The Missing Middle.

# The Missing Middle
# Rethinking Housing Density In Ahmedabad

.

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MSc4 Graduation Studio (AR4GH010)
Global Housing: Dwelling in Ahmedabad

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**To my parents, family, and friends – thank you for your endless support.**

Anne ve babama, aileme ve arkadaşlarıma – sonsuz desteğiniz için teşekkür ederim.

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ABSTRACT

Ahmedabad is traditionally known for it's active streets, courtyards, and thresholds supporting social interaction in everyday life. These environments are commonly found in its characteristic low-rise, high-density neighborhoods. However, with rapid urbanization, population growth and land scarcity, contemporary high-rise developments are increasingly being used as an efficient solution to housing shortages. These developments often prioritize quantitative density metrics over spatial quality and collective life, contrasting to Ahmedabad's low-rise housing environments. This graduation project investigates how the spatial and social qualities found within low-rise environments can coexist with the density required in rapidly growing cities such as Ahmedabad.

Through fieldwork observations in Ahmedabad, comparative case study analysis and architectural exploration, the research examines the relationship between housing form, density, livability, and social cohesion across neighborhood, cluster, and unit scale. The study focuses on "the missing middle" as an alternative housing approach positioned between low-rise and high-rise developments in Ahmedabad. Case studies such as LIC Housing, Aranya Housing, PREVI Housing, the Dapperbuurt, Spangen Quarter Housing, and Terrassenhaussiedlung were analyzed to identify spatial and programmatic strategies related to collective living, incrementality, and active street life.

The research is translated into an alternative 'missing middle' housing approach within the context of Bimanagar Ahmedabad. The architectural exploration proposes G+6 mid-rise housing organized around courtyards, collective circulation spaces, layered thresholds, and mixed-use environments. The demonstration of the coexistence between density and livability can be found in the diverse housing typologies, massing, shared communal spaces on neighborhood, cluster and unit scale. Ultimately, the graduation project argues approaching housing as

habitat rather than purely through quantitative metrics, emphasizing the importance of social interaction, everyday life, and contextual understanding within future housing.

## READING GUIDE

This report is structured in two main parts. The first part focuses on the research, introducing the housing challenges of Ahmedabad the research questions, methodology, and theoretical framework. The research approach is followed by comparative case study analysis and a site analysis on Bimanagar. Based on these findings, the second part of this report translates the research into a design approach for a missing middle housing model in Ahmedabad. The final chapters present the design strategy on neighborhood, cluster and unit scale together with the conclusions.

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# PART I - INTRODUCTION

# INTRODUCTION

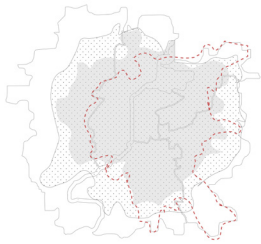


Fig. 01
The Ahmedabad municipal corporation (AMC) boundary which is responsible for the administration, infrastructure, and urban planning, has been extended since 2006 as urbanization has been growing rapidly the past 20 years.

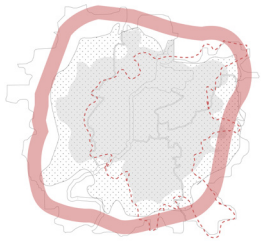


Fig. 02
Affordable housing zone primarily concentrated around the rapidly developing peripheral areas along Sardar Patel Ring Road in Ahmedabad.

Housing is the basis of stability and security for an individual or family. It is a globally renowned human right that enables people to live with culture, and access to essential services and amenities such as education, healthcare, and employment (OHCHR-UNOG, 2014). However, the need for affordable housing has been growing continuously (Anwar, 2015), particularly in cities with rapidly growing urbanization where economic growth and population increase create pressure on scarce land, infrastructure and housing systems. (Wehrmann, 2016).

Affordable housing is a driving force for social inclusion as it benefits vulnerable populations, by allowing low to middle income households to grant their limited resources towards education, healthcare and nutrition (Habitat Charlotte Region, 2025). Furthermore, affordable housing plays (beyond social needs) an essential role in local economic developments (Hudson, 2015). Generating employment and wealth (Nayak & Hazarika, 2019) while encouraging inclusive, mixed-income development (Onatu & Baloyi, 2020).

India is currently experiencing one of the world's most significant urban transformations (Hoda, 2025) with rapidly growing urbanization, and mass migration towards its cities. This population growth is further worsening the shortage of affordable housing (Prajapati & Patel, 2022). The provision of adequate, affordable, and livable housing has become a crucial architectural and urban challenge in growing cities (Raheja & Baijal, 2024).

# PROBLEM STATEMENT



Fig. 03
Low-rise housing in Ahmedabad.
Photo by R. Yasar 2025

With rapid urbanization and population growth resulting in land scarcity and high prices, Indian cities have started building vertically rather than horizontally (Bhatt, 2025; Gattupalli, 2025). High-rise housing is often promoted as increased density optimizing land value in prime urban locations, improving infrastructure efficiency and service delivery (Gattupalli, 2025). However while this approach succeeds in quantitative density, it often neglects the spatial, social and cultural dimensions of everyday life.

According to Bhatt (2025) 'vertical gated communities' with restricted access can increase social and economic inequalities. Home ownership in India is traditionally associated with ground or low-rise housing creating strong connections to land for rituals and community ties. Unfortunately, many contemporary housing projects are driven by speed, efficiency, and profit (Homes and Buildings, 2025). This has resulted in repetitive monotonous building forms with inactive ground floors, and vehicular movement taking over human interaction (Express News Service, 2025).

In addition, fundamental amenities (including open spaces, green areas, and reliable water supply) are often neglected. As Charles Correa argues, vertical development is only meaningful when building footprints are reduced and amenities are increased, which is rarely applied in Indian context as high-rise developments are packed closely together, resulting in intensified congestion rather than improved living conditions (Correa, 2010). These developments are often lacking in architectural identity, failing to reflect local cultural and climatic contexts or creating opportunities to enable meaningful spaces for social cohesion and everyday life.

Architectural identity is the unique character and meaning of a building or urban environment, shaped by local history, culture, climate, and everyday life of its community, offering a sense of belonging.

Ahmedabad, as one of the fastest growing, seventh-largest city in India, is a great example of this condition. With a population of approximately nine million and predicted an additional 1.5 million resident by 2030, Ahmedabad faces increasing pressure and challenges regarding

Fig. 04
Monotonous high-rise housing in Ahmedabad
Photo: R. Yasar (2025)



Fig. 05
Courtyard as a central core of social cohesion in low-rise housing in Ahmedabad
Photo: R. Yasar (2025)



housing supply, land scarcity and infrastructure (Lehner et al., 2016). Here, high-rise housing developments of G+13 and above, have increased as a response to the population growth and rapid urbanization. High-rise housing developments may offer benefits regarding density and privacy, however studies indicate that such environments have negative effects on physical and mental well being as it often weakens social relationships and reduces perceived safety (Bansal et al., 2024).

In contrast, traditional low-rise, high density neighborhoods (up to G+4) in Ahmedabad show a different perspective on what housing that foster social relationships are. Such neighborhoods are characterized by courtyards, narrow streets, thresholds and informal shared spaces which support strong social cohesion, cultural practices, and everyday life (Gulati, 2019). However, as times have changed, land has become more valuable and the population keeps rapidly growing, this housing model is no longer sufficient in accommodating contemporary density demands (Patil, 2025). Many Indians have deep cultural attachments to ground-level housing making the navigation of the cultural and psychological transition from traditional horizontal to high rise a great challenge (Gattupalli, 2025). As a result, between the social and spatial gap of livable low-rise neighborhoods and efficient high-rise developments, a “missing middle” in current housing production has emerged, referring to housing systems achieving higher density without compromising social and spatial qualities.

Fig 06.
Fieldtrip exploring low-rise Calico Mills
Photo: P. Aung (2025)



Fig 07.
Low-rise housing with direct connection to the street in Ahmedabad
Photo: R. Yasar (2025)



# RESEARCH QUESTIONS

'The missing middle' housing approach refers to the combination of social and spatial livability with density, balancing the two extremes. Ideally, this mid-rise type of housing is denser than traditional low-rise housing in Ahmedabad, yet socially and spatially more engaging than contemporary, generic high-rise developments.

Neighborhood vitaltiy is the liveliness and overall heatlh of a neighborhood, often charactersized by diverse, dense, and safe, walkable environments. In these neigborhoods amenites are accesible and being used by a mix of people. They fosters social cohesion and bring quality to life.

The social and spatial gap between livable low-rise neighborhoods and efficient high-rise developments highlights the need to explore alternative housing models that can address both social and spatial qualities while accommodating contemporary density demands. Here, the concept of a 'missing middle' housing approach becomes relevant as a potential bridging strategy. This housing approach may offer new possibilities for combining density with livable and socially active urban environments within the context of Ahmedabad. To investigate this housing approach the following questions will be answered.

**How can a 'missing middle' housing approach in Ahmedabad bridge the gap between low-rise and high-rise development while supporting a dense, livable and socially active neighborhood?**

*1. How do low-rise and high-rise housing developments in Ahmedabad compare in terms of built density, spatial organization, patterns of social interaction, and neighborhood vitality?*

*2. Which spatial, and programmatic qualities of traditional low-rise, high-density neighborhoods support livable, socially and economically active communities?*

*3. How can mid-rise, high density housing integrate the positive qualities of traditional low-rise housing to design a socially active, livable habitat while also accommodating to contemporary density demands?*



Fig. 08
Low-rise housing in Mumbai.
Photo by R. Yasar 2025

# RELEVANCE, OBJECTIVE AND MOTIVATION, SCOPE



Fig. 09
Contemporary mid-high rise housing in Ahmedabad.

## RELEVANCE

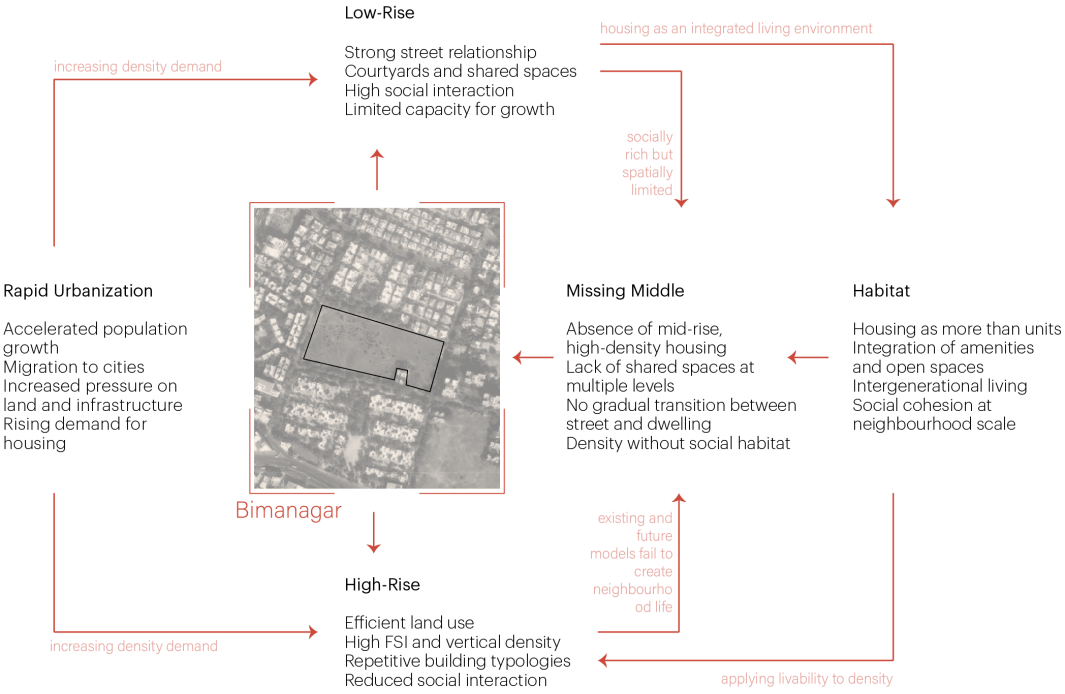
When researching housing density there seems to be a bigger focus on quantitative metrics such as Floor Space Index (FSI) and population density with little studies measuring density in ways that directly relate to well-being. Quantitative metrics are dominating density research whereas qualitative aspects such as livability, social interaction and everyday life are falling short on discussion (Pont et al., 2021). To contribute to architectural discourse, this project will focus on the concept of housing as habitat. By doing so the research will not only focus on density but also address a larger problem within a socio-spatial realm where density can be achieved without the scarification of livability, architectural identity and social cohesion.

It is of high relevance in Indian context to research the "missing middle" as an alternative to the current low-rise, high density sprawl and the isolated high-rise developments. This research aims to contribute to the profession by proposing design strategies for mid-rise, high density housing designed for mixed-use and mixed-income households. This missing middle will be adapting to the currently needed affordable housing, integrating social, cultural and spatial considerations to arrive at dense livability. This will be done at unit, building and neighborhood scale by acknowledging the importance of habitat and programming.

## OBJECTIVE AND MOTIVATION

The objective of this project is researching density, understanding habitat in Indian context and applying these findings through architectural design. The design proposes a mid-rise, high density housing neighborhood that balances density alongside livability and functions as a socially active habitat as seen in traditional low-rise housing in contrast to contemporary, isolated high-rise housing in Ahmedabad.

Aside from the observed gap for a missing middle, the investigation of this topic stems from a personal interest in how cities accommodate population growth and urbanization. High-rise buildings can easily be presented as an obvious response to housing shortages, however I have long questioned whether simply building higher truly addresses how people live within dense urban environment. I am particularly interested in the relationship between housing, streets, and shared spaces weakening as buildings grow taller. These driving factors are what motivated the desire to design livable neighborhoods with mid-rise, high-density housing, as a response to changing social structures and urban pressure, which reinterpret important social elements such as courtyards, thresholds and shared spaces within a contemporary architectural framework.




**Bimanagar** predominantly low-rise residential fabric, fragmented plots and gated developments, inactive streets, ongoing mid-rise (G+13) redevelopment

Fig. 10
Framework Bimanagar, Ahmedabad

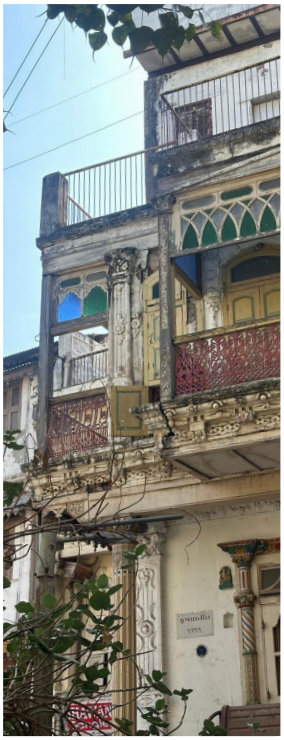


Fig. 11
Low-rise housing in Ahmedabad
Photo by R. Yasar 2025

This project investigates density through building height, spatial organization, and programmatic distribution. This includes studying density calculations, FSI, and housing typologies appropriate for the site, while exploring how spatial elements such as courtyards, thresholds, shared circulation, and mixed-use functions can support social interaction and neighborhood vitality.

## SCOPE

The scope of this research is limited to a housing development on a vacant LIC (Life Insurance Corporation) -owned, 28.753 m2 total site area plot in Bimanagar, Ahmedabad, India (see fig.10). In this program the focus relies on affordable and mixed income housing with an intergenerational unit mix, supported by neighborhood scale commercial and communal functions.

The architectural challenge in this context is aside from building high and dense also about creating housing that functions as a habitat, carefully designing an environment which balances density with livability, supports everyday routines, fosters social interaction, and accommodates a mix of generations, incomes and activities.

The project site, currently dominated by low-rise housing, yet surrounded by ongoing mid- and high-rise redevelopment and abandoned buildings the streets of Bimanagar remain largely inactive. Bimanagars neighborhood is fragmented into gated pockets with few opportunities for social cohesion, especially compared to Ahmedabads, traditionally vibrant urban environments.

The integration of commercial functions or amenities at neighborhood scale is minimal and as a result social life and cultural expressions are lacking outside the gates. Bimanagar feels spatially fragmented and disconnected, making this site ideal for architectural intervention where housing is not just designing a dwelling but designing habitat and reintegrating social life into the neighborhood fabric.

The project aims to demonstrate the creation of a mid-rise, high-density housing model which can act as a ‘missing middle’ housing approach, exploring habitat and its spatial configurations that encourage social cohesion, shared use and active everyday life at both housing and neighborhood scale while simultaneously accommodating to contemporary density requirements.

Fig. 12
Vacant plot of LIC-located in Bimanagar, Ahmedabad.
Photo by R. Yasar (2025)



Fig. 13
Vacant plot of LIC-located in Bimanagar, Ahmedabad.
Photo by R. Yasar (2025)



Fig. 14
Contemporary mid-rise housing in Ahmedabad.
Photo by R. Yasar (2025)



# PART II - APPROACH

# METHODS

This research adopts a mixed-method approach by combining qualitative and quantitative methods to investigate housing as habitat and urban density within the context of Ahmedabad. The methodology integrates fieldwork observations, case study analysis, comparative evaluation and lasty arrives at an architectural design output. For clarity and structure within the research three spatial scales will be adopted. The housing unit, the cluster, and the neighborhood.

*Fieldwork Observations*

During a two-week field trip to India, including cities such as Mumbai and Ahmedabad in December, research will be conducted in collaboration with CEPT University. In this time a firsthand understanding of Indian housing, culture, density, spatial usage and everyday life across different housing typologies will be build .

Low-rise, mid-rise, and high-rise housing neighborhoods with various FSI values will be visited and compared in its research on spatial and social consequences of density. The chosen site of Bimanagar in Ahmedabad will be documented through sketches, photographs, field notes, mapping, and informal interviews with residents. This will be conducted at multiple scales considering dwellings, their streets and the neighborhoods created.

Academic assignments like site-based neighborhood analysis, density study model making and user-based scenario design will be conducted with CEPT University and its students.

The site Bimanagar will be visited multiple times , to gain in depth understanding of existing spatial conditions, residential behavior and neighborhood activity. Observations of private and public will be made as housing units, gated communities, the streets and neighborhoods will be visited.

*Case studies*

By analyzing a series of case studies, a better idea will be formed around Ahmedabads different housing models and in what way density, livability, and social interaction are addressed in already existing projects. These case studies will include examples from both Indian and global context, moreover they will address housing typologies in low-, mid- and high-rise complexes.

The selected case studies include B.V. Doshi's LIC Housing demonstrating neighborhood vitality social interaction and incremental growth. In contrast, contemporary EWS high-rise developments in Ahmedabad will be analyses on quantitative density and lack of social and spatial qualities.

Furthermore, global projects which explore mid-rise housing approaches and emphasize collective living such as Spangen Quarter Housing in Rotterdam by Michiel Brinkman and Terrassenhaussiedlung in Graz by the Werkgruppe Graz will be highlighted. Previ Housing in Lima by Charles Correa further demonstrates the integration of low rise principles within a dense urban environment while the Dapperbuurt in Amsterdam focusses on a greater scale. Together, these case studies will provide spatial and programmatic insights that contribute to defining a missing middle housing model for Ahmedabad.

*Comparative Framework*

After conveying a deeper understanding with the insight gained by doing fieldwork observation, and analyzing case studies. All findings will be synthesized into a comparative framework. This will evaluate housing typologies across unit, building, and neighborhood scale based on various criteria such as, programming, social interaction, spatial hierarchy, access to amenities, local economy and achieved density. The comparative framework will combine research findings into design criteria which will create the foundation for architectural decision-making in the design phase.

Neighborhood

Cluster

Unit

*Architectural Design*

Architectural design forms the final stage of this research. In this phase, all theoretical and empirical findings will be translated into an architectural proposal for a mid-rise, high-density housing neighborhood, that functions as a socially active habitat, balancing density and livability across three scales (unit, cluster, and neighborhood). The design output will communicate through drawings, diagrams, models, and spatial strategies including siteplans, floorplans, sections, and elevations. The proposal will explore mixed-income and mixed-use housing, integrating shared spaces, amenities, shops, and mixed-use functions.

# THEORETICAL FRAMEWORK

Over the years, many scholars have agreed on housing being more than physical shelter. They have stated their fundamental role in creating social stability, and well-being. Similarly, Indian housing policies such as the Pradhan Mantri Awas Yojana-Urban (PMAY-U) recognizes that housing extends beyond physical shelter, incorporating access to basic amenities and improved living conditions as other essential components of housing (Government of India, 2015). This supports the understanding of housing as habitat and highlights the challenge in providing housing units in environments that support everyday life as it directly affects society as a whole.

Further research on affordable housing centers their social and economic impact. Anwar (2015) links the growing demand for affordable housing to rapid urbanization, Wehrmann (2016) further builds on this by claiming scarcity of land is increasing its prices which result in intensified housing shortage in rapid growing cities. Many scholars, additionally, discuss the link between affordable housing and the improvement of public health outcomes, claimed that it reduced long-term social costs (Habitat Charlotte Region, 2025; Mehdipanah, 2023) as it plays a fundamental role in local economies by constructing employment and mixed-income environments (Nayak & Hazarika, 2019; Onatu & Baloyi, 2020). With these findings we can understand the multidimensional layers of affordability and their effects on cost, spatial quality and social integration and participation.

The built environment and the density of housing are often approached through quantitative metrics like Floor Space Index (FSI), Ground Space Index (GSI), and population density. According to Pont et al. (2021), however, these metrics are lacking essential insights of lived experience, often overlooking, social cohesion, spatial perception, and everyday practices leading to growing criticism of contemporary density models that prioritize density and numerical efficiency over human-scale environments.

The call for qualitative interpretations addressing livability, architectural identity, and social cohesion is integrated in the concept of seeing housing as habitat. Gulati (2019) emphasizes the importance of neighborhood spaces, courtyards, and thresholds in Indian context as these support social life within residential environments in contrast to housing as a collection of isolated units.

Collectively, this body of literature establishes a theoretical foundation, framing housing as a socio-spatial system in which housing is understood as habitat rather than simply a dwelling. Within this framework, emphasizes is placed on the importance of livability and social cohesion in neighborhoods in addition to the need for greater densities following rapid urbanization. This will set the basis for exploring the 'missing middle' as a potential approach to achieving dense yet livable housing environments.

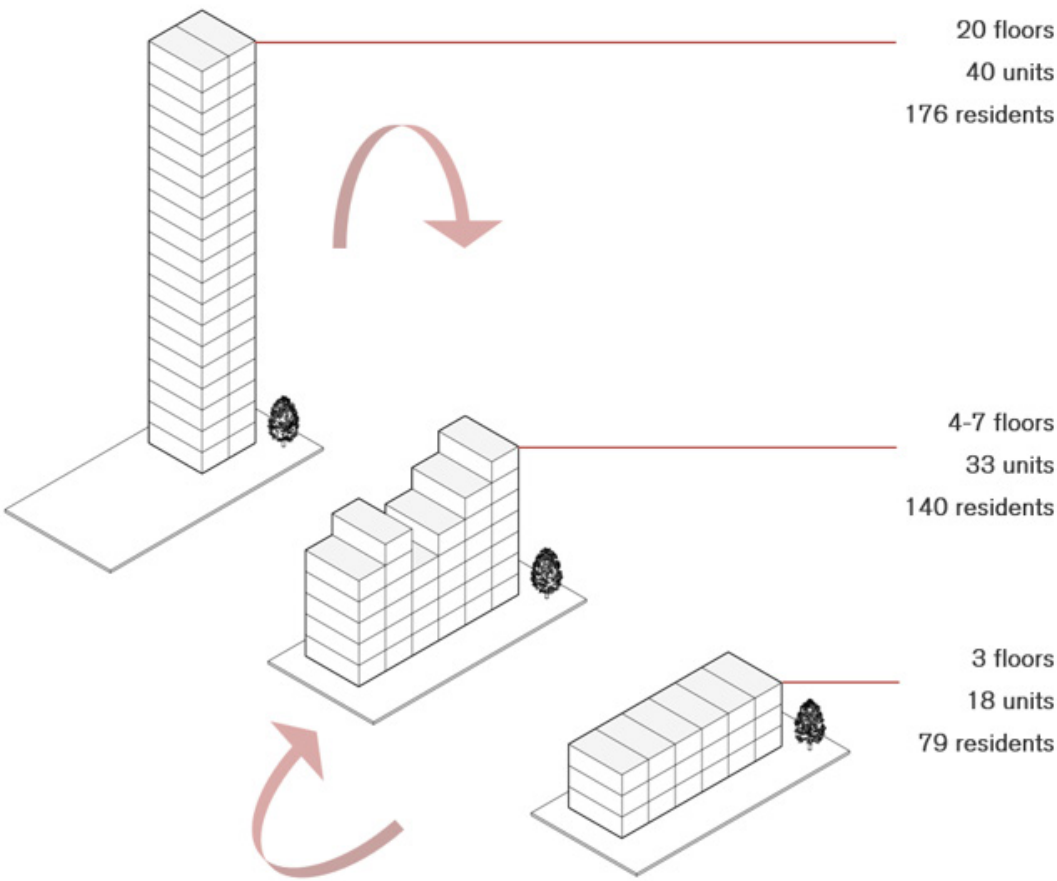



Fig. 15
Diagram problem statement

# PART III - RESULTS

# RESEARCH

# FIELDWORK OBSERVATIONS

## HOUSING DENSITY AND EVERYDAY LIFE IN INDIA

An essential part of this research was the field trip to Ahmedabad, together with the additional travels trough Mumbai, Jaipur, and New Delhi. During the trip, a strong contrast between two housing models became apparent. On one hand, low-rise neighborhoods demonstrated the importance of housing as habitat and the relationship between housing and the street. Regardless of scale or form, many low rise environments made the street their own. This qualitative environment  makes the streets feel open, welcoming, and socially active, contributing to a strong sense of community, familiarity, and safety within the neighborhood.



Fig. 16
Global housing studio visiting LIC Housing by B.V. Doshi in Ahmedabad.
Source: @global.housing.tudelft on Instagram

In contrast, contemporary high-rise developments visited had a very different environment, with a noticeable disconnection from the streets. Just a few people occupy the public space, most of daily life is retreated upwards into enclosed apartments behind the barred windows. The streets are dominated by vehicular use making it inactive, weakening the relationships between residents and their surrounding environment. During the field trip the statement made by a CEPT tutor "*People don't feel like they own the open space anymore.*" became very apparent.

Another statement made during a lecture at CEPT University highlighted an important cultural perspective on Indian housing and urbanism: "*The imagination of the room comes first in some countries. The imagination of open space enclosed by four walls comes first in India.*" This observation makes one wonder how contemporary housing developments may be transforming the traditional relationship between built form, collective space, and everyday urban life.

The following image series highlights key spatial and architectural observations made throughout the three-

week trip in India. The section begins with observations of low-rise housing environments, followed by case study-specific analyses of the visited Ambika Society in Ahmedabad. It then explores high-rise housing developments observed across different Indian cities, including Sardar Patel Housing Society. The final part including projects such as the India Habitat Centre, Indian Institute of Management Ahmedabad, CEPT Univesity, Sangath, NCDC Building, Amdavad ni Gufa, and Premabhai Hall, focuses on architectural massing, materiality, and climatic design strategies that inspired the design process.

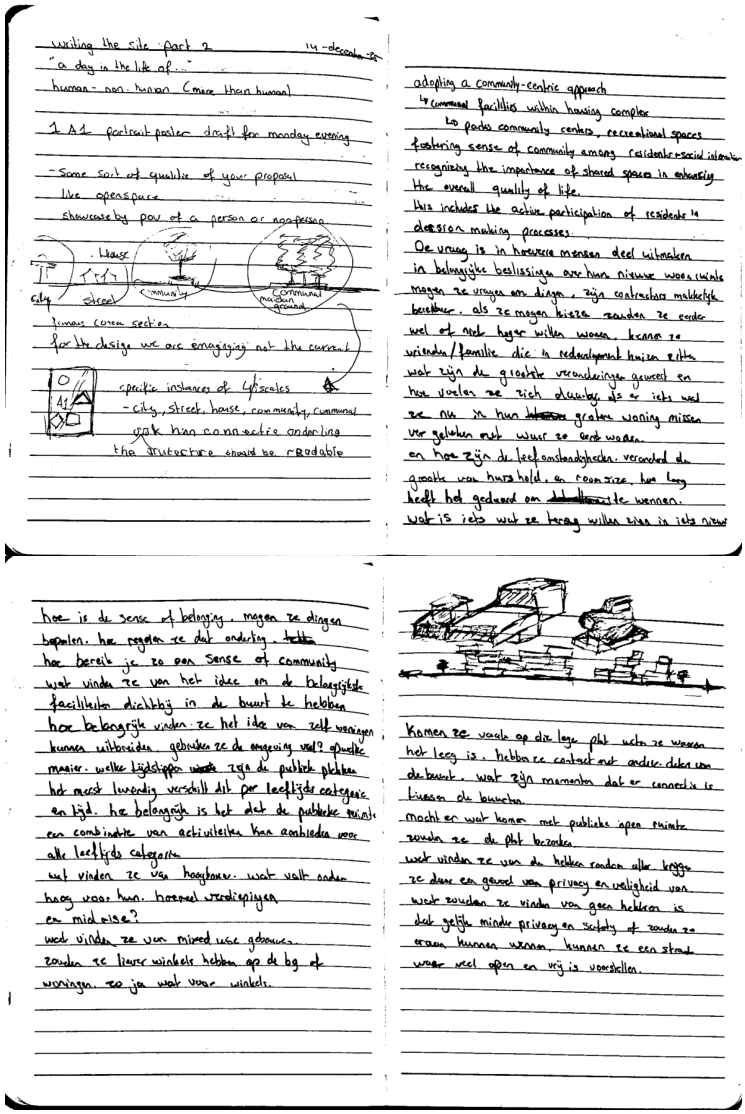



Fig. 17
During the field trip, I found myself questioned many aspects regarding housing and everyday life in India. I wrote these reflections down in my notebook and revisted them. To what extent are people involved in important decisions regarding their new living environment? If given the choice, would they prefer to live higher or lower? Do they know friends or family living in redevelopment housing? Is there something they miss in their larger homes compared to where and how they used to live before? How have the living conditions changed, as well as the size of their household? Did it take a long time to adjust to the new living conditions? How is the sense of belonging? How do you achieve a sense of community? What do they think about having important facilities close to the neighborhood? How important is the possibility of arranging and expanding their homes themselves? Do they use the surrounding environment a lot? At what times are public spaces most lively? Does this differ between age groups? How important is it that public space can offer a combination of activities for all age groups? What do they think about high-rise housing? What counts as high-rise? When does high-rise become too high? And what about mid-rise? What do they think about mixed-use buildings? Would they prefer shops on the ground floor or housing? If so, what kind of shops and amenities? Do they often visit the empty plot in Bimanagar? At what moments is there connection between the different neighborhoods? If public open spaces were introduced, would they visit the site? What do they think about the fences surrounding everything? What would they think about having no fences? Would that immediately feel less pleasant, less private, or less safe?



Fig. 18
Thresholds in low-rise housing
Photo by R. Yasar (2025)



Fig. 19
Brick and concrete seen as common materials for low-rise housing
Photo by R. Yasar (2025)





Fig. 20
Compact street and thresholds being used in various ways
Photo by R. Yasar (2025)



Fig. 21
Celebration in courtyard of a low rise housing complex
Photo by R. Yasar (2025)



Fig. 22
Details of a pol house facade
Photo by R. Yasar (2025)




Fig. 23
Colorfull low-rise housing
Photo by R. Yasar (2025)





Fig. 24
Communal courtyard
Photo by R. Yasar (2025)





Fig. 25
Colorfull l
small bal
storage
Photo by R





ow-rise housing with
conies being used as

. Yasar (2025)

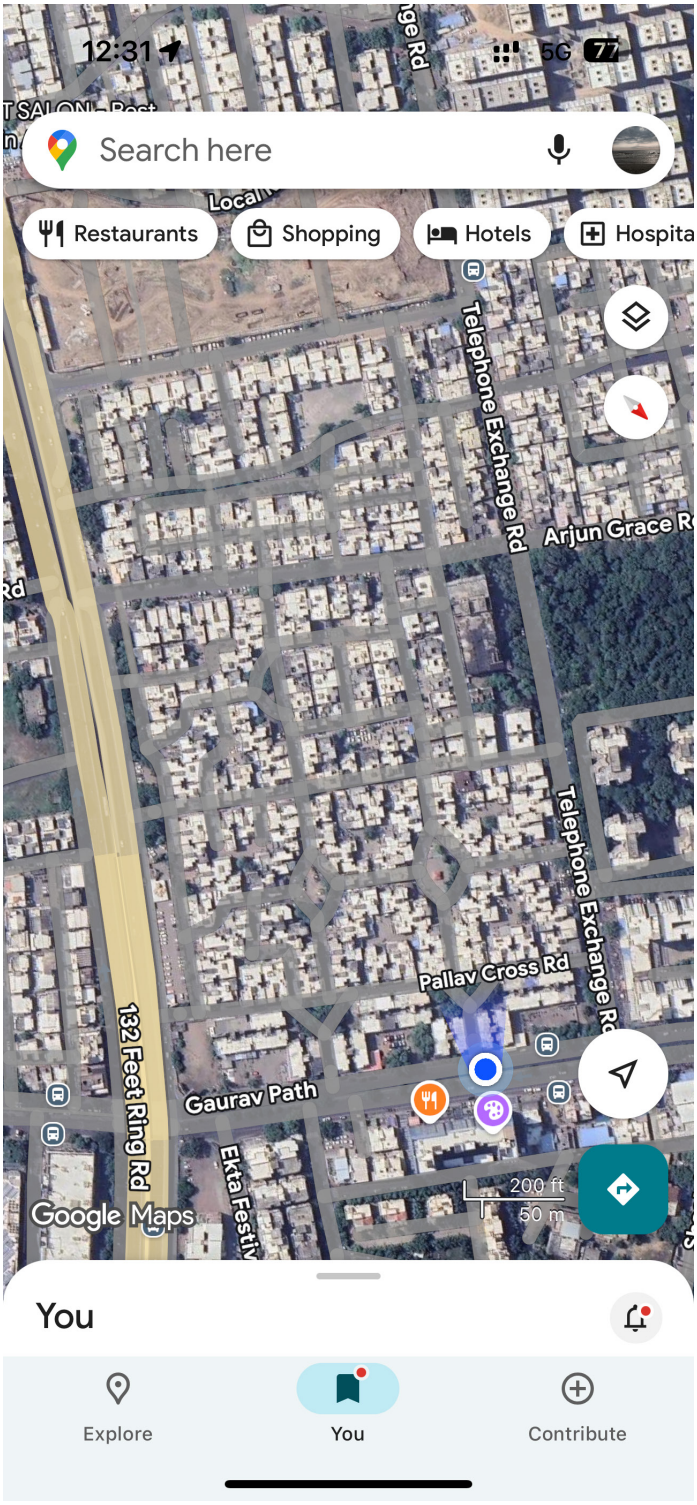



Fig. 26
Screenshot of location low-rise, high-density housing at Ambika society in Ahmedabad
Source: Google Maps



Fig. 27
Communal courtyard at Ambika Society
Photo by R. Yasar (2025)





Fig. 28
Multi purposed balconie railling also functioning as a drying rack
Photo by R. Yasar (2025)



Fig. 29
Climate adaptive recessed facades
Photo by R. Yasar (2025)





Fig. 30
Narrow streets leading up to communal courtyards
Photo by R. Yasar (2025)



Fig. 31
Otla with sink and storage space
Photo by R. Yasar (2025)



Fig. 32
Facades being used as drying racks
Photo by R. Yasar (2025)



Fig. 33
High-rise housing with repetitive facade elements
Photo by R. Yasar (2025)



Fig. 34
High-rise housing towering over low-rise housing
Photo by R. Yasar (2025)





Fig. 35
High-rise housing in development
Photo by R. Yasar (2025)




Fig. 36
Low-rise housing with commercial plinth in front of high-rise housing with a closed plinth
Photo by R. Yasar (2025)



Fig. 37
Dense high-rise facade revealing traces of everyday life behind repetitive barriers.
Photo by R. Yasar (2025)

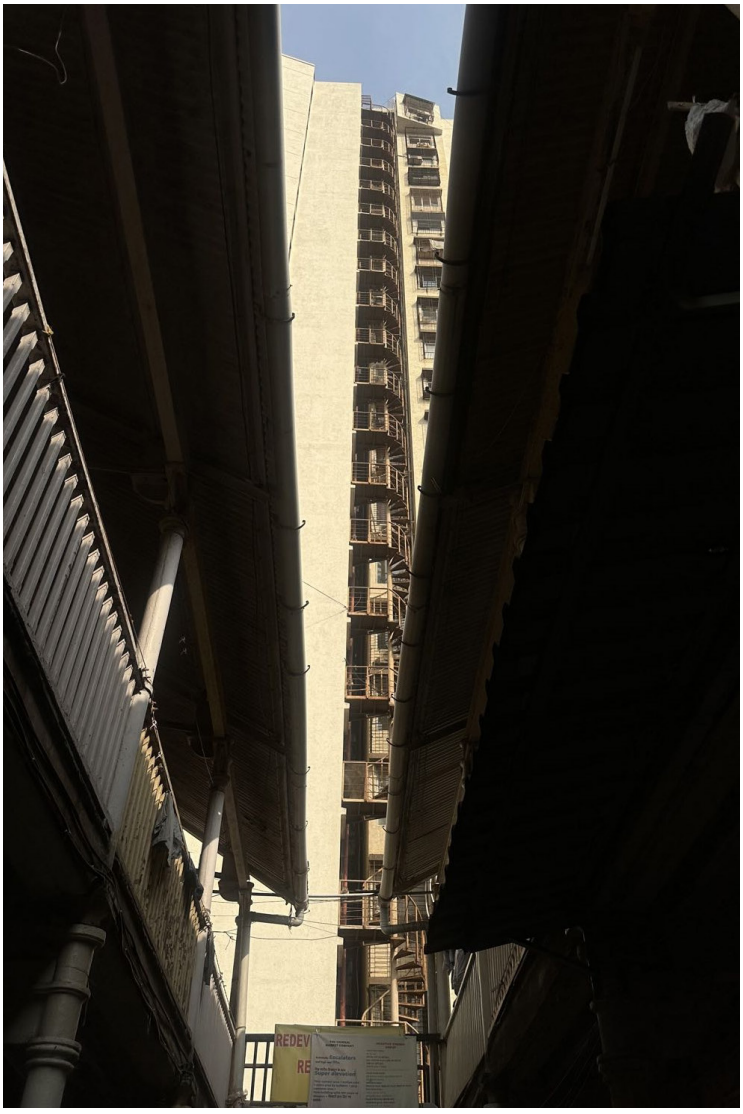


Fig. 38
Contrast in low and high-rise housing
Photo by R. Yasar (2025)



Fig. 39
High-rise housing in development
Photo by R. Yasar (2025)





Fig. 40
High-rise housing in development
Photo by R. Yasar (2025)



Fig. 41
High-rise housing in development
Photo by R. Yasar (2025)

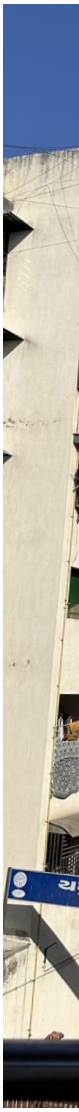


Fig. 42
Mid-rise h
repetitive
Photo by R



housing in the form of
towers
. Yasar (2025)




Fig. 43
Mid-rise housing with prominent balconies
Photo by R. Yasar (2025)

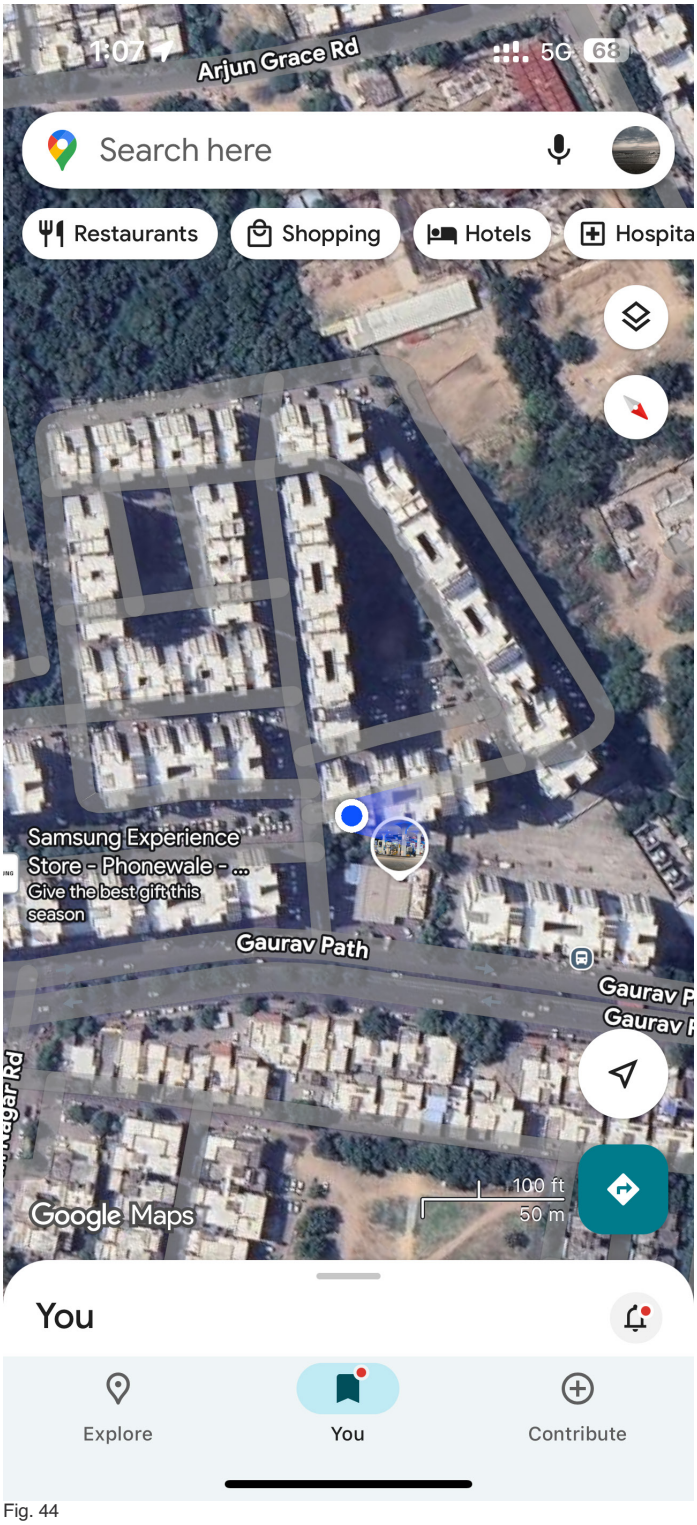



Fig. 44
Screenshot of location low-rise, high-density housing at Sardar Patel Housing Society, Ahmedabad
Source: Google Maps

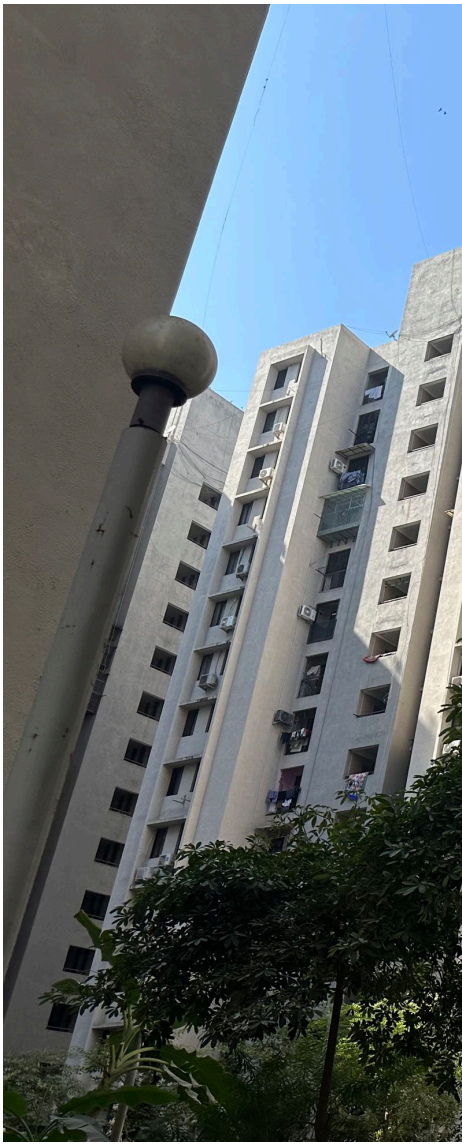


Fig. 45
Repetitive towers and climate adaptive, deep recessed facade openings
Photo by R. Yasar (2025)





Fig. 46
No clear entrance of housing units
Photo by R. Yasar (2025)



Fig. 47
Street level dominated by vehaculair use
Photo by R. Yasar (2025)





Fig. 48
Plinth of housing complex used as parking
Photo by R. Yasar (2025)



Fig. 49
Livabilty peaking through the facade openings
Photo by R. Yasar (2025)



Fig. 50
Livabilty peaking through the facade openings
Photo by R. Yasar (2025)



Fig. 51
India habitat centre in New Delhi showing rotated masses
Photo by R. Yasar (2025)



Fig. 52
Sculptural architecture seen in the deep recesses carved in the mass
Photo by R. Yasar (2025)

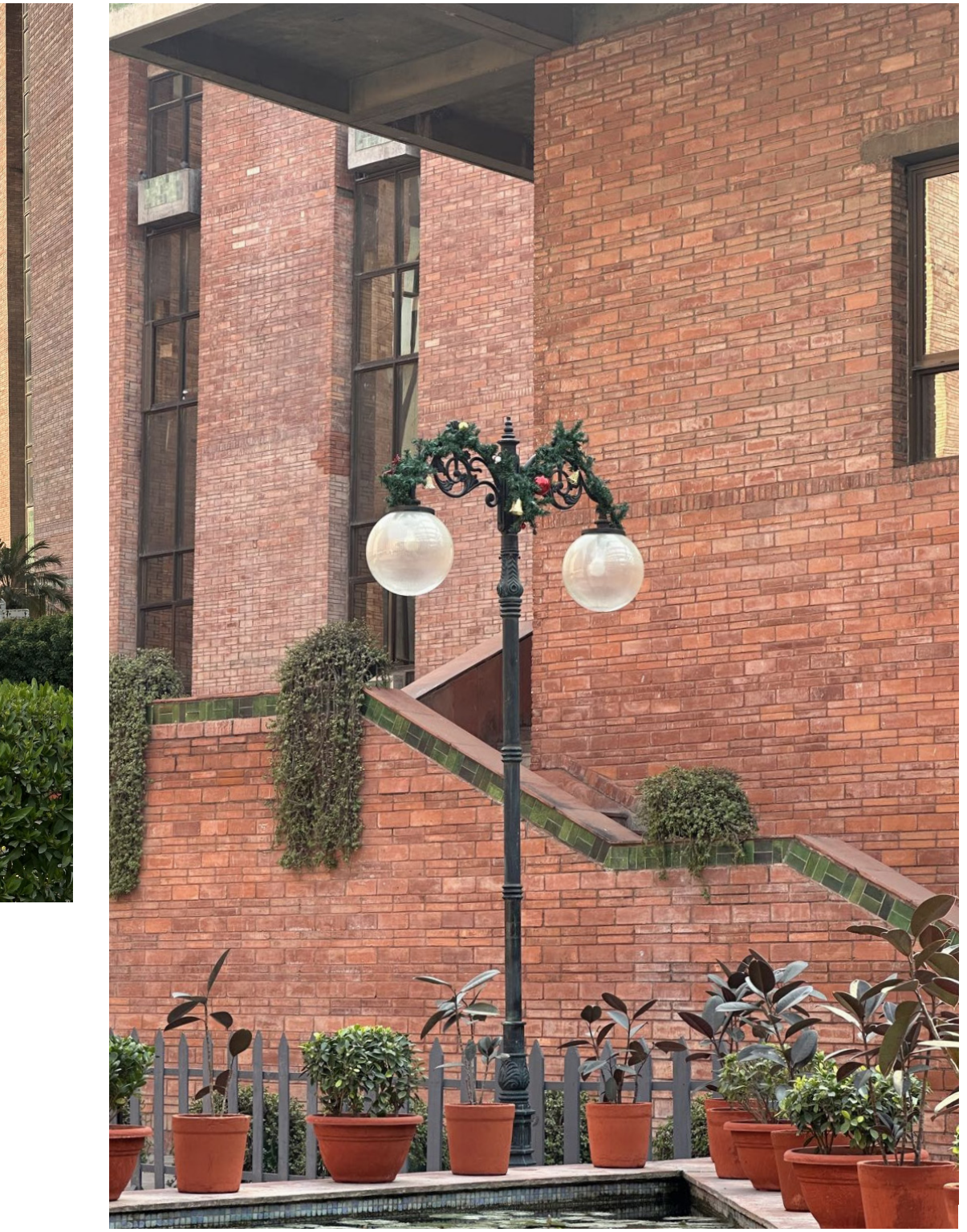


Fig. 53
Brick facade with green accent point
Photo by R. Yasar (2025)



Fig. 54
Brick facade of IIMA in Ahmedabad
Photo by R. Yasar (2025)



Fig. 55
Portal-like pathways
Photo by R. Yasar (2025)

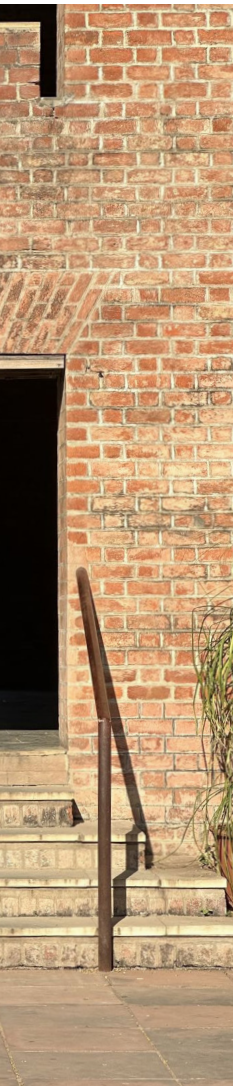




Fig. 56
Grand, round voids in facade.
Photo by R. Yasar (2025)



Fig. 57
China Mosaic tiles on the roof
photographed at Sangath, Ahmedabad
Photo by R. Yasar (2025)



Fig. 58
China Mosa
photograph
Ahmedaba
Photo by R. Y



aic tiles on the roof
ed at Amdavad ni Gufa,
d
Yasar (2025)



Fig. 59
Greenery used as passive cooling in hot climate
Photo by R. Yasar (2025)



Fig. 60
Premabhai Hall in Ahmedabad
Photo by R. Yasar (2025)



Fig. 61
Brutalist massing with pronounced staircase
Photo by R. Yasar (2025)



Fig. 62
NCDC Building in New Delhi
Photo by R. Yasar (2025)



Fig. 63
Pronounced horizontal facade openings in brutalist massing
Photo by R. Yasar (2025)



Fig. 64
Shaded panels reflecting sunlight at peak hours
Photo by R. Yasar (2025)



Fig. 65
Native greenery softening and cooling the collective courtyard environment
Photo by R. Yasar (2025)





Fig. 66
Shaded courtyards create a comfortable microclimate making outdoor habitable during summer season
Photo by R. Yasar (2025)



Fig. 67
Open central courtyard at CEPT University in Ahmedabad
Photo by R. Yasar (2025)



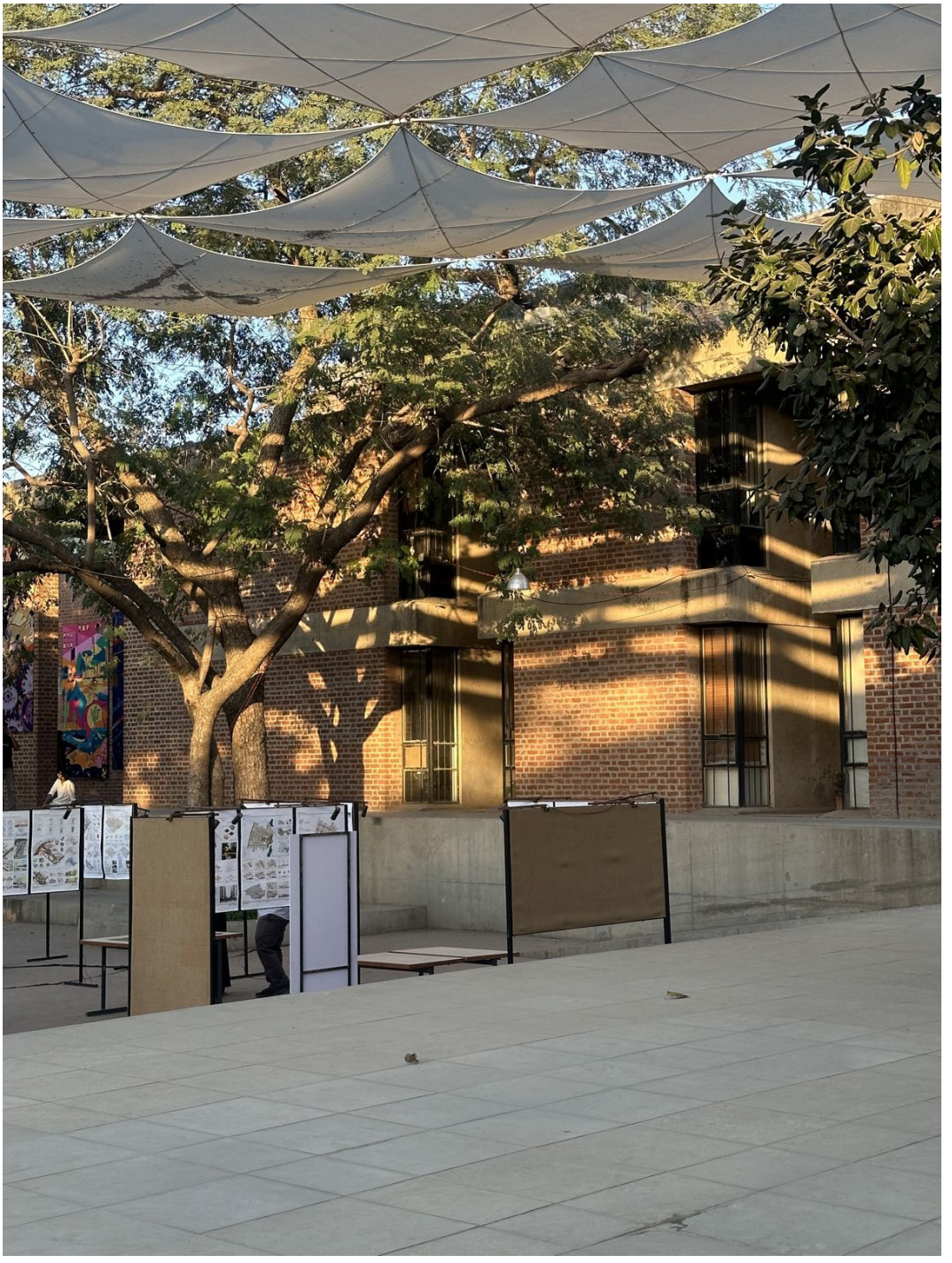


Fig. 68
Large overhead shading structure cooling and activating the central courtyard space
Photo by R. Yasar (2025)

# CASE STUDY ANALYSIS

## CHOICE OF CASES

The case study research is structured in two stages to investigate the influence of housing form on density, livability and social cohesion. The first stage will demonstrate a local comparison made between the contrasting housing models of LIC Housing by B.V Doshi, and contemporary EWS high-rise developments in Ahmedabad. LIC Housing is particularly relevant as it is a well-established low-rise housing model, located within the same socio-spatial context directly opposite the project site in Bimanagar. This project provides a valuable reference against contemporary density driven high-rise developments. The second stage consists of a broader selection of local and global reference projects, including Aranya Housing by B.V. Doshi, PREVI Housing by Charles Correa, The Dapperbuurt in Amsterdam and more. These projects cover various spatial and programmatic strategies that may be considered while defining the missing middle housing approach in Ahmedabad.





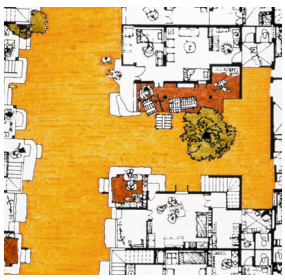












# CASE STUDY ANALYSIS I: LOCAL HOUSING EXTREMES IN AHMEDABAD

## CHARACTERISITCS LOW AND HIGH-RISE HOUSING

Housing form changes and densifies over time (Kostourou, 2021). Within this change spatial organization plays an essential role in achieving neighborhood vitality (Samanta et al., 2024). To understand this in Ahmedabad's context, a comparative analysis is conducted between the low-rise LIC Housing project by B.V Doshi and contemporary high-rise housing development for Economically Weaker Sections (EWS) conducted by Ahmedabad Municipal Corporation. This comparison, like the rest of the research is structured across neighborhood, building and unit scale.





Fig. 69
LIC Housing by B.V Doshi in Ahmedabad incrementality over time
Source: Vsf

Life Insurance Corporation of India (LIC) housing located in Bimanagar was developed in the early 1970s as an experiment in excremental housing. Despite having a relatively low density (FSI = 0.8, G+2) its neighborhood vitality is evidently high (Pandya & Moors, 2023). Field observations highlighted active streets with steady social interaction, and a strong sense of community with most residents being familiar with one another. According to one of its residents, shared spaces such as the streets and also the courtyard, are actively used by various residents throughout the day for children's play, jogging, and informal gatherings. Additionally, amenities are easily accessible contributing to a self-sufficient and socially cohesive environment.

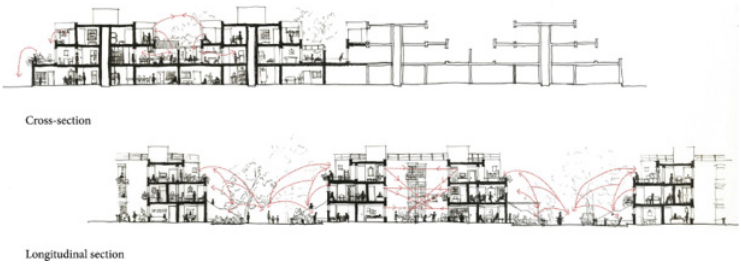



Fig. 70
LIC Housing by B.V Doshi in Ahmedabad section
Source: Stuti Pandya & Marie Moors

When analyzing two EWS (49 and 52) contemporary high-rise developments, contrasting results are found. Although these developments reach significantly higher density (EWS 49, FSI= 5.4, G+12 and EWS 52, FSI=6.4, G+14) when compared to LIC Housing, they both seem to lack in neighborhood vitality. These developments are segregated by income, typically organized as gated compounds with substantial portions of the ground level taken over by vehicular use. Pedestrian activity and potential social interaction are minimal and reduced to one underused central courtyard (Gulati, 2019).

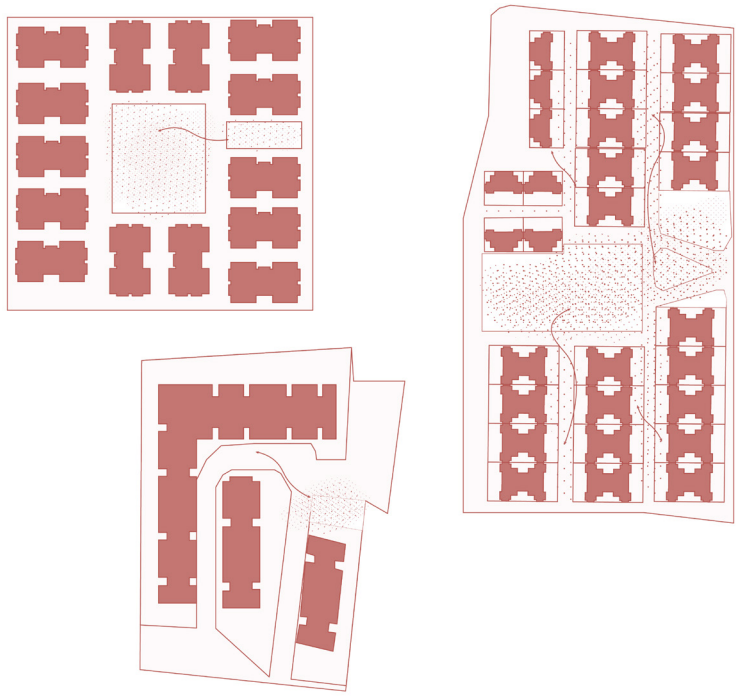


Fig. 71
Siteplan showing social and avtive spaces on low-rise, mid-rise and high-rise
Source: Author's own





Fig. 72
EWS 52 by Ahmedabad Municipal Corporation
Source: a2zproperty

Fig. 73
Incrementality seen in the facade
LIC Housing by B.V Doshi in
Ahmedabad
Photo by R. Yasar (2025)



Fig. 74
Provided services in LIC Housing
by B.V Doshi in Ahmedabad
Photo by R. Yasar (2025)



Fig. 75
Central Courtyard in LIC Housing by B.V Doshi in Ahmedabad
Photo by R. Yasar (2025)



LIC Housing is organized through clustered units with shared spaces and semi-public thresholds between dwellings. This arrangement supports a smooth transition between public and private spaces, with direct connection to the street encouraging interaction between residents at the cluster scale. In contrast, the high-rise developments heavily rely on vertical circulation systems and have repetitive floorplans following more isolated living conditions with a lack of variation and shared intermediate spaces, further limiting opportunities for spontaneous social encounters. Fieldwork observations also indicate that the repetitive floor plans do not establish a clear front or back of the building, while the

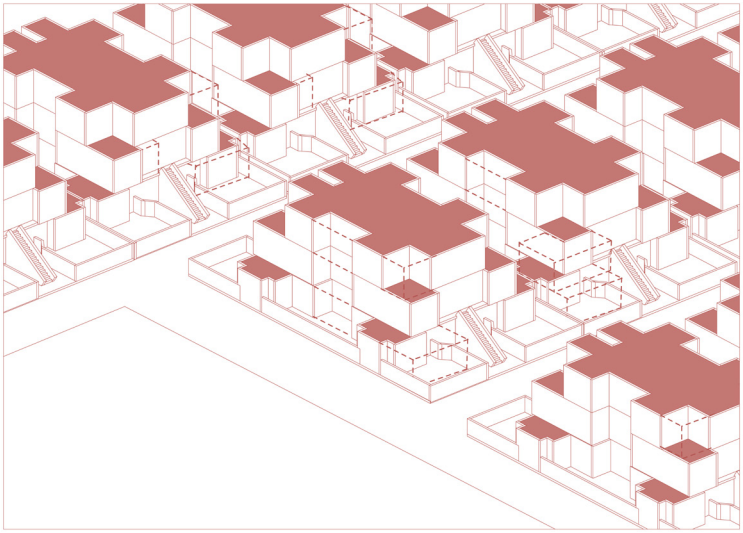


Fig. 76
Zoom in to LIC Housing by B.V Doshi in Ahmedabad

G+2
FSI 0.8
Source: Author's own

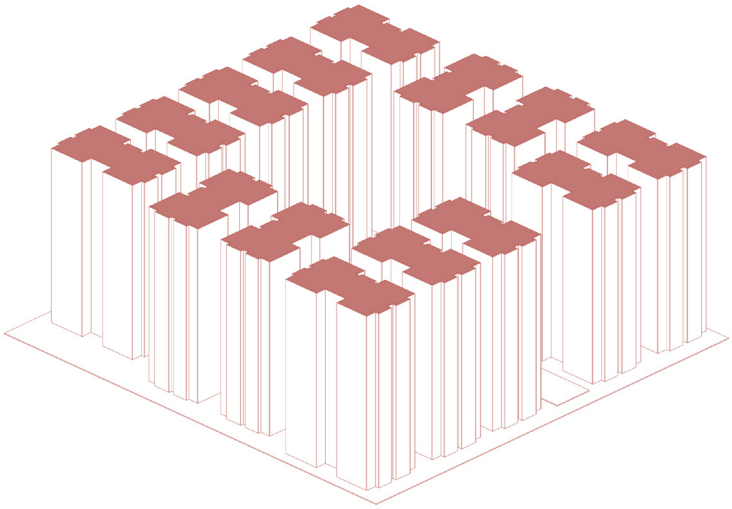


Fig. 77
EWS 52 by Ahmedabad Municipal Corporation
Source: Author's own

Fig. 78
LIC Housing by B.V Doshi in Ahmedabad
Photo by R. Yasar (2025)



dominance of vehicular activity at ground level creates unclear orientation and a lack of distinct entrances to the building.

When it comes to units LIC Housing allows its residents to adapt and modify their dwelling as it is designed to accommodate incremental growth. This flexibility where every level has setbacks enables residents to personalize their homes which creates this sense of ownership and belonging of the space (Safarkhani, 2025). In contrast, units in contemporary high- rise developments are standard units repeated on every floor throughout all buildings offering little to no flexibility nor room for

incremental change, restricting residents' ability to shape their own living environment. Residents are positioned as mere (sometimes temporary) occupants of a rigid structure rather than active participants in a living habitat.

This comparison highlights that while high-rise developments achieve better numerical density, they often do so at the expense of spatial quality and social interaction. LIC Housing is one of many low-rise housing examples in Ahmedabad that supports strong neighborhood vitality with flexible design and active communal spaces. These findings highlight the critical role spatial organization plays across scales aside from density in shaping livable and socially active housing environments.



Fig. 79
EWS 49 by Ahmedabad Municipal Corporation
Source: Google Street View

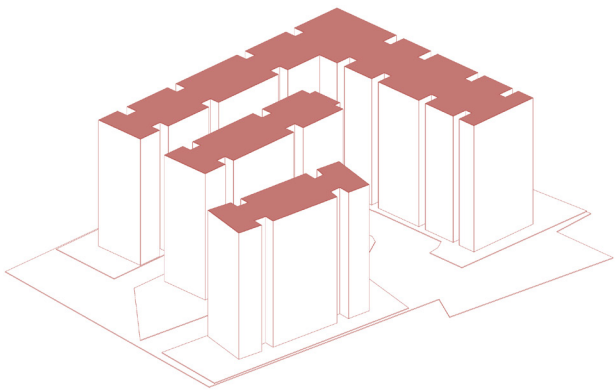


Fig. 80
EWS 49 by Ahmedabad Municipal Corporation
Source: Author's own

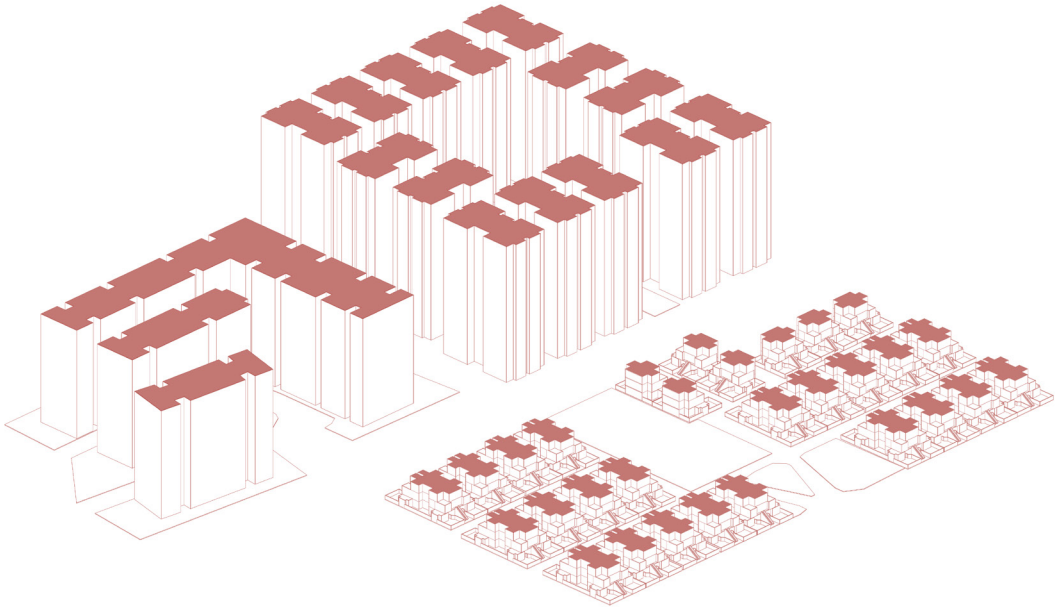


Fig. 81
Comparison low-rise, mid-rise and high-rise in Ahmedabad
Source: Author's own



Fig. 82
LIC Housing by B.V Doshi in Ahmedabad
Photo by R. Yasar (2025)

## CASE STUDY ANALYSIS II: SPATIAL AND PROGRAMMATIC LESSONS FROM OTHER NOTABLE PROJECTS

### LIVABLE, SOCIALLY, ECONOMICALLY ACTIVE COMMUNITIES

Over the years studies on the housing sector revealed several issues regarding quality of housing design related to unit size, the absence of passive approaches, and the lack of traditional knowledge systems (Agarwal et al., 2023). Recent research emphasizes the influence of cultural and community space on social interaction and the overall improvement of social well-being (Adriaanse, 2007; Layseca, 2023). Low-rise housing refers to residential structures that are typically no more than five stories high (Tyagi et al., 2024). Spatial and programmatic qualities are not fixed as they strongly depend on context. However, to better understand which qualities contribute to livable and socially active environments, a selection of successful low-rise housing projects are examined within this research. The identified qualities will be compared and summarized in a comparative framework towards the end.

LIC Housing by B.V Doshi as described in the section above provides a good example on incremental design and active streets. A similar approach to stepped or terraced housing can be seen in the Terrassenhaussiedlung in Graz-St. Peter, which is a community oriented urban development including customizable apartments surrounded by green spaces designed by the Werkgruppe Graz. The complex is further enhanced with numerous shared amenities such as playgrounds, a communication level, a parking garage and thoughtfully designed traffic system that creates car-free pedestrian zones offering spaces for interaction and relaxation (Novak, 2026).



Fig. 83
Incremental change over time seen in LIC Housing
Photo by Iwan Baan (2022)



Fig. 84
Die Terrassenhaussiedlung in Graz-St. Peter Terraces ca. 1980
Source: stadt-landschaft

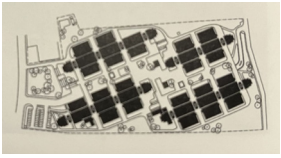


Fig. 85
Die Terrassenhaussiedlung in Graz-St. Peter siteplan
Source: 3hefecit

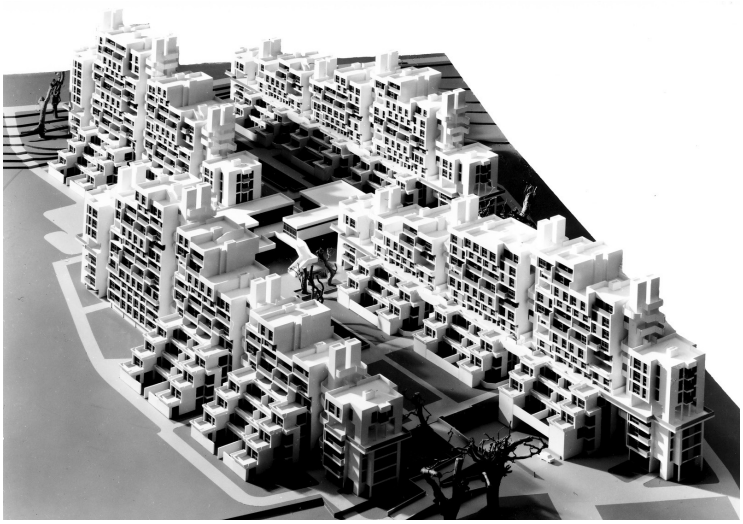


Fig. 86
Die Terrassenhaussiedlung in Graz-St. Peter model (1972)
Source: Werkgruppe Graz

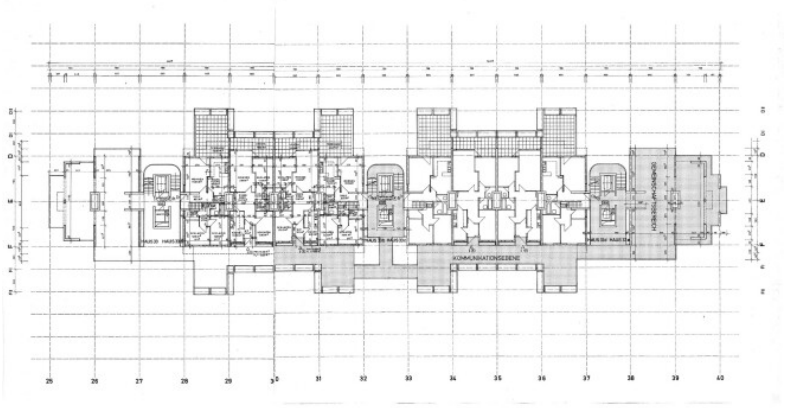


Fig.87
Die Terrassenhaussiedlung in Graz-St. Peter Floorplan
Source: zv-architekten



Fig. 88
Die Terrassenhaussiedlung in Graz-St. Peter Unit
Source: stadt-landschaft

Similarly, Previ housing by Charles Correa consist of two types of independent dwellings placed side by side, these dwelling create an axis separating the driveways and vehicular streets from the pedestrian streets, with each residence having dual access to both sides. The layout of the floorplans along the pedestrian streets are designated for guests, emphasizing the project's sense of community. The streets are oriented in the direction of the wind for cooling. Additionally, the streets are placed perpendicular to a service axis as the center point of the site (Silenzi, 2009).

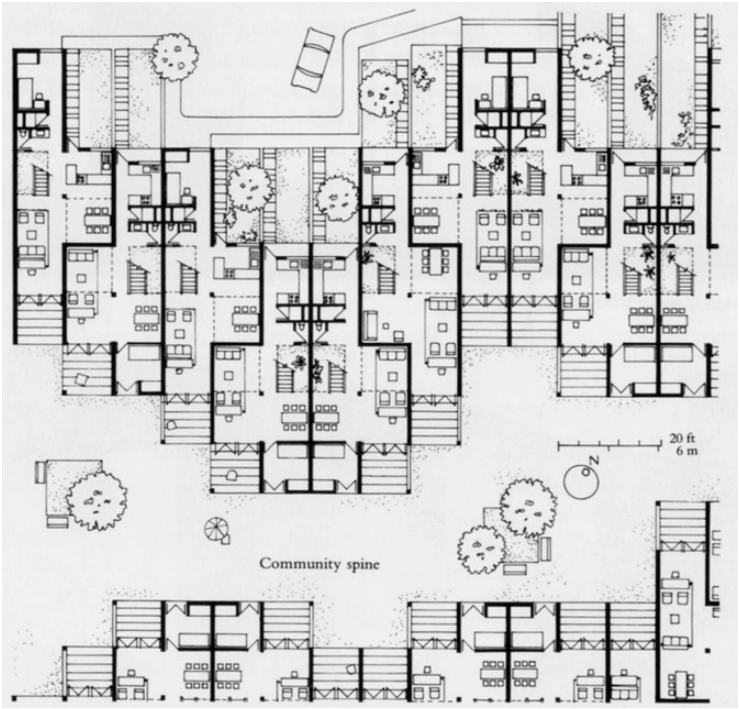





Fig. 89
Correa Previs Housing
Lima, Peru
by Charles Correa
Source : architectuul



Fig. 90
Correa Previs Housing
Lima, Peru
by Charles Correa
Source : architectuul

Fig. 91
Correa Previs Housing
Lima, Peru
by Charles Correa
Source : architectuul

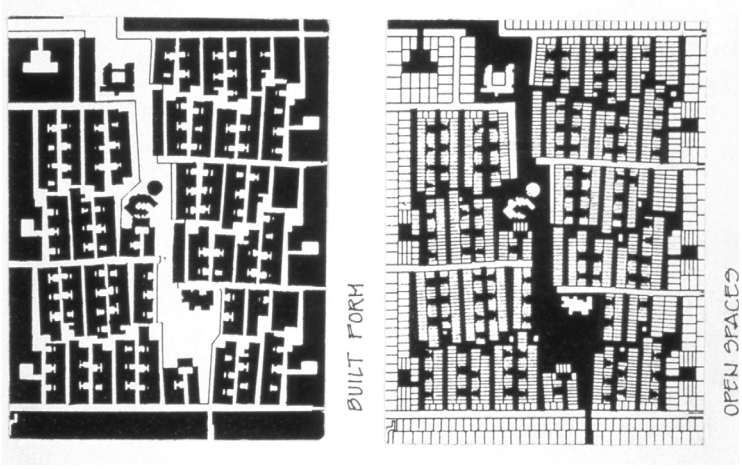


Fig. 92
Minimum Cost Housing Group and Vastushilpa Foundation. Figure-ground plan, Aranya Low Cost Housing, Indore, India, 1990.
Source: cca

These characteristics, resulting in a dynamic and active public realm, can also be found in Aranya Housing by B.V Doshi, where cluster of housing form narrow and active streets with integrated mixed-use functions (Hidden Architecture, 2023).



Fig. 93, 94
Aranya Low Cost Housing elevation, built form and open spaces siteplan, Indore, India, 1990.
Source: cca



Another project where we see this urban distribution is The Dapperbuurt neighborhood in Amsterdam which has a clear main axis containing shops and other amenities leading to a multi purpose public square that support daily life and local economy, while residential streets branch off into quieter zones. This hierarchy allows for both activity and privacy within the same neighborhood.



Fig. 95
Siteplan The Dapperbuurt
Amsterdam, The Netherlands
Source: Rogier Schravendeel



Fig. 96
Aerial Photograph of the
Dapperbuurt showing the
Central square and main axis
accomodating the daily market
Source: Beeldbank Amsterdam

Other projects like Spangen Quarter Housing in Rotterdam explore social interaction not merely on street level but also upper levels, creating community oriented spaces in form of gallery circulation (Hidden Architecture, 2023).

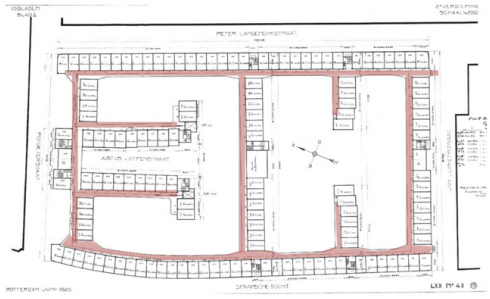


Fig. 97
Layout Plan third floor by Michiel
Brinkman with communal spaces
can be lifted to upper levels,
extending shared life beyond the
ground.
Source: Michiel Brinkman



Fig. 98
Spangen Quarter Housing Photo
by Hidden Architecture

To conclude, the diverse selection of case studies mentioned above introduce several qualities such as, the use of courtyards and shared spaces, the integration of amenities, the spatial hierarchy of neighborhoods, climatic responsiveness, and incrementality. These spatial and programmatic strategies demonstrate that livability and social activity are results of well organized housing on unit, building and neighborhood scale.

# COMPARATIVE FRAMEWORK

## COMPARATIVE ANALYSIS ACROSS NEIGHBORHOOD, CLUSTER, AND UNIT SCALE

This chapter compares the selected case studies across neighborhood, cluster, and unit scale in order to provide an overview of the spatial, social, and climatic qualities relevant to the research. The comparative framework is used to understand how the case studies deal with density, and livability, linking the findings to the final design proposal.

















# LIC HOUSING, AHMEDABAD, INDIA

active street life and social interaction
incremental horizontal growth
orthogonal street layout

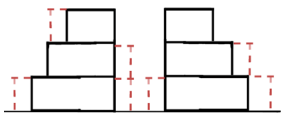
FSI: ± 0.75
GSI: ± 0.50
G+2



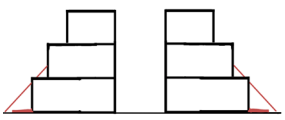
## UNIT



Middle-class households target group

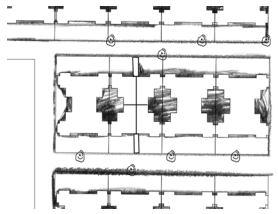


Possibilities for horizontal incremental change

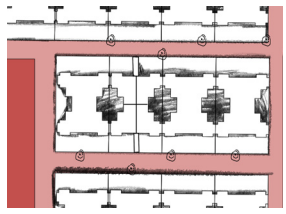


Recessed entrances and semi-private edges

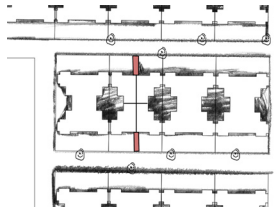
## CLUSTER



Staggered cluster based housing

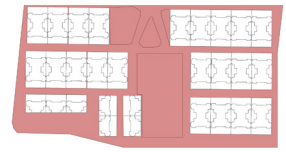


Large communal courtyard connected through narrow streets

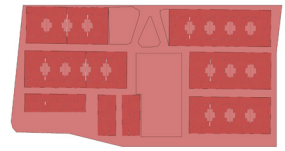


Housing units accessed through small shared staircases

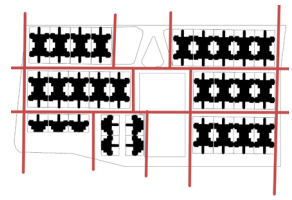
## NEIGHBORHOOD



Social cohesion present throughout the neighborhood, strongest along the courtyard and entrance



Internal communal streets and courtyard surrounding private units



Orthogonal street layout



## PREVI HOUSING, LIMA, PERU

FSI: ± 0.68

GSI: ± 0.35

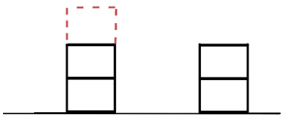
G+1

interlocking housing clusters maximizing density and shared space
communal spine supporting collective life and neighborhood interaction
hierarchy

### UNIT



Mixed target group, low - middle income

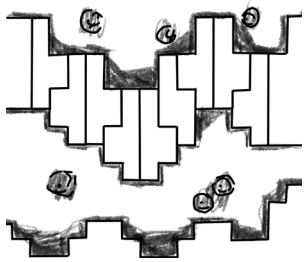


Possibilities for vertical incremental change

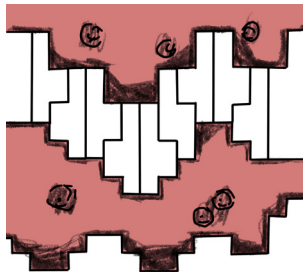


Thresholds between public and private space

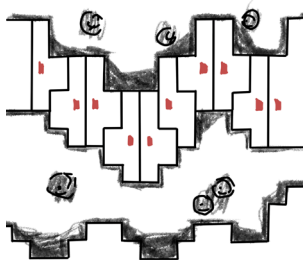
### CLUSTER



Interlocking clusters shaping the streets

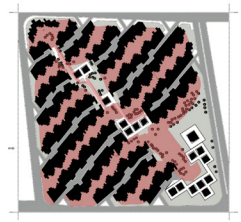


Shared comminity spine

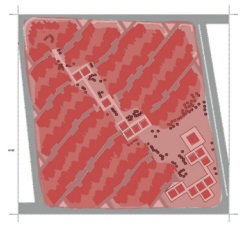


The units are accessed on ground level but each have their own staircase inside the unit

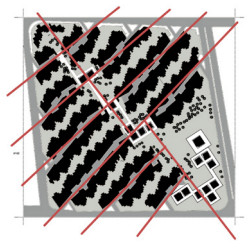
### NEIGHBORHOOD



Social interaction supported through community spine created by the interlocking clusters



Gradual transition between public and private space



Cluster-based dense low-rise morphology

# EWS-52, AHMEDABAD, INDIA

mixed-use central streets supporting daily life and local economy

FSI: ± 6.4

GSI: ± 0.44

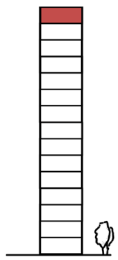
G+14



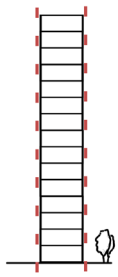
## UNIT



Economically Weaker Section

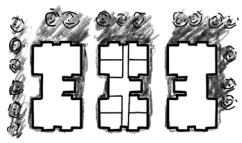


No possibilities for incremental change

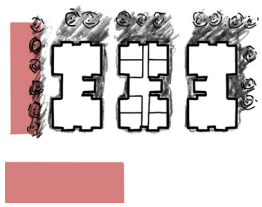


Abrupt transition from public to private space

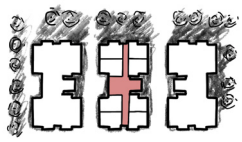
## CLUSTER



Cluster of 8 identicall units

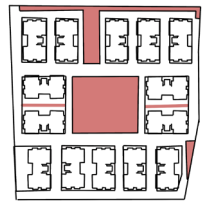


Leftover open space surrounding tower blocks

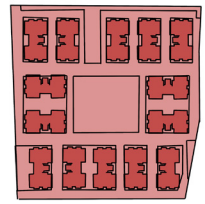


The units are accessed through shared stair cores.

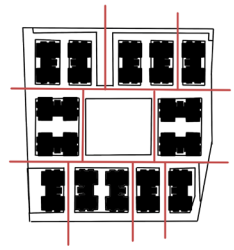
## NEIGHBORHOOD



Weak relationship between residents and public space



Gated compounds, limited communal space



Repetitive high-rise tower morphology



## EWS-49, AHMEDABAD, INDIA

FSI: ± 5.4

GSI: ± 0.23

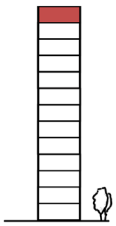
G+12

spatial organization through clusters, courtyards, thresholds, and active streets can support both density and strong collective

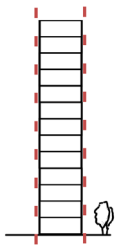
### UNIT



Economically Weaker Section

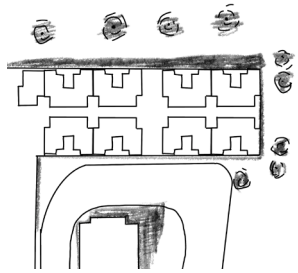


No possibilities for incremental change

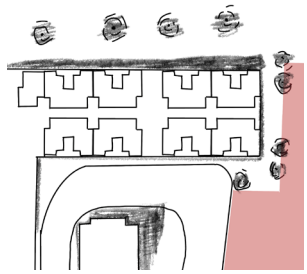


Abrupt transition from public to private space

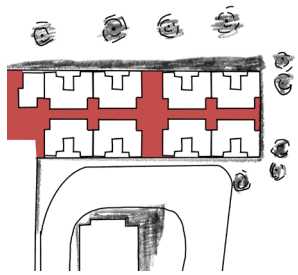
### CLUSTER



Cluster of 8 identicall units

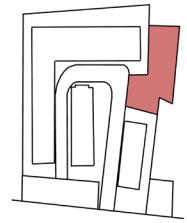


Minimal communal space limited to leftover green areas

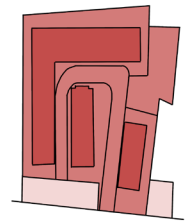


The unit are accessed through stair cases on the ground floor.

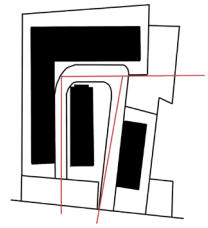
### NEIGHBORHOOD



Weak relationship between residents and public space



Gated compounds, limited communal space



Repetitive high-rise tower morphology

# SPANGEN QUARTER HOUSING, ROTTERDAM, THE NETHERLANDS

elevated gallery street
supporting social cohesion

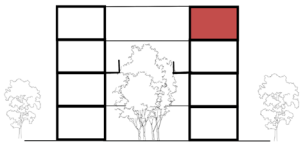
FSI: ± 0.78
GSI: ± 0.35
G+3



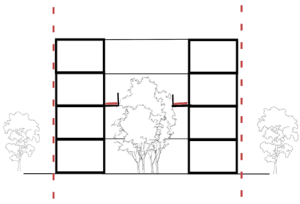
## UNIT



Young couples and nuclear families target group

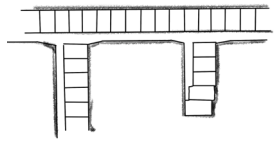


Limited possibilities for incremental change

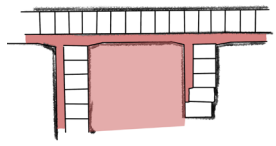


Shared galleries supporting social interaction

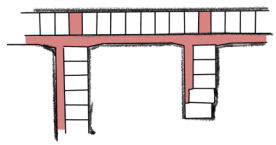
## CLUSTER



Pre-war perimeter block housing with elevated gallery circulation

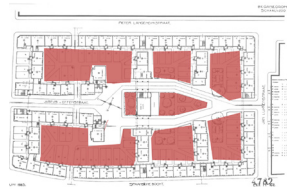


Large communal inner courtyard and elevated gallery streets extending collective life vertically

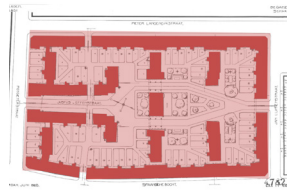


The apartments are accessed through shared stair cores and elevated gallery

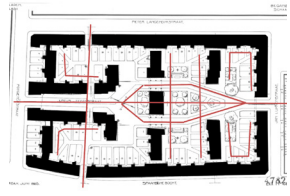
## NEIGHBORHOOD



Social cohesion present throughout the neighborhood, strongest along the courtyard and elevated gallery street



Clear private, communal, public hierarchy



Semi enclosed housing block with communal courtyards



## TERRASSENHAUSSIEDLUNG, GRAZ, AUSTRIA

FSI: ± 2.2

GSI: ± 0.45

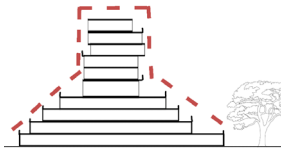
G+3/7

elevated communal spaces,
terraced mid-rise

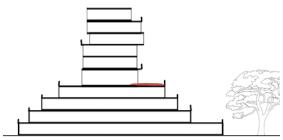
### UNIT



Mixed target group, building for the community



No possibilities for horizantal and vertical incremental change

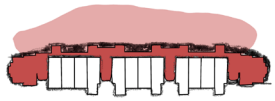


Private terraces connected to collective circulation

### CLUSTER



Cluster of teracced units and mid-rise apartments



Communal courtyard, shared terraces and elevated communal spaces

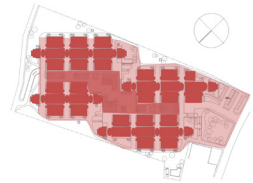


Collective circulation integrated into terraced structure

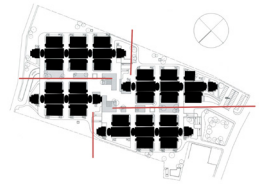
### NEIGHBORHOOD



Social interaction supported through courtyard and elevated communal spaces



Strong hierarchy through terraces and shared circulation



Terraced mid-rise housing morphology

# THE DAPPERBUURT, AMSTERDAM, THE NETHERLANDS

mixed-use central streets supporting daily life and local economy

FSI: ± 2.5

GSI: ± 0.50

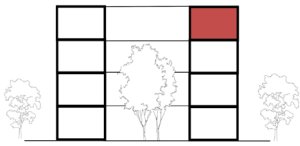
G+3/4



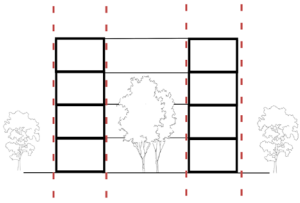
## UNIT



Mixed target group

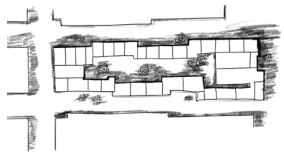


Limited possibilities for incremental change

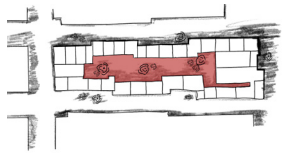


Lack of layered thresholds between public and private space

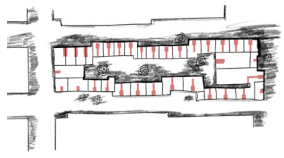
## CLUSTER



Pre-war perimeter block housing in Amsterdam

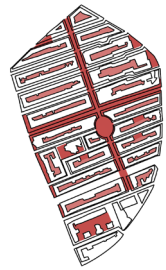


Communal courtyard space

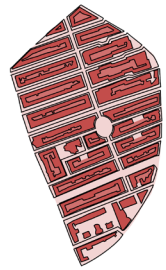


The apartments are accessed through shared stair cores.

## NEIGHBORHOOD



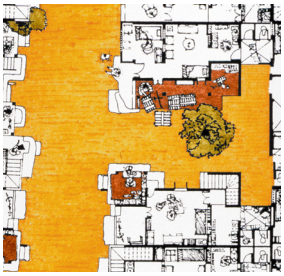
Social cohesion present throughout the neighborhood, strongest along the two mixed-use main streets



Clear private, communal, public hierarchy



Dense pre-war perimeter block morphology



## ARANYA LOW COST HOUSING, INDORE, INDIA

FSI: ± 1.2

GSI: ± 0.45

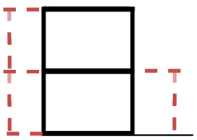
G+1/2

spatial organization through clusters, courtyards, thresholds, and active streets can support both density and strong collective

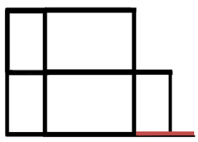
### UNIT



Mixed target group

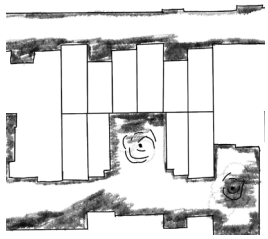


Many possibilities for horizantal and vertical incremental change



Thresholds between public and private space

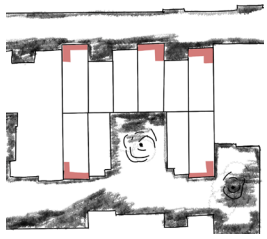
### CLUSTER



Cluster of 6 and 4 units with a small shared open space

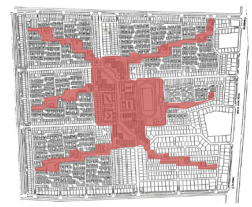


Communal courtyard space created by cluster



The apartments are accessed through stair cases on the ground floor.

### NEIGHBORHOOD



Social interaction supported through clustered housing and shared streets



Gradual transition between public and private space through streets and courtyards



Cluster-based dense low-rise morphology

# MATERIAL AND CONTEXTUAL STUDY:

## HOUSING AND COMMON MATERIALS IN AHMEDABAD

Before and after the fieldwork period in Ahmedabad, an additional collective research document was produced by the students of TU Delfts 2025-2026 Global Housing Studio, The book is a compilation of several housing case studies across Ahmedabad, examining architectures reaction to climatic design, materiality, privacy, incrementality and everyday life on neighborhood, cluster and unit scale.

The following page provides a brief glimpse into selected spreads from the booklet related to brick within Ahmedabad. Further information and additional case studies can be found within the complete research document.

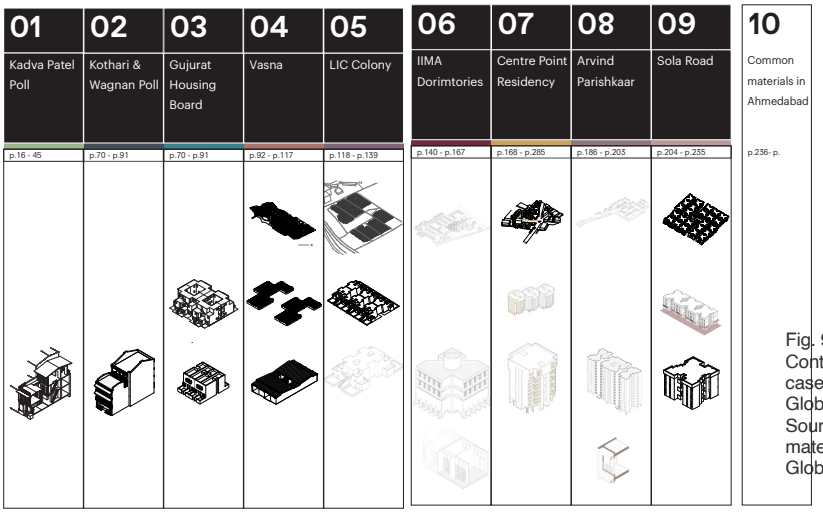



Fig. 99
Content page with the analysed casestudies by the students of Global Housing studio 2025-2026
Source: Housing and common materials in Ahmedabad by Global Housing studio 25/26

Fig. 100
Window details from Gujarat Housing Board 3 project
Source: Housing and common materials in Ahmedabad by Global Housing studio 25/26

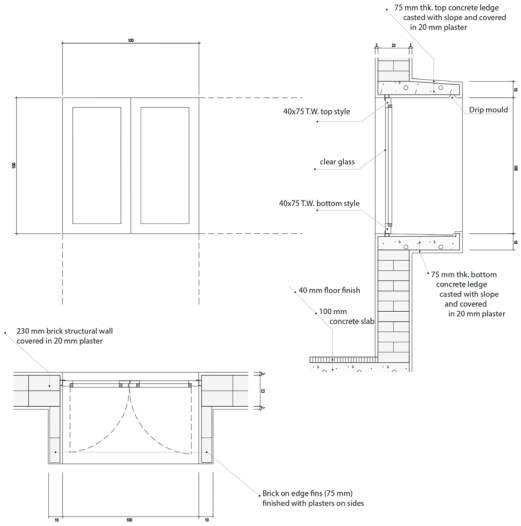



Fig. 101
Masonry wall composition in Gujarat Housing Board 3 project
Source: Housing and common materials in Ahmedabad by Global Housing studio 25/26

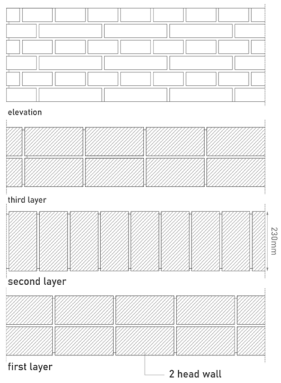
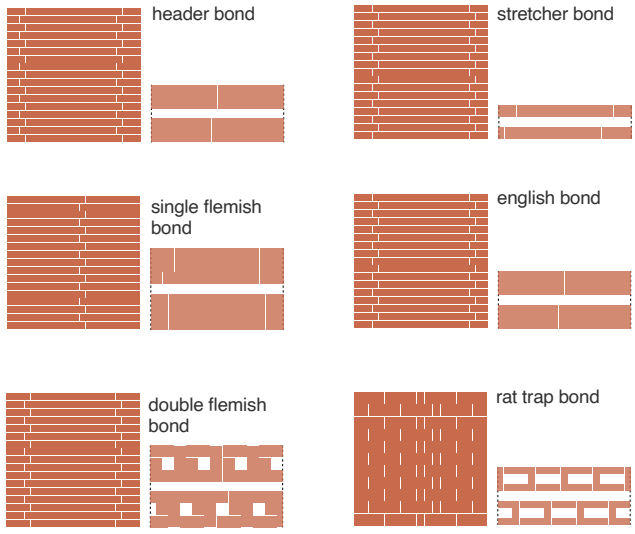



Fig. 102
Different types of bick bonds
Source: Housing and common materials in Ahmedabad by Global Housing studio 25/26







# BIMANAGAR

## SITE ANALYSIS , WORKSHOP AT CEPT UNIVERSITY, DENSITY STUDIES

The selected site is located in Bimanagar, situated in the western part of Ahmedabad. The project focusses on a Life Insurance Corporation (LIC) owned vacant plot of 28.753 m2 total site area with a base FSI Zone R1 of 1.8 and a maximum permissible FSI of 2.7.

The relevance of this site within the search area lies in its immediate context. The surrounding area of Bimanagar is mostly traditional residential- low rise housing, where the importance of communal spaces is found in the urban fabric. LIC Housing by B.V. Doshi is one of the key examples. Simultaneously, the area is undergoing significant transformation, with many redevelopment projects of G+13 emerging. As a result, there are many abandoned buildings. Additionally, many residential developments are gated. This limits the interaction between different communities and reinforces a sense of spatial disconnection. Bimanagar looks like gated pockets where the streets are very inactive.

In terms of amenities, the area includes a limited number of commercial and medical facilities but remains residential in character. Basic facilities like a dentists and hospitals are present, however there is a lot of potential to introduce a wider range of additional amenities which will make the area more pleasant for all residents, as it will enhance livability, and activate the streets and the neighborhood. By incorporating spaces for learning, social interaction, health, and everyday activities, the project aims to create an environment that supports community life, safety, and interaction across different target and age groups.



Fig. 103
Aerial Image Bimanagar
Source: Apple Maps

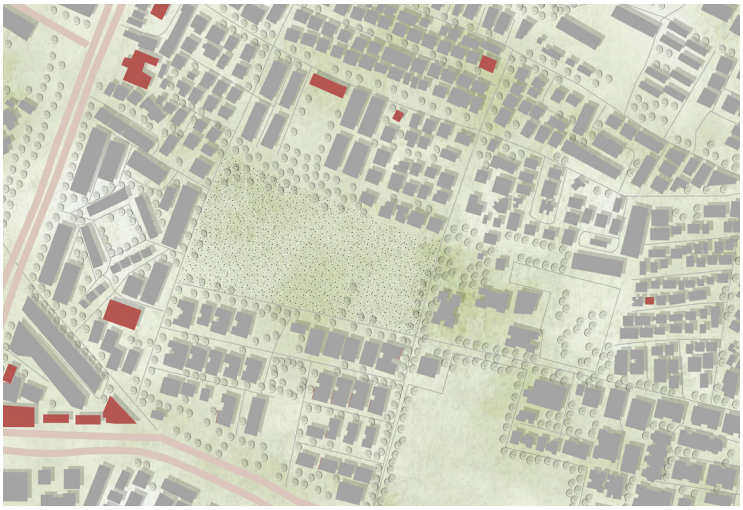


Fig. 104
Bimanagar is a predominantly residential neighborhood with a limited number of shops and amenities, including a kindergarten, pharmacy, hospital, commercial strip, shopping centre, and temple
Source: Author's own



Fig. 105
Bimanagar consists of inactive streets as almost all developments are gated, aside from that there is a busy road nearby that is not pedestrian friendly
Source: Author's own



Fig. 106
In terms of building height, Bimanagar consists primarily of older low-rise developments such as bungalows and G+2 residential buildings. However, the area is currently undergoing redevelopment, with new housing projects ranging from G+9 to G+13
Source: Author's own








BEDROOM -2
10'-0" X 8'-0"
BATH
4'-0" X 3'-9"
WC
4'-0" X 3'-0"
BEDROOM -1
9'-0" X 10'-0"
LIVING / KITCHEN
17'-3" X 9'-3"
WASH AREA
4'-3" X 4'-0"
TYPE - 1




TV
FOOD
SKY
CLOTH
STORE
CLOTH
SHOOSE
STORE
CLOTH
CLOTH
0 7575 00 4000















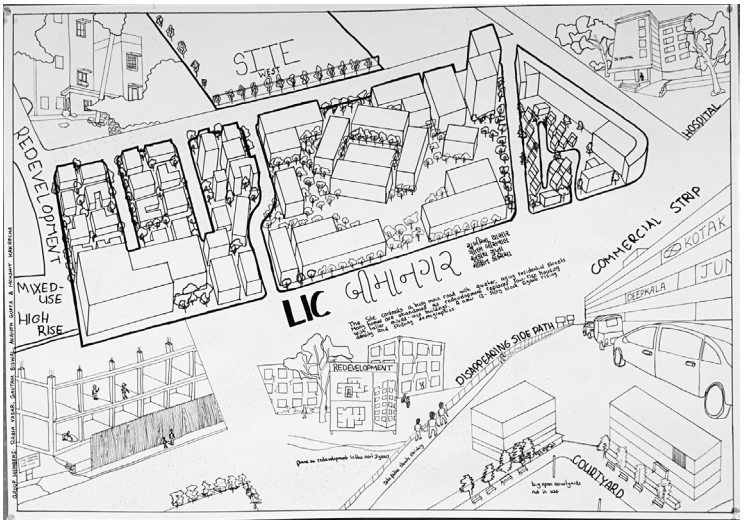
## WORKSHOP CEPT UNIVERSITY, AHMEDABAD

During the field trip, the Faculty of Architecture at CEPT University organized workshops focused on “Reading the City” and “Writing the Site.” During the first part of the ten-day workshop, TU Delft students and CEPT students collaboratively conducted a contextual analysis of Bimanagar. After visiting the site, speaking with residents, making sketches, and observing everyday life, part of the Bimanagar neighborhood was visualized in the form of a poster.

Another assignment focused on model-making and density studies, exploring how an FSI of 2 could be achieved through low-rise, mid-rise, and high-rise housing configurations.

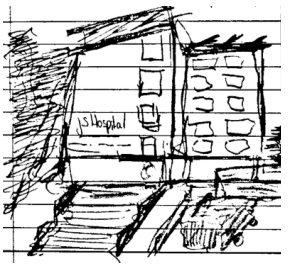
The second part of the workshop focused on “Writing the Site,” exploring the daily life of both human and non-human actors and their relationship with the city, the street, the house, the community, and communal ground, inspired by Charles Correa’s well-known section drawing ‘Hierarchy of Spaces’.

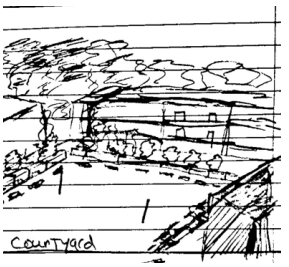
Fig. 107
Bimanagar site analysis poster made during the workshop in Ahmedabad.
Source: Author’s own in collaboration with CEPT Students

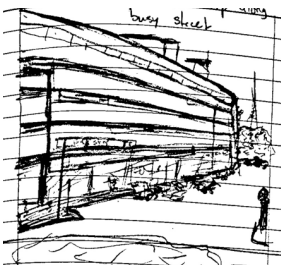








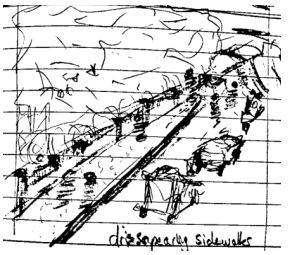




Fig. 108
Bimanagar site analysis sketches
Source: Author’s own

Fig. 109
A day in the life of a young adult renting in LIC, Bimanagar site poster made during the workshop in Ahmedabad.
Source: Author's own in collaboration with CEPT Students

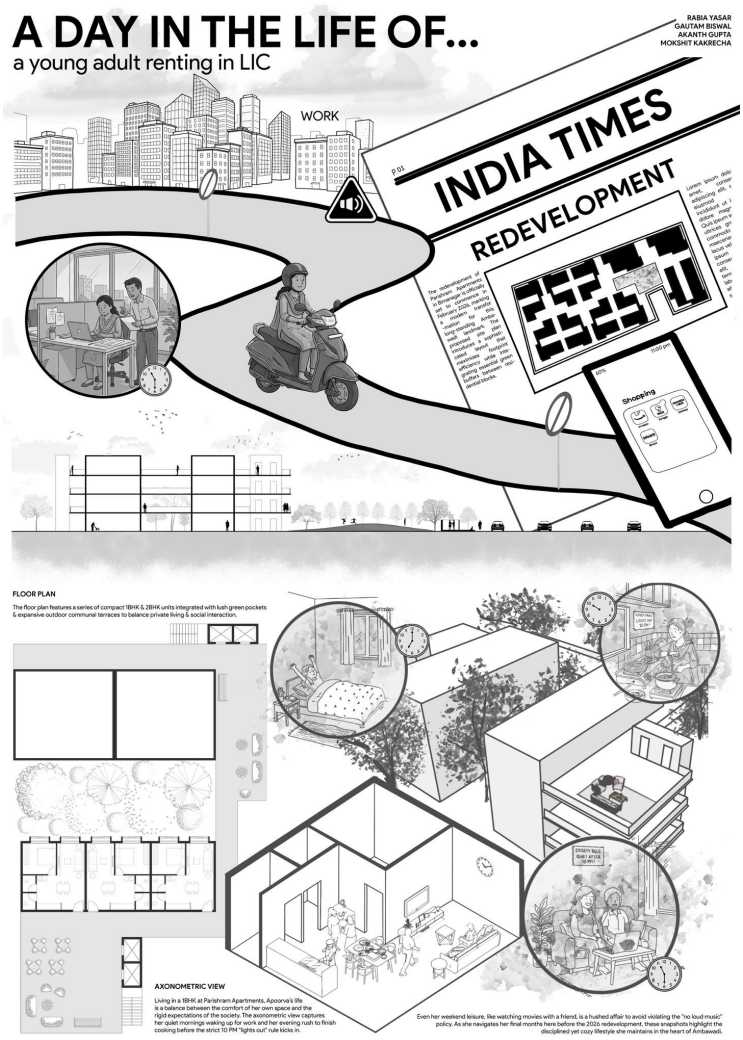
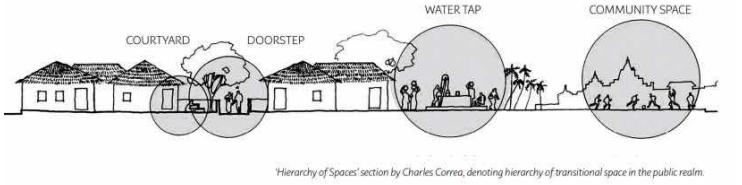
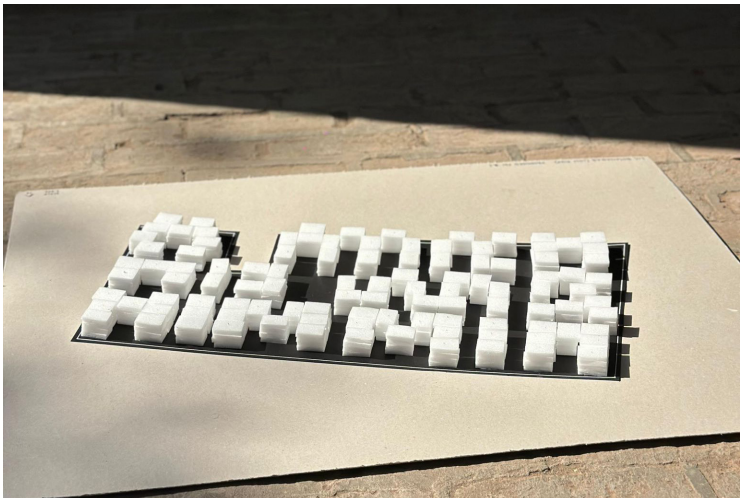



Fig. 110
Section 'Hierarchy of Spaces' by Charles Correa.
Source: charlescorreafoundation





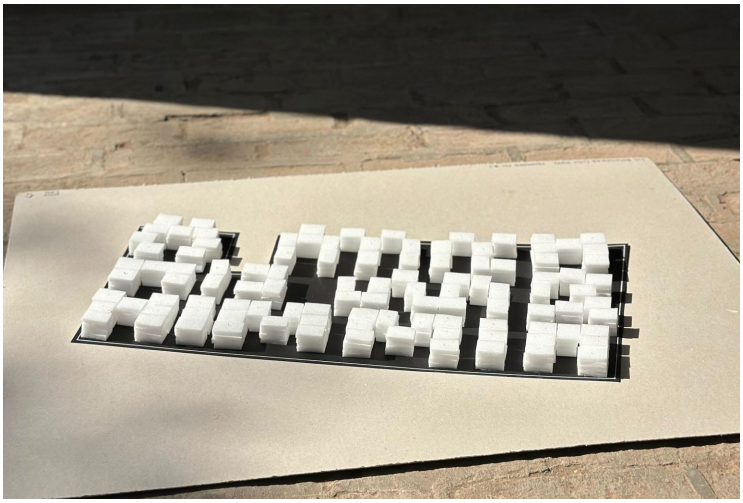




Fig. 111
Model making density study excersice in Ahmedabad. Placing LIC Housing on the Plot and achieving FSI 2 with low-rise, mid-rise and high-rise. Low-rise challenged the creation of meaningful open spaces. While mid-rise and high-rise this was easily achieved.
Source: Author's own in collaboration with CEPT and TU Delft students

Fig. 112
Low-rise on plot
*G to G+2*
Outlines of various FSIs on the plot showing required horizontal expansion needed to achieve said FSI. Comparing extremes show big contrast in available open land use.
Source: Author's own



LIC Housing FSI 0.8



Calico Mills FSI 2

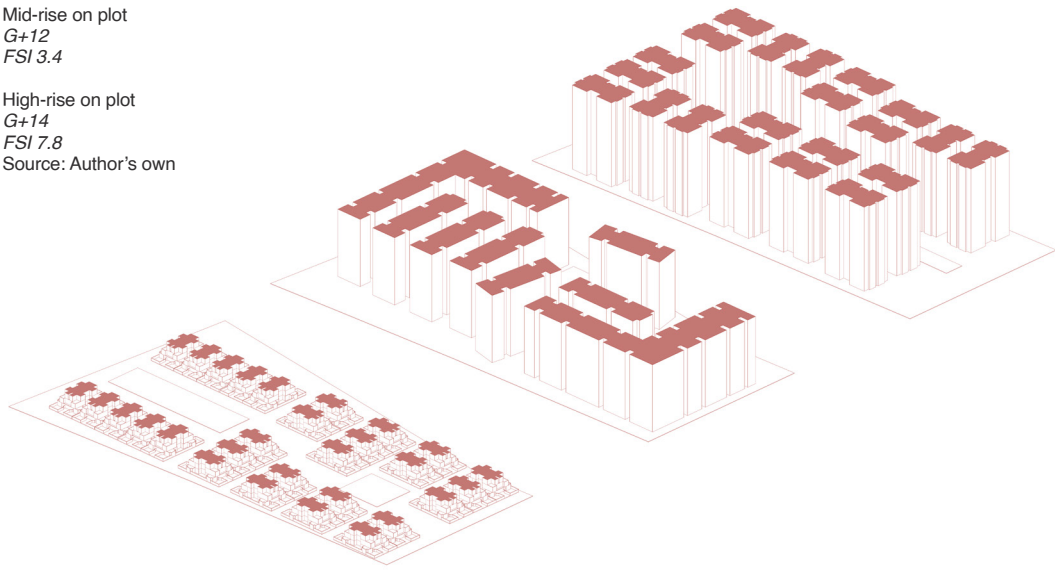


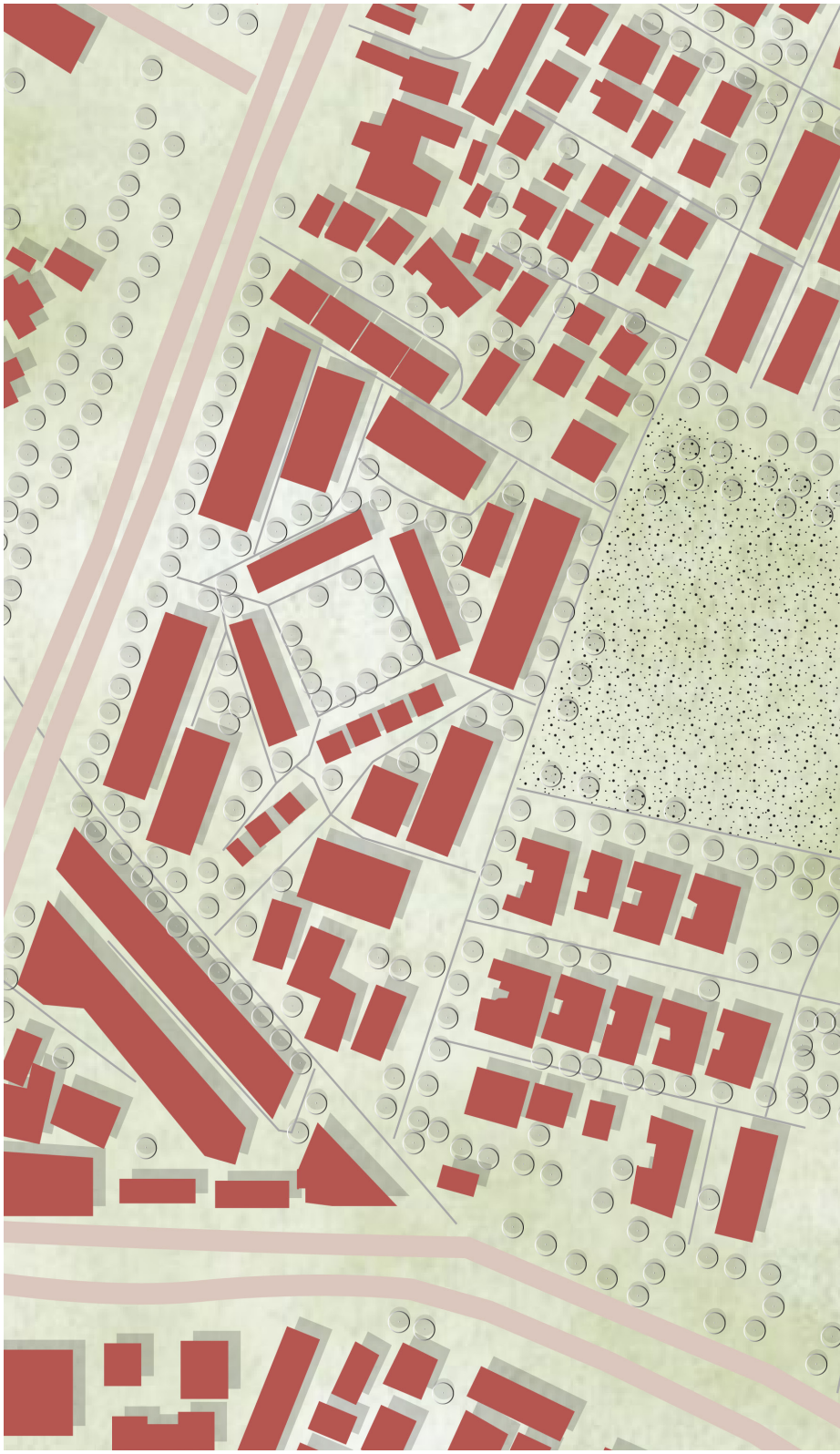
Sharpur FSI 2.5

Fig. 113
Low-rise on plot
*G+2*
*FSI 1.3*

Mid-rise on plot
*G+12*
*FSI 3.4*

High-rise on plot
*G+14*
*FSI 7.8*
Source: Author's own





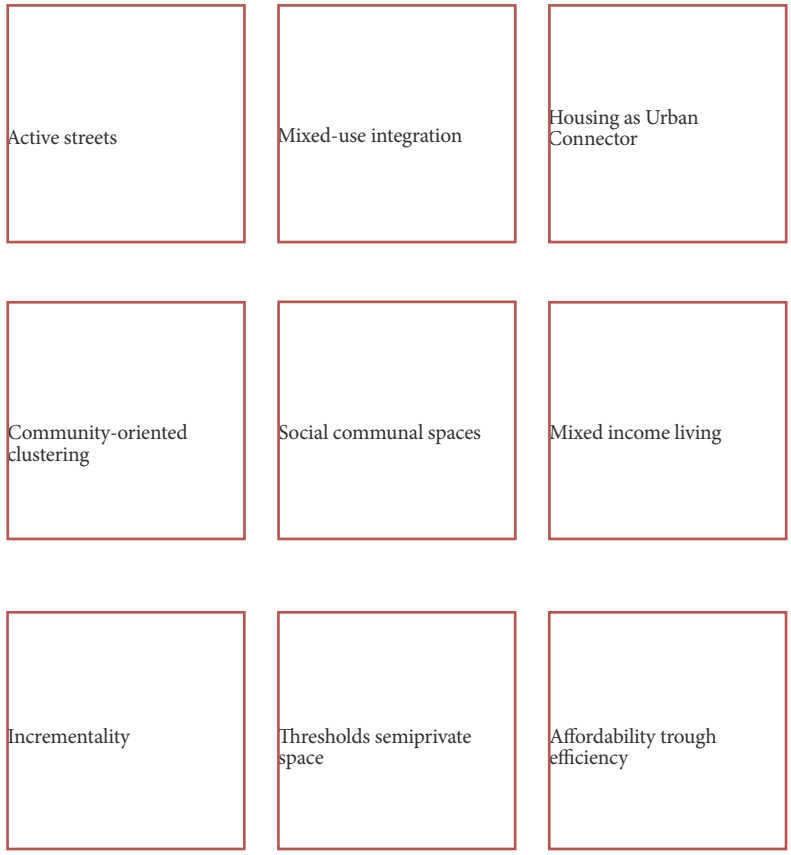


# DESIGN

## MID-RISE HOUSING

DESIGNING DENSE HABITAT

Applying spatial and programmatic strategies demonstrate how livability and social activity emerge from well-organized housing across the neighborhood, the cluster, and unit scale. Once again it highlights the complexity of designing dwellings that are not merely housing, but function as a habitat, as it incorporates multiple layers and scales simultaneously. Just like the design cirteria subtracted from the analyses for the design. Additionally, this project is highly site-specific, as different contexts will demand different responses to what constitutes housing as habitat. In the case of Bimanagar, the following spatial structure has been applied when designing the missing middle as mid-rise, high-density housing.




Design principles

## NEIGHBORHOOD SCALE

### URBAN DENSITY AND PUBLIC LIFE

At the neighborhood scale, the layout is orientated towards the sun, with buildings facing east and west to create a more comfortable microclimate. In contrast to the gated communities currently dominating Bimanagar, the proposed streets are open and accessible to the public. A main axis runs through the entire plot, acting as a central attractor integrating shops and amenities within the neighborhood. This axis is relevant for both residents and the surrounding communities and leads to a central courtyard, which functions as a multifunctional space accommodating festivals, rituals, weddings, and other everyday activities, supporting a diverse range of users and age groups. Another attractor includes a shaded green park which improves usability in the local climate. With this structure traditional low-rise qualities at neighborhood scale are applied while accessibility and openness are preserved establishing active streets.



Masterplan
1:2000

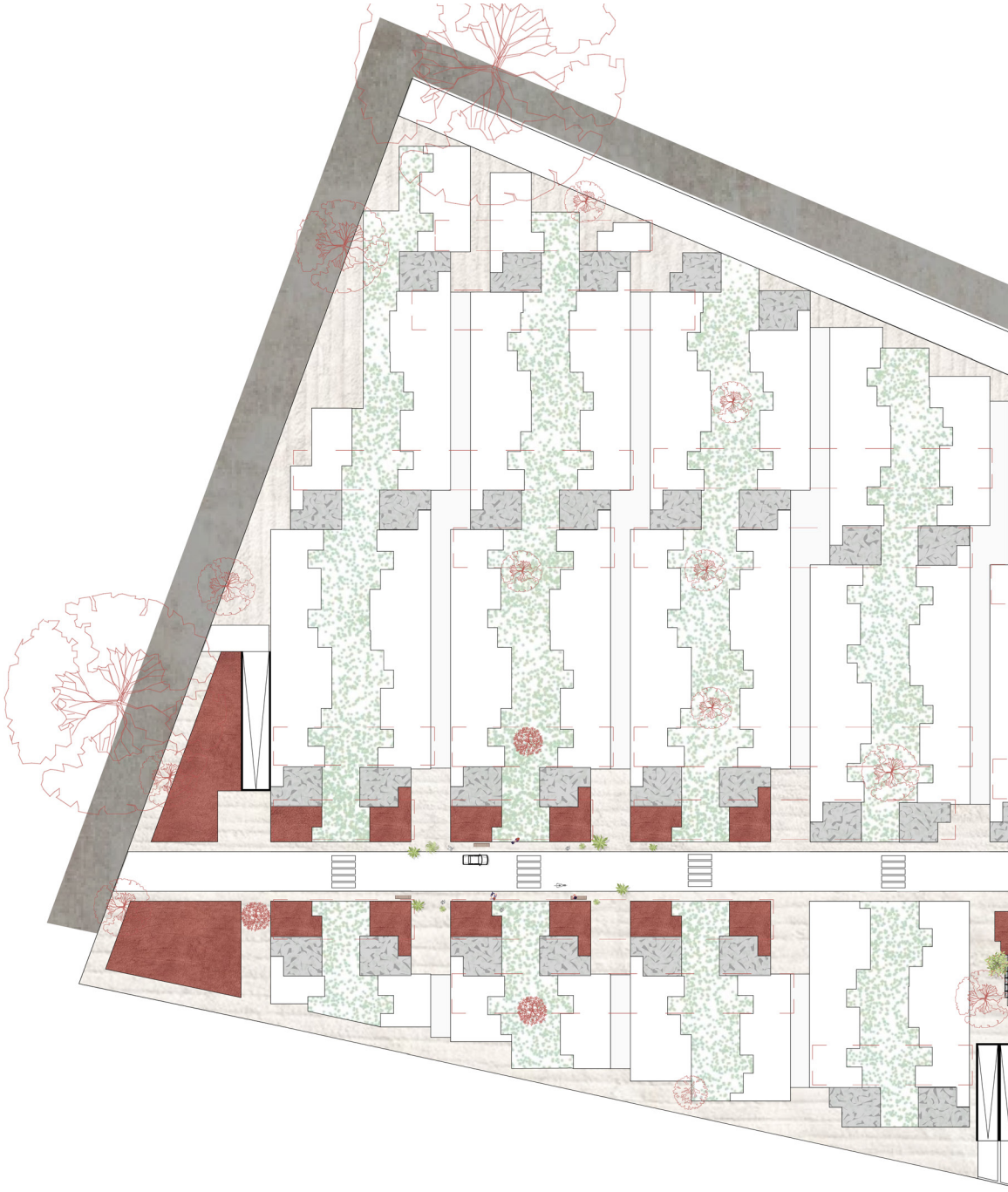


## PROGRAM AND AMENITIES

As the project caters to a diverse group of residents on the plot and the neighborhood, it also offers a mixed program of amenities. Aside from the residential clusters, housing as habitat can be found starting from one edge of the neighborhood where larger community oriented functions, such as a gym, co-working and study spaces, and other flexible community facilities are integrated. Then, through the central spine an active plinth, accommodating smaller everyday amenities such as café, restaurant, a grocery shop and fruit and vegetable vendors. In total there is 40 spaces contributing to the activation of the central spine. Continuing towards the shaded communal courtyard which together with a smaller community pavilion integrates gathering spaces for resident and neighborhood activities, ensuring social cohesion on a bigger scale. Towards the opposite edge of the spine a climatically responsive park together with a children's playground is located creating additional outdoor spaces.
Additionally, two underground parking garages with entrances on both edges of the plot reduce the vehicular presence while offering a parking spot for residents as well as visitors.
The remainder of the project consists of housing offering of a variety of maisonette and apartment typologies. In total, the proposal includes:

143 × 1 BHK maisonettes,
174 × 2 BHK maisonettes,
109 × 3 BHK maisonettes,
42 × 4 BHK maisonettes,
61 × 5 BHK maisonettes,
75 × 1 BHK apartments and
52 × 2 BHK apartments

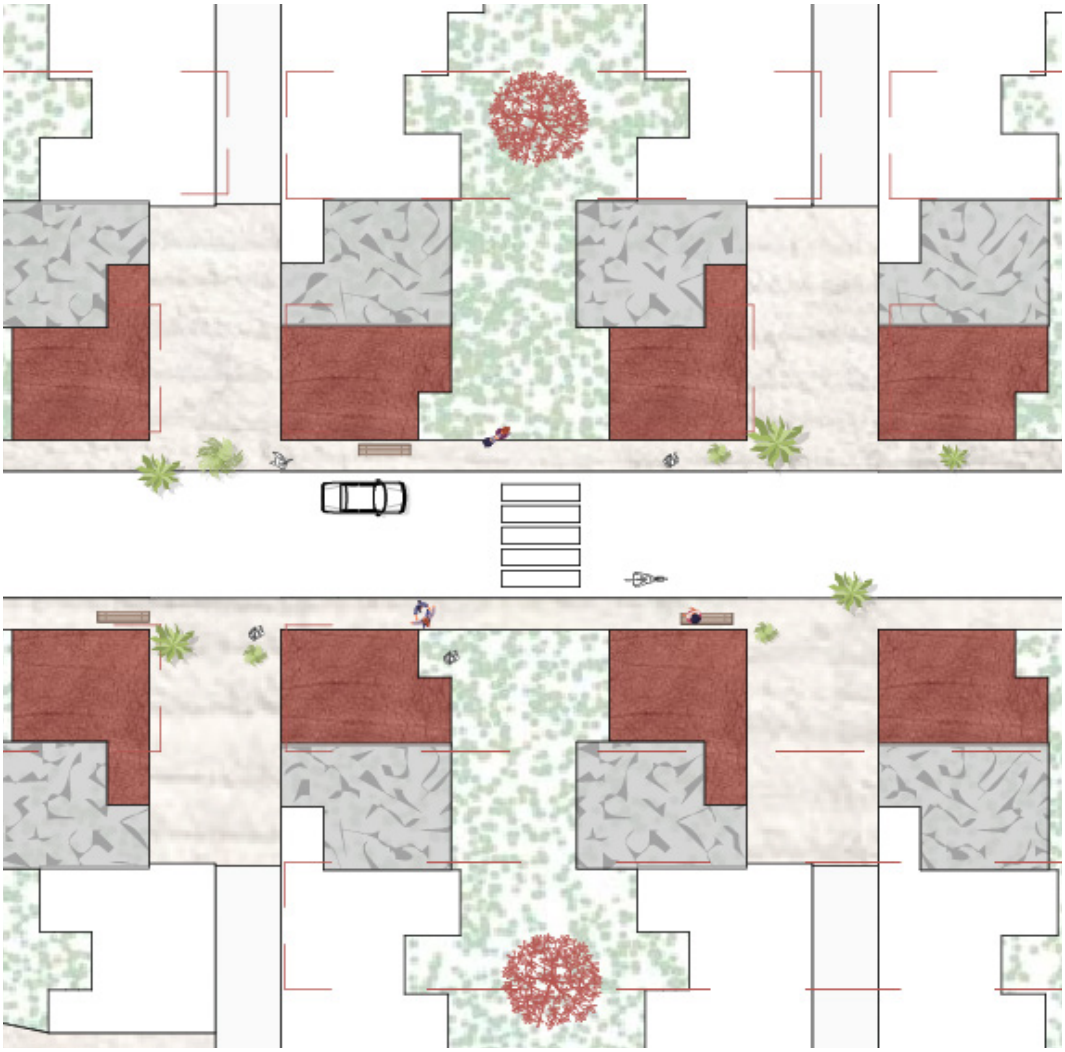
Together, the project provides housing for approximately 2,200 residents, with a total built up of 64.804m2, achieving a 2.51 FSI with a 0.50 GSI.



Masterplan
1:1000



## CENTRAL SPINE

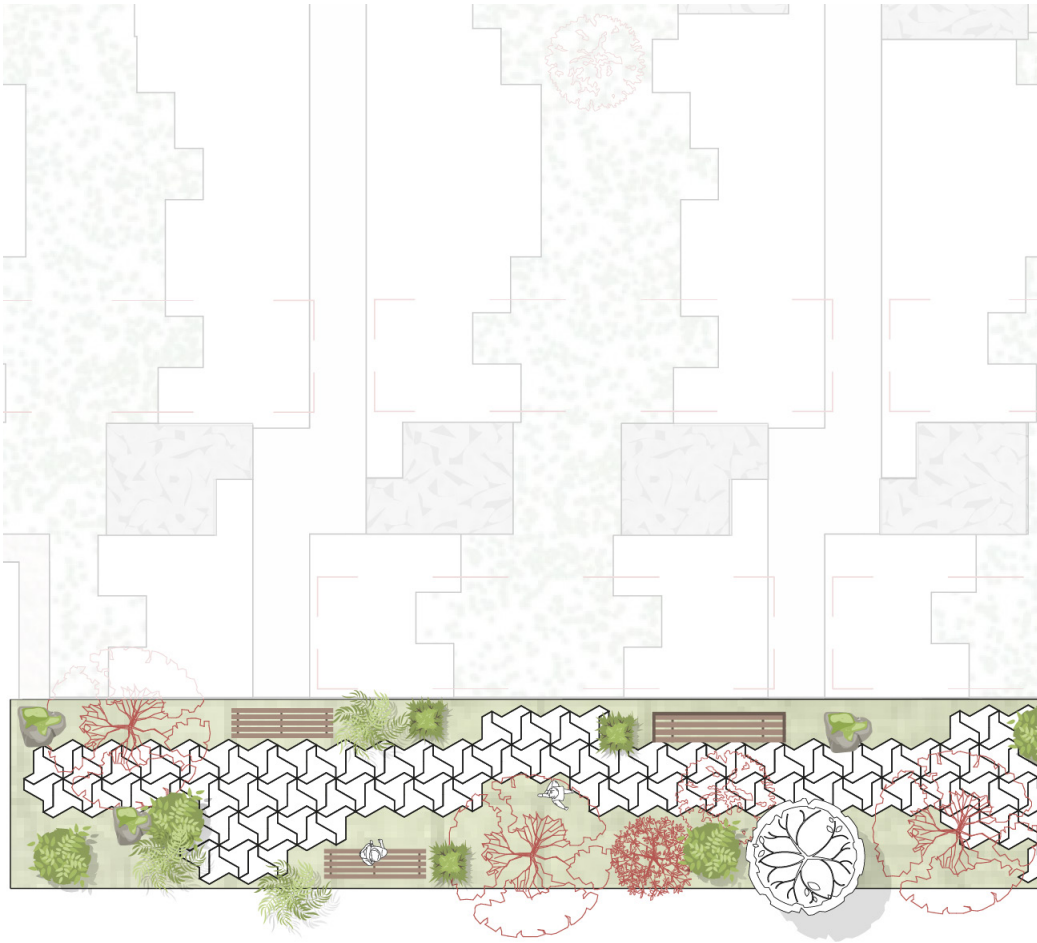


Impression central spine

## CENTRAL COURTYARD



Impression central courtyard

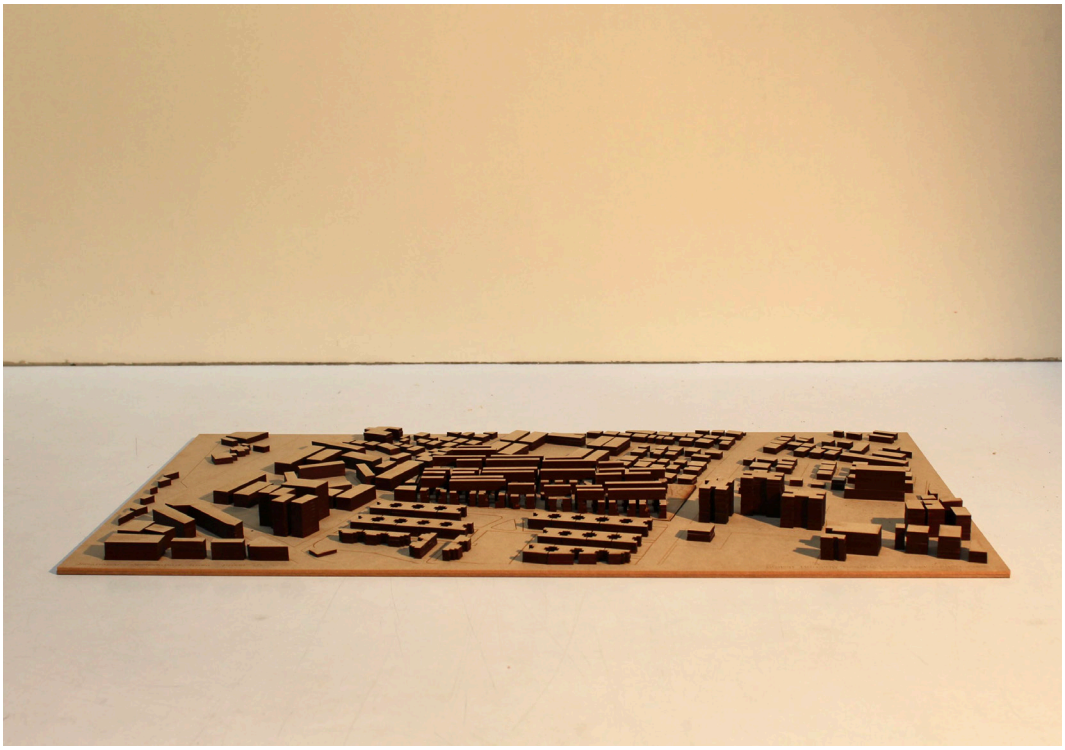


Impression park

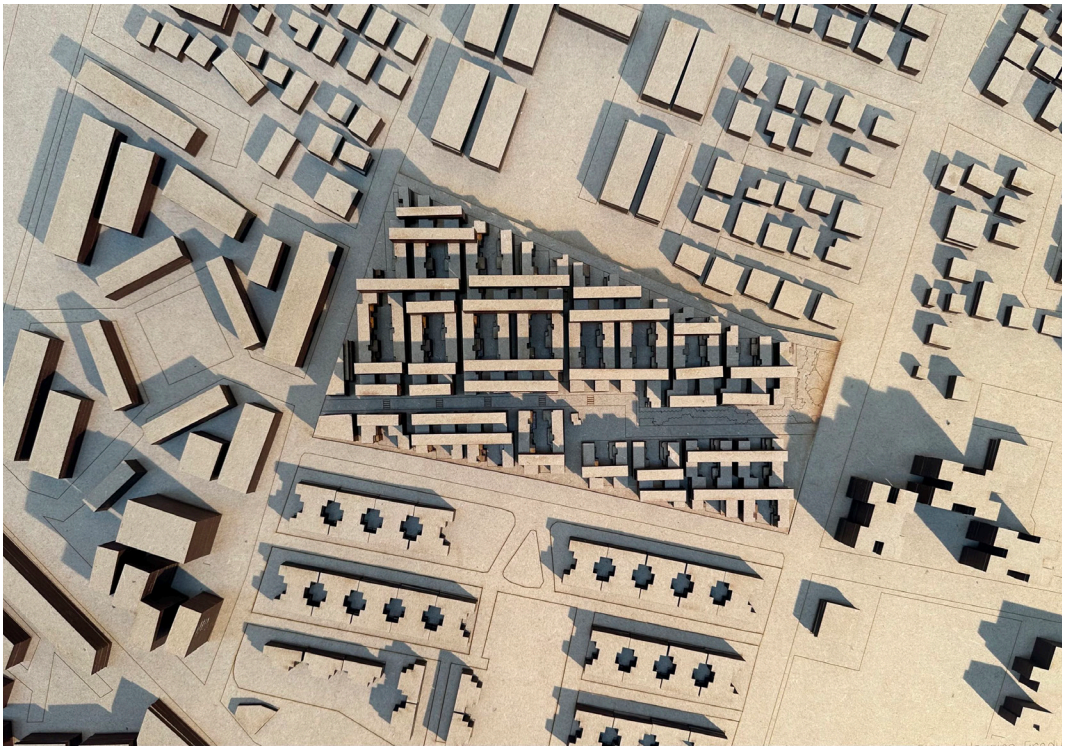




Impression park

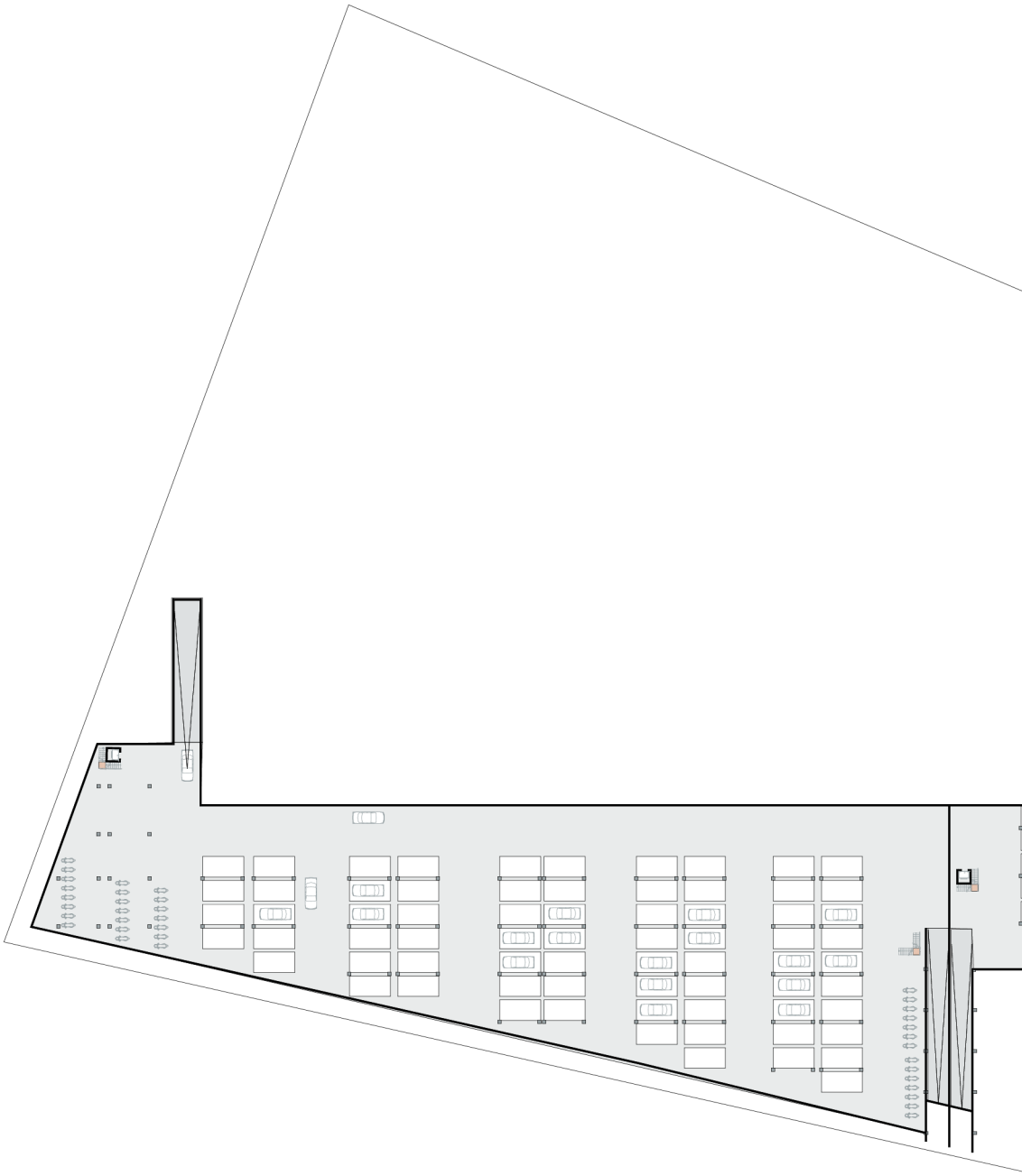


Model Masterplan

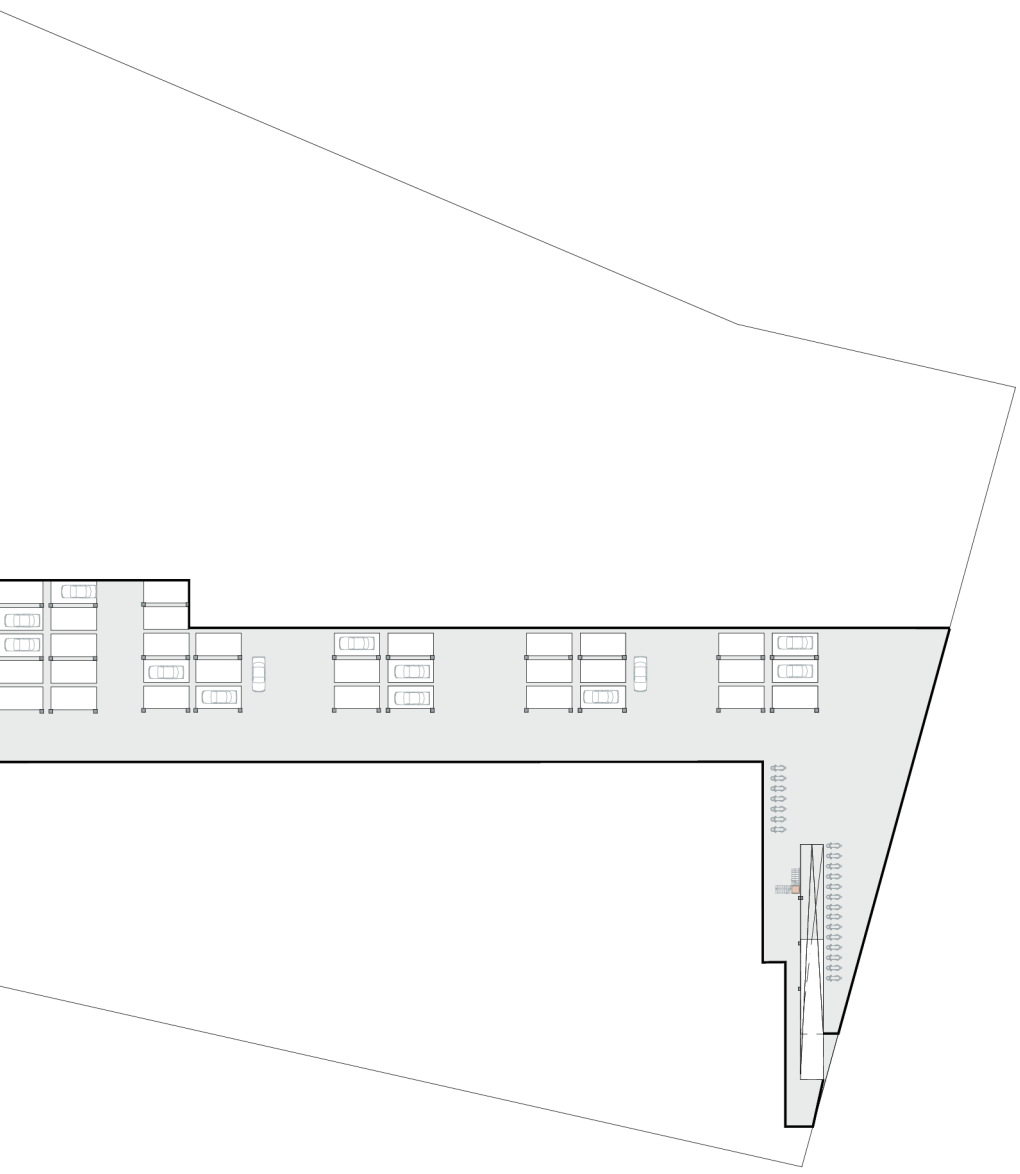


Model Masterplan

# PARKING PLAN



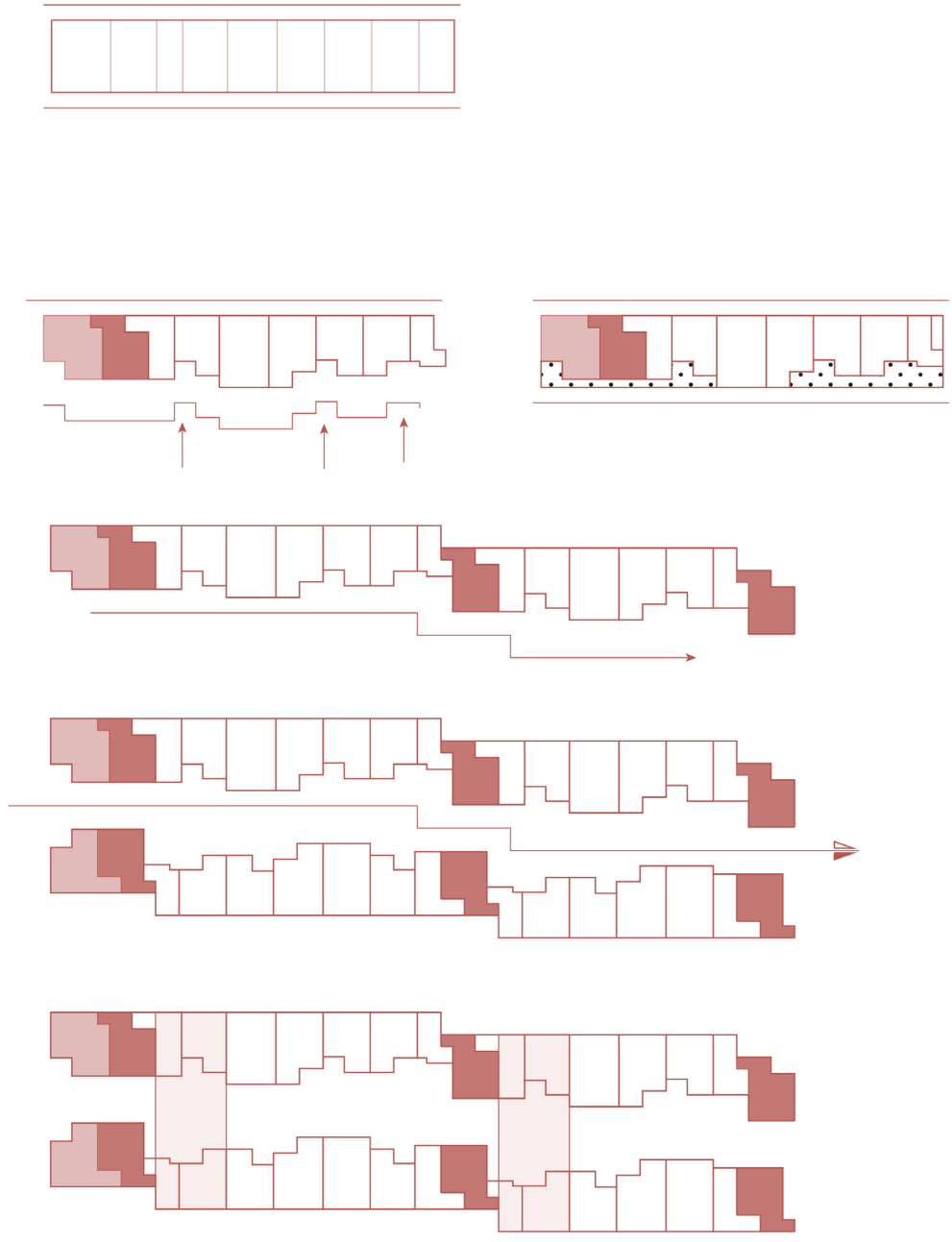
Parking plan (97 cars spots)
1:100

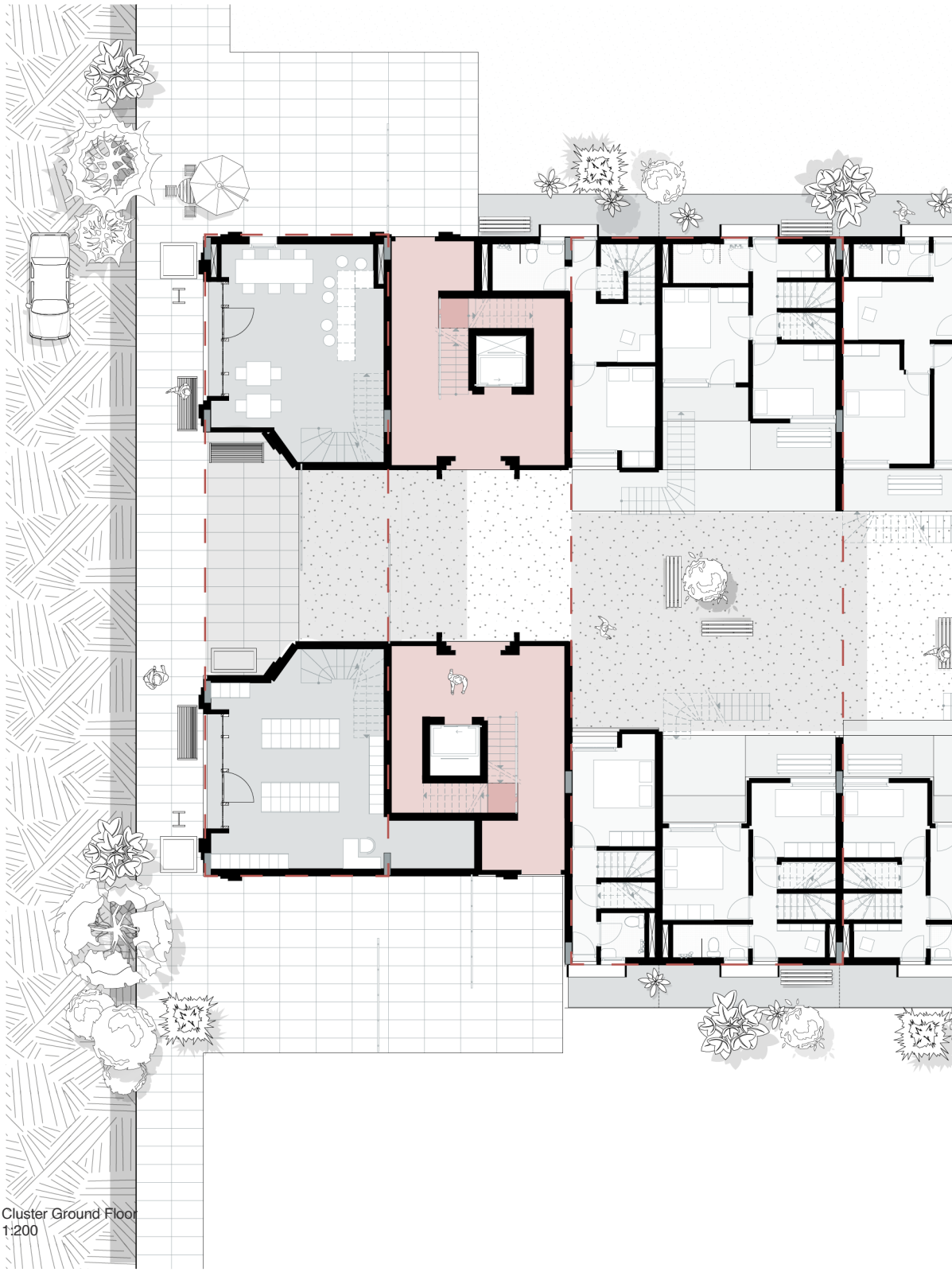


# CLUSTER SCALE

## HOUSING CLUSTERS AND COLLECTIVE SPACE

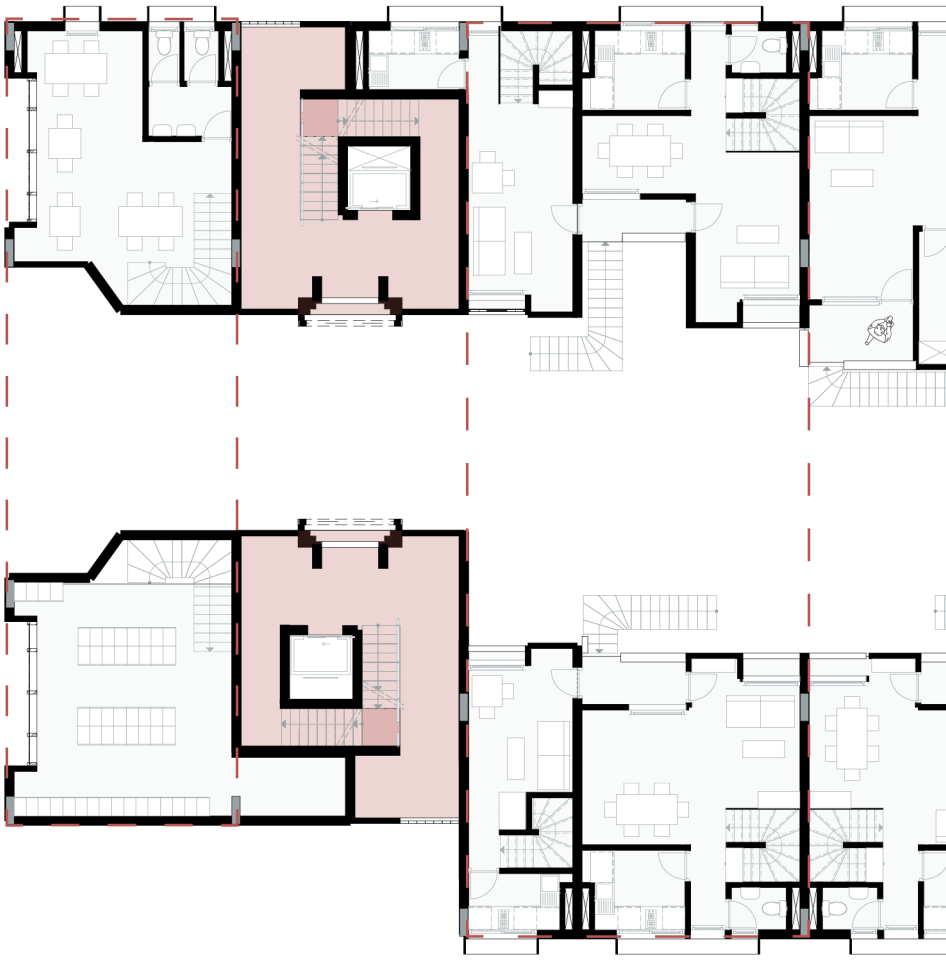
At the cluster scale, housing is organized through clusters formed by combining units with a shared puzzle piece like circulation zone. This L-shaped circulation element allows additional cluster to attach at strategic points, creating a more dynamic street condition. When mirrored these clusters create spacious pedestrian streets and communal courtyards with living and sleeping spaces oriented towards them. This initial cluster configuration forms a base condition of G+3 while achieving a FSI of 1.8 which is the current base FSI of Bimanagar. To increase density without compromising livability, a secondary layer of rotated cluster is added between mirrored blocks next to the circulation zones. These perpendicular volumes are not only connecting the clusters or achieving higher density, but they also create shade within the courtyards, improving comfort in hot climates. This results in a building height ranging from G+3 and G+6 with an FSI of 2.51. Additionally, the rotated Jenga-like stacking introduces a complex massing, avoiding monotonous continuous building blocks.



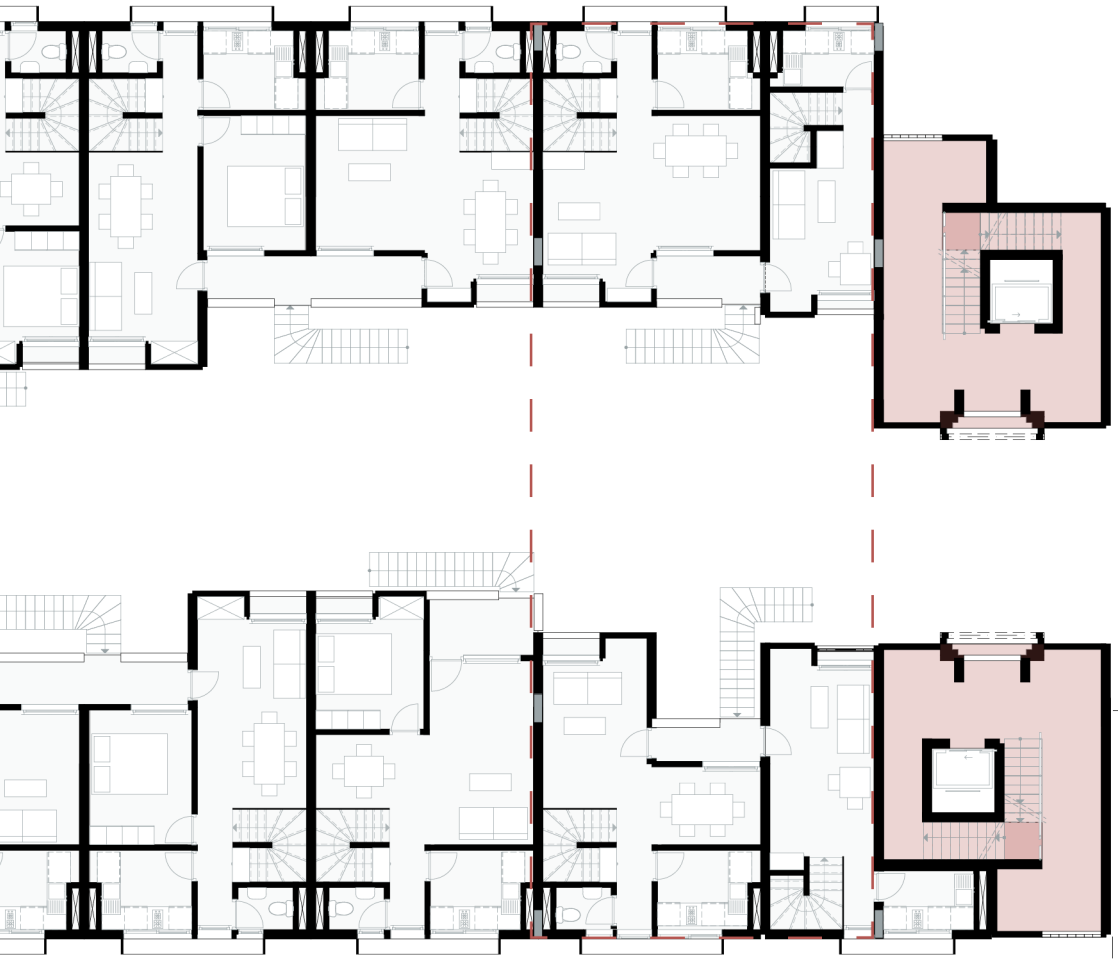


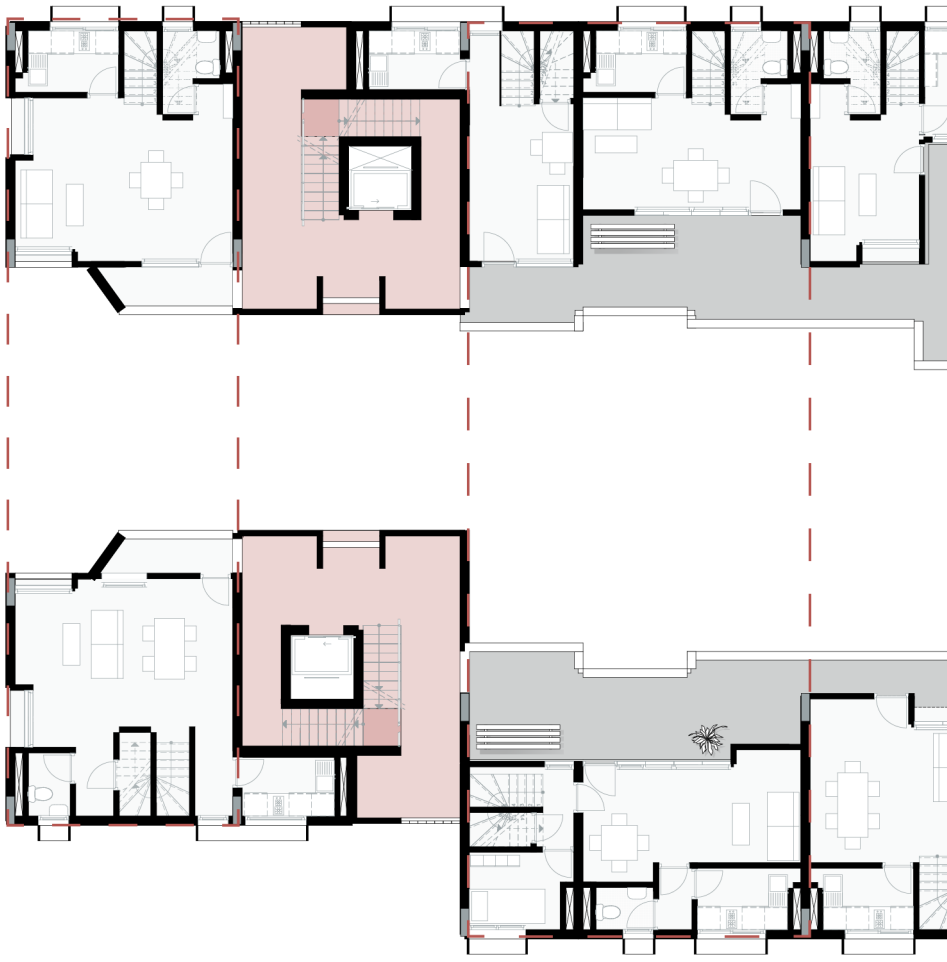
Cluster Ground Floor
1:200



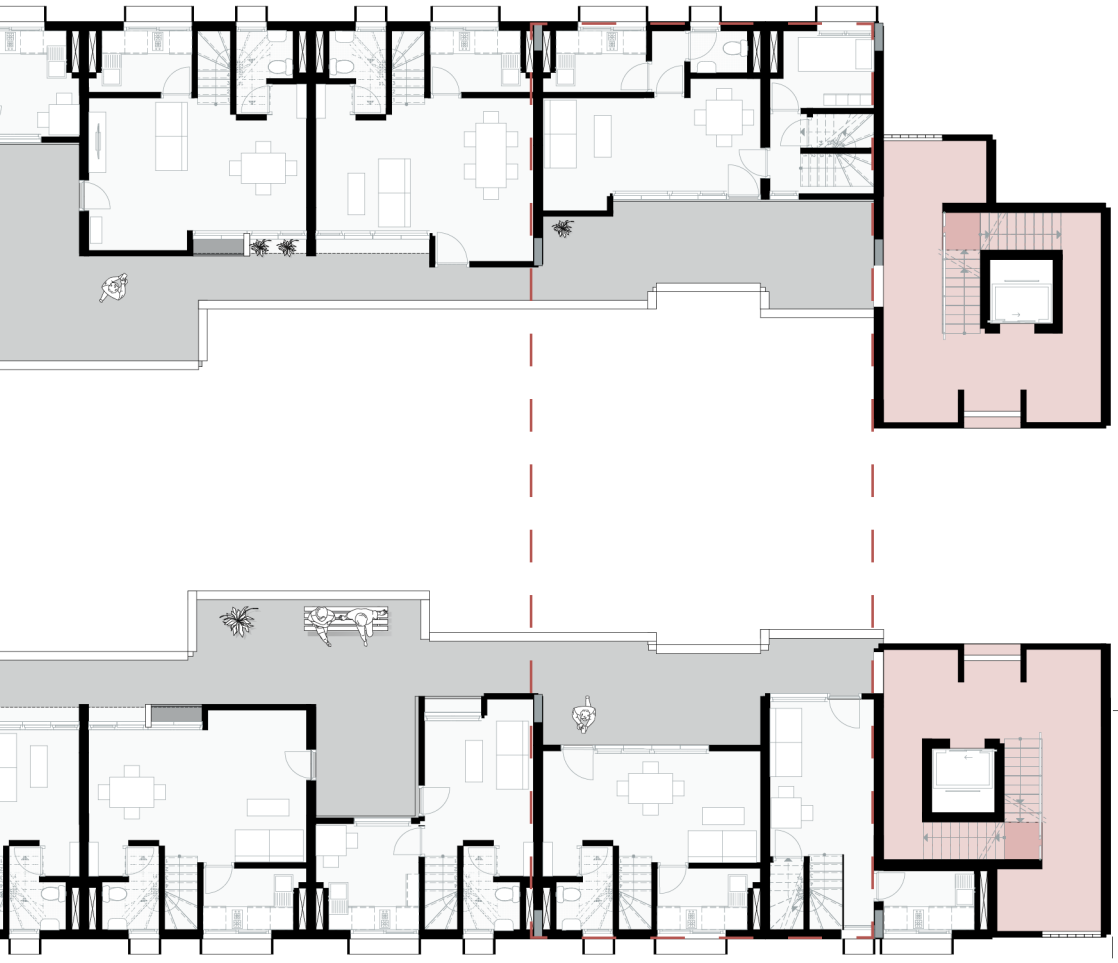


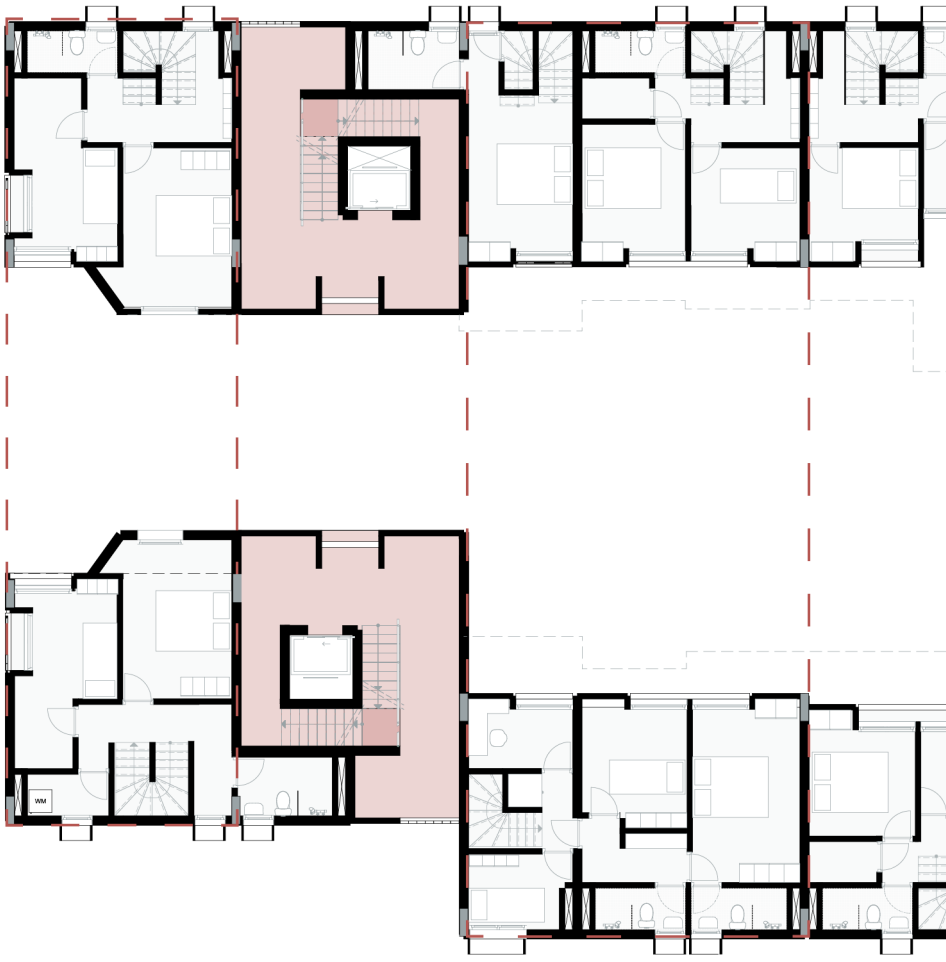
Cluster First Floor
1:200



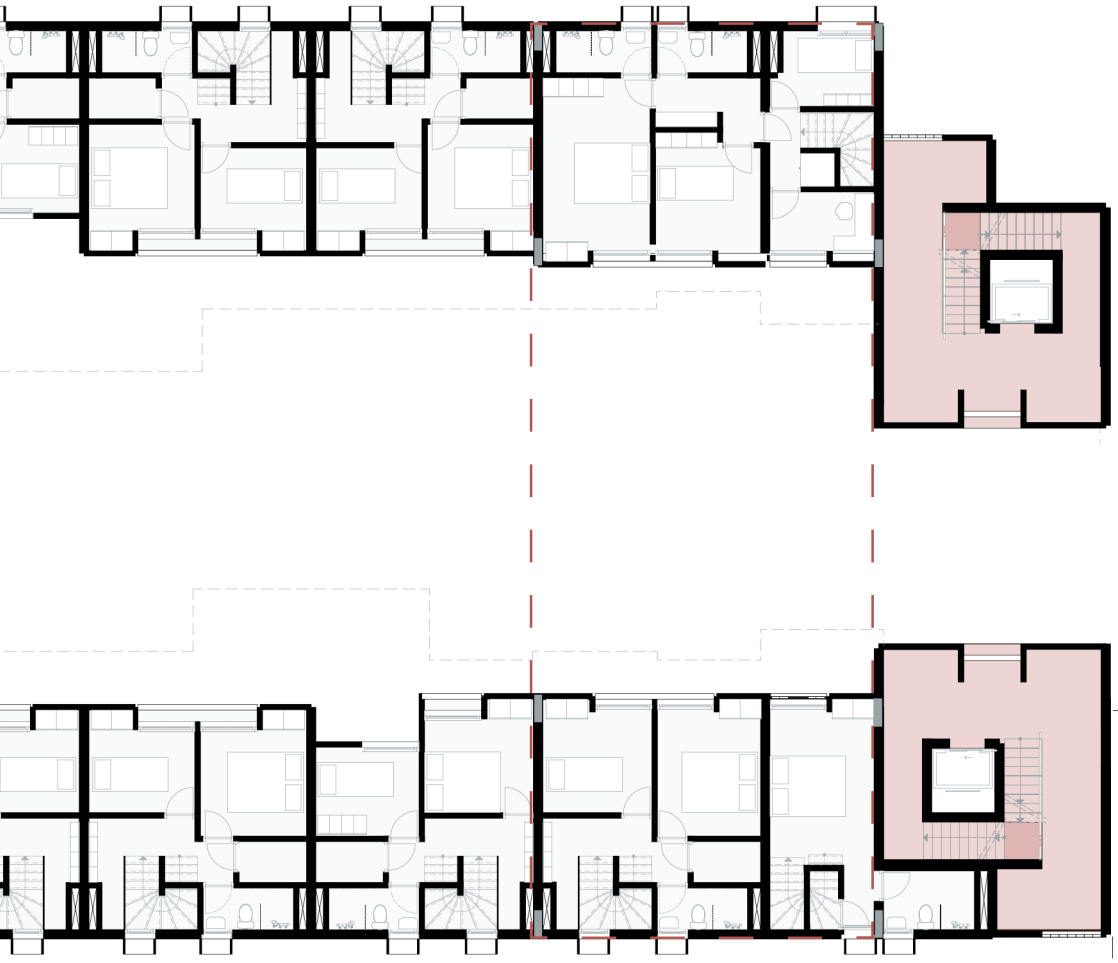


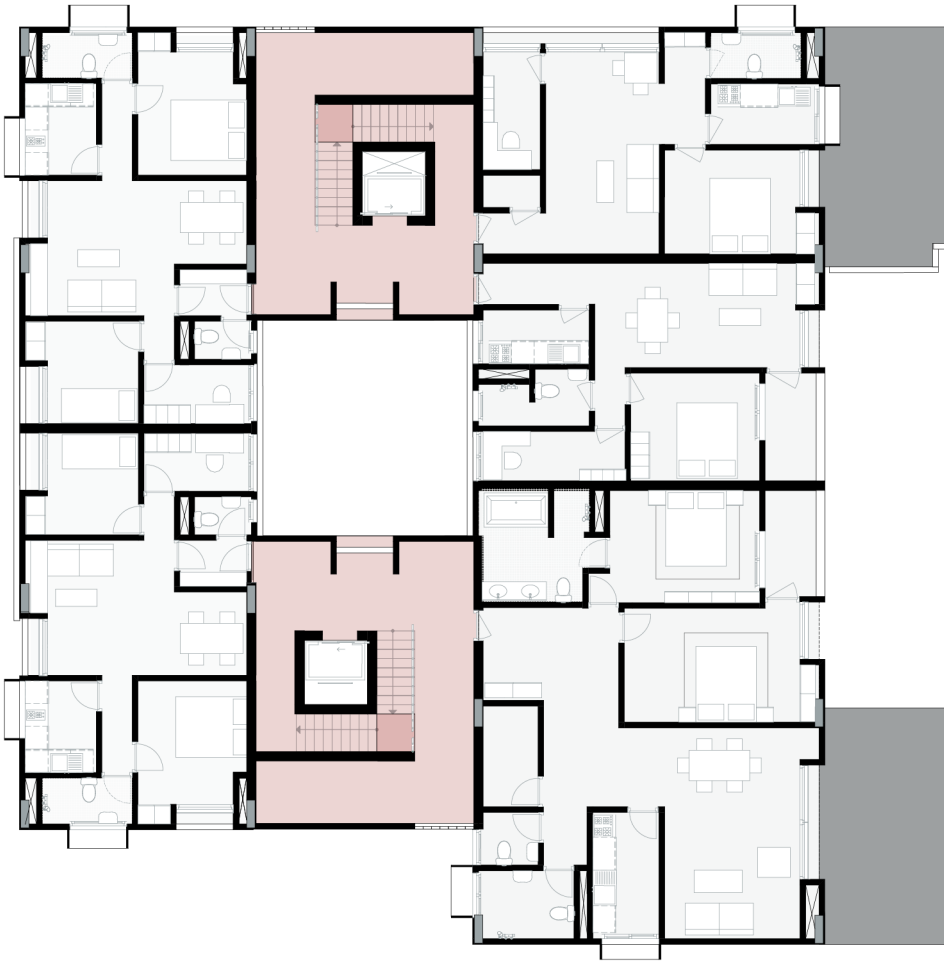
Cluster Second Floor
1:200



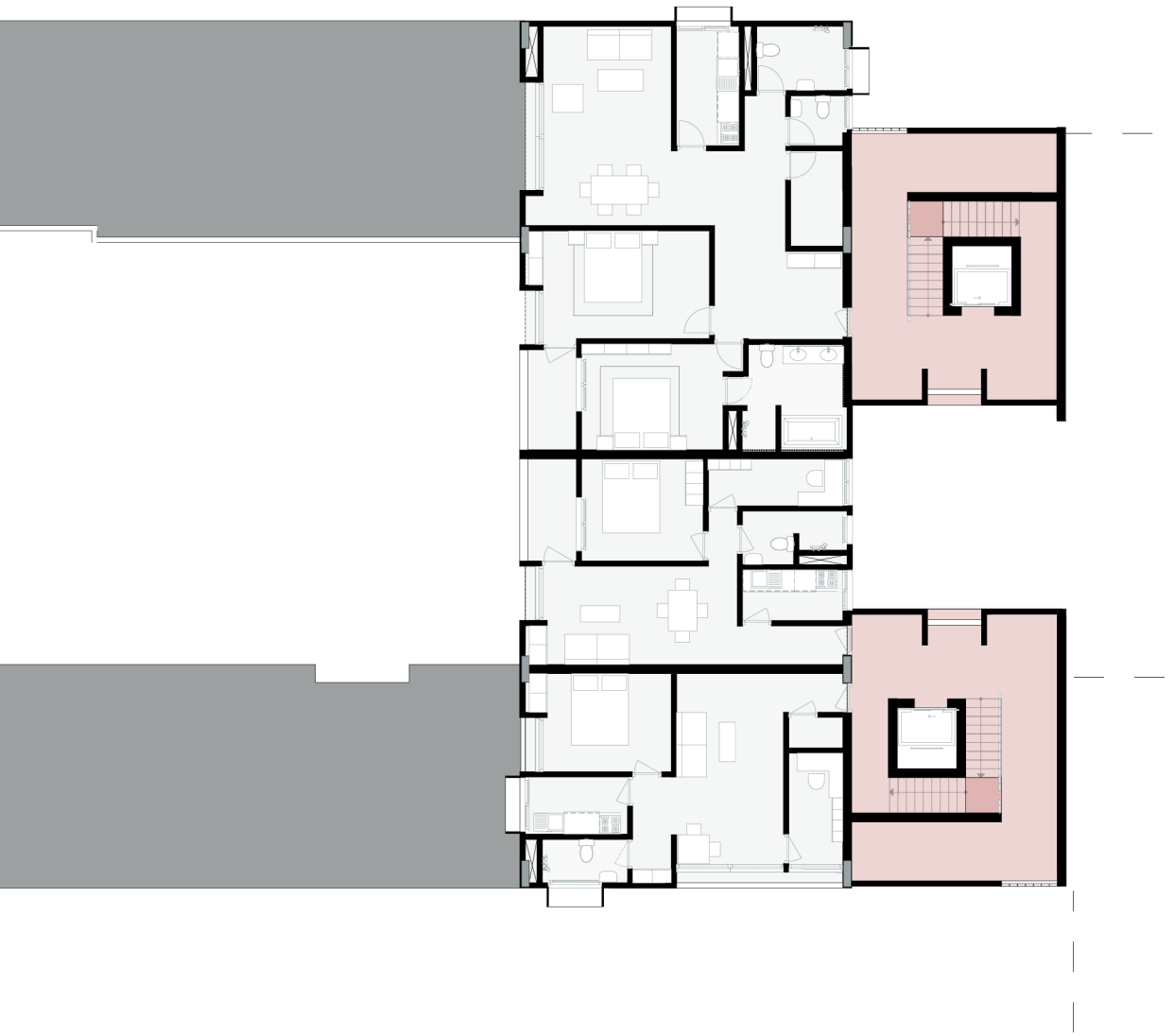


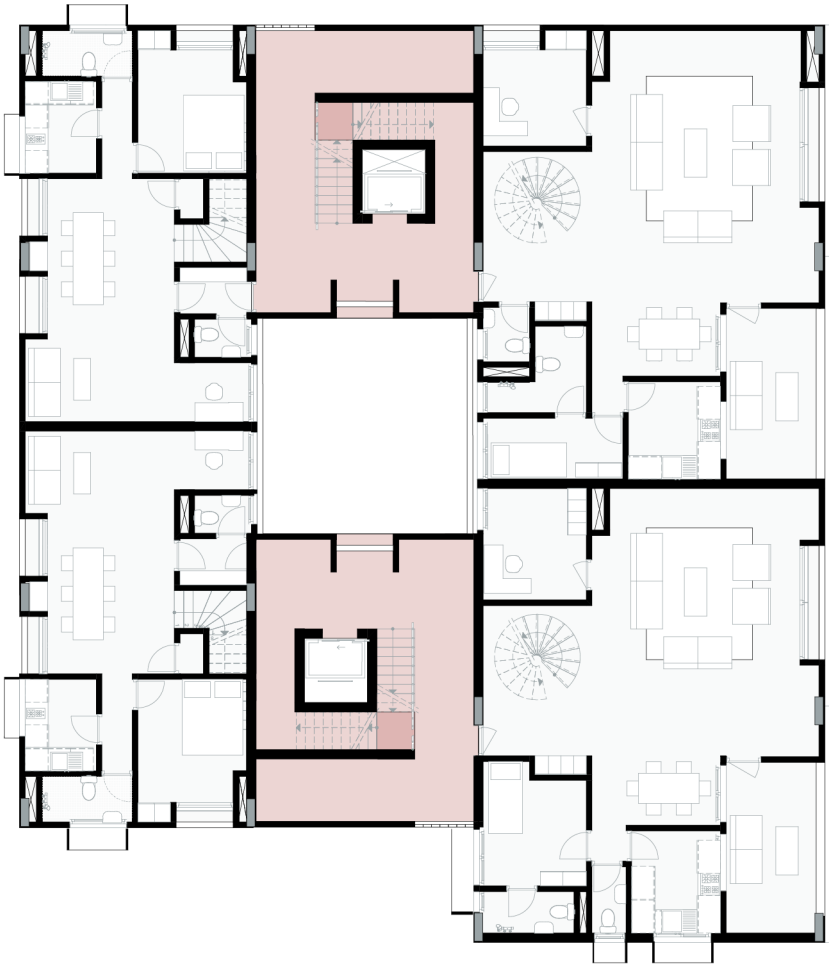

Cluster Third Floor
1:200



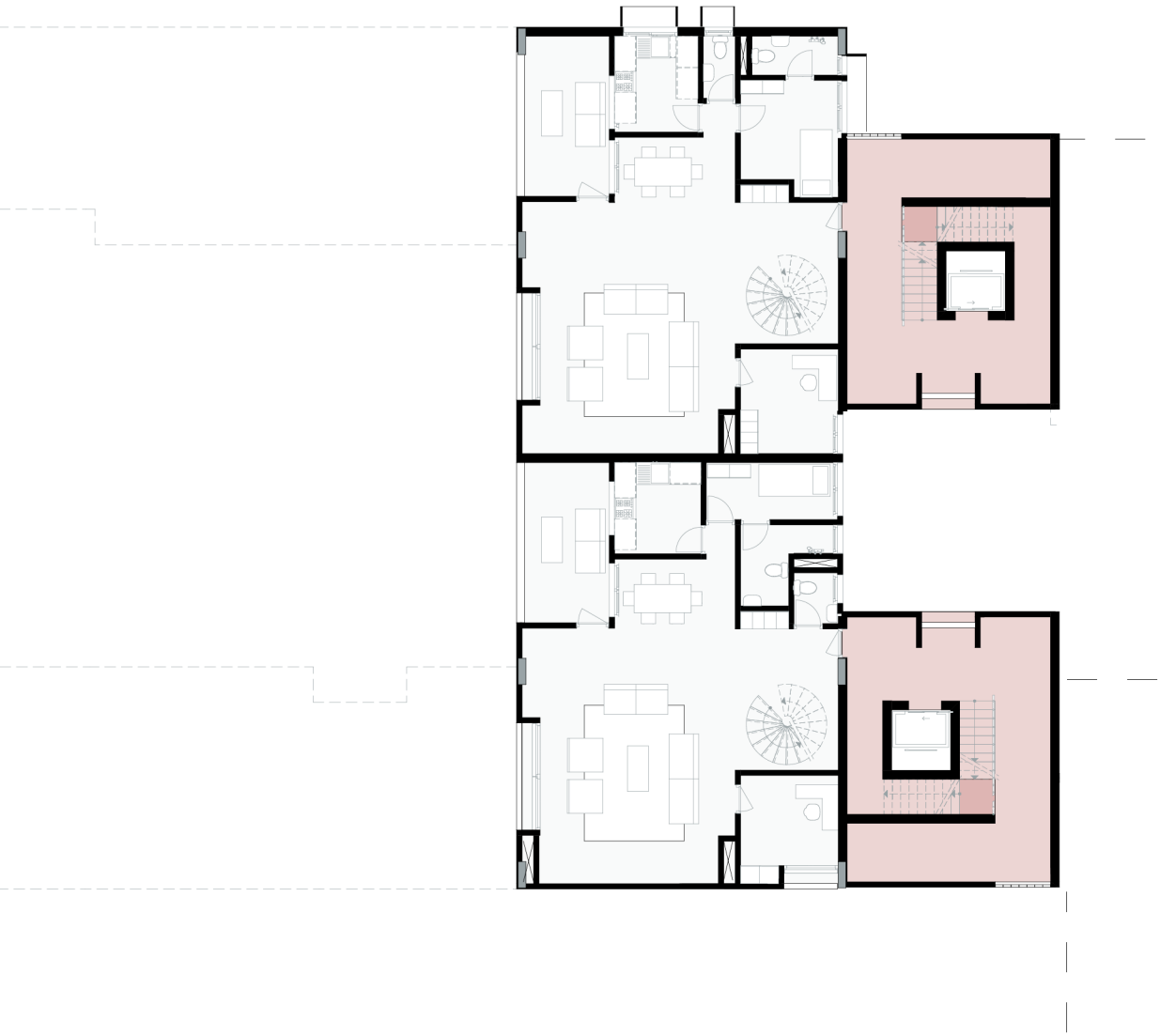


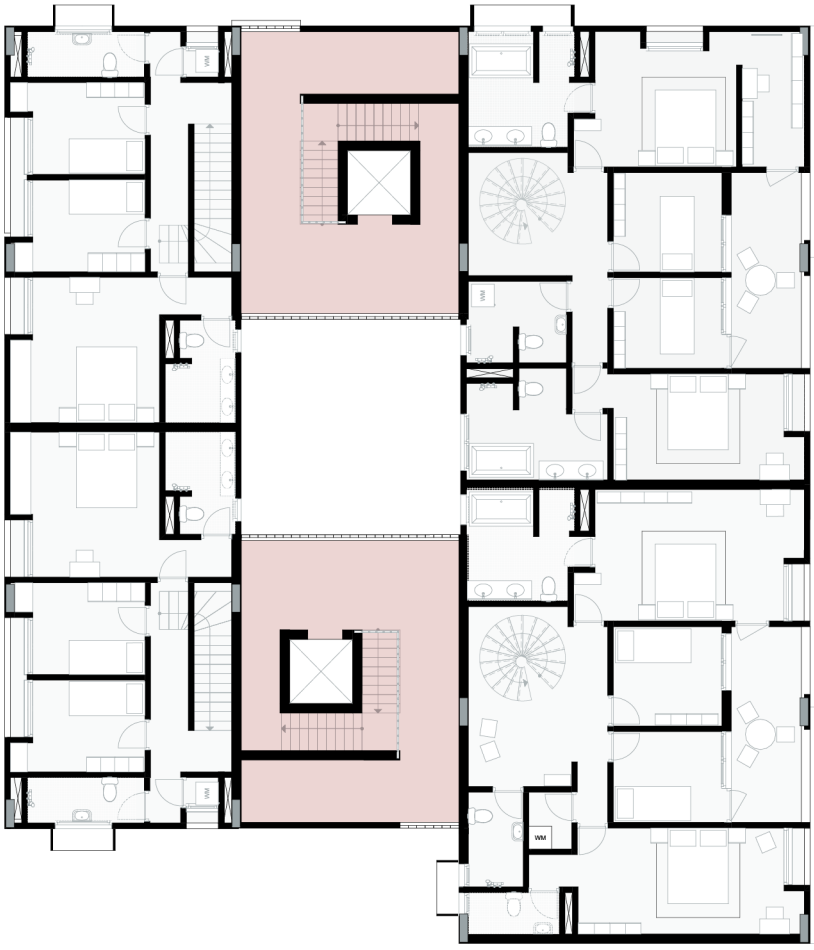
Cluster Fourth Floor
1:200



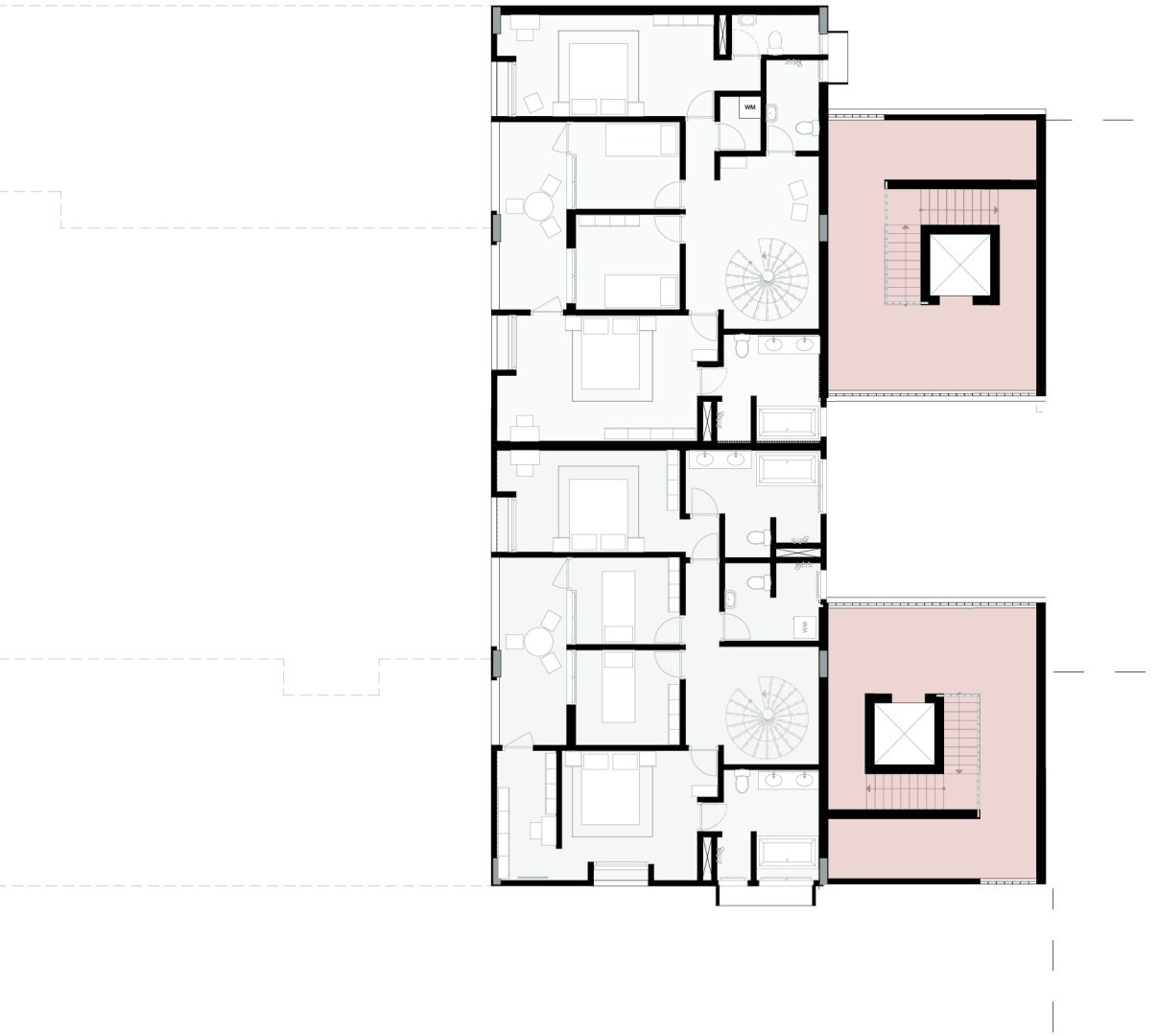


Cluster Fifth Floor
1:200






Cluster Sixth Floor
1:200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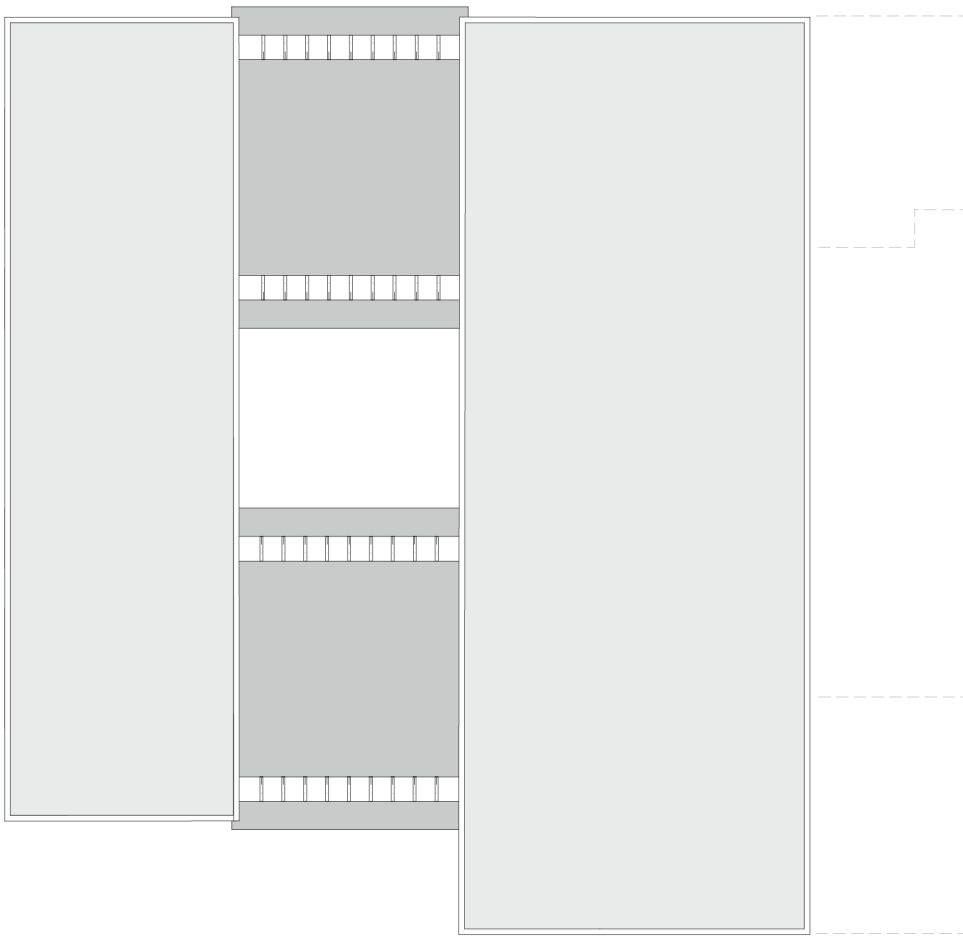
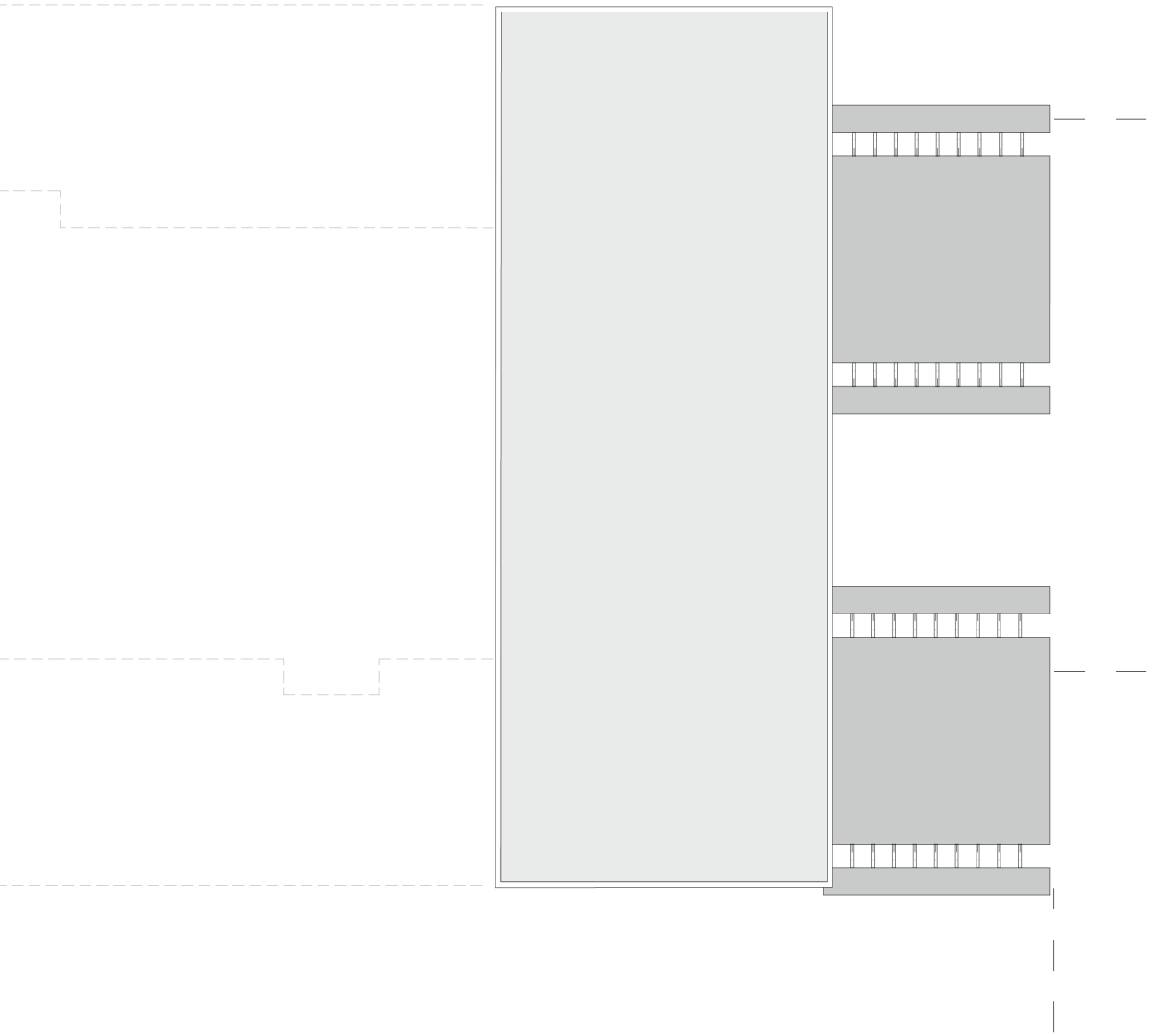


Cluster Roof
1:200





Inner Elevation
1:200





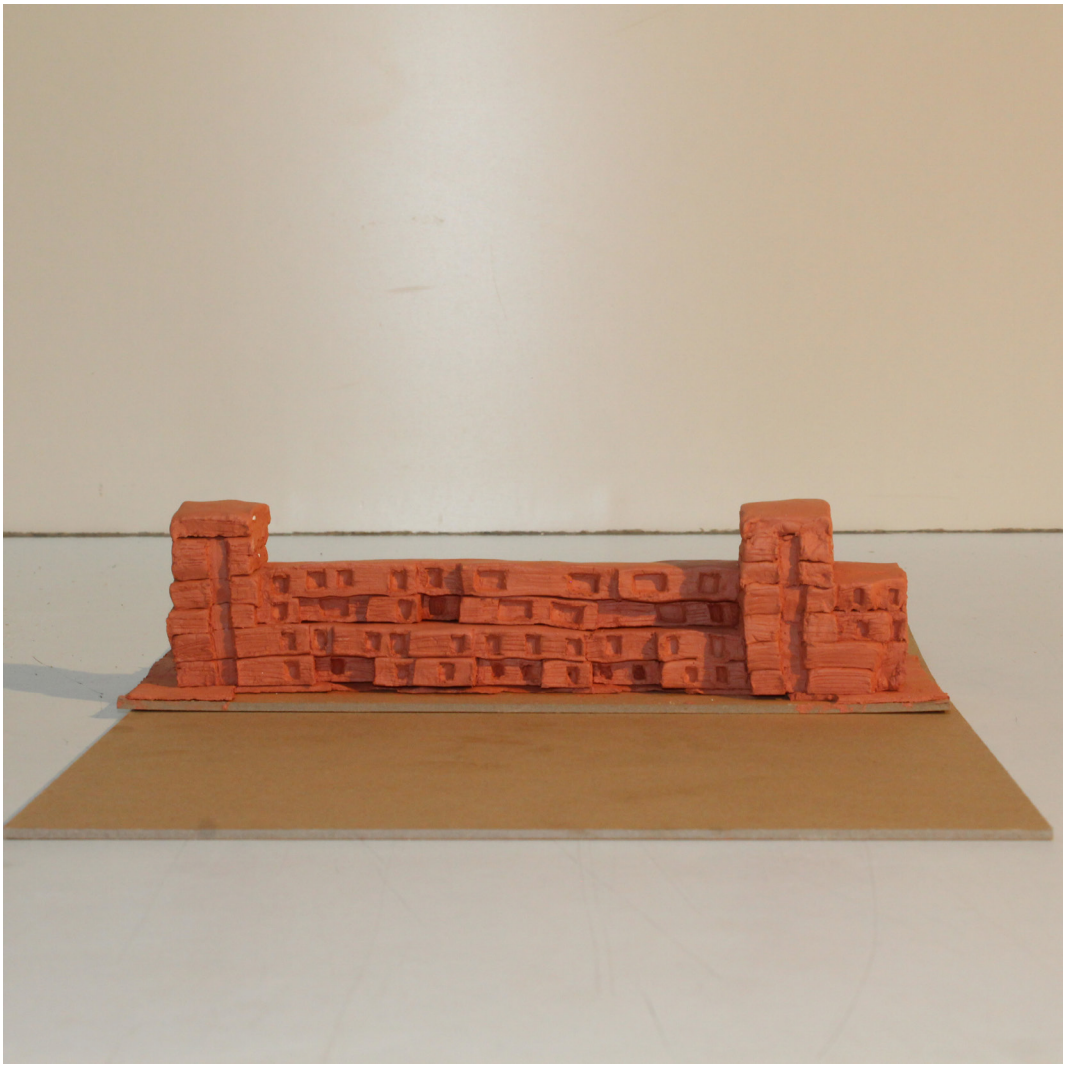
Front Elevation
1:200



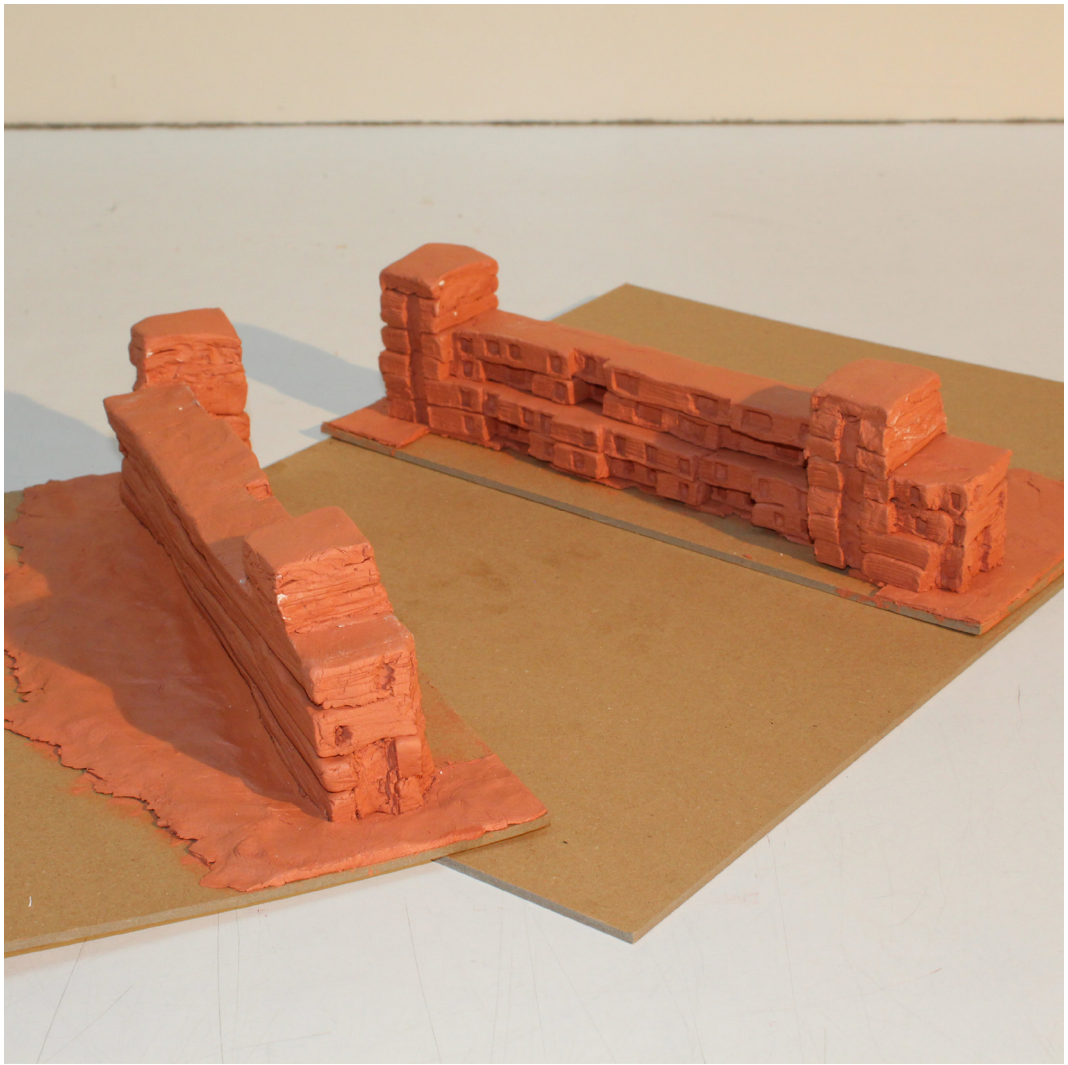
Rotaded Upper Level Elevation
1:200



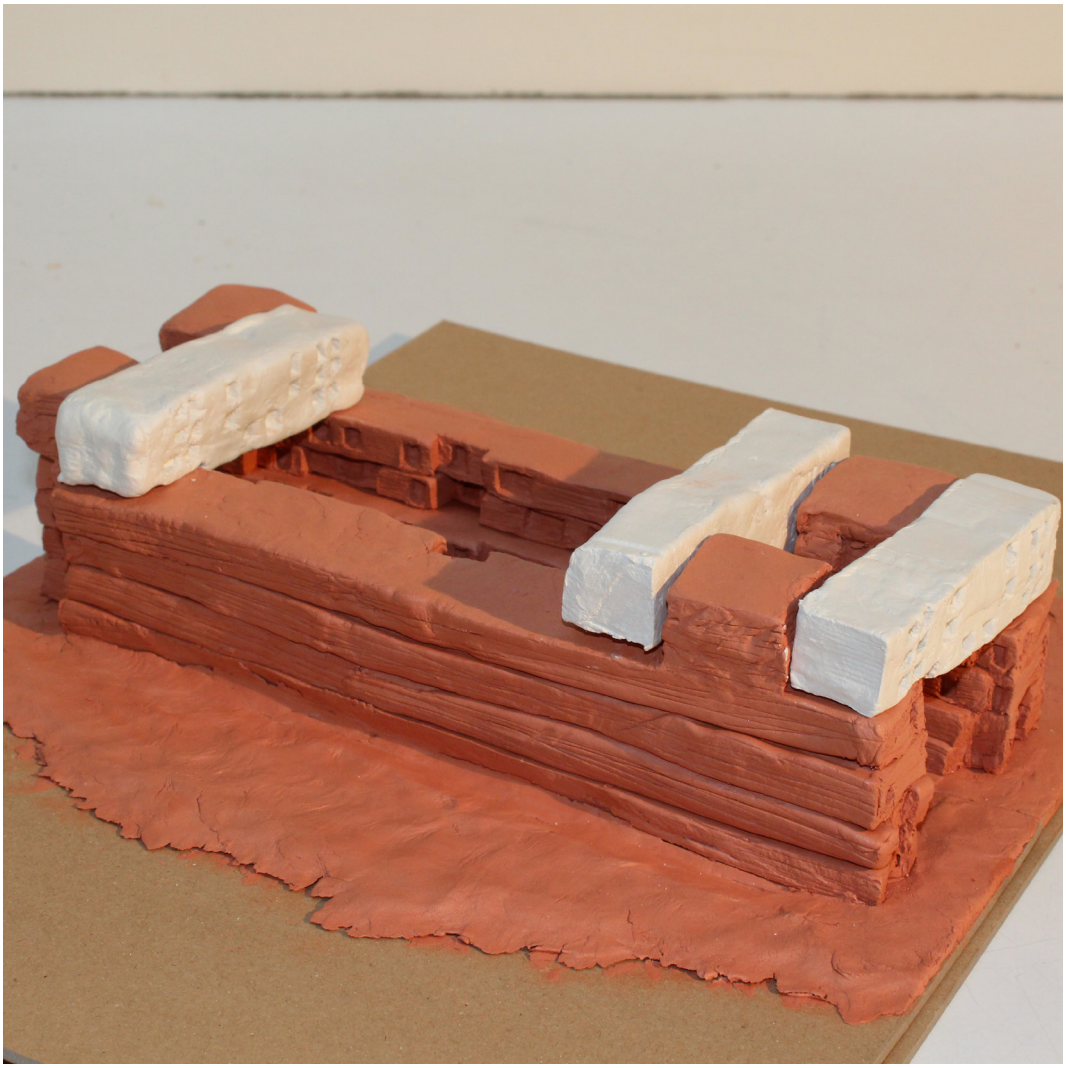
Impression gallery



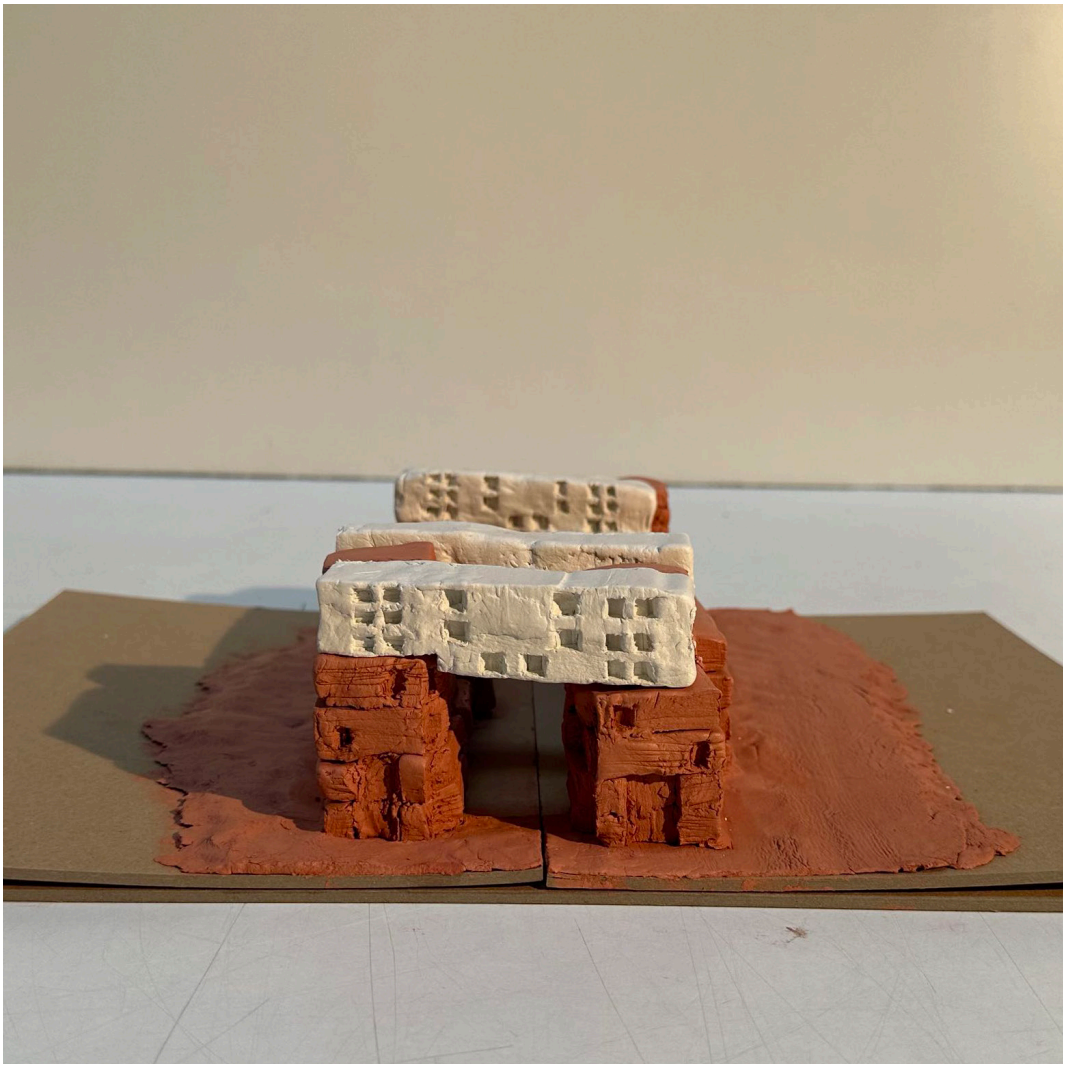
Model cluster



Model cluster



Model cluster

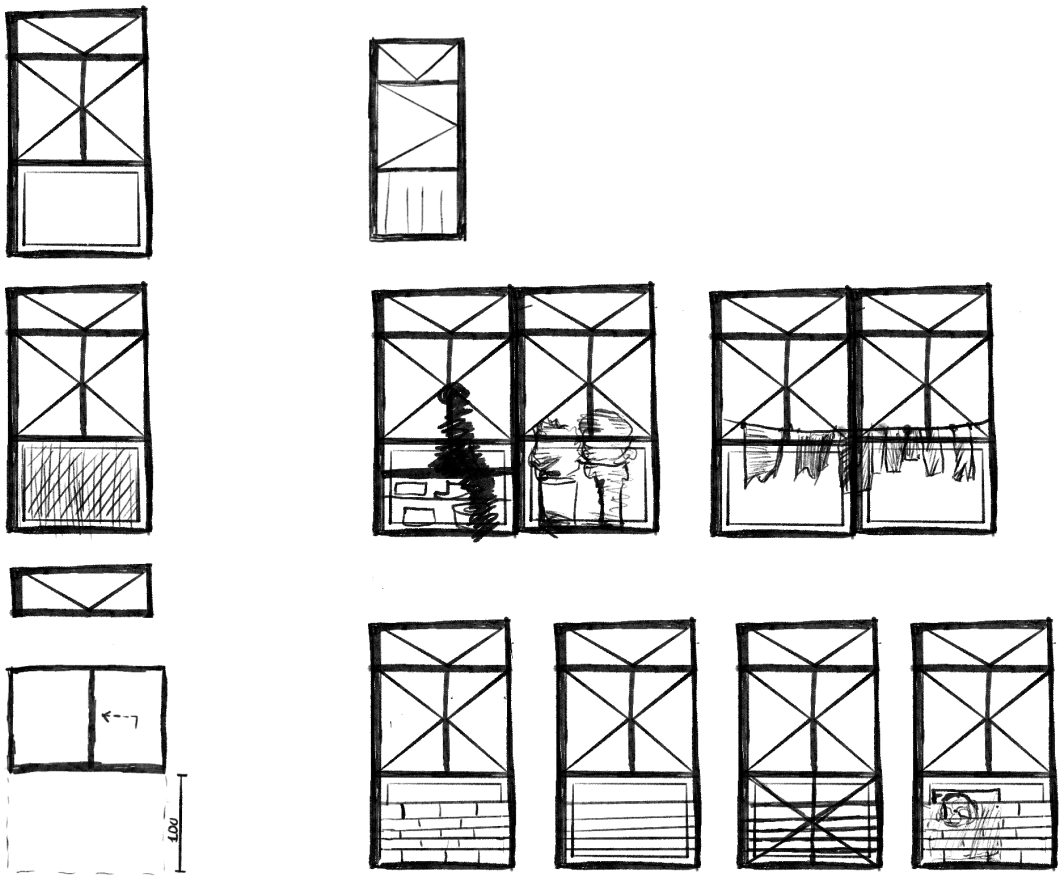


Model cluster

## HABITAT IN WINDOW ELEMENTS

The window elements within the project are recessed with 600mm which is not only a climatic strategy but also a way to create space that reintroduces habitat into the facade.

Different window types are used throughout the project, many of which are organized as a three-part system. The upper part functions as a clerestory window supporting heat dissipation and natural ventilation, with the middle part being the primary window opening. The lower section can vary depending on the housing typology and resident needs. In some cases, the lower part consists of fixed glazing, privacy screens, or operable windows with protective railings in front as seen in traditional pol houses of Ahmedabad. This way resident can enjoy the cool breeze while sitting or lying down throughout the day. Additionally, the lower section can function as a balustrade concealing AC units, as informal storage space, or as a small threshold for plants. These variations facilitate the adaptability and room for habitat within the window elements.



Sketches window elements



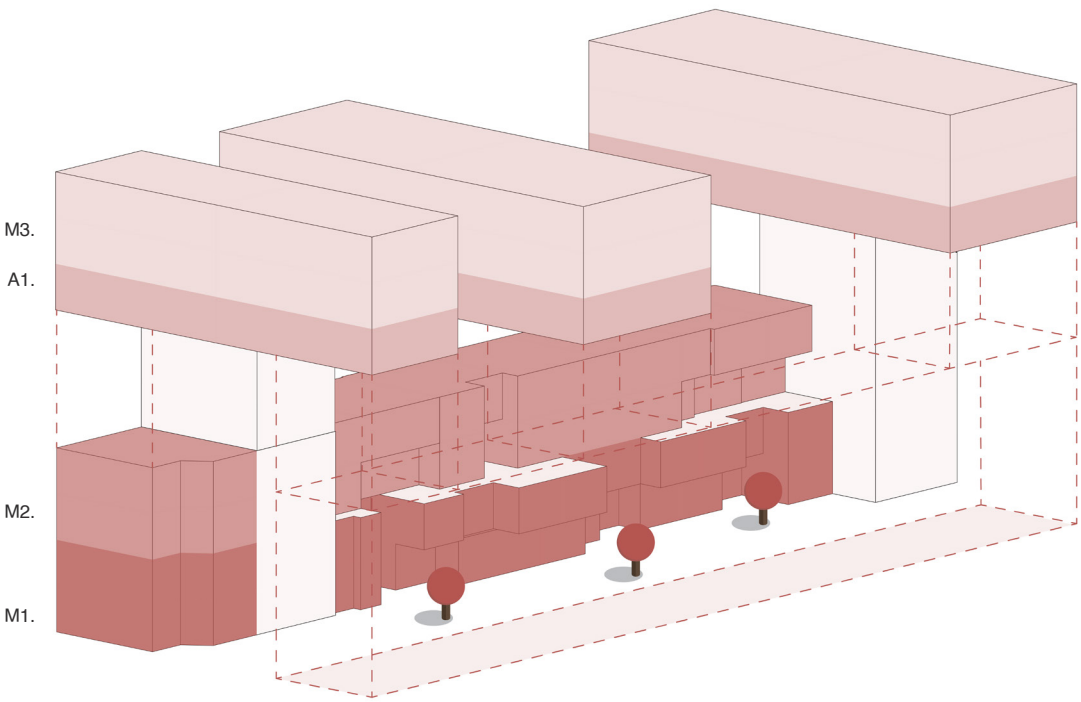
Impression Backyard*

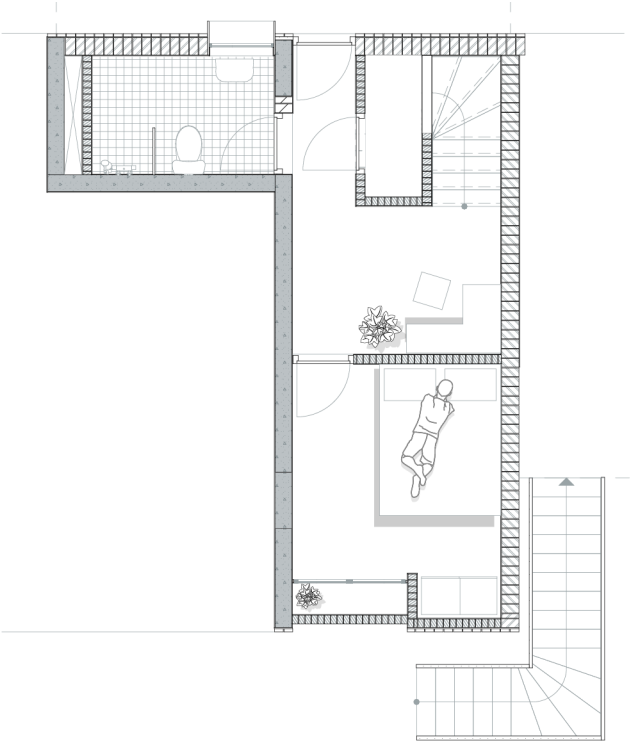
*This visualization was originally modeled and composed by the author in ARCHICAD and rendered using Twinmotion. The resulting image was then enhanced and atmospherically refined using AI-assisted tools, including Interstitial and ChatGPT

# UNIT SCALE

## DWELLING TYPOLOGIES

At the unit scale, a variety of housing typologies is introduced with a typical organization of services spaces such as kitchens, bathrooms, and toilets at the rear, while living areas are oriented towards the courtyards. The ground floor and first floor accommodate 281 maisonette-type units (primarily for low-mid income) ranging from 45 to 95 m2. The units have a smaller ground floor and a larger upper level, creating shaded conditions and allowing for controlled incremental expansions. This unit is accessible through a separate staircase leading to the first floor, while some ground floor bedrooms have direct access, allowing elderly residents to minimize stair use. The second and third floors accommodate 281 smaller maisonette types ranging from 40 to 65m2 designated for lower income. These units are accessed through the staircase in the central circulation core and lead up to a gallery that has the entrances to the units. The first floor of these maisonnetes is set back creating shaded spaces in the gallery that can be used for informal social interaction on upper levels. Then, the rotated cluster volumes starting from the fourth floor are designated for mid income with 130 apartment units of around 55m2. These introduce a different typology to respond to varying household needs and to diversify the overall layout. These units are accessible through the same staircase in the central circulation core as well as a private elevator. One circulation floor can serve 2 to 4 apartment units. Finally, the fifth and sixth floors contain approximately 65 larger maisonette units of around 210 m², intended for higher-income households. These units are accessed via the same circulation cores and private elevators and include private loggias, providing private shaded outdoor spaces.


M3.
A1.
M2.
M1.



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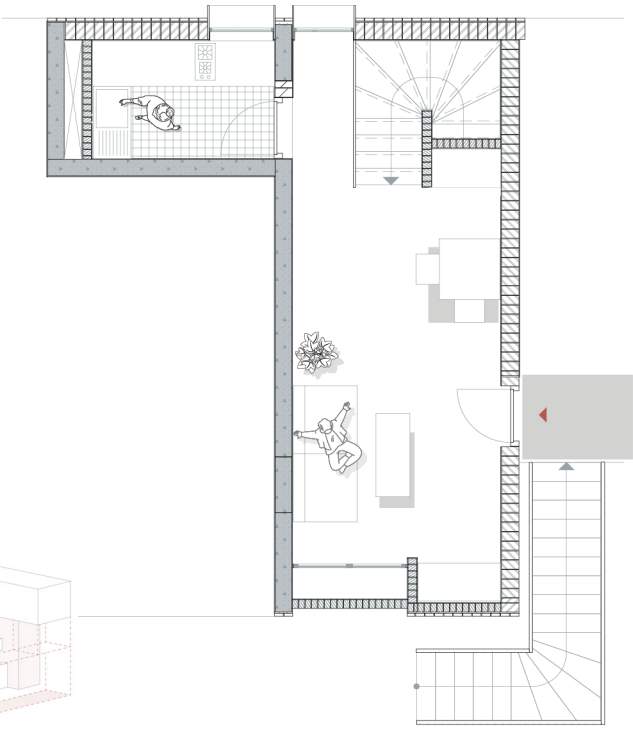

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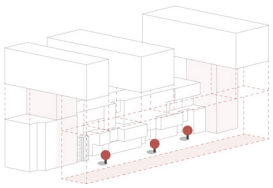
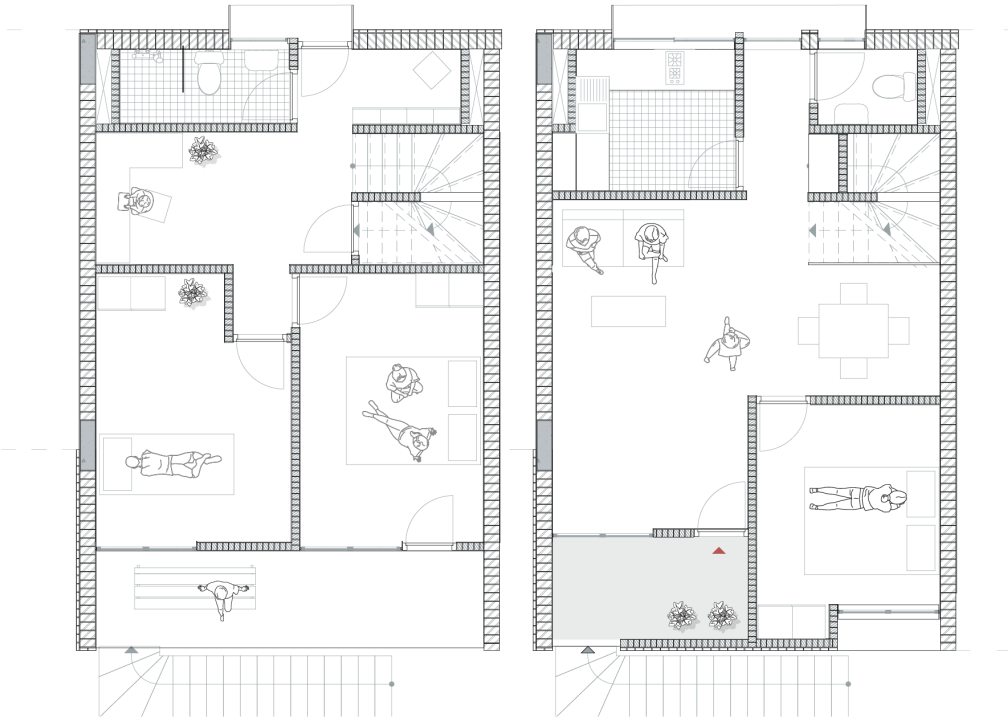


Maisonette 1.1
1BHK - 60 m²
1:100



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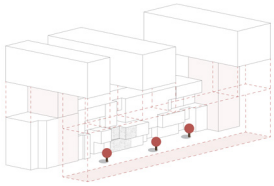
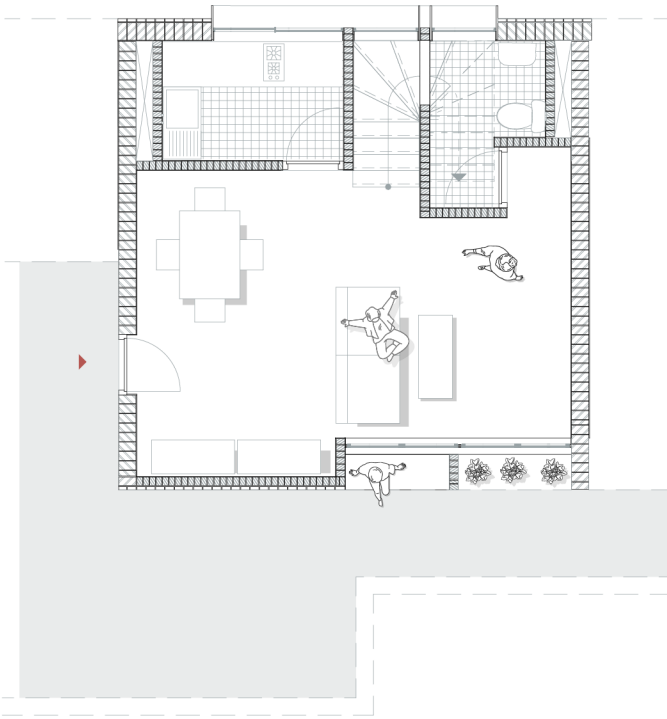
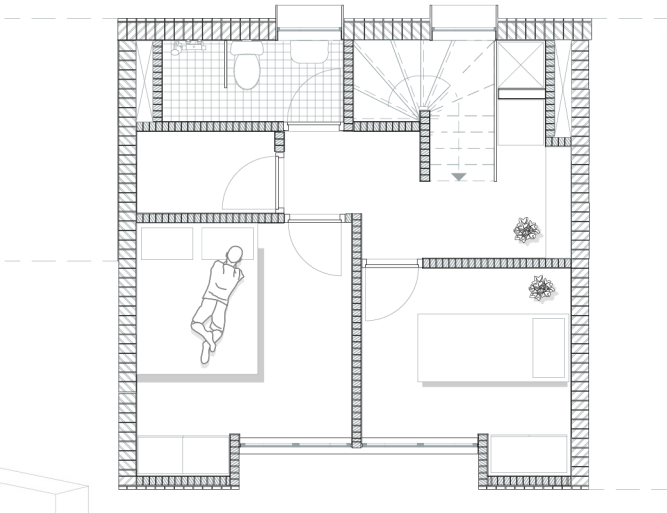
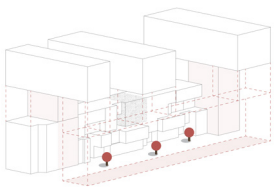


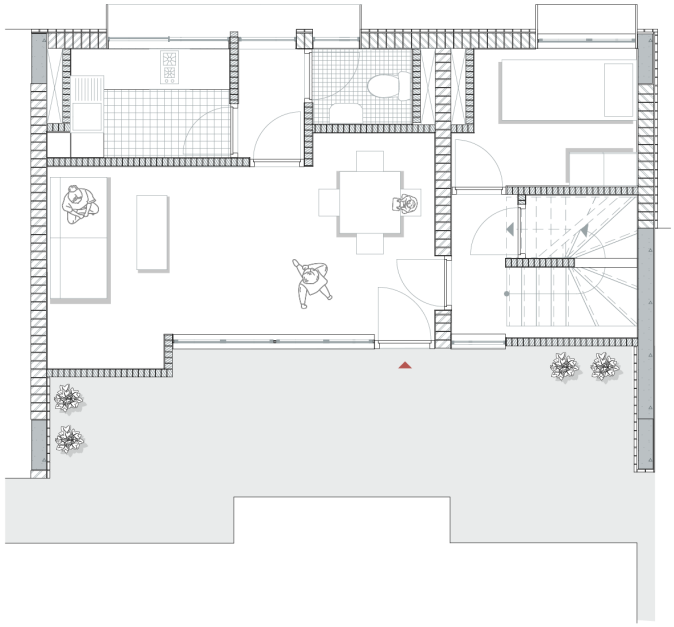
Maisonette 1.2
3BHK - 95 m²
1:100



Maisonette 2.1
2BHK - 72 m²
1:100



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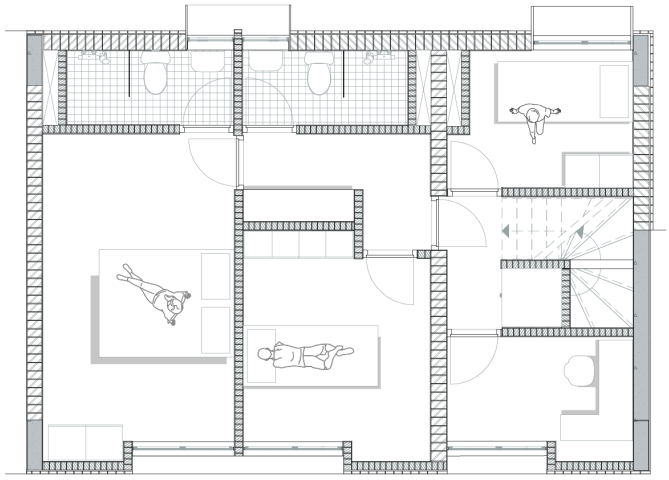

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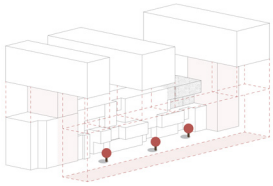
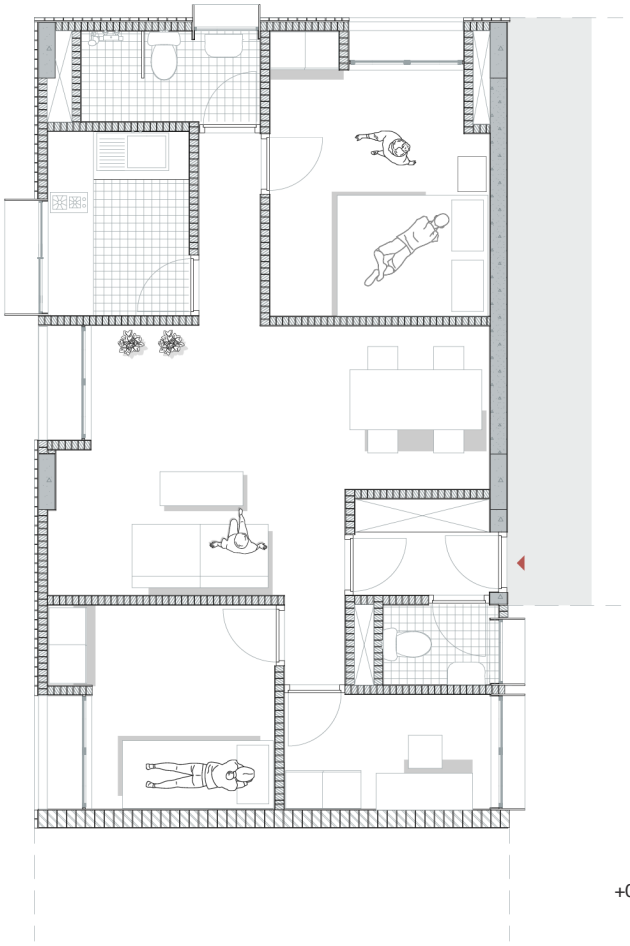
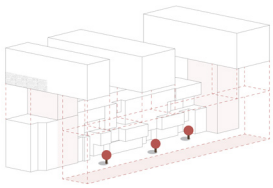
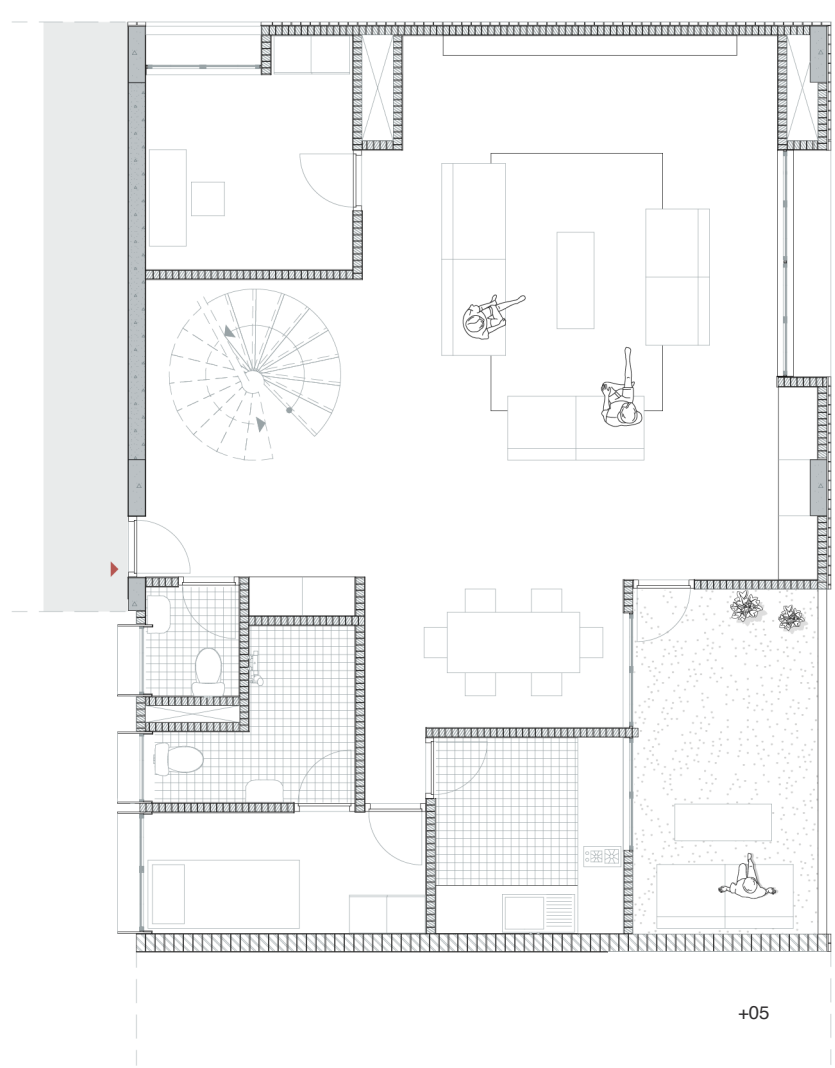


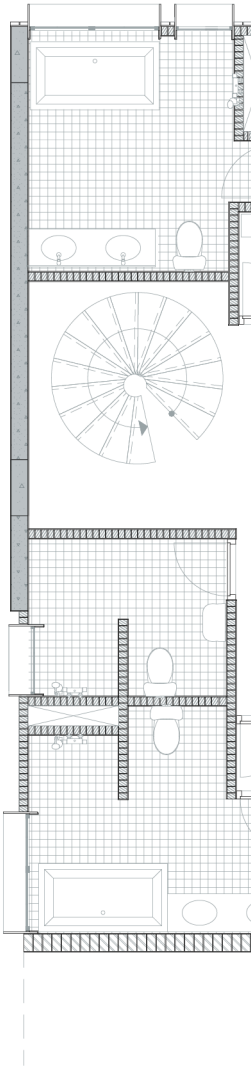
Maisonette 2.2
4BHK - 100 m²
1:100

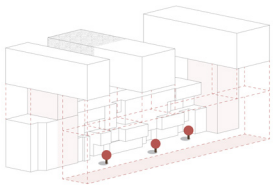


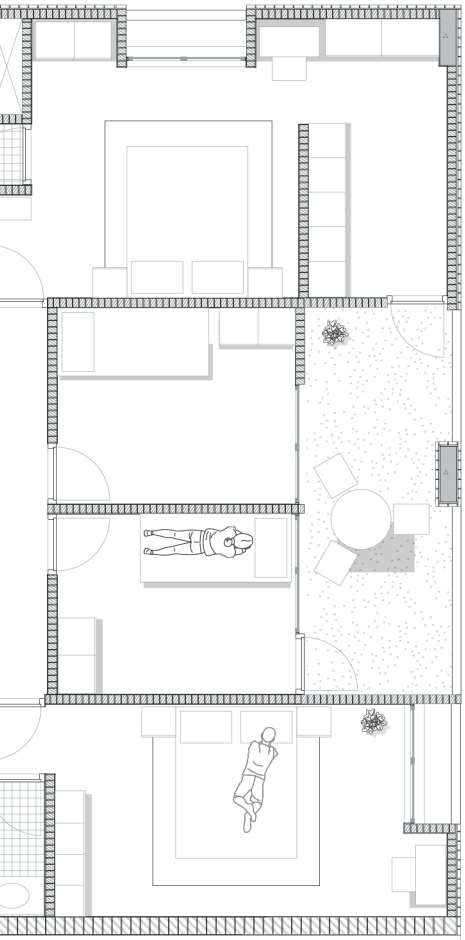
Apartment 1.1
2 BHK - 65 m²
1:100





Maisonette 3.1
5 BHK - 220 m²
1:100

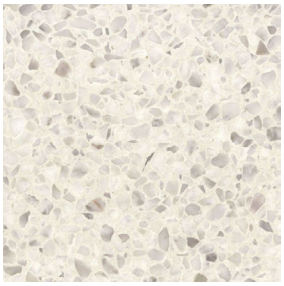


+06



Impression Unit*

*This visualization was originally modeled and composed by the author in ARCHICAD and rendered using Twinmotion. The resulting image was then enhanced and atmospherically refined using AI-assisted tools, including Interstitial and ChatGPT



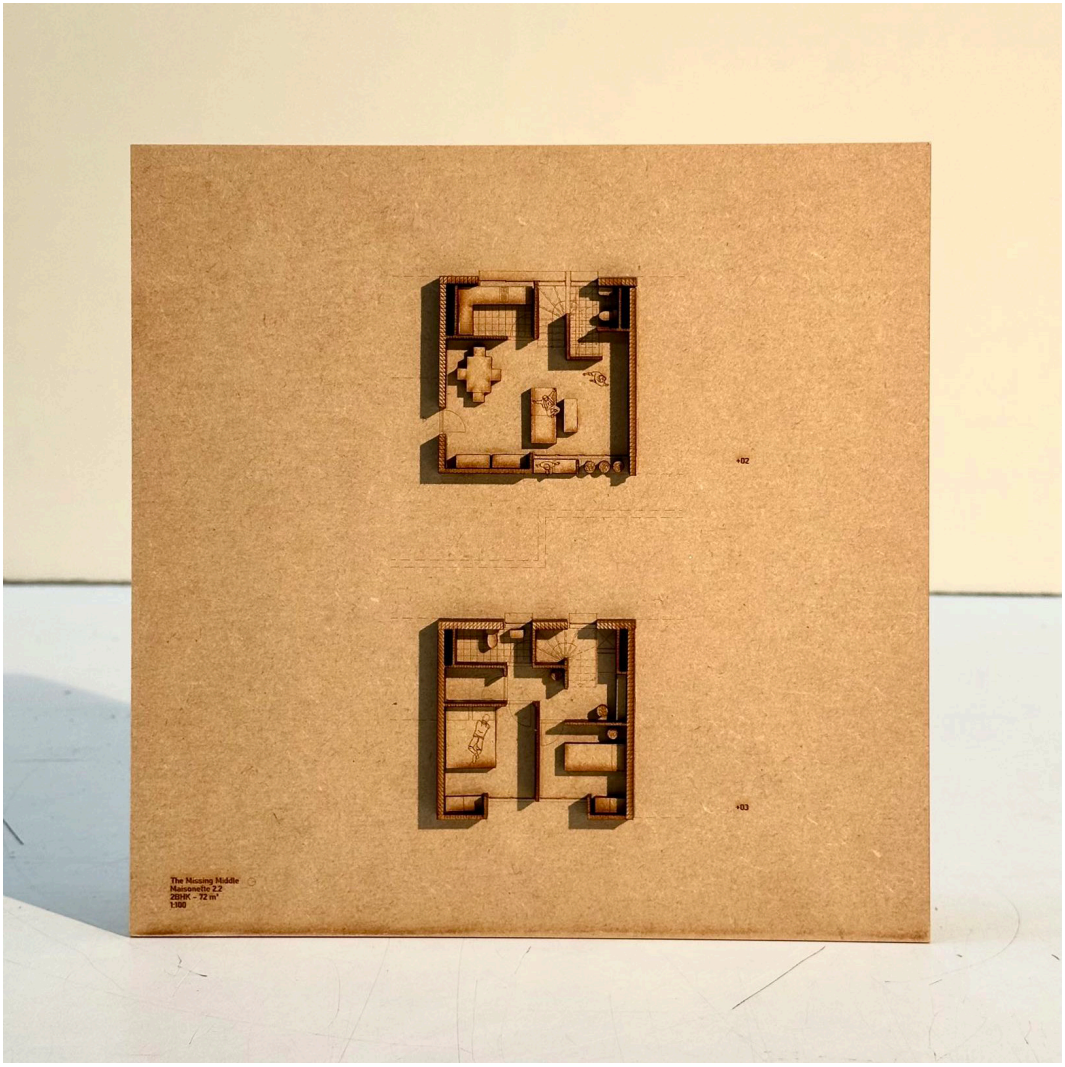








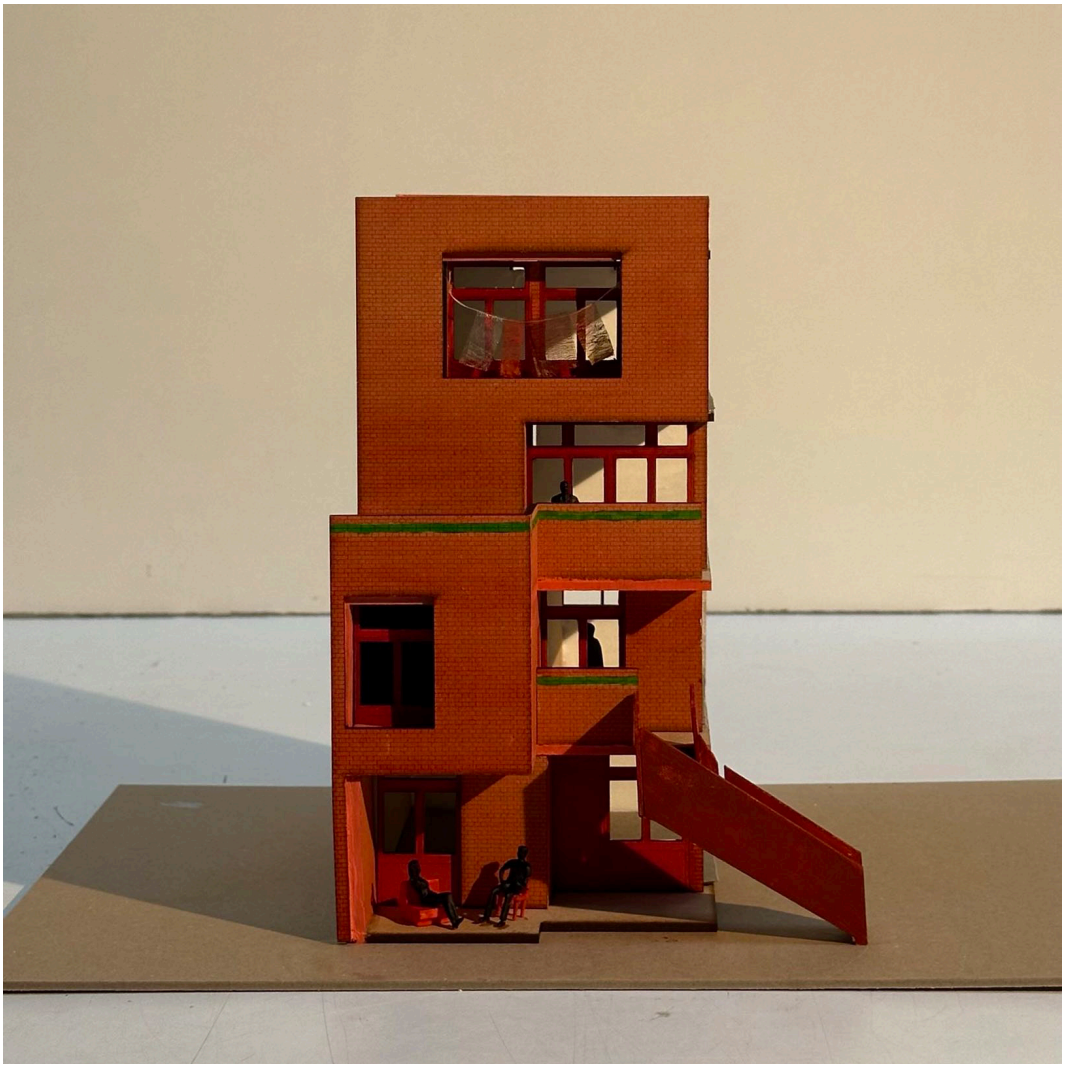
Materialisation Terazzo floor, Plaster wall and ceilling, Red brick wall, Red wood walls
Source: Furnified, Architexture, Istock




Model Maisonette 2.2



Model fragment



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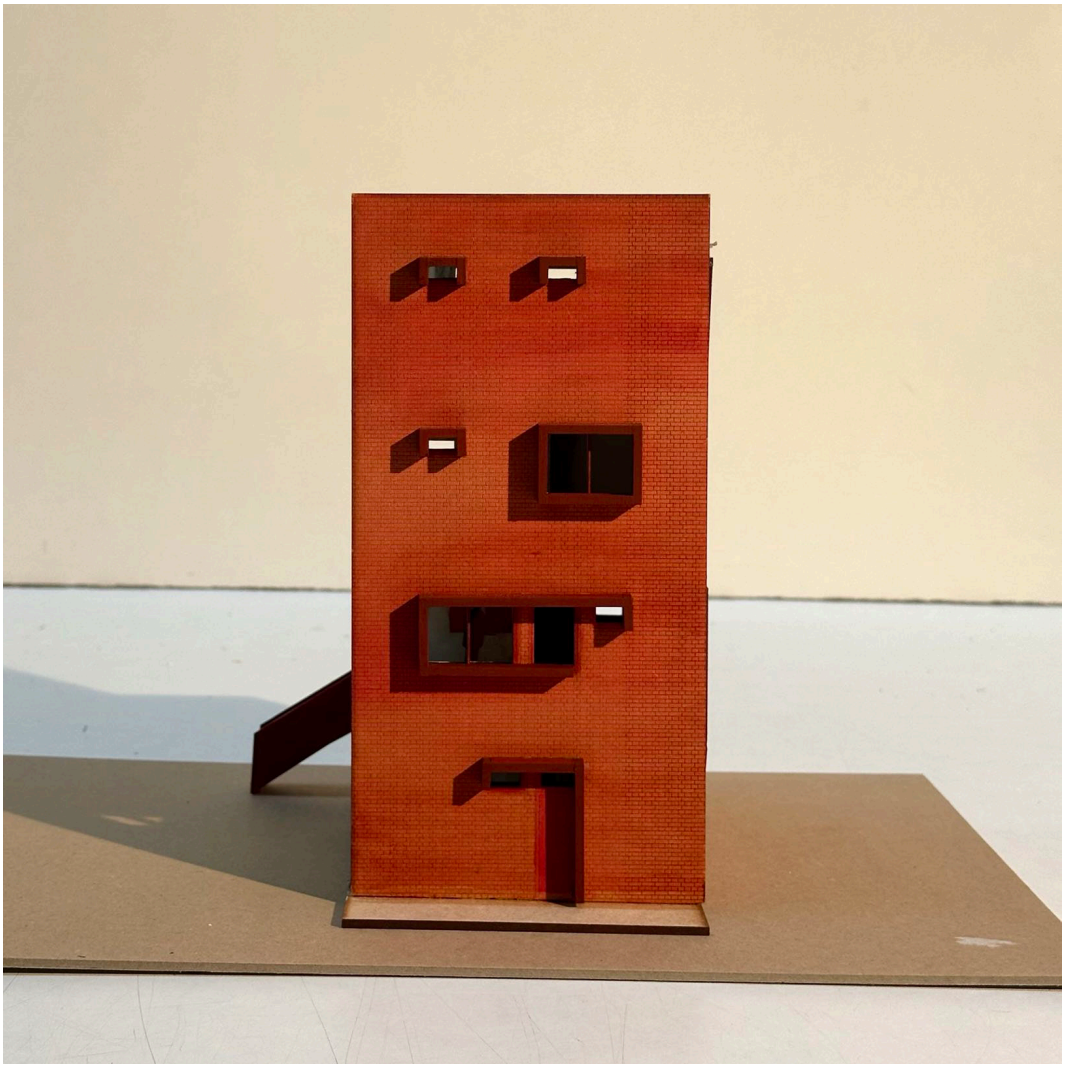

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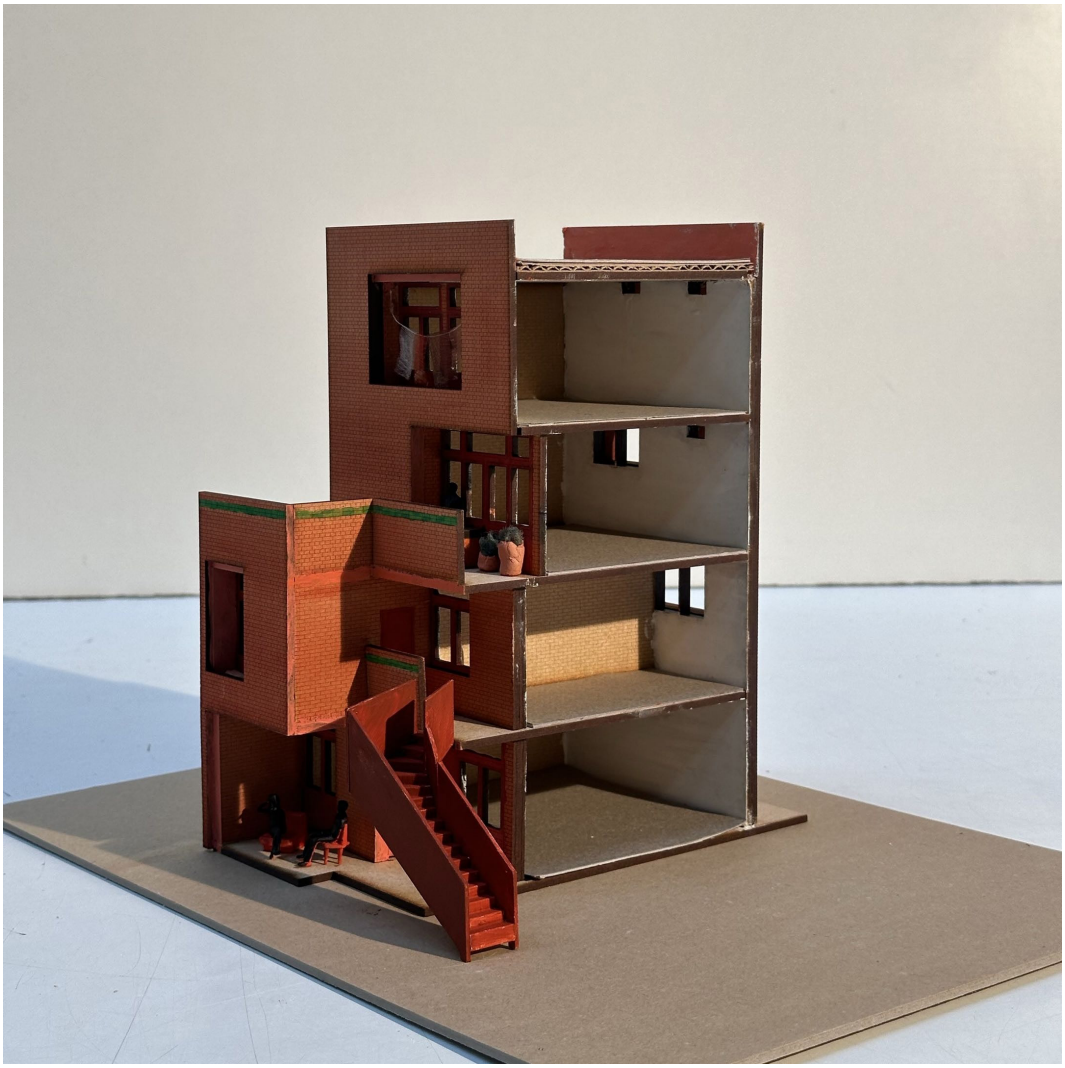

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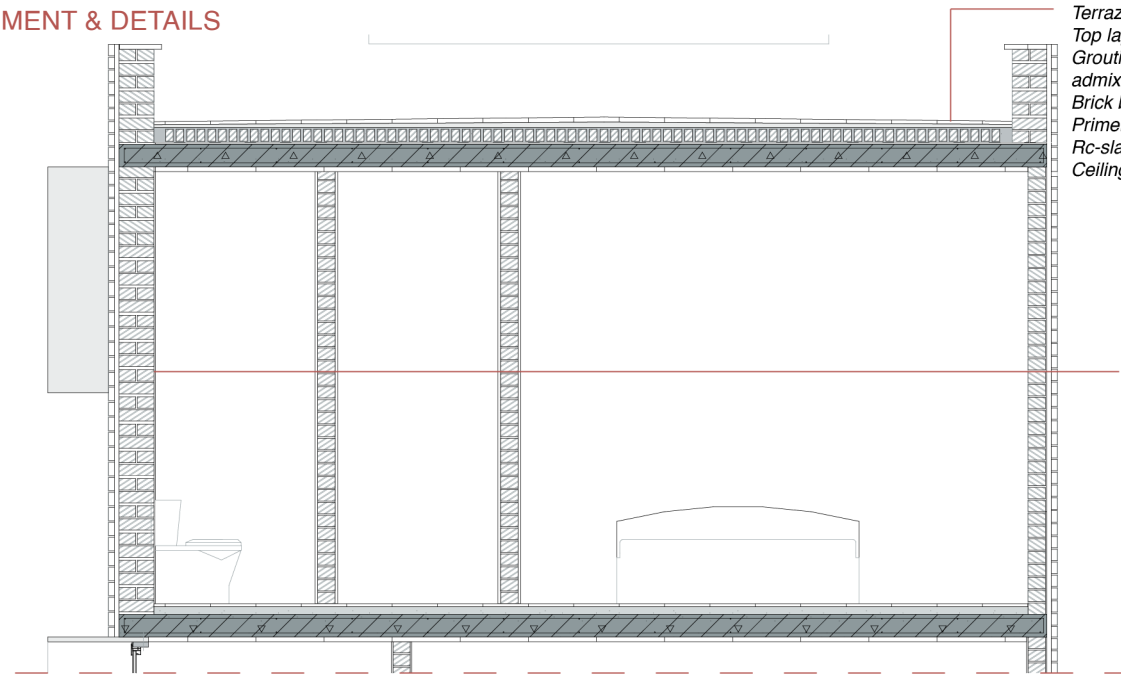
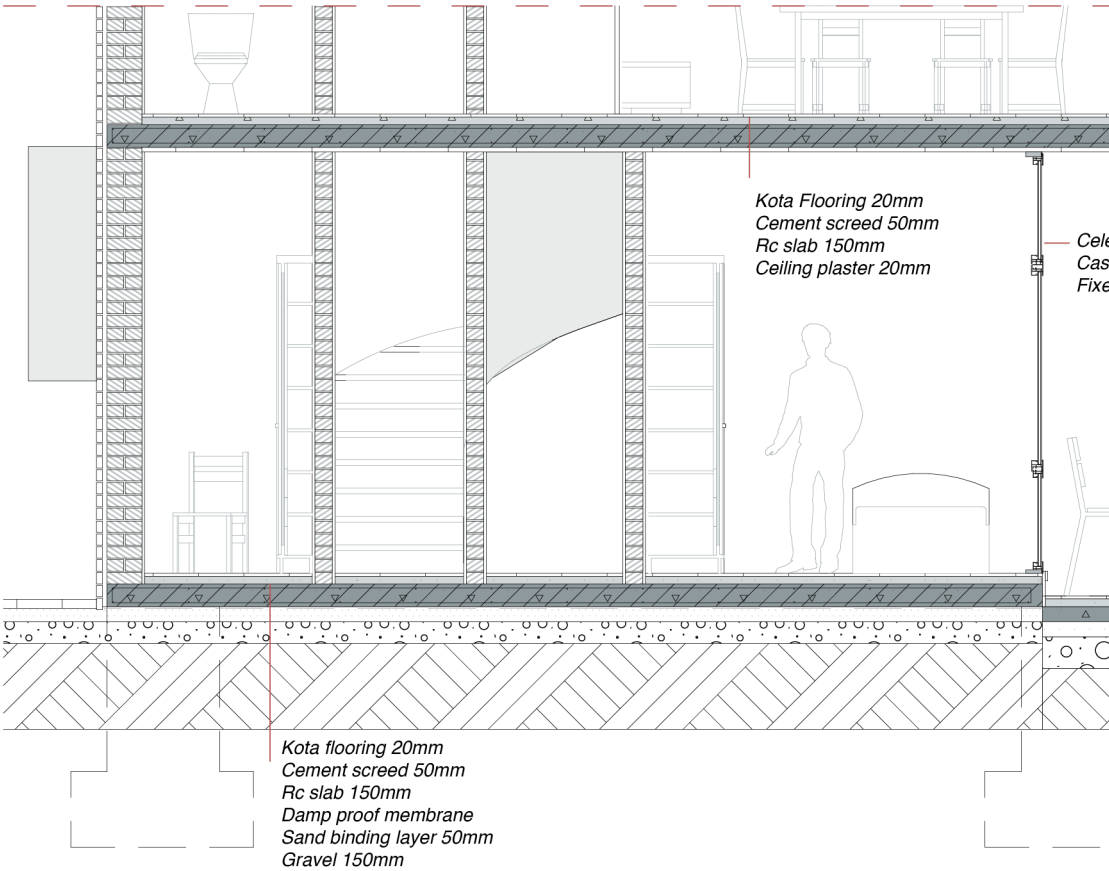



Kota flooring 20mm
Cement screed 50mm
Rc slab 150mm
Damp proof membrane
Sand binding layer 50mm
Gravel 150mm

Fragment
1:50

*o finish 15mm*
*yer plaster 5033*
*ng with waterproofing*
*ture*
*oat coba 100mm*
*r coat 10mm*
*ab 150mm*
*g plaster 30mm*



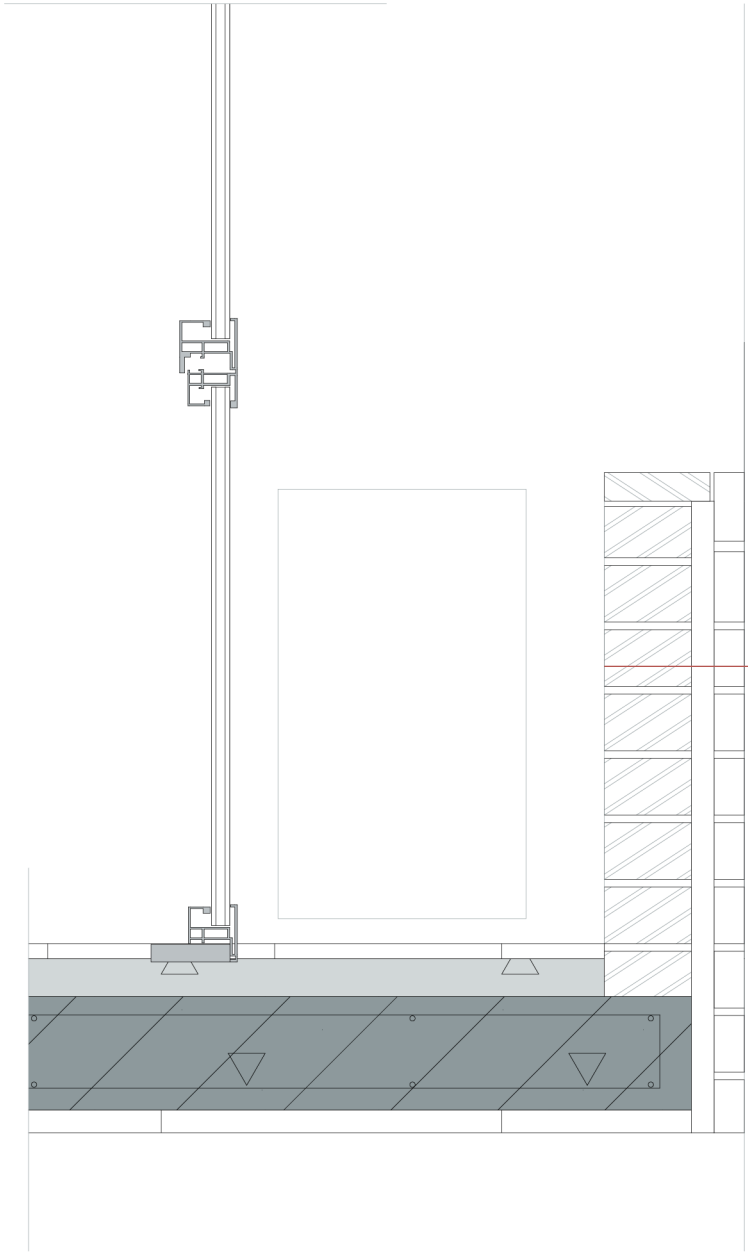
*Brick tiles 10mm*
*Adhesive mortar 10mm*
*Load bearing brick*
*masonary wall 230mm*
*Finishing plaster 10mm*



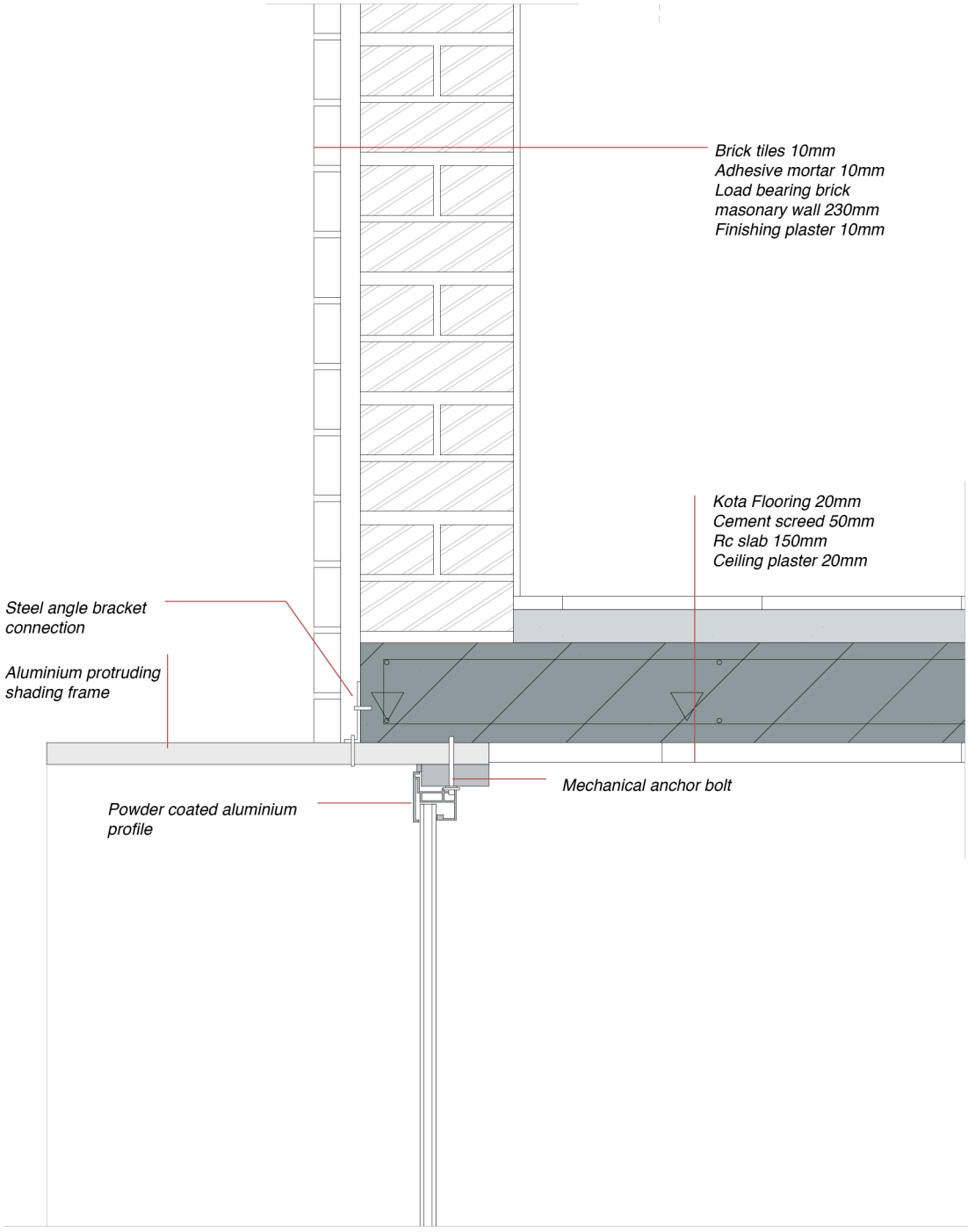


*estory window*
*ement window*
*ed glazing*

*Brick paving 60mm*
*Bedding sand 40mm*
*Gravel 150mm*

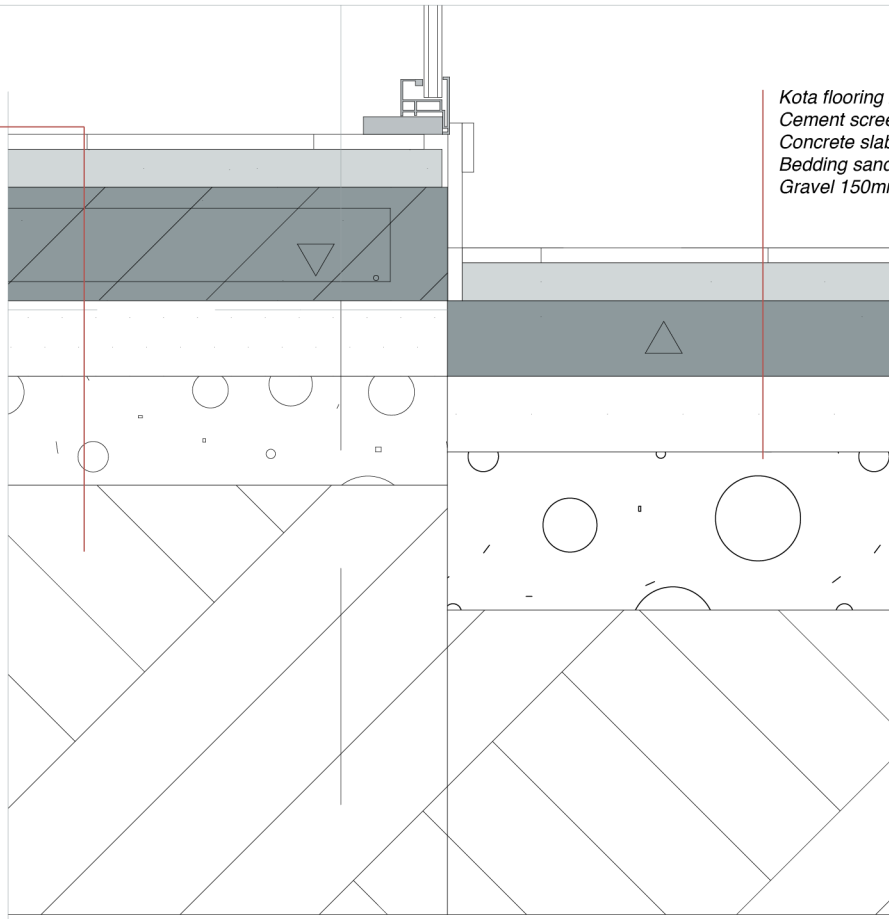



Micro balcony aluminium window
detail
1:10

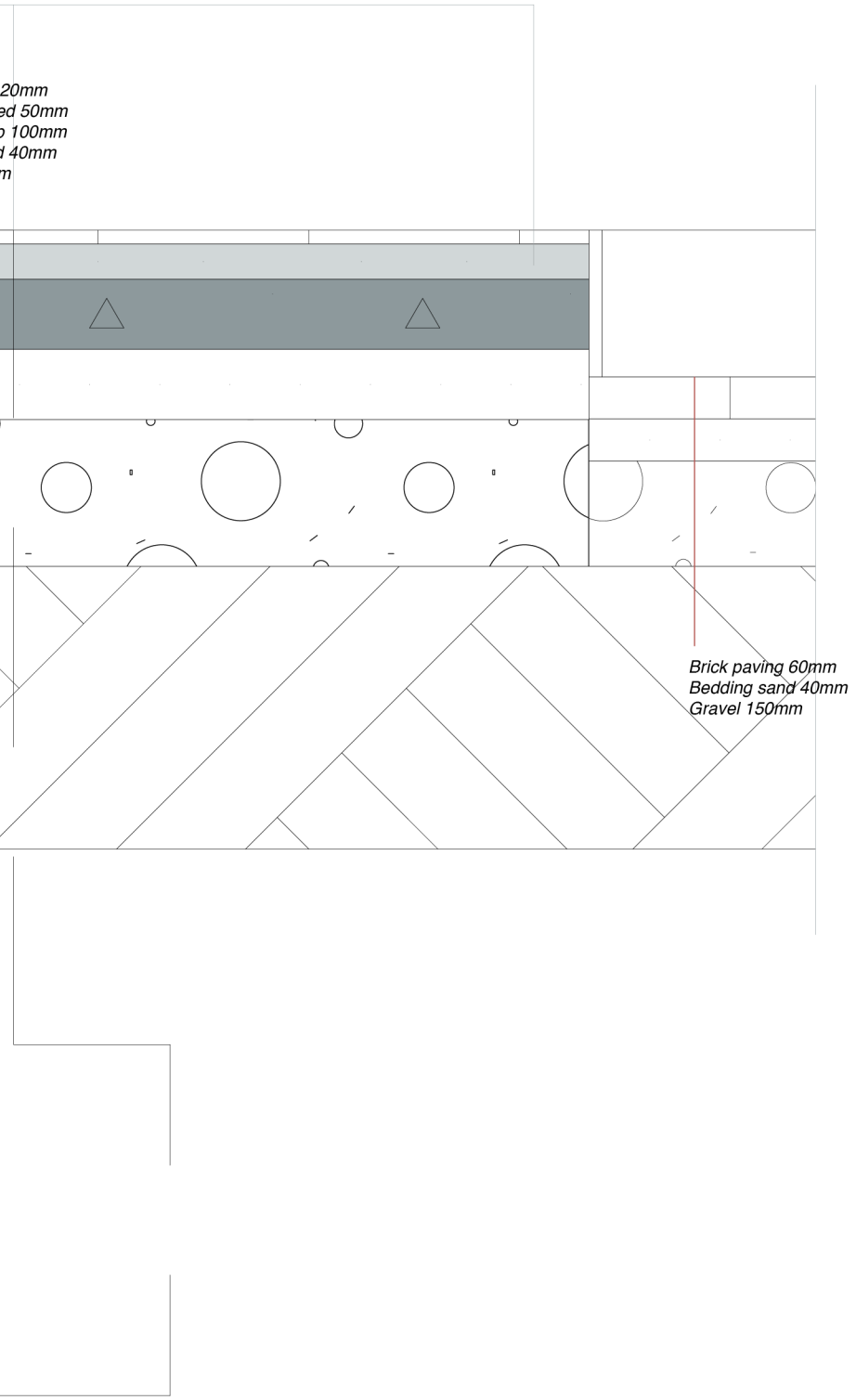


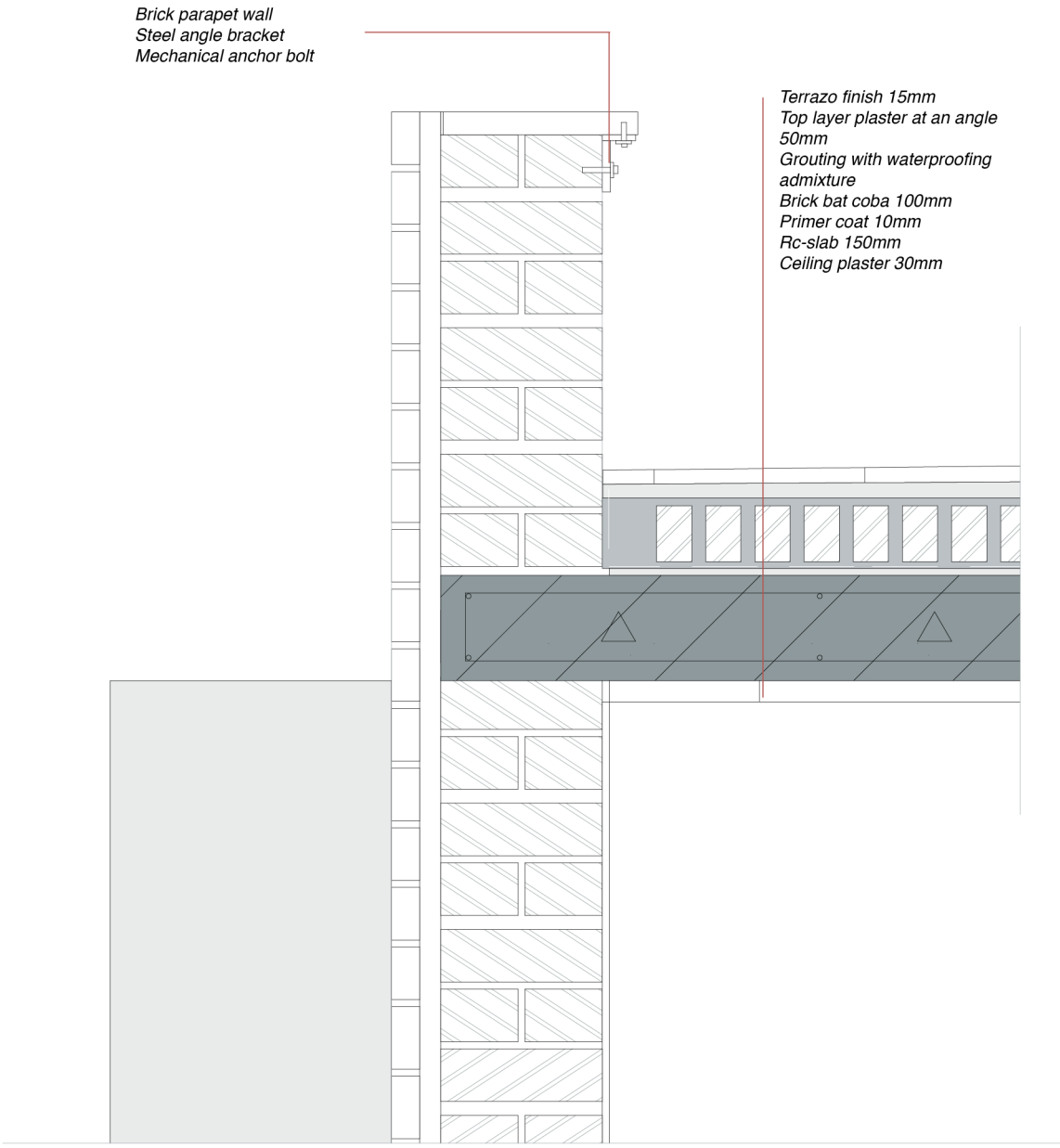

Aluminium window and sun-shading detail
1:10

*Kota flooring 20mm*
*Cement screed 50mm*
*Rc slab 150mm*
*Damp proof membrane*
*Sand binding layer 50mm*
*Gravel 150mm*

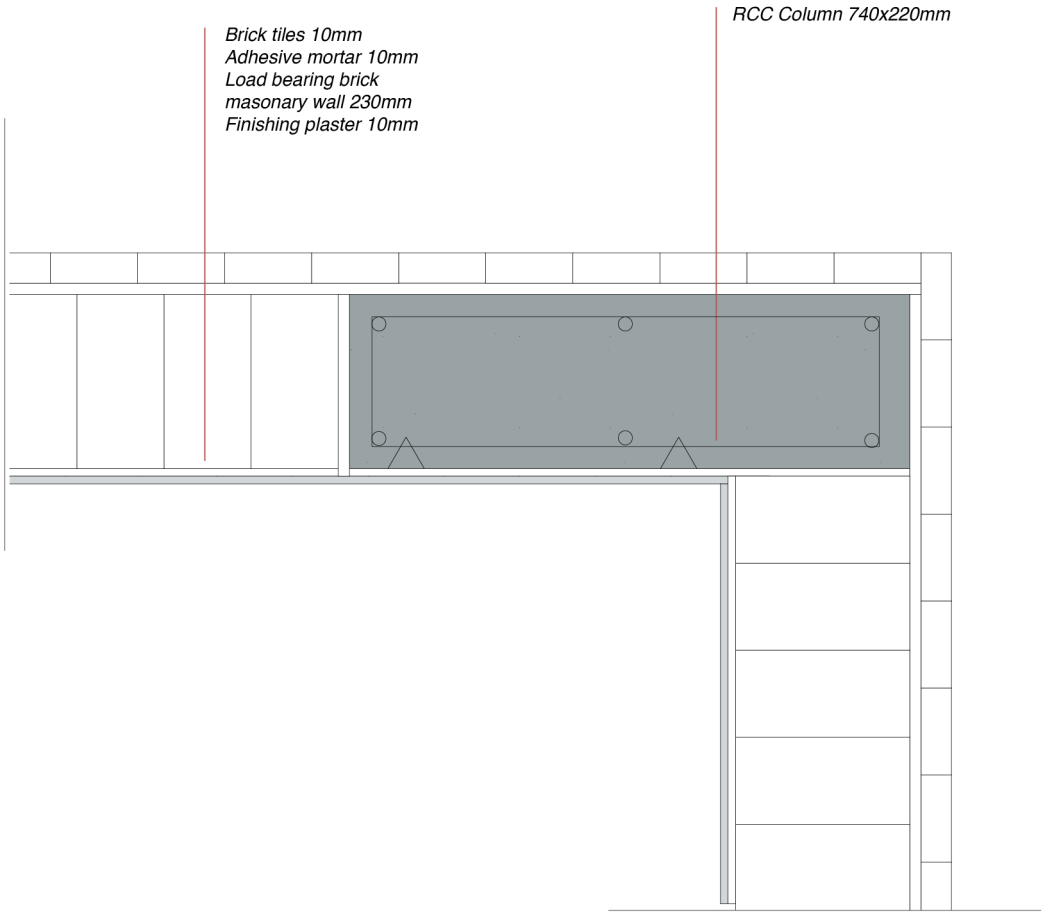



Ground floor and otla detail
1:10


20mm
ed 50mm
o 100mm
d 40mm
m
Brick paving 60mm
Bedding sand 40mm
Gravel 150mm




Roof detail
1:10




Horizontal detail column hidden in brick facade
1:10

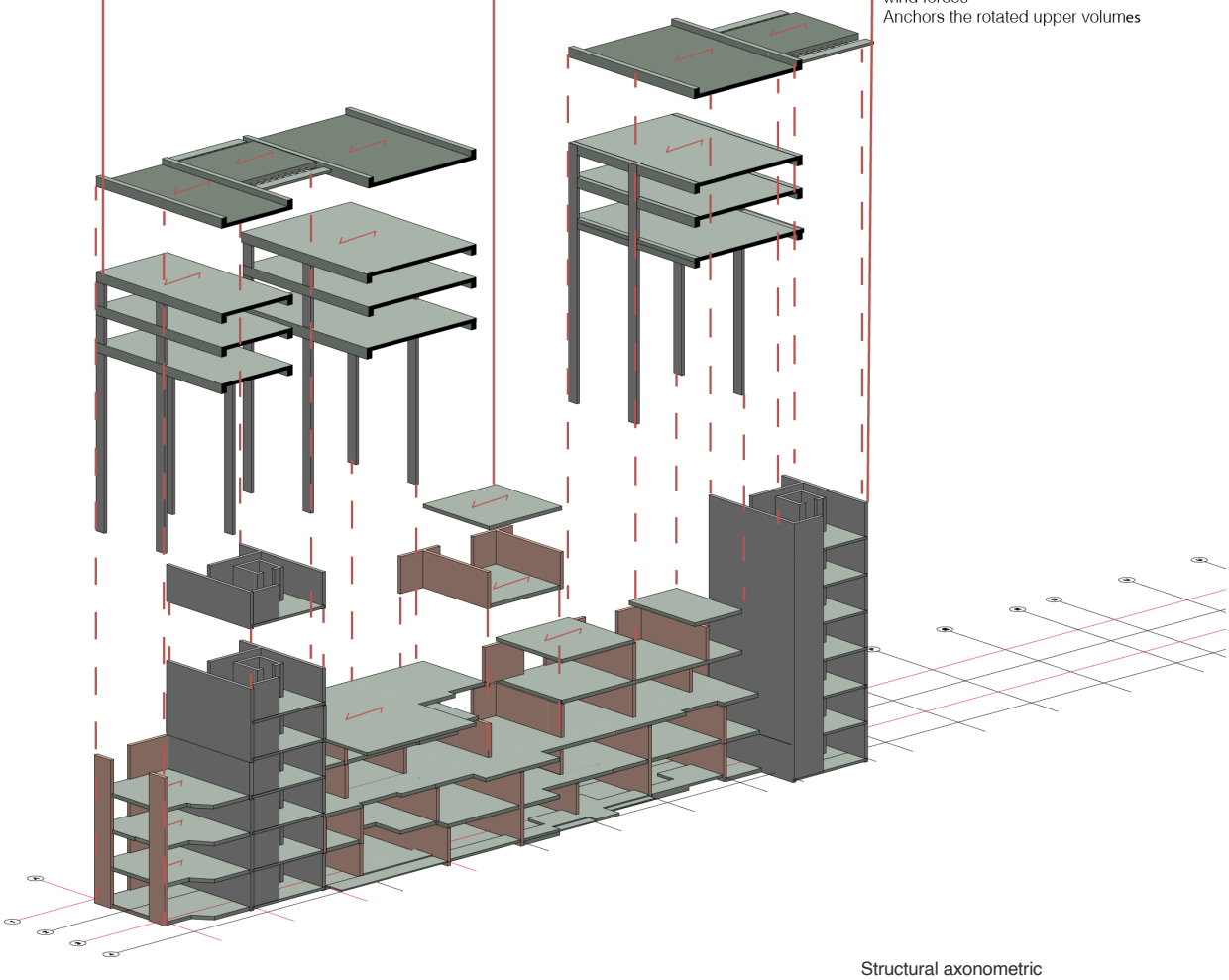
## STRUCTURAL STRATEGY

The structural strategy of this project is seen in its hyrbid structural system combining 230 mm load-bearing brick constrution with reinforced concrete elements for the lower G+3 housing clusters accomadating 6m intervals. While for the upper rotated housing volumes, larger spans of max 12m are supported by reinforced concrete columns of 740 x 220 mm together with 500 x 800 mm rc beams carrying 150 mm rc slabs. A reinforced concrete core ensures the overall stability of the upper volumes and supports the vertical circulation systems throughout the clusters.

G+3 lower-rise blocks constructed with
load-bearing brick masonry
RCC slabs
RCC tie beams and horizontal bands vertical
reinforcement for improved seismic resistance

RCC frame structure supporting the rotated
upper volumes
RCC beams 800 × 500 mm
RCC columns 74 0 x220 mm and RCC slabs
150mm

RCC circulation and stabilizing core
Provides lateral stability against seismic and
wind forces
Anchors the rotated upper volumes



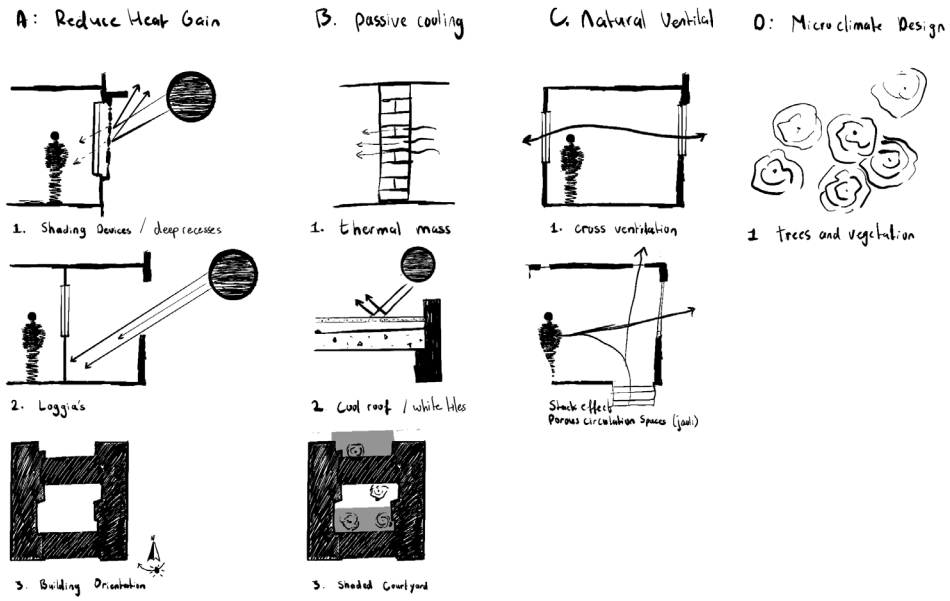
Structural axonometric

## CLIMATIC STRATEGY

Ahmedabad has an extremely hot climate. Various climatic strategies are integrated within this project starting with the building orientation and implementation of shading devises like jaali, deep recessed window elements, loggias, and chajjas to help reduce heat gain and create more comfortable environments. Additionally, this is implemented as setbacks of the first-floor maisonettes create shadow over otlas and thresholds at unit scale.

Secondly passive cooling strategies like thermal massing and cool roof strategies using lighter terrazzo surfaces help reduce heat absorption. Cross ventilation is integrated within the housing units as importance is put on natural ventilation with the stack effect principles being implemented in the vertical circulation cores. Here jaali screens support the ventilation while simultaneously filtering sunlight and maintaining privacy.

Lastly, the integration of vegetation, landscaping and shaded communal spaces are contributing to the creation of more comfortable microclimates.




Diagrams climate responsive design



Climatic Section
1:100



## MANAGERIAL STRATEGY

In terms of the managerial strategy several stakeholder are involved within the project. The plot is LIC-owned reducing part of the financial pressure related to land acquisition. This allows for a more flexible housing strategy.

Additionally, this project is catered towards a mixed target group as well as mixed income groups. The design proposal of the missing middle combines apartments maisonettes, and larger penthouse-like maisonettes units, creating diversity in its typologies and also economically. In this case the higher-income housing units allow for a cross-subsidy strategy helping support the affordability, maintenance, and collective spaces of the development.

Aside from that, within this project there are three parts that generate income. Firstly, within the plinth surrounding the central communal spine of the neighborhood, 2-story commercial spaces are integrated facilitating amenities such as shops, café, restaurants and more. This does not just create a lively environment throughout the day but also supports the local economy by generating income. Currently, the Bimanagar neighborhood is predominantly residential making this type of open commercial spaces attractive for residents from surrounding neighborhoods as well. This also increases the attraction towards the two larger facilities located on the edge of the site, which generate additional income used to maintain the neighborhood.

This generated income contributes to the long-term maintenance and management of the communal courtyards, circulation space, and the public areas within the developments. Over time this helps ensuring the activity and accessibility of the communal spaces and the overall livability of the neighborhood.

# PART IV - CONCLUSION AND DISCUSSION

## CONCLUSION

Ahmedabad is facing rapid urbanization and population growth while also tackling increased land scarcity leading to immense pressure on housing developments. As a response, contemporary high-rise developments are increasingly taking over the skyline . While these developments succeed in creating large quantities of housing, they often prioritize efficiency and density over spatial and programmatic quality. Spatially, they take the form of repetitive isolated towers that are disconnected from each other, the street and the neighborhood. Ground levels are often dominated by vehicular use and gates around the sites limit the interaction between residents and the neighborhood. A sense of belonging is hard to find which strongly contrast with the traditionally embedded low-rise, high-density neighborhoods within Ahmedabad. These neighborhoods show how people in Ahmedabad naturally use the streets throughout the day, as long as the spatial and climatic conditions support it. Streets, courtyards, and thresholds remain active and continuously support social interaction and everyday life with it residents feeling connected to and in ownership of the public spaces.

Through, fieldwork observations, case study analysis, comparative analysis, and architectural exploration, this graduation project investigated how the spatial and social qualities found within Ahmedabad's and other global low-rise environments could coexist with the density often achieved through contemporary high-rise developments. The project therefore explored "the missing middle" as an alternative housing approach in which housing as habitat with a balance between density and livability was investigated.

The final design translates "the missing middle" through a G+6 mid-rise housing proposal organized around courtyards, thresholds, collective circulation spaces, and climate-responsive design strategies. Catering towards a mixed group of intergenerational families, nuclear

families and young adults, the design combines various maisonette and apartment typologies with multiple circulation systems, creating diversity not only in housing typologies, but also in the ways residents interact with each other and their surroundings. Additional upper housing volumes increase density(2.51 FSI and 0.50 GSI) while simultaneously generating shaded communal spaces below, responding to Ahmedabad's hot climate. Across neighborhood, cluster, and unit scale, the project aims to create housing as habitat through active ground conditions, collective spaces, incremental possibilities, and inhabitable thresholds that support everyday social interaction and daily life.

Ultimately, this graduation project argues that increasing density and achieving a high FSI do not have to come in the form of isolated high-rise developments. Instead, the research demonstrates how spatial and programmatic qualities found in low-rise housing neighborhoods, can still exist at neighborhood, cluster and unit scale,within a denser housing model.

## IMPLICATIONS AND RECOMMENDATIONS

The research conducted on the "missing middle" highlights the importance of approaching housing as habitat. This approach goes beyond seeing housing purely through quantitative density metrics such as FSI, GSI, or a given amount of units per square meter. As an efficient response to rapid urbanization and housing shortages plentiful contemporary developments in Ahmedabad take the form of repetitive stacked and often isolated high-rise tower. This research demonstrated how this often comes at the cost of spatial quality, social cohesion, and the overall connection between users and their environment. The findings indicate that future housing developments within growing cities like Ahmedabad should value spatial quality, living environments, and collective interaction as much as maximizing density. They should aim to create meaningful environments and a sense of belonging for residents, as the success of a housing development ultimately depends on how people experience, inhabit, and interact with it.

Additionally, this research demonstrates "the missing middle" as an alternative housing approach where density and livability coexist. Key findings underline valuable qualities for future housing developments, such as thresholds, mixed-use environments, collective circulation, communal spaces, and opportunities for incremental change.

Another significant implication of this research is the importance of fieldwork and contextual understanding of the site within the architectural profession. A thorough understanding of the context is essential to design something valuable and fitting within the climate, culture, and users' everyday routines. This is especially important as an outsider. Many of the spatial and social qualities identified throughout this research and project could only truly be understood by physically observing and experiencing Ahmedabad, once again highlighting the value of research-driven and context-sensitive design

approaches.

Lastly, this graduation project lays the groundwork for further research into missing middle housing models within rapidly growing cities, investigating its application on larger urban scales and the long-term sustainability of housing as habitat.

## REFLECTION

Closing my academic chapter with a graduation project focused on global housing has been one of the most valuable decisions throughout my architectural education. During my bachelor, I mostly focused on housing and the Dutch built environment, while during my master's I decided to step outside of my comfort zone and intentionally explored other studio's. Returning to housing during graduation therefore felt nostalgic and meaningful. However, the Global Housing Graduation Studio became much more than simply designing housing. Throughout the process, I learned not only about housing in general, but specifically about designing the context of Ahmedabad, India.

One very important lessons this studio has thought me was the significance of physically experiencing the place and people for whom one designs. The field trip to India, together with the workshops organized by CEPT University, fundamentally changed my understanding of housing and architecture. It showed me how housing is more then just a roof over you head. Housing also became addressing the climate, the culture, creating meaningful places for social interaction and daily routines. I learned how to formulate and validate architectural opinions through research and spatial analysis, while continuously critically questioning my own approach throughout the process.

During the start of this studio, I was mostly focused on a few key themes mentioned in the studio manual. Rapid urbanization, population growth, and low rise,

high-density housing as a design principle. However, unlike the assignment suggested my initial reaction was immediately to think of skyscrapers. I have always been intrigued by the idea of skyscrapers, as the scarcity of housing in the Netherlands has always been a major topic even during my high school years. Something that forever will stay with me is a conversation I had with my history teacher, who argued how simply building higher would solve housing shortages. However, that never fully convinced me. I remember thinking that stacking people vertically does not address how those people actually use streets, amenities, public spaces, and infrastructure while these are all essential parts of everyday life. With this driving force I started researching contemporary middle- and high-rise housing developments in Ahmedabad and quickly noticed recurring patterns of repetitive towers with little attention to collective life, public space, or amenities. This was unlike the qualities, such as social interaction, active streets, courtyards and a strong sense of ownership that traditionally could be found in the low-rise housing of Ahmedabad. This realization ultimately led me to exploring 'the missing middle' as the central theme for my graduation project. Rather than positioning the missing middle as a single perfect solution, I wanted to explore it as an alternative approach in which density could be achieved without losing the qualities of low-rise housing that I had researched and observed.

This studio also thought me once again how the design process is never linear, as it continuously required me to move back and forth between research, analysis, reflection, and redesign. However, this also strengthened my architectural position and persistence.

Looking back, this graduation project has reshaped my understanding of architecture and strengthened my confidence moving forward as a designer where I want to be able to create meaningful environments where user can create even more meaningful stories.

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