bridging realities

a response to spatial inequality in Mumbai

Wong Quin Ee Queenie
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Delft University of Technology
Faculty of Architecture, Urbanism and the Built Environment
MSc Architecture, Urbanism and Building Sciences

Architecture & Dwelling: Global Housing Graduation Studio
Mixing Mumbai - Affordable Housing for Inclusive Development
Master's Thesis
September 2018 - October 2019

Tutors:
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"Right to the City":

(1) the right to appropriate urban space

(2) the right to participate centrally in the production of urban space

(3) the right to diversity

Acknowledgement

I have learnt a lot throughout the year in the Global Housing Studio, and I would like to express my deepest gratitude to my tutors, Ir. Harald Mooij, Ir. Hubert van der Meel, Dr. Ir Nelson Mota, and Prof. Ir. Dick van Gameran whose constructive criticism and guidance helped me to bring this project into success.

I would like to extend my thanks to fellow peers from the Global Housing Studio, who gave me feedback and support throughout the year.

I would also like to take the oppurtunity to thank fellow students from Kamla Raheja Vidyanidhi Institute for Architecture and Environmental Studies (KRVIA) in Mumbai, especially Saniya Patil and Sadhvi Vanjare, for the welcoming and enthusiastic assistance during and after the excursion in Mumbai.

The last graduation days of model making would not be successful without the help of the staff in the modelling hall of the TU Delft Faculty of Architecture. Thank you.

Last but not least, my heartfelt gratitude to my friends: Tanya, Sindhura, Mandy, Samantha, Action, and my beloved family, for the constant love, companion, and moral support throughout the graduation days.

First Impressions

The most vivid impression I had of the city of Mumbai is the stark contrast between the tightly cramped communities with poor living conditions, and the expensive luxurious towers in the background, a physical manifestation of the income disparity in the city. On the other hand, although it was my first time in Mumbai, I felt a sense of familiarity. I later realized that it is the diversity in this place, the people from different places, speaking different languages, wearing different costumes, having different writings, cultures, and religion, that reminded me of Kuala Lumpur, the multi-cultural city I grew up in. I then made a mental note to myself, that

whatever I design in the end should not be a one-size-fits-all solution.

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01 background & problem

02 spatial research

03 design proposal

04 building technology

05 operational model & urban design

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“Two-thirds of the city’s (Bombay) residents are crowded into just 5 percent of the total area, while the richer or more rent-protected one-third monopolize the remaining 95 percent.”

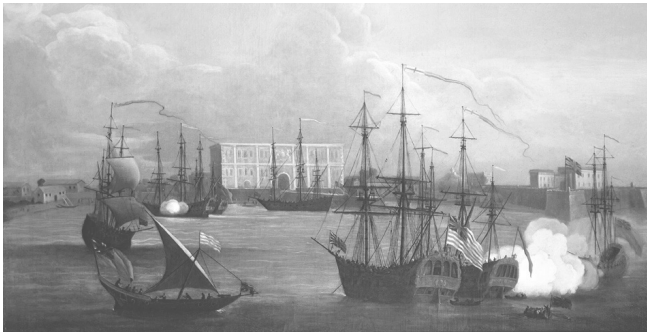
Suketu Mehta
Maximum City: Bombay Lost and Found

01

background

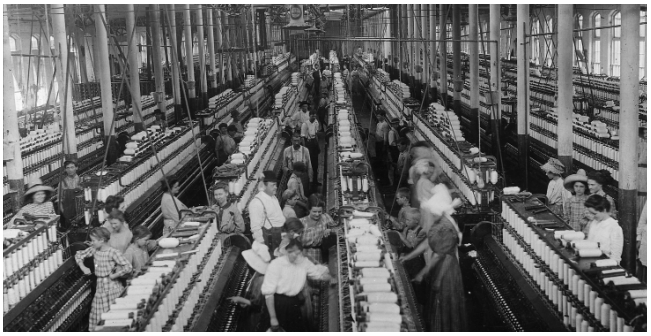
Historical Background

A Pictorial Timeline



The Birth of a City
1500 - 1850

The archipelago of seven islands is unified through the reclamation of land, characterised its strategic value to the systems of global trade driven by European Colonialists, and the local paddy farmers, fishermen, and palm juice distellers.



Industrialization & Centralization
1850-1920

Mumbai expanded through new infrastructure as a center for industry and culture. This period saw the booming of the cotton industry in Mumbai as the British shift their sourcing of cotton trade from the United States to India.

Transition to Modernity
1920-1950

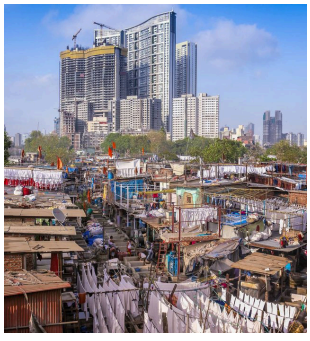
Following the industrialization, transportation and infrastructure were developed rapidly to facilitate the trade, The population has increased by 20% in 1920-1940, with an increase in migration diversity, which made Mumbai a polyglot city.

Post Independence
1950 - 1960

After the Partition of India on 15 August 1947, over 100,000 Sindhi refugees from the newly created Pakistan were relocated in the Maharashta Region, and Bombay witnessed the emergence of migrants.

Emergence of the Megalopolis
1970s-1980s

Rapid growth of population and a new economic model of de-industrialization leads to expansion of the cities' statutory limits. The spilling of metropolitan area growth in Mumbai Metropolitan Region (MMR) made it the largest metropolitan region in India.



Global City
1990 -2010

The liberalization of the economy in 1991, also meant a transformation of the geography of the city. The real estate market was stimulated by a surge demand for luxurious housing and commercial establishments while the working classes in the city faced a shortage in the affordable housing market.

A Timeline of Urban Expansion in Mumbai

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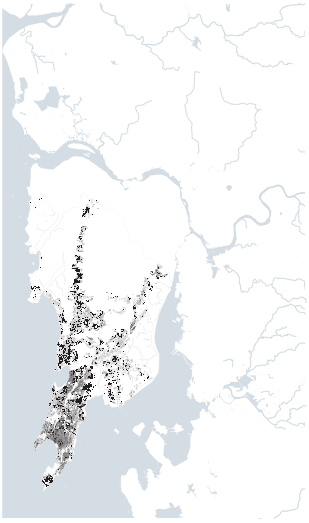

Post Independence
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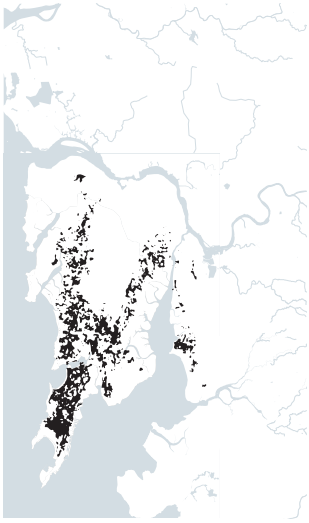

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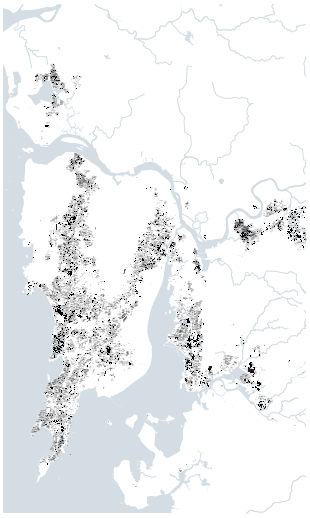

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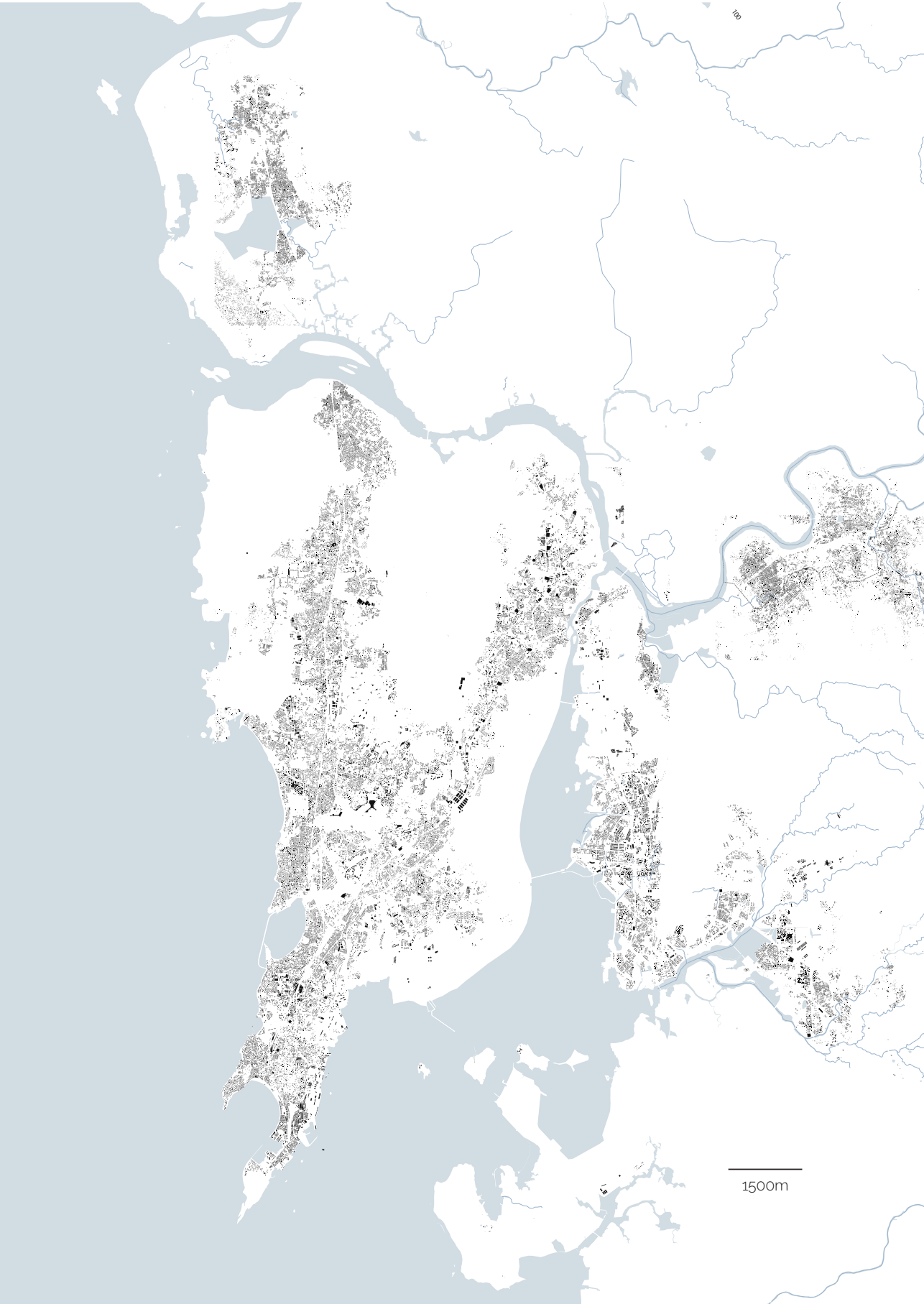

100
1500m

India and Mumbai Today

The Expanding Periphery 2010s- Now

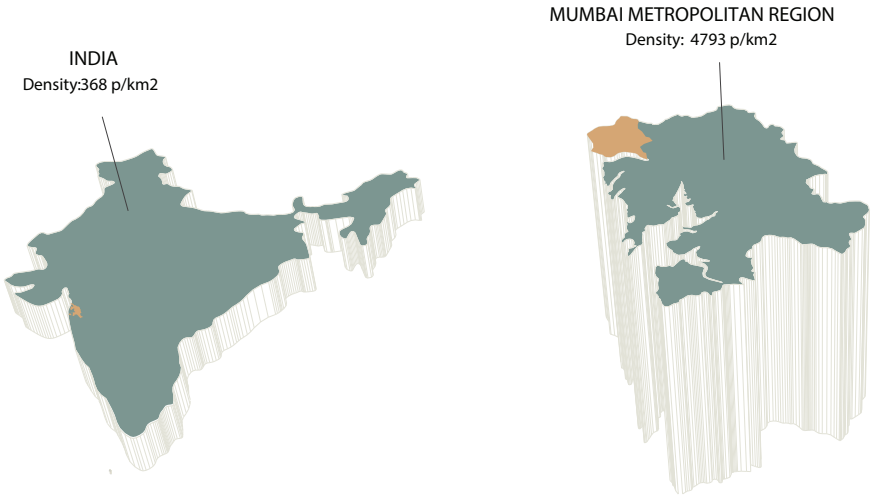
India is on its way of becoming the most populous country by 2024

Today Mumbai can no longer be considered a separate entity, but rather looked upon as partof the Mumbai Metropolitan Area, its reach continuing to touch further North and East. Updates in infrastructure allow it to continue sprawling onto sites that were previously untouched by big development. Virar and Nalasopara are sites of further development at present, as the locations of the last stop on the railway line running North-South into Mumbai. In effect, this delineates the limit of the expansion to the North. At the same time, new sites further East into Navi Mumbai are being developed for affordable housing schemes, as they are not considered extremely valuable land.

India and Mumbai has undergone some major transformation over the past decade, including Narendra Modi as Prime Minister, the introduction of the Goods and Services Tax (GST), Snehal Ambekar as Mayor of Mumbai, the completion of the Mumbai Metro and Monorail etc. New development has also been plan to accomodate its peripheral expansion, including the Navi Mumbai Airport, which first phase is to be completed in 2020, and the Mumbai Mumbai Trans Harbour Link (MTHL), which is a 21.8 km, freeway grade road bridge connecting Mumbai with Navi Mumbai, to be completed in 2022.

Housing of this time period is characterized by tall, tightlyspaced residential towers. The developments targeted towards the EWS and LIG sectors tend to be tall, with a single unit type repeated across each level and have little to no useful public space. All lavatories are located on the exterior facades in such a way that they form shaft spaces when two buildings are constructed side-by-side. Newbuilds are designed and places without regards for context; the same building can be repeated on multiple different sites. Redevelopments usually stay within the pre-existing plot boundaries and tend to form extrusions of what was there before. Density is therefore achieved, using either of these two methods: new-builds or extrusions, both of which generally disregard the need for quality public space and amenities.

Population Density

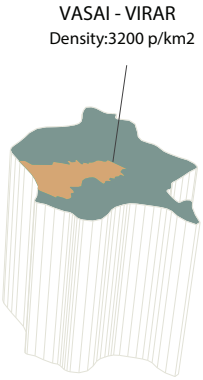


India

The population density in India is above average, ranking it amongst the top 20 most dense countries. The density has gone up from 325 persons per square kilometer up to 382 persons per square kilometers in 2011. Even though the density in India has increased every year, the rate of increase has slowed down in the last decade.

Mumbai's Metropolitan Region

Mumbai's Metropolitan Region is in the top 5 of the most dense cities in the world. This is partly a consequence of the fact that more than 40% of the inhabitants of Mumbai live in slums. It's most infamous slum, Dharavi for example, has a population density of over 340.000 persons per square kilometers.



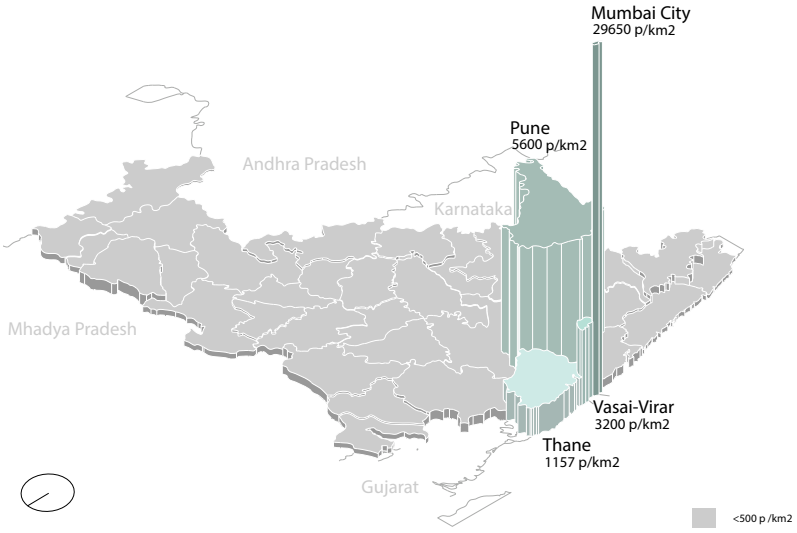
Vasai-Virar

The density is lower that that of Mumbai's Metropolitan Region, however it is still very dense compared to other cities in the world.

Nalasopara

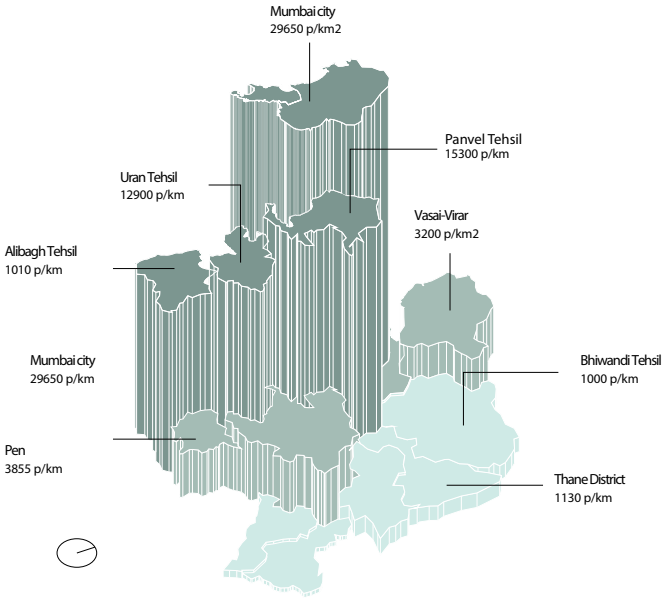
The density in Nalasopara is astonishingly high, with around 30% of the population of Vasai-Virar living in an area which makes up only 11% of the whole of Vasai-Virar.

Population Density in the Region



Districts in Maharastra

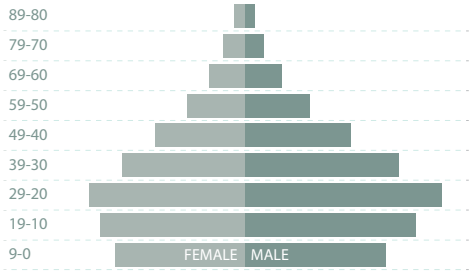
The Population Census 2011 reveals that population of Maharashtra has increased by 15.99% in this decade compared (2001-2011) to past decade (1991-2001). The denser districts / subdistricts in the state are areas closer to Mumbai City, including Pune, Thane, and Vasai-virar.



Mumbai and its Surroundings

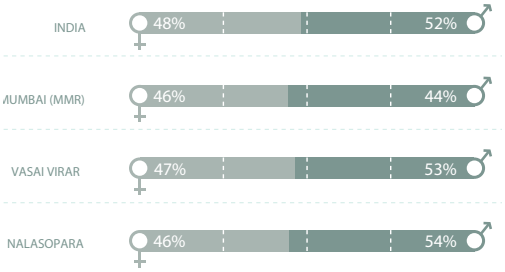
Mumbai city is the most dense area in the Mumbai Metropolitan Region with about 30000 persons per square kilometer.The density reduces when going further away from Mumbai city with the lowest density being found in the east of the MMR which is around 1000 persons per square kilometers. Even Though Mumbai city is the most attractive destination for people seeking a job, the migration seems to be shifting from mumbai city to the north to places like Nalasopara, where development has started on fresh grounds.

Demography



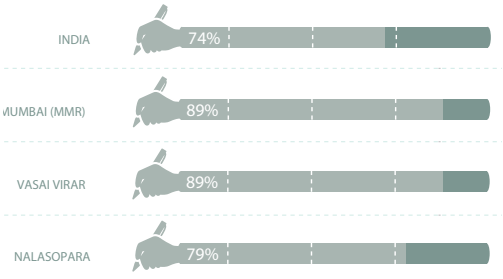
Age Pyramid

The age pyramid is the same as that of India with the greatest number of the population being between 20 and 30 years old.



Sex Ratio

The major cause for the imbalanced sex ratio between males and females is considered to be the violent treatments of female children at the time of birth. The sex ratio in India has increased from slightly from 933 females per 1000 male in 2011 to 940 females per 1000 males in 2011.

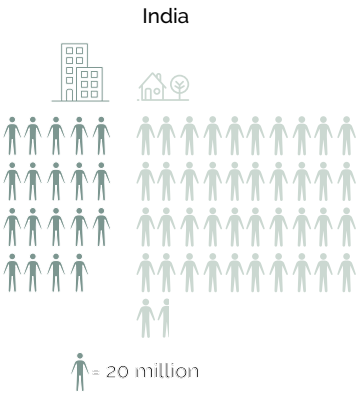


Literacy

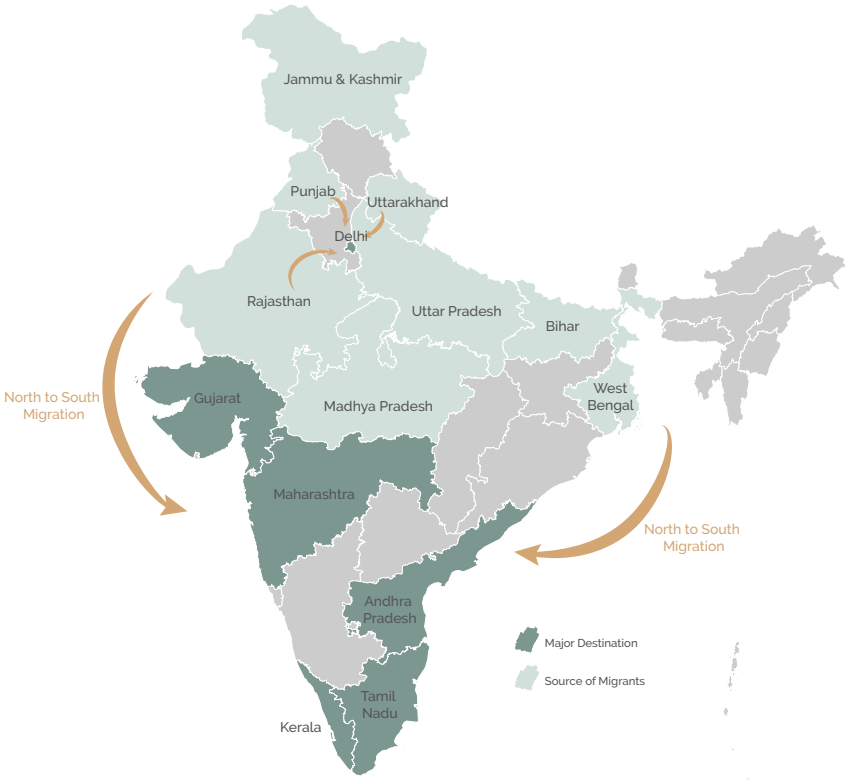
The literacy rate in the MMR has risen from 86% in 2001 to 89% in 2011 and is very much above the Indian average. This shows a positive growth in terms of overall literacy. When looking at the literacy rate based on sex there is a significant growth in the literacy rate of females.

Rural vs Urban

India as a whole is about 30% urbanized, while Maharashtra is 45% urbanized (MOHUA, 2018). Perhaps a much more interesting phenomenon happening within India is the Rural-Urban migration and seasonal internal migration.

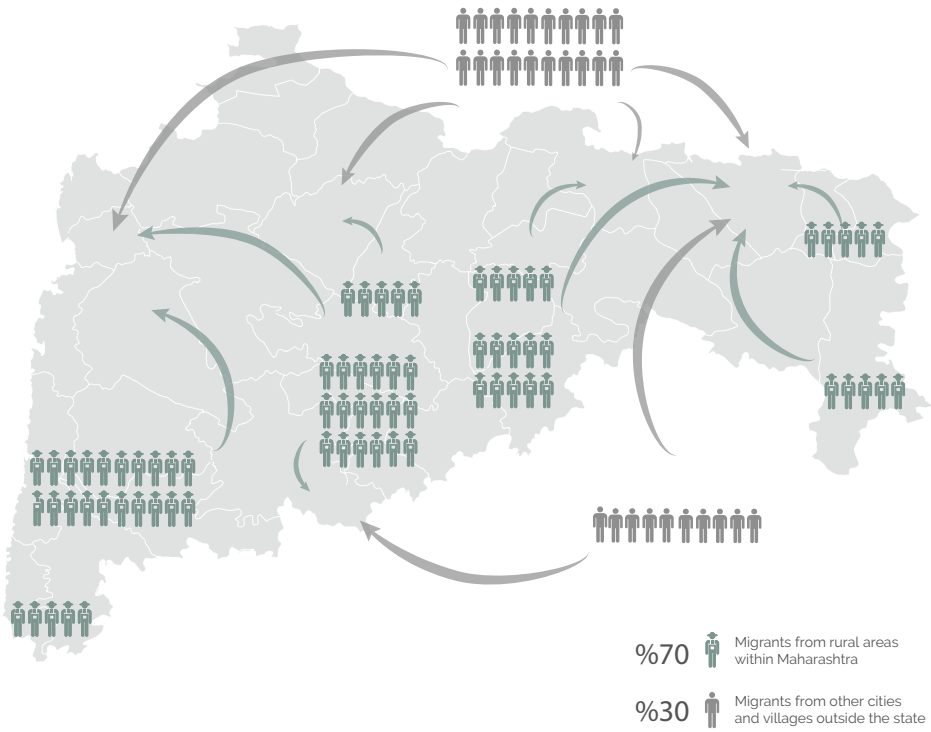


Migration



Internal Migration in India

There is a very clear trend of Southward migration, where people from the less affluent Northern states make their way to more affluent states. The majority of these internal migrants come from rural areas often looking for jobs in the larger cities. Some are part of the group of seasonal migrants who look for work in cities and return to harvest crops in the village, later in the year, while others hope to make the move to the city a longer term decision. These seasonal workers usually work in construction, hotels, textiles and manufacturing, transport and domestic work, to name a few examples, but the lack of provision of dwellings forces them to often live in rented rooms, open spaces, slums, pavements and even their worksites (Sharma, 2017).



Migration in Maharastra

Zooming into Maharashtra, the overwhelming majority of migrants moving to the big cities are people from within the state, usually living in rural areas. The other 30% are migrants from other parts of the country.

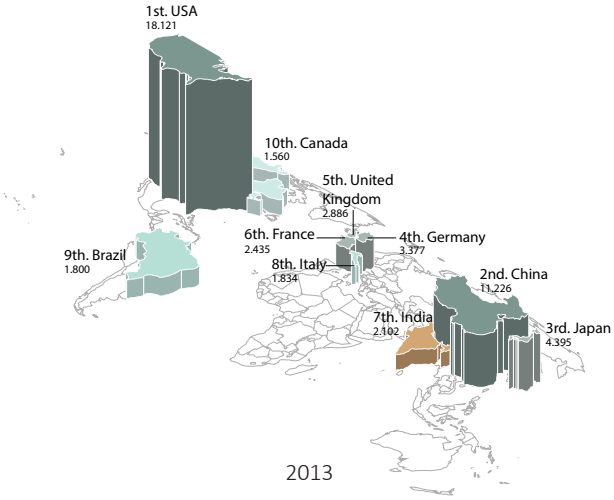
Economy

GDP Rankings

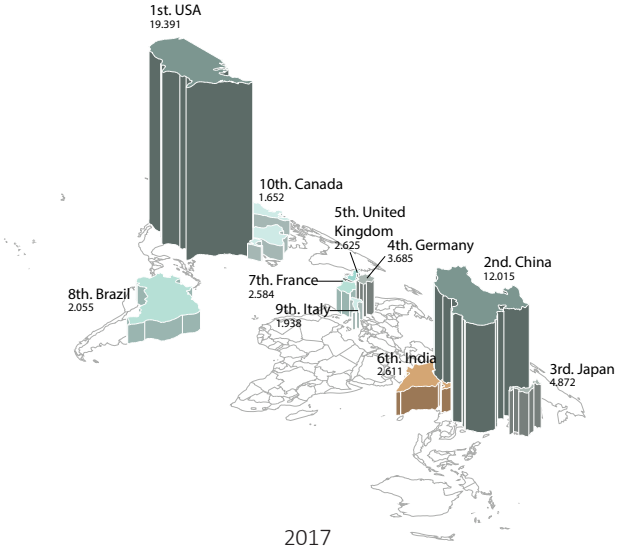
There has been a notable rise in India's performance at the World's Gross Domestic Product (GDP) Rankings throughtout the past decade. In 2013, India was ranked 7th with a total GDP of 2.102 trillion USD, and was ranked the 6th in 2017, with a total GDP of 2.611 trillion USD.

India's economy hasn't had a down year in this century and has been growing at around 7% per year ever since Prime Minister Narendra Modi took office in 2014. In 2018, India's economy will be one-third bigger than when Modi took office.

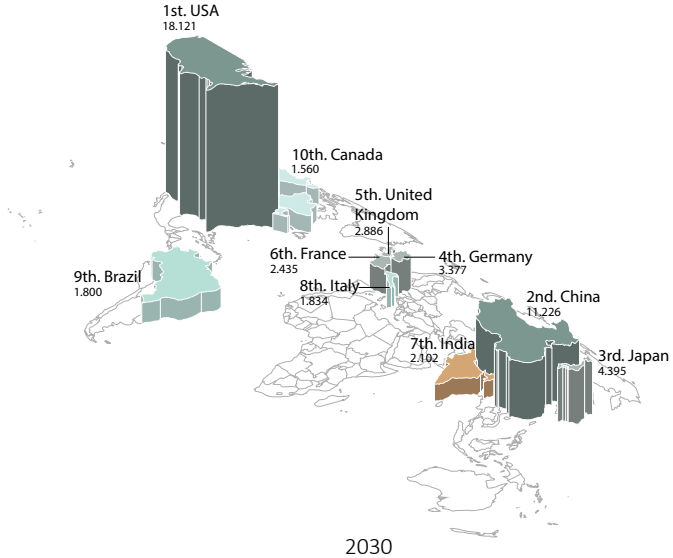
In a report by PricewaterhouseCoopers (PwC) titled "the world in 2050", they projected that the emerging markets will continue to be the growth engine of the global economy. By 2050, China could
be the largest economy in the world, accounting for around 20% of world GDP in 2050, with India in second place and Indonesia in fourth place.



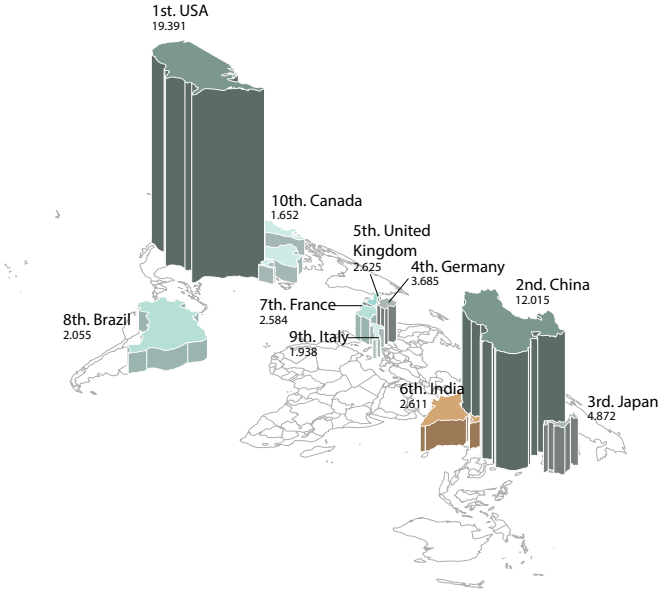
2013



2017



2030



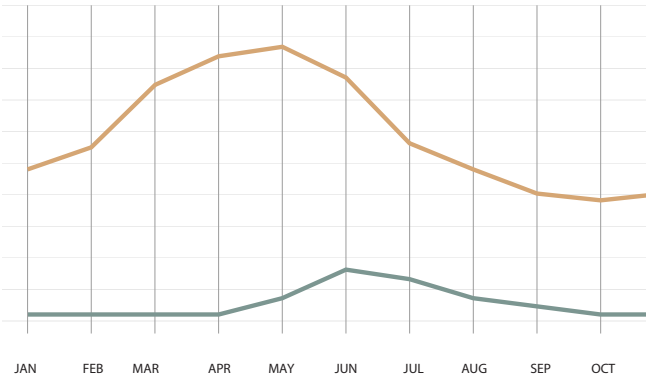
2050

Figure
Comparison of GDP Ranking by current dollars. Source: IMF: World Economic Outlook (WEO) Database, PwC

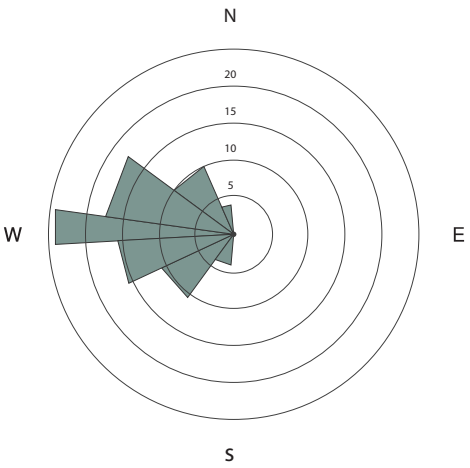
Climate

From March till May the average amount of sunlight in India is the highest, which correlates with the maximum temperatures which are reached around May. The maximum temperature can reach 41 degrees celsius, and the minimum temperature can be around 16 degrees celsius. This however differs from region to region, since India covers a large area resulting in different climates between north and south.

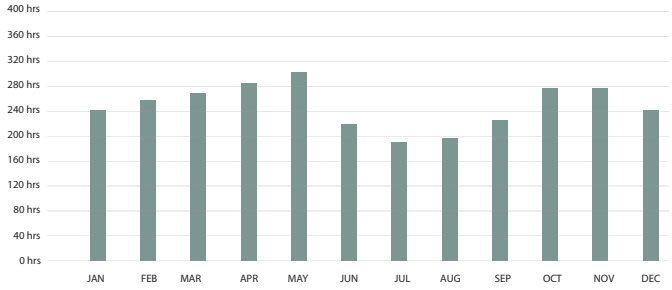
Precipitation in India causes many problems during july and august especially with the maximum precipitation at around 200mm. Global warming also enhances this effect with the indian sea level rising about 1.3mm per year and precipitation increasing with about 6-8% by 2030. There are many areas in mumbai that are considered as Low elevation zones, which are prone to flooding. This results in India being highly vulnerable to climate hazards and the people living in slums and low lying areas often the most.



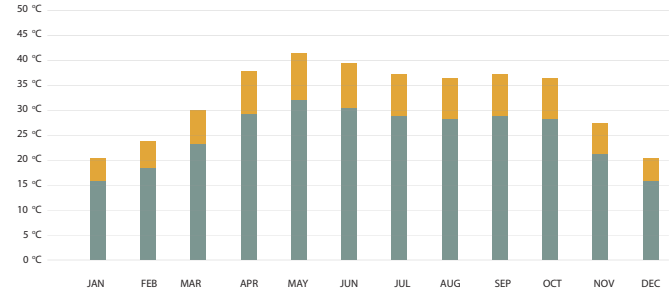
Max and Min Wind Speeds Per Month (2016)



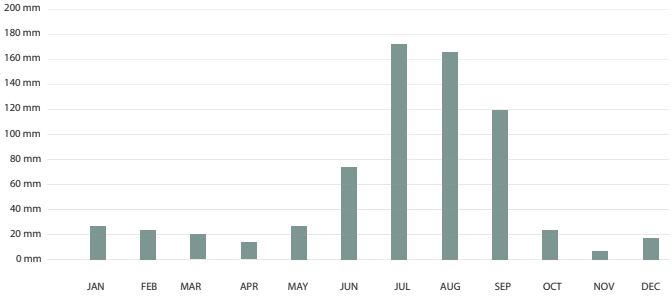
Wind - Rose Plot (2016)



Hour of Sunlight Per Month (2016)



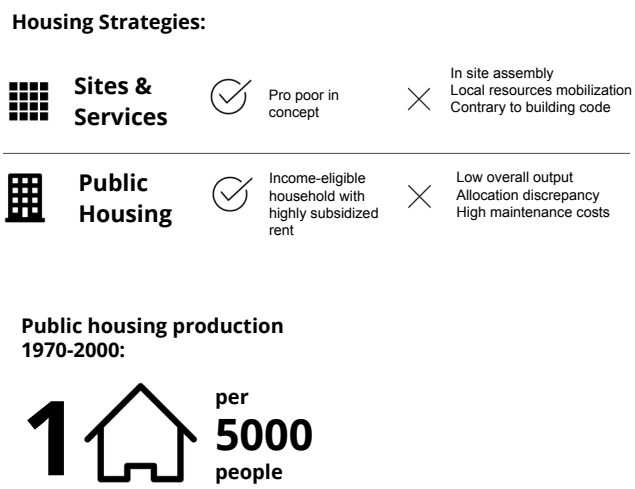
Max and Min Temperatures (2016)



Average Percipitation Per Month (2016)

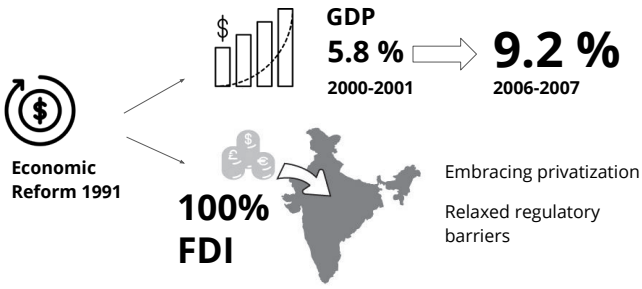
Housing in India

Brief Overview



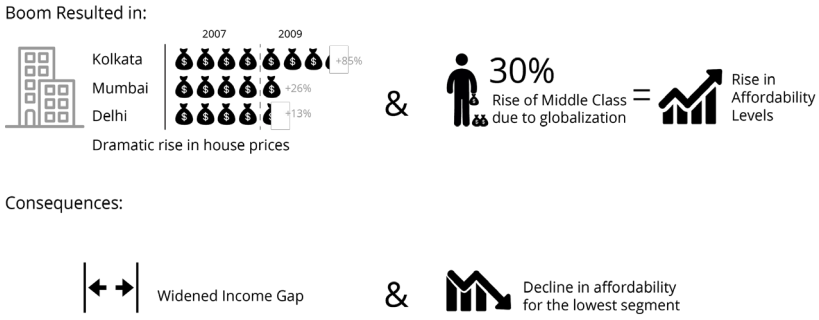
Housing since 1947

There were two housing strategies: Sites and services and Public Housing. Sites & Strategies is pro poor in concept, but it relied excessively on neoliberal principles of affordability, cost recovery and replicability to succeed. The principle of progressive development ran contrary to local building codes and regulations. Therefore Public Housing aimed at income-eligible households at highly subsidised rent became popular. However, the low overall output, allocation discrepancy and high maintenance costs makes the economic case for moving away from this strategy. In 1970-2000, the public housing production on average was 1 unit per 5,000 people. Typical design for affordable housing is to compress a home into a single room with basic provision. In 1987 National Housing Policy announced with government role to provide for the poorest and facilitate the other income groups.



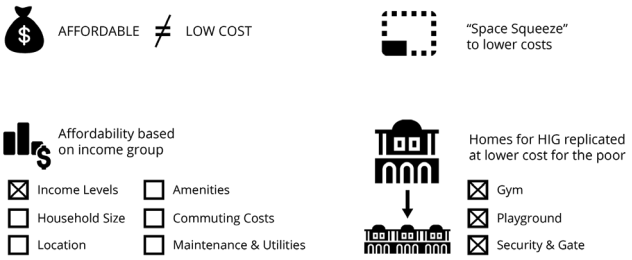
Housing after 1991

The country-wide economic reform affected trade, industry, finance and housing. By embracing privatization, it relazes regulatory barriers and allows 100% foreign direct investment. It has also increased the GDP significantly. On the other hand, despite financial crisis, housing prices remained stable. This economic reform however brought huge changes to the housing situation in India.



Housing Boom in 2000's

Following the economic reform, the rapid appreciation of property lead to dramatic rise in house prices. Housing prices in 2009 were above 2007 levels in Kolkata by 85 per cent, in Mumbai by 26 percent, and in Delhi by 13 per cent after prices rose by30 per cent in 2008. There was also a dramatic rise of Middle Class, which became the largest group of consumers, and as a consequence of globalisation, the lifestyle and consumption pattern of this group defines housing aspirations and attitudes. The rise of middle class is equated with the rise in affordability levels, while prices of homes has gone up, the median income of avg households has trebled. Metropolitan cities have a higher median household income and higher population living in slum condition compared to secondary cities. This housing boom is accompanied by the widening of income gap the and decline in housing affordability for the lowest segment.



Affordable Housing Today

The affordability levels today are decided based on income groups, ignoring factors like household size, location, quality (amenities), commuting costs, utility costs and maintenance costs. "Space Squeeze" is a common stratgy to lower cost, and spaces designed for the Middle Income Group and Higher Income Group are replicated at a fraction of the cost for the poor due to rising aspirations towards a middle class lifestyle. These housing might include middle income aspirations such as gyms, playgrounds, security systems etc.

Current Household and Income Groups Structure

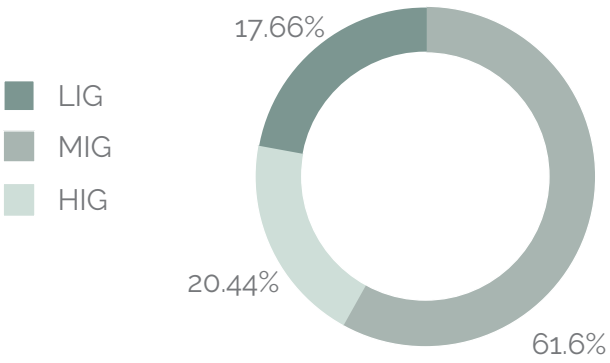
Household Structure

The average number of children in the whole of India is 3 per household (2 boys and 1 girl) , while in the MMR an average houshold has 2 children (1 boy and 1 girl).

Income Groups

Out of total 228.4 million households of the country at the end of 2009-10, 47.6 million were high income households (20.44 per cent), 140.7 million (61.6 per cent) were middle income households and 41.0 million (17.96 per cent) were low income households.

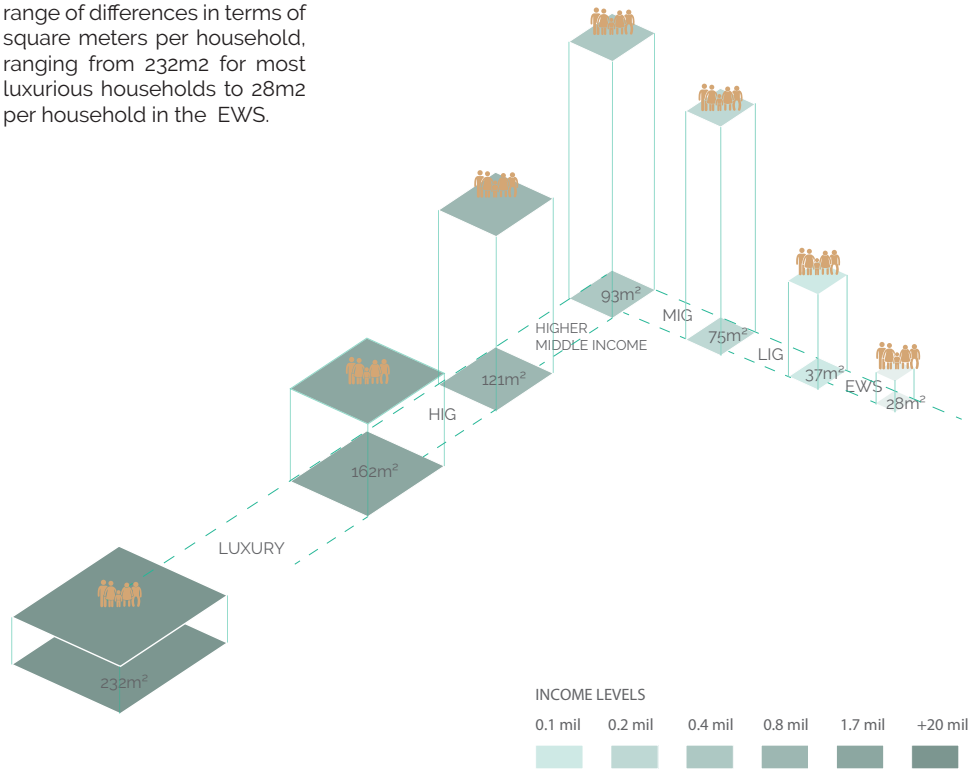
Middle Income households are the largest income group in modern India. as well as the largest consumer group for housing.



Affordability

The affordable housing sector is the fastest growing segment in India, and there is a paradigm shift of affordable housing tailored to the aspirations of the middle class living style.

The huge disparity of income gap in India results in a wide range of differences in terms of square meters per household, ranging from 232m2 for most luxurious households to 28m2 per household in the EWS.



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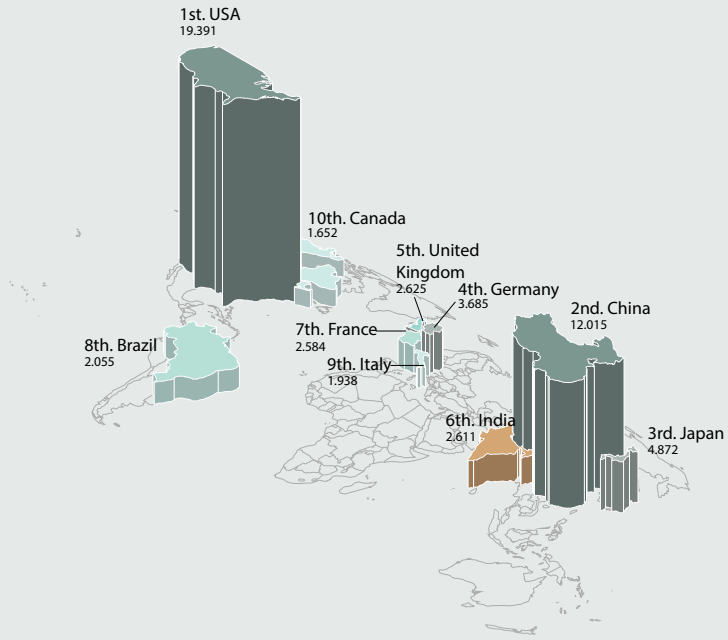
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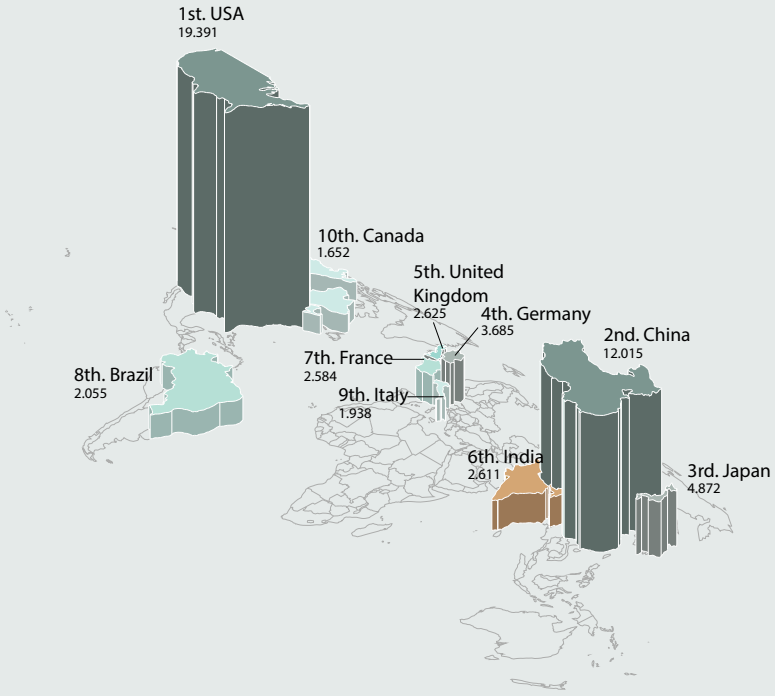
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India is projected to be the 2nd largest economy in the world by 2050, being the growth engine of the global economy in terms of GDP

Income inequality gets worse; India's top 1% bag 73% of the country's wealth, says Oxfam

In the period between 2006 and 2015, ordinary workers saw their incomes rise by an average of just 2% a year while billionaire wealth rose almost six times faster.

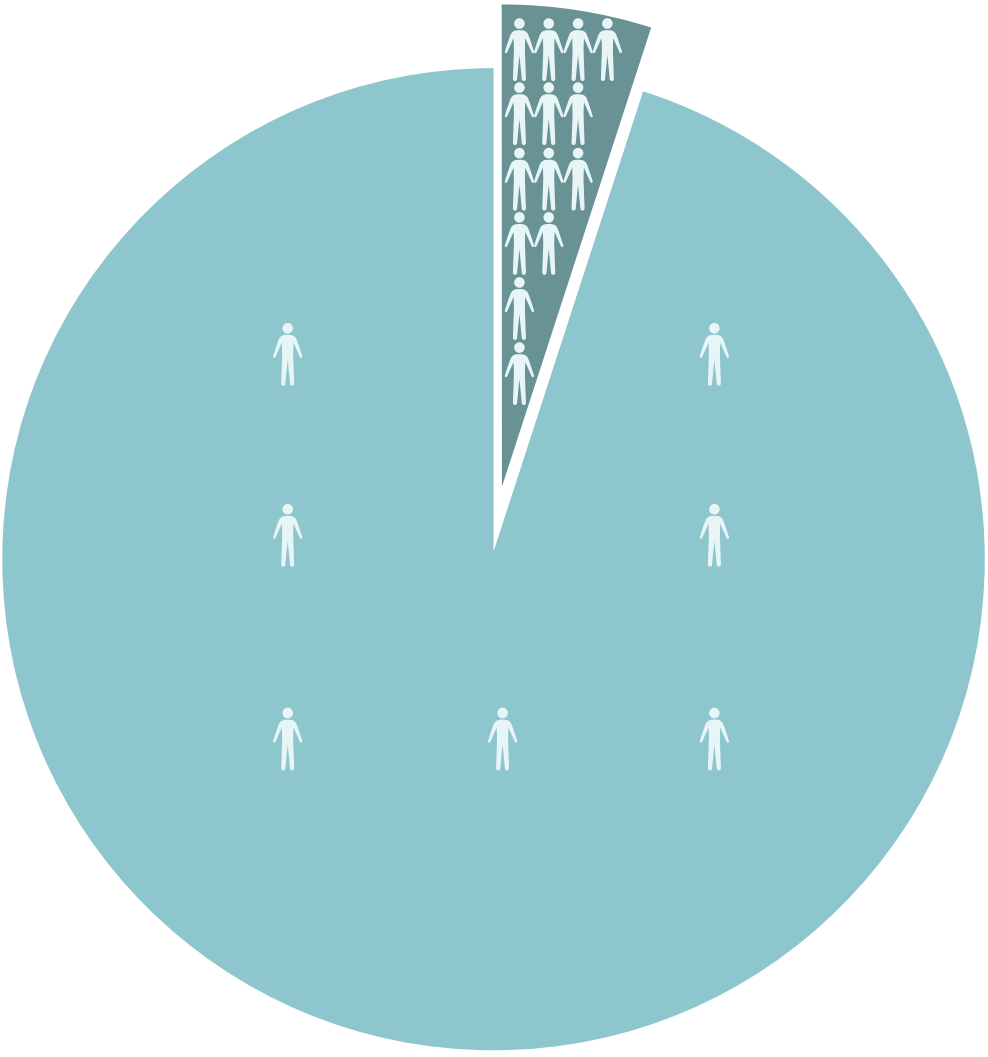
BusinessToday.in Last Updated: January 30, 2019 | 16:50 IST

However, in the chase of GDP growth, the income gap in India is widening at a shocking rate.

In 2017, India's richest 1% held 58% of the country's total wealth, while in 2018 the top 1% holds 73% of the wealth.

The income disparity is especially apparent in Mumbai, and it is not merely a matter of wealth distribution, but also a matter of spatial inequality, a matter of access to land, and open spaces.

= 1,000,000 people



"Two-thirds of the city's (Bombay) residents are crowded into just 5 percent of the total area, while the richer or more rent-protected one-third monopolize the remaining 95 percent."

Suketu Mehta
Maximum City: Bombay Lost and Found

The Development Plans for Mumbai is criticized as "a form of 'planned' exclusion of the poor and the middle class", which have failed to address issues of slums and affordable housing.

East-West division in Nalasopara and Vasai-Virar

The issue of exclusion and spatial inequality also extends to Nalasopara and the Vasai-Virar region, the Northern tip of Mumbai's urban expansion.

The railway that connects Nalasopara to Mumbai creates a prominent East West Divide Middle Income Groups living in cooperative housings or gated apartments are spread across the West; while most of the urban poor living in chawls concentrate on the East of the railway. Many of the single-storey Baithi chawls were replaced by five storey "handshake chawls" on the exact same footprint, leaving minimum distances in between buildings.

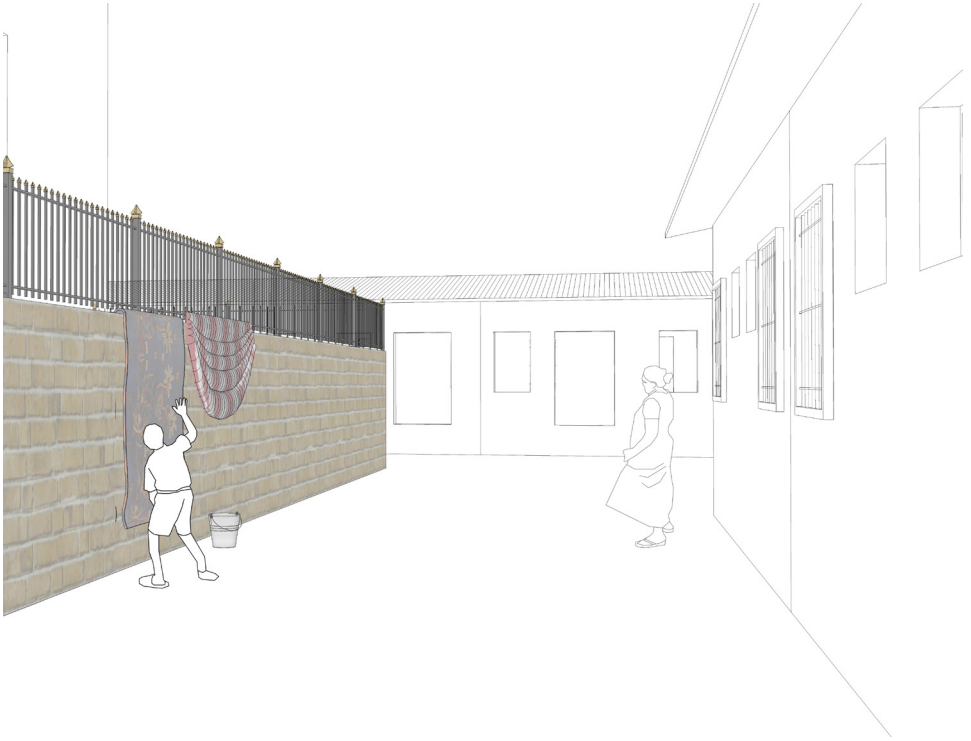
Gated Communities n Nalasopara

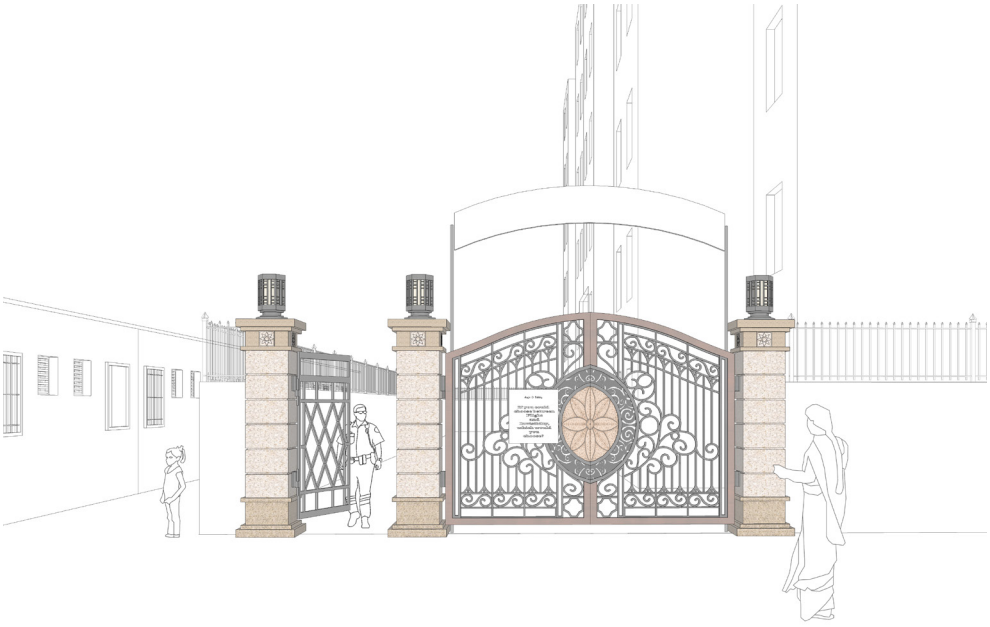
Gated communities are booming across Nalasopara, and in some cases the only open spaces available in the area are within the compounds of gated communities.

In other words, a child who grew up in the gated apartments could enjoy the communal gardens; while a child who grew up in the "handshake chawls" would possibly spend most of the childhood in the long and dark corridors.

Open spaces in Gated Communities

Open spaces in Handshake Chawls





This "conspicuous separation" between "gated communities of the privileged and ghettoized territories of the marginalized people" creates harsh boundaries and unfairness in terms of accessibility to open spaces.

Ghettoization and Relocation

Water Supply

Security

Education

Job Oppurtunities

Connection to the City

Resources made unavailable due to Relocation and Ghettoization

There are two kinds of general attitude towards the urban poor, firstly, separation with physical barriers; and secondly, relocation to make space. Up to the mid-1980s, slums dwellers were displaced to hardly maintained buildings in the peripheries of the city by the Slum Rehabilitation Authority (SRA), where water supply, security, education, job opportunities, and connection to the city were barely accessible.

Results of Exclusion

These acts of exclusions form pockets of ghettoization, breeding social tension, insecurity, violence, and psychological disorders.

Lack of Decision Making Power among the People

Slum Rehabilitation Authority (SRA) displaced Resident

- displaced to periphery, lack of connections
- lack of maintainence of new building
- does not feel safe
- lack of water supply
- unemployment

Baithi Chawl Resident

- Baithi Chawl under the threat of being redeveloped into handshake chawl
- builders did not provide the promised compensation and temporary housing
- refuses to move because of lack of water supply in handshake chawls

Sri Prastha Cooperative Housing Resident

- Buildings falling apart
- Residents seriously injured by falling slab
- There has been ongoing rumours of possible redevelopment for the past decade but nothing has happened

People could only wait for something to happen, without control over the future of their neighborhood. Policies that are supposed to be equal for all create conditions that are equally miserable.

Problem Statement

The **widening of income gap** leads to

spatial inequality in Mumbai and Nalasopara, which contributes to

the unfairness in **accessibility to open space,**

harsh separation across income groups,

ghettoization of marginalized groups,

and the **lack of decision-making power** among people,

which all together

denies people to The Right to the City

“Right to the City”

(1) the right to appropriate urban space

(2) the right to participate centrally in the production of urban space

(3) the right to diversity

proposed by Henri Lefebvre and summarized by Purcell and Duke.

Design Goal

The project therefore aims to

Create **accessible and meaningful urban spaces** across income groups,

soften boundaries among income groups while having appropriate borders,

provide oppurtunities for **people participation** in the development process,

and accommodate and encourage **diversity,**

which all together

bring The Right to the City to the People

Research Question

How can housing and urban design allow **equal participation** in the development of the built environment and **equal access to open spaces** across income groups?

Spatial Level:

1. What are the aspirations of different income groups?

2. What are the challenges and strategies for mixed income housing?

3. What is the suitable housing configuration to encourage social interaction while keeping appropriate borders?

Organizational Level:

4. What is the appropriate level of intervention for the government, sponsor, and user?

5. What are the models of participatory design?

“Borders are porous edges... boundary is an edge where things end... Whereas the border is an edge where different groups interact... an active zone of exchange.”

Richard Sennett
Building and Dwelling: Ethics for the City

02

research

Research Methods

1. Background Study

Hard and Soft Data

Before visiting the site, we have conducted typological and morphological analysis and studied relevant data and literature to grasp the reality of the larger context of Mumbai and India. We were divided into groups to study specific periods of Mumbai. The information was then compiled into a research booklet, which act as a collective knowledge base containing background information such as demography, politics, economy, climate, history etc, This allowed us to understand the major events, changes, and aspirations of the period in relation to its urban transformation.

Spatial Mapping and Typological Studies

The spatial transformation of the city, and key housing projects that represented the "zeitgeist"of the periods were also included in the collective research booklet.

Academic Literature

A wide range of topics including urbanization in India, housing policies in India, and dwelling in Mumbai was also studied. In addition, general literature that were relevant to the issues of the global south but not specific to Mumbai was also studied.

Written Narratives

Reading written narratives including "Maximun City""by Suketu Mehta and "Arrival City" by Doug Sanders also helped to provide a more presonal, first person point of view to the context of study.

2. Site Research

Interviews

To get a better understanding of the context from a first person point of view, we spoke to many locals in Mumbai and Nalasopara.

Micro-Visual Ethnography

Using ourselves as objects of research, we experienced, identified, and then recorded the findings through photographs, videos, and sketches, and then compiled them into a catalog of perpsctive drawings known as "Book of Patterns", which would be used as a guide for further research and designing,

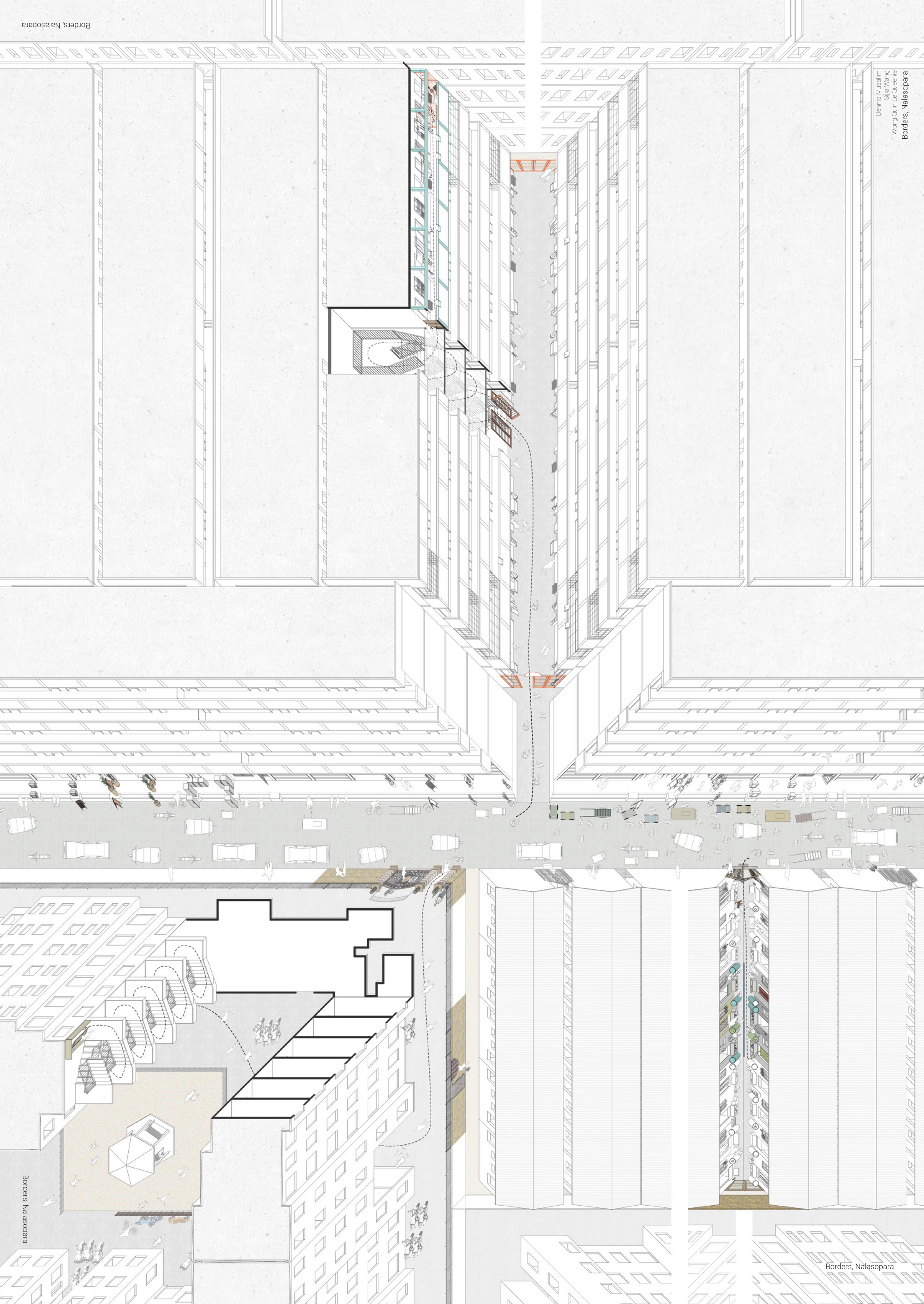
Literary Writing

In addition to visualizing our experience, we also wrote about the experience for instances that were difficult to visualize.

These methods complement each other in the research process. Writing allowed me to record experience by other senses apart from visual ones, while drawing extracts key factors that forms the specific pattern.

Written Narratives

Reading written narratives including "Maximun City""by Suketu Mehta and "Arrival City" by Doug Sanders also helped to provide a more presonal, first person point of view to the context of study.


Borders, Nalasopara
Dennis Musalim
Sijia Wang
Wong Quin Ee Queenie
Borders, Nalasopara
Borders, Nalasopara
Borders, Nalasopara

Visual Ethnography and Writing as a Tool in Understanding Patterns of Inhabitation

– The Strength and Challenges

Introduction

There is a growing awareness of research and research methodology in the architectural profession. According to Groat and Wang, many firms incorporated the role of research in their professional practice due to the changing trends of economy and competitive pressure among professional fields. Architectural firms including MVRDV and OMA have their own research departments – The Why Factory and AMO. These firms also publish books about research methods that are have been implemented. In "Commonalities of Architecture", Atelier Bow Wow presented visual ethnography as an important tool to study Architectural Behaviorology in urban spaces.

However, though research has been a crucial part throughout my architectural education, I had hardly reflected critically on the processes of conducting research before joining the Lecture Series on Research Methods. Through the course, I had learnt that the research process can also be carefully designed. The lectures presented a wide range of research methodologies which I had never knew or thought about. The lecture "Investigating Spatial Narratives" by Klaske Havik was eye-opening for me because I have never thought of writing as a research method. In the coaching session by Marieke Berkers on "Praxeology", she mentioned that we often use terms like "users" or "residents" when we refer to humans in relation to buildings, and by using these terms, you position yourself as an outsider. This had made an impression on me and I tried to use myself as a research object during field visits.

I have chosen the Global Housing Studio, under the Architecture and Dwelling Chair and the ultimate task of the studio is to propose affordable housing solutions within Nalasopara, a township to the north of Mumbai. The living environment in Nalasopara is not ideal, people live in densely built and unregulated apartments with poor hygienic conditions. Buildings are deteriorating due to a lack of maintenance and is dangerous for people to live in. Since the government is hardly involved, the only decision makers are the market-driven private developers.

Figure
Borders in Nalasopara

Some people fear that they would lose their existing homes and lifestyle in the name of development, and others have been waiting for many years for redevelopment in hope to improve their living conditions, but they can only wait and anticipate for the next thing to happen. There is also an income gap between the East and West of Nalasopara, lower-income groups mainly in the east and middle-income groups mainly in the west, which led to other problems in the area. Therefore, my research question would be: How can housing and urban design allow equal participitation in the development of the built environment and equal access to open spaces across income groups?

This process of being a "participant observer" helped me to identify patterns of inhabitation and would thus inform the design process.

Visual Ethnography and Literary Writing

The main strategy for the site survey was a combination of visual ethnography and literary writing, from a first-person point of view. In Nalasopara, my teammates and I tried to identify borders in different levels, including physical and social borders. Using ourselves as the objects of research, we went through different spaces to experience spatial borders. Personal encounters with these borders were very useful because it provides information of the actual condition that is otherwise unattainable if observed from afar. For example, we were barked at by dogs in some communities, although there was no physical gate keeping us out, or in other cases, the gate exists just as a marker, but we could go through them without being questioned. These findings were experienced, recorded, and then analyzed through drawings. There are instances that were difficult to visualize. For example, we struggled in drawing the religious border, because there was no physical border between the Hindu and Muslim communities. We started by writing about what made us realize that we had enter a Muslim neighborhood:

"We saw that the men had 'topi' on their heads, and women are either in burka or a combination of sarees and hijabs. There was a lack of flags with Swastika on the streets, and most of the signboards are in Urdu instead of Hindi. When there is a mosque nearby, we can hear sound of the prayers. "

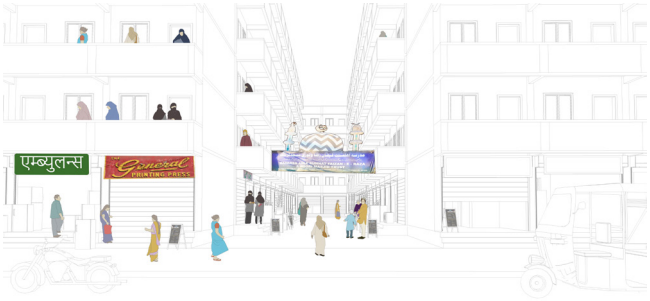


Figure
Religious borders in Nalasopara

This then enabled us to visualize the "religious border" in drawings. We are also able to include experience by other senses apart than visual ones via writing. The visual ethnography and writing spatial narratives complement each other. Writing allowed me to record the personal experience of the space and the change in the surroundings, while drawing extracts key factors from the surrounding, and helps to identify what exactly makes a border.

This process of being a "participant observer" helps me to identify patterns of inhabitation and would thus inform the design process, allowing me to imagine the spatial experiences of the spaces that I have designed from a personal point of view and make a judgement of whether they are appropriate. In other words, the experience of the individual would be given more attention in the design process.

Literature Review

To expand my knowledge on this, I have referred to "Doing Visual Ethnography" by Sarah Pink, in which she elaborated on the visual aspect of ethnographic research, with a brief history of visual ethnography in relation to anthropology . She also elaborated the methods of photography and film making as a tool for ethnography. I have also referred to "The Future of Visual Anthropology" by the same author. In the first chapter, she described the historical context of engaging the visual . In "Qualitative Methods: Their History in Sociology and Anthropology", Vidich and Layman outlined a historical background of ethnography as well as the challenges it faces now . In Jan Gehl and Birgitte Svarre's "How to Study Public Life", a detailed explanation of various methods that were used to study public life was also given .

Ethnography- A Historical-Theoretical Context

According to Peacock, "ethnography" means "a description of a certain way of life, and it is based on 'field work' – living with and observing a living group." The origins of the methodology are debatable, some historians argue that it could be traced back to ancient Greek, Roman, Byzantine and Arab, until reappearing during the European expansion. The interest in depicting foreign lands and people can be traced back to as early as the third millennium B.C, and Egypt's neighbours were either portrayed as tributes to the pharaoh or vanquished barbarians. For example, gold bearing Nubians and "Asiatics" were depicted on brightly painted frescoes that adorned the tomb of Sobekhotep at Theves.

Vidich and Lyman argued that early ethnography grew out of the interests of Westeners towards "primitive" people in the 15th and 16th, as a result of Columbus's and later explorer's voyages to the New World. The invention of photography and film in the colonial period during the 17th to 19th century brought light to new methods of documentation. Edwards proposes that colonial photography produced from 1860-1920 were the start of what has become visual anthropology. Advancements in

By identifying these patterns, I intend to understand human behavior in order to create better domestic and urban spaces.

technology allowed fieldworkers to collect ethnographic materials in multiple media and present them in photographs, films, and sounds in public lectures.

Ethnography then started to spread to other fields. Desai argues that there is a paradigm shift to ethnography in contemporary art, following the emergence of "site-specific art" in the 1960's and 70s, when "the public sphere became an arena for active investigation." In an effort to study preferred places to stand at a public square in Italy, Jan Gehl and his team observed that people have a clear preference of standing at the edges via behavioral mapping. The prevalence of film also allowed researchers to record human behavior over a long period of time. In the appendix of "The Social Life of Small Urban Spaces" by William Whyte, he explained how he used time lapse filming to record human activity in public spaces, which he then further analyzed and extracted important qualities of a successful public space.

The prevalence of the computer also brought a change to the field. Pink stated that "the use of computers and digital media became an increasingly normal part of everyday anthropological practices of writing and communicating" in the 1980s and 1990s. Under the present phenomenon of Big Data, Sanchez and Coreno also suggested the application of digital ethnographic methodology in architecture practices by using social media data and Big Data to study behavior of society in real time.

Positioning

Though I have chosen visual ethnography as my research method, the aim differs from the intention of the Egyptians or the Colonials as mentioned above and is more similar to William Whyte's and Jan Gehls approach. By identifying these patterns, I intend to understand human behavior in order to create better domestic and urban spaces. In my case, I have used photography and filming as a tool to record my experience on site, and also

mapped human behaviors at border conditions. On the other hand, the internet and computer also allowed me to have an aerial understanding of the site before visiting. Most of the patterns were drawn in a human perspective point of view, on the other hand however, I find it helpful to create axonometric drawings of the patterns after the visit, to try to understand how the many borders work together in a system.

Reflection

In general, I find that the combination of visual ethnography and writing is a useful way to understand the context we are working in. To illustrate, understanding pattern of "borders" among people is extremely crucial especially in Nalasopara, because we would be designing houses for people from different cultural, social, religious backgrounds and income groups. The studying of patterns helps me to better understand and design housing from a human perspective. For example, through the field work, we have identified a clear gender border in the socio-economic situation of Mumbai. We realized that most of the people who are in the houses are women, for the men are working in the day. This is also manifested in the market, where all the vendors are male, and the consumers are female. Thus, this made me aware that designing housing essentially means designing housing for the women, because they are the ones who spend most time in it. This realization reminded me of the book Die Neue Wohnung by Bruno Taut, presented by Berkers in her lecture about Praxeology. It is mentioned that "Bruno Taut was the first person who gave the woman creative power in areas otherwise reserved for men". It occurred to me that if I had attempted to design housing without conducting fieldwork and ethnography and based myself only on reports or researches that are available, presumably conducted mostly by men, I might not have obtained this piece of information. The aim of the Global Housing Studio is to proposed solutions that are replicable over Mumbai Metropolitan Region, not only on one specific site. Therefore the patterns that are observed will serve as an important material for the following design phases.

...the human perspective is of utmost importance and should always be thoroughly thought of in the research and design process.

In the foreword of Klaske Havik's "Urban Literacy: Reading and Writing Architecture", Juhani Pallasma has also stated that "Literary imagination can strengthen the designer's functional, spatial and functional imagination, and project images of life into the nonexistent spaces." Indeed, writing allowed me to explain conditions that I have experienced on the site.

Dilemma

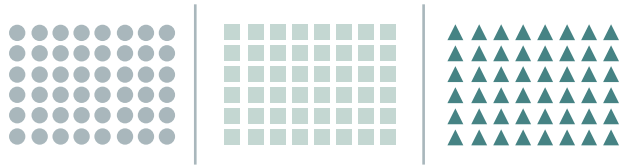
Pink has pointed out that in the 1960s to early 1980s, there were claims that visual ethnography is too "subjective, unrepresentative and unsystematic" as a way to collect data. Though there are many ethnographers who could prove this wrong, I can understand why this has became a point of contention. Indeed, I feel that the micro-ethnography that we had been conducting might not be enough to view the whole picture, or to understand the society as a whole. This reminds me of an image that was shown in Berker's lecture, it was an image of a man peeping through a keyhole with his camera. It occurred to me that we might be conducting research through a keyhole, overlooking the larger reality behind the door. This was a huge concern for me since we had limited time on the site and would not have the chance to return to the site. This is often the case especially in the Global Housing Studio, we have done pre-research to identify the patterns in Mumbai, but there was no opportunity to return to clarify some details. Therefore, to tackle a complex issue like housing, I have chosen to conduct the research via various methodologies, including typological studies, reading literature and gathering quantitative data, apart from a combination of visual ethnography and literary writing, from a first-person point of view. In my opinion, since we now have the privilege to have access to technological devices and the internet, we should make full use of them as a tool to aid us in the research process, in order to have a more objective view. However, the human perspective is of utmost importance and should always be thoroughly thought of in the research and design process.

Spatial level sub-question

1. What are the challenges and strategies for mixed income and participatory housing?

Challenges and Strategies for Mixed Income Housing

Clustering Strategies of Income Groups

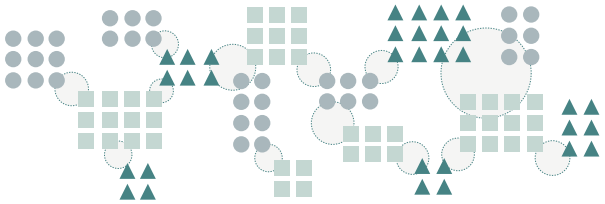


Completely Separated

- Hard to form social ties
- Harsh separation and exclusion

Fully Integrated

- Difficulties in building management due to different aspirations
- Inequality in decision making power
- Hard to attract High Income Groups



Clustered with "Zones of Exchanges"

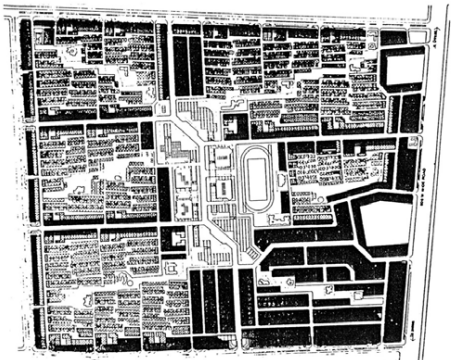
- Borders as zones of exchanges, as spaces for encounter to encourage formation of social capital

A complete separated scheme for the different income groups would lead to exclusion, while a fully integrated scheme would be difficult and unrealistic due to different aspirations. Therefore, the project aims for a clustered approach with zones of exchanges in between, acting as spaces for informal encounter, encouraging formation of social capital.

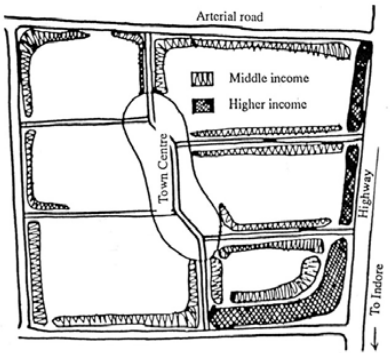
"Borders are porous edges... boundary is an edge where things end... Whereas the border is an edge where different groups interact... an active zone of exchange."

Richard Sennett
Building and Dwelling: Ethics for the City

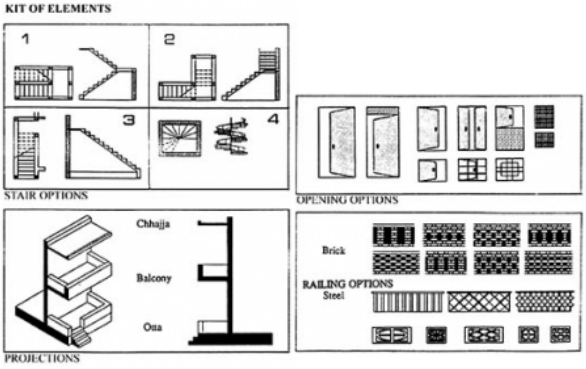
Case Studies - Mixed-Income and Participatory Housing



Series of open spaces that lead to center



Zoning of income groups: HIG and MIG on the periphery, LIG towards center



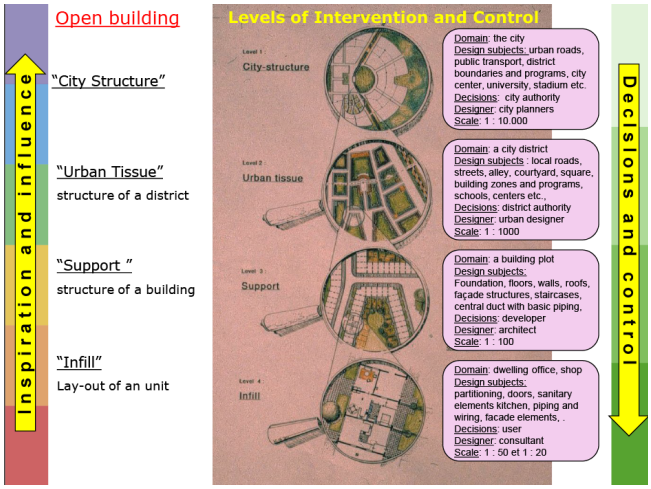
Kits and Parts for users to choose from

Aranya Township, Indore, India - *Balkrishna Doshi*

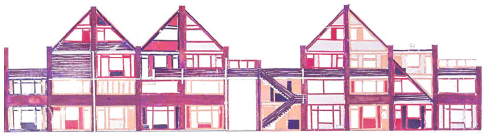
In the Aranya Township by Doshi, there is a hierarchy of open spaces, from the staggering streets in between the houses to the center where amenities are located.

The MIG and HIG are clustered along the periphery of the plots, while the LIG are at the center of the clusters, closer to the local paths.

The residents were able to choose elements of their houses from a catalogue of items.



Open Building Movement:
Levels of Intervention and Control



Infill system allowing "Diversity Within Wholeness"

Molenvliet, Papendrecht, the Netherlands
- Frans van der Werf (Open Building Movement)

In the Molenvliet project, Frans van der Werf promoted "diversity within wholeness" by allowing the users to choose their own unit layout and façade infill within a fixed frame and structure, so even though the units have different sizes and layouts, they would appear as a whole.

Summary of Challenges and Strategies of Mixed-Income Housing

Challenges:

1. Barriers forming social ties

2. Inequality in decision making power

3. Difficulties in building management due to different aspirations

4. Difficulties in attracting High Income groups

5. Difficulties in educating people about new system

Strategies

1. Spaces for encounter to encourage formation of social capital

• Circulation and acessible shared spaces

• Combine housing with neighborhood investment eg. Co-op Grocery store

2. Ensure participation of all groups, as a whole

• Fomation of new housing cooperatives with societies

3. Clustered into zones

• Including moderate-income tier to help facilitate social interaction across income levels

4. Attend to the aspirations of all Income groups

5. Create urban center with training center and supporting amenities

Spatial level sub-question

2. What are the aspirations of different income groups?

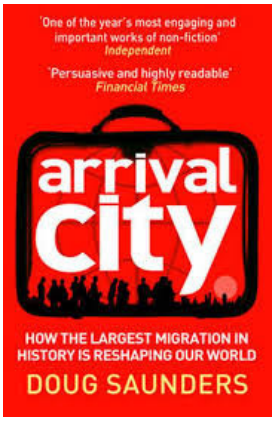
Aspirations of Income Groups

References

EWS & LIG

Baithi Chawl, Nalasopara

Mid-rise Chawls, Nalasopara



Arrival City
Doug Saunders

Lower MIG

New Frontiers & Challenges for Affordable Housing Provision in India
Urmi Sengupta

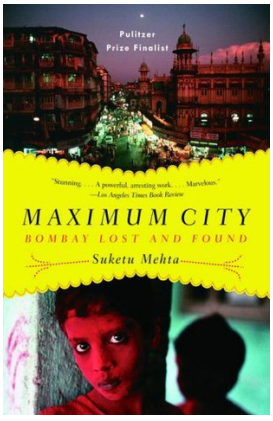
Gated Communities, Nalasopara

Upper MIG

Global City, Virar
Rustomjee

Sriprastha

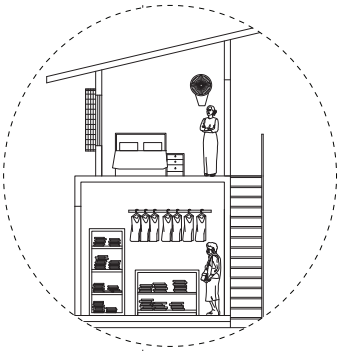
Kanchajunga Apartments, Mumbai
Charles Correa



Maximum City - Bombay Lost and Found
Suketu Mehta

Pattern of Inhabitation: Income Generation

EWS / LIG **Lower MIG** **Upper MIG**

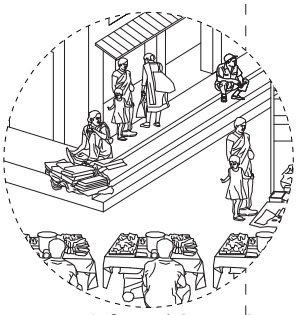


Intimate Working and Living Space

White Collar Office Jobs

Home Production by Women

Work from Home Proffesionals

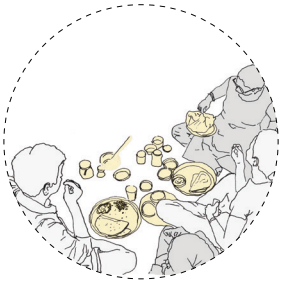


Informal Street Corner

Pattern of Inhabitation: Domestic Spaces

EWS / LIG

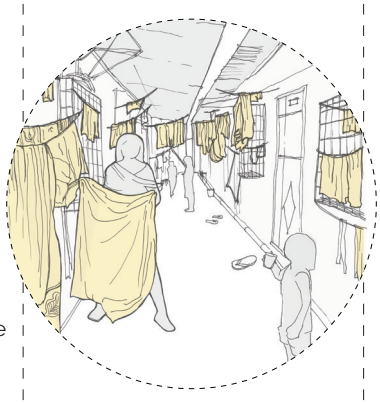
Facing Kitchens for Surveillance



Living in Proximity to Relatives / Surrogate Family

Preparing Food Together

Lower MIG



Drying Laundry

Renting out Extra Space for Paying Guest

Upper MIG

Hire Domestic Cook / Housemaids

Panaromic View

Pattern of Inhabitation: Social Spaces and Amenities

EWS / LIG **Lower MIG** **Upper MIG**

Festival Spaces

Private Playground Area

Intimate Communal Spaces

Defined Amenities

Undefined open space for flexible use

Pattern of Inhabitation: Borders

EWS / LIG

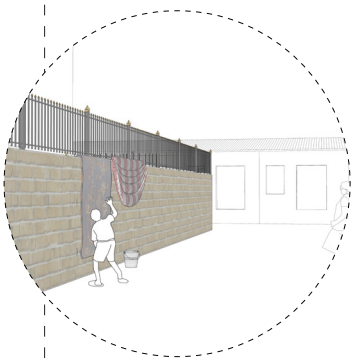
Curtains to Separate Private and Communal Spaces

Lower MIG

Plinth

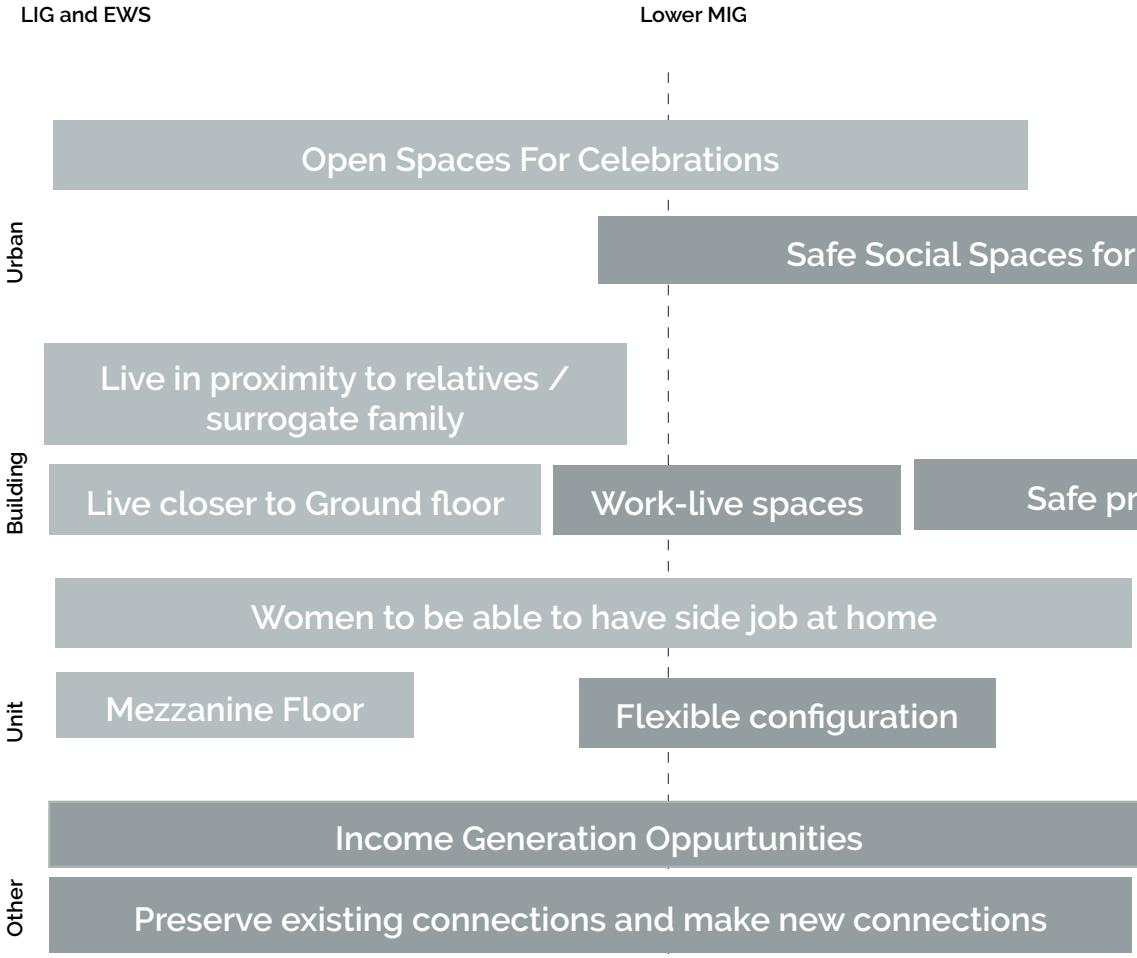
Upper MIG

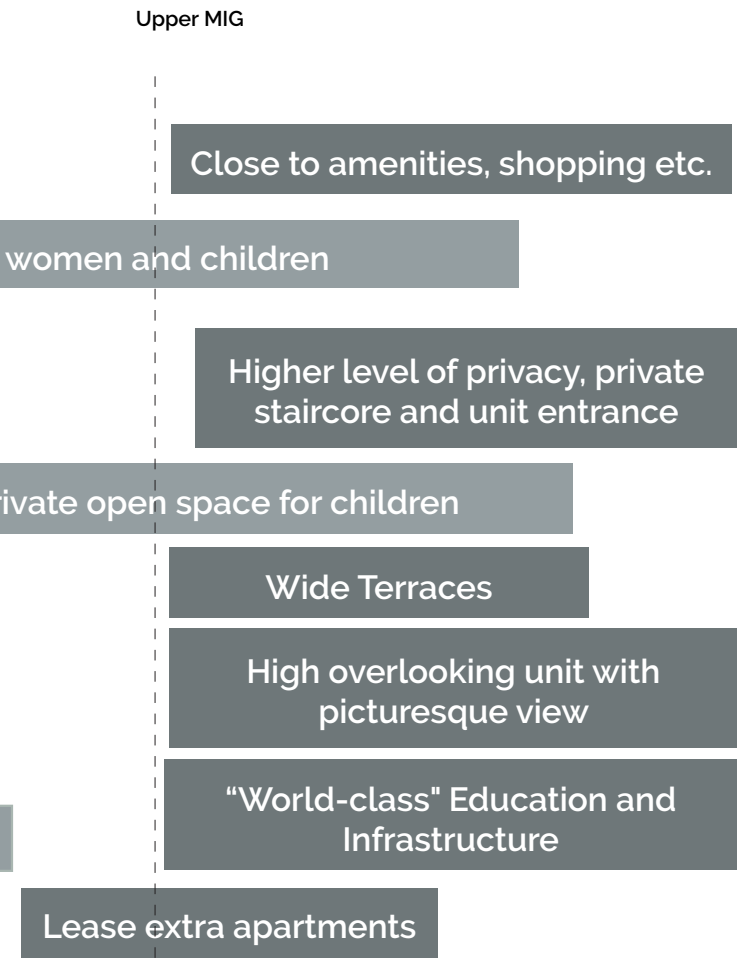
Claiming Space with Decorated Entrances



Compound wall for privacy

Aspiration of Income Groups Summary





After referring to literature, site-interviews and housing projects targeted towards specific income groups, I have identified certain patterns of inhabitation that belong to each income group.

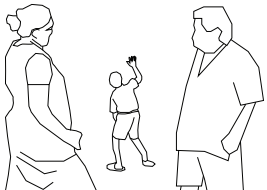
For example for the LIG it is important to have units that could cater for working, living, and production, therefore it is important that they live closer to the ground, while for the upper MIG it is less important because most people work in an office in the formal sector, and they would prefer to live in a higher apartment with a view from the top.

The LIG would also require more undefined open spaces for flexible use, for example, the same space can be used as a workshop for the women in the day, and then as a space for children to do their homework when they are back from school. For the higher income group, it is usually more important to have well-defined recreational amenities, like libraries, gyms, playgrounds etc.

These patterns are summarized and would act as a basis for the development of my design.

Imaginary User Profiles

LIG and EWS



Aarav and Anaya
Rickshaw driver and Jewel crafter

- Couple with a son, aspiring to have another child
- Aarav drives rickshaws in the area during the day
- Anaya does beading work at home or in a workshop with other women during the day when the family is off to work or school, requires a flexible common and private spaces
- Spaces to celebrate festivals like Diwali and Ganapati are very important to the family

Abidah and Madeeha
Gujarati Muslim Sisters, newcomer and local

- Abidah have been living in Nalasopara for 10 years, Madeeha have just arrived with her husband who hopes to find a job in Mumbai
- Abidah is a beautician that takes phone orders from Mumbai occasionally
- Prefer to stay in neighbouring units with a shared common space

Middle and Lower MIG

Faheem
Religious lea
converted p

- Father o
- Knows a
neighbh
- Converts
room for
- Hopes to
his son t
- Wants to
apartme
family

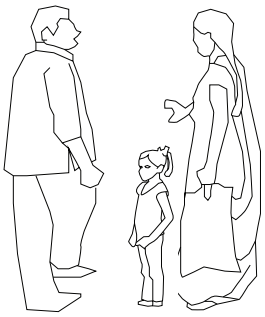
Moosa
Highly-educ
bachelor

- Works fr
based IT
- Reluctar
Mumbai
have soc
nearby
- Wishes t

HIG & Upper MIG

ader and owner of self-
rayer room

f two children
lmost everyone in the
ourhood
s garden space into praying
r neighbours to pray in
o have large open spaces for
o play in
o move into a higher
nt with amenities for the



Gurkiran and Lakshimi
Couple with a daughter and aspires to have another child

- Wants to live close to good schools, tuition centers, swimming pools, gym, and playgrounds for the children
- Wants to live on a higher floor with a large terrace, having a picturesque view of the region
- Wants to have more privacy with the family

cated work-from-home

om home with a California
company.
nt to travel long distances to
for social events, prefers to
cial spaces and amenities

to have a quiet space to work

Sindhura
Housewife who wants extra income

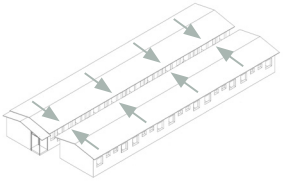
- Hires beautician from east nalasopara occasionally
- Wants to lease an extra unit or run it as a bnb to earn extra income when her husband is working, and eventually give it to her son when he gets married

Spatial level sub-question

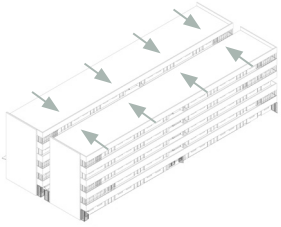
3. What is the suitable housing configuration to encourage social interaction while keeping appropriate borders?

Building and Urban Configuration Studies

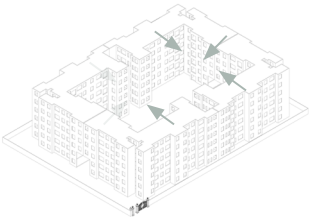
Inward Facing



Baithi Chawls

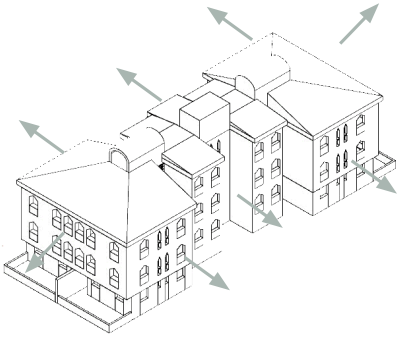


Extruded "Handshake"Chawls



Gated Communities

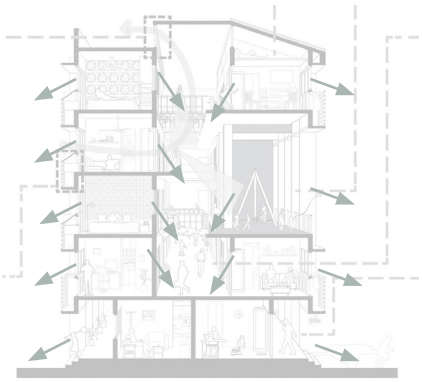
Outward Facing



Sriprastha

MHADA Housing Proposal,
Charles Correa

Facing Bothways



UDAAN, Sameep Padora

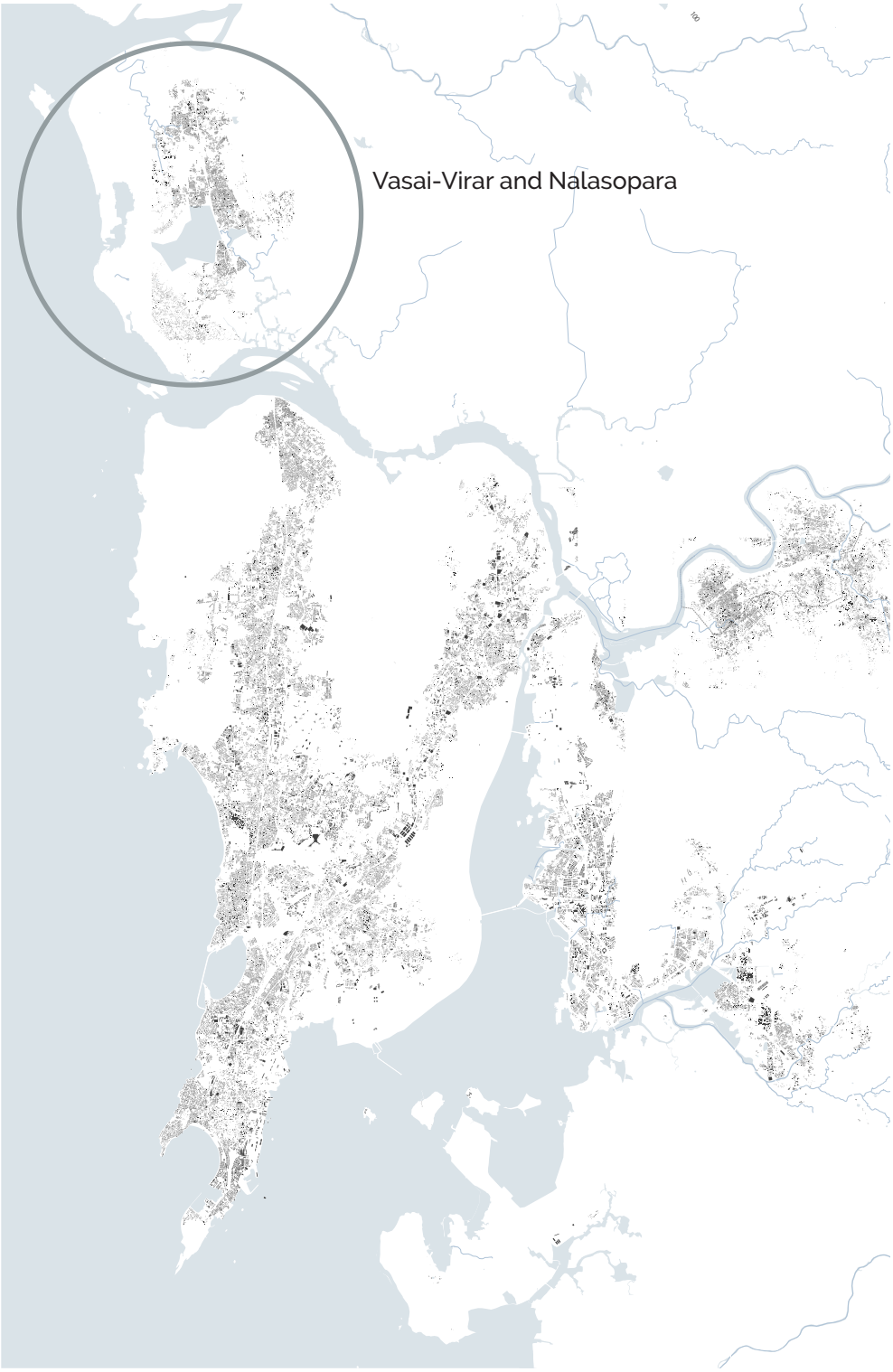
The Baithi Chawls, Handshake chawls, and Gated Communities are all inward facing. They create an intimate communal space, but also neglects the edge resulting in leftover unused backlanes.
Projects like Sri prastha and the MHADA Housing Proposal on the other hand, are outward facing. In my design, I would like to have a combination of both, similar to the Udaan project by Sameep Padora, whereby the units faces the outside without losing the internal intimacy in the communal space.

"...while the building industry will benefit from the lower costs of standardised design, building amterials and techniques through higher overall output, the approach is contrary to user compatibility, in terms of quality and sustainability needs."

Urmi Segupta,
New Frontiers and Challenges for Affordable Housing Provision in India

03

design proposal


Vasai-Virar and Nalasopara

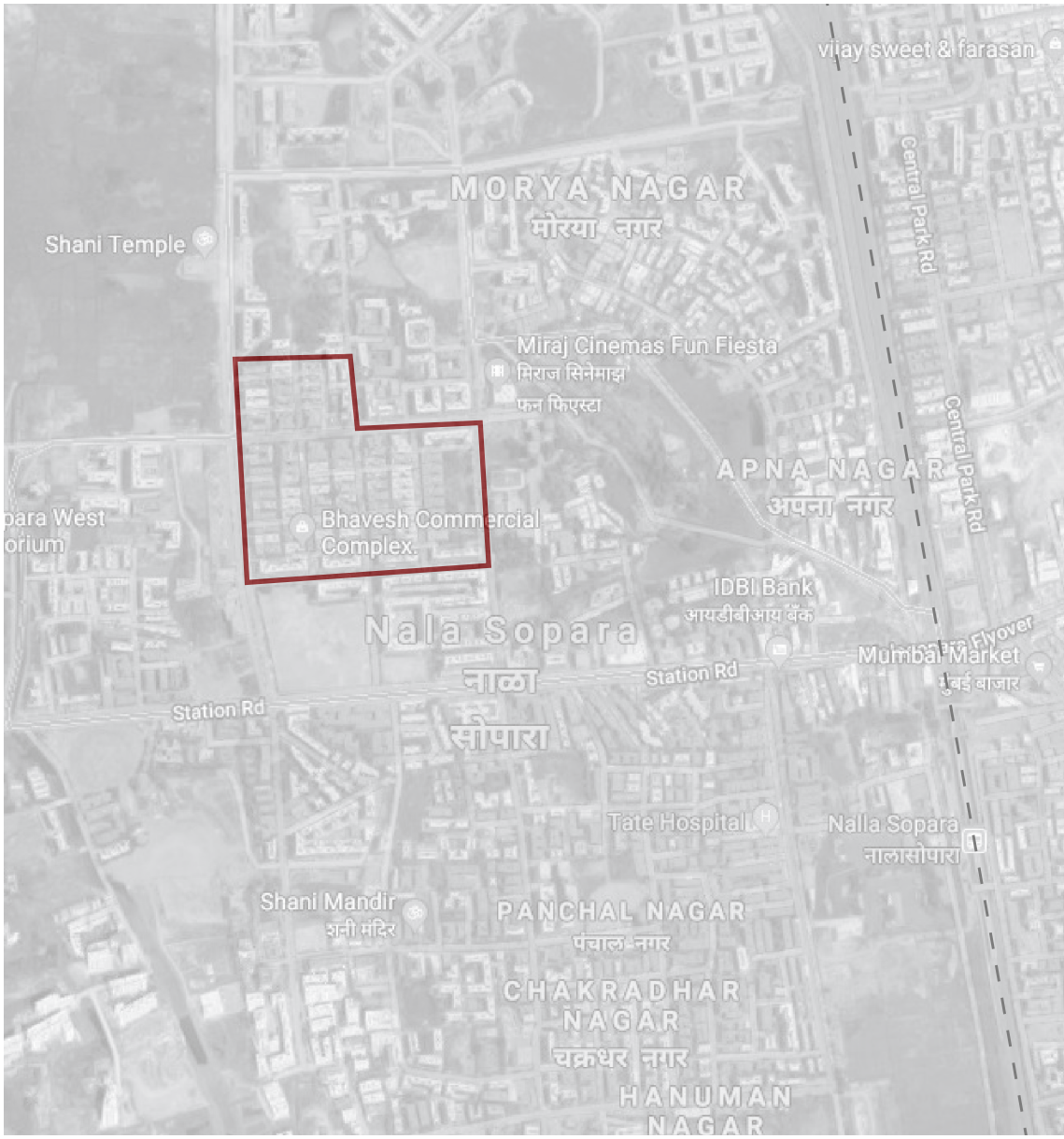
Location: Nalasopara

The project is located in Nalasopara, a suburban town within the Vasai-Virar region, the Northern tip of Mumbai's urban expansion. This area is connected to central Mumbai by railway, and acts as an arrival city for migrants from all over India, a stepping stone for those who aspire to succeed in Mumbai.

There is a lack of governance in Nalasopara, and due to the astonishing increase in the influx of migrants, the housing situation is at acritical point, and needs to be addressed.

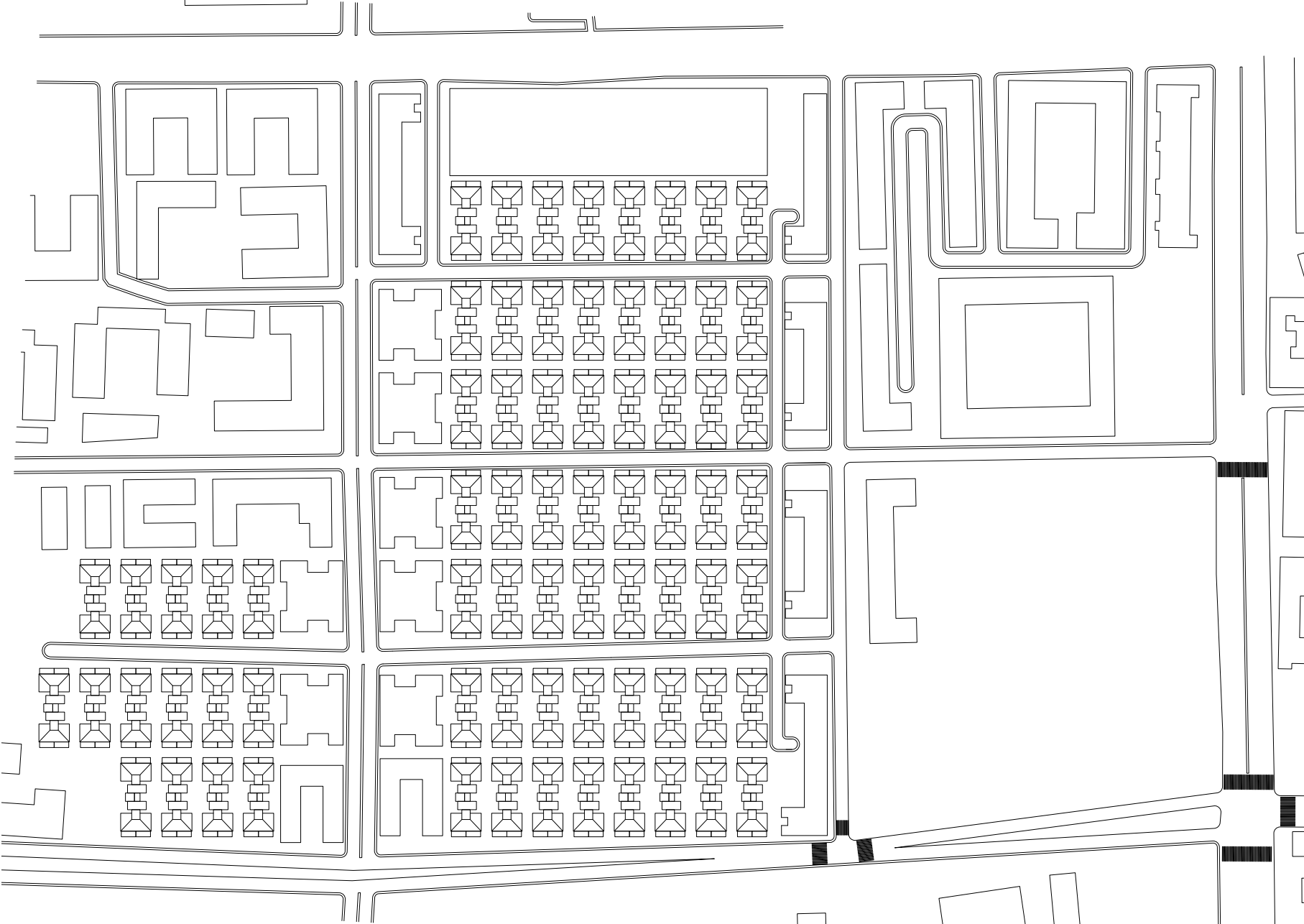
The railway that connects Nalasopara to Mumbai creates a prominent East West Divide. Middle Income Groups living in cooperative housings or gated apartments are spread across the West, while most of the urban poor living in chawls concentrate on the East of the railway. Many of the single-storey Baithi chawls were replaced by five storey "handshake chawls" on the exact same footprint, leaving minimum distances in between buildings.

Location: West Nalasopara




Vasai Virar Municipal Co Hospital
Durga Temp
दुर्गा मं
Sunni Masjid Toll Naka Nalasopara East
DAMODAR NAGAR
दामोदर नगर
Shri Datta Mandir
GAJANAN NAGAR
गजानन नगर
Tulinj Rd
Pelhar Rd
VALAI PA
वालई पा
MAHAN
महान
SAINATH NAGAR
साईनाथ नगर
Alliance Hospital
BORI COLONY
बोरि कॉलनी
NALASO
Bank of Baroda
बैंक ऑफ बडोदा
SANYUKTA NAGAR
संयुक्त नगर
Om Sai Hospital
ओम साई रुग्णालय

Location: Sri Prastha



Location: Sri Prastha

Background

The project is located in Sri Prastha, a deteriorating cooperative housing in Nalasopara West, occupied mainly by the lower segment of the middle income group.

It consists of three storeys housing blocks arranged in a tight grid, whereby two neighbouring blocks would often come together and form a society.

The project includes a new development on the new plot at the South of the existing Sri Prastha, as well as the redevelopment of the existing Sri Prastha.

Figure
Urban plan of Existing Sri prastha

Issues and Threats

The main problems in the current Sriprastha are as follows:

1. Building is Falling Apart

2. Uncertain Future

3. Reluctance to Invest in Maintenance

4. Concentration of Single Income Tier

5. High Vacancy Rate

6. Lack of Oppurtunities for Income Generation

7. Lack of Hierarchy and Diversity in Open Spaces

The buildings are falling apart, and residents were seriously injured. The residents are waiting for a redevelopment. There were rumours going on for the past 10 years that the area would be redeveloped into 22 storey high-rise buildings, but nothing has happened. Existing residents are reluctant to invest in maintenance because of the rumors, and therefore there is a high vacancy rate. The homogeneous in between spaces are often deserted due to the lack of diversity and hierarchy in open spaces.


SRI PRASTHA BLDG. No. 181
SRI PRASTHA BLDG. No. 182
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K.G. TO VII STD.


प्रभइच्छा

Strength and Oppurtunities

The main oppurtunities in the current Sriprastha are as follows:

1. Existing Grid Structure

2. Porous Urban Fabric

3. Access to Lower Middle Income Group

4. Existing Connection with People from Nalasopara East

5. Mixed Religious Communities

6. Existing Structure of Housing Cooperative Societies

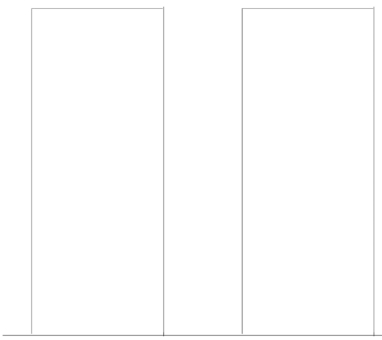
I would make use of the existing grid structure, porous urban fabric, and the existing structure of housing cooperative societies in my proposal, to further enhance the existing qualities of the neighbourhood

Future Scenarios

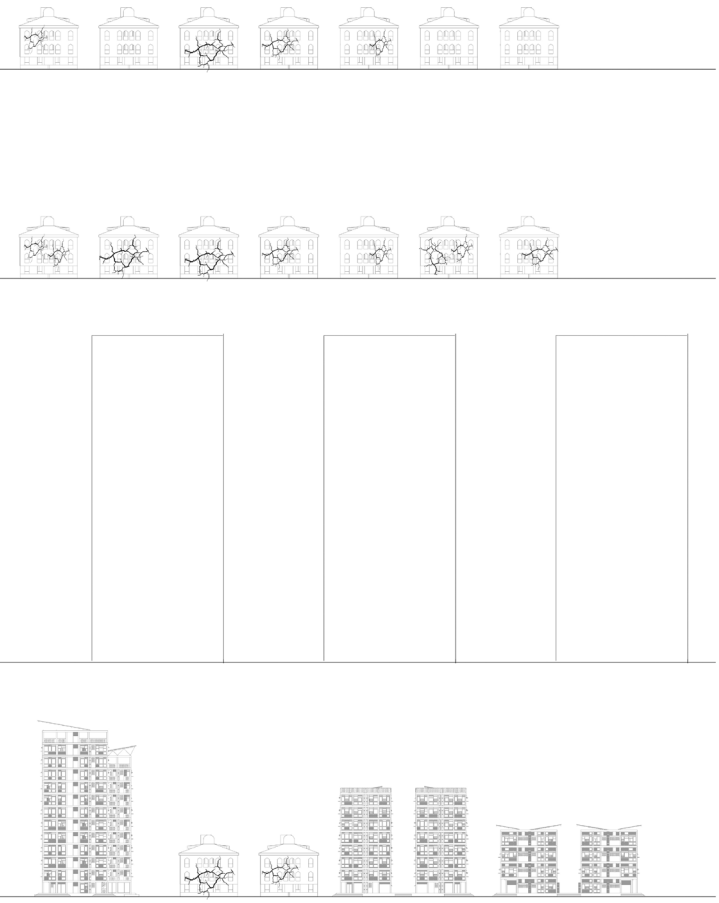
Current Situation

Future Scenario 1: nothing takes place

Future Scenario 2: rumoured development takes place



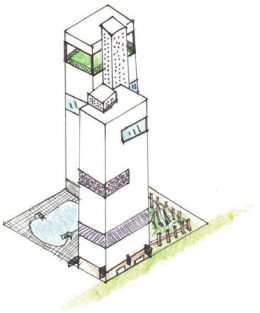
Proposed Scenario: Typological Mix

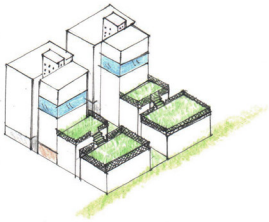


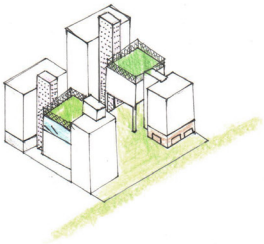
There are two possible future scenarios in Sriprastha at the moment. If nothing takes place, the buildings will continue to fall apart, putting the safety of the residents at stake; if the 22 storey high-rise development takes place, it would be another gated communities development that destroys the existing fabric and qualities of the neighbourhood completely.

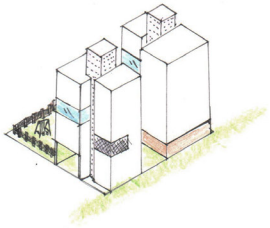
I hereby propose a third scenario whereby the people could initiate the redevelopment by themselves instead of waiting for something to happen, a new future with mixed typologies, breaking the homogeneity while working within the existing fabric.

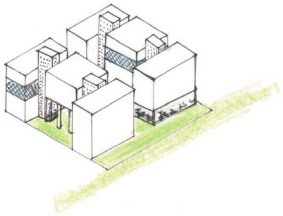
Preliminary Design Hyphothesis

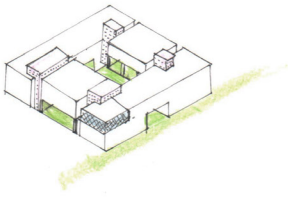












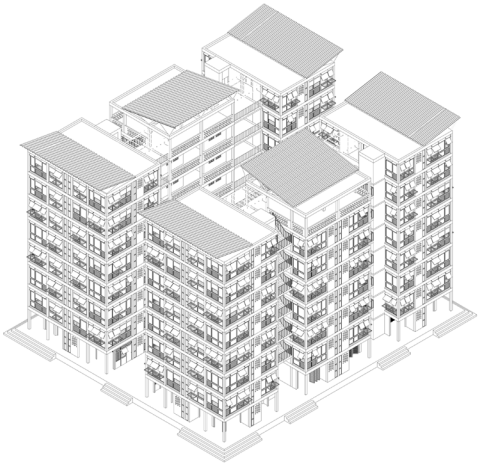
During the preliminary stage, I have proposed different typologies that caters to the different income groups, creating diversity in the neighbourhood, and envisioned that they would activate the in betwee spaces, forming a community spine in between.

This idea was then further developed and refined.

Building Design

Typological Mix

Low rise - Chain Typology



Mid rise - Slab Typology

High rise - Tower Typology

Responding to the aspirations of the different income groups, I proposed three different typologies.

The low rise typology, also known as the chain, caters for the lower income group (LIG) and economically weaker sector (EWS).

The mid rise typlogy, also known as the slab, caters for the lower middle income group.

The high rise towers will cater for the upper middle income group.

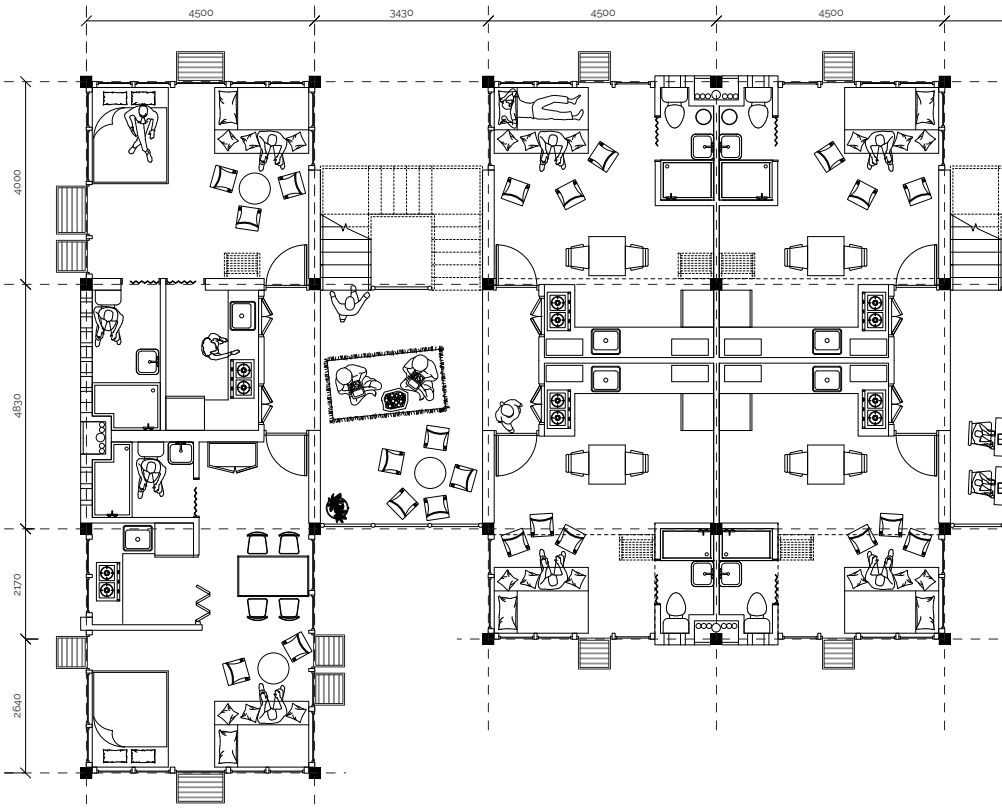
Type 1: Low rise - Chain

The low rise typology, also known as the chain, caters for the lower income group.

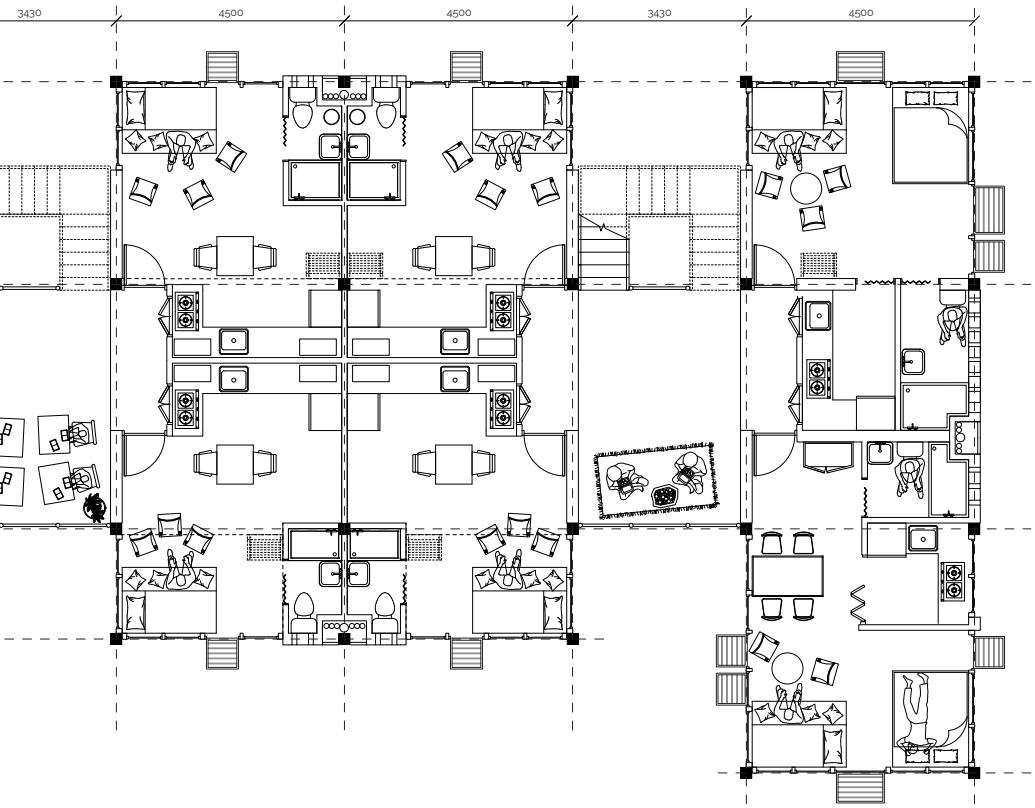
It is named as "the chain typology" because it mainly consists of two types of components: the corner modules and the middle modules, connected by semi-outdoor platforms that can be utilized for activities like preparing food, beading, or doing homework. This configuration allows it to be extended or shortened like a chain, depending on different site conditions.

Two buildings come together to form a courtyard in between.

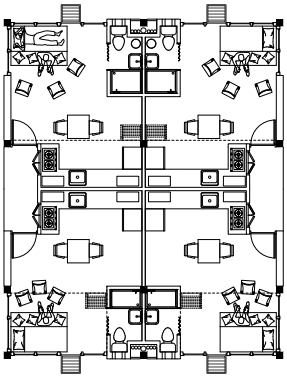
Type 1: Low rise - Chain

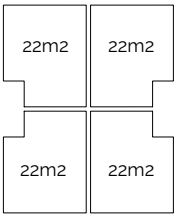


Low Rise Typical Floor Plan
1:150

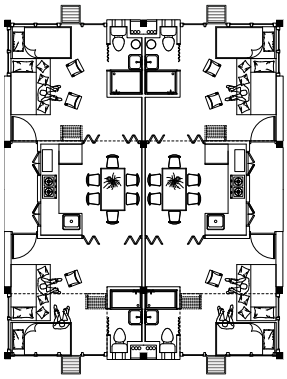

3430
4500
4500
3430
4500

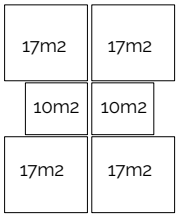
Type 1: Low rise - Chain



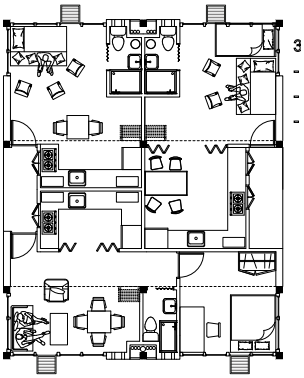


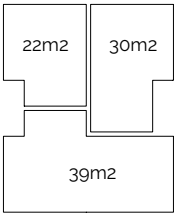
4 units





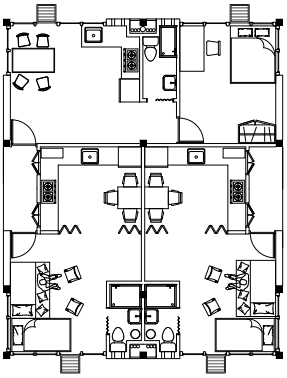
4 units with shared kitchen

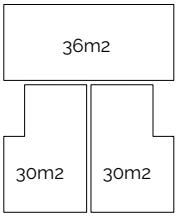




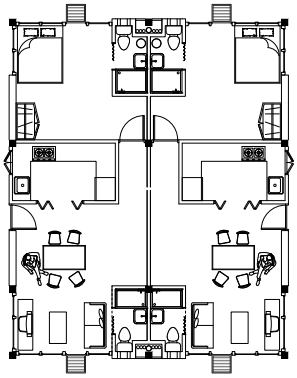
3 units

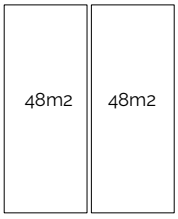
Low Rise Middle Component Variations
1:250





3 units





2 units

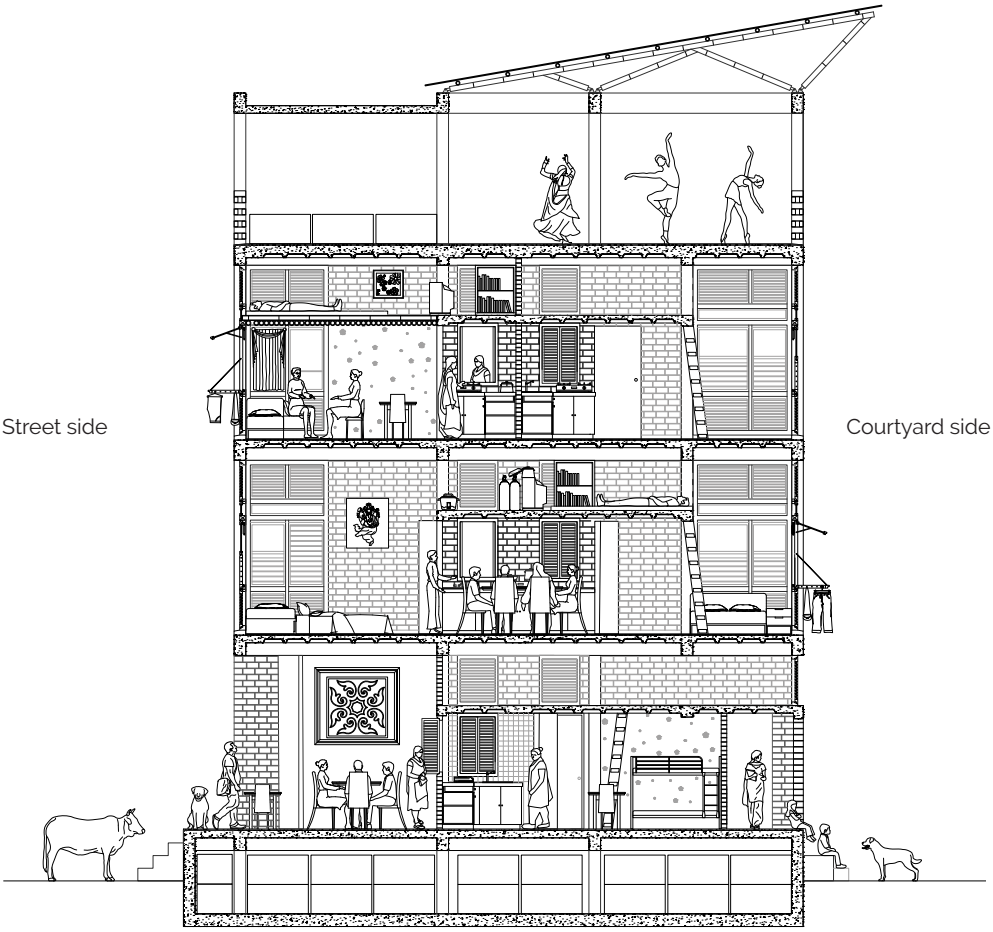
In this typology, the smallest unit size is 22m², with additional mezzanine.

Lower income groups in Nalasopara tend to live together or closeby to their relatives. Therefore two families could also choose to share their kitchen in the middle to have a larger kitchen together.

Other combinations are also possible, providing oppurtunities for larger units, and the largest possible unit is 48m².

Type 1: Low rise - Chain

Street side



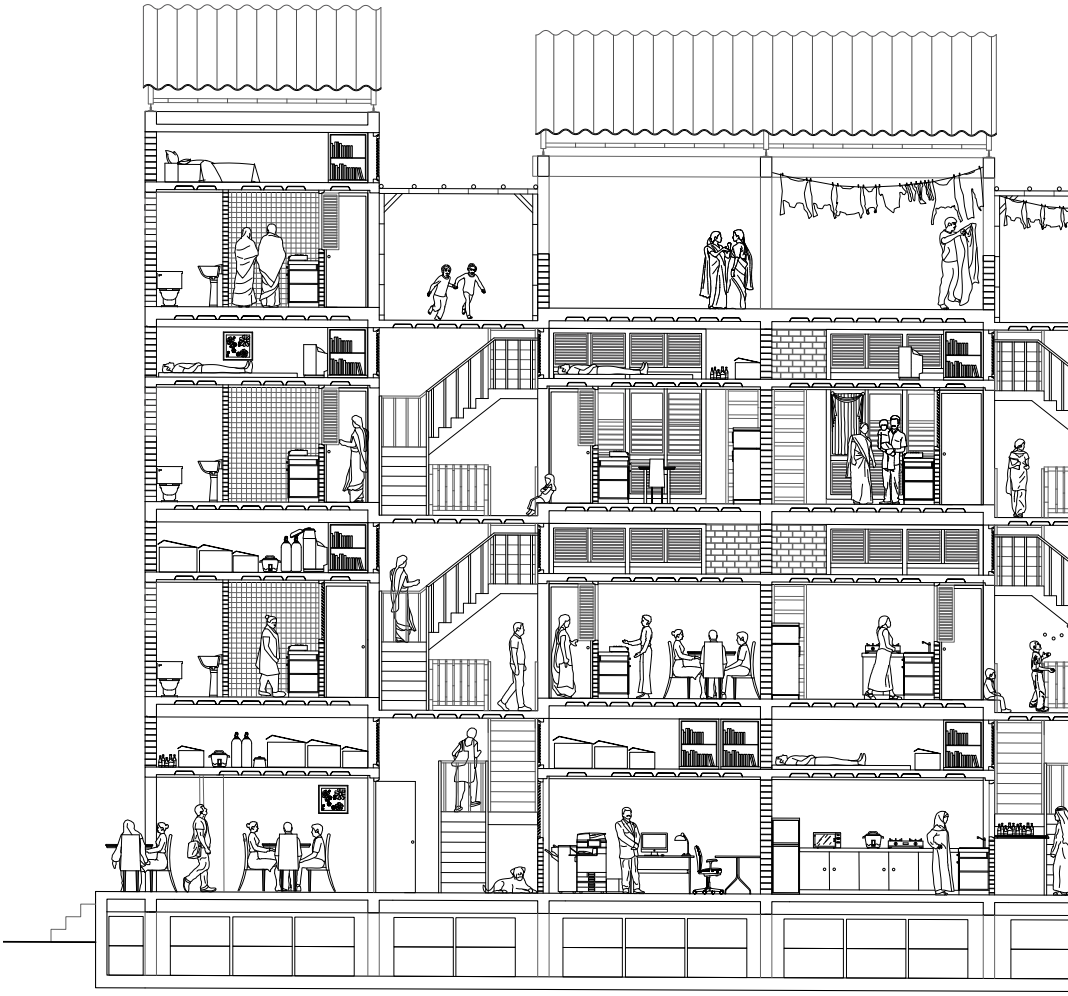
Courtyard side

Low Rise Short Section
1:150

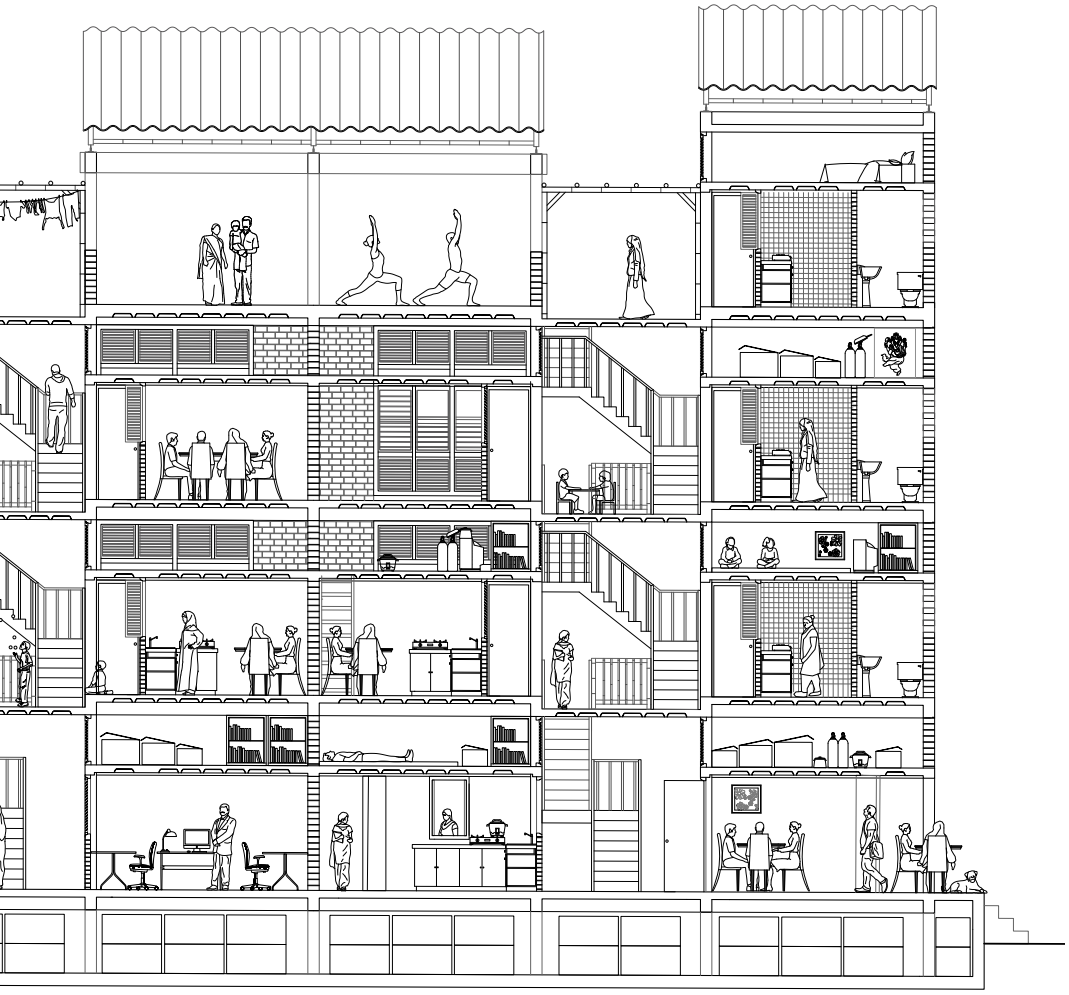
In this typology, because the units are small, a mezzanine will be provided for storage or sleeping, and the user could choose to extend the mezzanine by themselves later.

Units on the Groundfloor are set back to create a covered walkways, and on the courtyard side the mezzanine protrudes onto the walkway to create a more intimate space.

Type 1: Low rise - Chain

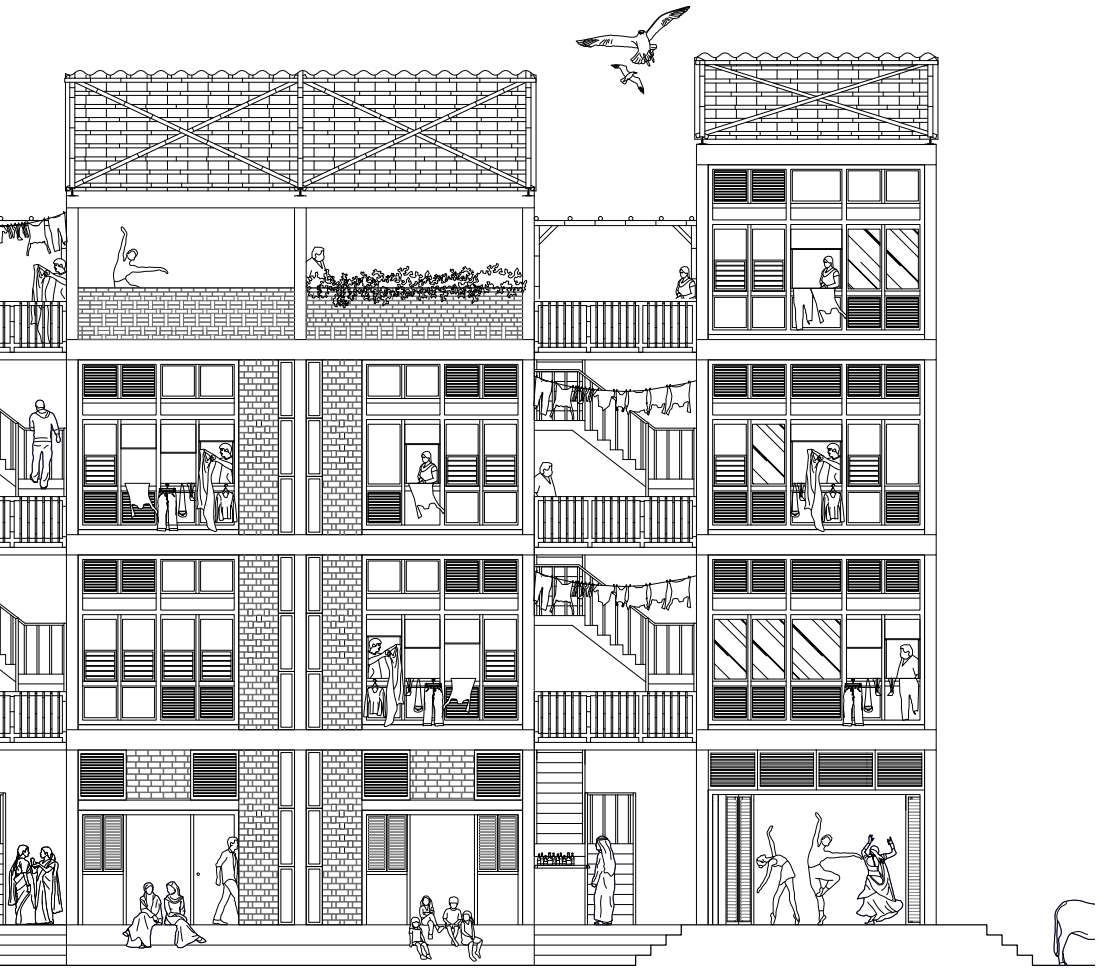


Low Rise Long Section
1:150



Type 1: Low rise - Chain

Low Rise Elevation
1:150



Type 1: Low rise - Chain

Low Rise Elevation

The connecting platfirms and the rooftop terrace can be used for semi-outdoor activities.

There is a height difference of a step between the platforms and the units to create a threshold before entering the unit.

The different spaces can be read from the façade whereby the solid towers are connected by porous in between platforms with bamboo balustrades.

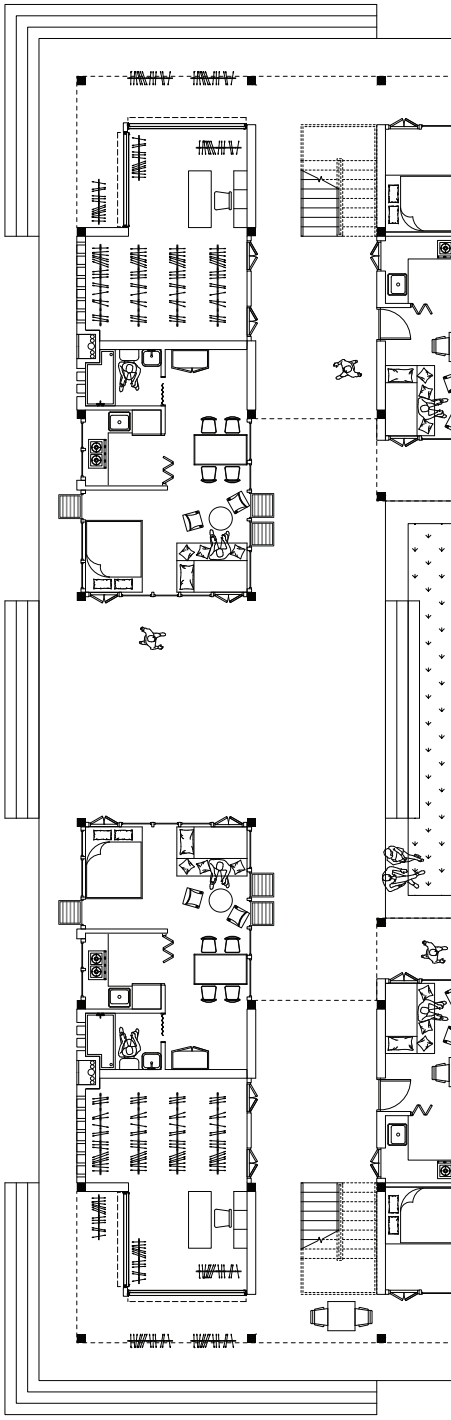
Type 1: Low rise - Chain

Two buildings come together to form a courtyard in between with seating area on the edge.

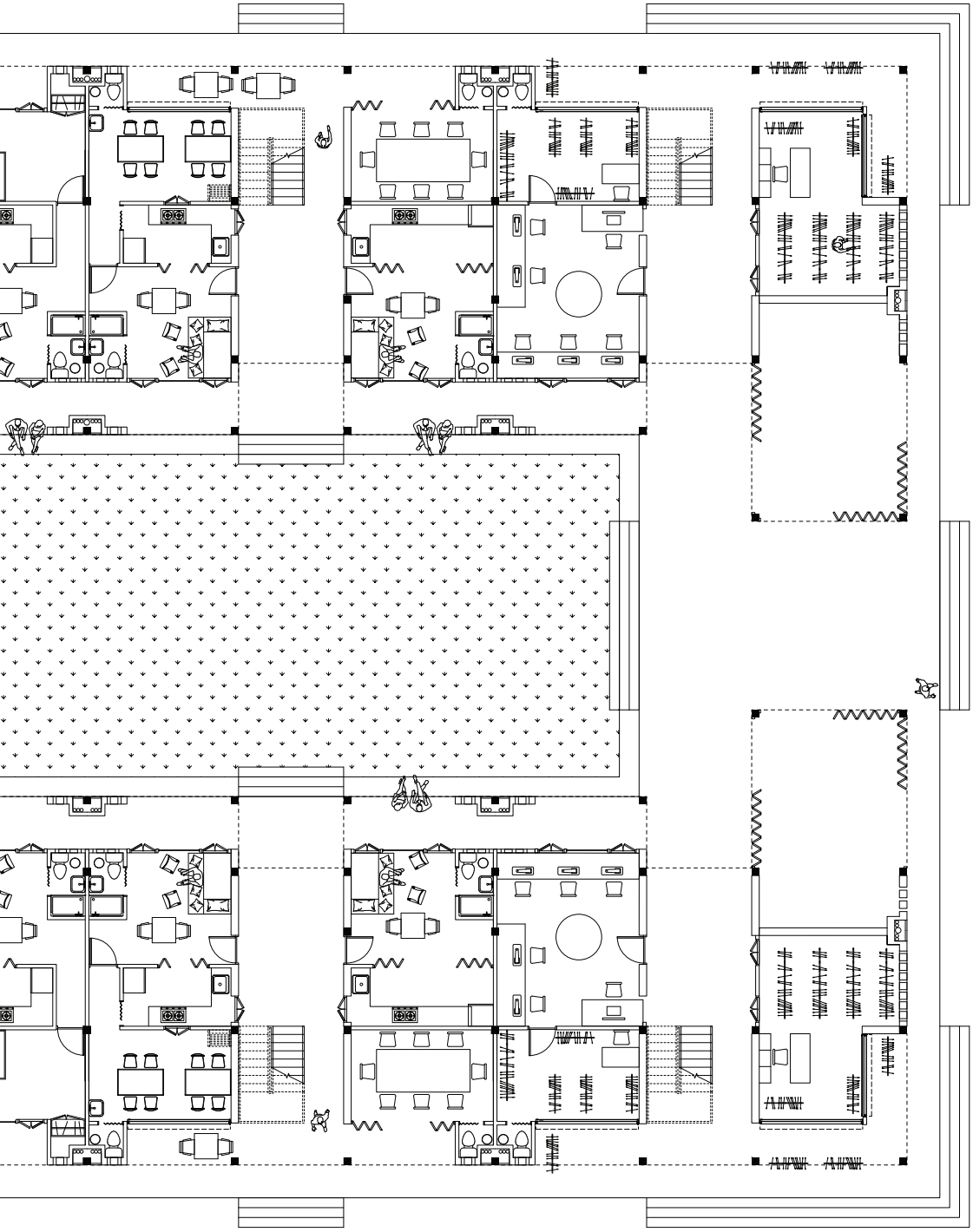
On the ground floor, a continuous covered walkway is created to activate the edge of the courtyard. The other side of the building has a street like condition, where commercial activities could be extended outwards. There is a multipurpose space at the entrance of the society, that could be complete opened or closed, and could be use for activities and celebrations.

In all typologies, the corner is always set back, and steps are always added to activate the corner.

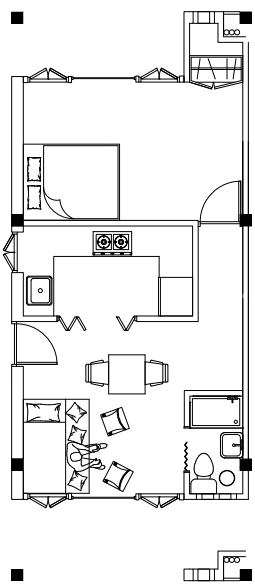
To encourage income generation, the GF units can be used entirely for living, as a work-live unit, or entirely for working.



Low Rise Ground Floor Plan
1:200

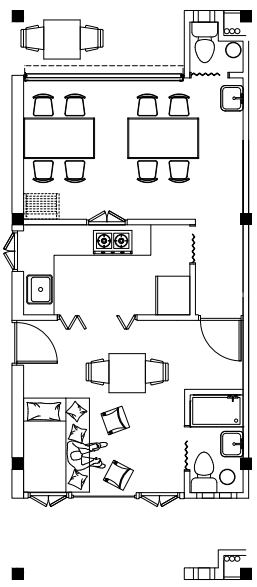


Type 1: Low rise - Chain



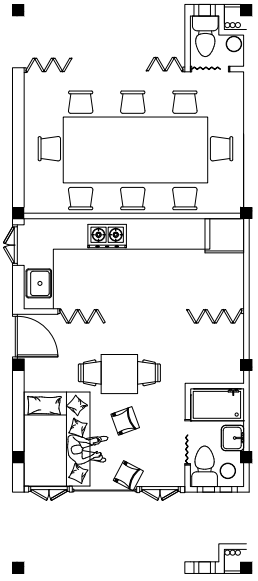
Entirely living

43m2 living space
(++ mezzanine)



Restaurant + living

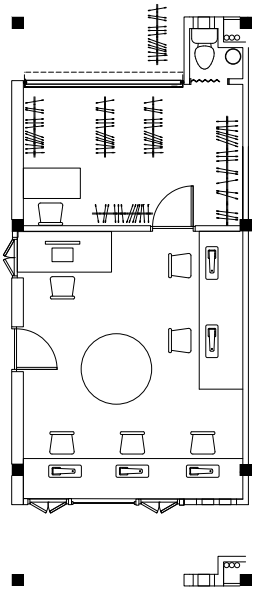
15m2 restaurant
+ 6m2 kitchen
+ 16m2 living space
(++ mezzanine)



Living & leased

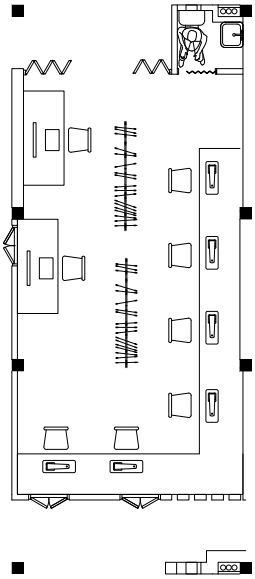
- 15m2 production space
- 22m2 living space
(++ mezzanine)

Low Rise Ground Floor Unit Variations
1:150



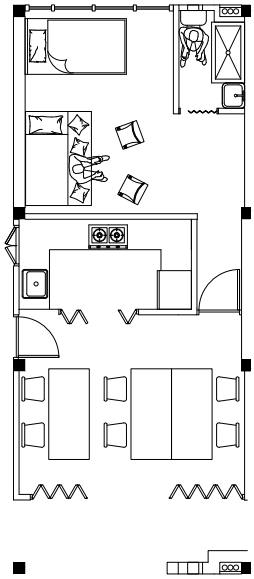
Production + retail

15m2 retail space
+ 22m2 production space
(++ mezzanine)



Production

39m2 production space
(++ mezzanine)



Living + community

Day:

16m2 community space
+27m2 living space

Night:
43m2 living space
(++ mezzanine)

Type 2: Mid-rise - Slab

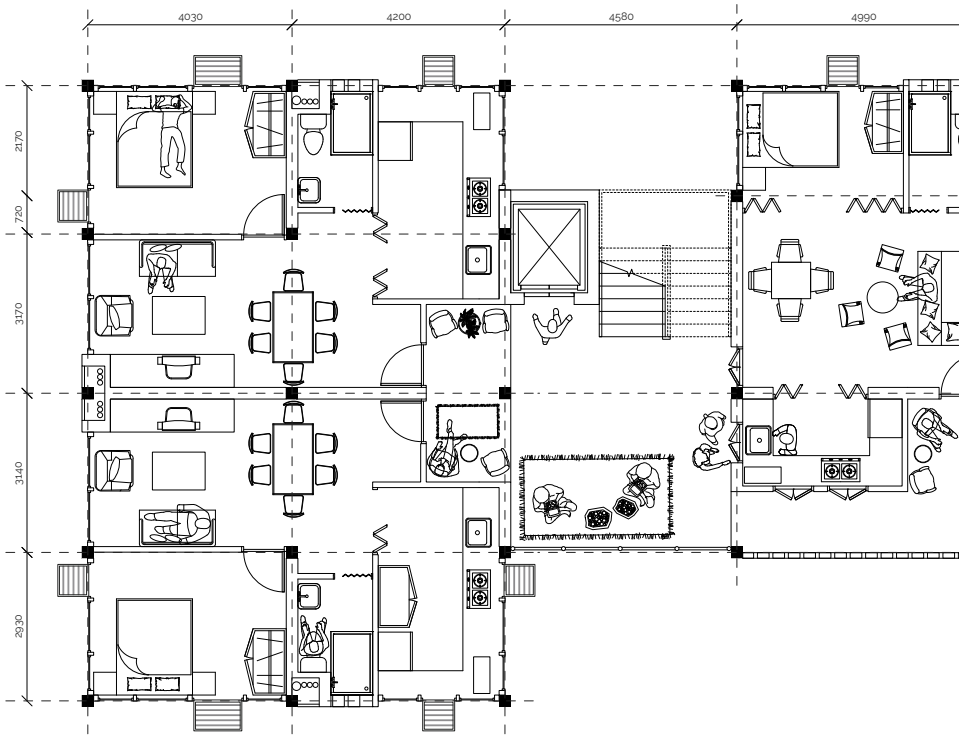
The Mid-rise typology, also known as the slab typology, is catered towards the Lower segment of the Middle Income Group.

It also consists of a corner module and a middle module, connected by a platform, but here the middle module has a corridor so that the users could access staircases on both sides.

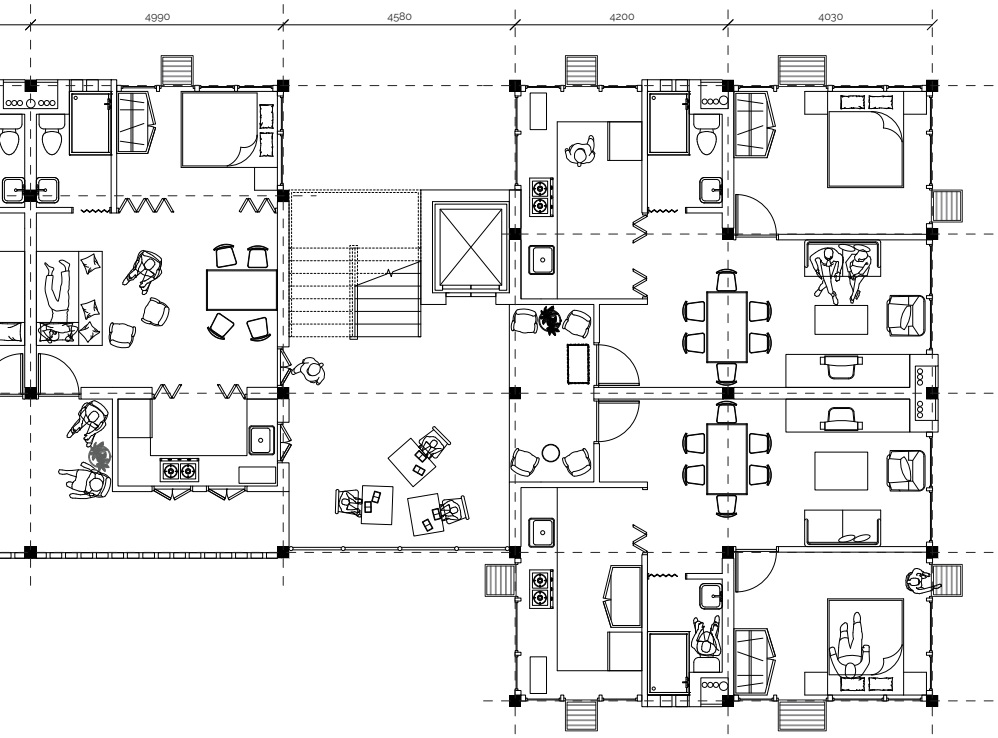
The threshold area in front of the apartment in this typology is also larger, allowing some personalization of the entrance.

The middle module consists of two studio units, while the corner module consist of two 1-bedroom units.

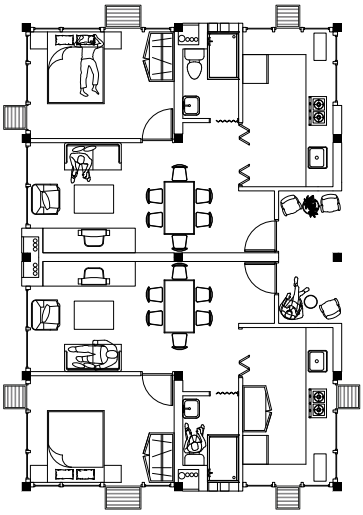
Type 2: Mid-rise - Slab

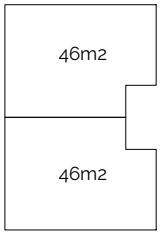


Mid Rise Typical Floor Plan
1:150

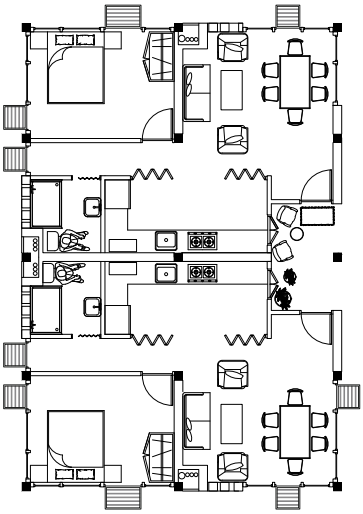

4990
4580
4200
4030

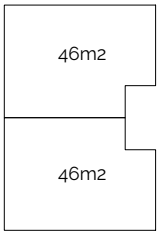
Type 2: Mid-rise - Slab





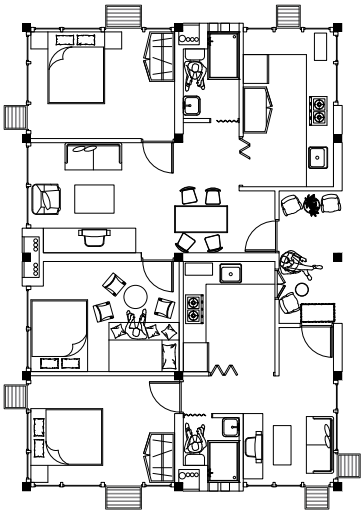
2 units

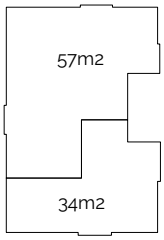




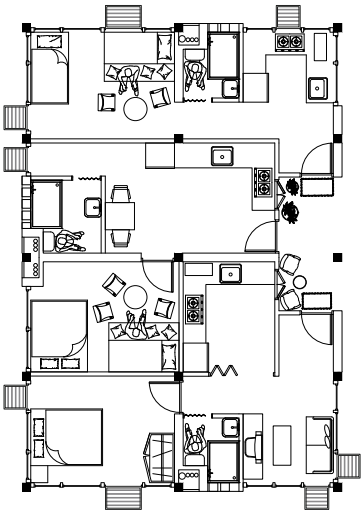
2 units

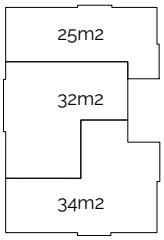
Mid-rise Corner Module Variations
1:200





2 units

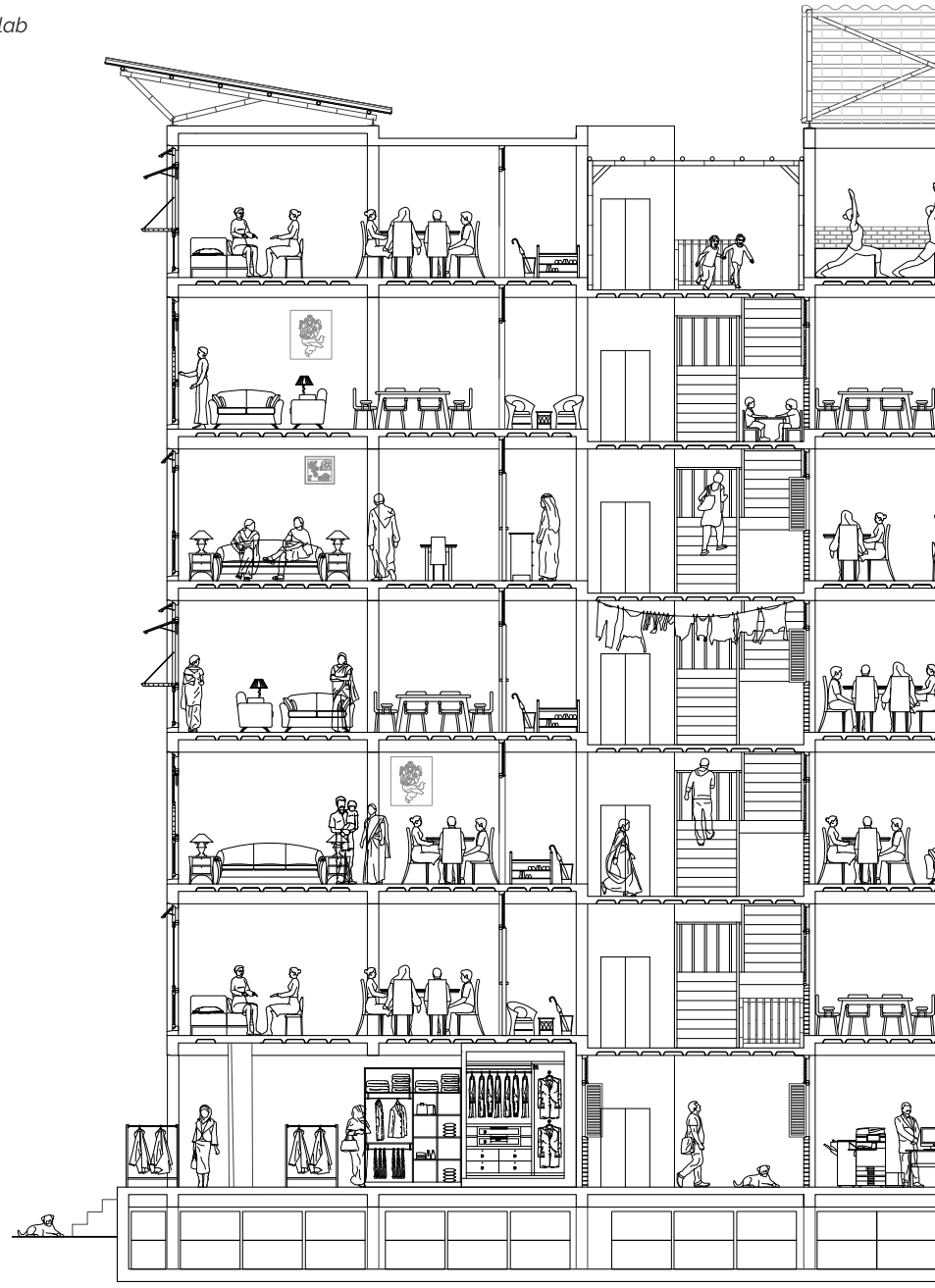




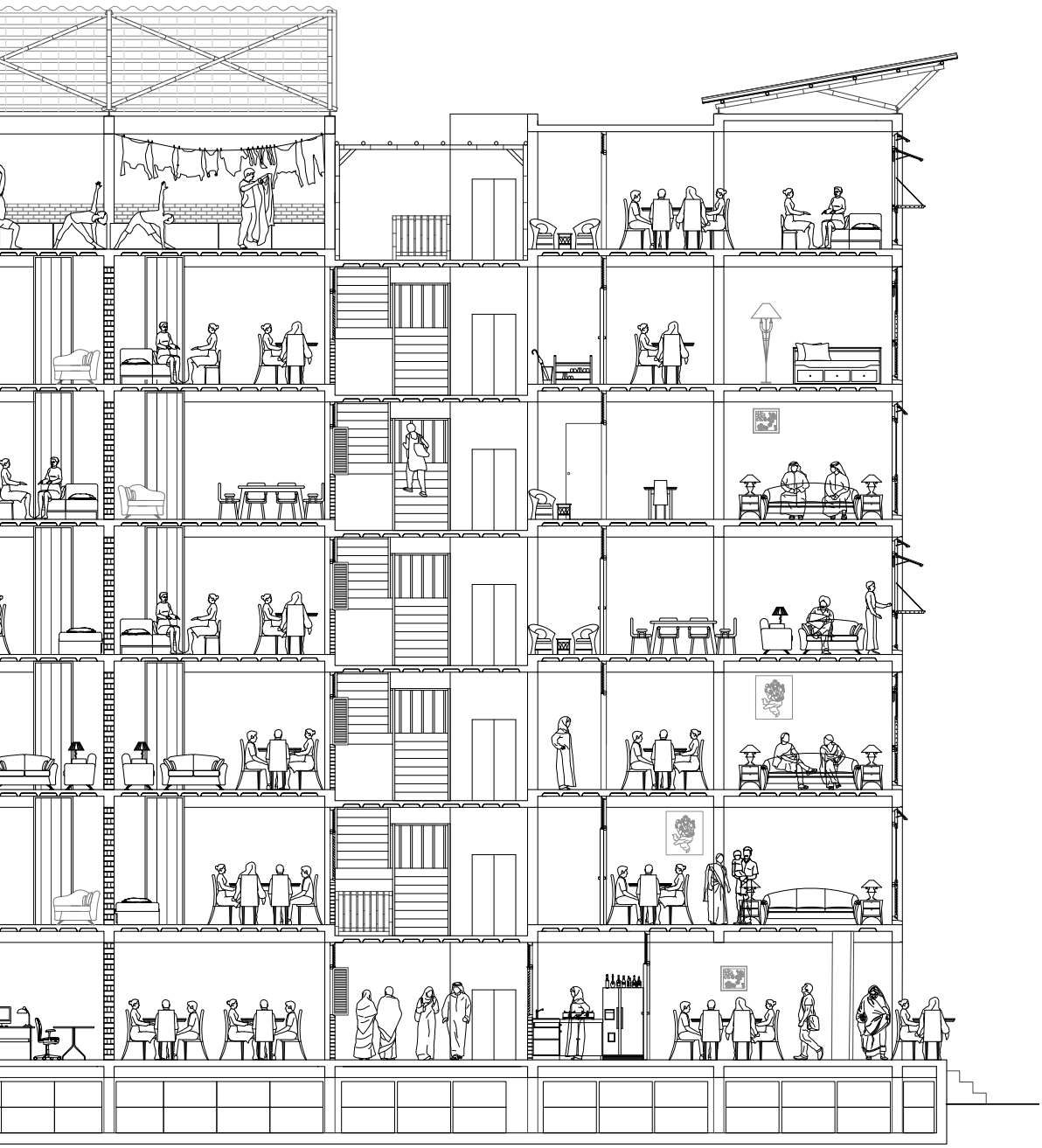
3 units

There are multiple pipe shafts in the corner module to allow flexible unit configuration because this income group would often want to rent part of the apartment for paying guest. Since the toilet can be placed in different locations, it increases the freedom in dividing the space.

Type 2: Mid-rise - Slab



Mid Rise Section
1:150



Type 2: Mid-rise - Slab

Mid Rise Elevation
1:150

Type 2: Mid-rise - Slab

Low Rise Elevations
1:200

In the slab typology, the level of the connecting platform and the units are also slightly shifted to create a threshold.

Similar to the previous typology, the solid towers are connected by porous platforms with bamboo ballustrades and are open on both sides, allowing cross ventilation.

Apart from these platforms, semi-outdoor activities can also be brought up tp the roof terrace on the top floor.

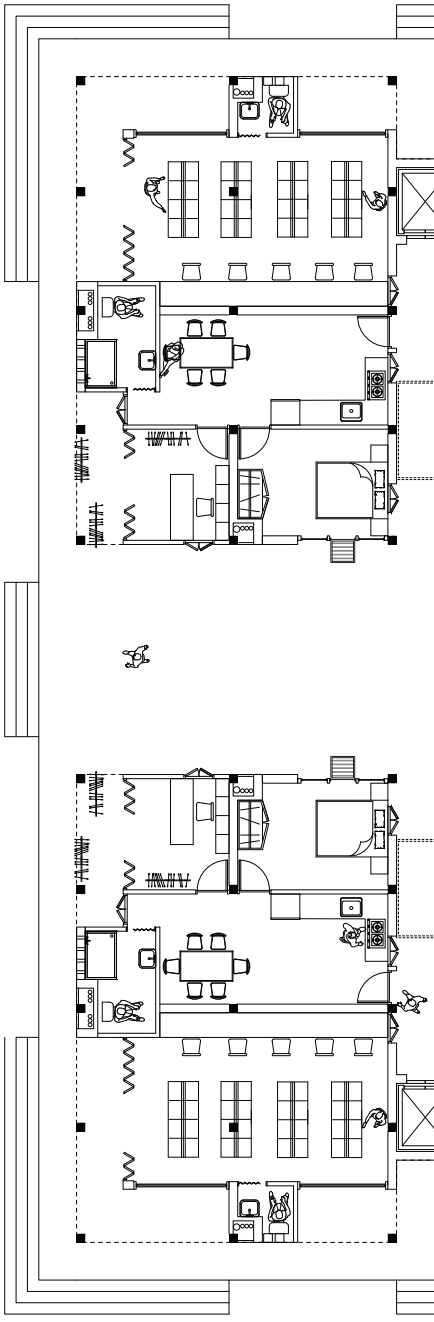
Type 2: Mid-rise - Slab

Similarly to the previous typology, the corner is activated on the groundfloor with set backs and steps.

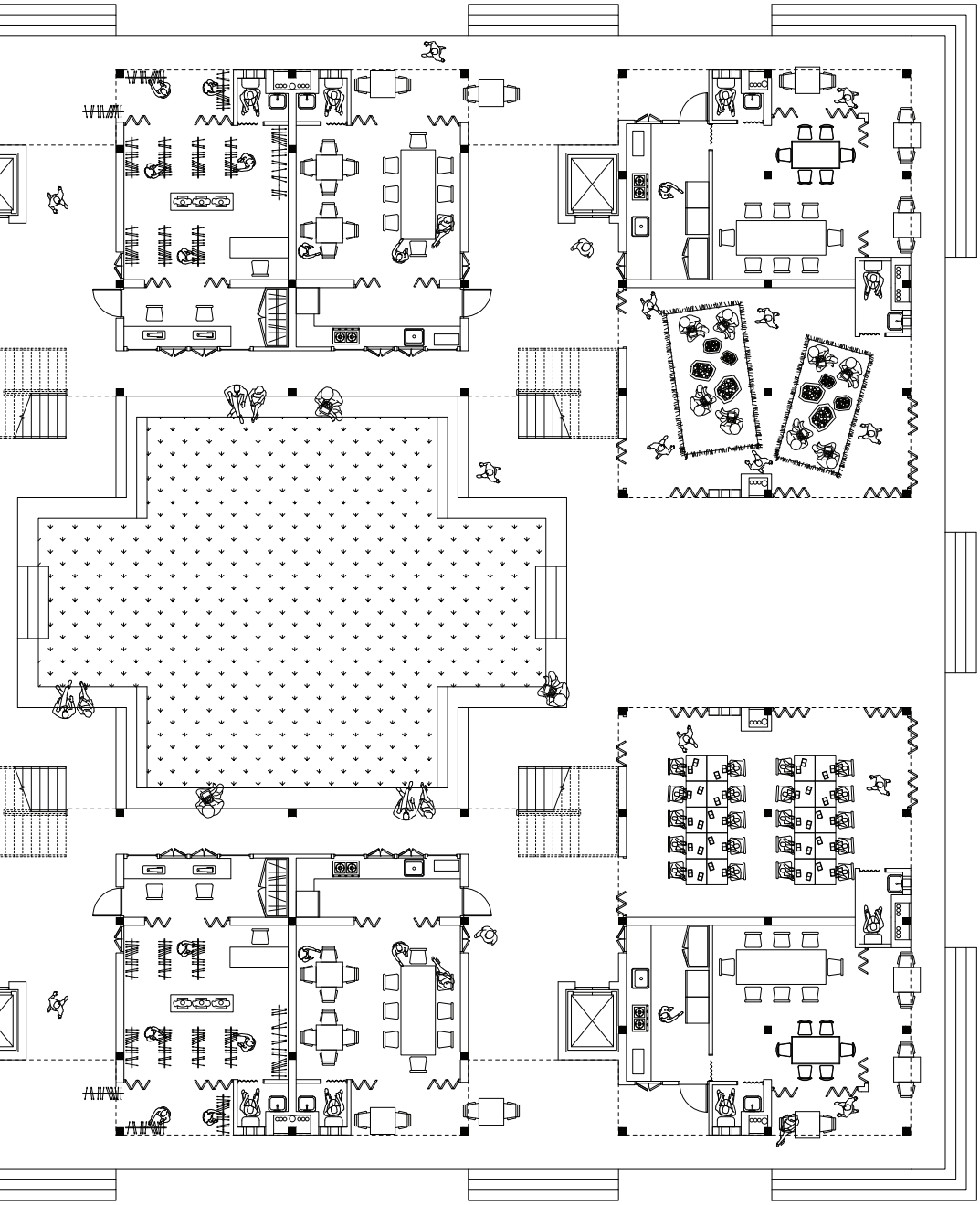
The units are on the courtyard side are set back to create covered walkways facing the courtyard, while on the street side there are set backs in certain parts to create a street-like conditions.

Seating are also added at the edge of the courtyard.

The units on the groundfloor are also flexible work-live units, and there is also multipurpose space at the entrance of the society.



Mid Rise GF Plan
1:200



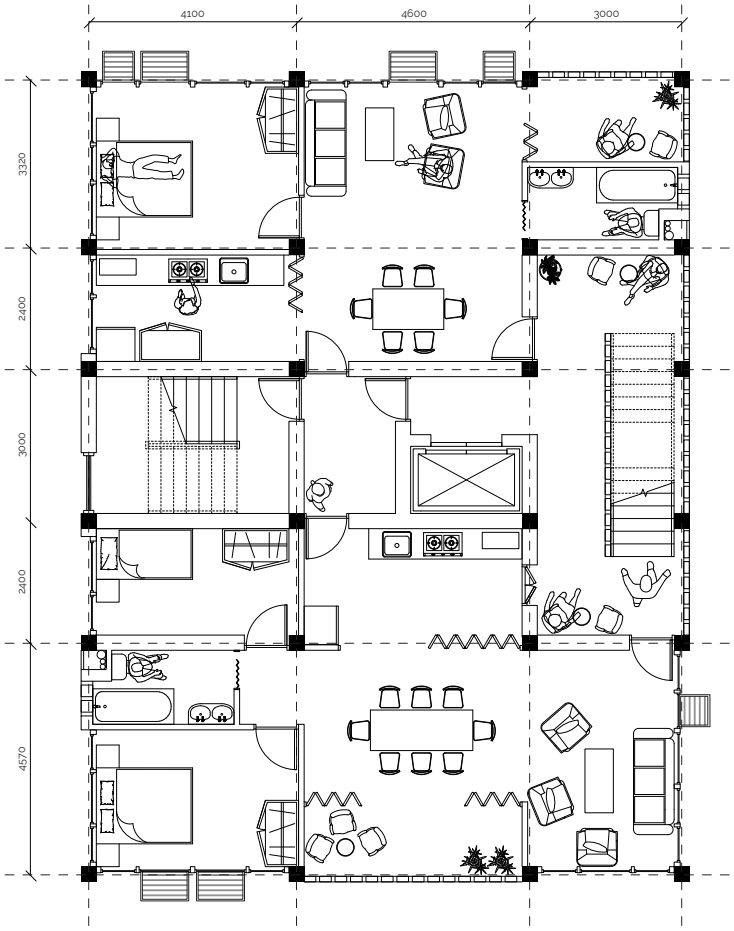
Type 3: High-rise - Tower

The high-rise tower typology is catered towards the upper middle income group.

Two towers are connected by a podium with a communal playground area. By elevating the common area to the first floor, it makes this area more exclusive.

The ground floor will be used completely for public and commercial activities.

Type 3: High-rise - Tower

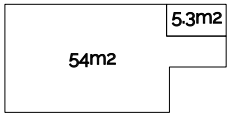


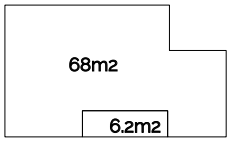
High Rise Typical Floor Plan
1:150

There is a higher degree of privacy in this typology, with only two units per floor.

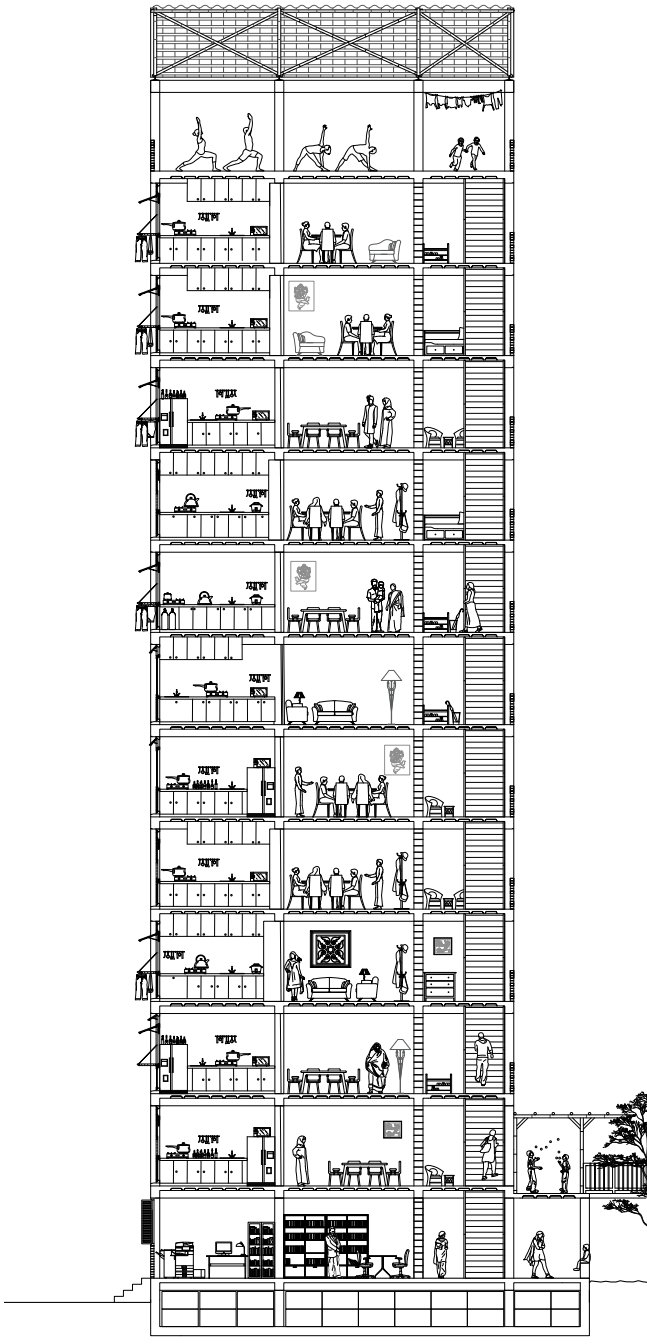
On the plan, there is also a main entrance for the residents, and a service entrance close to the kitchen, that could be used for housemaids, gas delivery, and a fire escape route.

Instead of shared connecting terraces, private balconies would be provided in this typology, and users can enjoy a panoramic view from the dining room.

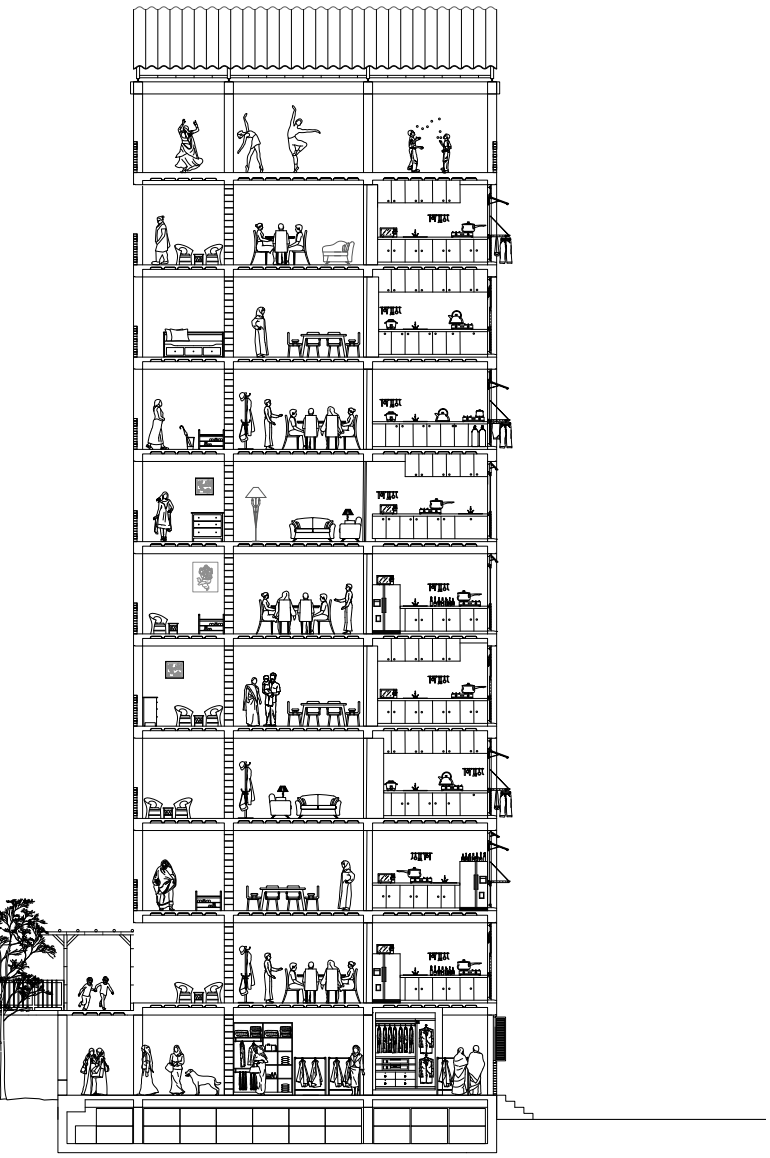




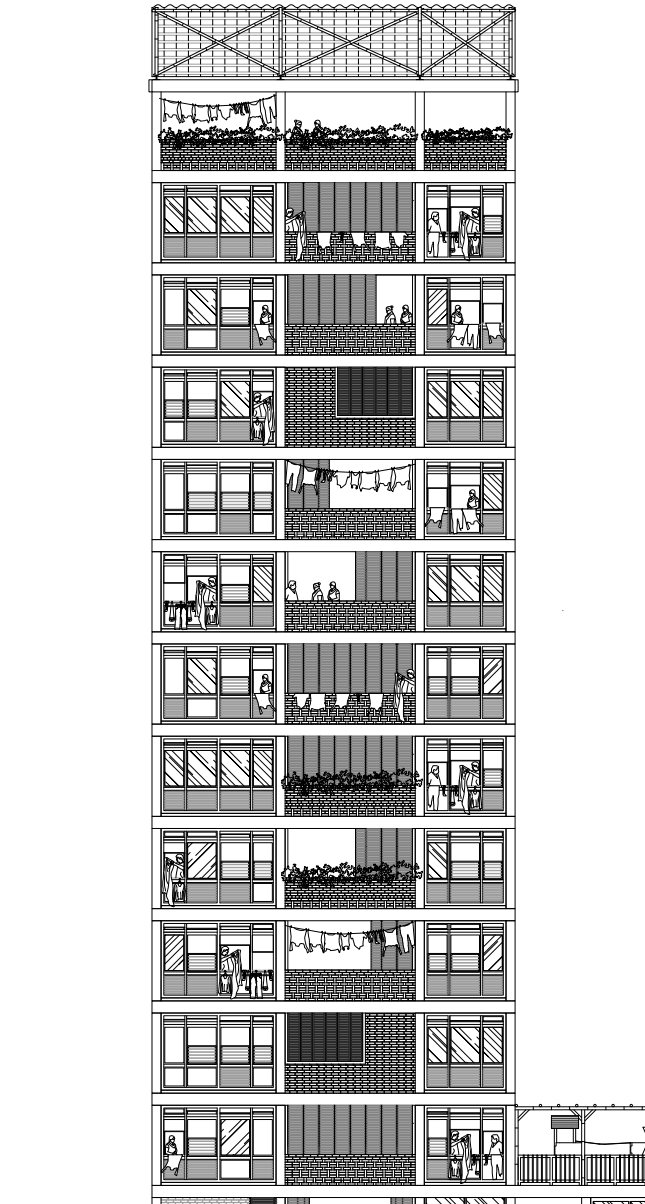
Type 3: High-rise - Tower



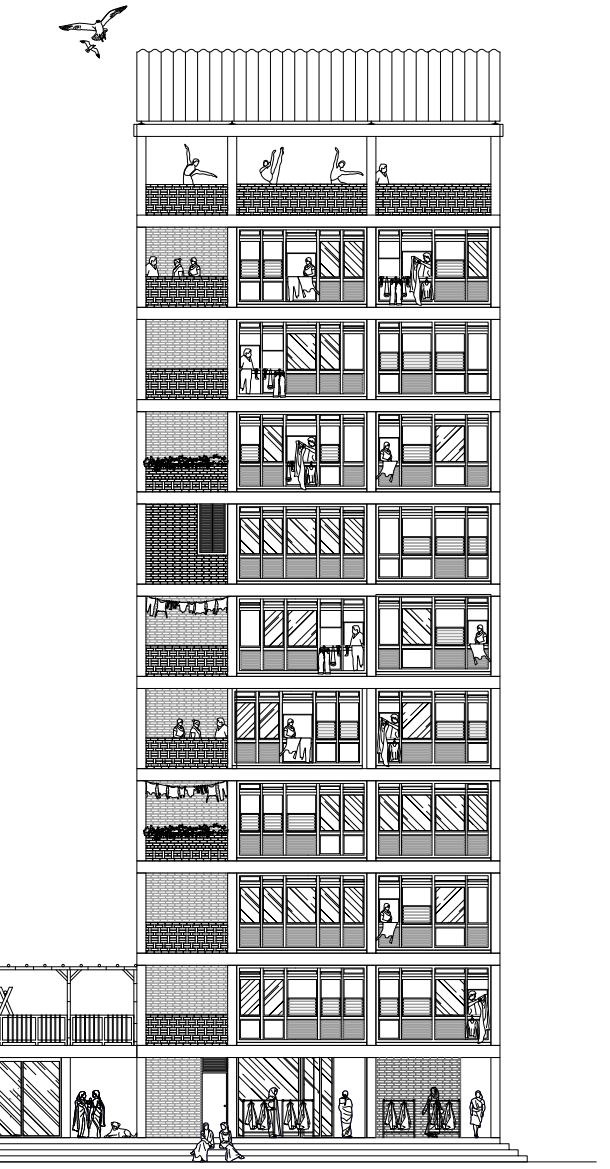
High Rise Section
1:250



Type 3: High-rise - Tower



High Rise Elevations
1:250

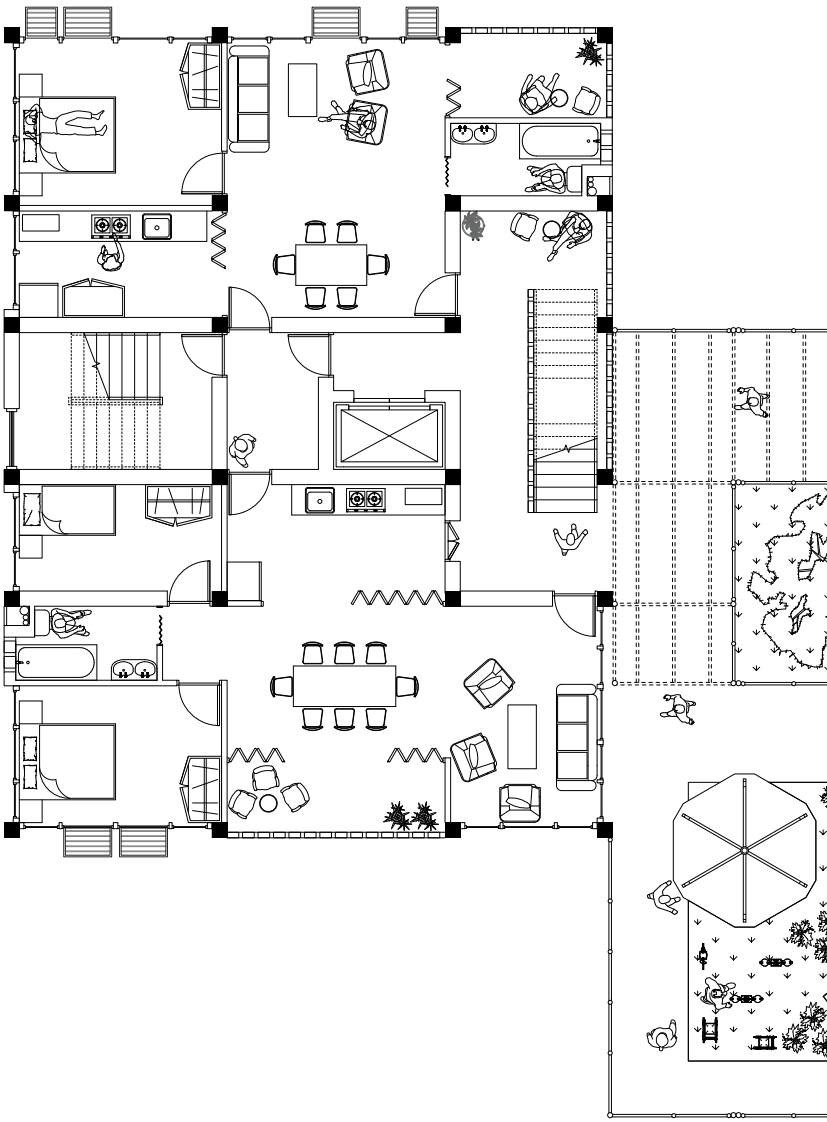


Type 3: High-rise - Tower

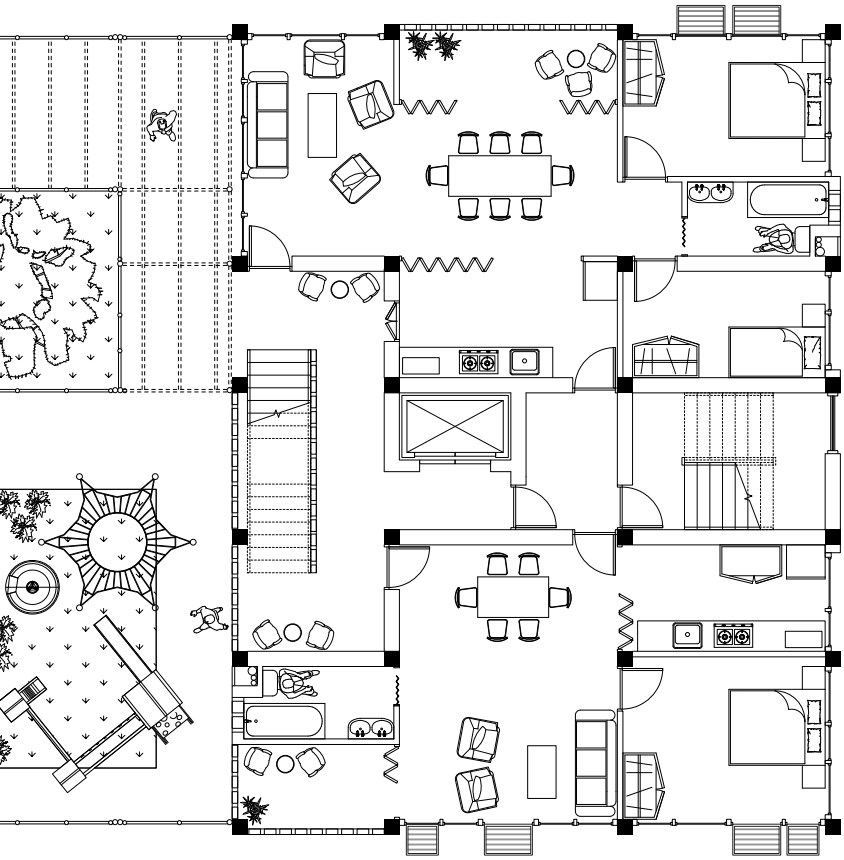
Two towers are connected by a porous podium. The courtyard of this typology is shifted to the first floor for more exclusivity. Here the units from both towers share a playground. There is a void on the first floor so that there could be a visual relationship between the first floor and the ground floor.

Similar to the previous typologies, there will be a rooftop terrace. In this typology the users could also choose to close off their balconies as an extension of the domestic space.

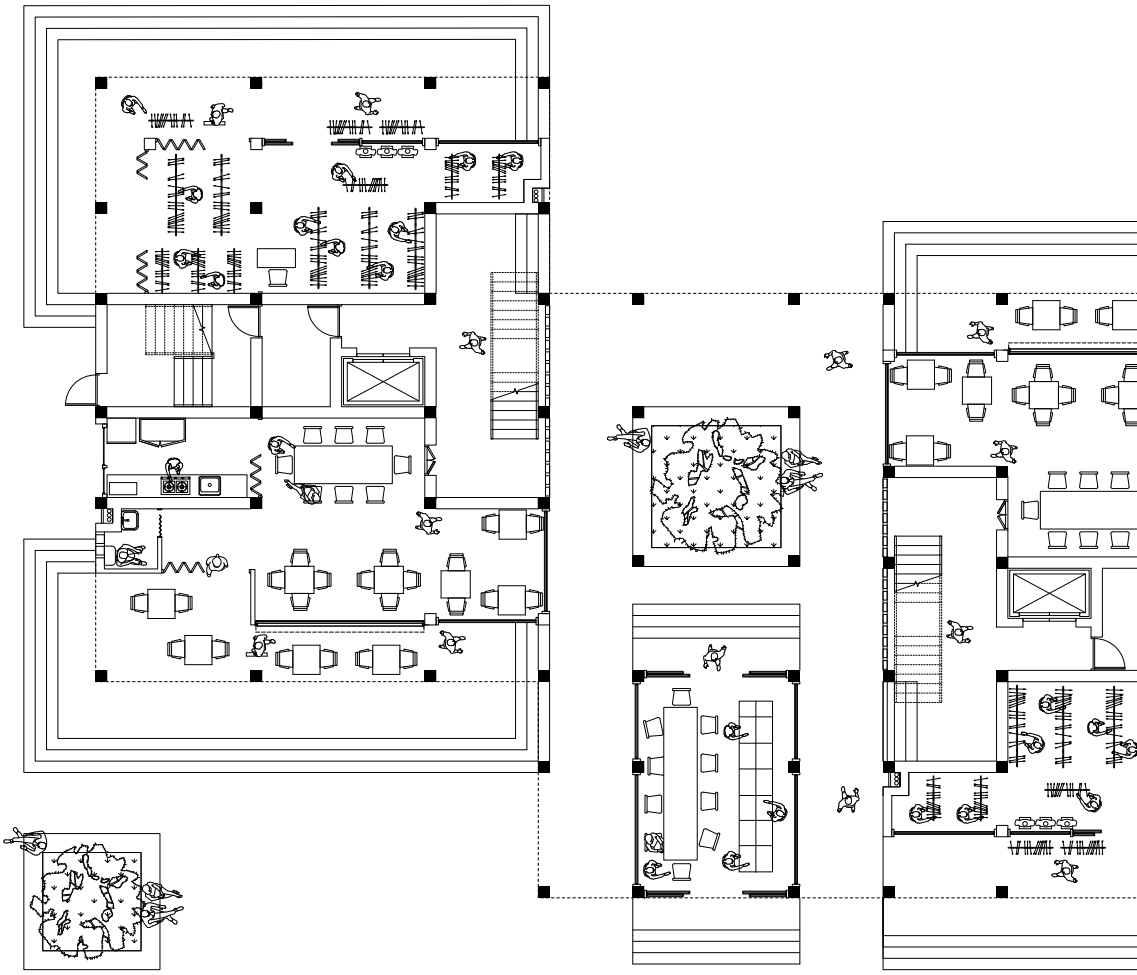
Type 3: High-rise - Tower



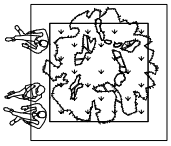
High Rise 1st Floor Podium Plan
1:150

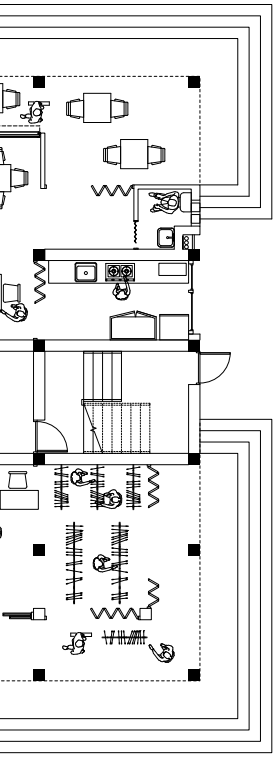


Type 3: High-rise - Tower



High Rise Ground Floor Plan
1:200





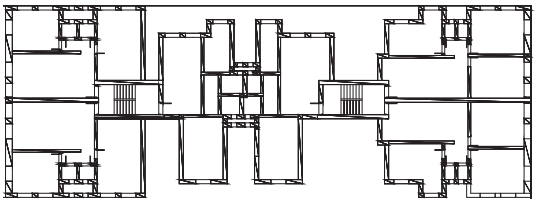
The Ground Floor of this typology is completely opened to the public, with commercial and public amenities.

Societies that choose this typology would have to give back part of the ground floor as a neighbourhood amenity. For example in this drawing the space in between the two towers is a neighbourhood library, but it can also be a temple, a clinic, a school, etc.

Public could walk through the area covered by the podium. The corners are also activated by set back, added steps, and also planters that could act as seating.

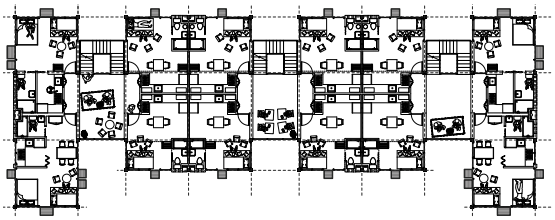
Typology Comparison

Spatial Aspects



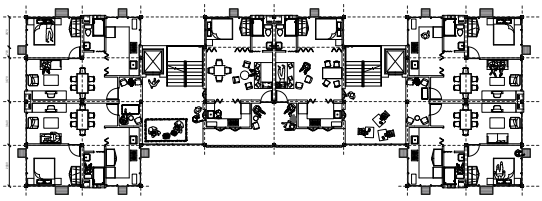
Sri Prastha

- no elevator
- no common space among units
- dark circulation spaces



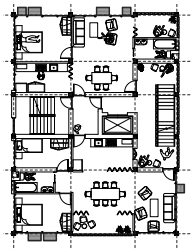
Low rise - Chain Typology

- no elevator
- each 2-4 units share unprogrammed open space
- shared courtyard space and multi-purpose hall on GF
- facing kitchens among neighbours for security surveillance
- flexible Work-Live units on GF
- oppurtunity to add mezzanine



Mid rise - Slab Typology

- with elevator
- each 2-3 units share unprogrammed open space
- shared courtyard space and multi-purpose hall on GF
- larger threshold area before entering unit
- flexible Work-Live units on GF
- multiple ducts for flexible unit configuration

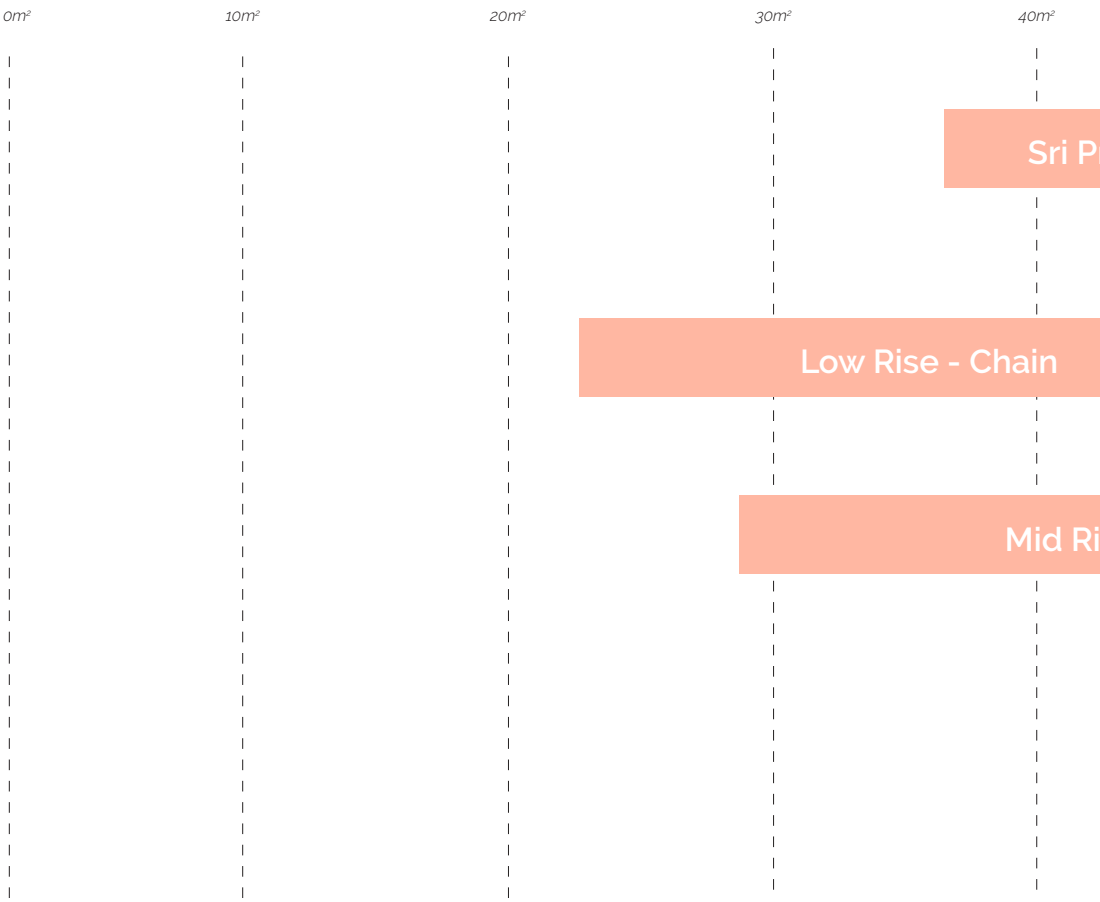


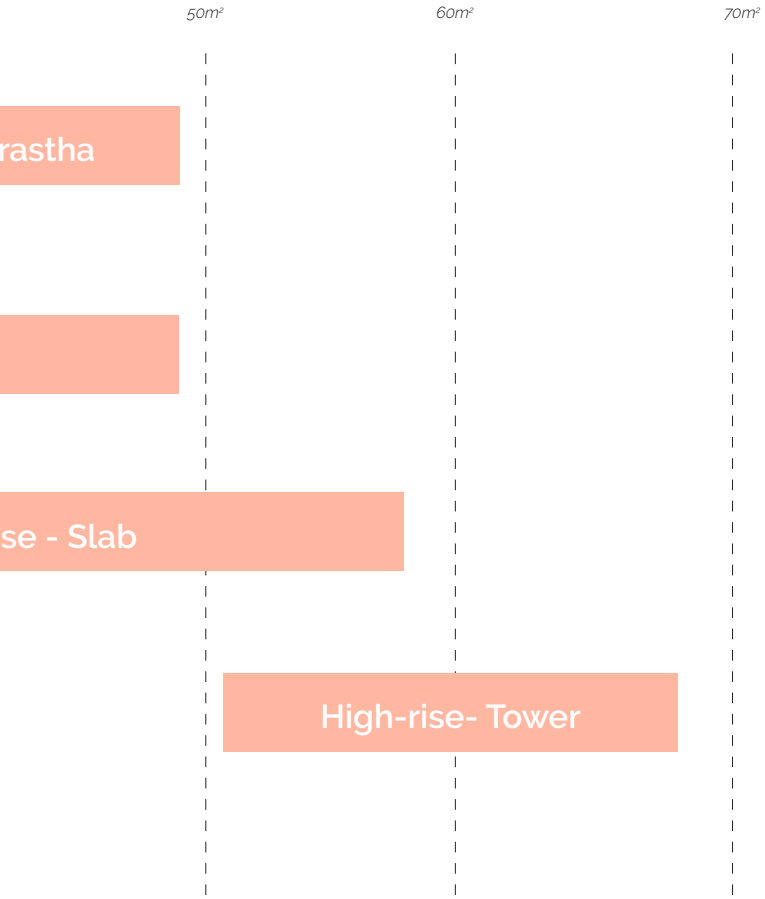
High rise - Tower Typology

- with elevator
- each unit has its own entrance
- each unit has its own balcony
- panoramic view from the top
- GF is completely for commercial and amenities
- Private communal podium on 1F

Typology Comparison

Unit Sizes





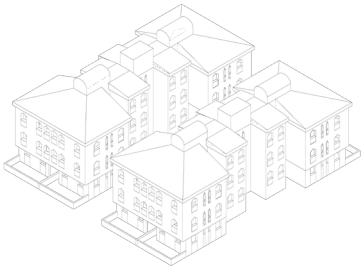
All three typologies are improvement upon the existing sri prastha. The existing SP has no common spaces among the unitswhile in these three typologies, the common and circulation areas are design with respect to the aspirations of different income groups.

In terms of unit size, The mid rise caters for unit sizes that are closest to the ones in the existing, and the low-rise could also achieve the same unit size if the smaller units are combined, the high-rise provides apartments that are slightly bigger, catering for more affluent societies.

Each typologies have a higher FSI and provide more units than the existing Sri prastha, so that extra units or commercial spaces could be sold to gain profit.

Typology Comparison

Society Figures



Sri Prastha

Number of dwelling per two buildings: 36

Unit sizes : 35 - 48 m²

Plot FSI: 1.4

Storeys: 3

Target Group: Lower MIG

Low rise - Chain Typology

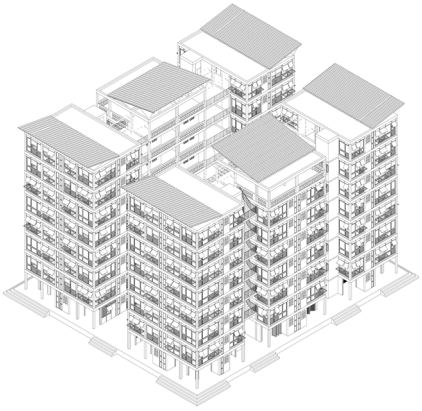
Number of dwelling per two buildings :
38 - 80 (depending on unit combination)

Unit sizes : 22-50m²

Plot FSI: 2.64

Storeys: 4 (with mezzanine)

Target Group: EWS, LIG, Lower MIG



Mid rise - Slab Typology

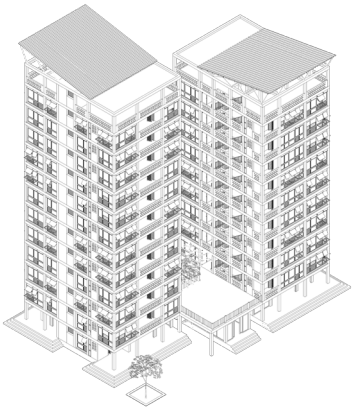
Number of dwelling per two buildings:
76 - 104 (depending on unit combination)

Unit sizes : 31-57m²

Plot FSI: 3.5

Storeys: 7

Target Group: LIG, Lower MIG, Middle MIG



High rise - Tower Typology

Number of dwelling per two buildings:
40 (+5 commercial spaces)

Unit sizes : 54-68m²

Plot FSI: 2.5

Storeys: 10-12

Target Group: Middle MIG, Upper MIG

04

building technology

Construction & Materiality

Roof

1 corrugated bamboo sheet
2 bamboo roof trusses and purlins
3 concrete ring beam
4 concrete roof gutter
5 modular water tank
6 rainwater downpipe

Building

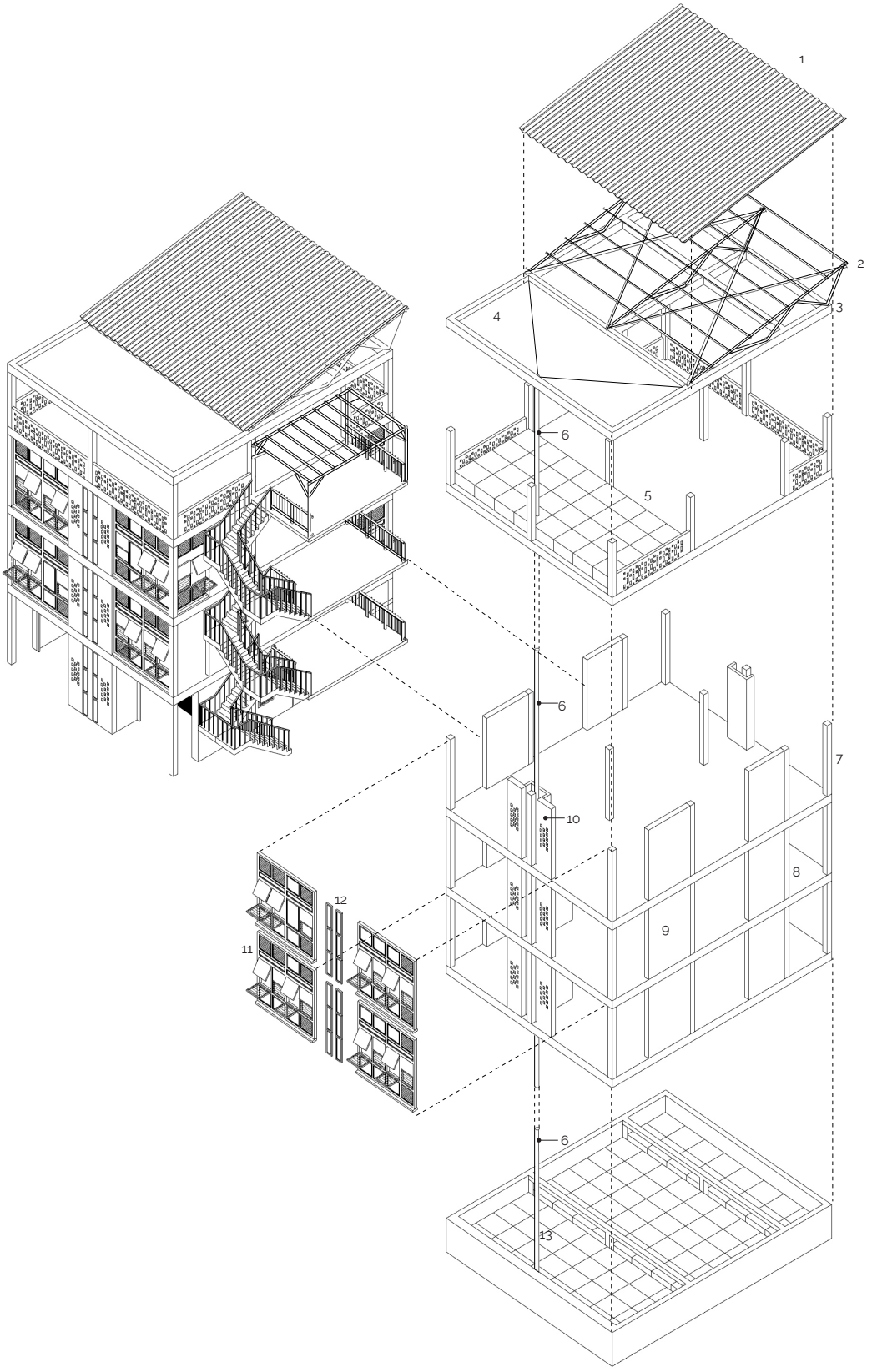
7 concrete skeleton
8 filler slab
9 stabalizing walls (fly ash brick or AAC blocks)
10 fly ash brick walls with jali as stabalizing walls

Facade

11 flexible user defined facade system
12 removable panels for pipe shaft

Ground

13 modular water tank
14 concrete foundation slab


1
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Structure

Comparison of Common Masonry Types in India

	Raw Material	Density	Availability
Red Clay Bricks	Clay	1800 kg/mm^3	High, Locally Available
Fly Ash Bricks	Fly Ash, Cement, Sand/ Stone dust	2200 kg/mm^3	High, Locally Available
AAC Blocks	Cement, Fly ash, Aluminium Powder, Air Entraining Agent (for lightweight purposes)	550-650 kg/mm^3, Saves Steel in High Rise	Highly Available in Tier I & II Cities where High-Rise construction occurs
CLC Blocks	Cement, Fly ash, Foaming Agent (for lightweight purposes)	800kg/mm^3 Saves Steel in High Rise	Less Available

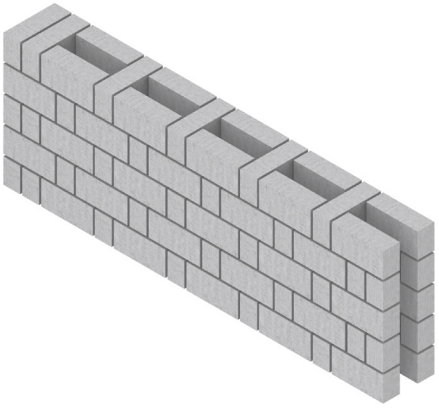
Cost and Cost Benefits	Finishing	Environmental Impact	
Rs 3200/m^3, overall cost is more, requires most mortar	Can be exposed	Made from topsoil, reduces agricultural land. Higher CO_2 emmision due to firing	
Rs 3100/m^3, overall cost is more, requires most mortar	Can be exposed	Use flyash produced by thermal power plants, Very low CO_2 emission during manufacturing	✓
Rs 4200/m^3, Individual block is expensive but overall cost is low, consumes less mortar, cheaper in bulk	Has to be plastered due to high porosity	Manufacturing waste is recycled, less CO_2 emission during manufacturing	✓
Rs 4000/m^3, Individual block is expensive but overall cost is low, consumes less mortar, cheaper in bulk	Has to be plastered due to high porosity	Use flyash produced by thermal power plants, Very low CO_2 emission during manufacturing	

All three typologies have the same construction method and materiality: concrete skeleton filled in with masonry and timber frame façade system, with a concrete foundation tank at the basement, and a bamboo roof structure.

After comparing the masonry types available in India, I have chosen fly ash bricks and AAC blocks, mainly due to the price, high availability and environmental impact.

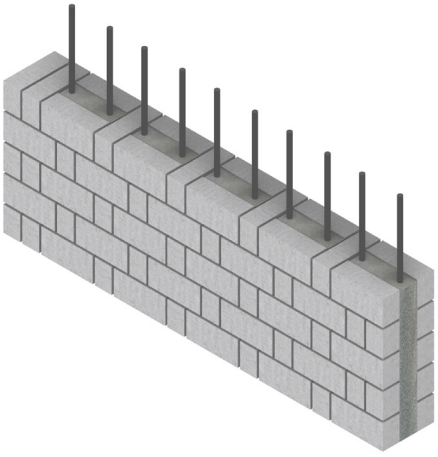
Structure

Stabalizing Wall



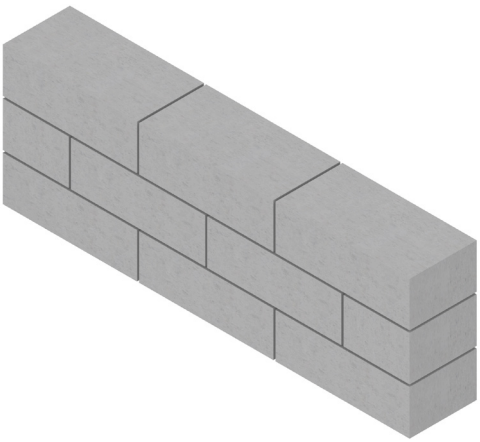
Fly ash brick - Rat trap bond

Stabalizing elements in Low rise Typology



Fly ash brick - Reinforced Rat trap bond

Stabalizing elements on the facade in Mid-rise & High-rise Typology



AAC Blocks

Internal stabalizing elements in Mid-rise & High-rise Typlogy

Fly ash brick arranged in rat trap bond would be used in the Low rise typology as stabilizing walls.

The rat trap bond masonry introduced by Laurie Baker requires approximately 25% less bricks and 40% less mortar than traditional masonry bond. Cavity induced in wall also provides better thermal insulation, resulting in cooler interiors during summer and warmer interiors during winter.

The stabilizing walls on the façade for the mid-rise and high-rise typology will consists of a reinforced rat trap bond masonry for a better aesthetic, and AAC blocks for the as internal stabilizing elements in the mid-rise and high-rise typology.

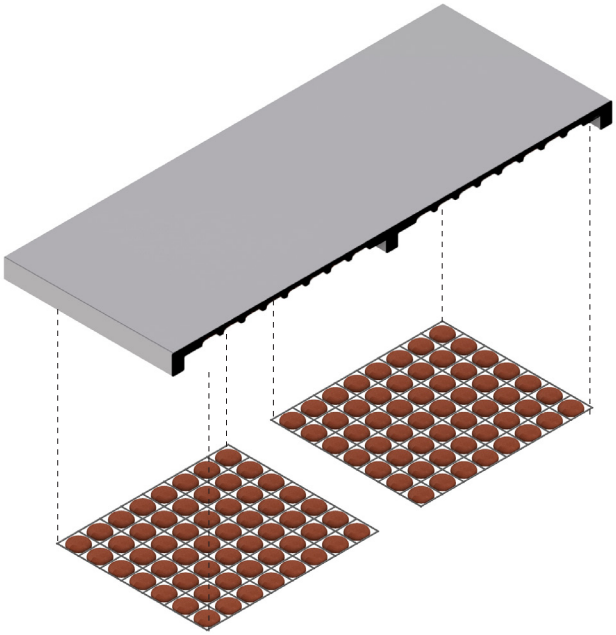
Structure

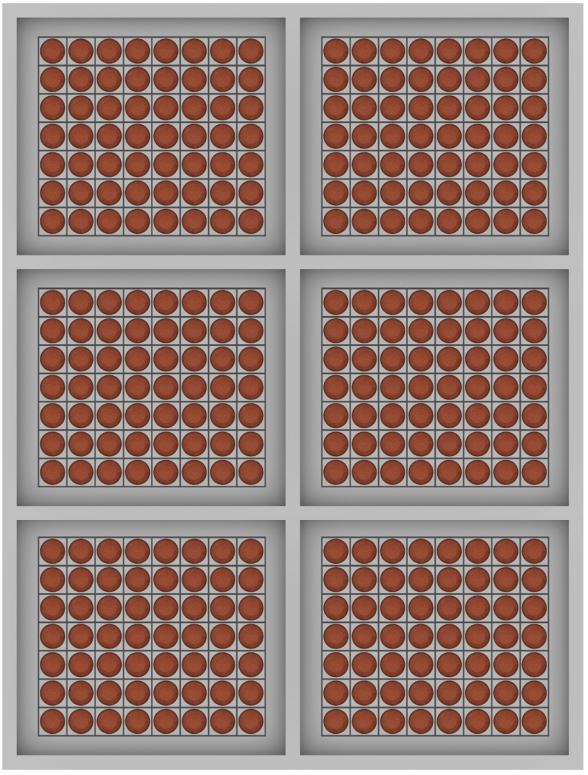
Filler Slab

Filler slabs will be used to reduce the amount of concrete used. The filler material should be lightweight, inert and locally available.

In my drawings I have chosen locally available claypots as a filler material for these slabs, but other materials such as coconut shells, waste mangalore tiles, and waste bricks are possible alternatives.

The claypots will remain in the slab after casting and would form an aesthetically pleasing ceiling.





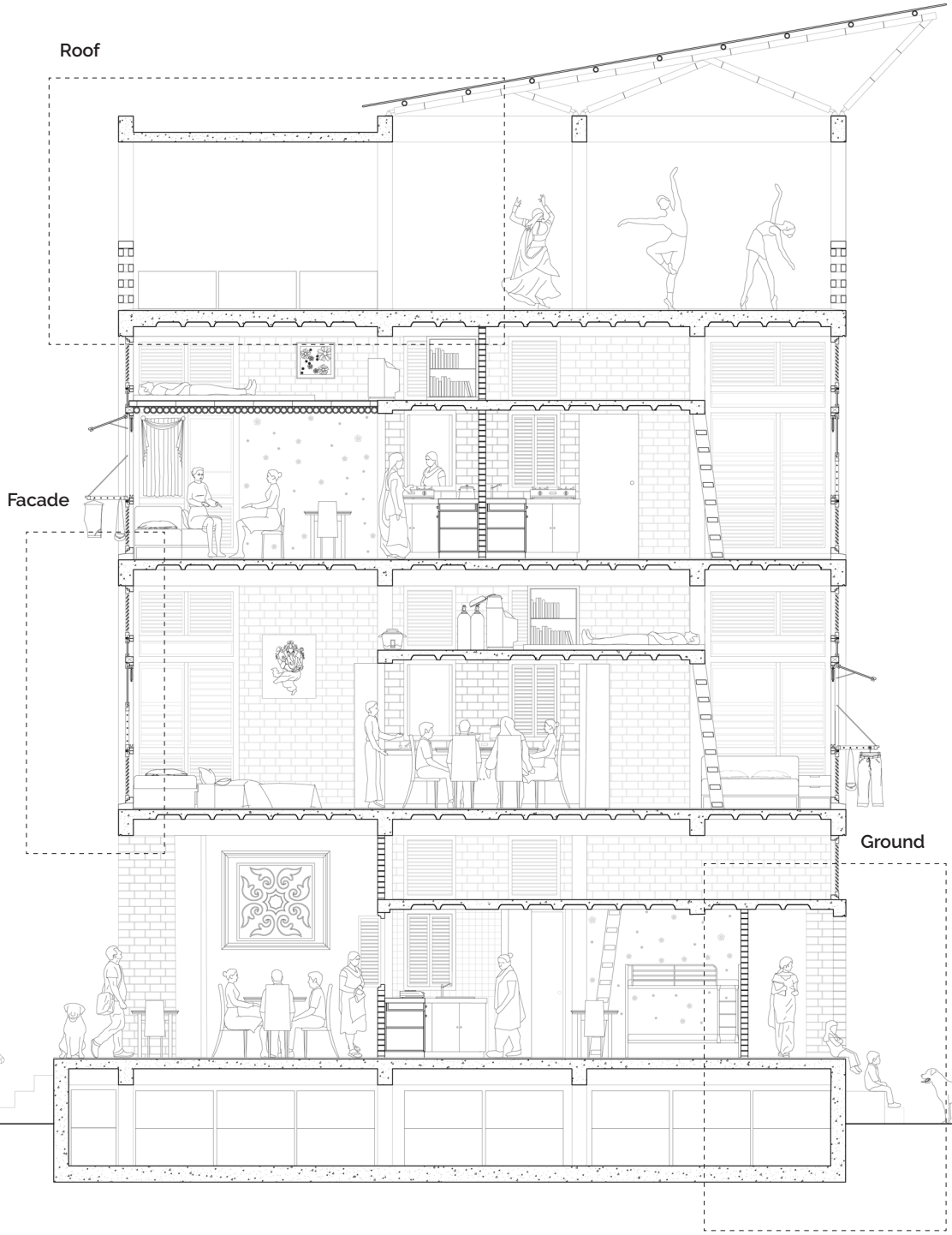
Construction & Materiality

Building Construction

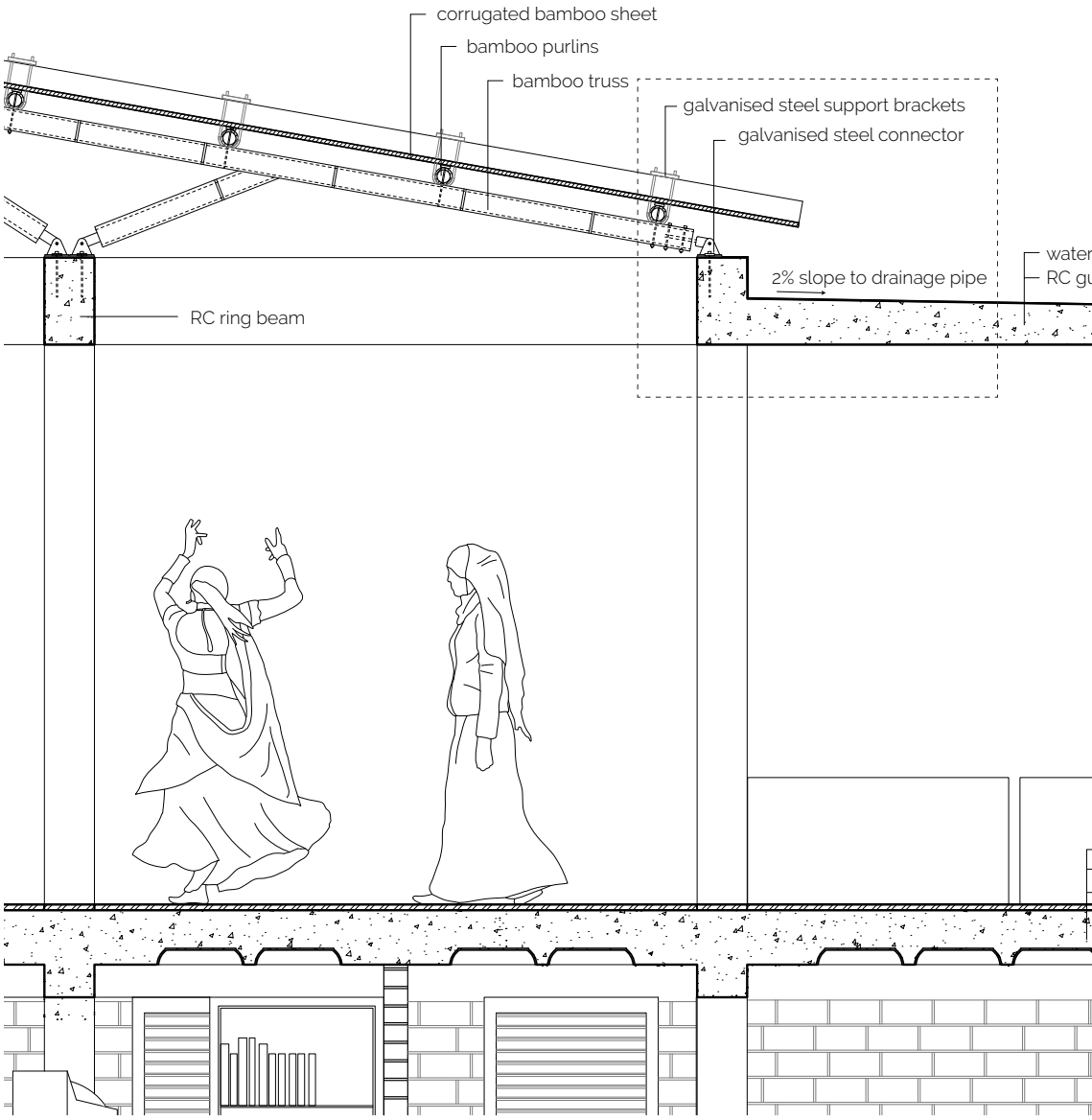
All three typologies have the same construction method and materiality: concrete skeleton filled in with masonry and timber frame façade system, with a concrete foundation tank at the basement, and a bamboo roof structure.

The detail construction of the roof, the facade, and the connection to the ground would be further explained in the following pages.

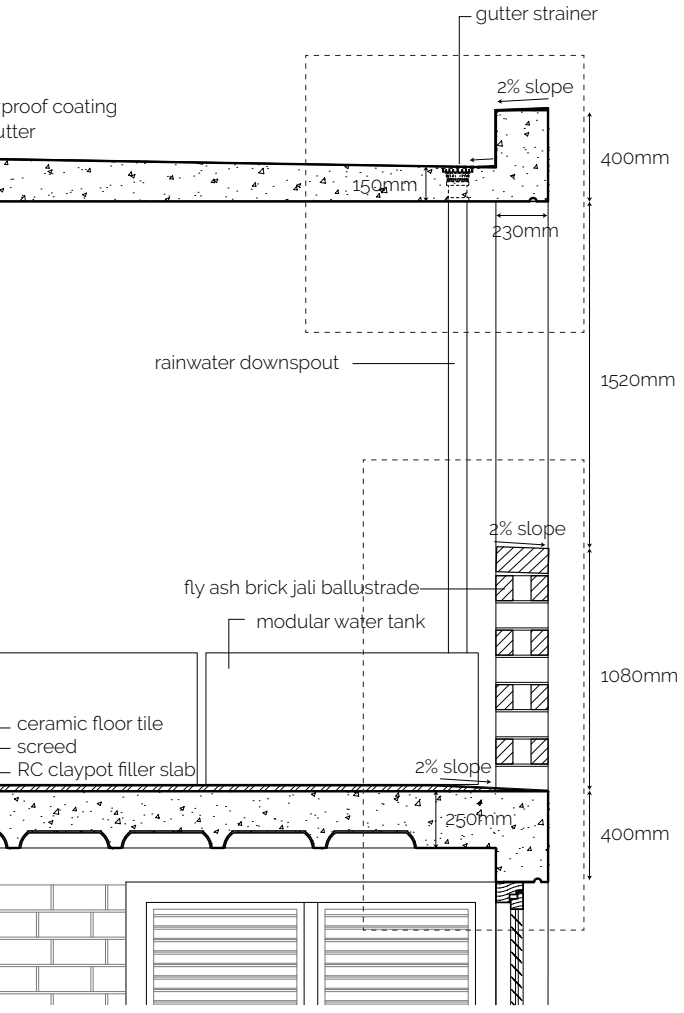
Building Section
1:100


Roof
Facade
Ground

Roof Construction



Roof Section
1:33

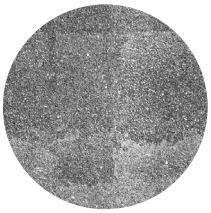


corrugated bamboo sheet

bamboo

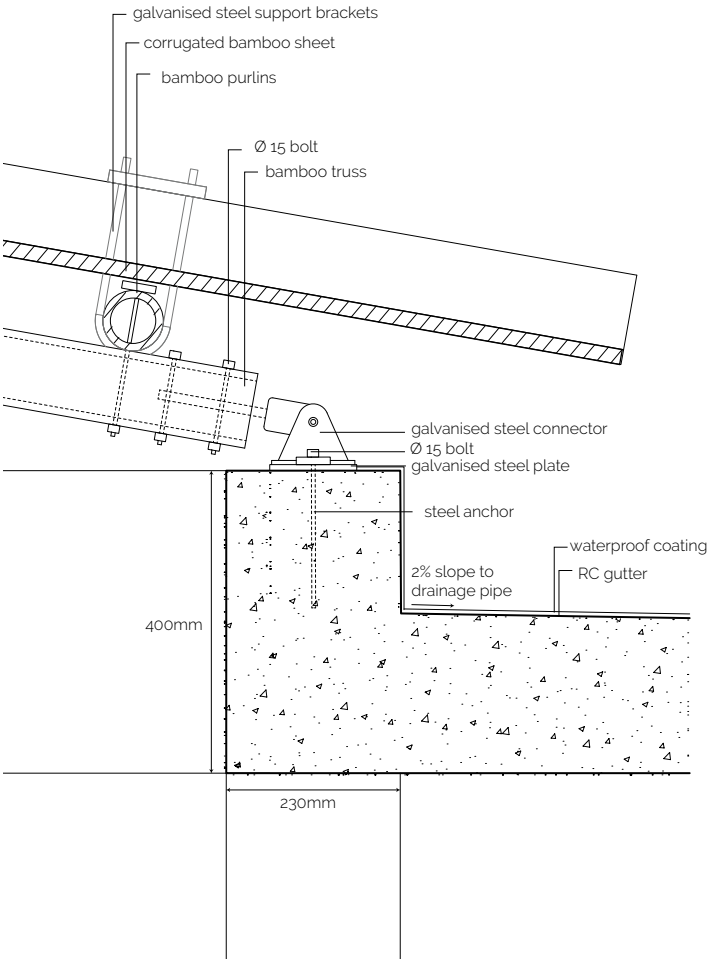
broken recycled china tiles

fly ash brick



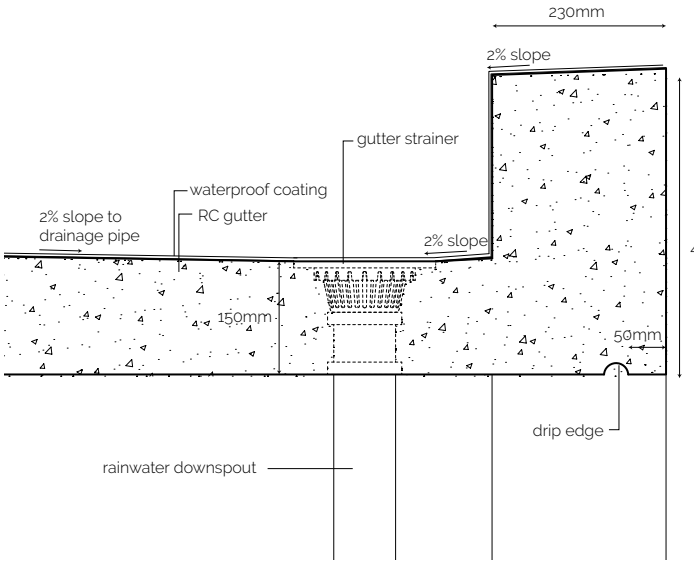
reinforced concrete

Roof Construction



Concrete gutter and bamboo roof connection

Roof Details
1:10



Gutter strainer and downspout

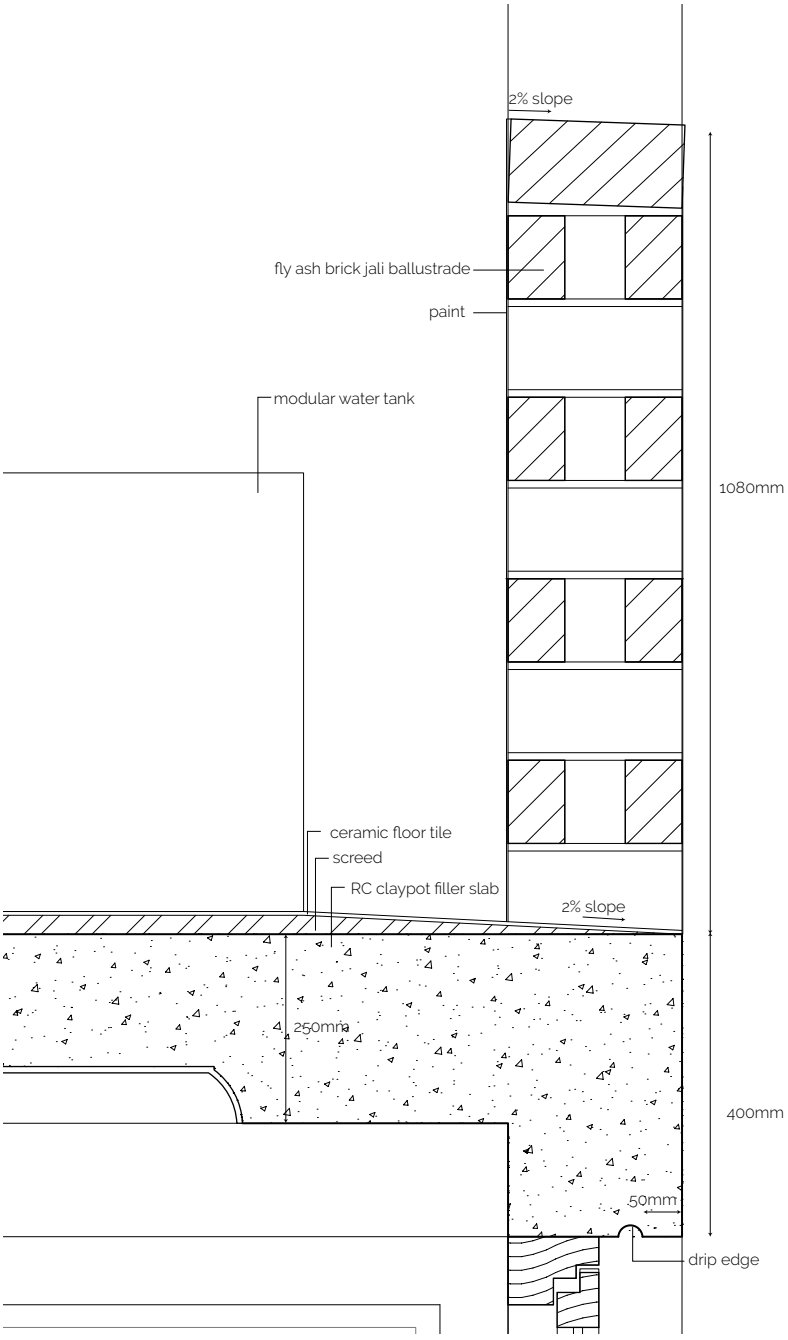
Roof Construction

The roof terrace will be covered by corrugated bamboo sheets, supported by bamboo trusses and purlins, which are supported by concrete beams and columns. Part of the roof would be a large concrete gutter that collects water. The floor of the terrace would be covered by broken recycled tiles, locally known as China tiles

The roof is connected to the concrete beams by galvanized steel support brackets. Within the gutter, there is a 2 % slope towards the gutter strainer, into the downspout.

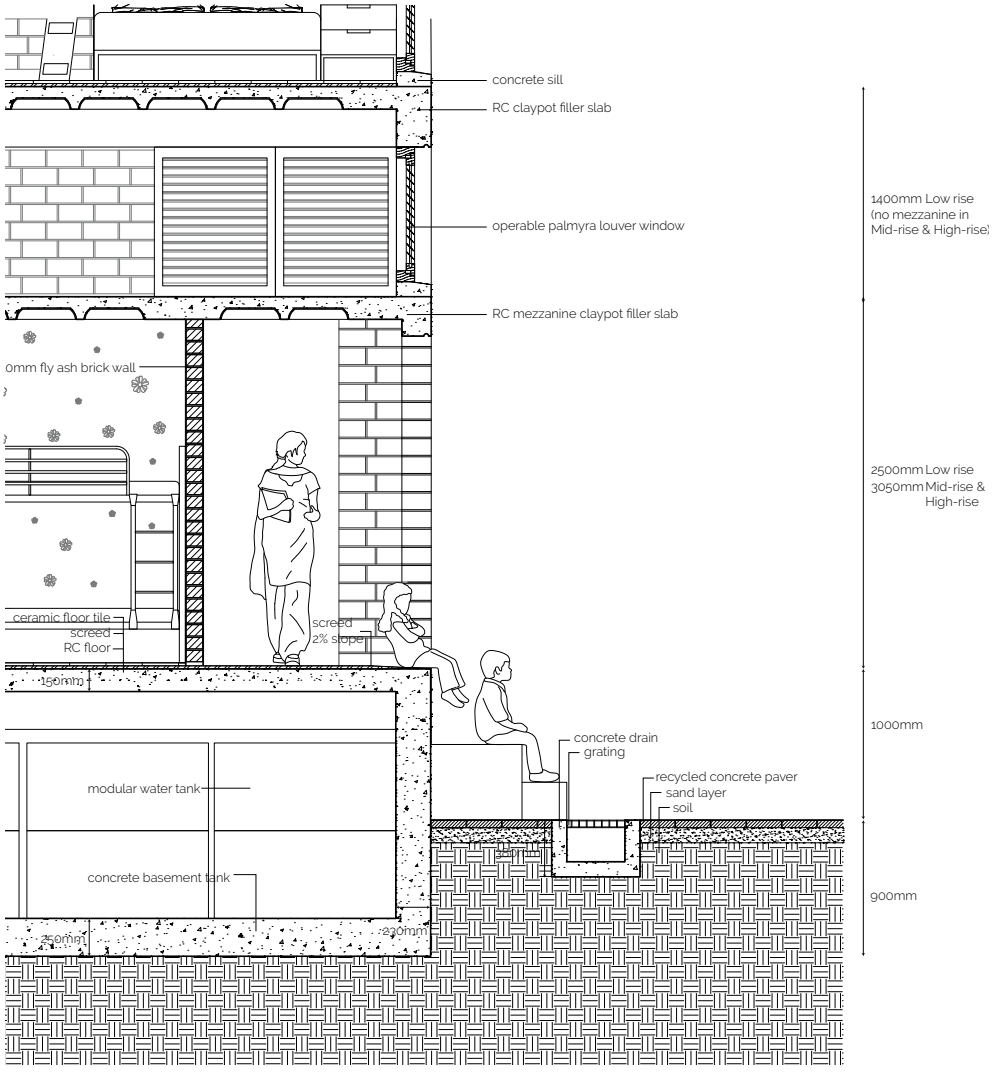
The top brick of the jali ballustrade of the roof terrace is also placed slanted, so that there will be a slope where water can run off. There is also a slope on the screed of the floor.

Roof Details
1:10



Roof Terrace Brick Jali Ballustrade

Ground Construction



Ground Section
1:50

recycled concrete paver

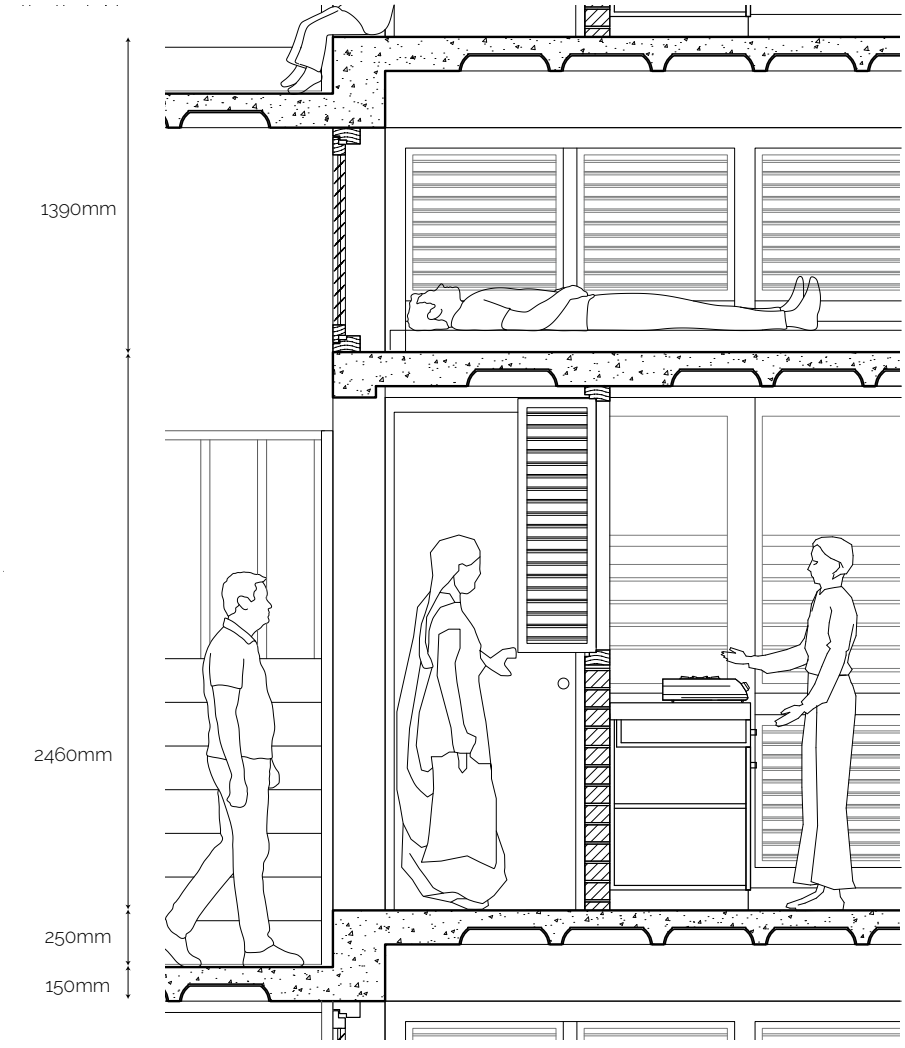
fly ash brick

reinforced concrete

The foundation of the building would be a large concrete tank, where the collected rainwater would be stored.

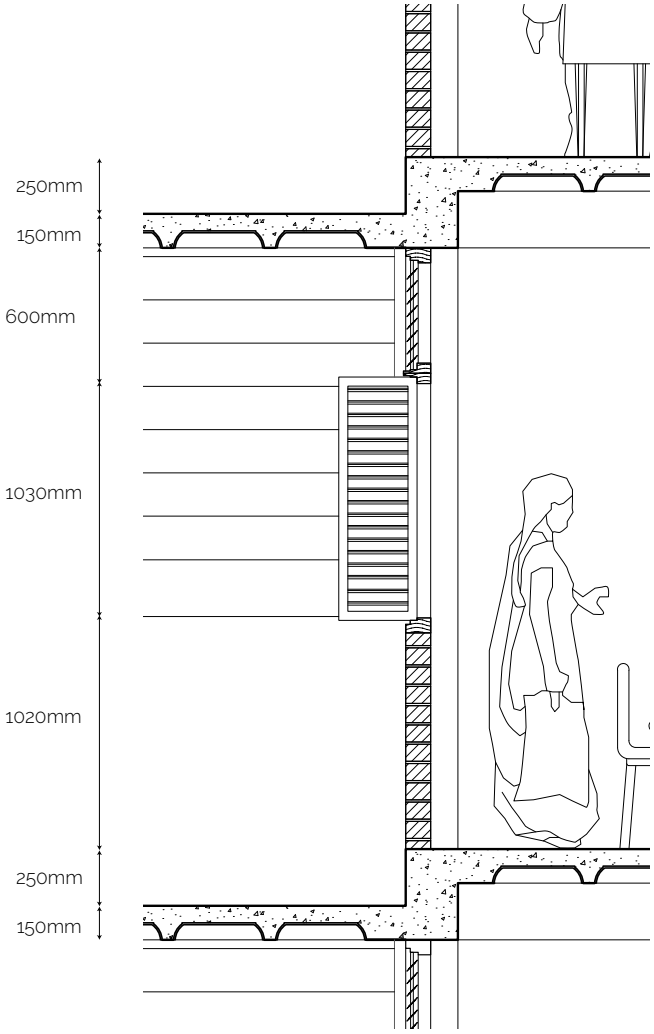
The courtyard will be paved with recycled concrete pavers.

Facade Construction - Internal



Low-rise internal facade

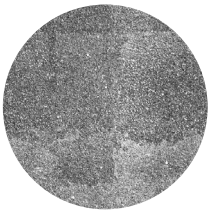
Internal Facade Section
1:33




palmyra louvers

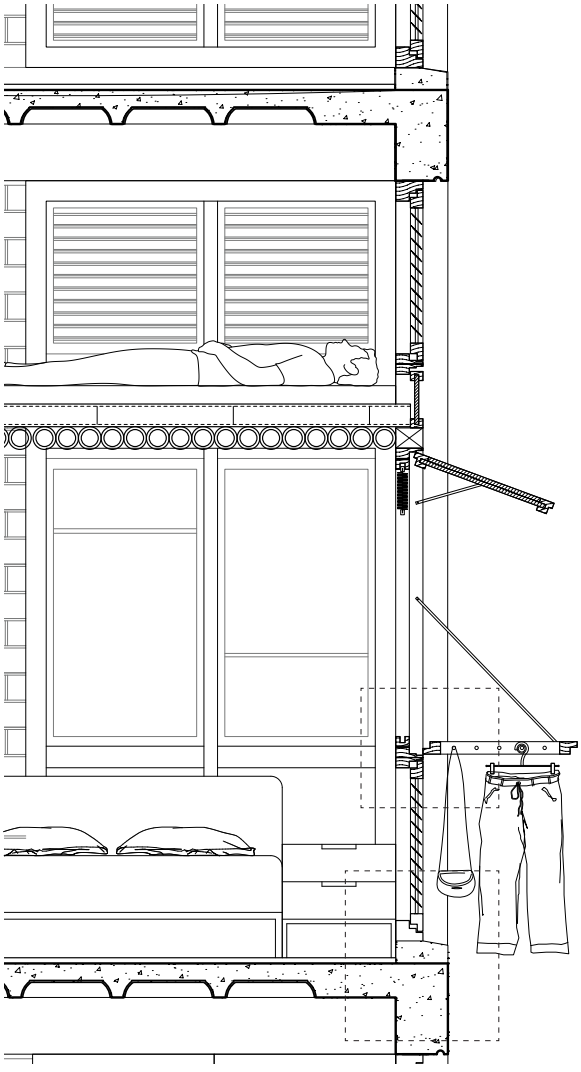

wood frame


fly ash brick


reinforced concrete

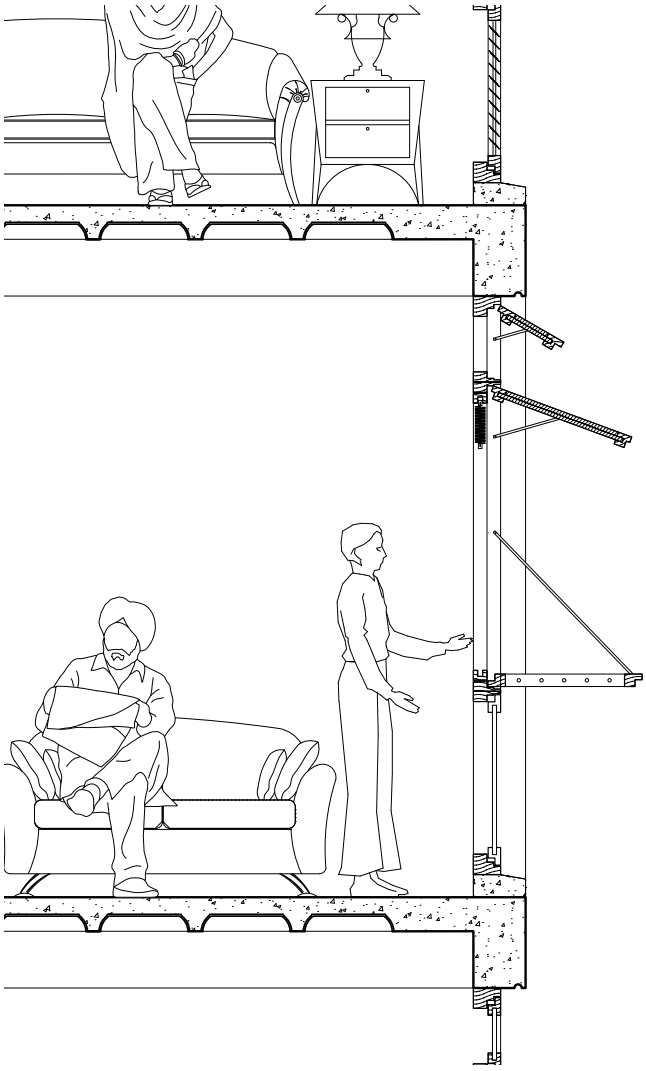
Mid-rise and high-rise internal facade

Facade Construction - External



Low-rise external facade

External Facade Section
1:33



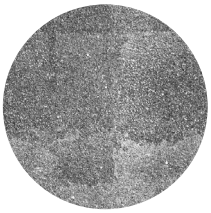
Mid-rise and high-rise external facade

palmyra louvers

coir ply

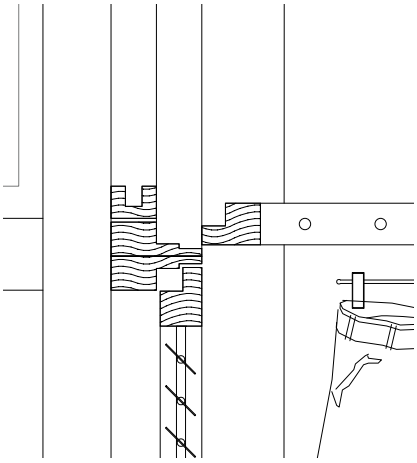
wood frame

fly ash brick

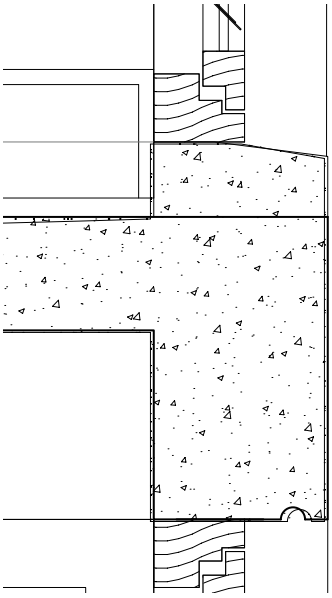


reinforced concrete

Facade Construction - External



Window frame detail



Frame sill and drip edge

Facade details
1:10

Since the low rise is the only typology with mezzanine, there is a slight difference in the façade sections in terms of height.

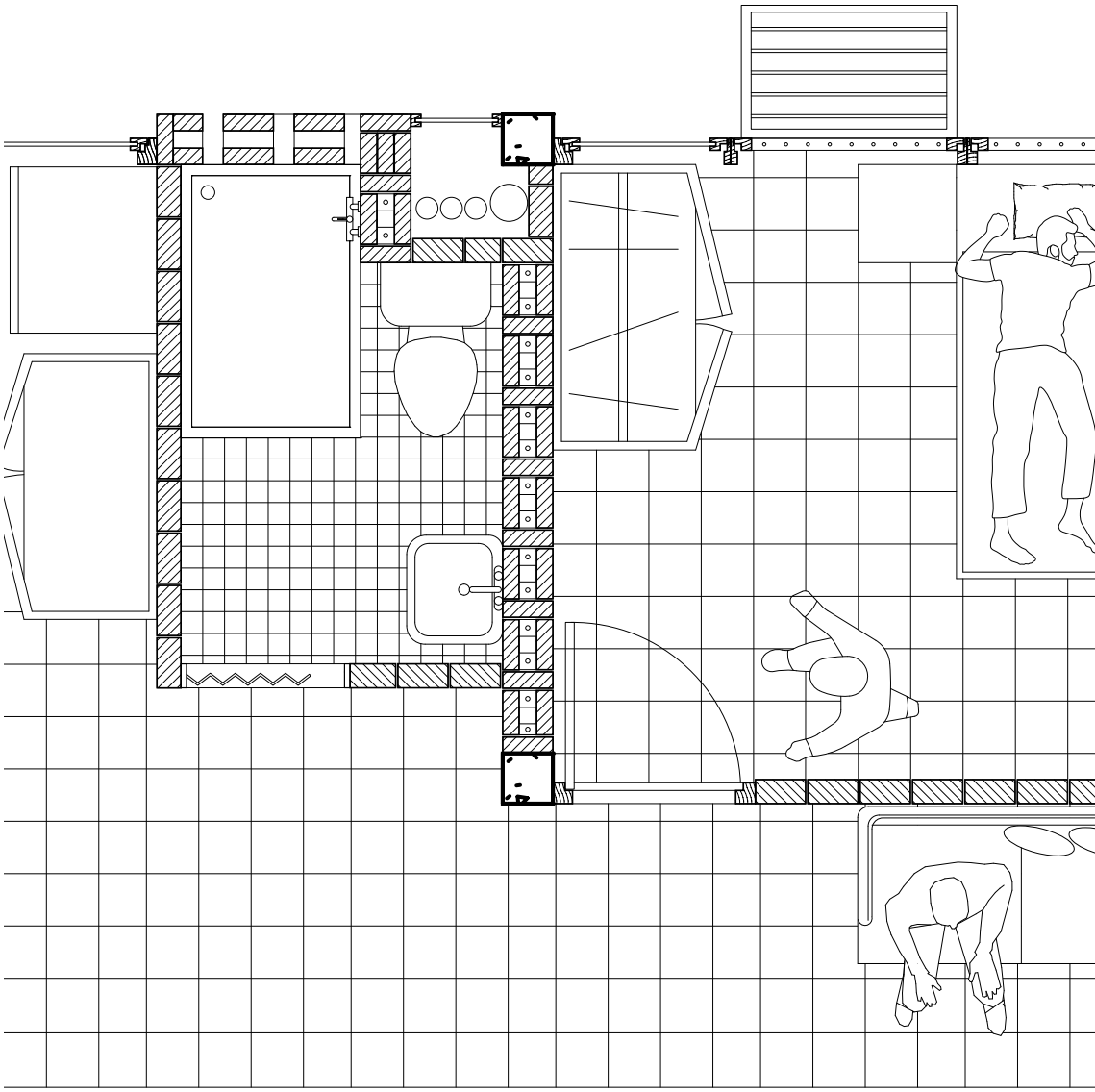
All the buildings have internal facades, facing the communal platforms, and external facades, facing the outside.

The internal façades are brick walls with window and louvers.

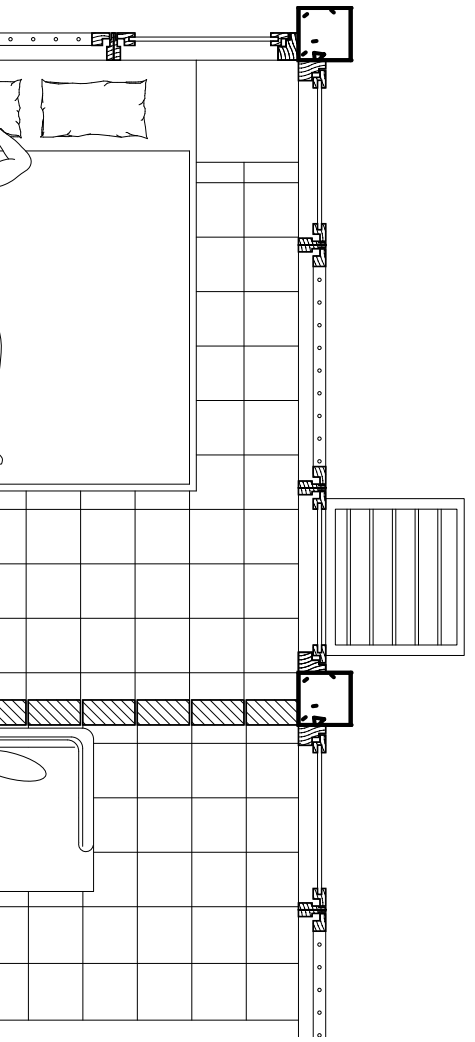
The external façades consist of a main timber frame with interchangeable components., with louvers on the lower part, windows in the middle, and louvers or a ventilation window at the top depending on the typology. The upper flap of the window could be a shutter, while the lower flap could be a laundry drying grill.

Where openings are not needed, users could choose to close off the opening with coir ply, a material made from compressed coconut waste.

Facade Construction - External



Facade Plan
1:33



The plan cuts through the façade main timber frame with the interchangeable components, whereby the users can choose their own components based on the internal configuration.

The internal stabalizing walls in this case are reinforced rat trap bond wall. The toilet also has a brick jail façade for ventilation.

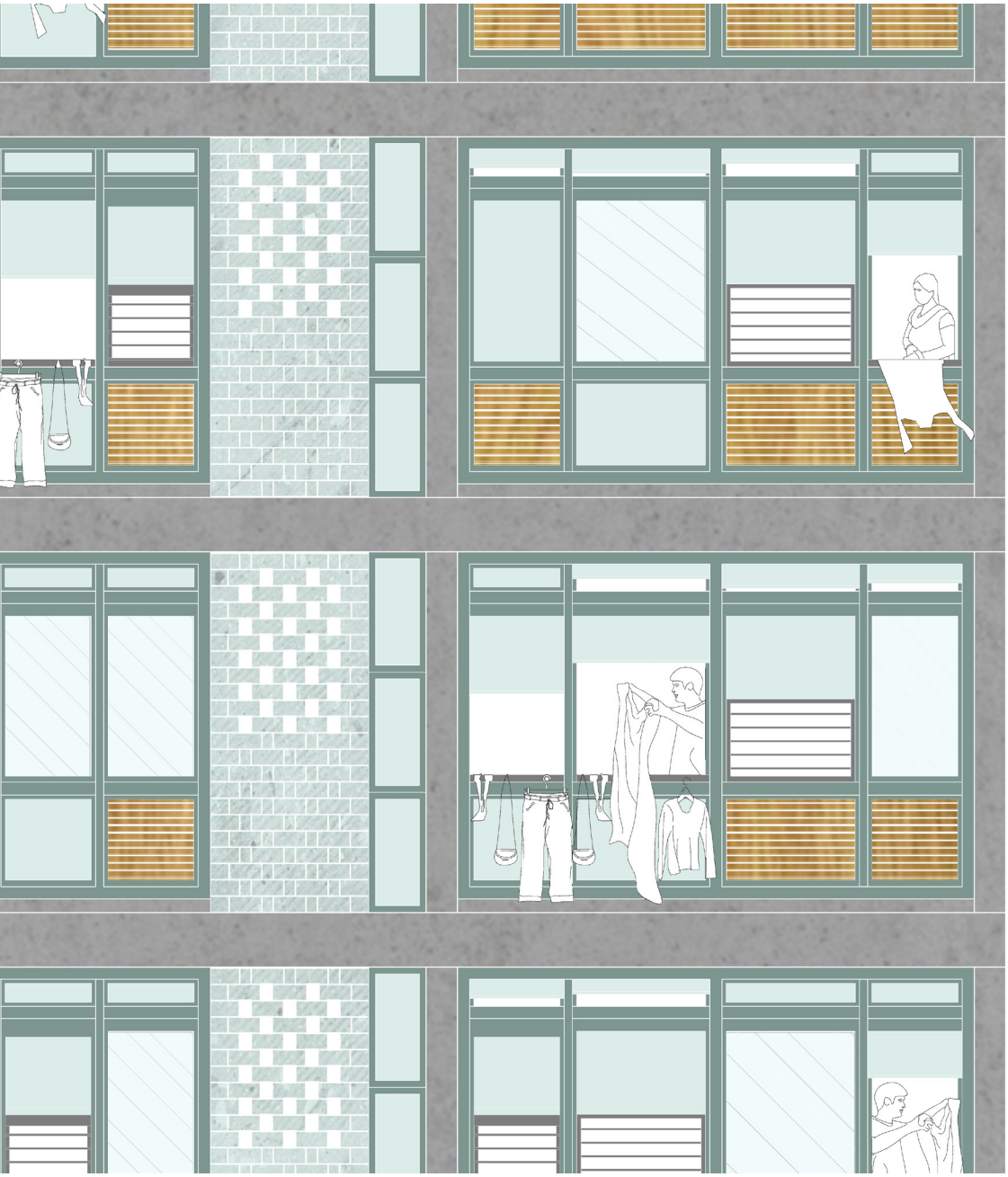
Facade Materiality

The user defined facade components would result in a dynamic facade. Users are free to choose their own combination of the components, thus every unit is unique.

The facade of the toilet would be brick wall with jali for ventilation, and the pipe shaft would be covered with removable coirply panels.

The bamboo ballustrades on the connecting platform forms a contrast with the solid towers that houses the units.

Facade Elevation
1:50



Facade Materiality

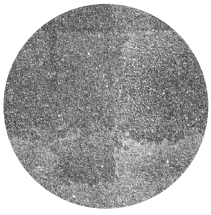

bamboo


coir ply


fly ash brick


palmyra louvers

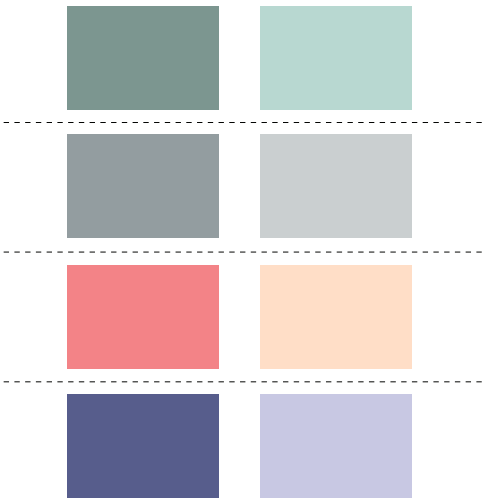

wood frame


reinforced concrete

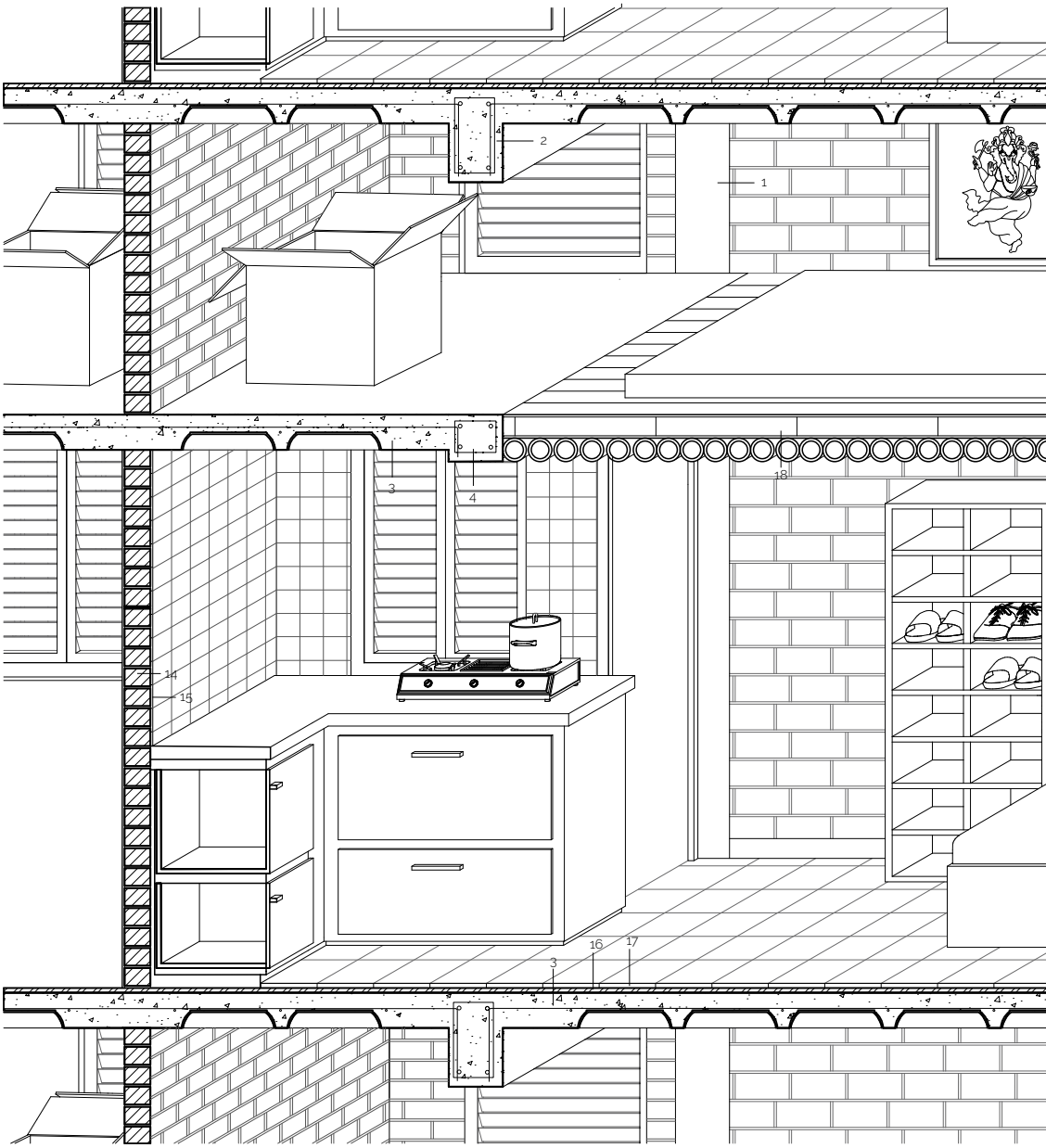
Facade Material Palette

All these materials and components come together and form a dynamic façade.

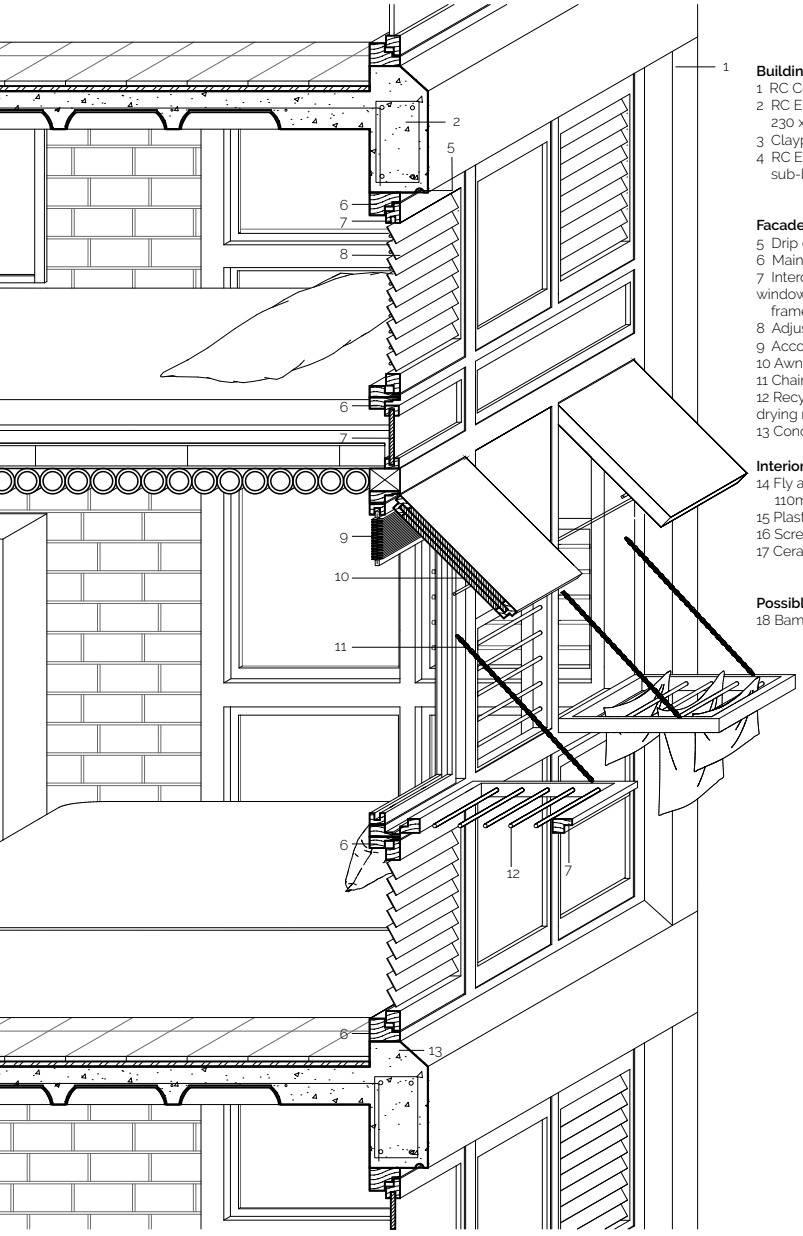
While the bamboo balustrade and palmyra louvers are not painted, the timber frames will be painted in a darker colour, with a matching lighter colour for the components and brick wall.



Pairing of Facade Colour Scheme



Unit Section
1:30



Building Structure
1 RC Column 230 x 230 mm
2 RC Embedded beam 230 x 400mm
3 Claypot Filler Slab 150mm
4 RC Embedded mezzanine sub-beam 200 x 200 mm

Facade
5 Drip edge
6 Main timber frame
7 Interchangable timber window frame
8 Adjustable palmyra louver
9 Accordion insect screen
10 Awning window shutter
11 Chain
12 Recycled steel bar as drying rack / security grill
13 Concrete window sill

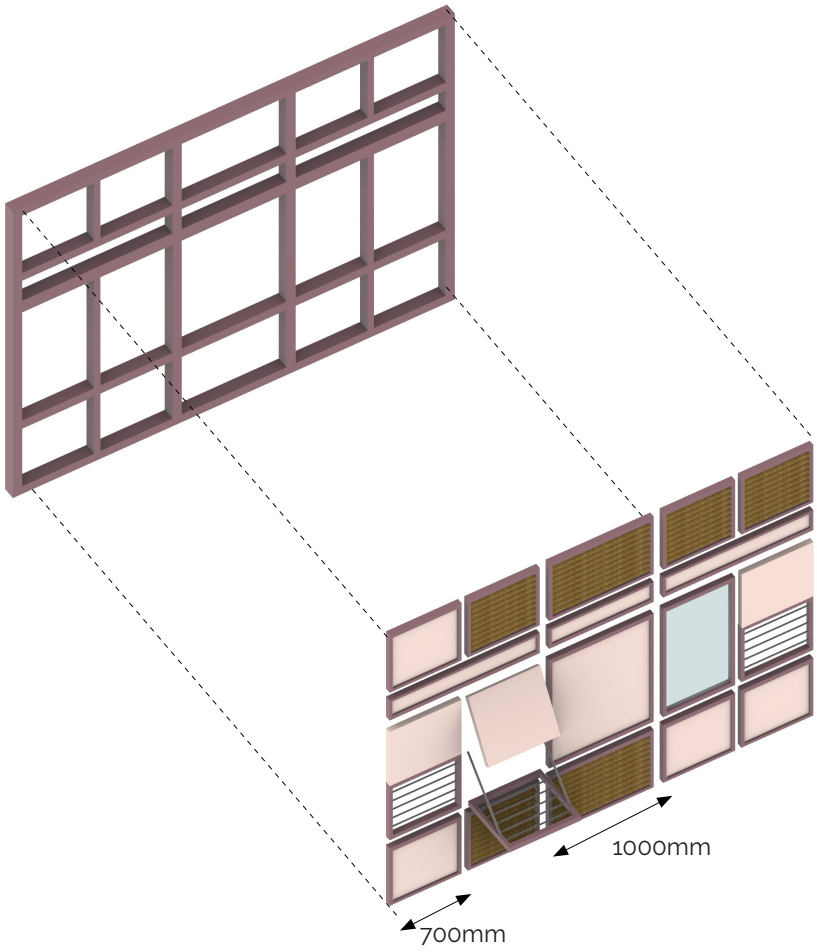
Interior
14 Fly ash brick partition wall 110mm
15 Plaster / tile wall finish
16 Screed
17 Ceramic floor tile

Possible Additions
18 Bamboo deck

The timber frame is thick enough to hold another layer on the inside, like an insect screen or a curtain for different levels of porosity, which is a common pattern in india.

User could choose façade elements in relation to the interior configuration of their choice. For the low-rise, users could choose to add their own mezzanine, perhaps a bamboo deck.

Facade Component Catalogue



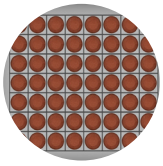
Users are free to choose their own facade components from this catalogue based on their personal preferences and unit configurations.

For all the typologies, the façade would consist of components of standardized sizes. All of the façade consists of bays that are either 700 mm or 1000mm wide.

Potential Recycled Materials from demolished buildings in Sri Prastha

Concrete recycled into pavers

Steel bars used for laundry drying grill

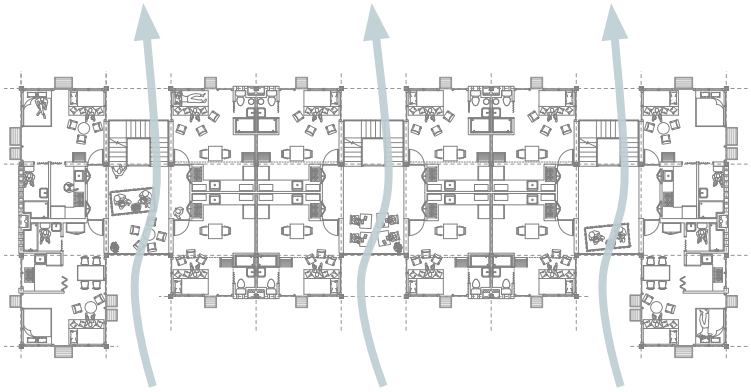


Brick as slab filler material

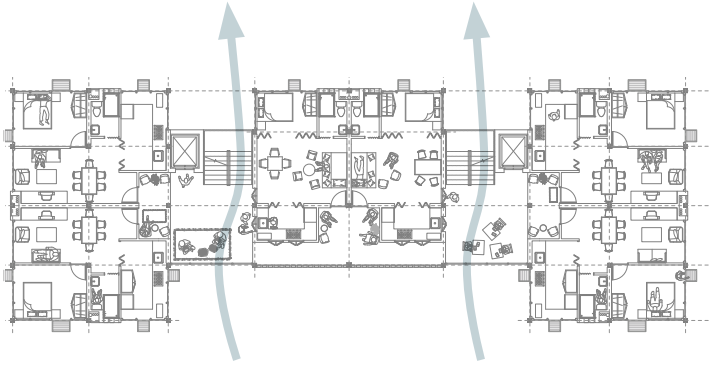
Certain materials from the existing Sri prastha could be recycled and used in the new buildings. For example, the concrete could be recycled into concrete pavers by existing factories in Maharasthra, the metal bars could be used for the laundry drying grill, and the bricks could be used as filler materials for floor slabs.

Ventilation

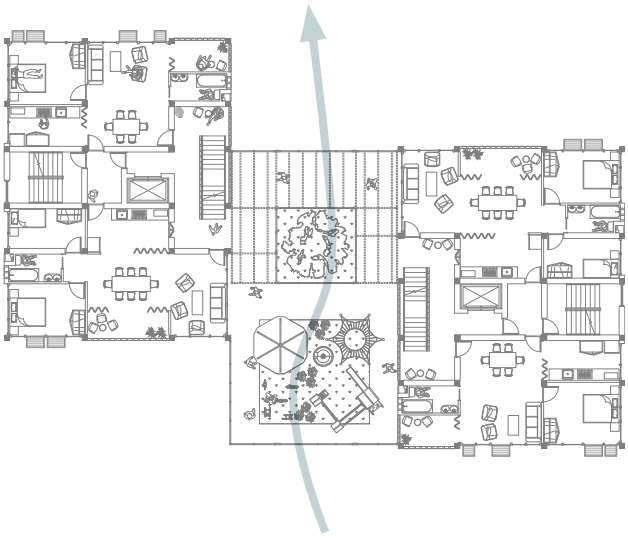
Urban and Building Ventilation



Low-rise - Chain



Mid-rise - Slab

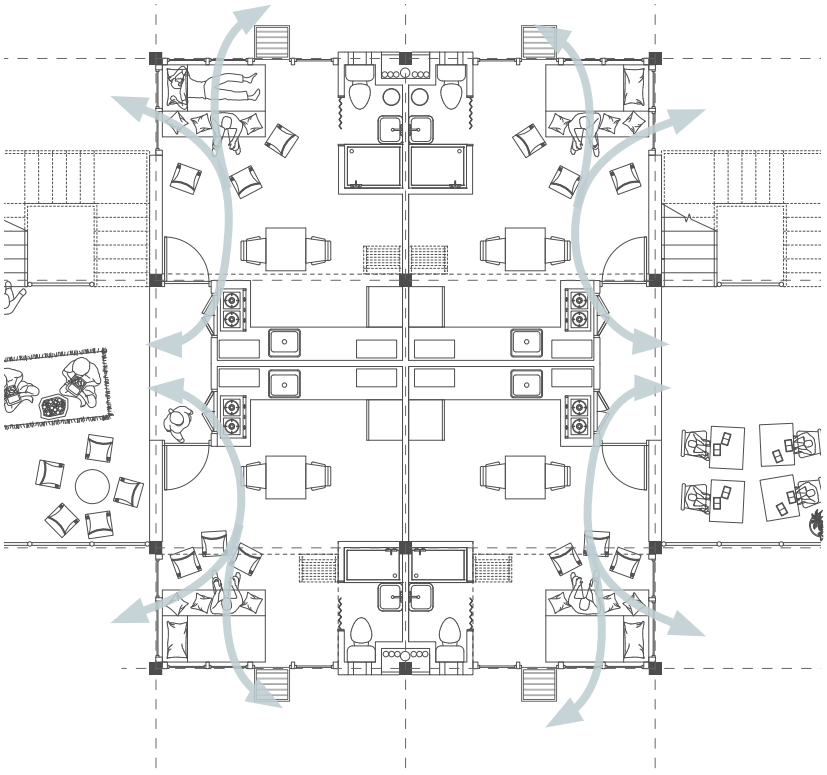


High-rise - Tower

Since the climate in Mumbai is hot and humid, cross ventilation is given a high priority in the design.

Urbanistically, although the buildings are linear, all typologies have porous breaks in between, so they do not block the air that goes through the plot.

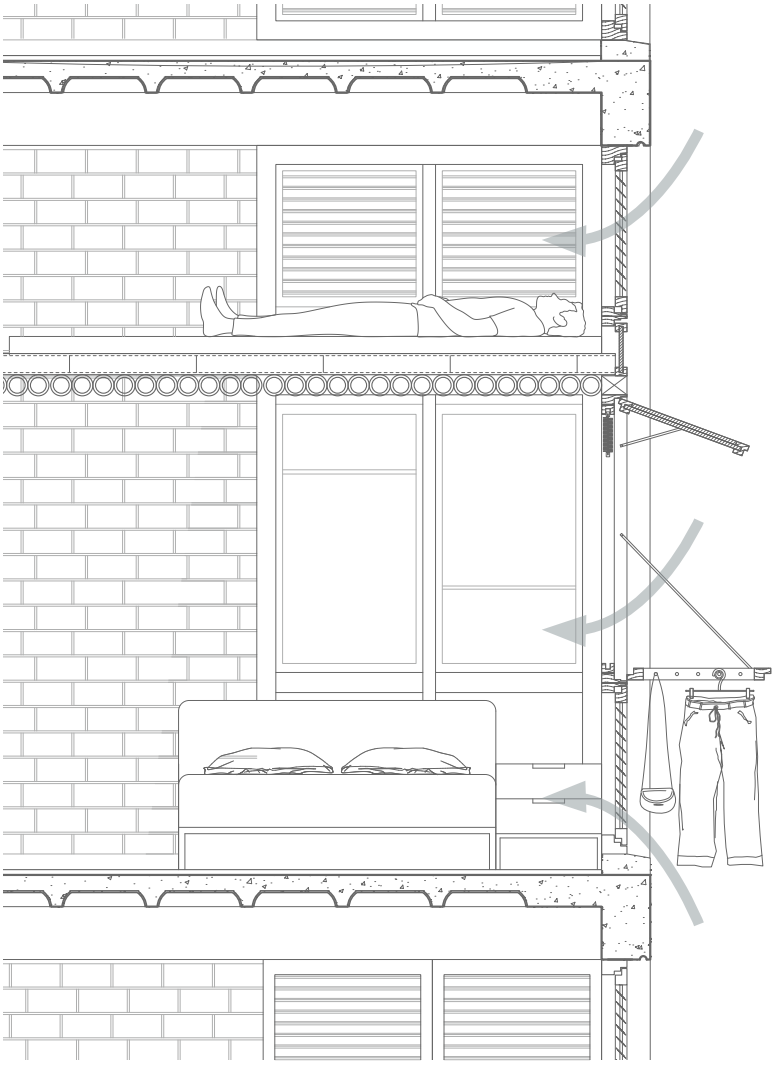
Unit Ventilation



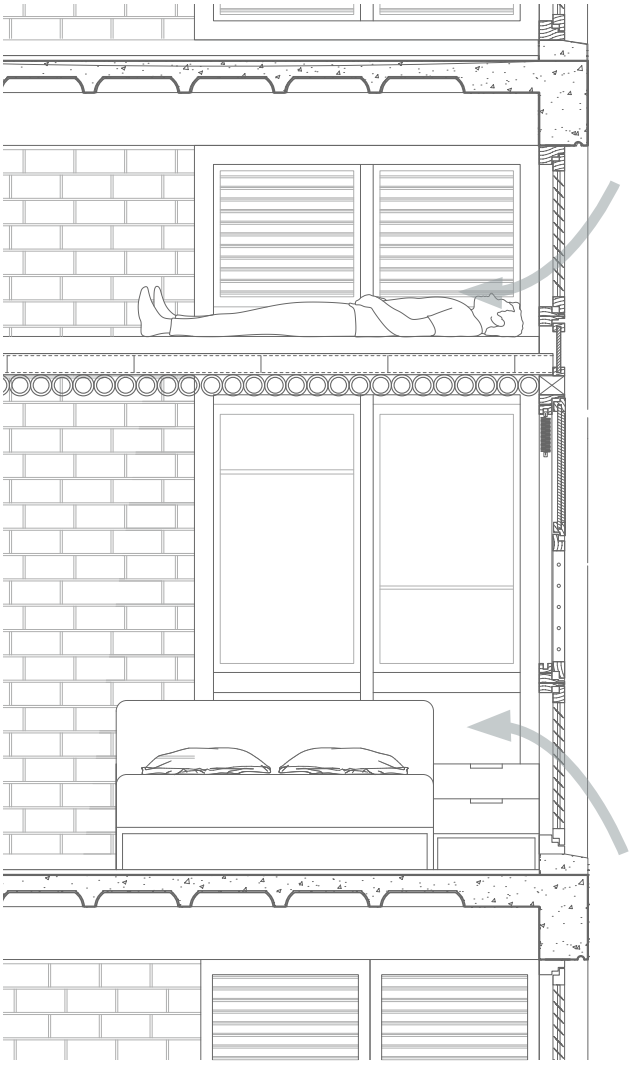
Cross ventilation through units

On a unit scale, units in all three typologies are corner units with three facades, allowing cross ventilation through the apartment

Facade Ventilation



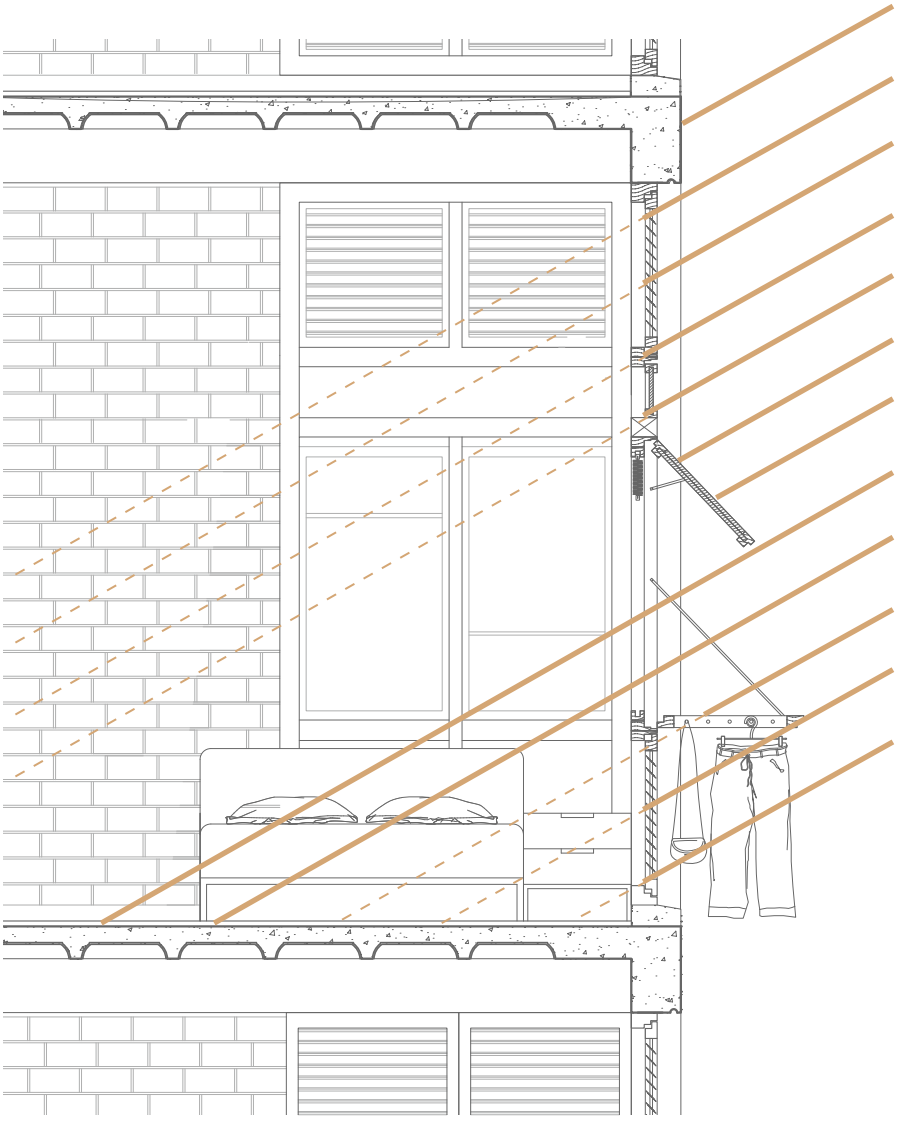
Day



Night

The design of the façade is derived from day and night windows in traditional houses in india. Even if the main window is closed at night, the louvers at the bottom still allows ventilation into the unit. There are also louvers on top for people who are sleeping on the mezzanine.

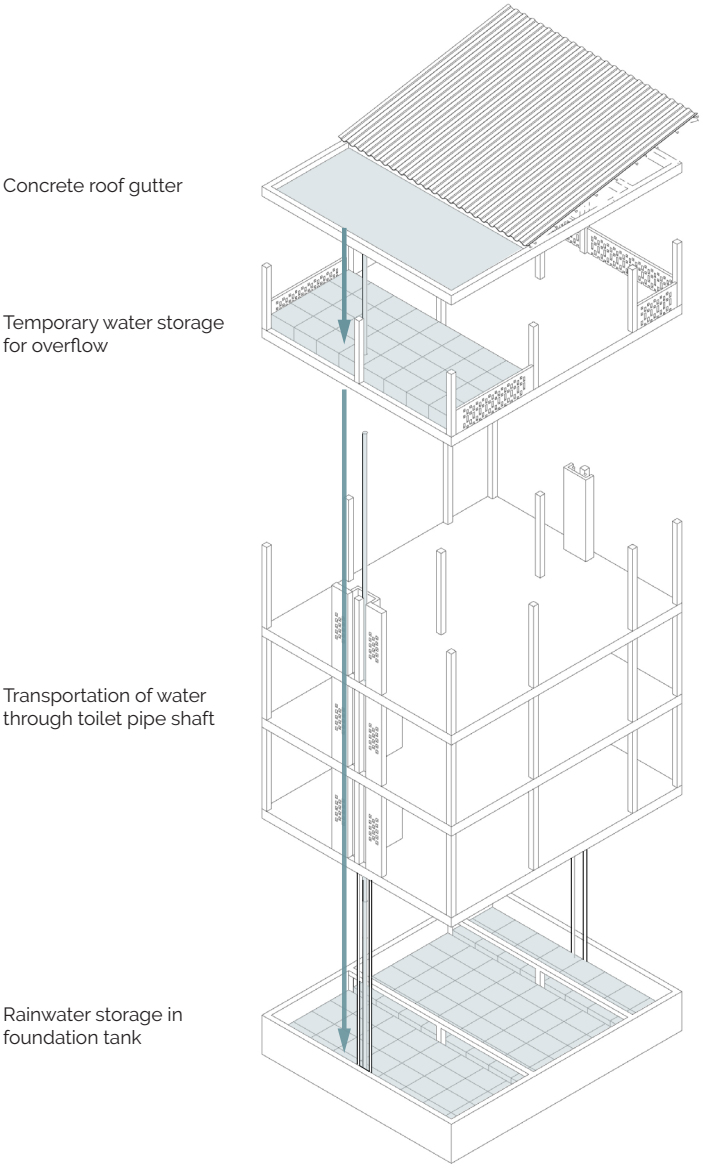
Sun shading



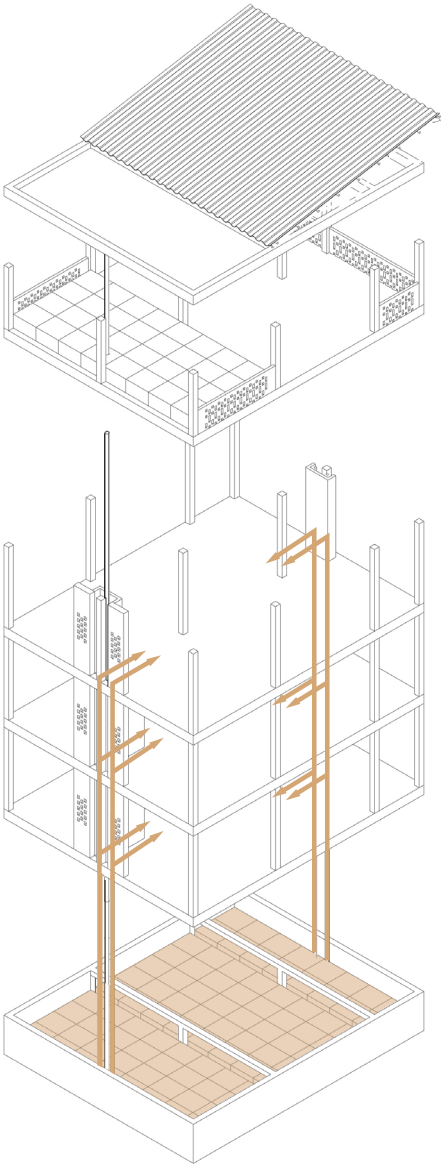
In terms of sunshading, the louvers also help to diffuse sunlight from the top, while the shutter blocks the sunlight at eye-level.

Therefore, even though this idea of user defined façade components was inspired by the Open Building Movement in the Netherlands, the design of the components is thought of according to an Indian tradition and climate.

Water Management



Rainwater Collection and Storage



Provision of Water from Foundation Tank

Water is collected from the concrete roof gutter, the overflow will be stored temporarily in the terrace, and then transported to the foundation tank through the pipe shaft at the toilet.

The stored rainwater would then be provided to the units for grey water use.

05

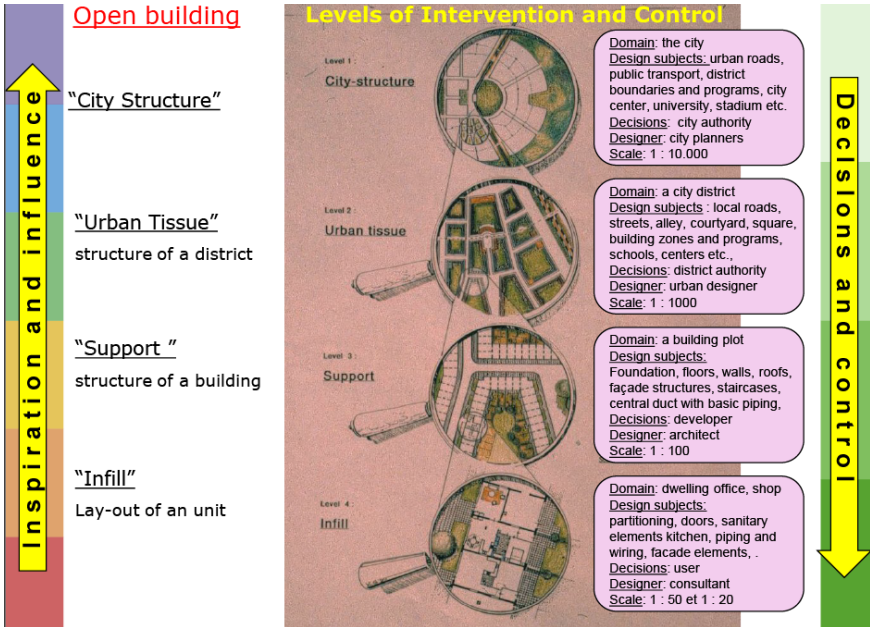
operational model & urban design

Organizational level sub-question

4. What is the appropriate level of intervention for the government, sponsor, and user?

5. What are the models of participatory design?

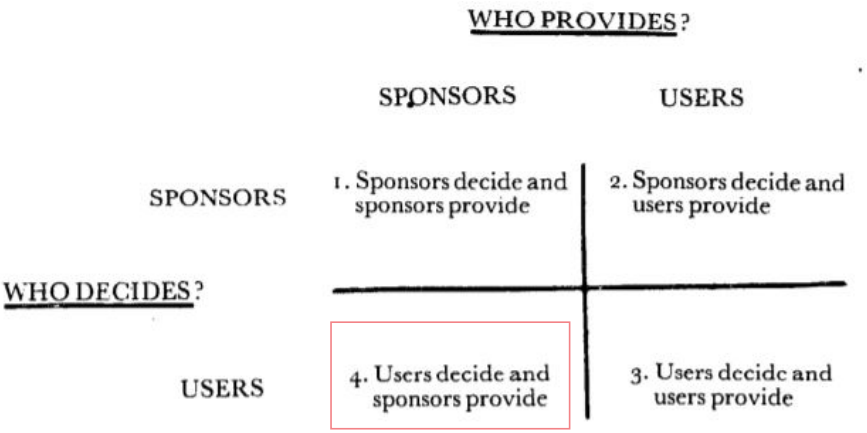
Levels of Intervention and Participation



Ideal Levels of Intervention and Control in the "Open Building" Concept
by Frans van der Werf

I took inspiration from the open building movement, whereby the larger scale would be taken care of by city authority, the support of the building would be taken care of by the architect, and the infill would be taken care of by the user. Therefore the user gains more power as the scale decreases.

Whose participation: whose decision and whose action?

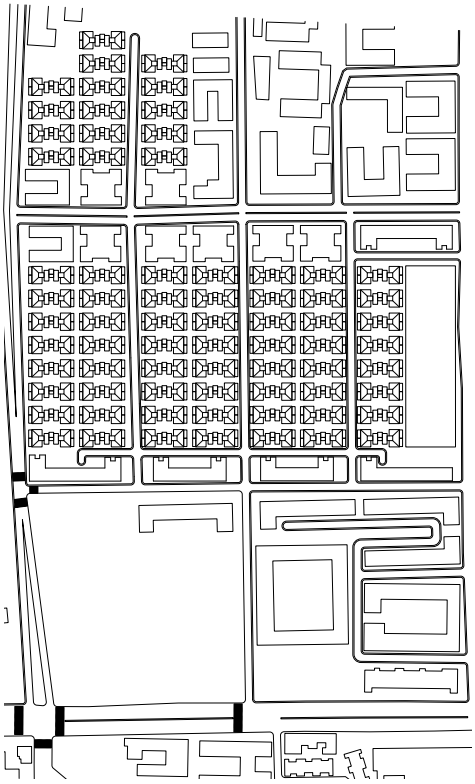


Models of participatory design
by John Turner

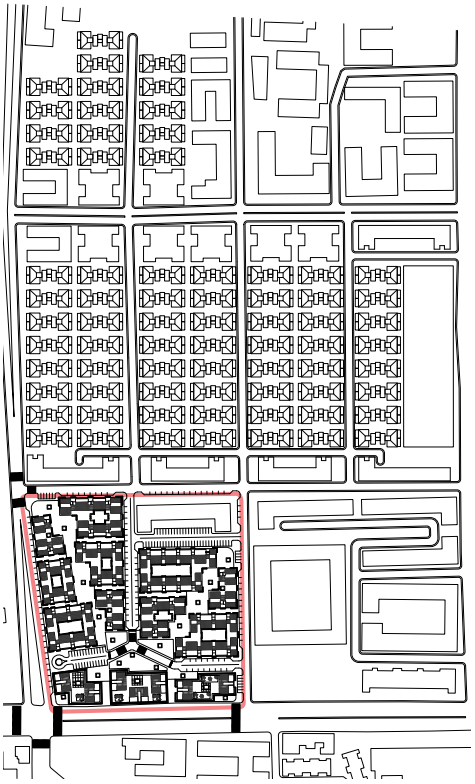
When discussing participatory design, it is important to determine the roles of the different stakeholders, in other words, who decides and who provides.

Among these models of participatory design suggested by John Tuner, I have chosen a users decide and sponsors provide model.

Phases of Development



Existing



Phase 1: Development on empty plot

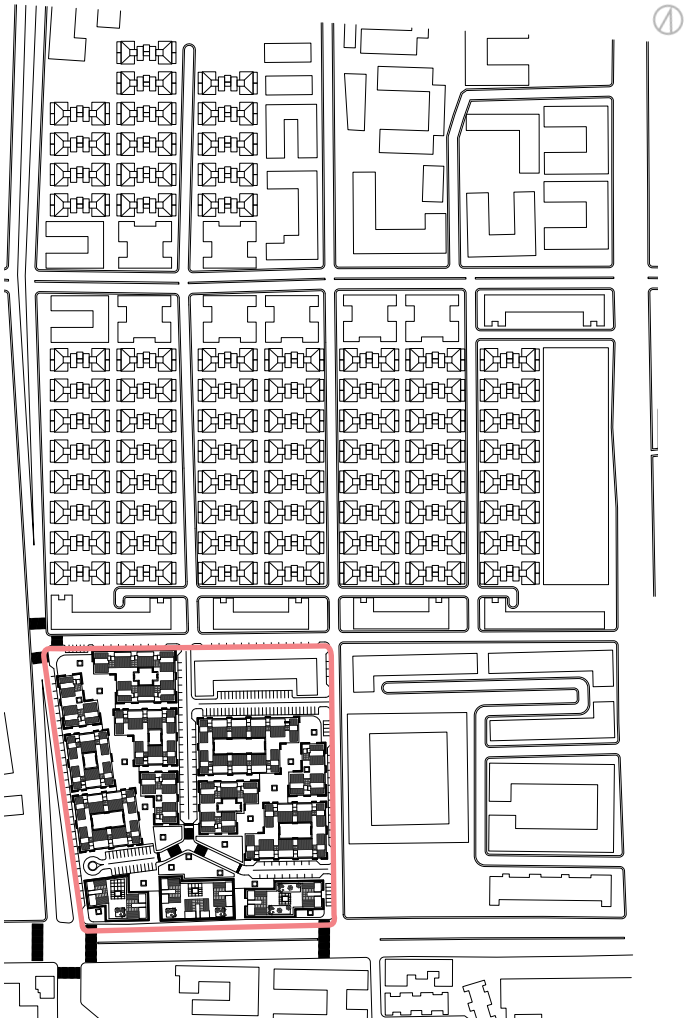
Phase 2: Redevelopment of existing Sriprastha

The project would be done in two phases, the first phase includes the development on an empty plot next to the existing Sri Prastha, while the 2nd phase is the redevelopment of the existing Sri Prastha.

Different strategies and models would be applied to these two scenarios.

Urban Strategy - Phase 1: New Development

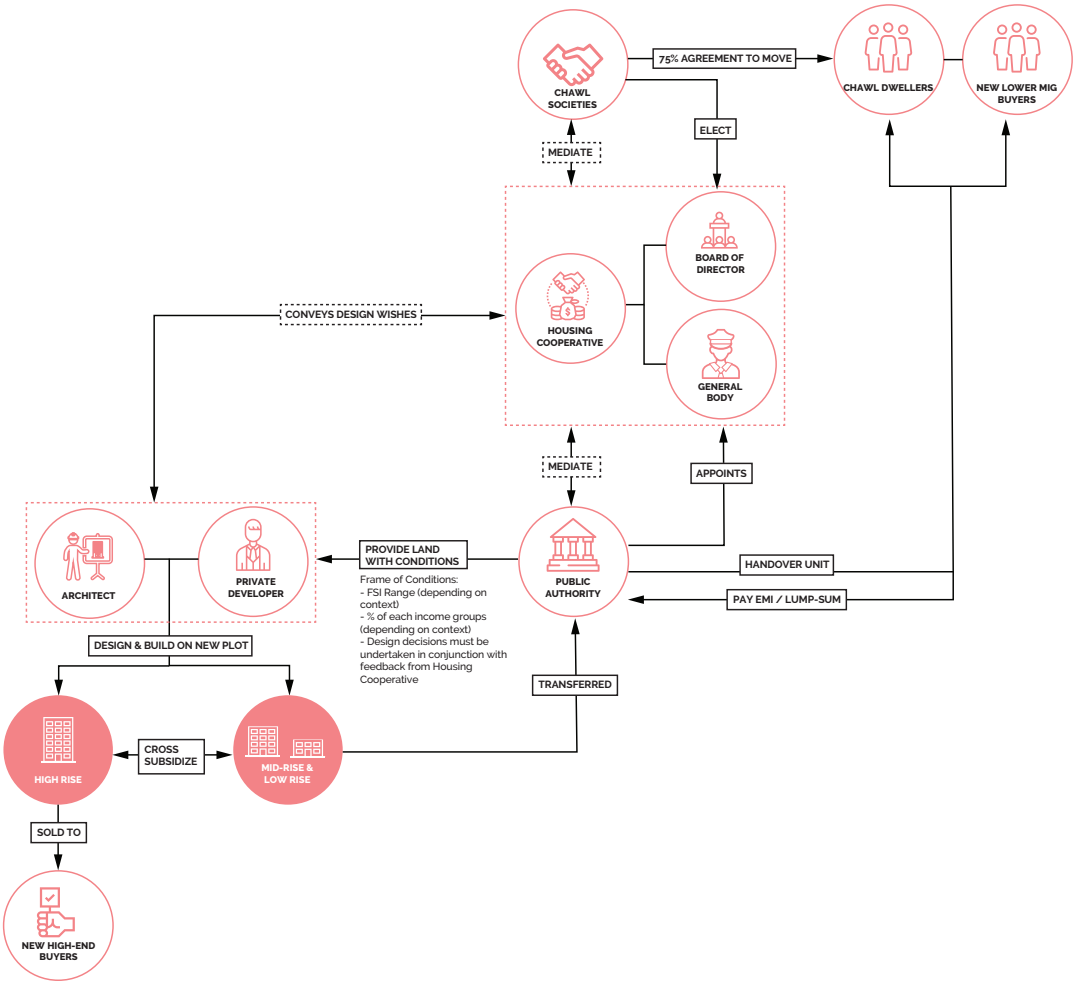
Public-Private Partnership - Mixed-development Cross-subsized Housing



Phase 1: Development on empty plot

The first phase starts on the empty plot, and here a Public-Private Partnership model of Mixed-development Cross-subsidized Housing would be introduced. This model is one of the 8 Public Private Partnership Models introduced by the government of India.

Stakeholder Model



1. The authority provides land to be developed by private developer. The private developer agrees to a set of conditions.

2. A housing cooperative is established to act as a mediator. It consists of members appointed by the authority and members from the chawls societies from Nalasopara East.

3. Interested Societies obtain a 75% agreement from its residents to move.

4. The housing cooperative collects design wishes from its members and convey them to the architect and developer.

5. The developer builds affordable housing and the higher end apartments that cross-subsidizes each other. The high rise apartmnets are sold to new high-end users.

6. The affordable housing is transferred to the public authority and are then handed to the chawl dwellers and new lower middle income buyers.

Financing Model

	Market Price	Public-Private Partnership Cross-subsidized Model
Land Price	Rs 2,000/ sqft	Nominal rent to Government: Rs 550/sqft
Construction Cost	Rs 20,00 / sqft	Rs 20,00 / sqft
Total Cost	Rs 4000 / sqft	Rs 2550 / sqft
Sale price	Sri Prastha Market Price: Rs 5,600/ sqft	35% Upper MIG Rs 6000/ sqft 35 % Lower MIG Rs 4400 / sqft 30% LIG Rs 100 / sqft Average: 3670 / sqft
Profit Margin by developer	40%	43.9%

If the plot was developed and sold at a market rate, the developer would earn a 40% profit margin. However, the market price would be too high for the Lower Income Group to afford.

Through the Public Private Partnership Cross-subsidized model, government subsidizes in the form of land. The developer will have to pay a nominal amount of rent to the government, but would be allowed to build at a higher FSI. The diversity in income groups allows for a different sale price for the different income groups. The sale price for the upper MIG will be slightly higher than the current market price, the Lower MIG will be slightly subsidized, and the LIG will be heavily subsidized.

There will also be a slight profit margin for the developer, providing incentive for them to participate in this scheme.

Urban Design on New Plot

In the new plot, because the typologies are designed with a middle and corner component, they can be extended or shortened according to different site conditions. The low rise and mid rise are clustered at the northern half of the plot, closer to the local roads, while the high-rise are flanking the edge of the main primary road that connects nalasopara east and west.

Inspired by the plan of Aranya, the corners of the plot are connected to the center to improve connectivity. The diagonal streets, formed by series of squares, are staggered to discourage vehicular traffic. Two buildings of the same typology are clustered around a courtyard, and the different typology would meet at the staggering streets, acting as bordering zone of exchange among the income groups. The open GF of the tower typology would also be part of this diagonal relationship, and the GF would house shops and amenities, thus turning the center into a commercial center. There is a slight bump on the road when the car enters the central zone, and the pavement of the road in that area would also be different, indicating that pedestrian is given a higher priority in this area. Since road boundaries are flexible in india, whereby a road could transform into a market during different times of the day, I would anticipate that commercial or celebration activities might take over this part of the road.

New Plot Urban Plan
1:1500

Urban Strategy - Phase 2: Redevelopment of Existing

In-situ Replacement of Existing Housing

Phase 2: Redevelopment of existing Sriprastha

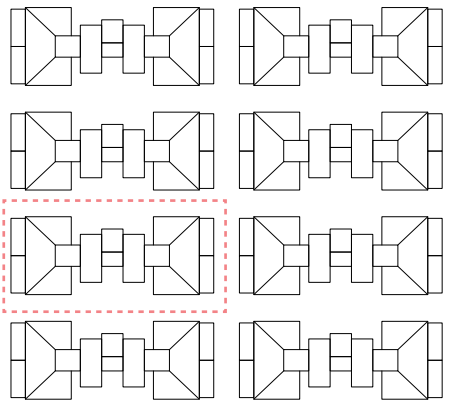
The first phase would act as a reference material for the existing residents of sri prastha, to help them make a better judgement of the desired typology.

The existing residents could then decide if they want to redevelop their own society, and choose their preffered typology on a case by case basis.

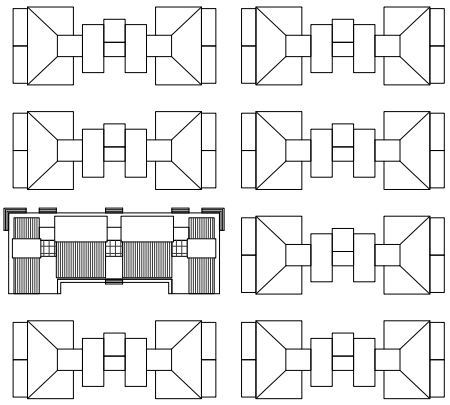
Residents could choose to replace a single building, which would improve the quality of the building, increases the diversity of income groups, and defines the edge of the street.

However it is more advisable for them to replace the whole society because this provides an additional quality of a courtyard and strengthens the hierarchy among open spaces.

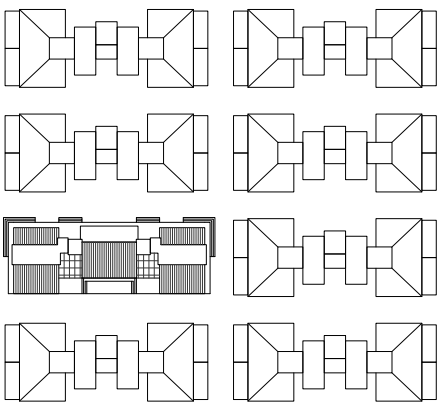
In-situ Replacement of Single Buildings



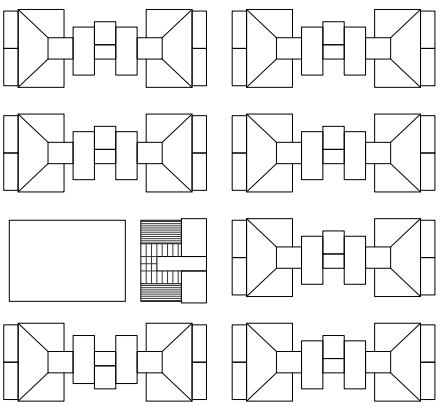
Existing



Low-rise



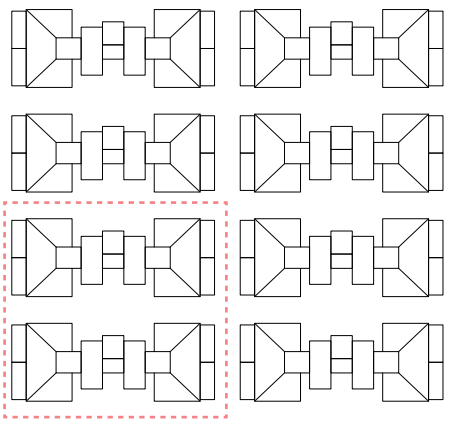
Mid-rise



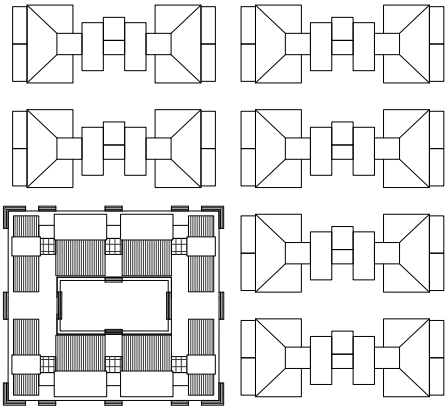
High-rise

- Improved building qualities
- Increases income group diversity
- Defines street edge

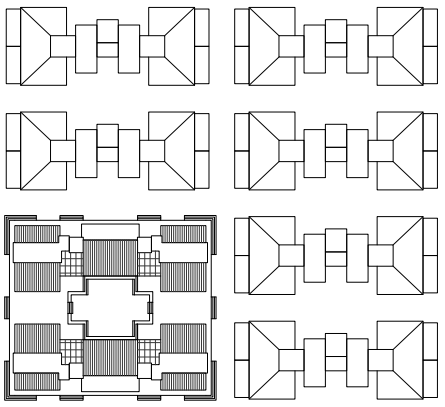
In-situ Replacement of Societies (two societies)



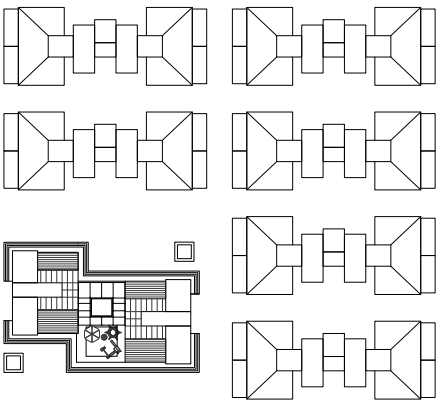
Existing



Low-rise



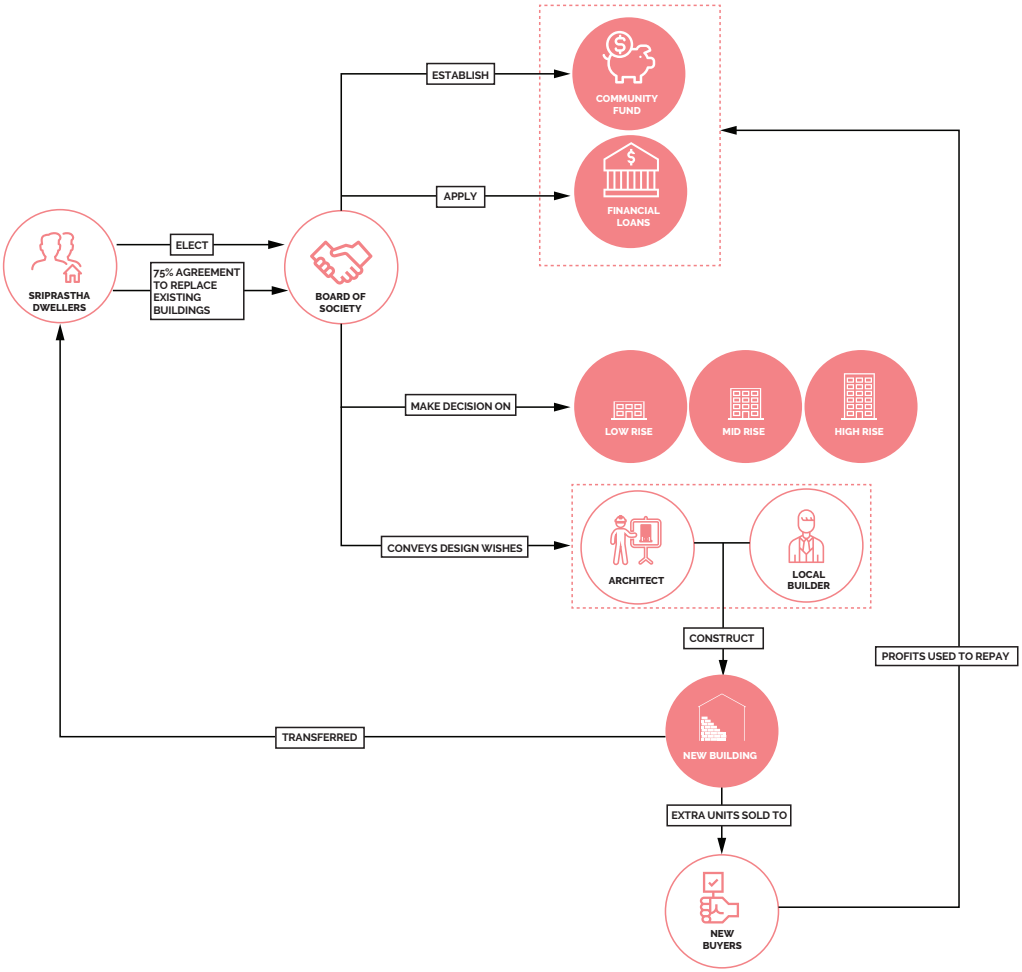
Mid-rise



High-rise

- Improved building qualities
- Increases income group diversity
- Defines street edge
- Courtyard within society, strengthens internal relationship within cluster
- Strengthens hierarchy of in between spaces
- Ensures enough distances between buildings

Phase 2: In-situ Replacement of Existing Housing Societies



1. Original residents in Sri Prastha establish a society board and achieve a 75% agreement internally to replace existing buildings in the society.

2. A community fund is established within the society, while the society tries to secure loans.

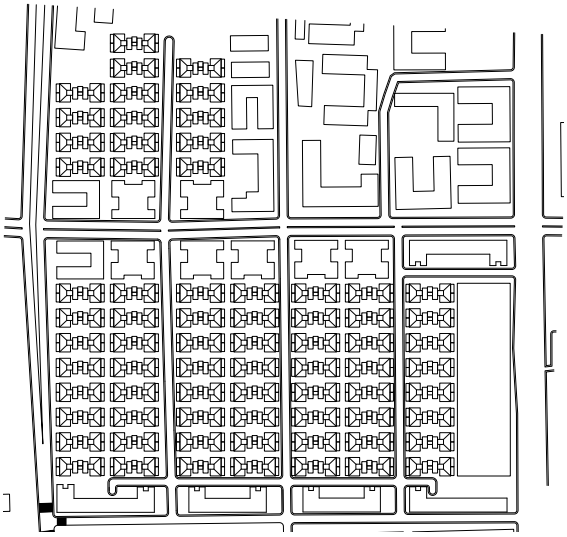
3. Original residents make a collective decision on the typology of their choice.

4. The decision is conveyed to the architect and local builder, who would construct the desired type.

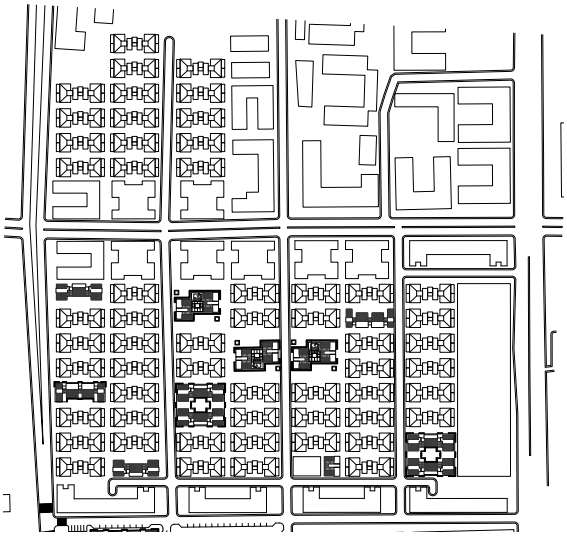
5. New units are handed over to the original dwellers.

6. Extra units are sold to new buyers, and the profit is used to repay the loans and the community fund.

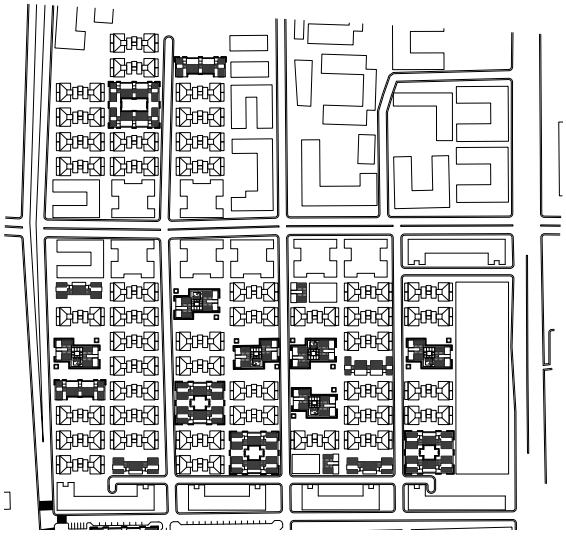
Replacement of Existing Sri Prastha



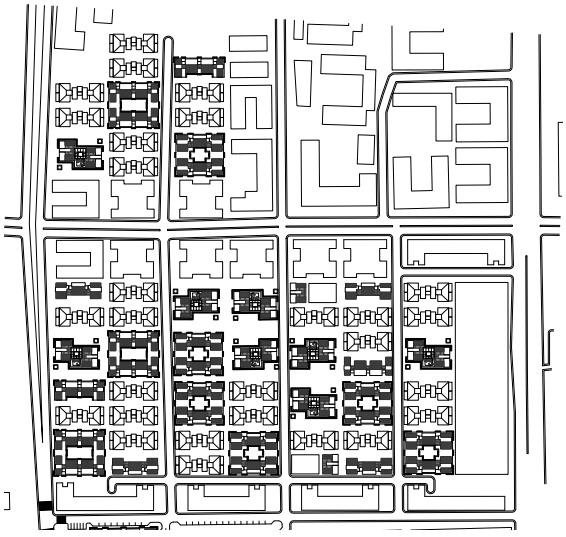
Current Situation



2020



2025



2030

The replacement of the existing Sri Prastha would thus be done on a case by case basis. Each society would make their own decision, at their own pace, since the scale of operation is reduced to the hands of individual societies.

The second phase will not take place in one go, but is a prolonged process. It might start with a few society, which will slowly infect the rest.

Urban Strategy - Phase 3: Expanding the Project

Since the project is feasible in both operational models and scales, it could be applied on empty plots or existing urban fabrics, having the potential to be replicated in other places in Nalasopara, or even beyond.

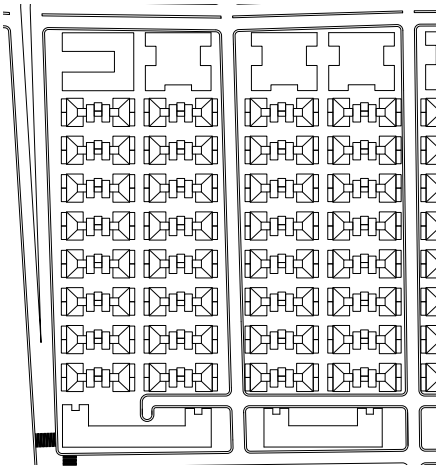
Potential grided sites for redevelopment strategy to be applied

06

Impact

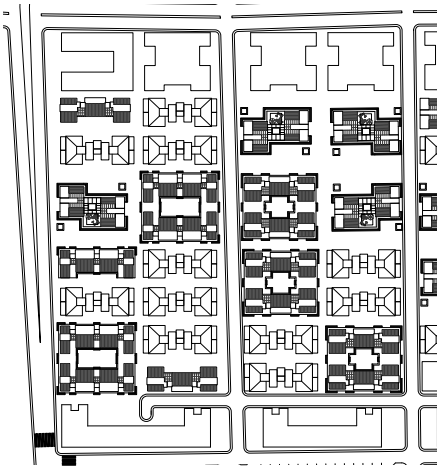
Urban

Old and New Comparison: Figures



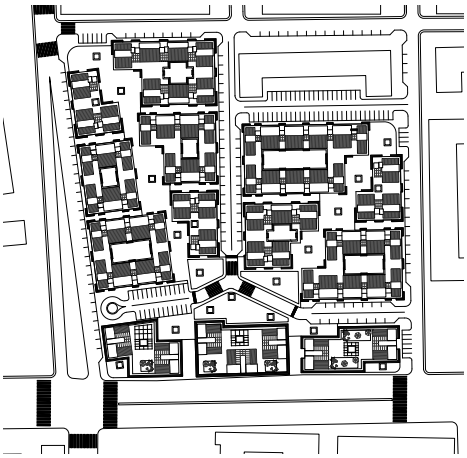
Existing Sri Prastha

Units per hectare: 180



Redeveloped Sri Prastha

Units per hectare:
if 10% choose to redevelop: 196
if 30% choose to redevelop : 214
if 60% choose to redevelop: 258
if 90% choose to redevelop: 312



New Plot

Units per hectare: 250-296

In terms of density, there are 180 units per hectare in the existing SP plot.

If 10% of the existing choose to redevelop, there would be 196 units per hectare; while if 60% choose to redevelop, there would be 258 units per hectare. Therefore it would be a densification of the existing plot in any case.

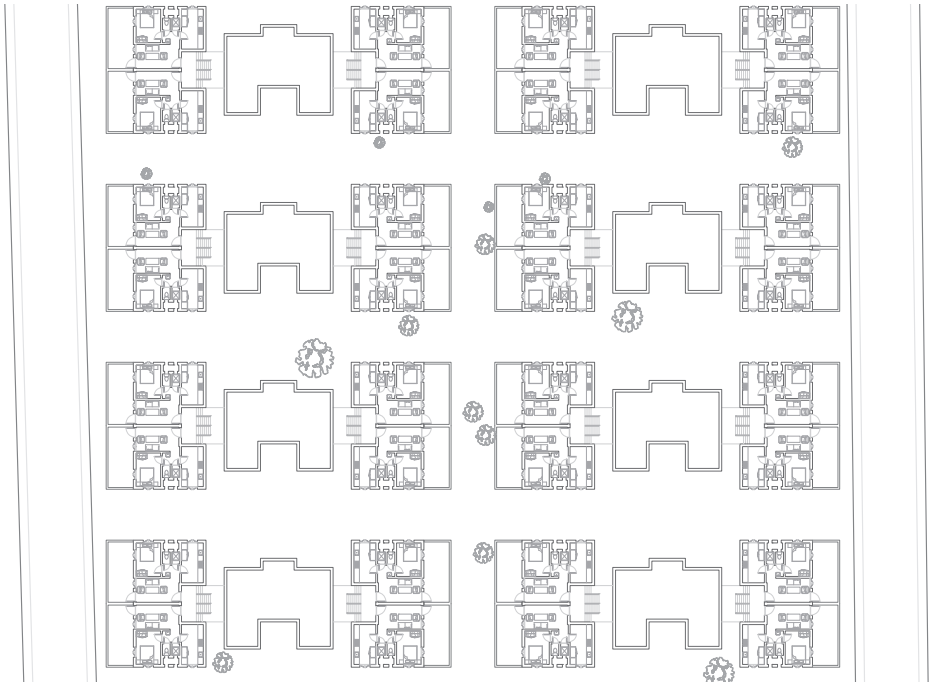
On the new plot, there will be 250-296 units per hectare.

In terms of spatial qualities, the existing situation consist of homogeneous and meaningless open spaces.

The new buildings help to define the street on the edge of the society, define the courtyard, and activates the corner. Different combinations of typologies would result in different in between spaces.

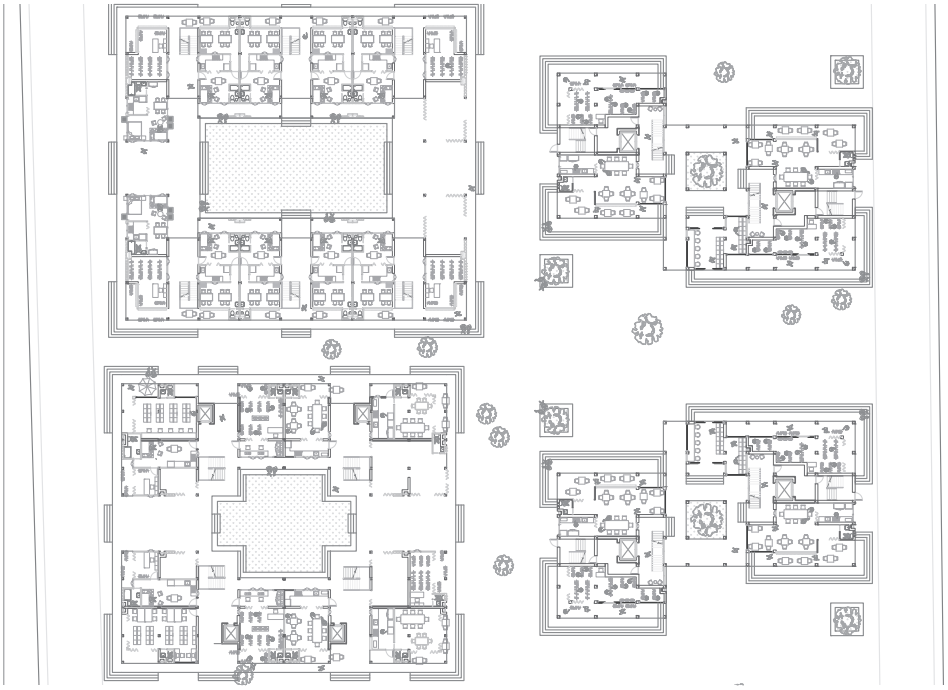
Urban

Old and New Comparison: Spatial Qualities



Current

Homogeneous and meaningless open spaces

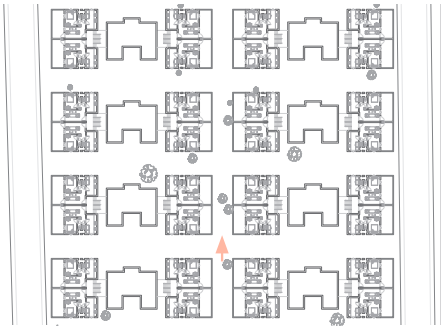


Potential Future

- Defines Street on the edge of the society
- Defines courtyard within the society
- Activation of the corner, creates diverse in between spaces, converting leftover lane into community spine

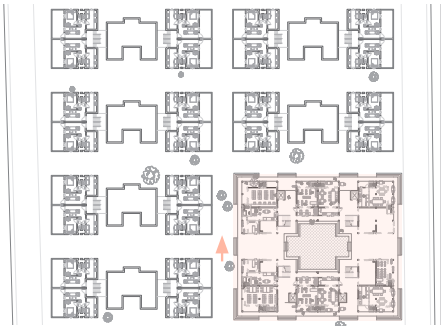
Building Corner - Before

The existing edge of the buildings are homogeneous, meaningless, and abandoned spaces.



Building Corner -
1 Society Replaced

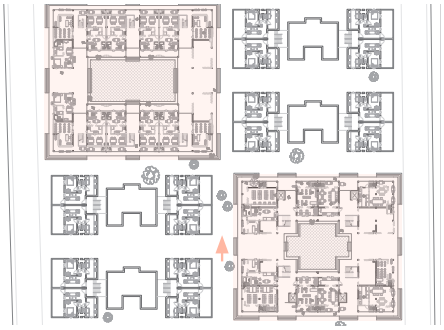
If one society is being replaced, the street like condition on its edge gives the in between space a little bit of definition.




AL MADINI EGG CENTER

Building Corner -
2 Societies Replaced

If two society has been replaced, they could be in dialogue with each other, and the corner could be further activated. Children might start to play at the corners of the societies.

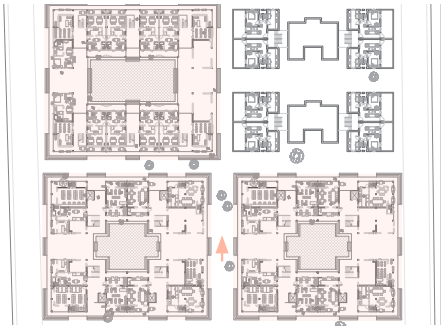



CENTER

Building Corner -
3 Societies Replaced

If three society has been replaced, the edge of the buildings could infect each other. More commercial and social activities might spill out onto the in between space.

The tree at the corners of the societies might be turned into a temple.



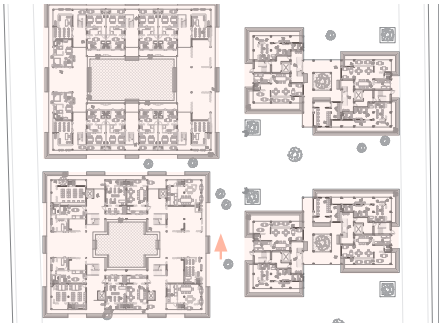

CENTER

Building Corner -
4 Societies Replaced

This is another example whereby two societies are being replaced by the high-rise typology.

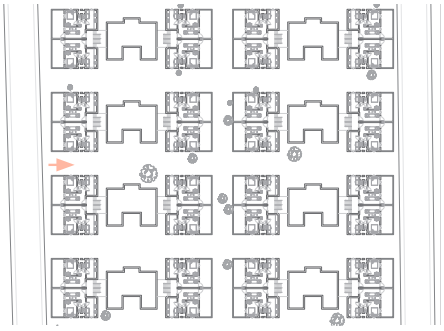
This typology creates larger open squares in between, does allowing different kinds of activities to spill out onto the space. The planters also act as seating and a gathering space.

Therefore, the different combinations of different typologies at the corner, would result in different kinds of open spaces. This would break the homogeninity of the in between space, and gives it identity. If a series of these spaces were created in a row, the in between space would have the potential to be developed into a community spine.



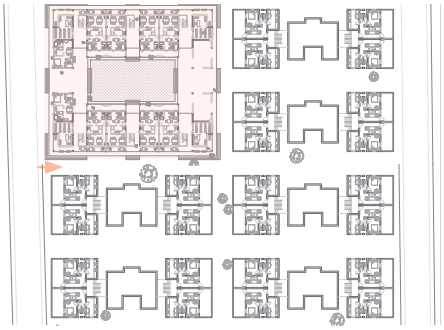
Between societies - Existing

Though the urban fabric of the existing Sri Prastha is porous, these backlanes between the societies are also deserted, apart from being used ocassionally to circulate from the neighbourhood to the main roads.



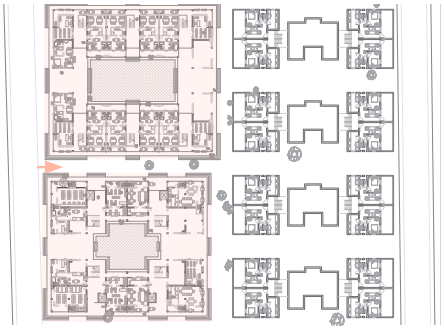
Between existing Sriprastha buildings and new Societies

If one society is being replaced, the flexible work-live units would allow chances for income generation.



Between new Societies

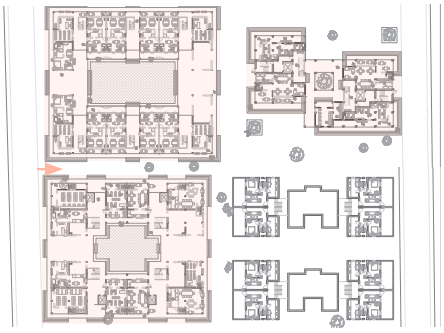
If two societies are being replaced, it further defines the characteristic of the space as a street.




General

Between new Societies

If more societies are being replaced, they would infect each other and encourage more income generation activities in between. In this case becase the buildings have a different set back, they create spaces of different widths. Children might start to play around the spaces in between.




B
13

Society Courtyards

There is a lack of hierarchy among the open spaces in Sri Prastha. The existing courtyards are homogeneous spaces, and are same as the backlanes.

In the following pages i will show the new society courtyards.

Existing Society Courtyards

Society Courtyard - Low rise

Society Courtyard - Mid rise

Society 1F Podium - High-rise

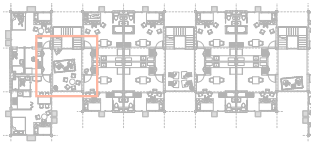
Ground floor public void deck - High-rise

Hierarchy of Open Spaces in New Plot

Hierarchy of Open Spaces in New Plot:
1. Shared terrace

The hierarchy of series of open spaces will be shown in the following pages, from the perspective of Sadvhi, a housewife living in the low-rise typology on the new plot.

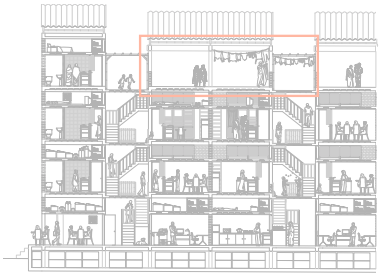
Sadvhi is leaving her home to do some shopping. She tell her neighbour who is cooking in the kitchen to keep an eye on her son, who is doing his homework in the shared terrace.



Shared terrace:
2-4 households

Hierarchy of Open Spaces in New Plot:
2. Rooftop Terrace

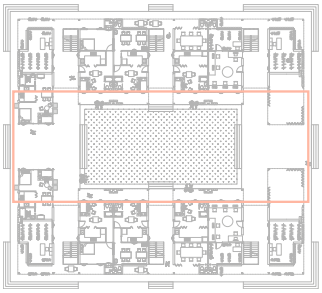
She goes to the roof terrace to have a look at her daughter's dance practice.



Rooftop terrace:
10-20 households

Hierarchy of Open Spaces in New Plot:
3. Courtyard

She goes through the communal courtyard, which is shared by residents of 2 buildings.



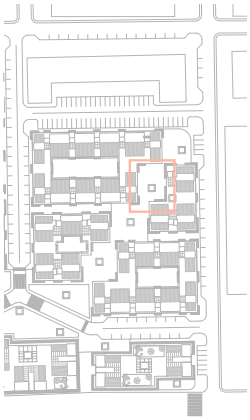
Shared courtyard:
40-80 households


The General

Hierarchy of Open Spaces in New Plot:
4. Square

Leaving her society, she walks into the square that is shared by two societies.

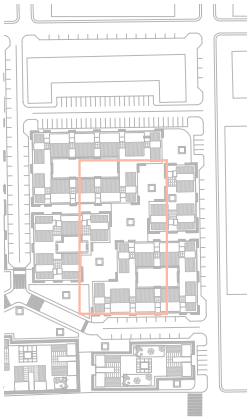
Sadvhi met her friend Anaya, who lives in the mid-rise building, and has converted part of her unit into a jewellery store. She is happy because Anaya has commisioned some beading work to her so she can gain extra income.



Square:
approximately 200 households

Hierarchy of Open Spaces in New Plot:
5. Community Spine

Sadvhi and Anaya walks through a community spine which consist of a series of squares, similar to the one in front of their societies.



Community spine:
approximately 600 households


General

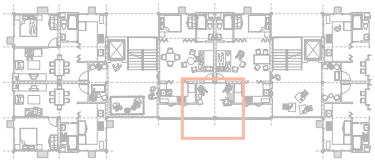
Hierarchy of Open Spaces:
6. Urban Center

Sadvhi and Anaya walks to the urban center, where all the shops are. This is where all the community spines meet and commercial activities spill over onto the road. Here they met their friend Sindhura, who lives in the high-rise typology.

Community spine:
approximately 1800
households

Threshold - Midrise

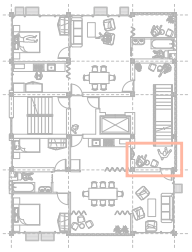
Anaya goes back to her mid-rise building. There is a corridor in front of her house and the entrance is set back, creating a space for her family to rest and have chai.



Mid-rise Threshold space:
2 household

Threshold - Tower

Sindhura goes back to her high-rise building. She and her family have their own entrance, so they could personalize it with laminated marble to claim the outside space and express wealth.



High-rise threshold space:
1 household

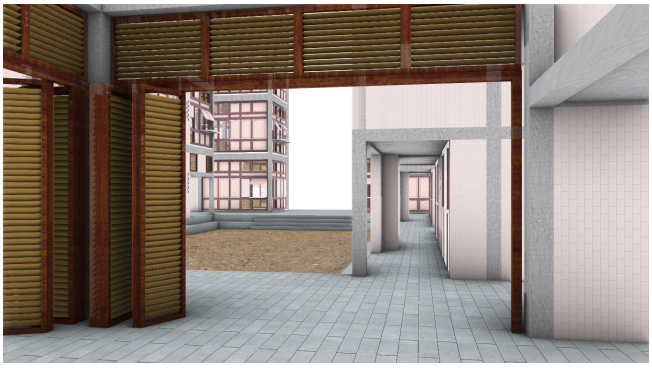
Amenities

Primary Amenities

Every high-rise society will be required to provide amenities on the Ground Floor. Therefore the primary amenities on the new plot will be concentrated in the urban center, while in the existing Sri Prastha it will be at societies that have chosen the high-rise typology.

Secondary Amenities

The secondary amenities would occur in a more organic manner, i.e. within the work-live units of the low and mid rise typology.

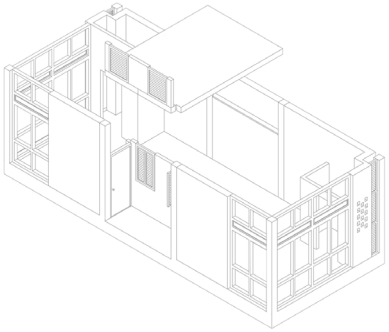


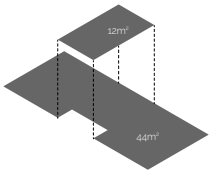
Tertiary Amenities

The tertiary ammenities would occur within the society. Since the buildings consist of concrete skeletons, residents could easily transform the rooftop terrace or the multi-purpose hall on the ground floor into the required amenities.

Narrative: The Chronicle of Narvel's Home

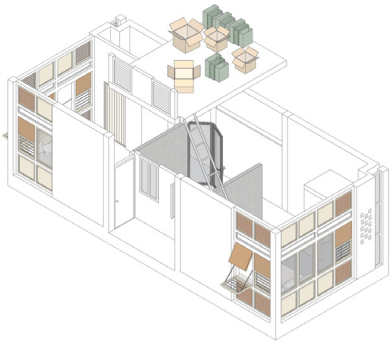
Built

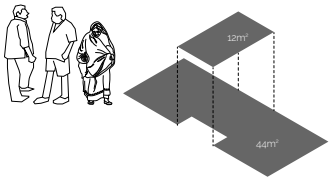




Units are built with basic structure's provided

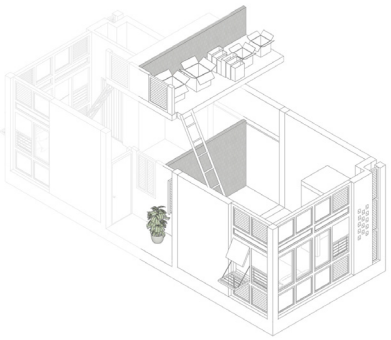
2020

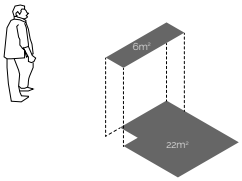




Narvel, his brother, and his mother received a replacement unit. They chose their own combination of facade elements and internal configurations.

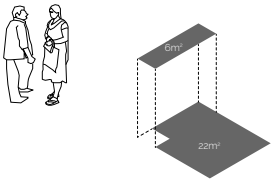
2022





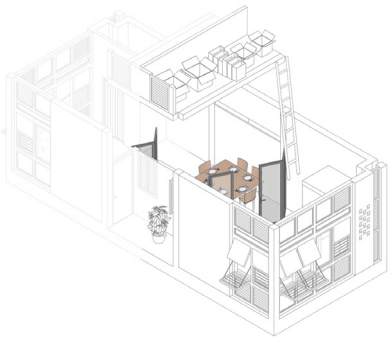
Narvel's mother passed away, and his brother decided to move to Mumbai. Narvel divided the apartment into two and rented the other half to another family for extra income.

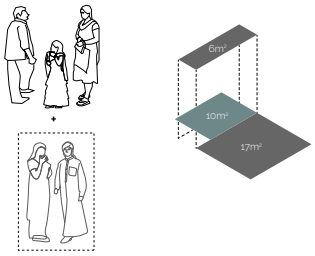
2025



Narvel married Anuti. They decided to change some of the glass windows into drying racks to accomodate the increased amount of laundry.

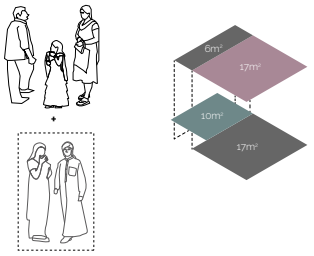
2027





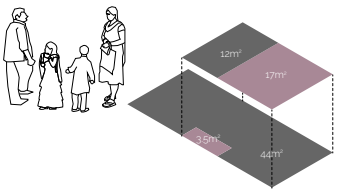
Anuti's cousin's family from Gujarat moved to Nalasopara and stayed in the other half of the apartment. Both families shared a larger dining and kitchen area together in the middle, while keeping other living spaces apart on both sides.

2029



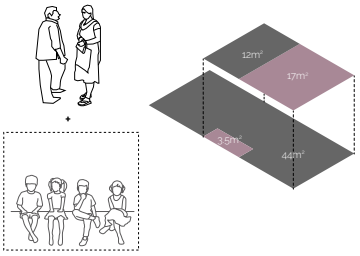
Narvel and Anuti had their first child. They added an extension to the existing mezzanine for the child to sleep. Louvers were added to the top part of the facade for better ventilation for the child.

2035



Narvel and Anuti had their second child. The cousin moves out so that Narvel and Anuti could expand the unit . They also extended the unit into the shared entrance area.

2050



Their children grew up and left for college. Narvel and Anuti uses the empty space to teach English to children in the neighbourhood. Part of the windows are replaced to make space for the advertisement banners of the tuition service.

07

reflection

Standardization

Diversification

Standardization

1. Similar appearance

- Same Pallette of Materials

- Same Facade Module and Components

2. Same Construction Method

- Locally available construction techniques and materials

- Same water management method

3. Similar Logic in Building Configuration

- All units are corner units

- Unit entrance are always ventilated

4. Similar Consideration for Activation of GF

- Raised floor and steps

Diversification

Standardization

Diversification

1. Typological Mix based on aspirations

2. Flexible options for unit layout

3. Room for addition / alteration

4. Buildings that could be extended / shortened to respond to different site conditions

The Project

In 2017, India's richest 1% held 58% of the country's total wealth, while in 2018 the top 1% holds 73% of the wealth. The income disparity is especially apparent in Mumbai, and it is not merely a matter of wealth distribution, but also a matter of spatial inequality, a matter of access to land, and open spaces.

According to Mehta, "two-thirds of the city's (Bombay) residents are crowded into just 5 percent of the total area, while the richer or more rent-protected one-third monopolize the remaining 95 percent."

The Development Plans for Mumbai, criticized as "a form of 'planned' exclusion of the poor and the middle class", have failed to address issues of slums and affordable housing. These acts of exclusions form pockets of ghettoization, which are breeding grounds of social tension, insecurity, violence, and psychological disorders, where people are denied access to water supply, security, education, job opportunities, and connection to the city.

In Nalasopara, many of the original single-storey Baithi chawls were replaced by four to five storey "handshake chawls" on the exact same footprint, and the distance between buildings are minimized, in some extreme cases, to less than 10 cm. This creates dark, long, and poorly ventilated spaces, barely leaving any "open-to-sky space". The only open spaces that could be found in the area are the communal gardens in the gated communities. In other words, a child who grew up in the gated apartments could enjoy the communal gardens or playgrounds after school; while a child who grew up in the "handshake chawls" would possibly spend most of his or her childhood in the long and dark corridors. This "conspicuous separation" between "gated communities of the privileged and ghettoized territories of the marginalized people", as stated by PK Das , not only creates harsh boundaries among different groups, but also unfairness in terms of accessibility to open spaces.

In short, the widening of income gap leads to spatial inequality in Mumbai and Nalasopara contributes to the unfairness in accessibility to open space, harsh separation across income groups, ghettoization of marginalized groups, and the lack of decision-making power among people, which all together denies people to

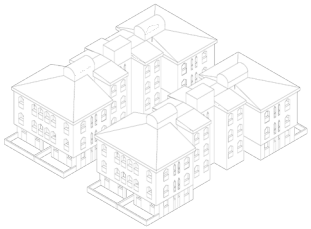
The Right to the City, i.e. (1) the right to appropriate urban space; (2) the right to participate centrally in the production of urban space; and (3) the right to diversity,

as proposed by Henri Lefebvre and summarized by Purcell and Duke.

The project therefore aims to create accessible and meaningful urban spaces, soften boundaries among income groups while having appropriate borders, provide opportunities for people participation in the development process, accommodate and encourage diversity, and

combat segregation that has kept inhabitants from appropriation and participation, which all together bring The Right to the City to the people.

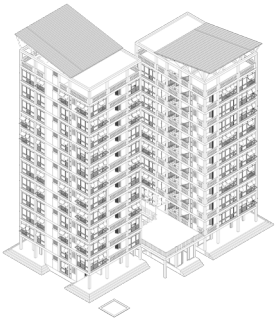
Using Sriprastha, an existing deteriorating cooperative housing in the West of Nalasopara as a starting point, I would propose three new housing typologies that cater aspirations of different income groups, while being relatable to the existing buildings. These typologies would be offered to the existing residents as choices to redevelop their existing societies on a case by case basis. To show how these new typologies would be applicable in other areas, they would also be built from scratch on a neighboring empty plot, with a different configuration from the existing urban fabric. Ultimately, the project hopes to propose an alternative scenario from the current situation of complete exclusion of the urban poor, creating borders that act as "zones of exchanges", rather than harsh boundaries, as framed by Sennett.



Existing Sriprastha

Mid-rise

Low-rise



High-rise

Typological Differences

Research Methods and Approaches

The research approach proposed by the Chair of Architecture and Dwelling was a combination of pre-visit background study, followed by an on-site micro ethnography survey.

Stage 1: Background Study

Before visiting the site, we have conducted typological and morphological analysis while studying relevant data and literature to grasp the reality of the larger context of Mumbai and India. In terms of literature, a wide range of topics including urbanization in India, housing policies in India, and dwelling in Mumbai was studied. Information including demography, politics, economy, climate, history etc, as well as spatial information such as mapping and typological studies were also collected and compiled into a research booklet, which act as a collective knowledge base for the entire group of students. We also studied a wide spectrum of housing projects that represented the "zeitgeist" of the specific period. The book "Building and Dwelling" by Richard Sennett was also included as an important knowledge base, giving us new insights in understanding cities and the built environment. I was especially inspired the way Sennett frames borders as porous zones of exchanges among different communities, rather than harsh boundaries with no intensity of activity.

Stage 2: Site Survey

The main strategy for site survey was a combination of visual ethnography and literary writing. Using ourselves as objects of research, we experienced, identified, and then recorded the findings of patterns of inhabitations into a catalog of perspective drawings known as "book of patterns". We also wrote an essay comparing the pattern of inhabitations in Mumbai and the Netherlands. Writing allowed me to record experiences by other senses apart from visual ones, and reflect upon them, while drawing extracts key factors that forms the specific pattern.

These two stages complement each other. The first stage provides an objective view of the overall big picture, including the major events, changes, and housing aspirations of different periods in relation to its urban transformation, while **the process of being a "participant observer" in the second stage helps me to identify patterns of inhabitation and would thus inform the design process.** It allows me to imagine the spatial experiences of the spaces that I have designed from a personal point of view and make a judgement of whether they are appropriate. In other words, while the experience of the individual would be given more attention in the design process, the information obtained from the first stage would fill in the gaps in aspects that were covered by the micro-ethnography.

These complimentary research methods that were implemented in the beginning sets the holistic tone of the studio, that issues should be addressed from all dimensions.

Research and Design

After visiting Mumbai, we had to formulate our Problem Statement and Research Question. My research question is:

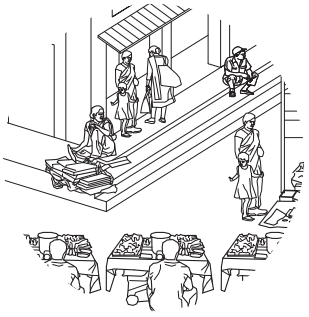
How can housing and urban design allow equal participation in the development of the built environment and equal access to open spaces across income groups?

This question is then divided into various sub-questions.

On a spatial level:
i. What are the challenges and strategies for mixed income housing?
ii. What are the aspirations of different income groups?
iii. What is the suitable housing configuration to encourage social interaction while keeping appropriate borders?

While on the organizational level:
i. What are the models of participatory design?
ii. What is the appropriate level of intervention for the government, sponsor, and user?

The collective effort of preliminary research forms a solid knowledge base for my research questions, and we had to further our investigation on the specific research questions individually. The result from my sub-questions then form the basis of the program of requirements for my design. For example, the research on the aspirations of different income groups through literature, interviews, and housing examples, helps me to formulate the main characteristics for the three different typologies. However, the research and design did not progress in a linear manner. The design process has, in many cases, informed me of the lack of information, and I had to return to the research phase to investigate further, or even sharpen some of the sub-questions, in order to proceed. The research and design processes were therefore of constant back and forth.



Informal Street Corner

Curtains for Privacy and Ventilation

Claiming Space with Decorated Entrances

Pattern of Inhabitations

Global Housing Graduation Studio &
Master of Architecture, Urbanism, and Building Sciences

Reflecting upon my experience in the Global Housing Graduation Studio, I would say that it has been an extremely challenging but also rewarding journey. The main challenges of this studio lie within its complexity. While attempting to address specific problems in Mumbai, equal attention must be given to the issues about density, affordability and buildability, taking social, managerial, technological, and environmental aspects into account. The studio therefore requires a holistic approach, to address its many dimensions; an open mind, to understand foreign environments and culture; and a practical attitude, to ensure the feasibility of the project.

In the studio, rather than zooming into the details progressively, tutors are constantly urging us to zoom in and out on the various scales. It was also a back and forth process, because the different scales would inform each other, and constant iteration was necessary. This way of working was new to me before I joined this studio, especially when we were told to design in 1:20 at an early stage of the project. The challenging part was to think about all dimensions at the same time, but it was necessary to prevents us from dwelling on certain details while neglecting the larger picture.

Personally, my biggest takeout from this experience is the ability to tackle a complex, multi-faceted project, by breaking it down into manageable components, and working on them simultaneously.

Another key aspect in the studio was the investigation of patterns of inhabitation and the translation of these findings into our own project.

The human perspective is of utmost importance and had to be thoroughly thought of in the research and design process. This is the attitude that I would carry on in my future practice as an architect.

Though there are many ways of working in architecture, we are ultimately designing for humans. This studio requires one to let go of the ego as a main master planner and delve into the ever-changing realities of the inhabitants. Since it is set in a foreign context, this studio also requires a constant discussion and reflection upon how much we, as an architect, should imitate the existing conditions, and how much we should be interfering. To me, the research and design process are attempts to search for a balance between top down and bottom up approaches.

Within this framework, my project thus suggests different levels of intervention and participation on different scales, using the open building model as an example. On the urban level, the architect has a larger control, and the user's power increases as the scale reduces. On the unit level, the user has complete control over the unit layout and the façade choices, since I have also proposed a flexible façade system that allows users to choose their own façade components.

I have also proposed two possible urban scenarios where my design could be implemented: i. starting from scratch on an empty plot, and ii. as a model to redevelop existing cooperative housing. While being deeply rooted in the social context of Nalasopara, this shows the potential of my project to be replicated in different areas of Nalasopara, Mumbai, or even beyond, which is one of the main goals of the studio.

While considering the architectural aspects in detail, the participatory nature of the project also demands clarification on the managerial processes. For example, I have designed all three typologies within the plot boundaries of an existing society in Sriprastha. This reduces the complexity of the redevelopment process by allowing each society to redevelop their own society on a case by case basis, at its own pace, without an overall masterplan of the area. On the other hand, to address the issues of affordability and replicability, I have also investigated local affordable materials and technology for the construction of the buildings. Therefore, while working on the architectural design, the role of the architect was also expanded to other disciplines. This multi-disciplinary way of working to create integrated solutions aligns with the tradition within the Master of Architecture, Urbanism, and Building Science of TU Delft, where the role of an architect is constantly being redefined.

Elevation of Mid-rise Typology with Flexible Facade

Ethical Issues and Dilemmas

Though the micro-ethnography research was beneficial to the project, the way it was conducted brought with it some ethical dilemmas. We had limited time to spend on site, and there were also language barriers among us and residents who do not speak English. Moreover, during the process of interviewing the locals, it was obvious that we were outsiders, and so since the residents are fully aware that they are being observed, they might behave differently. Therefore, what we have recorded might not be enough to understand the society as a whole. It occurred to me that **we might be conducting research through a keyhole, overlooking the larger reality behind the door.** Though we try to be as true to the findings as possible, there was no opportunity to return to Mumbai and clarify certain details, so we had to make certain assumptions to fill in the gaps.

Due to time constraints, we had to capture as many photographs and films as possible as materials for the production of the ethnography "Book of Patterns", and as materials for future references during the design process. Thereforeat many times when we were entering the communities, it felt like we were intruding the privacy of the residents.

On the other hand, my research questions were formulated after I have returned from Mumbai. Though I could answer the questions based on my observation in Mumbai, and additional literature that I could study here, I did not have the chance to dig deep into the reality of Mumbai to cross check my findings. For example, most of the people we have spoken to in Mumbai were of the Lower Income Group, I had to make more assumptions regarding the aspirations of the Upper Middle-Income Group.

Therefore the literature and background studies were important to compensate the dilemmas that emerge due to time constraints on the site.

Figure
Students and Tutors visiting housing by SPARC in Dharavi during the field trip


NO PARKING

Social, Professional, & Scientific Framework

During a lecture that PK Das has given in TU Delft, he has mentioned that:

"for policies that are supposedly equal for all, can produce equal conditions, that are equally miserable, that have to be fought, so it is not just the fight of the poor therefore, against such urban development policies and plans, but it is for all of us. Even the middle-class and upper-class citizens will get down to these struggles and challenges."

The issues of income disparity, spatial inequality, exclusion, and ghettoization are problems that persists not only in Mumbai, but also the rest of India, and the world. Gated communities are prevalent globally, and I believe that this exclusion cannot be solved from one side or the other, but must be addressed holistically. Therefore, through the project, I explored ways the different income groups could co-exists. Since the Ministry of Housing and Urban Affairs of India has introduced incentives for 8 Public-Private Partnership models in 2017, my proposal takes advantage of the "Mixed-development Cross-subsidized Housing" model, whereby the more high-end typologies could cross-subsidize the affordable housing. The proposed model softens boundaries among income groups by encouraging dialogues between the different clusters without having a complete integration. This is a model that is not confined to Sriprastha, but replicable in other areas in Mumbai or beyond, providing an alternative input to addressing the issue of social segregation, rather than making it a battle between the rich and the poor.

Apart from being a response towards spatial inequality, the project is also a result of frustration towards a worldwide phenomenon of cookie cutter housing buildings that I have personally observed, especially in cities that I have lived in: Kuala Lumpur, Hong Kong, and Shanghai. These housing are usually profit driven, disregarding intangible human needs like income generation, borders, local culture, and social spaces, often neglecting the different needs of the individual and the articulation of the in between spaces. In high-density areas, the "cookie-cutter housing" phenomenon is even heightened when a mass amount of people are cramped into identical towers with identical units. In India, this trend is also observed in both the affordable housing provided by the government, and the higher end housing targeted towards the middle and upper class. Rapid urbanization has result in a loss of human touch, and the underlying question behind my project, and perhaps the entire Global Housing Graduation Studio, is **how can we cater for individual human needs while fulfilling the demands of the realities behind the provision of mass housing?**

My project thus attempts to encourage diversity within a standardized framework, from typological differences within the same grid, to variations of façade components within the same frame. The main challenge of this assignment is to determine the differences among the typologies, and the governing rules that tie them together, in other words, finding a balance between diversification and standardization. I think that my proposal contributes to the larger discussion of individuality in mass housing, which is very relevant in a time when houses are treated as commodity rather than a place to live.

Kuala Lumpur

Shanghai

Hong Kong

Mumbai

High Density Cookie-cutter Housing Towers Globally

08

appendix

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