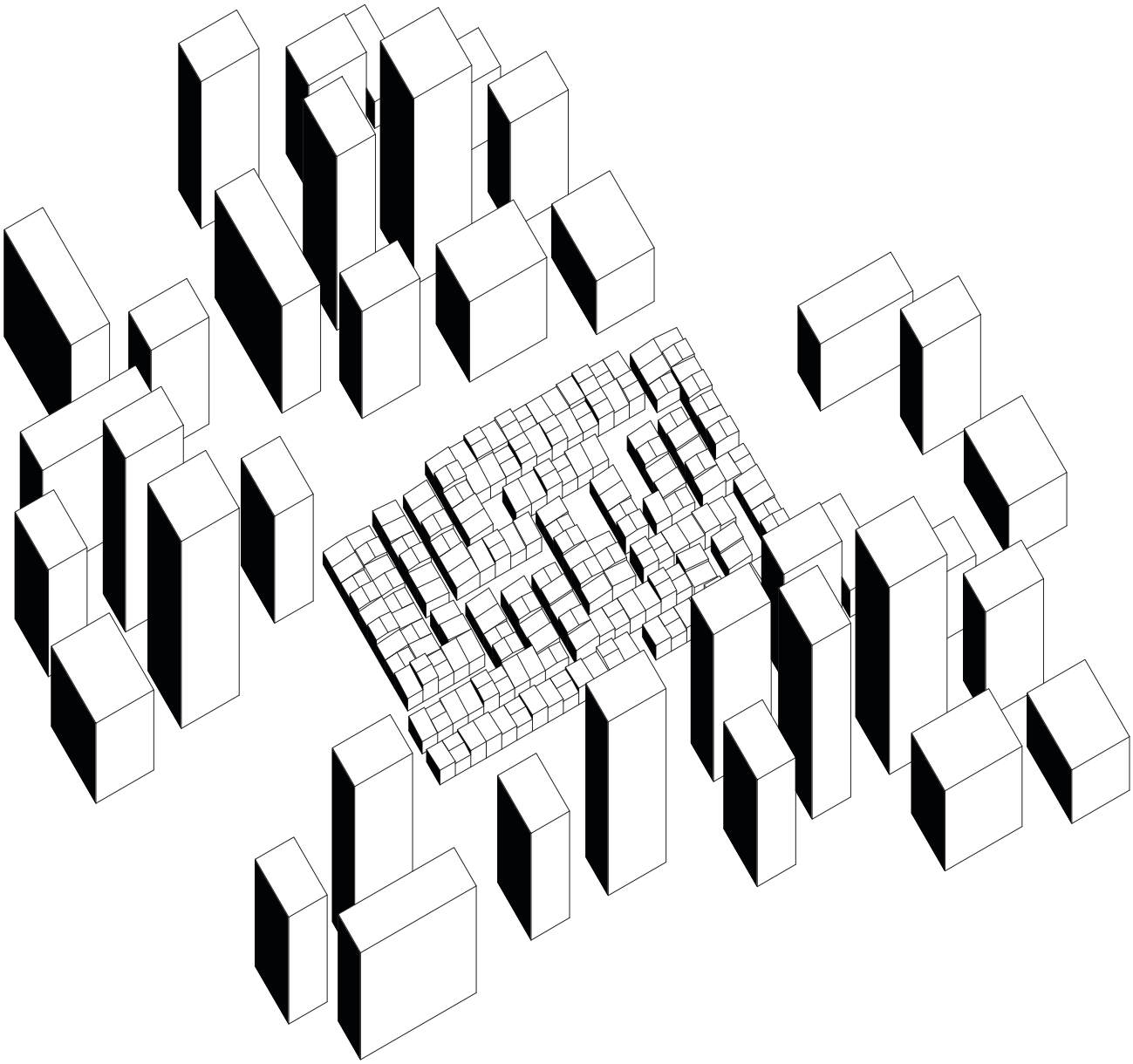
The global south is undergoing the greatest migration in human history. Rural populations are leaving agriculture in search for a better future in the city. This provokes rapid urbanization around the world. One of the cities where this urban growth is the most eminent is Mumbai in India. The growing economy resulted in a draft of work force from the countryside over the last century. For these people finding a job is easy but housing proved to be more difficult.



Due to its geographical conditions – it is situated on a slender peninsula – the urban growth resulted an immense density in the city. Next to that the urban fabric moved out along the train lines, constructed by the British, towards the north creating a linear city highly depended on the public transport. The focal point of the city lies in the southest tip of the peninsula and therefore density and land prices are highest in this fort district. This slowly fades away towards the north.

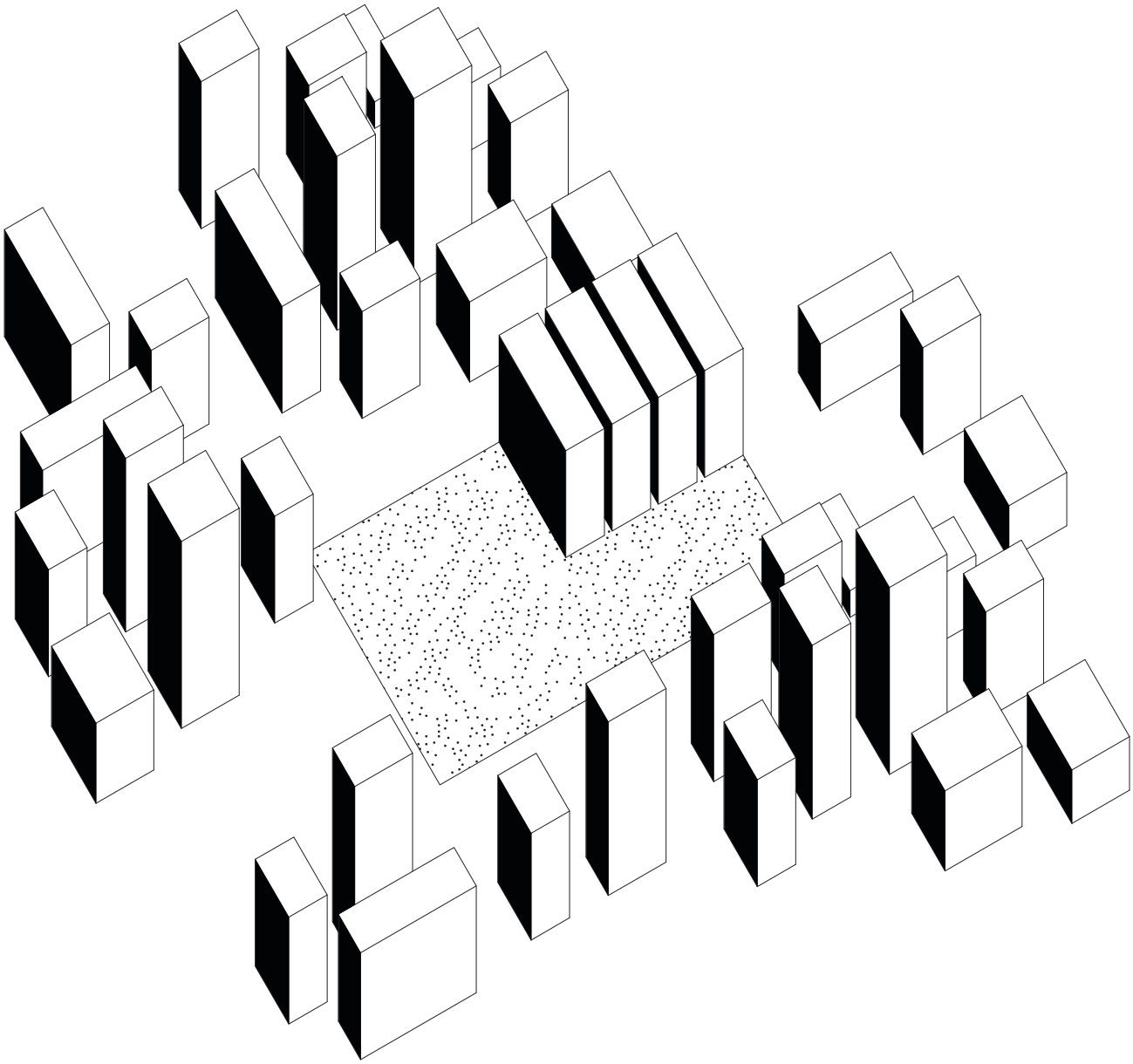
Affordable Housing in neoliberal Mumbai

In order to house the new urban populations governments have been involved in provision of affordable housing. But the built strategies could not provide inclusive housing for everyone, especially the urban poor, which led to the emerge of informal settlements. Later the sites and services strategy was implemented and presented as an uniform solution to the problem of informality. However, contemporary examples of this scheme proved to be less successful due to the fact that this scheme is mostly located far

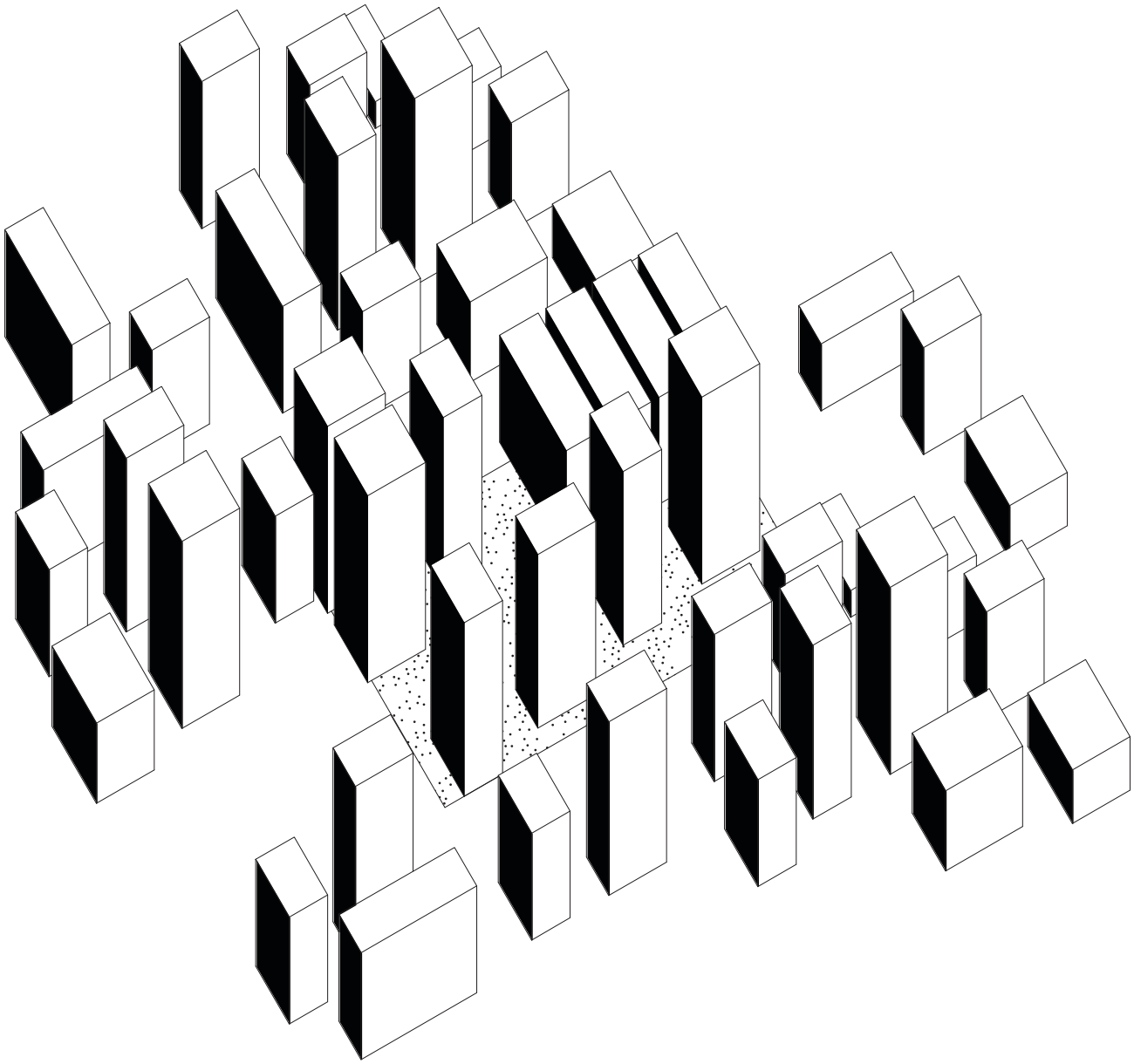


from economic activity and in lack of proper public transport. The strategy also fails to address the need for higher density in an ever-expending city like Mumbai where land is scarce and therefore valuable. (Van Lindert et al, 2014, p.4-5)

Under the neoliberal ideology that spread over the globe in the last two decades the role of governments shifted from the provider of housing towards an enabler of housing markets. In Mumbai one can recognize this shift in certain policies that were implemented such as the slum rehabilitation scheme

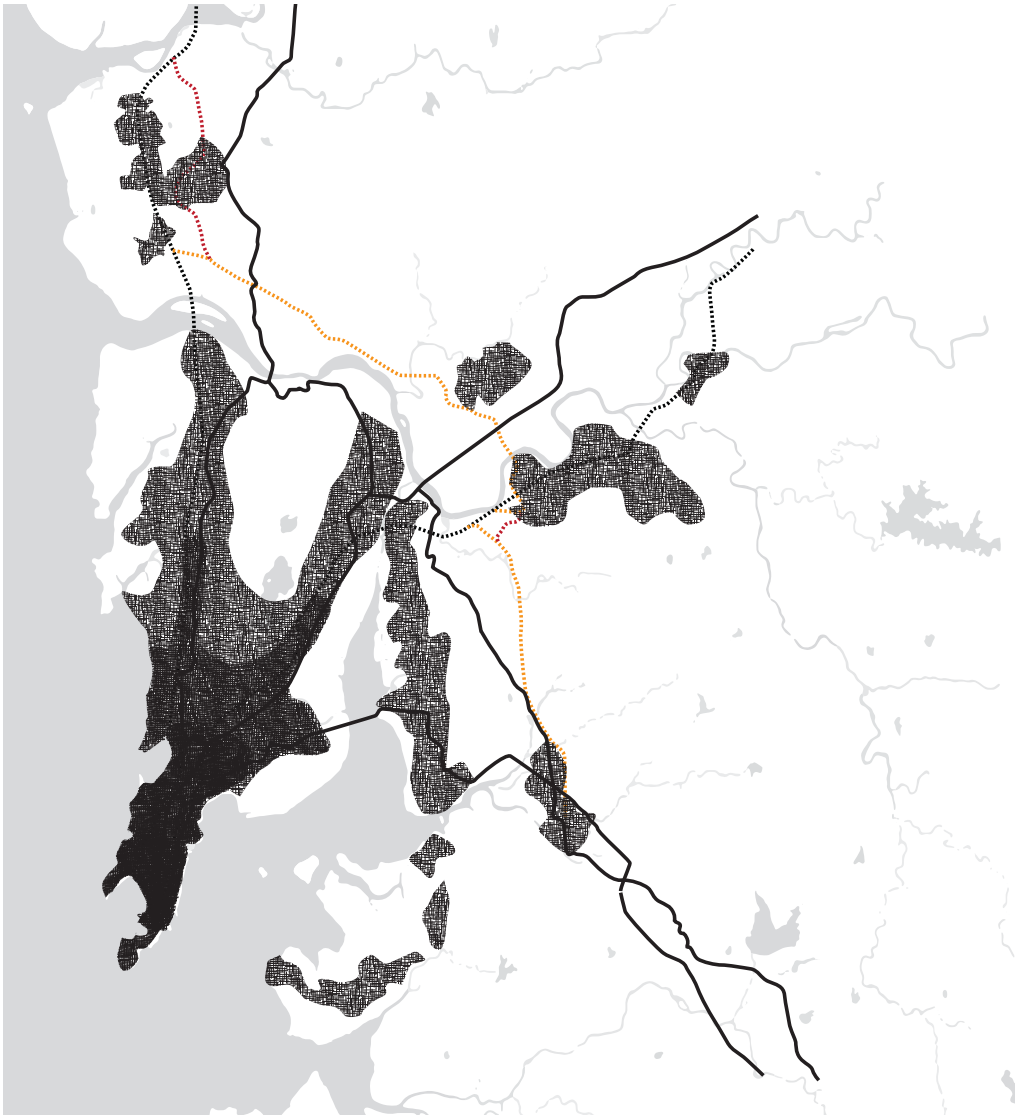


(SRS) in 1995. In this strategy private developers were encouraged to cleanse the slums, rehabilitate its dwellers in a greater density and in return get part of the ground for their own developments to earn back the invested capital. Due to the scarcity of buildable areas and therefore the enormous price of land in Mumbai this scheme provoked developers to reserve a minimum of space for the rehabilitation leading to so-called 'handshake' apartments. A name derived from the vicinity in which these buildings were constructed in relation to each other. They stand so close to one another that sometimes neighbors could literally

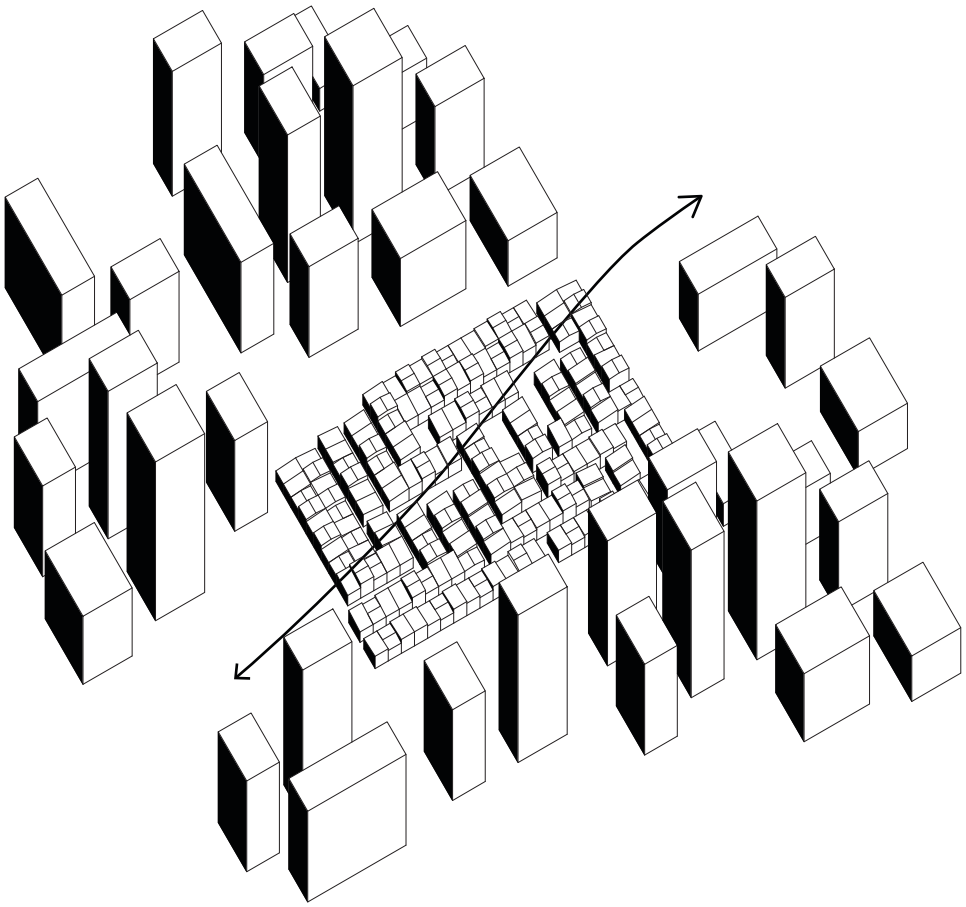


shake hands across two buildings. Being mostly G+5 this distribution leads to problems with ventilation and natural light. Next to that the focus on the market of developers and architects results in a disregard of the existing structures and work and live patterns of the slum communities (CRIT, 2007, ch.15).

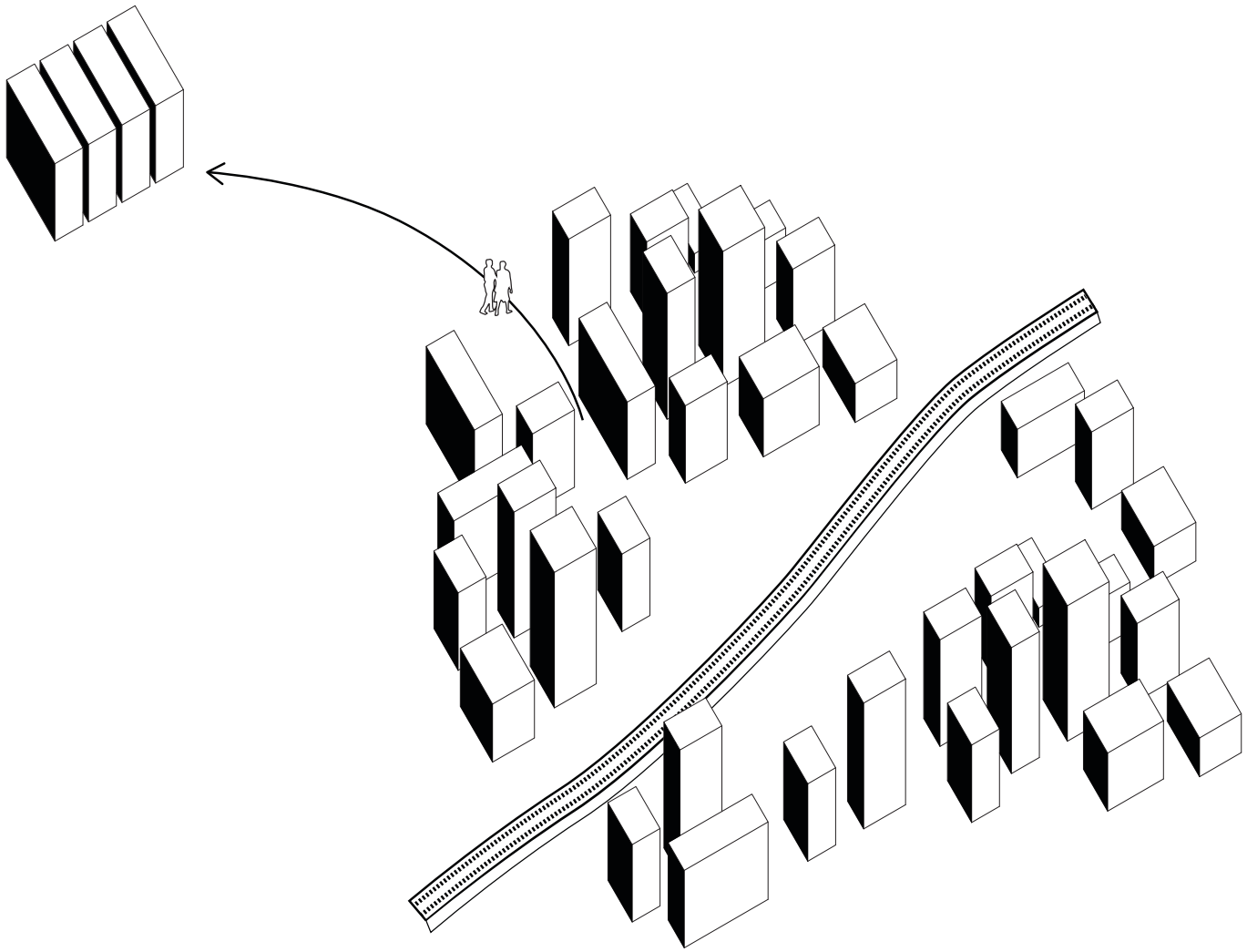
new trainline



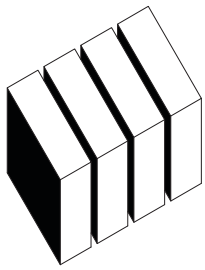
In order to release pressure on the city center the Mumbai authorities are planning new infrastructrual corridors around city. The MMR development plan for 2036 shows these new lines and one can see that a new trainline is crossing the area of Vasai Virar.

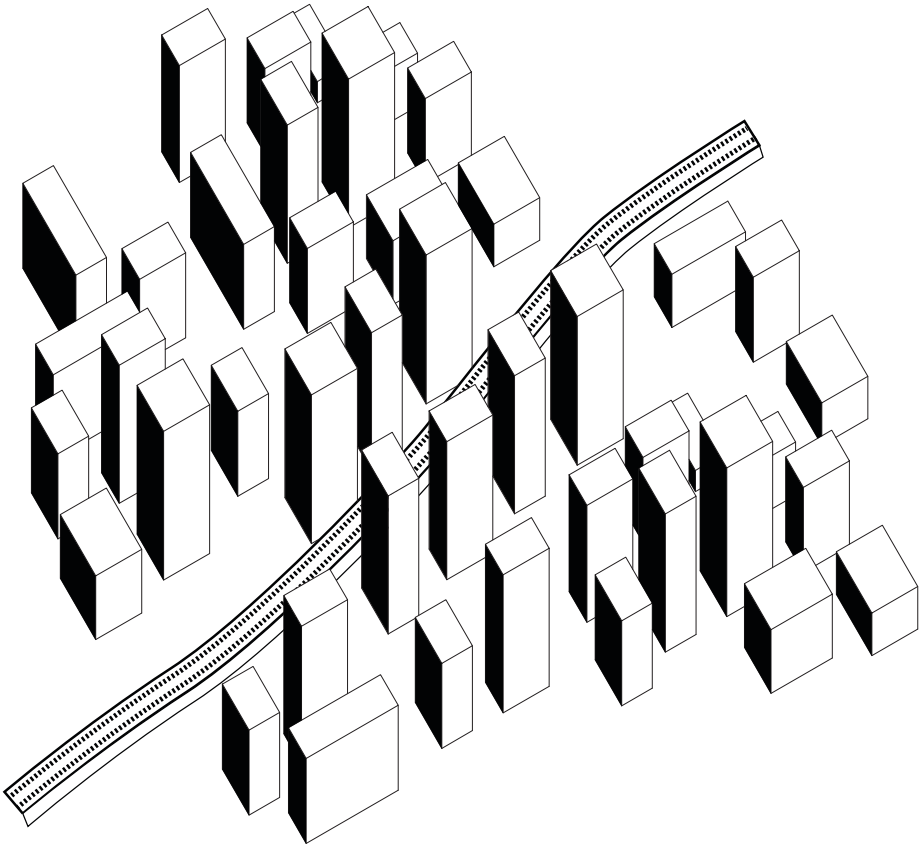


When looking at the way of densifaction along infrastructure in broader scale of Mumbai one can see that also here the SRS scheme is used. In many cases informal settlements were established on the location of the lines due to a delay in the construction process.

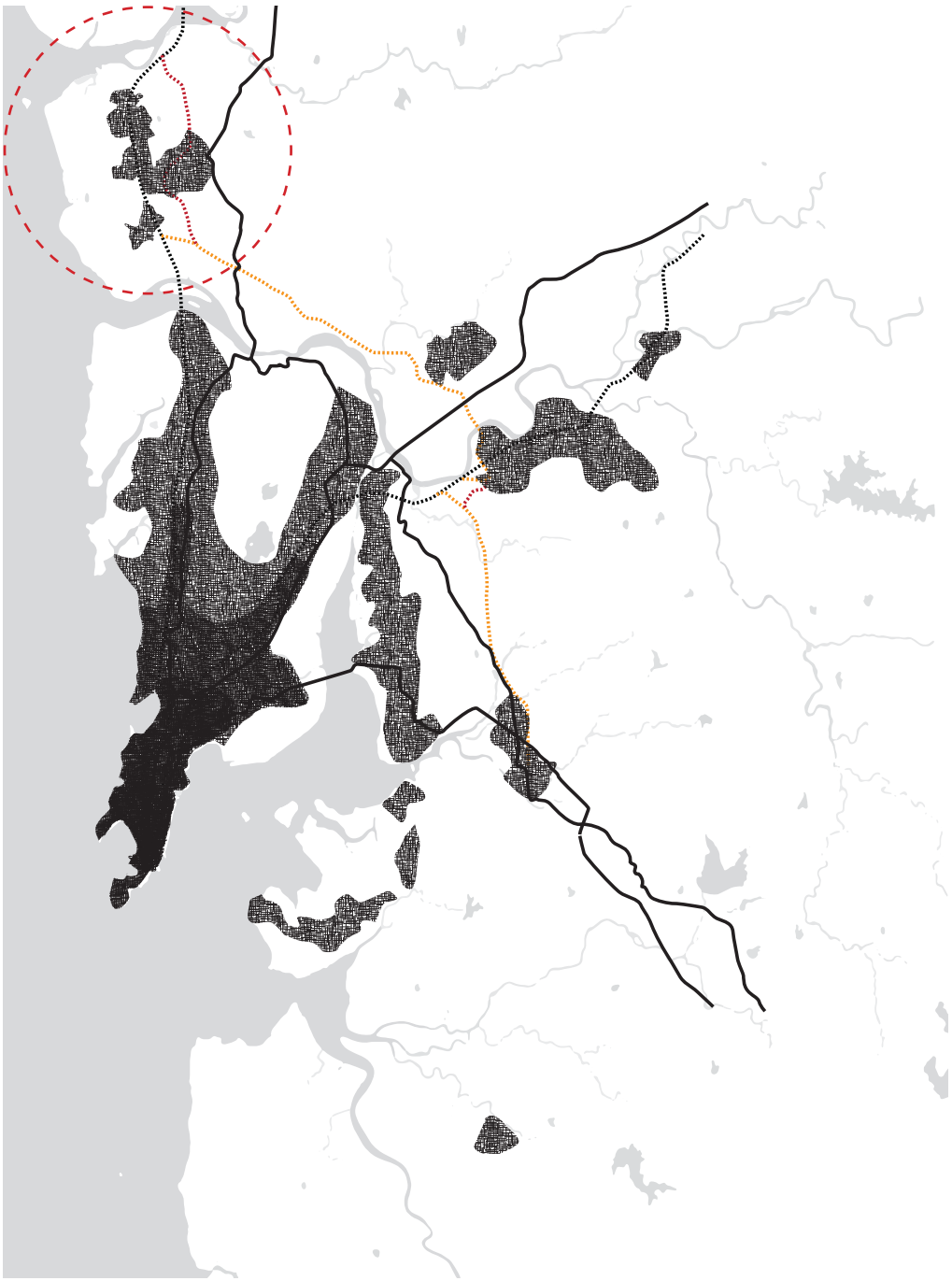


The people living in the slums are moved out of the area and relocated on an obsolite location far away from their original means of income and a public transport connection.

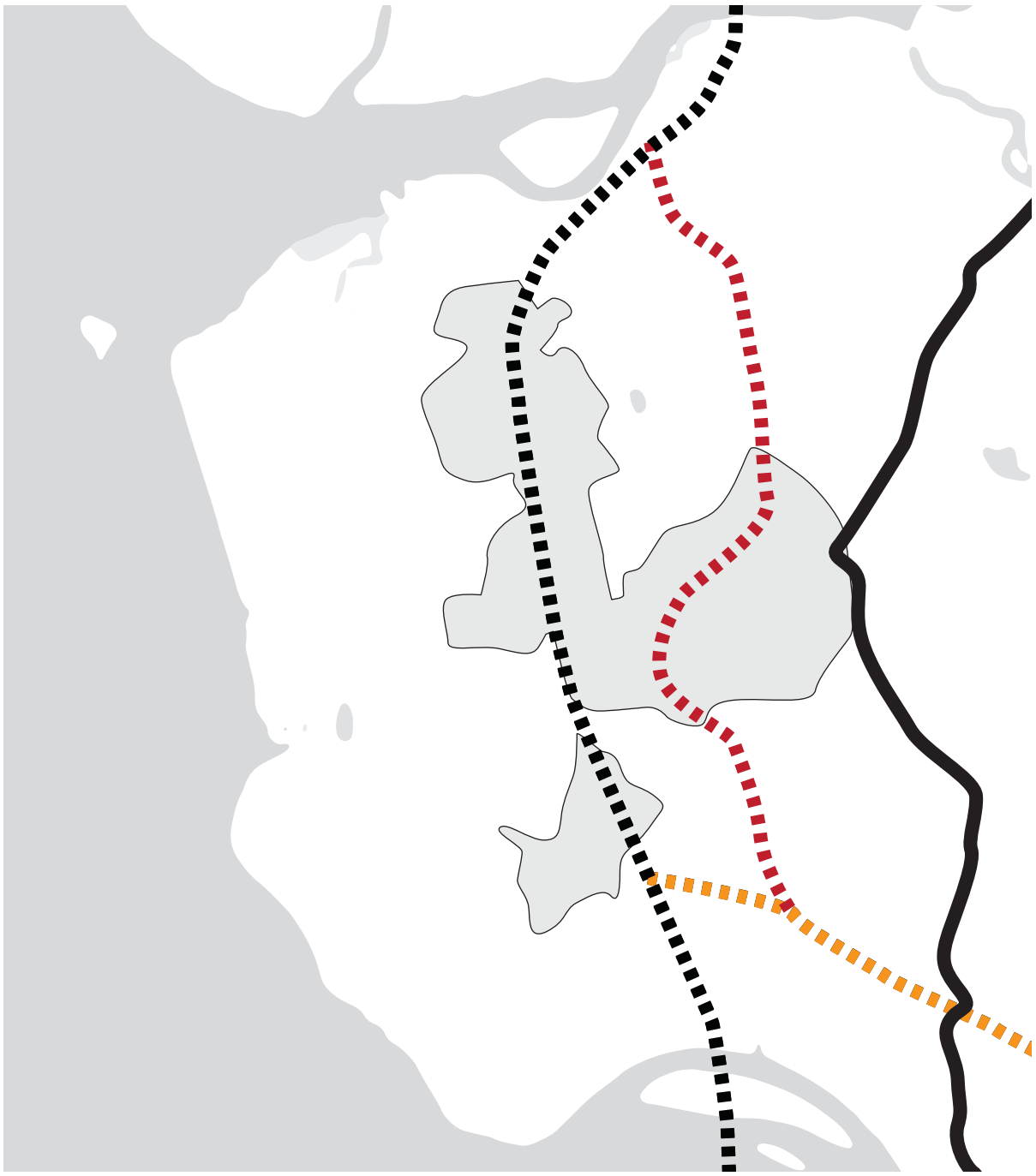




The developers that build the rehabilitation are rewarded with the higly provitable builiding rights for the newly made space along the train corridor, or so called FSI rights elsewhere in the city. In some cases the slums are even used to drive up the land price before the real development takes place.



So going back to the new trainline we now zoom in on the northern Vasai-Virar area in which the project location is located.

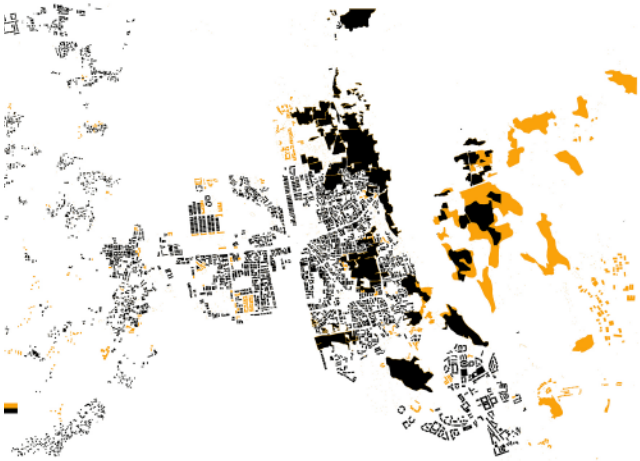


So we see that the new line is crossing urban fabric and to understand what this means we now focus on how densification took place in Nala Sopara.

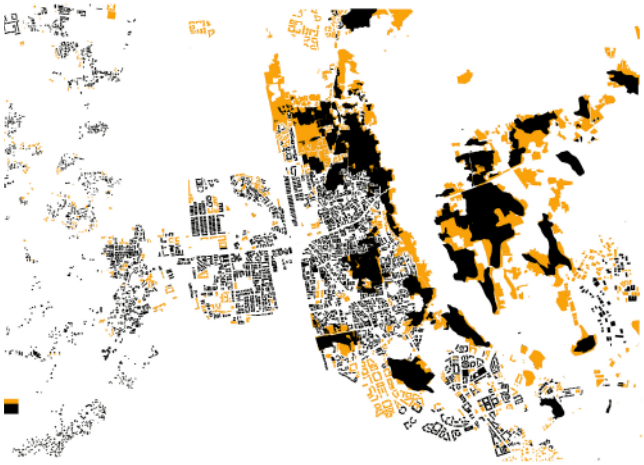

N

2002

2005



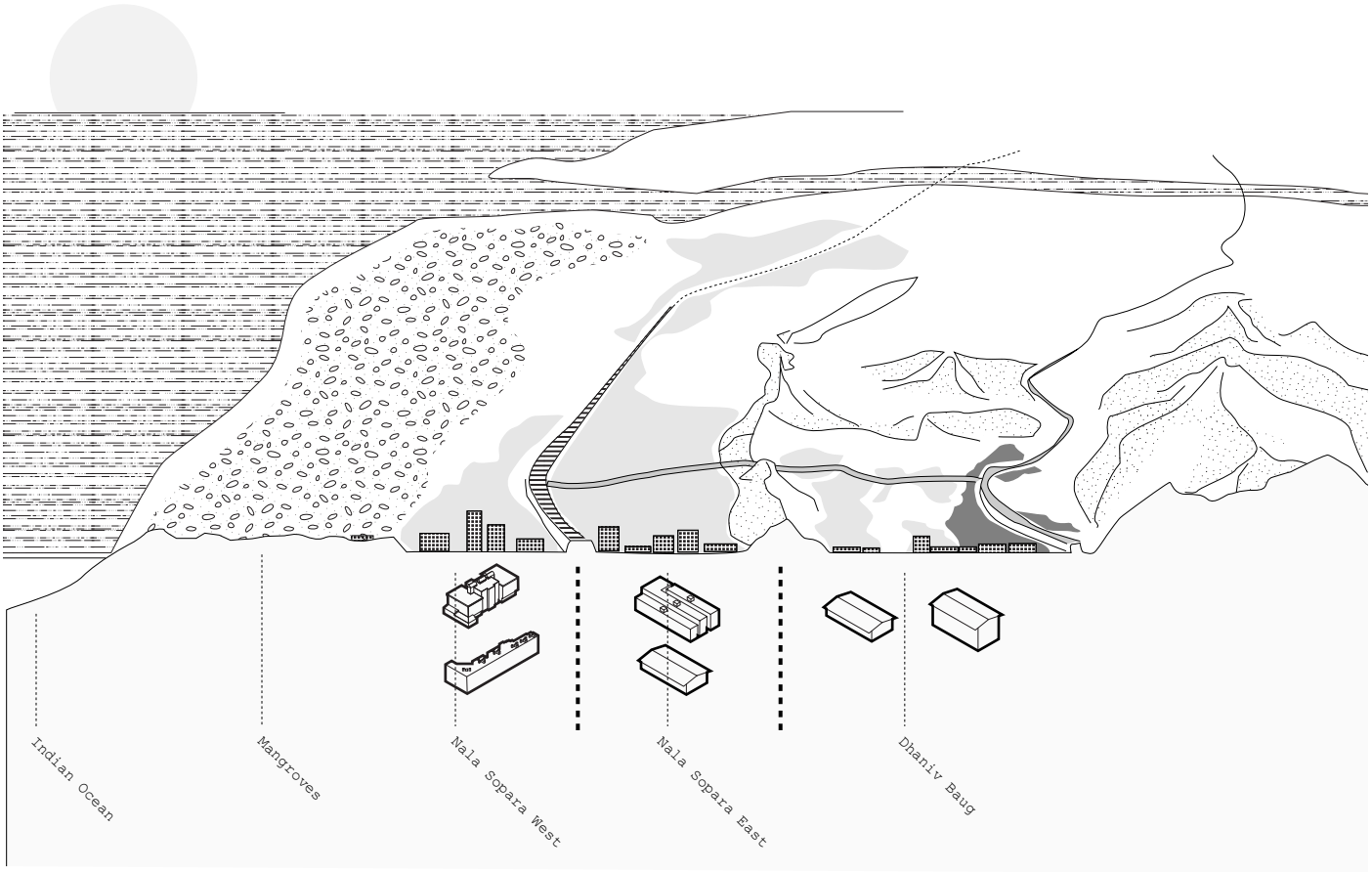
2009



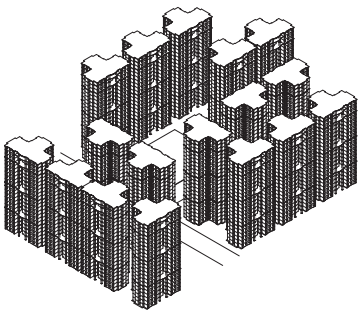
2013

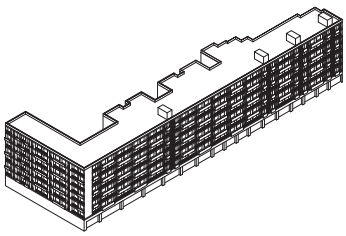
Due to the heavy pressure on the center of Mumbai, the cheap price of land in Nala Sopara and its connection to the railroad network, many new migrants settled in this area over the last 2 decades or so.
These diagrams show the exponential growth of urban fabric in this period.

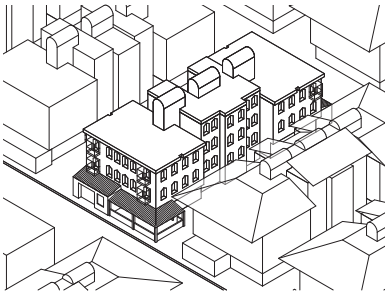
The current situation show that this once small fishermen settlement grew into a city on its own, where now live over a million people.

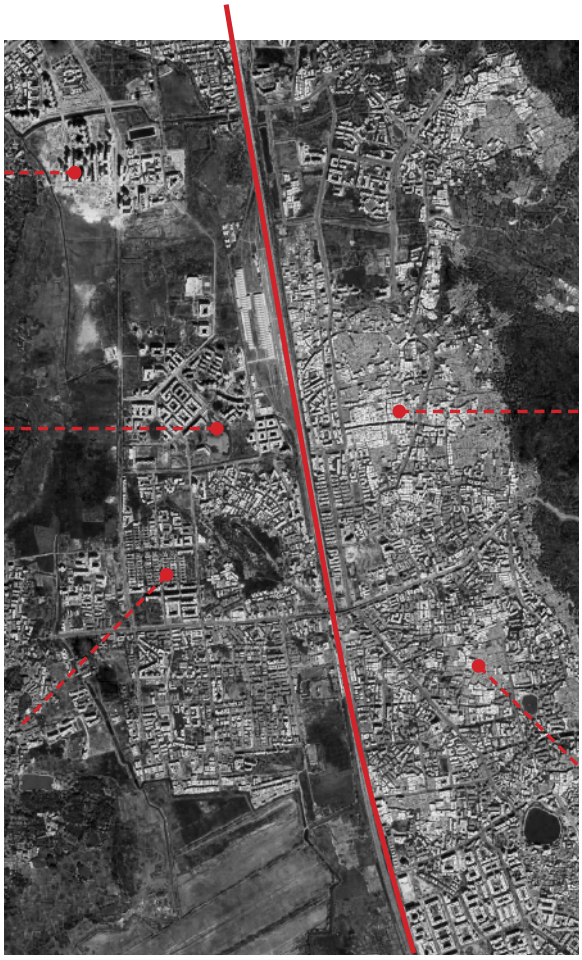


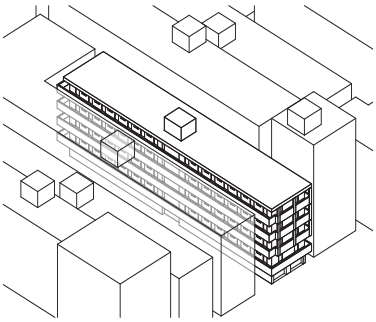
This landscape section shows that there is a certain zoning from the Indian Ocean west towards the industrial corridor along the highway in the east.

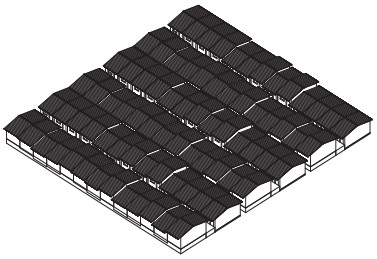




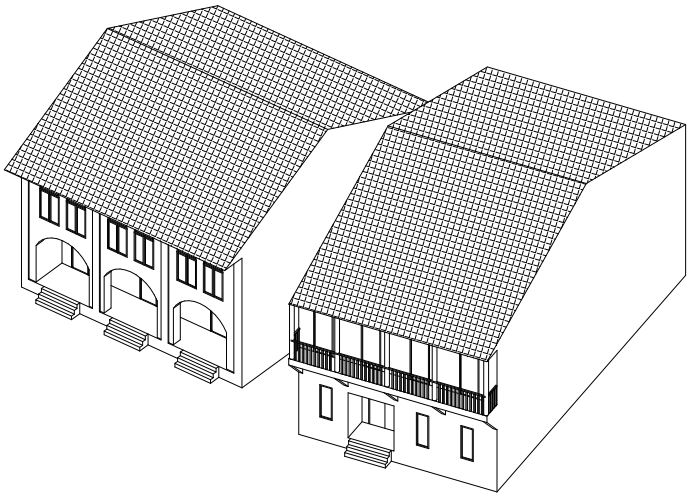


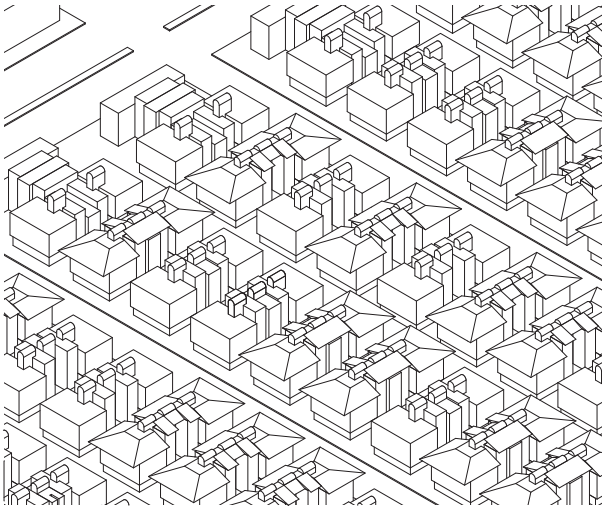




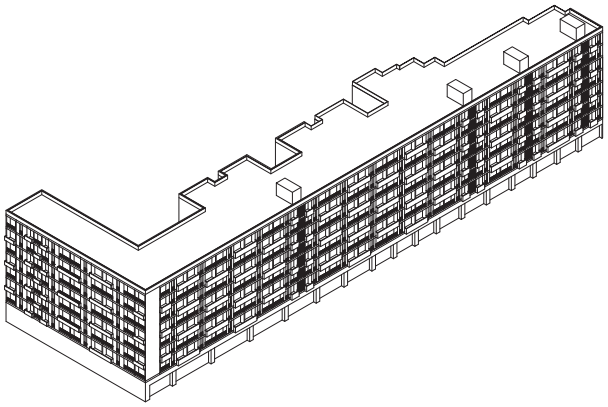


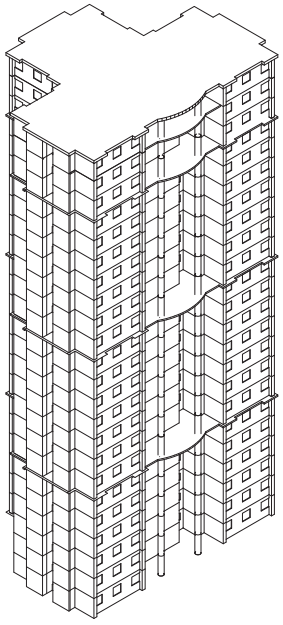
This zoning becomes clear when studying the different types in Nala Sopara.

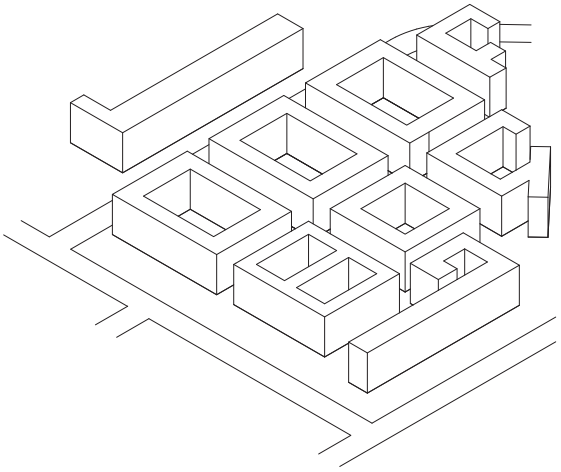


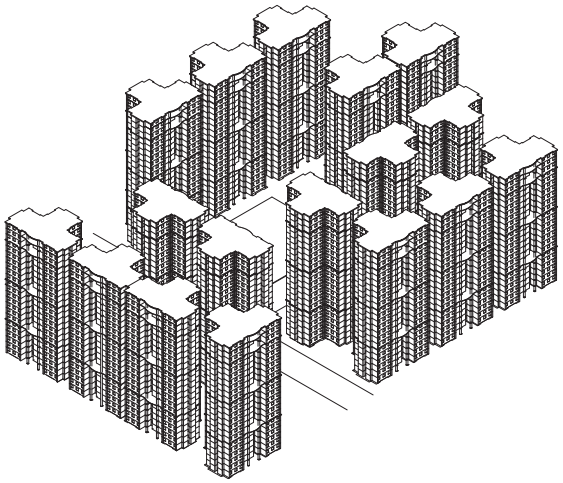


In the western part one can see the village type as the vernacular type. Furthermore there is social housing in the Sri Prastra area which was constructed in the 80s.



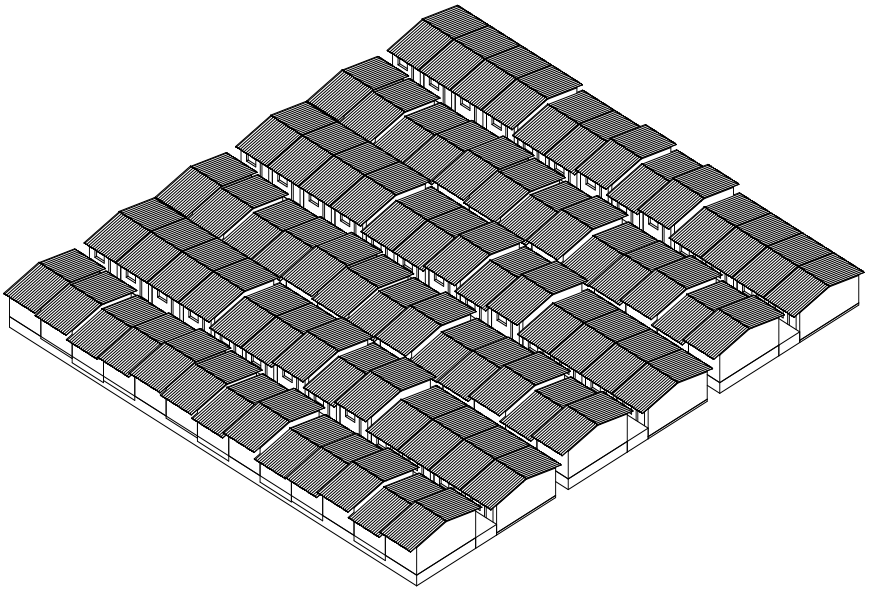


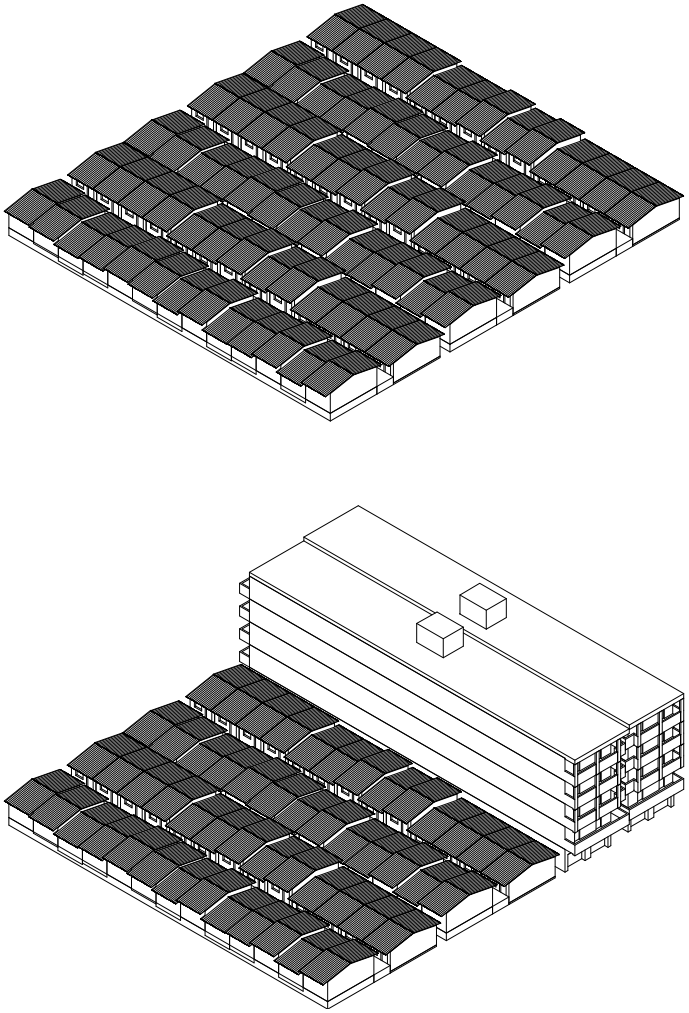




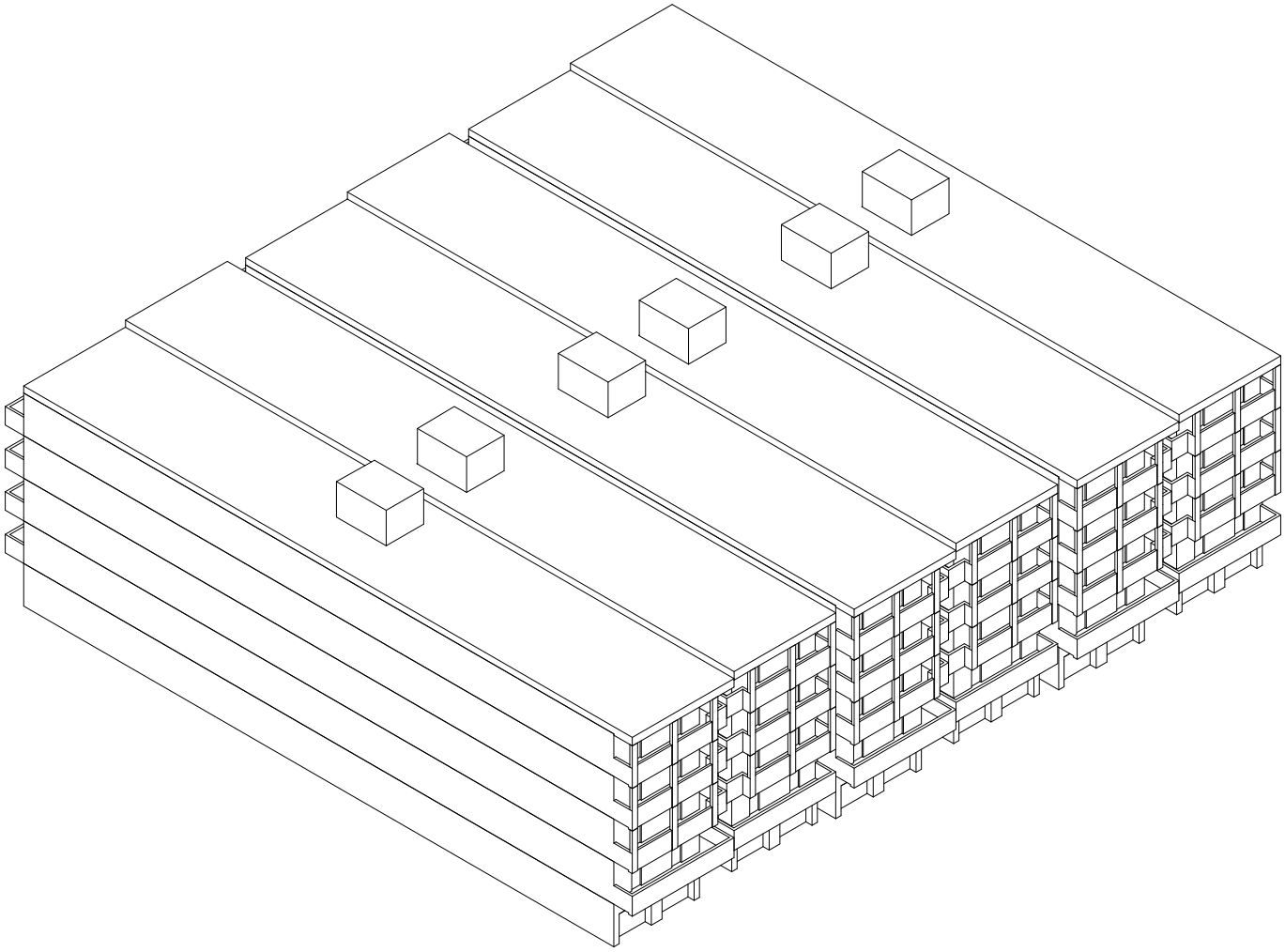
The densification in Nala Sopara West nowadays takes place in the shape of more market oriented developments where an extremis is reaches in the MHADA highrise colony. These towers do not have any relation with ground floor and therefore function as gated comunities.

In the eastern part of Nala Sopara the main type that is found is the so called Baithi Chawl. This low rise structrues are characterised by a longitudial axis road which serves as a comunity lane.

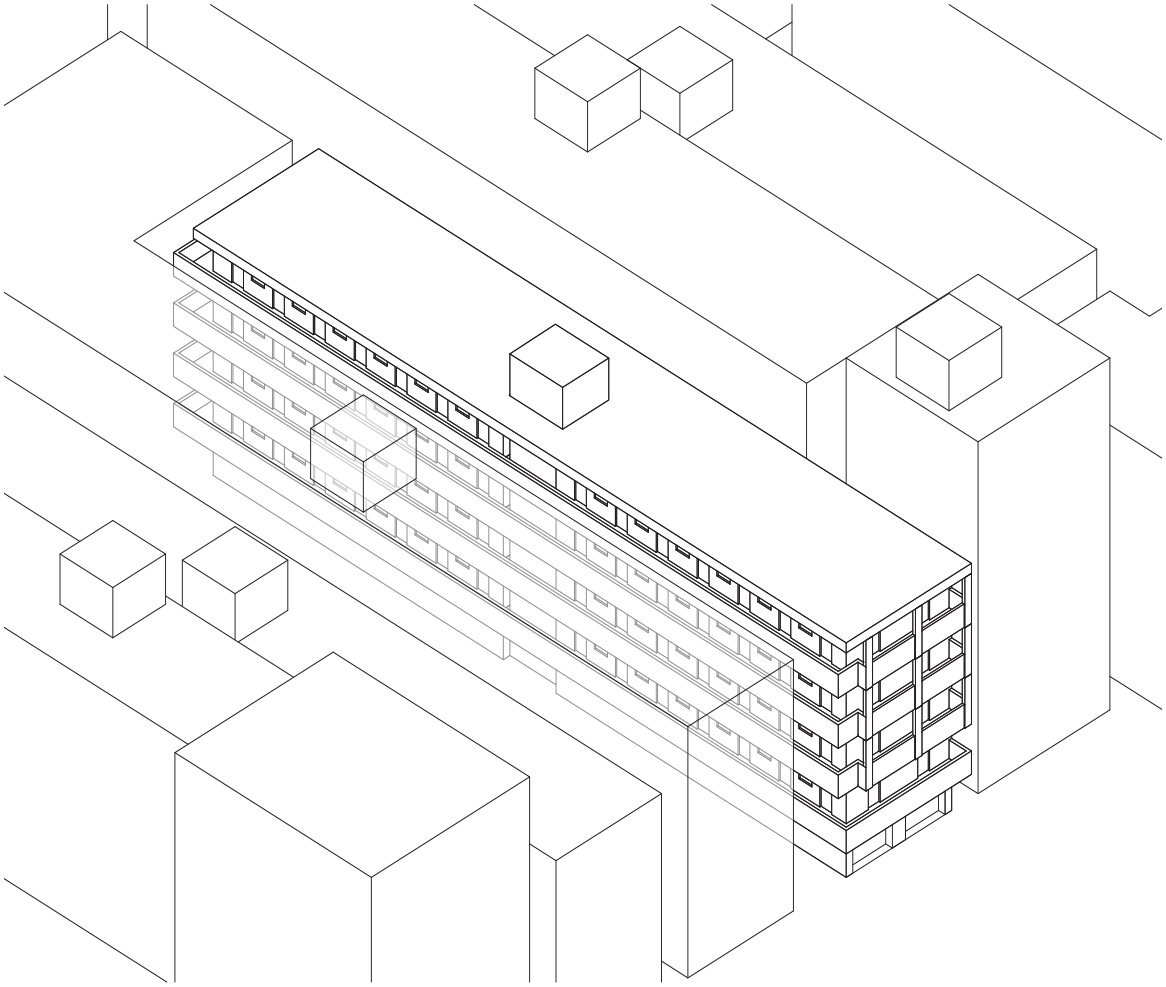




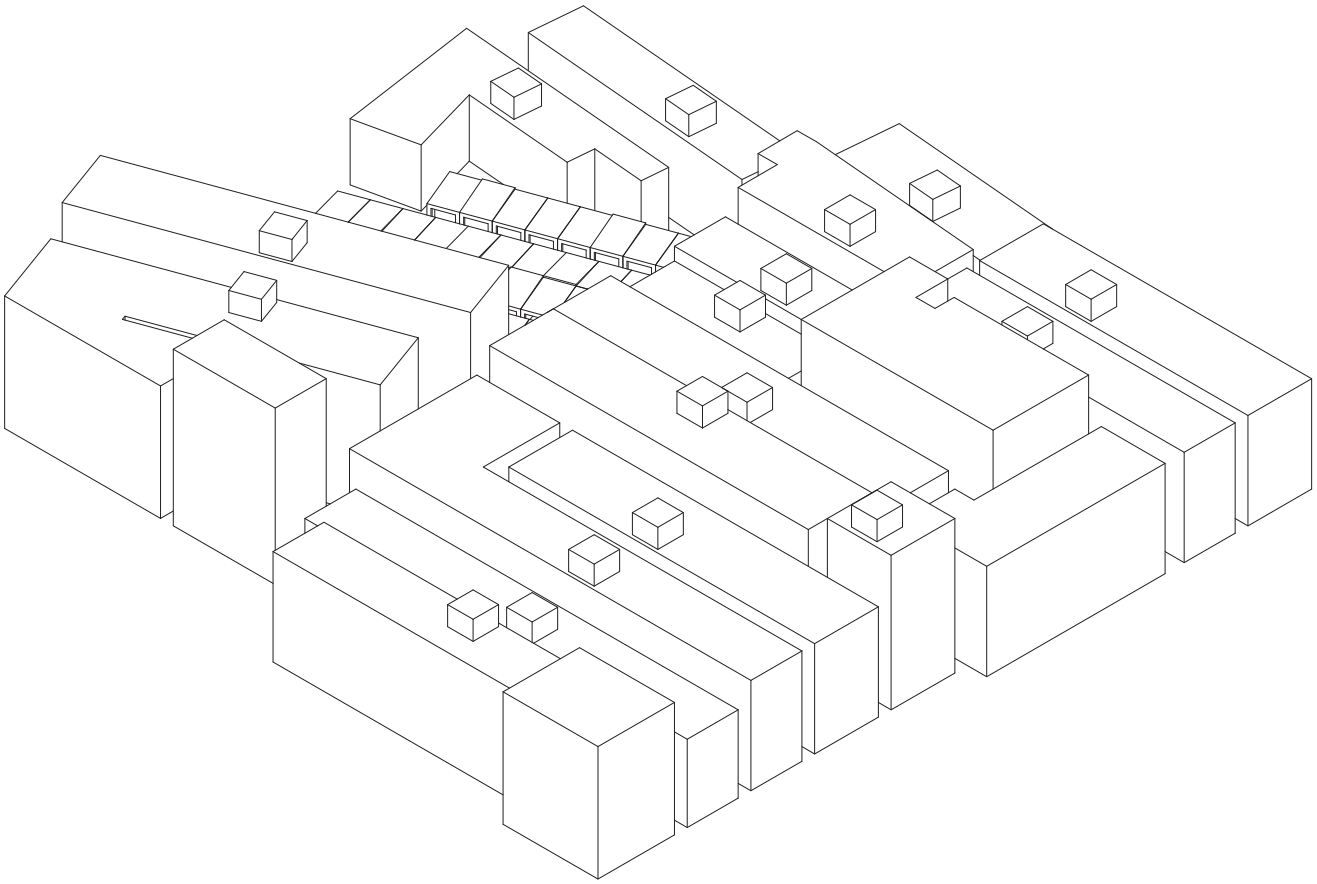
The densification of Nala Sopara east takes place in a more informal way by replacing the low rise baithi chawls with G+4 apartment buildings.



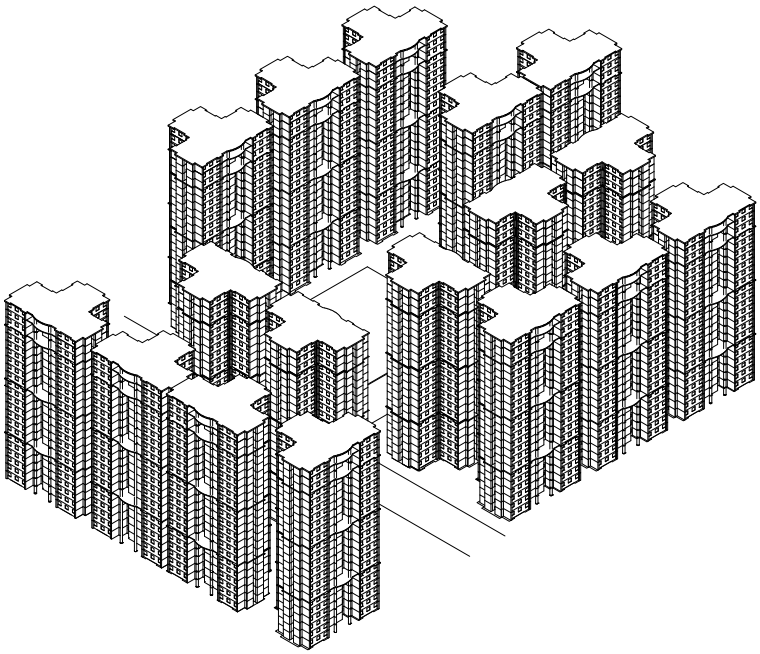
This densification has as a result that these ‘chawls’,
are placed very closely towards eachother.



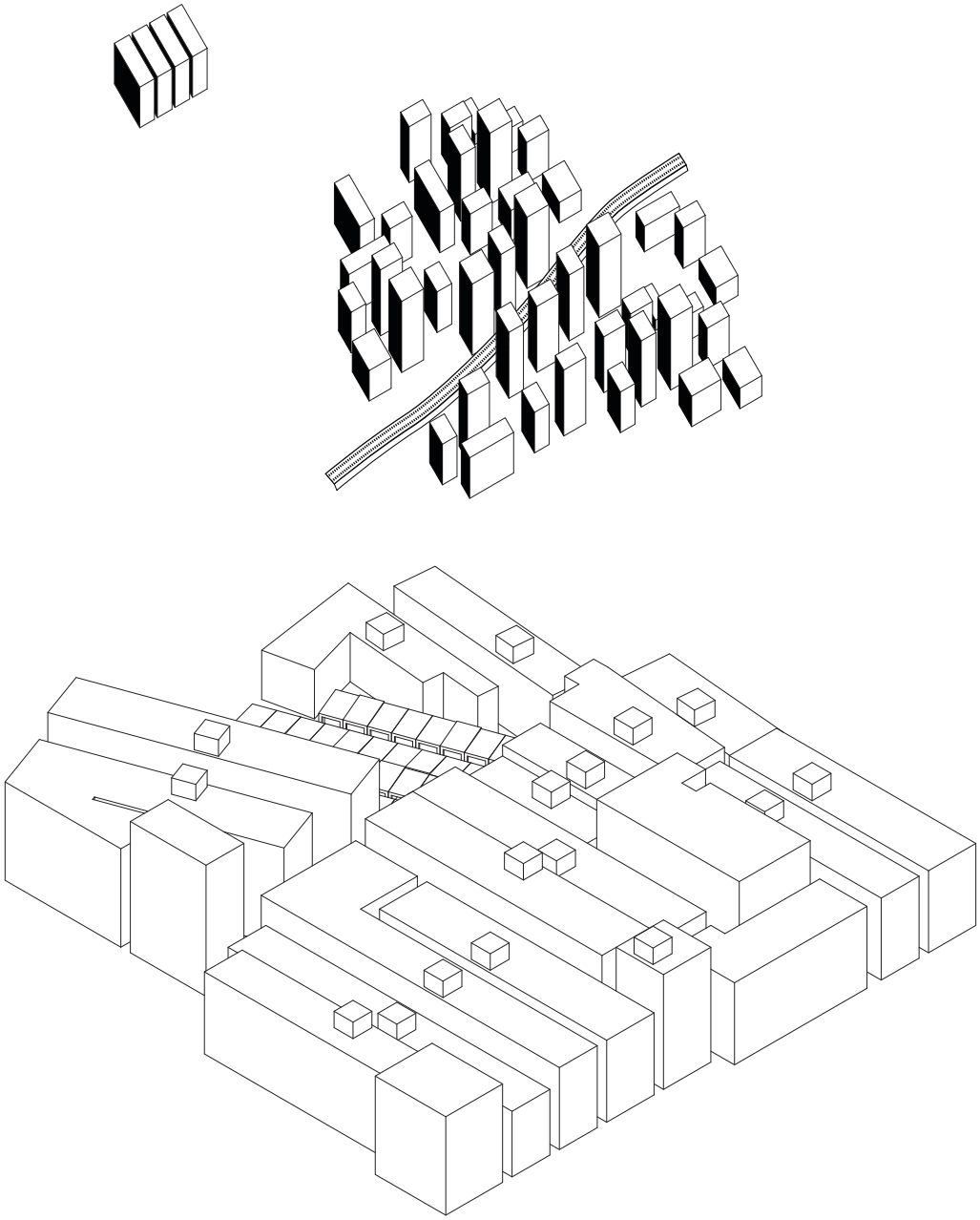
this has as a result that ventilation and light conditions are very poor in this type. Furthermore there is a lack of open space around these buildings.



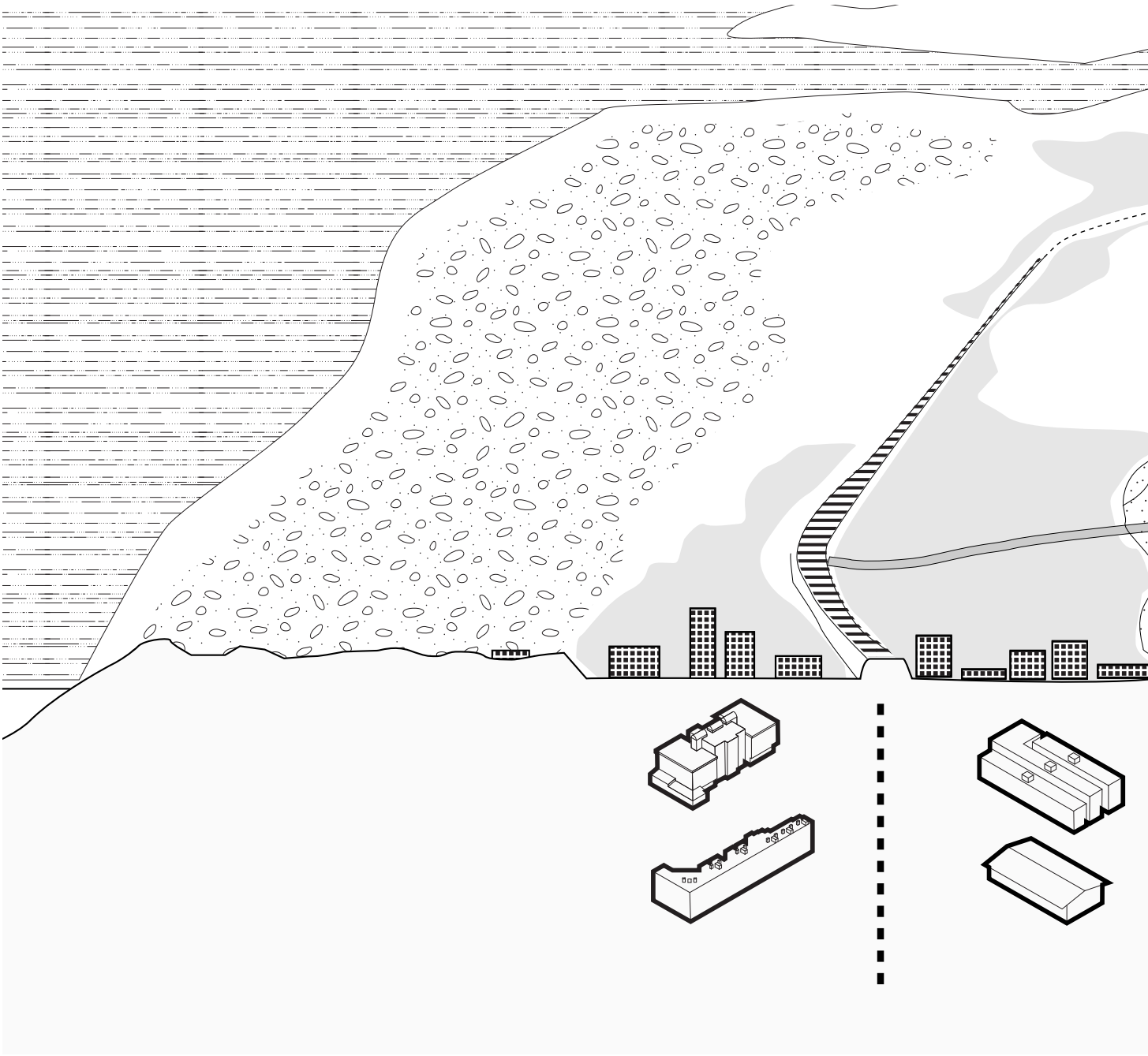
problem statement



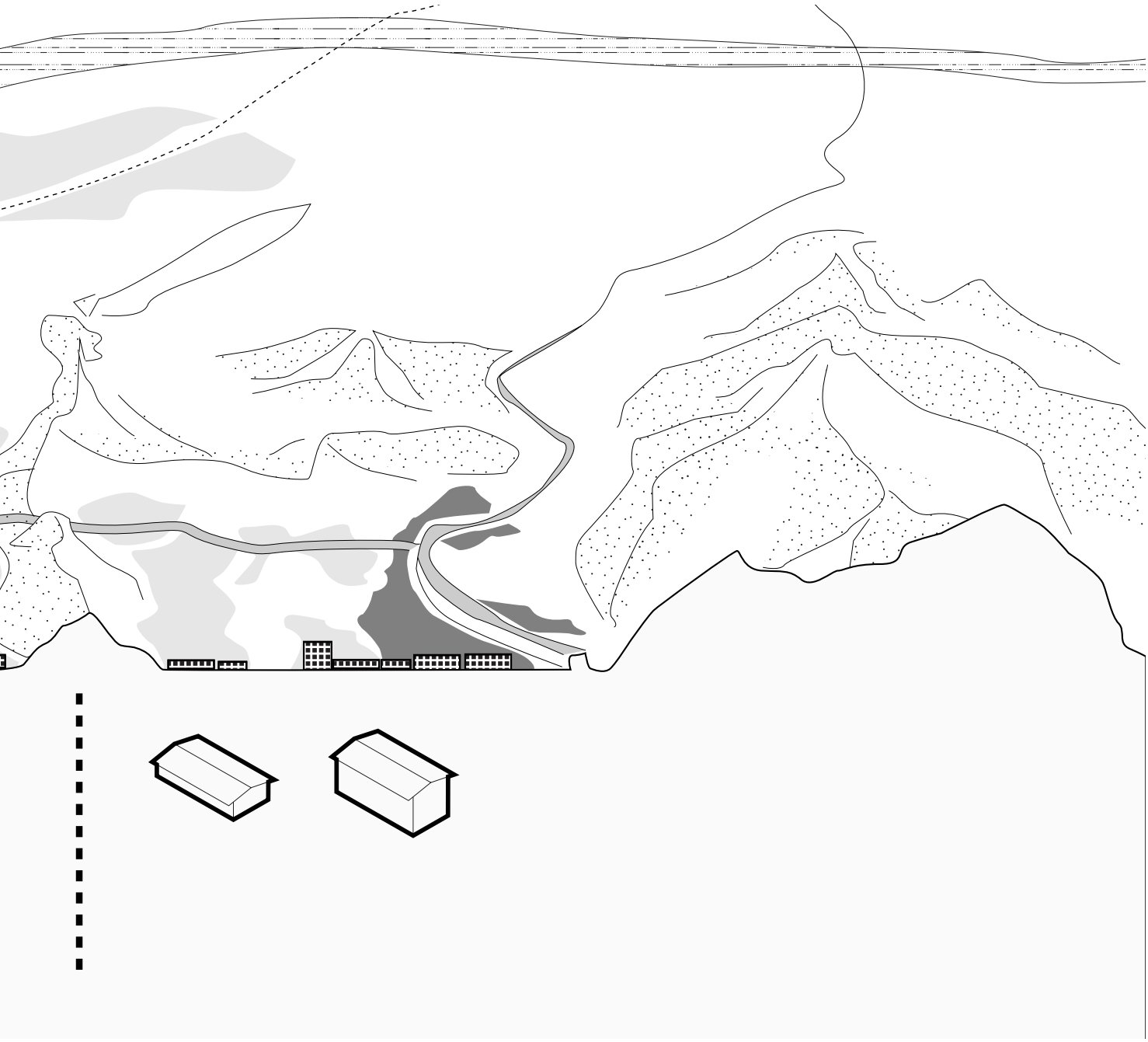
on the one hand people can see that the densification is following a neoliberal pattern, in the shape of highrises without identity.

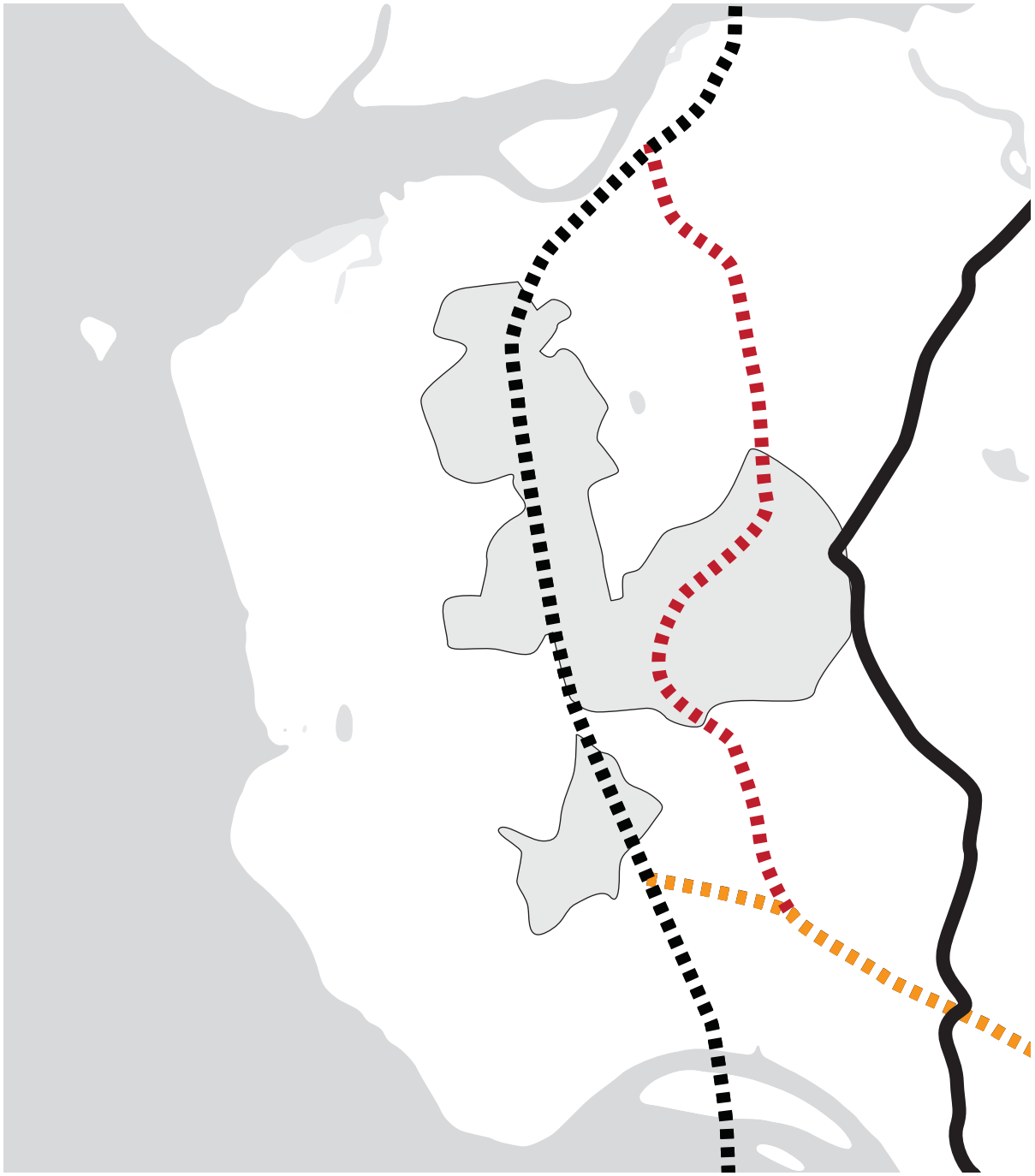


On the other hand freedom of development led to inhumane conditions in the shape of the SRS scheme and in the case of Nala Sopara into high density chawl rehabilitations.



The trainline served as a catalyst for the urban development of nala sopara but one can see that next to that it also serves as a social divsion.

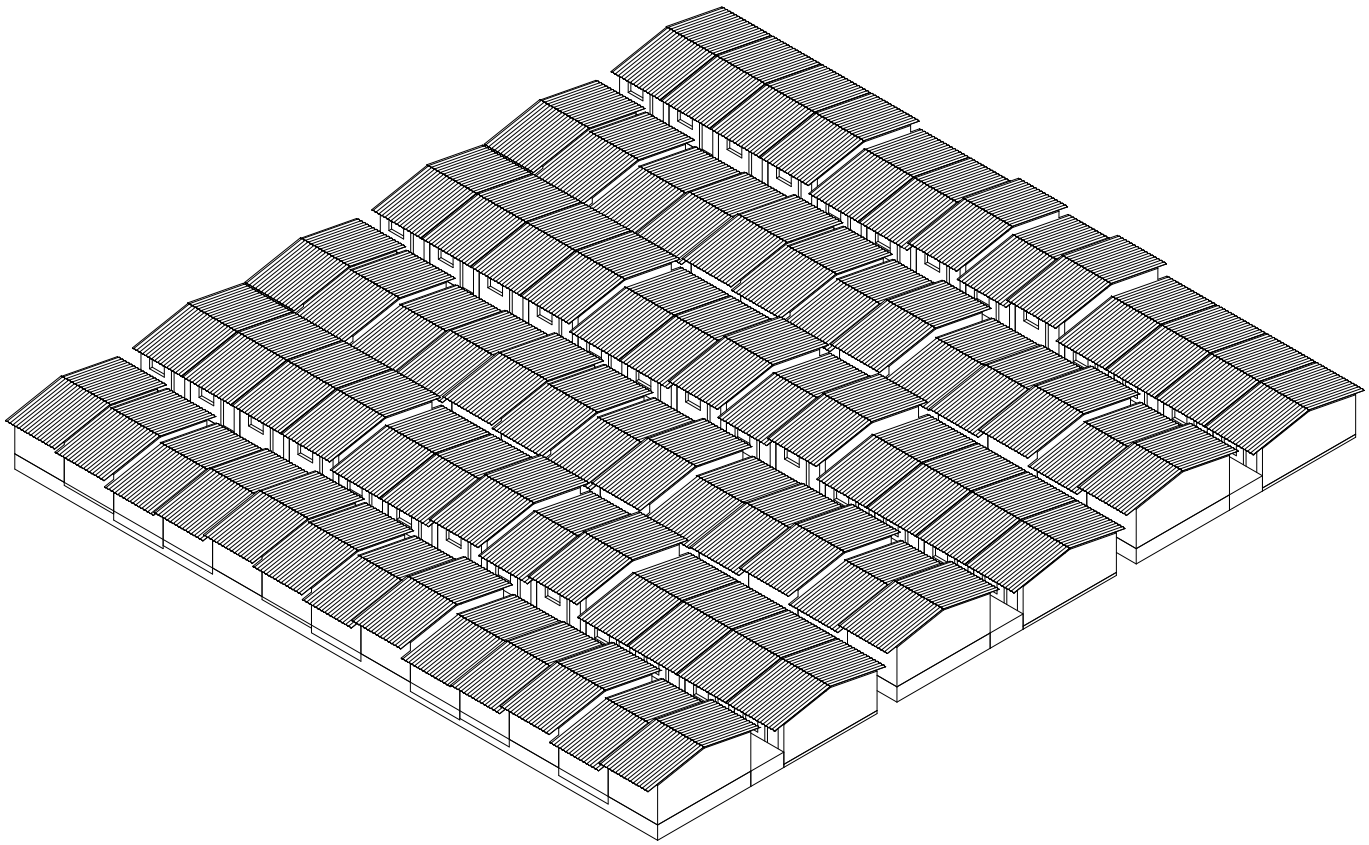




The new trainline crossing Nala Sopara can cause a continuation of the already established processes.
The bad consequences of these processes gave my the design hypothesis: how can transit oriented development in Nala Sopara be reinterpreted as a inclusive design strategy?

Book of Patterns

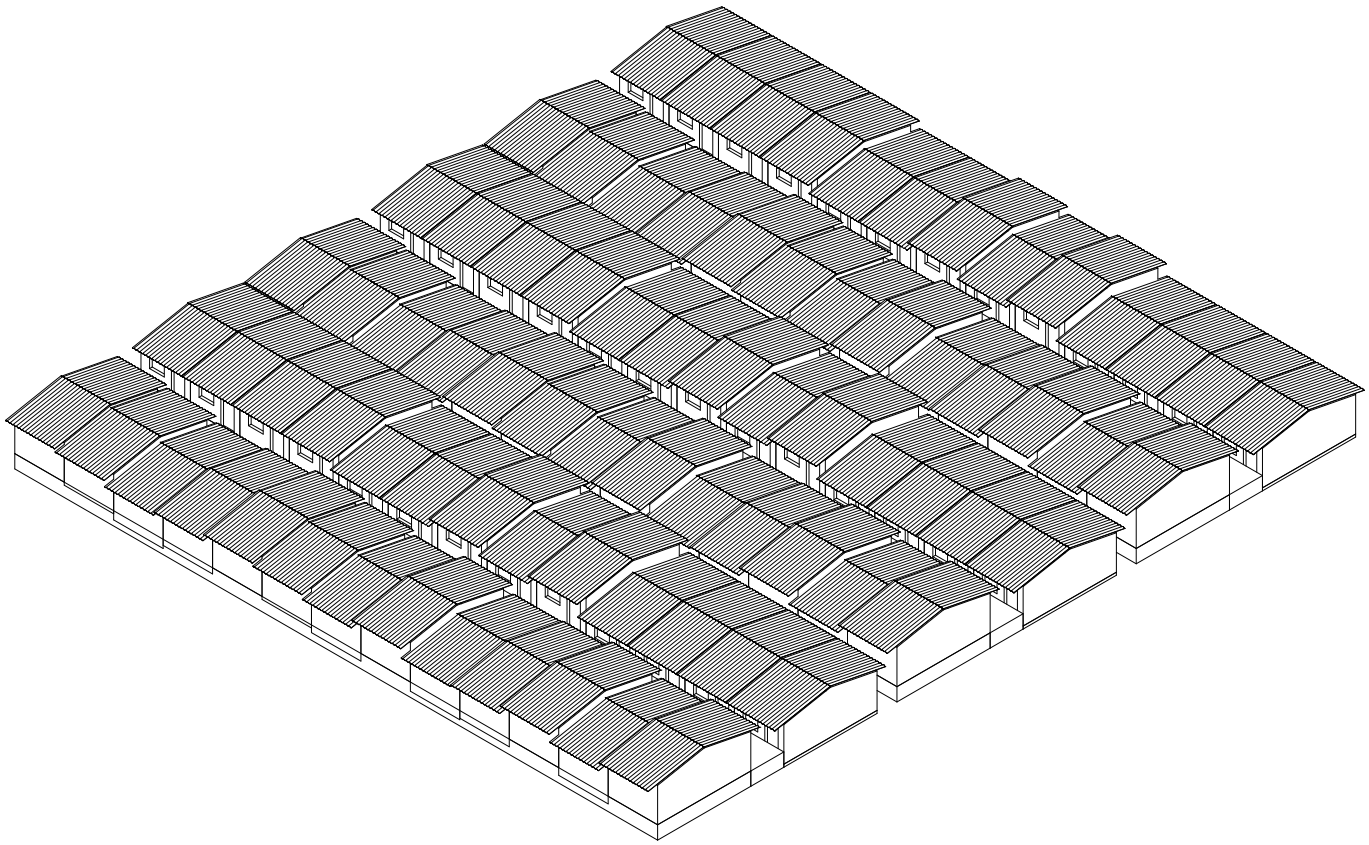
the Baithi Chawl



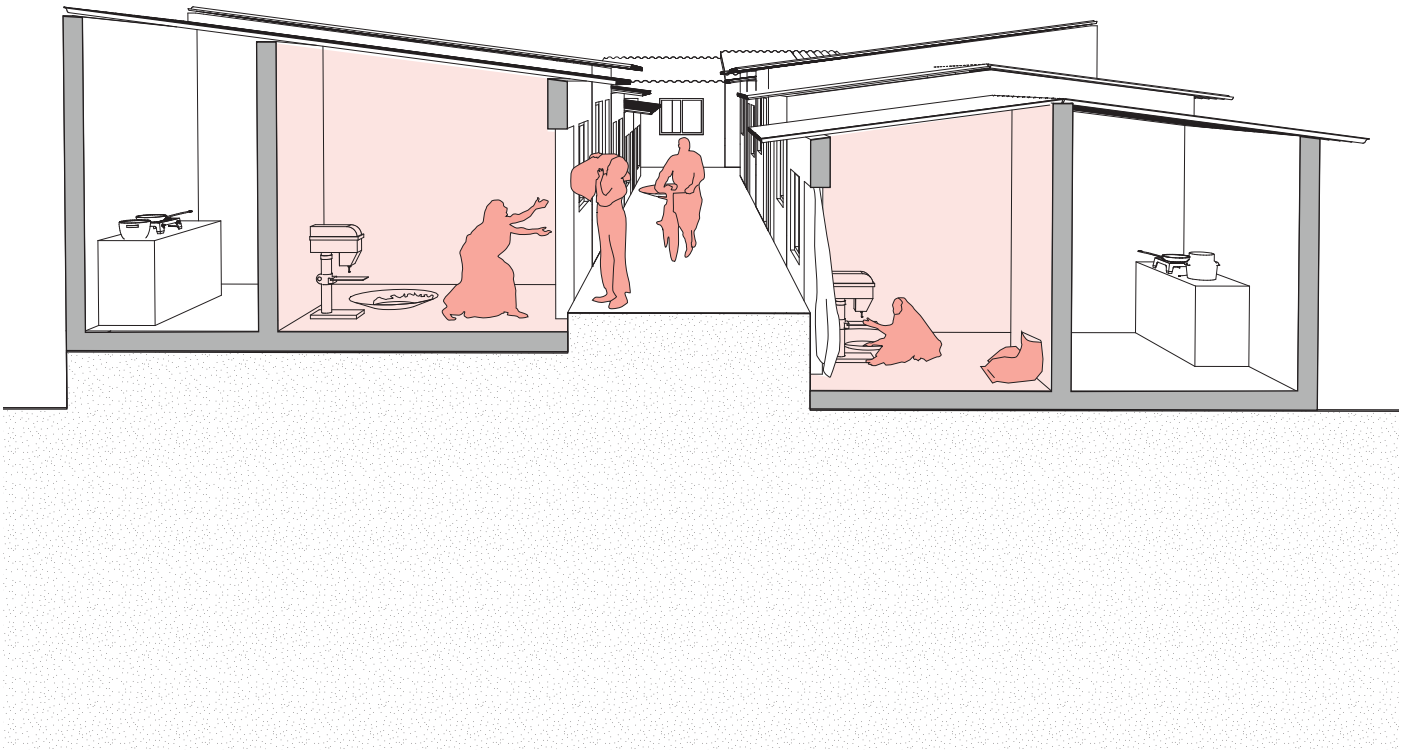
Pepijn Holthuis | Jaap Le
Nelson Motta | Dick van Gameren | Rohan Varma

Book of Patterns
the Baithi Chawl

Income Generation



1. Domestic Workshops

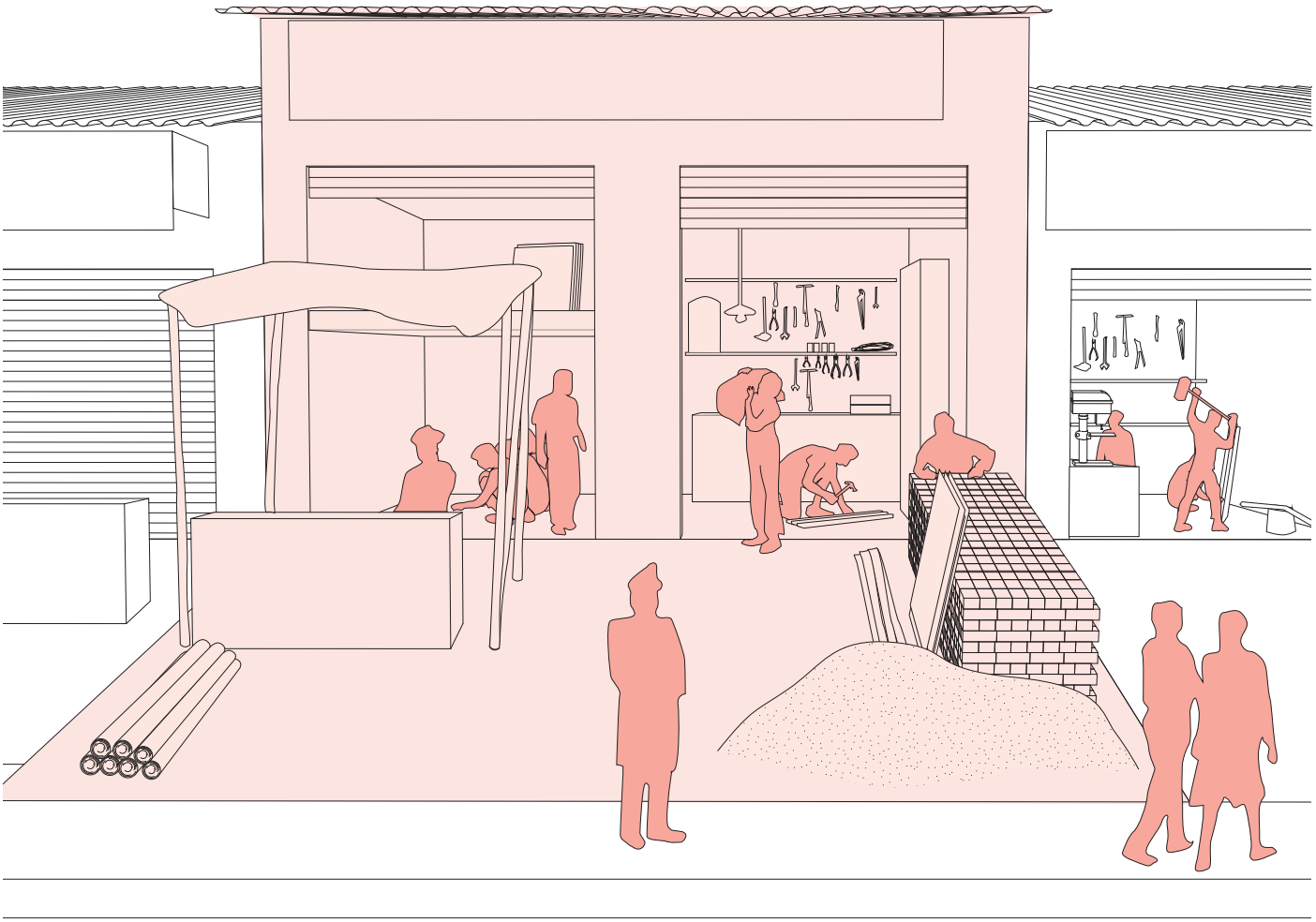


In some of the baithi chawls manufacturing of goods takes place in mixed used residential units. It both occurs that multiple units in one chawl are producing the same goods being part of one company, as are the autonomous operating units working individually. The front room is both used for manufacturing and storing the goods.

2. Local shops

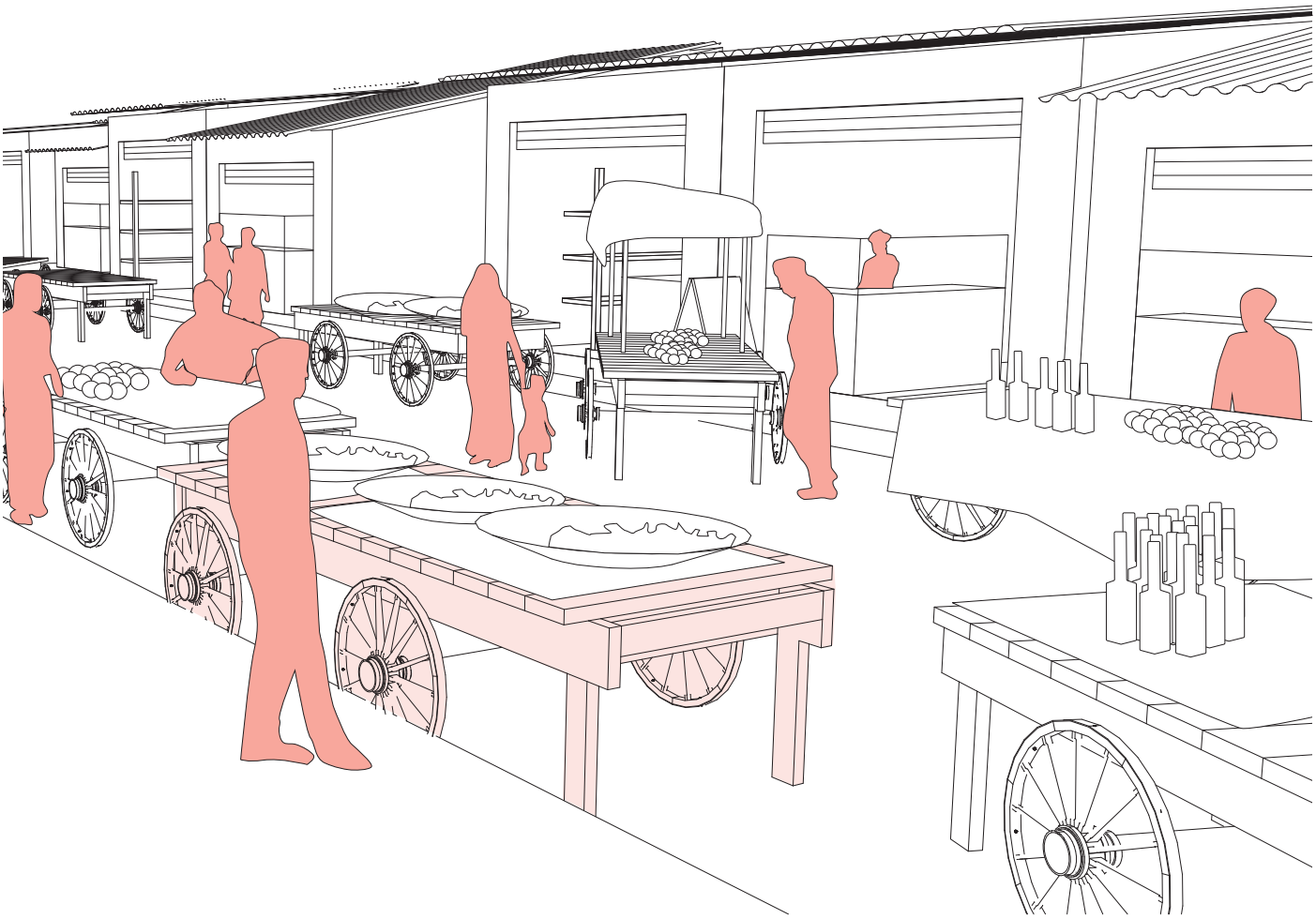
The baithi chawls are perpendicular to secondary roads which are themselfes perpendicular to the main road. In this secondary roads local shops are placed along the streets. These shops vary in size, ranging from a couple of square meters to deeper units which sometime have a backroom or second floor to house the owners family. The roads are wider than the baithi chawl paths giving space for other forms of mobility than pedestrians. The shops sell a variety of products mostly related to daily needs and in some cases other functrions are housed such as small offices. The sidewalk in front of the shop is used to place signs, tables and stalls as an extension to the shop.

3. Industrial Ghalas



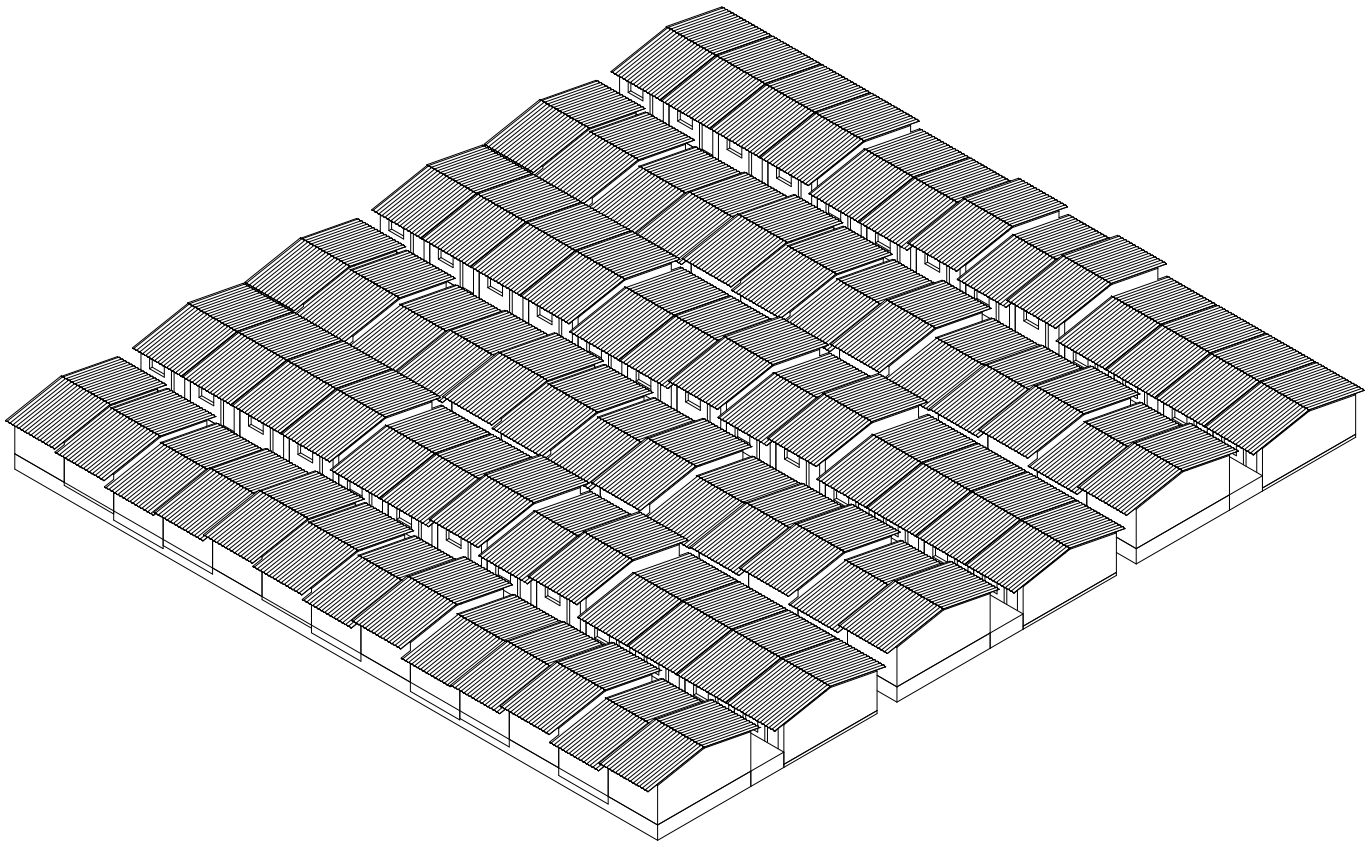
The highway coming from Mumbai offers a vital artery for various industrial activities taking place in the area of Nala Sopara East. These activities are held in workshops of varying size close to the highway and along the main road crossing the area. These so-called Ghalas are manufacturing and selling various products mostly related to construction such as bricks, cement, steel beams etc. A concrete ramp is built in front of the ghalas on which the finished goods, raw material and a reception desk are placed.

4. Street Vendor Stands



The street vendor stand offers another way of selling goods in the shopping streets. In the busier streets these stalls are clustered in a market but they also appear 'alone'. They are mostly made of wood or metal with plastic sheet covers and often mobile or temporary constructions. The vendors sell mostly products related to daily needs such as food. Sometimes the stall is part from the shop where they stand in front of and serve as an extension to the interior.

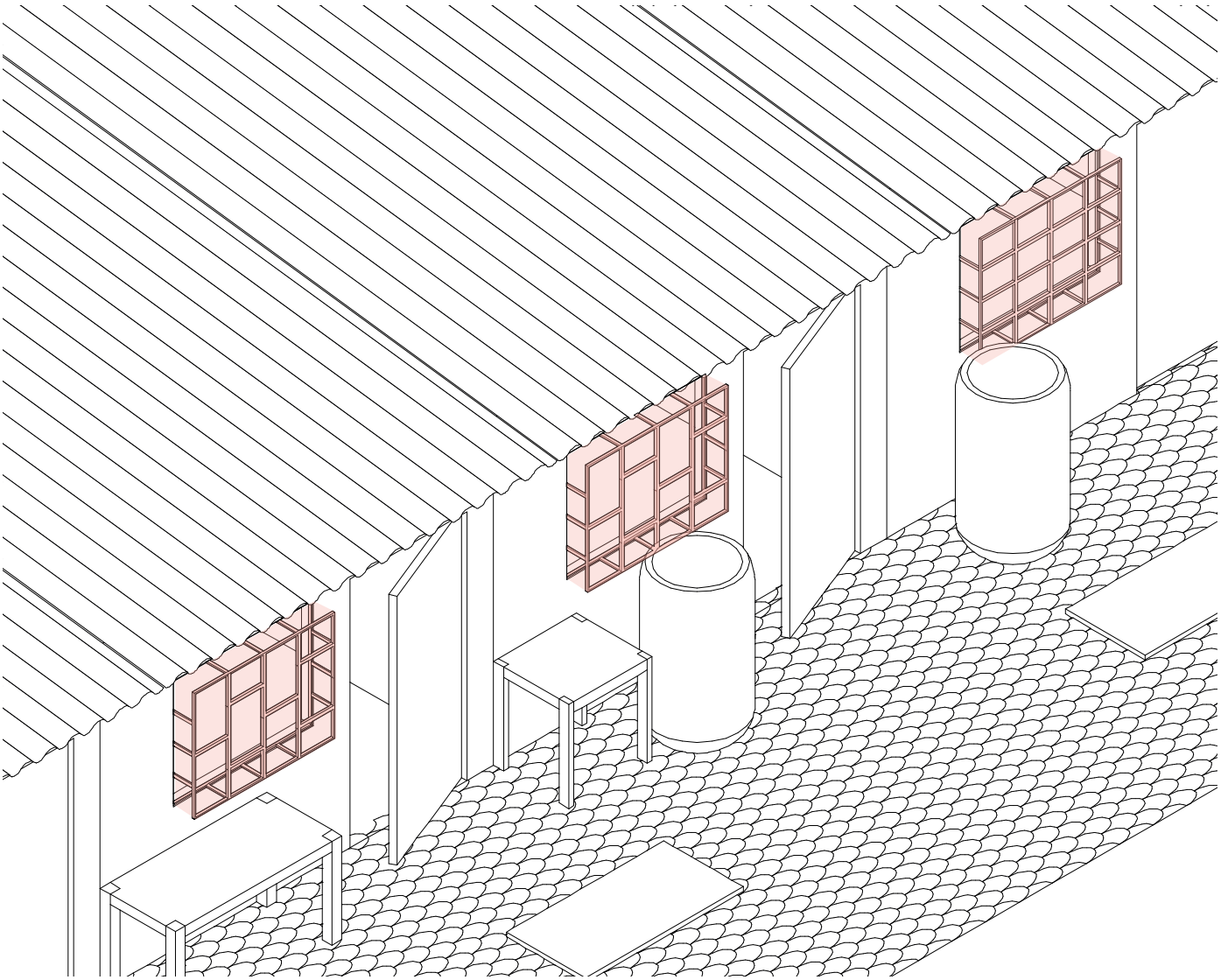
Borders



1. Society Gates

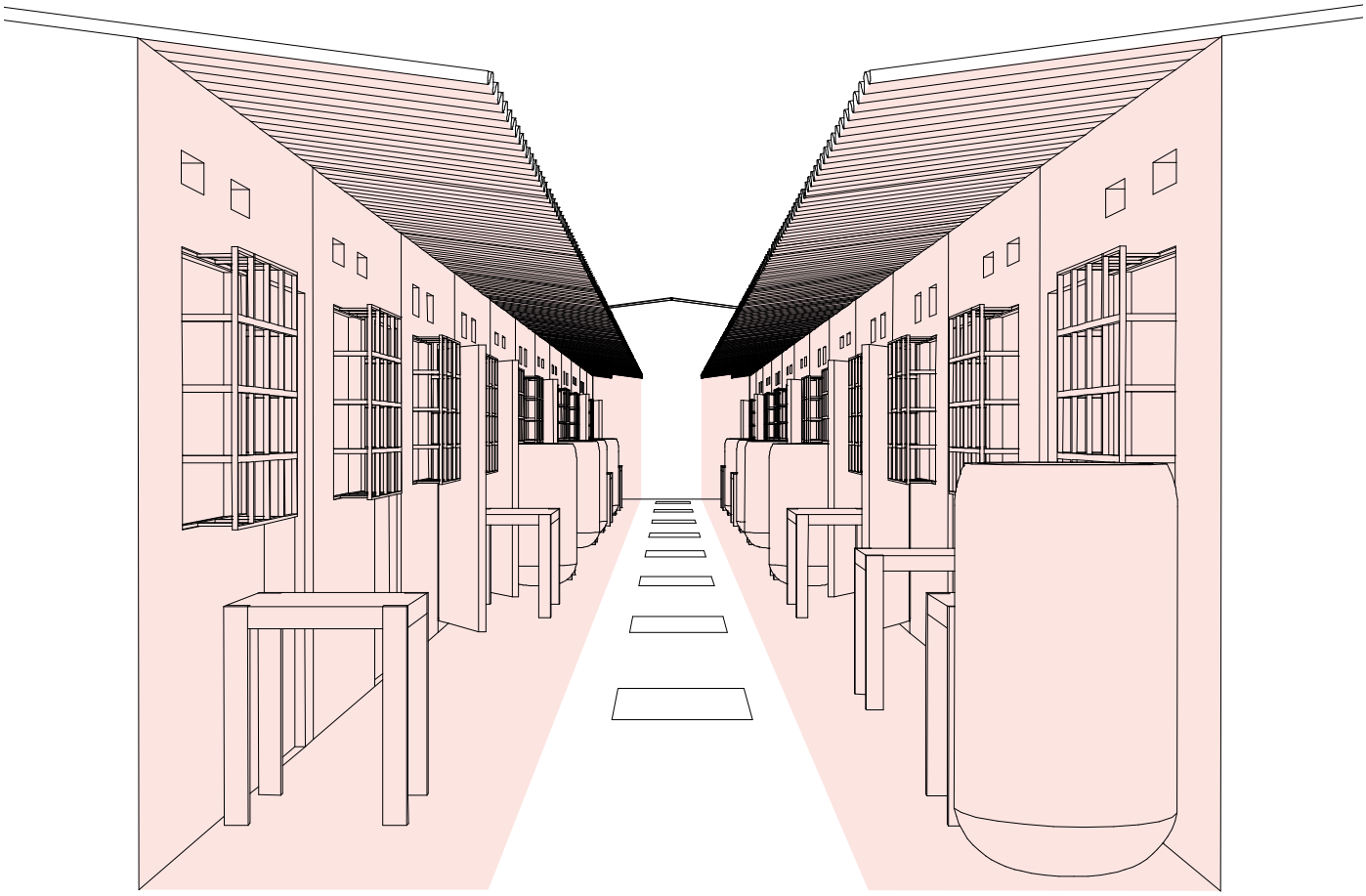
The society gate acts as a transitional border that sets the perimeter of semi-public space: the society area. This measure not only gives information about the society itself but also gives a very clear message to everyone not from the society that they are visitors.

2. Window cages



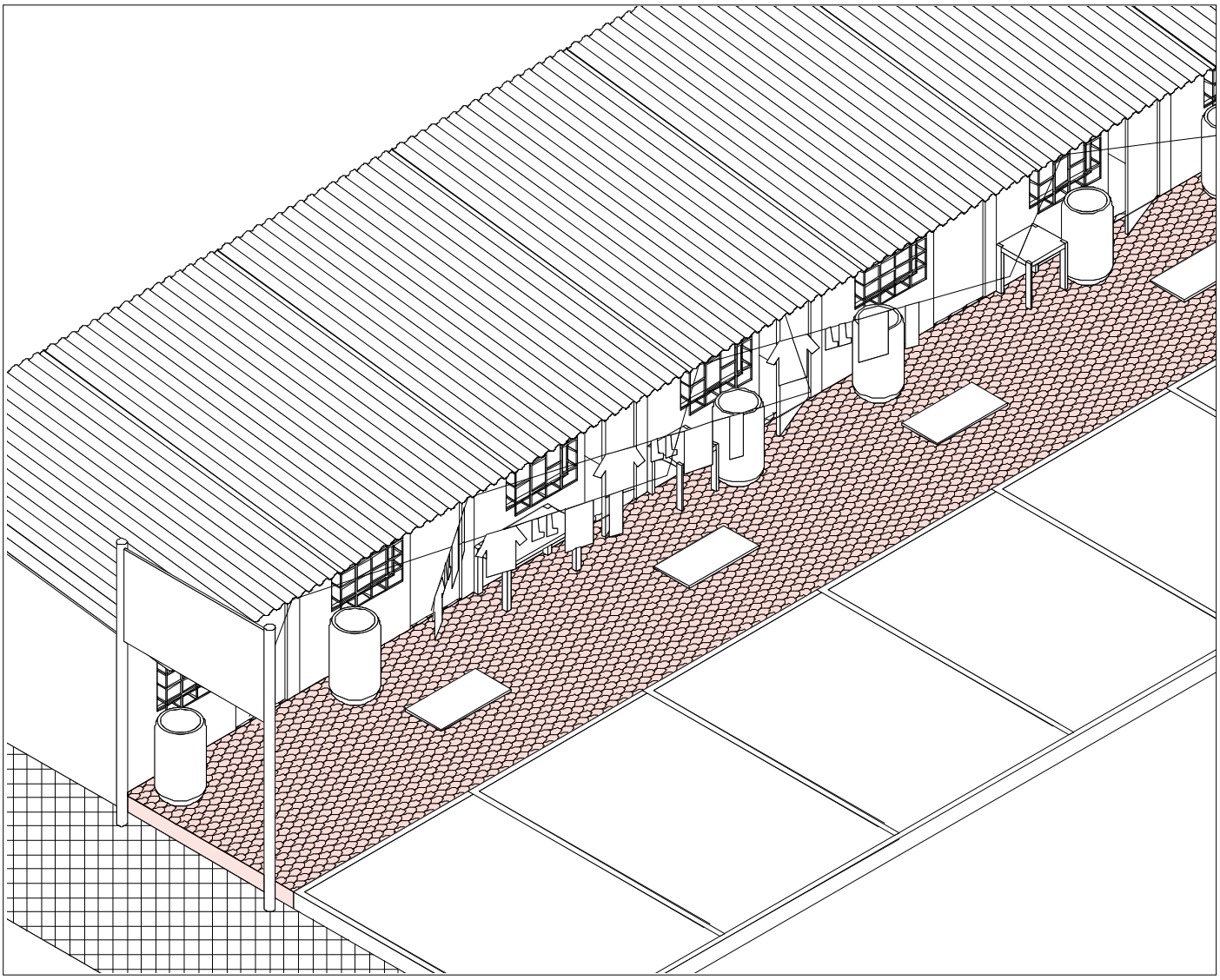
The cages in front of the windows of baithi chawls are for protection but also indicate to the person not living there: "keep out, private property". It's a very hard transitional element that separates semi-public with private space. In other cases, you will find these cages to be used as a extension of the dwelling, but the cages found in baithi chawl dwellings are not deep and are only meant for security purposes.

3. Roof Canopies



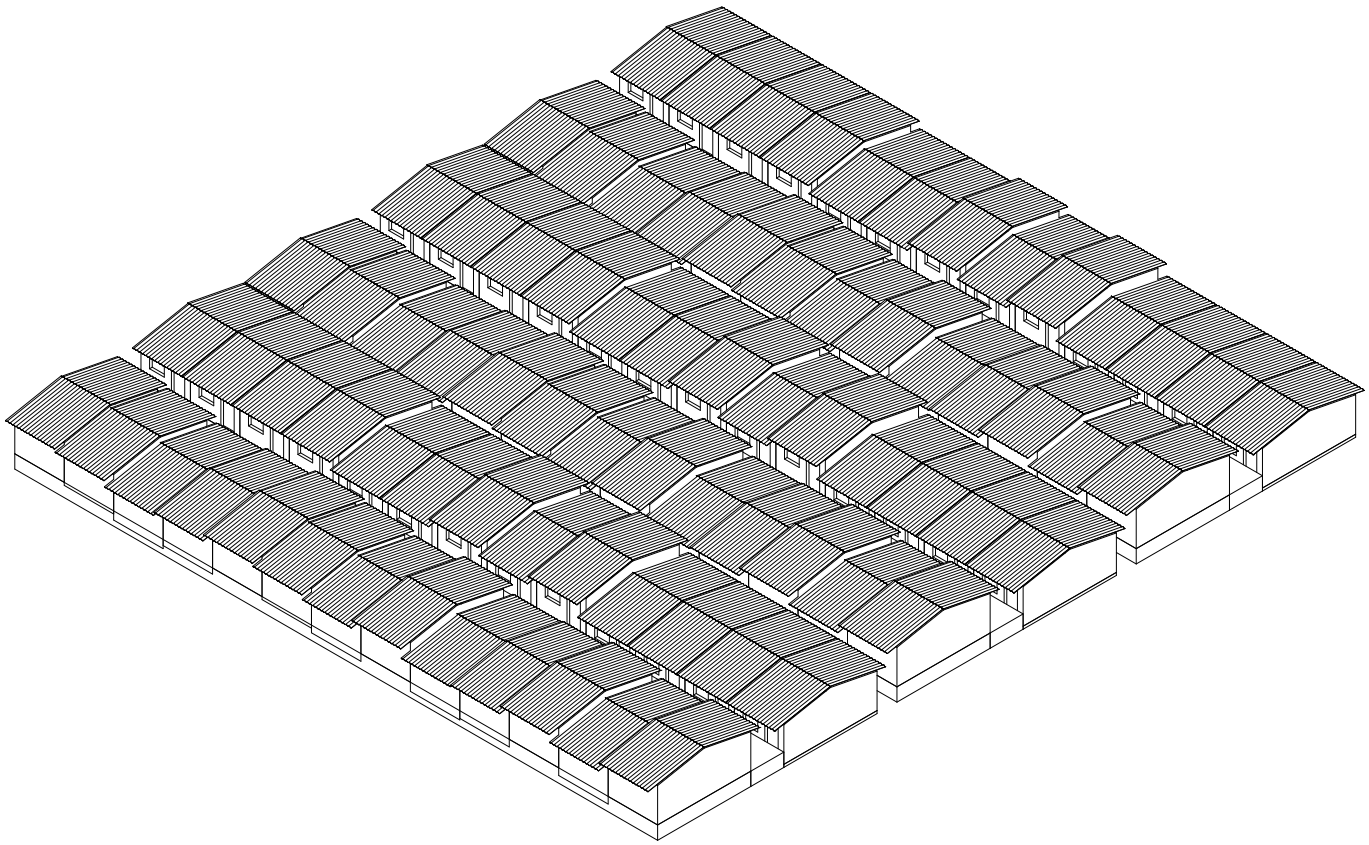
The roof canopies of baithi chawls cover a part of the communal lane. This space is appropriated by the different dwellers and used as an extension of their house, to store water, to dry clothes or to sit outside. This makes this layer a private area although being actually semi-public. This space further softens the transition of public street to private dwelling

4. Communal pavements

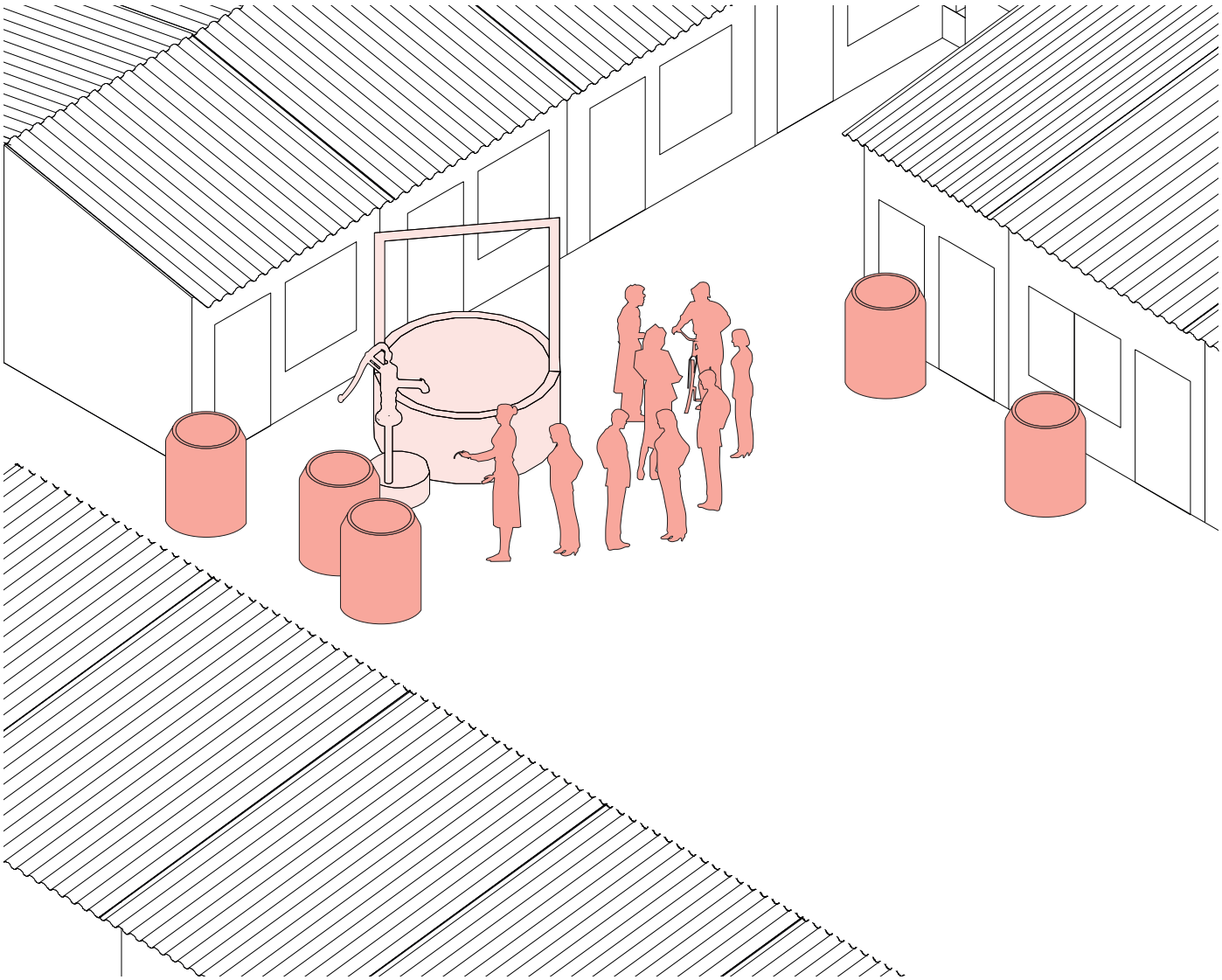


The communal pavement of the alley between baithi chawls is an element that highlights the semi-public character of the communal lane. This pavement is characterised by a little height difference and different type of bricklaying and is often well maintained showing the community's tight interaction. By entering a different street, characterised by a smaller width and materialisation than that of the bigger commercial street a person enters a new domain, here a semi-public area. With this well maintained different communal pavement the dwellers living here signal that a person entering here is mere a visitor.

Social Spaces

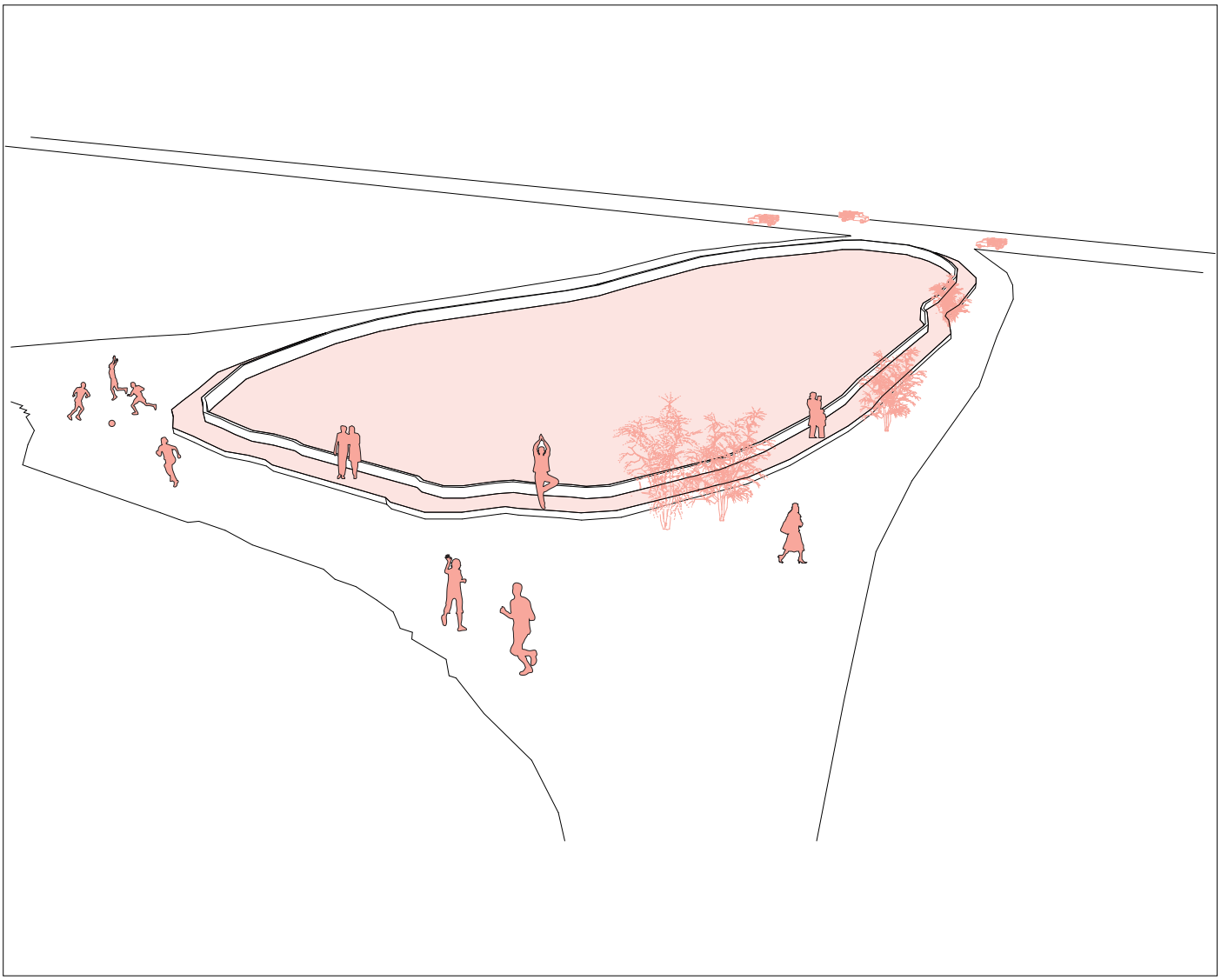


1. Wells



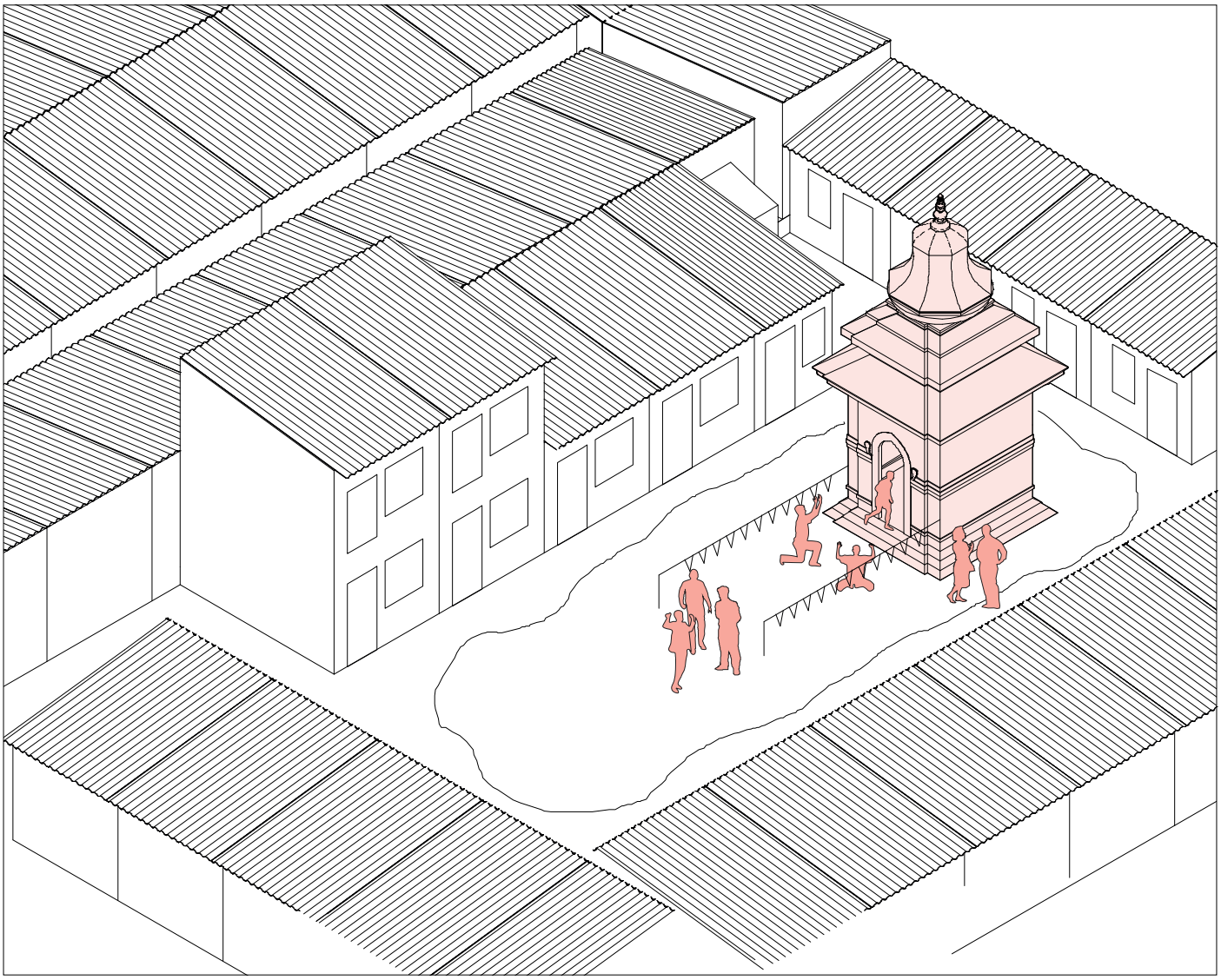
Wells around the rows of baithi chawls act as a place to meet for the women of the baithi chawl area. In a conservative nation such as India, where women of economical lower classes have not always the possibility to move around, the act of getting water as a daily activity act as a way for women to go out of their houses and to meet one another, to gossip or to talk. This happens on a local basis so this social space is characterized by its semi-public appearance.

2. Lakes



Lakes can be found all around the baithi chawl area of Nala Sopara. Some of them are used for industrial purposes but some have been transformed to public spaces for people to enjoy a walk, to sport or to have some privacy away from the communal baithi chawl areas. Not only people from the nearby baithi chawls use these spaces but they also atrract visitors from further away resulting in a place where people can be less exposed.

3. Temples

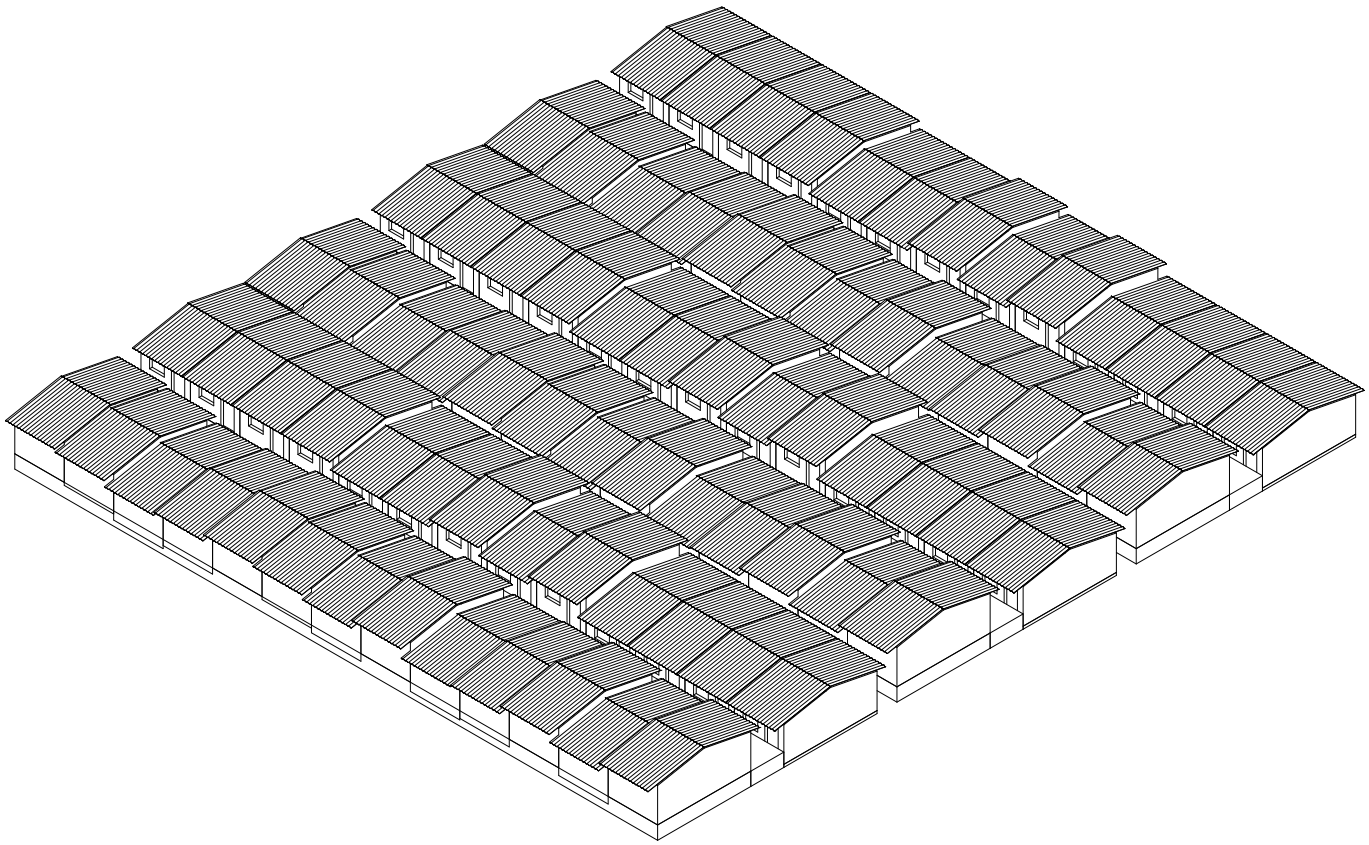


Temples or places of worship are scattered all around the baithi chawl alleys, often situated in open areas. These places are spaces to pay respect to the gods but also to meet the community, to show that you are pious and committed and fitting within the group.

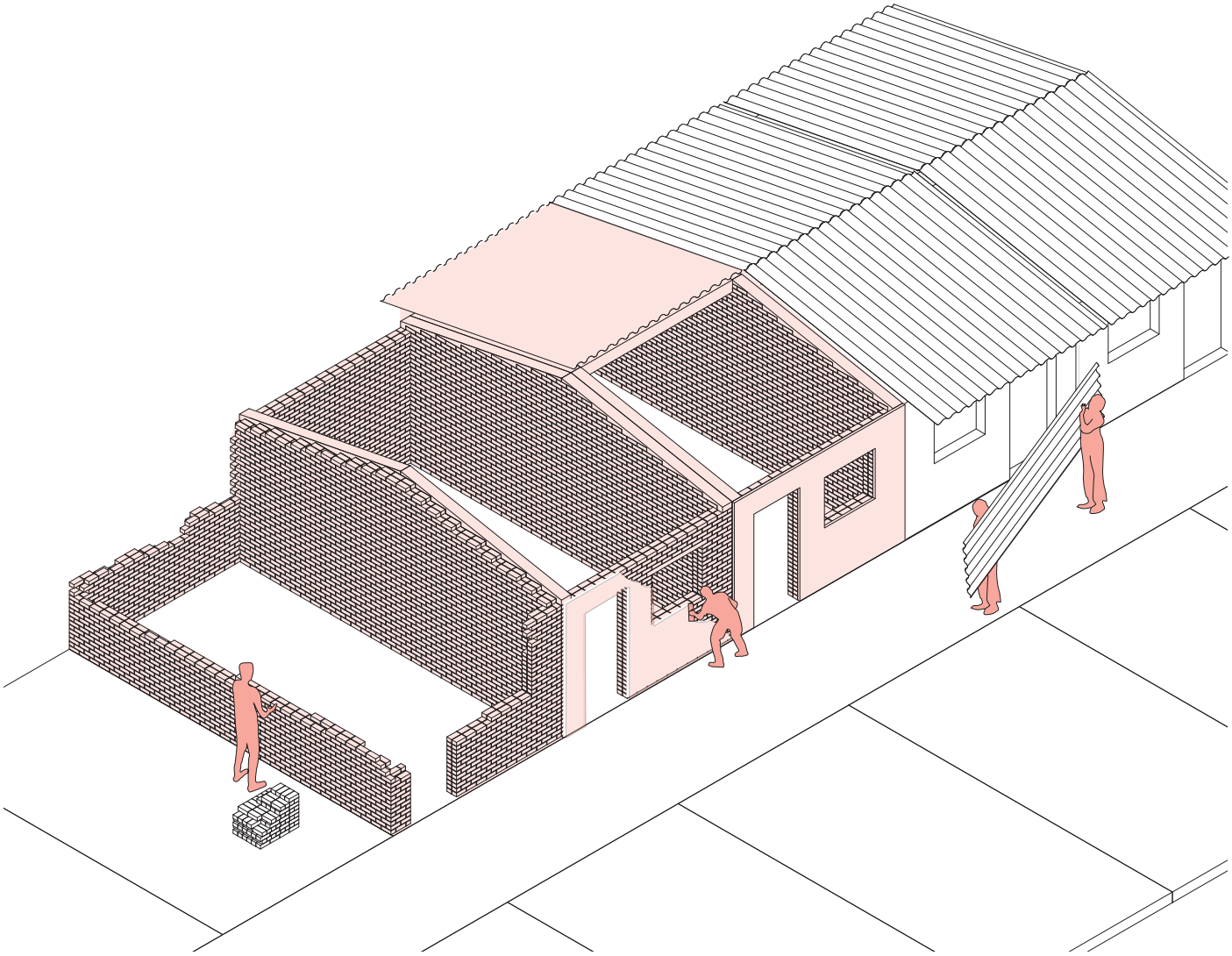
4. Communal alleys

The communal alley is, although its a cramped space, a very lively social area. This is where the private lives of the dwellers meets the public sphere and where family, friends and neighbours meet each other. It is a very important space for the community to bond and to discuss important matters. People sit in front of their houses or stand in door openings chatting with oneother.

Building Technique

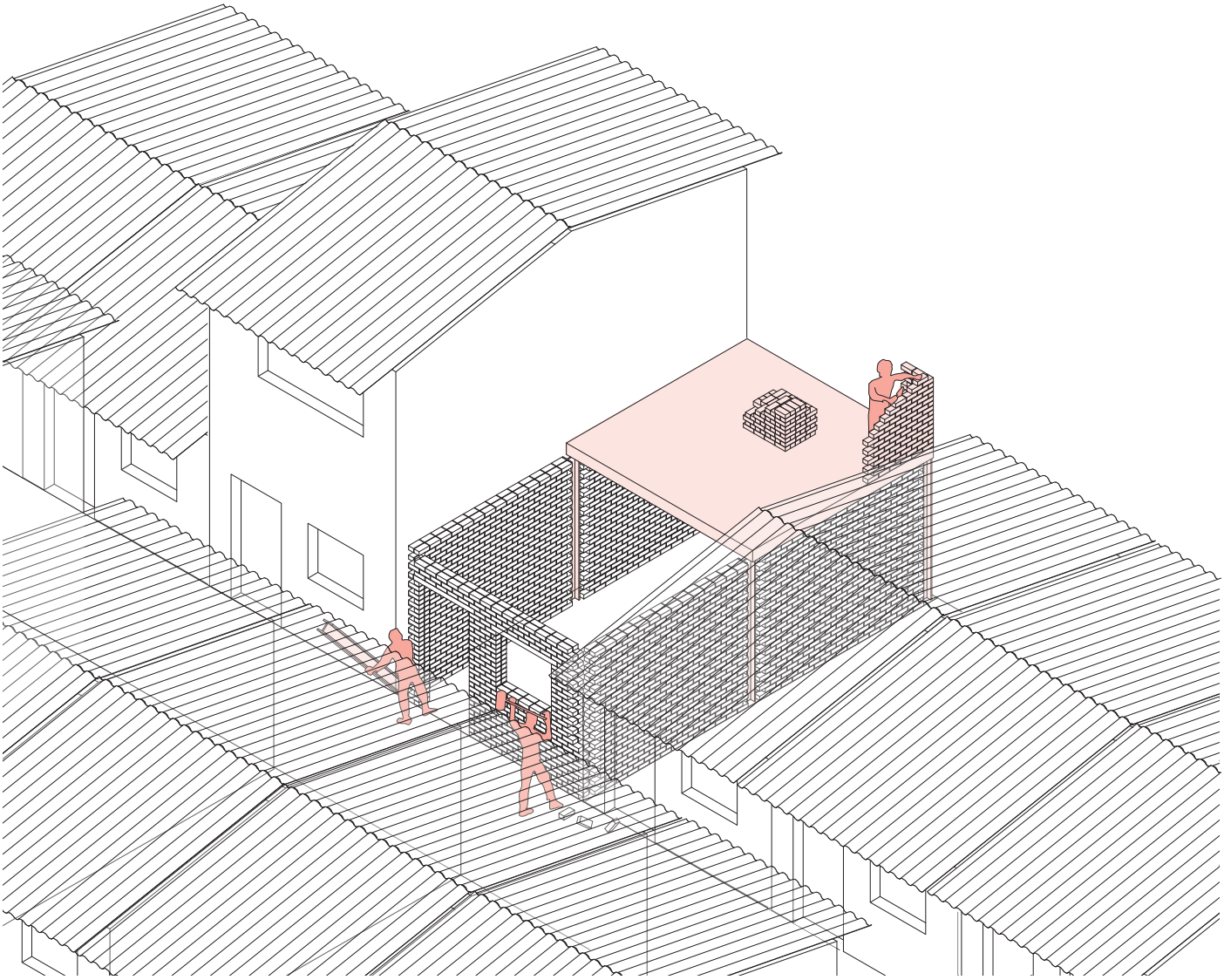


1. Baithi chawl construction process



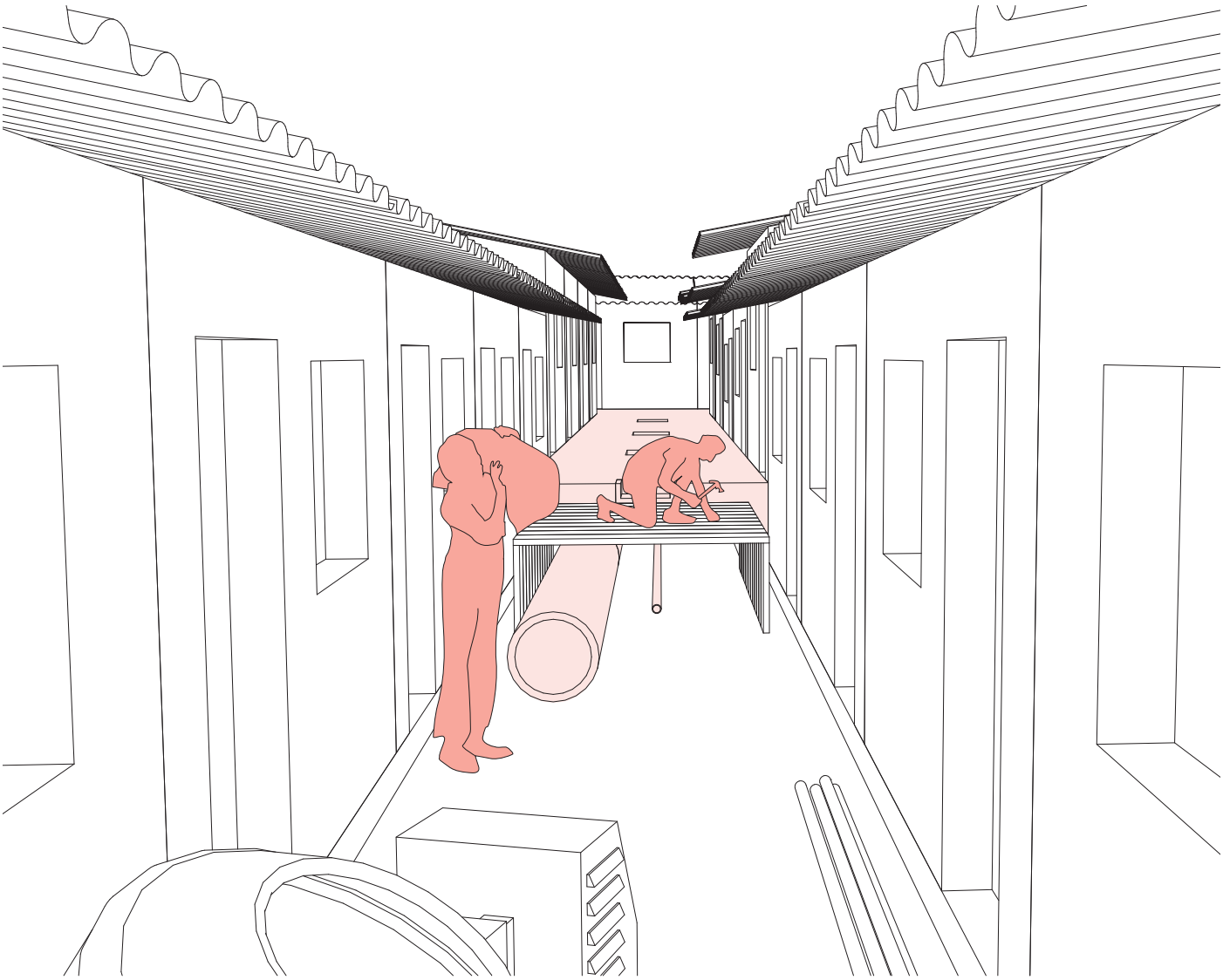
The units of the baithi chawls are constructed by the same contractor or developer and grouped in clusters of approximately twenty parts. The walls are made of brick after which the exposed sides are covered with a layer of cement to protect the bricks from rainwater. After this small steel beams are layed upon the wall to support the roof made of corrugated steel.

2. Vertical unit extensions



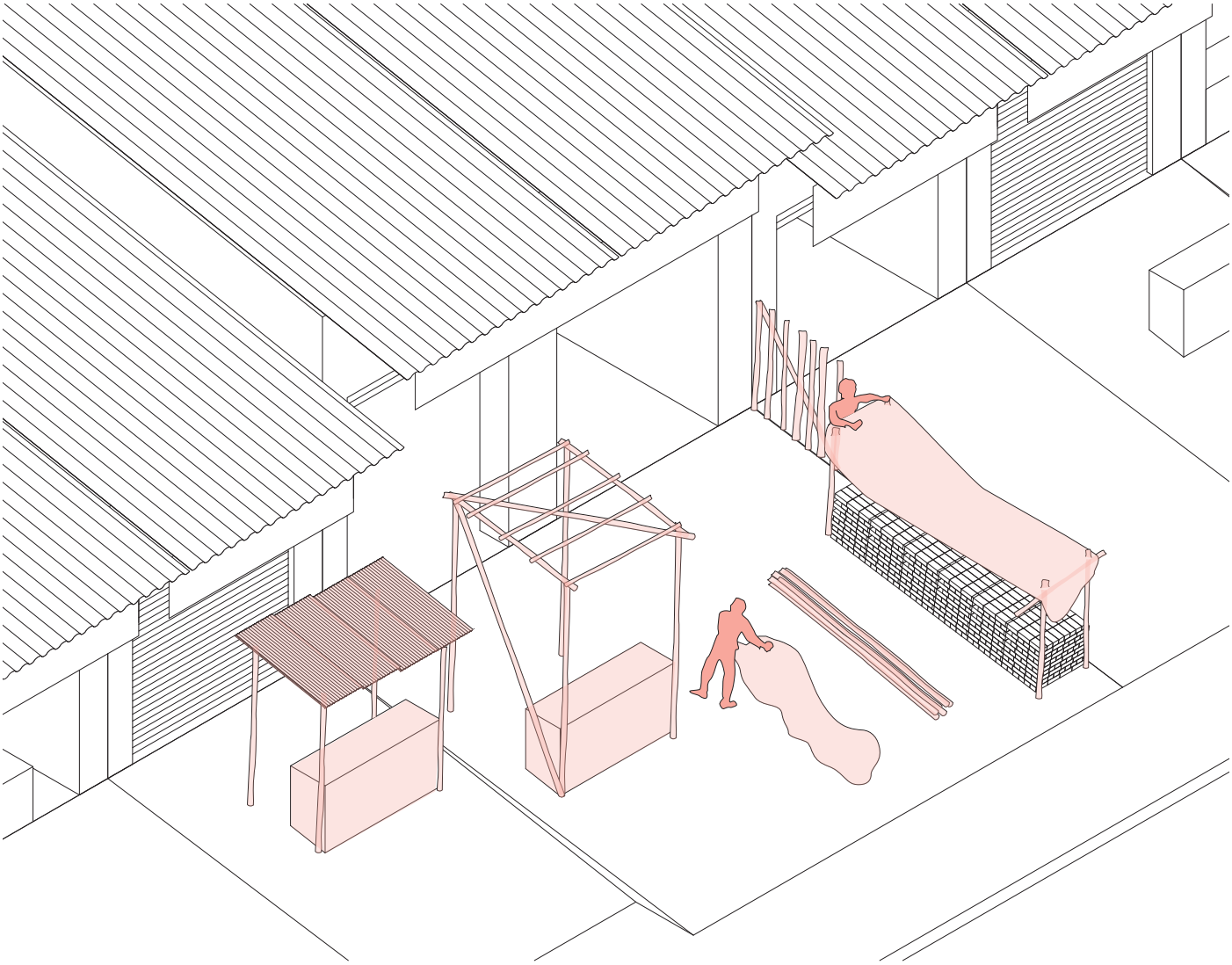
In some cases the units can individually be extended with a second floor on top of the existing structure. The load bearing structure exists out of steel beams that are placed in voids that are cut out of the brick. On top of this construction a new concrete slab is cast after which brick walls cladded with cement are used for infill.

3. Elevated flood preventive paths



Due to the high water level in the monsoon period some Baithi Chawl societies have elevated their communal path in order to prevent flooding. This concrete construction is next to preventing floodings also supplying a common water and drainage system for the adjoining houses. Some of these houses have been raised afterwards to level again with the path when the owners had enough money. This is not always the case which leads to ackward openings as if one is going into a sort of basement through a 1m high door.

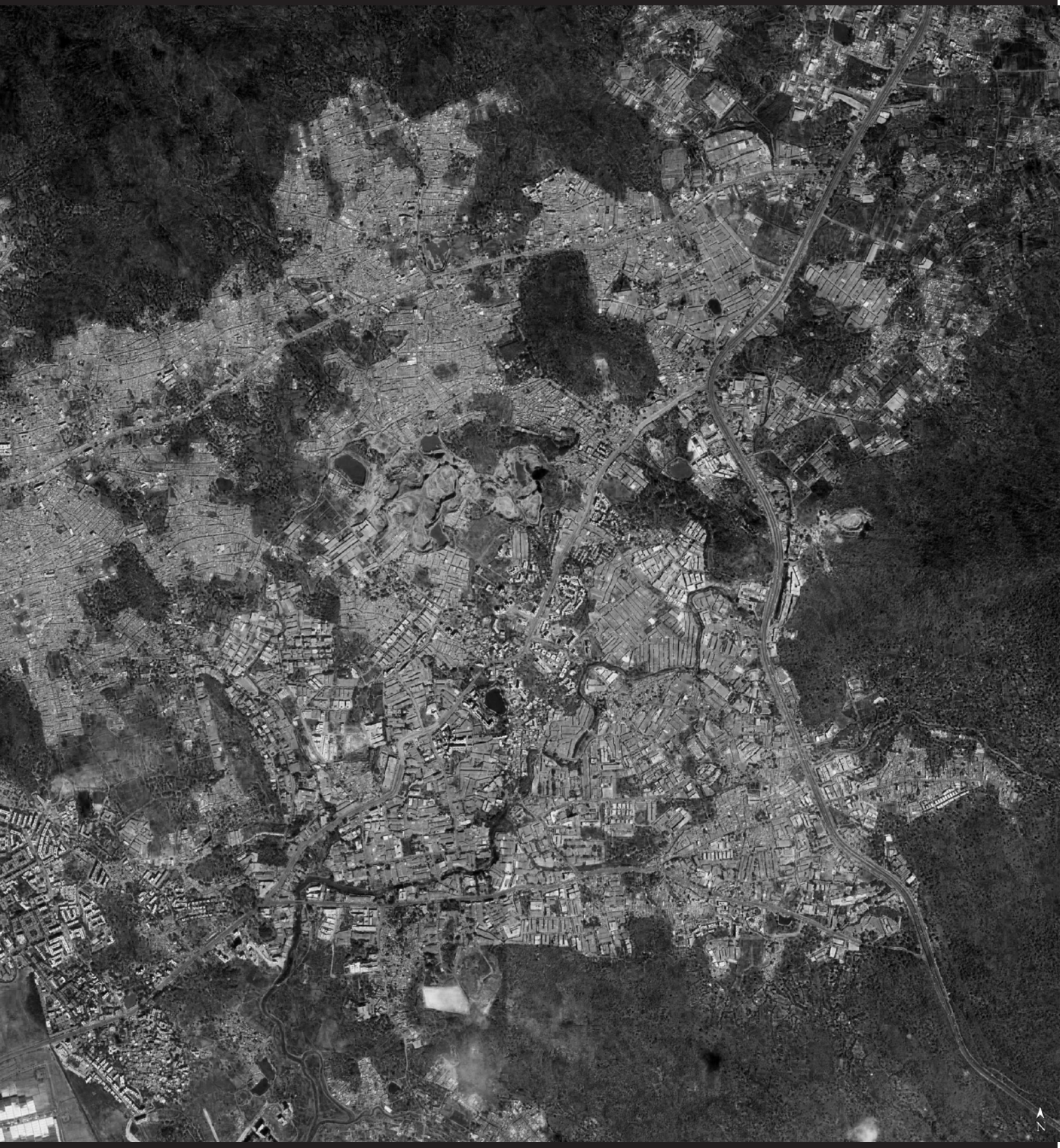
4. Exterior buildouts



The local shops and industrial ghalas appropriate some of the exterior space in front of the unit with secondary structures. These structures have different functions: sometimes they serve as a reception desk, as a cover for goods or to mark the border between two units. The used material are wooden or bamboo sticks or small steel beams covered by a plastic canvas or corrugated steel or plastic sheets. The desks are made of wood or sometimes cast in concrete.

regional strategy

use and not abuse the existing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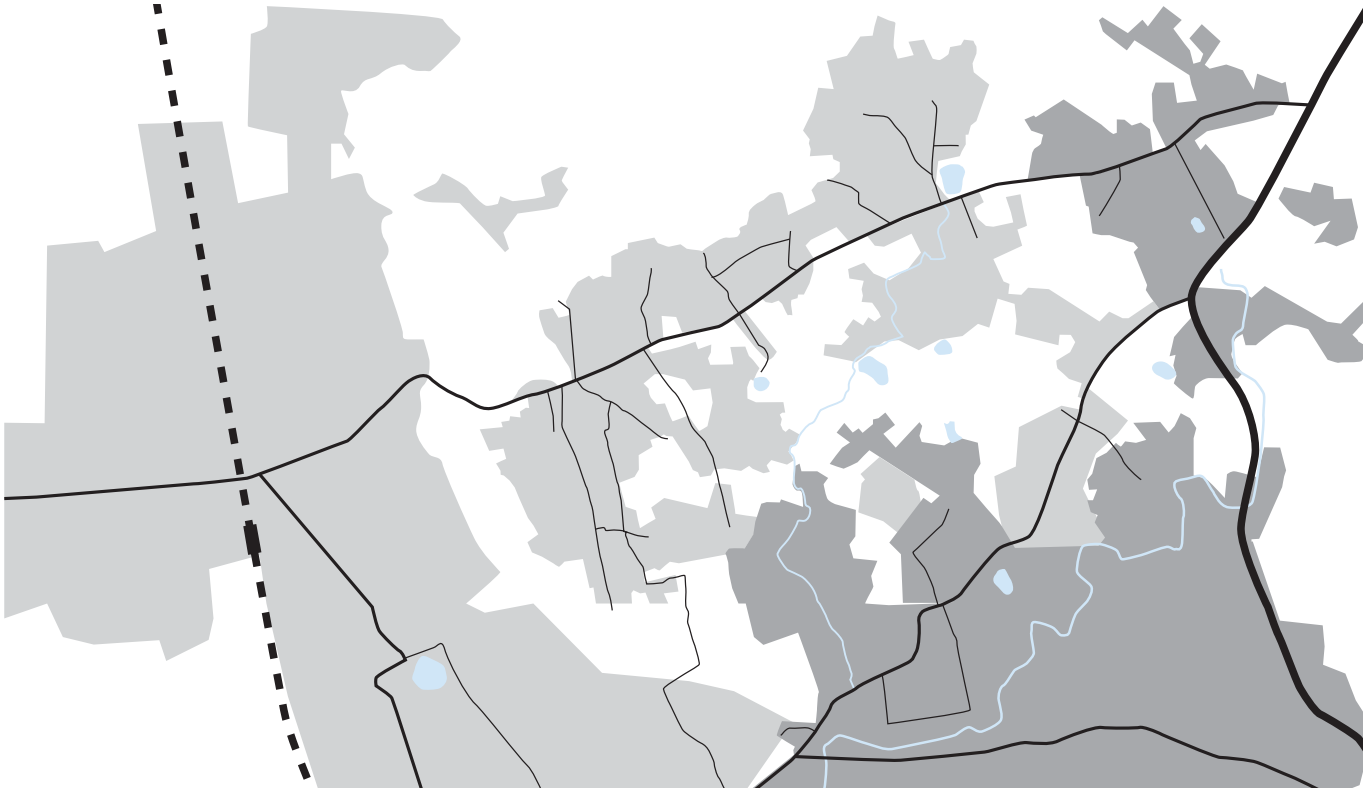
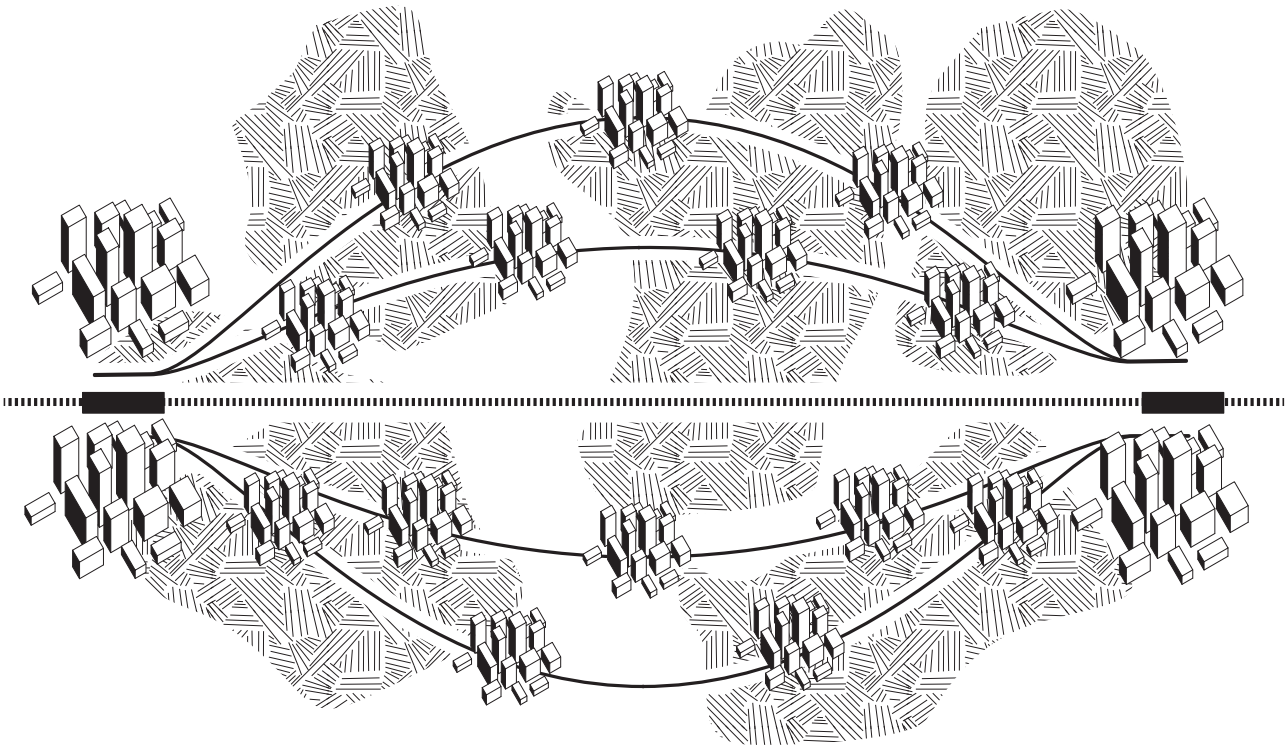
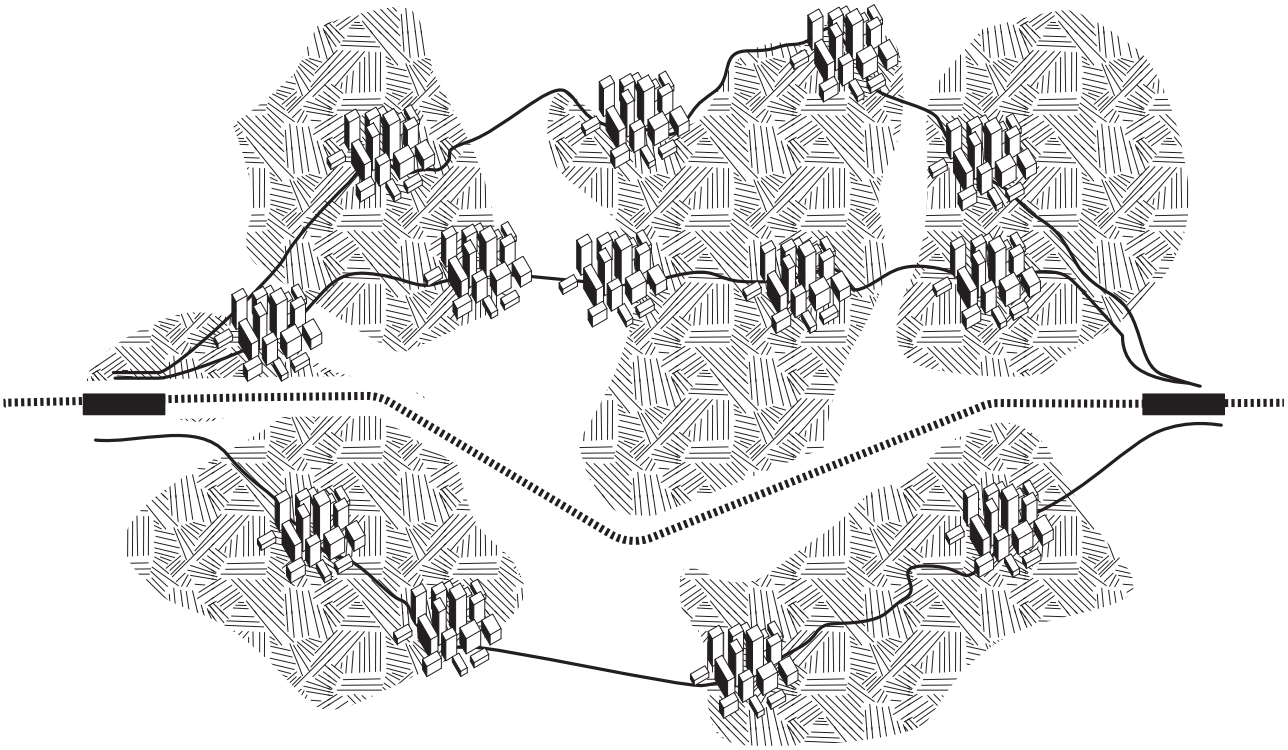



0
0.2
1km

In the map of the new development plan of the MMR the new trainline cuts right trough existing urban fabric.

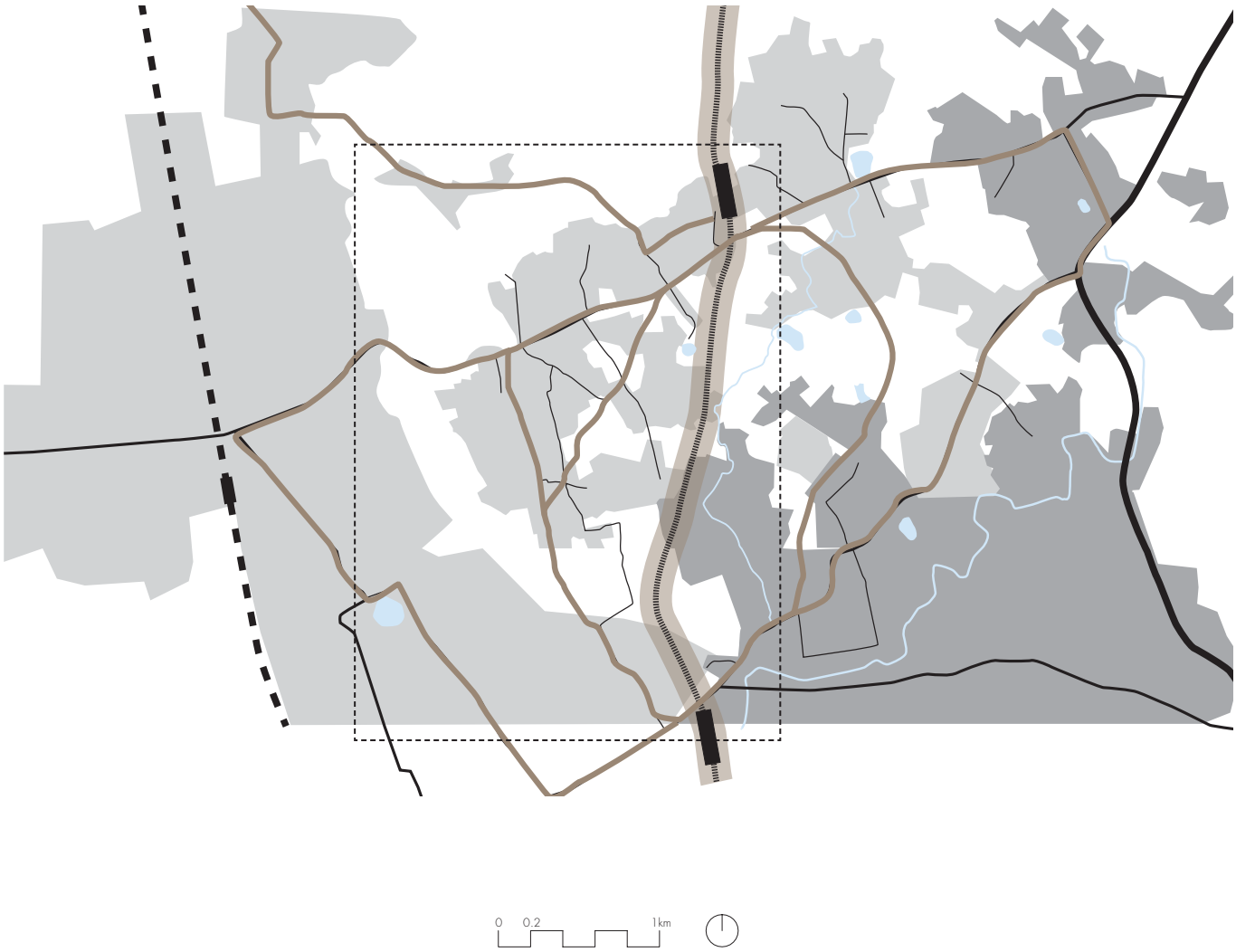


The regional strategy is based on the plan for Navi Mumbai where there are two complementary public transport systems: a primary train corridor and a busline to connect the hinterland to the stations.

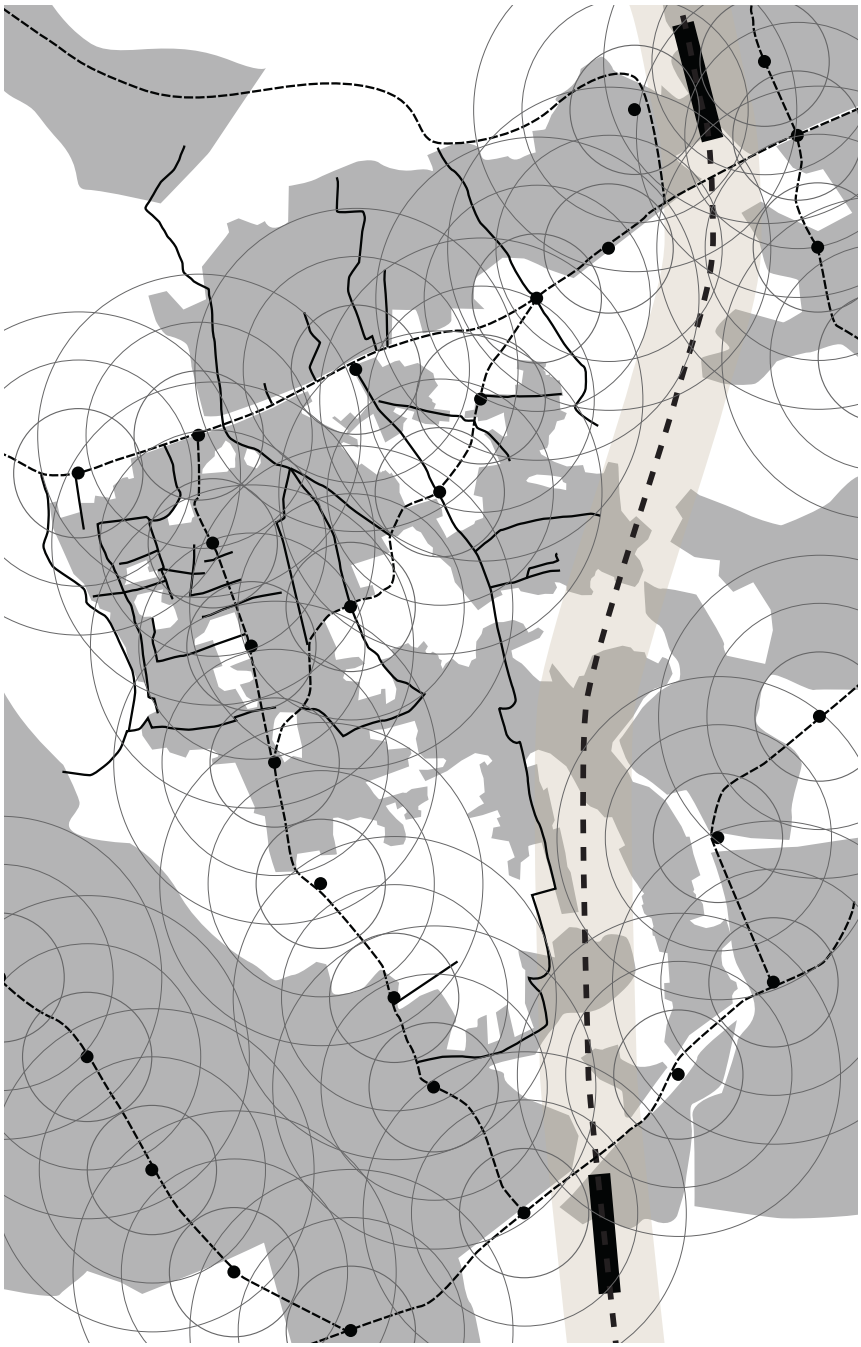


This system is adapting to the existing urban fabric: the trainline is positioned inbetween teh existing fabric and the busline is using the existing roads.

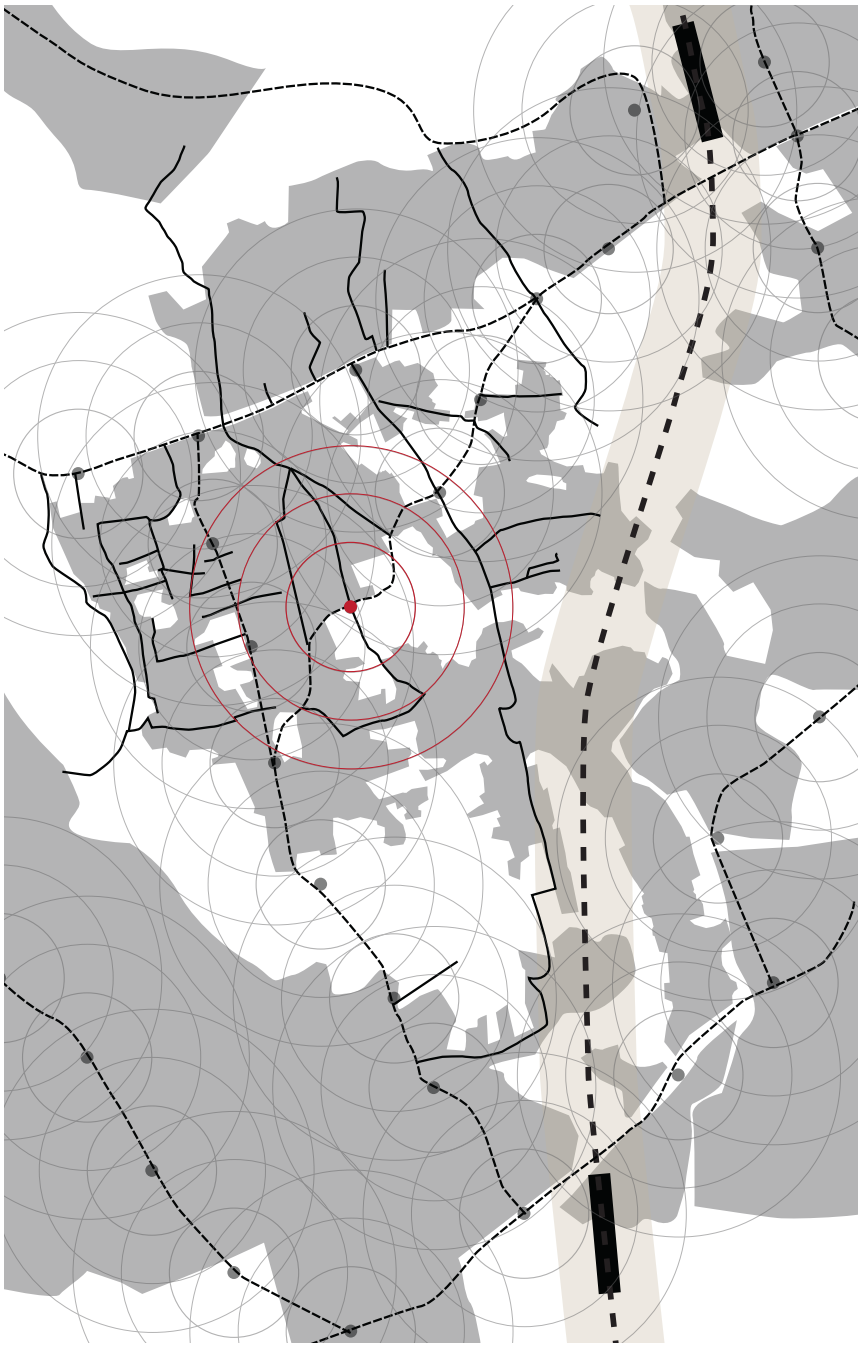
regional plan



the first step is to create the primary infrastructural line inbetween the urban fabric.



After this the secondary buslines are installed. The busstops will be placed on the crossing of existing roads. The densification takes place around the busstop.

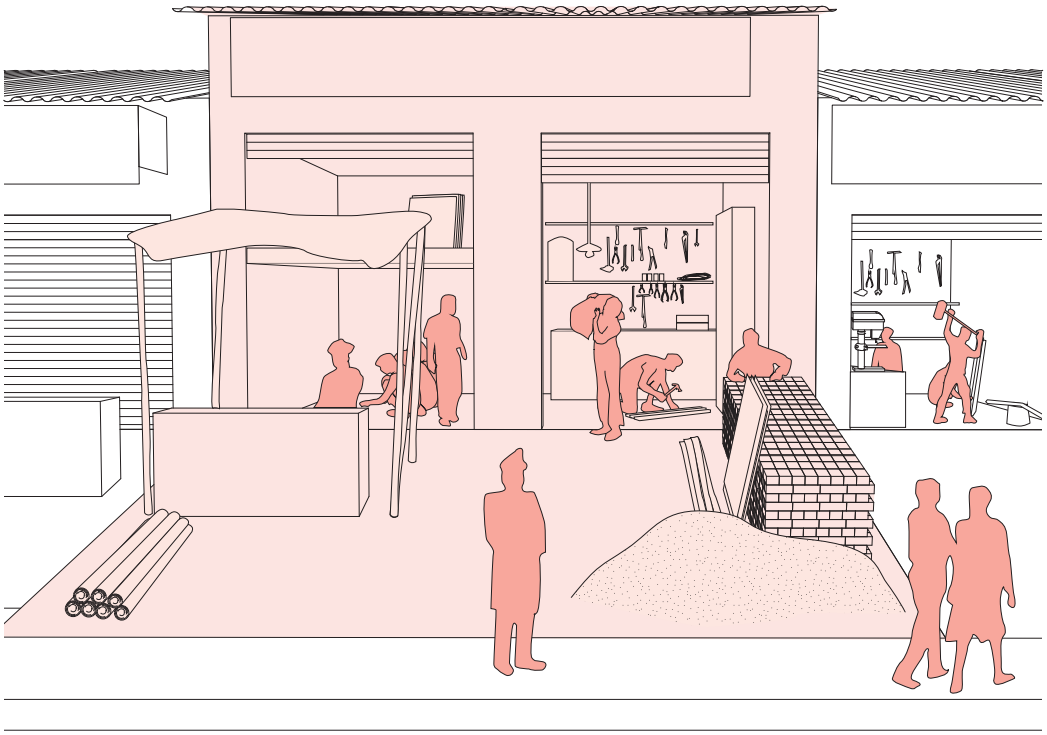


In the design one busstop is worked out as an example of how densification can take place.

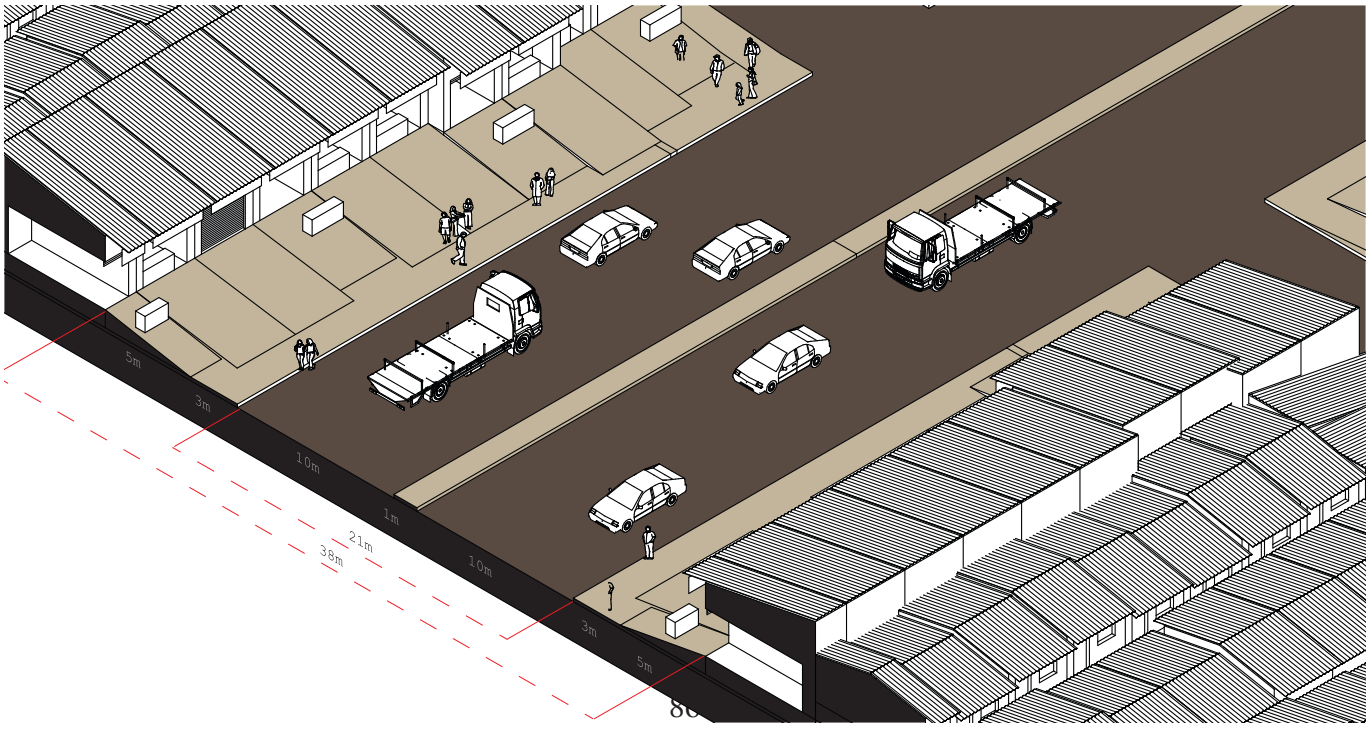
site analysis

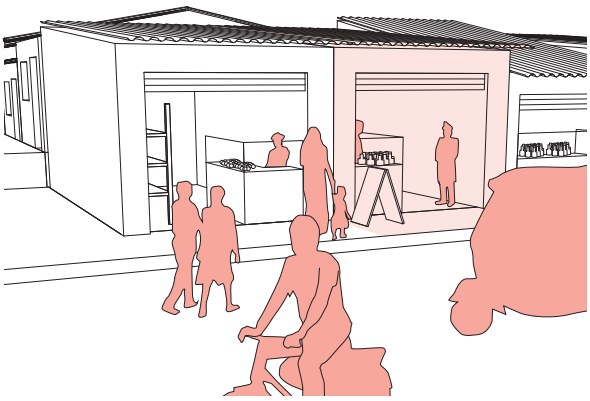
site analysis| ***baithi chawls and hill***

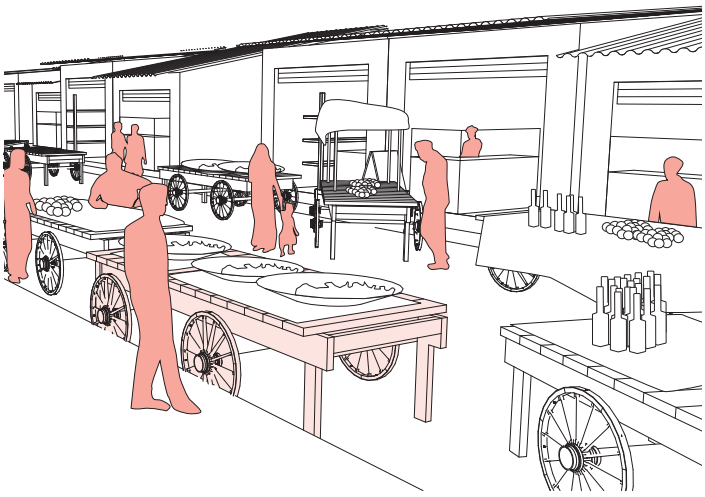
site analysis| ***hierarchy of roads***



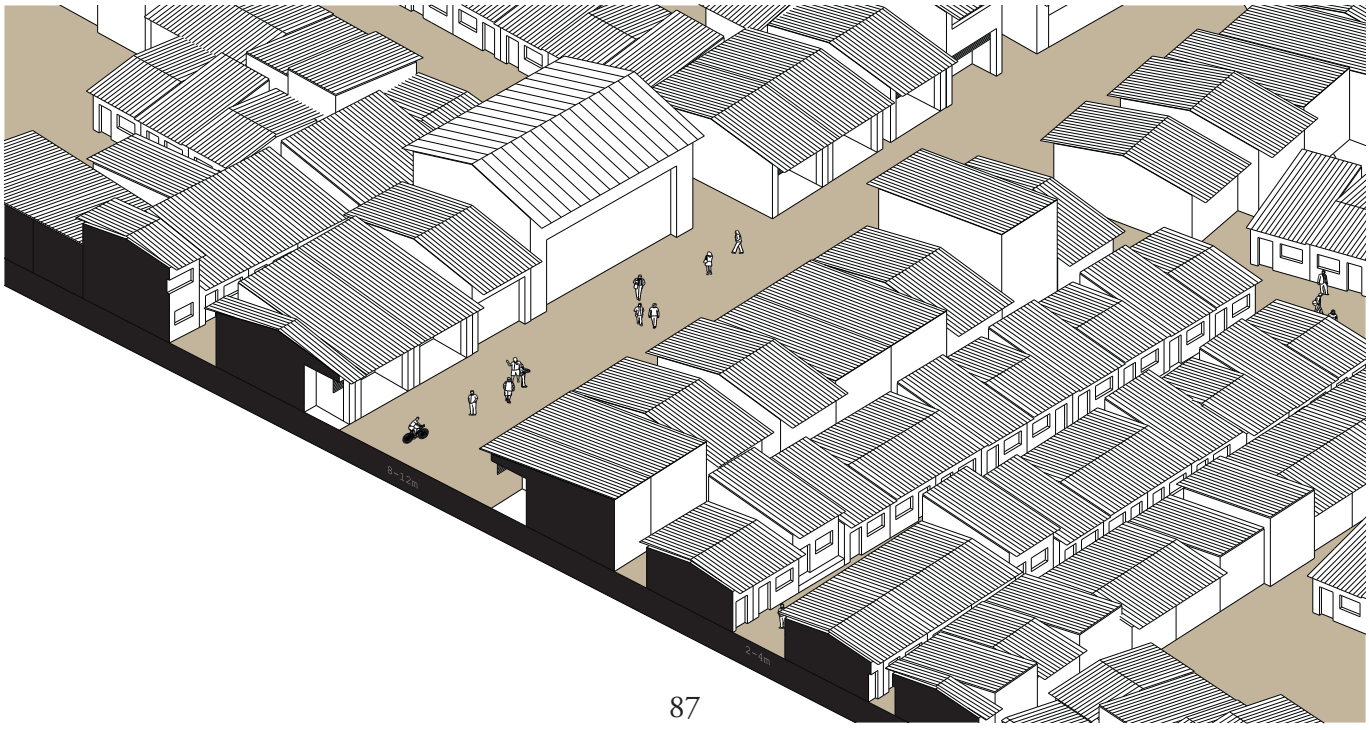
site analysis| ***main road***



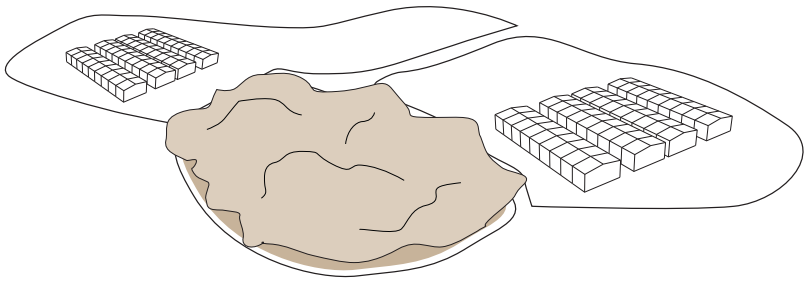




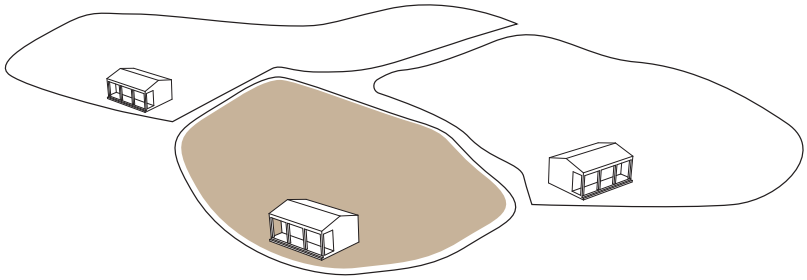
site analysis | ***secondary roads***



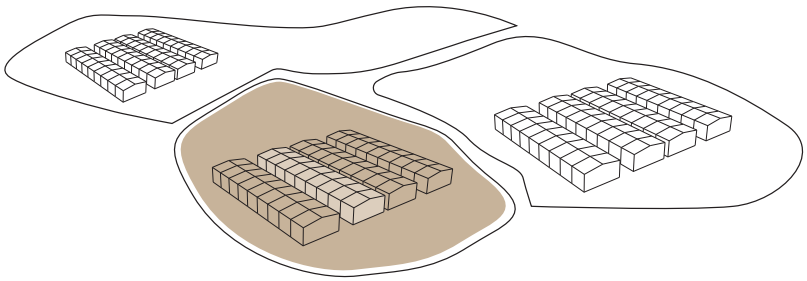
DP: Greenzone



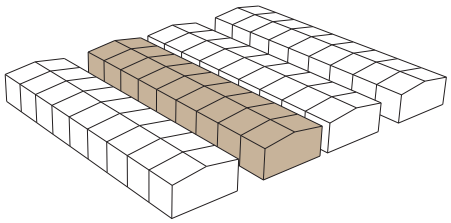
DP: Tribal-/ Farmlands
Ownership: farmers



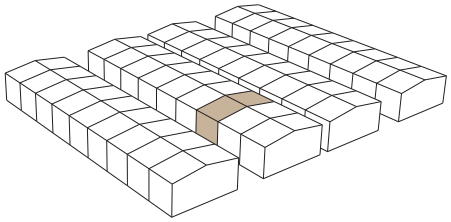
DP: Tribal-/ Farmlands
Ownership: developer/landlord
Pakde system: lease
Illegal: yearly fine



DP: Residential
Ownership: developer/landlord



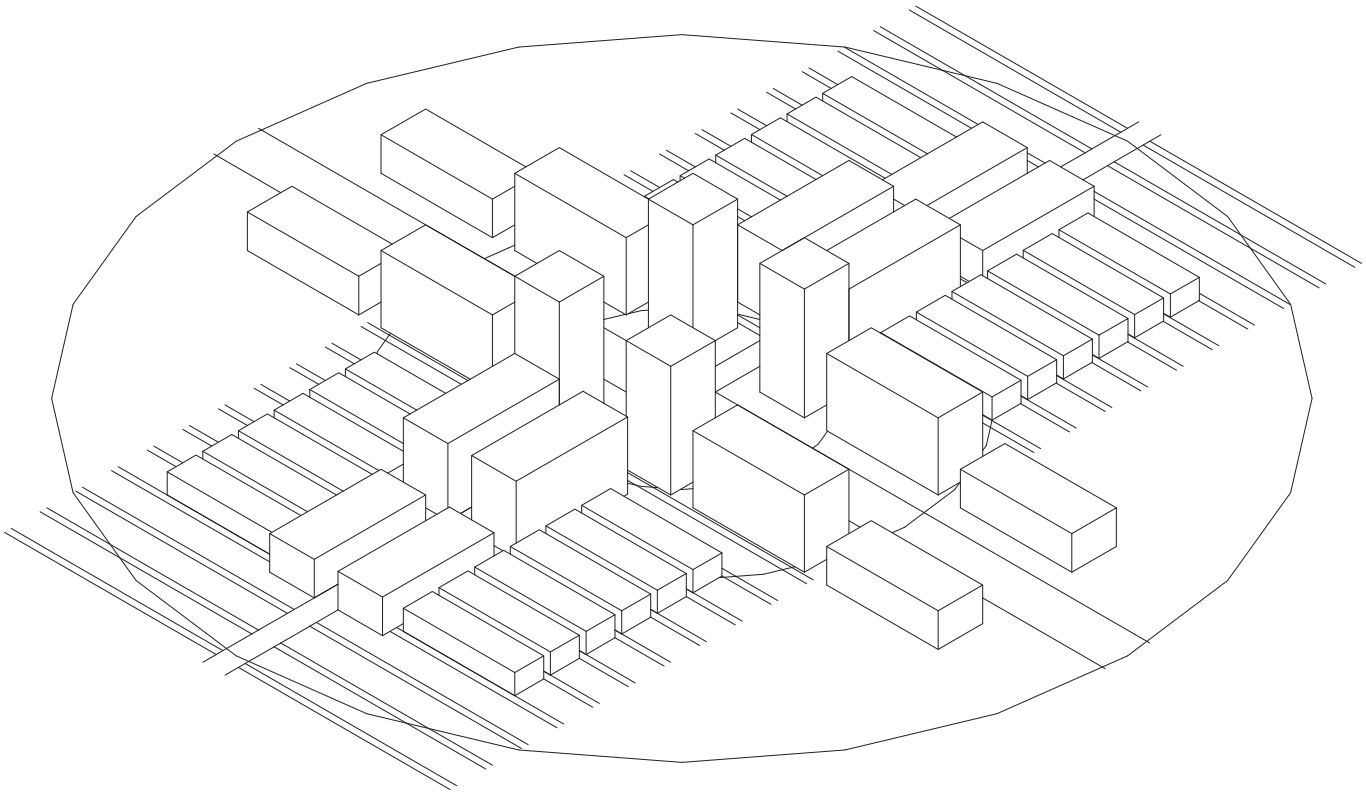
DP: Residential
Ownership: single plots



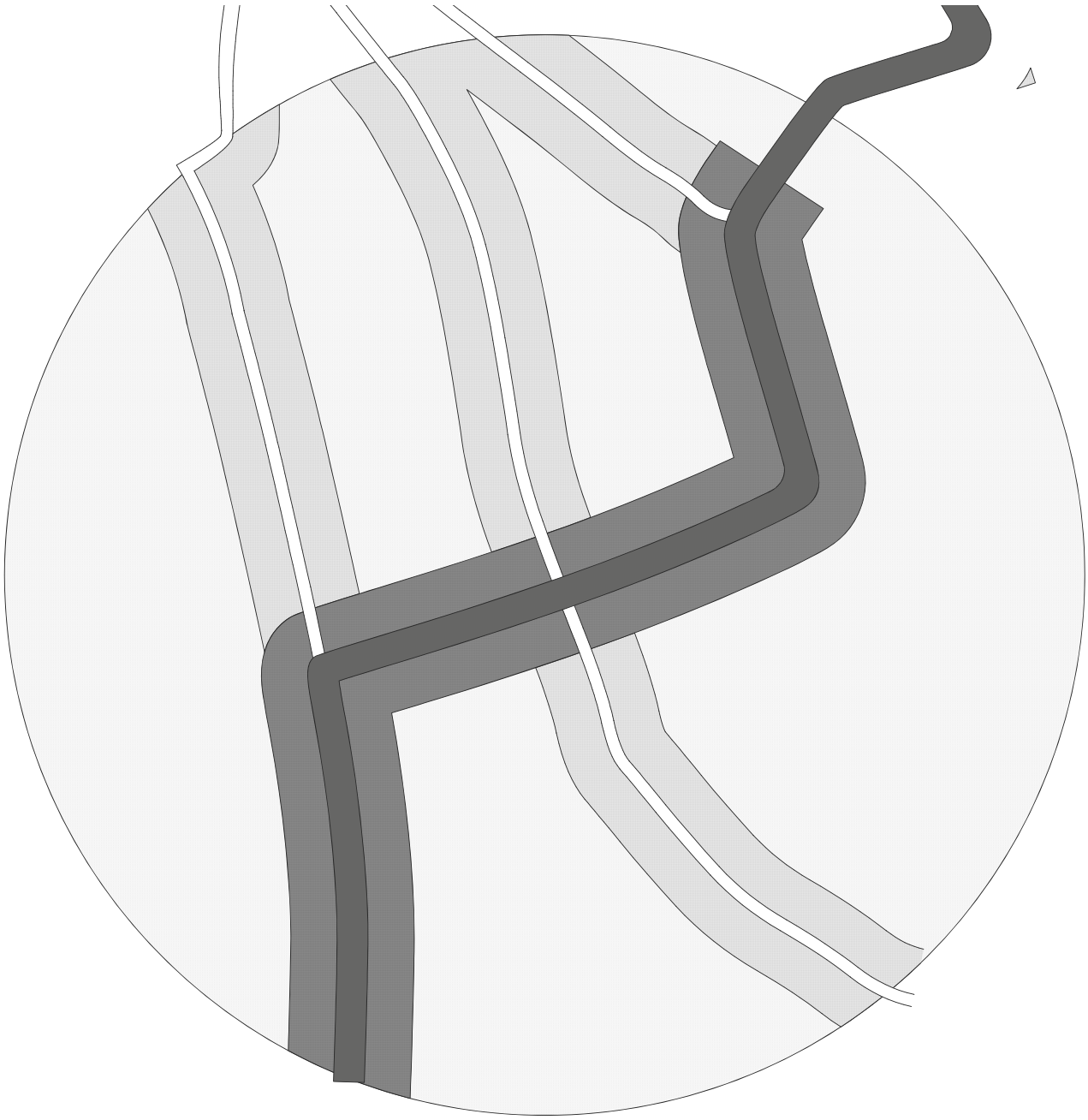
urban strategy

a hierarchy of spaces

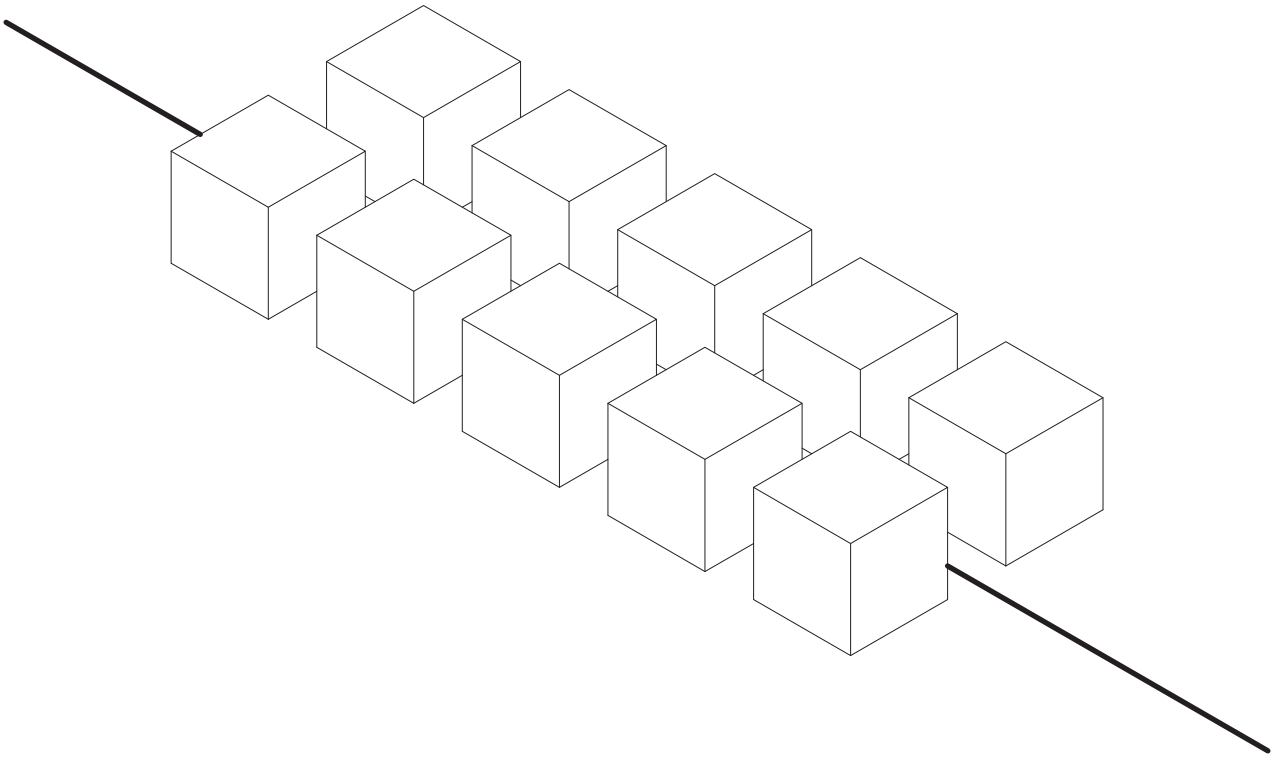
density peramid



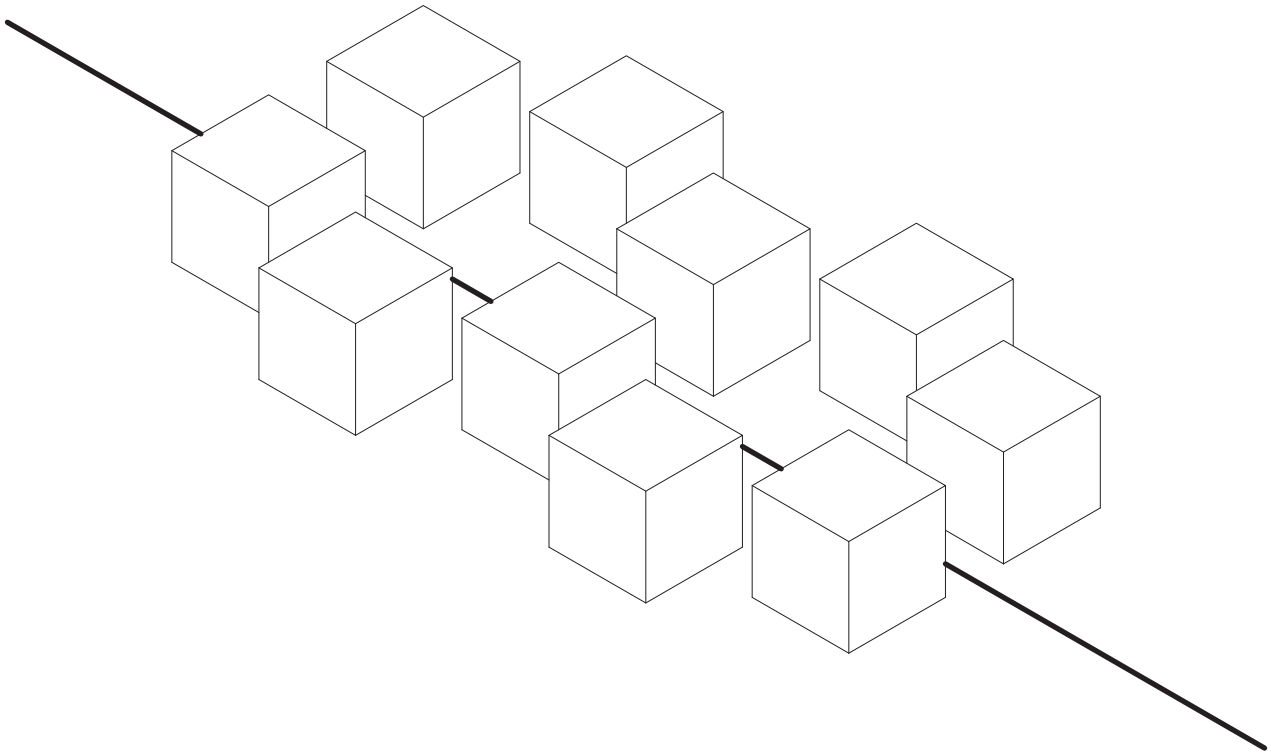
To give most people good access to the new busline the idea of a density piramid was implemented. The highest density appears closer to the busstop.



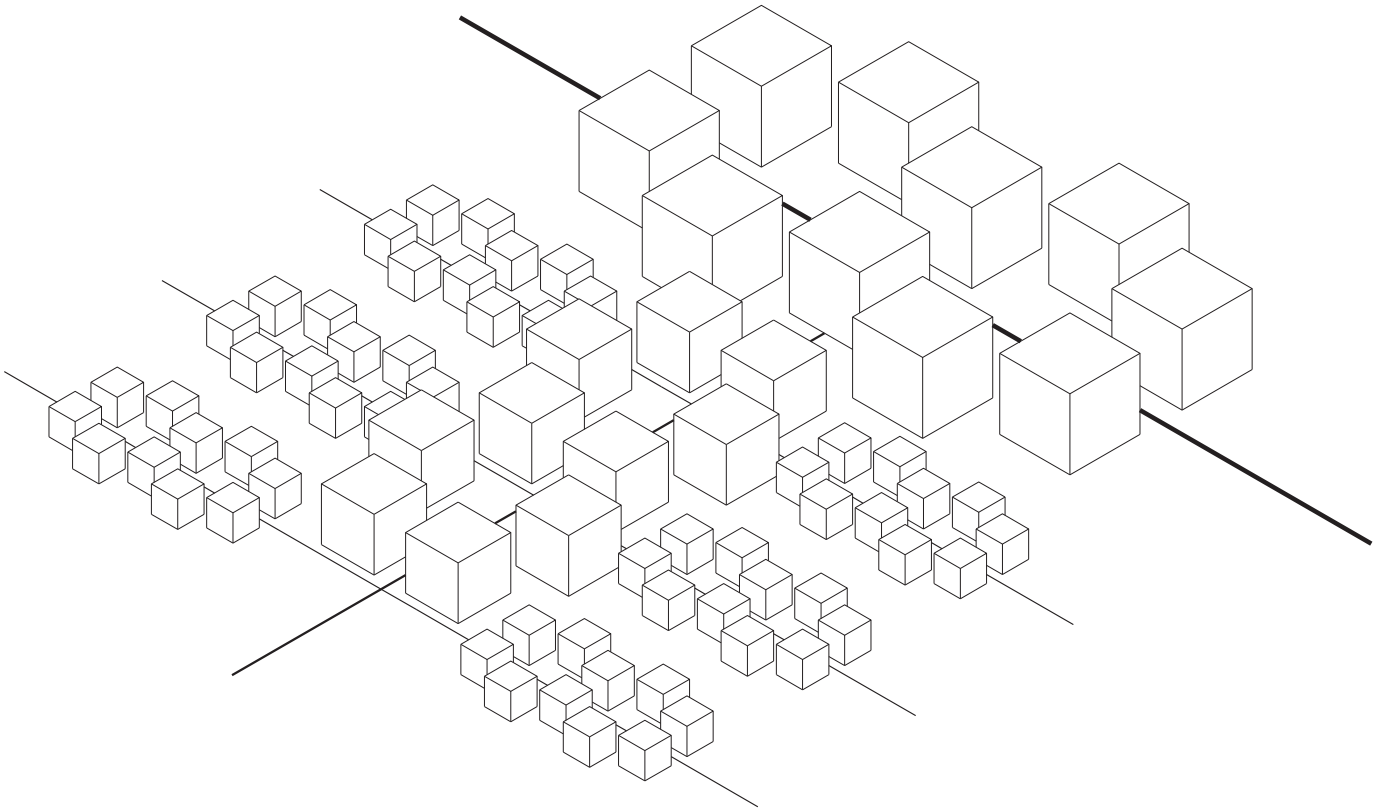
When applied on location the highest density appears in a belt around the busline. Along the main roads that connect to this busline a lower density is needed and finally the lowest density appears in the hinterland.



Due to the character of the baithi chawl type a liniar development is necissary.



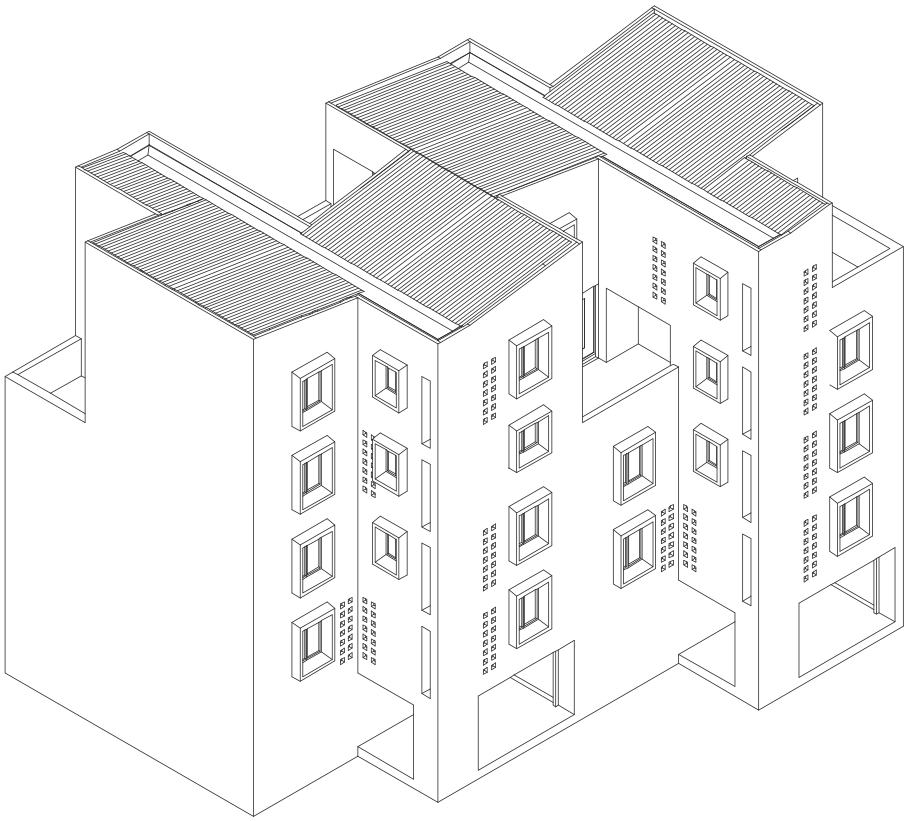
When the volumes are moved open space is created which could be defined as social spaces.

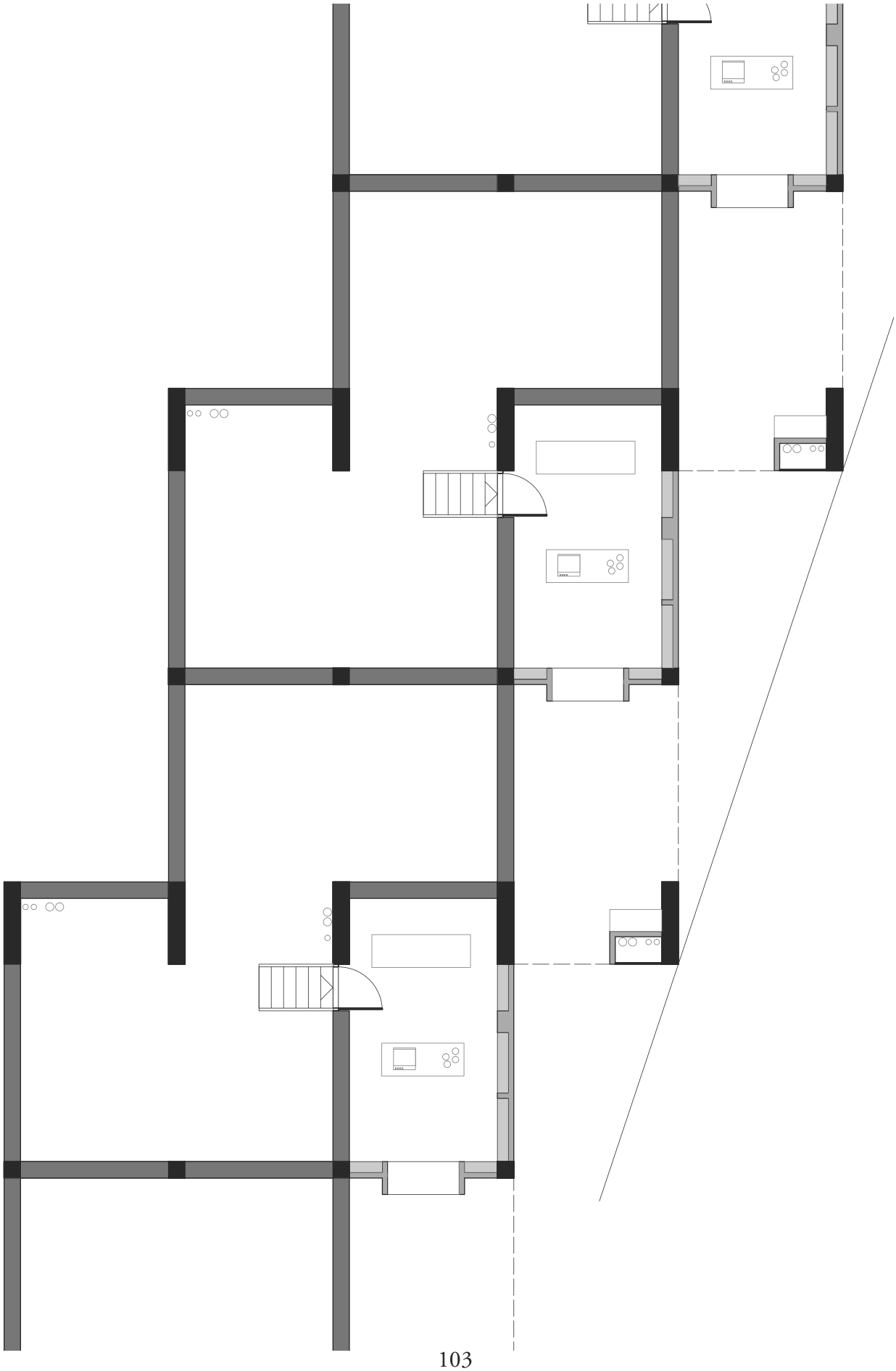


This system is then fractalised over the hierarchy of roads. Therefore one can automatically discover a hierarchy of spaces.

design

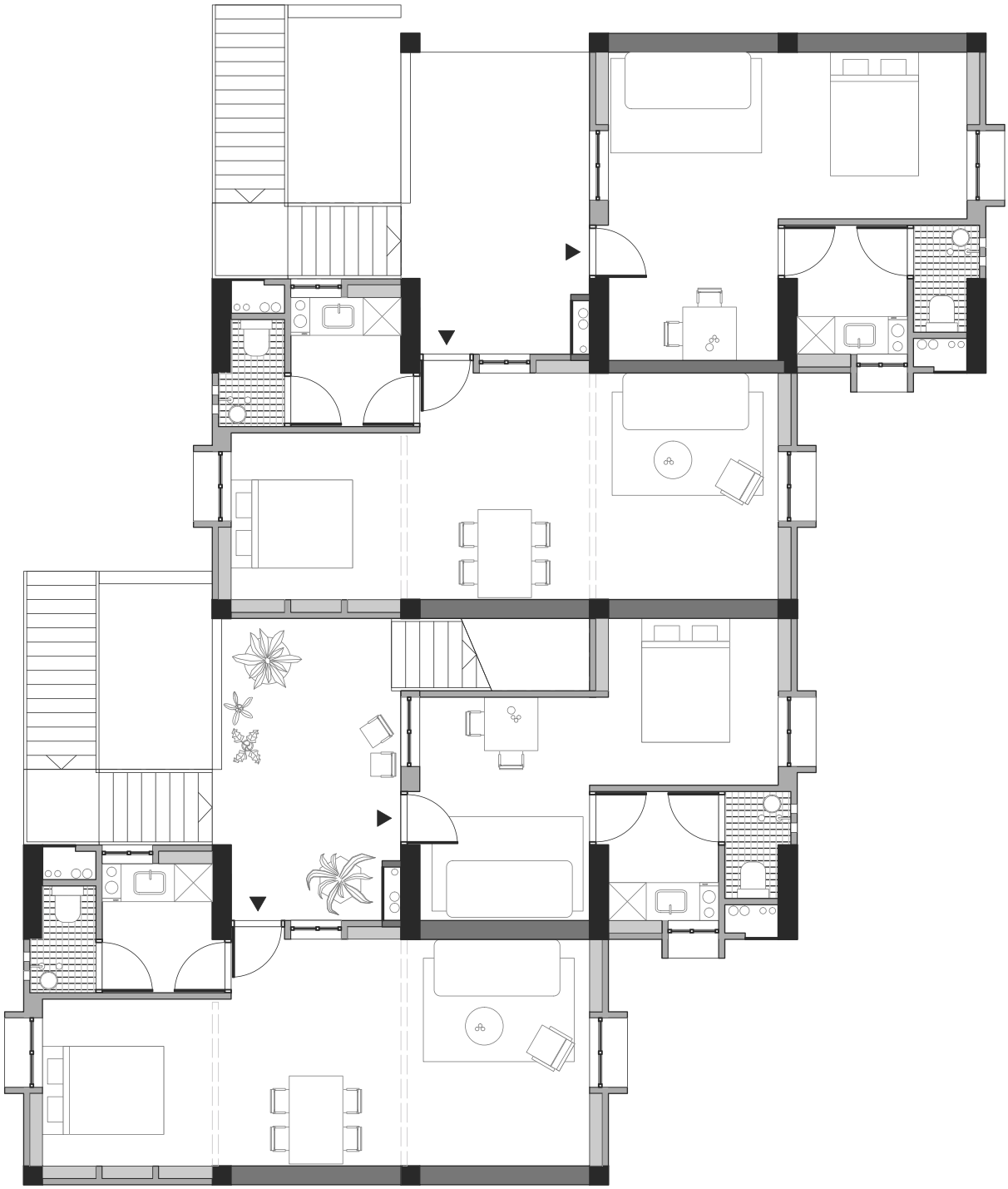
plans



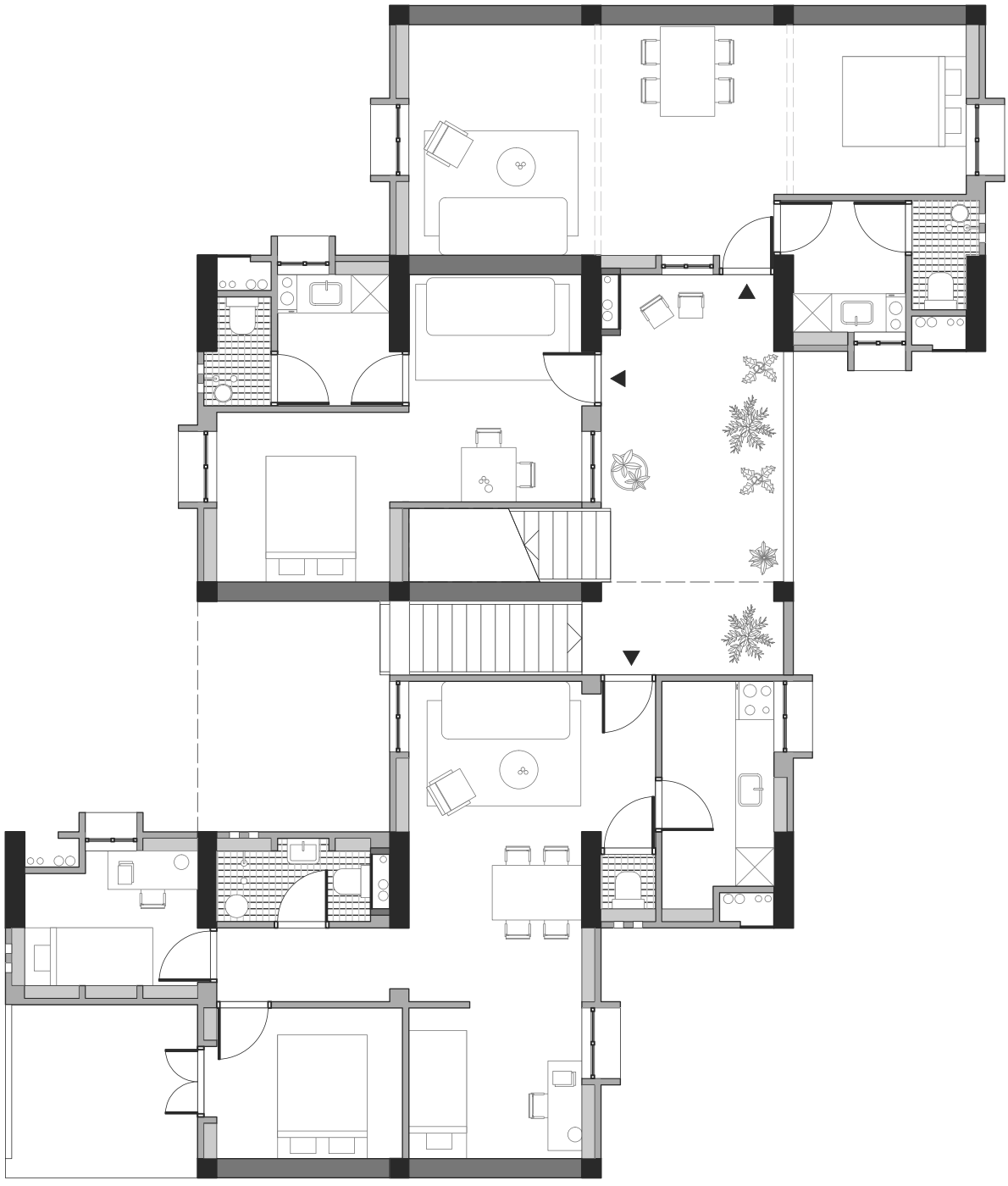


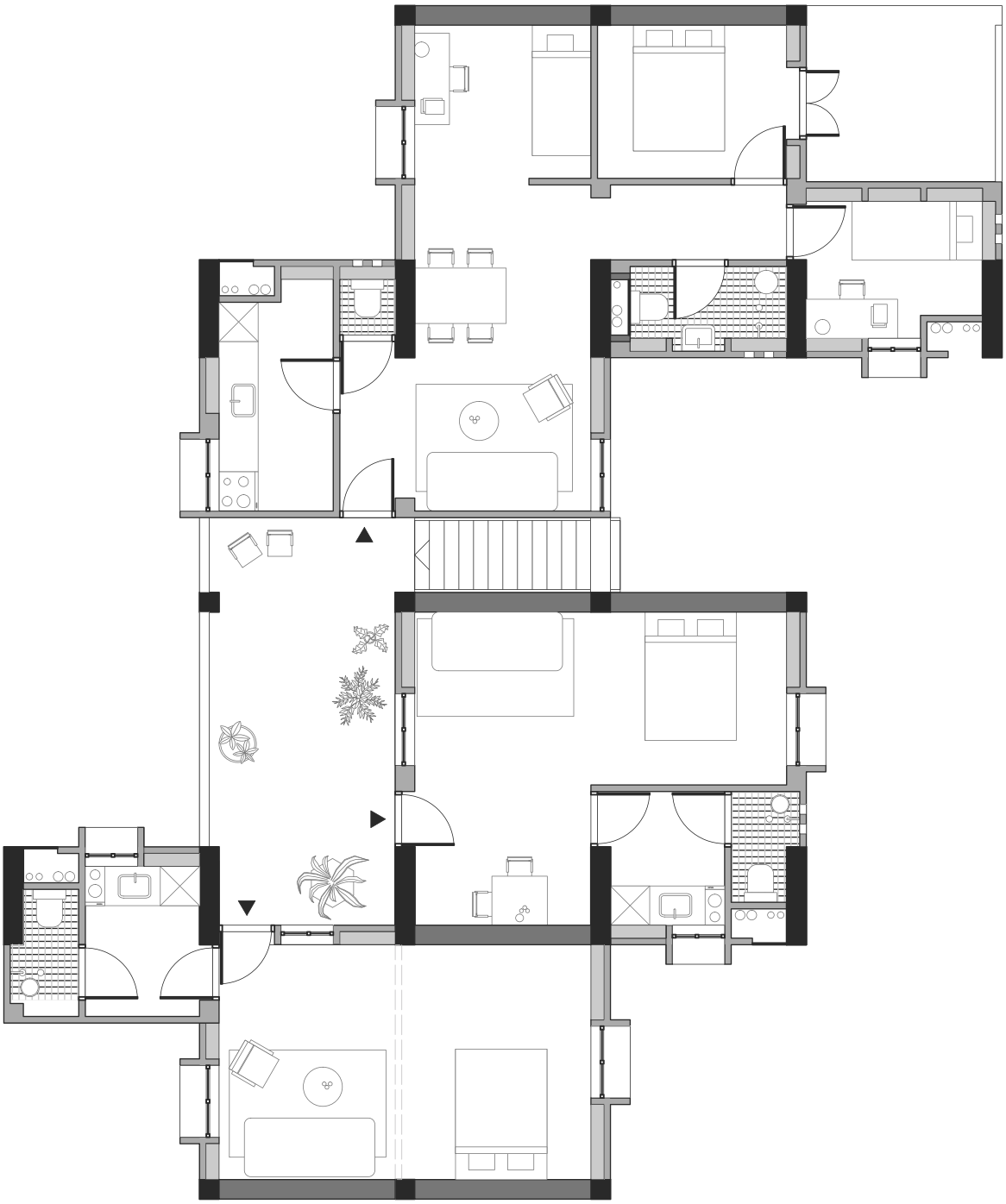
midrise: ground floor

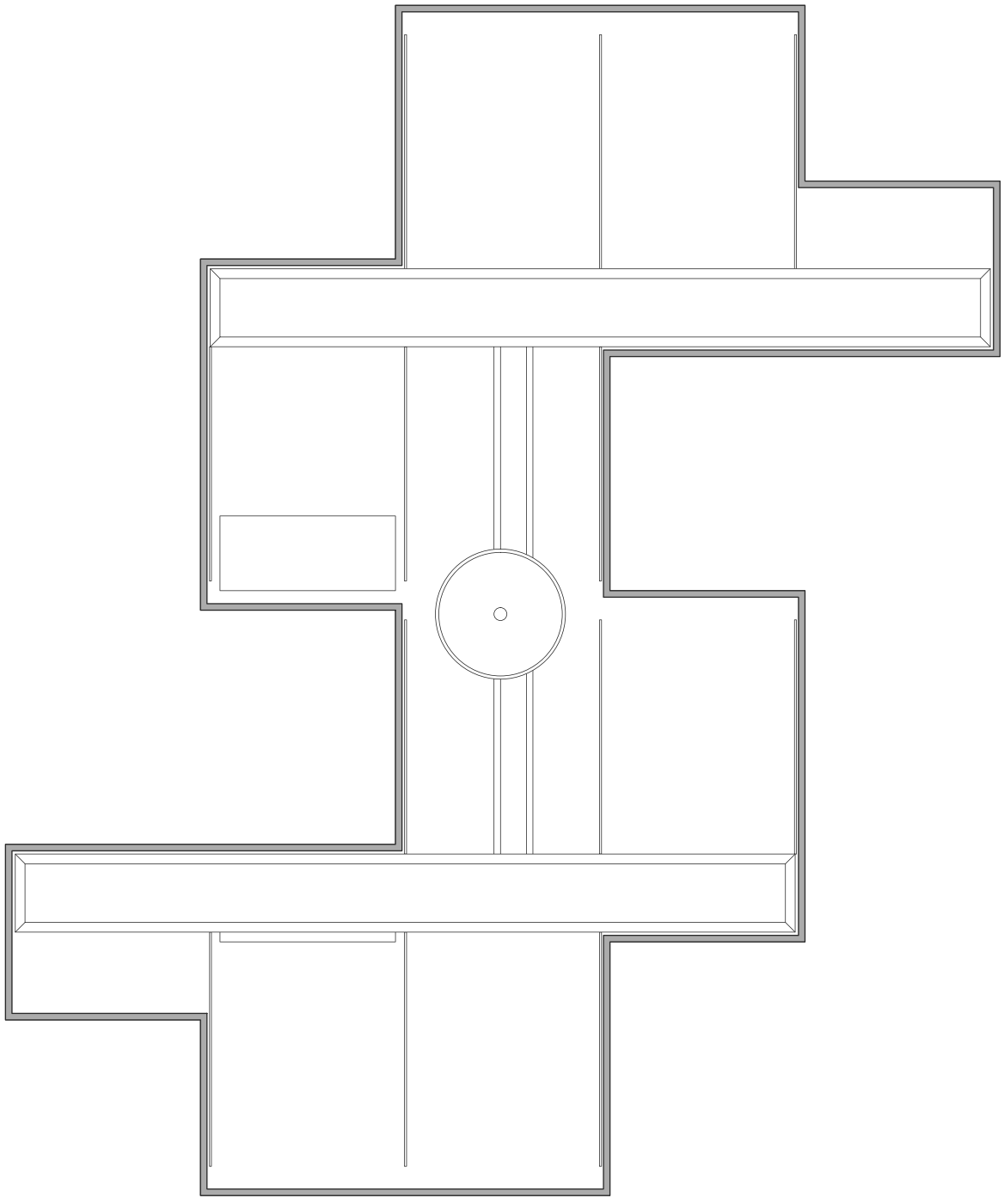
midrise: first floor

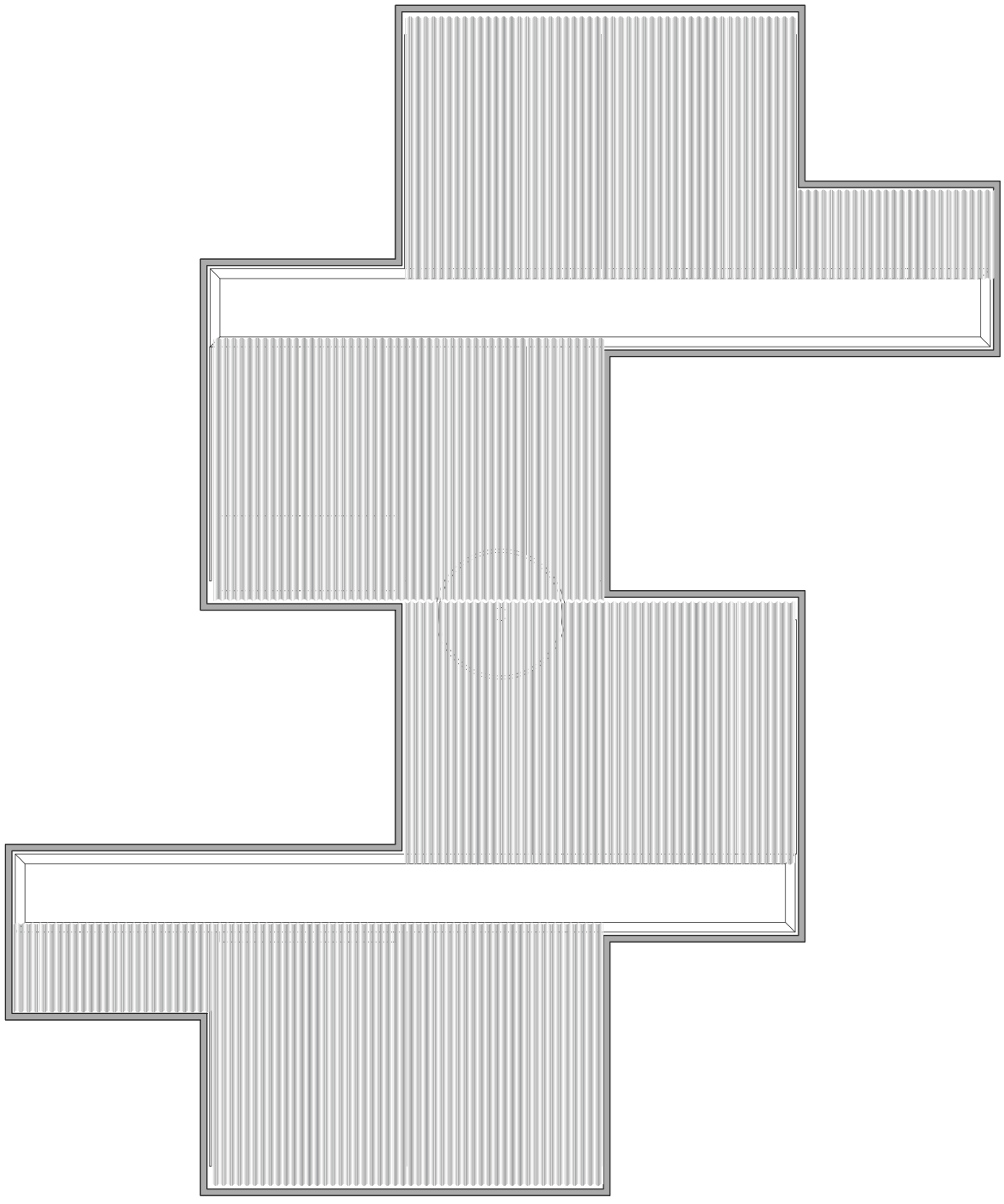


midrise: second floor

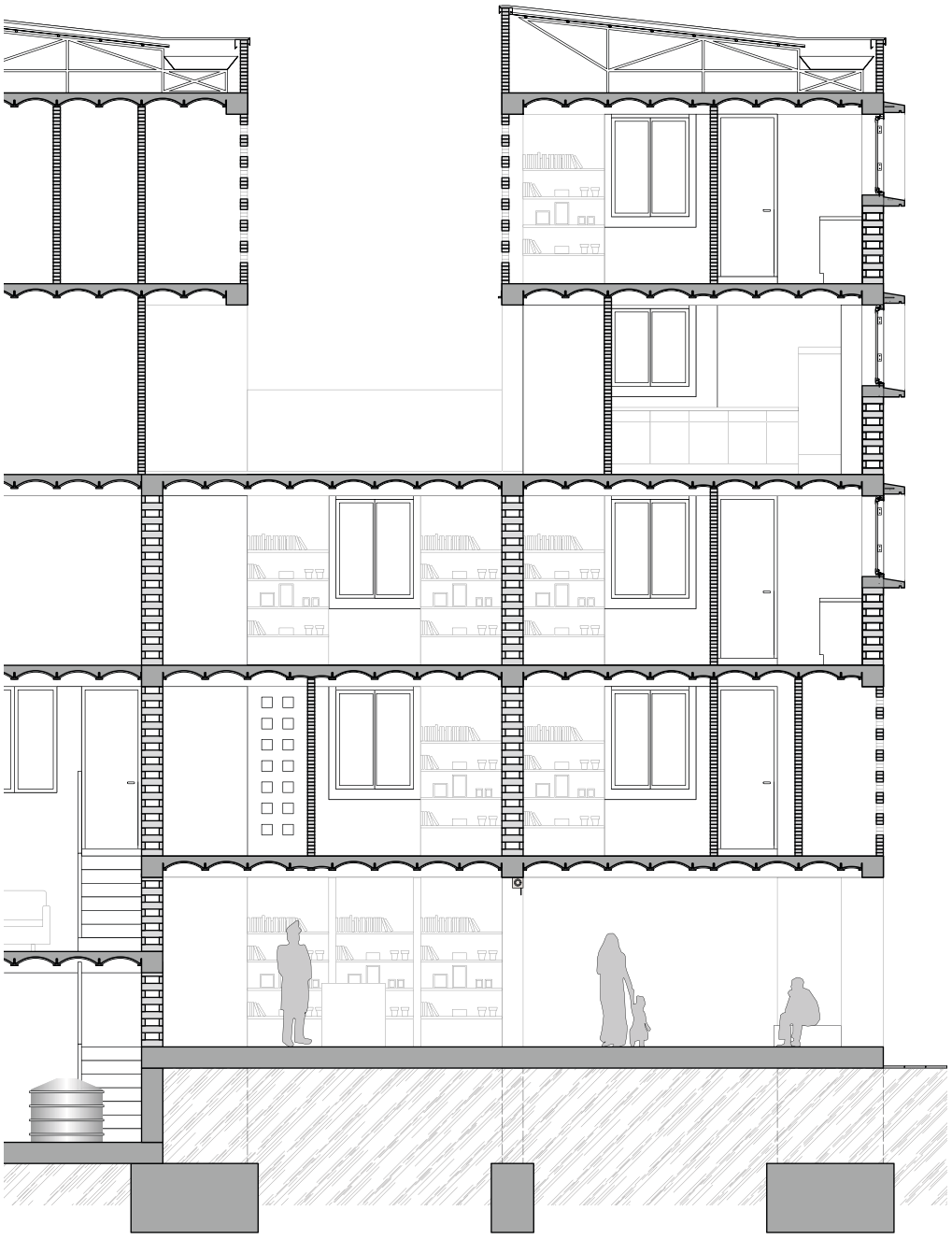








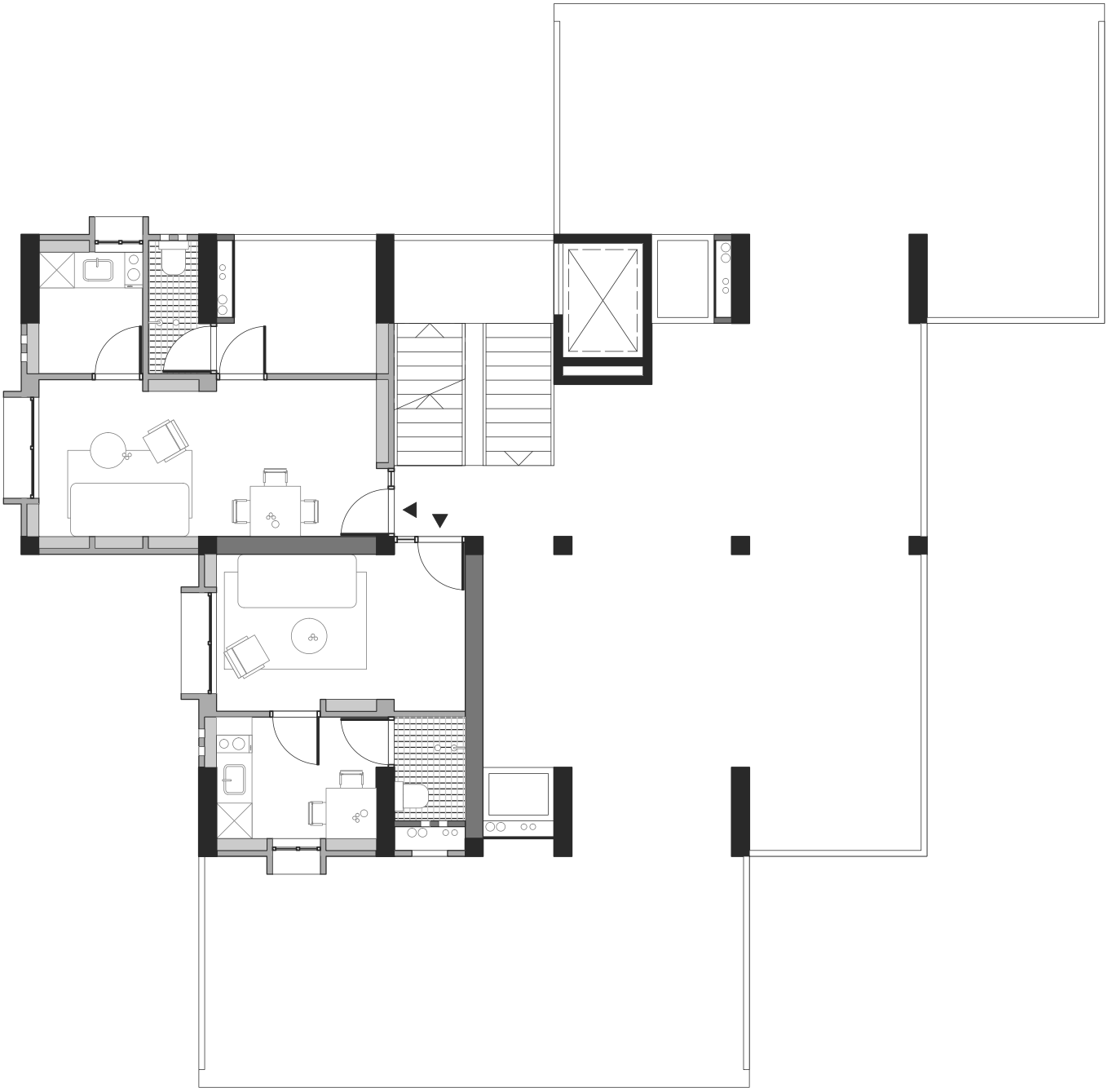
section

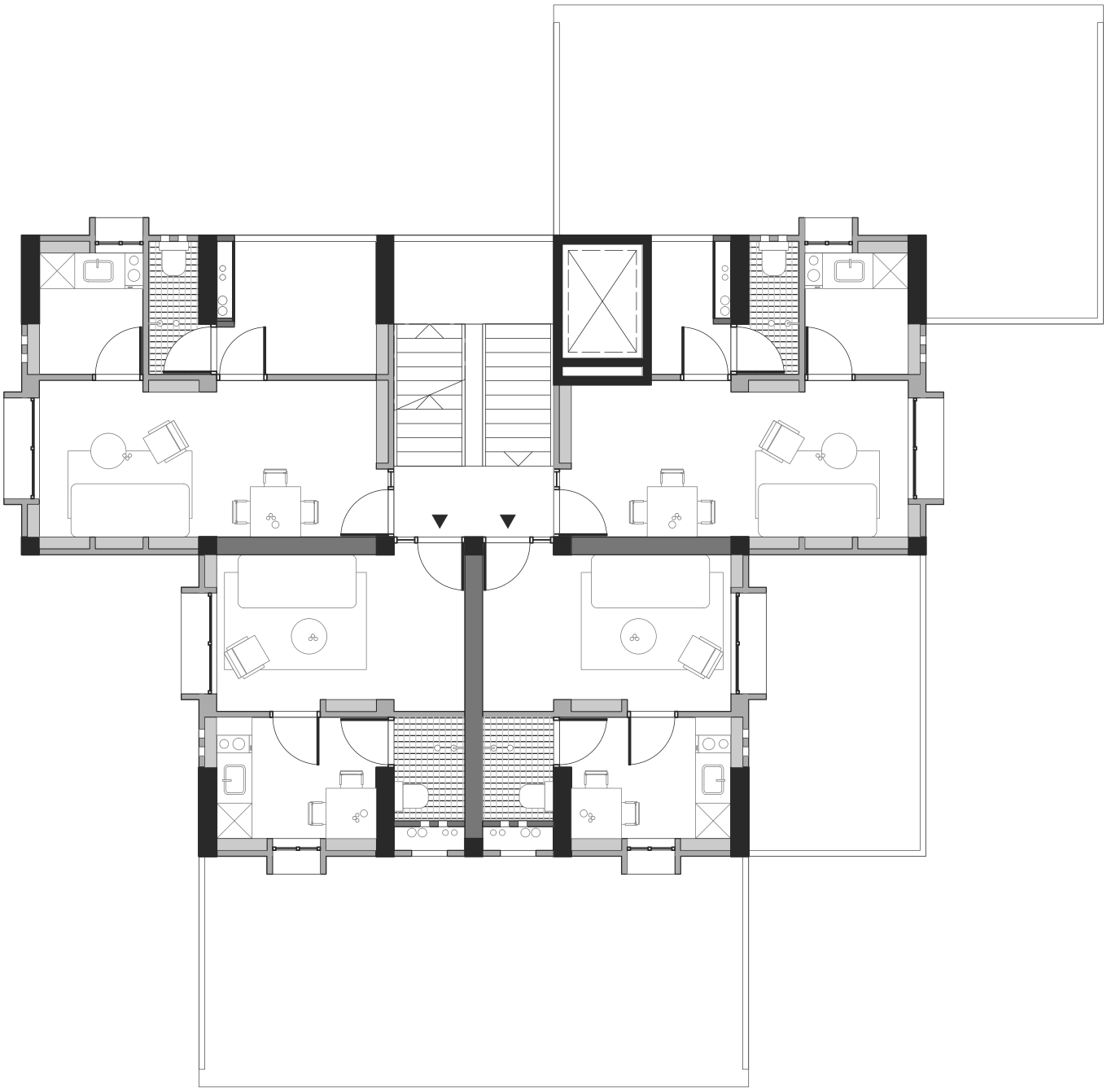


ground floor

tower first floor

tower second floor





tower +3,+6

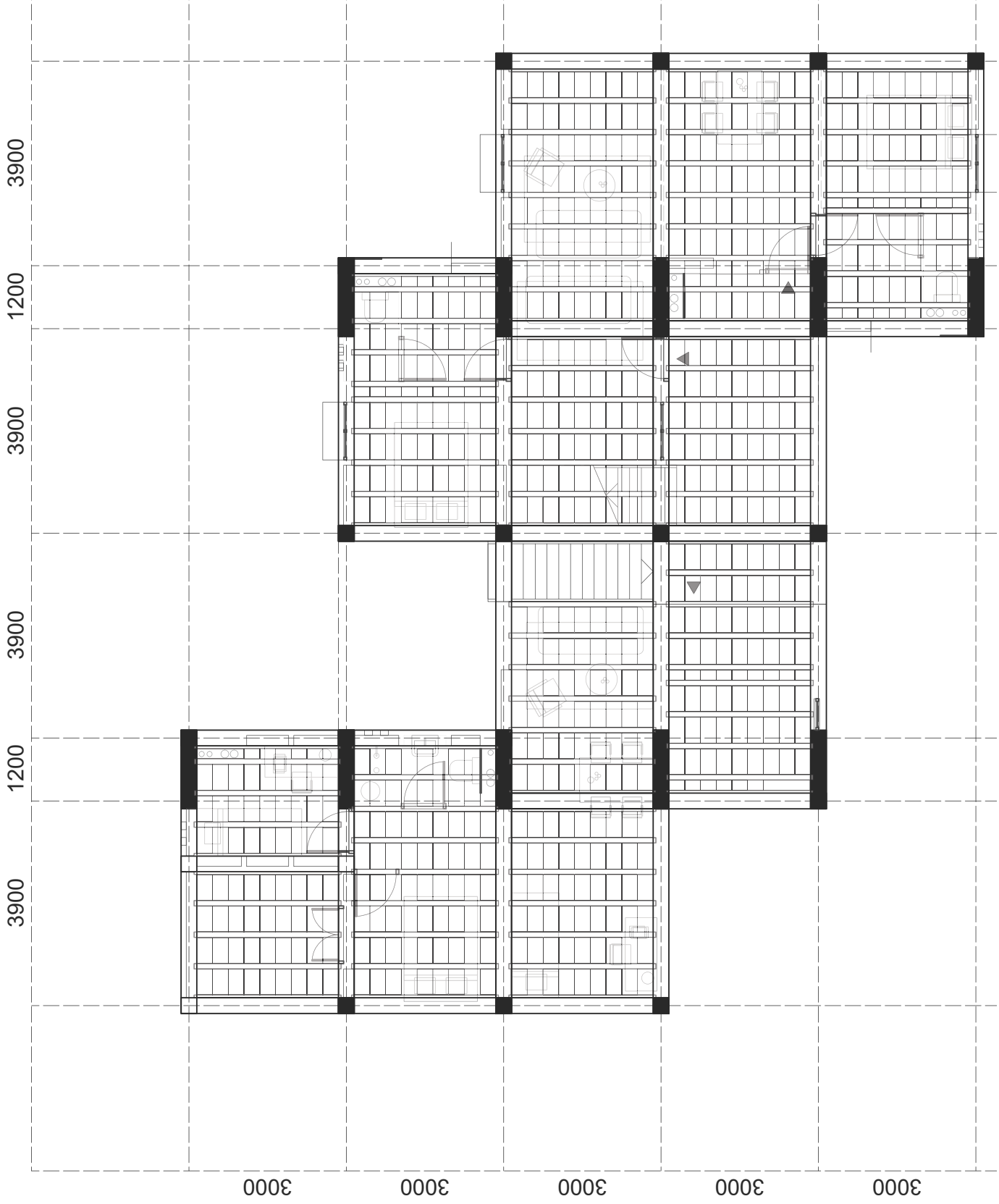
section tower 1:200

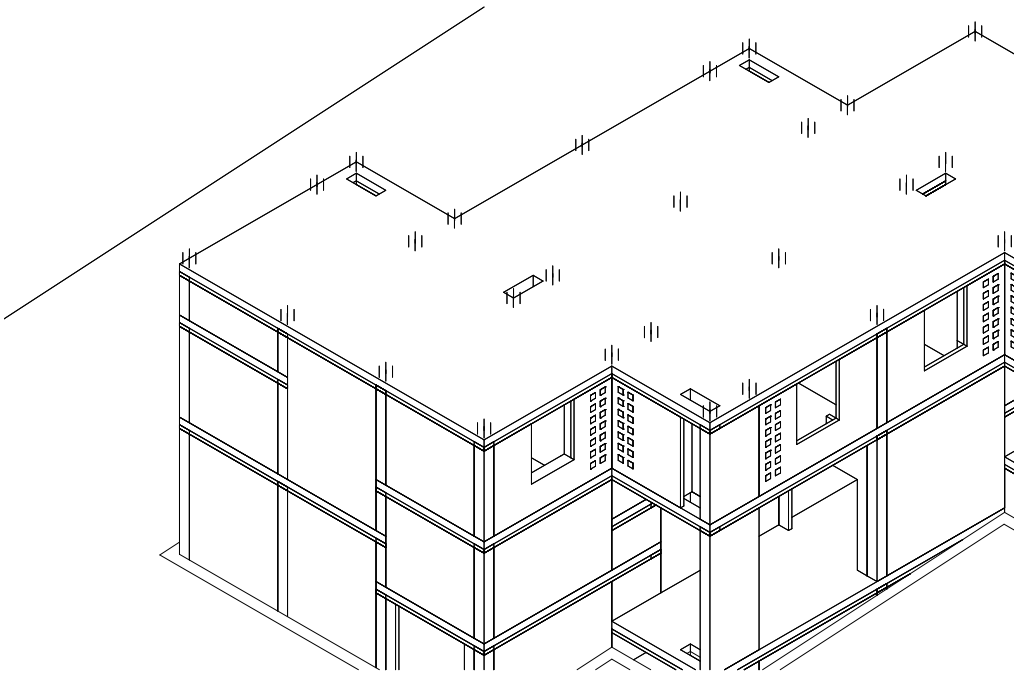
building technology

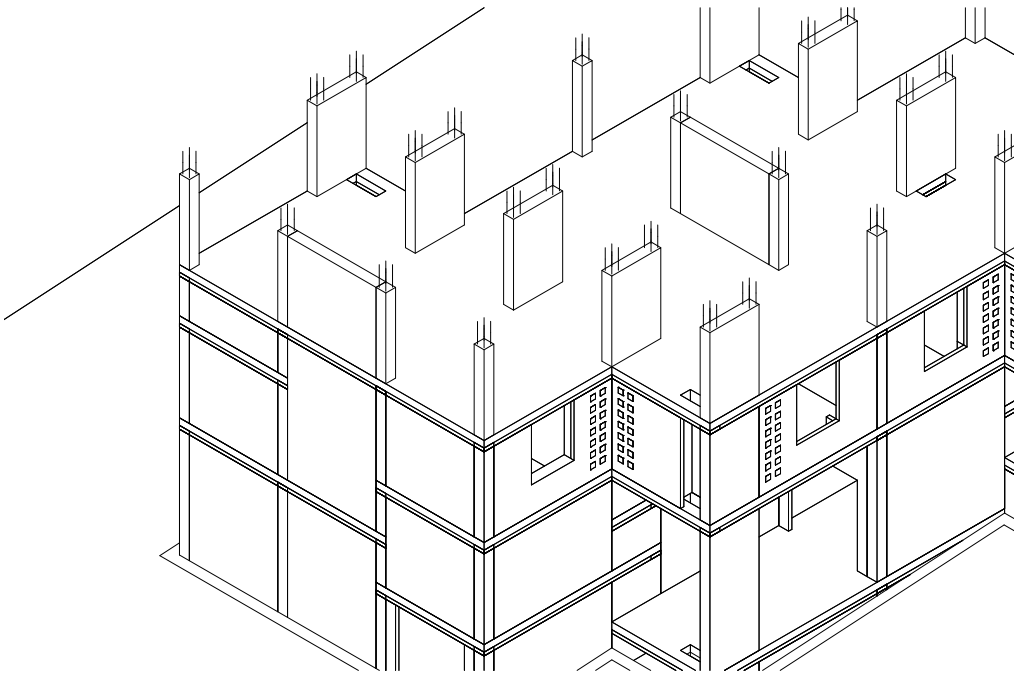
local techniques and affordability

The construction is based on a system of concrete columns and beams. The floor consists out of steel beams and ceramic elements.

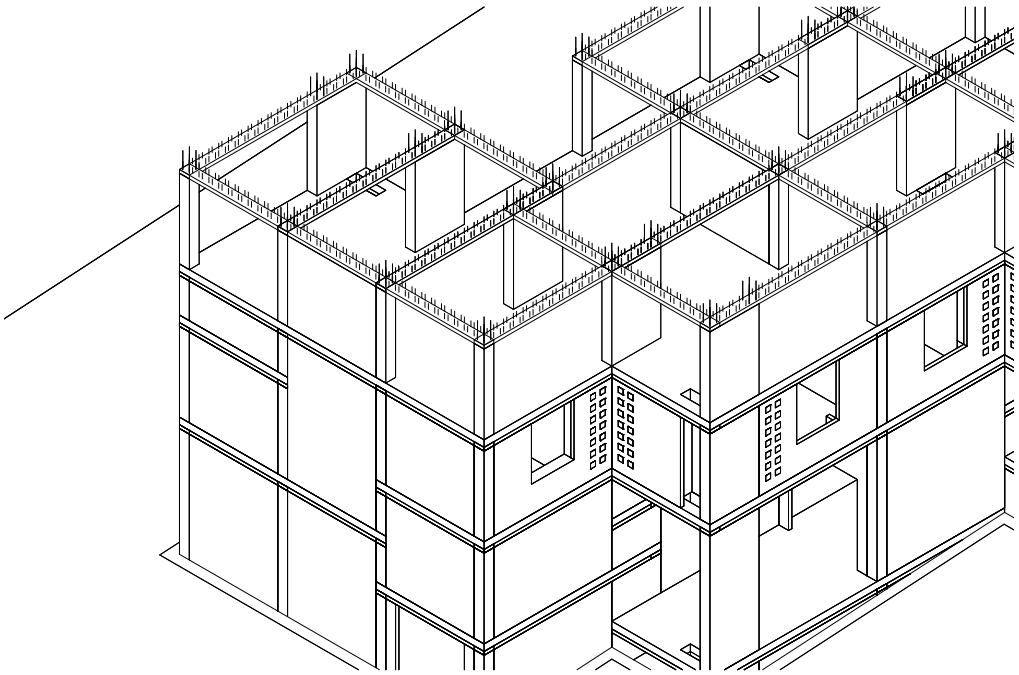
structural plan

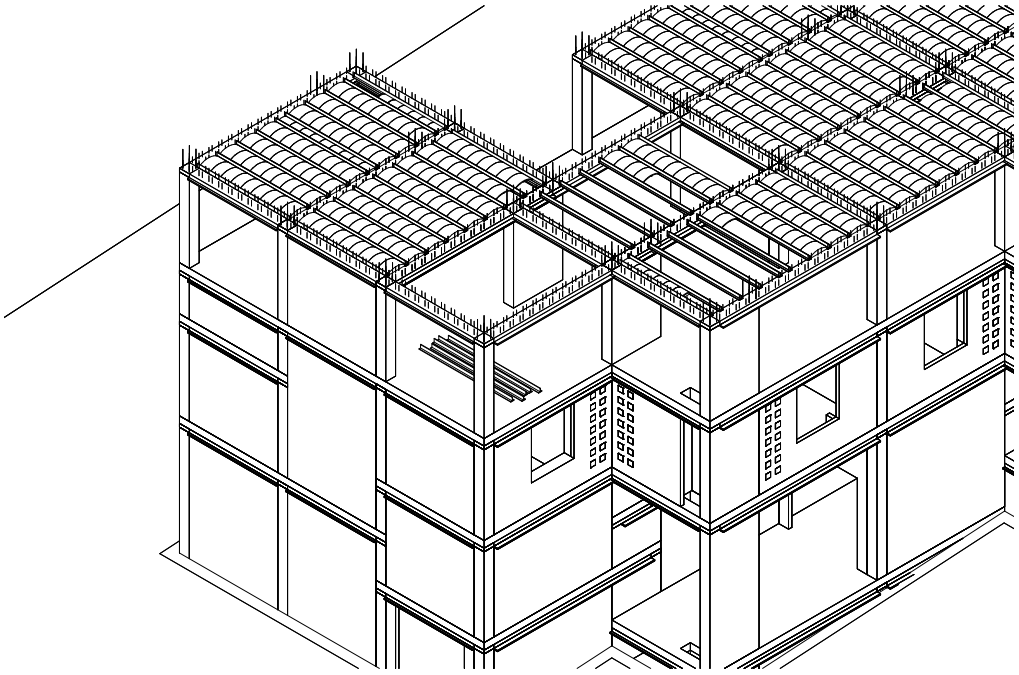




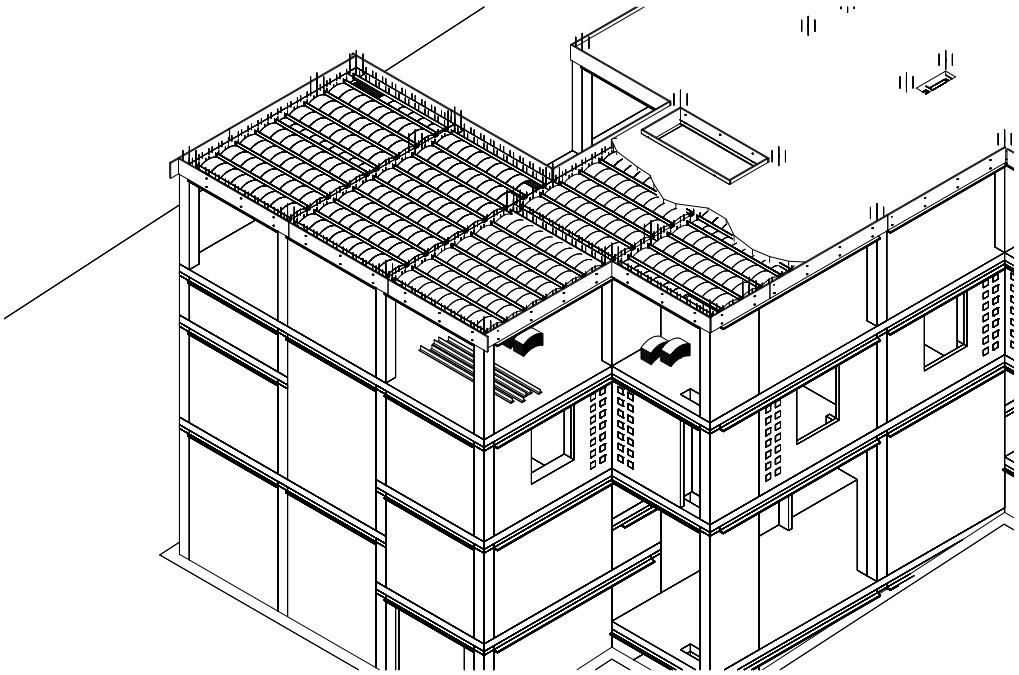


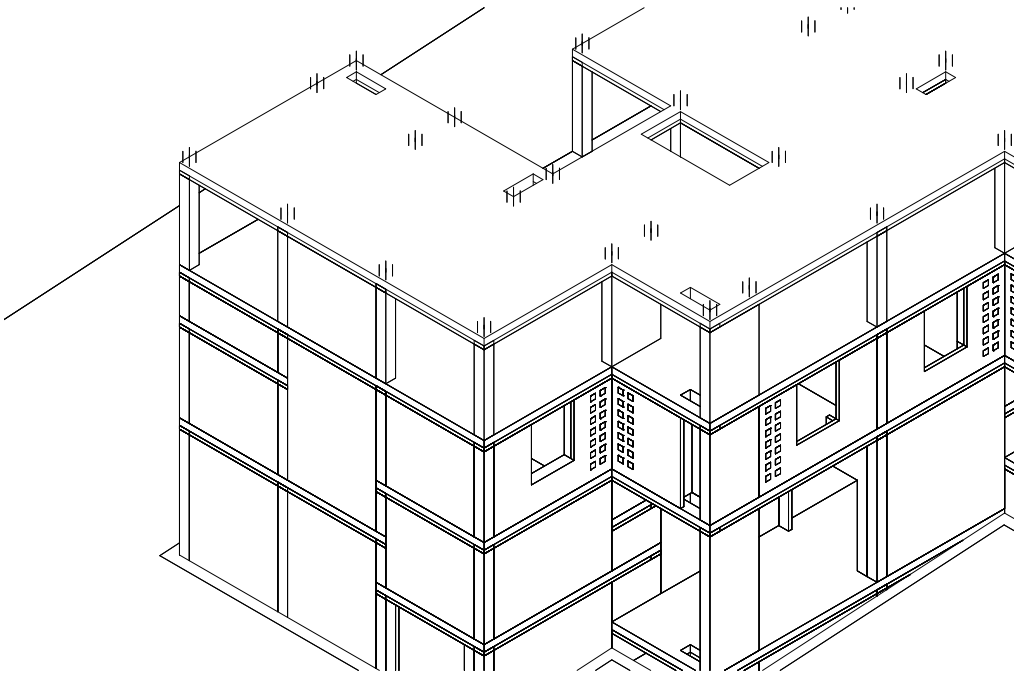
The building of a floor is started with the main concrete constrcution.



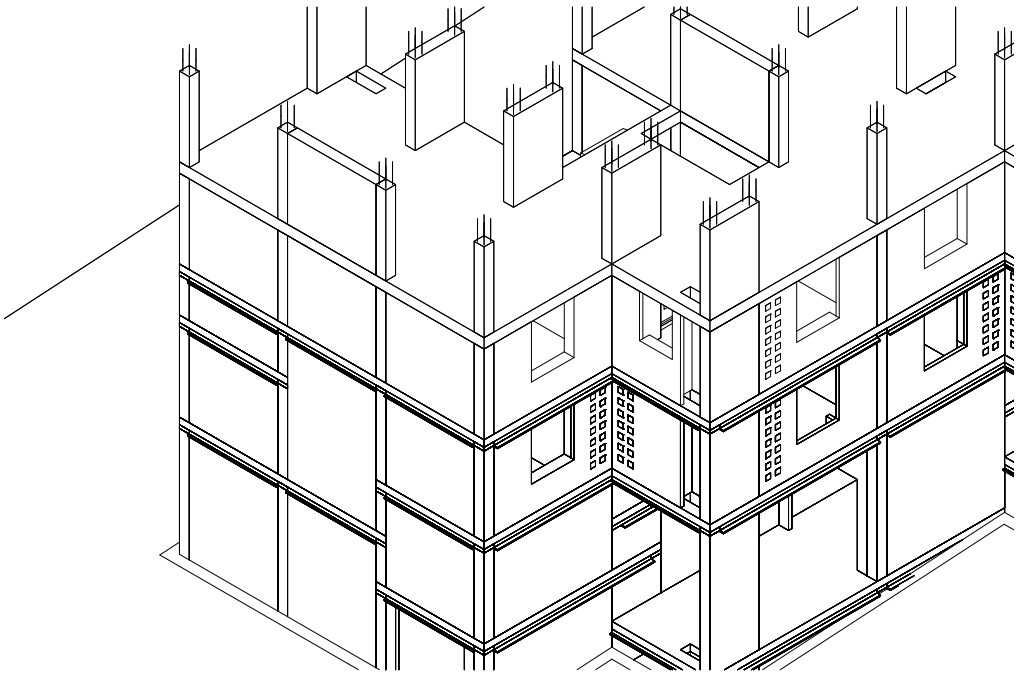


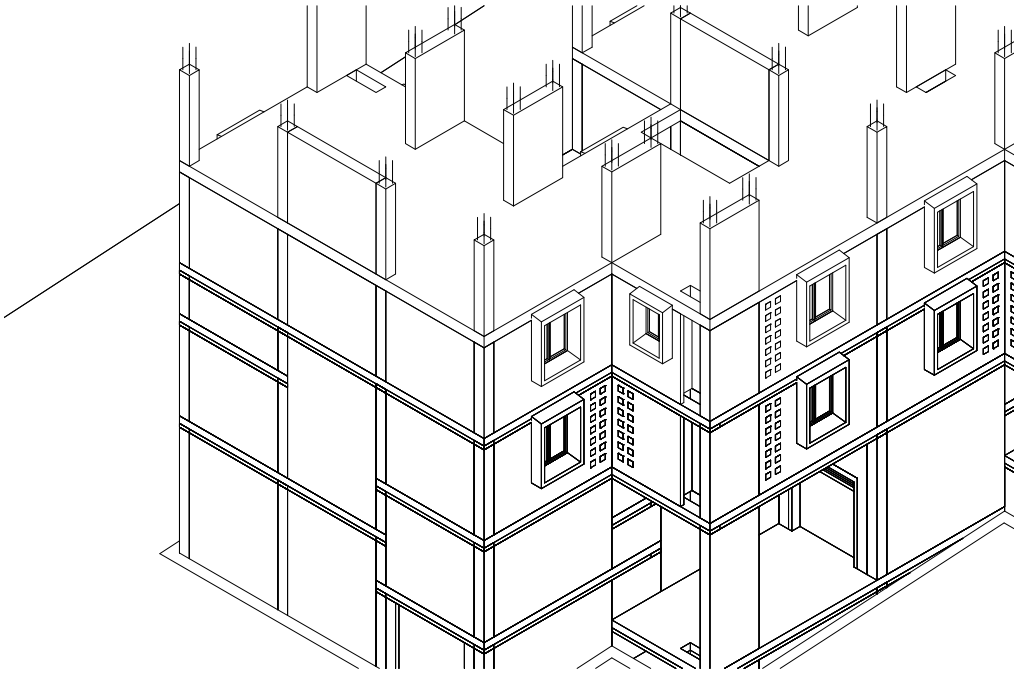
After this half of the beam is cast. Then the floor construction of steel beams and ceramic casing is placed. So there is no need for a conventional casing which quickens the production process.



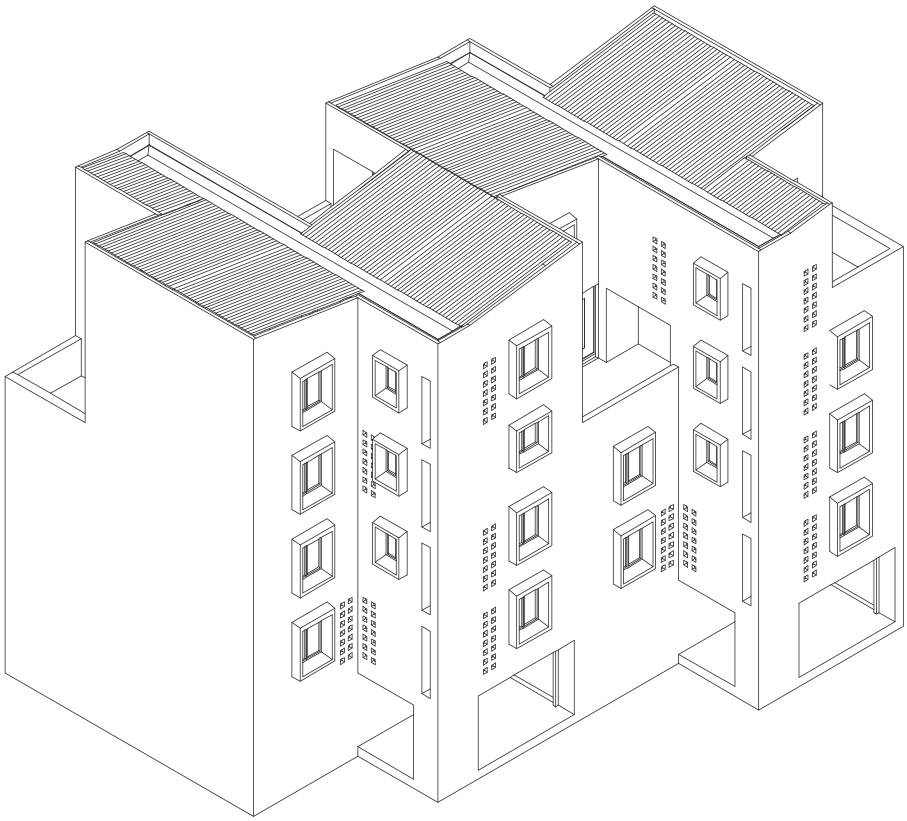


The next step is to cast the concrete structural layer on top of the ceramic elements.

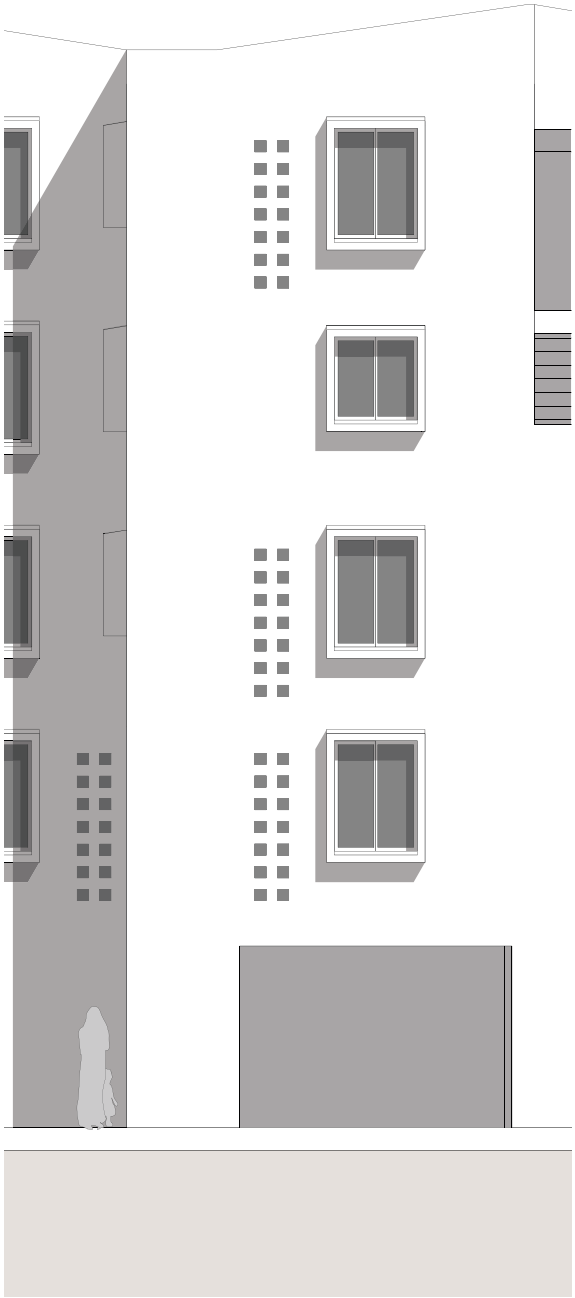


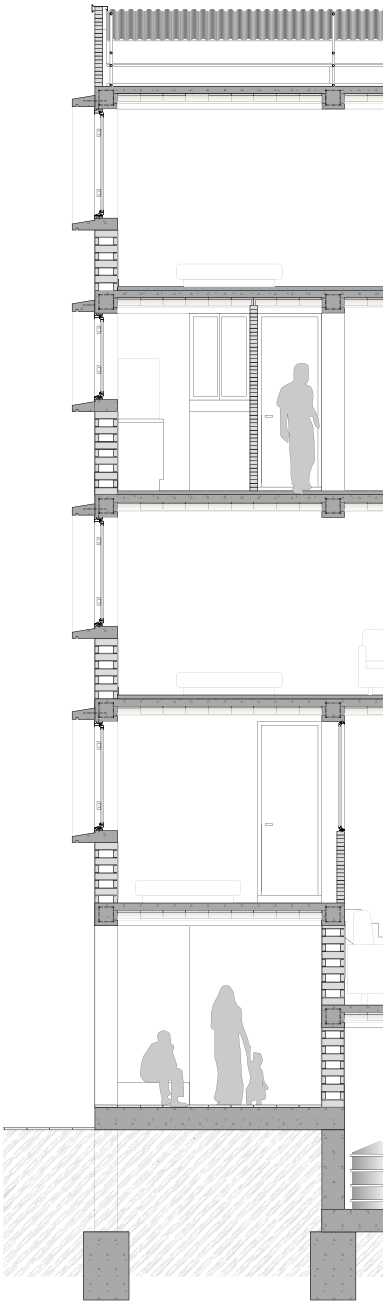


When the next floor is started the masonry facade infill is placed. And later the concrete window boxes are placed.

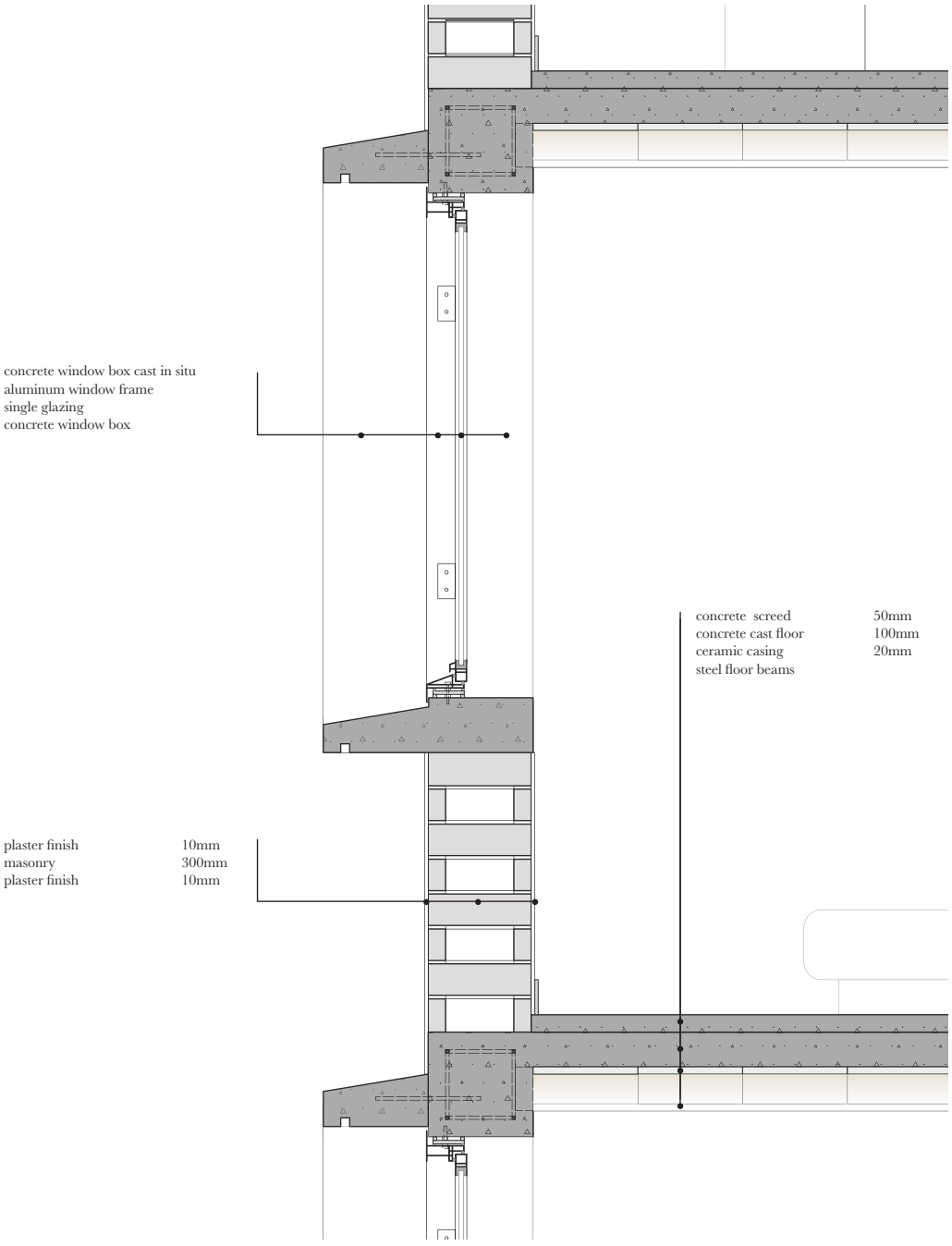


facade detail



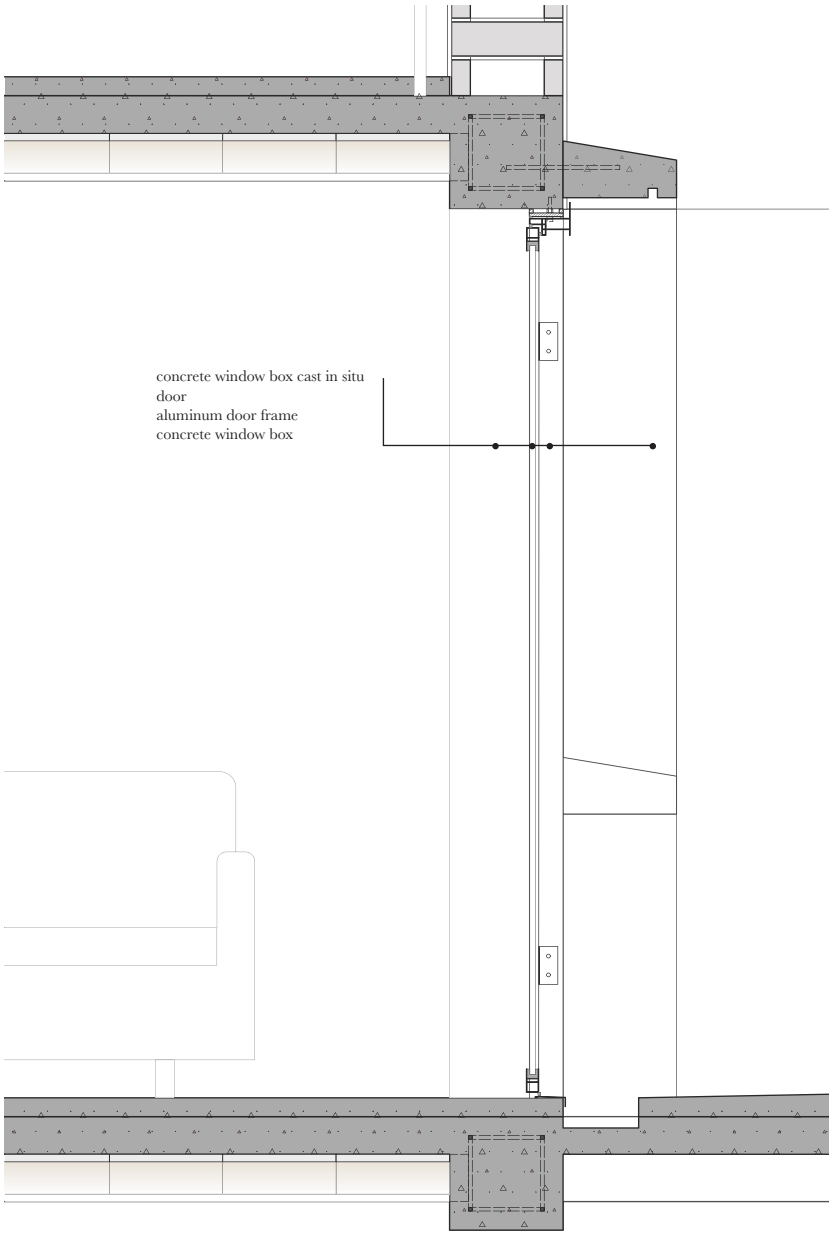


window detail 1:20

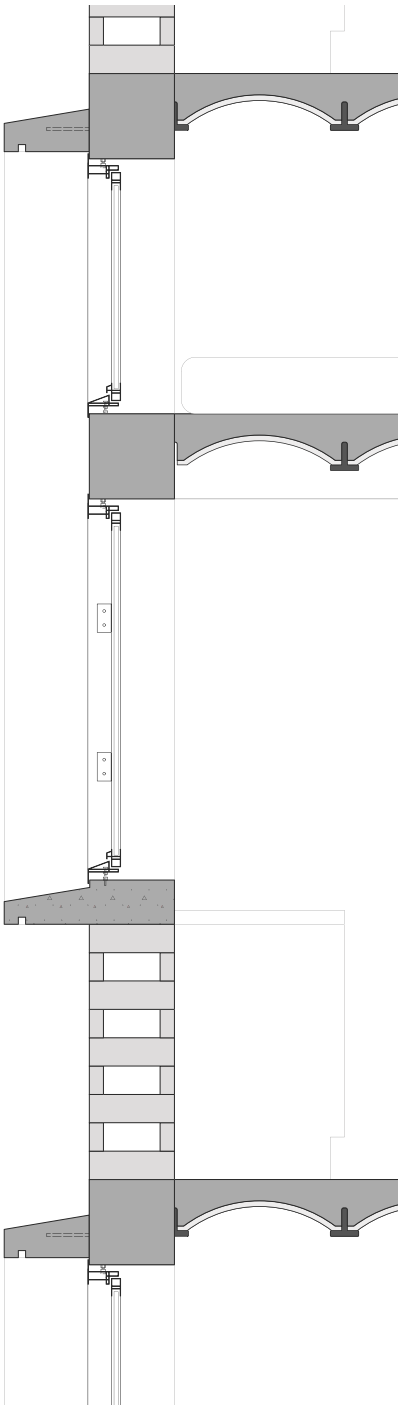


the windows are shaped as boxes. These boxes offers shade in the harsh sun of the tropical climate that Mumbai endures.

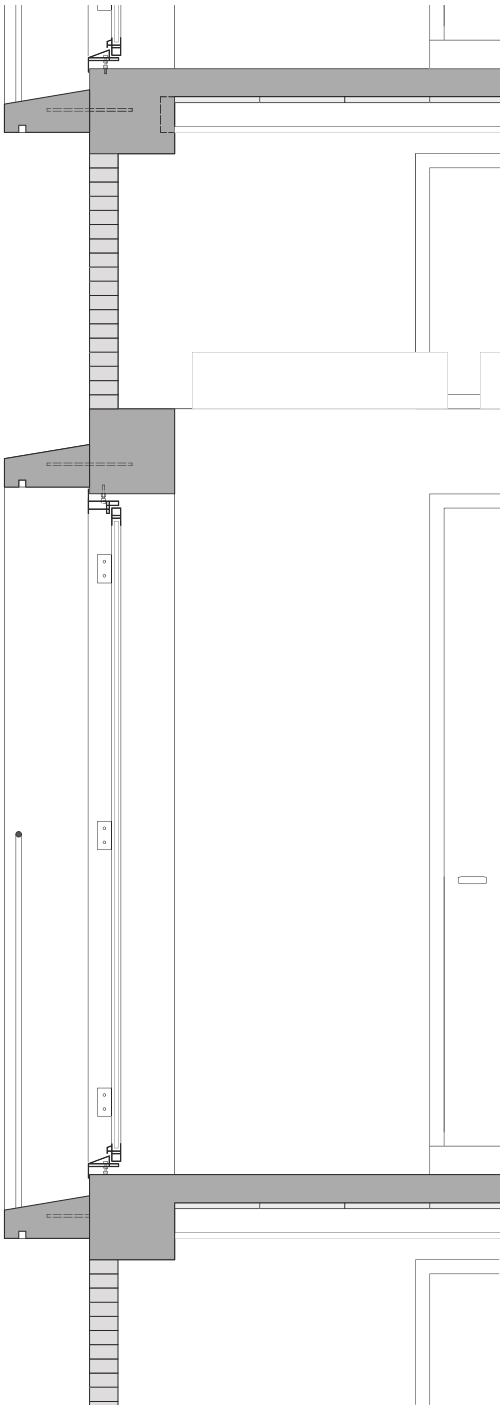
door detail 1:20



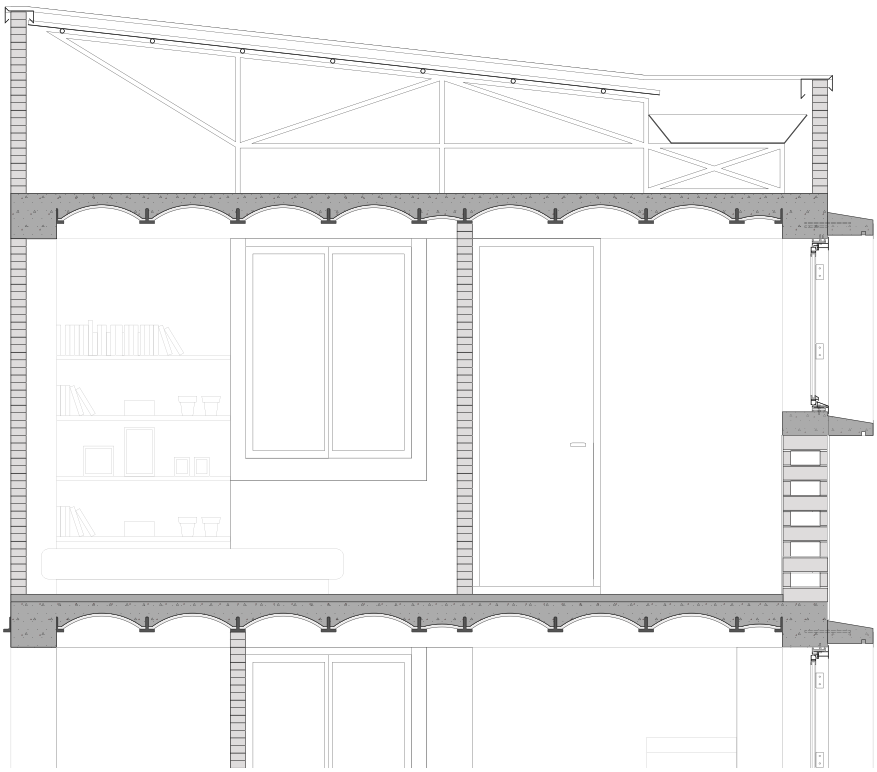
kitchen window detail tower 1:20

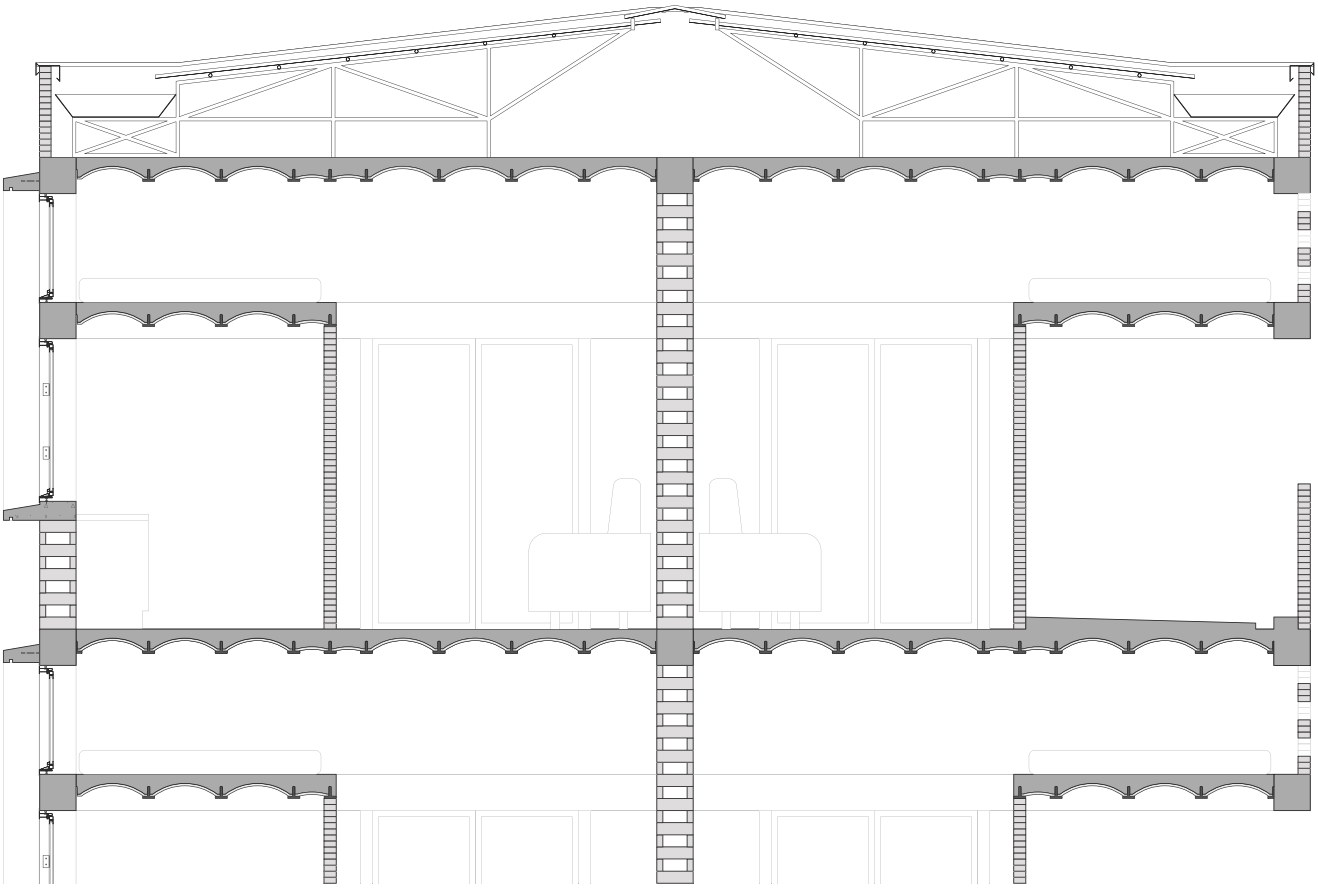


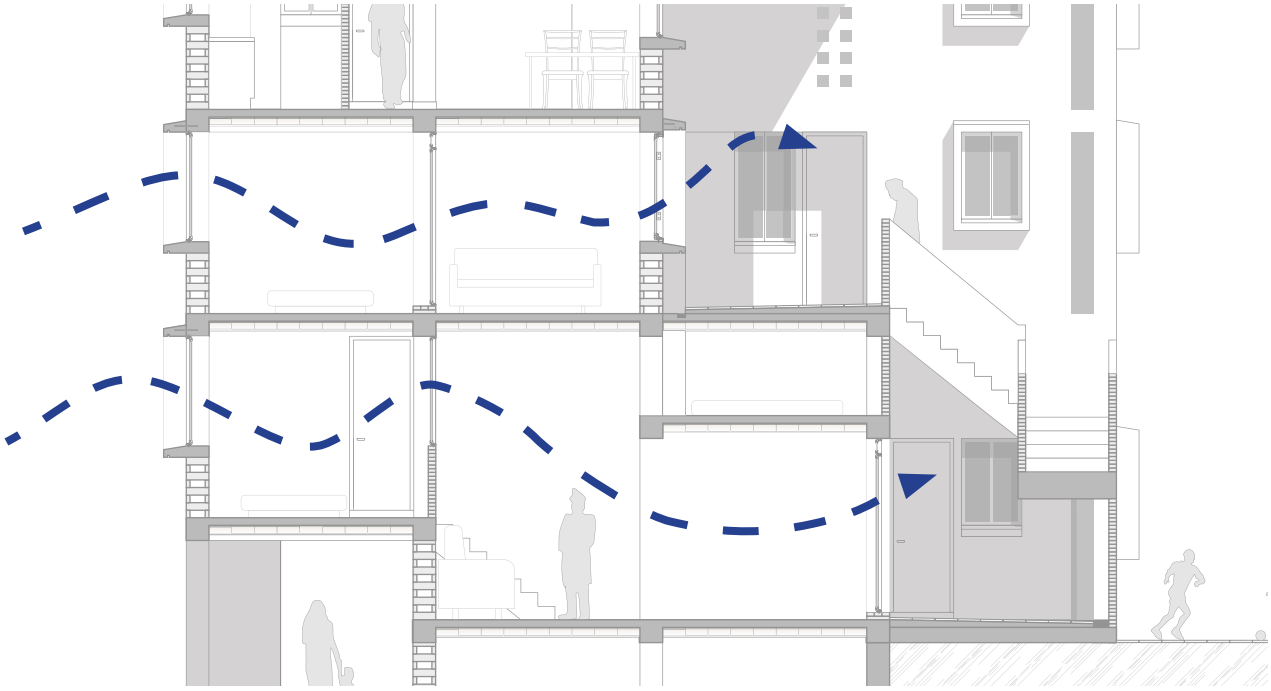
french balcony detail tower 1:20

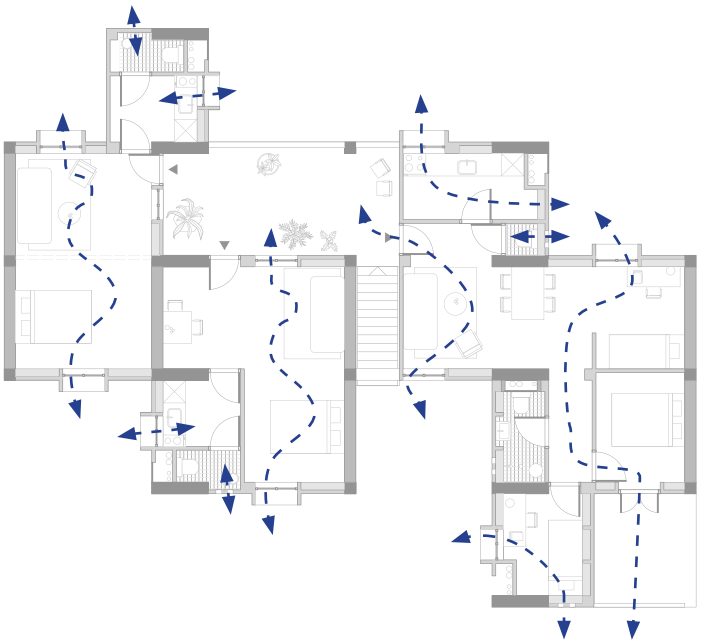


roof detail 1:50

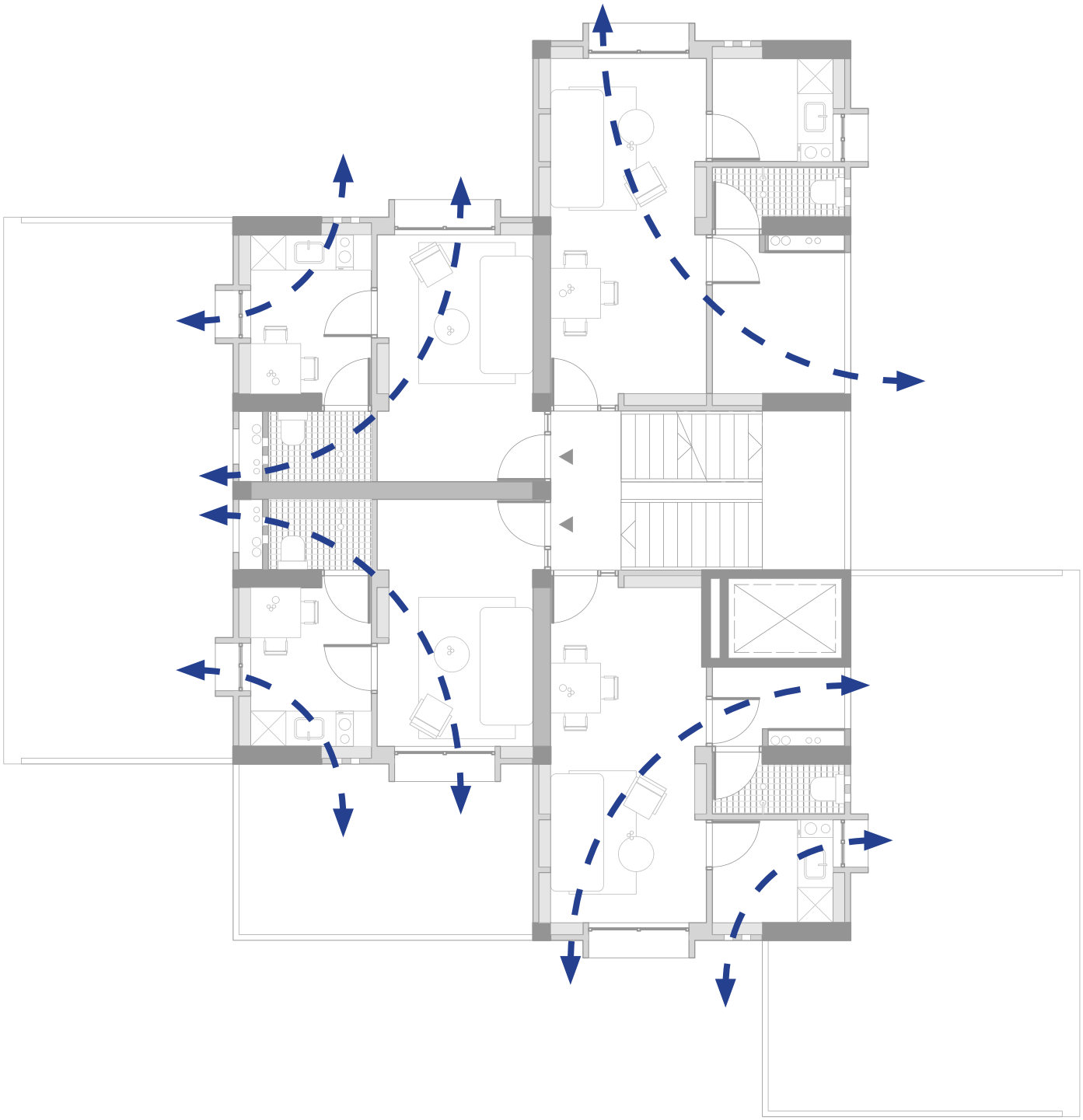




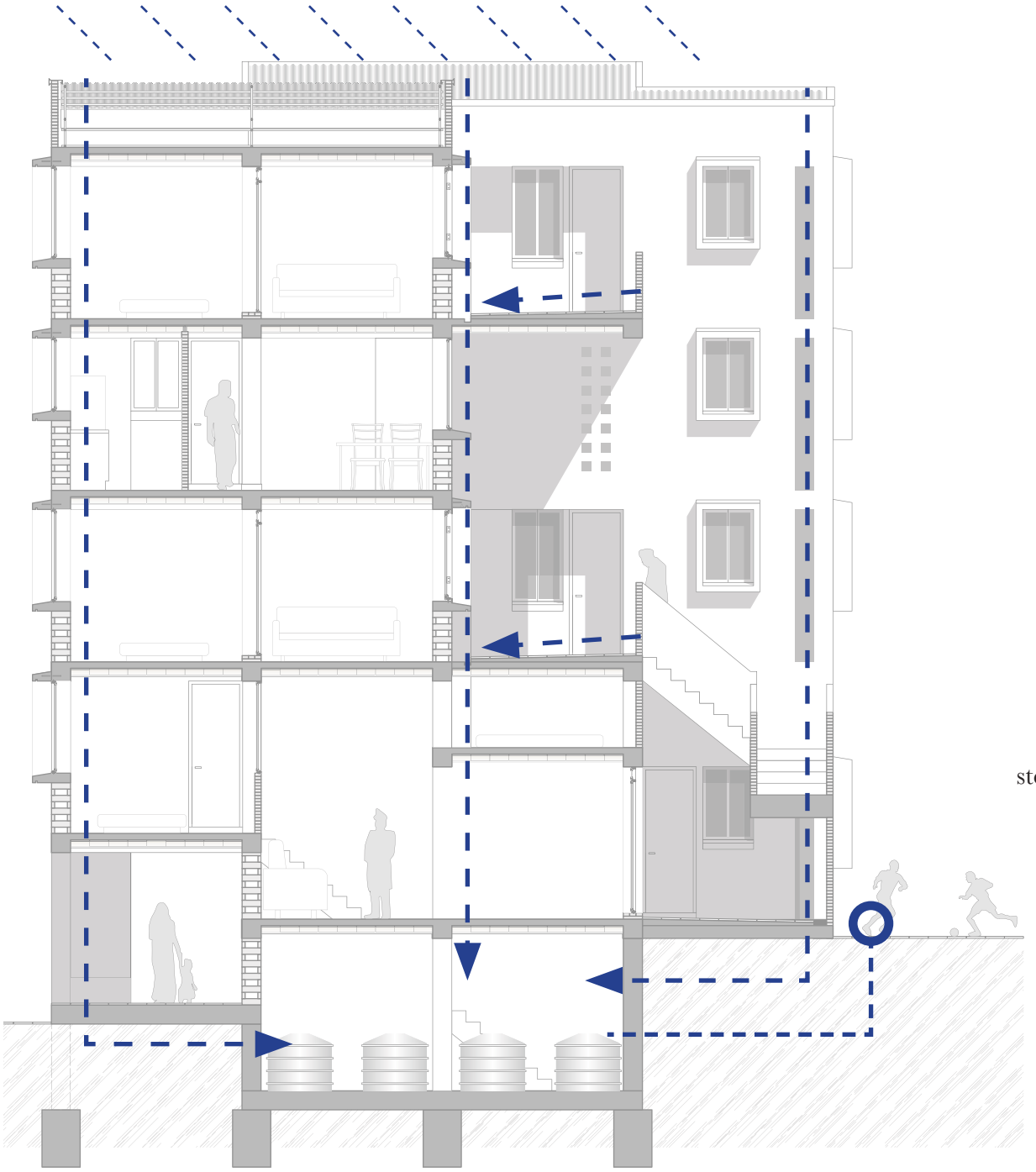




Cross ventilation is achieved by giving each unit at least two facades facing a different side.

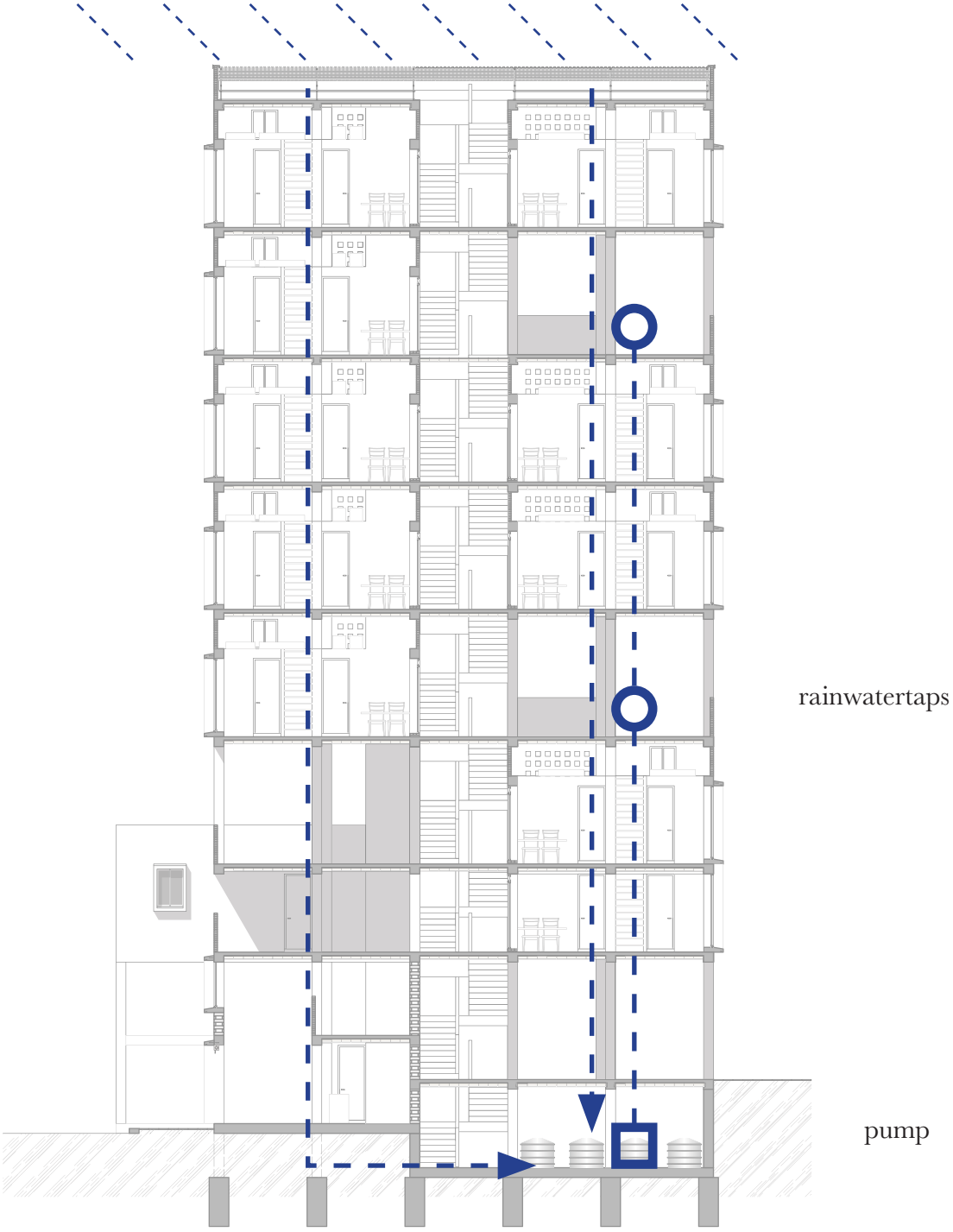


rainwater storage



stepwells

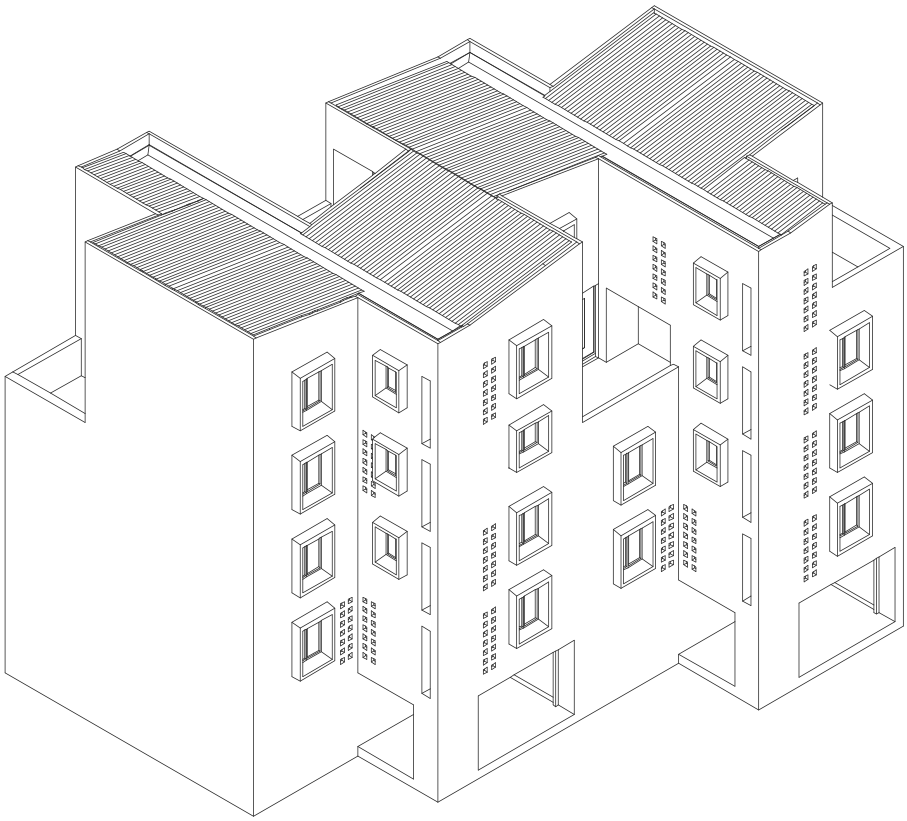
rainwater is harvested and stored underneath the building from where it can be tapped in the courtyards.

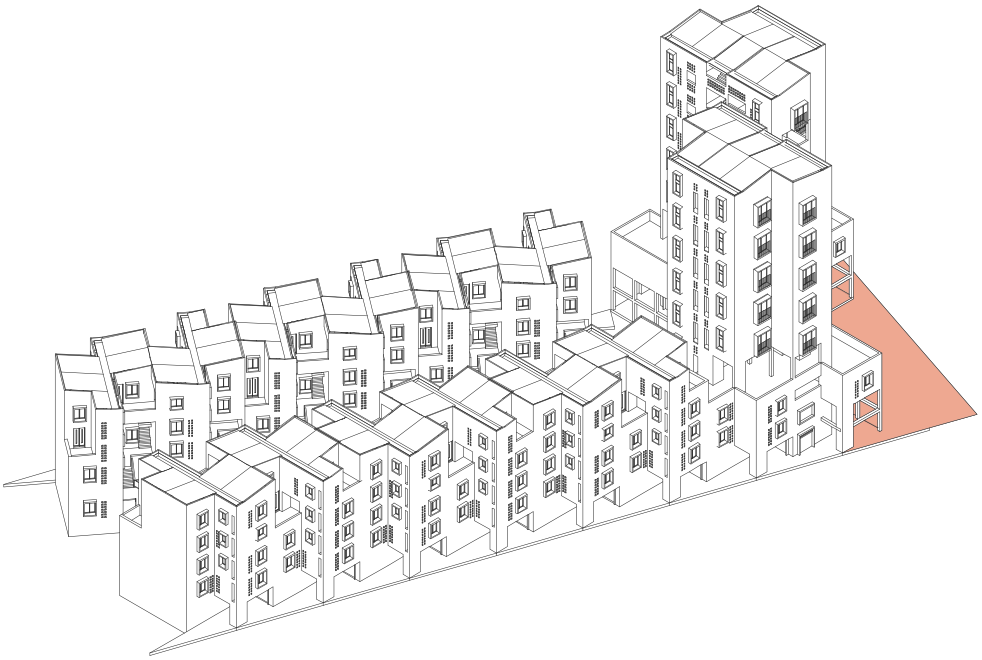


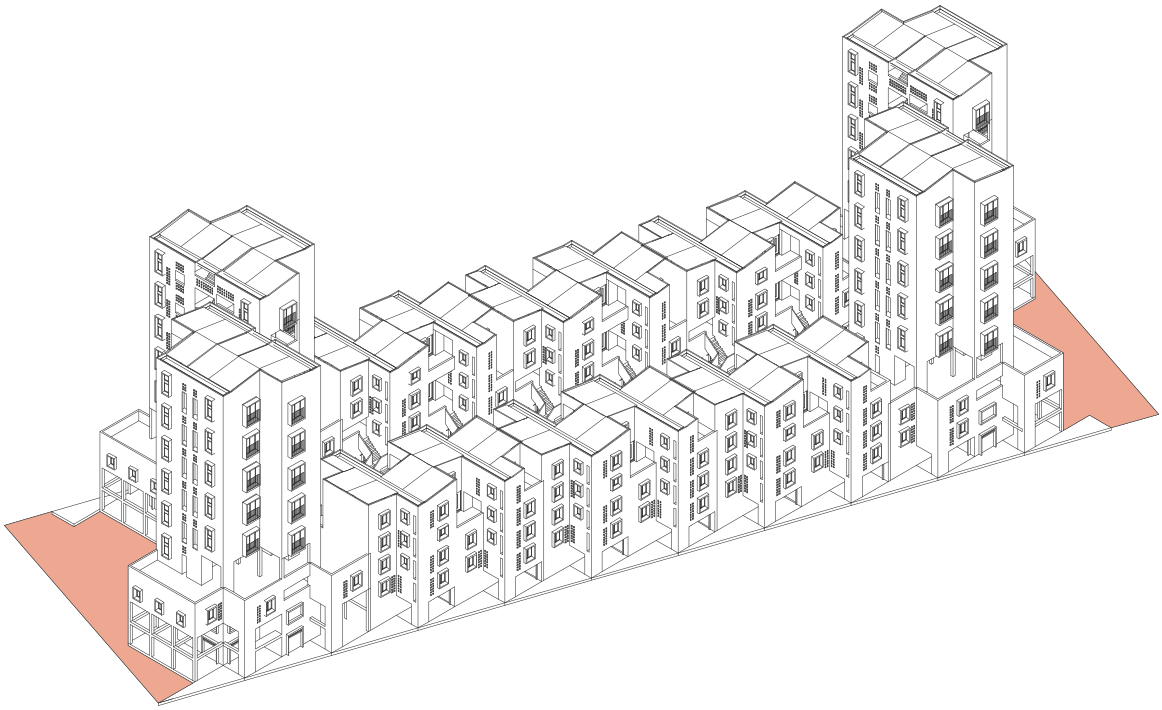
the same happens in the tower unit but the water can be tapped on the community floors.

clustering

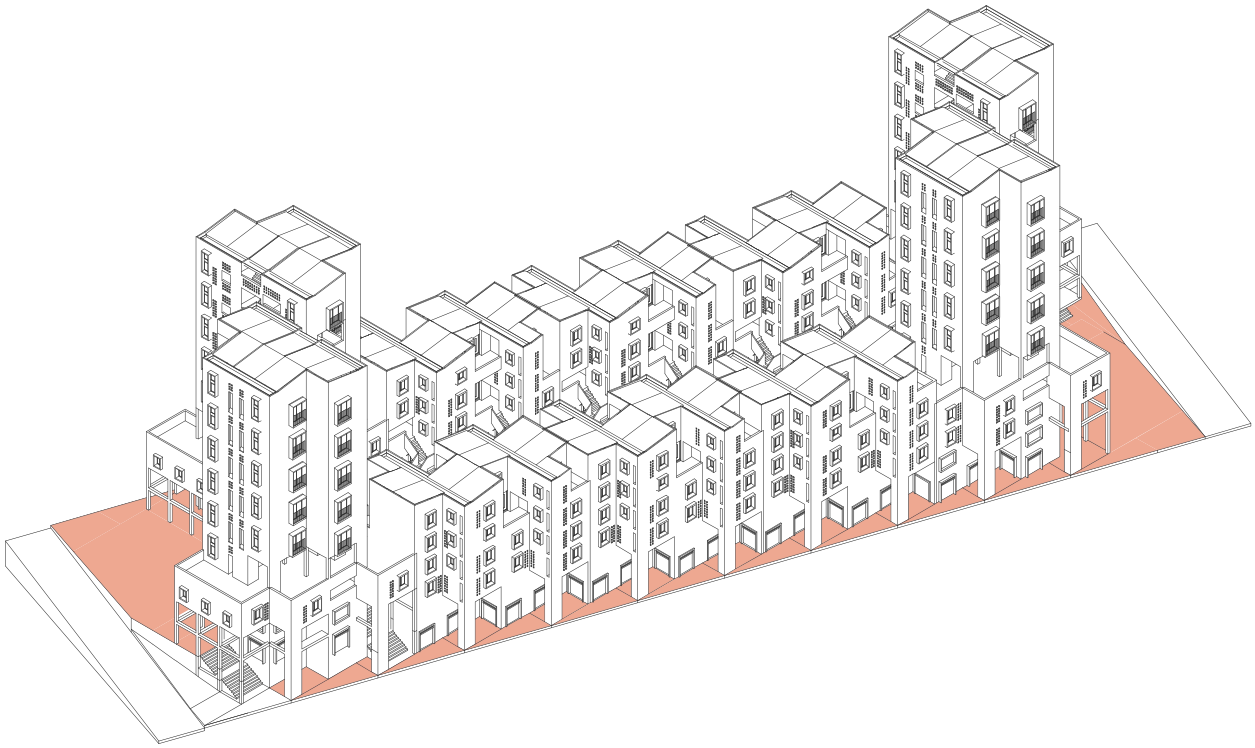
different densities with two types





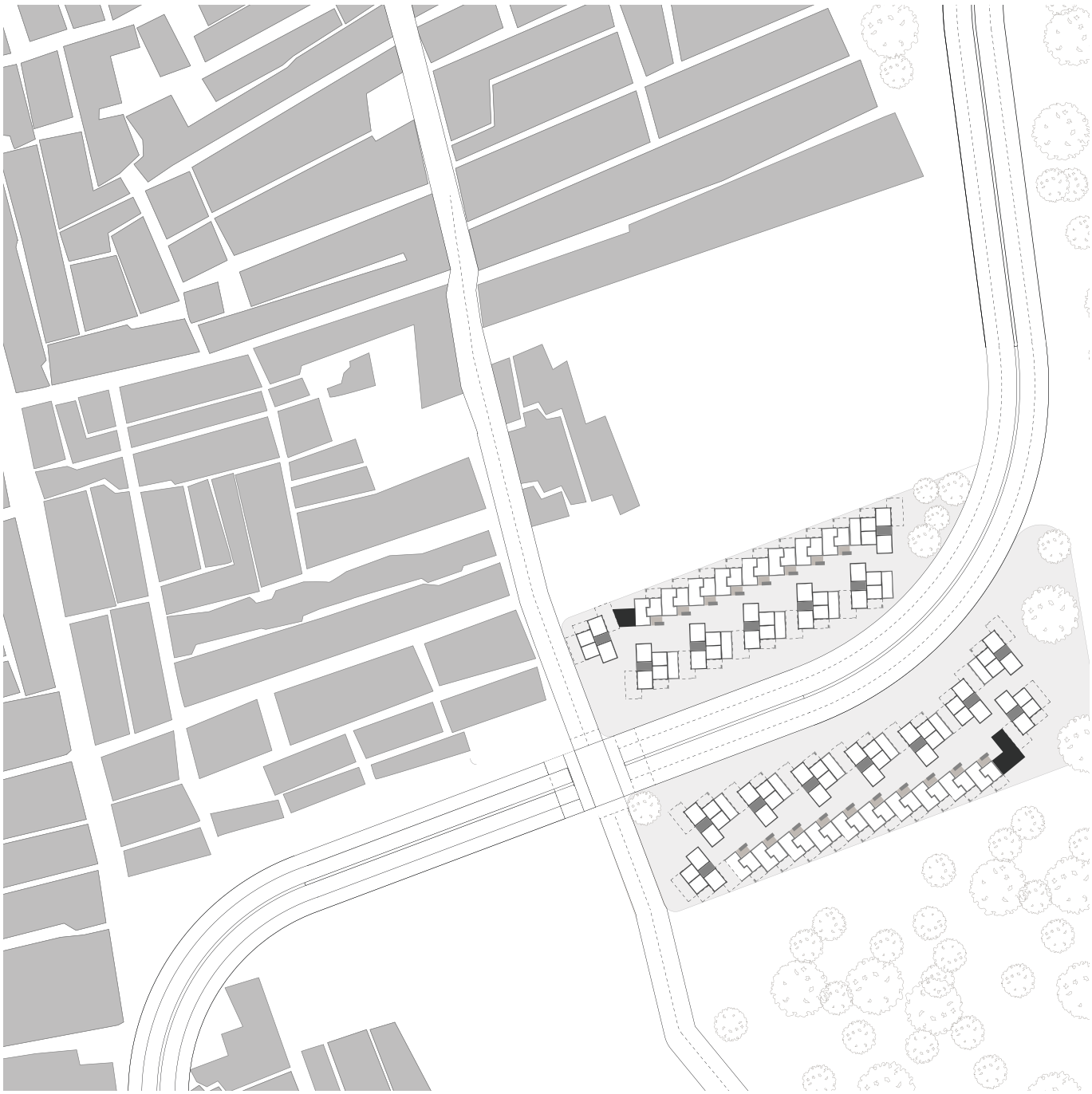


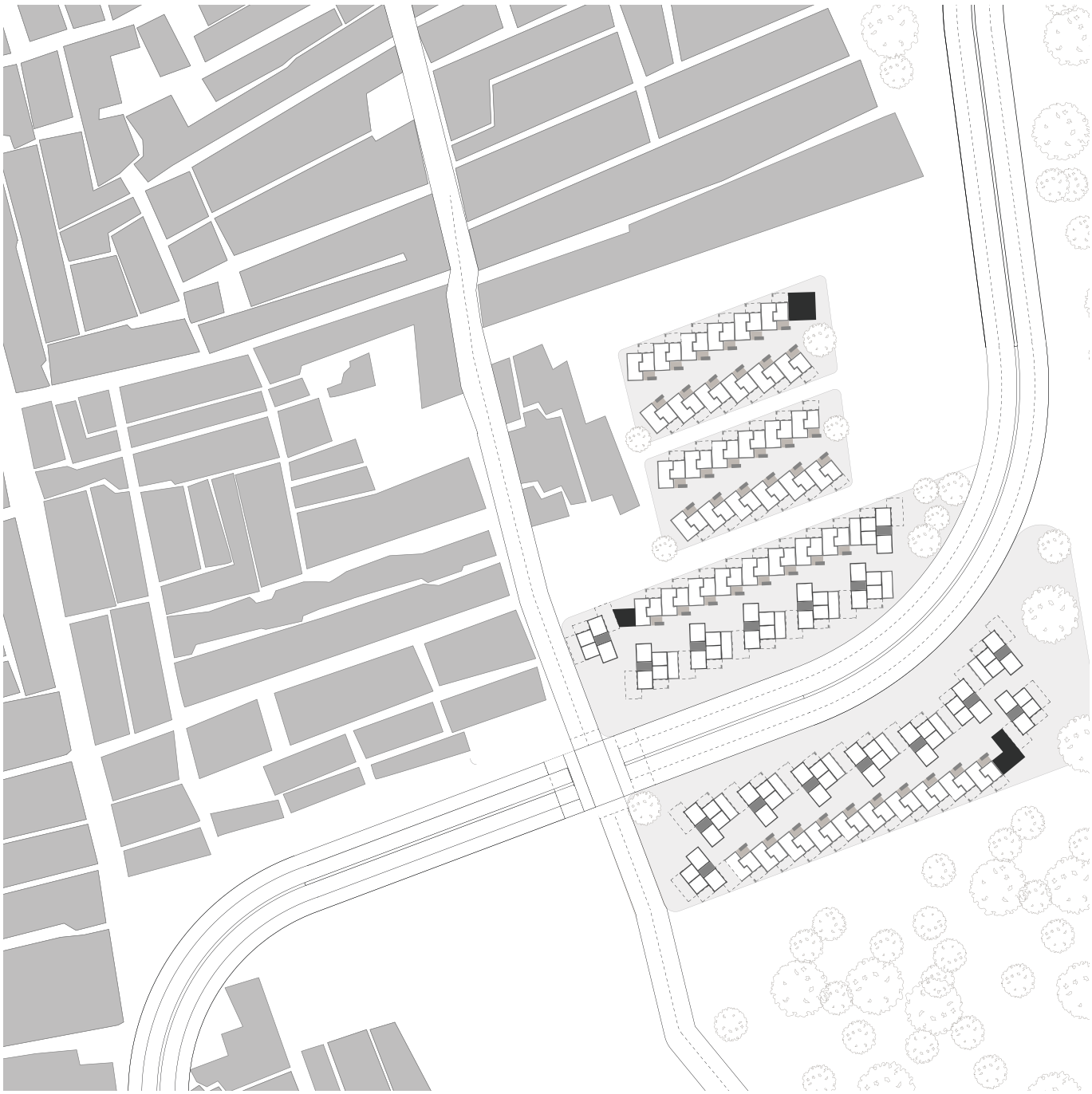
rising mid density cluster

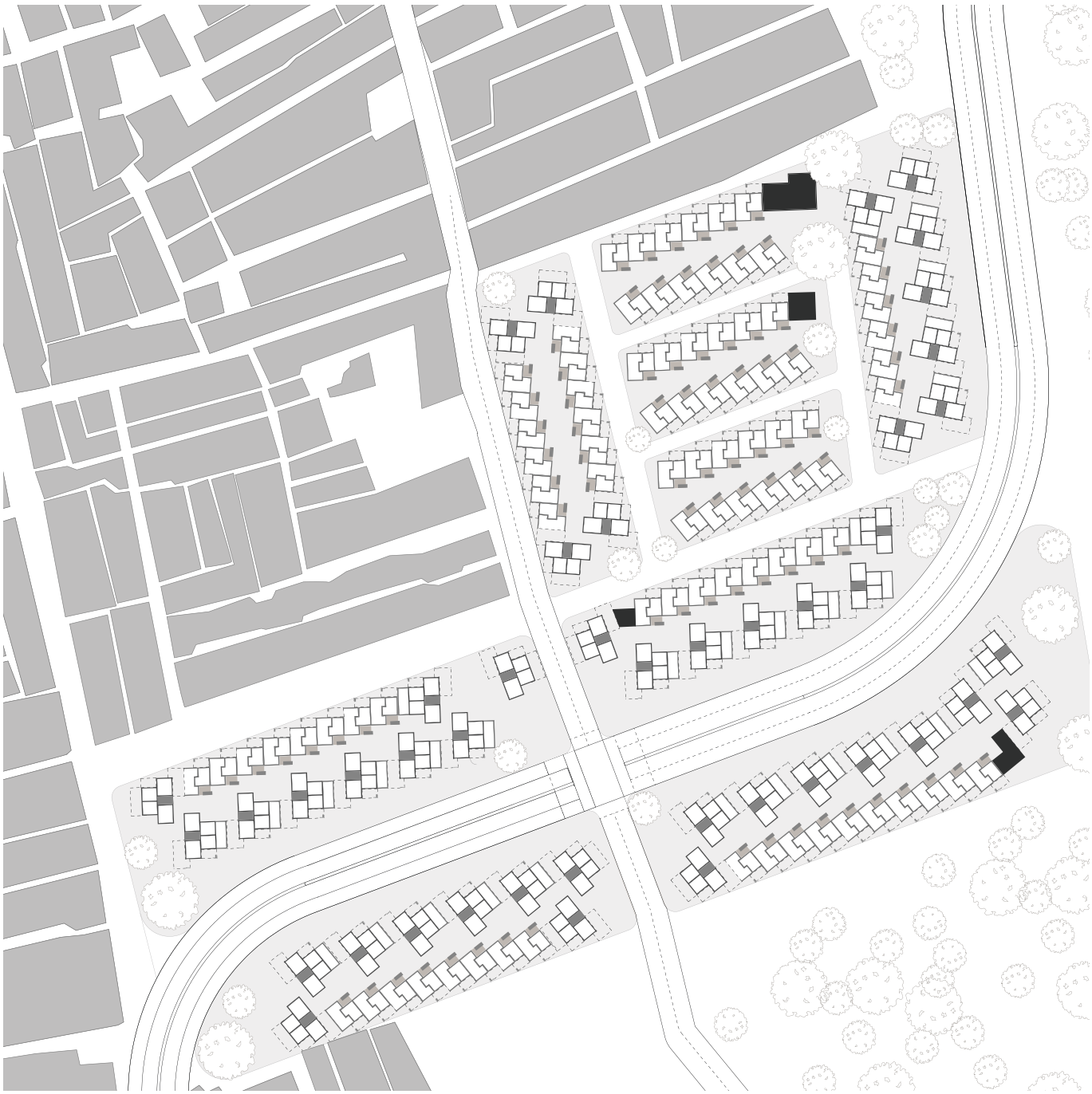


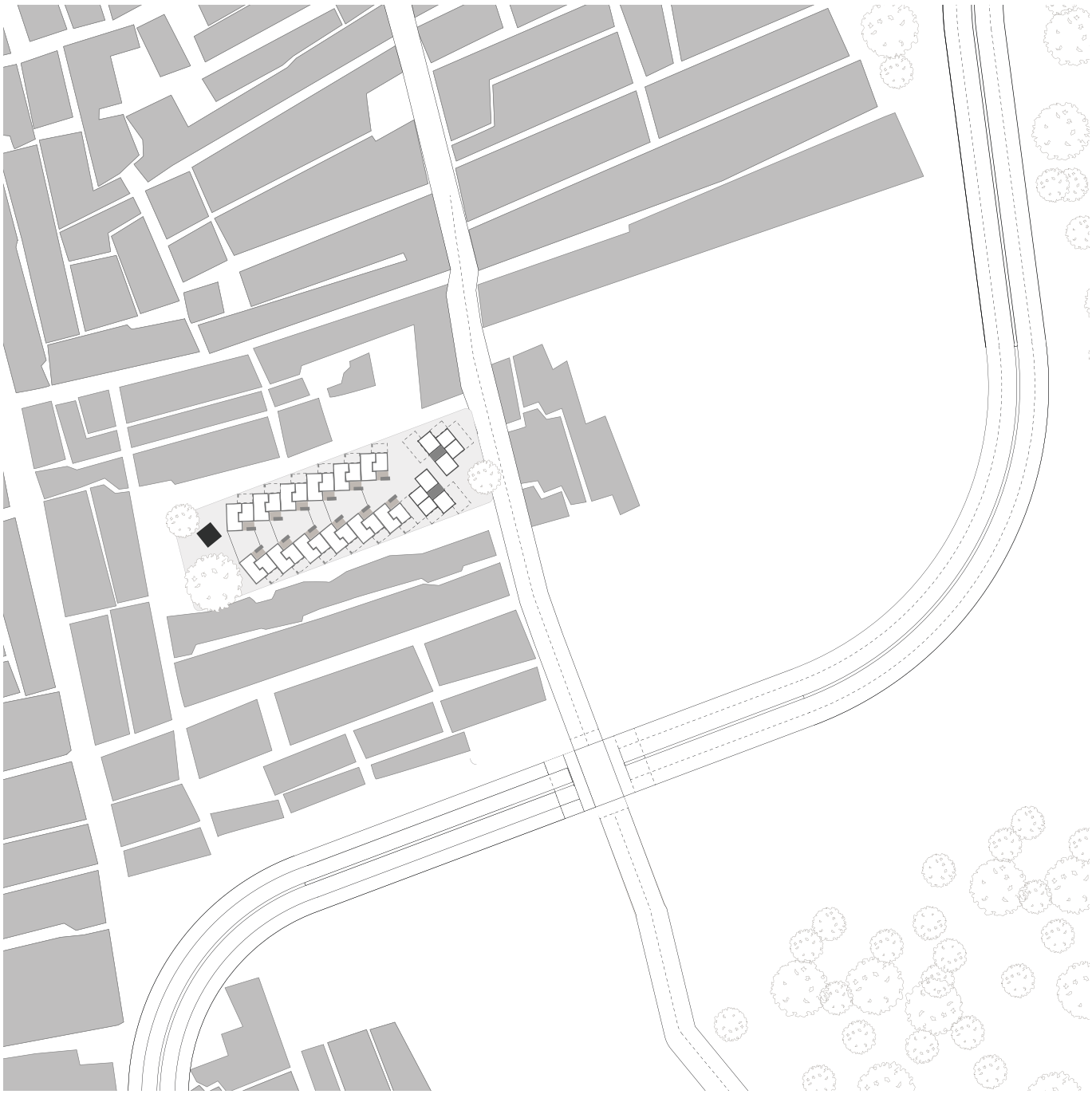
masterplan

phasing and hierarchy





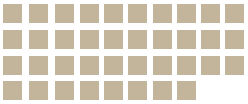




comparison

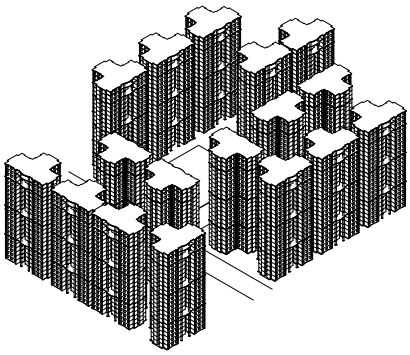
placed in a bigger context

380 units / hct

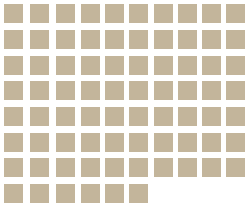


FSI: 1.6

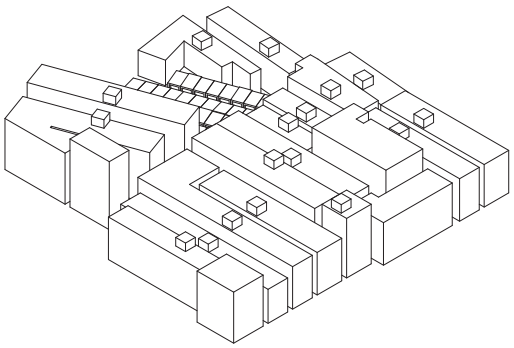
In terms of density the project does not get close to the density that is achieved in the MHADA and chawl developments.



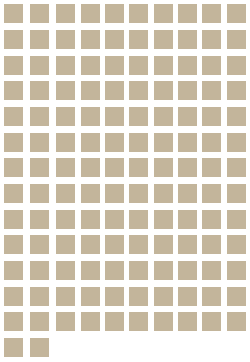
760 units / hct



FSI: >4



1360 units / hct

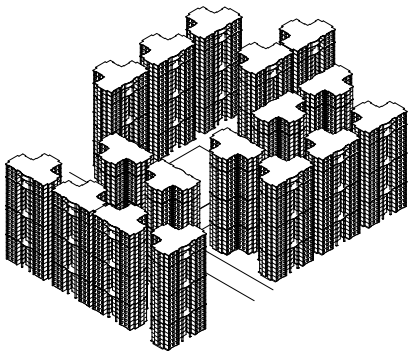


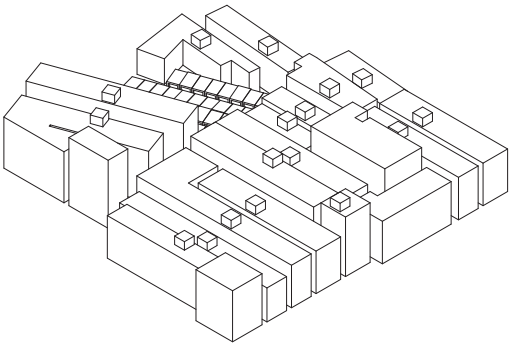
FSI: 3

5.2 m2 open space pp

3.2 m2 recreational open space pp

but one can see that the open space and more important the recreational open space is a lot higher than is the case with the MHADA and the chawl developments.



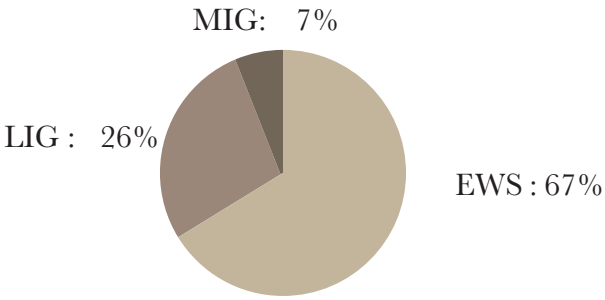


1.9 m2 open space pp

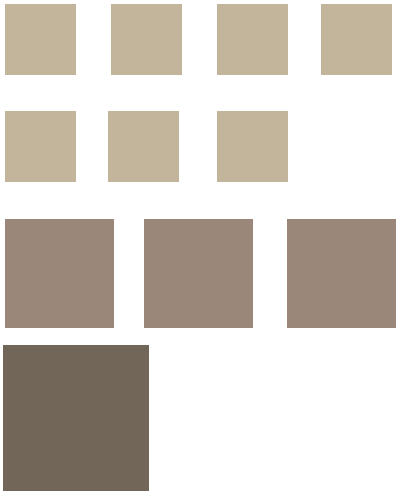
0.57 m2 open space pp

? m2 recreational open space pp

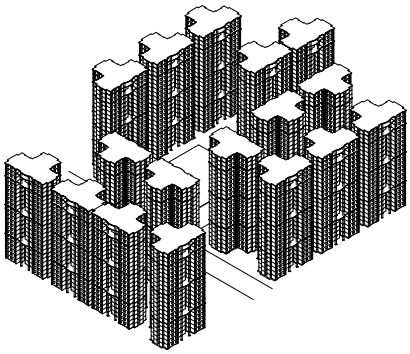
0 m2 recreational open space pp

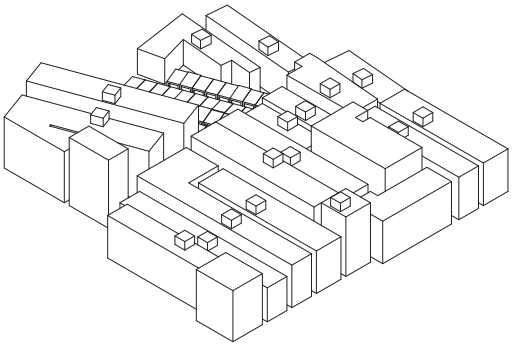


11 different unit types



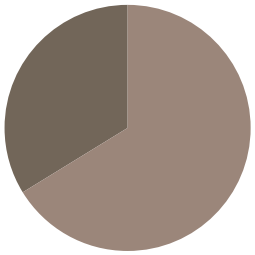
in terms of diversity the project shows a higher potential than the MHADA and chawl development.



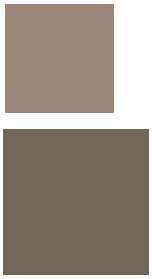


MIG: 34%

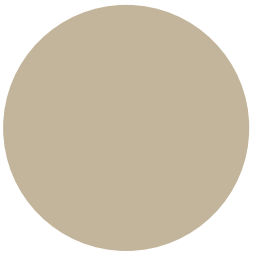
LIG : 66%



2 unit types



EWS : 100%



2 unit types

patterns

a characterising section

different unit types within one building

the diversity is seen in the section

The terrace serves as an extention of the small units.

This terrace still has a relation to the street level.

commercial activity can take place in the plinth.

Niches are related to the shops.

the courtyard is differently defined as the street.

Watertap points activate the use of the collective courtyard.