Activating Sri Prastha

Rehabilitation | Mumbai's vacant housing stock

TU Delft

Architecture & Dwelling

TU DELFT | FACULTY OF ARCHITECTURE AND THE BUILT ENVIRONMENT
DEPARTMENT OF ARCHITECTURE | CHAIR OF ARCHITECTURE & DWELLING

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AR3AD132 Dwelling Graduation Studio: Global Housing Studio
Affordable Housing for Sustainable Development in the Global Urban South.

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Preface

During the Bachelor and first year Master at the faculty of Architecture, we worked on many projects, mainly focused on the Netherlands. During two exchange periods during the studies, I found that I had great interest in projects abroad, mainly focused on housing in developing countries. During these periods abroad you see the poor conditions people can live in, especially compared to housing in the Netherlands. Areas where there is still a lot possible in the field of sustainable development. The global housing studio got me more excited and interested again in finding new ways of housing. After all, everybody in the world needs some sort of dwelling.

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List of Abbreviations

MLD	Million Liters per Day
MMR	Metropolitan Region Mumbai
EWS	Economic Weaker Section
LIG	Lower Income Group
MIG	Middle Income Group
HIG	High Income Group
govt	Government
1RK	1 Room, Kitchen
1BHK	1 Bedroom, Hall, Kitchen
2BHK	2 Bedroom, Hall, Kitchen
3BHK	3 Bedroom, Hall, Kitchen
UN	United Nations

Problem statement

With a growing population in India, and in Mumbai, the demand for housing is increasing every year. The growing population in Mumbai is mainly caused by the many migrants coming from outside areas of Mumbai, like Maharashtra, to find work in the growing city. Because of the lack of affordable housing in the city, many informal settlements arise. This is also the case in Nala Sopara, an area in the north of Mumbai, well connected with Greater Mumbai by train. Many migrants settle first in this area because of the affordable rents and the available space. Because of the lack of housing, many new projects are being developed and have been developed for many years. Especially on the more north side of Nala Sopara where there is still a lot of space available. But on the same time, informal settlements in Nala Sopara are still growing. There is a gap in the housing market between what is available and who is looking for a dwelling. And reports state that many of the houses in Mumbai, and in India, are lying vacant. According to a residential market report released by Liases Foras, Mumbai is second on the list with 192.27 unsold million square feet. And this is of course a big paradox for the city, which is facing a huge housing shortage, mainly in the affordable housing sector. Around 15% of the Mumbai's housing stock lies vacant, while the informal settlements are full, and even growing. According to the Census of India 2011, out of the 90 million residential units in India, 11 million units are vacant; that is about 12% of the total urban housing stock, and in Mumbai this is even more. Many of these vacant housing is government built housing, that are often built far from jobs and public transport and in some cases the houses have been of low quality and lacking basic infrastructure. electricity and water. People living in India's urban slums have often preferred to stay living in the slums rather than move to government built housing. But the bigger problem is that owners of private housing would prefer to see their housing capital lie vacant than to rent. Without a vibrant rental housing market labor markets cannot function efficiently (see Shah 2013). Bringing the private vacant housing stock into the rental market and understanding and resolving the reasons for vacancy in the government provided stock could significantly improve efficiency in utilizing available stock of housing.

In the whole of the Mumbai Metropolitan vacant housing is visible. Variating from a few vacant houses in a tower to a whole area that is lying vacant, for example the CIDCO Housing by Raj Rewal. But also in other projects a lot of houses are lying vacant, in Mota Mandir Chawl there is a vacancy of 86,6%, in the Swadeshi Market Chawl there is 25,8% lying vacant. All areas where you wouldn't expect the vacancy. Zooming in on the area of Nala Sopara we also see areas where there is a visible vacant housing stock. An example is the Sri Pristha housing area. This is an area in the west of Nala Sopara, around 1 kilometer away from the train station of Nala Sopara. The Sri Prastha area contains 78 buildings with a total of 2046 apartments. There is a combination of different types of apartments, varying between 25 m2 and 65 m2. The FSI of the area is 1.5. This is an area with a lot of strengths: the location, the surrounding infrastructure, the open space, the community space, the mix of inhabitants and the possibilities in creating commercial space. But the

area has also many weaknesses which makes it less successful than it could be, and which causes that many apartments are vacant. Weaknesses of the area are: poor water management, lack of maintenance, the limited extension that is possible in the houses, the neighborhood environment because of the many migrants that only stay for a short amount of time in the area, the distance to job possibilities, the lack of electricity and water and problems with the original structure. Besides strengths and weaknesses there are also many opportunities for the area. Many developers are interested in the area because of the increasing real-estate value of the location. There is already a design by SRI developers, which shows the high interest in Shri Prastha. The new design shows a totally new area of buildings, and the existing inhabitants complain that the new developers don't fix the weaknesses of the Shri Prastha, but only want to make fast money.

Many of the vacant areas or vacant housing have the same characteristics as the Shri Prastha area, many qualities are there but the weaknesses make the area or dwelling unlivable. The solution by developers is often to demolish everything and create new housing, most of the time high rise buildings. But in many of those cases the qualities are not kept in the new plan and the weaknesses are not being solved.

To find a way to make the Shri Prastha a highly used area with the qualities still present, I asked myself different questions, with the research question and design question as the most important ones. By finding answers on my questions and creating a design hypothesis I want to find a design solution for the now existing area of Shri Prastha, and also a general strategy for how to redevelop vacant housing for the lower income groups.

Research question

To find a solution for the problems described in the problem statement I formulated a research question. This research question and the answers found on this research question will help me to understand the problem better and will help to create in the end a well argumented design.

Research question:

How can the vacant existing housing stock contribute to solve the shortage of affordable housing in Mumbai, India?

To find answers on this research question I also asked myself different subquestions.
Sub questions:

- How is it possible that 15% of the housing stock is vacant, while there is a big shortage of housing for the lower income groups?
- How can existing vacant housing projects be redeveloped?
- How to choose for demolishing or repairing housing areas?
- How can redevelopment still be profitable?

Design assignment

Design question:

How can Sri Prastha be redeveloped as a project with high density, without losing the qualities of the existing plan?

The Shri Prastha has qualities, described in the problem statement, to keep these qualities but think of a solution for the weaknesses, design choices have to be made. The goal is to keep the qualities, and the existing urban fabric. Because of the thread of developers who want to demolish the area and built up a new plan without the existing qualities, a different design has to be created. Demolishing an area with excellent urban qualities is not the solution. The area has to be activated again. This to create a neighborhood with a community feeling. The buildings have to be renovated in such a way that the urban qualities are being kept but that the houses will also be of high quality. The public spaces that are now present in the area need to be activated and also the main streets should be activated. A combination of renovation and newly build buildings would also make the solution profitable. Renovation could happen in different ways, for example by adding extra layers on the existing buildings, what would also increase the density. The choice to demolish a building should be made with well-considered arguments, for example to create a public space or to create public functions.

In the end the new area should provide housing for the low income group with appartments in different sizes, ranging from 20m2 to 65m2. These apartments should not only house the existing inhabitants but should also provide housing for a large new group. The goals of the new design are to double the FSI to 3 and to double the number of apartments to around 4000 apartments.

To make a highly qualitative design of the Shri Prastha area the following subquestions should be answered:

- How can higher density be created in an already existing neighborhood?
- What are the qualities that should be kept?
- And how can these qualities be kept in the new design?
- Demolish or repair?
- How can the water management, as the biggest problem, be redeveloped?
- How can in the future maintenance be better managed to make sure that the area won't become dilapidated?

Relevance

As described in the Problem Statement, housing vacancy and a shortage in housing stock is a generally known problem in Mumbai and India, but also in many other places in the world. Especially in cities in the global south the population of the cities is growing. Many people from outside areas are moving to the cities to find work. Because of this big flow of new inhabitants there is a huge housing shortage all over the global south, and also in other places in the world. This results in growing slums and informal settlements. Around 95% of the housing shortage is in economically weaker sections/ low income group segments. At least in the next 30 years, cities will keep growing and the demand for housing will keep increasing. While the housing shortage is growing, the houses that stand vacant are also increasing. Many houses in cities are lying vacant for many different reasons, mainly because they are not designed for the lower income group. The main goal for developers is of course to make profit. Which makes it not attractive to develop housing for the poor. Resolving some of the reasons for vacancy could significantly improve efficiency in utilizing available stock of housing.

Reflection

The Global Housing studio focuses on integrating research and design during the studio work. With the research work produced in group and individually. The first phase of the project was focused on analyzing and collecting information about India and Mumbai, to understand the country better, with its different culture and therefor different approach on architecture.

During the first days of the trip to India, the most striking is the amount of people living in slum areas and in crammed housing, and the way commercial developers try to develop these areas. But as you see more of the different housing projects, the more you also get confronted with other problems, which have not so much to do with the redevelopment of slums. During this confrontation I started to wonder how you can avoid people to move to these crammed housing and slum areas in the first place.
During the visits of the case study projects in Mumbai, one of the projects, the Sri Prastha area, got my attention. In the first place because of the qualities of the area that were missing in other housing projects, but after understanding the area better, the many weaknesses became visible. And the many problems became even clearer after talking to many local residents of the Sri Prastha area. The area has many vacant housing for different reasons, because of this an inclusive community is not possible in this area.

To understand the Sri Prastha area better a research was done. The investigation of the research can be done in many different ways in the architectural field, from collecting literature to having interviews. The aim was to bring the most useful ways that are the most engaging and productive from the interdisciplinary discourse on methods to the architectural design context. Architectural design and research have a shared purpose, they can stimulate the production of knowledge by approaching it as research by design. The role of architectural research has gradually shifted over the past years during my studies. During the graduation project I was able to broaden the research into many different forms.

The goal for me during the graduation studio was to develop a research method wherein the role of architecture as discipline with an interest in the theory of the social role of space, the meaning of what people want and the historical context in which we live, plays an important role.

Within the Global Housing studio a research direction was already defined. During the first stage of the research we did a lot of investigation in how the research specialty is situated within the full spectrum of architectural research. In the earlier phases we all started analyzing in the way we have learned here ate the TU Delft. Using mainly mapping, morphological, typological, historical and topographical research about the site. But because of the location and the unfamiliarity with the country and culture that we worked with, the research became more varied and broad. During the process I wanted to take the position focused on crucial culture and social issues that will play a significant role during the development of the project, by choosing a qualitative research method. My goal was to understand the

dynamics from the point of view of the dwellers and that this insiders' perspective will eventually balance with my observations as a designer. What I value are the ideas of the social world, embracing the existing context, with different forms of interaction, and the quality of social spaces. Visiting the Sri Prastha area multiple times was the most important for me to get the information I wanted, just by simply walking down the street and talking to the people and observing the people and the buildings they live in.

The research gave me a better understand of the area and also Mumbai as a city.

Overall I used different methods during my research from historical mapping and studying housing policies, case studies, rehabilitation schemes, and housing regulations to mapping, interviews with local residents and studying housing typologies and social and special practices.

In the end, the research, needed to focus on the physical outcomes of the design, from the scale of the building components, to the neighborhood and urban design. During the design phases, the reality has always played a big role. The danger was the desire to create something new and complex, thinking about new housing schemes and principles, and the eagerness to create something special for your final project. This became a struggle in the first phases of the design phase, with the huge pile of information in your mind, collected during the beginning of the research phase. But in the end, by putting the reality more in the foreground, the project became more realistic, and different aspects have been studied. The project needed to be feasible financially, and local construction methods were analyzed and discussed with the mentors.

During the projects, with the focus on affordable housing in the Global South, the studio focusses on different issues and problems that are not always in the disciplinary field of the architect. Creating affordable dwellings

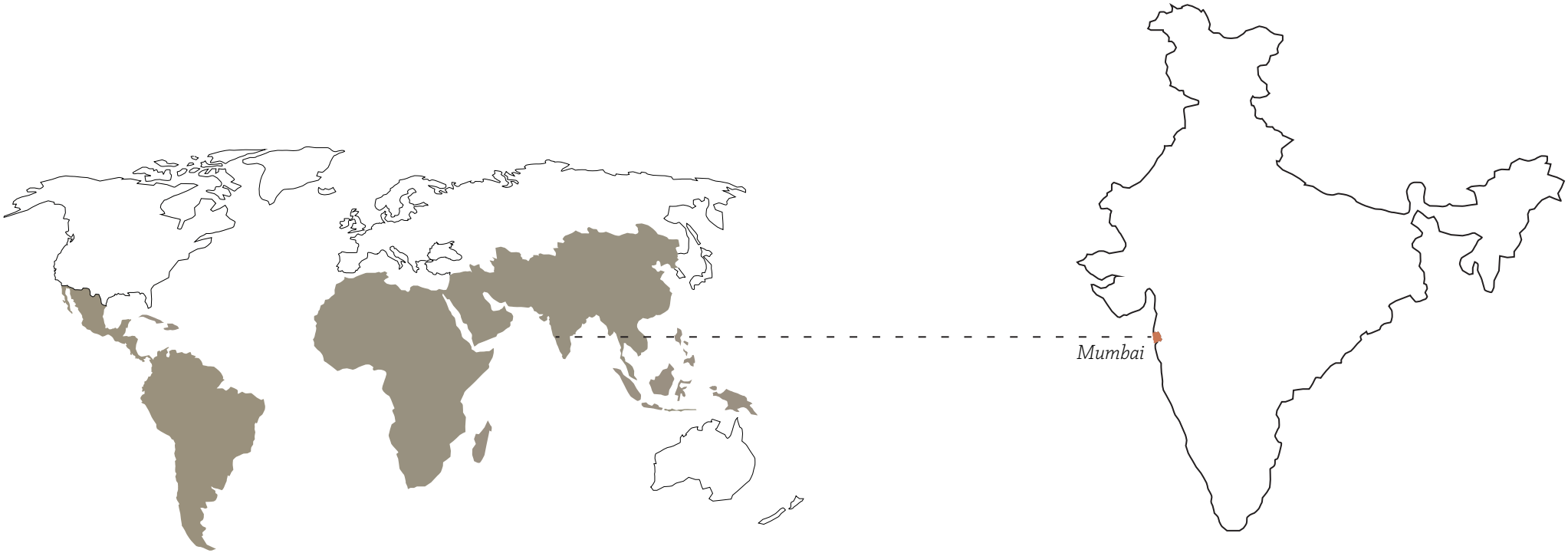
for the less fortunate in society is a task that asked for an approach that I was not familiar with, a different approach than I was used to. The goal to design affordable housing in Mumbai, asked for a research in a certain social group of Mumbai. And also a research into different housing policies and regulations, and different economic situations. In this given situations, the role you have as an architect feels very small. It will give the designer less opportunities, but despite this given, it is important that, especially in India and Mumbai, to focus on the social aspects of the design. Focusing on small optimizations of the social environment, in the form of by example, creating identity, landmarks an elements that will give a better sense of the whole.

The more the research and design developed over time, the more knowledge was gained about the situation at this moment in Mumbai and India. And you can say that the problems in affordable housing and vacant housing are not one to be solved by the architect. You can say that, the more you know, the deeper you sink into a pile of problems in the housing policies. The problems of affordable housing are not an issue of design, but more an issue of the government and economic situation, and also the social situation. The many housing policies and regulations make it hard as an architect to create a realistic solution for the affordable housing crisis. The general main goal of the development of housing in Mumbai, is to make profit. During this project a choice about how to balance this was an important choice to make. I choose to be as realistic as possible, but despite this, the reality still works differently.

But for all that, the possibility to work as a student in an academic setting, on an affordable housing project like this, was very interesting and informative, and I think is necessary for the overall research on this topic. With the help of the mentors and other experts, many things were possible. This graduation project not only gave me many new insights on an architectural level but also on a personal level.

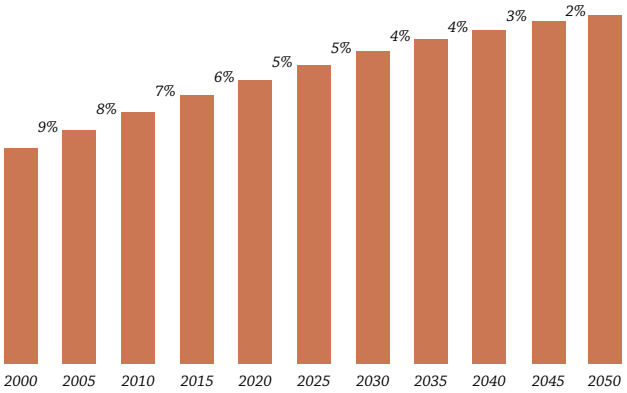
Research

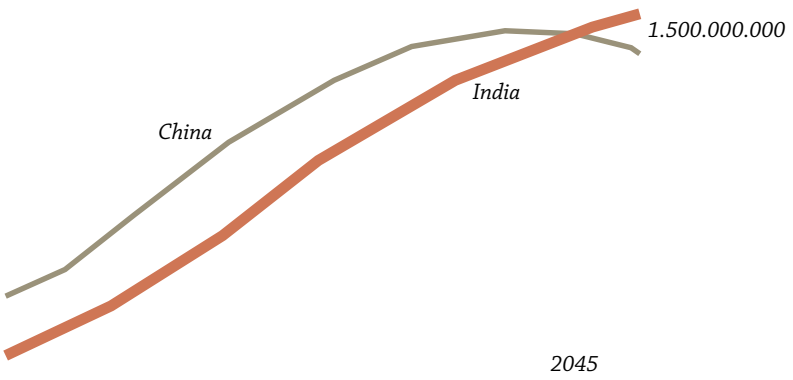
The Global South



Martin W. Lewis, There Is No Third World; There Is No Global South (2010), GeoCurrents

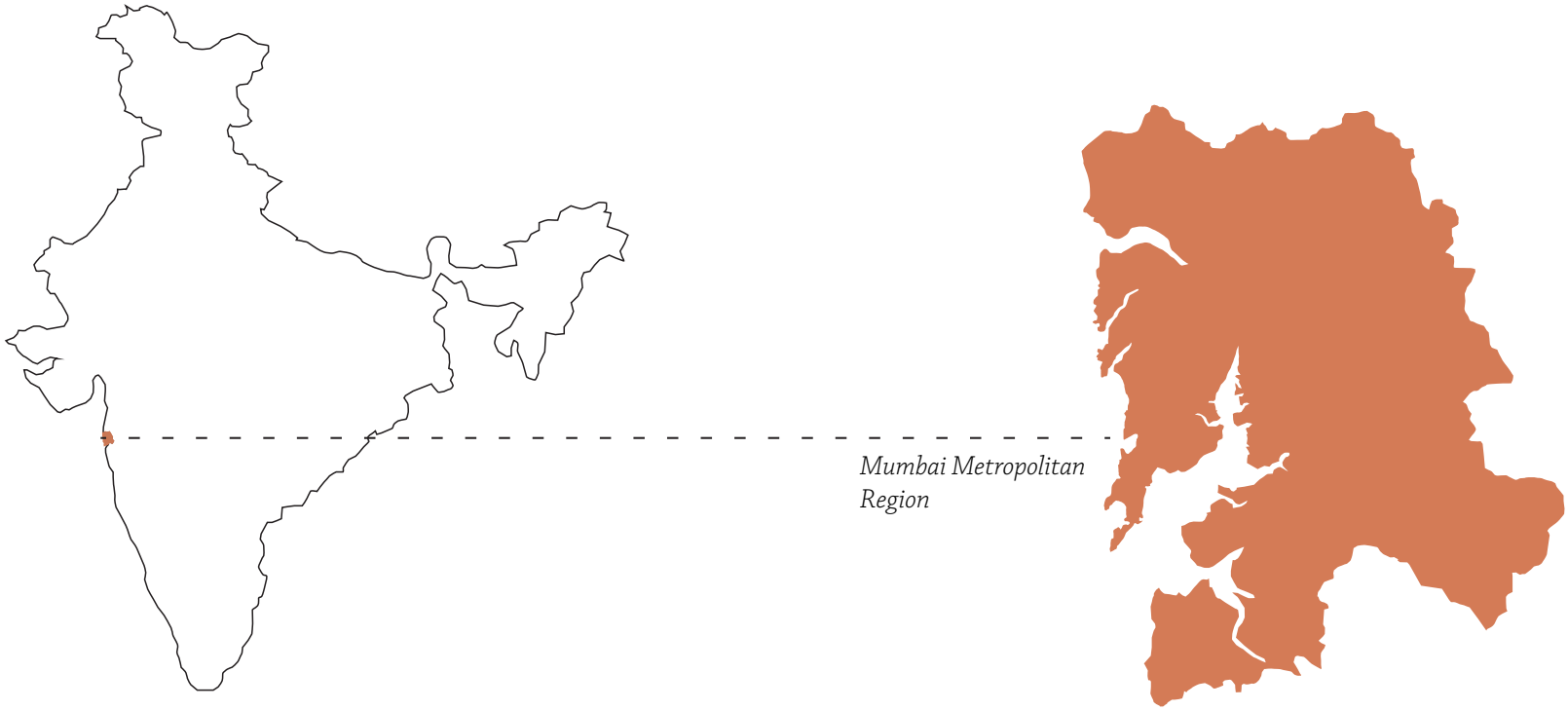
India





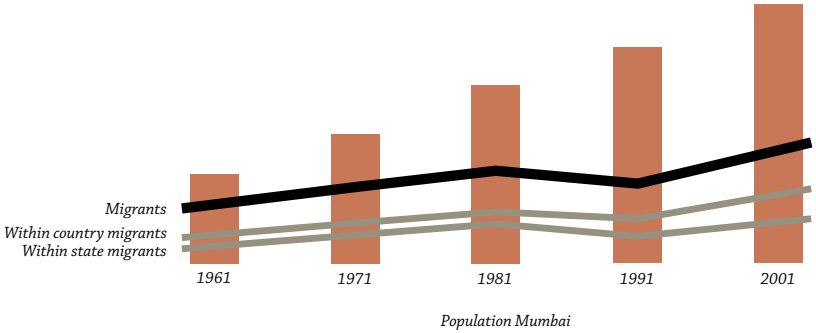
Rumani Saikia Phukan (2014), Overpopulation in India - Causes, Effects and How to Control it?
MMR Plan Report, 2016-36

Mumbai Metropolitan Region

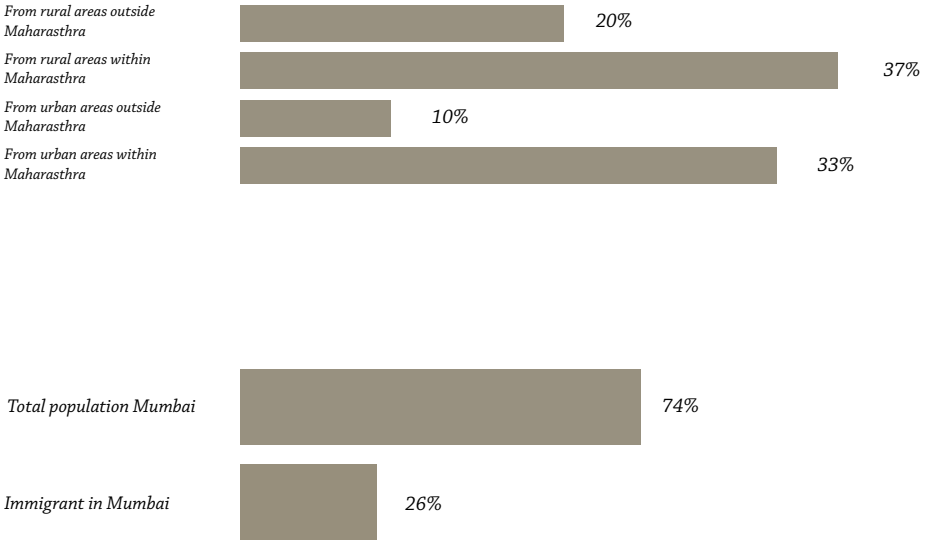


Google Earth Pro

Mumbai Metropolitan Region | Migration

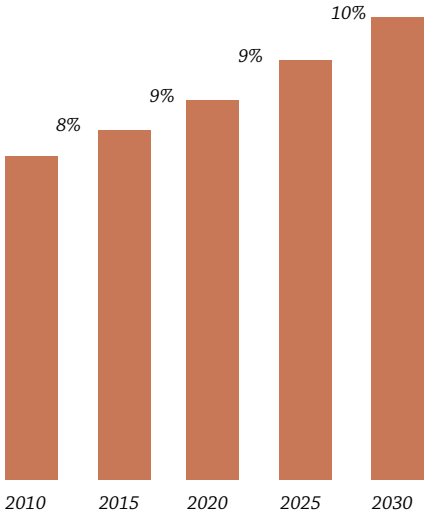


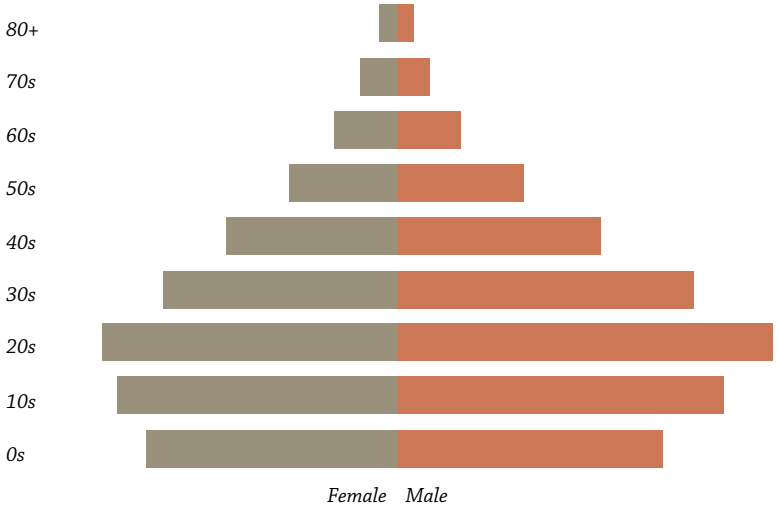
Population Mumbai



Rajadhyakshai. M, (2012), 70% migrants to Mumbai are from Maharashtra, The Times of India

Mumbai Metropolitan Region | Population growth





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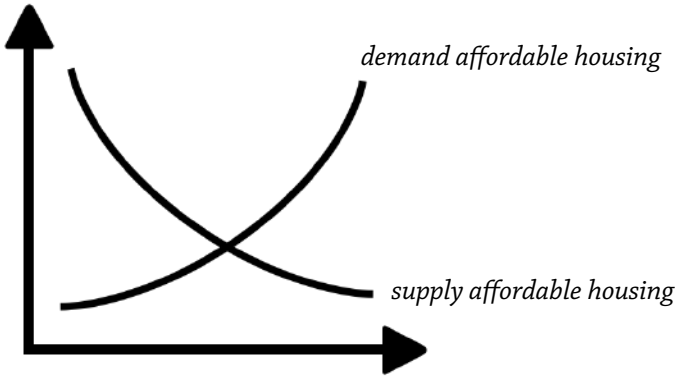
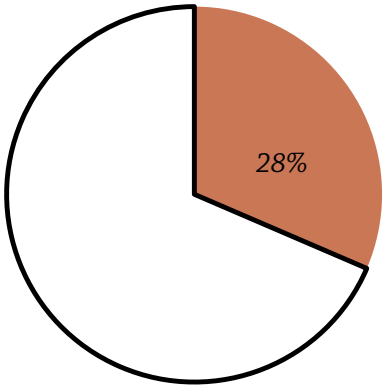
Mumbai Metropolitan Region | Imbalance

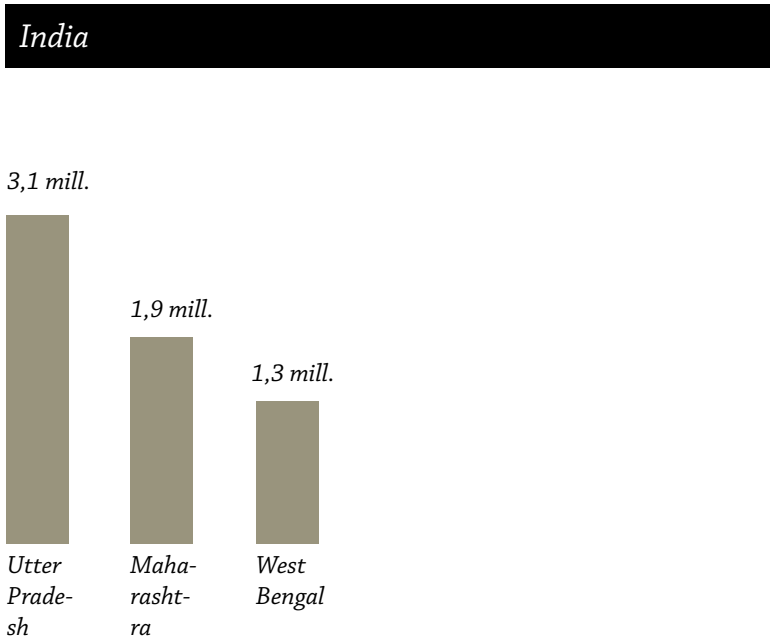


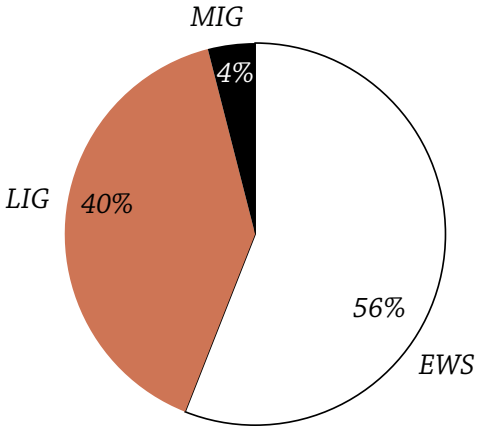


2011

Robert M Buckley, Addressing the housing challenge: avoiding the Ozymandias syndrome (2016)

Mumbai Metropolitan Region | Housing shortage

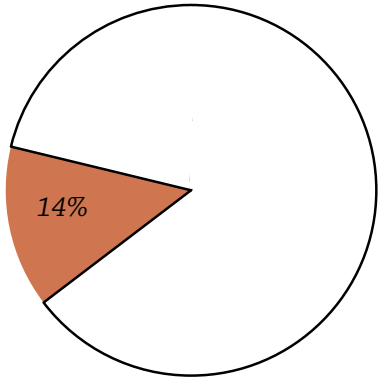




MIG - Middle Income Group
LIG - Low Income Group
EWS - Economically Weaker Section

Alex Tabarrok, The Paradox of India's Vacant Houses (2017), Economics Permalink
Sahil Gandhi, Housing paradox: Despite a severe shortage, 12% of houses in Indian cities are lying vacant (2017), Scroll.in

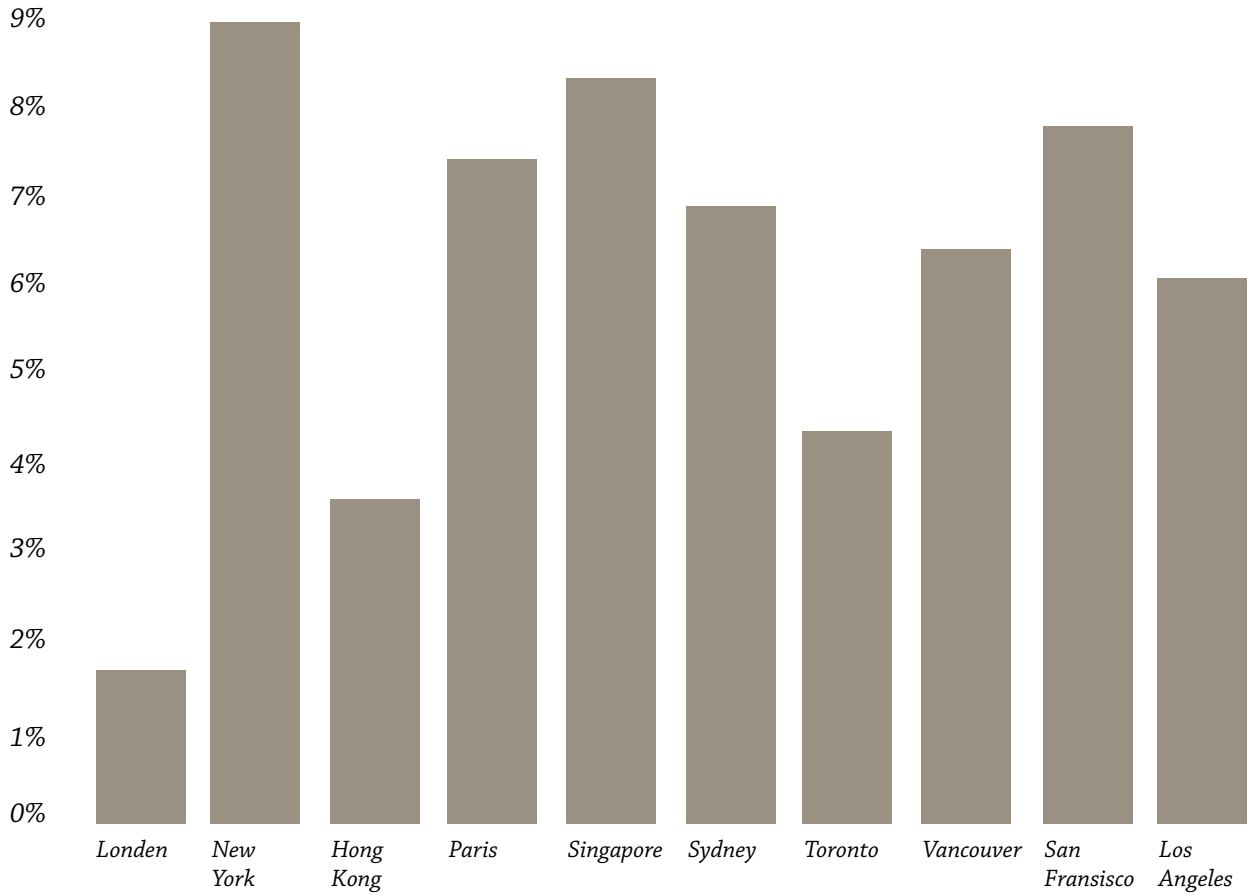
Mumbai Metropolitan Region | Vacant housing



Mumbai Metropolitan Region

KPMG, Bridging the Urban Housing Shortage in India (2012)

World | Vacant housing



Tyler Durden, Vacant Homes Are a Global Epidemic (And Paris is Fighting It With A 60% Tax) (2017)

Reasons vacancy

low rental yields

amount of paperwork

immigrants

water and electricity

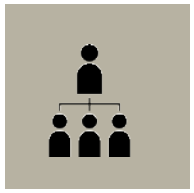
infratructure

maintenance

risk of renting out

black money

unrealistic pricing



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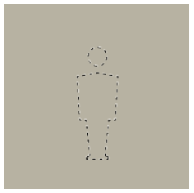
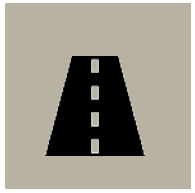


social networks

job possibilities

IBEF, Affordable Housing in India, Budding, Expanding, Compelling (2012)
Alex Tabarrok, The Paradox of India's Vacant Houses (2017), Economics Permalink
Kalpana Gopalan, Affordable housing: Policy and practice in India (2015), Elsevier

Government housing



infratructure

water and electricity

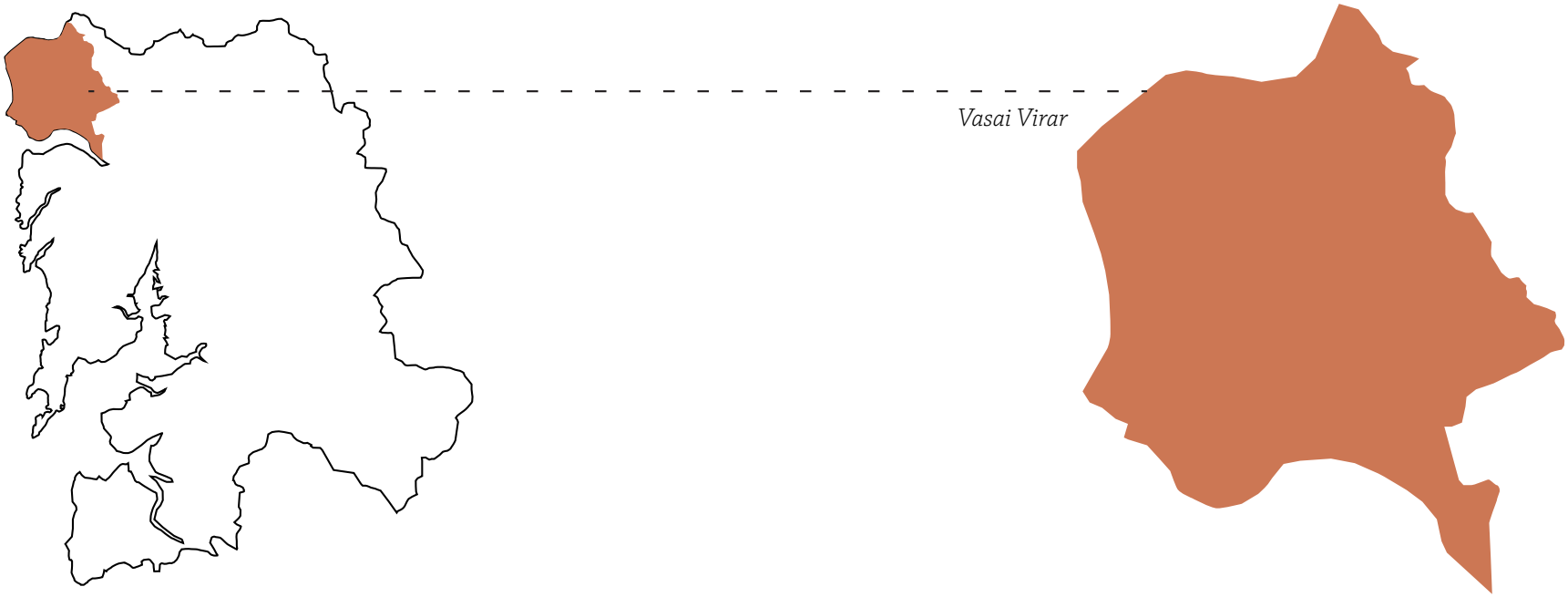
job possibilities

livelihood

public transport

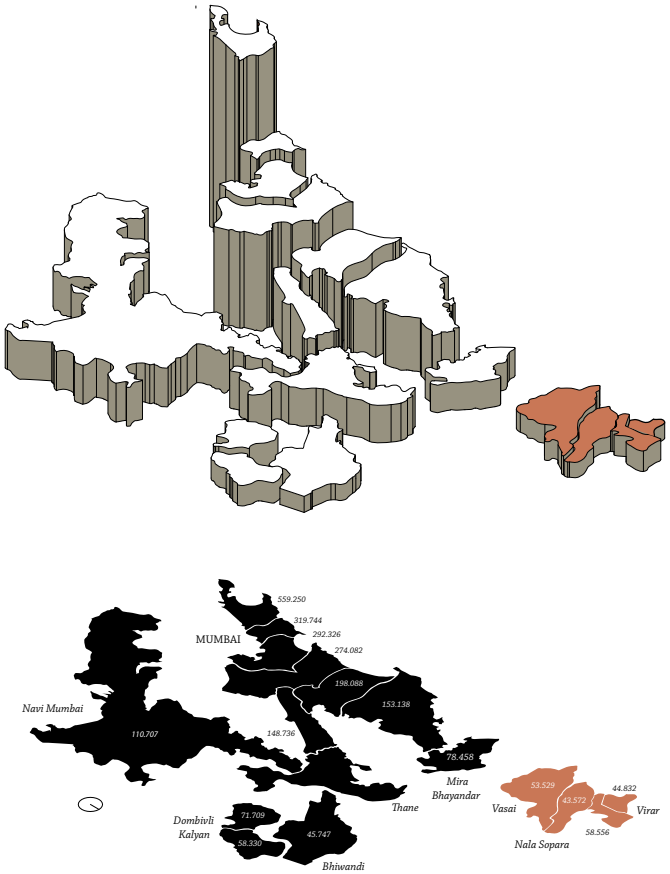
Soumya Singh, Top 5 reasons why apartments go unsold (2015), 99acres
Sukanya Bhattacharyyaa, Govt Building Homes That Poor Do Not Want (2016), India Spend

Vasai Virar

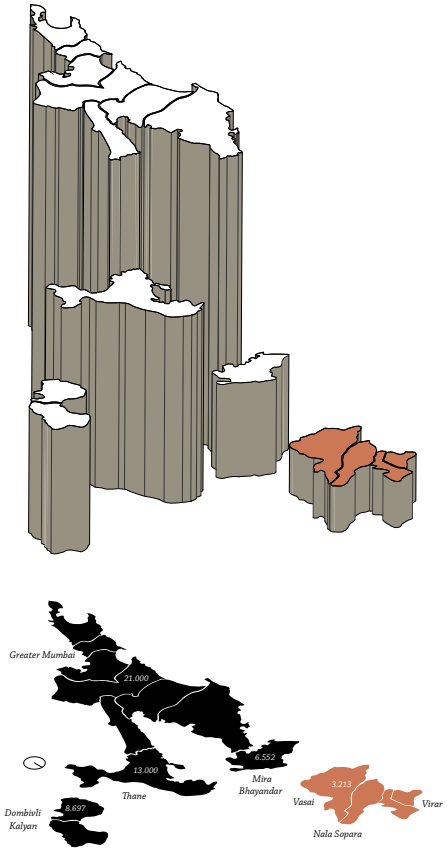


Google Earth Pro

Vasai Virar | afordability



property prices



density

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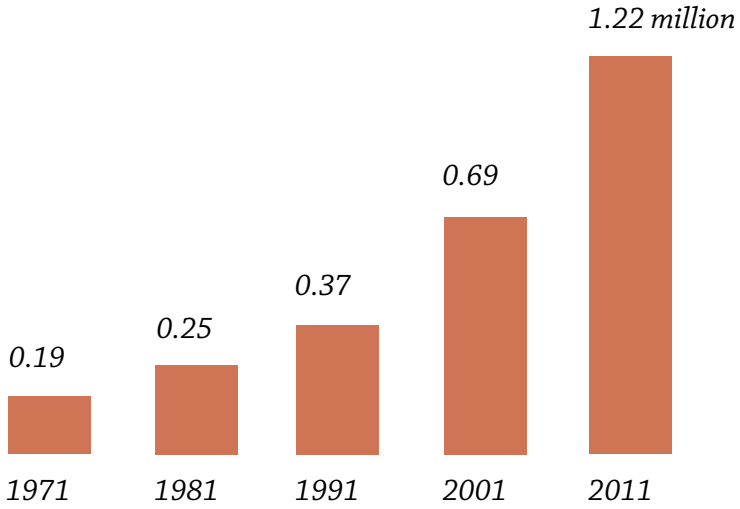
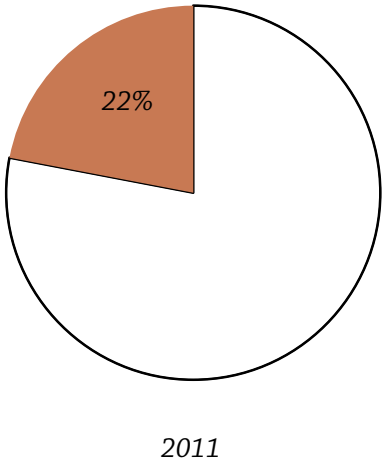
Vasai Virar | population growth





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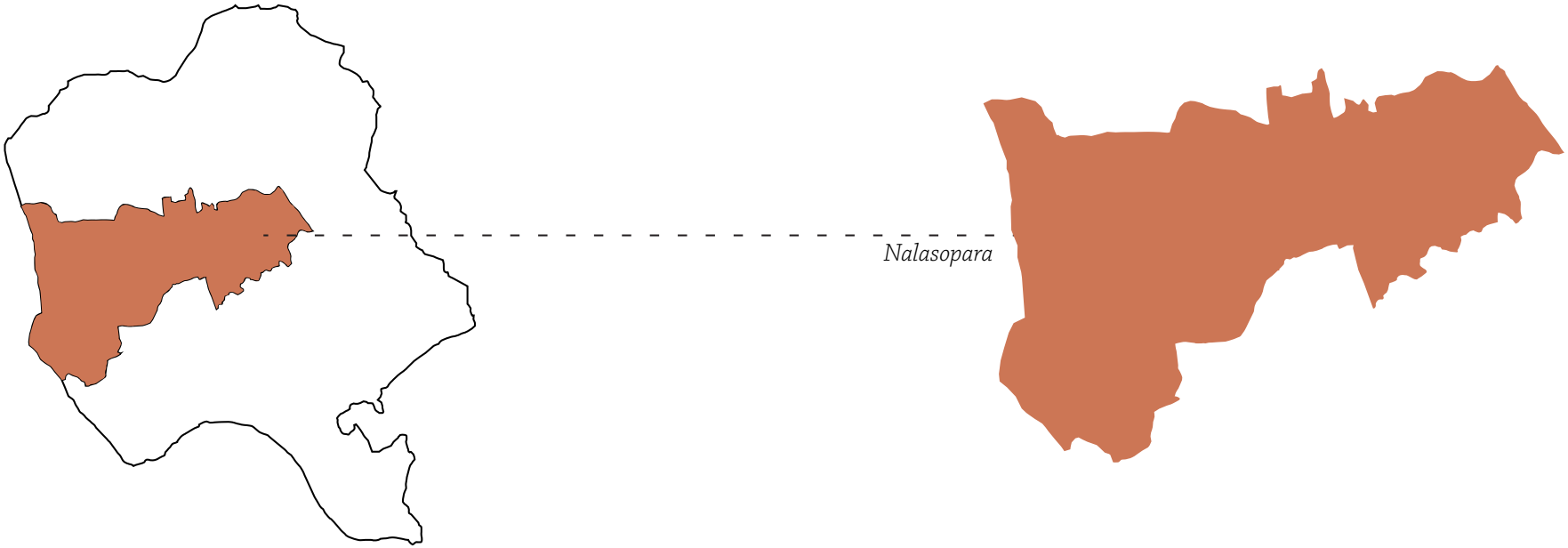
Nalasopara



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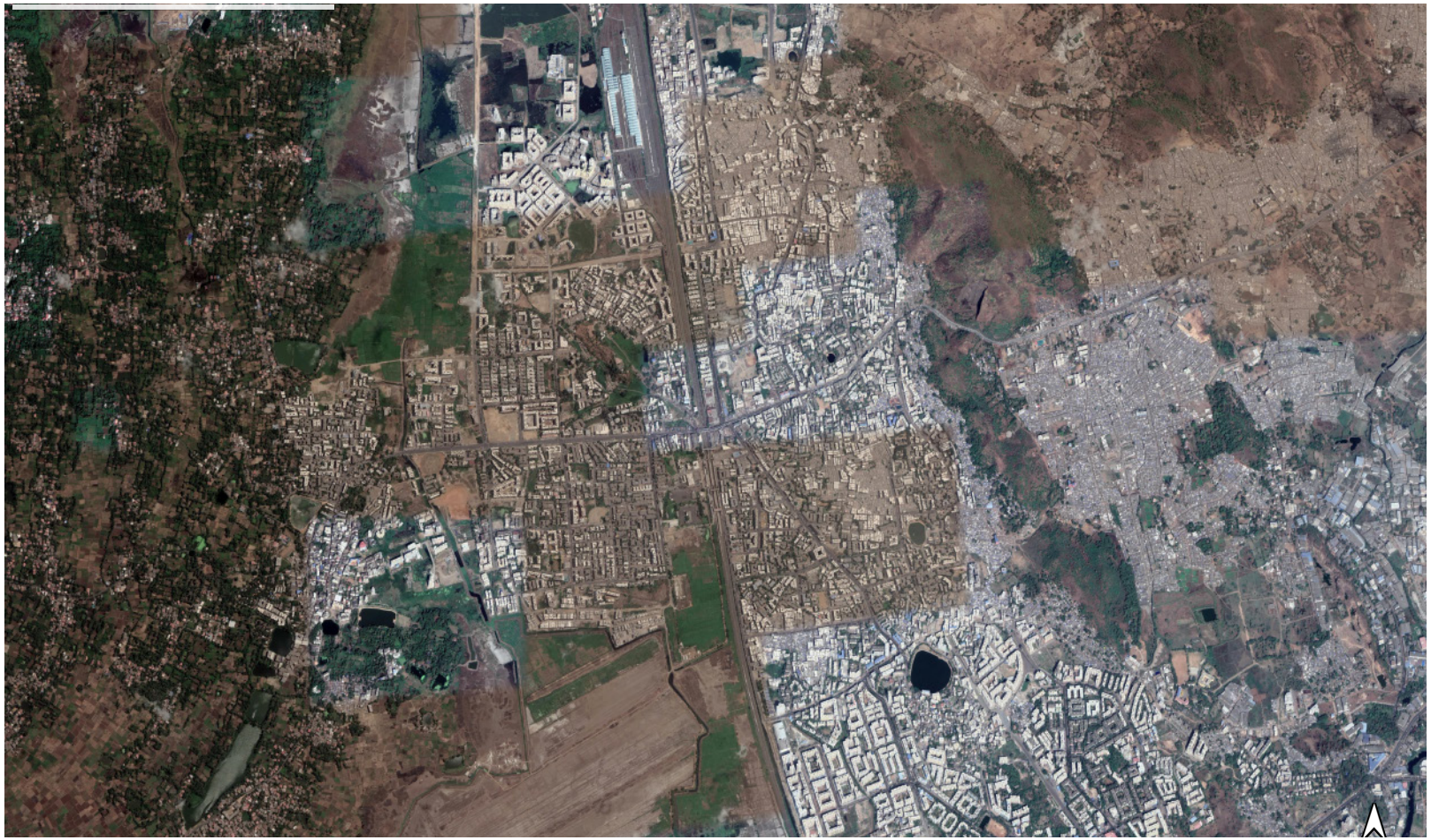
Nalasopara



Google Earth Pro

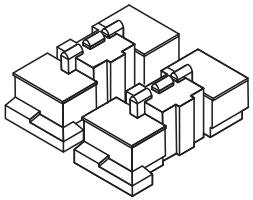
Nalasopara | growth

2002

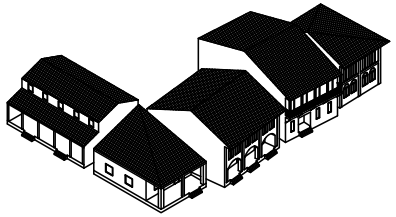
2017

Google Earth Pro

Nalasopara | housing typologies



2002



Google Earth Pro

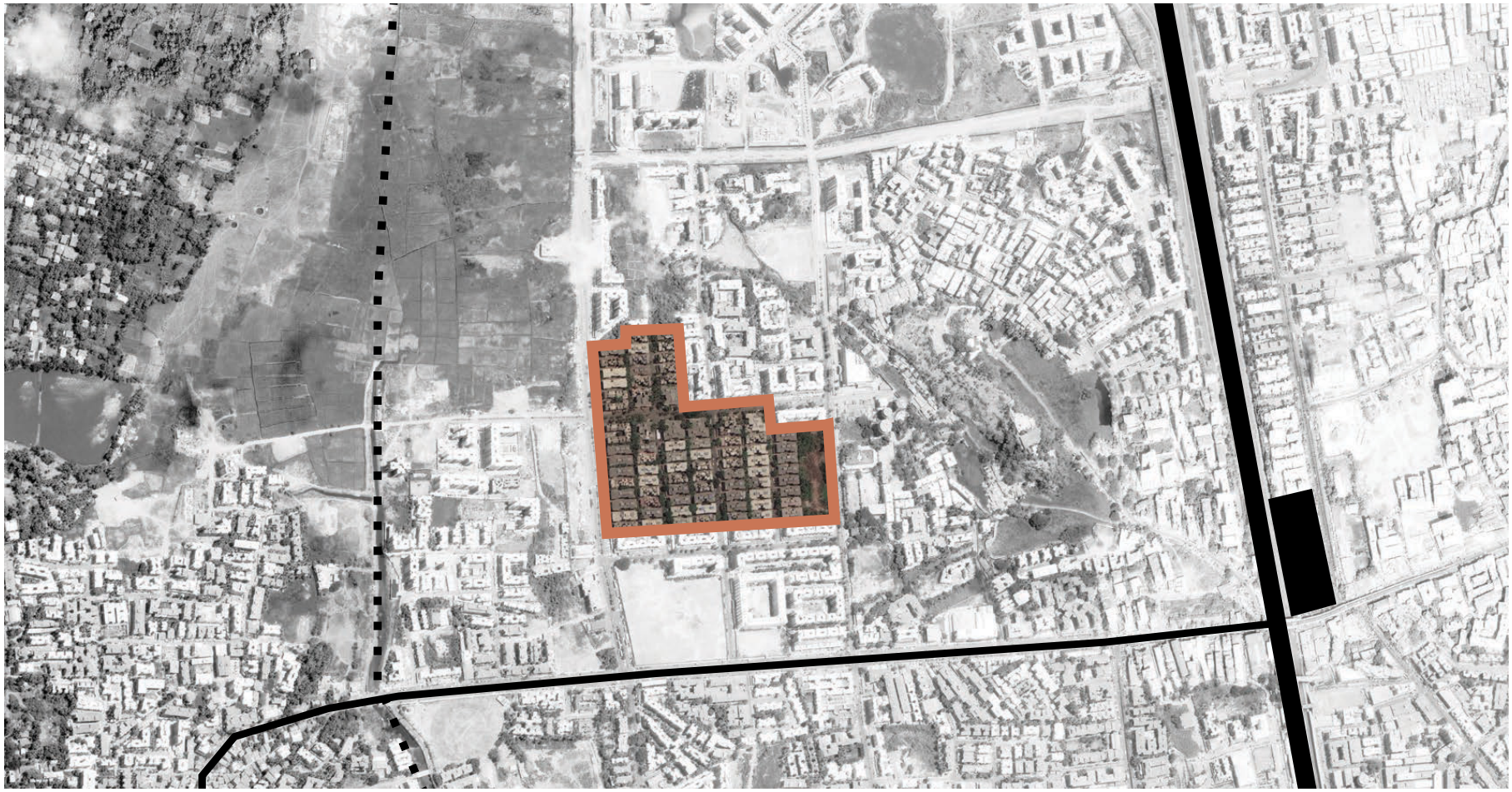
Nalasopara | housing typologies

Google Earth Pro

Nalasopara | location

Google Earth Pro

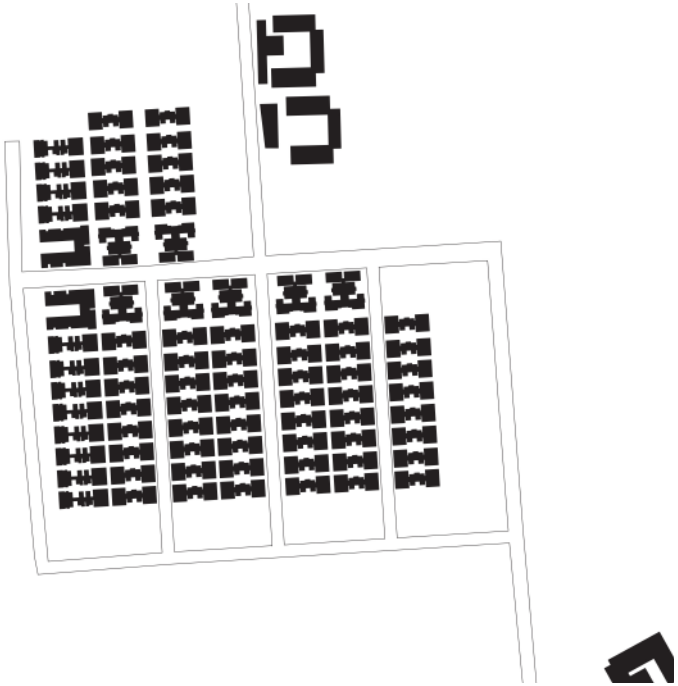
Nalasopara | location



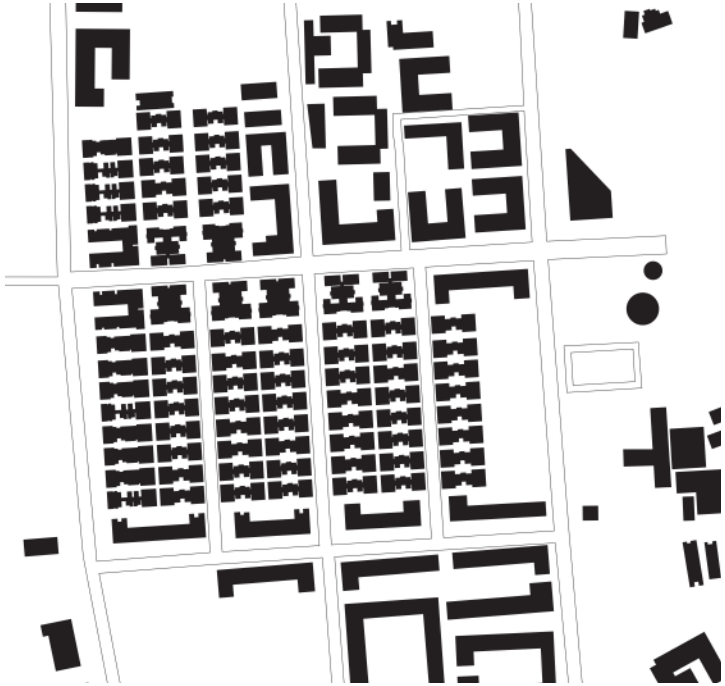
Google Earth Pro

Nalasopara | location

Sri Prastha | growth



2005

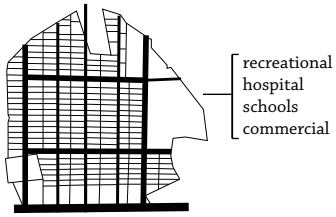


2017

Sri Prastha | timeline

1987

MASTERPLAN OF SITE



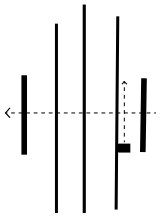
initiative of
Sharad Pawar,
Minister of Agriculture

Sell Houses:
1BHK
2BHK
1RK

Prices:
330.000-803.000 Rs

1989

ONGOING CONSTRUCTION



14 years

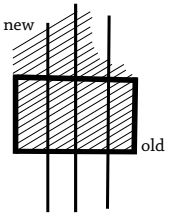
political issues

investing money generated from finished building

lack of funds

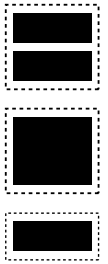
2005

COMPLETION OF 79 BUILDINGS



2008-now

FORMATION OF CO-OP SOCIETIES



developer 100%
maintenance:
1000 Rs/month

co-op society 51%

developer 49%

commercial | amenities

Sri Prastha | photos 2017

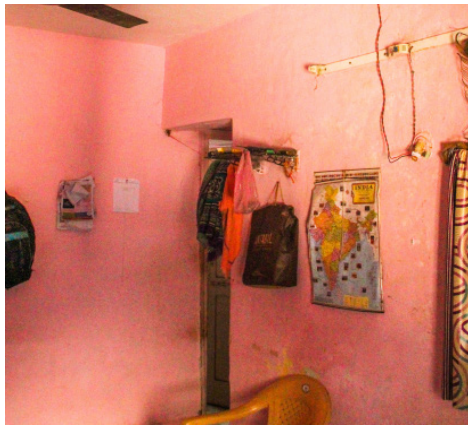
Sri Prastha | photos 2017

Sri Prastha | photos 2017

Sri Prastha | photos 2017


Nilkamal

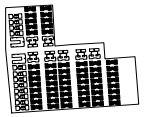

You
CAN'T
Be
NEGATIVE

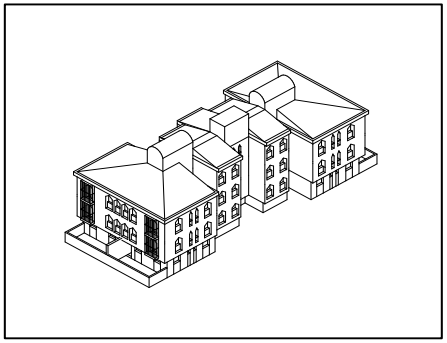


Sri Prastha | building types

type 1

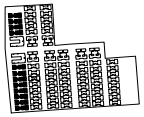
number of buildings:	*58*
number of dwellings:	*18*
dwelling types:	*2*
levels:	*3*
residents per building:	*90*

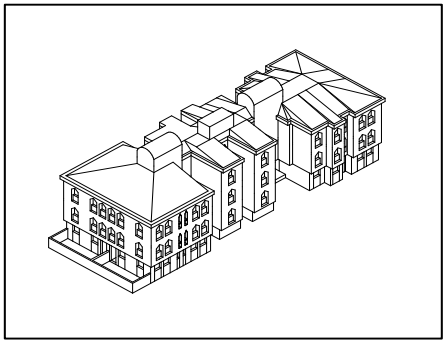




type 2

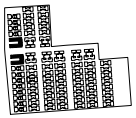
number of buildings:	*12*
number of dwellings:	*18*
dwelling types:	*3*
levels:	*3*
residents per building:	*90*

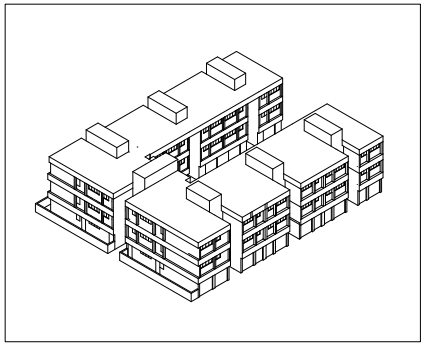




type 3

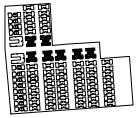
number of buildings:	*2*
number of dwellings:	*32*
dwelling types:	*3*
levels:	*3*
residents per building:	*160*

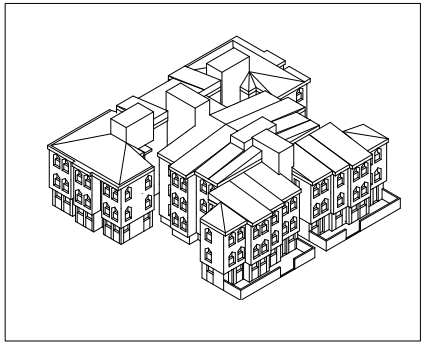




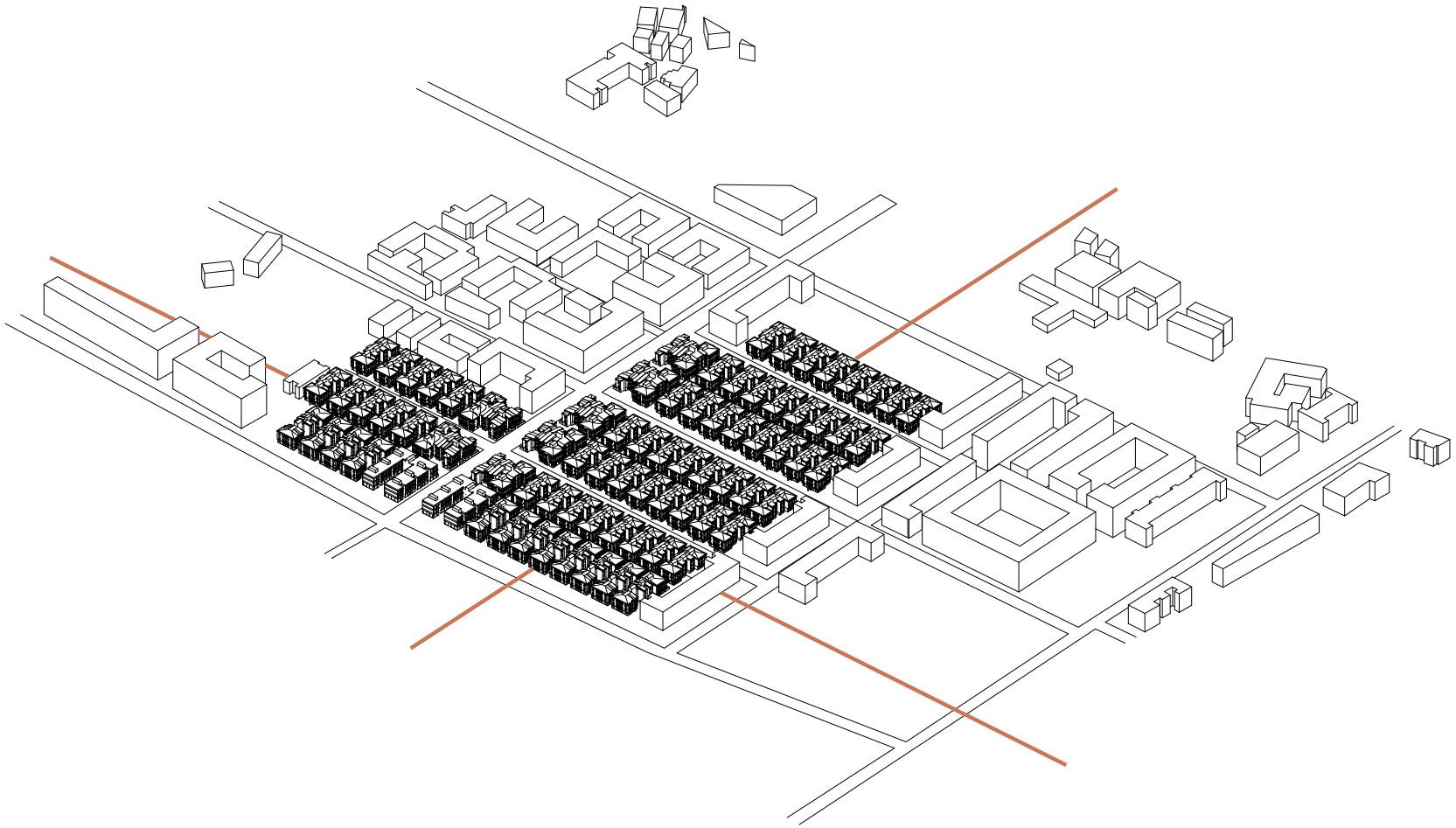
type 4

number of buildings:	*7*
number of dwellings:	*30*
dwelling types:	*5*
levels:	*3*
residents per building:	*150*

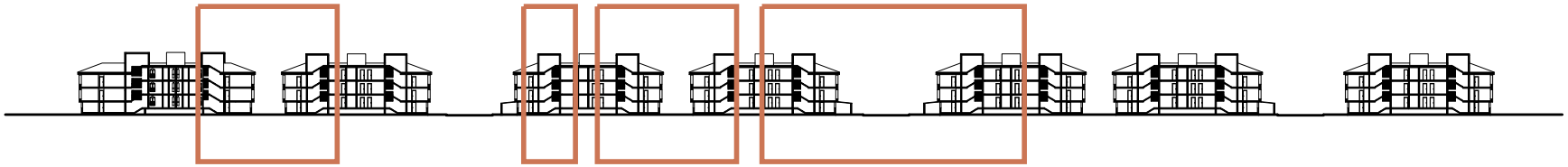


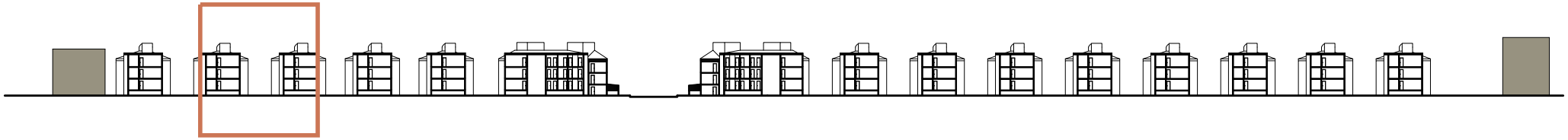


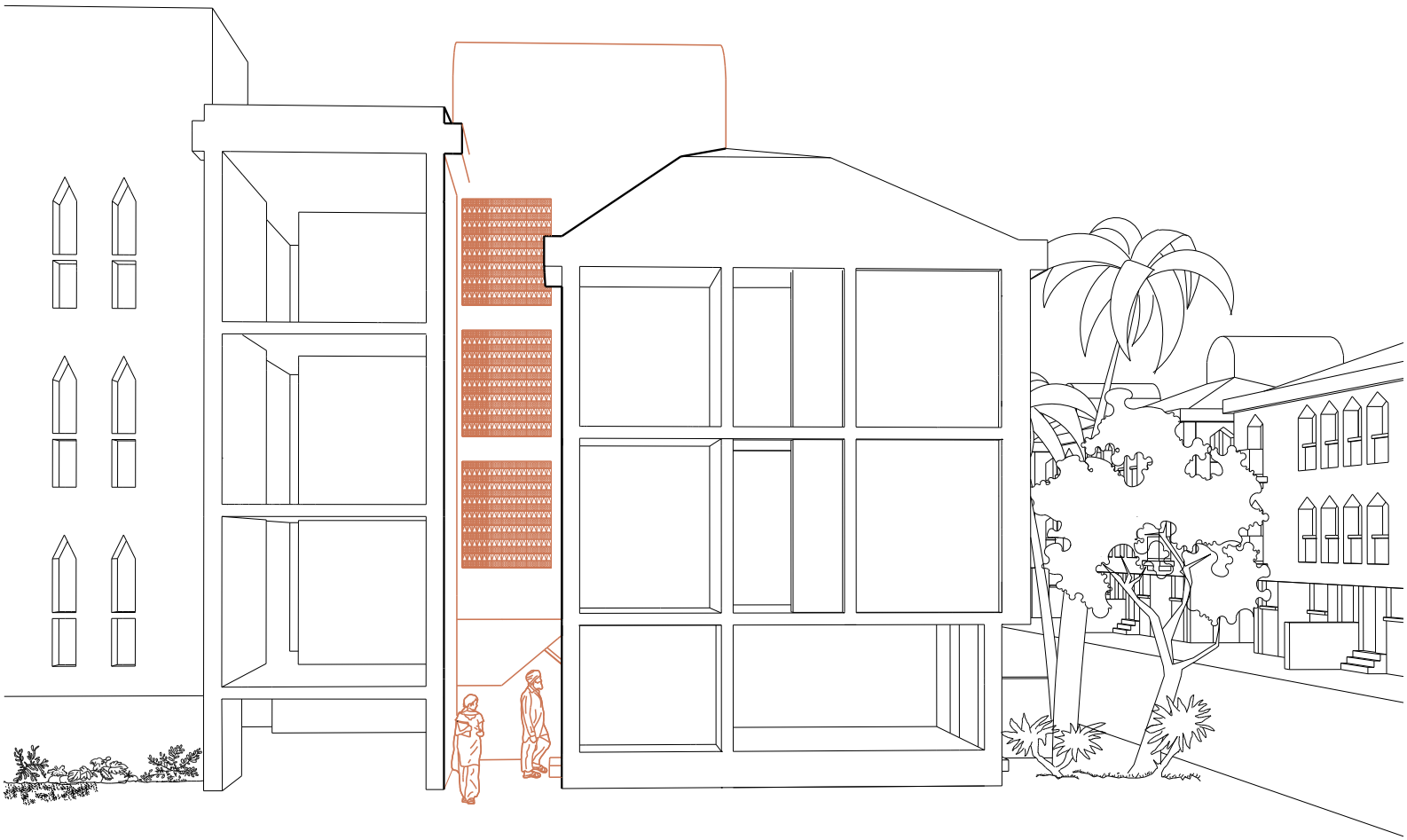
Sri Prastha



Sri Prastha







staircase | entrance building

Sri Prastha | inbetween two buildings

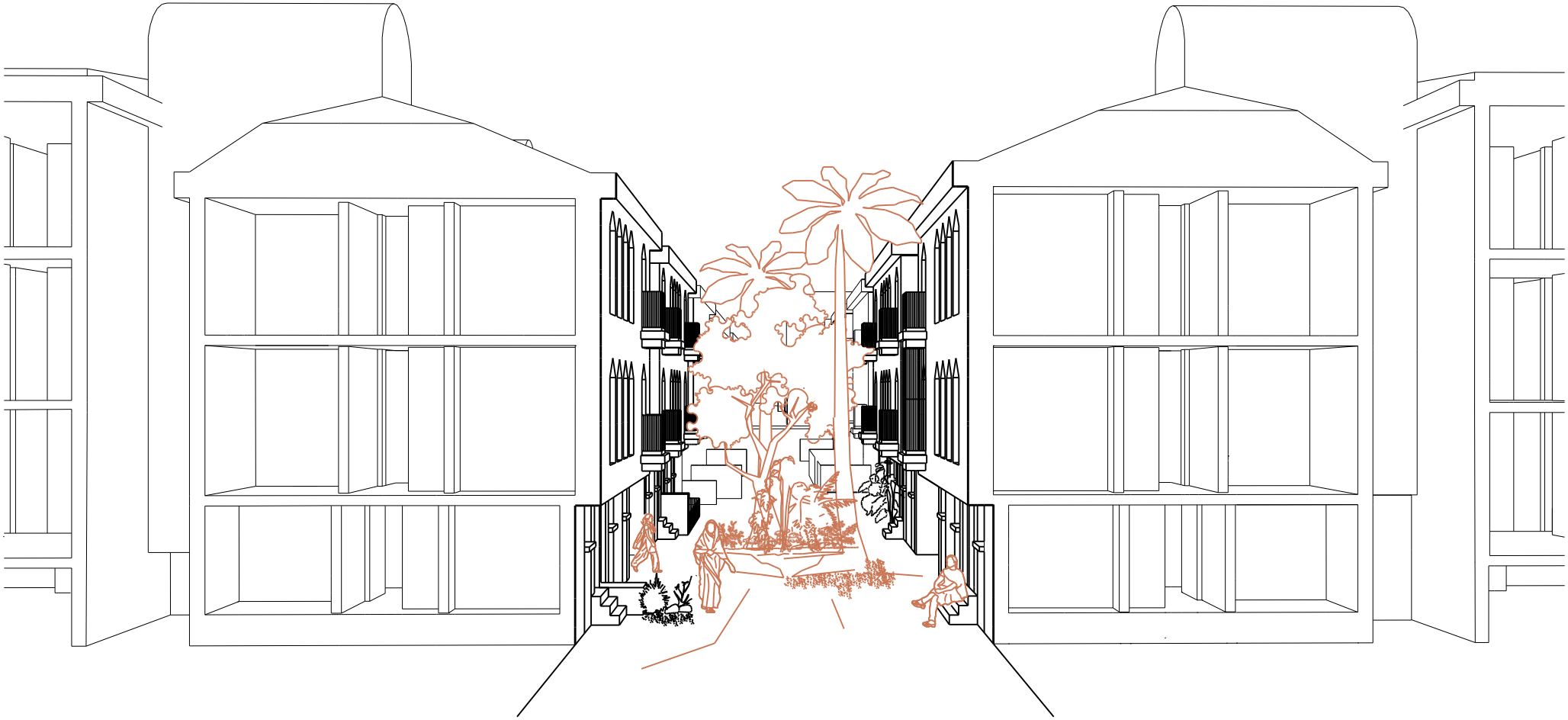
courtyard | parking| garbage

Sri Prastha | inbetween two buildings

courtyard | parking| garbage

Sri Prastha | small street

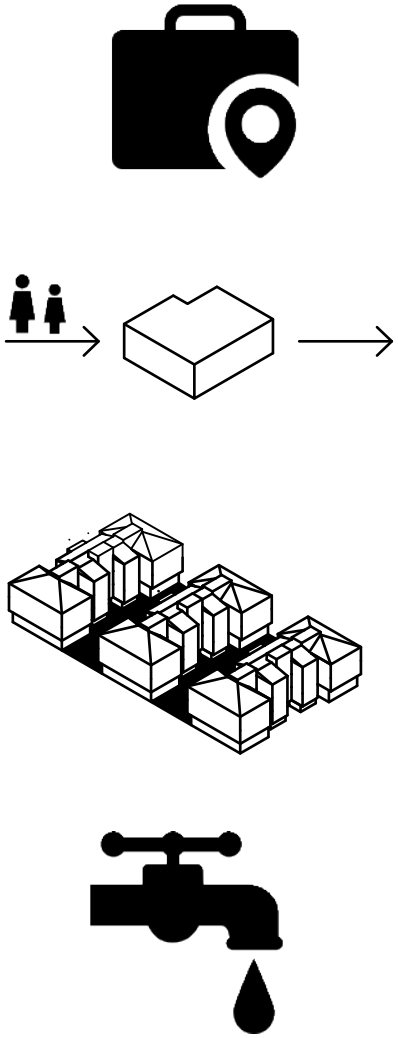
entrances to dwellings | green | house extensions

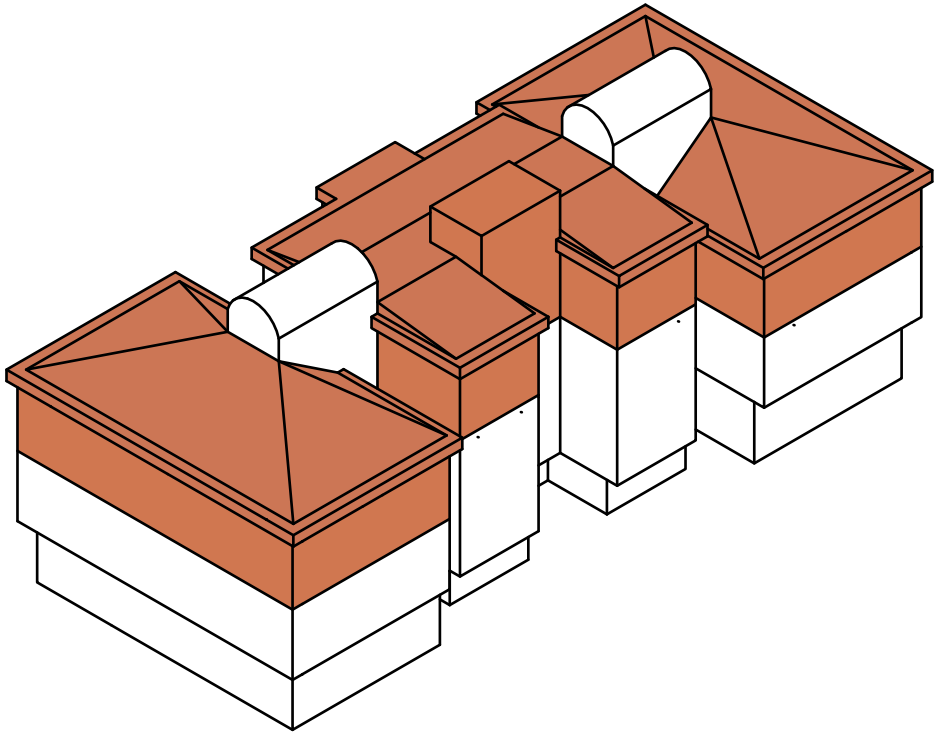


green | connection

Sri Prastha | big street

entrances to dwellings | parking | house extensions





Design question

How can Sri Prastha be redeveloped as a project with high density, without losing the qualities of the existing plan?

goals

Goals: How can Sri Prastha be redeveloped as a project with high density, without losing the qualities of the existing plan?

Activate the area

A place to start and a place to stay

Social

Inclusiveness and social cohesion

- creating spaces for minorities
- include everybody in future plans

Social centers

- shared open spaces
- community centers
- amenities

Income-earning opportunities

- commercial areas
- small businesses

Social mix

- creating spaces for EWS, LIG and MIG

Economic

Densify area

- taller buildings
- changing house plot or size

Low-cost technologies

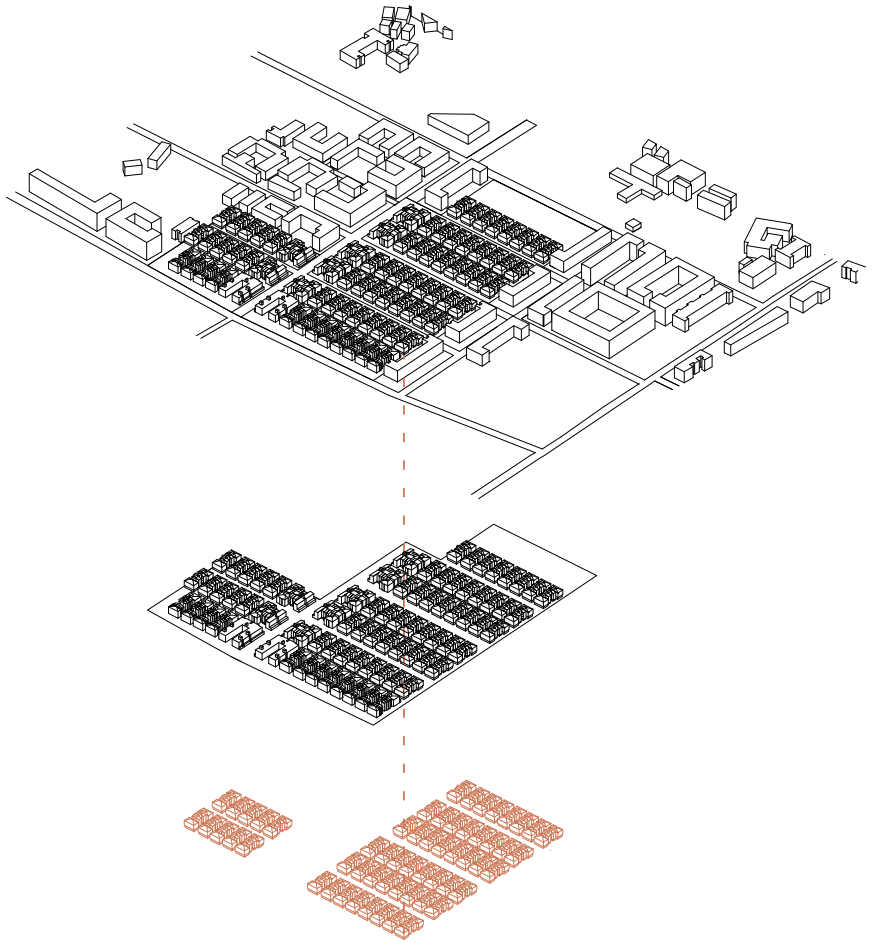
- affordable technologies and materials
- sustainable materials

Upgrade neighborhood value

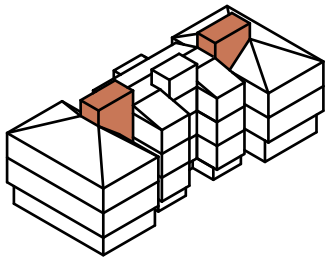
Cross financing

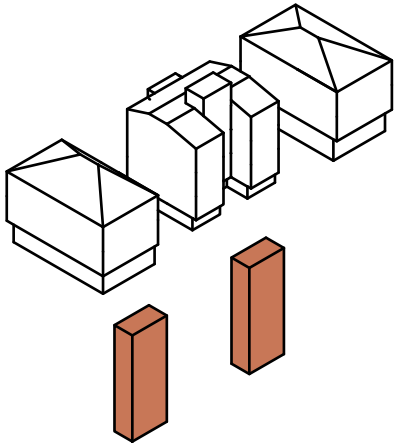
- creating opportunities to make profit for developers

focus

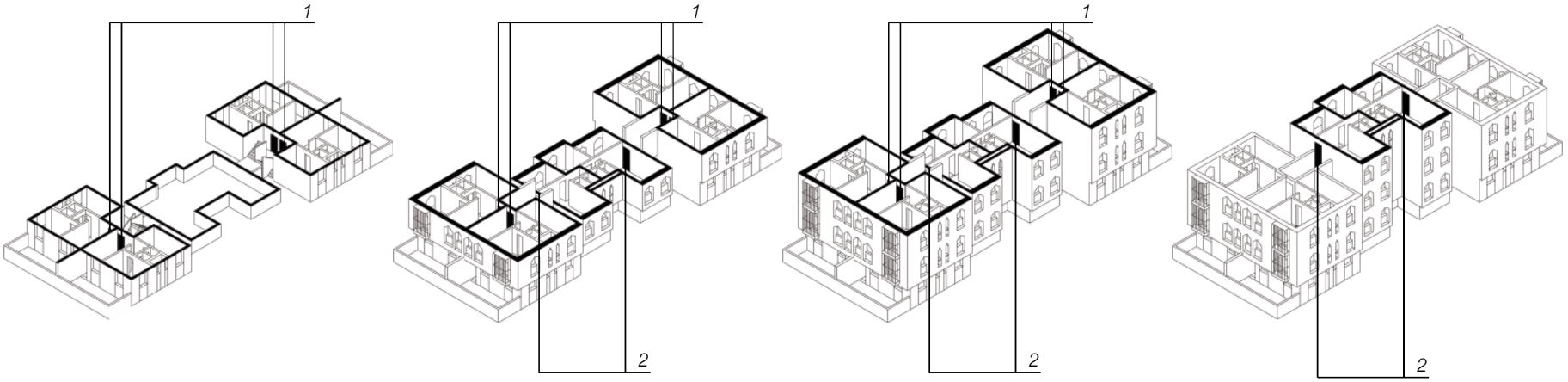


building type 1





building type 1



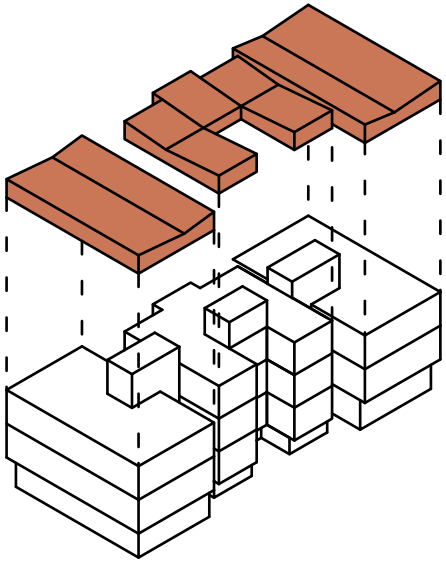
type 1

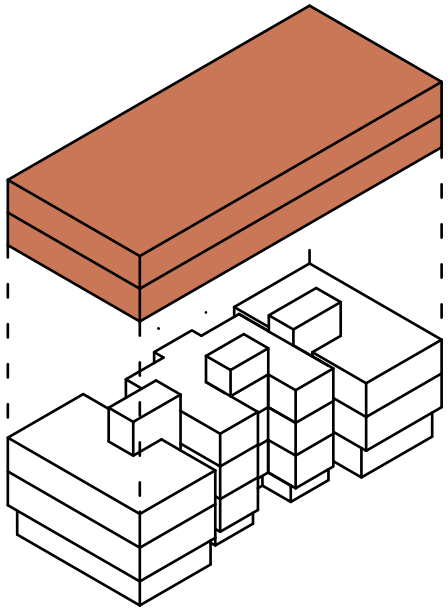
app. in building:	*12*
type:	*1BHK*
size:	*40 m2*
	(516 sqft)
price:	*567.600 Rs*
income group:	*LIG*
total app. in area:	*696*

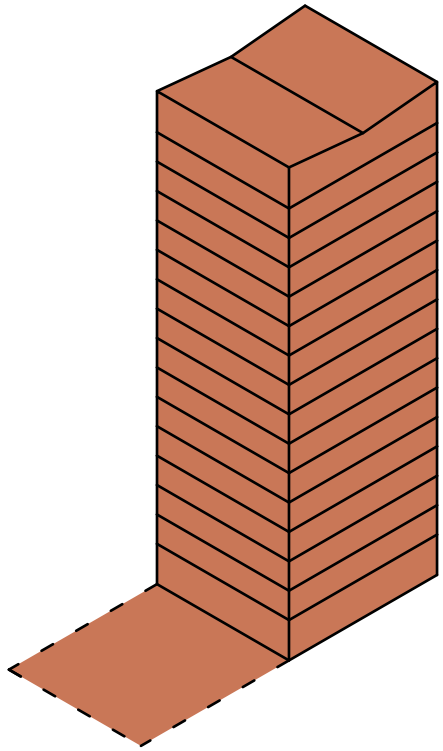
type 2

app. in building:	*6*
type:	*1BHK/1RK*
size:	*47 m2/36 m2*
	(516 sqft/365 sqft)
price:	*567.600 Rs/401.500 Rs*
income group:	*LIG*
total app. in area:	*174/174*

design strategy

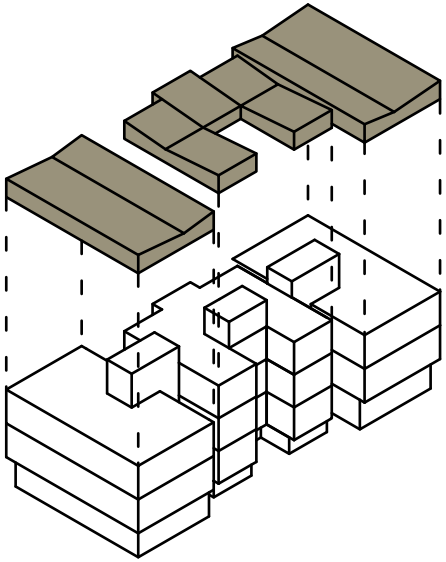


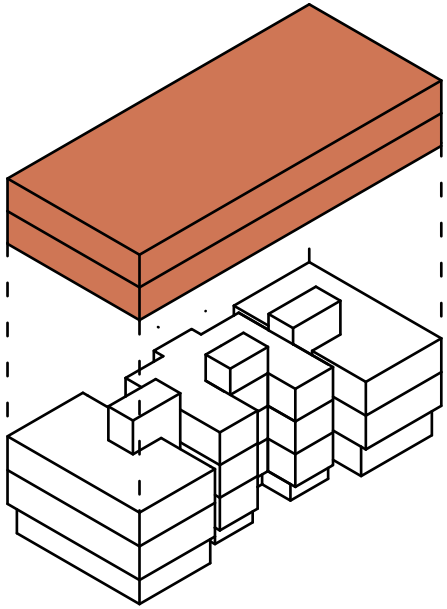


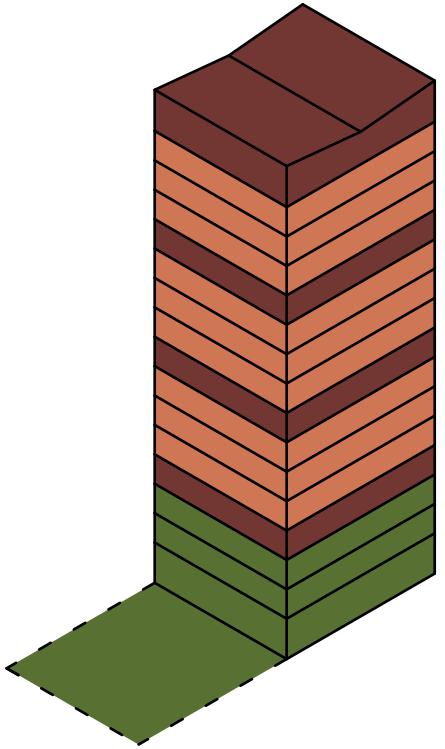


	-	LIG/MIG	EWS/LIG/MIG
	-	2	min. 8
	-	0-12	min. 18
	$	$$	$$$

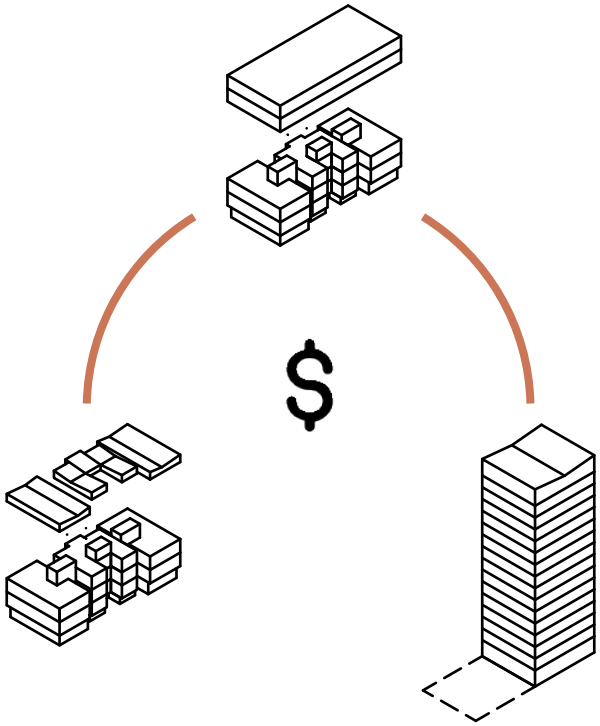
design strategy

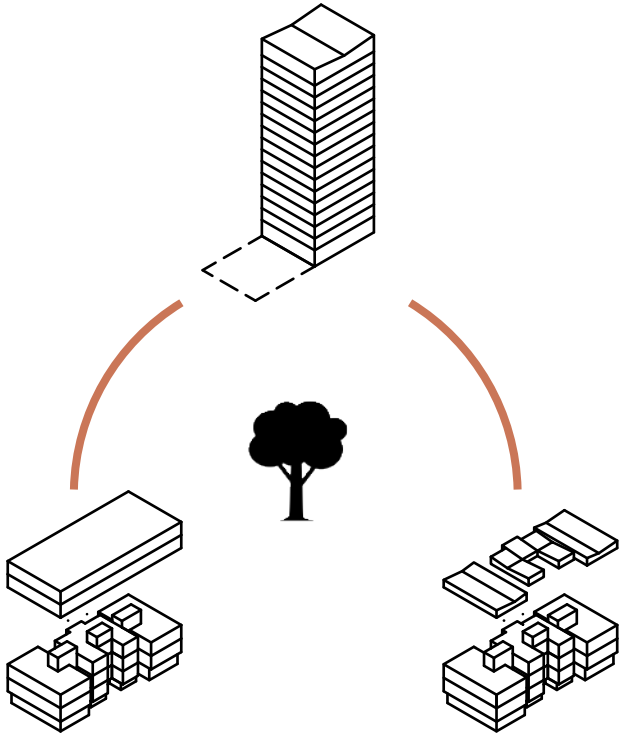




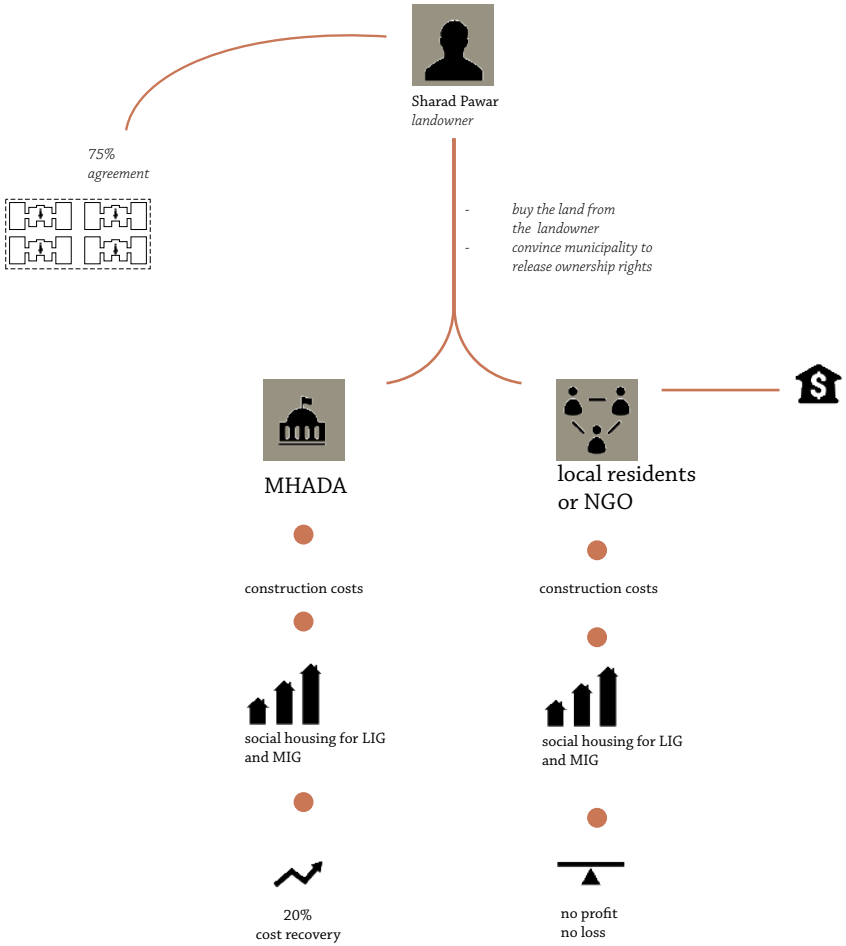


design feasibility



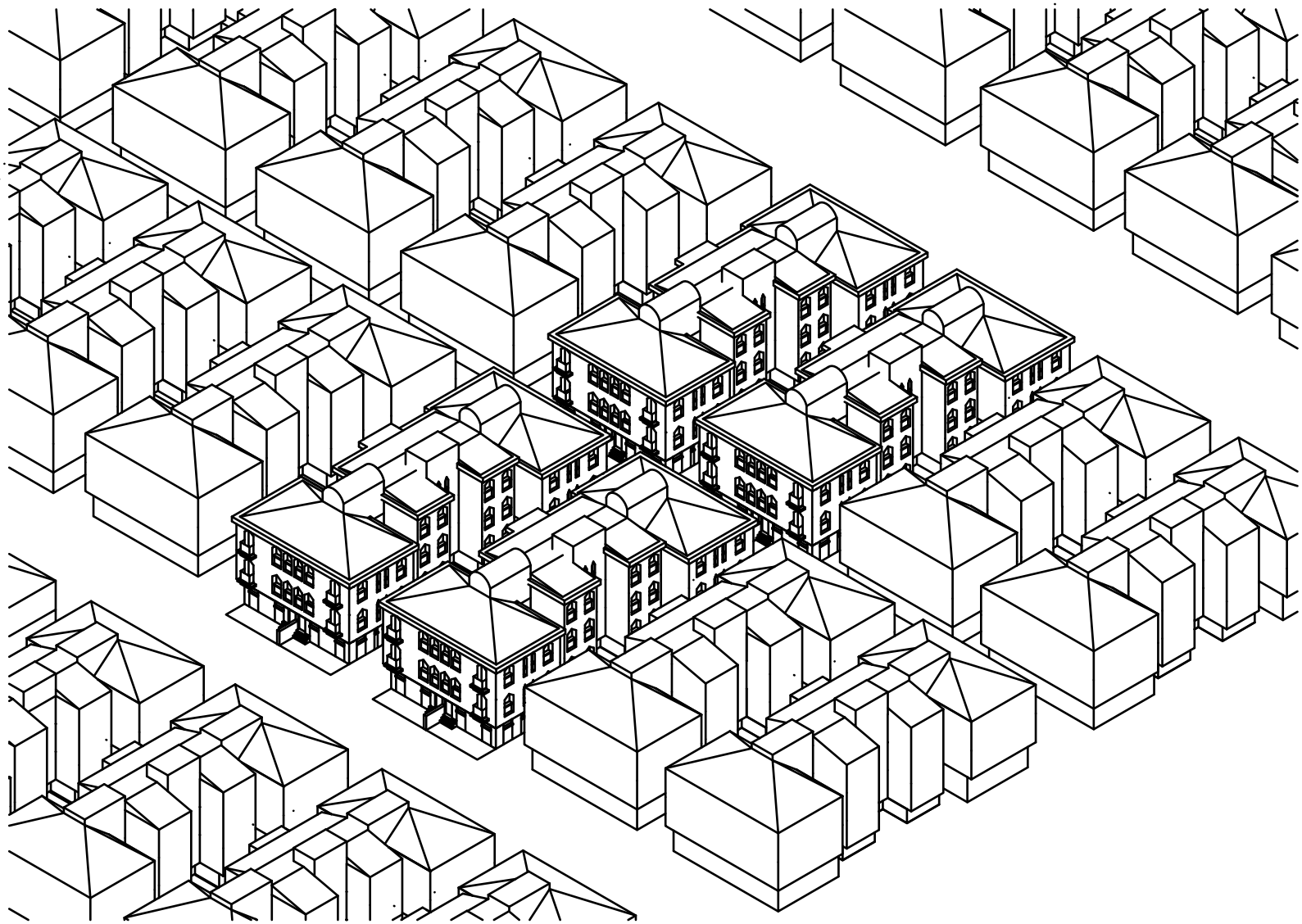


financial approach

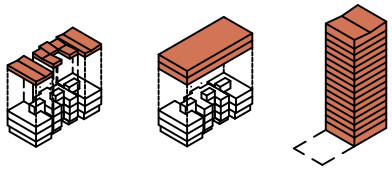


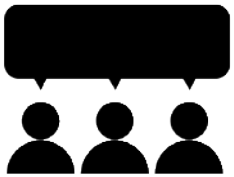
Design

urban block

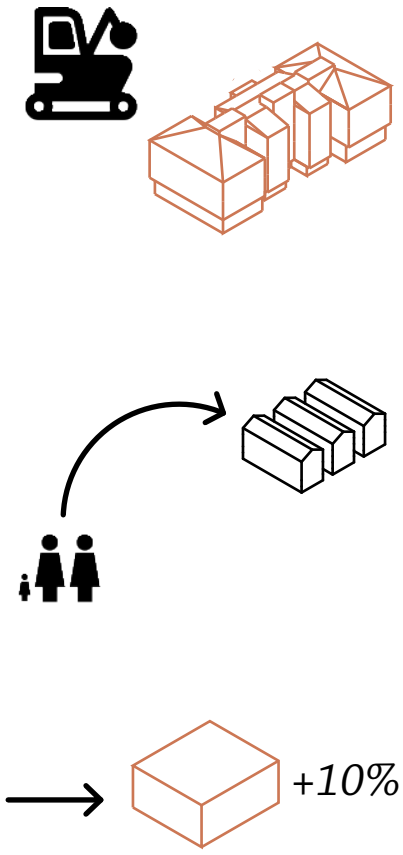


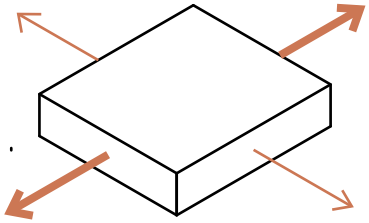
urban block

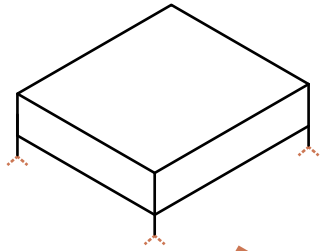


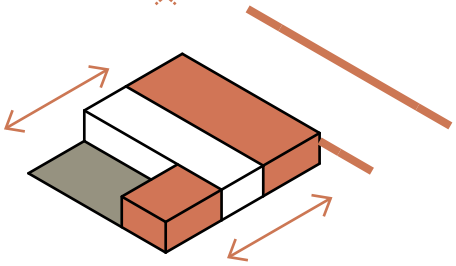


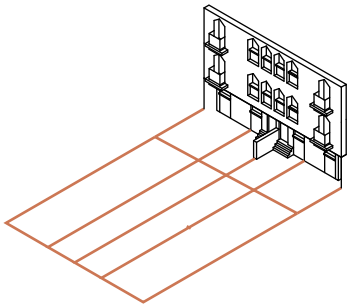
new building

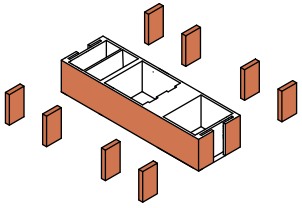




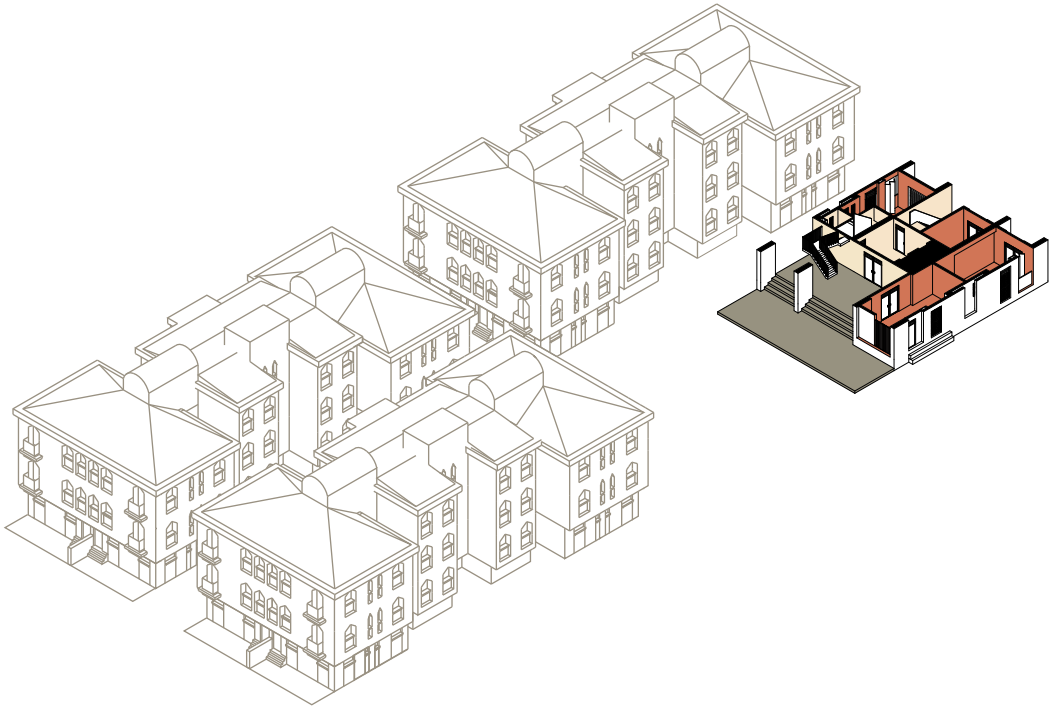




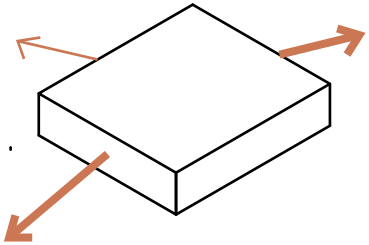


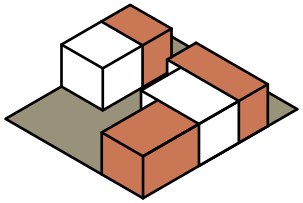


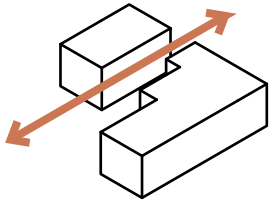
new building

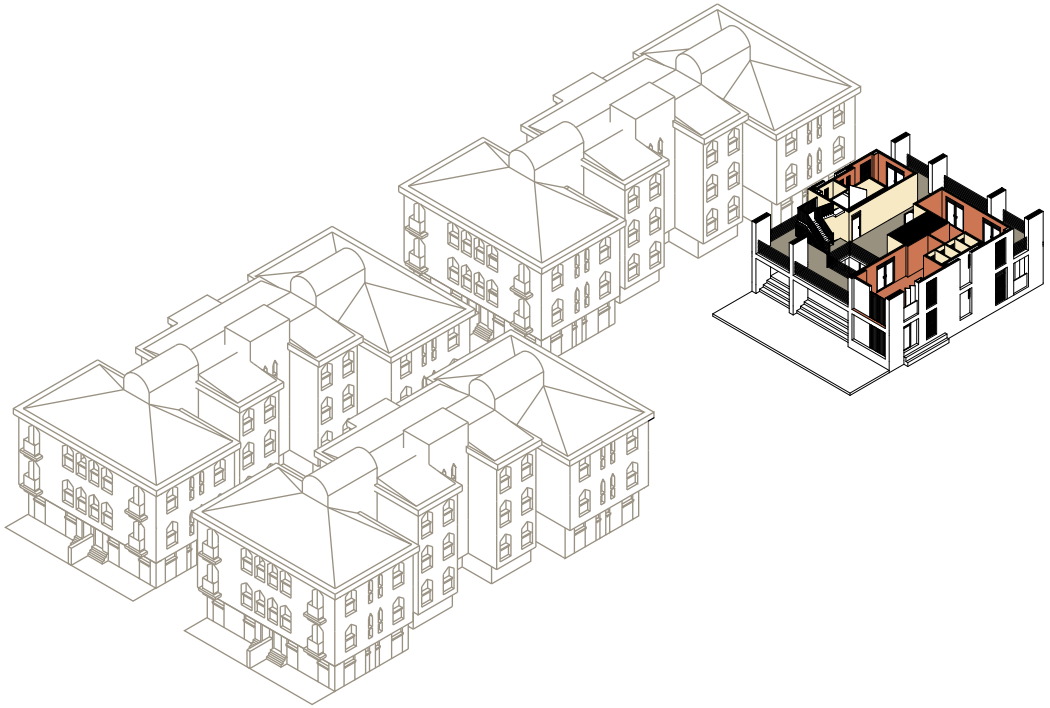


new building

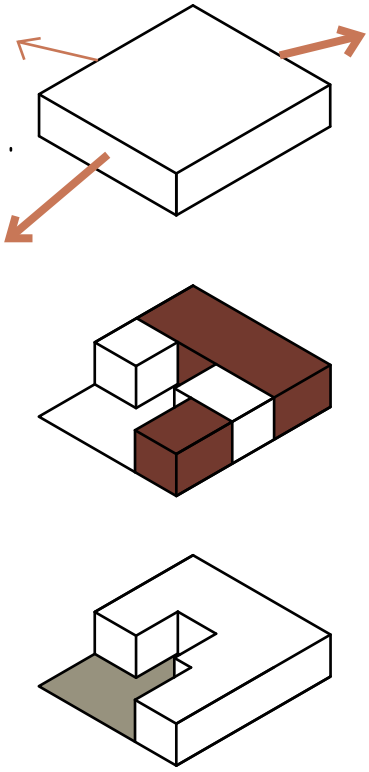


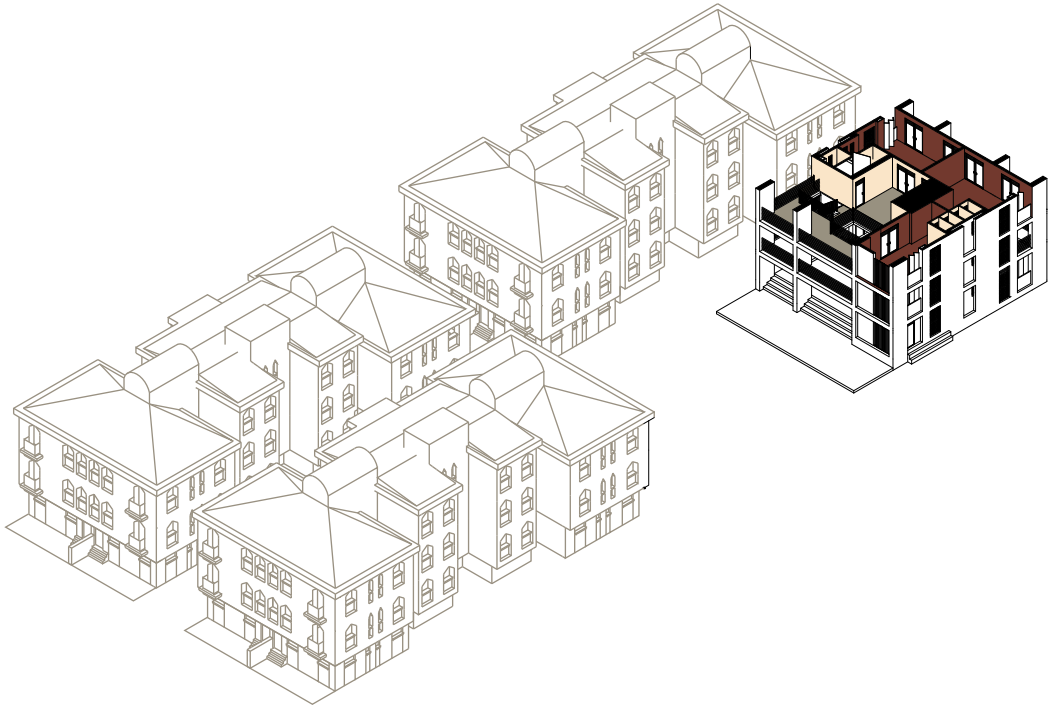




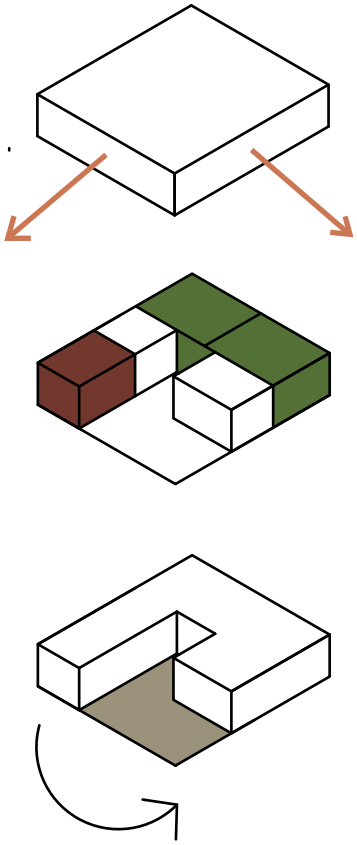


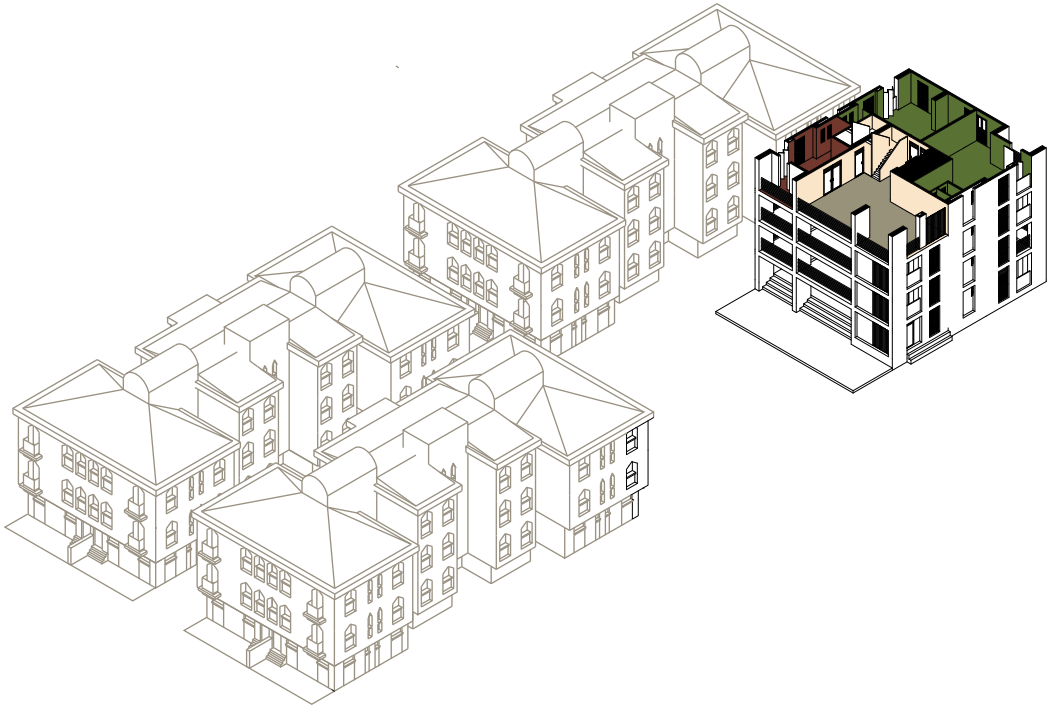
new building



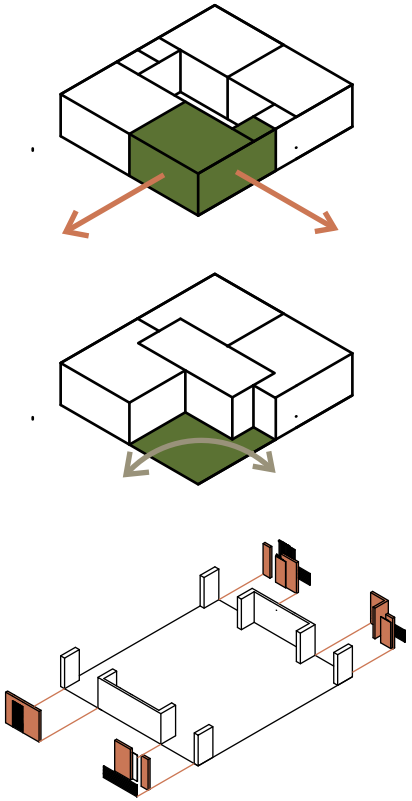


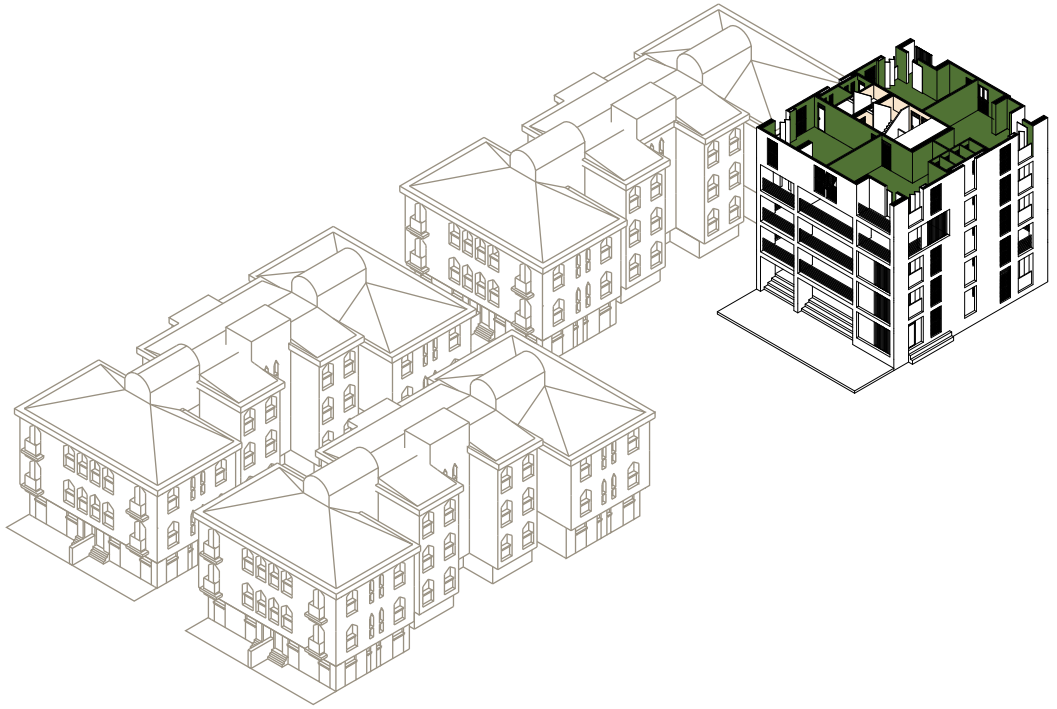
new building



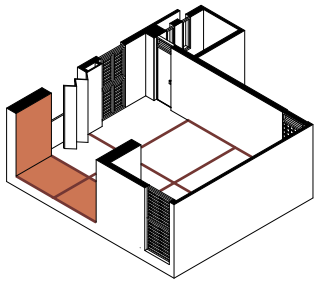


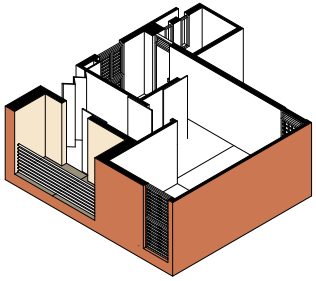
new building

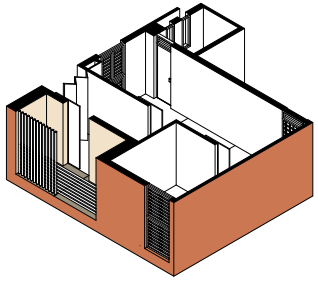


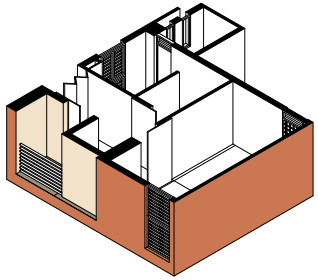


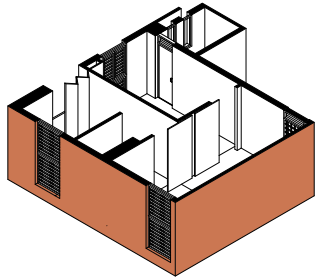
new building

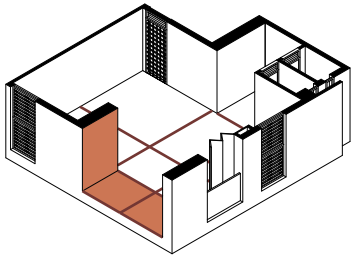


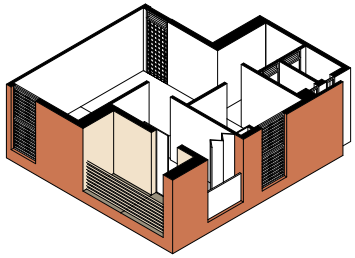


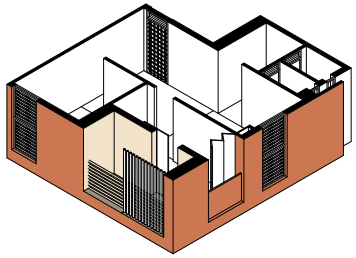


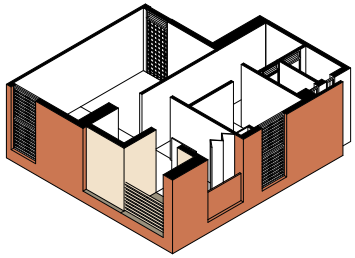


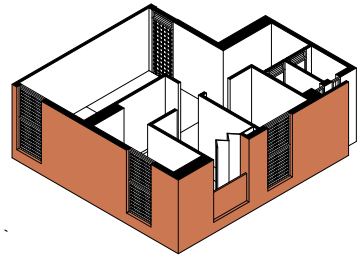




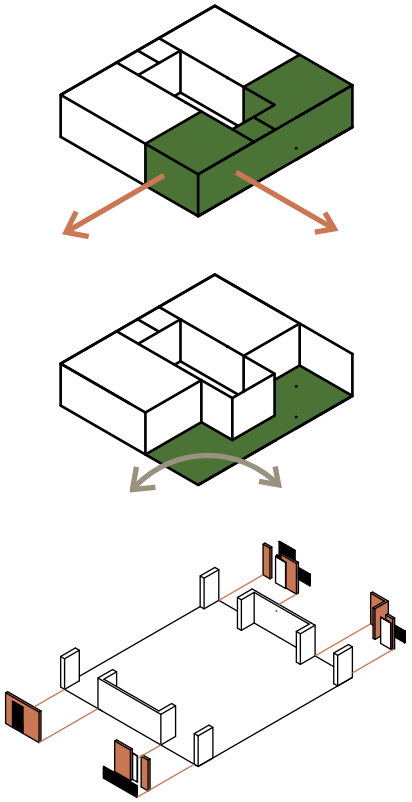


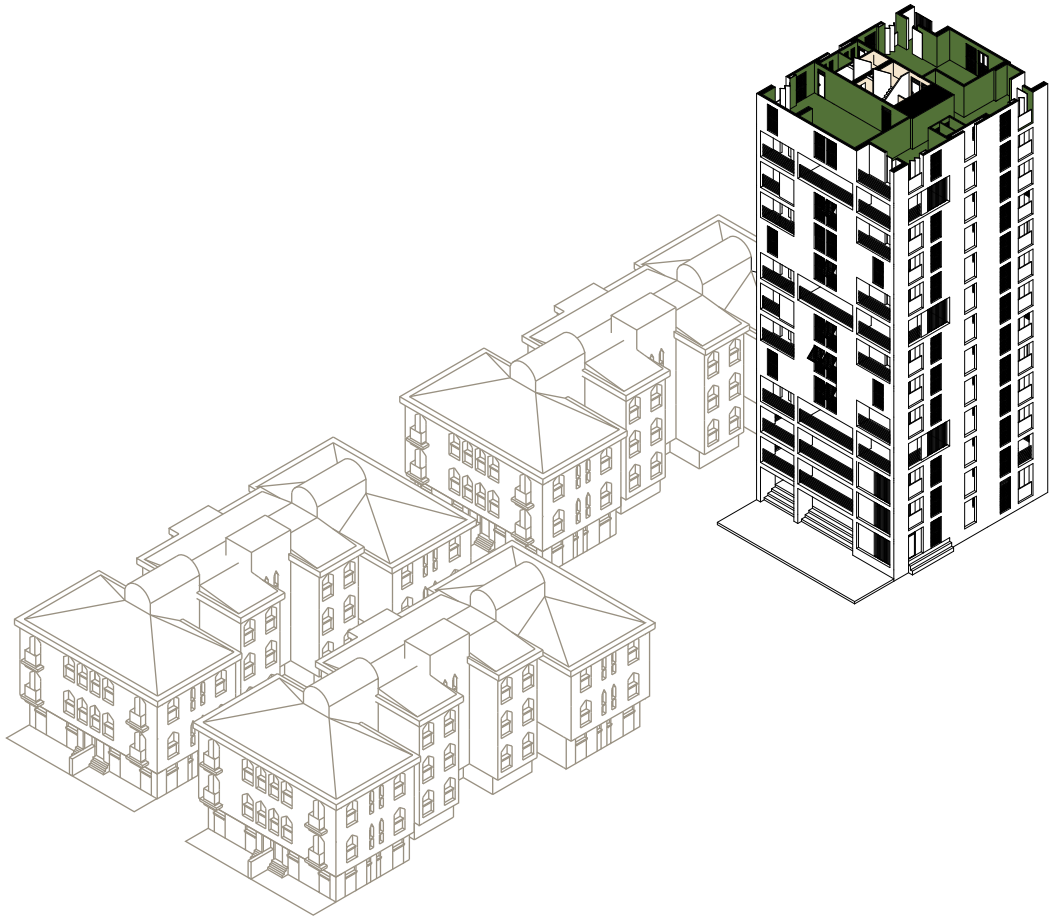




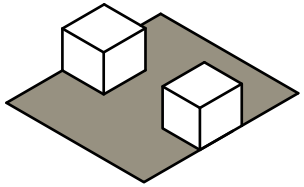


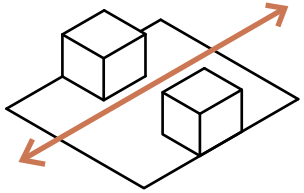
new building

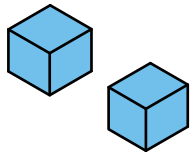


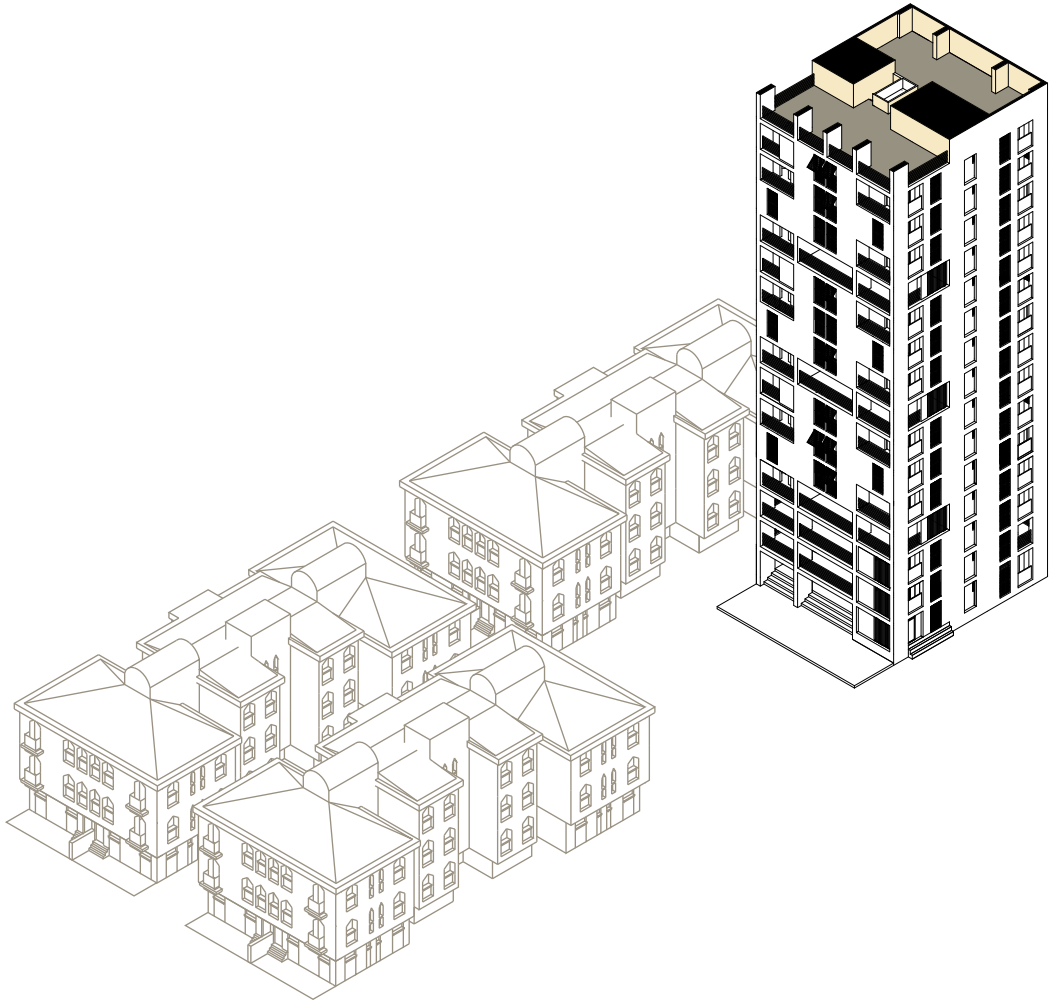


new building









max. 16

39

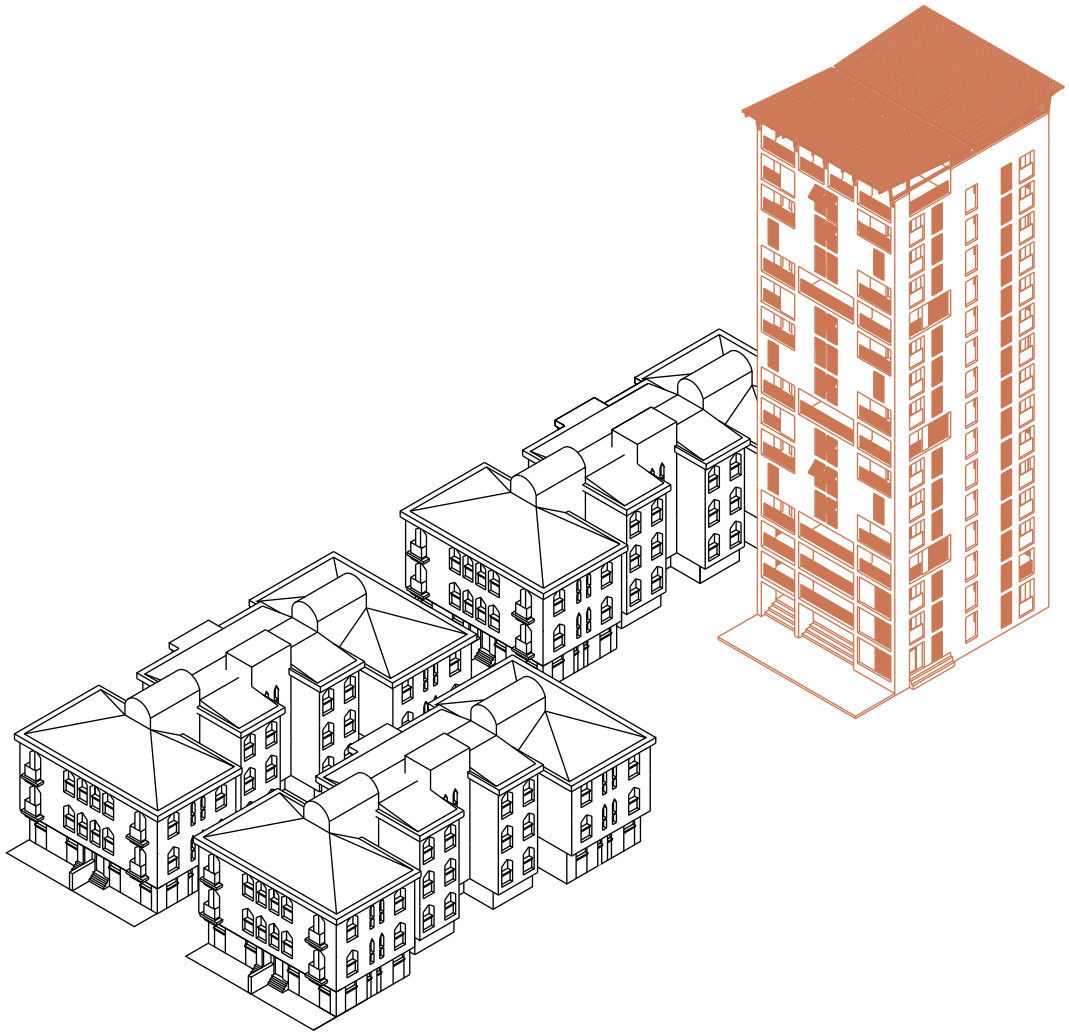
+/- 88

155 m2

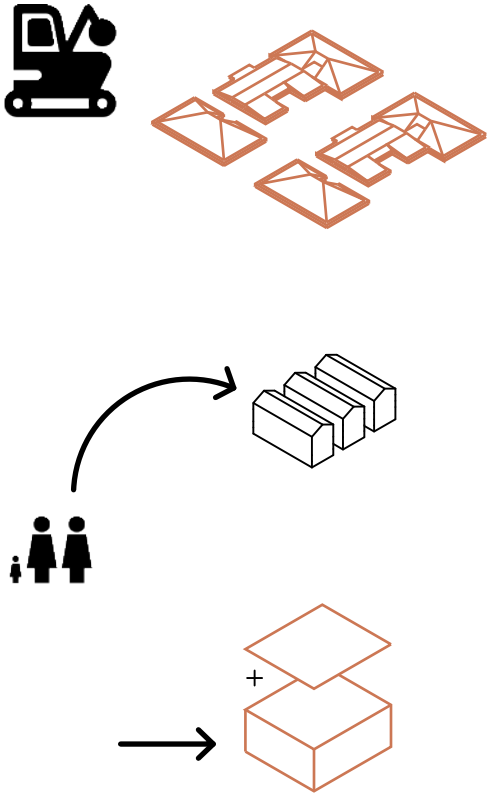
200 m2

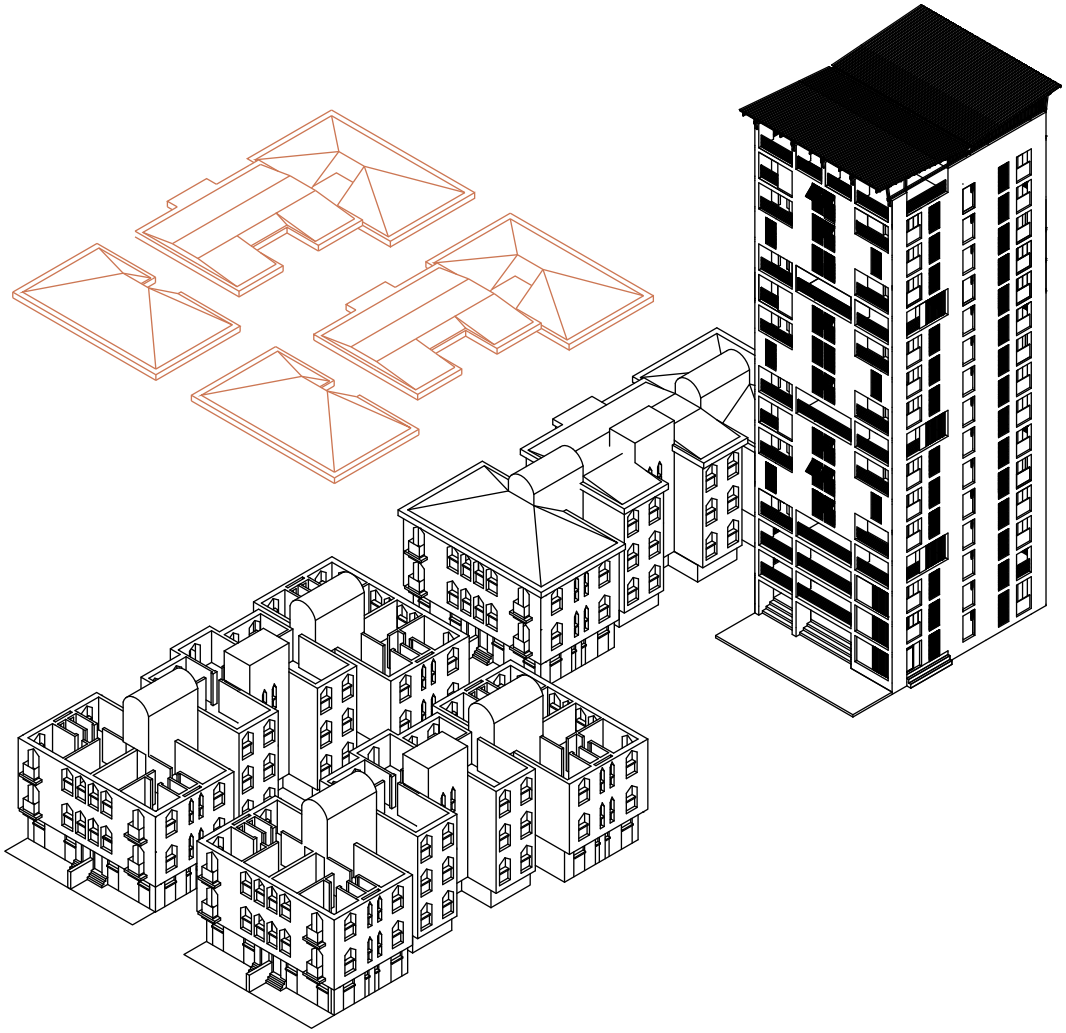
375

new building

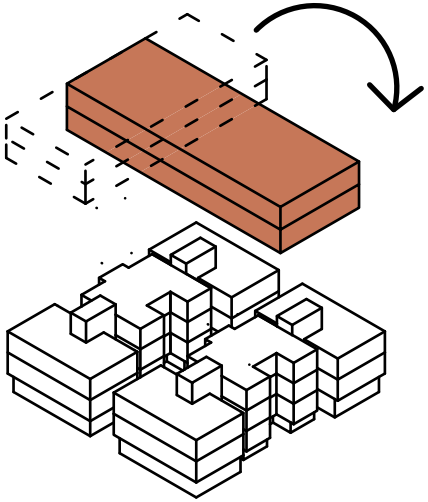


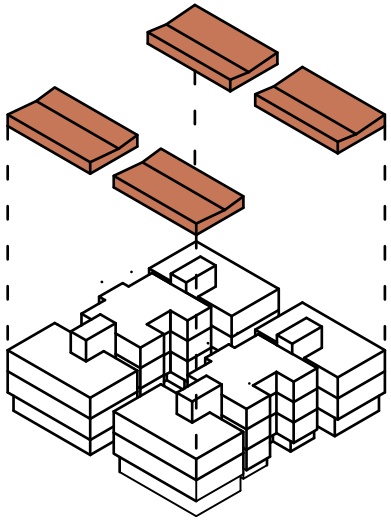
up-build

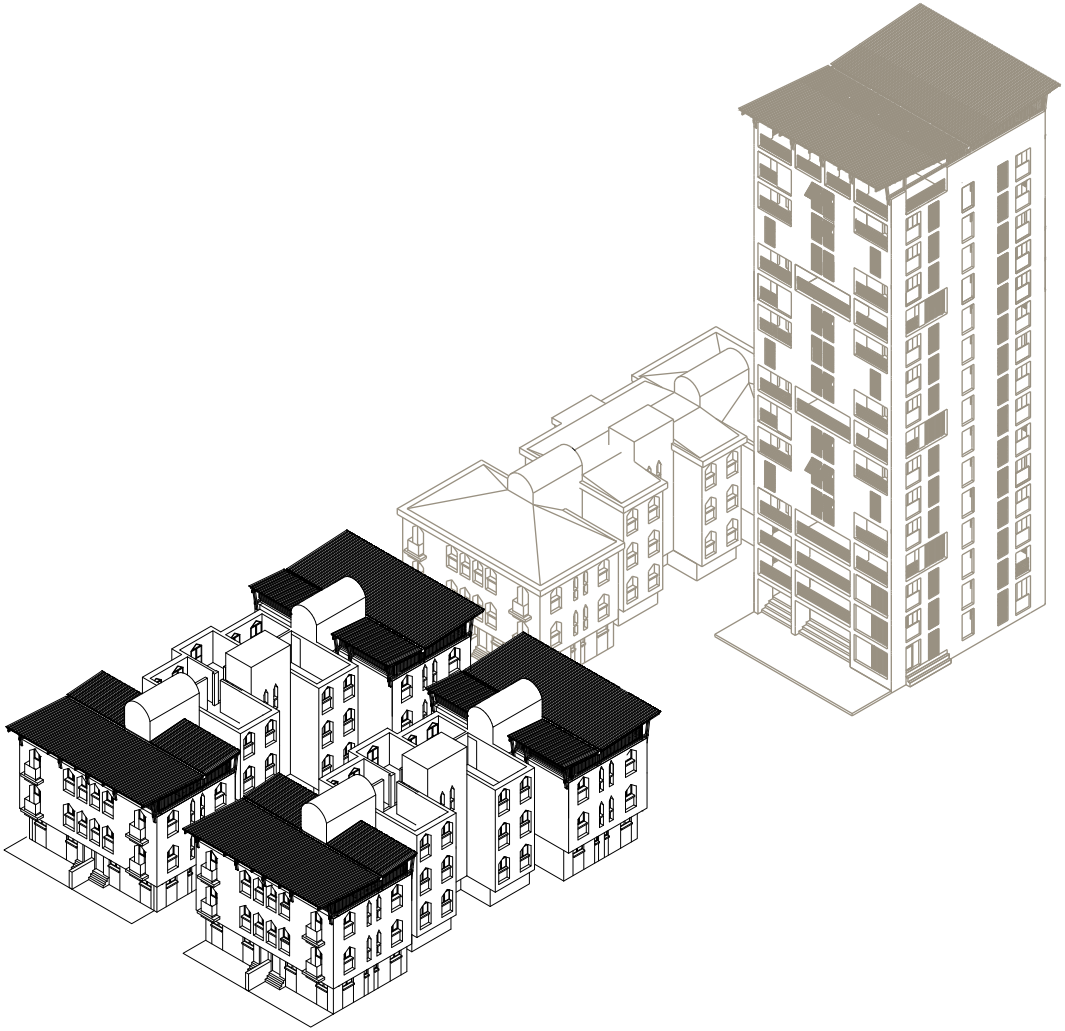




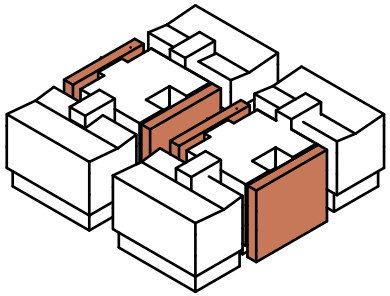
up-build

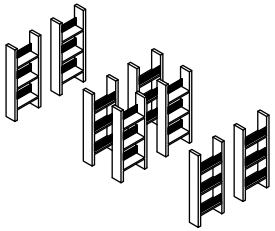


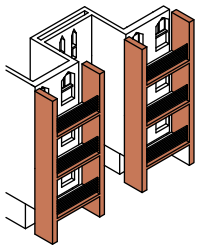


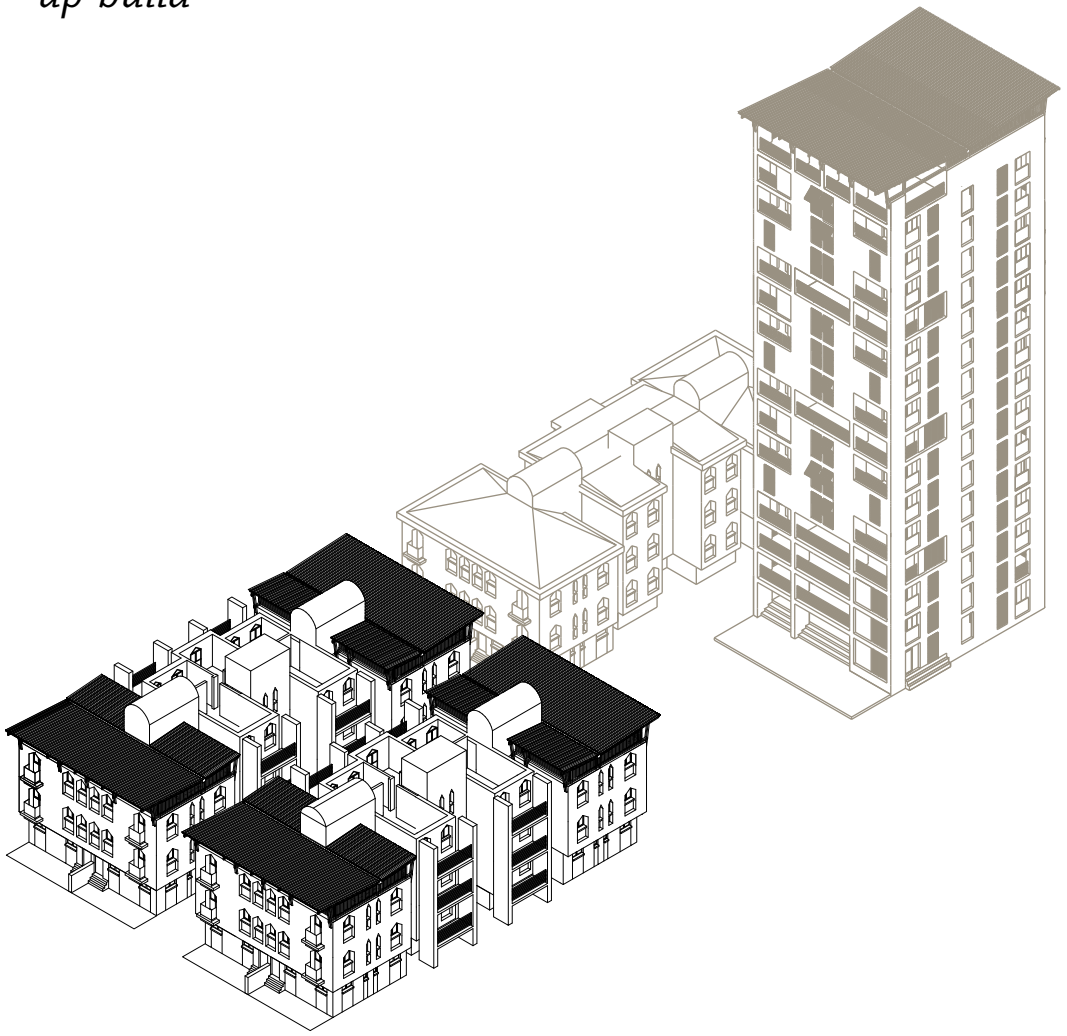


up-build

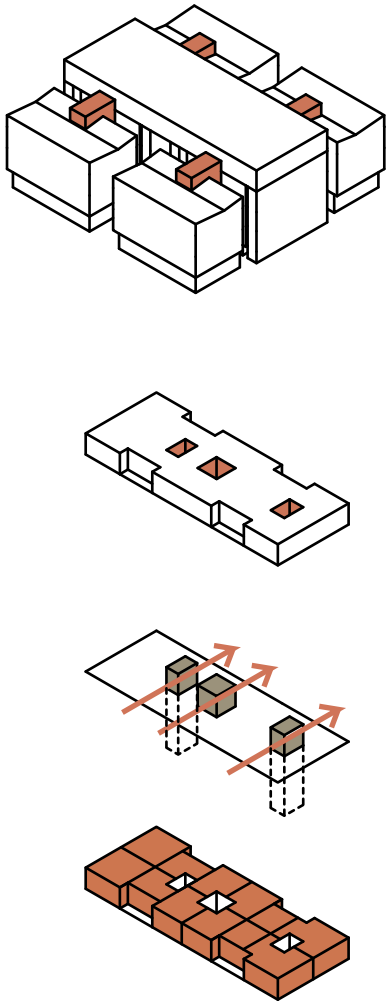


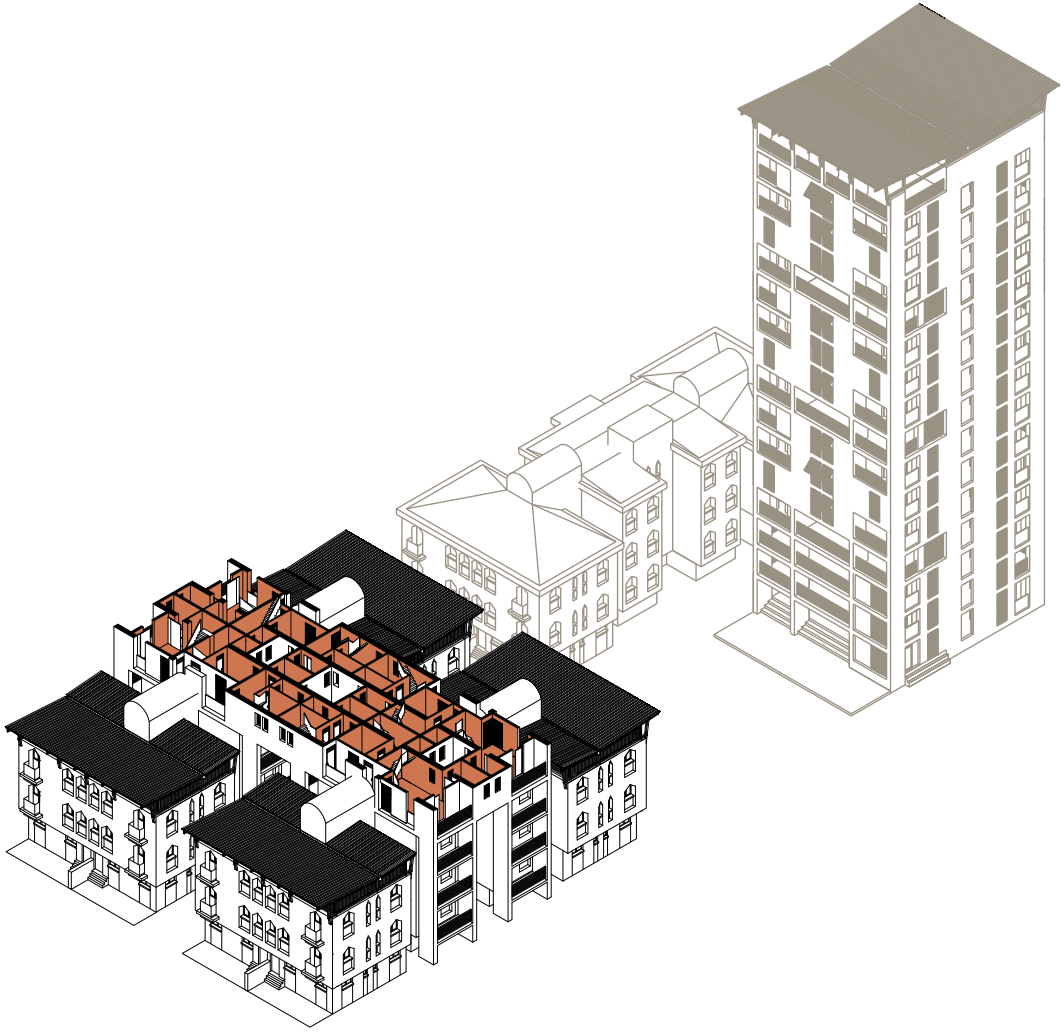




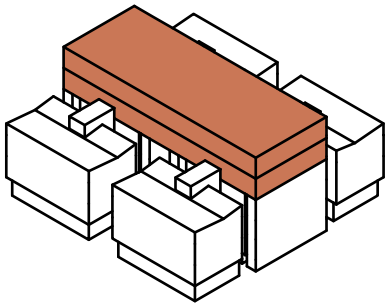


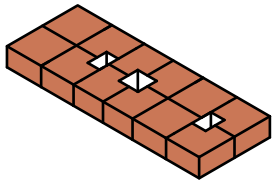
up-build

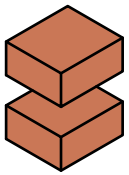


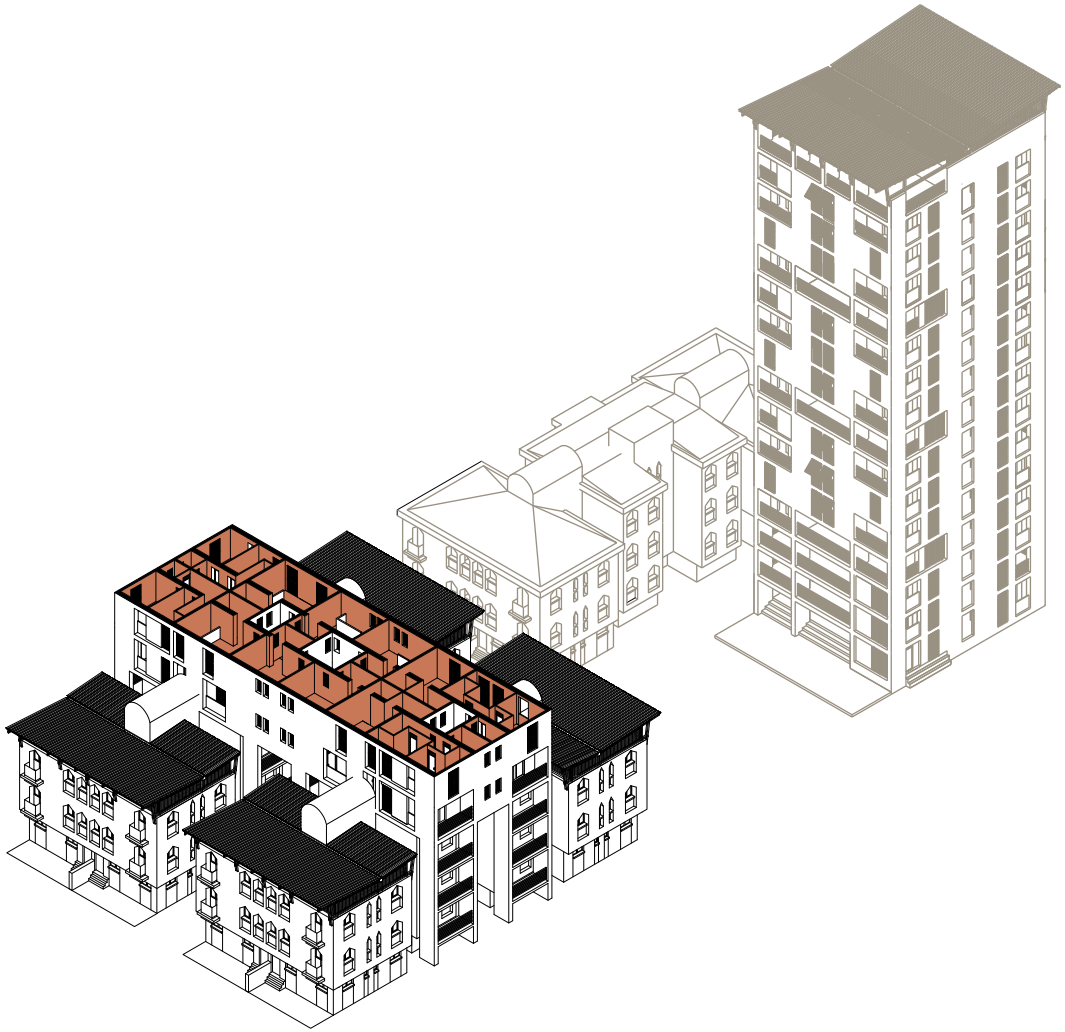


up-build









2

12

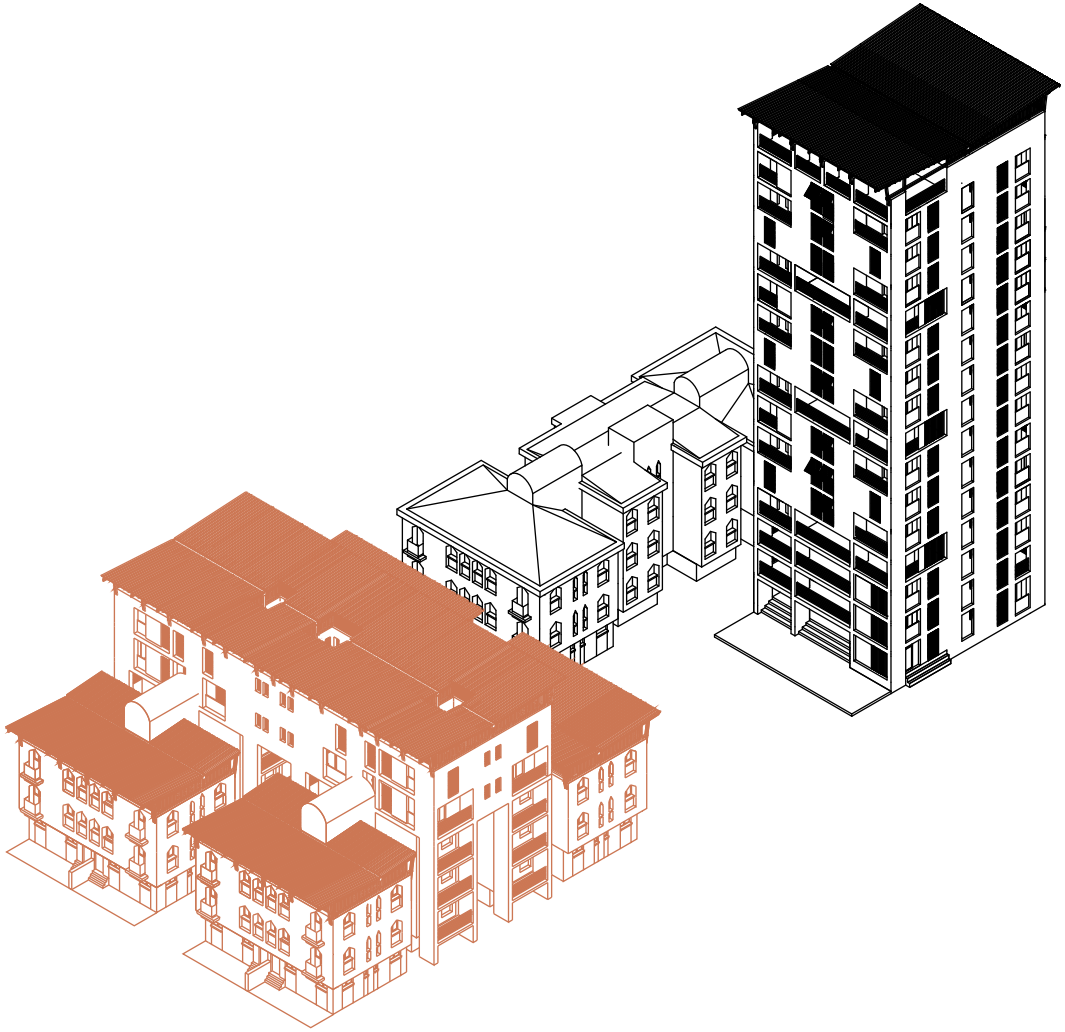
+/- 50

-

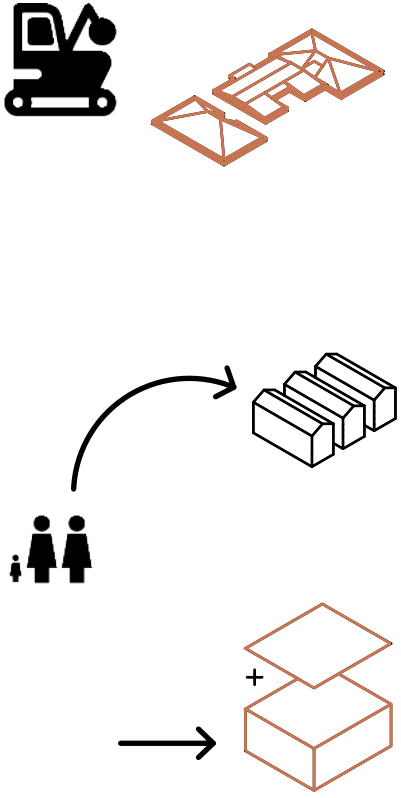
-

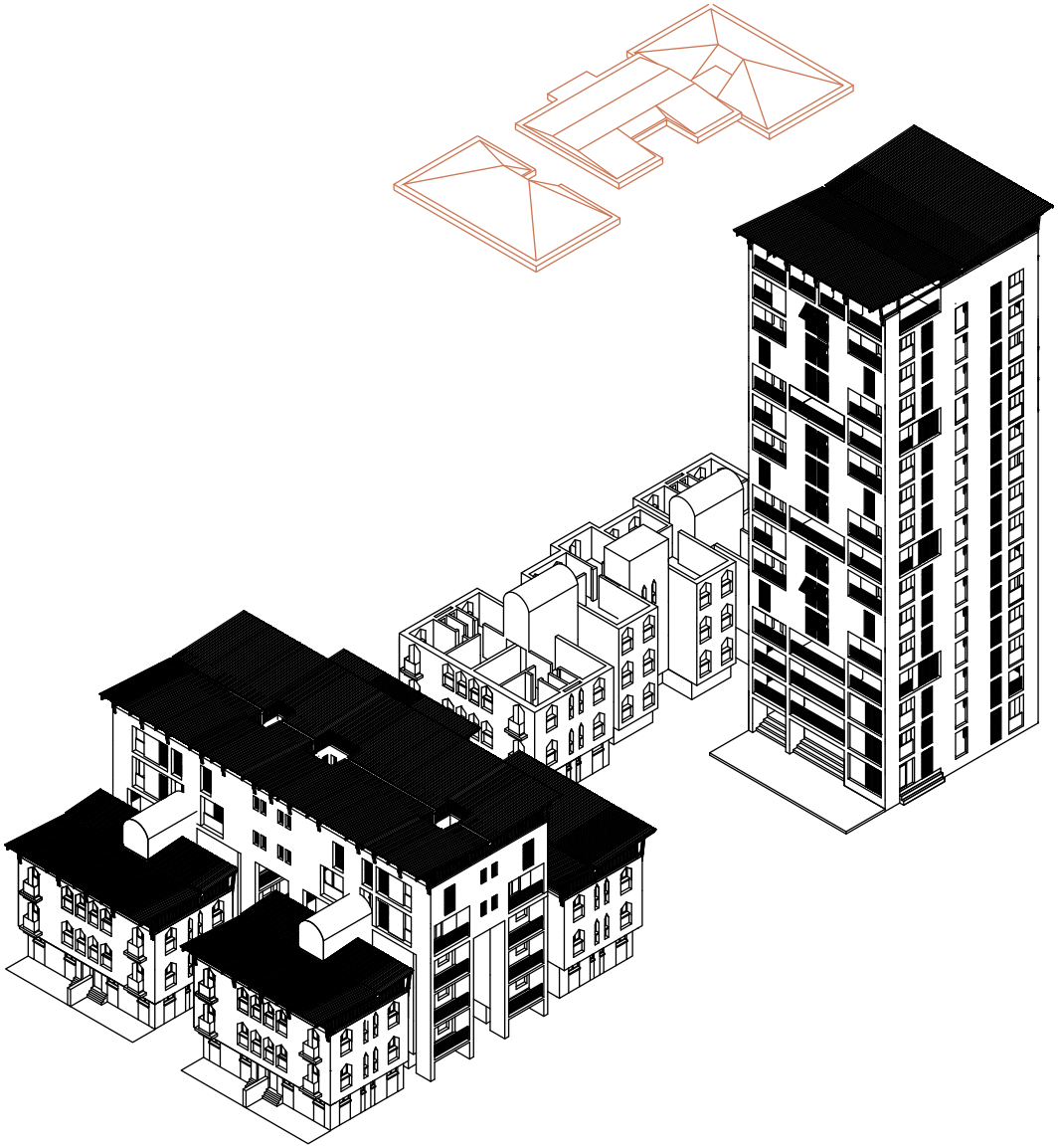
-

up-build

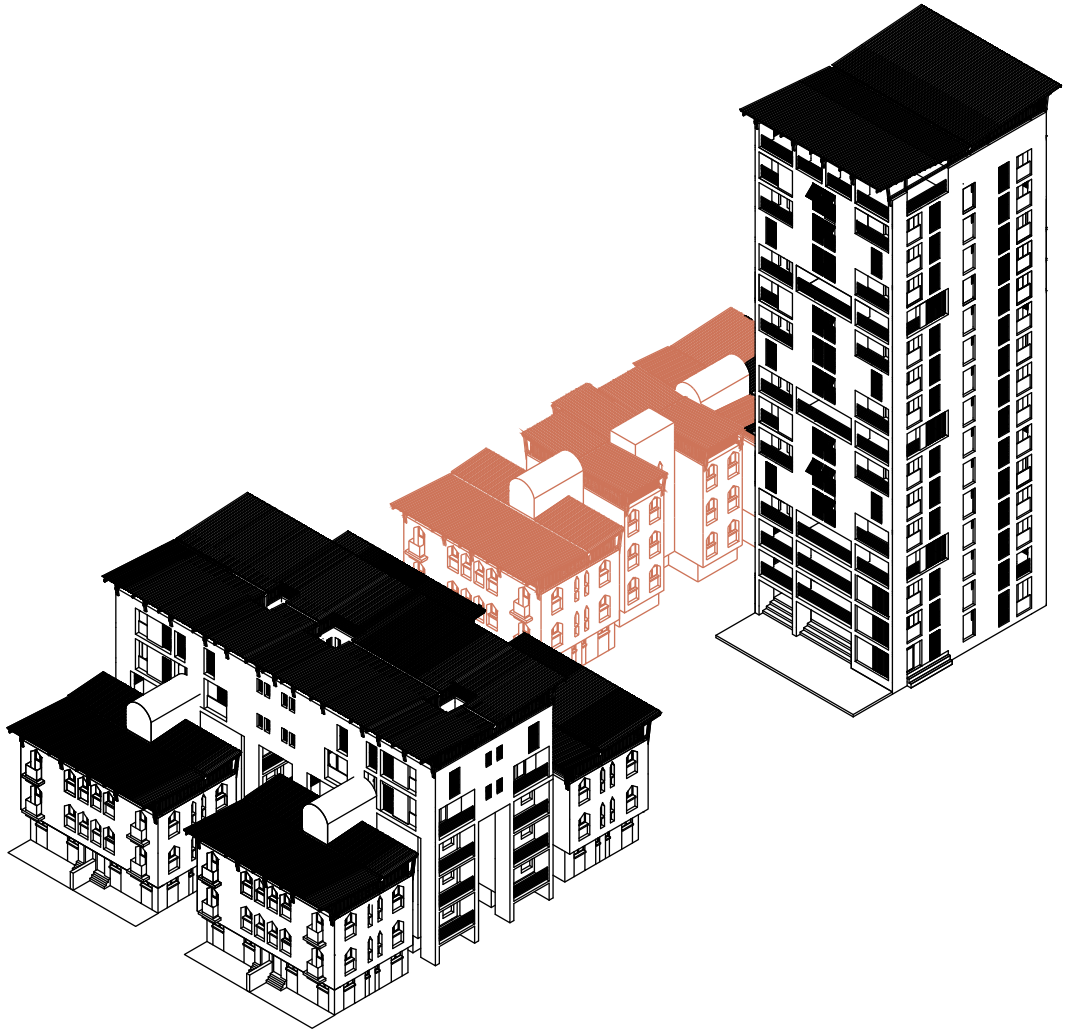


new roof

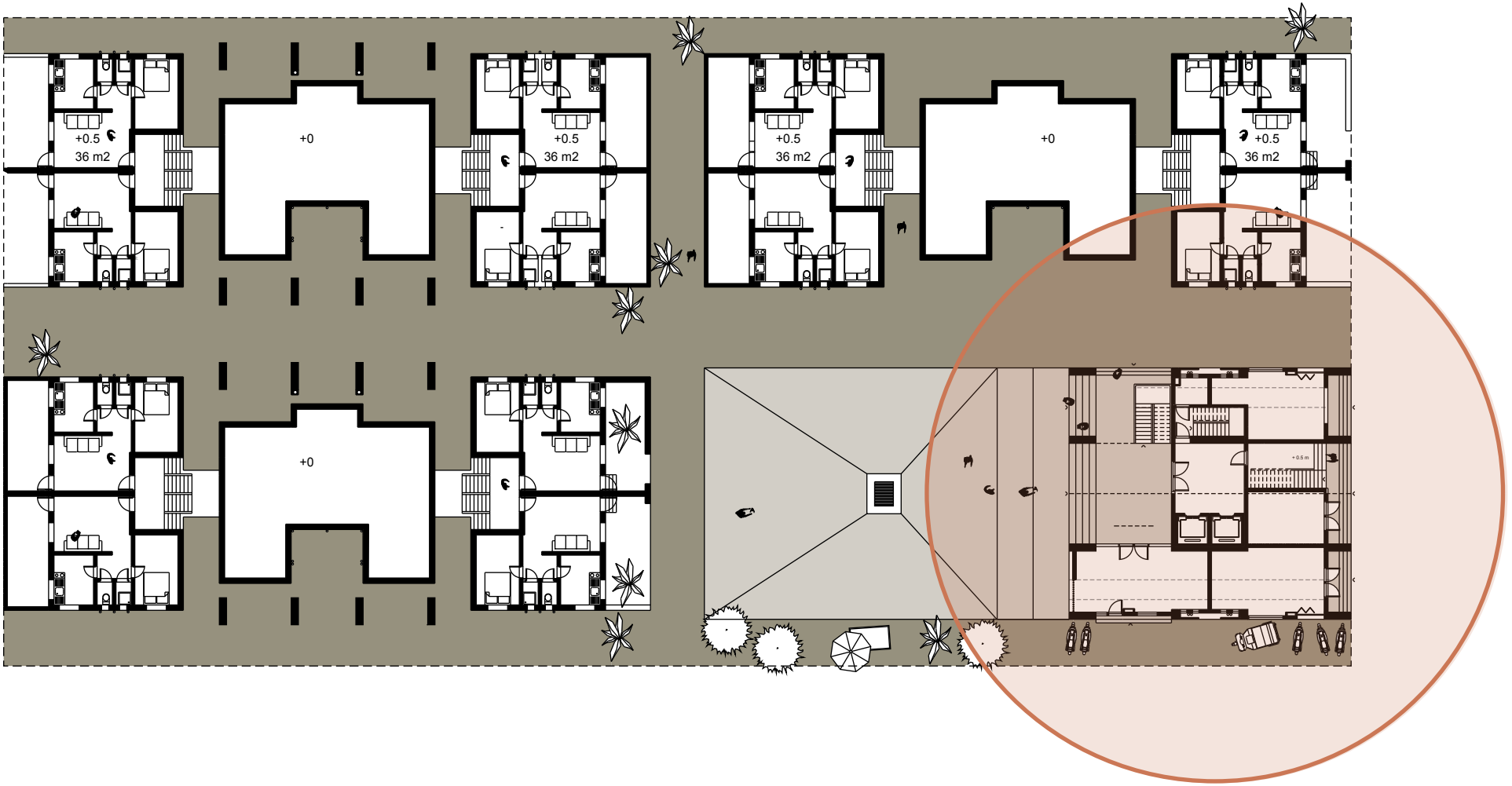




new roof

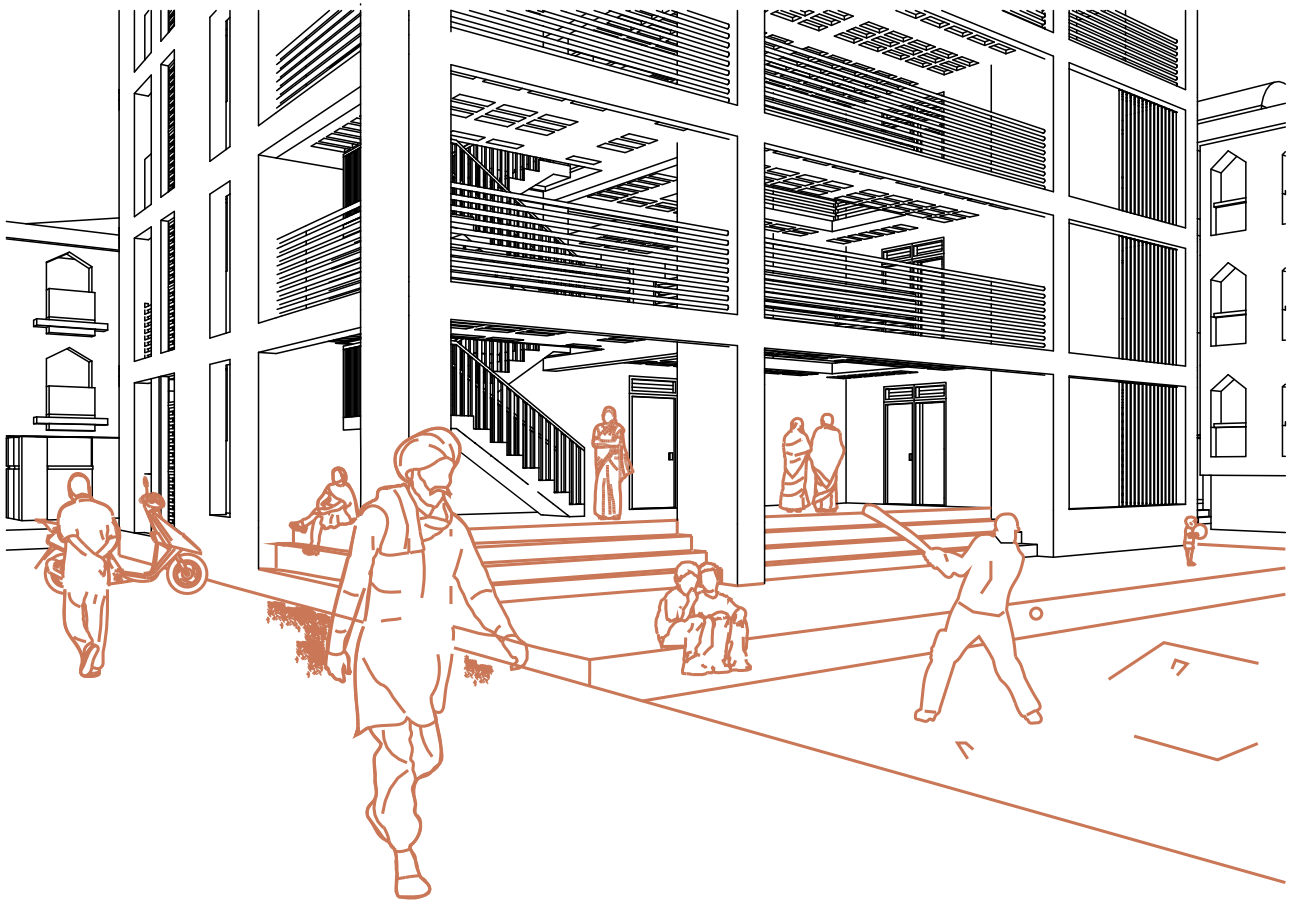


cluster



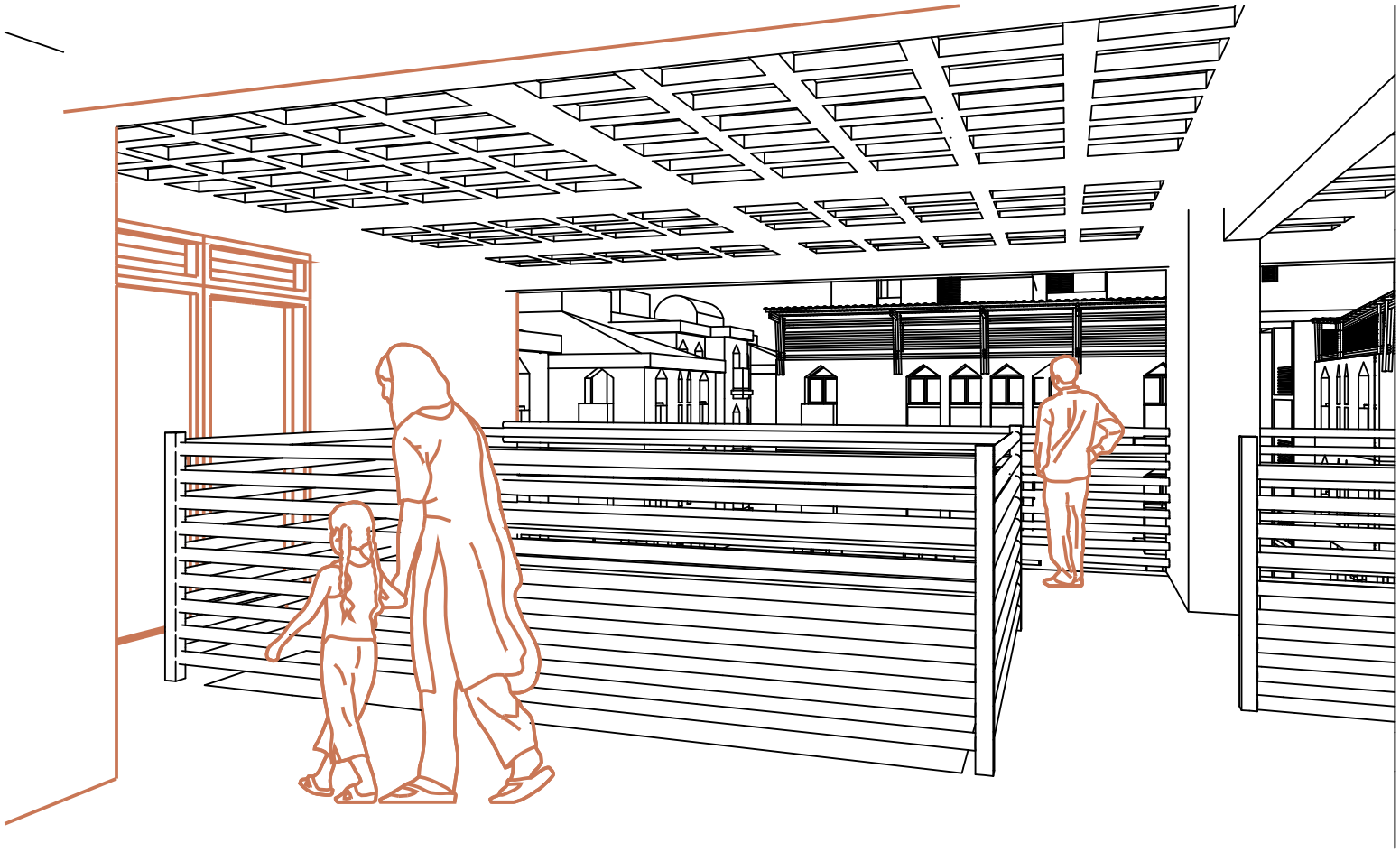
Patterns

square



play ground | commercial

amenity floor

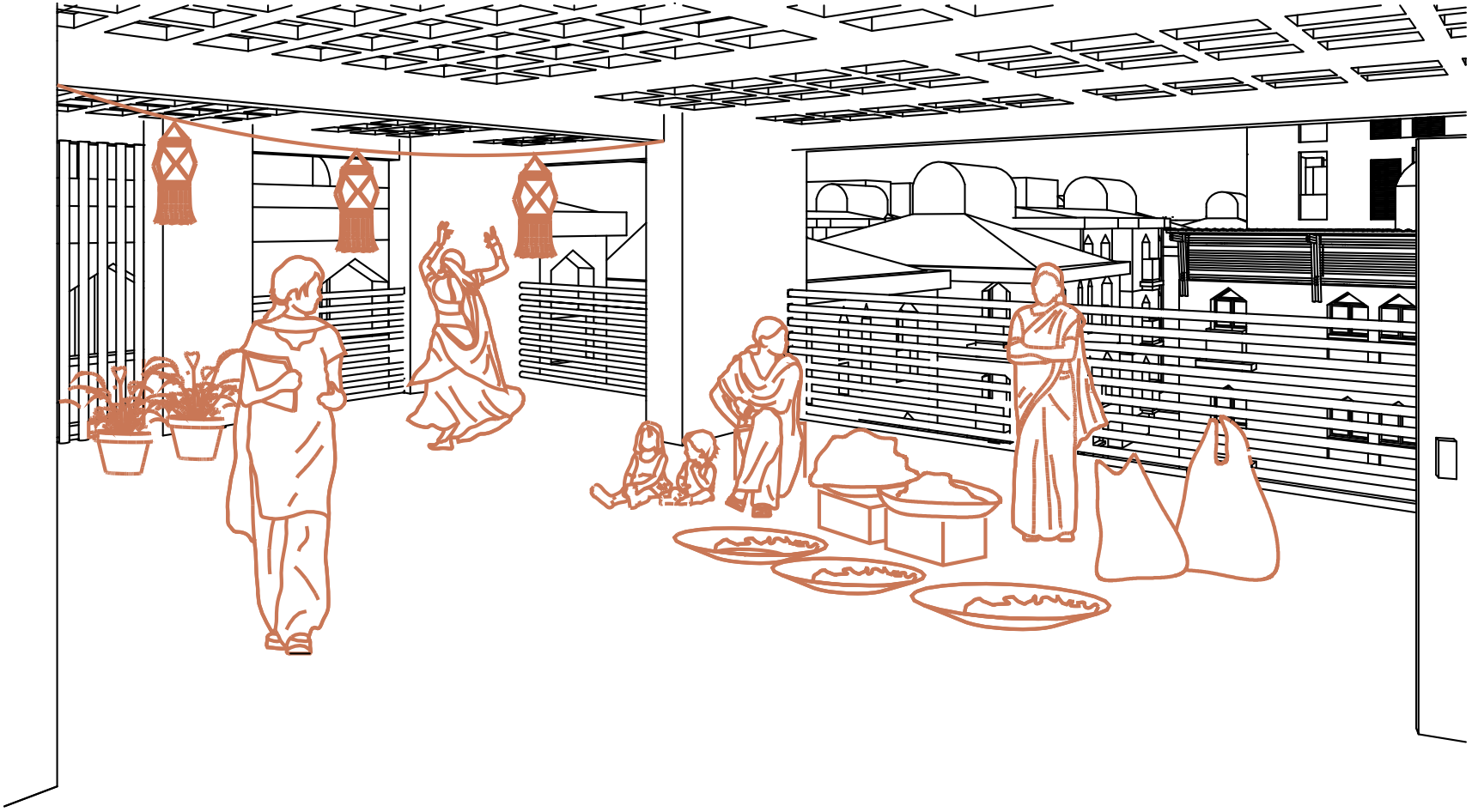


amenities | community

commercial plint

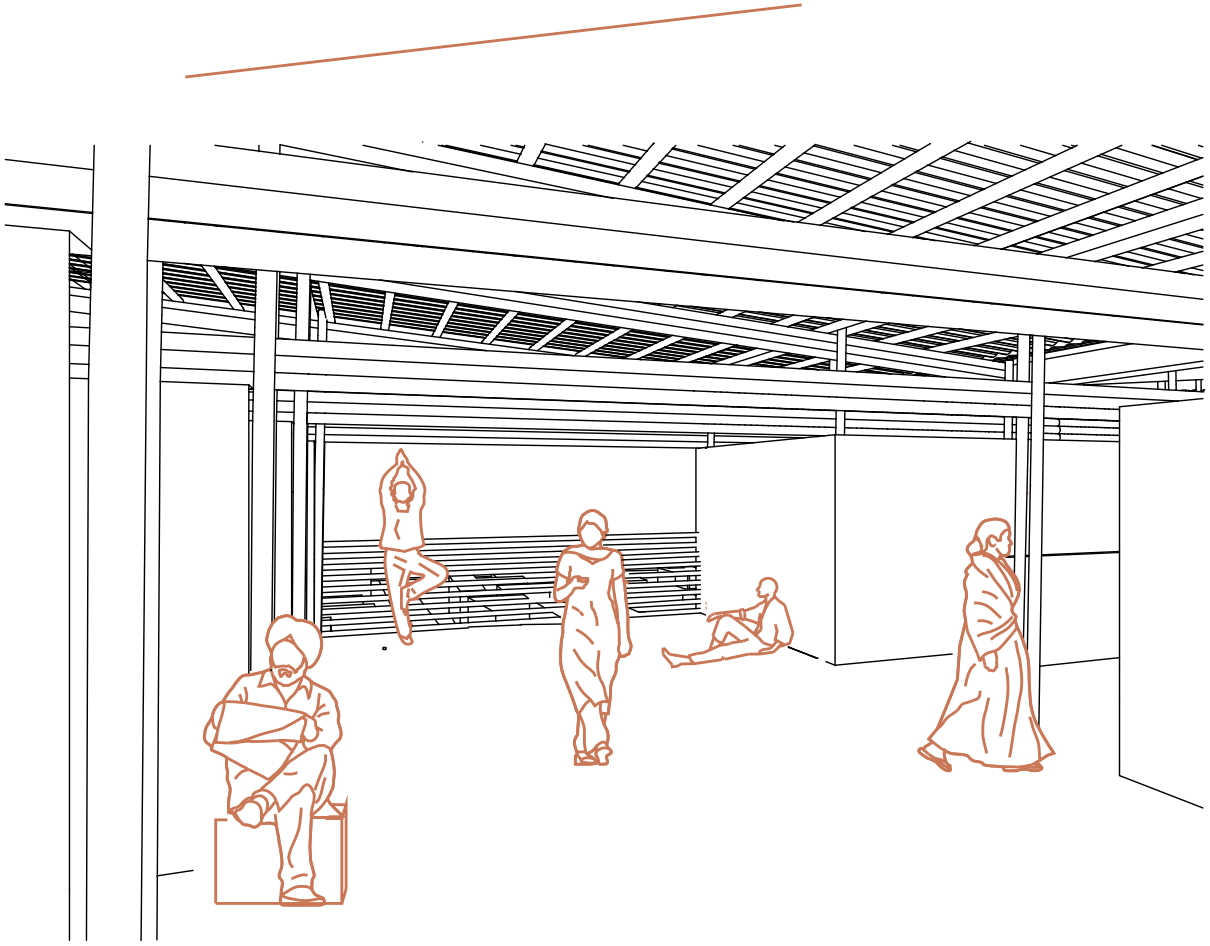
amenities | community

community floor



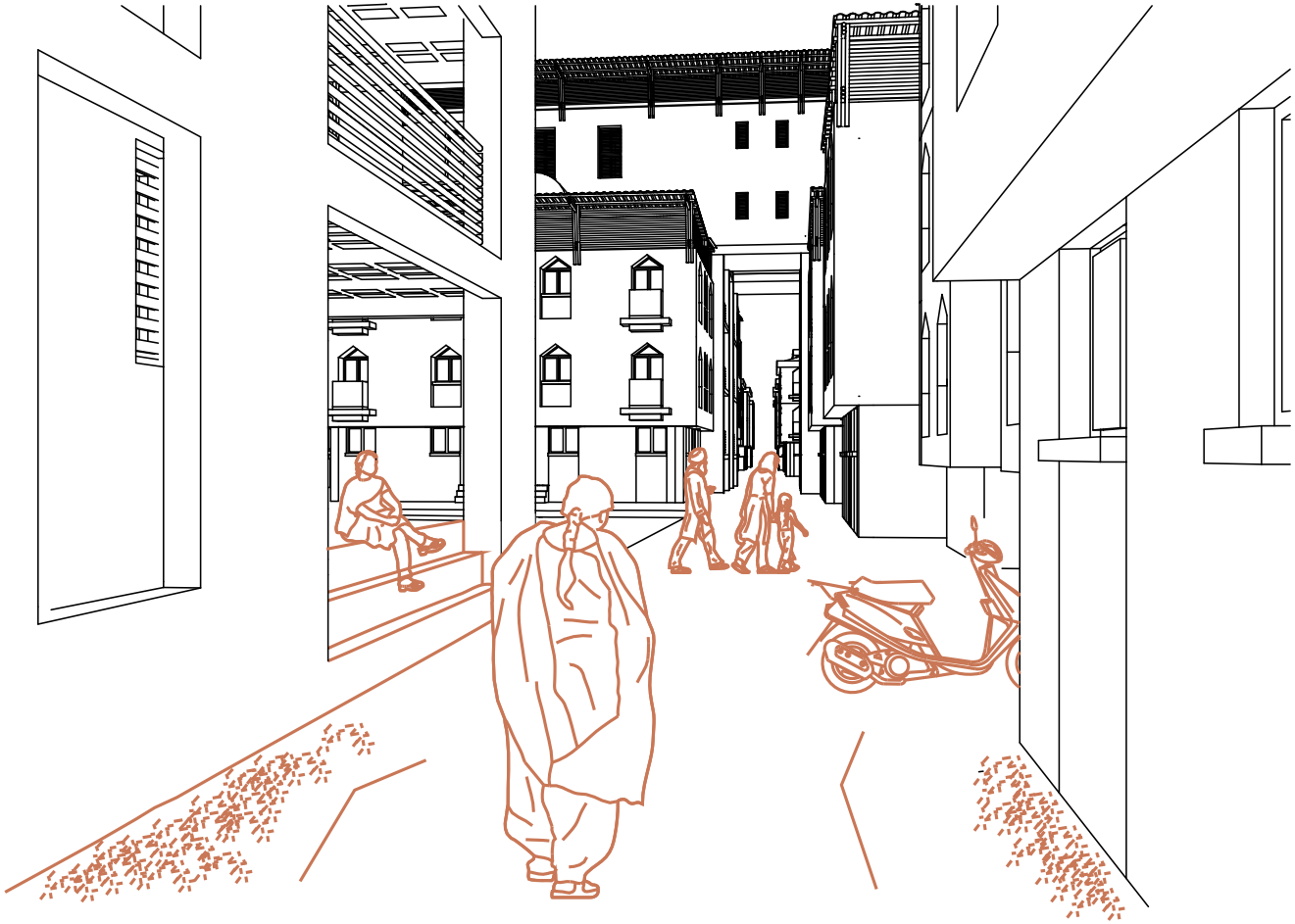
community | society

community roof



community

small street



parking | commercial

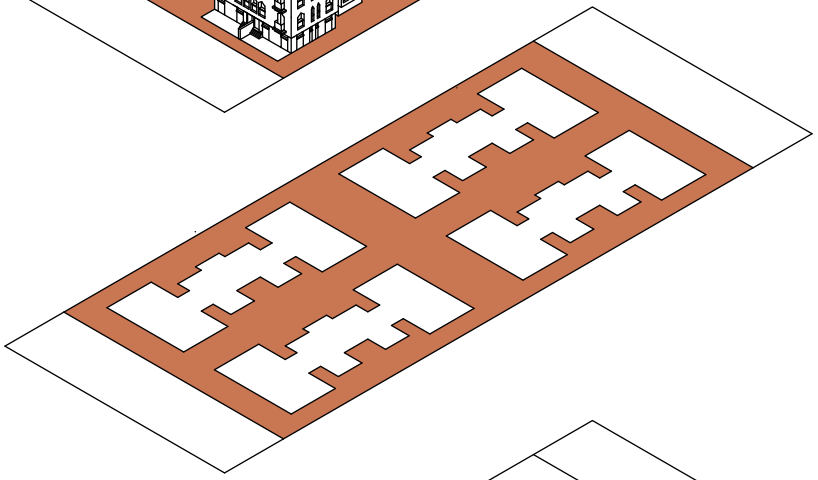
balconies

parking | balconies

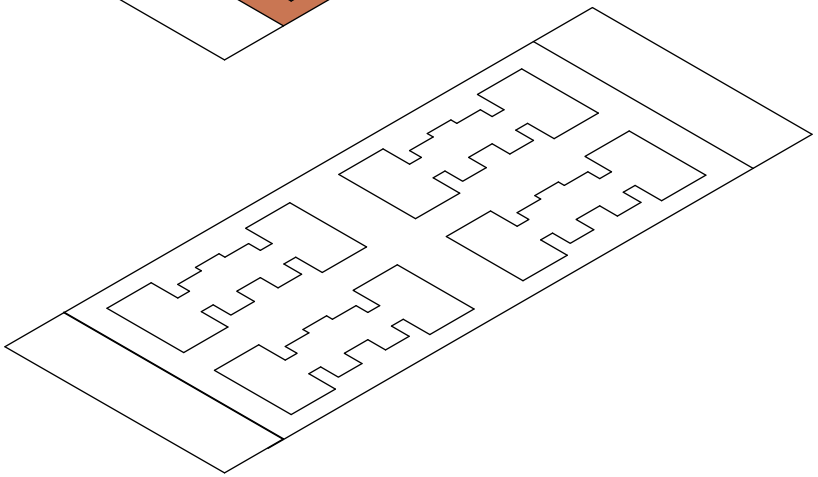
Comparison

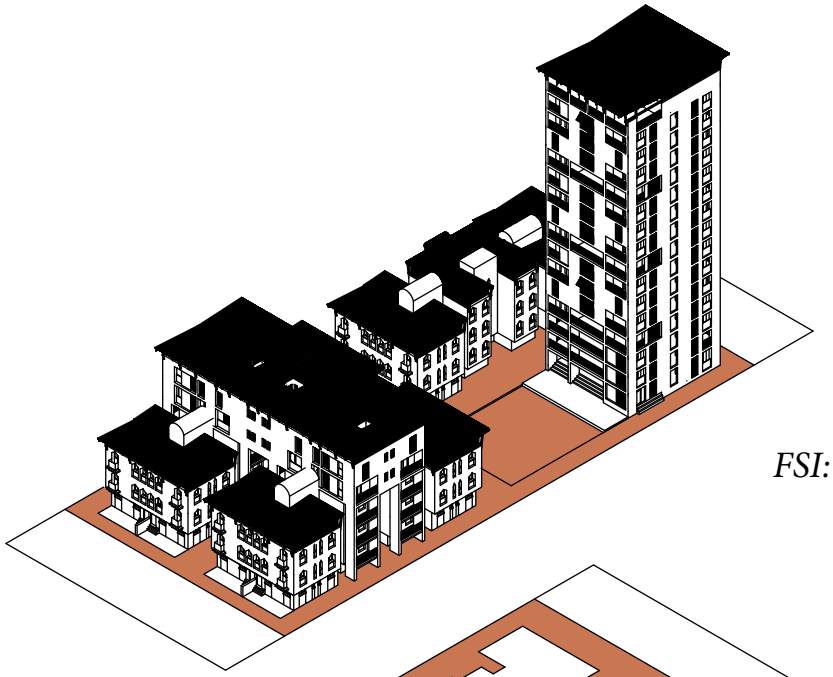
FSI: 1.5

4.4 m2/ person

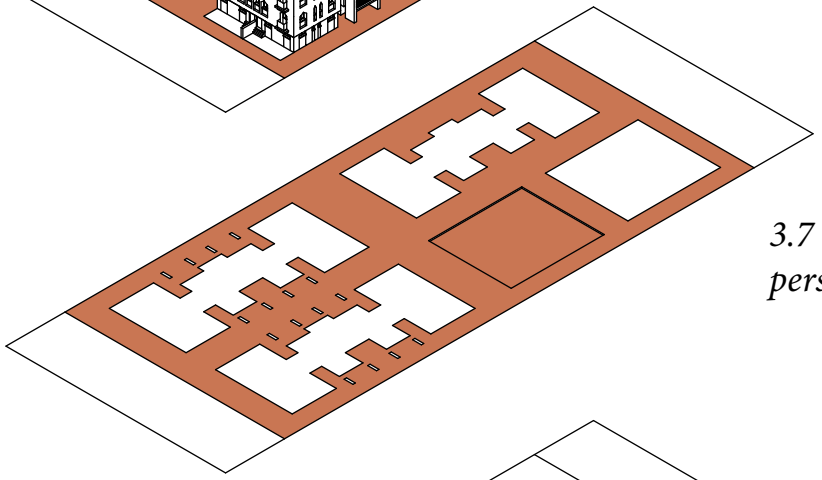


0 m2/ person

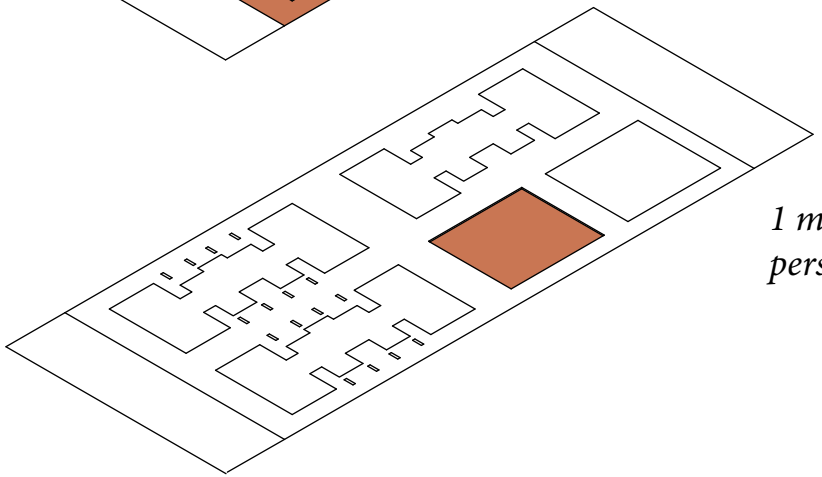




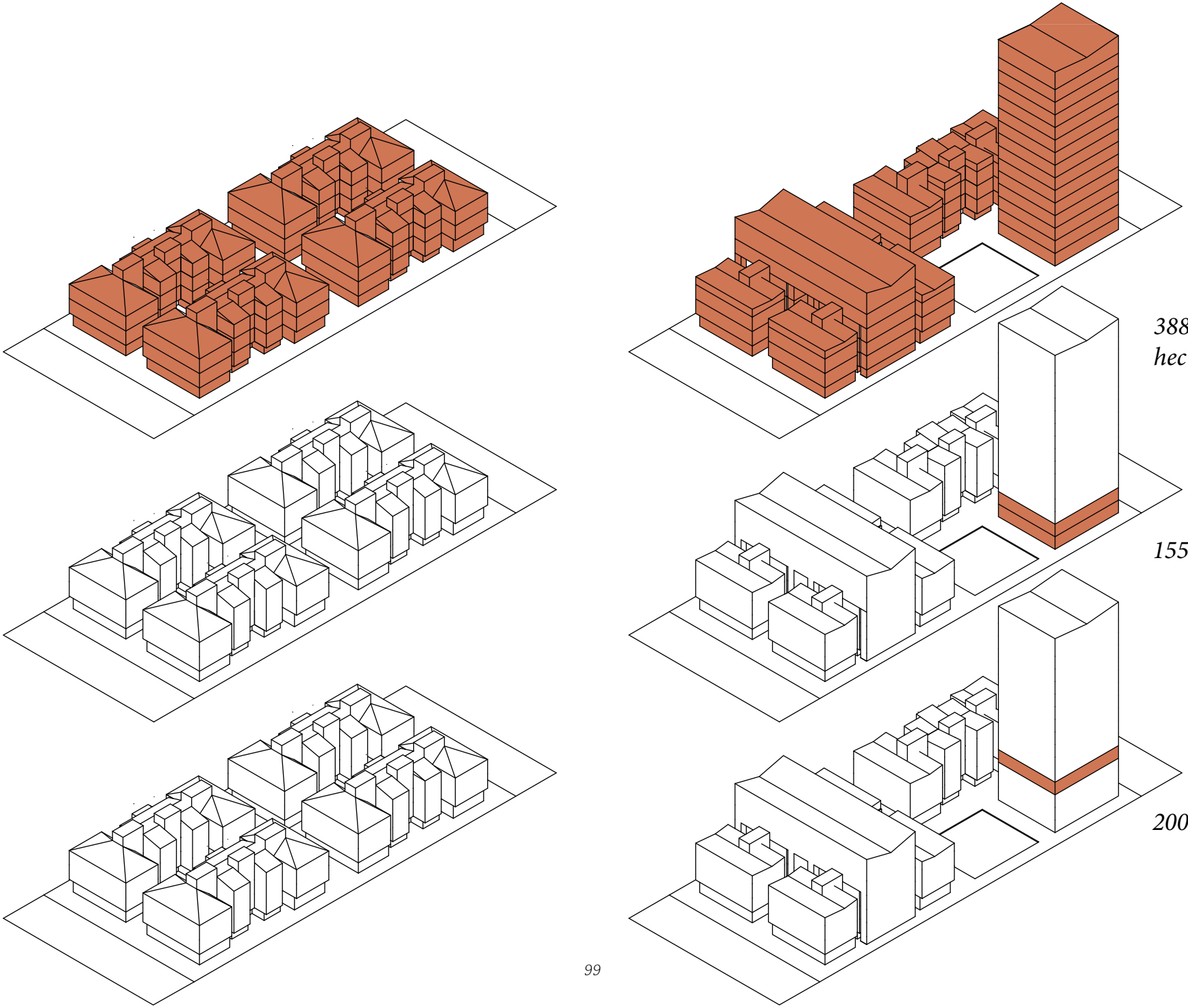
FSI: 2.5



3.7 m2/ person



1 m2/ person


266 units/
hectare
0 m2
0 m2
388 units/
hectare
155 m2
200 m2

Cluster options

directives

maximum FSI *maximum height*

rules

recreational open space *amenities*

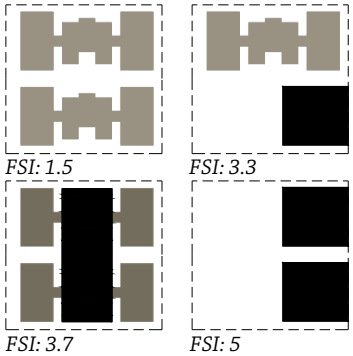
goals

one building

FSI: 1.5

FSI: 5

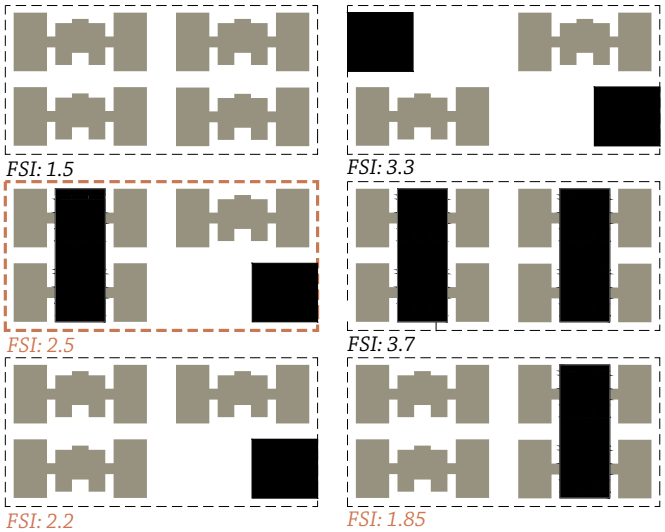
two buildings



FSI: 1.5 *FSI: 3.3*

FSI: 3.7 *FSI: 5*

four buildings

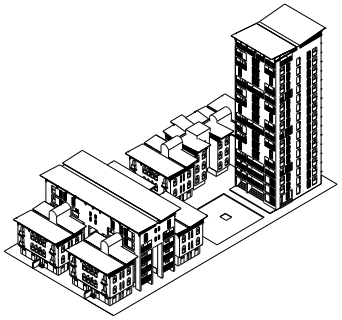


FSI: 1.5 *FSI: 3.3*

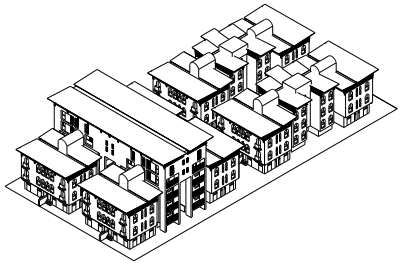
FSI: 2.5 *FSI: 3.7*

FSI: 2.2 *FSI: 1.85*

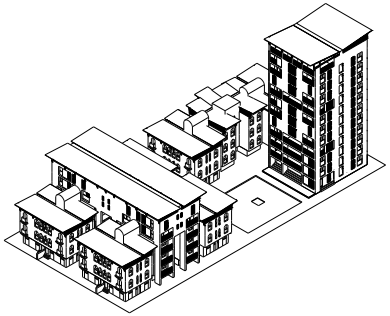
options



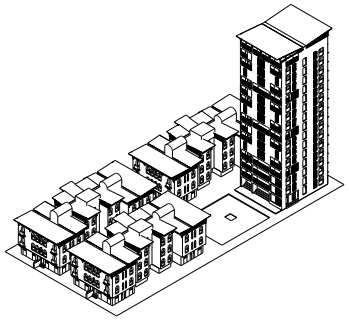
option 1



option 3



option 2



option 4

financing up built

Price dwelling space in Nalasopara West	4467 Rs/sqft
1RK apartment	1 100 000 Rs - 1 700 000 Rs
1BHK apartment	1 900 000 Rs - 2 800 000 Rs
2BHK apartment	2 900 000 Rs - 3 600 000 Rs
3BHK apartment	3 700 000 Rs - 5 800 000 Rs

Price commercial space in Nalasopara West	8000 Rs/sqft

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	58/678	2BHK/3BHK	MIG	3 500 000	2	7 000 000
2	44/527	1BHK/2BHK	LIG	2 800 000	2	5 600 000
3	44/527	2BHK/3BHK	LIG	3 000 000	4	12 000 000
4	45/538	1BHK/2BHK	LIG	2 800 000	2	5 600 000
5	58/678	2BHK/3BHK	MIG	3 700 000	2	7 400 000

Costs building in Rs	+/- 19 500 000
Sales volume in Rs	37 600 000
Profit in Rs	18 100 000
Profit in %	92%

Price dwelling space in Nalasopara West	4467 Rs/sqft
1RK apartment	1 100 000 Rs - 1 700 000 Rs
1BHK apartment	1 900 000 Rs - 2 800 000 Rs
2BHK apartment	2 900 000 Rs - 3 600 000 Rs
3BHK apartment	3 700 000 Rs - 5 800 000 Rs

Price commercial space in Nalasopara West	8000 Rs/sqft

Existing apartments:

Apartment size m2/sqft	*Number*	*10% bigger*
36 m2 /387 sqft	7	39.6 m2 / 426 sqft
40 m2 / 430 sqft	8	44 m2 / 473 sqft
47 m2 / 505 sqft	3	51.7 m2 / 556 sqft

New building 15 floors:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	40/430	1BHK	LIG	2 600 000	15	39 000 000
2	44/473	1BHK/2BHK	LIG	2 700 000	12	32 400 000
3	50/538	2BHK	MIG	3 400 000	3	10 200 000
4	55/592	2BHK	MIG	3 550 000	3	10 650 000
5	51/548	2BHK	MIG	3 500 000	3	10 500 000
6	58/678	2BHK	MIG	3 600 000	3	10 800 000

Commercial spaces	*Total m^2/sqft*	*Selling price in Rs*
7	150/1668	13 450 000

Costs building in Rs	+/- 77 000 000
Sales volume in Rs	127 000 000
Sales volume in Rs – existing apartments	77 000 000
Profit in Rs	0
Profit in %	0

financing new building

New building 12 floors:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	40/430	1BHK	LIG	2 600 000	9	23 400 000
2	44/473	1BHK/2BHK	LIG	2 700 000	8	21 600 000
3	50/538	2BHK	MIG	3 400 000	3	10 200 000
4	55/592	2BHK	MIG	3 550 000	2	7 100 000
5	51/548	2BHK	MIG	3 500 000	2	7 000 000
6	58/678	2BHK	MIG	3 600 000	2	7 200 000

Commercial spaces	*Total m^2/sqft*	*Selling price in Rs*
7	150/1668	13 450 000

Costs building in Rs	+/- 58 000 000
Sales volume in Rs	89 950 000
Sales volume in Rs – existing apartments	39 950 000
Profit in Rs	- 18 050 000
Profit in %	- 31%

Up-build apartments:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*
1	58/678	2BHK/3BHK	MIG	3 500 000	2
2	44/527	1BHK/2BHK	LIG	2 800 000	2
3	44/527	2BHK/3BHK	LIG	3 000 000	4
4	45/538	1BHK/2BHK	LIG	2 800 000	2
5	58/678	2BHK/3BHK	MIG	3 700 000	2

Costs building in Rs	+/- 19 500 000
Sales volume in Rs	37 600 000
Profit in Rs	18 100 000
Profit in %	92%

New building 15 floors:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*
1	40/430	1BHK	LIG	2 600 000	15
2	44/473	1BHK/2BHK	LIG	2 700 000	12
3	50/538	2BHK	MIG	3 400 000	3
4	55/592	2BHK	MIG	3 550 000	3
5	51/548	2BHK	MIG	3 500 000	3
6	58/678	2BHK	MIG	3 600 000	3

Commercial spaces	*Total m^2/sqft*	*Selling price in Rs*
7	150/1668	13 450 000

Costs building in Rs	+/- 77 000 000
Sales volume in Rs	127 000 000
Sales volume in Rs – existing apartments	77 000 000
Profit in Rs	0
Profit in %	0

Total:

Costs buildings in Rs	96 500 000

Up-build apartments:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	58/678	2BHK/3BHK	MIG	3 500 000	2	7 000 000
2	44/527	1BHK/2BHK	LIG	2 800 000	2	5 600 000
3	44/527	2BHK/3BHK	LIG	3 000 000	4	12 000 000
4	45/538	1BHK/2BHK	LIG	2 800 000	2	5 600 000
5	58/678	2BHK/3BHK	MIG	3 700 000	2	7 400 000

Costs building in Rs	+/- 19 500 000
Sales volume in Rs	37 600 000
Profit in Rs	18 100 000
Profit in %	92%

New building 12 floors:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	40/430	1BHK	LIG	2 600 000	9	23 400 000
2	44/473	1BHK/2BHK	LIG	2 700 000	8	21 600 000
3	50/538	2BHK	MIG	3 400 000	3	10 200 000
4	55/592	2BHK	MIG	3 550 000	2	7 100 000
5	51/548	2BHK	MIG	3 500 000	2	7 000 000
6	58/678	2BHK	MIG	3 600 000	2	7 200 000

Commercial spaces	*Total m^2/sqft*	*Selling price in Rs*
7	150/1668	13 450 000

Costs building in Rs	+/- 58 000 000
Sales volume in Rs	89 950 000
Sales volume in Rs – existing apartments	39 950 000
Profit in Rs	- 18 050 000
Profit in %	- 31%

Total:

Costs buildings in Rs	77 500 000
Total sales volume in Rs	77 550 000
Profit in Rs	**50 000**
Profit in %	**0.06%**

financing option 3

Up-build apartments:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	58/678	2BHK/3BHK	MIG	3 500 000	2	7 000 000
2	44/527	1BHK/2BHK	LIG	2 800 000	2	5 600 000
3	44/527	2BHK/3BHK	LIG	3 000 000	4	12 000 000
4	45/538	1BHK/2BHK	LIG	2 800 000	2	5 600 000
5	58/678	2BHK/3BHK	MIG	3 700 000	2	7 400 000

Costs building in Rs	+/- 19 500 000
Sales volume in Rs	37 600 000
Profit in Rs	18 100 000
Profit in %	92%

Total:

Costs buildings in Rs	19 500 000
Total sales volume in Rs	37 600 000
Profit in Rs	**18 100 000**
Profit in %	**92%**

financing option 4

New building 15 floors:

Unit	*m^2/sqft*	*Type*	*Target*	*Selling price in Rs*	*Number of total units*	*Total price in Rs*
1	40/430	1BHK	LIG	2 600 000	15	39 000 000
2	44/473	1BHK/2BHK	LIG	2 700 000	12	32 400 000
3	50/538	2BHK	MIG	3 400 000	3	10 200 000
4	55/592	2BHK	MIG	3 550 000	3	10 650 000
5	51/548	2BHK	MIG	3 500 000	3	10 500 000
6	58/678	2BHK	MIG	3 600 000	3	10 800 000

Commercial spaces	*Total m^2/sqft*	*Selling price in Rs*
7	150/1668	13 450 000

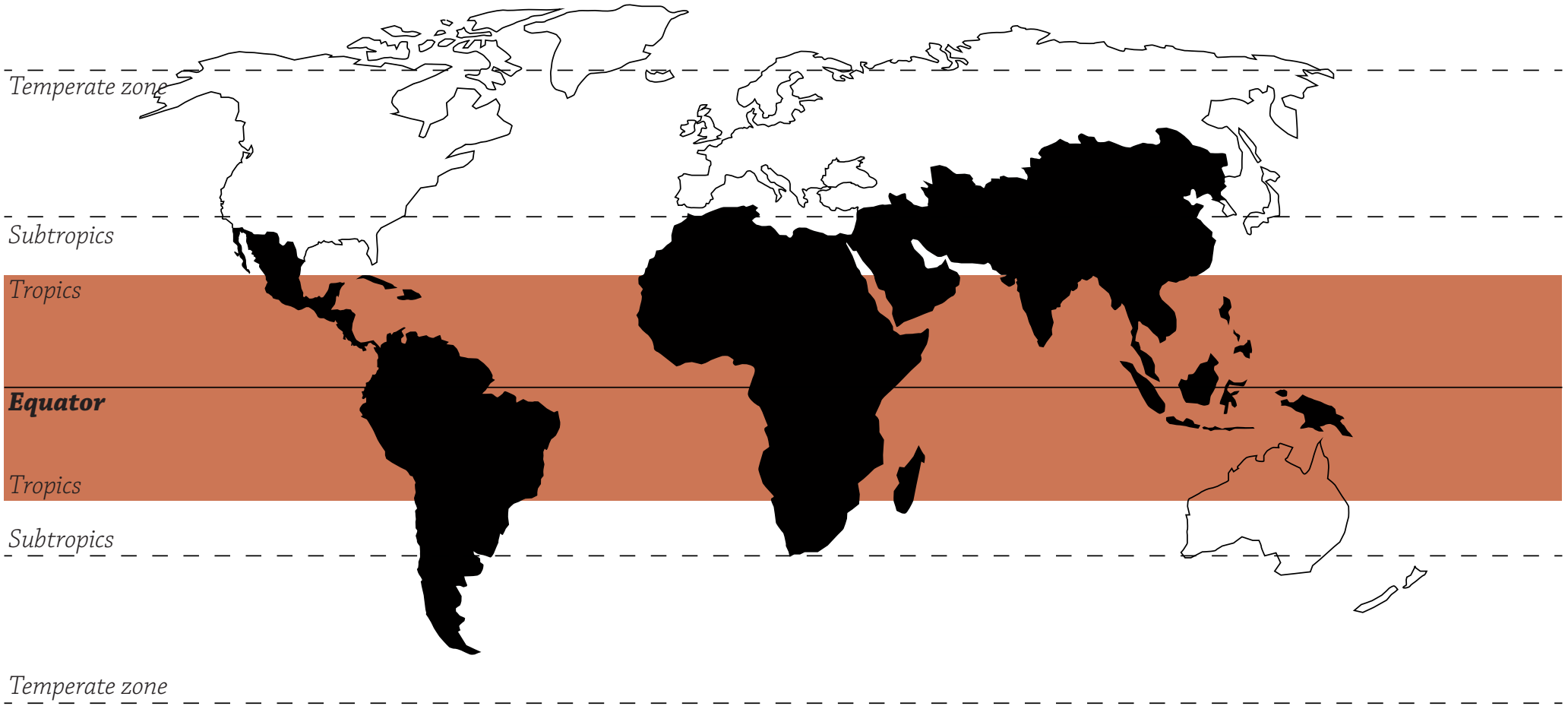
Costs building in Rs	+/- 77 000 000
Sales volume in Rs	127 000 000
Sales volume in Rs – existing apartments	77 000 000
Profit in Rs	0
Profit in %	0

Total:

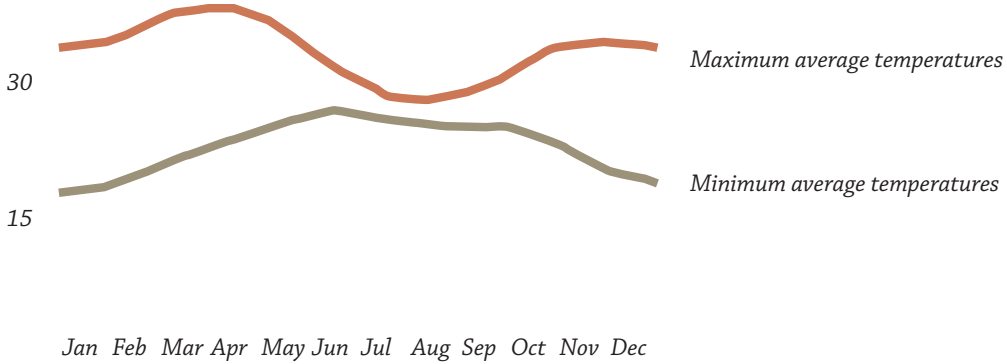
Costs buildings in Rs	77 000 000
Total sales volume in Rs	127 000 000
Profit in Rs	**0**
Profit in %	**0%**

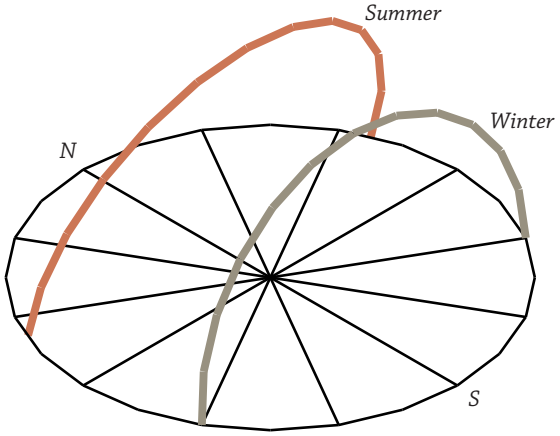
Building technology

climate design

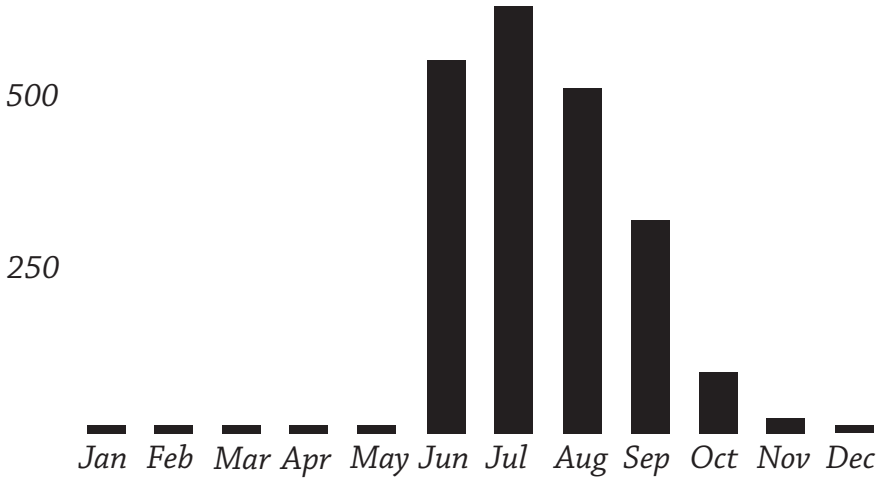


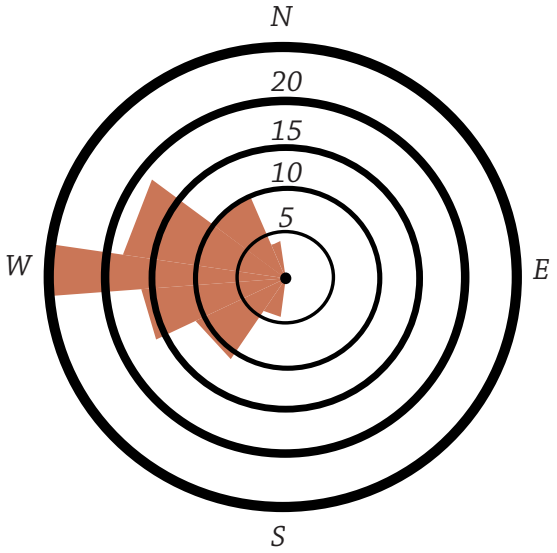
Mumbai


30
15
Maximum average temperatures
Minimum average temperatures
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec


Summer
Winter
N
S

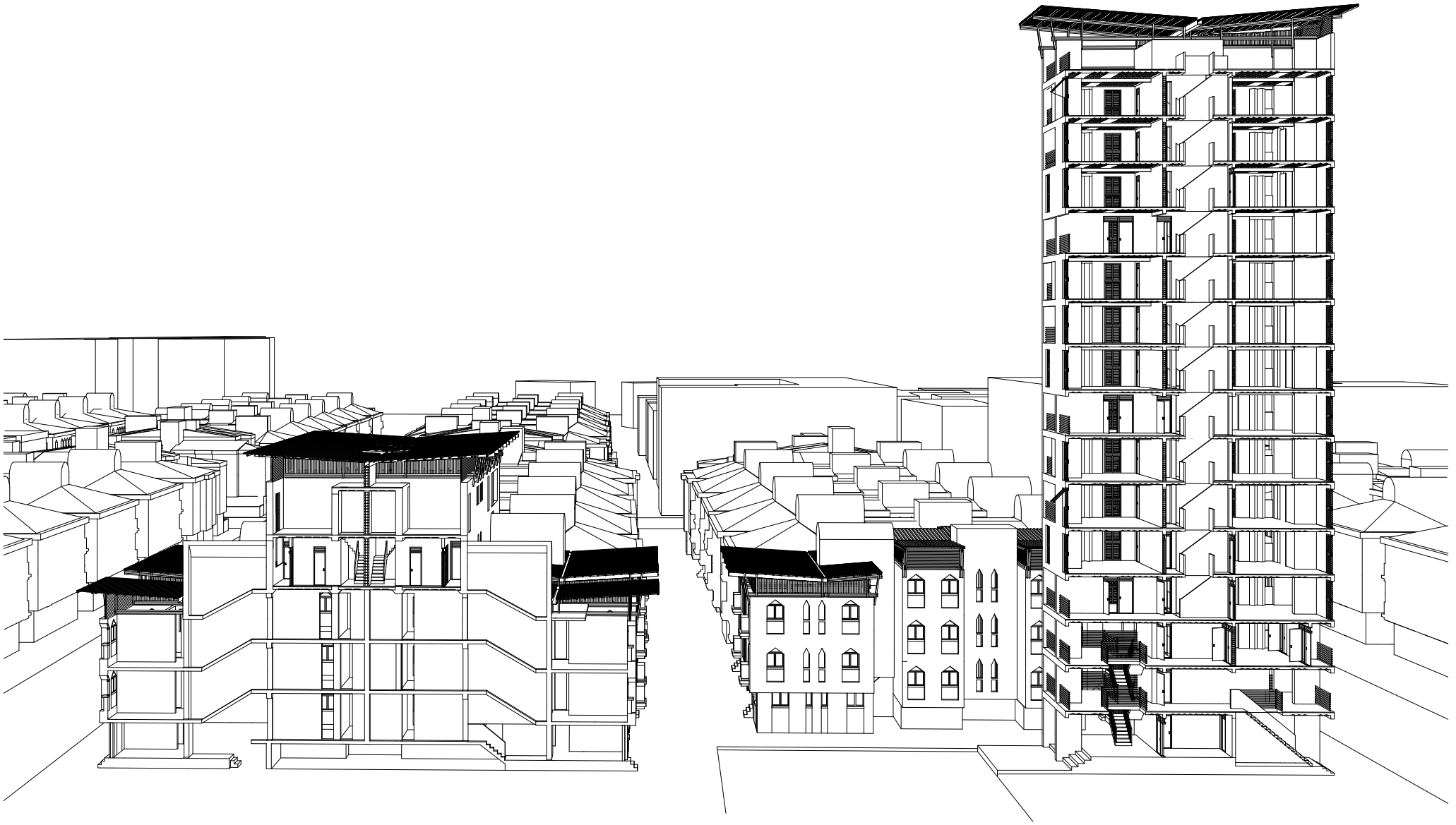
Mumbai


500
250
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

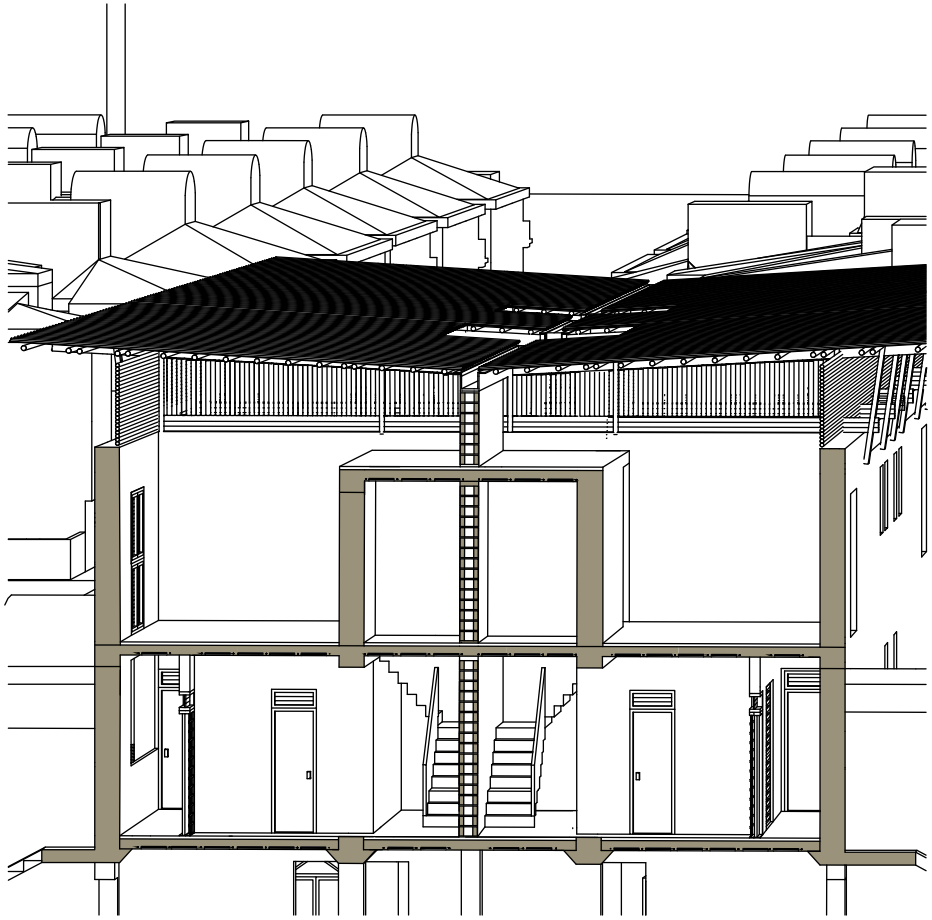

N
20
15
10
5
W
E
S

Cluster facade

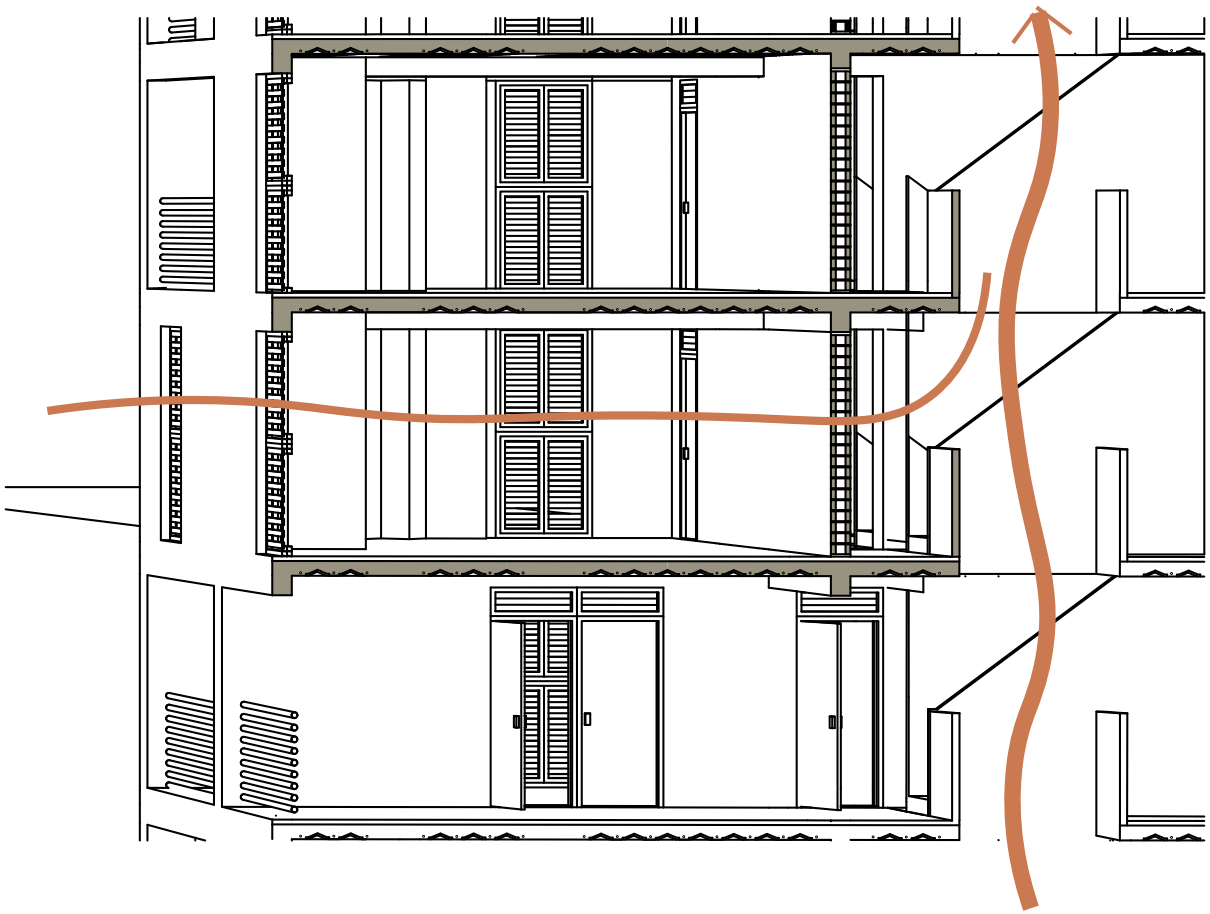
cluster



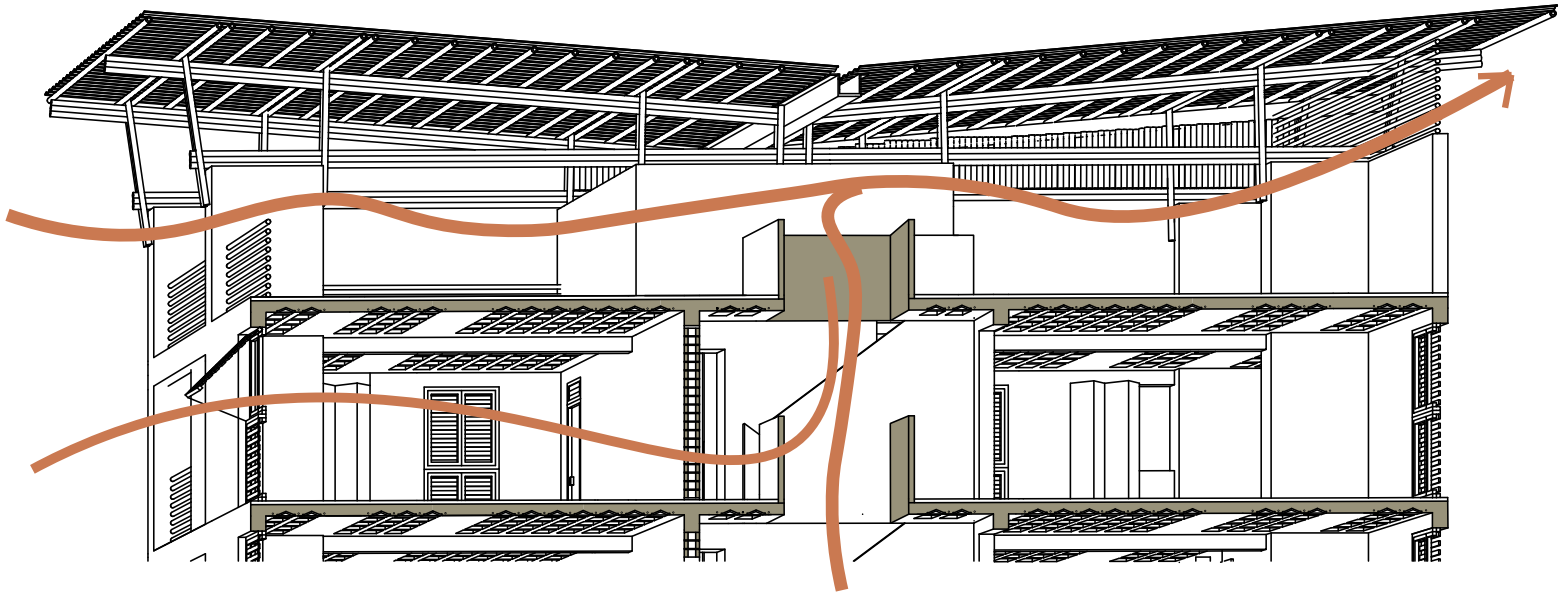
cluster



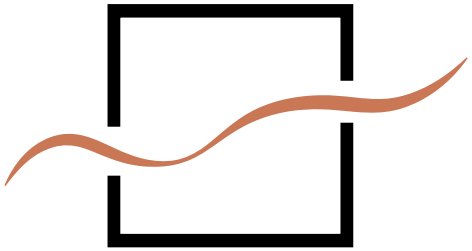
cluster

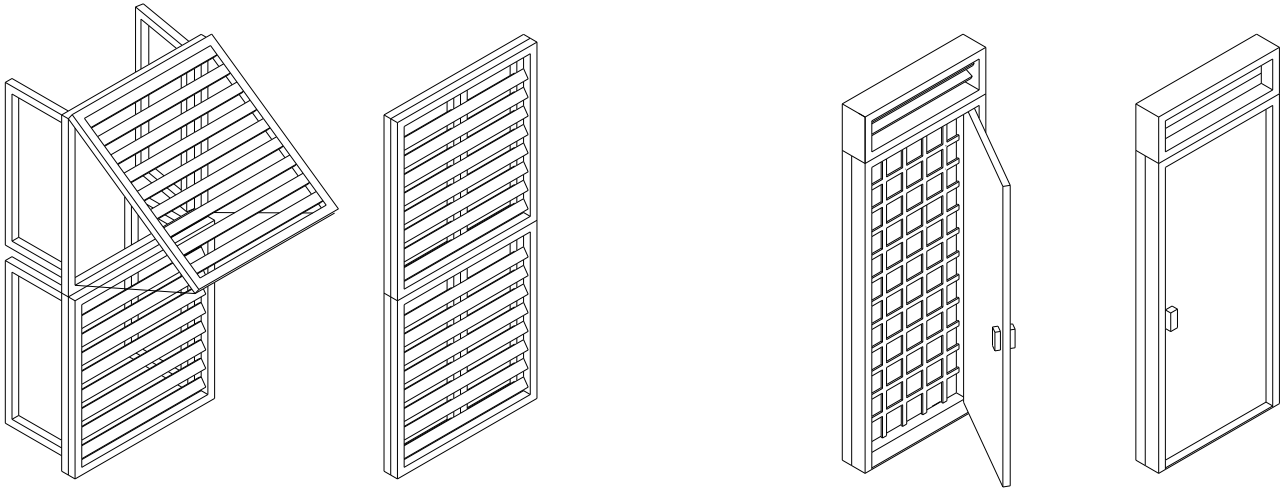


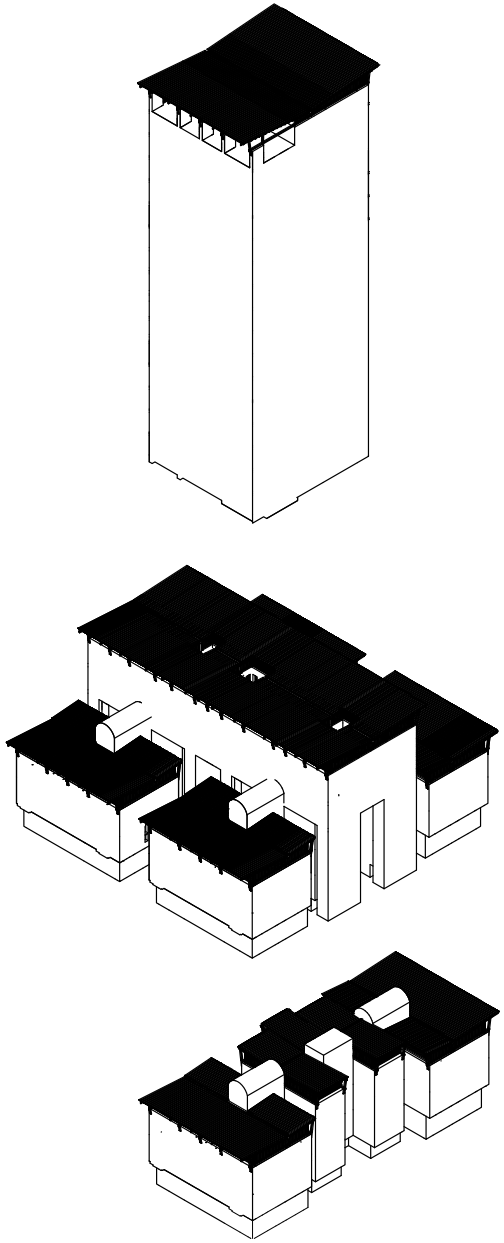
cluster



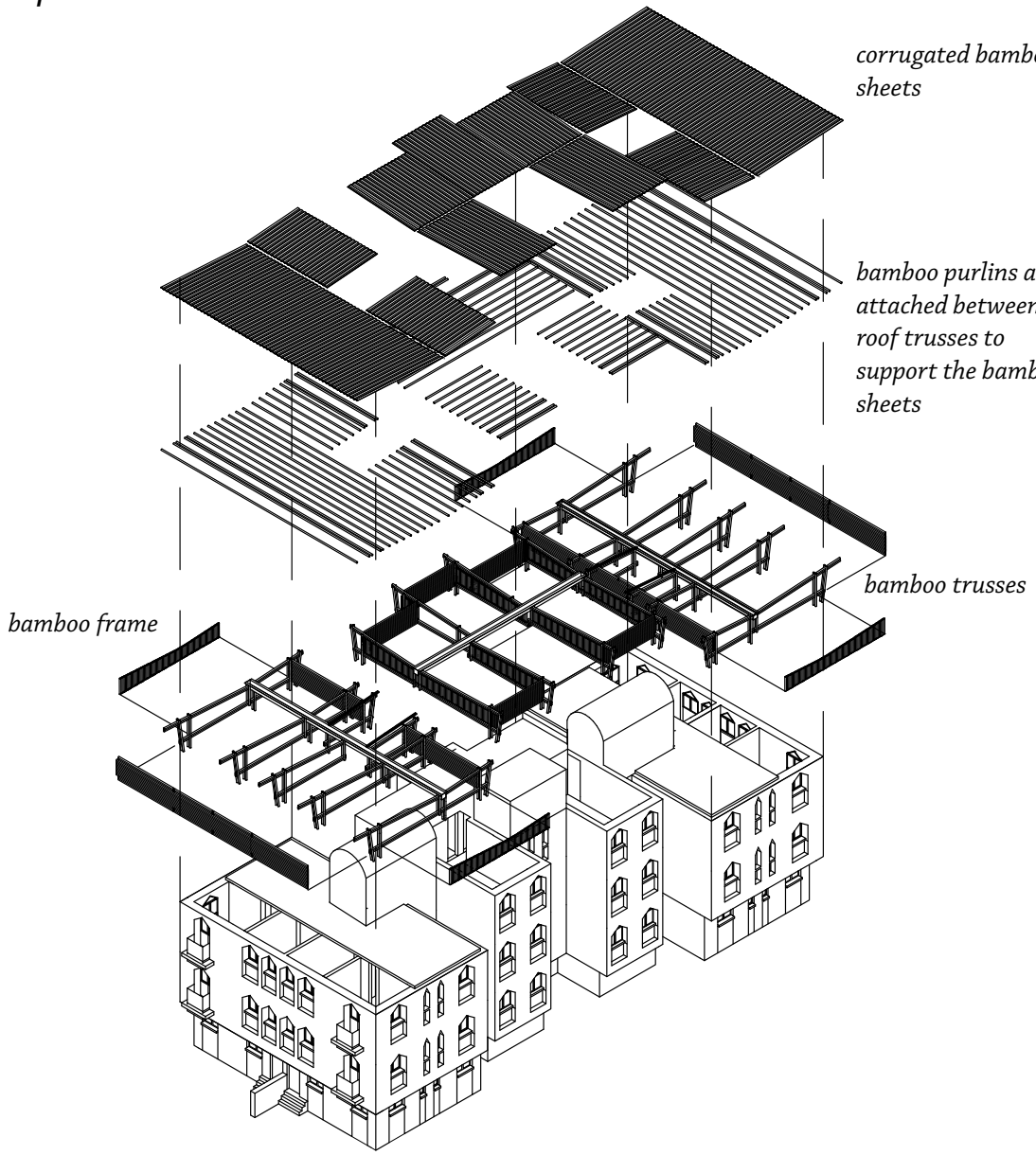
cross financing



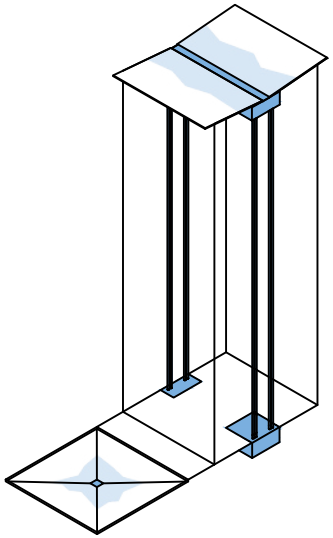


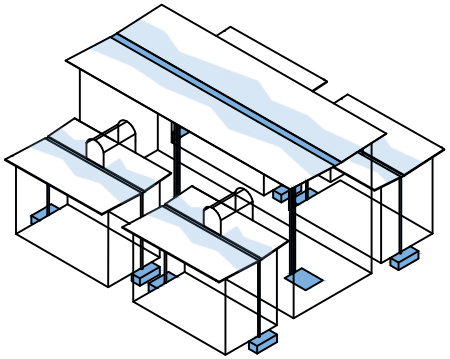


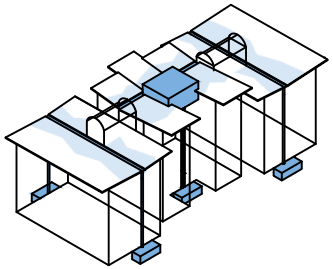
roof structure

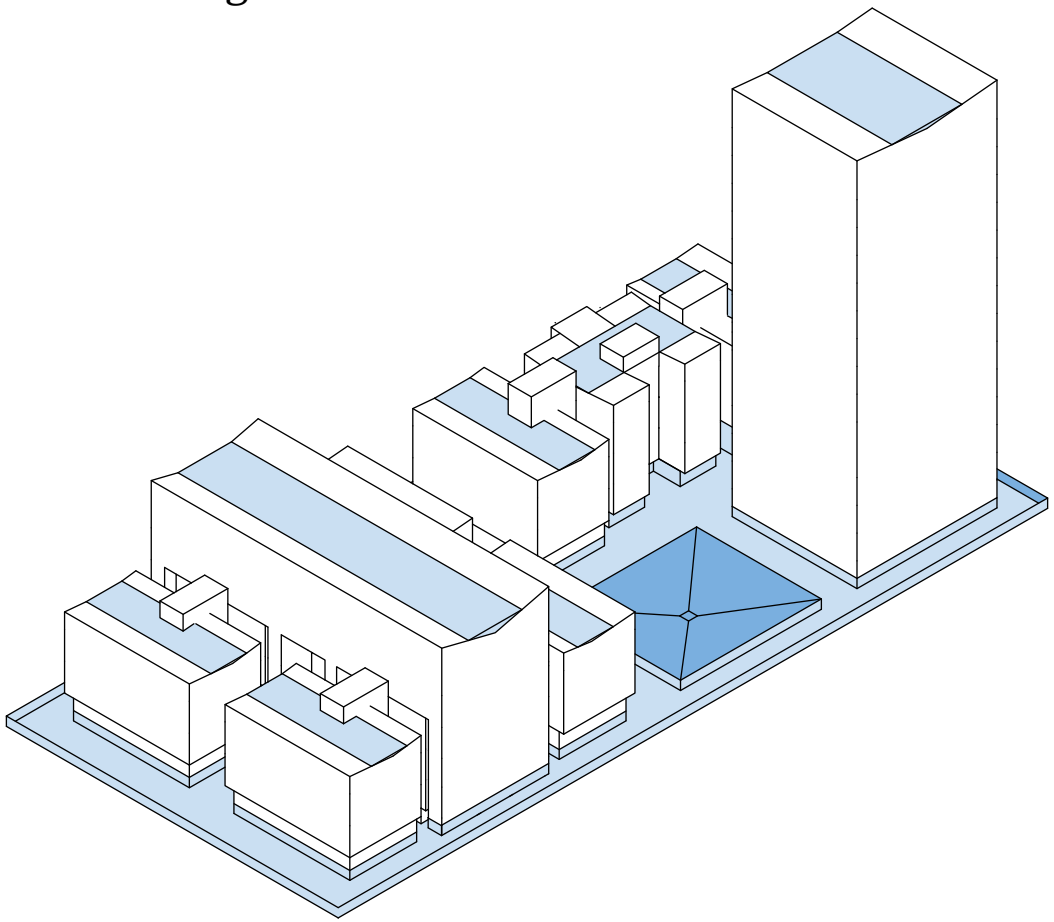


water harvesting



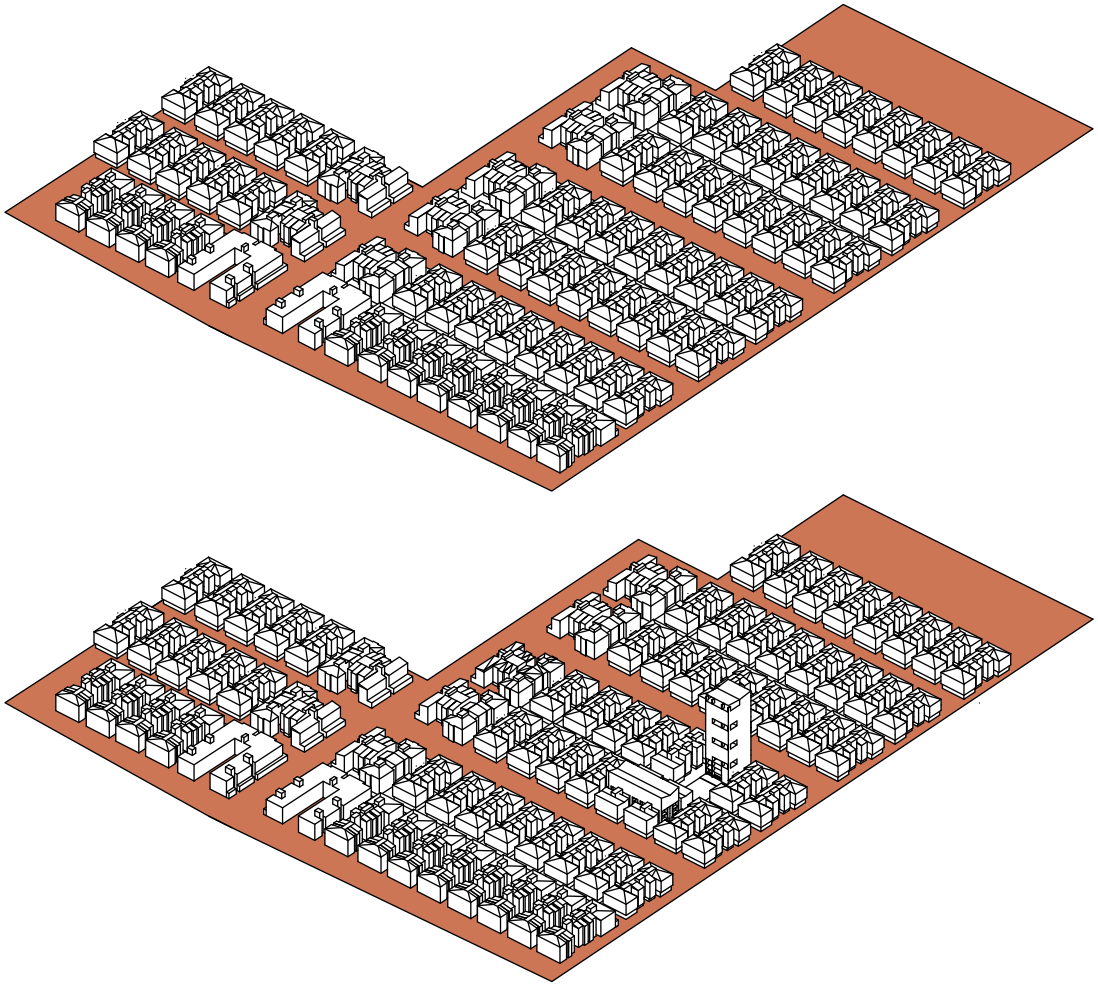






Urban strategy

Fasing



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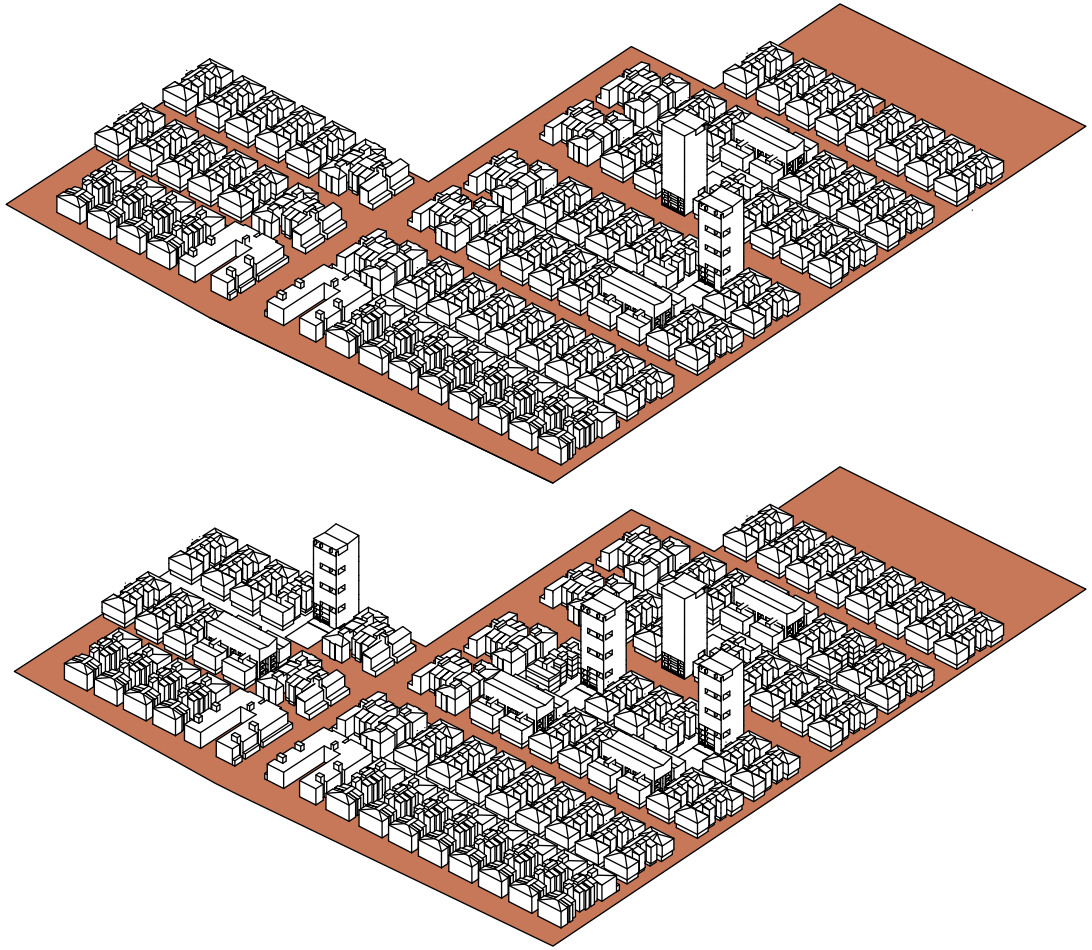

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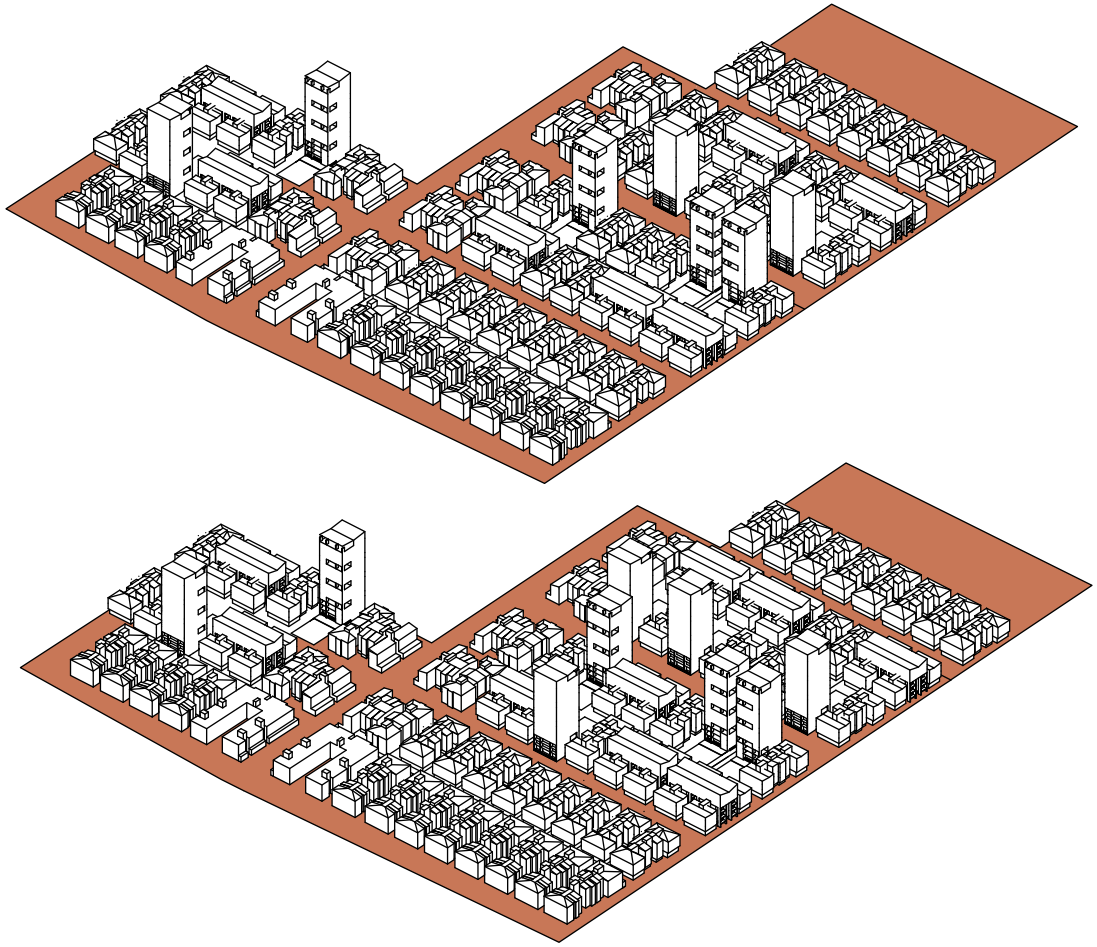
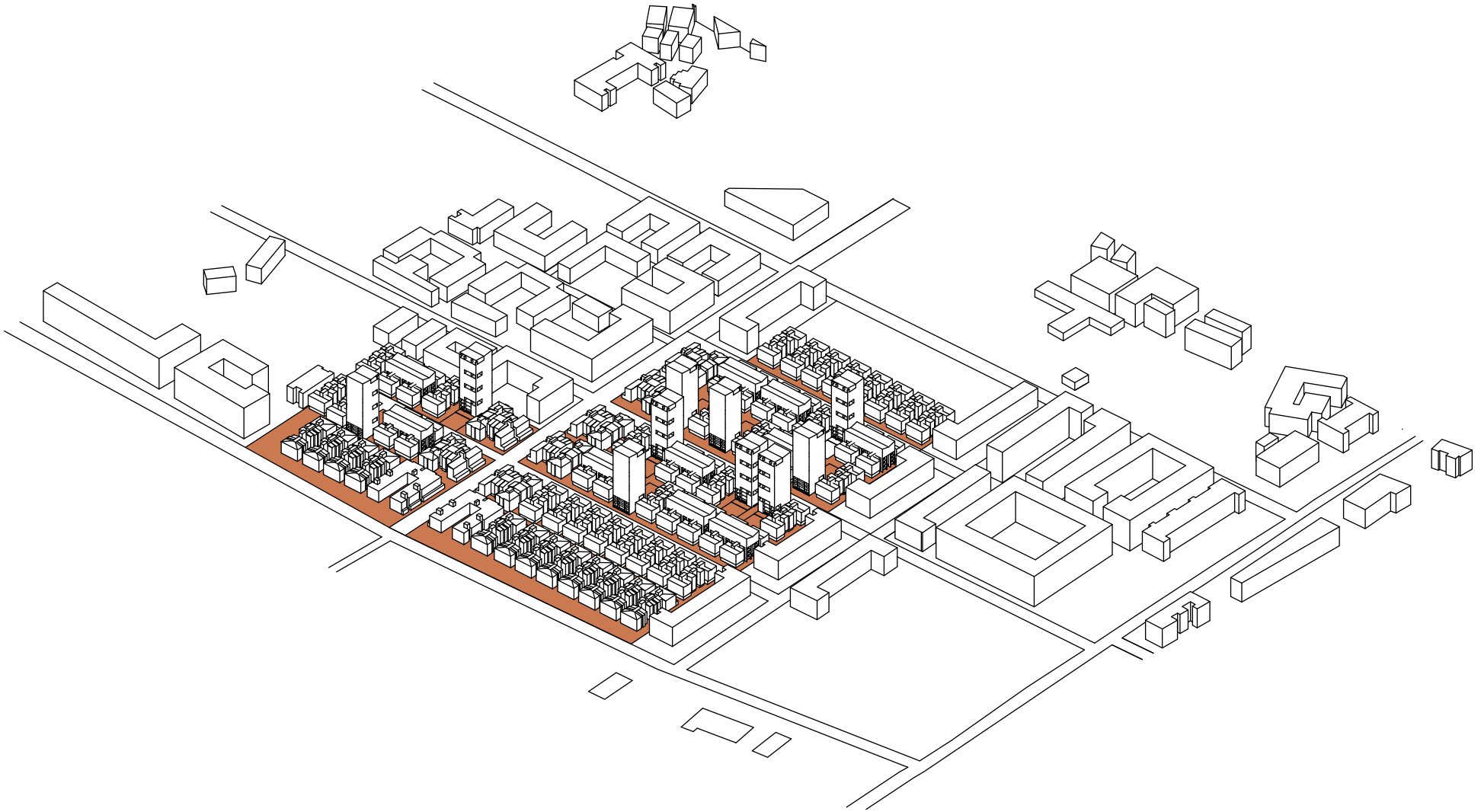


Masterplan




Masterplan

Conclusions

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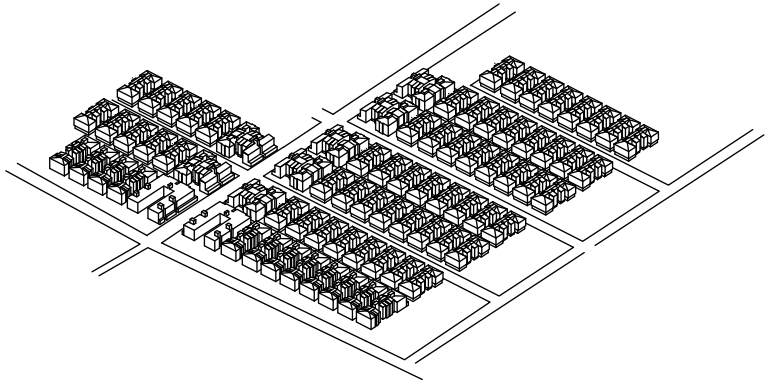
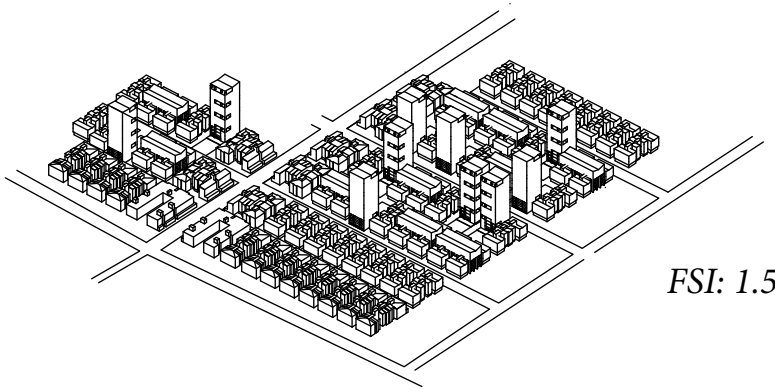
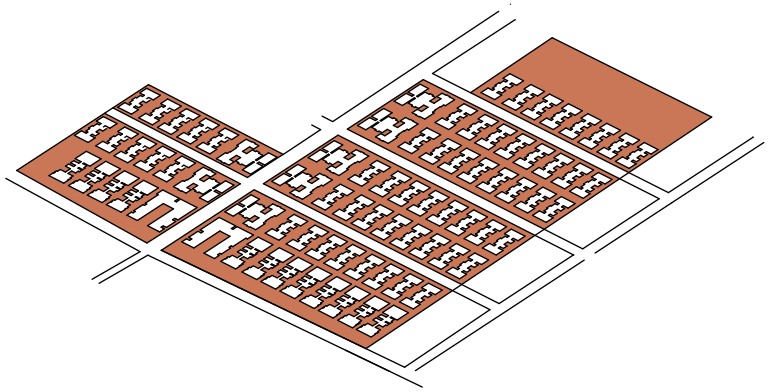
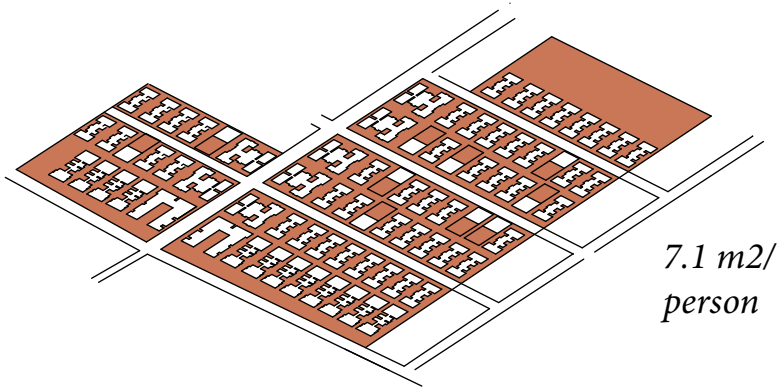




FSI: 1.55

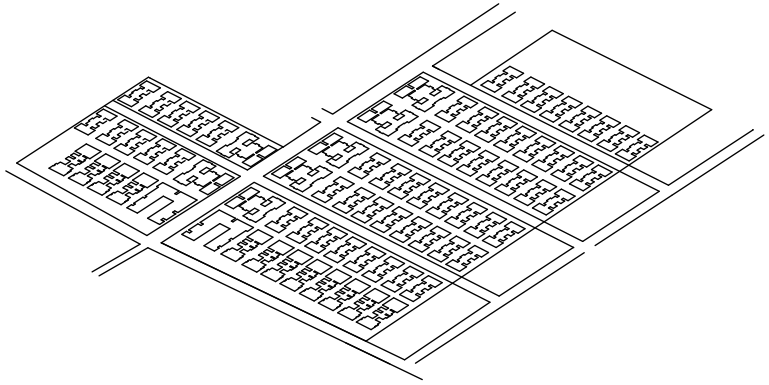
8.2 m2/ person

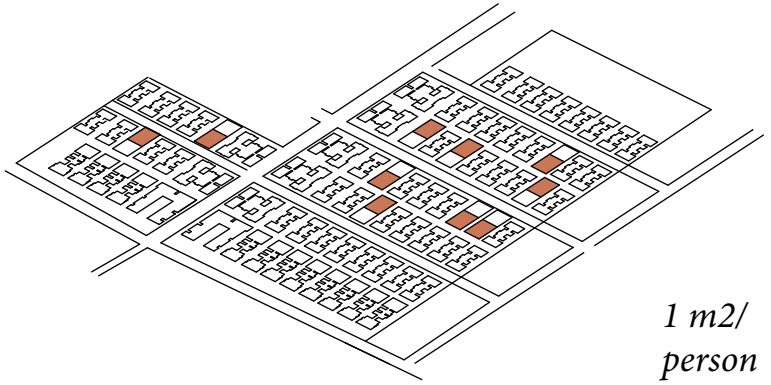




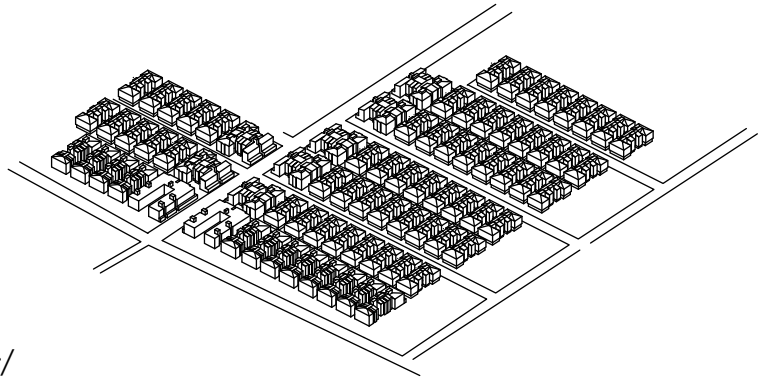
7.1 m2/ person

0 m2/ person

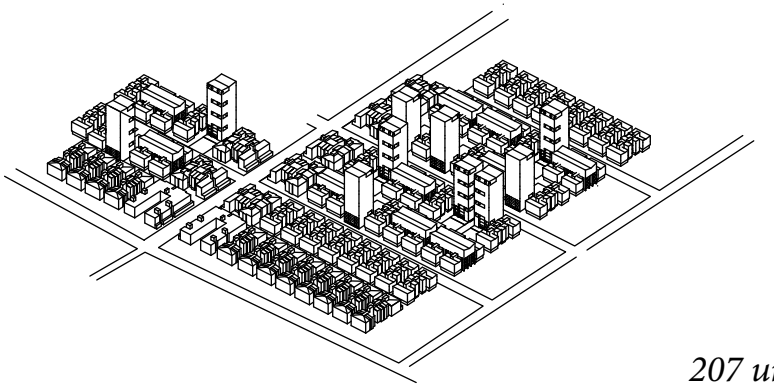




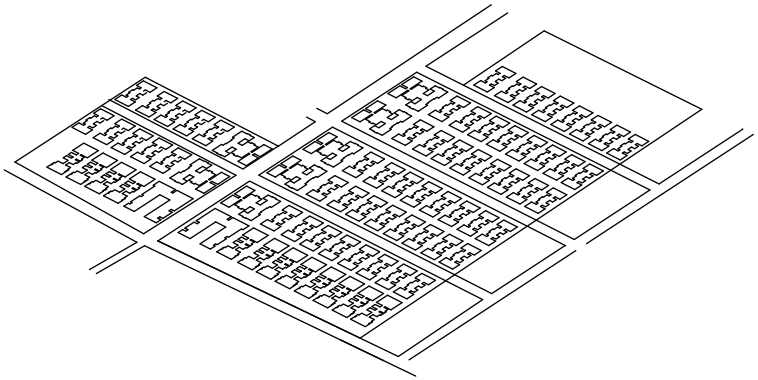
1 m2/ person



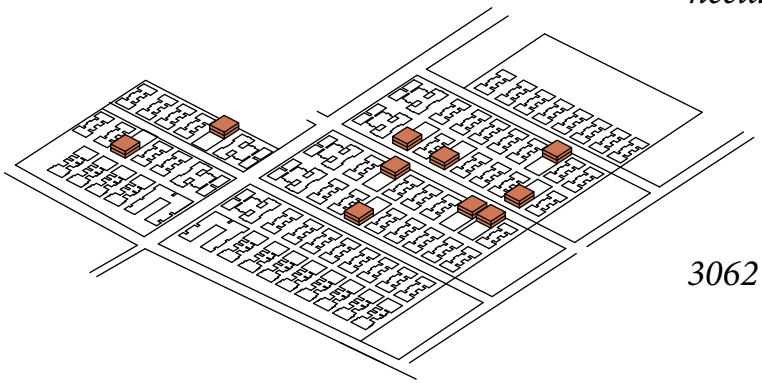
170 units/ hectare



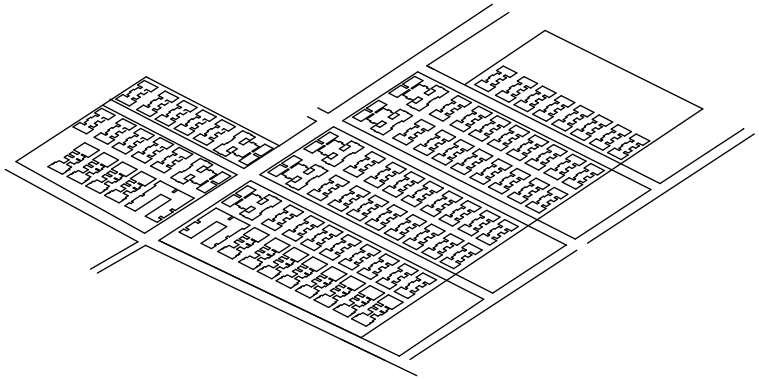
207 units/ hectare



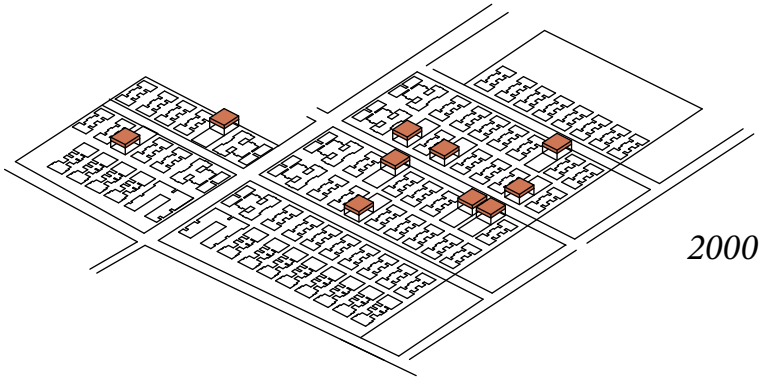
896 m2



3062 m2



0 m2

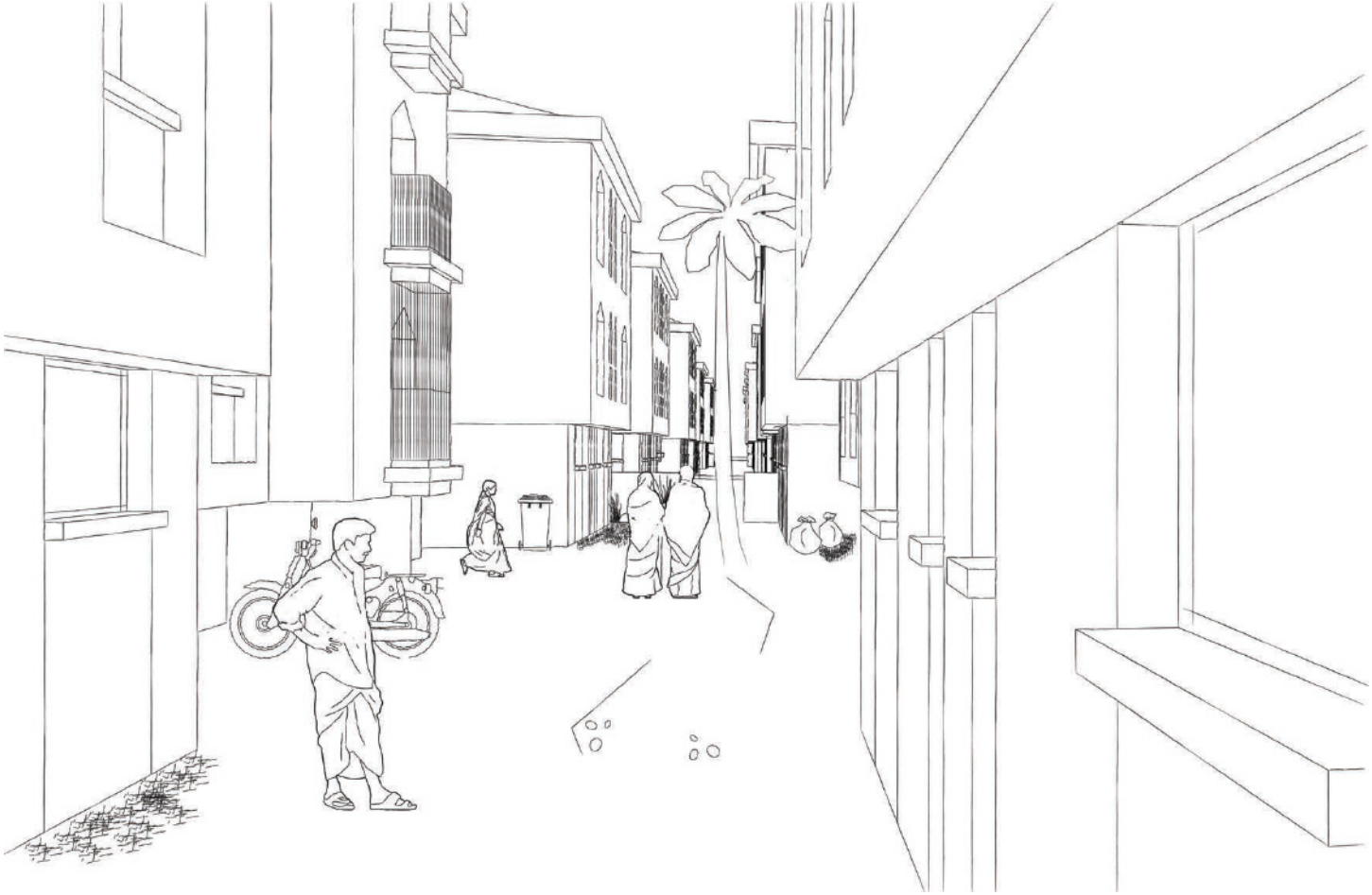


2000 m2

inbetween two buildings

new square

inbetween two buildings



small street

big street

big street

square

square