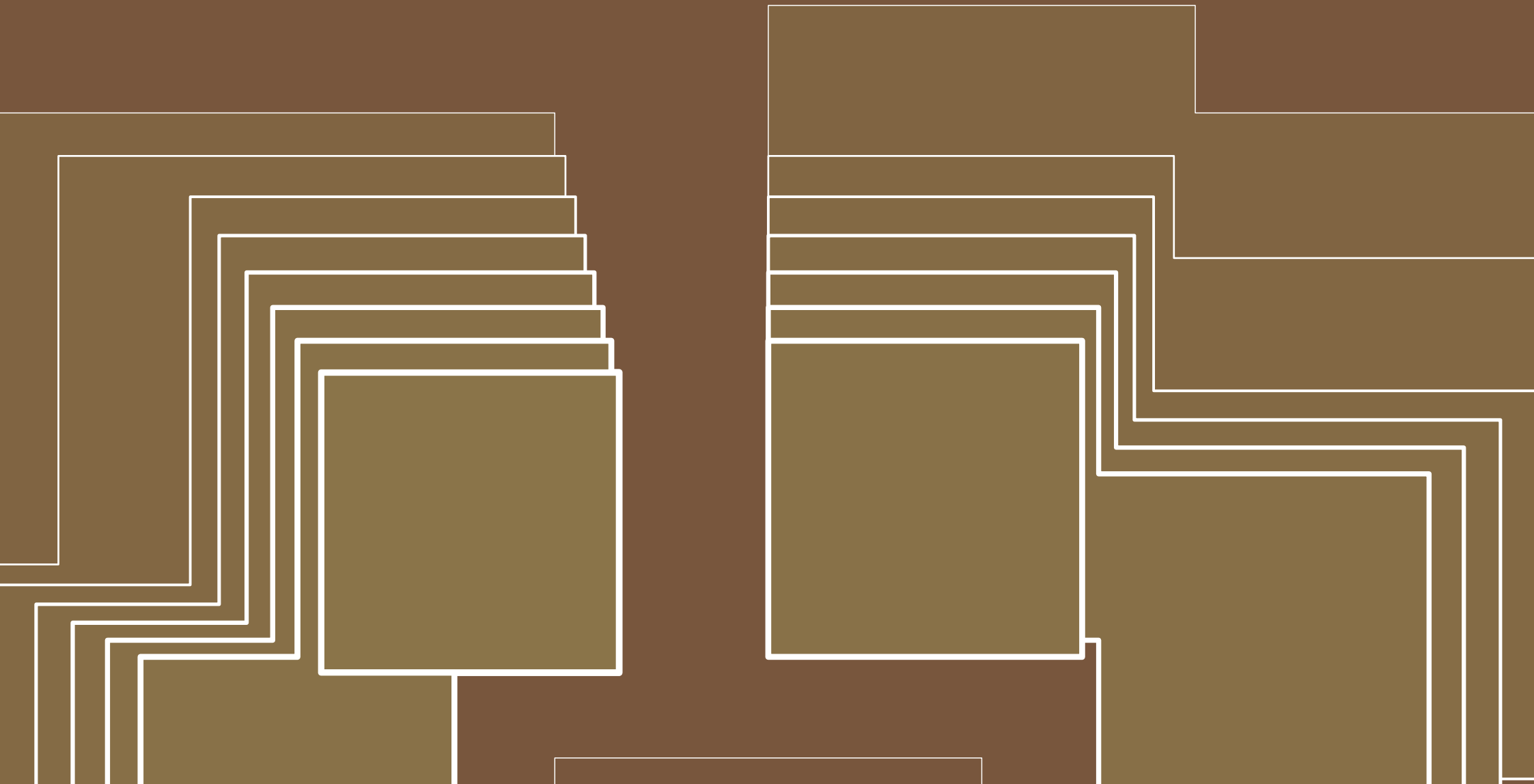
Transition Habitats

Freek van Schaik



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At the beginning of the course, we (the students) dove into the rich context of Bangladesh. From there, each student had to choose a research topic related to architecture which would form the foundation of the graduation research and design.

Soon I came to the conclusion that I was quite interested in the country's architectural history in relation to processes that are currently happening there. Urbanisation for example is reshaping Bangladesh' urban fabric and architecture. After exploring various researches about this theme, the ideology behind the cultural, social and climatic significant transition spaces caught my attention. Reading about how these spaces are prone to become overlooked in the future due to the cities' residential boom, made me eager to focus on this topic in my design.

On the next few pages, an introduction to the importance of transition spaces in Bangladesh is given as well as the problems urbanisation is causing to these spaces and an overview of my research plan. Information in text is supported by photographs personally taken on the field trip in October.

In the research plan, attained knowledge about transition spaces as well as research questions and methodology were written down as a start of the project. Eventually, this helped me throughout the whole process when making design decisions and kept understanding the socio-cultural context.



Transition Colonnade at Bait Ur Rouf Mosque, Dhaka



Transition Entrance hall at Red Mosque Dhaka

Cultural significance
In (South) Asian countries such as Bangladesh, spaces that accentuate transition have been playing a far more crucial role in architecture than in most other cultures (Singh, 2015). This intermediate or third space, holds a transitional quality and is therefore in architecture called the transition space. It's defined by the relationship of the extreme zones it's connecting, like private versus public or internal versus external zones. Since these in-between spaces are so frequently passed through, humans are often not even conscious of the themes it has been signifying for centuries: welcomeness, auspiciousness and prominence.

Social significance
The transition space is full of social and cultural meanings, shaping people's environment and everyday behaviour. For instance, in rural parts of the predominantly Islamic country of Bangladesh, transition spaces like courtyards reinforce the seclusion and segregation of women by influencing the female movement both in public and private spaces (Chowdhury, 1992). Men are able to move freely through the public streetscape, while women avoid open places. Instead they're circulating via the more private courtyards (anginas) where most female activities take place, like cooking and interacting with other women. Another transition space that's found in most of these dwellings, is the front porch (baithak) which is primarily used for receiving male guests. Women mostly don't feel at home in this space although it is a prominent part of their homestead, and thus making an impact on their habits. Like for females, transition spaces also notably influence the lifestyle of children and the elderly by offering a more private space for daily activities and social interactions.

Climatic significance
Besides social and cultural importance, transition spaces are designed to respond to climatic needs of the tropical monsoon climate (Singh, 2015). To illustrate, courtyards provide ventilation and therefore facades facing the street can contain fever openings, enabling more privacy and creating an open, yet private environment. Transition spaces like verandas offer a greater spatial quality by providing protection from harsh sunlight and rainfall. In addition, the direct infiltration of heat and glare into the interior is being prevented by the extended roofs, keeping these indoor spaces cooler. Since the in-between space functions as a buffer zone for (severe) climate conditions, a more comfortable transition for the residents is created and the liveable quality of inside spaces is significantly being improved.



Transition Communal courtyard at Manipuri Para, Sylhet



Urbanisation Mass construction of isolated dwellings, Dhaka

Liveable habitats
Transition spaces are capable of either dividing or connecting spaces since they act as a link between public and private spaces (Singh, 2015). For example, at one level it's able to achieve privacy by not placing entrances in direct contact with exterior spaces. On the other level, interaction is being promoted when the space is enclosed through an in-between space like courtyards. In either way, transition spaces are inevitably at the heart of living in many (South) Asian cultures such as Bangladesh. Late Indian architect Charles Correa even believes that a transition space like an open to sky place can make a significant difference between a liveable habitat and claustrophobia in small (low income) housing. Taking into account the importance of transition spaces in Bangladesh' architecture is therefore crucial. People specific themes like gender, ethnicity, religion and income are all playing a key role in the creation of meaningful transition spaces which affect and operate on various scales: the scale of a dwelling, community and city.

Rapid urbanisation
Bangladesh is undergoing a process of increasingly rapid urbanisation after the country became independent in 1971 (Hasan, 2022). The cities are growing more than twice the rate of the country's rural area, boosting the level of urbanisation from 28% to 56% in the year 2050. Besides population growth, urbanisation is caused by climate-induced migration: humans trying to find desirable opportunities to live in the city while escaping the environmental vulnerabilities and risks like floods and earthquakes arising in the rural areas (Rana & Ilina, 2021). Not only the capital city of Dhaka has absorbed a great share of the new urban population, various secondary cities such as Sylhet, are flooded with migrants from rural parts of Bangladesh and are expected to grow significantly in the future.

Residential boom
The mass migration towards these cities and towns is creating major difficulties, especially in the housing sector (Hasan, 2022). Since the expansion through autoconstruction cannot manage to accommodate the increasing population, local governments and urban planners are obliged to counteract the housing scarcity. Since land in urban areas is valuable and the land shortage is getting more critical everyday, every single piece of land must be planned to be optimally utilised and to house the growing population by enabling density. Only Bangladesh' four biggest metropolitan areas have come up with urban master plans.



Boundary Solid walls in front of higher income dwellings, Sylhet



Boundary Closed gate segregating public and private space, Sylhet

Smaller urban areas like Sylhet are expanding their territory with hardly any development control or vision from the (local) government.

Isolated dwellings
As a result, the realisation of a large percentage of new (middle or higher income) dwellings in the cities are being handled through real estate developers (Nabila, Nazmul, Mian & Saifuzzaman, 2022). The focus of these developers is on mass producing and selling isolated dwellings instead of integrating the entities into the urban fabric. Little positive contribution to their surroundings is being made due to the structures concentrating primarily on their individual plots and neglecting the streetscapes around it. Developers underestimate the influence of architectural transition space between internal and external space, and therefore don't pay attention to enhancing people's experience through improving the urban built environment. It comes as no surprise that the implementation of transition spaces are frequently being overlooked.

Solid boundaries
Public and private spaces are often completely separated through the use of solid boundary walls and closed gates in the plinths of new residential buildings for privacy and security purposes. Sadly, these features are creating inactive street edges where anti-social behaviour and street crime are more likely to occur instead of becoming a place for informal social gatherings by small groups of people which adds life to the streets. Besides, these spaces often transform into trash dumping zones or parking space, which worsens the road condition. Since street edges are the first points of contact between the private house and the public outside, it has great capabilities of creating meaningful transition spaces (Singh, 2015). Well designed transition spaces have proved for centuries that it offers social, cultural and climatic benefits which impacts the urban context positively. Therefore, the mass construction of isolated residential structures accompanied by little attention to street edges, forms a threat to one of the most crucial elements of Bangladesh' architecture: the transition space.

Replicable situation
This research will be valuable to contribute to the discussion about the decreasing implementation and importance of transition spaces in locations where these are also part of architectural culture like in India. The already existing literature and new findings regarding transition spaces in Sylhet



Transition Communal courtyard in rural village, Sonargaon



Transition Veranda as threshold in rural village, Tahirpur

during the fieldwork, will offer new insights into the subject matter which is relevant and replicable for other parts of Bangladesh, (South) Asia and the Global South.

Main research question
Since a well thought through transition space of a building impacts the surrounding built environment and its people, it must be an architect's duty to adequately design such a space. Therefore, the designer must have knowledge about the social, cultural and climatic function of a qualitative transition space in relation to the specific site. In my case, it concerns a dwelling in Sylhet, Bangladesh. This leads me to my main question: 'How should transition spaces of dwelling practices in Sylhet be designed in order to positively impact its surroundings?'

Sub research questions
Firstly, to answer this question, it must be clear what types of transition spaces are impacting the surrounding urban built environment. Courtyards and verandas are examples of those, but what other kind of spaces can be identified as transition spaces. . Investigating borders and boundaries that influence the use/lack of various qualitative transition spaces in Sylhet is therefore crucial. Thus my first sub question: 'What types of transition spaces, in relation to borders and boundaries, can be found in Sylhet that positively impacts its surroundings?'

Secondly, we must know what defines transition spaces that are positively impacting the urban surroundings. Understanding themes such as social activity, culture and climate in Sylhet, is critical before starting to design transition spaces on different aspects and various scales. Therefore my second sub question: 'What is the thematic essence of transition spaces situated in Sylhet that positively impact its surroundings?'

Lastly, after knowing what different kinds of transition spaces are discoverable in Sylhet, there must be a clear overview of the architectural elements that are enabling borders, boundaries and transition spaces to positively impact its urban context. Aspects such as formation, dimension, porosity, tangibility and visibility, should be analysed. Hence my third sub question: 'What architectural characteristics give transition spaces in Sylhet the ability to positively impact its surroundings?'



Transition Spaces

'This whole, seemingly transitional space might be irrelevant in many cultures, but in Asia, we perceive water, the courtyard and in the end, the notion of life, in a very different way.' **Lyndon Neri**

Research Plan
Freek van Schaik



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Research Plan
Freek van Schaik

Global Housing
Sylhet, Bangladesh
November 2023

Dr. Rachel Lee
Dr. Nelson Mota
Ir. Rohan Varma

Introduction 03

In (South) Asian countries such as Bangladesh, spaces that accentuate transition have been playing a far more crucial role in architecture than in most other cultures (Singh, 2015). This intermediate or third space, holds a transitional quality and is therefore in architecture called the transition space. It's defined by the relationship of the extreme zones it's connecting, like private versus public or internal versus external zones. Since these in-between spaces are so frequently passed through, humans are often not even conscious of the themes it has been signifying for centuries: welcomeness, auspiciousness and prominence.

The transition space is full of social and cultural meanings, shaping people's environment and everyday behaviour. For instance, in rural parts of the predominantly Islamic country of Bangladesh, transition spaces like courtyards reinforce the seclusion and segregation of women by influencing the female movement both in public and private spaces (Chowdhury, 1992). Men are able to move freely through the public streetscape, while women avoid open fields and roads. Instead they're circulating via the more private courtyards (anginas) where most female activities take place, like cooking and interacting with other women. Another transition space that's found in most of these dwellings, is the front porch (baithak) which is primarily used for receiving male guests. Women mostly don't feel at home in this space although it is a prominent part of their homestead, and thus making an impact on their habits. Like for females, transition spaces also notably influence the lifestyle of children and the elderly by offering a more private space for daily activities and social interactions.

Besides social and cultural importance, transition spaces are designed to respond to climatic needs of the tropical monsoon climate (Singh, 2015). To illustrate, courtyards provide ventilation and therefore facades facing the street can contain fewer openings, enabling more privacy and creating an open, yet private environment. Transition spaces like verandas offer a greater spatial quality by providing protection from harsh sunlight and rainfall. In addition, the direct infiltration of heat and glare into the interior is being prevented by the extended roofs, keeping these indoor spaces cooler. Since the in-between space functions as a buffer zone for (several) climate conditions, a more comfortable transition for the residents is created and the liveable quality of inside spaces is significantly improved.



01 Communal courtyard at Manipuri Para, Sylhet

Introduction 04

Transition spaces are capable of either dividing or connecting spaces since they act as a link between public and private spaces (Singh, 2015). For example, at one level it's able to achieve privacy by not placing entrances in direct contact with exterior spaces. On the other level, interaction is being promoted when the space is enclosed through an in-between space like courtyards. In either way, transition spaces are inevitably at the heart of living in many (South) Asian cultures such as Bangladesh. Late Indian architect Charles Correa even believes that a transition space like an open to sky place can make a significant difference between a liveable habitat and claustrophobia in small (low income) housing. Taking into account the importance of transition spaces in Bangladesh' architecture is therefore crucial. People specific themes like gender, ethnicity, religion and income are all playing a key role in the creation of meaningful transition spaces which affect and operate on various scales: the scale of a dwelling, community and city.



02 Various courtyards and verandas, Bangladesh



03 Mass construction of isolated dwellings, Dhaka

Problem 05

Bangladesh is undergoing a process of increasingly rapid urbanisation after the country became independent in 1971 (Hasan, 2022). The cities are growing more than twice the rate of the country's rural area, boosting the level of urbanisation from 28% to 56% in the year 2050. Besides population growth, urbanisation is caused by climate-induced migration: humans trying to find desirable opportunities to live in the city while escaping the environmental vulnerabilities and risks arising in the rural areas (Rana & Ilina, 2021). Not only the capital city of Dhaka has absorbed a great share of the new urban population, secondary cities such as Sylhet, are flooded with migrants from rural parts of Bangladesh and are expected to grow significantly in the future.

The mass migration towards these cities and towns is creating major difficulties, especially in the housing sector (Hasan, 2022). Since the expansion through autoconstruction cannot manage to accommodate the increasing population, local governments and urban planners are obliged to counteract the housing scarcity. Since land in urban areas is valuable and the land shortage is getting more critical everyday, every single piece of land must be planned to be optimally utilised and to house the growing population by enabling density. Only Bangladesh' four biggest metropolitan areas have come up with urban master plans. Smaller urban areas like Sylhet are expanding their territory with hardly any development control or vision from the (local) government.

As a result, the realisation of a large percentage of new (middle or higher income) dwellings in the cities are being handled through real estate developers (Nabila, Nazmul, Mian & Saifuzzaman, 2022). The focus of these developers is on mass producing and selling isolated dwellings instead of integrating the entities into the urban fabric. Little positive contribution to their surroundings is being made due to the structures concentrating primarily on their individual plots and neglecting the streetscapes around it. Developers underestimate the influence of architectural transition space between internal and external space, and therefore don't pay attention to enhancing people's experience through improving the urban built environment. It comes as no surprise that the implementation of transition spaces are frequently being overlooked.



04 Solid boundary wall at new dwellings, Sylhet

Problem 06

Public and private spaces are often completely separated through the use of solid boundary walls and closed gates in the plinths of new residential buildings for privacy and security purposes. Sadly, these features are creating inactive street edges where anti-social behaviour and street crime are more likely to occur instead of becoming a place for informal social gatherings by small groups of people which adds life to the streets. Besides, these spaces often transform into trash dumping zones or parking space, which worsens the road condition. Since street edges are the first points of contact between the private house and the public outside, it has great capabilities of creating meaningful transition spaces (Singh, 2015). Well designed transition spaces have proved for centuries that it offers social, cultural and climatic benefits which impacts the urban context positively. Therefore, the mass construction of isolated residential structures accompanied by little attention to street edges, forms a threat to one of the most crucial elements of Bangladesh' architecture: the transition space.



05 Communal courtyard in rural village, Sonargaon

Questions 07

Since a well thought through transition space of a building impacts the surrounding built environment and its people, it must be an architect's duty to adequately design such a space. Therefore, the designer must have knowledge about the social, cultural and climatic function of a qualitative transition space in relation to the specific site. In my case, it concerns a dwelling in Sylhet, Bangladesh. This leads me to my main question: **'How should transition spaces of dwelling practices in Sylhet be designed in order to positively impact its surroundings?'**

Firstly, to answer this question, it must be clear what types of transition spaces are impacting the surrounding urban built environment, such as courtyards and verandas. Investigating borders and boundaries that influence the use/lack of various qualitative transition spaces in Sylhet is therefore crucial. Thus my first sub question: **'What types of transition spaces, in relation to borders and boundaries, can be found in Sylhet that positively impacts its surroundings?'**

Secondly, we must know what defines transition spaces that are positively impacting the urban surroundings. Understanding themes such as social activity, culture and climate in Sylhet, is critical before designing transition spaces on the various scales. Therefore my second sub question: **'What is the thematic essence of transition spaces situated in Sylhet that positively impact its surroundings?'**

Lastly, after knowing what different kinds of transition spaces are discoverable in Sylhet, there must be a clear overview of the architectural elements that are enabling borders, boundaries and transition spaces to positively impact its urban context. Aspects such as formation, dimension, porosity, tangibility and visibility, should be analysed. Hence my third sub question: **'What architectural characteristics give transition spaces in Sylhet the ability to positively impact its surroundings?'**



06 Various courtyards and verandas, Bangladesh

Methods 08

The foremost research methods that will be used to attain the knowledge to answer the questions are literature review, fieldwork observations and case study analysis. Prior to looking at the main research question, the findings from the three sub questions will be carefully combined. This process of synthesis will be visualised through a comprehensive catalogue that will form the foundation from which the main research question can be answered. See the diagrams on the next pages.

Since transitions spaces in Bangladesh are perceived differently and have fuller meaning than in most countries in the West, like the Netherlands, a **literature review** of existing (academic) discussions and articles give insight into its significance. This provides a knowledge base which helps to answer the sub questions, especially the second sub question. The theoretical framework in this research plan gives a closer look into the to be used literature.

The **fieldwork observations** in Sylhet will be the most important method used in this research because of its on-site investigations. These explorations should consist of interviews with residents in Sylhet, note-taking on the discovered qualitative transition spaces and a visual analysis of these through photography. Mostly the first and third questions will benefit from the findings done during the field trip.

The process of answering the first sub question and the curation of the research overview, will improve from a more comprehensive research. This is to be achieved by investigating the transition spaces of various **case studies** throughout South Asia. Those can be for instance more contemporary residential projects, like Charles Correa's Belapur Housing and Raj Rewal's CIDCO Housing, both located in India. This additional information will be included in the research catalogue.



07 Communal courtyard in rural village, Tahirpur

Methods 09

07 Catalogue formed by research questions

	Sub Question 1 Fieldwork Observations	Sub Question 1 Case Studies
Sub Q2 Literature Review		
Sub Q3 Fieldwork Observ.		

Methods 10

08 Catalogue analysing transition spaces

	Transition Spaces Types (Sylhet)	Transition Spaces Types (India)
Themes Social Culture Climate		
Elements Formation Dimension Porosity Tangibility Visibility		



08 Walls segregating various income classes, Sylhet

Framework 11

The used literature for the research of transition spaces can be categorised in roughly two sections: academic articles that are more focussed on the cultural historical or socio spatial aspects of these spaces. Besides, an additional section of reports on design projects across Bangladesh where the importance of transition spaces is being highlighted, will be incorporated.

The article **'Understanding Transition Space' (Singh, 2015)** gives a thorough analysis of the cultural historical significance of transition spaces in (South) Asian countries like Bangladesh. **'Segregation of women in Islamic cultures and its reflection in housing: A study of spaces for women in a Bangladesh village' (Chowdhury, 1998)** and **'Visibility effecting gender aspects in middle income group apartments in Dhaka' (Gomes, 2015)** are addressing gender segregation in relation to theses spaces.

The socio spatial aspects are covered by the articles **'Impact Analysis of Urban Street Edges of Residential Area in Dhaka, Bangladesh' (Nabila, Nazmul, Mian & Saifuzzaman, 2022)** and **'Assessing the Impact of Street Frontage in Streetscape on the Quality of Public Gathering Space: A Case Study in Chittagong, Bangladesh' (Ziad , Fahami & Fariha, 2019)** which zooms in on the effect residential transition spaces have on its built environment and people. **'Spatially Adaptive Courtyard Models for High-Density, Multi-Storied Residential Developments in Bangladesh' (Khan, 2021)** gives additional insights into this subject.

To conclude, the papers **'A redevelopment approach to a historical market in Sylhet City of Bangladesh' (Rahman, Islam & Hasan, 2016)** and **'Designing architectural continuity in a historic urban quarter of Dinajpur, Bangladesh' (Shahriar, Mithun, Saha & Ahmed, 2023)** showcase relevant design projects that addresses qualitative transition spaces.



09 Wall segregating public and private space, Sylhet

Relevance 12

To summarise, one of the most crucial elements of (South) Asian architecture, the so-called transition spaces, is prone to become undermined in the future (Singh, 2015). Rapid urbanisation in Bangladesh is causing a construction boom of isolated residential structures, not well integrated into the urban built environment (Nabila, Nazmul, Mian & Saifuzzaman, 2022). Little to no attention is given to the transition spaces between private and public or internal versus external. Instead for privacy and security reasons, solid boundary walls and closed gates are used to divide the two zones. This often results in dead street edges where criminality and anti-social behaviour is more likely to occur. This is the complete opposite of what qualitatively designed transition spaces are capable of creating: promoted social activity and a feeling of welcomeness (Singh, 2015).

Not only in Bangladesh are poorly designed transition spaces and dead street edges in newly constructed (residential) buildings being realised, this trend also takes place in other areas in the Global South. In India for instance, where transitions spaces are as important as in Bangladesh, fast urbanisation has led to contemporary residential areas where neighbourhood spaces like courtyards are being neglected (Gulati, 2020). As a result, a diminished feeling of belonging and privacy is occurring which eventually causes the loss of orientation and territoriality.

Therefore, this research that focusses on transition spaces in Sylhet, will be valuable to contribute to the discussion about the decreasing implementation and importance of transition spaces in locations where these are also part of architectural culture like in India. The already existing literature and new findings regarding transition spaces in Sylhet during the fieldwork, will offer new insights into the subject matter which is relevant and replicable for other parts of Bangladesh, (South) Asia and the Global South.

References 13

Publications

Ahmed, Z. N. (2007). Increasing rural livability: coping with climate and flooding. In the proceedings of International Seminar: Architecture for the Economically Disadvantaged', Dept. of Architecture, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh.

Chowdhury, T. (1998). Segregation of women in Islamic cultures and its reflection in housing: A study of spaces for women in a Bangladesh village. Shelter, Woman and Development. First and Third World Cities, 338–346.

Gomes, C. D. (2015). Visibility effecting gender aspects in middle income group apartments in Dhaka. In Proceedings of the 10th International Space Syntax Symposium (p. 104).

Gulati, R. (2020). Neighborhood spaces in residential environments: Lessons for contemporary Indian context. Frontiers of Architectural Research, 9(1), 20–33.

Hasan, M. R. (2022). Urban planning in Bangladesh: Challenges and opportunities. The Business Standard. https://www.tbsnews.net/supplement/urban-planning-bangladesh-challenges-and-opportunities-362911

Hasan, M. T., Rahman, M. M., & Siddika, T. (2022). Assessing the urban design qualities of the urban street: A case study of Sylhet, Bangladesh. Architecture Papers of the Faculty of Architecture and Design STU, 27(2), 3–10.

Jafar, R. A., Habib, A. R., & Ahmed, I. An Empirical Study on Continuation, Transformation and Transfiguration of Homestead Layout and Space Organization of Handloom Communities in Bangladesh.

Khan, S. (2021). Spatially Adaptive Courtyard Models for High-Density, Multi-Storied Residential Developments in Bangladesh.

Munk, A. (2022). Transition Spaces and how they translate. RTF | Rethinking the Future. https://www.re-thinkingthefuture.com/article/transition-spaces-and-how-they-translate/#:~:text=These%20spaces%20are%20generally%20used,spaces%2C%20relate%20both%20as%20other

Nabila, S., Nazmul, A. R., Mian, M. J. I. I., & Saifuzzaman, M. (2022). Impact Analysis of Urban Street Edges of Residential Area in Dhaka, Bangladesh. American Journal of Multidisciplinary Research and Innovation, 1(5), 44–52.

Rahman, M. M., Islam, S., & Hasan, M. T. (2016). A redevelopment approach to a historical market in Sylhet City of Bangladesh. Civil Engineering and Architecture, 4(3), 127–138.

Rana, M. M. P., & Ilina, I. N. (2021). Climate change and migration impacts on cities: Lessons from Bangladesh. Environmental Challenges, 5, 100242.

Shahriar, A. T. M., Mithun, S. N. H., Saha, D., & Ahmed, S. (2023). Designing architectural continuity in a historic urban quarter of Dinajpur, Bangladesh. Frontiers of Architectural Research.

Shaikh, Z. U., & Movla, Q. A. (2009). Documenting the Architectural Style of the Antiquity Buildings in Panam Street, Potnatstha.Journal Dep. Archeol, 79–97.

Singh, R. (2015). Understanding transition spaces. www.academia.edu. https://www.academia.edu/19852235/Understanding_Transition_Spaces

Ziad, A., Fahami, M., & Fariha, L. (2019). Assessing the Impact of Street Frontage in Streetscape on the Quality of Public Gathering Space: A Case Study in Chittagong, Bangladesh.

Figures

Cover Colonnade at Bait Ur Rouf Mosque, Dhaka. Photograph by Freek van Schaik.

Content Main hall at Ayub National Hospital, Dhaka. Photograph by Freek van Schaik.

01 Communal courtyard at Manipuri Para, Sylhet. Photograph by Freek van Schaik.

02 Various courtyards and verandas, Bangladesh. Photographs by Freek van Schaik.

03 Mass construction of isolated dwellings, Dhaka. Photograph by Freek van Schaik.

04 Solid boundary wall at new dwellings, Sylhet. Photographs by Freek van Schaik.

05 Communal courtyard in rural village, Sonargaon. Photograph by Freek van Schaik.

06 Veranda as threshold in rural village, Tahirpur. Photograph by Freek van Schaik.

07 Catalogue formed by research questions. Diagram by Freek van Schaik.

08 Catalogue analysing transition spaces. Diagram by Freek van Schaik.

09 Wall segregating various income classes, Sylhet. Photograph by Freek van Schaik.

10 Gate segregating public and private space, Sylhet. Photograph by Freek van Schaik.

Back Urbanisation creating isolated dwellings, Dhaka. Photograph by Freek van Schaik.

Site Analysis 20

After setting up the research plan and investigating all things related to transition spaces, it was time to travel to Bangladesh for the field work. Since I already did a part of my research and came up with my research questions, I could be more focussed and efficient on the trip when observing transition spaces on the go.

In Sylhet, we visited various potential project locations, both urban and rural. We crossed one site in Sylhet city, which was an empty plot near the Laldighi pond, that I really connected with quite unconsciously. Around the pond there was a stark contrast between the more inviting traditional housing and the new residential blocks with high walls in front of them. This felt very fitting with my research topic and therefore I opted for this location.

A few days later we came to this site with a smaller group of students so we could investigate the area and urban context more thoroughly. We got in touch with the ward's councillor, who talked about the location's features and answered our initial questions. Afterwards, we walked around and I photographed subjects related to my research. An overview is given on the next pages.

Back home, I started to analyse the site and the area around the pond in plan and section. This gave me a good understanding of various communities and housing typologies. Exploring Laladighi's borders and boundaries helped me to see these aspects in relation to the use or lack of transition spaces.



Traditional Housing with internal verandas alongside the pond



Traditional Greenery and hidden paths alongside the pond



Traditional Hindu temple



Traditional Social interaction



Traditional Manipuri community



Traditional Low-rise housing



Traditional Low boundary walls alongside streets



Traditional Housing with green communal courtyards



Settlement Low-tech materials



Settlement Seperation steps



Traditional Various generations



Settlement Narrow alleyways



Modern New walk-up apartments alongside the pond



Modern Solid boundary walls in front of residential blocks



Modern High boundary walls



Modern Closed gates



Modern Inactive street edges



Modern Polluted street edges



Plot Segregated informal settlement to the east of the site



Plot Segregated newer apartments to the west of the site



Plot Empty and polluted piece of land with little activity



Plot Cricket field behind small canal to the south of the site



Field Open space in the middle of various residential areas



Field Green and sandy space where children play all-day



Field Canal as boundary



Field Poor infrastructure



Field Polluted canal

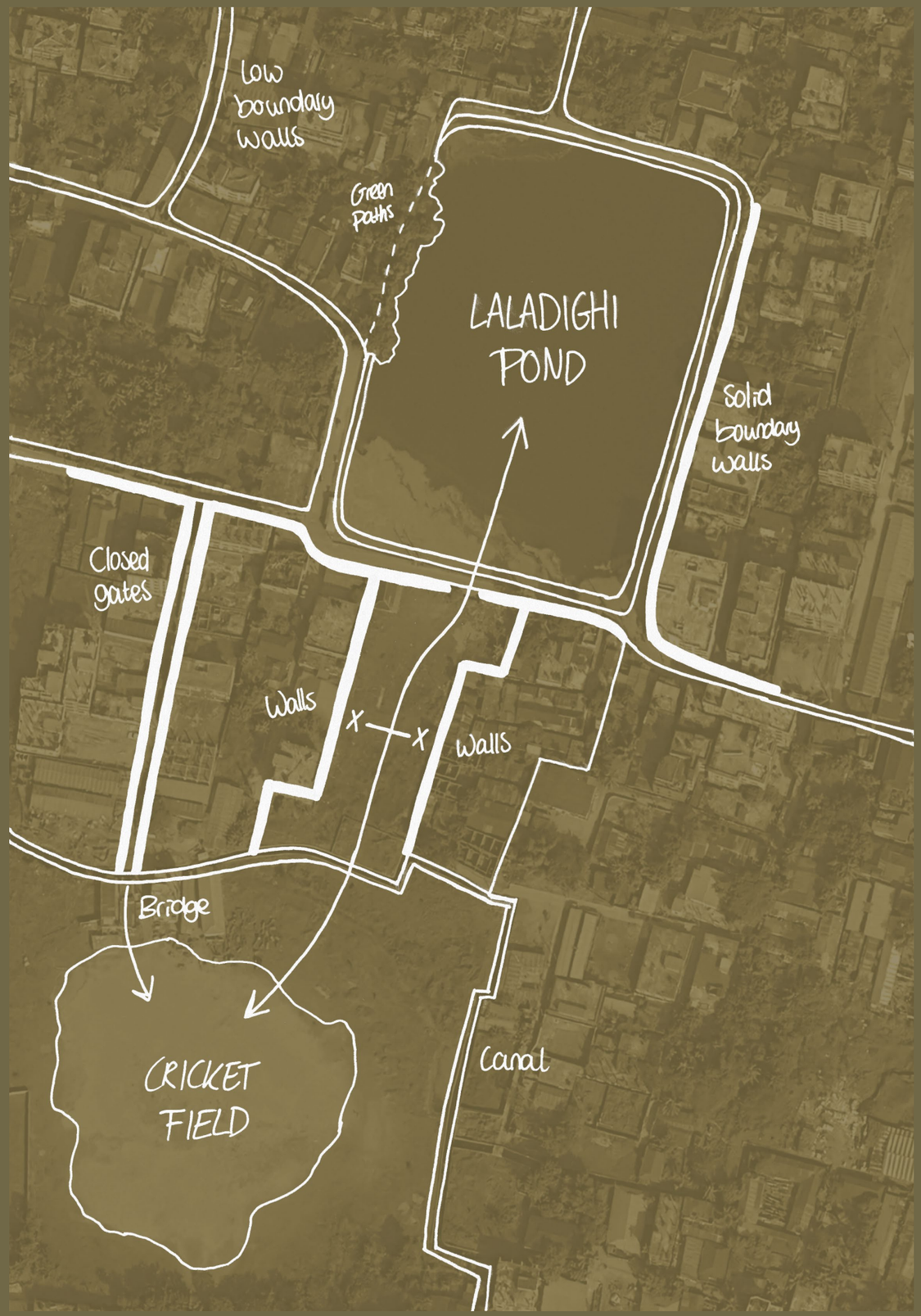


Field New residential blocks


LALADIGHI
SYLHET, BANGLADESH
ACCORDING TO THE COUNCILLOR
GLOBAL 2023
HOUSING STUDIO
FREEK 4851757
VAN SCHAIK
NORTH
HOUSES WITH VERANDAS
'OLDER' PART
PLANS FOR REDEVELOPMENT
WASHING
MORNING WALK
MIDDLE INCOME HOUSING
NO COURTYARDS!
LESS FOCUS ON TRANSITION SPACES: PEOPLE WANT THEM
NEW DEVELOPMENTS
BUILT 2-5Y. AGO
RICHER AREA
(HINDU) PUJA
BLOCKING CIRCULATION
LALADIGHI POND
"RECREATIONAL HEART"
BARBERE WALLS
DENSITY!
"NEWER"
PRIVACY
FLOODS
1 meter
FISH FEEDING
MANIPURI (HINDU)
SHORS 2
WEST
POORER AREA
GREENER
COUNCILLOR HOUSE
OLD BANGLA HOUSE
GRASS
PLOT
18 PEOPLE IN A HOUSE
INFORMAL SETTLEMENT
SOUTH EAST
SCHOOL
NEW DEVELOPMENTS ON FORMER PLAYING FIELD
POLUTED
WALLS AROUND
PRIVATELY OWNED LAND
DENSER
GARBAGE
RIVER
OPEN FIELD
SPM
CRICKET
TOO HOT TO USE DURING THE DAY?
SOUTH



Laladighi Various socio-economic groups living around the pond



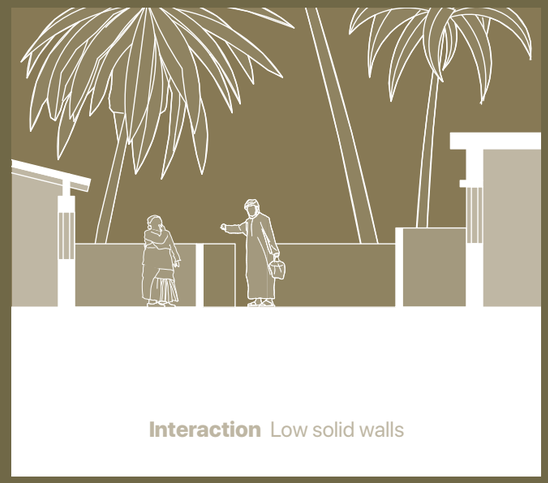
Laladighi Various segregated areas and boundaries around the pond



Laladighi Communities living segregated around the pond

The Laladighi area in Sylhet is a great example of a place where the significance of transition spaces is increasingly being overlooked. During the site investigation, the difference in spatial design of these spaces were vastly distinguishable in the three segregated communities situated around the Laladighi Pond.

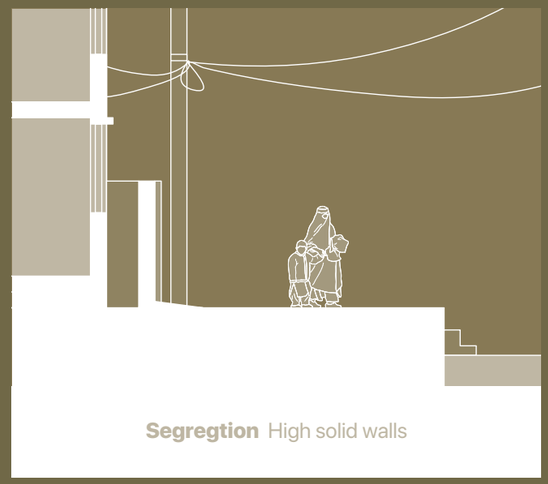
The Manipuri is living in courtyard housing where porous boundaries, such as low walls and greenery, enable social interaction and contribute to the community feel. In the informal settlement made up of self-build housing, thresholds like steps and verandas provide a soft division of private and public spaces. In contrast, inactive street edges are realised via high solid boundary walls and closed gates in front of new mid-rise housing. Transition spaces like courtyards and verandas are missing and because of that, anti-social behaviour and criminal activity are more likely to occur in these poorly designed and used places.



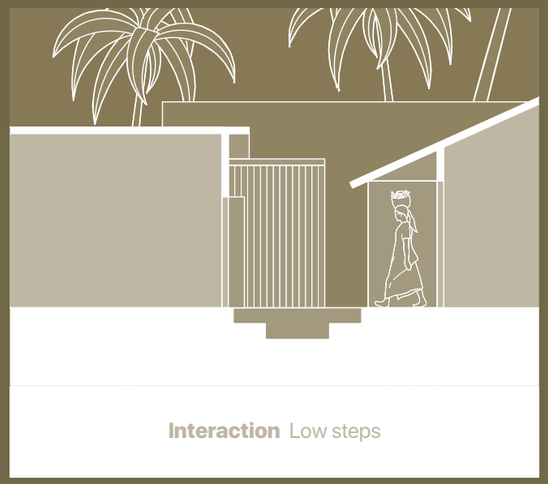
01 Courtyard housing



02 Courtyard housing



03 Mid-rise housing



04 Self-build housing



05 Self-build housing



06 Mid-rise housing



Transition Spaces



‘This whole, seemingly transitional space might be irrelevant in many cultures, but in Asia, we perceive water, the courtyard and in the end, the notion of life, in a very different way.’

Lyndon Neri





















Urbanisation



















Laladighi



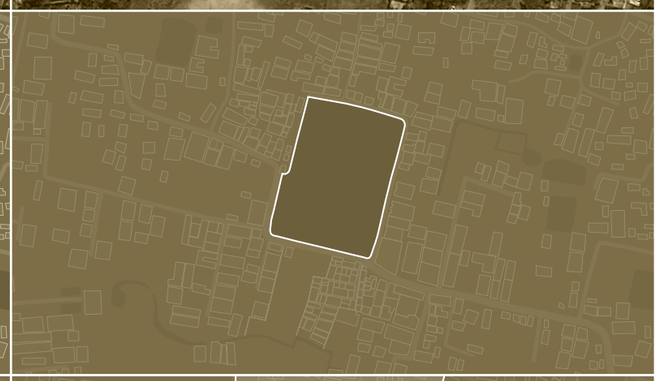






























































Research Question

‘How should transition spaces of dwelling practices in Sylhet be designed in order to positively impact its surroundings?’

Freek van Schaik

An accumulation of

Transition Spaces

The Laladighi area in Sylhet is a great example of a place where the significance of transition spaces is increasingly being overlooked. During the site investigation, the difference in spatial design of these spaces were vastly distinguishable in the three segregated communities situated around the Laladighi Pond.

The Manipuri is living in courtyard housing where porous boundaries, such as low walls and greenery, enable social interaction and contribute to the community feel. In the informal settlement made up of self-build housing, thresholds like steps and verandas provide a soft division of private and public spaces. In contrast, inactive street edges are realised via high walls and gates in the front of new mid-rise housing, resulting in anti-social behaviour and higher chances of criminality.

The design hypothesis aims to generate a new habitat where communities coexist, through the incorporation of various transition spaces. Therefore, Charles Correa's hierarchy of private and public spaces is deeply embodied to create a sequence of transition spaces: the bazar, courtyards, verandas and dwellings.

At the heart of the plan, the public bazar connects the pond with the stadium and introduces a smaller pond in the middle. Here, this secondary water body generates a microclimate which is ideal for social interaction and recreation. Established roads are extended to meet at the new pond which integrates habitants of the existing urban fabric with the new neighbourhood.

Housing blocks consisting of a mix of typologies and groups (income, religion etc.), are clustered around the semi-public courtyards and linked with the central bazar through semi-private verandas. Unlike the current mid-rise housing, harsh boundaries between public and private are nowhere to be found. Lastly, open spaces higher up in the blocks are intended for additional dwellings and verandas, allowing incremental expansion and adaptation by its future habitants.

Design Hypothesis

Freek van Schaik

01 Courtyard Housing



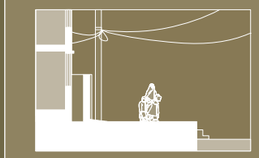
Interaction Low Solid Walls

02 Courtyard Housing



Interaction Internal Courtyard

03 Mid-rise Housing



Segregation High Solid Walls

04 Self-build Housing



Interaction Low Steps

05 Self-build Housing



Interaction Veranda

06 Mid-rise Housing



Segregation High Solid Walls

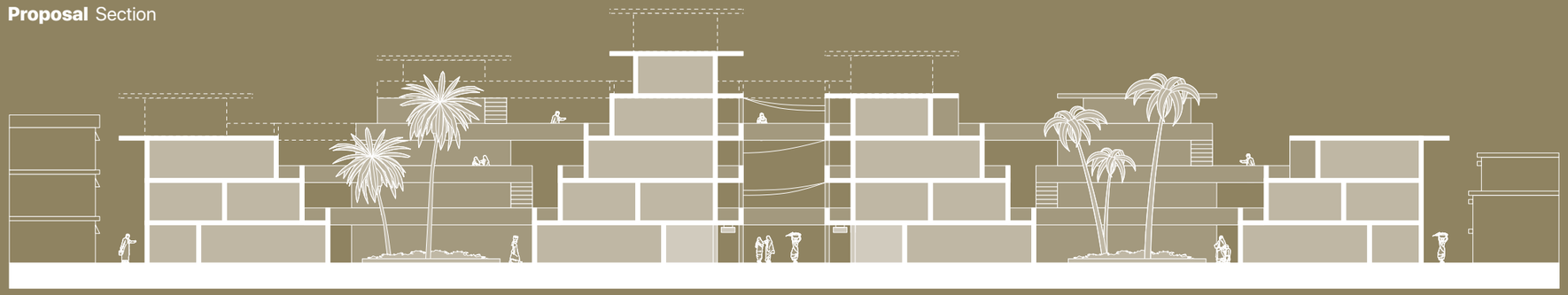
Laladighi Current



Proposal Plan



Proposal Section



Courtyards Semi-public

Bazar Public

Verandas Semi-private

Dwellings Private

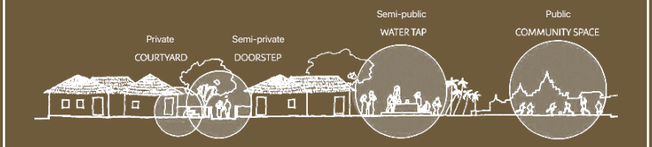
02 Concept

Laladighi, Sylhet

Densified Diversified

Preliminary Project
Freek van Schaik

01 Concept



Hierarchy of Spaces Charles Correa

Private
Terrace

Semi-private
Veranda

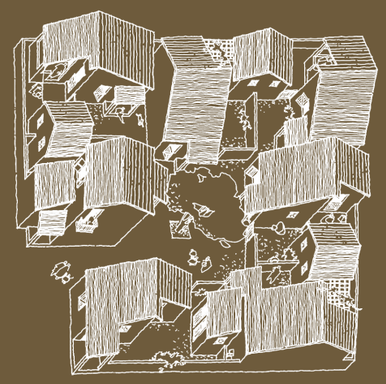
Semi-public
Courtyard

Public
Bazar

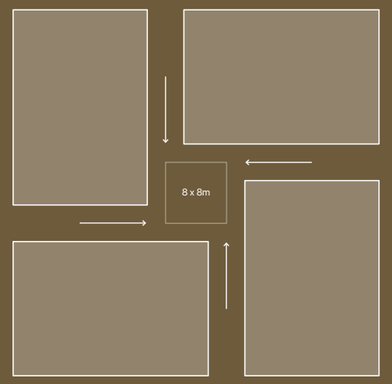
Foundation Categorising spaces



Belapur Housing Charles Correa



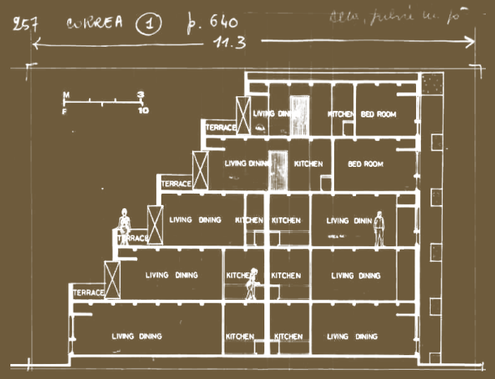
Belapur Housing 8 x 8m courtyard



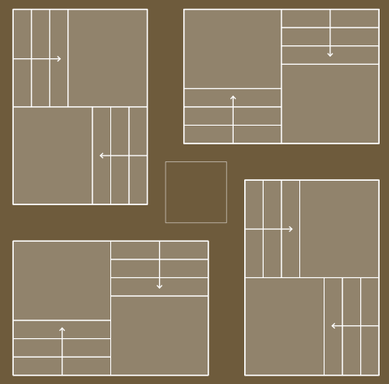
Step 01 Courtyard



LIC Colony Charles Correa



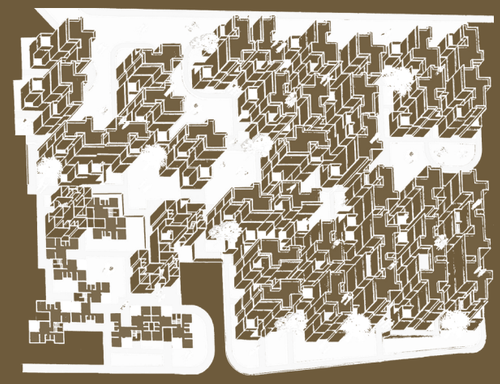
LIC Colony Terraces improving living quality



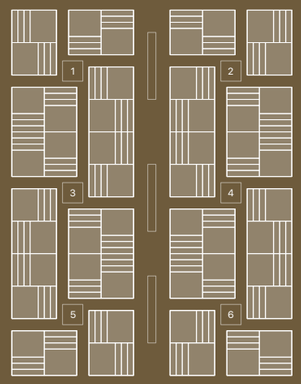
Step 02 Terraces



CIDCO Housing Raj Rewal



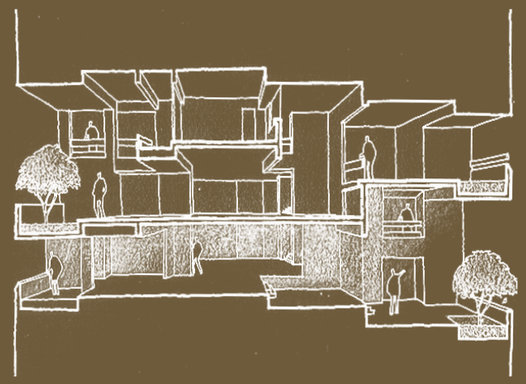
CIDCO Housing Sequence of open spaces



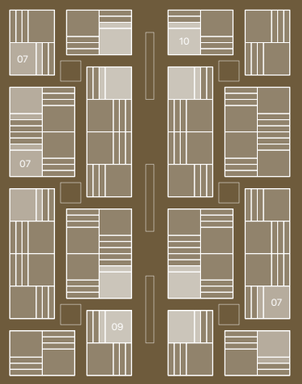
Step 03 Sequence



Kanchanjunga Apartments Charles Correa

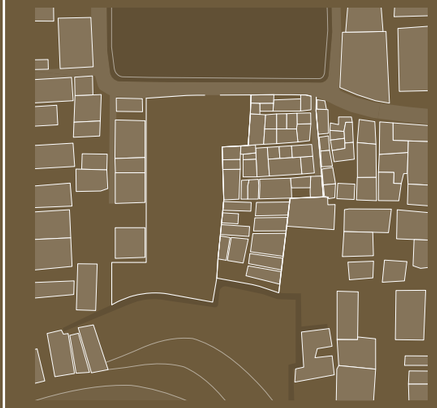


Kanchanjunga Apartments Optimising verticality



Step 04 Verticality

02 Urban



Program

280 housing units
440 units per ha

120 lower income
120 middle income
40 higher income

Commercial space
Community space
Parking space

Cross subsidisation

Informal Settlement

60 housing units
220 units per ha



Phase 01

140 housing units

60 lower income
60 middle income
20 higher income

Relocating people from informal settlement

Canal improvement and temporary bridge to field



Phase 02

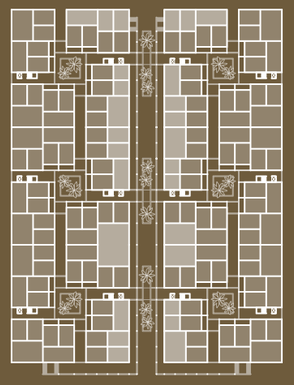
140 housing units

60 lower income
60 middle income
20 higher income

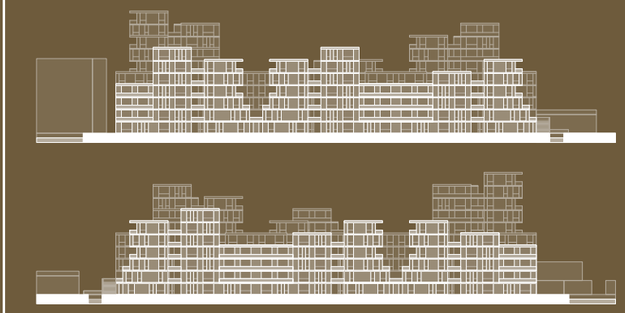
Demolishing remaining informal settlement

Public space completed

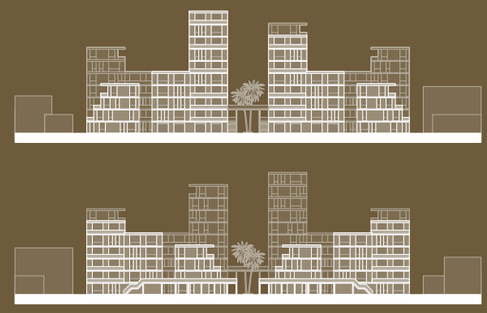
Permanent bridge to field



Plan Overview



Elevations East and west

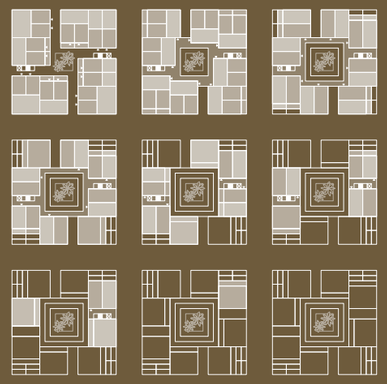


Elevations North and south

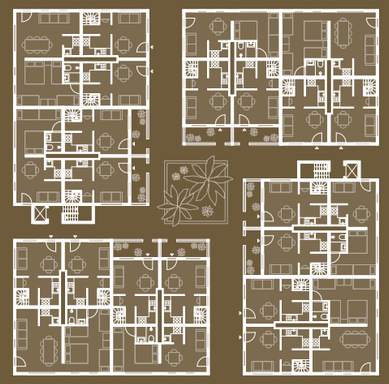


Section East-west

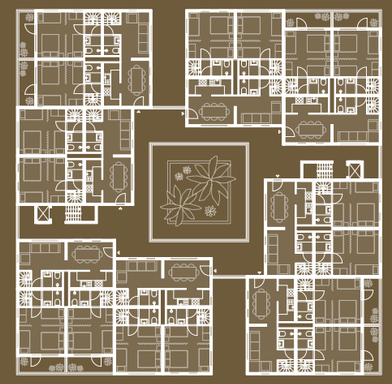
03 Cluster



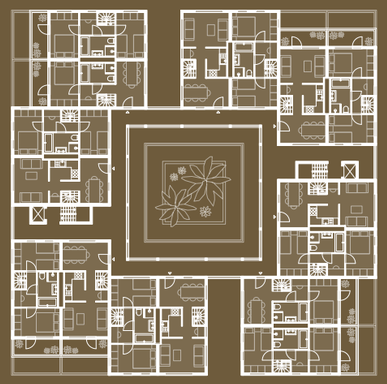
Dwelling Floors



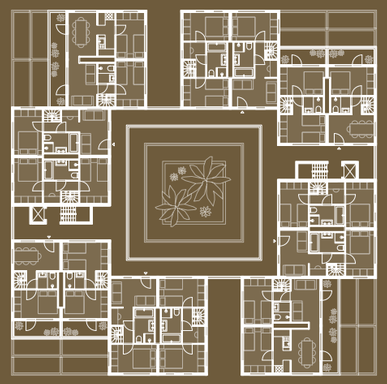
Cluster Ground floor



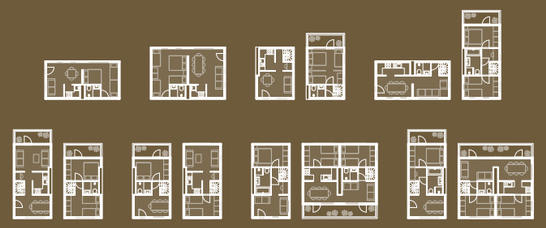
Cluster First floor



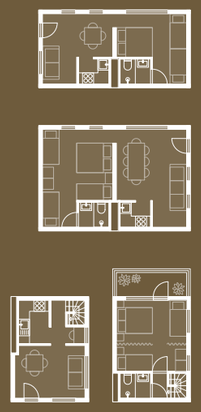
Cluster Second floor



Cluster Third floor



Dwelling Typologies



Lower Income

30 - 40 sqm inside
0 - 5 sqm outside

1 large bedroom
1 bathroom

Single floor
Double floor



Middle Income

50 - 80 sqm inside
5 - 10 sqm outside

2 bedrooms
1 or 2 bathrooms

Double floor



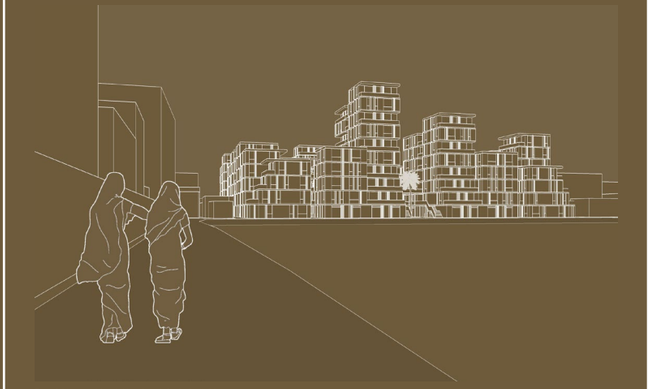
Higher Income

80 - 100 sqm insdide
10 - 15 sqm outside

3 bedrooms
2 bathrooms
2 living rooms

Double floor

04 Impression



Pond New residential landmark for Laladighi



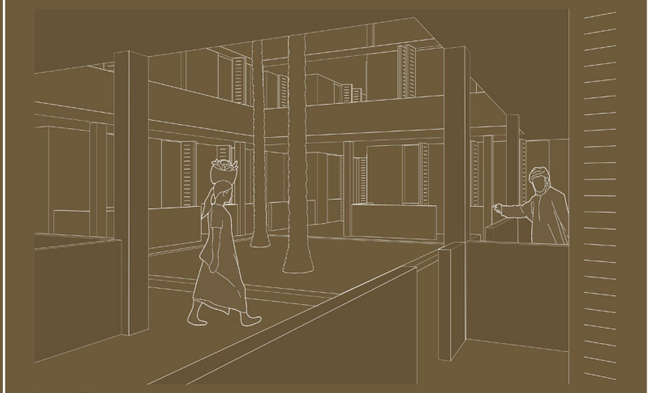
Walkway Enabling faster pace for pedestrians



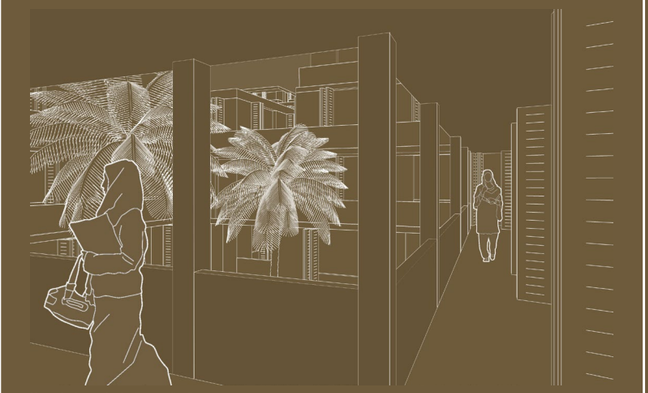
Bazar Primary public and commercial space



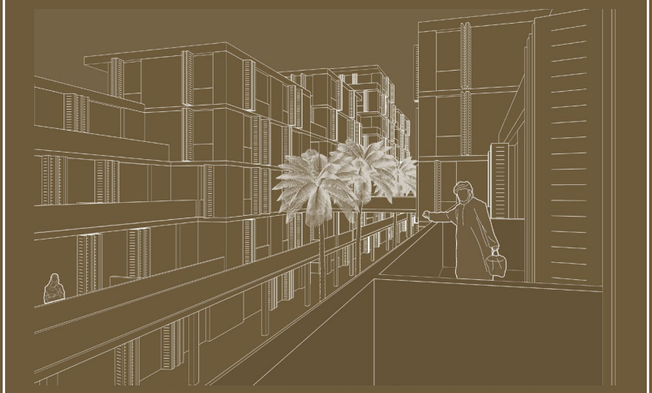
Alley More private street between courtyards



Courtyard Primary community space



Veranda Access for dwellings on first floors



Terrace Offering various unique observations



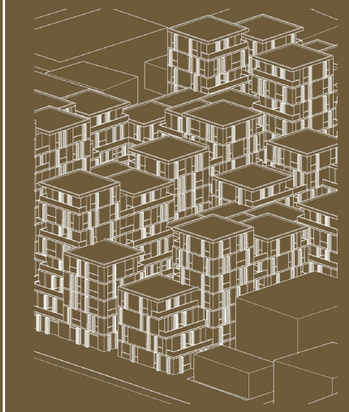
Bat Trang House Vo Trang Nghia



Barcelona Apartments Thomas Lussi



Premier Office Tropical Space



Laladighi, Sylhet

Densified Diversified

Preliminary Project
Freek van Schaik

Belapur Housing 54



Looking at the housing projects of late Indian architect Charles Correa, a hierarchy of (semi-)public and (semi-)private spaces can be found at its core (). The way he incorporates various transition spaces in a sequence became the starting point for my goal to house different socio-economic groups in a non-segregated building.

In the low-cost Belapur Housing (1986) in Mumbai, this hierarchy of open spaces is quite prominent (Chapekar, 2022). Each house has a private yard and veranda on its plot. Seven of these units are clustered around an intimate courtyard of 8x8m. Three of these clusters come together in a 12x12m communal courtyard and again three of these larger clusters are combined around a 21x21m courtyard which functions as the largest community space. Because of this, Correa managed to create a low-rise high-density development that simultaneously offers residents a sense of privacy and community.

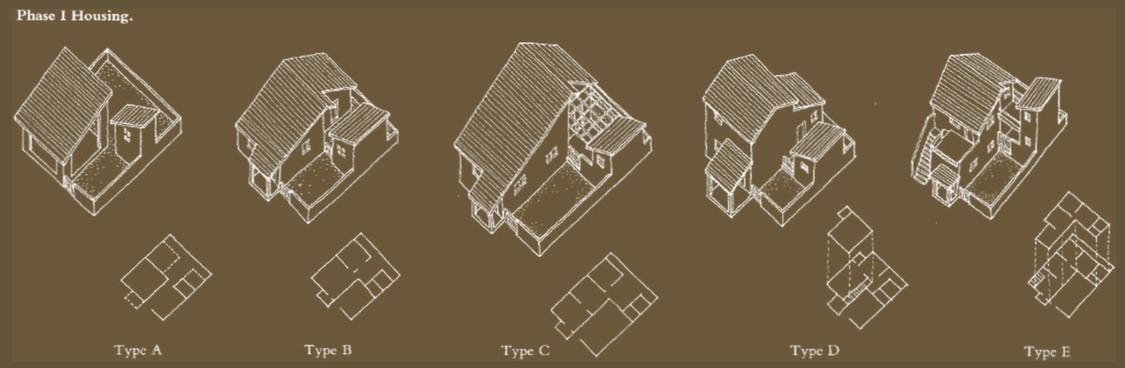
Taking inspiration from this project, I started to design a high density cluster which offers various groups of residents modern dwellings in a more traditional typology compared to walk-up apartments. Four smaller blocks are clustered around a 6,4x6,4m courtyard, similar to Correa's design. Lower income groups (including families from the informal settlement) are housed in the two lower levels with middle and higher income groups on the floors above. Some of these smaller blocks transform into compact towers since dwellings above four floors lose the sense of belonging to the courtyard.



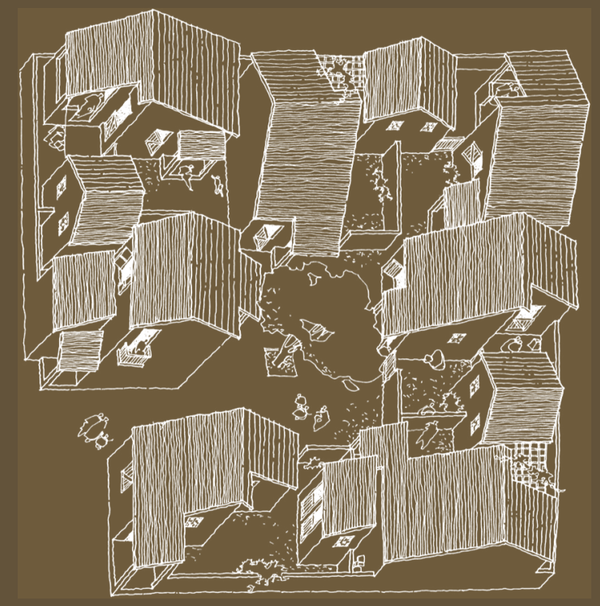
Transition Intimate courtyard offering social interaction



Transition Open veranda and stairs creating soft thresholds







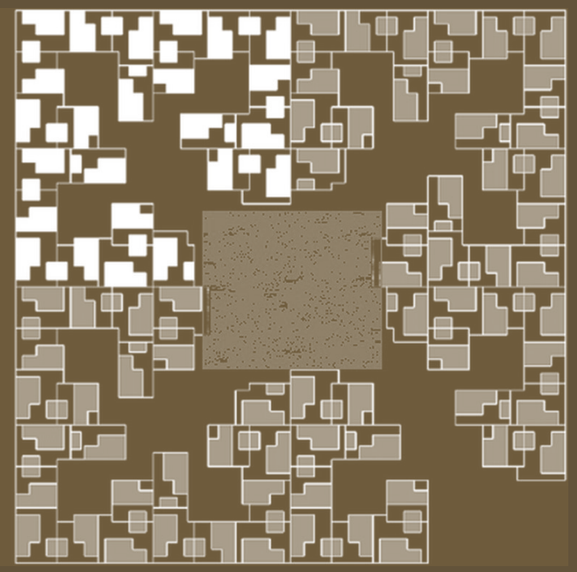


Smallest space 8m x 8m enclosed by seven units



Medium-sized open space 12m x 12m created by combining three clusters of dwellings

Largest community space 21m x 21 m formed by grouping three such larger clusters

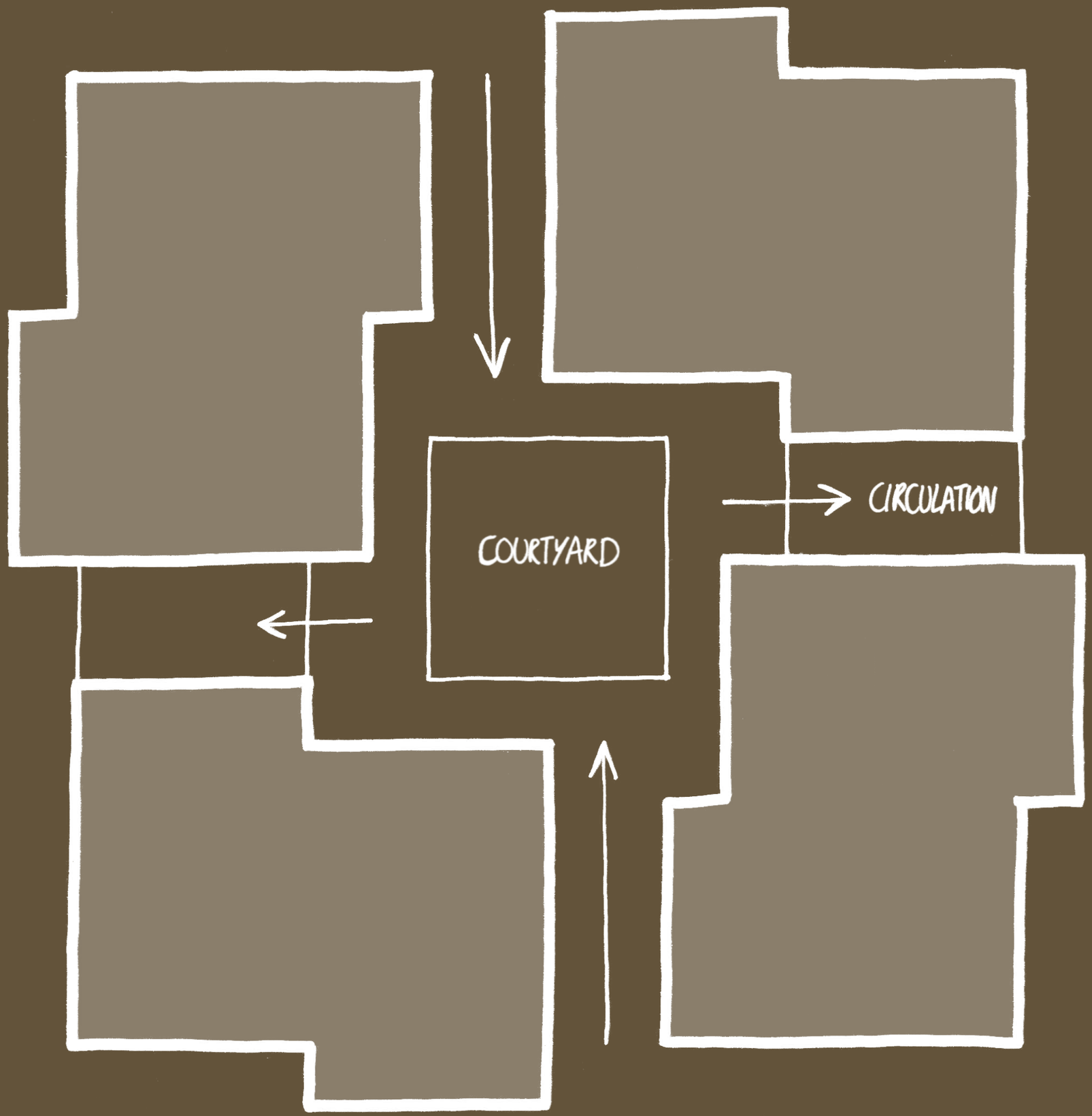


Concept Various courtyard scales and housing types

FOUR BLOCKS ARE DETACHED TO ALLOW FLOWS AND VENTILATION

ELEVATORS AND STAIRS ARE DIRECTLY ACCESSIBLE FROM COURTYARD

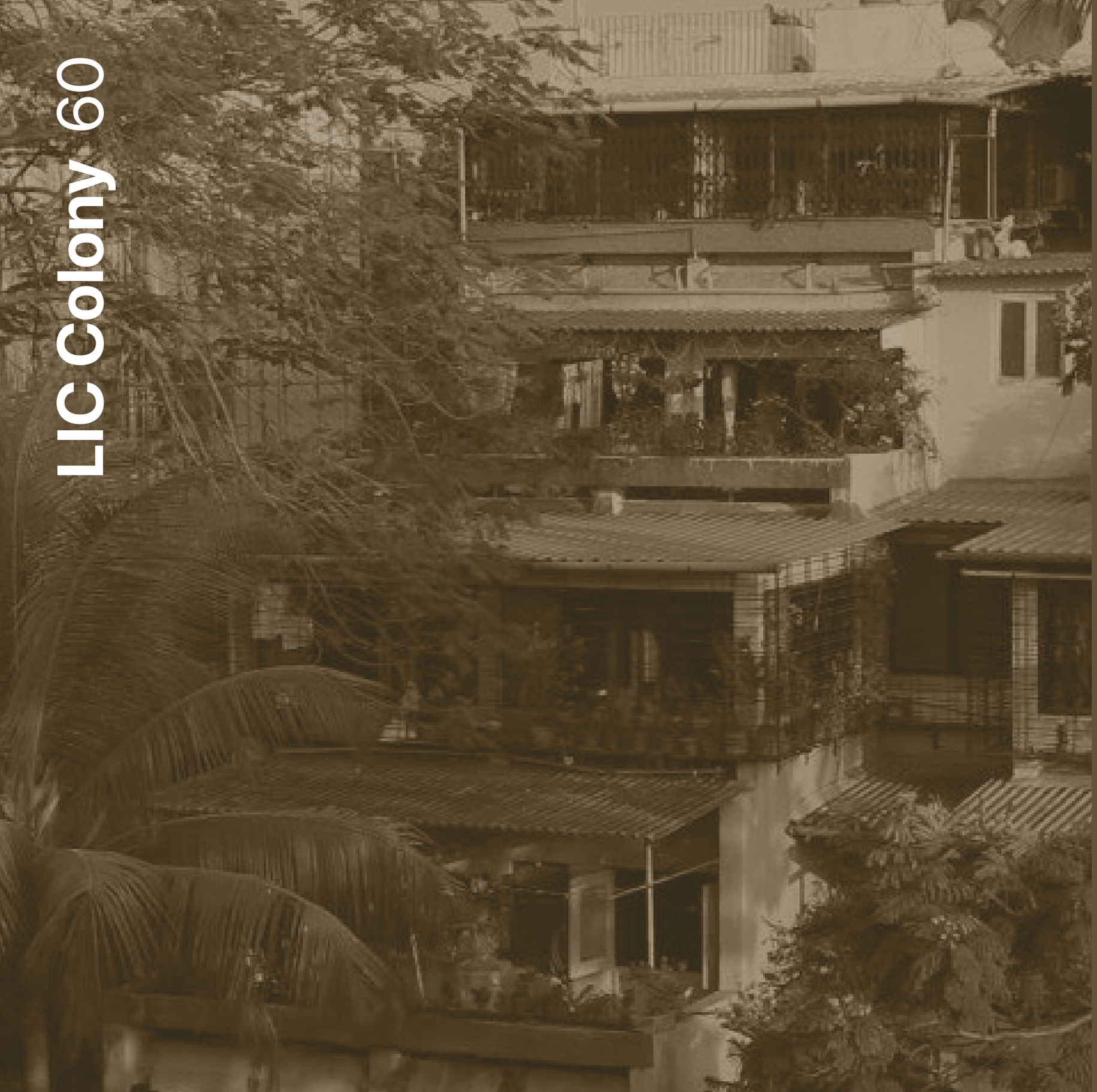
→ MIDDLE AND HIGH INCOME GROUPS



COURTYARD IS 6,4 x 6,4 m TO GIVE RESIDENTS A SENSE OF INTIMACY AND BELONGING

MICROCLIMATE IS CREATED VIA ENCLOSURE OF BUILDING VOLUMES

LIC Colony 60



Learning from another housing project by Charles Correa, the LIC Colony (1970) in Mumbai showcased how Correa had envisioned the 'idea of ideal living' (Ramnath, 2019). Instead of having dwellings placed in general housing blocks, he introduced volumes containing setbacks. By implementing these setbacks, each apartment would have a private terrace and large openings on both sides which allowed the tube-like apartments to have cross ventilation. Besides, various apartment sizes were created by these setbacks which encouraged people from different income groups to live in the same building.

For my design, introducing the concept of setbacks creates breathability in the dense housing clusters. On the outer edge of the building blocks, the setbacks functioned as private terraces or verandas. On the inner edge, the setbacks offer housing units on the first four floors gallery access around the courtyard. Having smaller building volumes on the upper floors compared to the lower floors, various housing typologies were created for different income groups just like in Correa's project.

The access galleries around the courtyard are pushed back every other floor by 1,6m (half the dimension of the 3,2x3,2m grid that's used), which creates stepping volumes with an angle of 75 degrees. Similarly, in Hong Kong 76 degrees setbacks were used to provide lower floors and streets sufficient light and ventilation (Wong, 2016). Therefore, my blocks contain setbacks in an angle of 75 degrees for that reason and limits the building heights to eight floors.



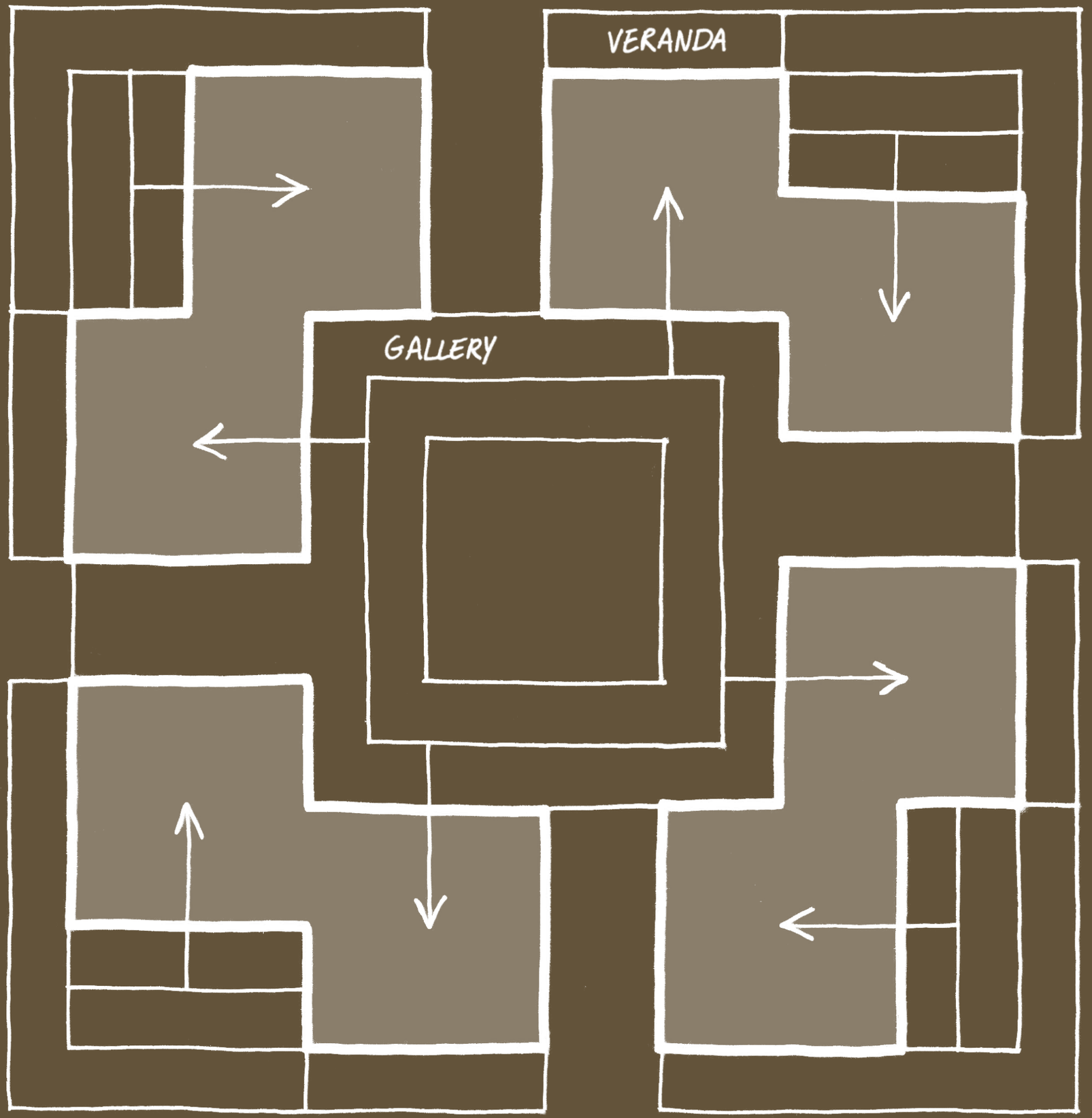
Transition Setbacks creating breathable streets and terraces



Concept Section and impression showcasing terrace structure

SETBACKS CREATING DIFFERENT HOUSING SIZES

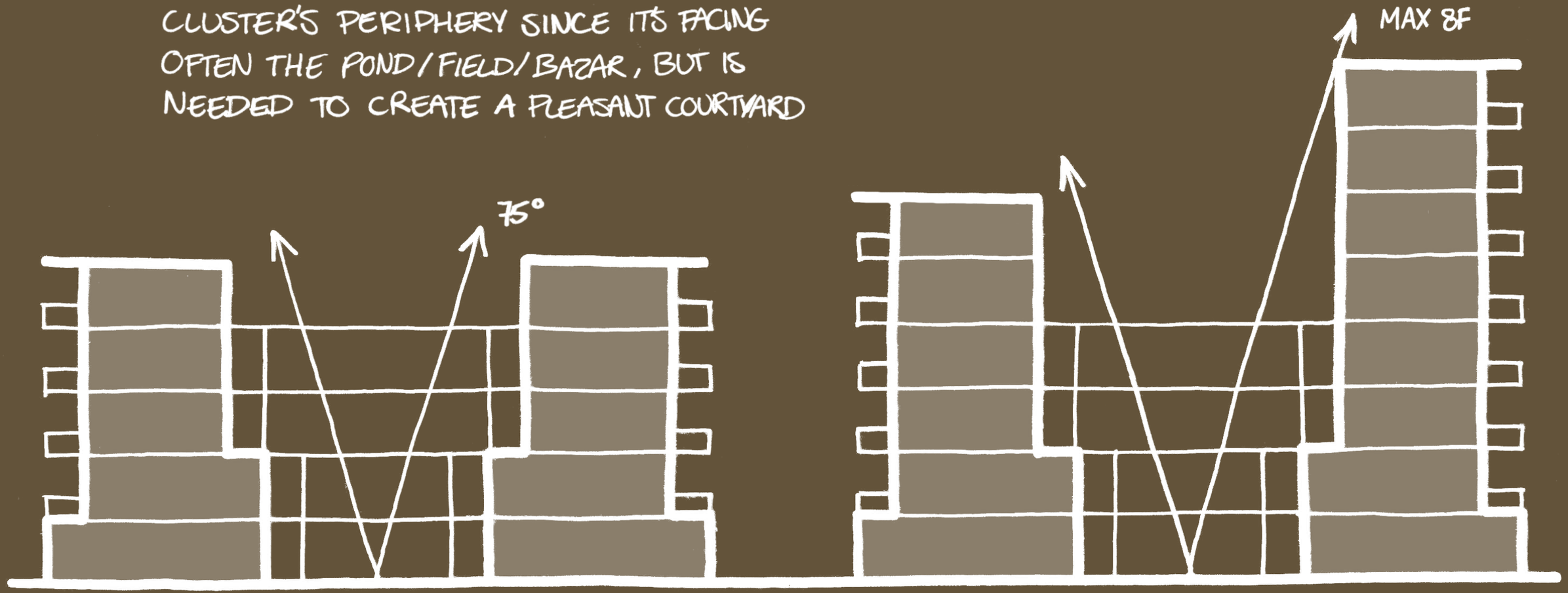
GALLERIES AROUND THE COURTYARD STOP ABOVE FOURTH FLOOR → SENSE OF BELONGING DECREASES



SETBACKS CREATING ACCESS GALLERIES AROUND THE COURTYARD AND PRIVATE TERRACES/ VERANDAS ON THE CLUSTER PERIPHERY

GREEN ROOFS ADDED FOR PROTECTION AGAINST SUN AND RAIN

SETBACKS RULES AREN'T NEEDED FOR CLUSTER'S PERIPHERY SINCE ITS FACING OFTEN THE POND/FIELD/BAZAR, BUT IS NEEDED TO CREATE A PLEASANT COURTYARD



75° SETBACK ANGLE IS IDEAL FOR PROVIDING DAY LIGHT ON LOWER LEVELS

RULES ARE DEFINING MAXIMUM BUILDING HEIGHTS AND DENSITY

Tara Apartments 68

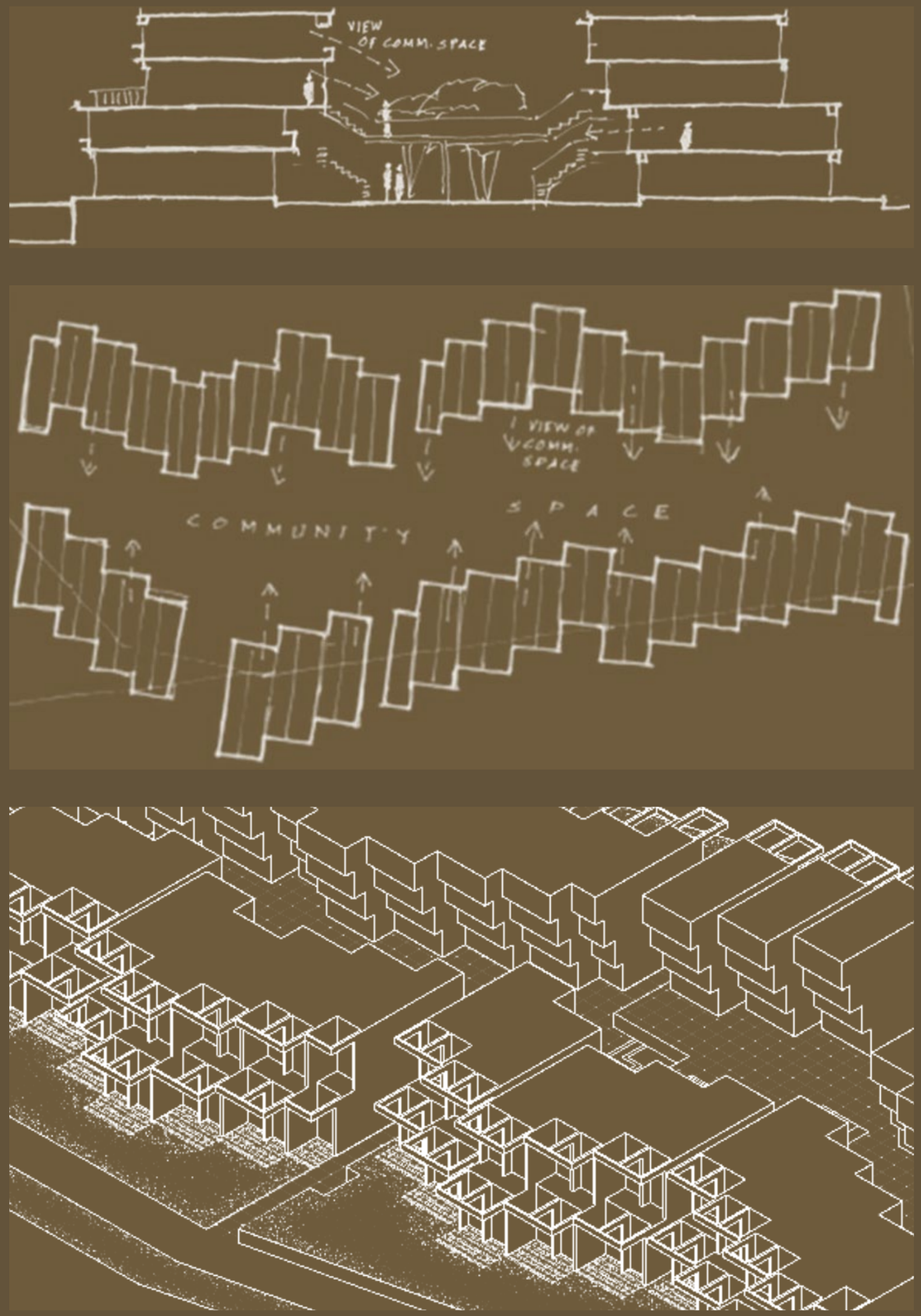


The middle income Tara Apartments (1978) in Delhi, also by Charles Correa, introduced a new way of living in a low-rise high-density project (Singh, 2023). Before, wealthier residential settlements often consisted of individual houses or stand alone houses. Instead, Correa grouped stepped and slender apartment units next to each other which together created clusters in a linear layout. Between two larger clusters of row houses, he designed a green landscape spine which functions as the main community space. Vehicular movement on the outer edges of the clusters is segregated from the pedestrian spine, offering the central open space protection from the city's traffic noise and dust pollution.

In my project, I took inspiration from Correa's urban plan ideas. The designed cluster with courtyards and setbacks is replicated six times in two North-South rows of three clusters. Between these rows, a 8m wide pedestrian public street is situated with commercial, communal and recreational spaces just like a traditional bazar. The clusters and bazar are raised 0,8m from the ground level to offer protection against floods. Alongside this platform, two roads are located for emergency and access to the underground car parking. This way, the central public space functions as a more pleasant oasis in the middle of the city.



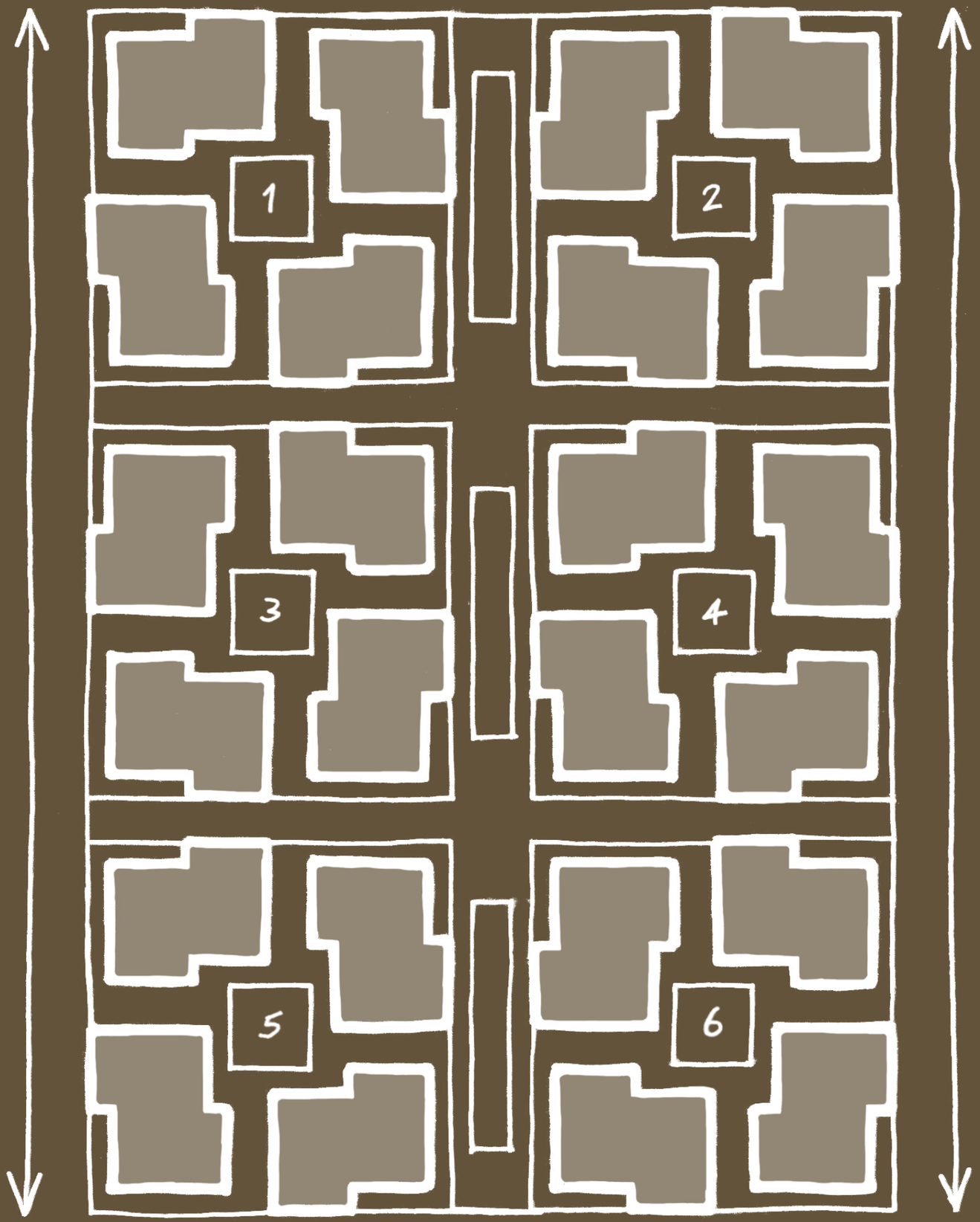
Sequence Pedestrian spine creating communal space for interactions



Concept Axonometry, plan and section explaining communal spine

CLUSTERS ARE RAISED ON 0,8 M HIGH PLATFORM IN ORDER TO BE PROTECTED FROM FLOODS IN RAIN SEASON

AROUND THE PLATFORM, TWO VEHICLE ROADS ARE SITUATED FOR CARS AND EMERGENCY



CLUSTERS ARE REPLICATED SIX TIMES TO CREATE THE MASTERPLAN FOR LALADIGHI

9,6 M WIDE STREET FROM NORTH TO SOUTH IS INTRODUCED TO FUNCTION AS THE MAIN PUBLIC SPINE

CIDCO Housing 74

Not far from the Belapur Housing in Mumbai, a different low-cost housing project was realised by Indian architect Raj Rewal, the CIDCO Housing (1988). Similar to Correa, he wanted to avoid producing repetitive monolithic housing blocks (Varma, 2015). Instead, for this project he created over 1000 dwellings on a hill-side where he focussed on creating units that vary in size and configuration. These together however would form a cohesive ensemble by the repetition of materials in the various neighbourhoods.

Drawing inspiration from vernacular architecture, Rewal carefully designed private and communal outdoor spaces through the use of courtyards. By recessing dwellings on the upper floors and contouring the site's topography, he created terraces at different levels. Between courtyards and clustered, narrow shaded streets at various levels provides residents space for interaction and recreation.

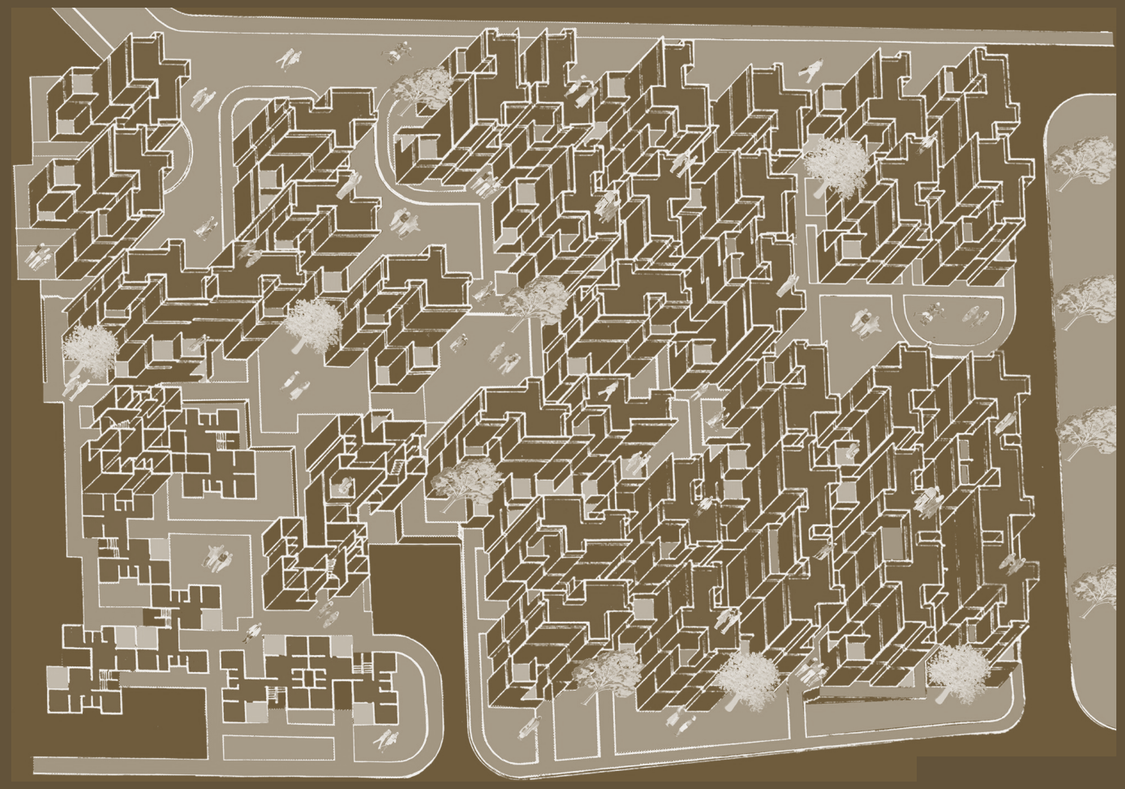
In my design, the heights of my clusters and towers are determined by the surrounding environment. Similar to Rewal's project, my various heights create a mountain landscape with higher peaks alongside the pond and the field. However, these form a cohesive appearance since these blocks are made of the same material palette. In contrast to the wider public bazar between the rows of three clusters, smaller streets of 3,2m are situated to give residents a shaded and more semi-public space to circulate and interact in.

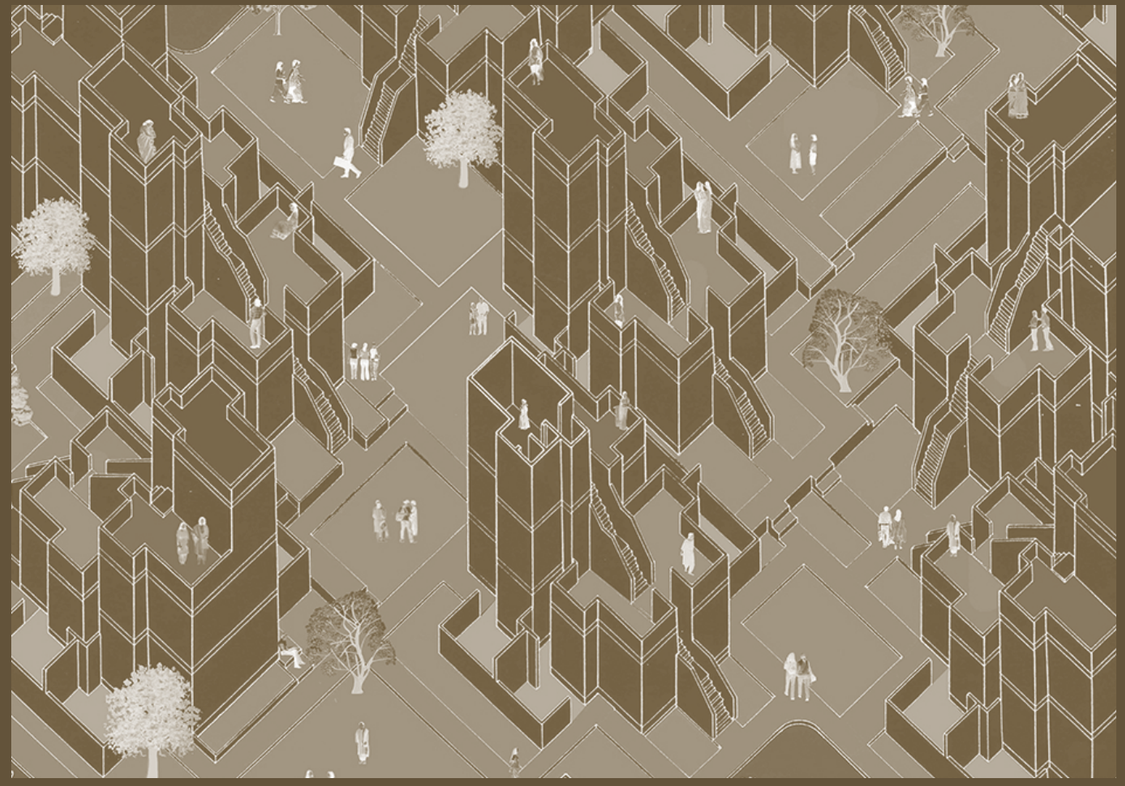


Sequence Open streets connecting various clusters



Sequence Different cluster levels creating mountain landscape





Concept Axonometries schowing sequence of clusters

Bat Trang House 78



Where housing projects from Correa and Rewal has influenced the overall spatial layout, the design's appearance is inspired by more contemporary housing projects. The Bat Trang House (2020) by Vo Trong Nghia is located in a Vietnamese village that's known for its ceramic pottery making (Abdel, 2021). The architect prioritised designing a house that uses local materials. Therefore, the double layer facade is made of ceramic bricks and contains alternating openings for improved ventilation, solar heat protection and privacy. The added greenery between the two facades also helps in keeping the building cooler during the summer.

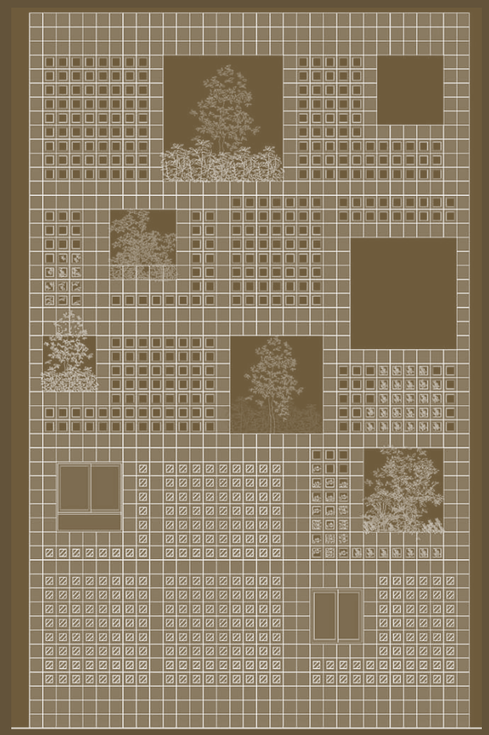
Studying about this project inspired me to use locally available materials, semi-open walls and greenery. The dwellings facades are made out of a concrete casted load-bearing structure with AAC blocks infill and cement plaster. This gives the exterior a more urban appearance that's commonly seen in Bangladesh. The transition spaces however, such as the courtyards, contain exposed brick jali screens which create porous borders and more traditional feel. Secondary plastered brick jali screens are also used in front of kitchens and bathrooms to offer more privacy and ventilation. Integrated planters around the courtyards and terraces are meant to create cooler micro-climates and rainwater sponges.

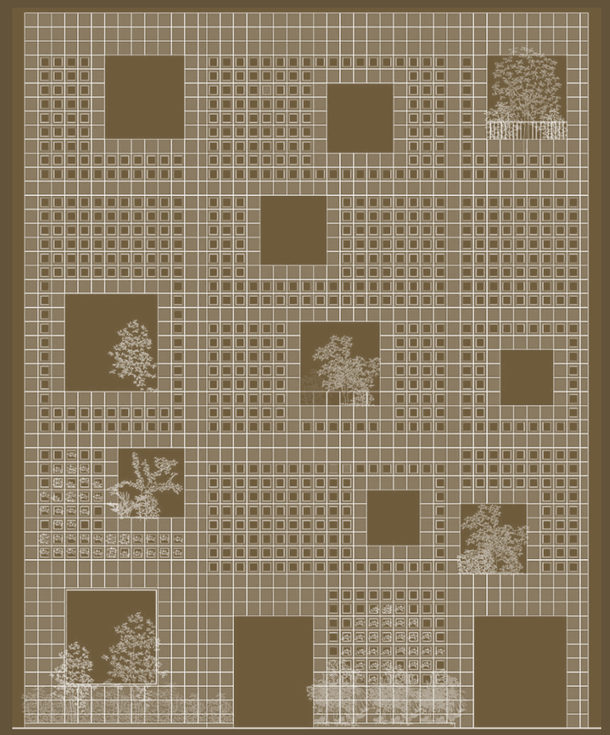


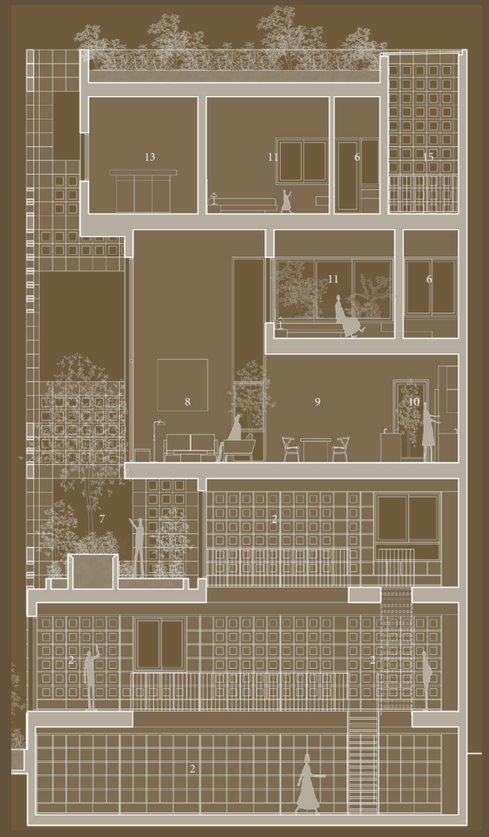
Transition Facade openings creating various levels of privacy

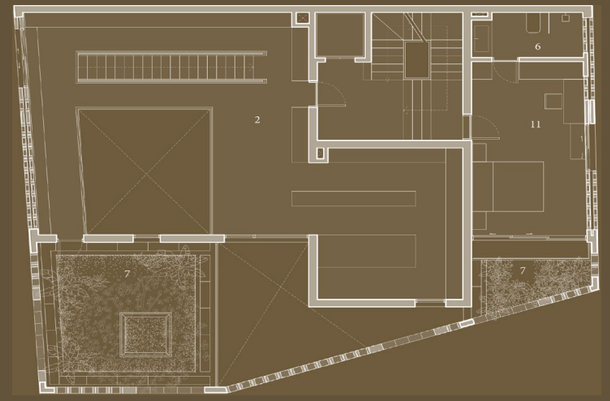


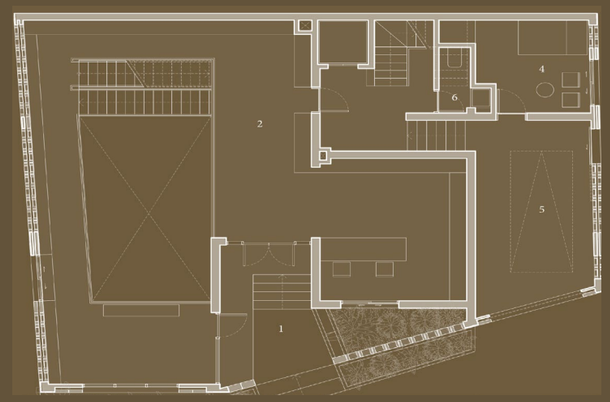
Transition Porous facade allowing filtered light to pass through











Concept Elevations, sections and plan showcasing the double facade

03 Design

Porous Transitions

Freek van Schaik



Porous Transitions **Urban**



Master plan Habitat for various communities between the pond and the field

Porous Transitions **Urban**



North elevation More urban appearance alongside the pond



South elevation More rural appearance alongside the field



West elevation Towers rising gradually near the pond and the field

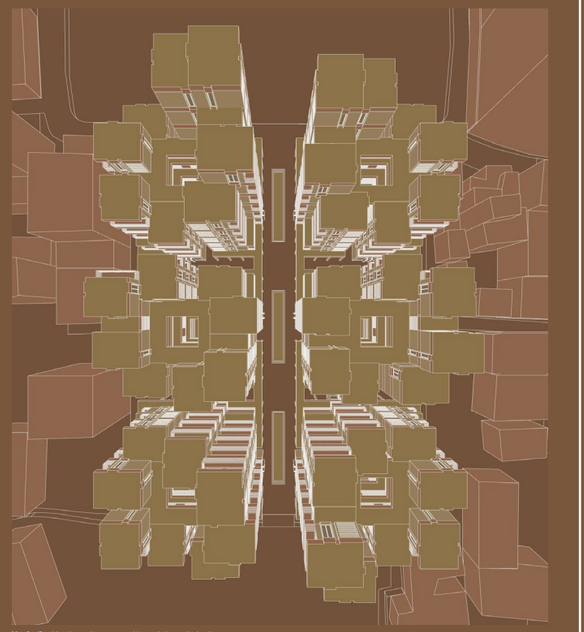


North section 8 meter wide bazar connecting various clusters

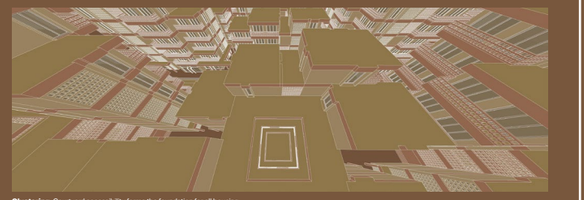


West section 3 meter wide alleys connecting various clusters

Porous Transitions **Narrative**



Verticality Housing various communities and classes in the dense area



Clustering Courtyard accessibility forms the foundation for all housing

Porous Transitions **Impressions**



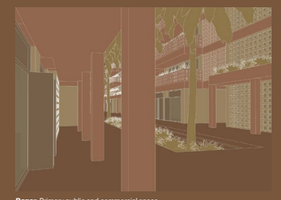
Pond New residential landmark for Laladighi



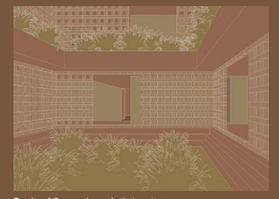
Field Adding life to the edge of the cricket field



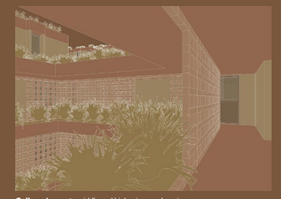
Alley Connecting existing fabric to the bazar



Bazar Primary public and commercial space



Courtyard Communal space for the lower income



Gallery Access to middle and higher income housing



Veranda Offering breathable outdoor space



Terrace Offering unique views over the bazar

Porous Transitions **Management**

	Existing	Proposal
FSI	2350/7160 sqm = **0,33** 50/4460 sqm = 0,01 (empty plot) 2300/2700 sqm = 0,85 (settlement)	12000/7160 sqm = **1,68** 2160 sqm (non-residential) 3120 sqm (lower income) 3840 sqm (middle income) 2880 sqm (higher income)
GSI	2070/7160 sqm = **0,29** 50/4460 sqm = 0,01 (empty plot) 2020/2700 sqm = 0,75 (settlement)	2880/7160 sqm = **0,40**
Density	67/0,716 ha = **93 dw/ha** 0/0,446 ha = 0 dw/ha (empty plot) 67/0,270 ha = 248 dw/ha (settlement)	144/0,716 ha = **200 dw/ha** 72 lower income 48 middle income 24 higher income
Residents	450/0,716 ha = **628 rs/ha** 0/0,446 ha = 0 rs/ha (empty plot) 450/0,270 ha = 240 rs/ha (settlement)	912/0,716 ha = **1274 rs/ha** 432 (lower income) 288 (middle income) 192 (higher income)

Social-spatial data Densifying the empty plot

	Existing	Proposal
Dwellings	67 units 67 (lower income)	144 units 72 lower income 48 middle income 24 higher income
Types	30 sqm (lower income) 40 sqm (lower income)	30 sqm (lower income) 50 sqm (lower income) 40 sqm (middle income) 80 sqm duplex (middle income) 120 sqm duplex (higher income)
Amenities	0/450 = **0 sqm/rs** 450 residents 0 sqm amenities	2500/912 = **2,74 sqm/rs** 912 residents 1140 sqm commercial space 720 sqm communal space 640 sqm parking space
Open space	396/450 = **0,88 sqm/rs** 396 sqm (informal settlement)	2580/912 = **2,83 sqm/rs** 1080 sqm (lower income) 960 sqm (middle income) 720 sqm (higher income) 420 sqm (public green)

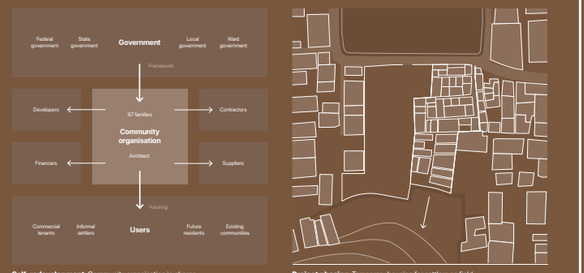
Programatic data Offering various living qualities

Revenue	**Expenses**	**Profit**
Tk 600.000.000	**Tk 306.432.000**	**Tk 293.568.000**
Price/sqm x area = revenue 50.000 x 12000 = 600.000.000 Tk 50.000 per sqm Average price for new mid-rise residential building in Sylhet city 12000 sqm built area (FSI)	Cost/sqm x area = construction 25.000 x 12000 = 300.000.000 Tk 25.000 per sqm Average cost for new mid-rise residential building in Sylhet city 12000 sqm built area (FSI) Rent x households = temporary housing on outskirts 96.000 x 67 = 6.432.000 Tk 4.000 per month/household Tk 96.000 for 2 years/household 67 households in settlement	

Cost calculation Financing through cross-subsidisation



Stakeholder analysis Community organisation engaged



Self-redevelopment Community organisation in charge

Project phasing Temporary housing for settlers on field

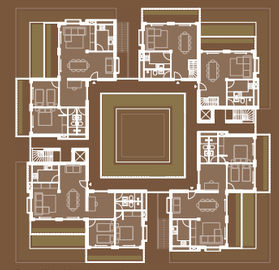
Porous Transitions **Cluster**



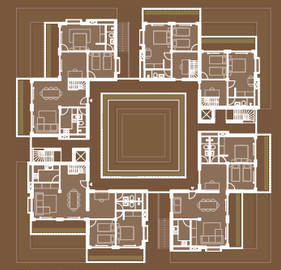
Ground floor Lower income (30 sqm)



First floor Lower income (50 sqm)



Second floor Middle income (80 sqm)



Third floor Middle income (80 sqm duplex)



Fourth floor Higher income (120 sqm duplex)



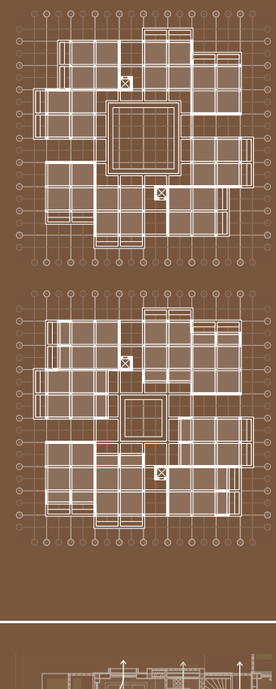
Fifth floor Higher income (120 sqm duplex)

Porous Transitions **Technology**



Dry season Green courtyards before becoming water squares

Wet season Water overflow transported to pond and river

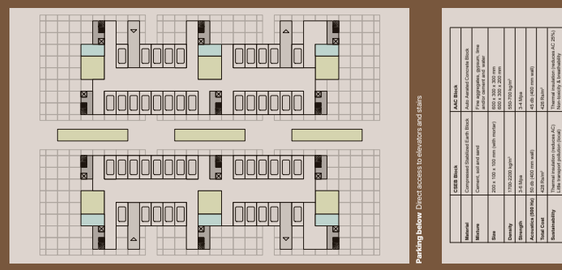


Structural plan Main column grid of 3200 x 3200 mm

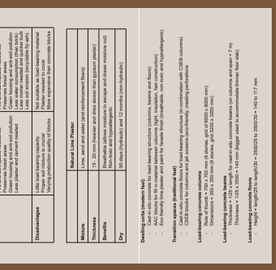
Structural plan Sub structure grid of 1600 x 1600 mm

Porous Transitions **Other**

Parking below Direct access to elevators and stairs



Parking above Direct access from wider side streets



Material selection Compensating cast of concrete

	CSEB Block	AAC Block
Material	Cement stabilized earth Brick	Autoclaved aerated concrete Brick
Mixture	Cement, soil and sand	Fine aggregates, gypsum, lime, calcium silicate and water
Size	29cm x 190 mm (with mortar)	600 x 200 x 200 mm 600 x 300 x 200 mm
Shape	Rectangular	Rectangular
Strength	3.4 N/m²	3.4 N/m²
Accounts (500 No)	Rs.60, 000 mm with	45.00, 000 mm with
Total Cost	420 Rs/m²	420 Rs/m²
Sustainability	Use the soil on site (reduces CO2 emissions and cost of transportation) Prevent earthquake resistance Low water absorption (less than 5%) Low plaster and cement mortar	Non-heating & thermal energy (AAC blocks are 3 times lighter than conventional bricks, thus reducing the dead load on the structure) Low water absorption (less than 5%) Low plaster and cement mortar (less than 2 mm thick mortar is used)
Disadvantages	Not load bearing capacity Prone to moisture & chemical Interlocking system is difficult	Not load bearing capacity Prone to moisture & chemical Interlocking system is difficult

	Natural Lime Plaster
Mixture	Lime, sand and water (sand reinforcement fibers)
Thickness	6 – 8 mm (chosen and varies based on plaster position)
Benefits	Breathable, flexible, self-healing, low carbon emission
Drawbacks	Slow curing time, requires skilled application and maintenance
Dry	Soft white (chalky) dull finish (varies by pigment)

Dwelling units (modular flats)
- Load-bearing concrete frame structure (columns, beams and floors)
- AAC blocks for fill in external (exterior columns (light), insulation, fast construction)
- CSEB blocks for fill in internal (interior columns (heavy), thermal mass, sound insulation)

Transition spaces (traditional Adal)
- Cast in-situ concrete floors for load-bearing structure (in combination with CSEB columns)
- Cast in-situ concrete columns (in combination with CSEB columns)

Load-bearing concrete columns
- Dimensions = 3200 x 3200 mm (Grid of 3 bays: grid of3200 x 9600)
- Dimensions = 3400 x 350 mm (6 stories, up to 20.4m x 3200 mm)

Load-bearing concrete beams
- Dimensions = 1200 x 600 mm (for pairs with concrete beams (on columns and span = 7 m)
- Thickness = 1200 x 2000 = 140 mm (bigger used to accommodate thinner floor slab)

Load-bearing concrete floors
- Span = 3200 x 3200 mm
- Thickness = 3200/24 = 3200/30 = 3200/30 = 140 to 117 mm

Key fundamentals Correa and Revati housing

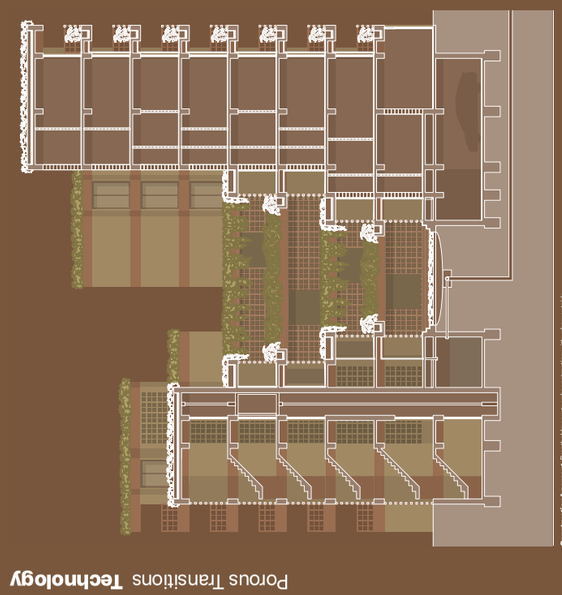
Porous Transitions **Technology**

Construction plan Concrete columns, AAC infill, CSEB jalis and lime wash plaster

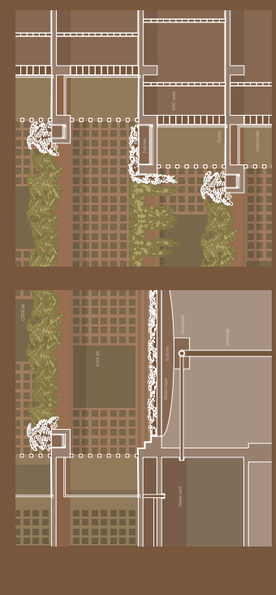
Water plan Rainwater transported in gutters and shafts

Ventilation plan Cross ventilation in various directions

Porous Transitions **Technology**

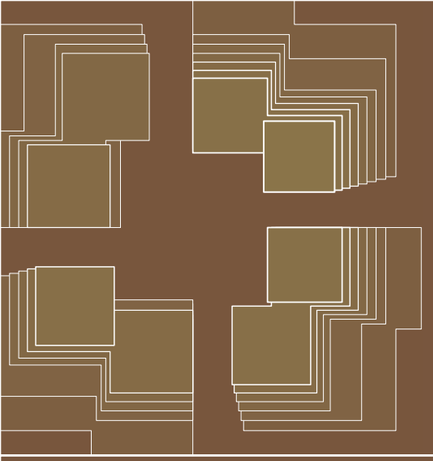


Construction fragment Breathable courtyard constrasting with urban outside



Planters fragment Excess water from green transported

Wadi fragment Rainwater collected in water tank and soil

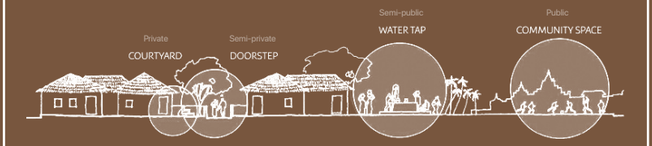


Laladighi

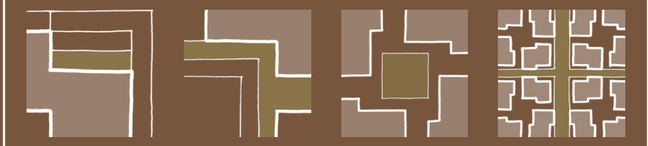
Terraced Habitats

Freek van Schaik

01 Concept



Hierarchy of Spaces Charles Correa



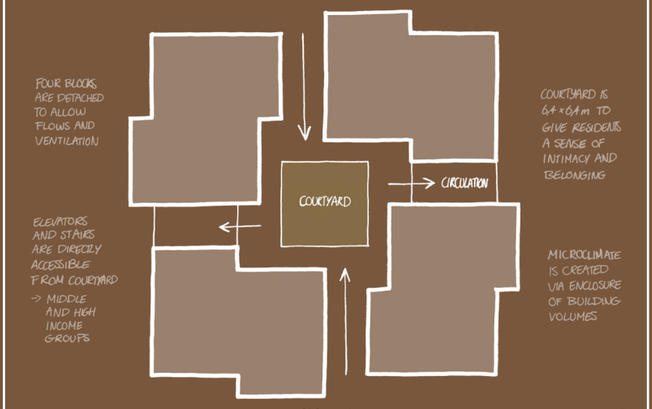
Hierarchy of Spaces Design



Belapur Housing Charles Correa



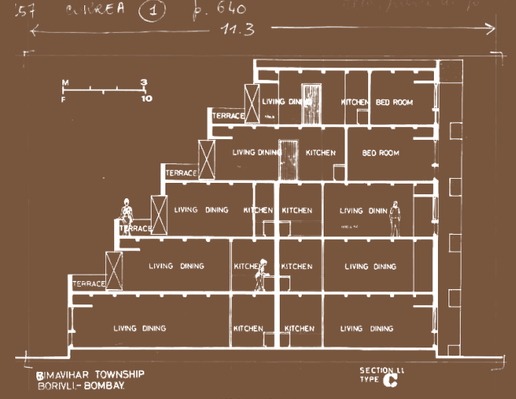
Belapur Housing Courtyard



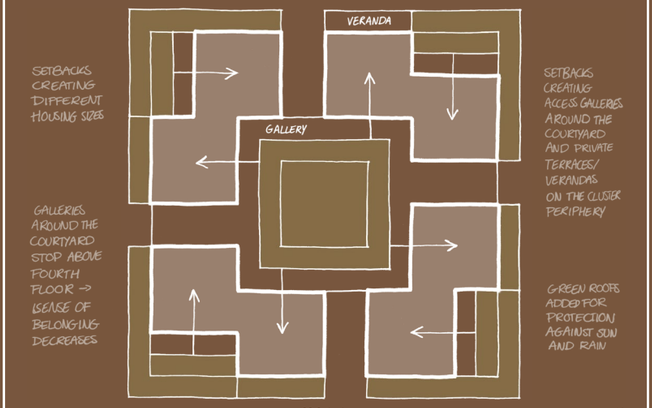
01 Courtyard



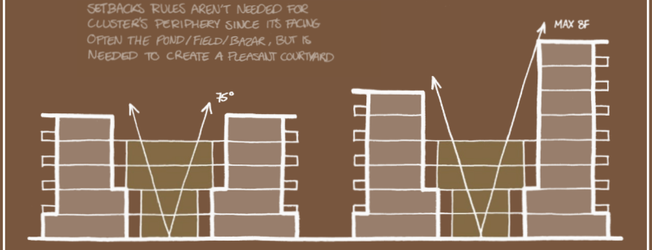
LIC Colony Charles Correa



LIC Colony Setbacks



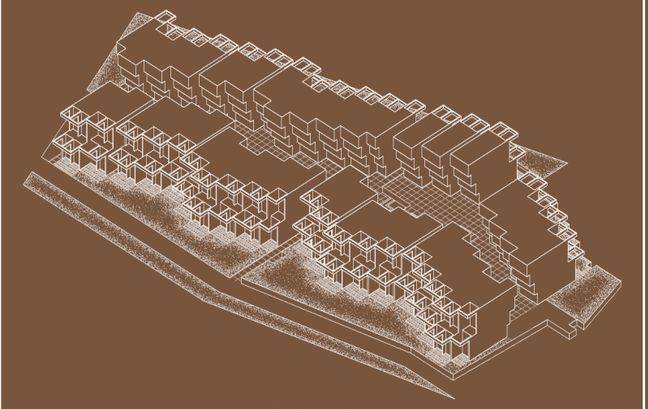
02 Setbacks



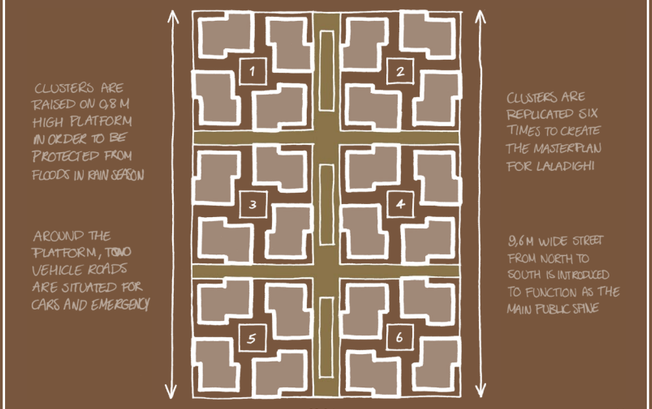
02 Setbacks



Tara Apartments Charles Correa

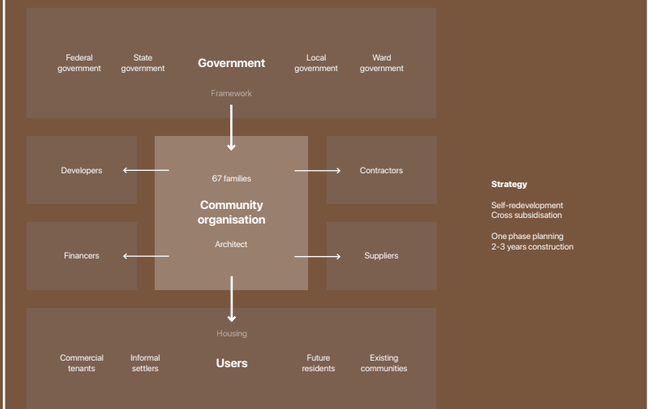


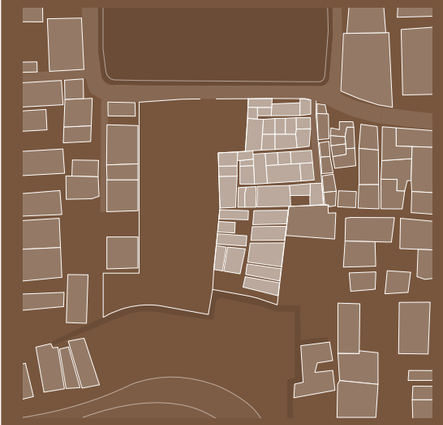
Tara Apartments Spine



03 Spine

02 Management



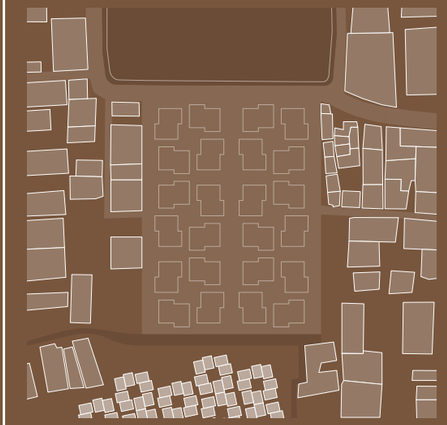


Current

0,25 GSI
0,33 FSI

93 dwellings/ha
628 residents/ha

67 dwellings
67 lower income



During

Temporary housing for
families on cricket field

80 bamboo huts
25 sqm + courtyards

Material reusable for
housing in rural areas



Final

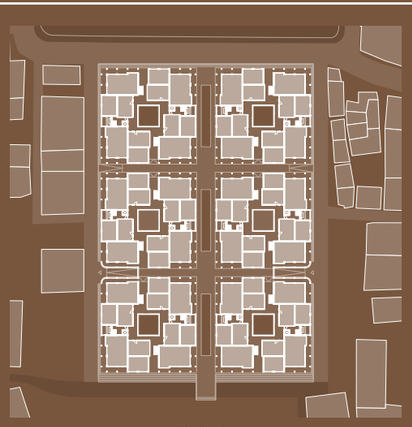
0,40 GSI
1,68 FSI

200 dwellings/ha
1062 residents/ha

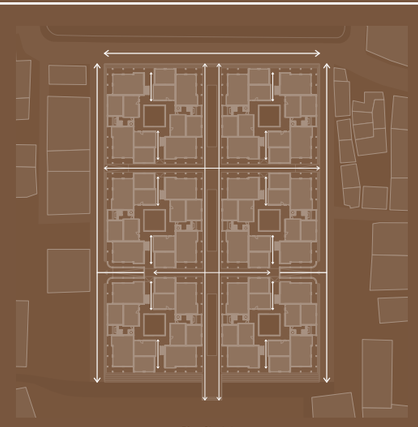
144 dwellings
72 lower income
48 middle income
24 higher income

12 community spaces
36 commercial spaces
68 parking spaces

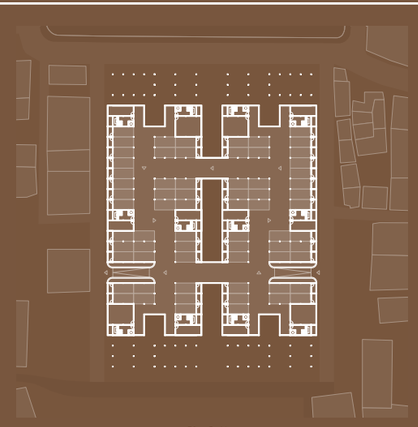
03 Urban



Plan Situation



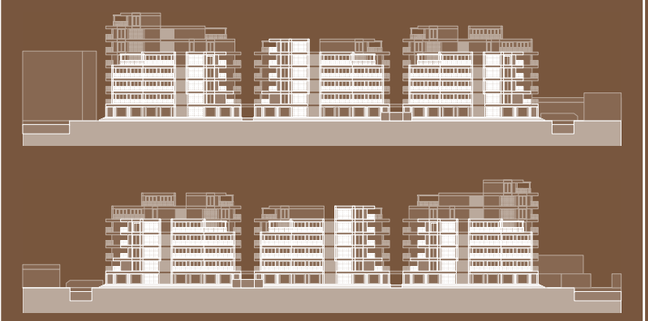
Plan Circulation



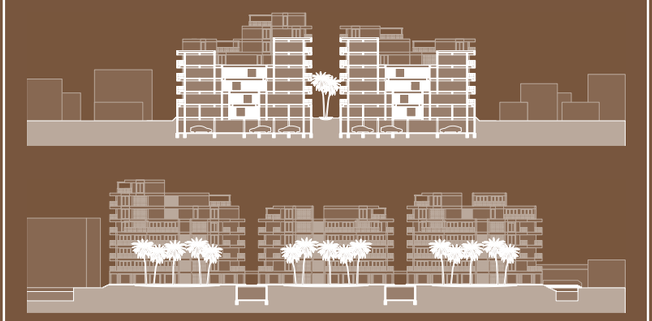
Plan Parking



Elevation North + south

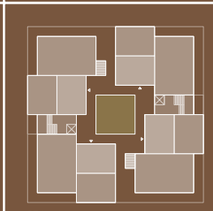


Elevation East + west

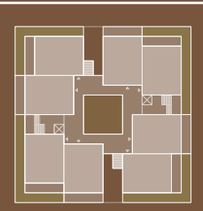


Section North-south + east-west

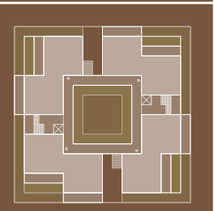
03 Cluster



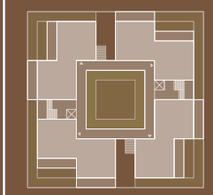
GF Low income + commercial



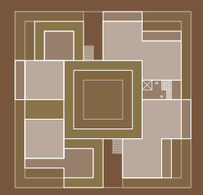
1F Low income



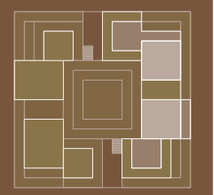
2F Middle income



3F Middle income + high income



4F High income



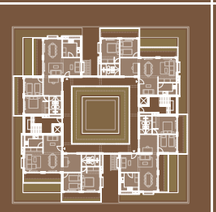
5F High income



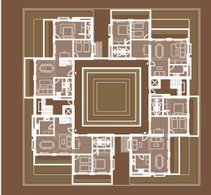
GF Low income + commercial



1F Low income



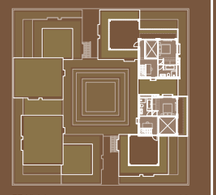
2F Middle income



3F Middle income + high income



4F High income



5F High income



Low income

30 sqm inside
40 sqm courtyard
1 bathroom

Low income

50 sqm inside
10 sqm veranda
1 bedroom
1 bathroom

Middle income

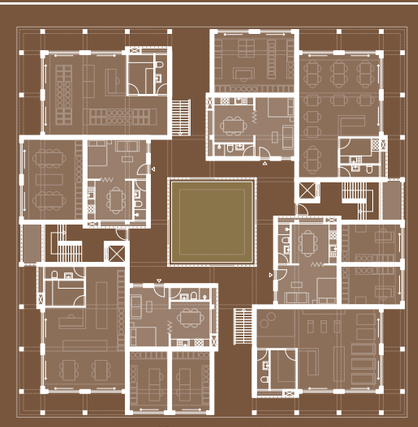
80 sqm inside
20 sqm veranda
2 bedrooms
2 bathrooms

Elevator access
Parking space
Storage space

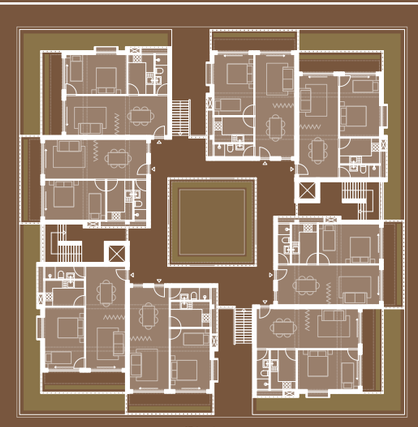
High income

120 sqm inside
50 sqm veranda
3 bedrooms
3 bathrooms

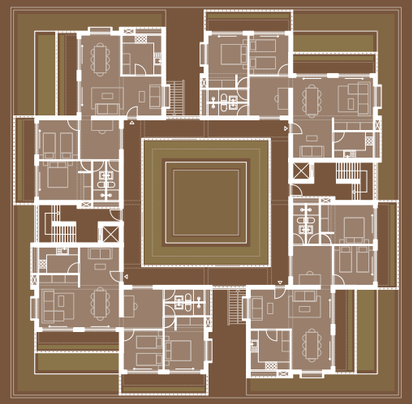
Elevator access
Parking space
Storage space



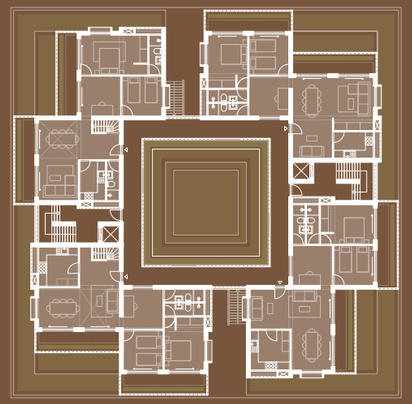
GF Low income + commercial



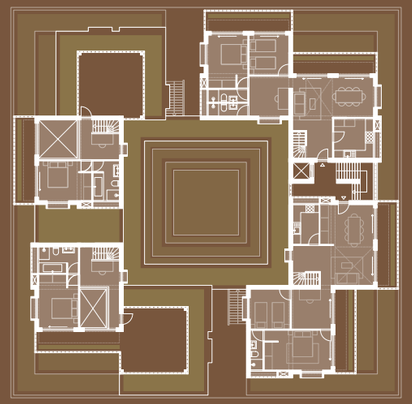
1F Low income



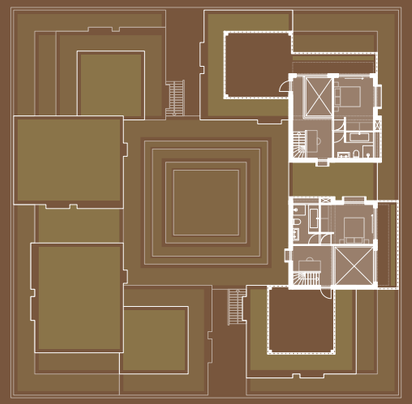
2F Middle income



3F Middle income + high income



4F High income



5F High income

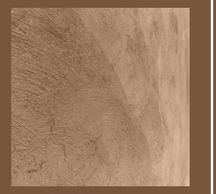
04 Technology



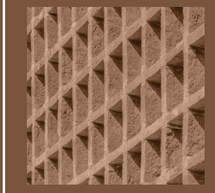
Concrete Structure



AAC blocks Infill



Cement plaster Finish



Fire brick Jali



Reclaimed brick Street



Terracotta tiles Terraces



Philodendrons Planter



Calathea Planter



Ferns Planter



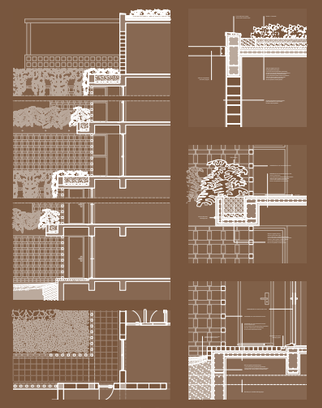
Vernonia Planter



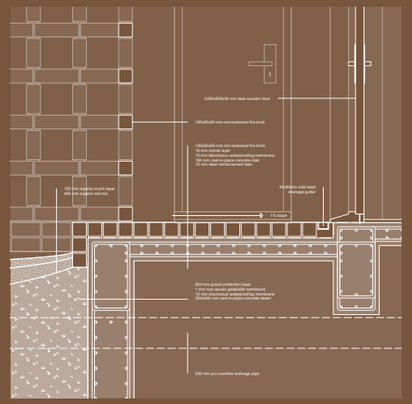
Palms Street



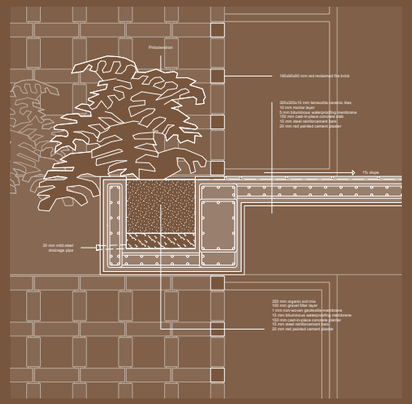
Sedum Roof



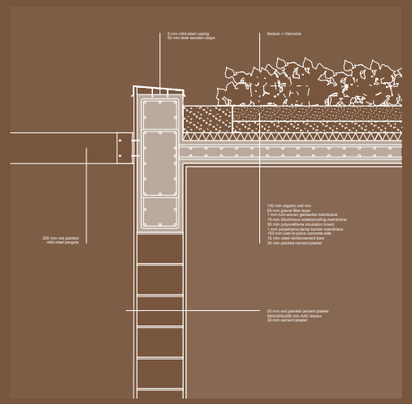
Construction Fragment + details



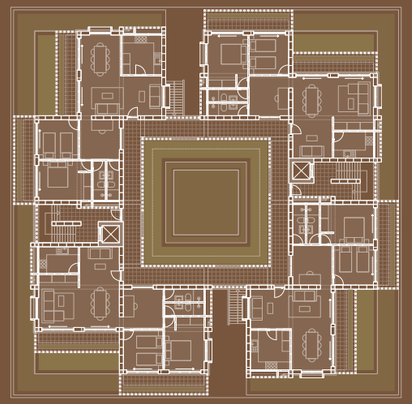
Detail Ground



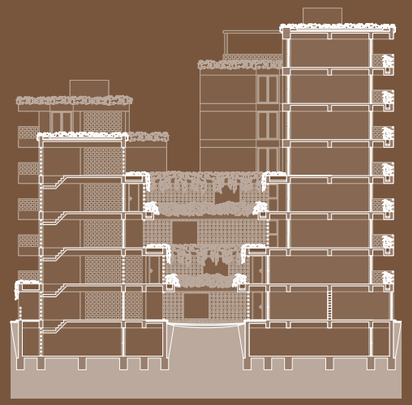
Detail Planter



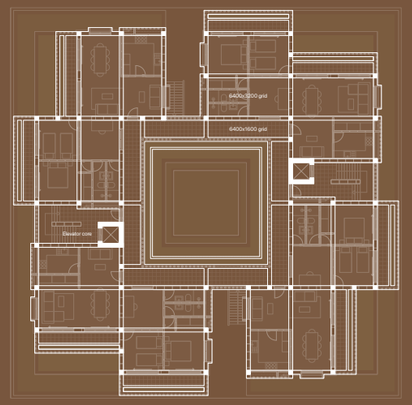
Detail Roof



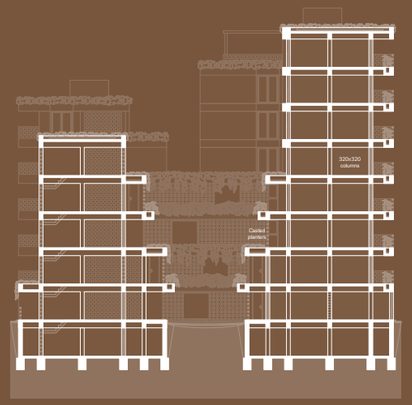
Construction Plan



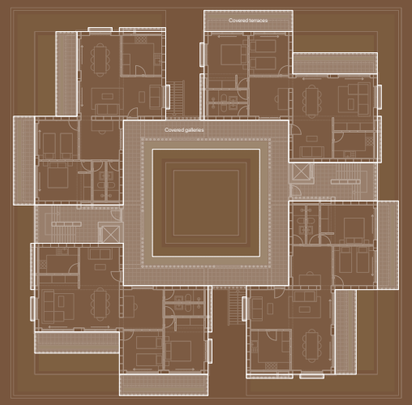
Construction Section



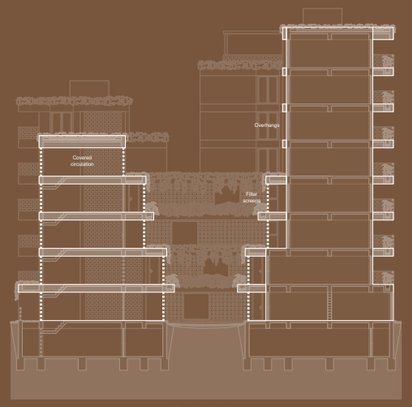
Structure Plan



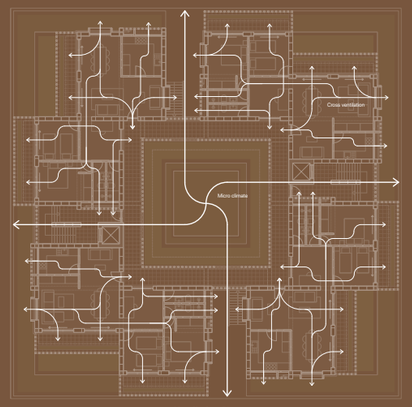
Structure Section



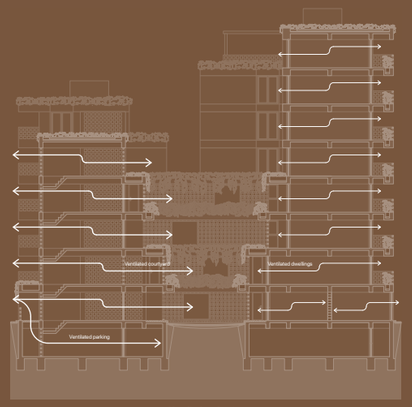
Shading Plan



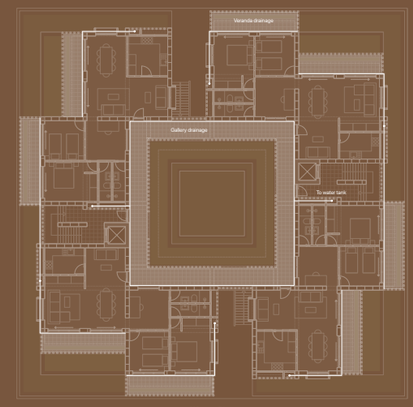
Shading Section



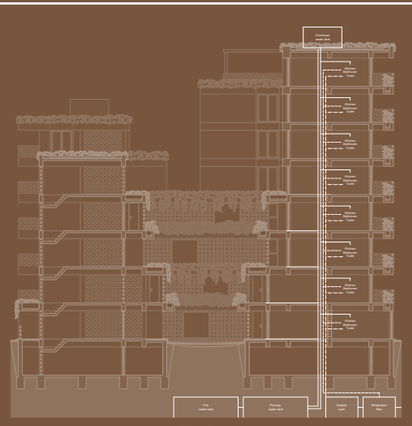
Ventilation Plan



Ventilation Section



Water Plan


Rainwater collection
Greywater collection
Blackwater collection
Rainwater collection
Greywater collection
Blackwater collection
Rainwater collection
Greywater collection
Blackwater collection

Managerial Strategy 96





Situation Current plan

The proposed design plot consists of two areas with completelty different characteristics. On the east side, an informal settlement is located with low-rise high-density housing. There's no real communal or outdoor space besides small alleyways between housing units. This settlement is segreagted from the surroundings through boundary walls. On the west side, a vast grass field is located which doesn't have a function yet.

When these two smaller sites are combined into one single larger site, new possibilities are created. More housing units (stacked vertically) will increase density but with having a larger site, sufficient outdoor space can be offered simultaniously. To determine what the sweet spot is between density and open space, a managerial strategy is needed. Calculating numbers such as FSI and GSI for various proposals give indications of the projects feasibility before setting on the final design. Besides, calculated numbers of the existing situation are needed in order to compare, check and improve the project.



Situation Proposed plan

After these calculations are made, the final design is set on six new residential clusters. These offer enough open space while establishing a high amount of residential, communal and living space. The project could've been denser and attracted even more people but the quality of the built environment would have suffered from it.

Compared to new lower income housing for the people of the informal settlement, middle and higher income units together with rentable commercial space, will generate the highest revenue. Therefore it's important to create spaces and amenities that suit these higher income lifestyles. These are for example dedicated parking spaces for residents and elevator accessibility. The needs have shaped the project's design and identity for a significant part. Being situated in Laladighi, a central urban area, the new type of clusters set the tone and hopes to inspire upcoming redevelopments in the nearby surroundings.

	Existing	Proposal
FSI	2350/7160 sqm = **0,33** 50/4460 sqm = 0,01 (empty plot) 2300/2700 sqm = 0,85 (settlement)	12000/7160 sqm = **1,68** 2160 sqm (non-residential) 3120 sqm (lower income) 3840 sqm (middle income) 2880 sqm (higher income)
GSI	2070/7160 sqm = **0,29** 50/4460 sqm = 0,01 (empty plot) 2020/2700 sqm = 0,75 (settlement)	2880/7160 sqm = **0,40**
Density	67/0,716 ha = **93 dw/ha** 0/0,446 ha = 0 dw/ha (empty plot) 67/0,270 ha = 248 dw/ha (settlement)	144/0,716 ha = **200 dw/ha** 72 lower income 48 middle income 24 higher income
Residents	450/0,716 ha = **628 rs/ha** 0/0,446 ha = 0 rs/ha (empty plot) 450/0,270 ha = 240 rs/ha (settlement)	912/0,716 ha = **1274 rs/ha** 432 (lower income) 288 (middle income) 192 (higher income)

Calculations Social-spatial data

Currently, the design location consists of two isolated pieces of land: the informal settlement to the east and an empty overgrown plot to the west. Therefore, the FSI and GSI of the existing situation are calculated both separately and combined which are 0,33 and 0,29 respectively. These outcomes are relatively the same which means that the site now only has homes with one floor.

The proposed design will be built on both pieces of land plus an extra 1000 sqm. The GSI will jump to 0,40 with less yet better designed public and communal space. The FSI of 1,68 however is significantly higher due to the added floors above the ground floor and towers. This results in a density of 200 dwellings and 1274 residents per hectare. Despite the higher density, the liveability is greatly improved by offering larger housing units and more private and communal outdoor space.

The large jumps in numbers are needed for the project to be sustainable and profitable (in the long term) since the plot is located in a highly desired and expensive part of Sylhet.

	Existing	Proposal
Dwellings	67 units 67 (lower income)	144 units 72 lower income 48 middle income 24 higher income
Types	20 sqm (lower income) 40 sqm (lower income)	30 sqm (lower income) 50 sqm (lower income) 80 sqm (middle income) 120 sqm (higher income)
Amenities	0/450 = **0 sqm/rs** 450 residents 0 sqm amenities	4240/912 = **4,65 sqm/rs** 912 residents 2160 sqm commercial space 720 sqm communal space 1360 sqm parking space
Open space	396/450 = **0,88 sqm/rs** 396 sqm (informal settlement)	2880/912 = **3,16 sqm/rs** 720 sqm (lower income) 960 sqm (middle income) 1200 sqm (higher income)

Calculations Programatic data

The new amount of dwellings will be 144 compared to 65 of the current situation. Half of these are lower income housing which are used to house the families from the informal settlement. These are funded by the profits made from the other half of dwellings, this part of the so-called process of cross-subsidisation.

Four housing typologies will be introduced which vary in size and target specific income groups. Apartments of around 30 sqm are suitable for small lower income households and 50 sqm for bigger households, 80 sqm for middle income households and roughly 120 sqm for higher income households. Most of these units have access to private verandas which results in 3,16 sqm open space per resident.

The informal settlement has no amenities for the people living there. Realising housing for higher income groups and bringing communities together, amenities are necessary for this coexistence. 2160 sqm will be dedicated to commercial space (shops and restaurants) and 720 to communal spaces (workshops and event spaces).

Revenue	Expenses	Profit
Tk 600.000.000	**Tk 306.432.000**	**Tk 293.568.000**
Price/sqm x area = revenue 50.000 x 12000 = 600.000.000 Tk 50.000 per sqm Average price for new mid-rise residential building in Sylhet city 12000 sqm built area (FSI)	Cost/sqm x area = construction 25.000 x 12000 = 300.000.000 Tk 25.000 per sqm Average cost for new mid-rise residential building in Sylhet city 12000 sqm built area (FSI) Rent x households = temporary housing on cricket field 96.000 x 67 = 6.432.000 Tk 4.000 per month/household Tk 96.000 for 2 years/household 67 households in settlement	

Calculations Cost estimation

For the project to be profitable, rough economic calculations need to be done before finalising the design and starting the construction. The profit can be estimated through a simple calculation: revenue minus expenses equals profit.

The revenue can be projected by looking at the price per square meter of similar mid-rise residential projects in urban Sylhet which comes down to roughly 50.000 taka.

The expenses are a combination of the projected construction costs plus the costs of housing the people from the informal settlement temporarily.

Construction cost per square meter in Bangladesh is around 25.000 taka. The expense for the temporary housing is the monthly rent for the 65 households over a period of 2 years (the estimated duration of construction).

The difference between the revenue and the expenses gives a profit of Tk 91.760.000. This is a relatively high amount which makes this project interesting for developers.



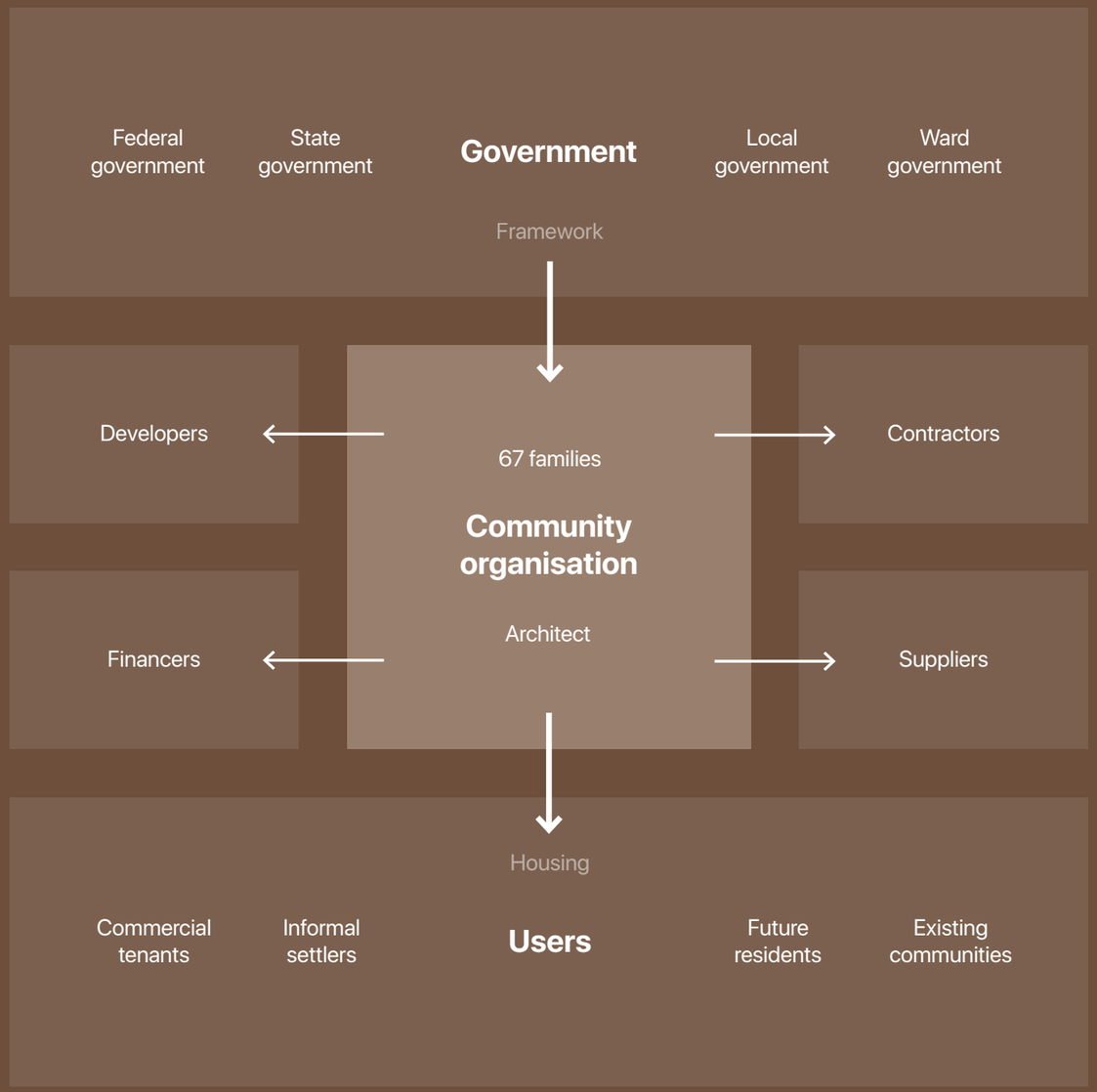
Strategy Stakeholders analysis

For a project on this scale, many different stakeholders are involved. They all have various levels of influence and interest, which can be analysed through the diagram.

Firstly, there is the government on four different scales: federal, state, local and ward. They have roughly the same influence but different interests. The local government is for example much more interested in this project than the federal government since it functions on a smaller scale.

Secondly, there're the developers which can be broken down into multiple smaller stakeholders. Suppliers and contractors have small influence and interest. The architect and project developer do have similar positions although the architect has more interest than the project developer since they mostly care about making profit. Financers have comparable influence but even less interest.

Lastly, the end user comes into play. The people from the informal settlement are most interested since they're living there and have stakes in better housing. Future residents and commercial tenants have less interest but more influence since they have access to more money.

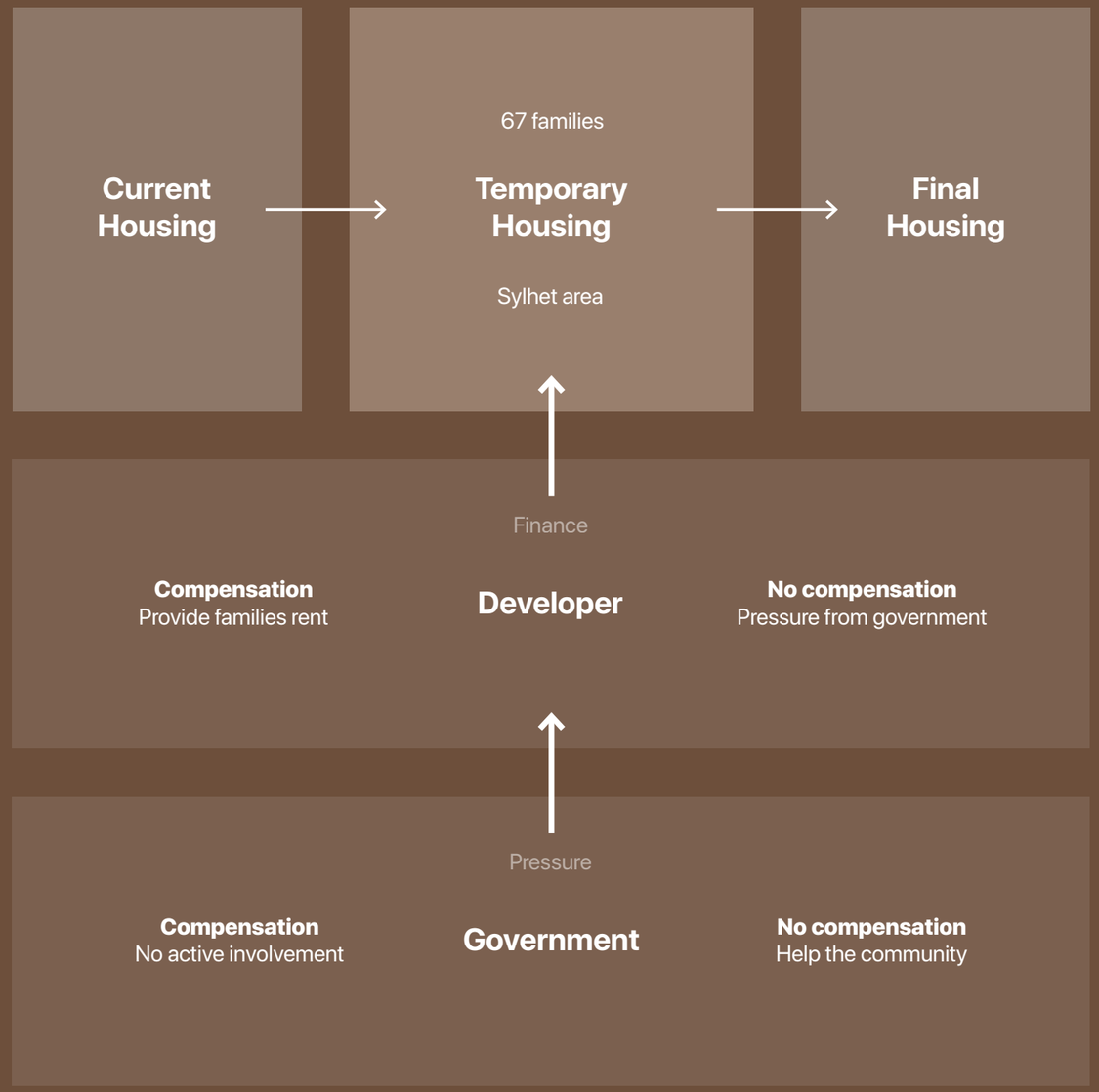


Strategy Self-redevelopment

In the process of self-revelopment, a community organisation will be established which communicates with the three main groups of stakeholders: government, users and developers. This organisation for example might consist of a member from each household, the architect and other members of the existing stakeholders.

The community organisation reaches out to the developer, asking them to develop better dwellings for the informal settlers and new dwellings for higher income groups. In the case of this specific project, it's interesting for the developer to jump from a FSI of 0,33 to 1,68 since these extra higher income units will generate profit. The government will set a maximum FSI depending on the plot and location within the city. This is usually around 2 or 3 which the project sits comfortably under.

Therefore, the role of the government comes mostly down to regulating the project via regulations and speaking to the community organisation until construction work is finished.



Strategy Temporary housing

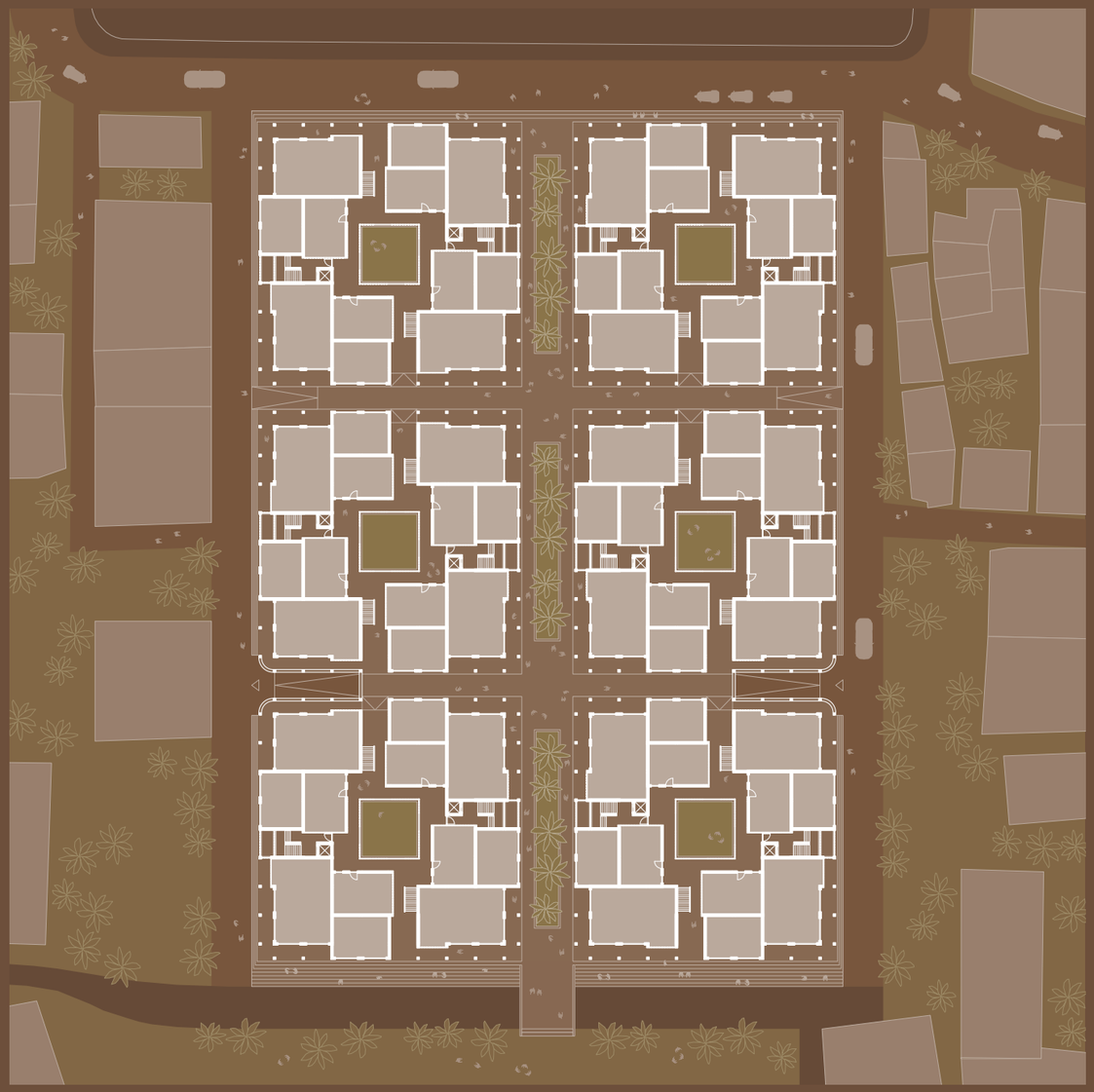
The developer will pay the people from the informal settlement their monthly rent for temporary accommodation. The families will get a chance to find suitable housing in the Sylhet area that is comparable to the current housing around Laladighi. If construction goes according to the plan, the project is estimated to be finishid within 2 to 3 years so the developer pays rent for this period when the construction site is uninhabitable. .

However, if construction works exceed the agreed time for their rent deal, the community organisation can go to the government if the developers decide to stop paying rent. The government will now pressure the developer through clauses or lawyers to advance the works quicker or keep paying the people's temporary housing rent.

By having a community organisation that negotiates between the developer and the government, situations like the temporary housing will result in a good outcome for the existing families. The people of the informal settlement are in power.

Urban Scale 106



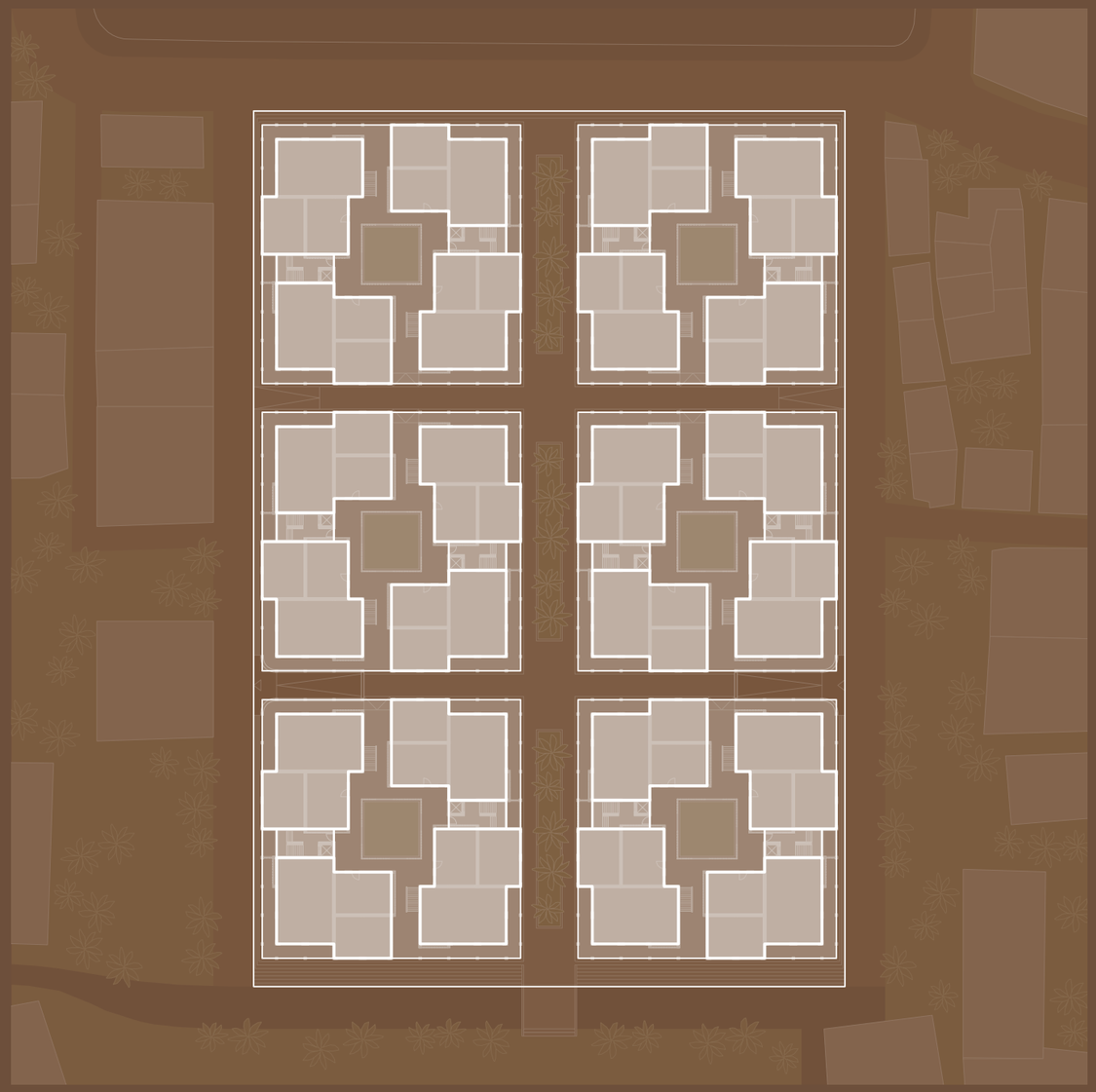


Situation Street plan

On site, six new residential clusters are realised which have communal and public functions on the ground floor. These clusters are raised on a platform against floods and are accessible via stairs and ramps. Large stairs on the pond site and even larger stairs alongside the new canal are offering people a place where they can meet and interact with each other in a pleasant environment.

The main street and public space, the bazar, runs from north to south and connects the pond with the cricket field through a new bridge. Here, shops and restaurants are located. Perpendicular to the bazar are the smaller streets where you find communal spaces such as workshops and event spaces. Surrounding the clusters, existing streets are connected with newer streets on the platform.

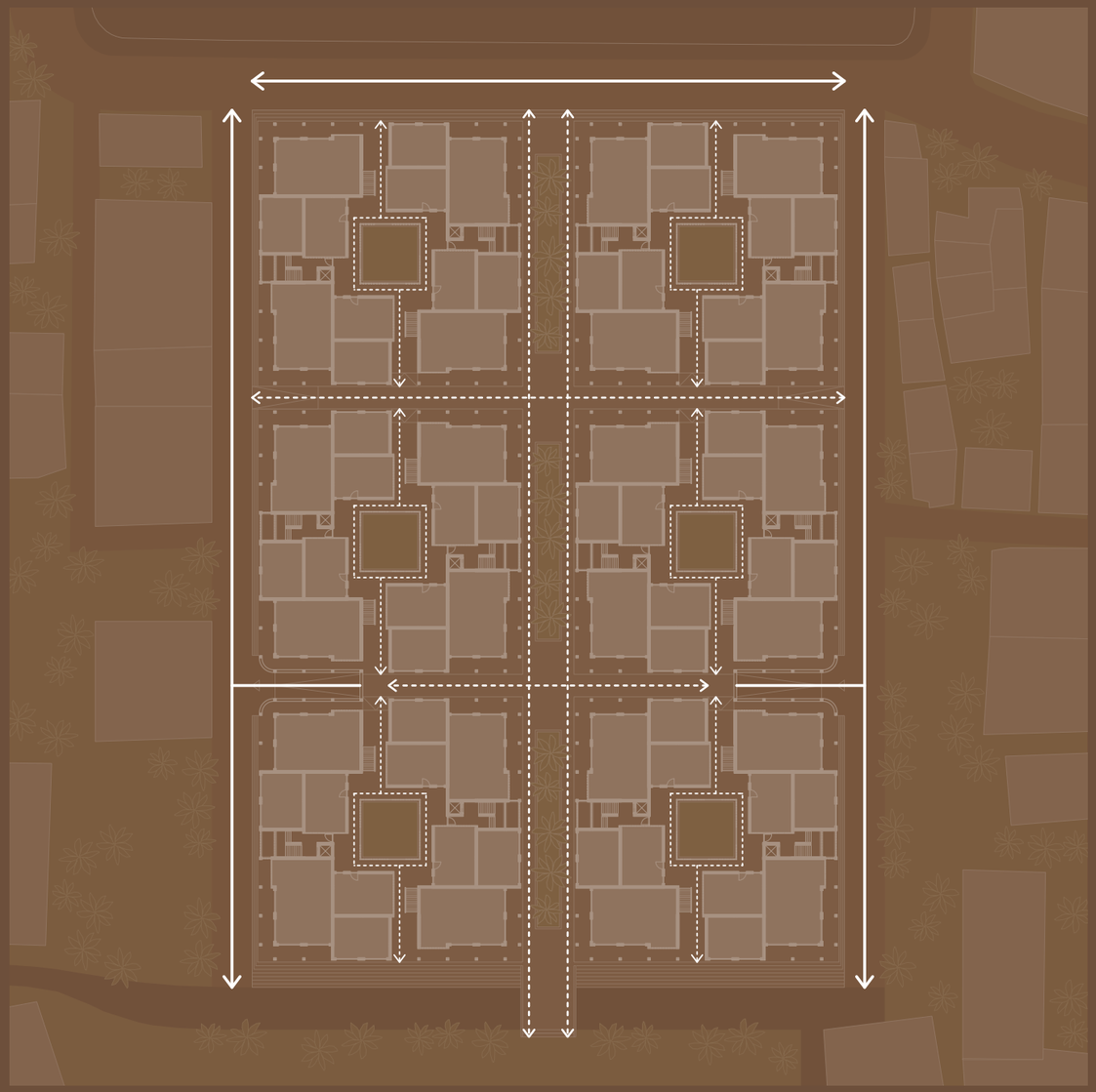
Three lineair green strips containing plants and palms are in the middle of the bazar to offer shading. Together with the green courtyards and the green surrounding the cricket field, vegetation enhances the overall atmosphere and the way people experience the place.



Hierarchy Street plan

Transition spaces like courtyards and verandas are at the heart of the project and form the bridge between public and private spaces. These are therefore mostly found in and around the clusters.

The platform on which the clusters are located is a small threshold that functions as transition space by connecting lower vehicular roads with a higher pedestrian level. The stairs surrounding the platform generate space for the public to relax and sit. Verandas enclosing the commercial and communal spaces are transitional spaces for climatic and social reasons, where people are encouraged to interact in shaded places protected from the rain and sun. The courtyards in the middle of the clusters are, although accessible for the public, meant for residents. Covered galleries around the courtyard create even more private places for residents in front of their dwelling entrances. From the public bazar to the private dwellings, a hierarchy of transition spaces is experienced.



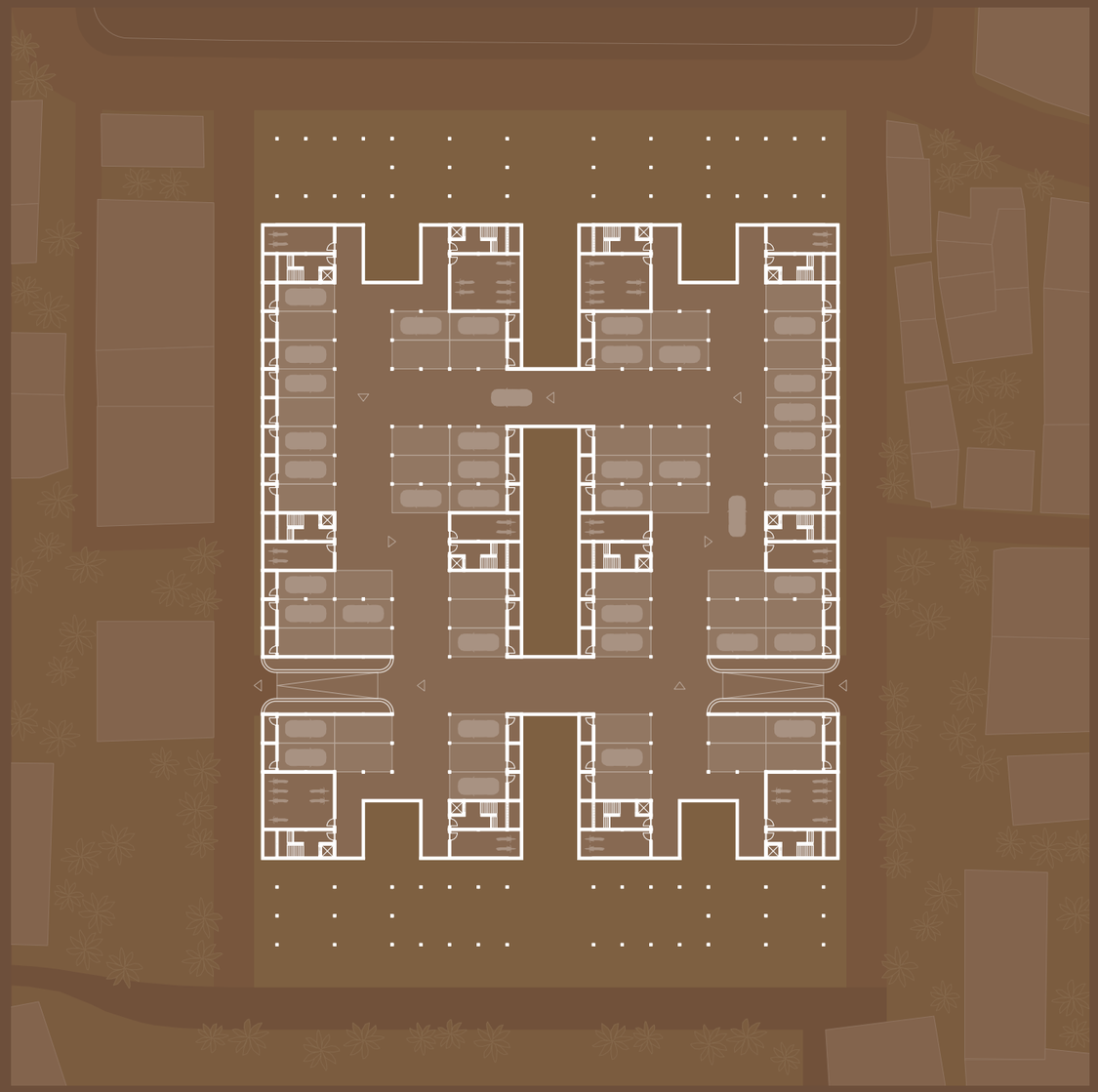
Circulation Street plan

The project is located south of an existing busy vehicular street. In order to create a liveable and enjoyable neighbourhood for different communities, recreational space is needed. Therefore, the platform on which the clusters are located, is designed as a pedestrian zone. The bazar and the adjacent streets give pedestrians space to both move slow and fast.

Two slits or streets in each cluster provides residents a secluded way to the courtyard and vertical circulation spaces. Since these spaces are not for the general public, they aren't directly accessible from the bazar but located slightly further away.

Around the platform, two wider streets are introduced perpendicular to the busy vehicular road in the north. These are necessary in cases of emergency and are used to access the underground parking garage further down the site.

By separating the two different types of flows, pedestrians and vehicles, optimised spaces with clear direction to a specific type are being realised. This makes moving through the project easier and more intuitive.



Parking Underground plan

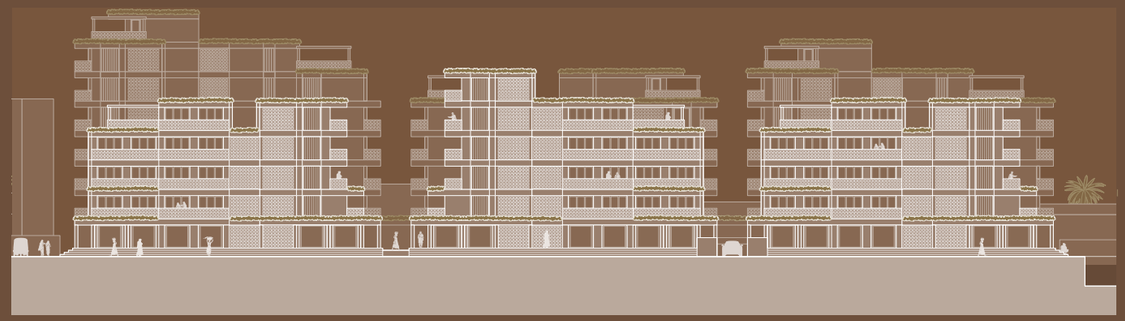
Parking for residents and people visiting the area is done through an underground parking garage. This can be entered and exited via the vehicular streets alongside the platform. When entering, cars and bikes are guided in a loop circulation to their parking spots.

The loop follows the shape of the streets between clusters since no columns are standing in the way of the drive lane. There's no garage underneath four courtyards and three green lanes of the bazar since these function as sponges for rainwater. In the plan, these are visible as cutouts from the parking and are separated via walls.

There are 68 parking spaces in total which are meant for residents of the middle and higher income dwellings. Higher income dwellings have an option to have two back-to-back parking spots. Behind the parking spots, external storage space for the residents is offered. Since most of these higher income groups will arrive and leave by car, the vertical circulation spaces to their dwellings are extended to the underground parking garage.



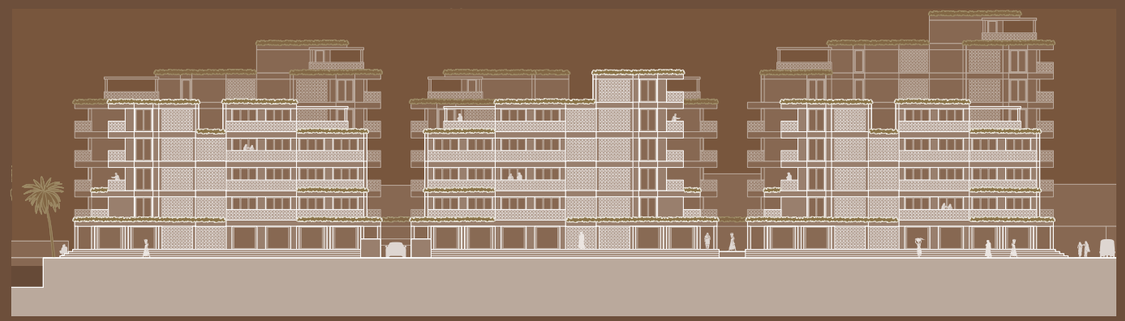
Situation North elevation



Situation West elevation



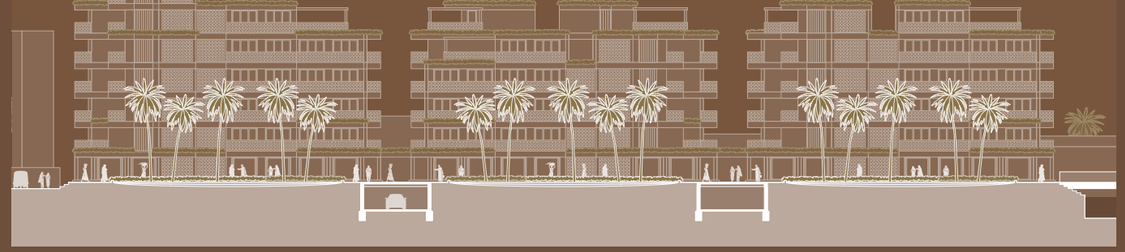
Situation South elevation



Situation East elevation



Situation East-west elevation

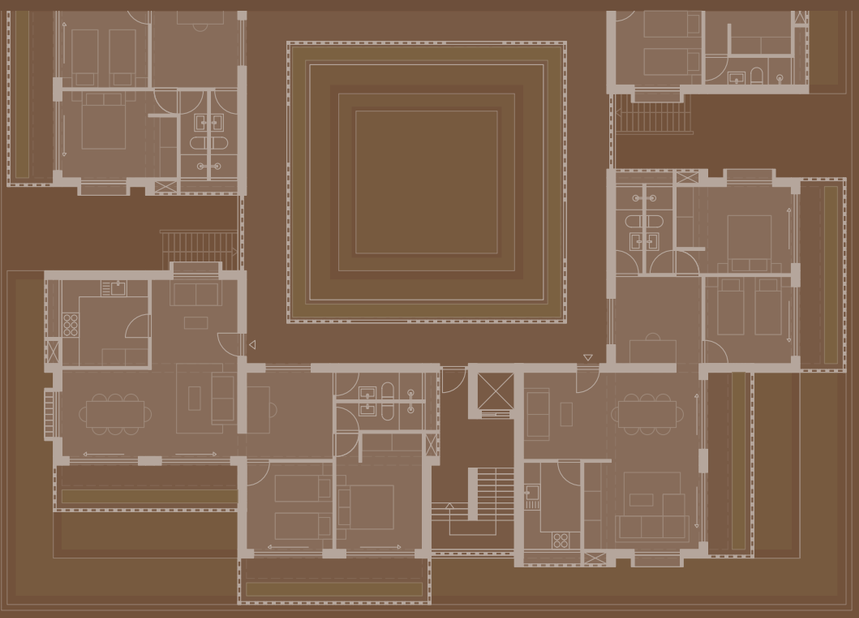


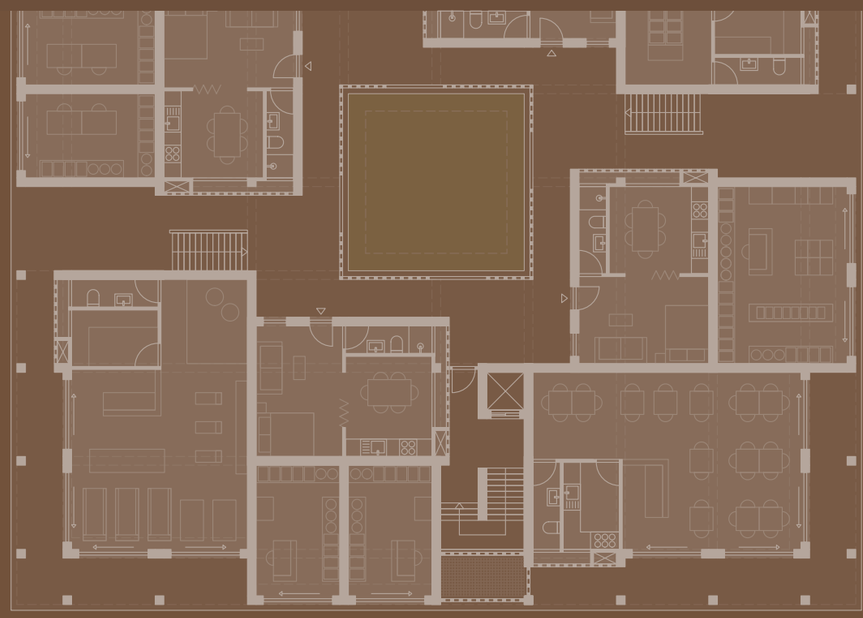
Situation North-south elevation

The project's shape is formed by the enviroment it's located in and responds to specific feature of that environment. While the consist of largerly the same floorplans, the heights vary and create an intering placeto be in

Comparing the north elevation with the south elevation, you notice that the north side has a more imposing urban image facing the pond whereas the south facade is more opening up to the field. Looking at the east and west elevations, it's noticeable that towers with the highest floors are located near the pond and field. Hereby, more dwellings are able to have views over these landmarks. The east-west section reveals the relation between the raised platform and the underground parking garage. In this case the two courtyards don't function as a sponge. In the north-south section however, the sponges underneath the bazar's green strips are visible and show the open spaces or squares where people can gather and comunal activities can be organised.

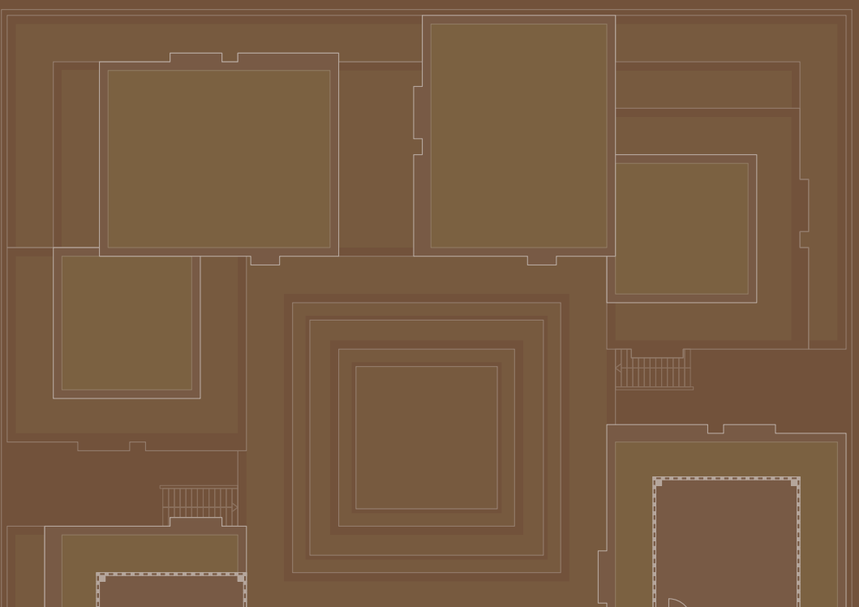
Cluster Scale 114

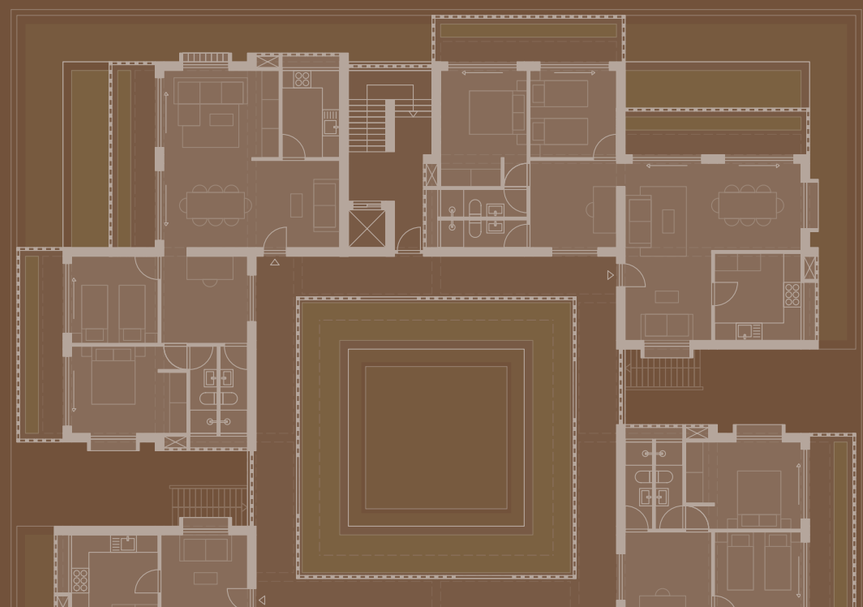


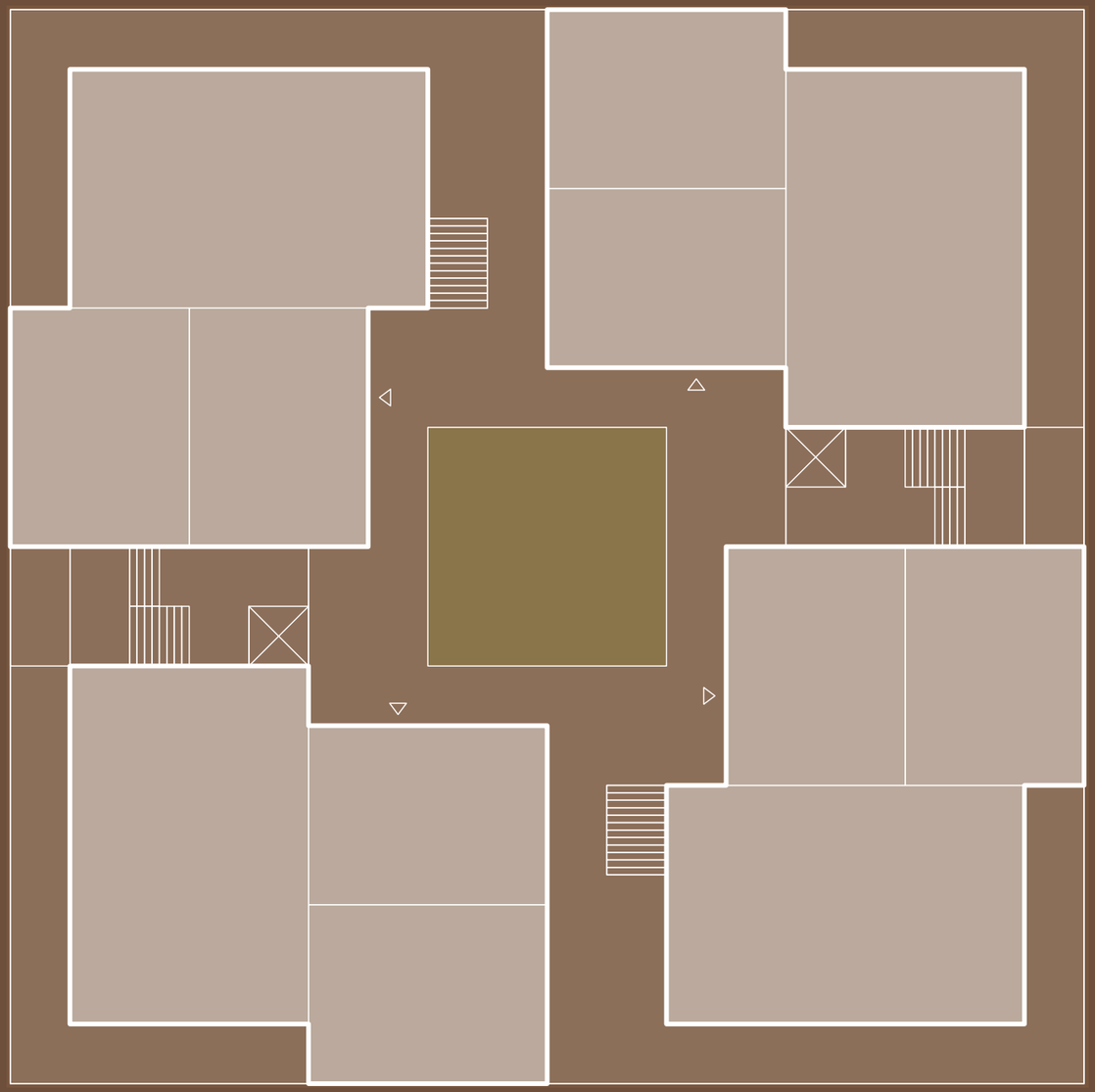




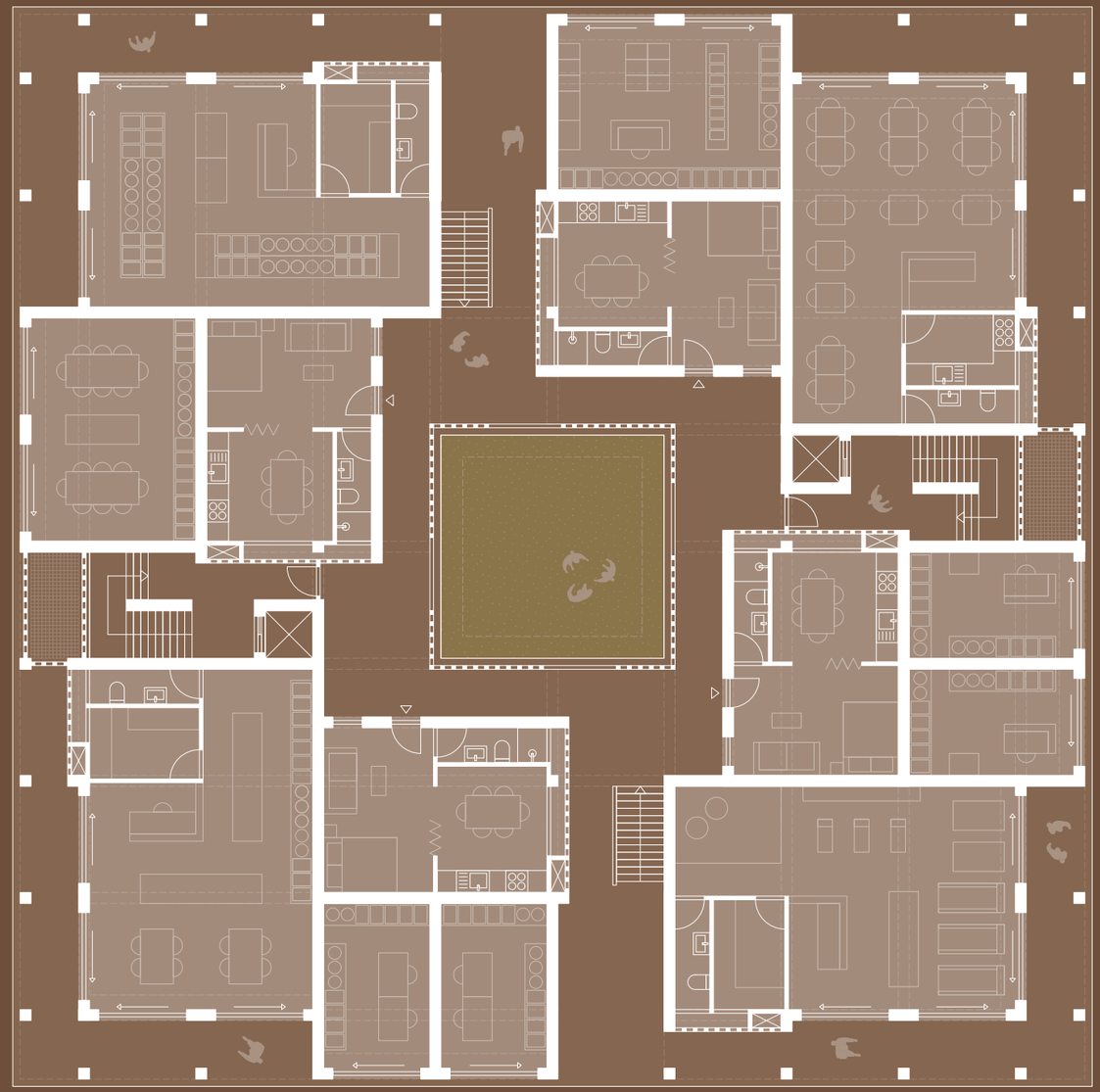








GF Concept plan



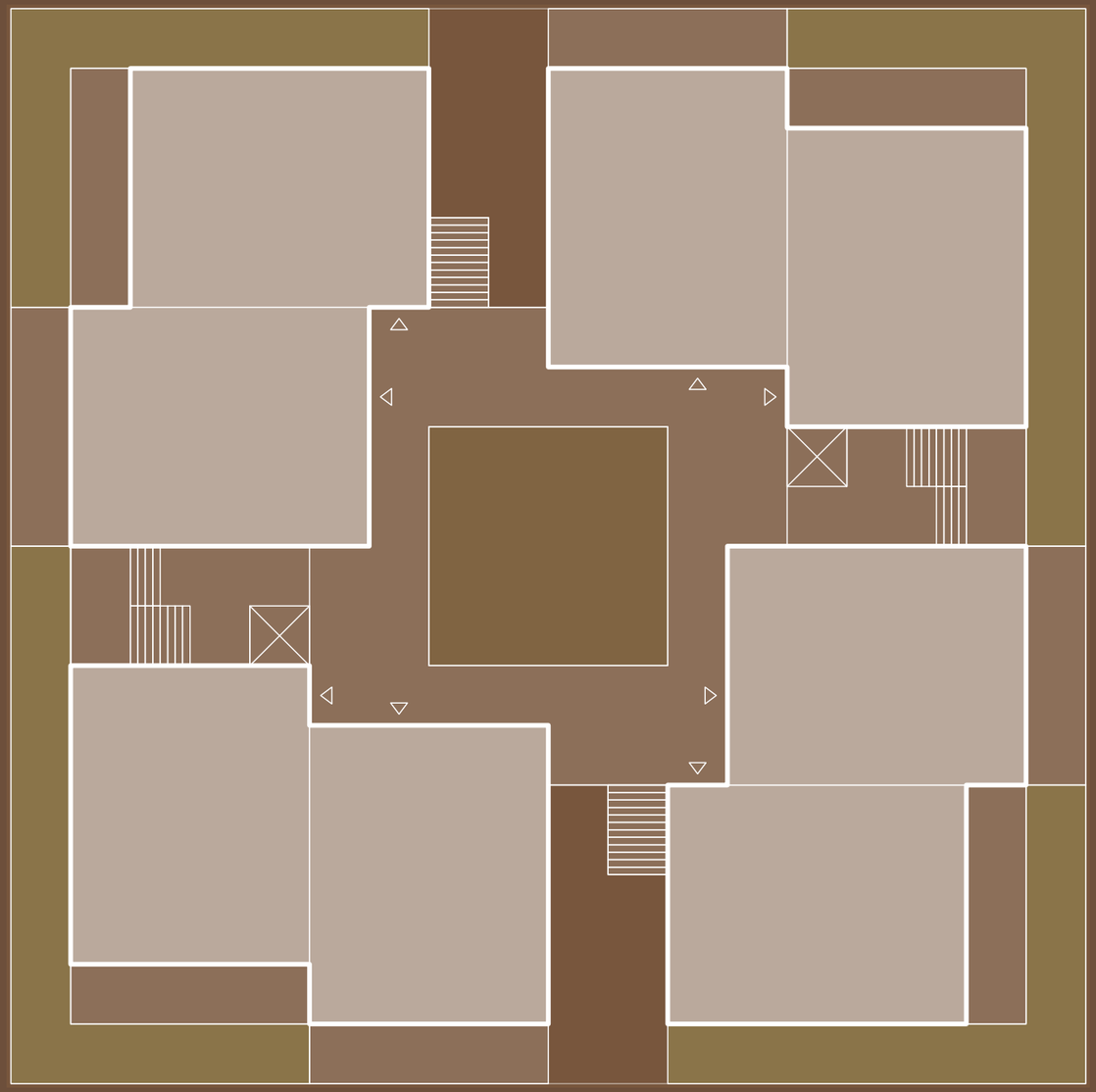
GF Detail plan

Residential, commercial and communal functions are housed on the ground floors of each cluster. The commercial and communal spaces of 30 or 60 sqm such as shops, workshops and restaurants, are situated on the periphery for easy access by the public. In front of these, transition spaces in the form of verandas create a climatic buffer zone and space for social interaction.

To access the 30 sqm lower income units, you have to enter the courtyards via open slits or streets on two sides of the cluster. On the other two sides, elevators and stairs for the higher income units are situated.

The layout of the lower income units is quite open with a multifunctional room which can be used for living and sleeping.. The kitchen and dining space is attached to the multifunctional space but can be closed off through shutter doors. Each space contains dedicated windows, with the kitchen and bathroom having an additional brick jali screen on the outside for improved privacy and ventilation possibilities.

The courtyard itself is enclosed by verandas in front of the housing units. The grass field in the middle is purposely left open so residents can do various activities here such as outdoor gatherings.



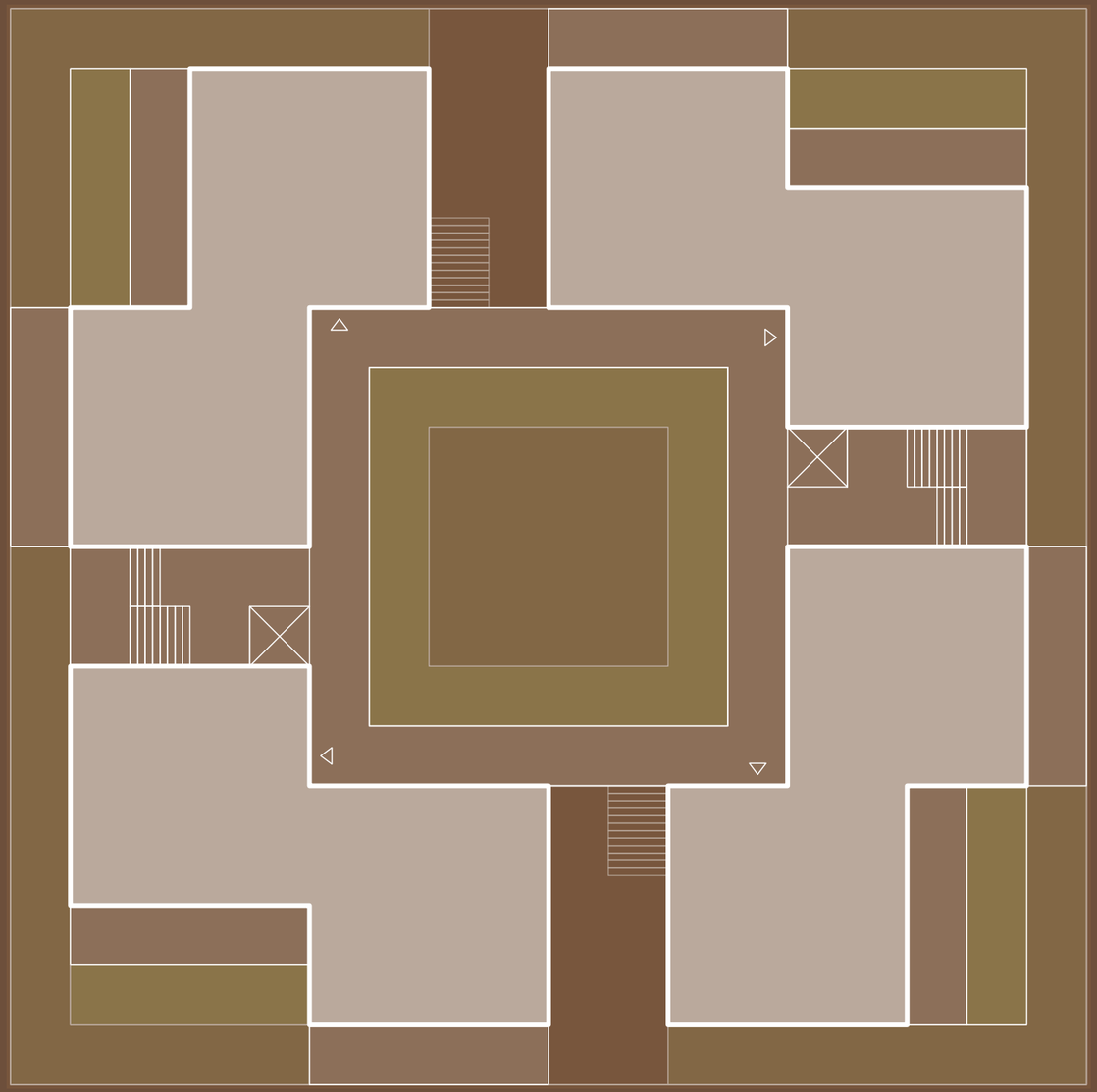
1F Concept plan



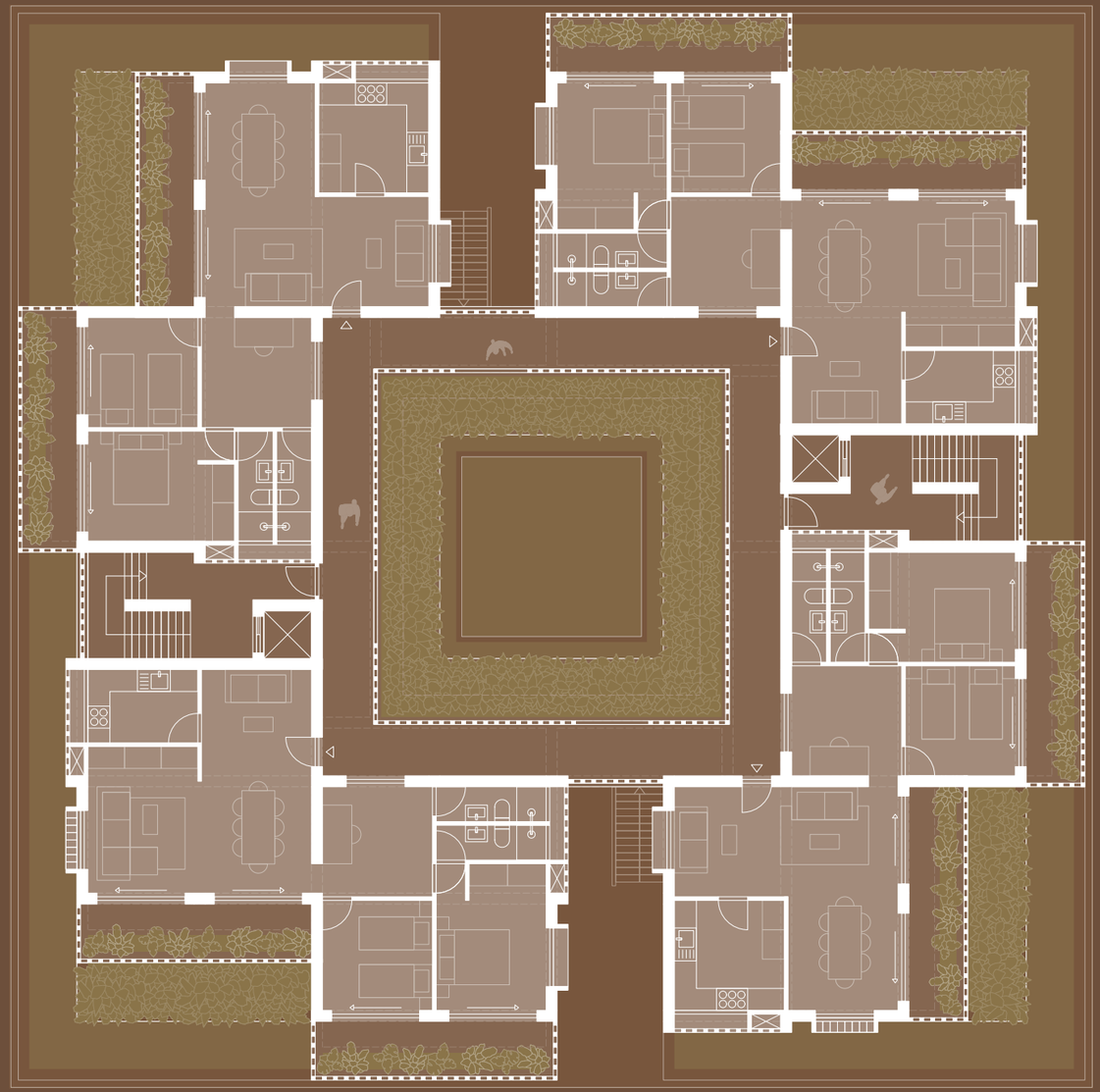
1F Detail plan

More lower income housing units are located on the first floor. For each cluster, these are accessible via stairs situated in the two open slits. After taking the stairs, you enter a covered gallery enclosing the courtyard. At four places, the gallery is enlarged to offer residents space for social interaction. Vegetation and brick jalis give the gallery a more breathable and traditional feel compared to the more urban building facades.

The lower income dwellings are significantly larger with 60 sqm than the units on the ground floor, targeting bigger families who need more space. The layout shares similarities with the 30 sqm ones, having the kitchen and bathrooms housed on the sides. However, there's a separate bedroom and kitchen. The living room can be divided from the dining room via shutter doors, so the living room becomes a second room where residents or guests can sleep in privacy. Sufficient daylight and ventilation is offered by folding glass doors leading to the private terrace. Here, a green strip is designed to encourage residents to grow their own plants and therefore improve breathability and liveability.



2F Concept plan

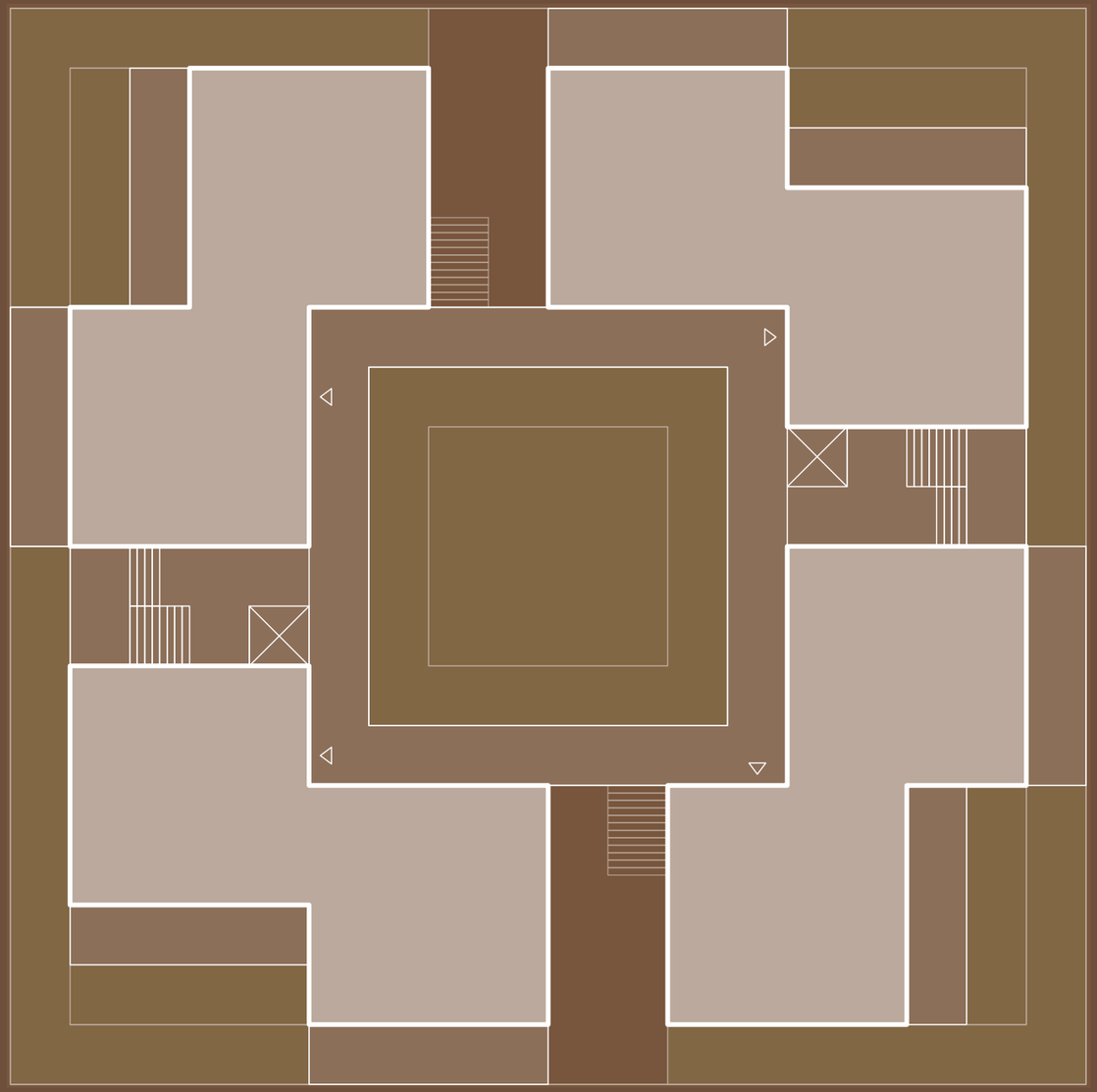


2F Detail plan

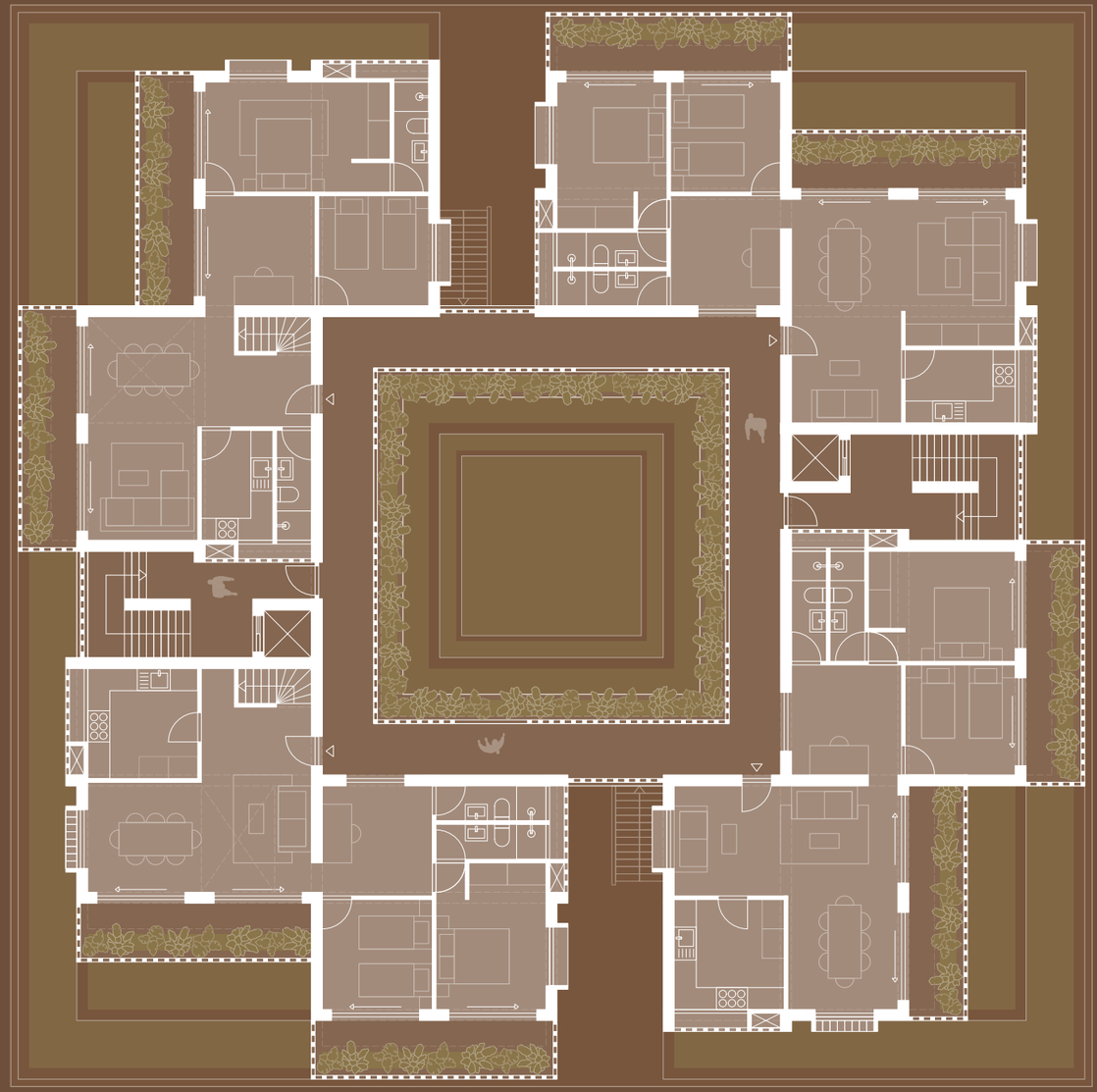
On the second floor, four middle income dwellings are situated. These will be accessed from the streets or underground parking garage through the separated vertical circulation space which contain an elevator and stairs. The access galleries around the courtyard are recessed compared to the floors below to create a more open feel.

The middle income units of 80 sqm have a flexible layout with only the kitchens and bathrooms being fixed again to the sides. The dwellings consist of two connected square volumes with the first one furthest from the front door housing the more private spaces such as the bedrooms.

You enter a dwelling via the open living and dining room, which is usual in Bangladesh. Adjacent to this space is the first of two private terraces and a multifunctional space that can be used as working space or an additional living room. The bedrooms and bathrooms are accessed via this space. The main bedroom has closet space and an ensuite bathroom. Additional storage rooms and dedicated parking space for these dwellings can be found in the underground parking garage.



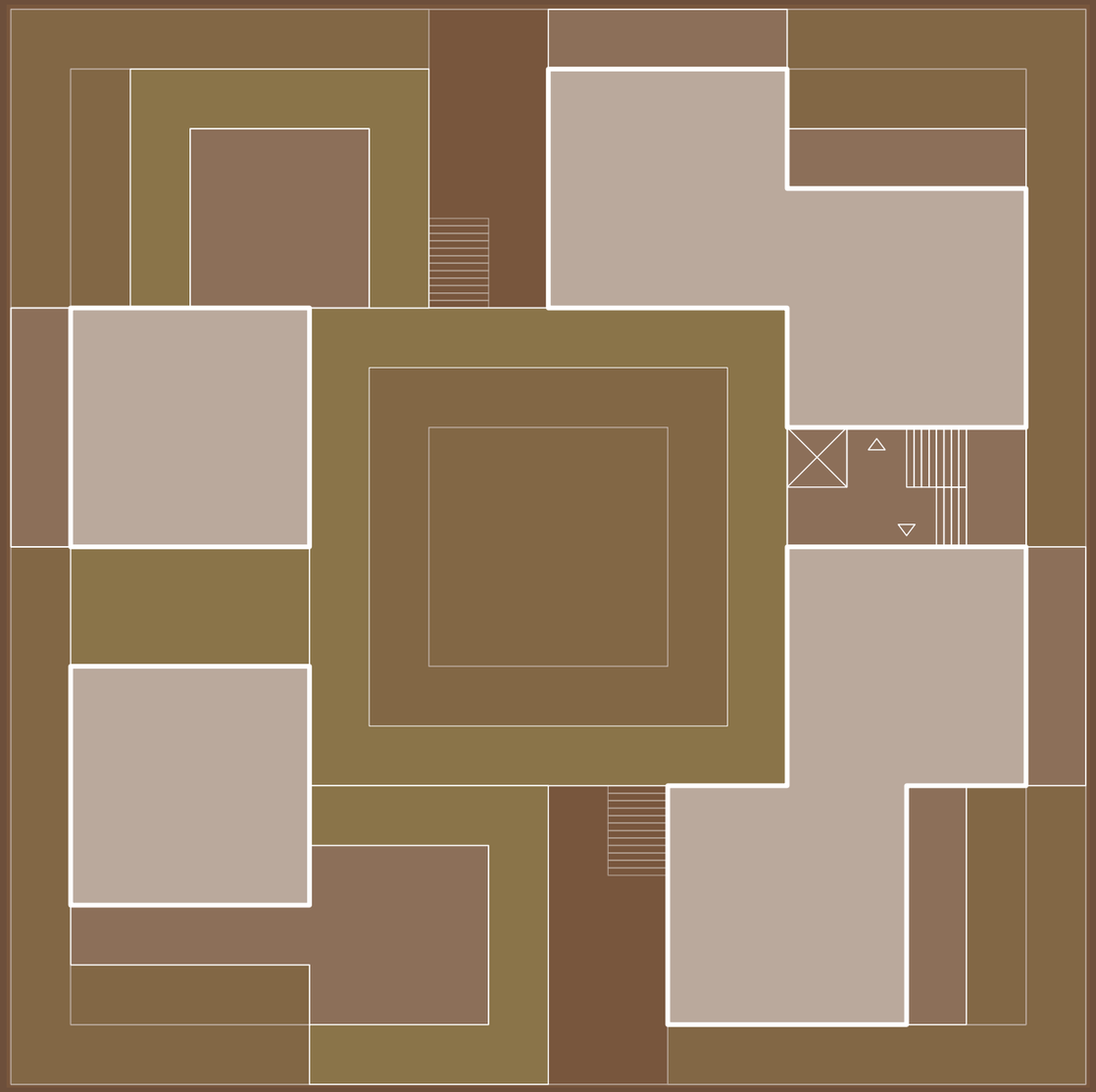
3F Concept plan



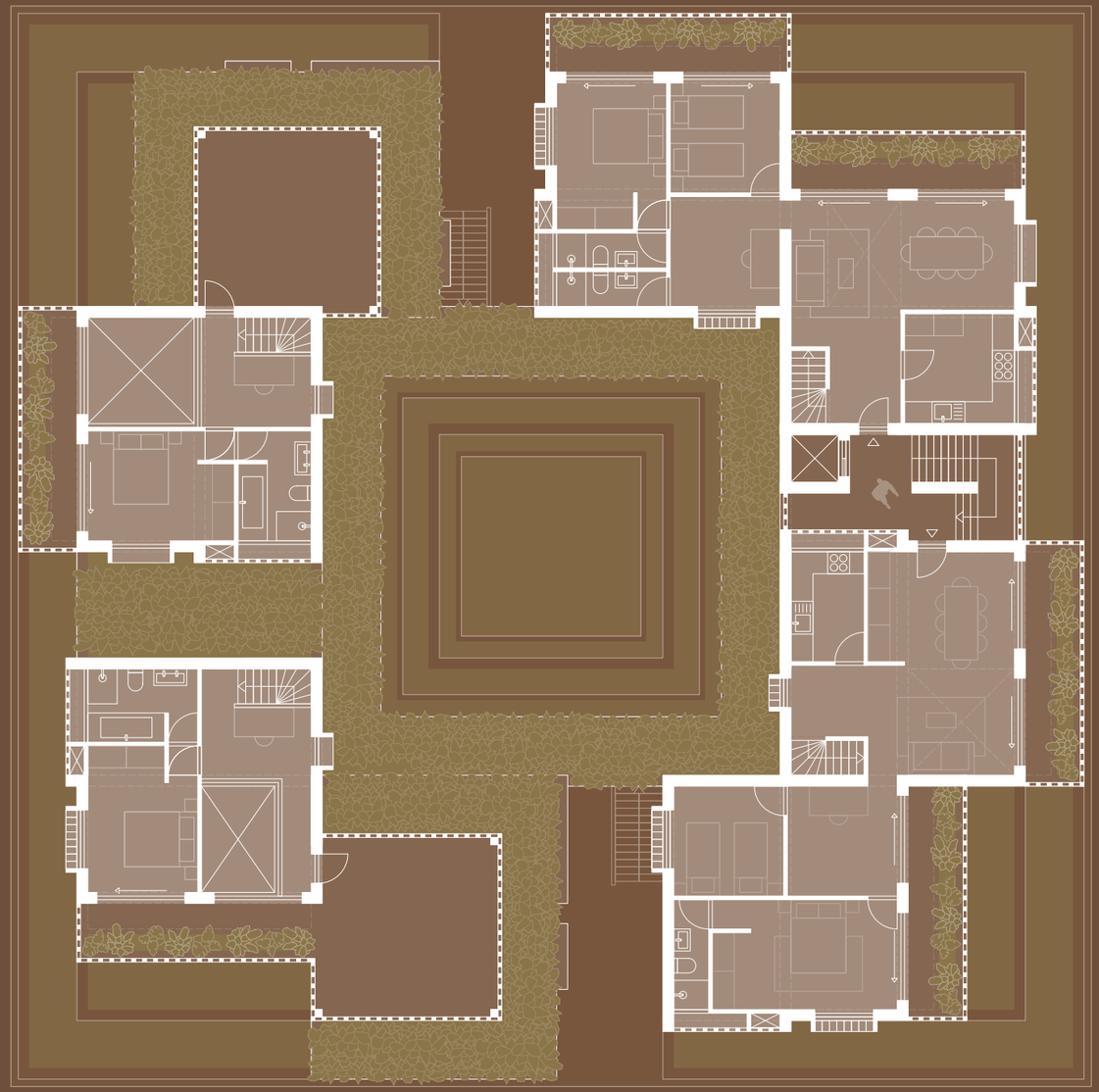
3F Detail plan

The third floor or rather the level above the first three floors is designed specific to the different cluster heights. In clusters with many levels, this floor is largely a copy of the second floor with middle income housing units. For lower clusters, some of the middle income dwellings are swapped for the first of two floors of the higher income duplex units.

The flexible layout of these 120 sqm dwellings are in line with the ones on the lower floors with the main difference being the added floor above one of the square volumes which is accessed through a in-house staircase. Having two floors of the same stacked above each other, creates the possibility for a double height space. The voids above the dining or living space gives the dwellings a more spacious and luxurious feel, fitting with the higher income households' lifestyles. Also fitting with their lifestyle, higher income units are offered the possibility to have back-to-back parking spaces in the underground parking garage if they would like to.



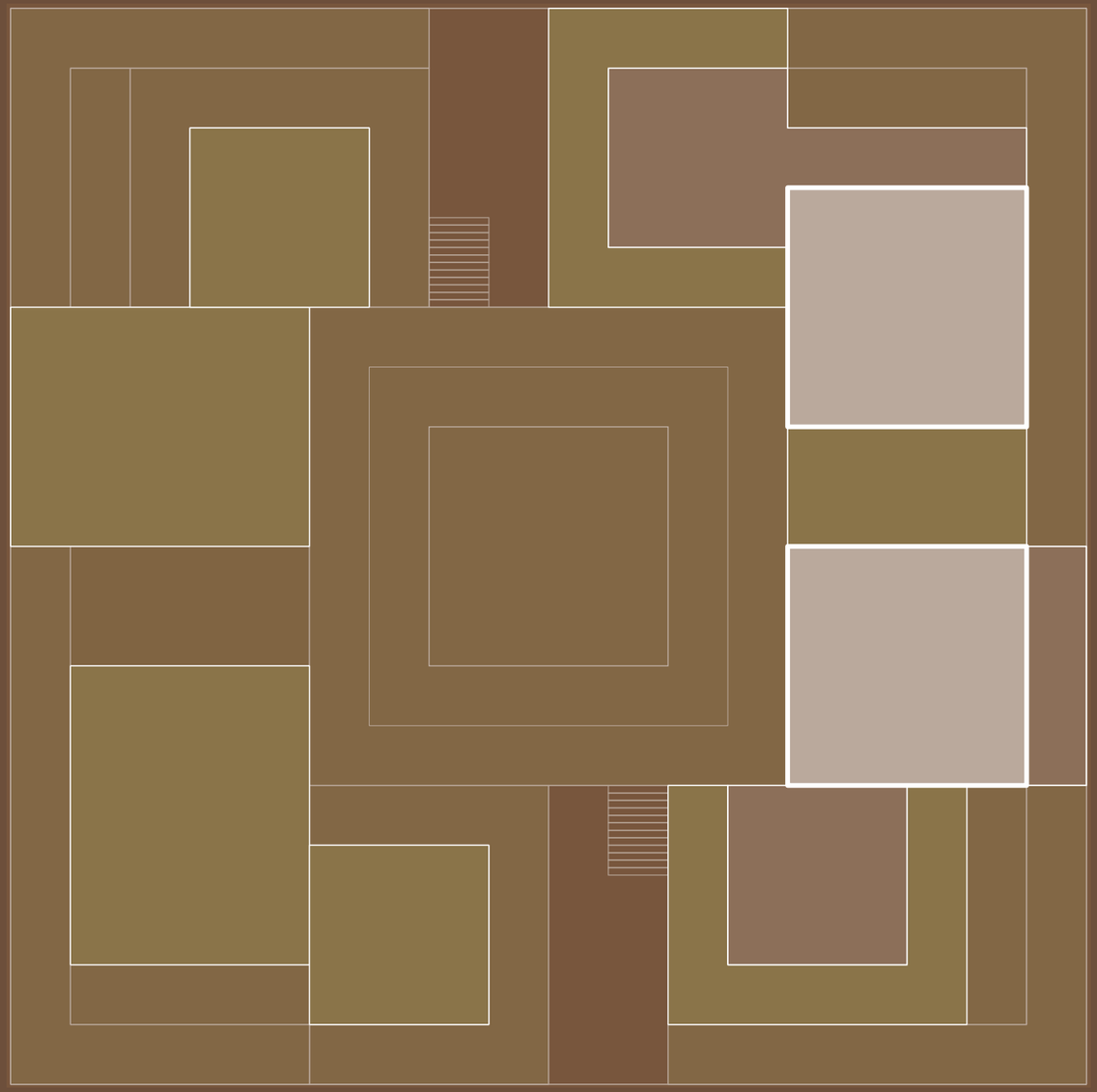
4F Concept plan



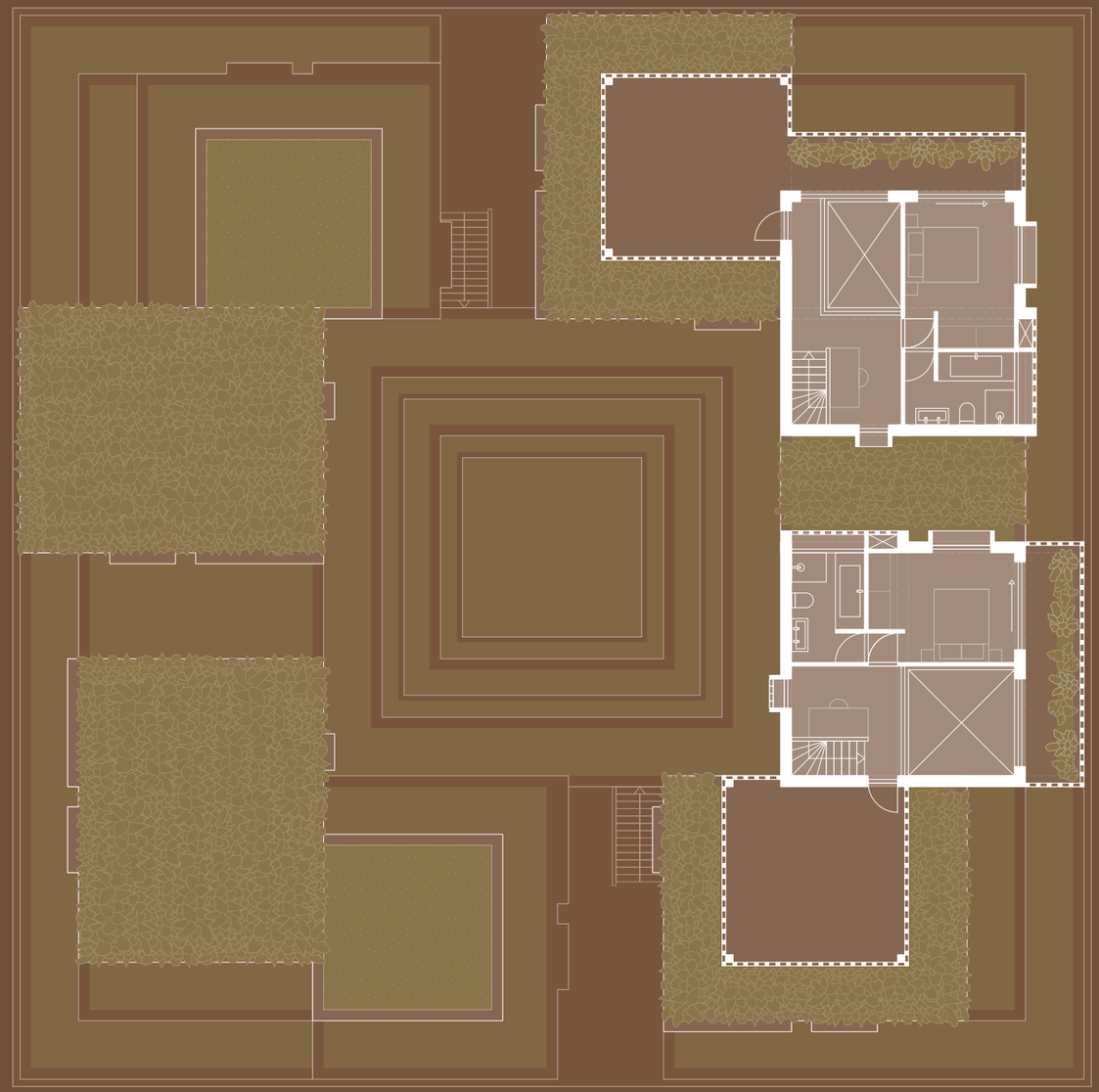
4F Detail plan

Where each specific cluster has a varying layout for levels above the first three floors, the circulation for every cluster switches from large galleries around the courtyard to smaller platforms which serve two housing units. This is because residents that have their dwelling above four floors, are less attached to the courtyard due to the increasing distance to the space.

Two tower-like volumes will appear from every cluster with each varying in height. The highest gallery is covered with green roofs, protecting the residents from sun and rain. The platforms themselves have brick jali screens on both sides to allow ventilation while offering a pleasant circulation space between the units. Solely the 120 sqm higher income dwellings can be found on the fourth floor. In the case of the lowest towers, the highest duplex level can be found here and in the case of the highest, an extra higher income level with additional rooms and large terraces overlooking the clusters are situated on this floor.



5F Concept plan



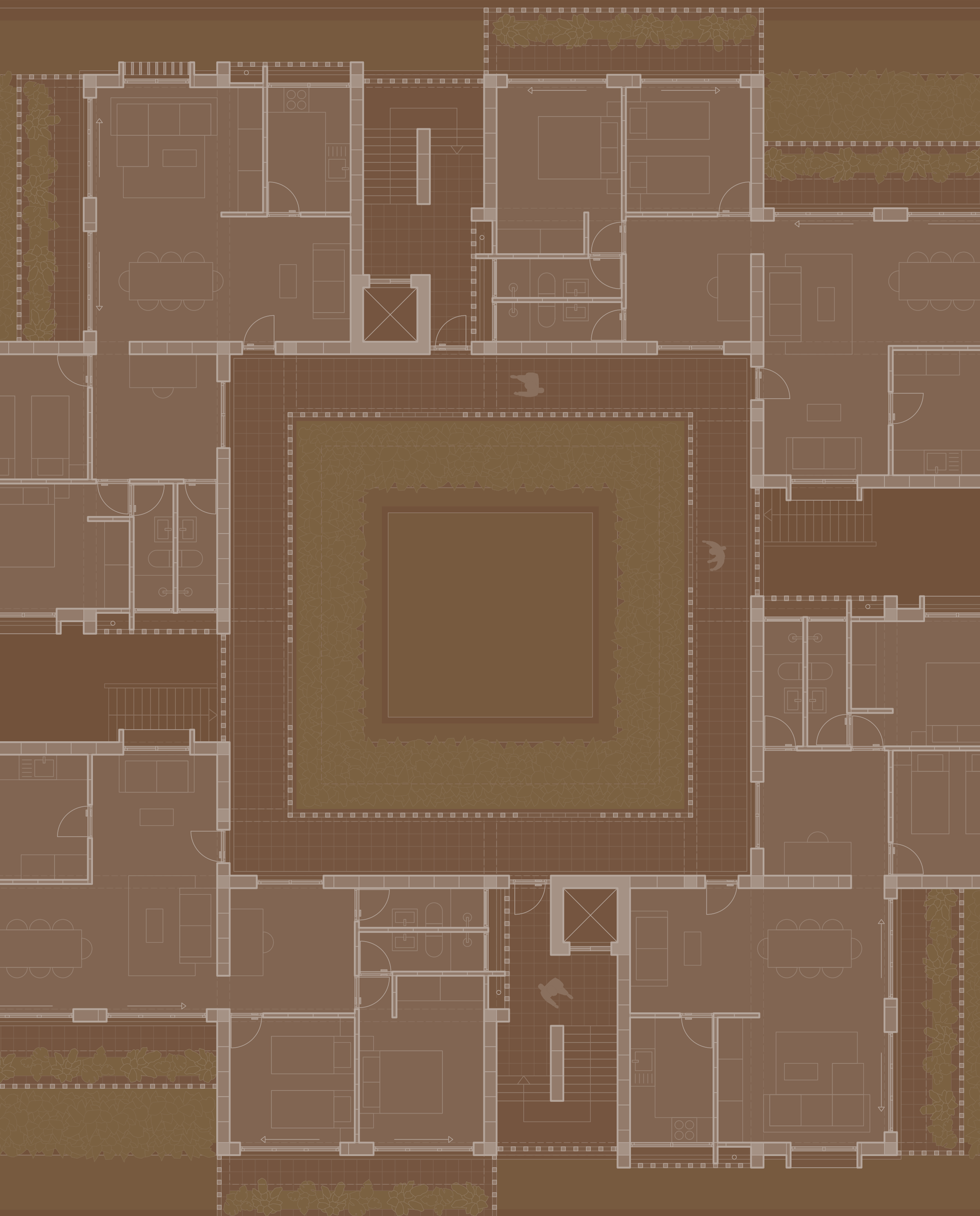
5F Detail plan

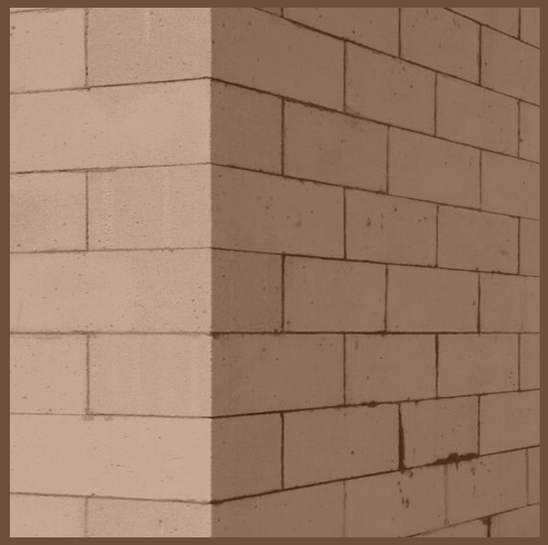
The fifth floor and in some cases the top floor, green roofs and duplex are found. The highest level of a duplex contains the largest bed and bath rooms. When even more living or sleeping space is needed for these income groups, the void can be transformed into a separate room with access to the private terrace.

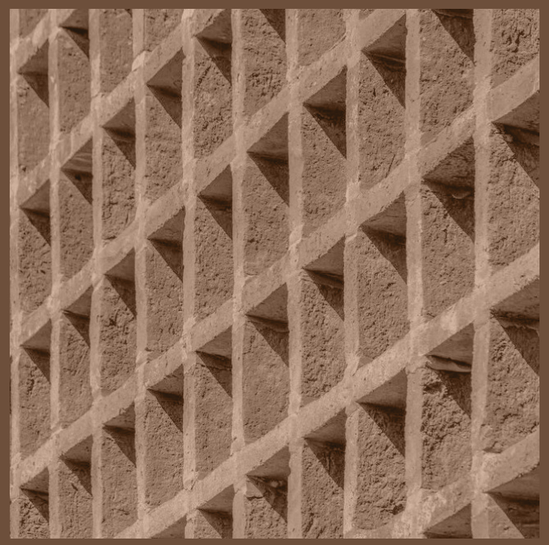
In addition to the private terrace, a larger covered terrace is located on this floro. Residents can enjoy the open views and do outdoor activities here. These terraces are recessed from the main building facade and are surrounded by green roofs, generating a cooler environment.

From this floor, the structure's setback volumes are clearly visible. The multiple floors' layouts have been increasingly transformed from having a ground floor with large urban volumes into a top floor consisting of smaller towers. The various commercial and communal spaces on the lowest floor serve the public and lower income classes, the highest floor provide higher income groups optimal living spaces.

Building Technology 128







Construction Material palette

The project is made of selected materials that are used widely in Bangladesh and can be locally sourced. Some sustainable material choices aren't yet possible in Bangladesh, but therefore alternatives are used or less sustainable materials are compensated with greener choices in other parts of the design.

The load bearing structure consists of cast-in-place concrete columns, beams and floors. Although not the most sustainable friendly material, the use of concrete is inevitable since some clusters are eight floors high and need the material's strength. To compensate for the concrete, walls between the columns are filled in with AAC blocks and finished with painted cement plaster. These blocks are lighter and more environmentally-friendly than concrete and fire brick. However, fire bricks are actually used for the jali screens since not much material is needed and the more sustainable CSEB blocks cannot withstand rain on its surface. The large platform is constructed from reclaimed bricks from the Sylhet area. Terracotta tiles are used for the upper floors' galleries since these are lighter than normal fire brick.



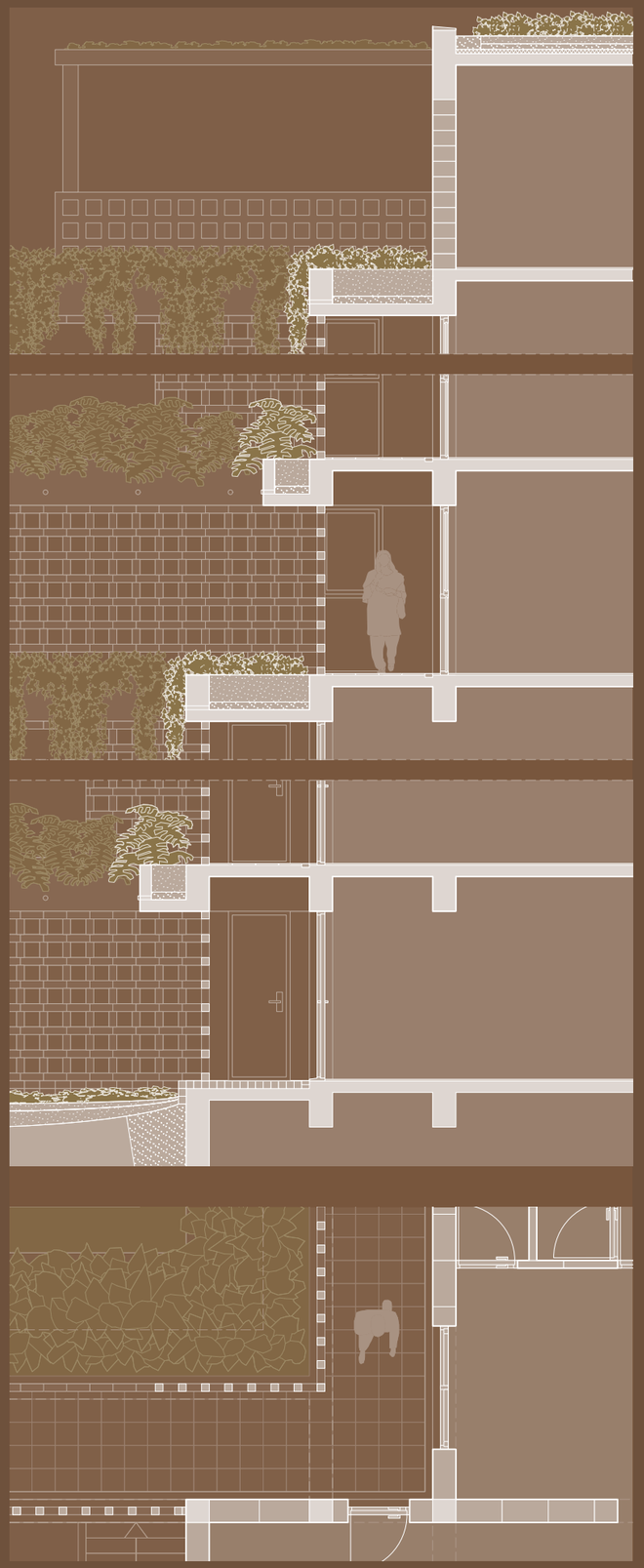


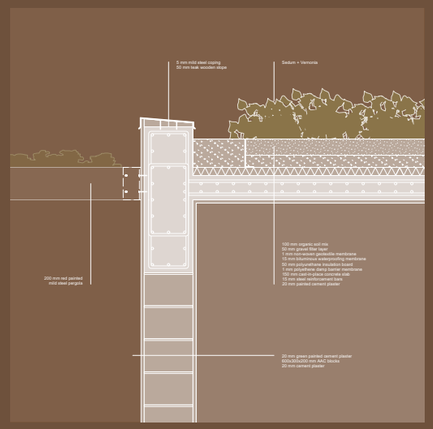


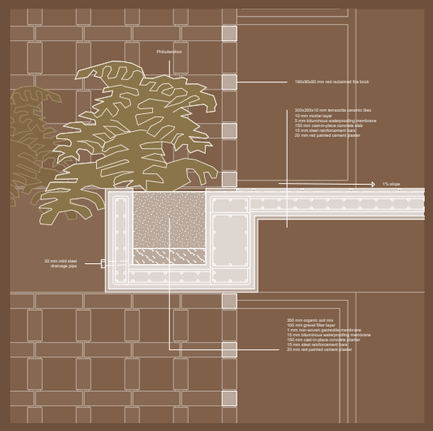

Construction Vegetation palette

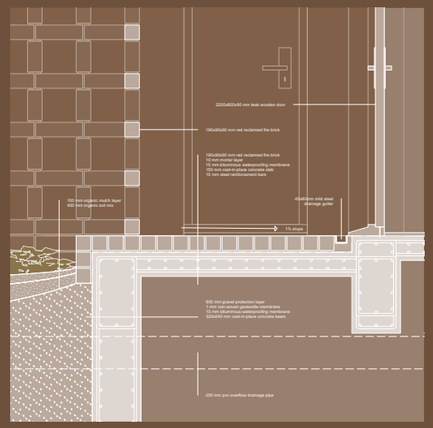
Besides construction materials, the project's appearance is enhanced by the use of various types of greens. To achieve greater sustainability, plants and trees that are native to Bangladesh should be used. Species that are imported are less sustainable since they have to be transported from further away and might not grow optimally in this tropical and humid climate.

Philodendrons, calatheas, and ferns are incorporated into the galleries around the courtyards since these can grow easily in the planters and offer a lush feel to the space. Vernonias or creeper plants are used in some of these planters as well to create a curtain like effect and more privacy. Sedums in combination with other mentioned vegetation are used on the roofs of galleries and dwellings. These are great for absorbing rain water and isolating by cooling down the roof. Palm trees are mainly used for the green strips in the bazar where other plants are also planted for a greener and cooler environment. In the courtyard, lower vegetation in the form of grass fields are located where people can do activities on.

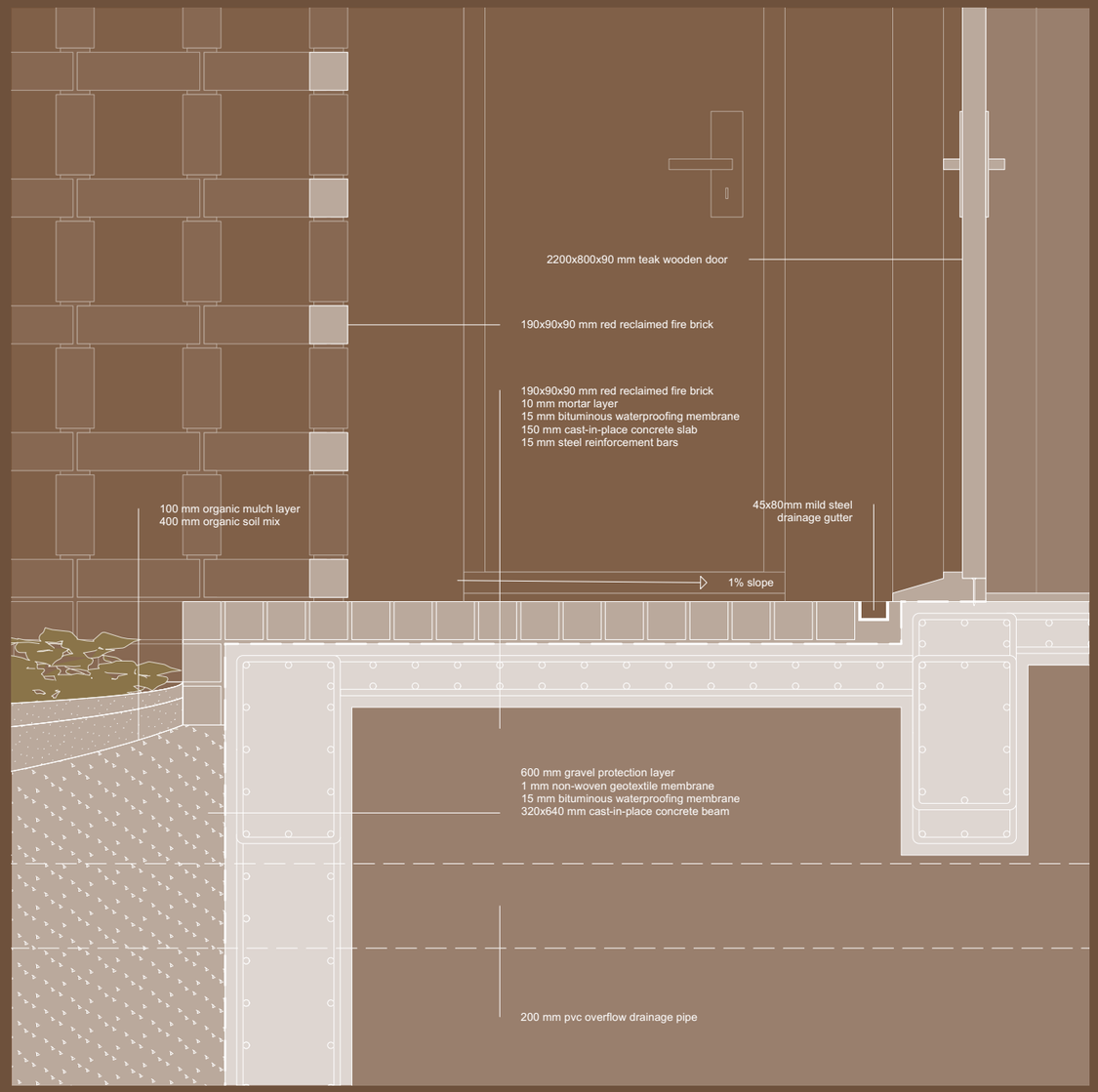








Cobnstruction Fragment + details

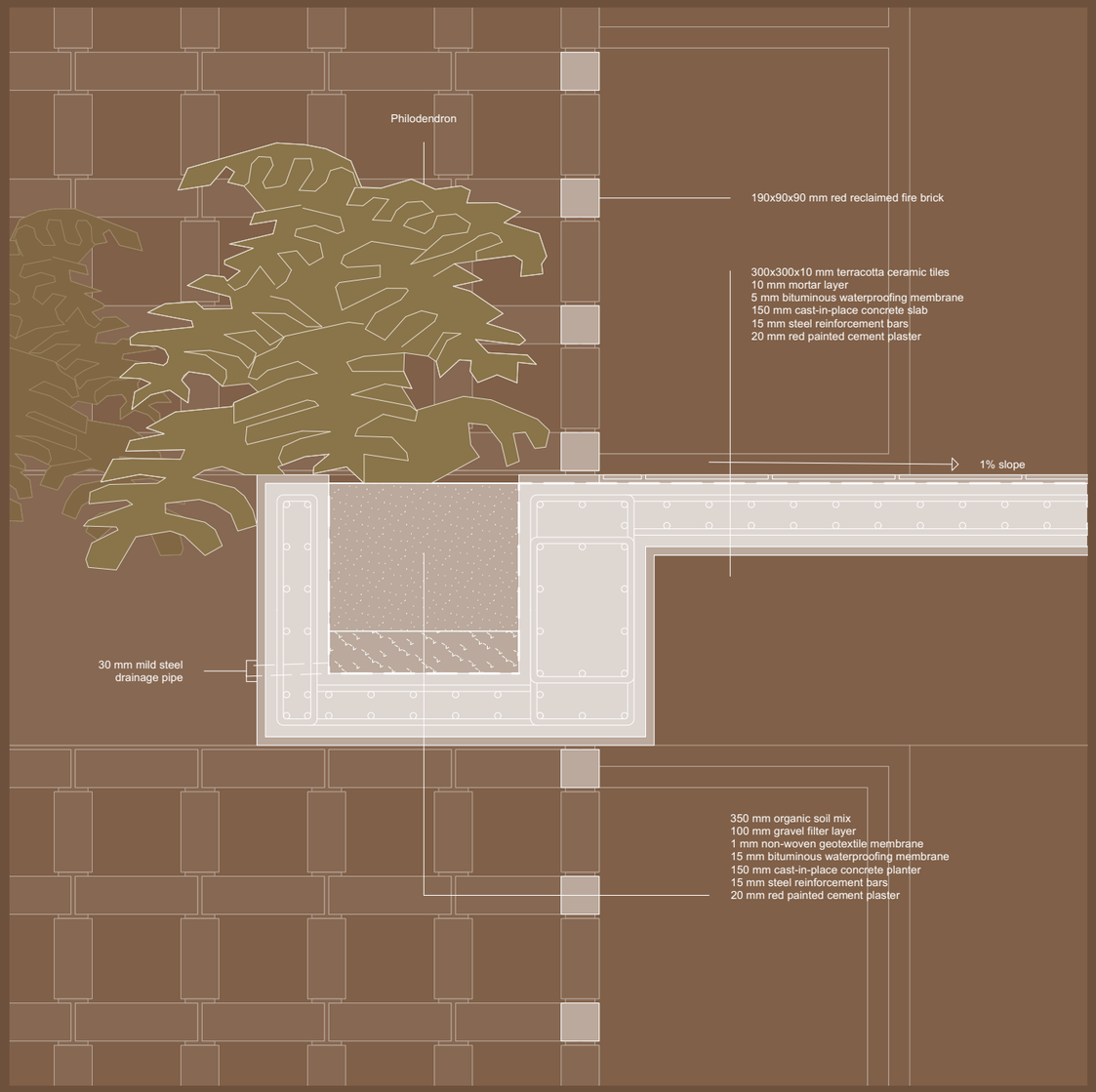


Construction Ground detail

On the ground floor where the platform meets the open courtyard, multiple materials come together to achieve the desired appearance.

Reclaimed fire bricks are placed on top of the load bearing concrete ceiling slabs and walls of the underground parking garage. To protect these concrete walls against too much rainwater, gravel protections and a non-woven geotextile membrane are added on the outside. By placing the bricks under an angle, rainwater will be directed to the steel gutters alongside the dwellings' facades. Facade openings like doors and windows consists of locally sourced teak wooden frames

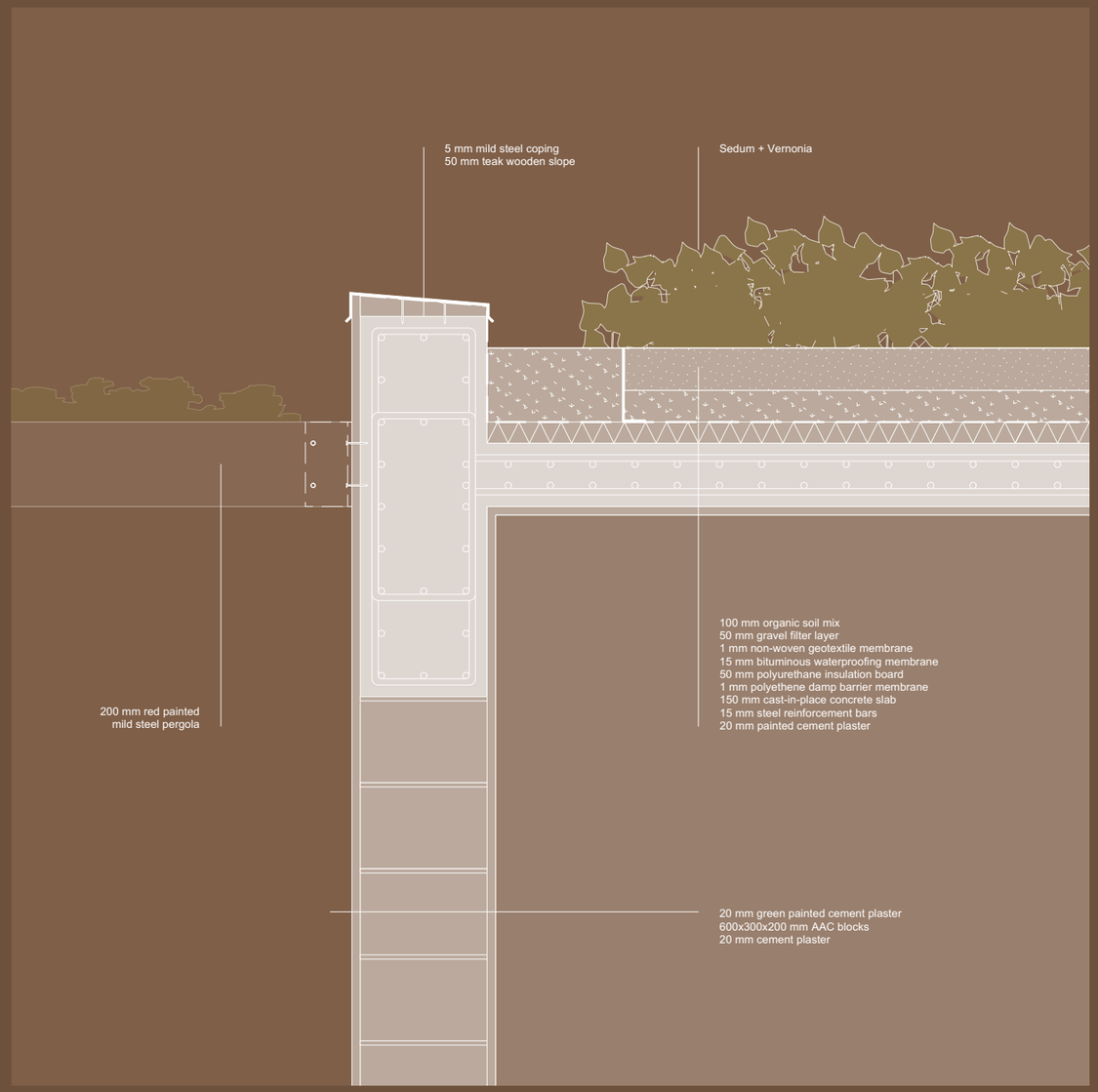
Vegetation, mulch layer and soil mix gives the courtyard the ability to function as a wadi. The fire brick jali screens surrounding the courtyards are not load-bearing and therefore one layer of brick is more than sufficient. These open screens create an interesting and contrasting effect compared to the solid plastered dwelling walls when light shines through it.



Construction Planter detail

The galleries surrounding the courtyard are made of a similar construction order and materials as the one on the ground floor. However, instead of having heavy fire bricks as surface materials, less material can be used by incorporating thinner terracotta tiles. These pair well in colour and feel with the brick jali screens.

The planters around on the edges of the galleries are casted with the concrete floor slabs and beams. In the planter, soil mix provides an environment for the plants to grow in. The gravel underneath is used as a filter layer. To avoid the planter to overflow with water when there's heavy rainfall, steel drainage pipes are used to get the water to lower floors and planters in a cascading way. Geotextile and waterproofing separate the vegetation soil and gravel from the concrete. The concrete is not being left exposed but is covered with painted cement plaster to create a desired red colour and look to contrast with the green vegetation in the planters and complement the brick screens.

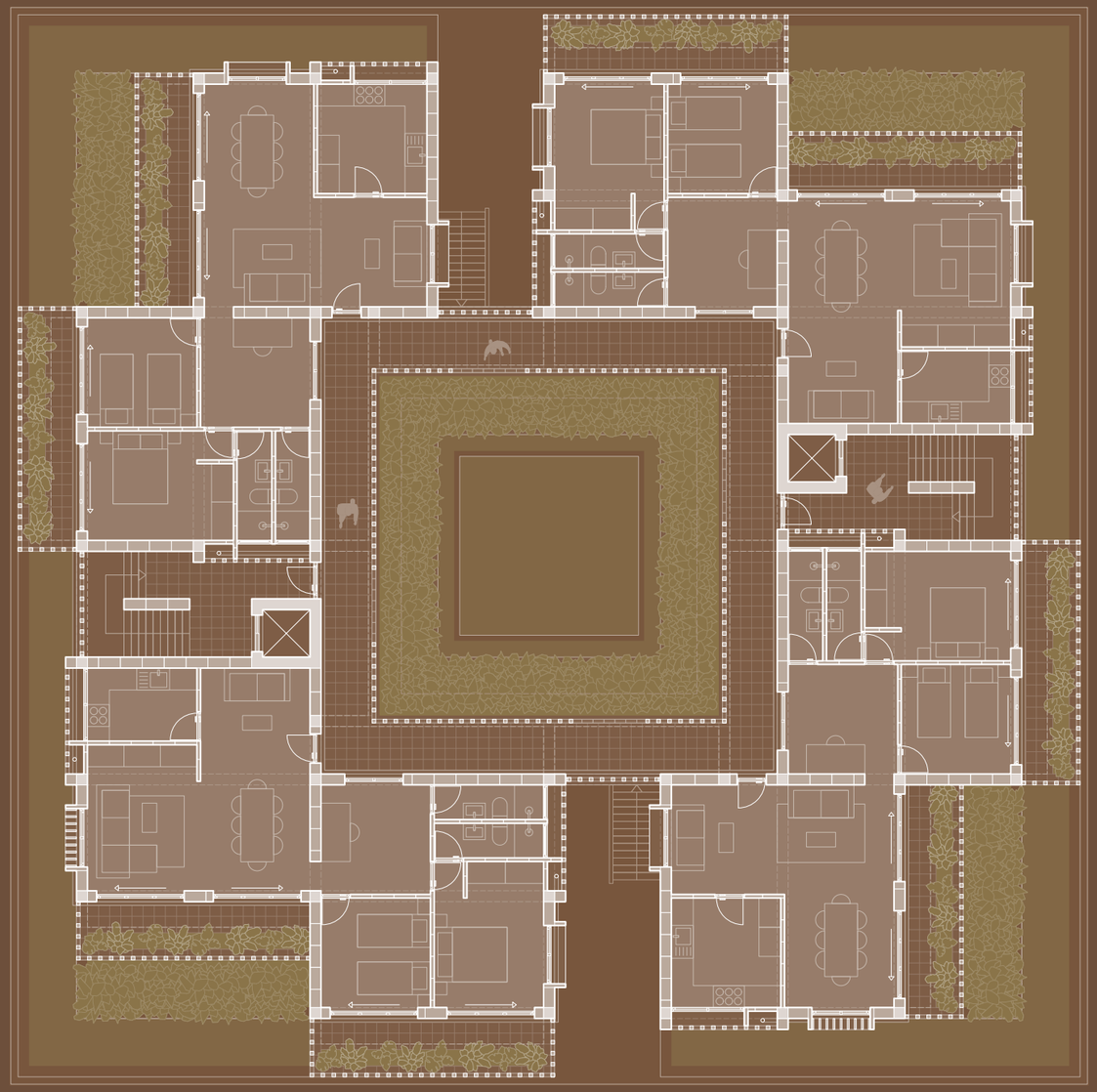


Construction Roof detail

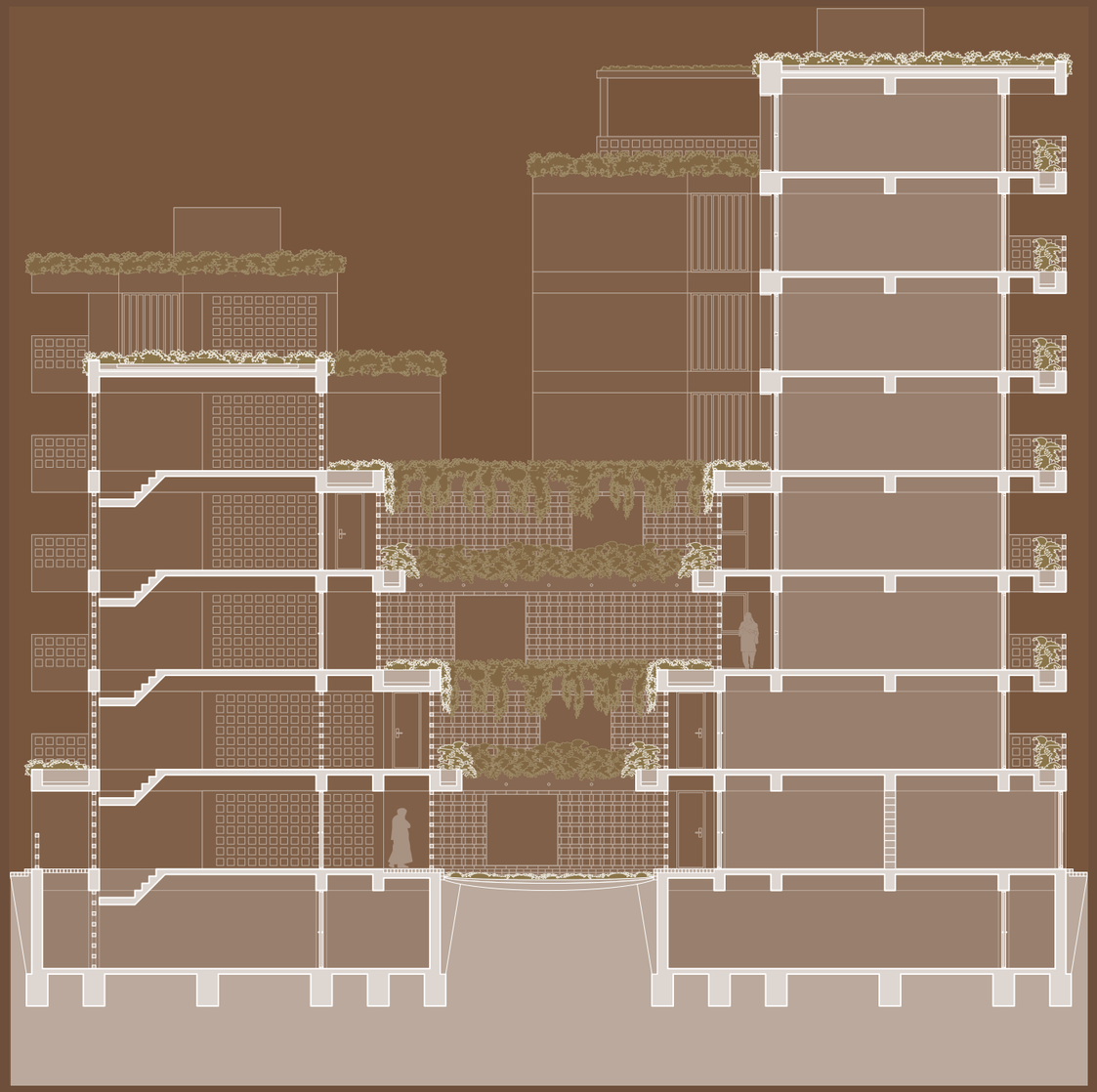
Solid walls consisting of AAC blocks and painted cement plaster as interior and exterior finishes will extend to the concrete load-bearing structure on the top floors. Here, a higher concrete beam together with a wooden slope and a steel coping form the parapet detail.

On the concrete roof slab, a mix of sedum and other vegetation is used to cool down the volumes. Soil mix and gravel layer is therefore needed. Underneath, a layer of geotextile and a bituminous waterproofing membrane protects the underlying polyurethane insulation that sits on the polyethene damp barrier layer.

To cover the larger terraces of the higher income dwellings, a steel pergola is used. Since these terraces don't align with the columns of the load-bearing structure underneath due to the added green strips around the terraces, a lighter material than concrete needed to be introduced. An additional sedum layer and red paint, will give this separate structure an appearance that matches the aesthetic of the design.



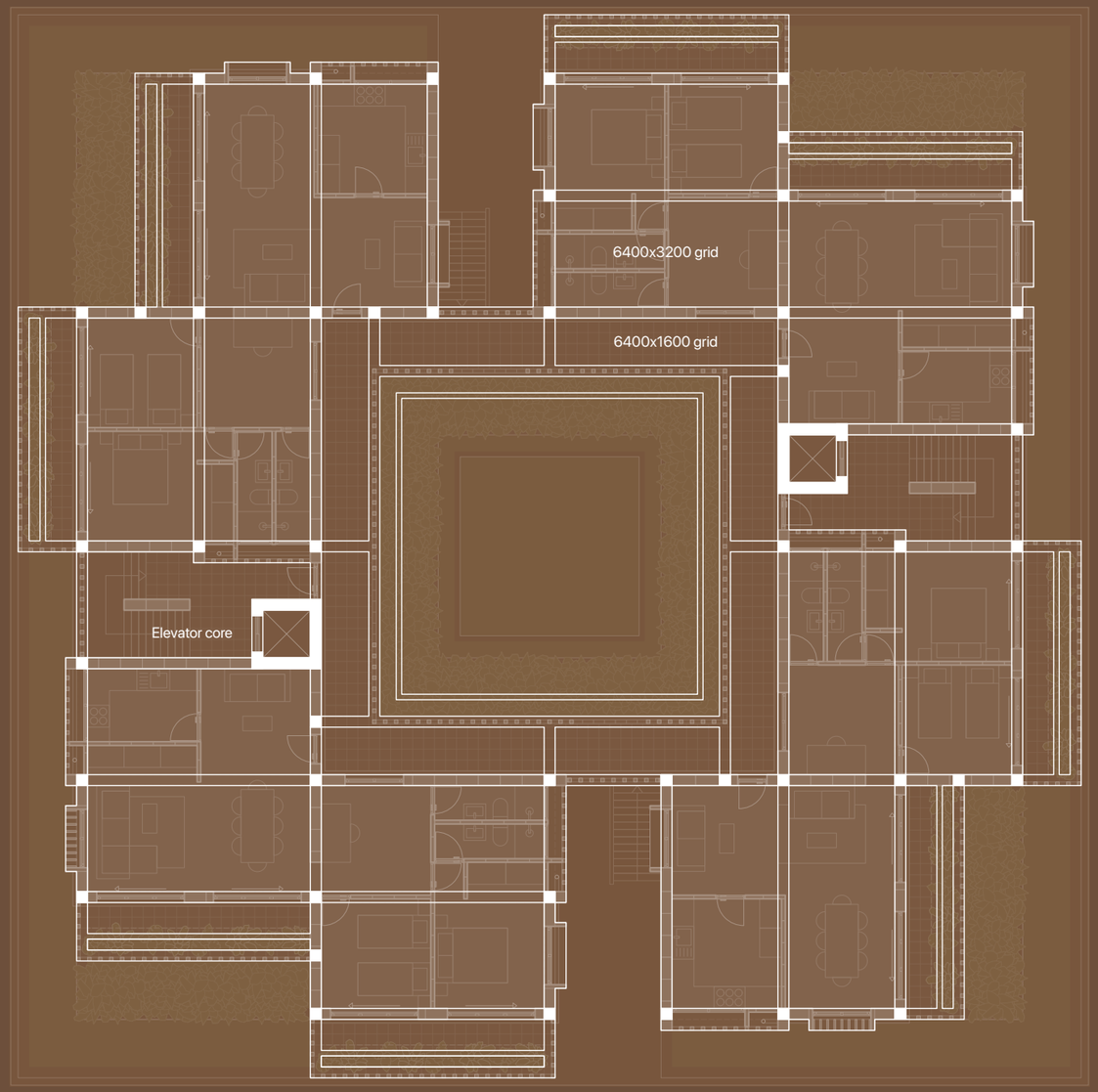
Construction Cluster plan



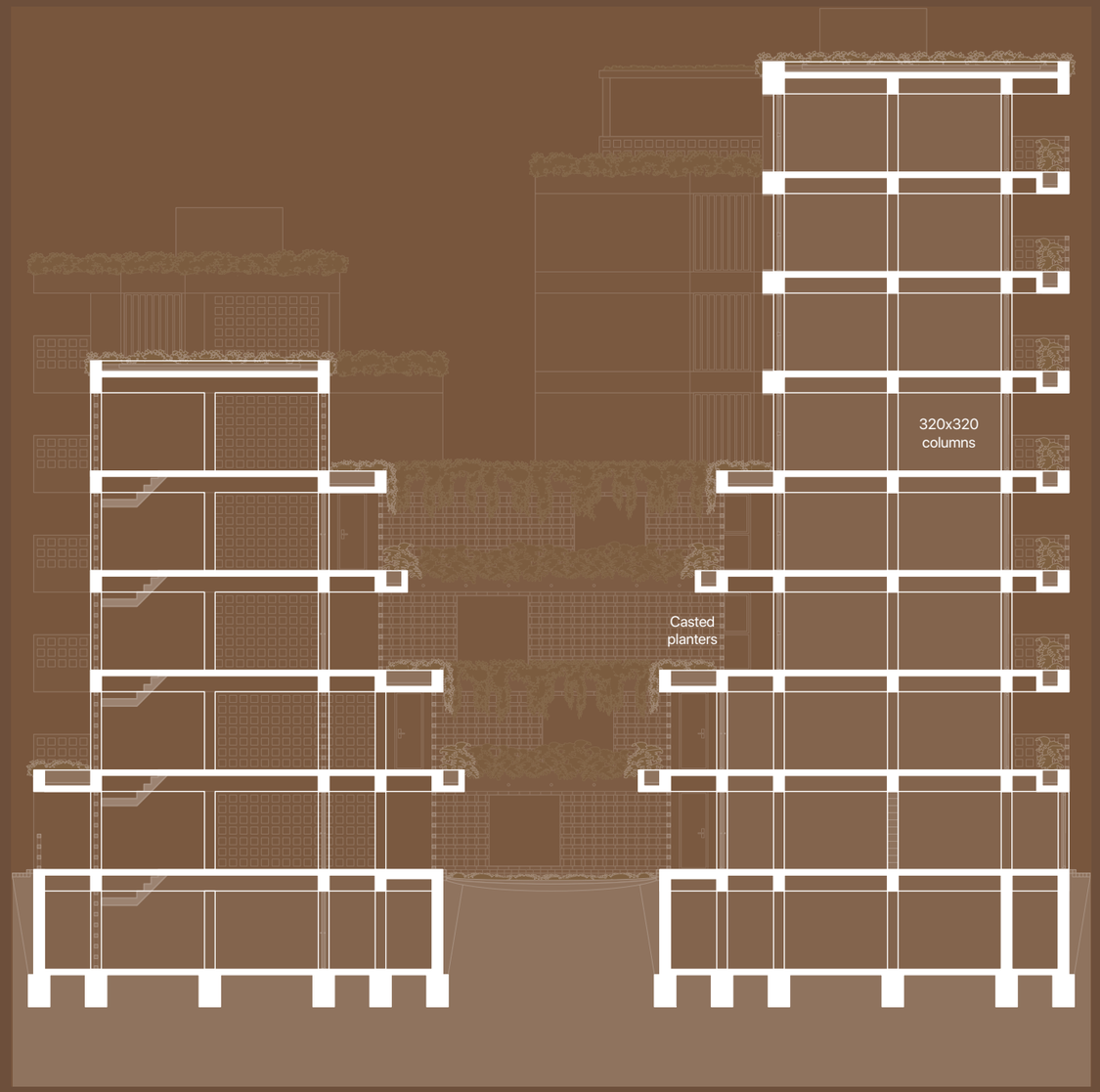
Construction Cluster section

In order to see how the different building technology aspects play together in a cluster, a glimpse should be taken of a typical floor construction plan and a section.

The plan shows the second floor where four middle income dwellings are situated. These are separated from each other via open slits that in two cases house the vertical circulation. These shafts are constructed from the same materials as the housing units: concrete for the structure, AAC blocks as infill and painted cement plaster as the finish layer. Green galleries and terraces create a stark contrast to the more urban image of the dwelling facades. This is even better visible when looking at a section. The vegetation in the planters around the courtyard especially, makes the centre of the cluster feel like an oasis. Hanging plant curtains and brick jali screens with strategic openings create a more playful appearance than the cluster's outer facades. This is done to create a hybrid of modern architecture design principles with vernacular elements native to Bangladesh.



Structure Cluster plan



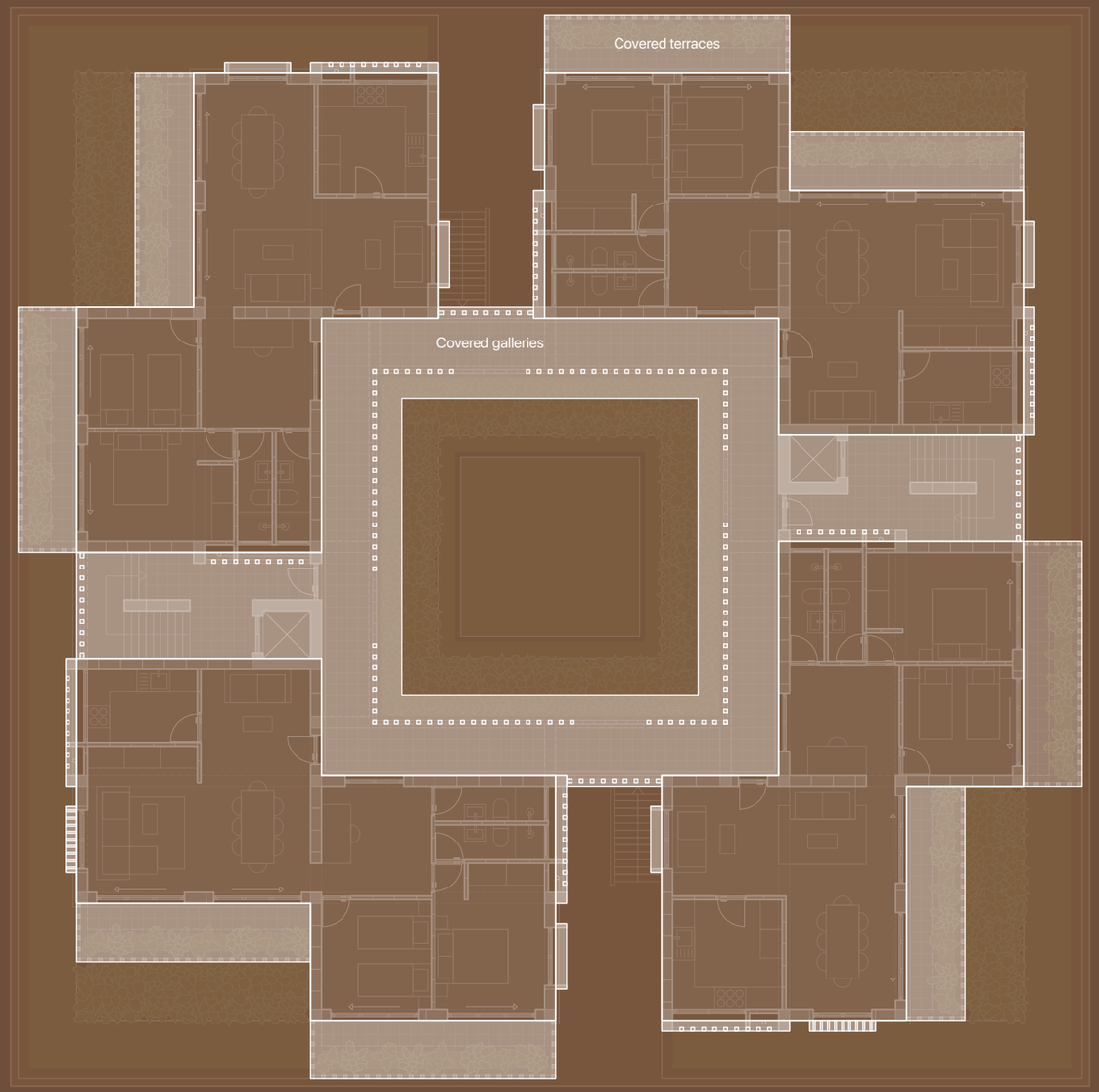
Structure Cluster plan

The primary load-bearing structure consists of casted-in-place concrete columns, beams and floor slabs. The choice for this material is made since some clusters have more than four floors and more strength than brick is needed.

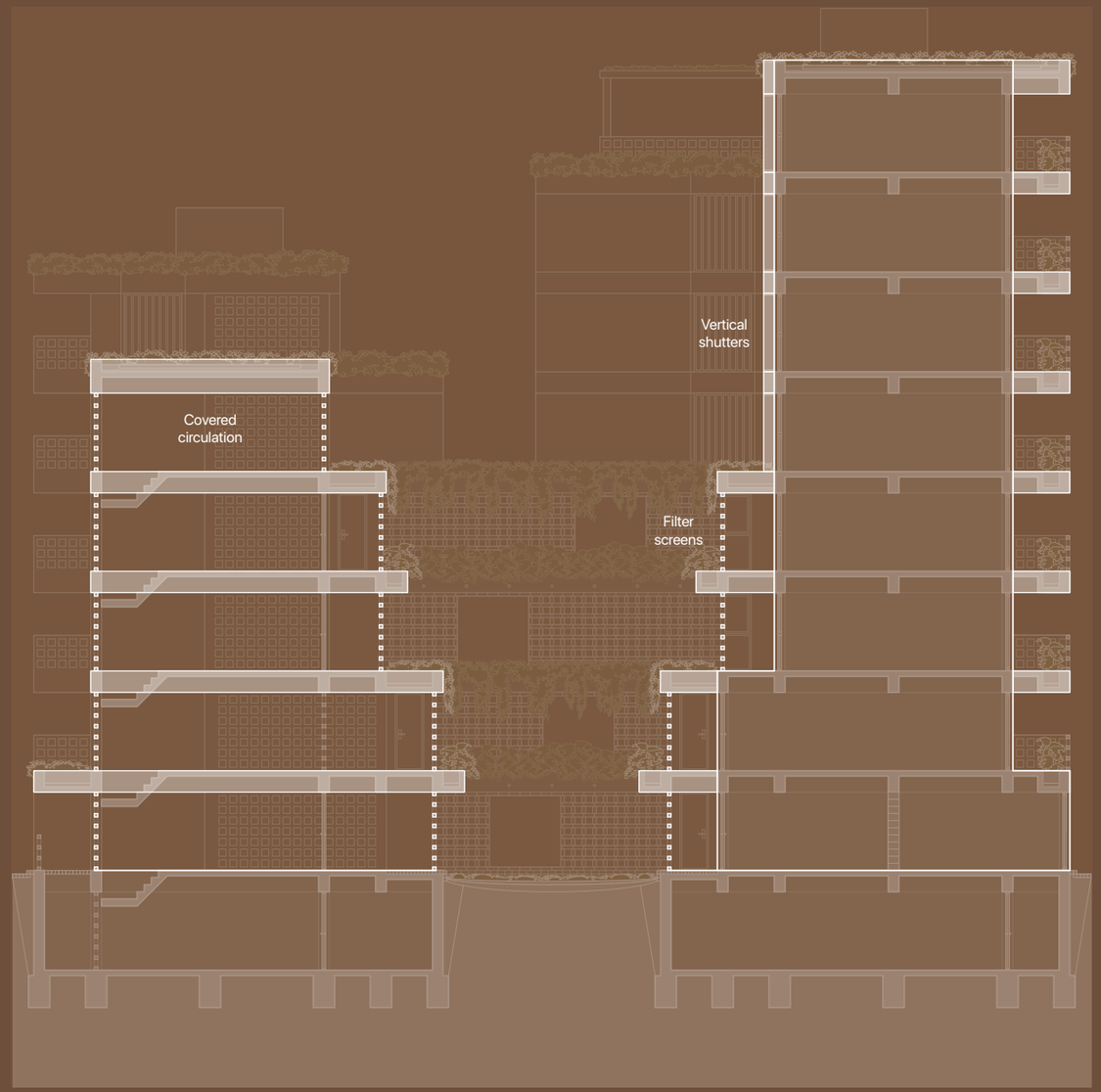
Each of the four dwellings blocks a repeated structural plan with a grid of 6400x3200 mm. Then, these blocks are connected with each other via galleries and terraces which use half the grid size: 6400x1600. Both the galleries and the terraces are overhangs and supported by extending the interior beams outwards. The planters are casted simultaneously with the beams.

Calculating with rule of thumbs, the columns dimensions are 320x320 mm and 2,8 m high. The height of the longest beams are 1/10 of the longest span and therefore 640 mm high.

Since the AAC walls function as stability walls and the floor slabs are made from concrete just like the beams and columns, the design functions as a RCC structure. Two concrete elevator cores add an extra element of stability and extend all the way down to the parking garage.



Shading Cluster plan

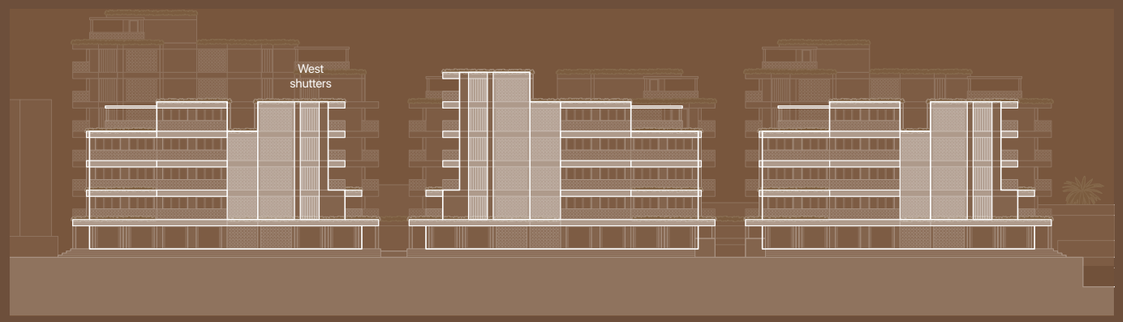


Shading Cluster section

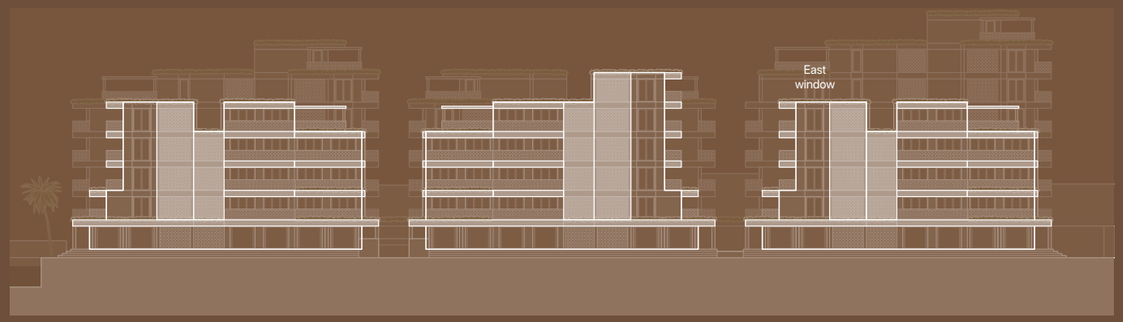
Due to the tropical climate in Bangladesh, rain and sun create unbearable conditions in different periods of the year. Therefore, dwellings and transition spaces should protect the residents from these climatic issues.

All the galleries and terraces are covered by large overhangs. Smaller overhangs are situated on top of the windows on the side facades. Brick jali screens in front of bathroom and kitchen windows offer protection from direct sunlight infiltration and add privacy. These screens are also used for the vertical circulation shafts and around the galleries to accommodate for a shaded access to the dwellings. When the angle of the sun is lower during the winter, these cast beautiful filtered light beams onto the surfaces of the transition spaces.

Moreover, the two streets of each cluster are quite narrow so sun shading will occur naturally and improve the climate between dwelling blocks. The courtyard on the other side is provided with sufficient sunlight when residents do want to enjoy the warmth and brightness of the climate.



Shading West elevation

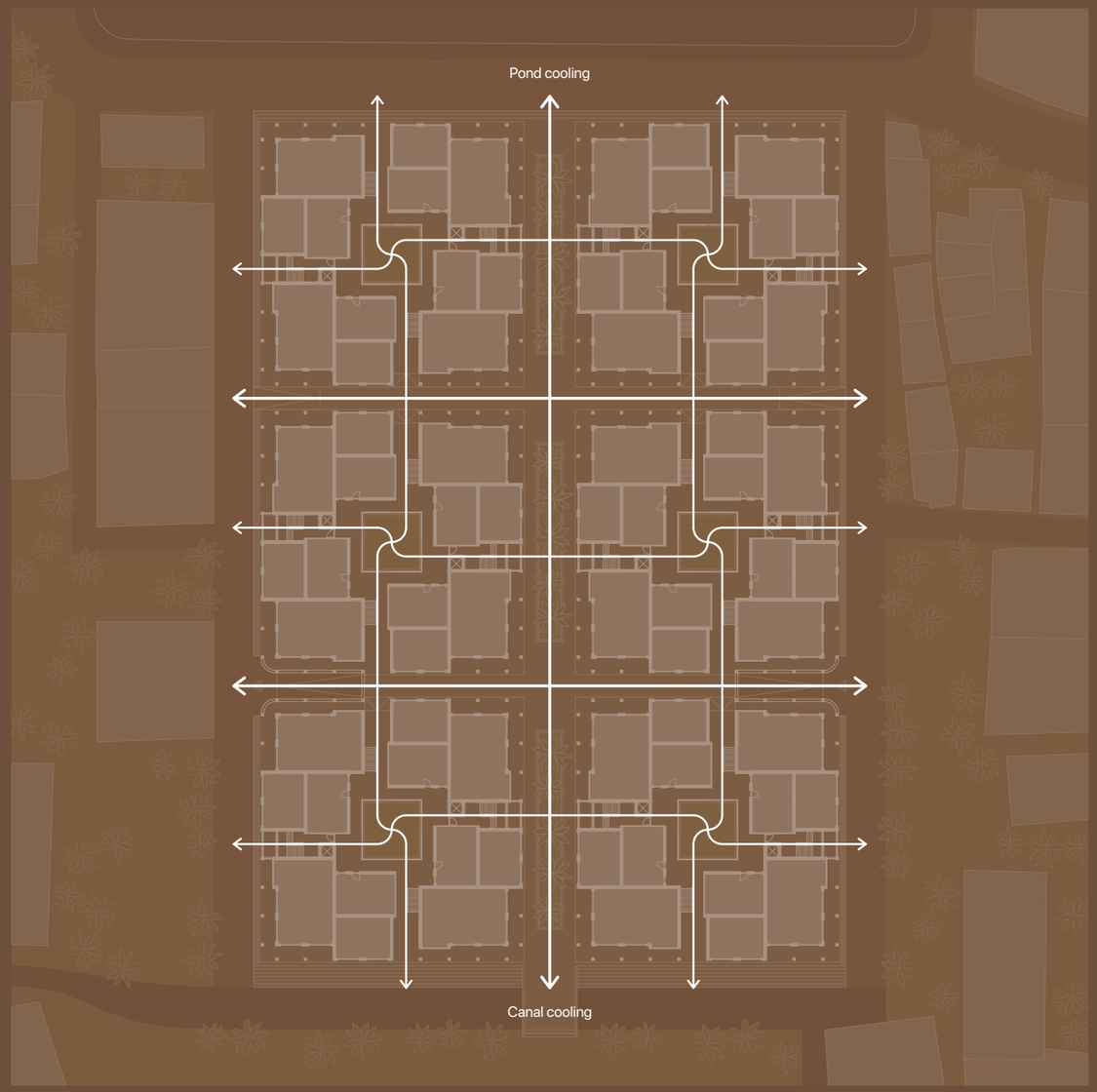


Shading East elevation

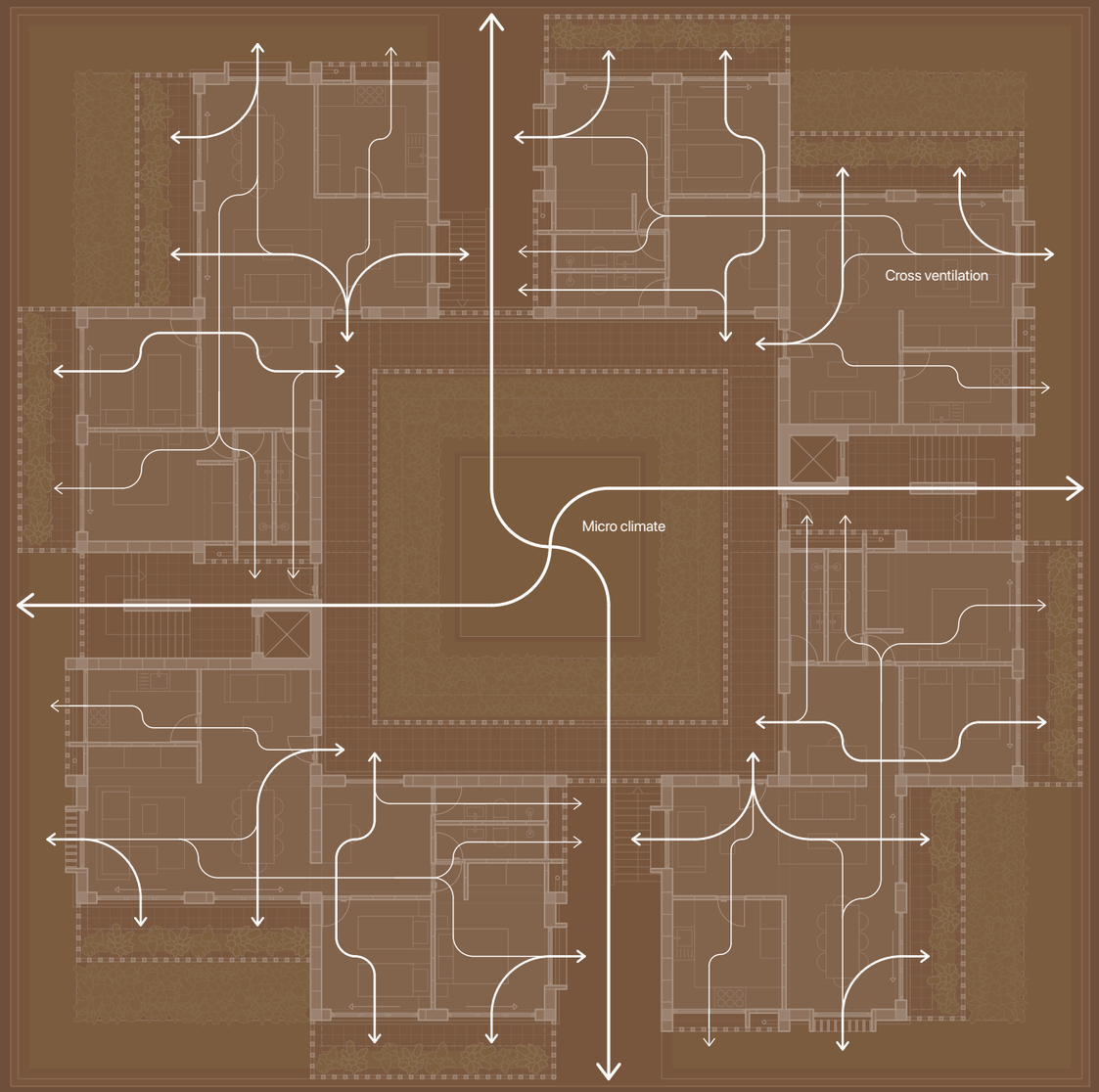
Looking at the elevations on the urban scale, you see how most of the shading features around the custers' courtyards are also implemented on the outer facing facades. Overhangs and brick jali screens generate protection against sun and rain.

The streets between clusters are narrow so they provide residents shade. Ground floor verandas on the periphery of the clusters, offer an additional protection against rain.

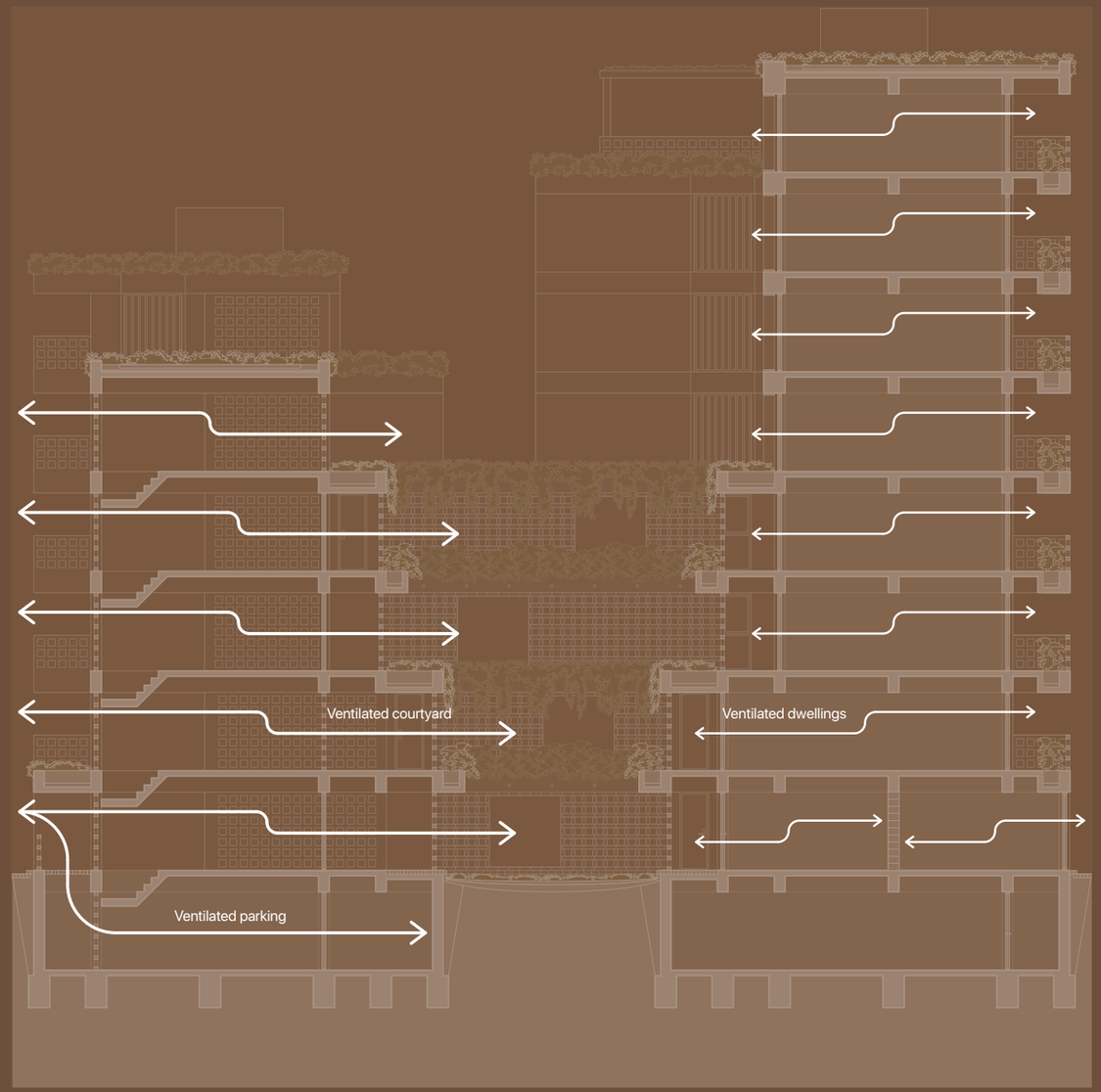
Since the conditions of the south and west facades are different than those of the north and east facades, with more direct sunlight throughout the days and month, extra shading is needed for the windows that don't have overhangs or jali screens in front of them. Fixed vertical wooden shutters work better than horizontal shading features and add shading without blocking the views from the window. The south and west facades therefore appear different than the other two facades with a more closed image but with the needed protection against the sun.



Ventilation Urban plan



Ventilation Cluster plan

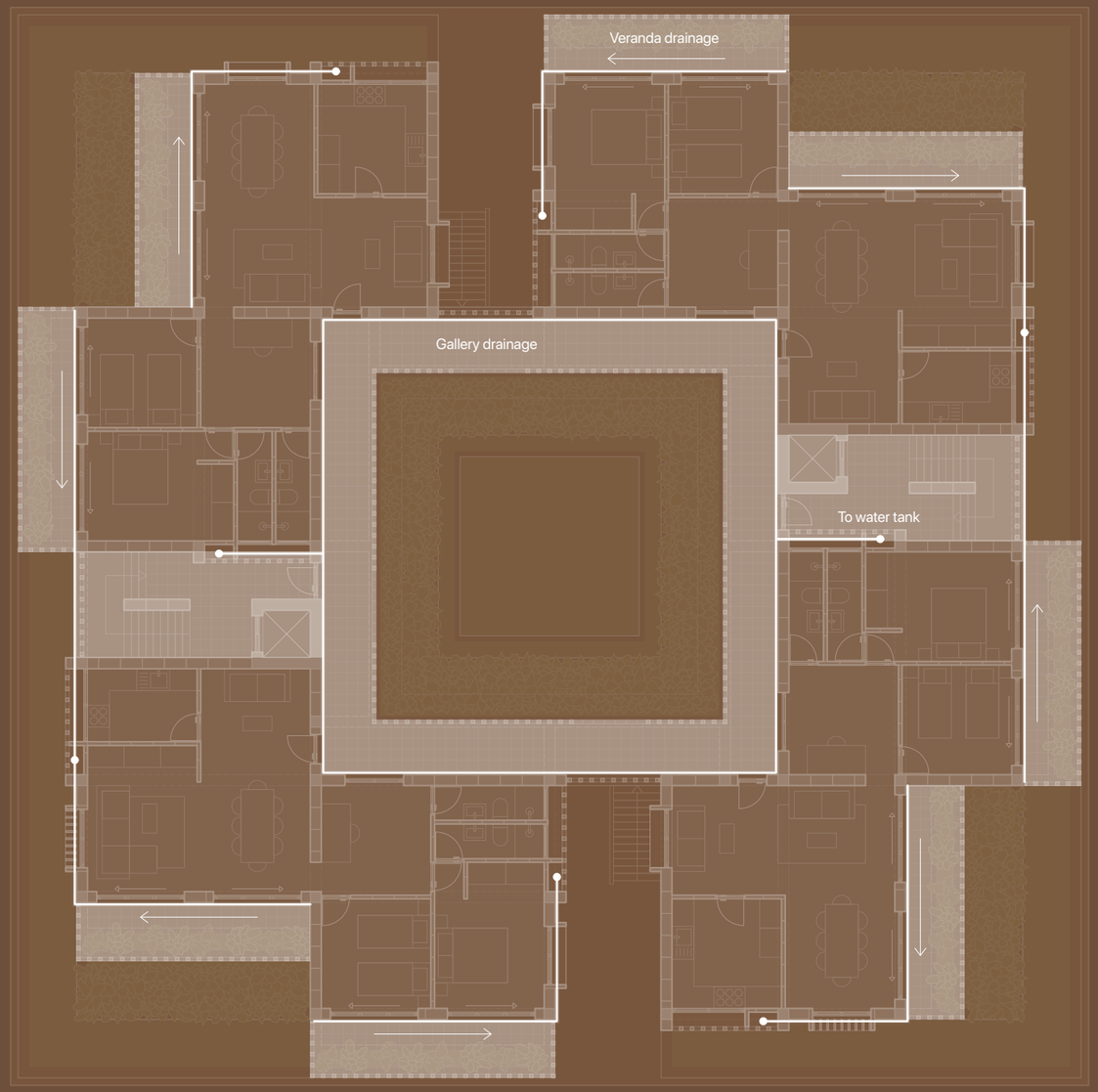


Ventilation Cluster section

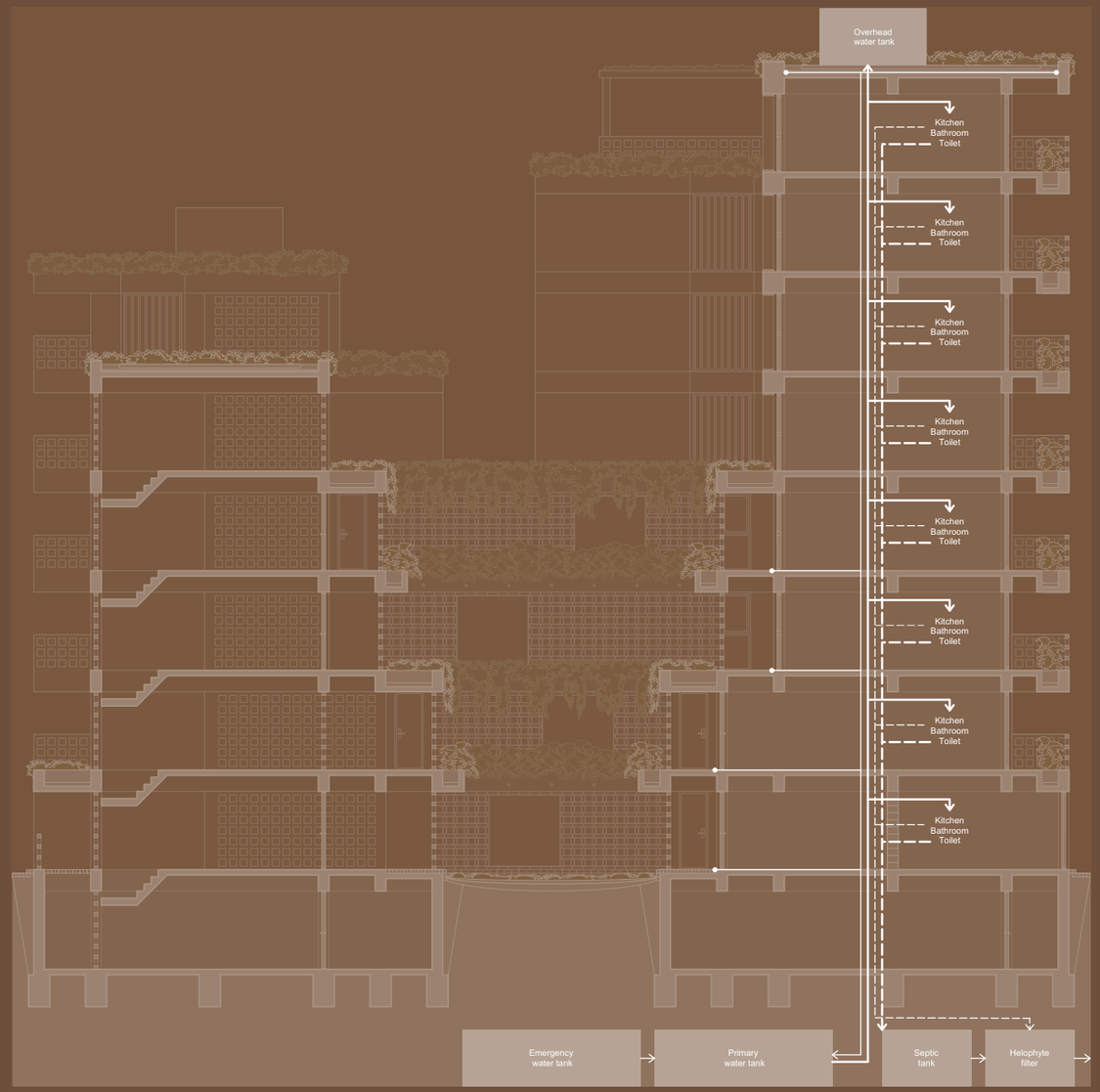
In Bangladesh, dwellings are in general cross ventilated. Kitchens and bathrooms need to be placed alongside the facades for that reason. In my case, this is done on the sides where the added brick jali in front of the windows offers an additional privacy element when ventilating.

The vertical circulation spaces and galleries contain brick jali screens on the sides whereby the four slits in the cluster are kept open for ventilation. Since there's not really a predominant wind direction in this area, wind is able to flow in various ways and creates a cooler microclimate in and around the courtyard.

For the urban plan, cluster slits are aligned so wind flows are not blocked. The linearity of the unobstructed bazar let coller wind from the pond and the canal flow through the plan. Smaller streets between the clusters also provide ventilation in the other direction. The underground parking garage is naturally ventilated by an enclosed open shaft behind the main circulation stairs.



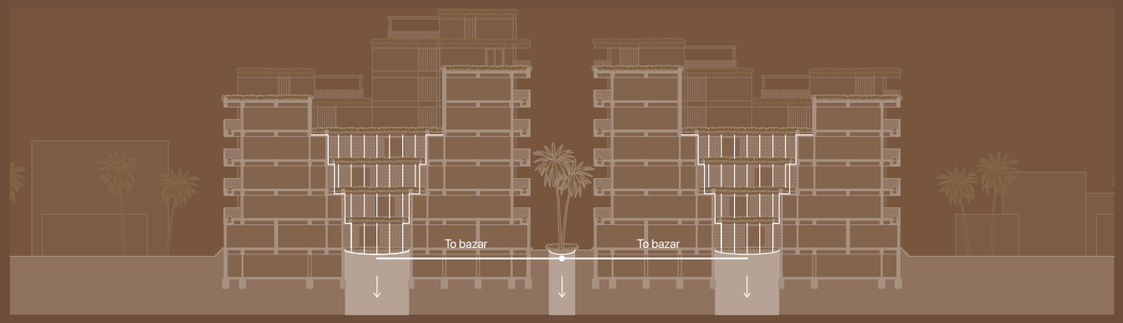
Water Cluster plan



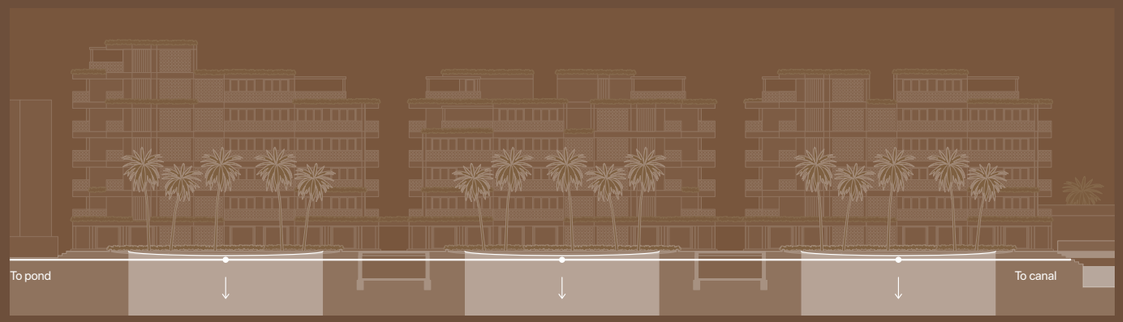
Water Cluster section

Every year during the rain season, an immense amount of rainfall hits the area. The water of the pond rises with about 75 cm and affects the inhabitants of Laladighi. Homes and roads get flooded which negatively impacts the area's liveability.

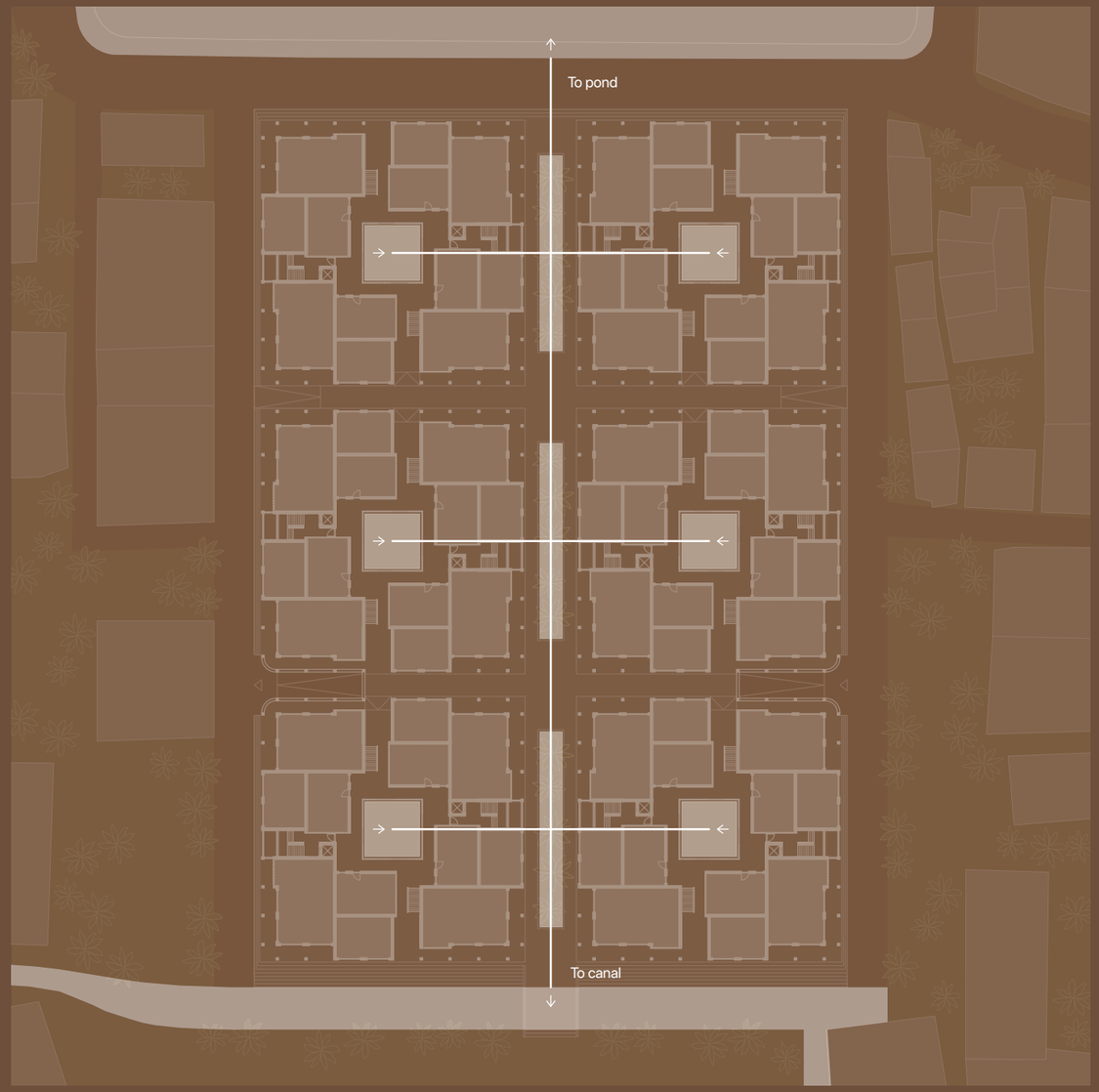
To avoid this, rainwater should be retained and reused. This is done in two underground water tanks, one general and one when fire breaks out, where water from the galleries and terraces is collected via gutters and pipes on the side of the dwellings. This water is then pumped to the overhead water tank on the top of a cluster tower, which is used as the main water supply for the households. The project is therefore focussed on reusing the rainwater by the residents as much as possible. Grey water of the kitchen and bathrooms is filtered by an area with helophyte near the waters around the cricket field. Black toilet water is first transported to a septic tank from which it will eventually be cleaned by the helophyte and the water can flow freely into the soil.



Water East-west section



Water North-south section



Water Urban plan

To tackle the problem of the floods during the rain season, the six clusters are placed on a 80 cm high platform so dwellings and other ground floor spaces don't get affected. Most of the rainwater will be guided via gutters to the water tanks.

Rainwater that falls on the grass of the courtyard and on the bazar's middle green strips, is able to flow directly into the ground and function as a wadi or sponges. If the groundwater rises too high as a result of these absorbing places, the water from the courtyards is directed through large drainage pipes and via the bazar into the pond and the canal alongside the cricket field.

When the planters around the courtyard galleries are flooded by the amount of rain, the water flows via pipes to underlying planters and eventually the courtyard grass. These small streams create a cascading waterfall like effect where the abundance of water creates a visual pleasing effect for the residents. Instead of actively fighting the water, people are encouraged to live alongside it.

Visual Impressions 152





Pond New landmark for the Laladighi area



Pond New landmark for the Laladighi area



Alley Connecting existing surroundings to the bazar



Alley Connecting existing surroundings to the bazar



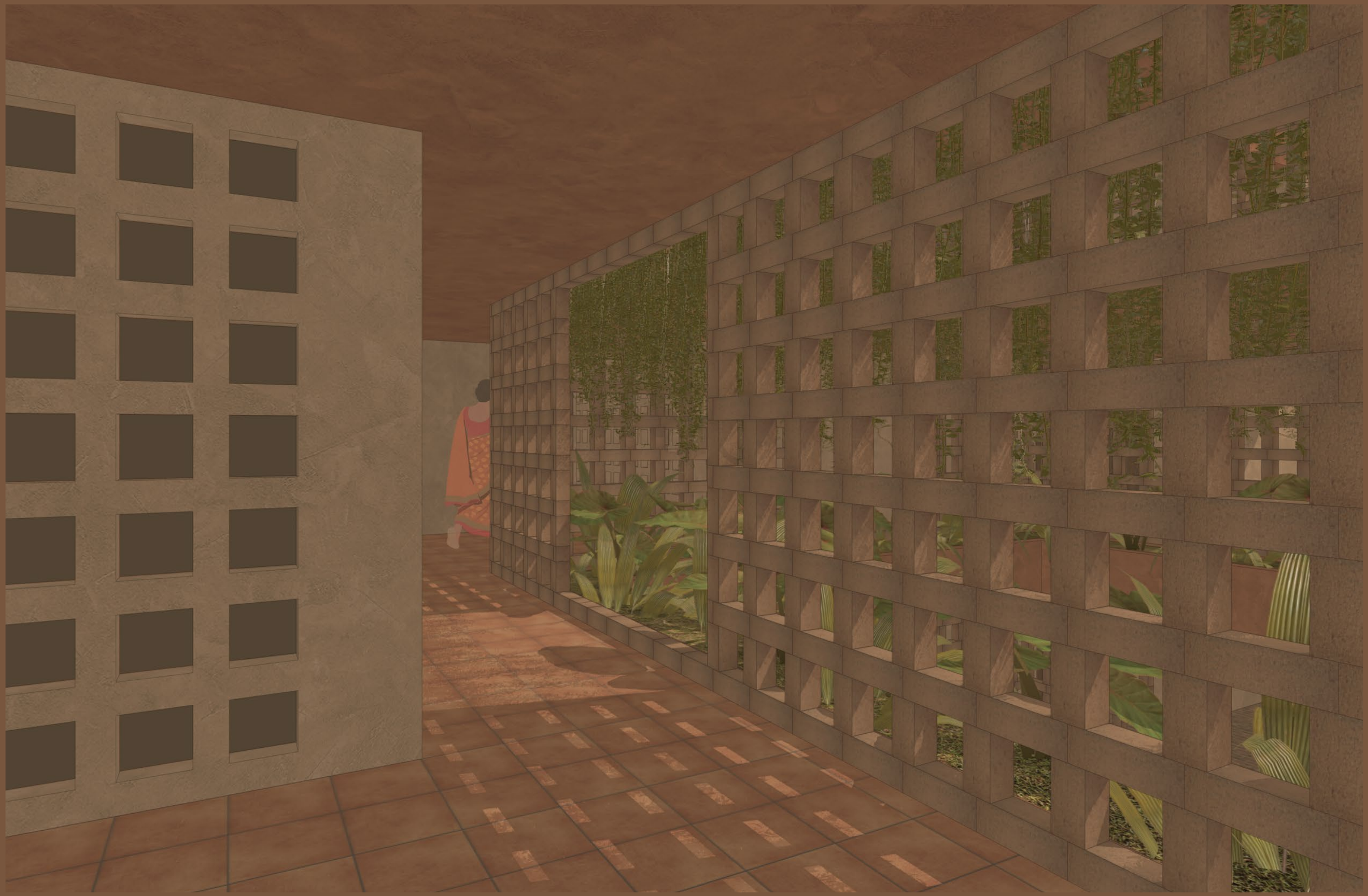
Bazar Primary public and commercial pedestrian spine



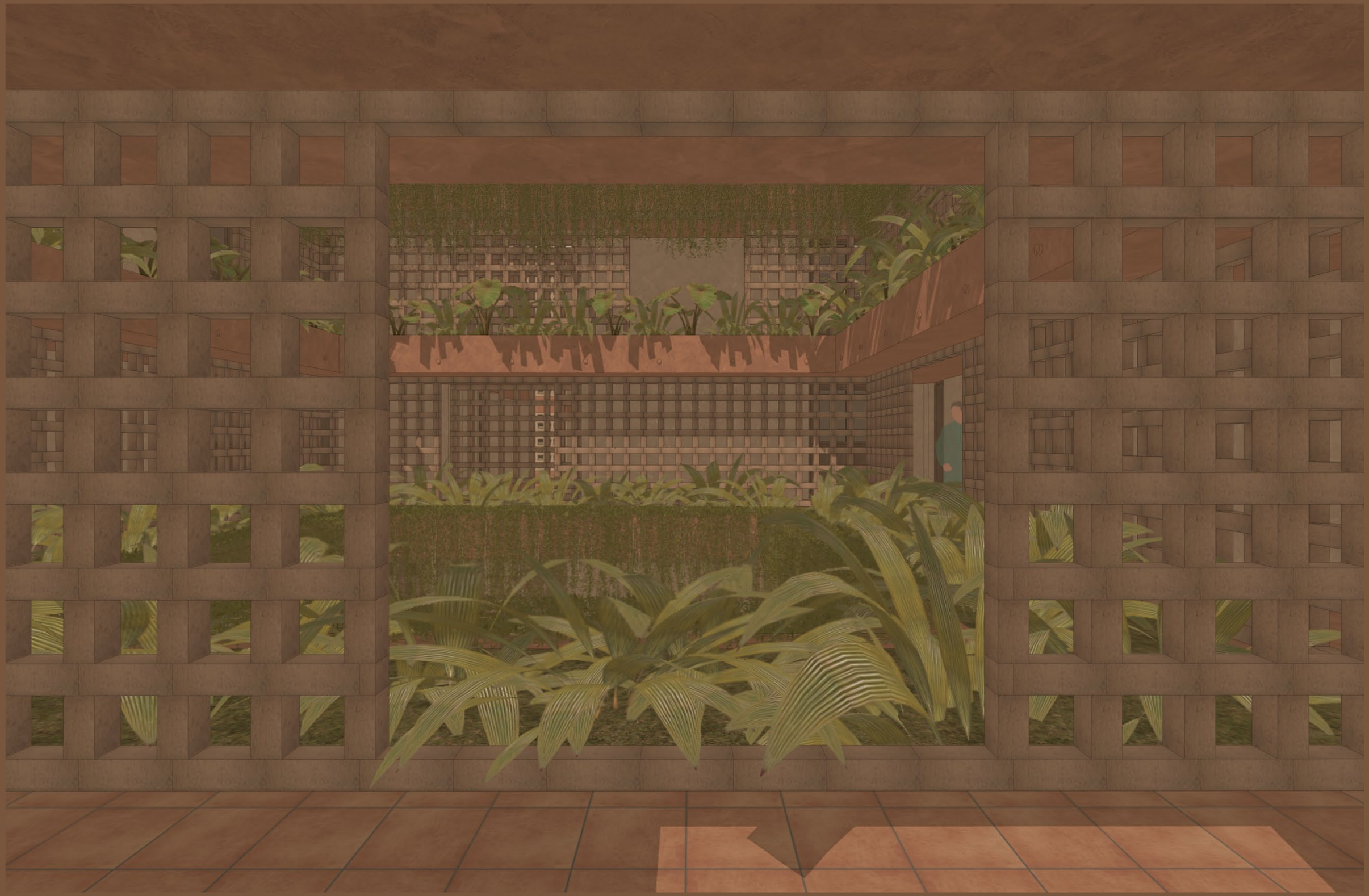
Bazar Primary public and commercial pedestrian spine



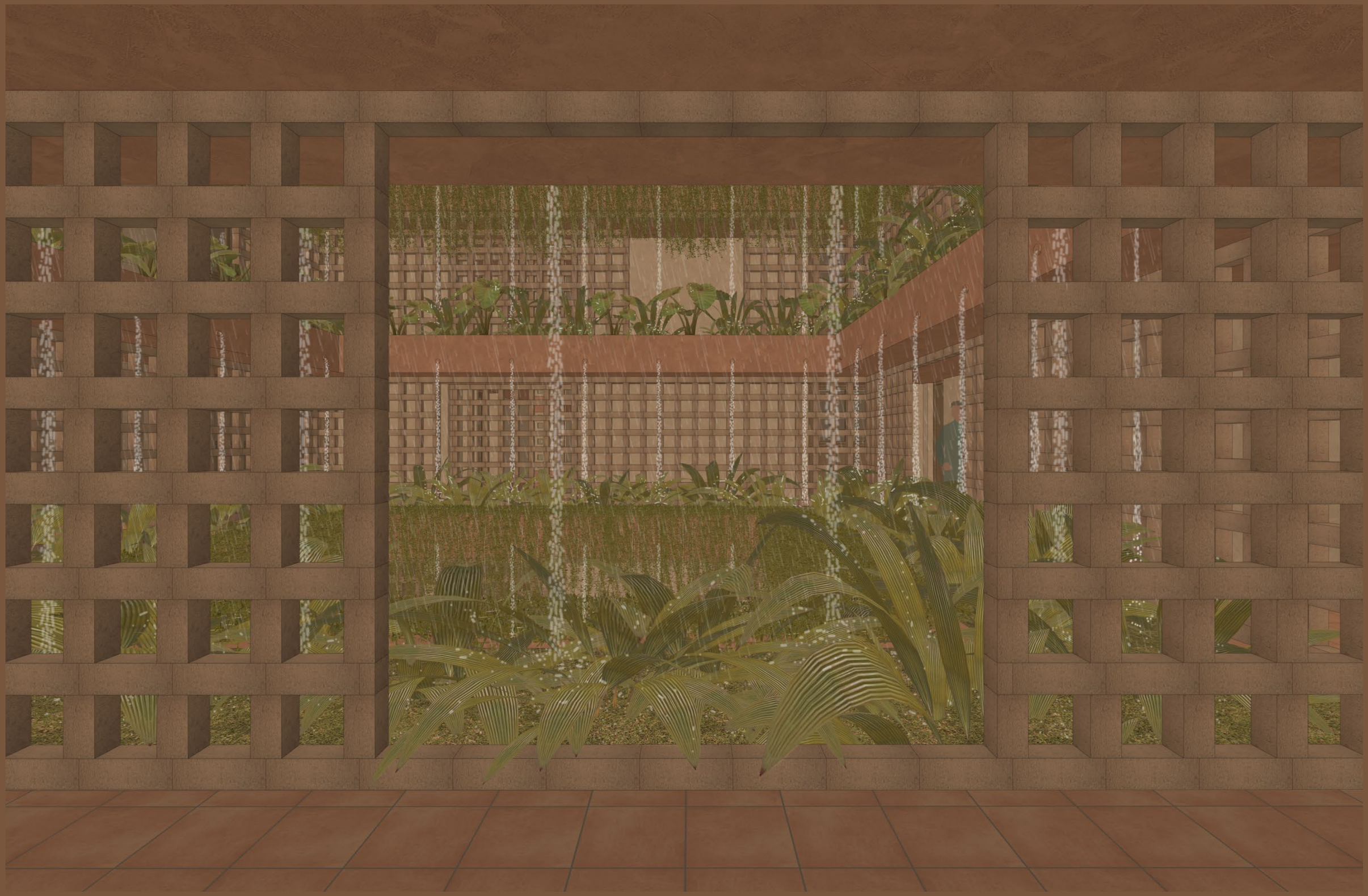
Courtyard Gallery access for dwellings on the upper floors



Courtyard Gallery access for dwellings on the upper floors



Courtyard Sunlight infiltration during the dry season



Courtyard Cascading waterfalls during the rain season



Terrace Offering unique views over the urban landscape



Terrace Offering unique views over the urban landscape



Canal Activating the periphery of the cricket field

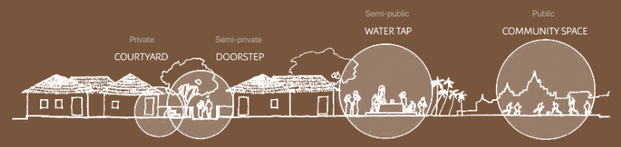


Canal Activating the periphery of the cricket field

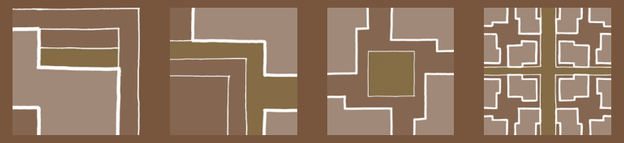
Freek van Schaik

Transition Habitats

01 Concept



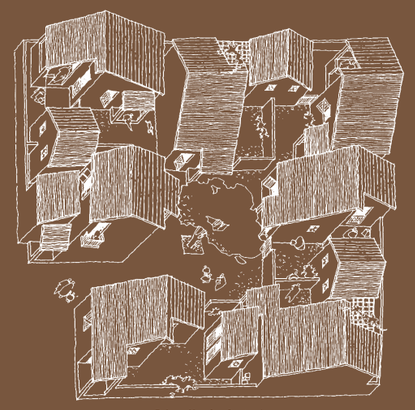
Hierarchy of Spaces Charles Correa



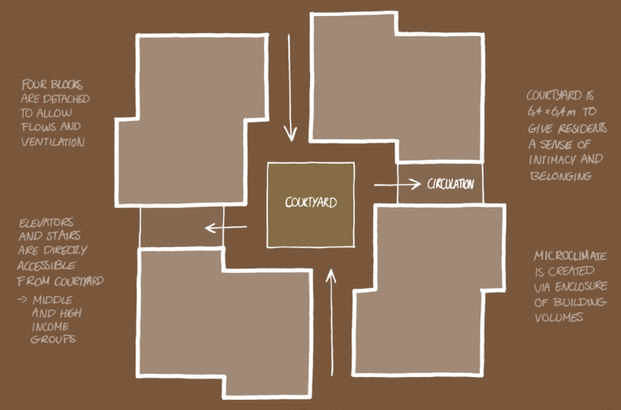
Hierarchy of Spaces Design



Belapur Housing Charles Correa



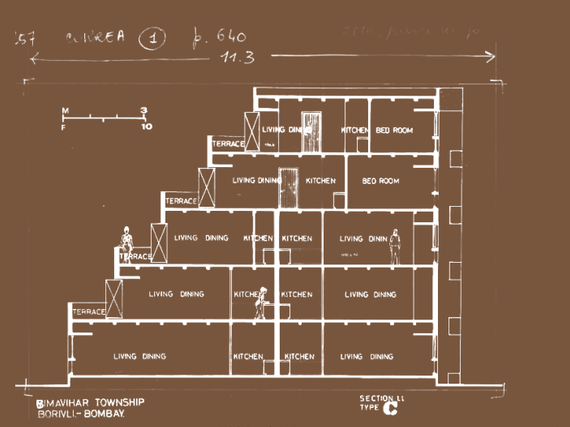
Belapur Housing Courtyard



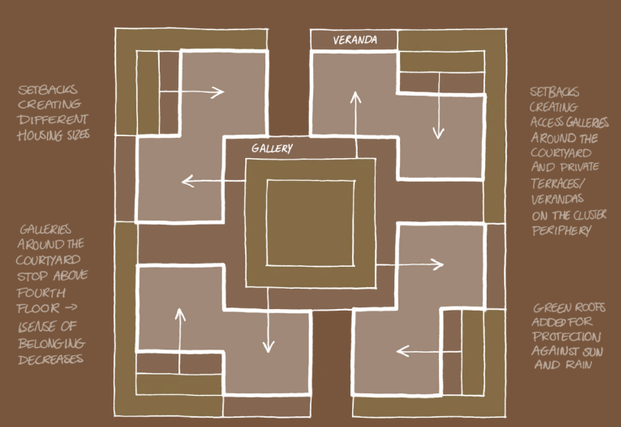
01 Courtyard



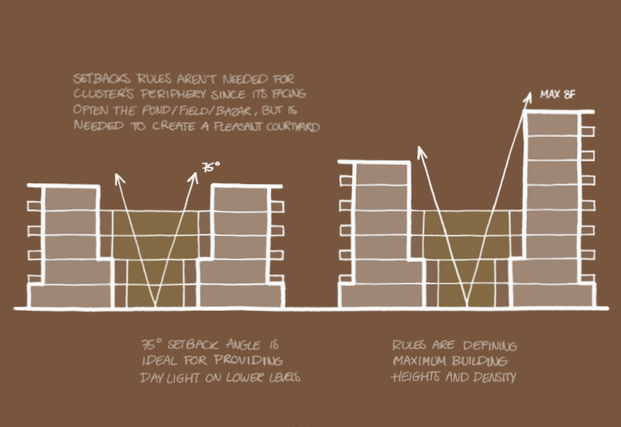
LIC Colony Charles Correa



LIC Colony Setbacks



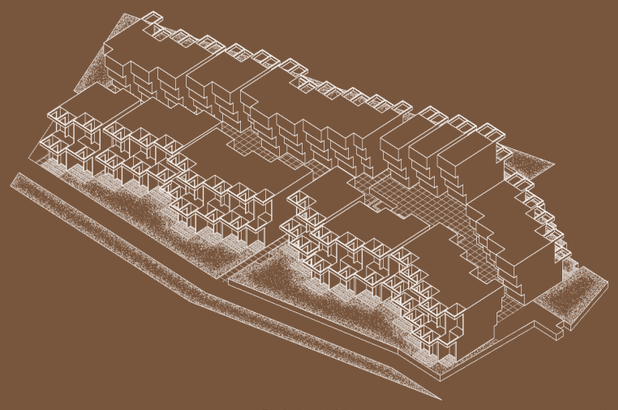
02 Setbacks



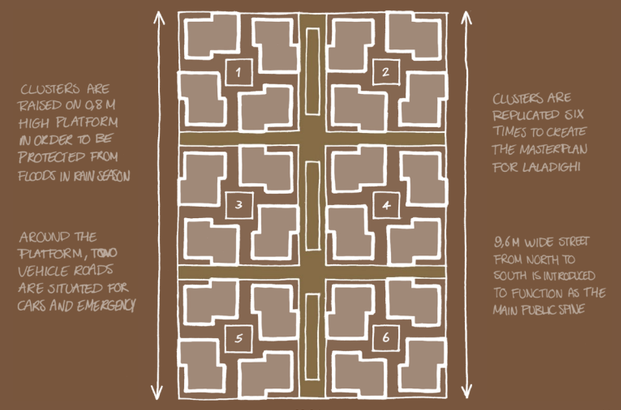
02 Setbacks



Tara Apartments Charles Correa



Tara Apartments Spine



03 Spine

02 Management



Current

0,29 GSI
0,33 FSI

93 dwellings/ha
628 residents/ha

67 dwellings
67 lower income



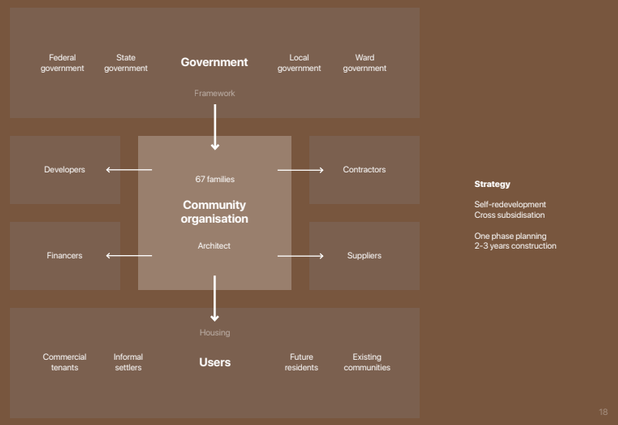
Final

0,40 GSI
1,68 FSI

200 dwellings/ha
1274 residents/ha

144 dwellings
72 lower income
48 middle income
24 higher income

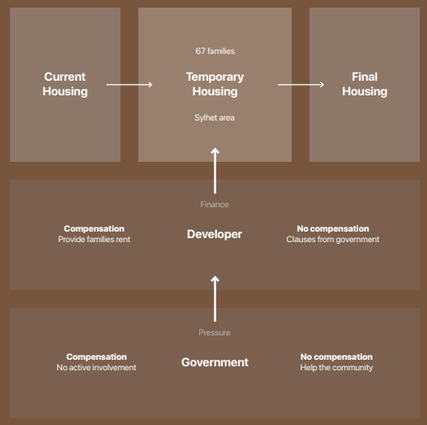
12 community spaces
36 commercial spaces
68 parking spaces



Strategy

Self-redevelopment
Cross subsidisation

One phase planning
2-3 years construction

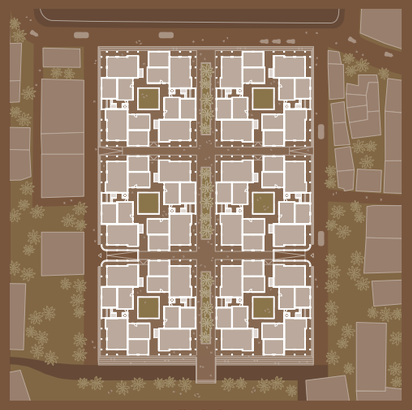


Strategy

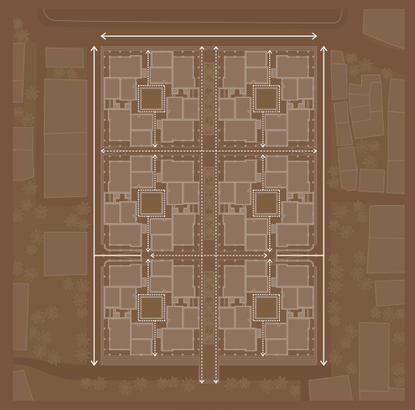
Temporary housing for families in Sylhet area

Community organisation in power of the process

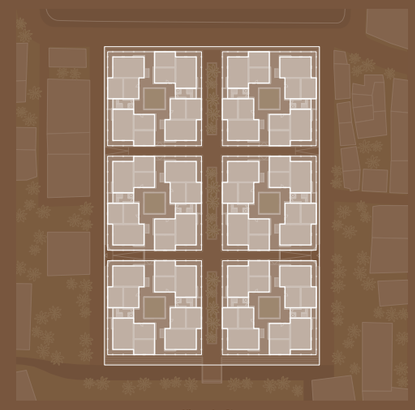
03 Urban



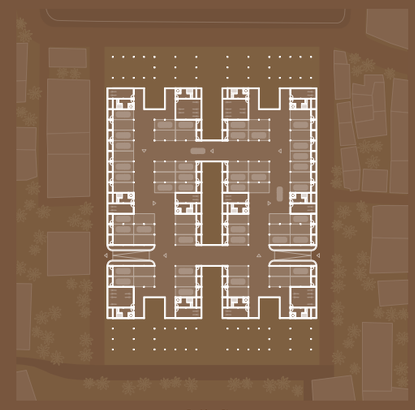
Situation Plan



Circulation Plan



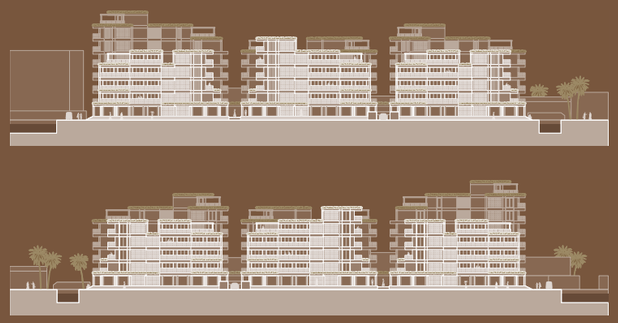
Hierarchy Plan



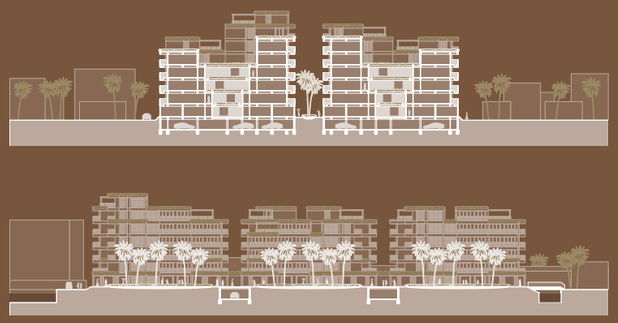
Parking Plan



Elevation North + south

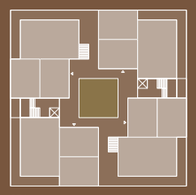


Elevation East + west



Section North-south + east-west

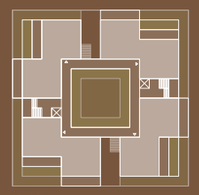
03 Cluster



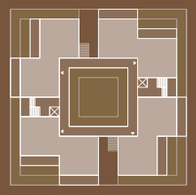
GF Low income + commercial



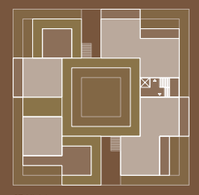
1F Low income



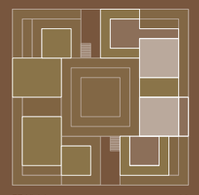
2F Middle income



3F Middle income + high income



4F High income



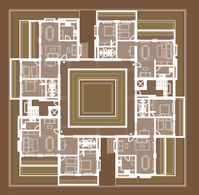
5F High income



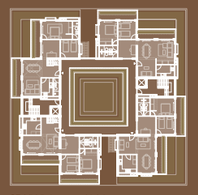
GF Low income + commercial



1F Low income



2F Middle income



3F Middle income + high income



4F High income



5F High income



Low income

30 sqm inside
40 sqm courtyard
1 bathroom

Low income

50 sqm inside
10 sqm veranda
1 bedroom
1 bathroom

Middle income

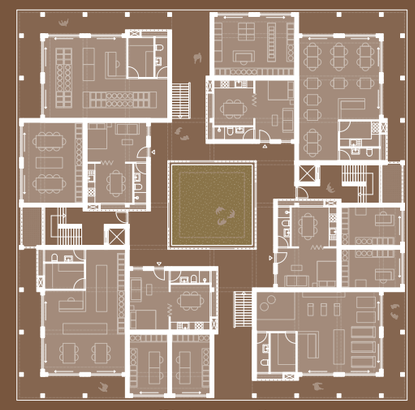
80 sqm inside
20 sqm veranda
2 bedrooms
2 bathrooms

Elevator access
Parking space
Storage space

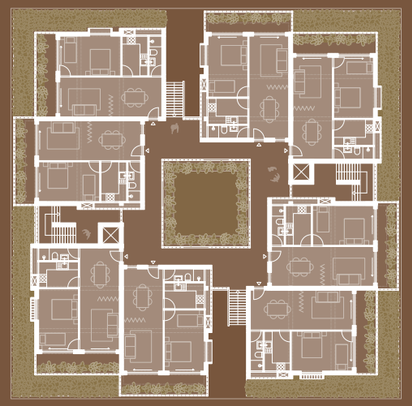
High income

120 sqm inside
50 sqm veranda
3 bedrooms
3 bathrooms

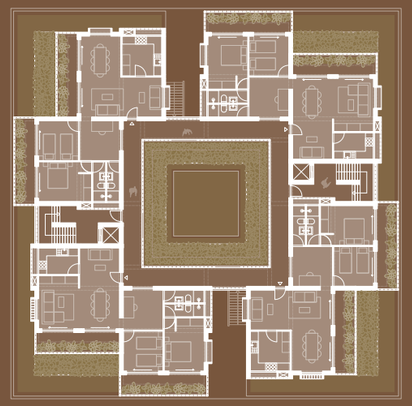
Elevator access
Parking space
Storage space



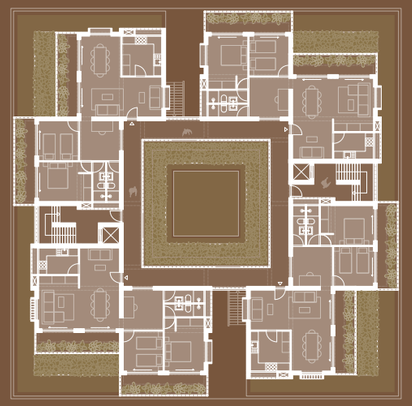
GF Low income + commercial



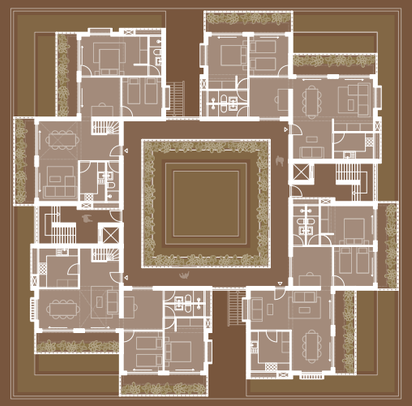
1F Low income



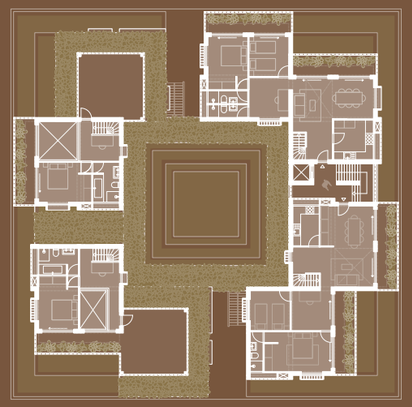
2F Middle income



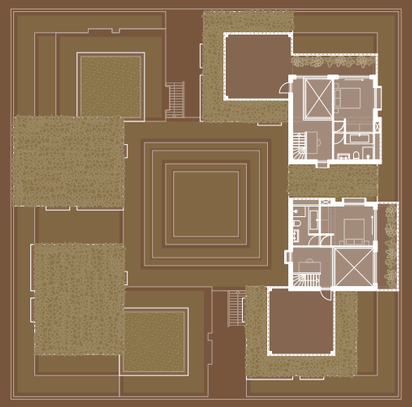
2F Middle income



3F Middle income + high income



4F High income



5F High income

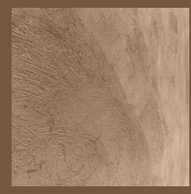
04 Technology



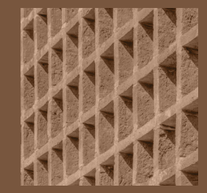
Concrete Structure



AAC blocks Infill



Cement plaster Finish



Fire brick Jali



Reclaimed brick Street



Terracotta tiles Terraces



Philodendrons Planter



Calathea Planter



Ferns Planter



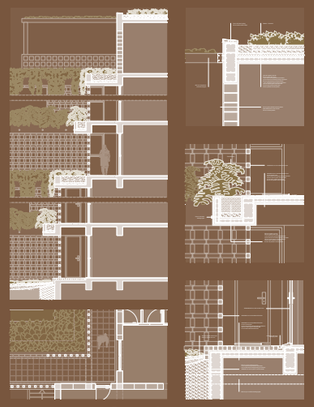
Vernonia Planter



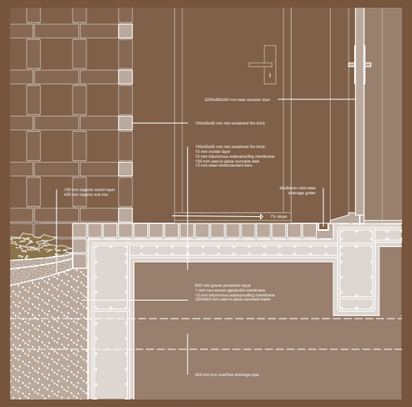
Palms Street



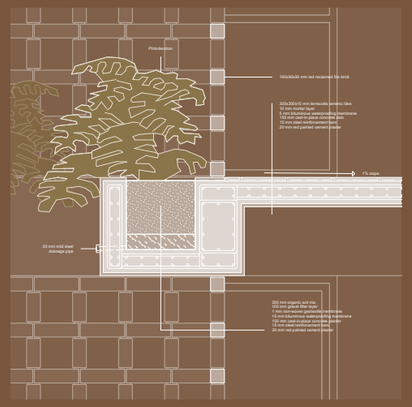
Sedum Roof



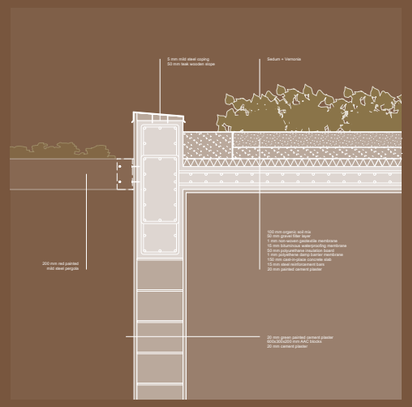
Fragment Construction



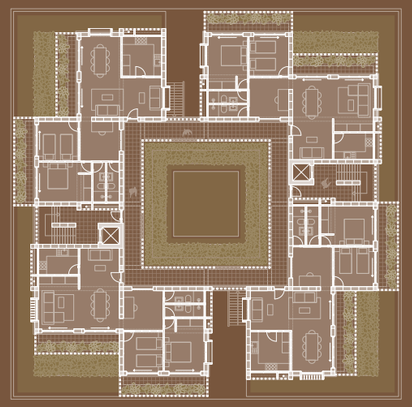
Detail Ground



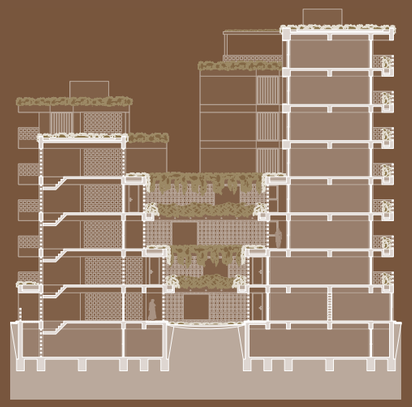
Detail Planter



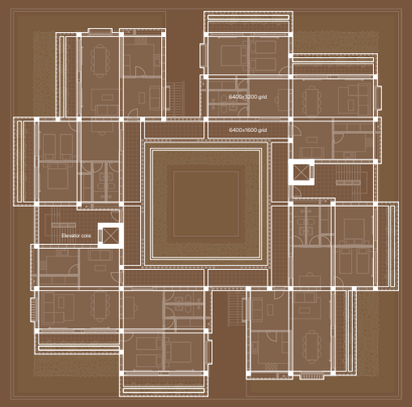
Detail Roof



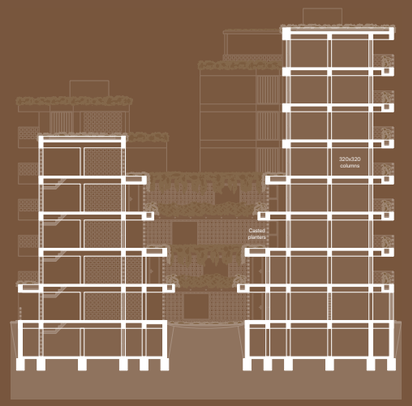
Construction Plan



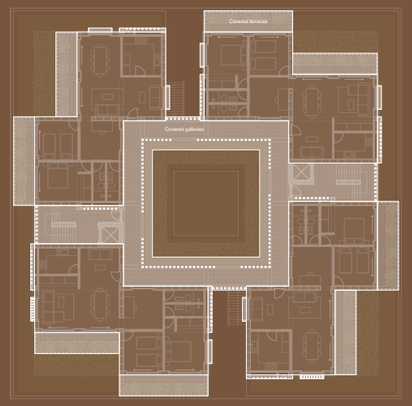
Construction Section



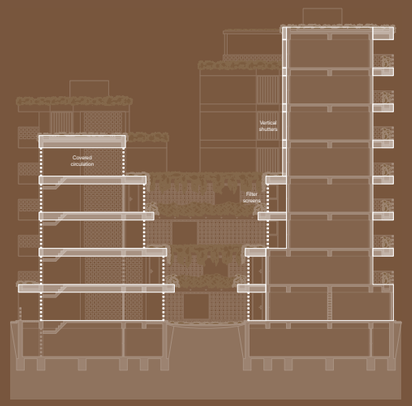
Structure Plan



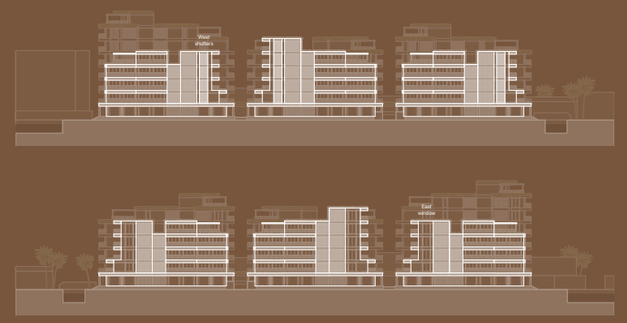
Structure Section



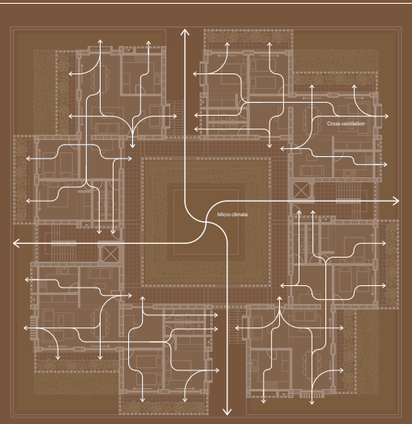
Shading Plan



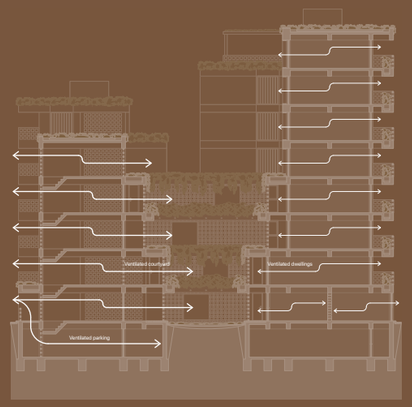
Shading Section



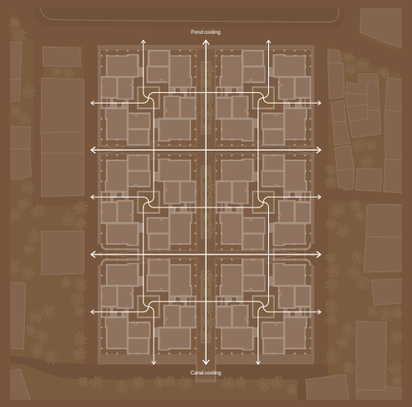
Shading Urban



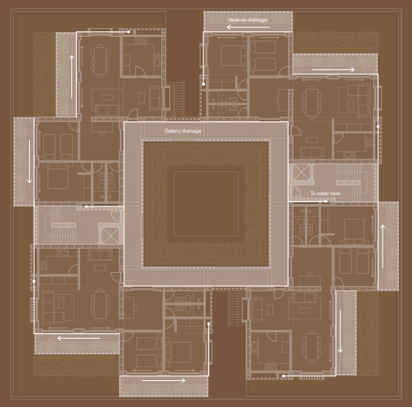
Ventilation Plan



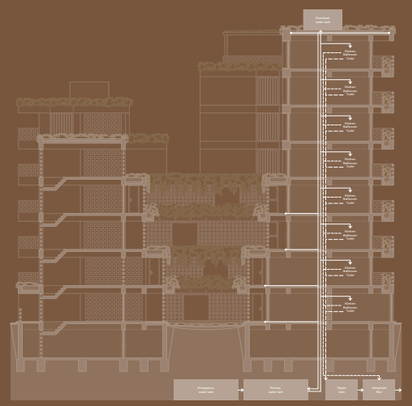
Ventilation Section



Ventilation Plan



Water Plan


Rainwater
waste water
Wastewater
from upper floor
Wastewater
from upper floor
Wastewater
from upper floor



Bazar Primary public and commercial pedestrian spine 65



Bazar Primary public and commercial pedestrian spine 66



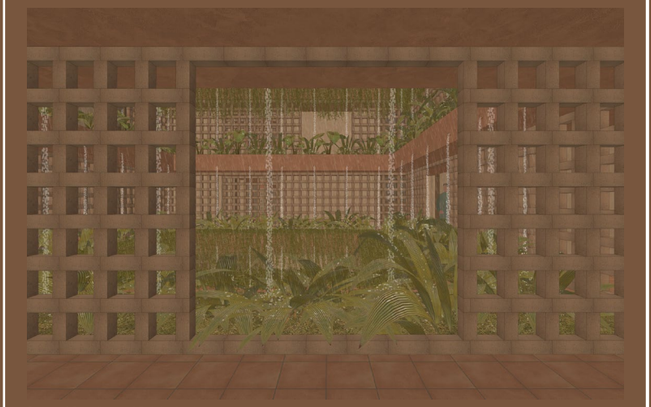
Courtyard Gallery access for dwellings on the upper floors 67



Courtyard Gallery access for dwellings on the upper floors 68



Courtyard Sunlight infiltration during the dry season 69



Courtyard Cascading waterfalls during the rain season 70



Terrace Offering unique views over the urban landscape 71



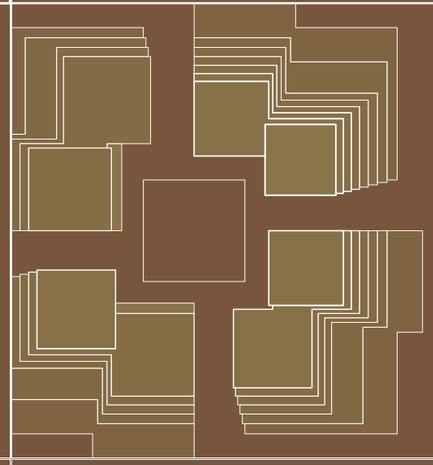
Terrace Offering unique views over the urban landscape 72



Canal Activating the periphery of the cricket field 73



Canal Activating the periphery of the cricket field 74



Freek van Schaik

Transition Habitats

04 Other

Reflection 192

Graduation topic
The Global Housing graduation offers students the skills and knowledge to tackle (housing) issues in the Global South through sustainable design. For my project, I tried to uncover how architecture can solve socio-spatial issues and improve the quality of living in urban areas throughout Bangladesh.

In Bangladesh, the process of rapid urbanisation is causing the construction boom of isolated residential structures and accompanying dead street edges. This results in the segregation of various socio-economic groups. My aim is to develop a housing scheme where these different groups can actually co-exist in a non-segregated built environment. Learning about the culturally important transition spaces and incorporating these into my design, helped me in achieving this aim during the process.

Transferability aim
Since the phenomenon of increasing segregation of different socio-economic groups is also occurring in other parts of the Global South, my graduation project will contribute replicable valuable social, professional and scientific knowledge. Instead of creating a one off masterplan tailor made to the specific design plot, I focussed on creating a housing cluster which ideas can be used in other urban contexts throughout South Asia.

The concept of replicability is supported by the managerial strategy made for the project. The existing inhabitants of the informal settlement get the opportunity to set up a community organisation which will have the control over the redevelopment of the site. This way, communities in poorly self-build settlements are given the chance to improve their living conditions by being relocated in modern dwellings that are arranged in a traditional way through transition spaces.

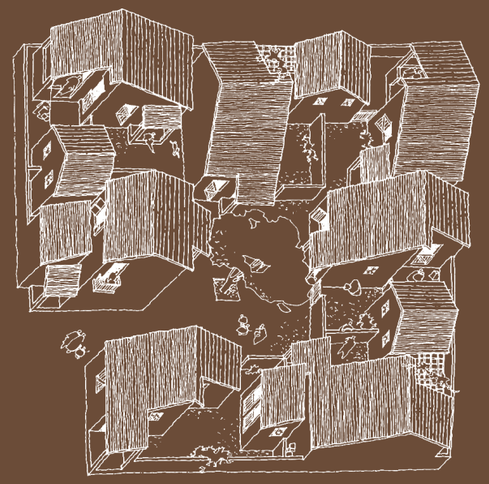
Of course, these new kinds of housing clusters were designed by me, someone who's an outsider of South Asian culture. Having visited Bangladesh for only two weeks, it's possible that such designed housing scheme fails to achieve the desired aim of coexistence. To avoid this, the architect, me in this case, should develop the design in collaboration with local stakeholders like members of the community organizations. This way, a more ethical solution can be posed for the development of new well-integrated residential structures.

Methodology shift
At the beginning of the project, my proposed research questions and methods focussed on investigating the characteristics of transition spaces in Sylhet specific. Setting up the research plan made my research rather convergent. That's quite normal however. As Nelson explained later, the research process is similar to the shape of a Martini glass where a divergent phase is followed after the initial convergence.

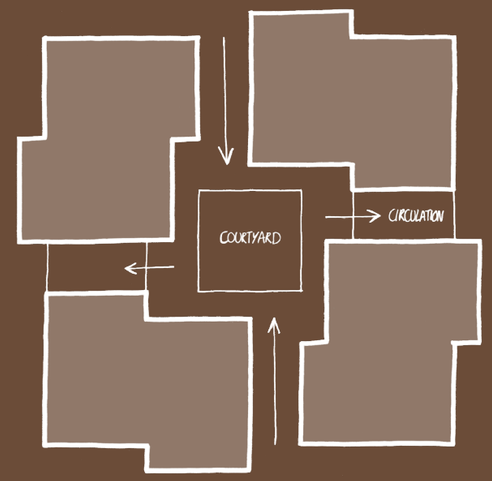
This process of divergence started to begin during the field trip. Here, I discovered that the main problem is often caused by the lack of transition spaces in modern dwellings compared to traditional housing typologies. Doing the site exploration in Laladighi, I stumbled upon harsh segregating elements, like high solid walls and closed gates in front of newer apartment blocks, that are used instead of transition spaces. This led to a slight shift in my research where I began to focus more on the problematic state and effects of these perimeters.

What followed was a broad analysis of the borders and boundaries on my specific site through the use of photographs and first-hand observations. Back home, I tried to illustrate these findings into drawings such as sections and plans, to get a sense of the context before starting the design process. Understanding the often problematic conditions of newer builds and comparing them to the conditions in more traditional housing, taught me that adding porous boundaries to transition spaces could possibly play a key role in generating the coexistence between different communities. Later in the process while testing and discussing various designs with this approach, I came to the conclusion that this possibility turned out to be true and really valuable. For example, vertical circulation spaces dedicated for middle and higher income groups, were now softly divided from lower income dwellings through open brick jalis instead of high solid walls. This decreases the sense of segregation while still providing privacy and security between different communities.

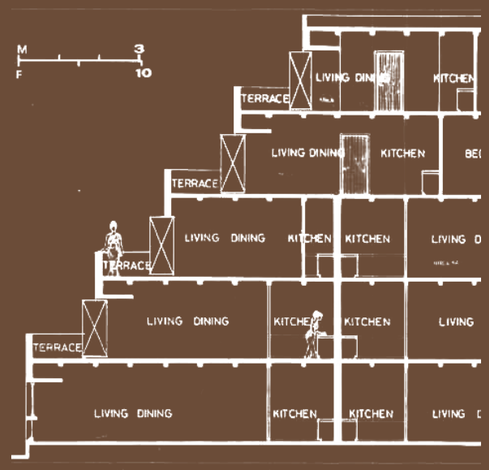
Research and design
Analysing case study projects from late Indian architects Charles Correa and Raj Rewal where



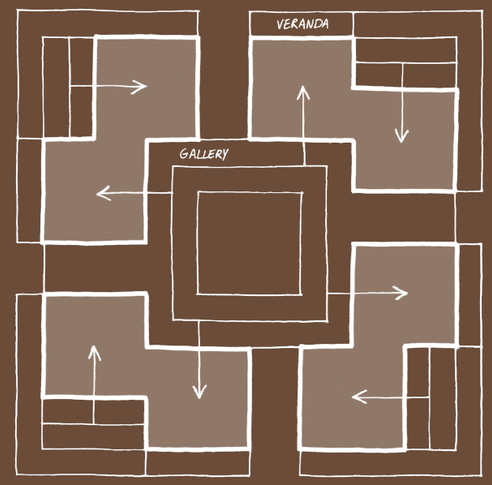
Belapur Housing Courtyard typology



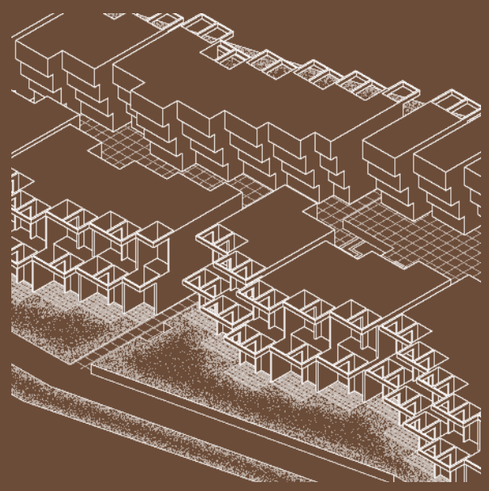
My design Courtyard typology



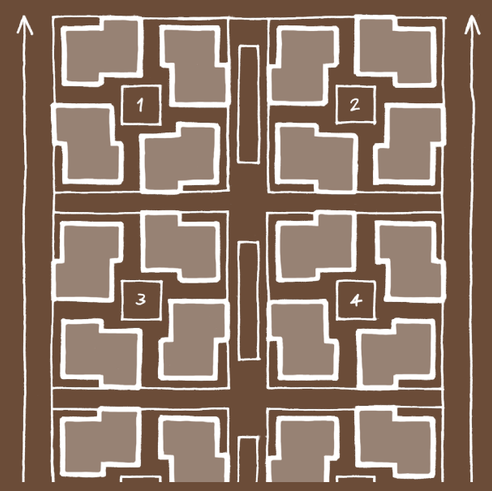
LIC Colony Setbacks terraces



My design Setback galleries/verandas



Tara Apartments Pedestrian spine



My design Pedestrian spine

traditional South Asian architecture elements like transition spaces are mixed with modern visions on how communities should live, formed the main concept for my project (see previous page). For example, Correa's hierarchy of (semi-)public and (semi-)private spaces showcased how various scales and places affect individual and communal interaction. Therefore, I introduced four main types of spaces with each space occupying a position in the public-private realm: the private veranda, the semi-private galleries, the semi-public courtyard and the public bazar.

During the tutoring sessions, a lot of thought and discussions went into optimising these spaces and therefore my overall design. At times, working on many different scales simultaneously was quite challenging since optimising one of the spaces often led to a decreased quality of the other spaces. For instance, implementing too spaced out courtyards resulted in a cramped public bazar due to the limited size of the plot. Therefore, as my tutors said, it's often about finding the sweet spot in sometimes contradictory conditions. Continuing the research while designing and being more precise in my investigations, helped me to find these optimal spots.

Project development

The evolution of the design is best explained by going thorugh the various iterations of the most significant part of the project: the replicable cluster. Here, the multiple aspects included in this studio have shaped the project's design.

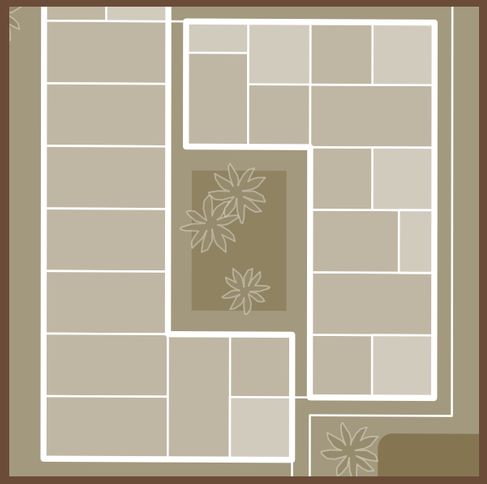
Prior to the P1, I was somewhat convinced to implement a courtyard typology to the structures when reading about the multi facet importance of courtyards as a transition space. I introduced four dwellings blocks with each containing a 12x16m enclosed courtyard (see next page). Stacked recessed housing volumes around these courtyard provided the blocks to have more daylight and ventilation. During the P1 however, Dick told me the courtyards were likely too large so little communal feeling of intimacy and belonging is added. Nelson therefore suggested me to explore fewer and smaller clusters instead.

For the P2, I came up with six smaller clusters which could be attached to one another to form the masterplan. This iteration contained largely the same kind of setbacks around the courtyard, but since the 8x8m courtyards were smaller, a large increase in dwellings was achieved. Although the feedback from Marina was quite positive, Nelson suggested to me to test if the design was the optimal trade off between density and liveability.

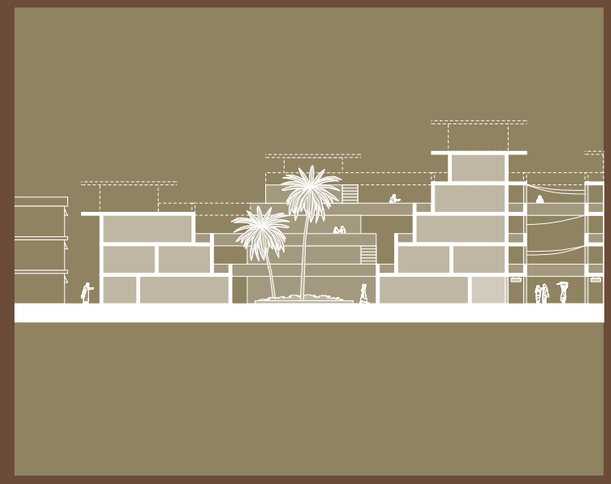
The weeks after the P2 and being confronted with the building technology aspects of the project, eventually made me realise that the amount of daylight and ventilation were suffering from the density. At first, I was a bit reluctant to change large parts of the design since I didn't exactly know what elements I should change to solve the issues. During a meeting where I discussed the managerial strategy with Nelson, he insisted me that my dwellings should be larger and target more the lifestyles of the specific income groups. Therefore, I made some big changes like implemented less setbacks which caused the dwellings to be larger and having more terraces provided. Moreover, the clusters were no longer attached to each other in the urban plan which helped creating more streets and better dedicated circulation spaces. Slowly, the initial issues were getting solved.

These results and the new cluster design were eventually met with positive feedback at the P3. Afterwards, a lot of time went into fine tuning and exploring the best ways to showcase and convey the vision of my design. The later part will play an even bigger role in the coming weeks after the P4.

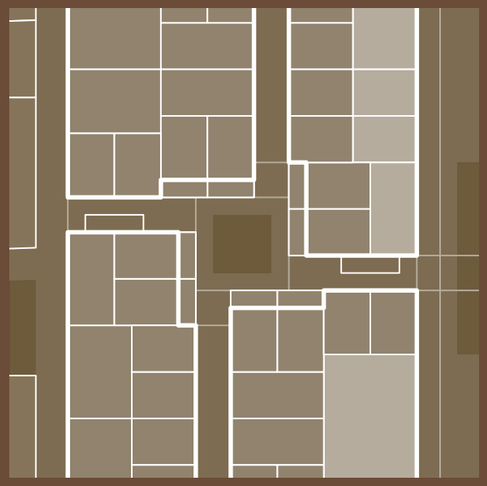
When I look back, getting told that my dwellings were too small and therefore my design wasn't working, resulted in the project's biggest jump forward. This taught me that sometimes you do need setbacks to push you (and the project) further. I often get a bit too attached to my initial designs and therefore the progress frequently slows down. Now I can appreciate critical feedback more since I'm able to better understand the value and outcome it will have in the long run.



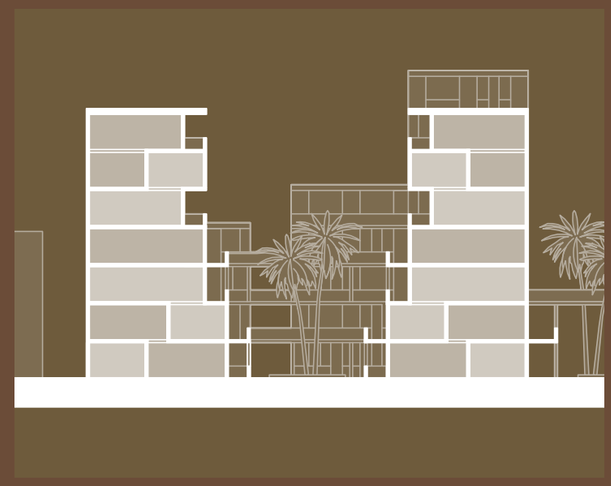
P1 12x16m courtyard (4 clusters)



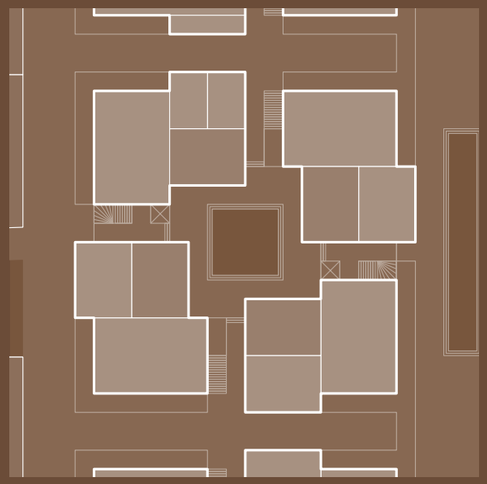
P1 Courtyard is too large for sense of belonging



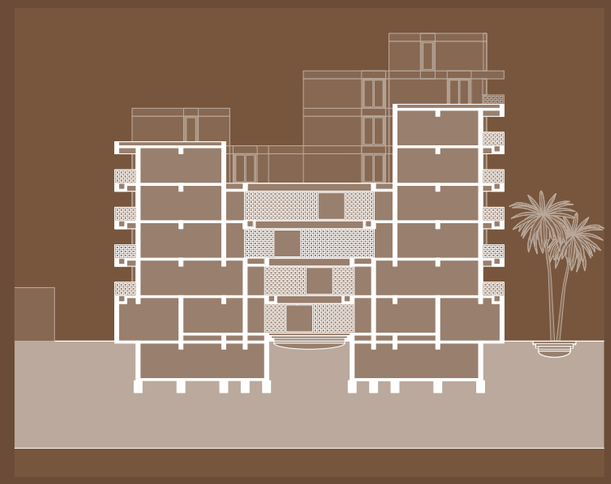
P2 8x8m courtyard (6 attached clusters)



P2 Ventilation and light suffering from density



P3 6,4x6,4m courtyard (6 clusters)



P3 More outdoor spaces and larger dwellings

References 198

Publications

Abdel, H. (2021, March 17). Bat Trang House / VTN Architects. ArchDaily. https://www.archdaily.com/958554/bat-trang-house-vtn-architects

Chapekar, P. (2022). Belapur Housing by Charles Correa: A sense of home and community. RTF | Rethinking the Future. https://www.re-thinkingthefuture.com/case-studies/a3735-belapur-housing-by-charles-correa-a-sense-of-home-and-community/

Chowdhury, T. (1998). Segregation of women in Islamic cultures and its reflection in housing: A study of spaces for women in a Bangladesh village. Shelter, Women and Development: First and Third World Cities, 338-346.

Hasan, M. R. (2022). Urban planning in Bangladesh: Challenges and opportunities. The Business Standard. https://www.tbsnews.net/supplement/urban-planning-bangladesh-challenges-and-opportunities-362911

Ramnath, N. (2019). Mumbai housing colony that Charles Correa designed as 'a mirror of the nation' is focus of new film. Scroll.in. https://scroll.in/reel/927644/mumbai-housing-colony-that-charles-correa-designed-as-a-mirror-of-the-nation-is-focus-of-new-film

Rana, M. M. P., & Ilina, I. N. (2021). Climate change and migration impacts on cities: Lessons from Bangladesh. Environmental Challenges, 5, 100242.

Singh, R. (2015). Understanding transition spaces. www.academia.edu. https://www.academia.edu/19852235/Understanding_Transition_Spaces

Singh, S. (2023). Post-Independence Delhi architecture: Tara apartments- an oasis in the real sense. Nirman. https://www.nirman.com/post-independence-delhi-architecture/#gsc.tab=0

Varma, R. (2015). CIDCO Housing Navi, Mumbai (IN). Delft Architectural Studies on Housing. https://journals.open.tudelft.nl/dash/article/view/5029/4599

Wong, W. S. (2016). Effects of the Building Code on construction and design of Hong Kong residential buildings in the colony. MATEC Web of Conferences, 68, 13006. https://doi.org/10.1051/matecconf/20166813006

