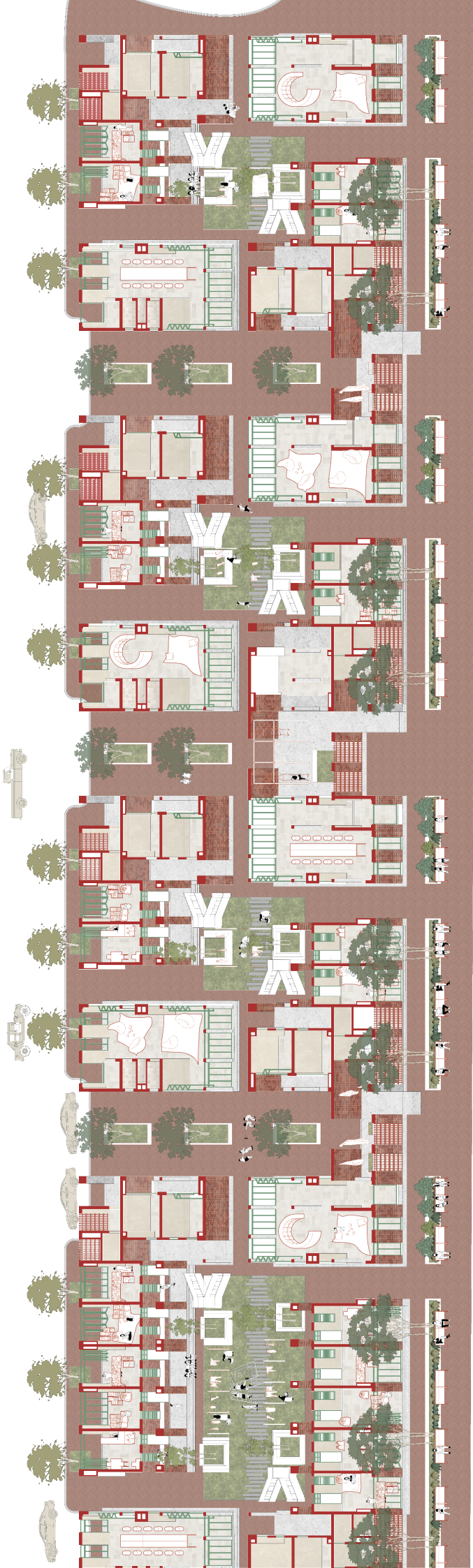
Living In A Game



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2023-2024 Global Housing Graduation Studio
Architecture of Transition: In the Bangladesh Delta

First mentor: Prof. Dick van Gameren
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01 PROBLEM &RESEARCH QUESTION

- Rapid urbanization
- A young society
- Problem statement
- Research question(s)
- Design hypothesis

RAPID URBANIZATION

THE URBAN POOR IN BANGLADESH

From the 19th century, rapid urbanization has brought huge population growth in urban areas, and it is continuously happening worldwide. According to the United Nations (2018), more than half of the population currently lives in urban areas, and the figure will rise to 68% in the coming two decades. Currently, Eastern Africa and South Asia are and will continuously be the main growth areas for population in the near future. In Bangladesh, according to the census of 2022, the national population has already reached nearly 170 million, with 67 million being the urban population (Macrotrends, 2023).

Urbanization works as a cycle, starting from attracting more people to large cities, making the cities bigger and resulting in the emergence and expansion of the 'urban poor.' Currently, around 20 percent of the urban population is reported to be living in poverty in Bangladesh, and it is estimated that over half of the poor households will be in urban areas by 2030 (Rahman and Hill, 2019). In *The Truly Disadvantaged* by Wilson (1987), he proposed the concept of 'neighborhood concentration effects' on the urban poor, arguing that poor families or individuals instinctively tend to gather as a community in the city. This may lead to isolation and physical segregation, which will further exacerbate poverty. This is indeed reflected in urban Bangladesh, as the gap between the living conditions of slum and non-slum neighborhoods is gradually widening.

Although the government of Bangladesh has taken economic measures that have resulted in a decline in the poverty rate, progress has been slowing since 2010 compared to the first decade of the 21st century (Rahman and Hill, 2019).

Therefore, how do these urban poor live now? And how can they survive in the future?

Dhaka city (photo by author, 2023)

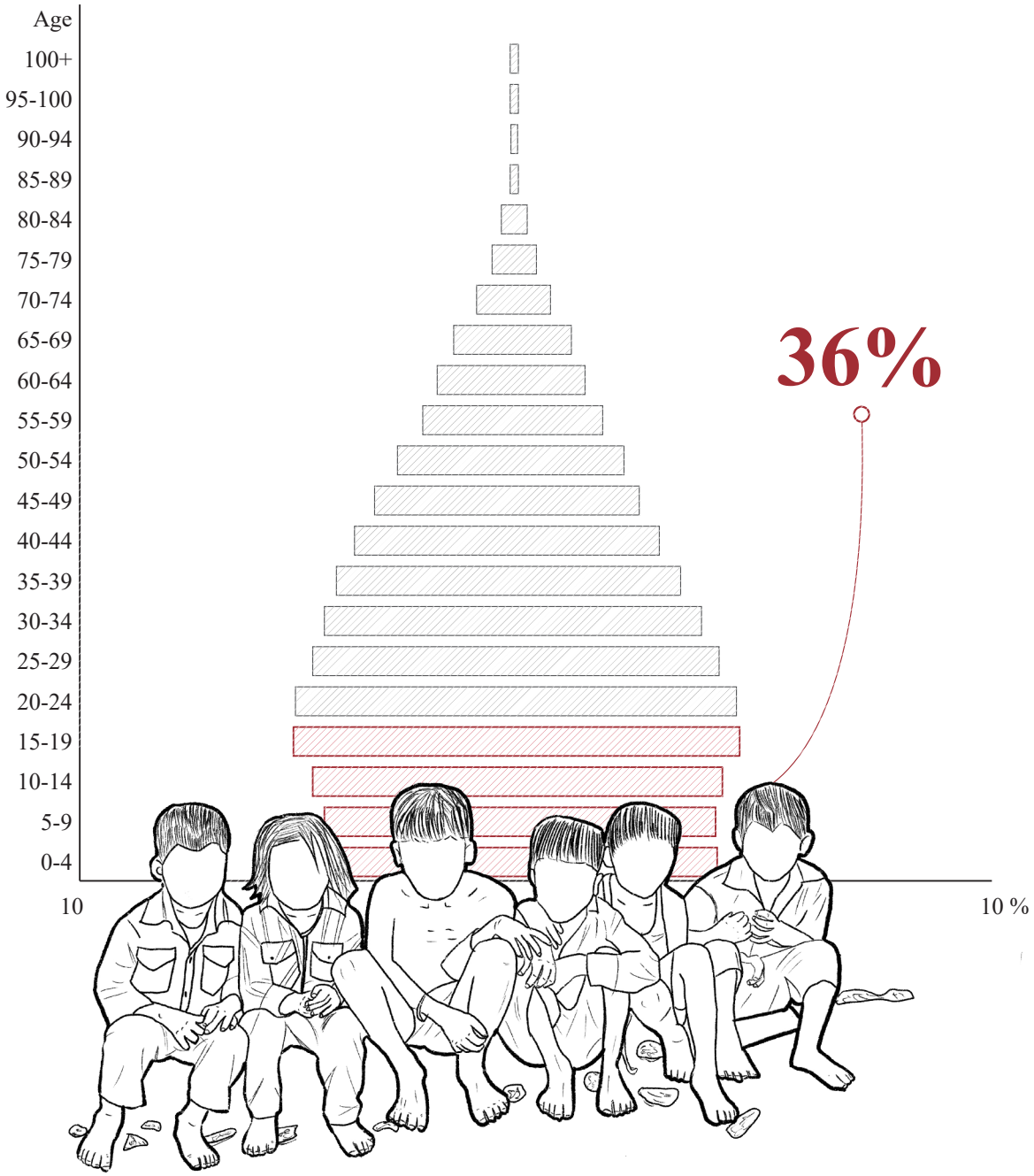
A YOUNG SOCIETY

CHILDREN IN BANGLADESH

The increasing population is also caused by the high birth rate and a large proportion of young people. According to RAPID, GED & UNICEF (2020), the demographics of Bangladesh show that 36% of the overall population is under 18 years old. In other words, Bangladesh should have abundant labor force in the near future when these children grow up. However, one surprising finding by Sharmin (2010) is that there is no unified definition of children in different fields in Bangladesh, indicating ignorance of children at the national level.

At the same time, poverty has a wide influence on the country, so a large number of children, for example, in urban poor families, do not grow up in a child-friendly environment. Instead, they live without permanent shelter or basic amenities, severely damaging their health and exposing them to dangerous environments. The UN General Assembly declared five basic children's rights in 1959 as protection, education, health care, shelter, and good nutrition. Unfortunately, none of these rights has been fully defended for urban poor children in Bangladesh.

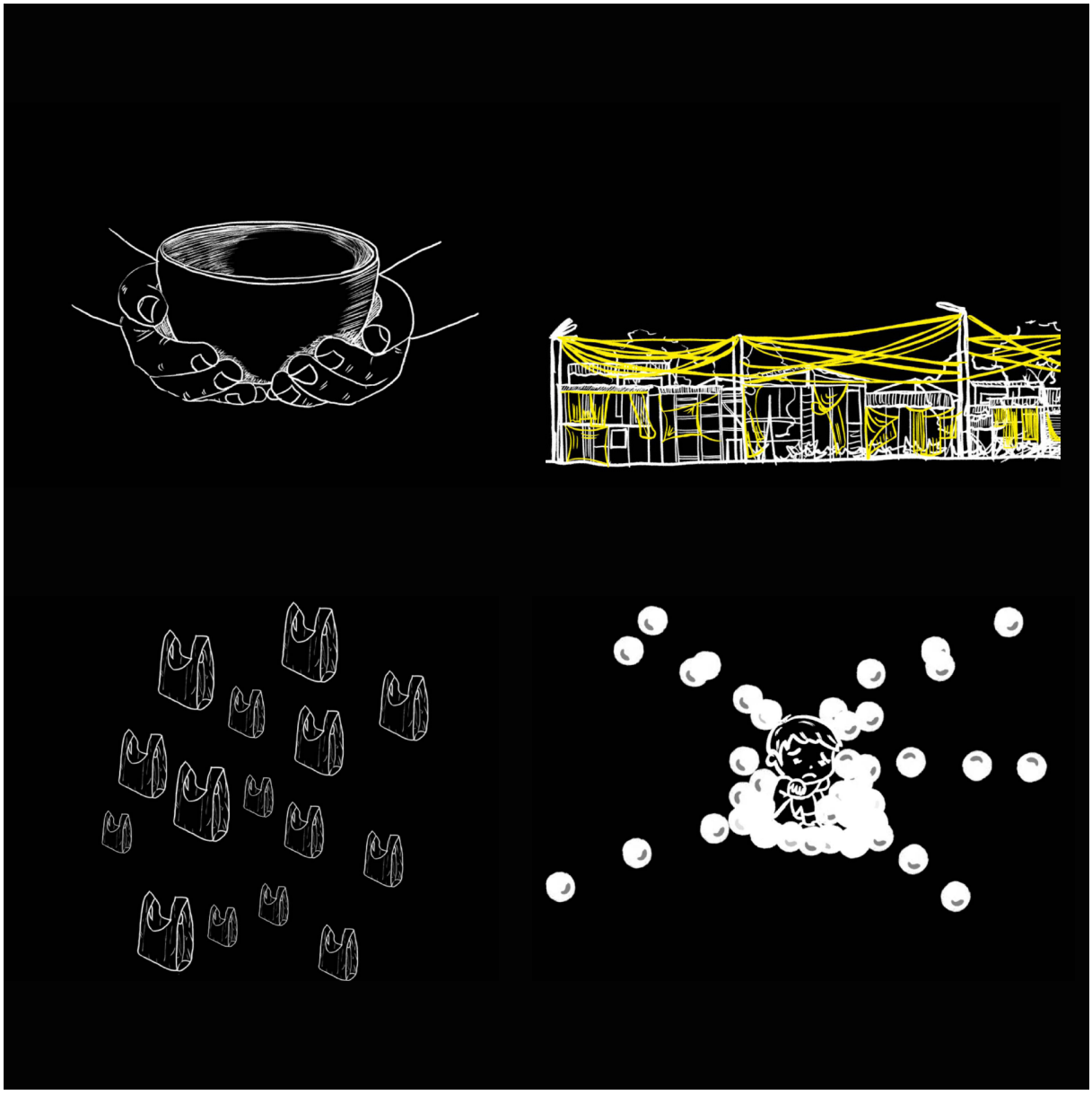
Combining information from the Demographic and Health Survey 2022 by NIPORT and ICF (2023) and the Survey on Children's Education in Bangladesh 2021 by BBS & UNICEF (2022), children in Bangladesh are facing health problems such as childhood mortality, malnutrition, and illness, as well as lacking access to education, leading to the problem of child labor, especially in urban areas. Regarding this fact, even if the number of children is considerable, survival is already a challenge for them, let alone contributing to the future labor force.


Age
100+
95-100
90-94
85-89
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
10
10 %
36%

PROBLEM STATEMENT

LACK OF SURVIVING CONDITIONS

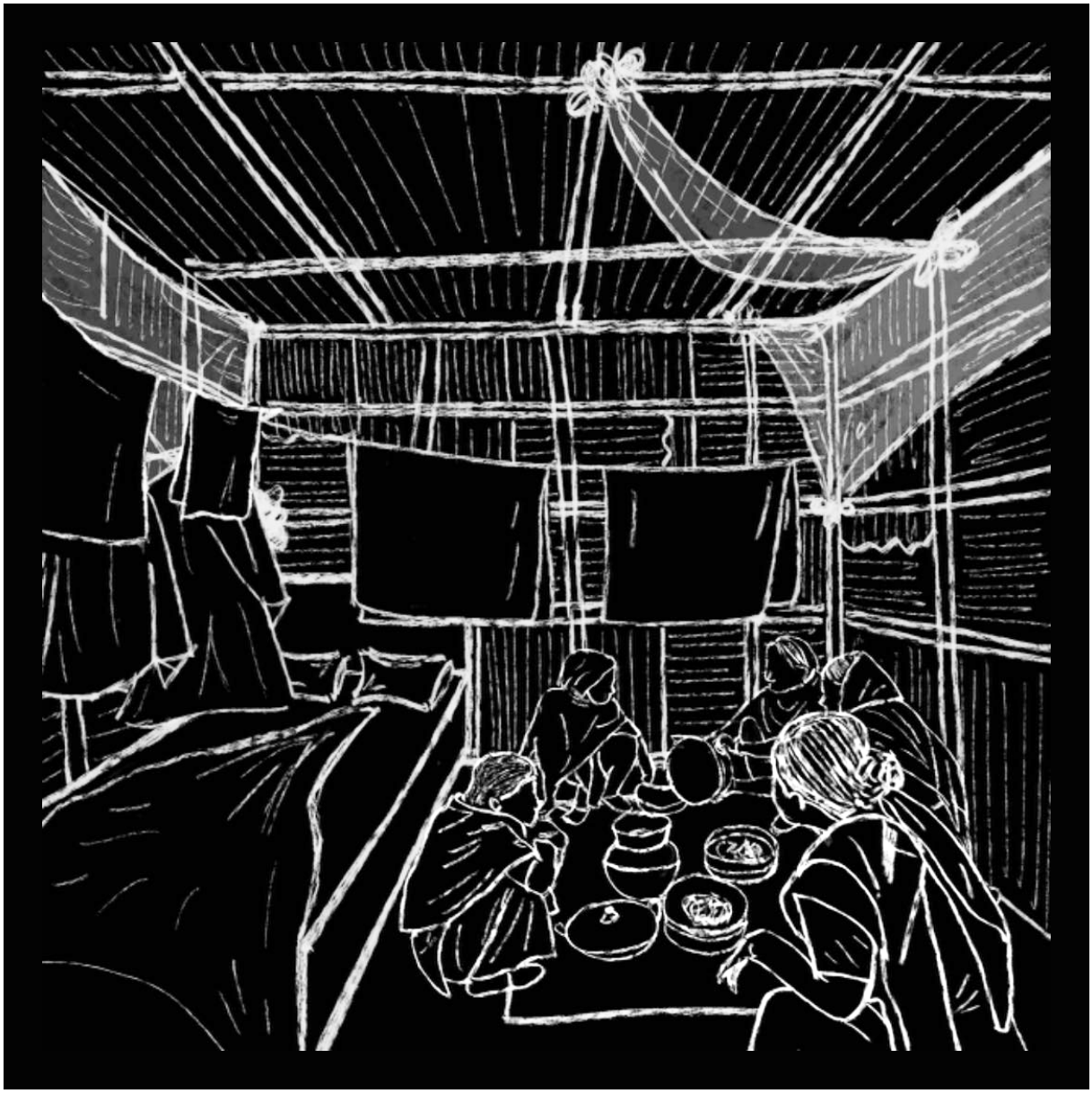
Children in urban poor families in Bangladesh are exposed to multiple threats at different stages of their childhood. Their health is not well protected from infancy and as they grow up, they remain vulnerable due to the lack of proper food and sanitation. Additionally, around 40 percent of children in urban areas in Bangladesh do not have access to formal education, instead, they start working or doing domestic chores from a young age (avg. 9 years old nationally, avg. 7 years old in Sylhet), and change their work frequently. These jobs are basically manual labor offering little salary but requiring a long working hour, and some are even in hazardous environment, which increases their vulnerability (RAPID, GED & UNICEF, 2020).



PROBLEM STATEMENT

PASSIVE ROLE IN FAMILY LIFE

According to the survey by BBS and UNICEF (2022), a safe family life is most desired by children, especially staying with their nuclear family. Research has indicated that children's well-being is positively correlated with their participation in daily activities and their engagement with family, and a stable housing environment is found to be the basis for a healthy family life (Mayberry et al., 2014). However, the living condition of the urban poor in Bangladesh is not stable. Especially under the conditions of land scarcity in recent years, their living areas are compressed before other social groups, resulting in either super-dense informal housing or simple shelters made of the cheapest and most accessible materials. In both cases, people's living spaces are drastically reduced, limiting family activities to only eating and sleeping, so children's development is hampered due to the loss of a healthy family routine.



PROBLEM STATEMENT

NEGLECT IN SOCIAL LIFE

Apart from family life, urban poor children also face inequities in social life.As urban poor, they are seen as informal population, who usually do not have their common space in their colony as all spaces that they have tend to be fully used for daily routine. Consequently, they take for themselves the 'community commons' such as the street or open spaces between houses, rather than specially defined areas. At the same time, they are prohibited from accessing some social spaces, or even when they are able to do so, they still face the risk of eviction.

Compared to children of middle or upper-income families, they are not only excluded from regular schools, but due to the lack of protection, they may be exposed to dangers while wandering in social space.

Common space in Muslim community (photo by author, 2023)

RESEARCH QUESTION(S)

Sub-question 1:

How can housing design ensure the most basic rights for urban poor children?

Sub-question 2:

What are the features of housing that promote the participation of urban poor children in family life?

Sub-question 3:

How can housing and public space design encourage urban poor children to have equitable access to social space and to participate in social life?

How can housing design help to build

a child-centric community

for urban poor children in Bangladesh?

DESIGN HYPOTHESIS

WHAT IF LIVING IN A GAME?

The design hypothesis responds to the problem of urban poor children and aims to build a child-centered community. The concept is 'playfulness,' so both the housing and other amenities are considered to be as playful as possible in terms of appearance and function, prioritizing children. There are three main elements involved: housing, street, and public space, all of which will be explored from the smallest unit and then accumulated step by step to the community scale. The hypothesis takes climate (impact of flooding), topography (sloping embankmemt), and existing urban fabric into account, showing how the design topic can be possibily presented on a real site.

'Living In A Game'

Global Housing Graduation Studio | Design Hypothesis | Sijie Song

The design hypothesis responds to the problem of urban poor children and aims to build a child-centered community. The concept is 'playfulness', so both the housing and other facilities are considered to prioritize children. There are three main elements involved, namely liveable housing, accessible street and playful public space, all of which will be explored from the smallest unit and then combined step by step to community scale. The hypothesis takes climate (impact of flooding), topography (sloping river bank) and existing urban fabric into account, showing a 'playful' character as well as incorporating other factors.

01 Toolbox

Liveable Housing

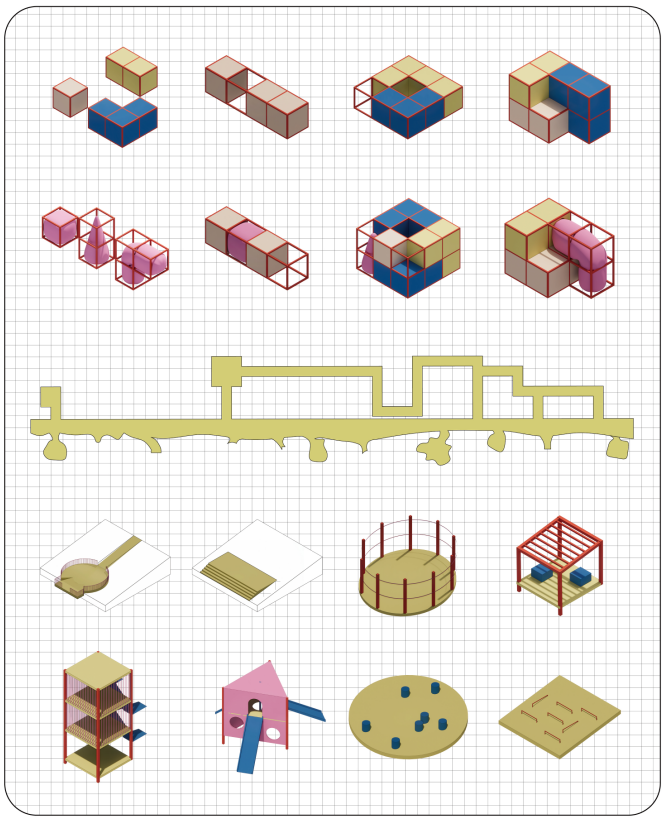
The first set of elements is housing components including both residential units and indoor play spaces. A frame is set first and the components are supposed to be filled in the frame. The residential units are modular and in regular form, while the play spaces are more organic in shape.

Accessible Street

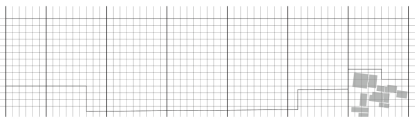
There is not a formal street on the site, so a new street system will be created, consisting of a main spine and more branches. In order to echo the built form, the shape of branches leading to residential area is more rational, while the ones to public spaces are more irregular.

Playful Public Space

The public space are designed based on the children's recreational needs. Although they are facilities for children, other groups can use them as well, which then become public spaces for the whole community.



02 Principles

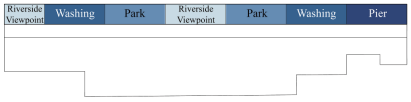


1 Long side division

The Hindu community is decided to be kept and its size is taken as reference for dividing the the site along the long side into 7 fragments.

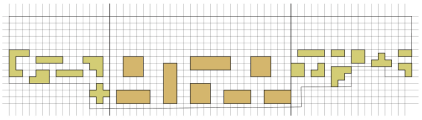
2 Short side division

The zoning along short side is based on the privacy. The sloping riverbank is playful public space; the side away from the river is residential area to prevent flooding; and a spine is in between.



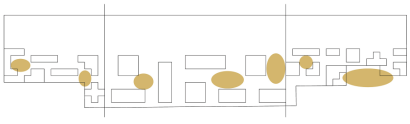
3 Theming public space

According to the way people use the river bank now, each fragment is assigned a thematic function, so that related facilities can be arranged.



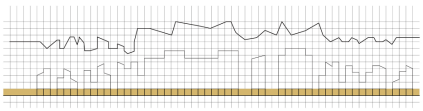
4 Theming residential area

The form of residential area should be based on the corresponding context fabric, showing the difference in scale, density and other qualities.



5 Forming cluster

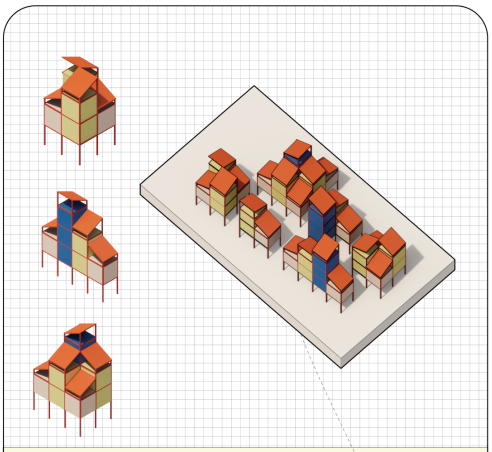
After defining the building form, buildings inside one fragment is considered as a cluster, sharing a common space in the center.



6 Rhythm in section

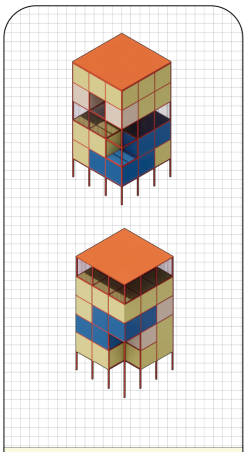
The respond to the surrouding context is also reflected on the change in section, such as the height and undulation.

03 Test Sample



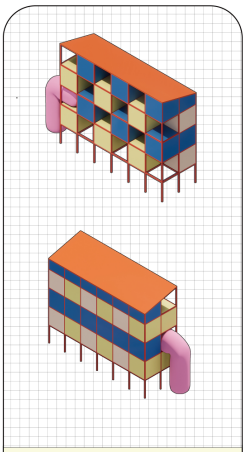
Fragment

'Fragment' type responds to the Hindu community and other areas with small scale but high density. One vertical block belongs to one family, so families in the same cluster share the ground floor but have their own roof terrace.



Tower

'Tower' type aims to show the possibility of adpating poeple who lived in low-rises before to a middle-rise life. In this type, there is always one floor completely functioning as play space.

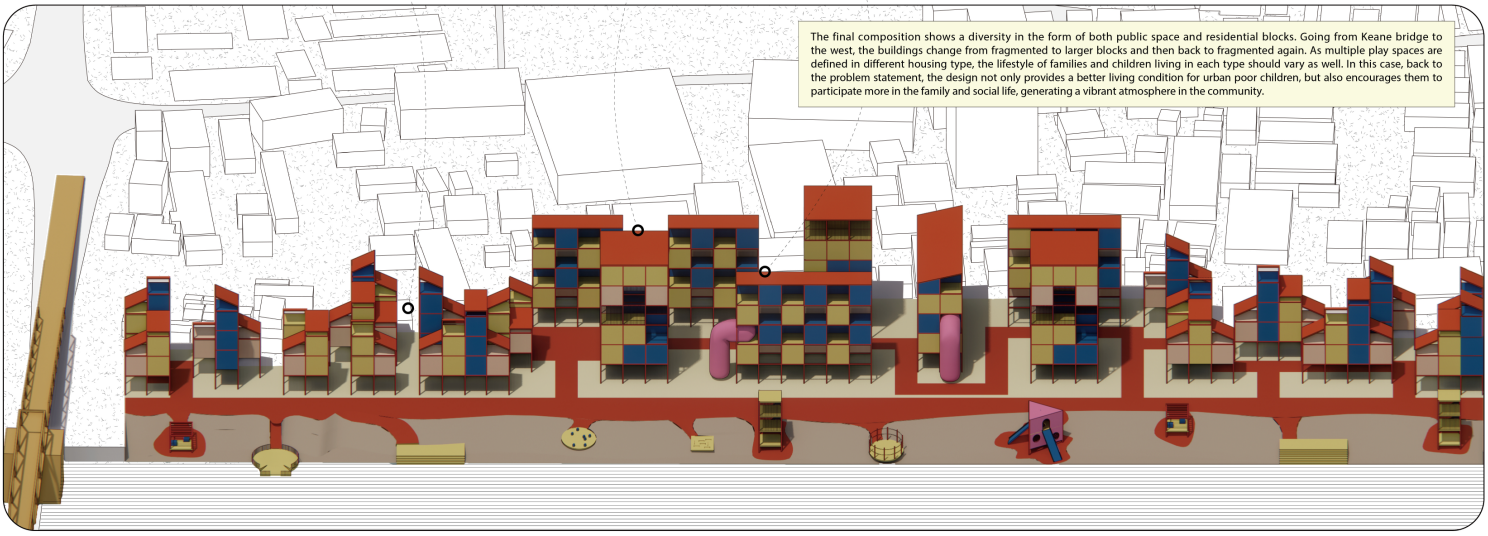


Linearity

'Linearity' type is usually with double rows on one floor, and the final outcome is that one side of the building is porous and the other is solid. The porous side always faces the river or a common space of the clustter.

Ground Floor Function

Considering the impact of flooding, all buildings are raised one floor up, so the ground floor of each building has a public function related to children's life, and these spaces consist of indoor and outdoor parts.



The final composition shows a diversity in the form of both public space and residential blocks. Going from Keane bridge to the west, the buildings change from fragmented to larger blocks and then back to fragmented again. As multiple play spaces are defined in different housing type, the lifestyle of families and children living in each type should vary as well. In this case, back to the problem statement, the design not only provides a better living condition for urban poor children, but also encourages them to participate more in the family and social life, generating a vibrant atmosphere in the community.

02 CHILD-RELATED RESEARCH

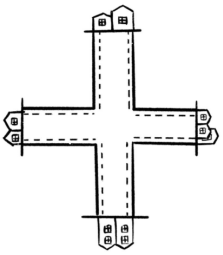
- Definition of child-friendly city
- Principles of child-friendly city
- 3 factors affecting children's liked space (economic level, age, gender)
- Conclusion: child-centric community in urban context

DEFINITION

WHAT IS A CHILD-FRIENDLY CITY?

In most of the current cases, 'child-friendly' is used more often than 'child-centric', so it is crucial to understand the difference between the two terms. The former one is to think as a child, but the latter one is to really hear from the children, to ensure the final results will benefit children directly. Therefore, 'child-centric' can be seen as a further step exploring what are the most urgant demand of children on the basis of 'child-friendly'. In UN Convention on the Rights of the Child, the criteria of a child-friendly city, town or commmunity include six key aspects: **safety, health, education, accessibility, play, inclusivity**.

Safety



Accessibility

Health

Play

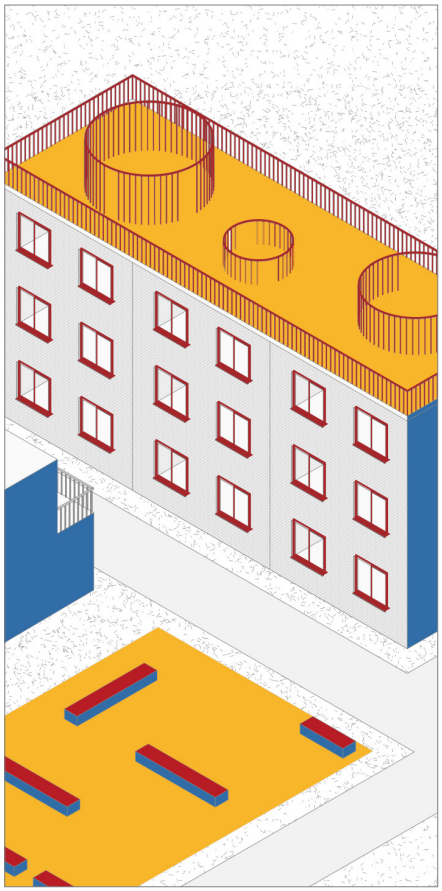
Education

Inclusivity

CASE STUDY

COPENHAGEN AS A KIDS' CITY

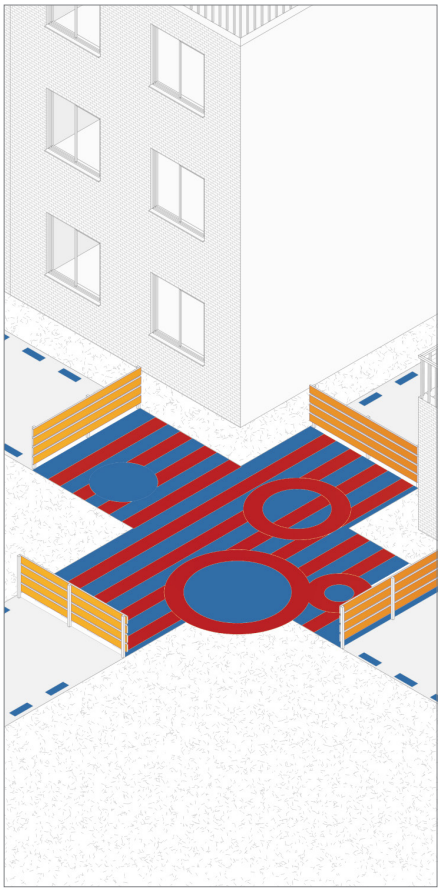
Copenhagen is known as a child-friendly city for years, and there are three main characteristics proving this title. As claimed in the International Convention on the Rights of the Child, play is one of the fundamental rights, and Copenhagen gives children two options for play. On the one hand, it turns some **outdoor public space** into children's park, and on the other hand, there are also **'staffed playgrounds'**, which are an indoor play space providing playing facilities for children as well as place for rest for their parents. Besides the well-designed play space, Copenhagen also applies **'street for kids'**, which are **car-free** to ensure a safe place for children.



'Outdoor children's park'

On the ground or roof top of buildings

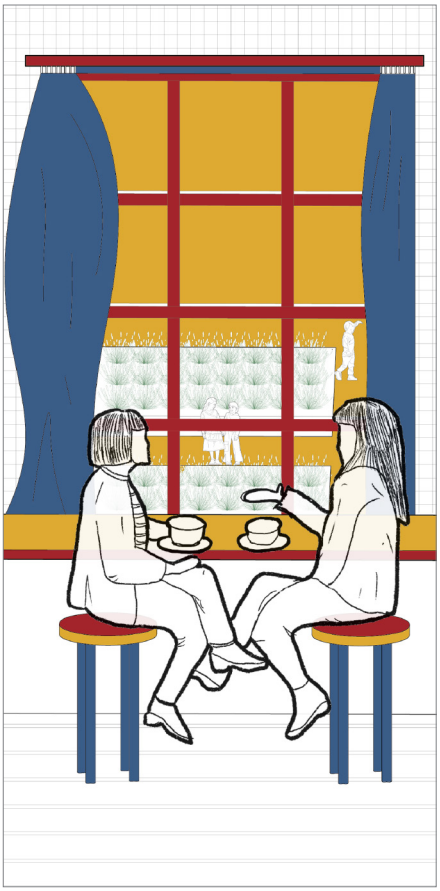
Integrate natural elements



'Streets for kids'

Car-free

Safe-linear play space on the ground



'Staffed playground'

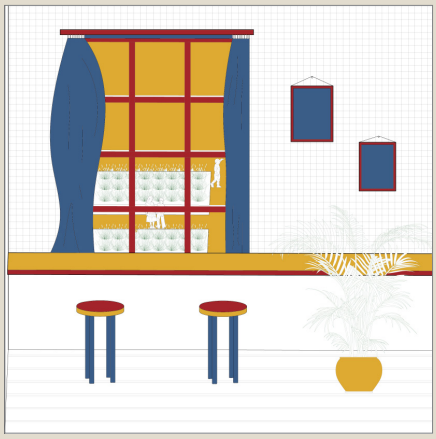
Indoor play space

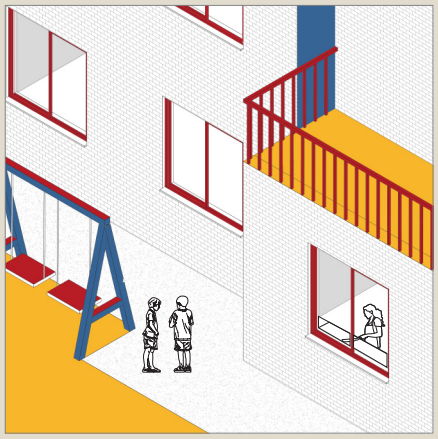
Space for parents to have a rest

CONCLUSION

PRINCIPLES OF A CHILD-CENTRIC CITY

Tim Gill advocates for a child-friendly urban planning and design in his book *Urban Playground: How child-friendly planning and design can save cities*, in which he also indicates that the housing and its surrounding environment should be taken into cosideration when designing a child-friendly community. Combining the principles from official definition of child-friendly city and case study, three key elements should be included in a child-centric design: **liveable housing**, where provides the basic needs of children; **walkable street,** which ensures the safety of children on the ground and links different public functions; **playful public space** including integrating engaging facilities and enough green spaces.

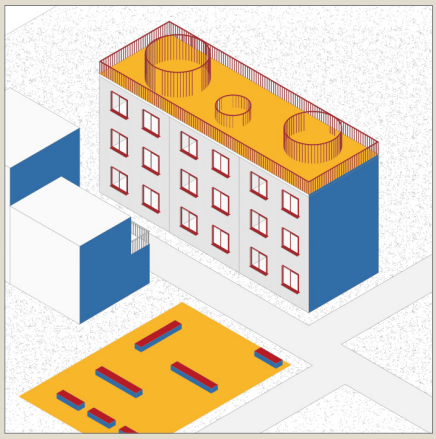


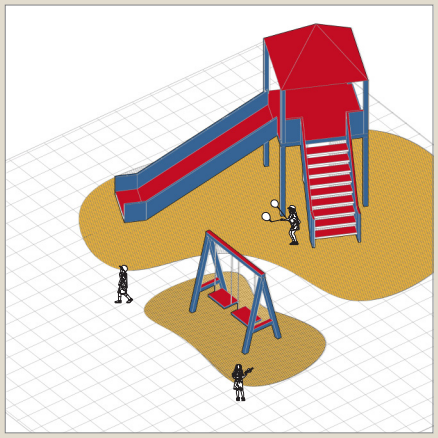


'Liveable Housing'

Ensure basic needs for children's life

Let parents keep an eye on children outside close by

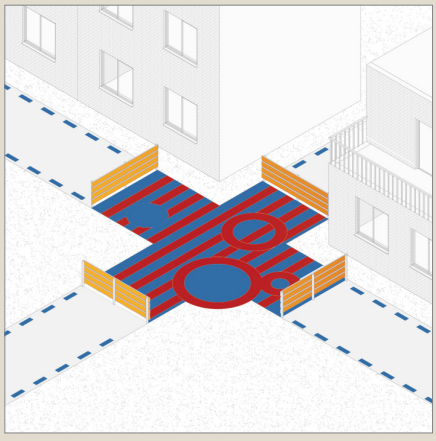


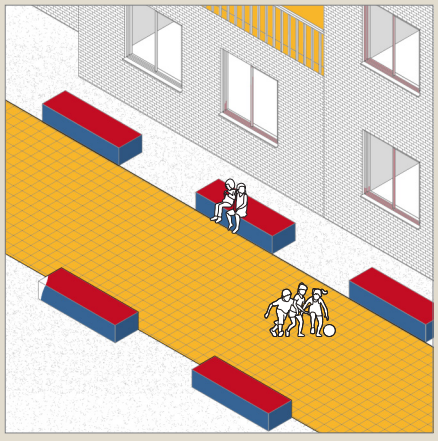


'Playful Public Space'

A diverse set of engaging public spaces for play;

Adequate green space.





'Walkable Street'

Safe networks for walking;

Easy access to public spaces (schools, shops, leisure activities)

CHILDREN'S LIKED SPACES

FACTOR 1 ECONOMIC LEVEL

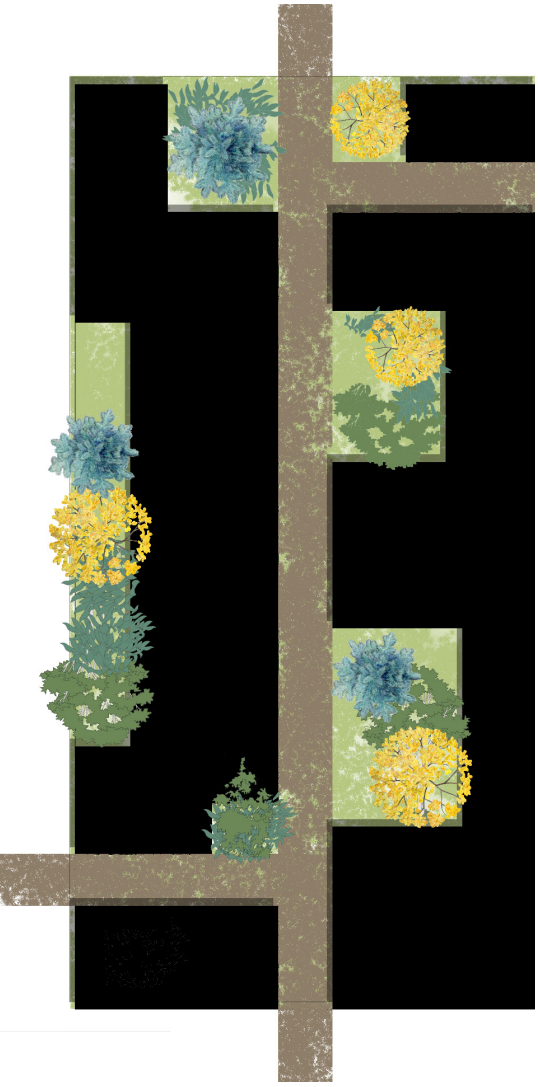
CHILDREN IN NON-CHILD-FRIENDLY CITIES

While a number of cities are already or in the process of moving toward a child-friendly city, still half of the world is yet to become child-friendly, and Sylhet is one of them. Therefore, it is significant to understand **what are children's liked and disliked places in these non-child-friendly cities**. Castonguay and Jutras (2009) demonstrat that compared to the richer neighbourhoods, children in poor neighbourhoods prefer to **stay outdoors with natural elements**. Additionally, Prakoso (2018) suggests in his research about urban Jakarta that children's liked places are **influenced by housing environment**. For instance, children living in low- or medium-density urban are usually have their activity area concentrated in a 'habitual range', which means **close to their home**, and they tend to **recreate the vacant land based on their own wills**; while in high-density area, since children cannot find any vacant land, they have to expand their activity area to an 'occasional range', which is usually not pretty close to where they live, but **the public functions are defined to meet children's needs**, such as shopping malls and sport fields. The site is a poor and densely-populated neighbourhood, so combining the information from the research above and the existing site conditions, the following three characteristics are considered to be included in the new project:

1 Provide outdoor spaces with vegetation

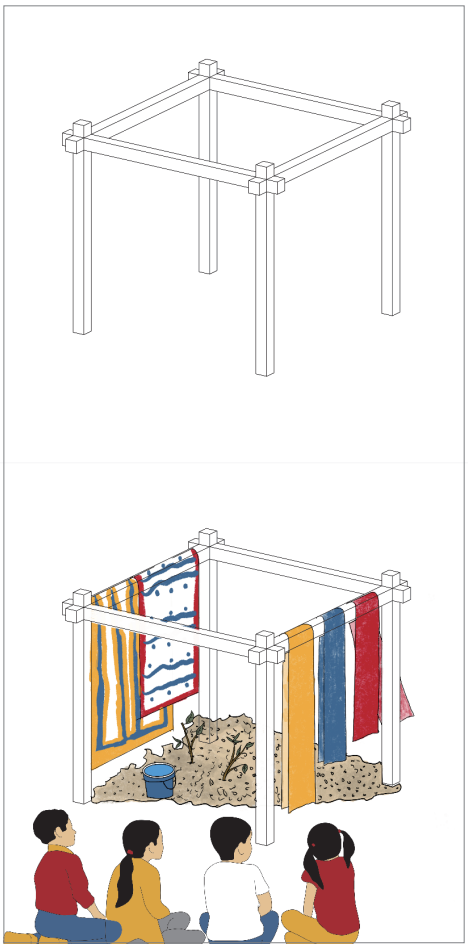
2 Provide possibilities for children to create their own spaces

3 Provide defined multi-functional spaces for children



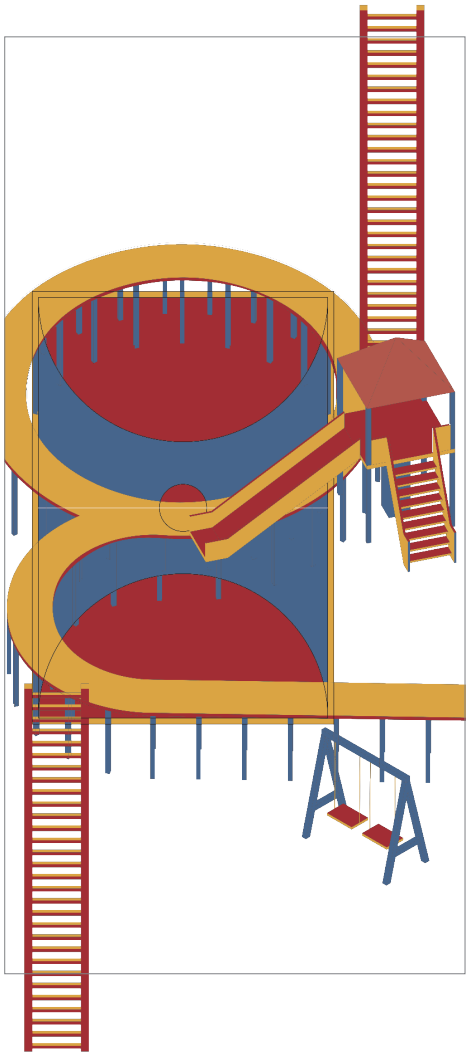
'Outdoor natural elements'

Provide enough outdoor spaces specially considering the vegetation



'Unspecified play'

Provide possibilities for children to create their own spaces



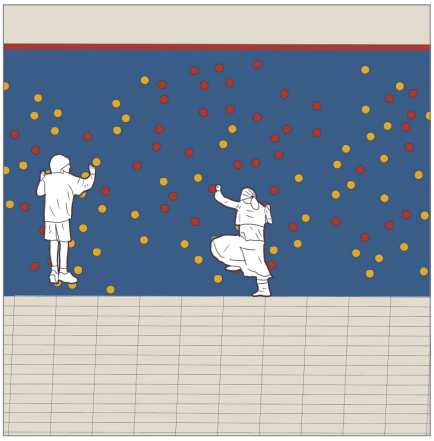
'Specified play'

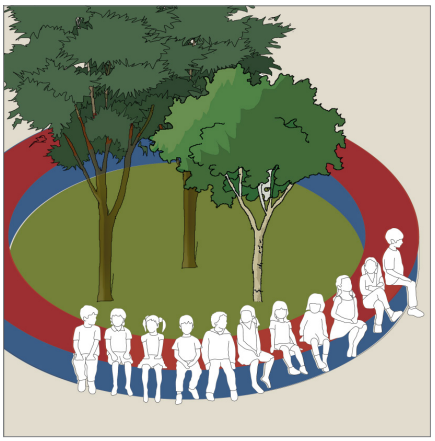
Spaces for defined functions that required by childhood development

CHILDREN'S LIKED SPACES

NECESSARY FUNCTIONS

For the specified play mentioned in the previous page, some functions are needed in childhood development and the spaces for them should be carefully designed. Basically, they can be divided into three categories, including **education, socialization and recreation**. The educational space includes reading and artistic functions to encourage children in both formal education and creative thinking; while for socialization, there should be both indoor and outdoor gathering space for children; finally, sport fields in a neighbourhood scale and spaces with natural elements within the cluster can be the possible space for recreation.





Education

Reading
(Indoor)

Art activities
(Indoor)

Socialization

Intergenerational play
(Indoor)

Socializing with peers
(Outdoor)

Recreation

Games with rules
(Outdoor)

Sport area
(Outdoor)

CHILDREN'S LIKED SPACES

FACTOR 2 CHILDHOOD DEVELOPMENT STAGES

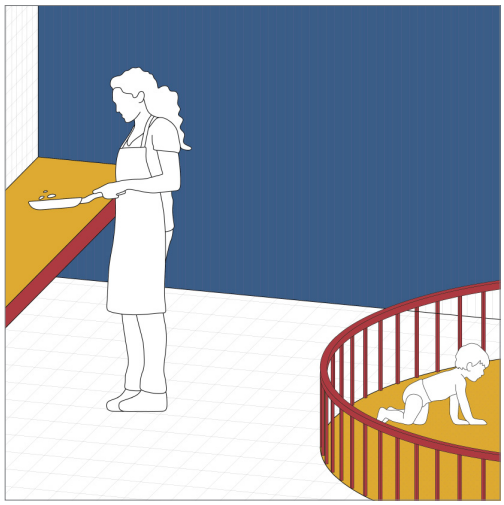
SPACE FOR DIFFERENT AGE GROUPS

Childhood can be divided into four stages acccording to the age, which are **infancy (0-2 years old), early childhood (2-6 years old), middle childhood (6-12 years old) and adolescence (12-18 years old)**, and each of them has characteristics in terms of the habits and the corresponding spaces they need. In the stage of **infancy**, children have a strong **attachment to their caregivers** (e.g. mothers in the case of Sylhet) and they start to know the world through **sensory experience**, so it is suggestive to **keep them at home** with sensory materials. From 2 to 6 years old, **relations between peers** are gradually formed, and children tend to immerse in **imagative play**, therefore, **common space close to their home** is needed. When it comes to **middle childhood**, children have more solid friendship and can understand rules, so **formal educational activties** start to play important role in their development. Finally, from **12 years old onward**, socilizing becomes more important for children, so they need larger spaces for gathering as a group. Additionally, the average height of children helps to understand the scale of space for each age group.

Infancy (0-2 years old)

Attachment to their mothers

Safe & closed indoor space



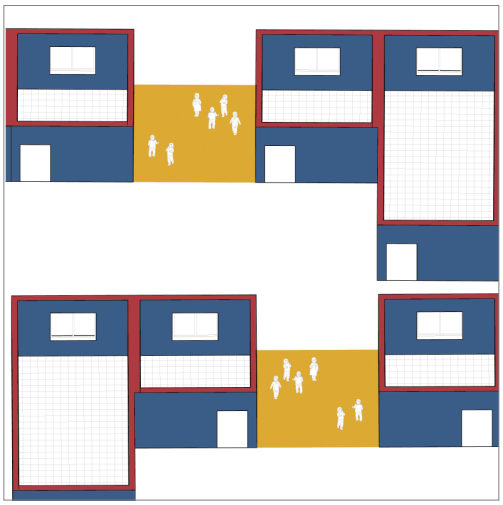
85.5cm 86.8cm

Average height of **2-year-old** children in Bangladesh

Early childhood (2-6 years old)

Relation with peers & skill development

Larger indoor space (for specific activities)



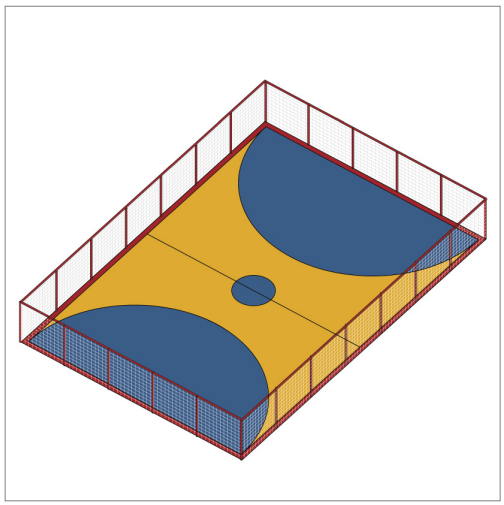
115.5cm 115.5cm

Average height of **6-year-old** children in Bangladesh

Middle childhood (6-12 years old)

Advanced skill developement

Outdoor space for specfic functions



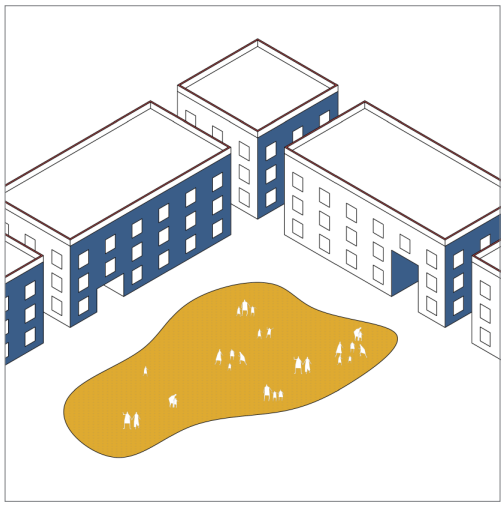
149.8cm 149.1cm

Average height of **12-year-old** children in Bangladesh

Adolescence (12-18 years old)

Independence & freedom

Free outdoor spacce for group gathering



163cm 175.7cm

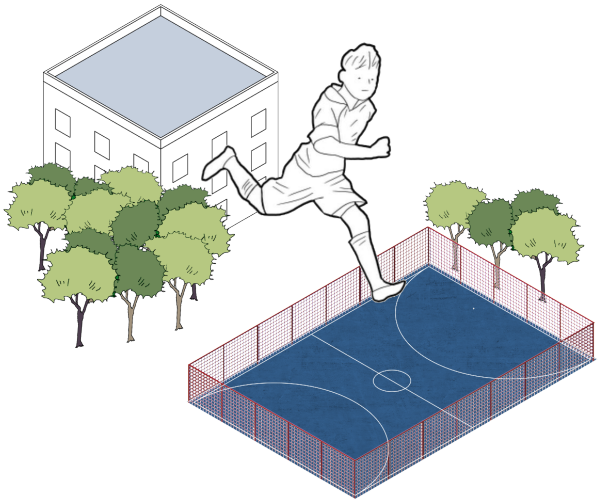
Average height of **18-year-old** youth in Bangladesh

CHILDREN'S LIKED SPACES

FACTOR 3 GENDER

SPACE FOR BOYS AND GIRLS

Research also shows that the preference of children on space is influenced by gender. Boys prefer sports and adventure activities, which require larger spaces, so they tend to go relatively farther from their home; on the contrary, girls prefer less sporty activities and also due to the local culture, they are not used to stay in very public places but usually appear around their home. Additionally, a research in environmental psychology demonstrates that the self-discipline of girls is strongly impacted by **near-home nature.** Therefore, the green spaces right outside their home help to build a healthy and effective life.



Girls

Less sporty activities

Near-home nature

Boys

Sports, adventure games

Away from home

CONCLUSION

CHIILD-CENTRIC COMMUNITY
IN URBAN CONTEXT

Liveable housing

Meet basic needs of life

Safe house for children

Playful public space

Scale of the space

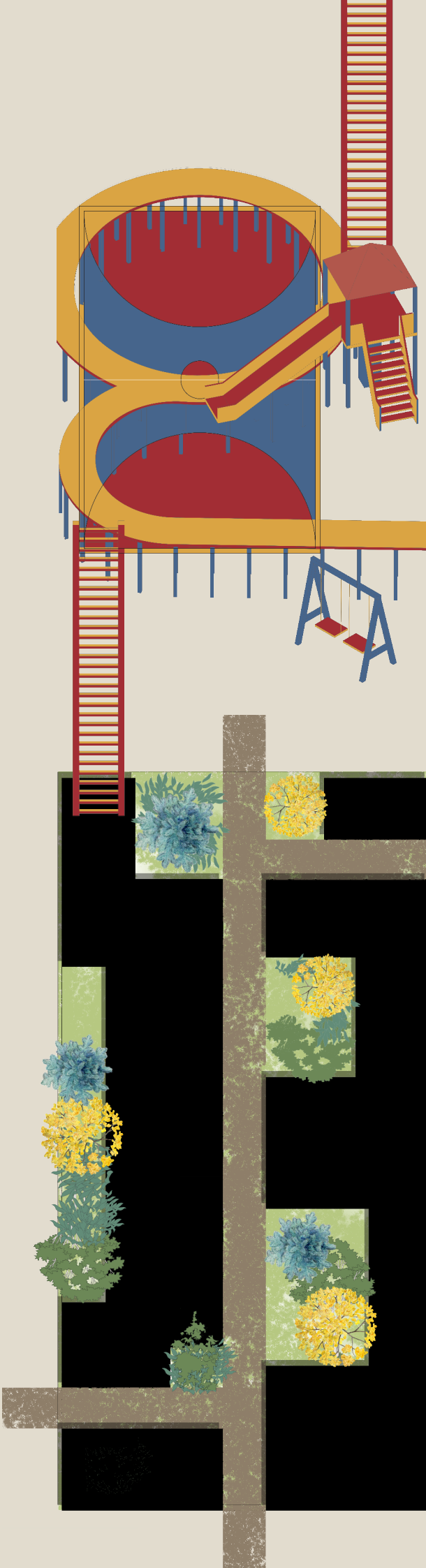
Indoor&outdoor play

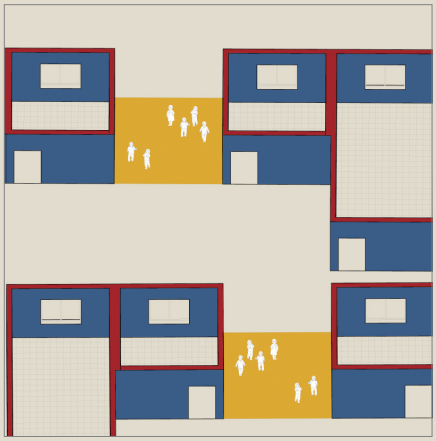
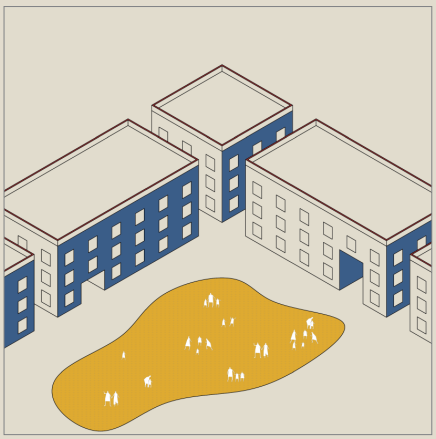
Flexible & specific functions

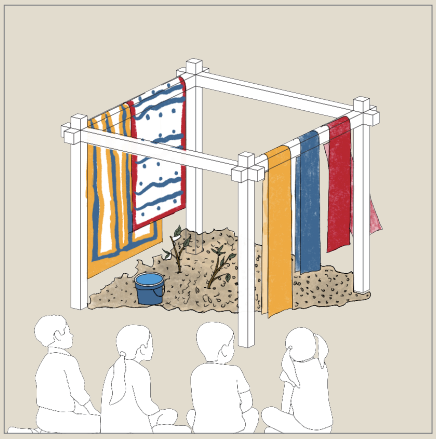
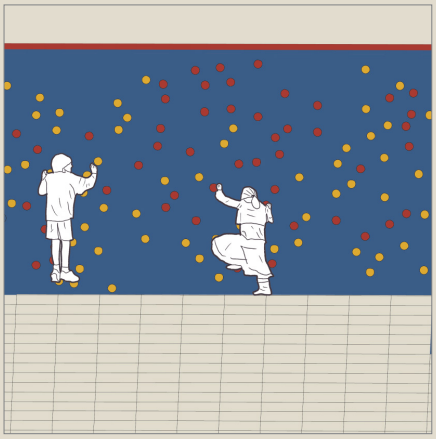
Walkable street

Accessibility to all clusters and amenities

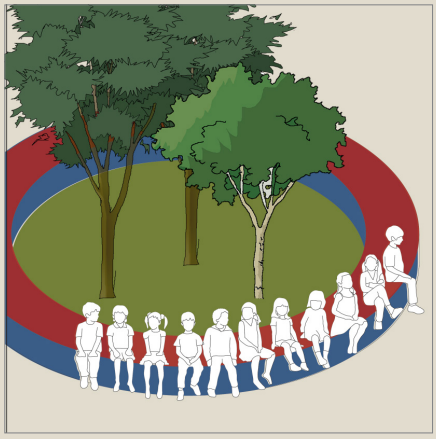
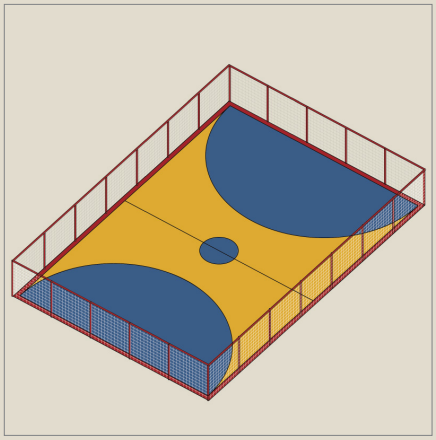
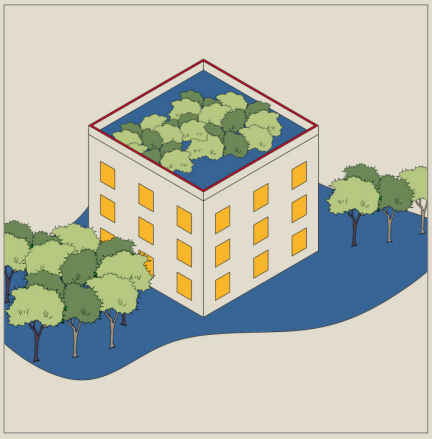
Safe walking/playing experience





03 SITE ANALYSIS

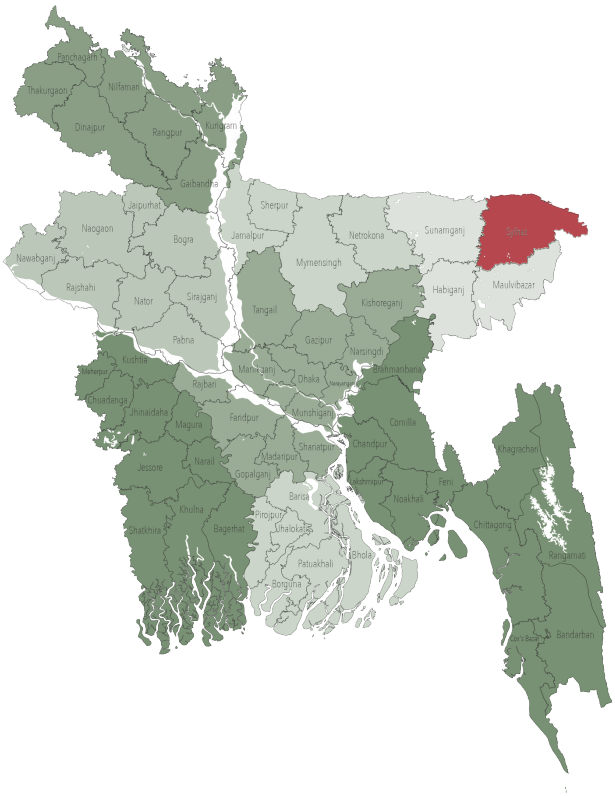
- Site information
- Contextual analysis
- Living mode analysis
- Conclusion: design goal of the project

SITE INFORMATION

COUNTRY, CITY, LOCATION

Sylhet division is in the northeast of Bangladesh, which is the **second most densely-populated area** after Dhaka, and sylhet district is the most densely populated among the four districts included in this division. Geographically, Syhlet is famous for its **natural water and wetland**, and with **heavy rainfall** in monsoon seasons, it is largely influenced by the climate and flooding.

The site is in urban context in the Sylhet city, **on the south bank of Surma river and next to the Keane bridge** (a pedestrian steel bridge, the landmark of Sylhet). As reported by the current residents, they have **suffered from rainfall and flooding** in monsoon seasons, but no effective actions has been taken yet.

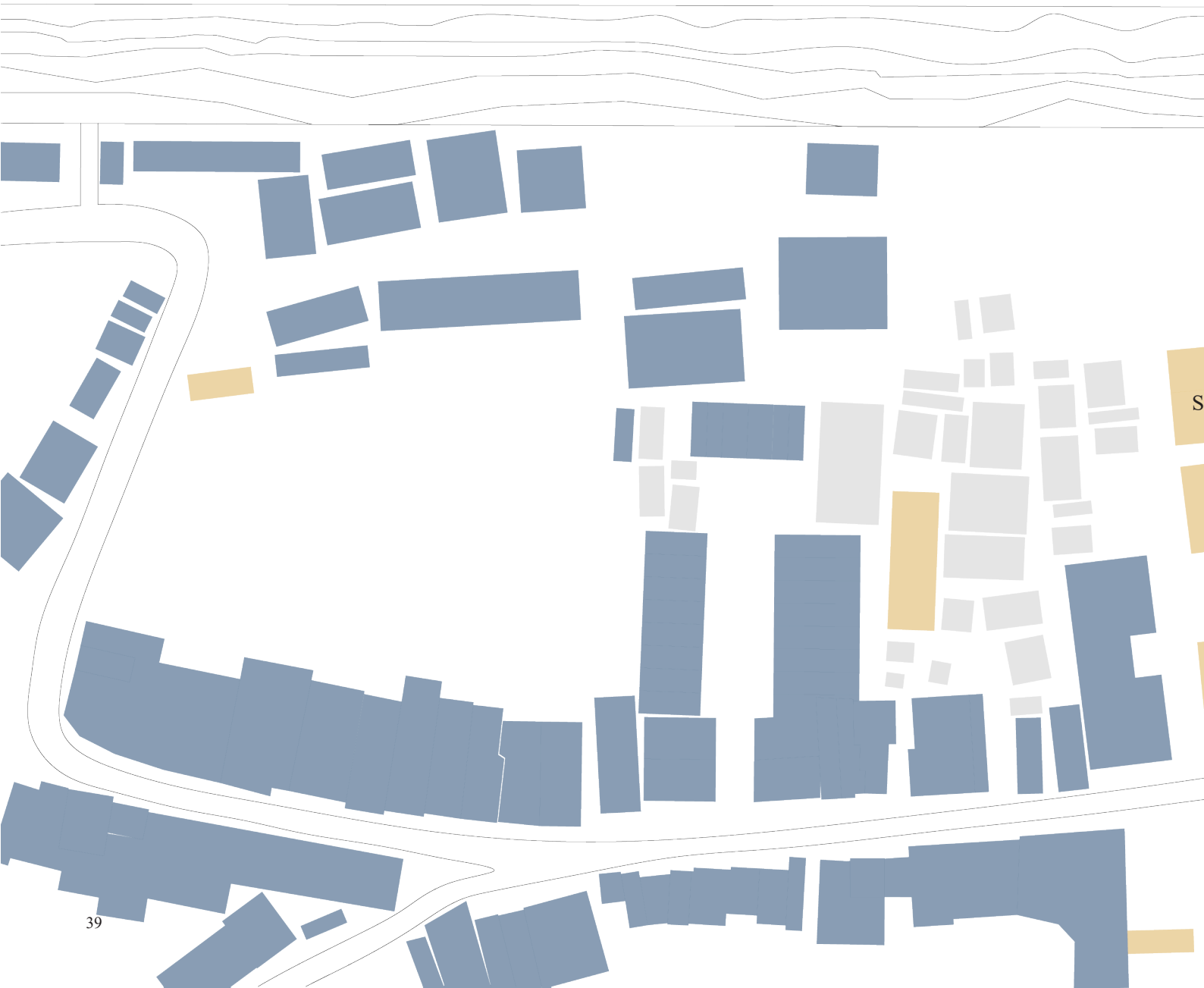


Relative location of Sylhet in Bangladesh
(excerpt from group booklet)

Site location in urban scale

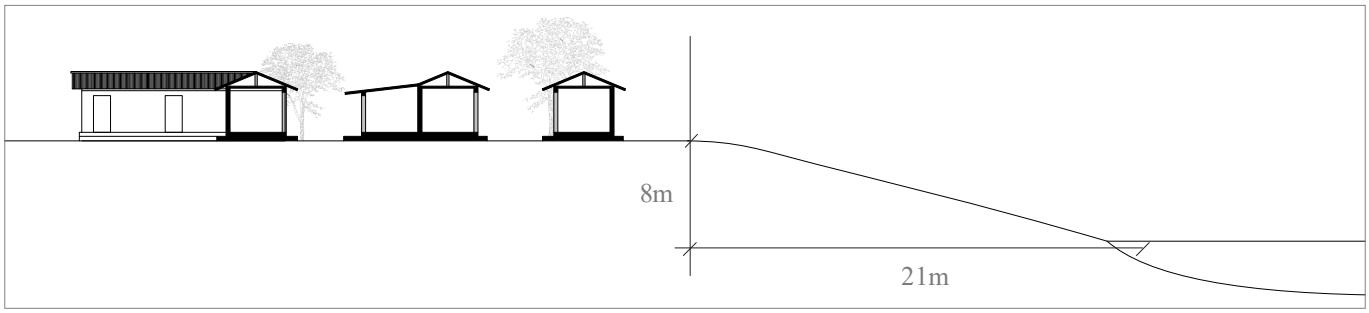
Relation between Keane Bridge and the site
(view from the other side of Surma river)

A natural slope on the north side of the site
(view from Keane Bridge)



On neighbourhood scale, there are existing public amenities around the site, including market, mosque and school. The ground floor of the buildings along the street is usually used for shops.

On the north side of the site, between the site and Surma river, the embankment is **a natural slope with 8 meters in height and 21 meters in length**, and the residents are using it for multiple purposes, incluing planting, doing laundry and barging.

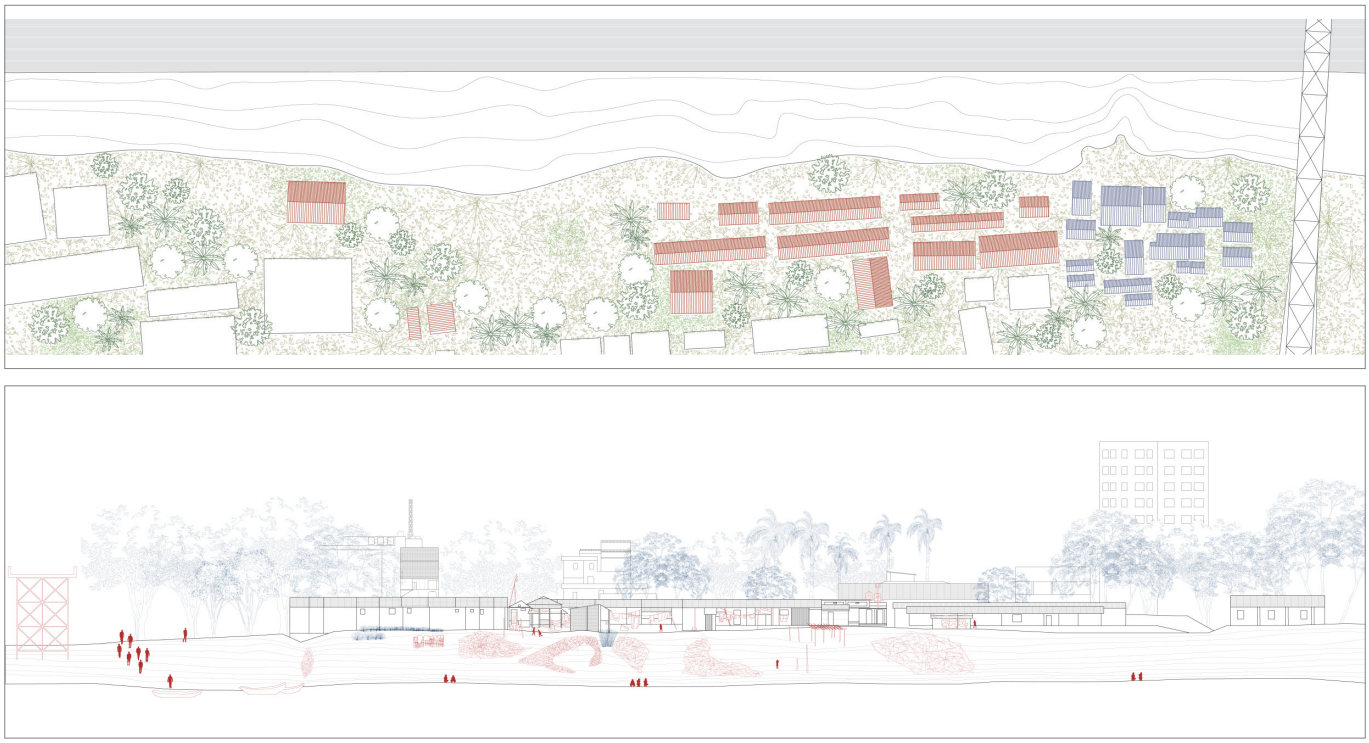


Site section
a(group work with Estelle Veron, Nynke Keulen and Veda Hepark)

CONTEXTUAL ANALYSIS

BUILDING, PEOPLE, LANDSCAPE

Currently, there are two religious groups living on the site, **20 Hindu families** and around **200 Muslim families**. All the houses are one-storey, but the houses for the two groups are quite different in appearance. The Hindu housing is in better condition, becuase it is provided by the government as a reward for working as sweepers. Their houses are constructed with more **permanent material and painted in various colors**, and there are also public spaces such as **small temple and courtyards** in the community. While the Muslim housing looks more shanty with **bamboo structure and corrugated iron sheet**, and the whole community is now sharing two toilet together.



Plan and elevation of the site

(group work with Estelle Veron, Nynke Keulen and Veda Hepark)

Housing of Hindu community

Housing of Muslim community

A small temple in Hindu community

Communal space in Muslim community

CONTEXTUAL ANALYSIS

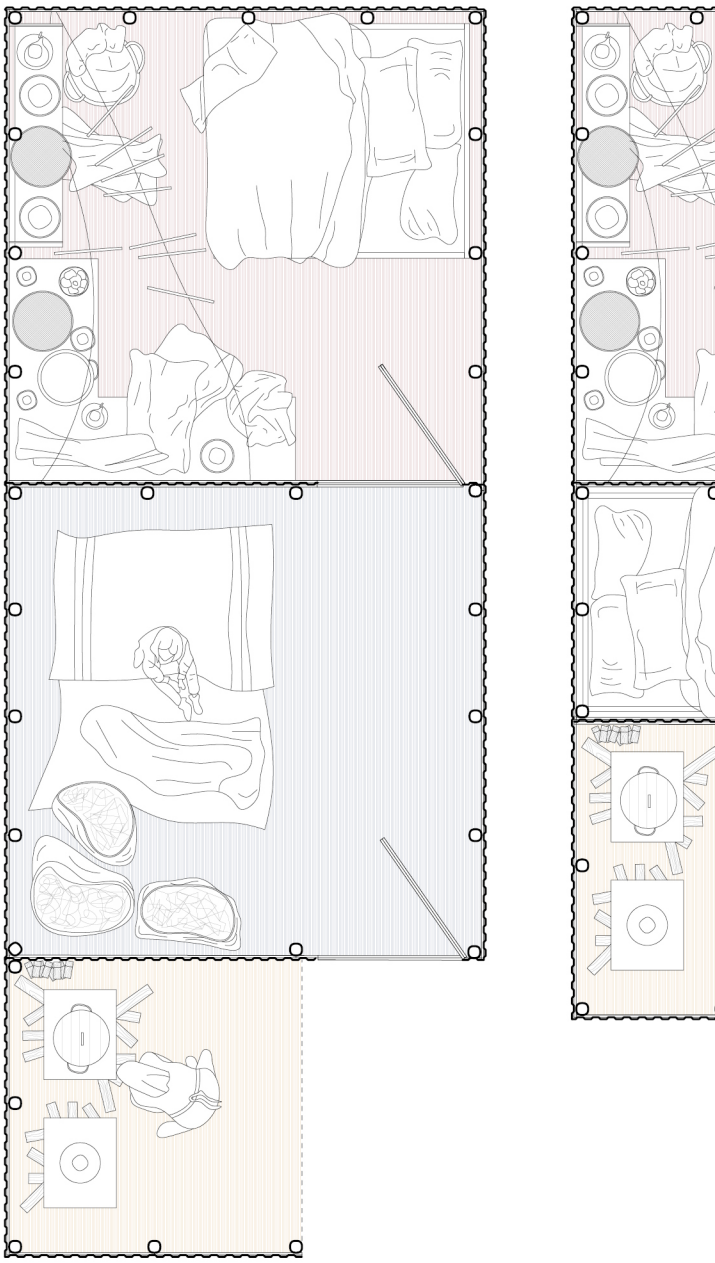
LAYOUT OF EXISTING MUSLIM HOUSING

According to the photos and videos taken during the fieldtrip, the existing housing shows a common pattern, and **3 principles** can be concluded.

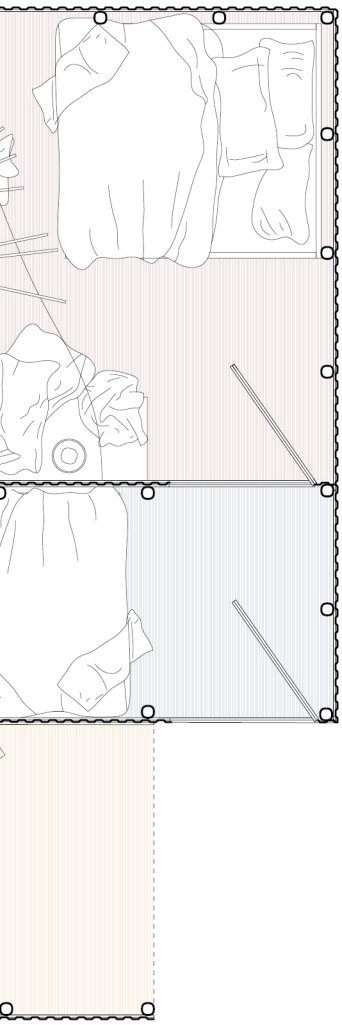
1 From the entrance, spaces in almost every house follow the sequence from public to private: **(shop/courtyard)-kitchen-flexible space (storage/bedroom/both)-main bedroom**;

2 Each function is a separate space and is connected linearly; the fuction and size of the room between kitchen and main bedroom vary from house to house;

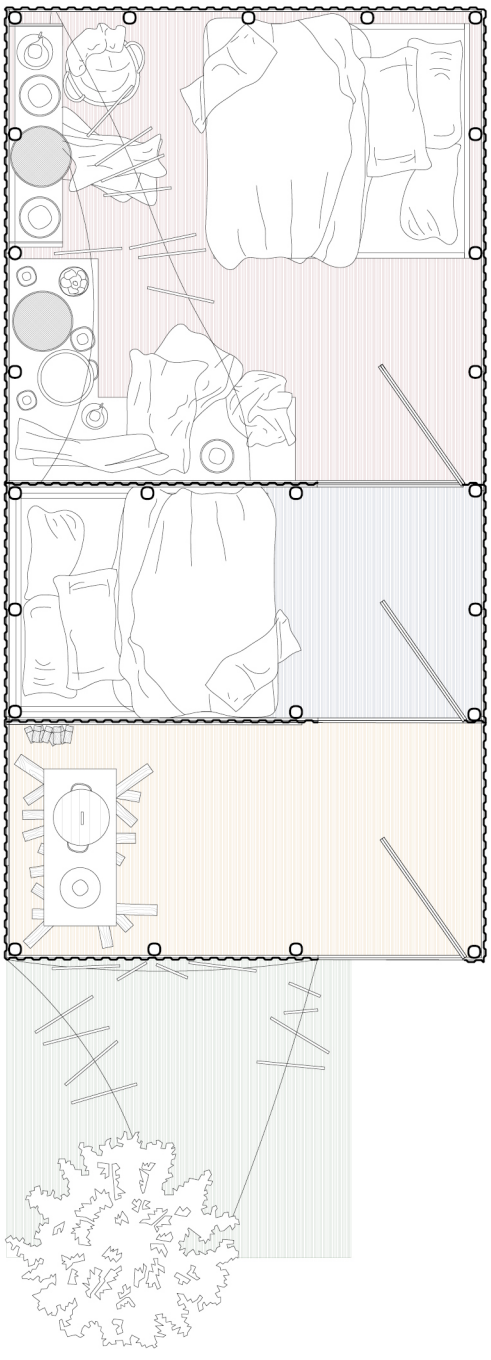
3 **2-3 families** (10-15 people) live in one house, 2-3 sqm/person.



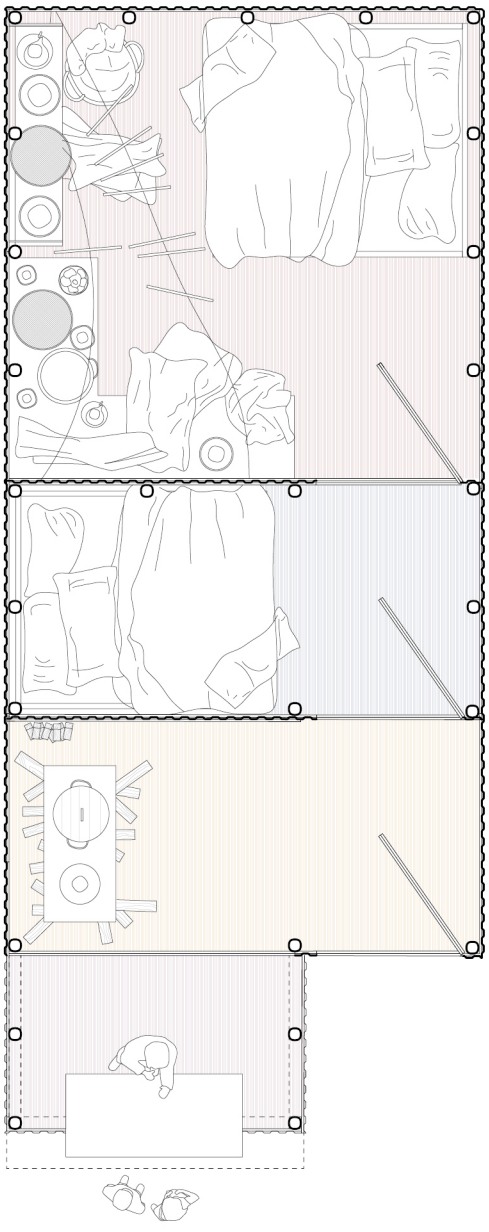
Main bedroom
Storage+bedroom
Kitchen



Main bedroom
Bedroom
Kitchen



Main bedroom
Storage+bedroom
Kitchen
Courtyard



Main bedroom
Bedroom
Kitchen
Shop

CONTEXTUAL ANALYSIS

DECONSTRUCT MUSLIM HOUSING UNIT

The results of the deconstruction of housing unit are five spatial prototypes, namely **courtyard, shop, kitchen and 2 rooms**, each of which has its features.

1 Courtyard: outdoor, shared by neighbours;

2 Shop: Semi-outdoor, exposed bamboo structure, extended to the street;

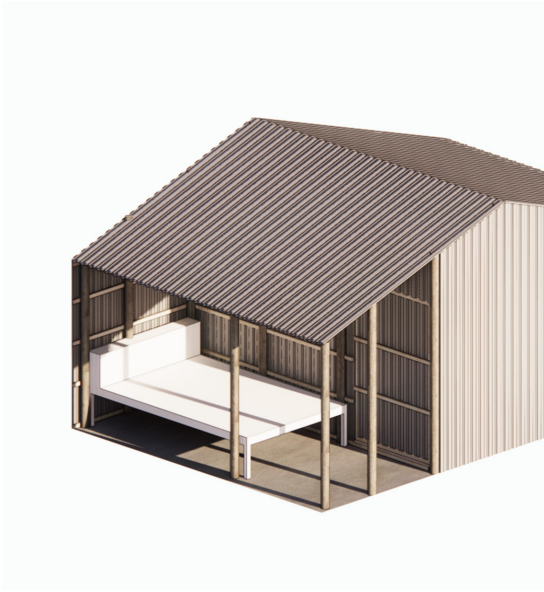
3 Kitchen: Semi-outdoor (in most cases) or indoor, separate room;

4 Room 1: Function and size vary in different houses, could be storage, living area or sleeping area at night;

5 Room 2: Main bedroom, the most inside and largest, for sleeping and other functions.

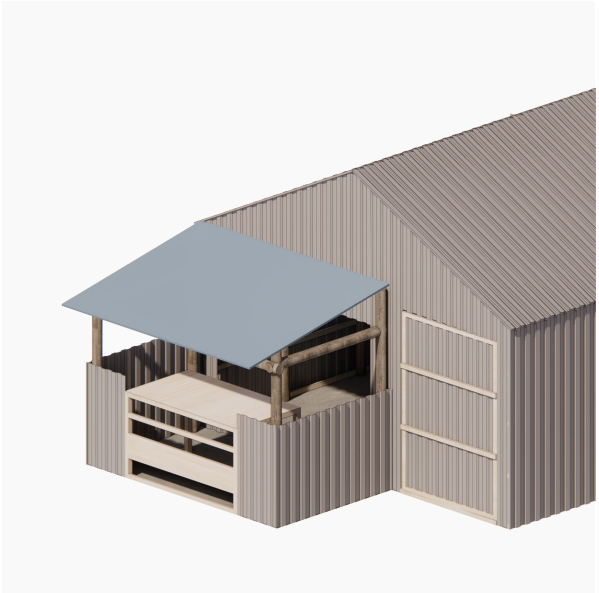
Front yard

Outdoor



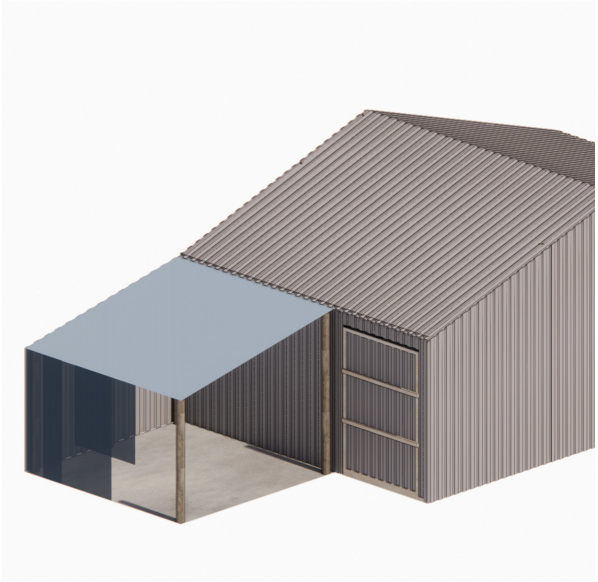
Room 2 (flexible function)

Indoor



Shop

Semi-outdoor



Kitchen

Semi-outdoor

Main bedroom

Indoor

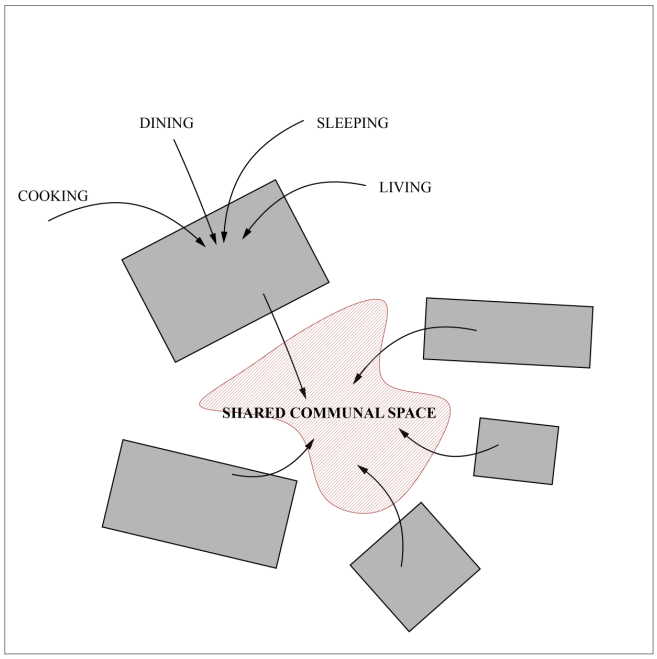
LIVING MODE ANALYSIS

TARGET GROUPS
AND THEIR LIFESTYLES

Depending on the income level, the target groups can be divided into low-income and middle-income.

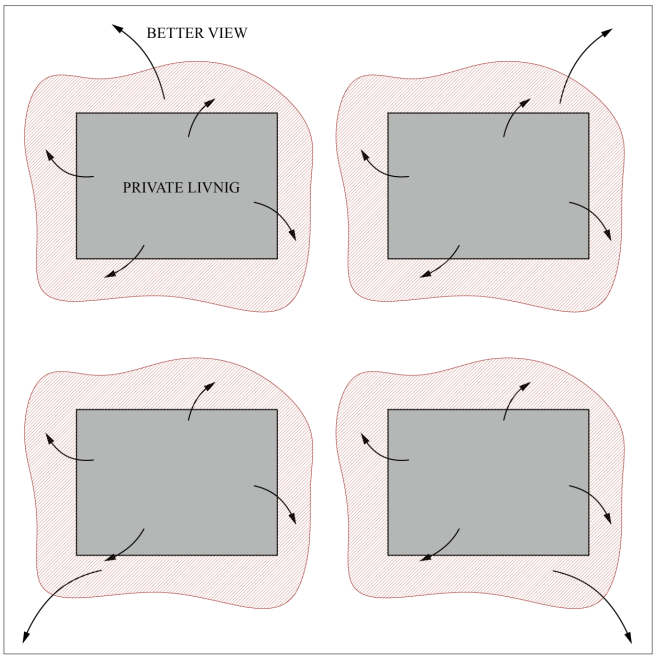
Low-income family: smaller houses, more people (6-8 people), relation with the ground, shared spaces in housing and community;

Middle-income family: larger houses, fewer people (4-5 people), prefer privacy, better view to the surroundings.



Low-income

Connection with the ground
shared living space



Middle-income

Better view to the surroundings
Better furnished

Large family

6-8 people
0-1 separate bedrooms

Small family

4-5 people
2-3 separate bedrooms

Design goal

- Location: A new city imag
- Residents: Co-living of di
- Relation wih Surma river

ge

Riverside elevation

fferent groups

Hindu: possible to upgrade+provide extra amenities

Low-income group: community-based living

Middle-income group: private living

r

Embankment

Building facing the river

04 CASE STUDIES

Urban Strategy

- Sheikh Sarai Housing Complex, 1970-1982
- Zakir Hussain Co-operative Housing, 1979-1984
- Shree Town, 2020
- SOS Children's Village in Jordan, 1991
- SOS Children's Village in Djibouti, 2014

Housing unit

- Tara Housing, 1975-1978
- CIDCO Housing, 1988-1993
- Housing Apartment at Bedade Nagar, 2022
- Kanchanjunga Apartments, 1983

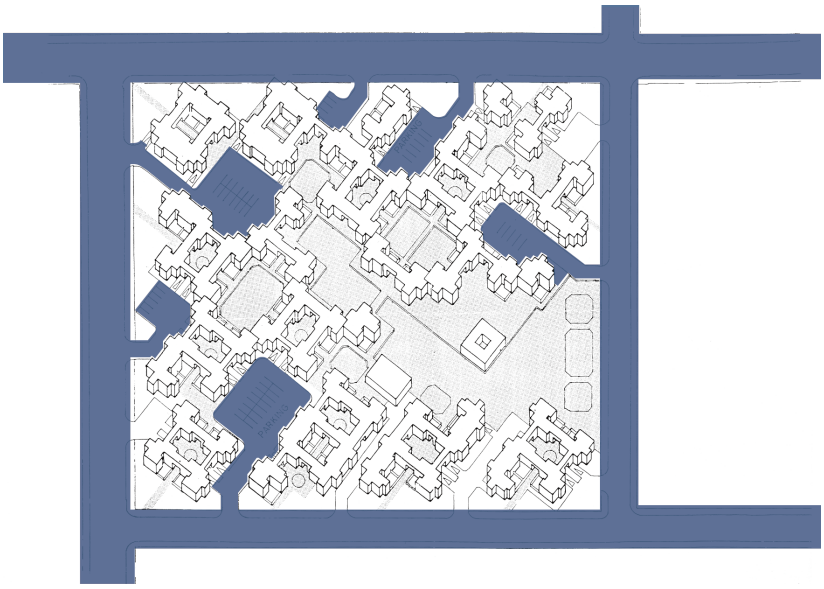
SHEIKH SARAI HOUSING COMPLEX

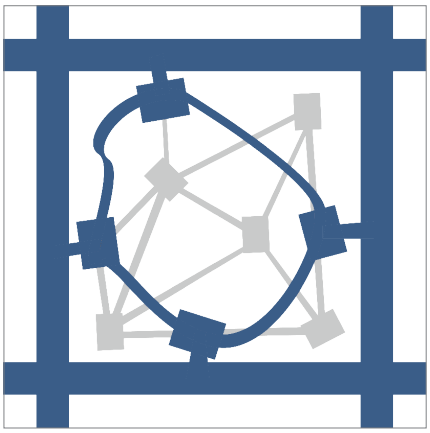
1970-1982, New Delhi, Raj Rewal

100 dw/ha

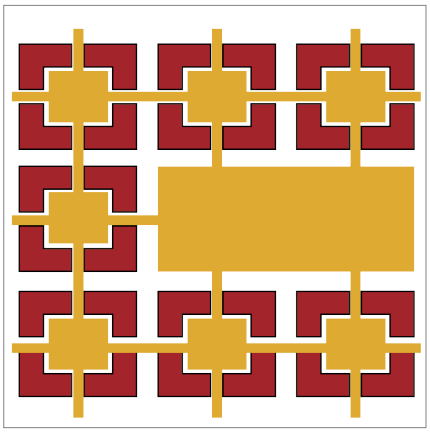
The housing complex is a high-density, low-rise project in the south of New Delhi. It provides 550 dwellings in total for both **low- and middle- income families**. In terms of the planning, the **roads for vehicles are arranged on the peripheral** ending wtih several open parking spaces, while the **inner streets are basically served for pedestrians**. **Commen spaces of various scales** are designed to encourage different activties and are **interrelated by a spine**. Each cluster is centered on a courtyard, with **roof terraces** on the top**,** and there are **slits on the facade** to facilitate natural ventilation as well as maintaining the privacy. The project is constructed with **concrete frame structure with brick infill covered with rough cast plaster**.

(Image source: https://rajrewal.in/wp/portfolio/sheikh-sarai-housing-new-delhi/)





Vehicle and pedestrian access



Interrelated public spaces in different scale

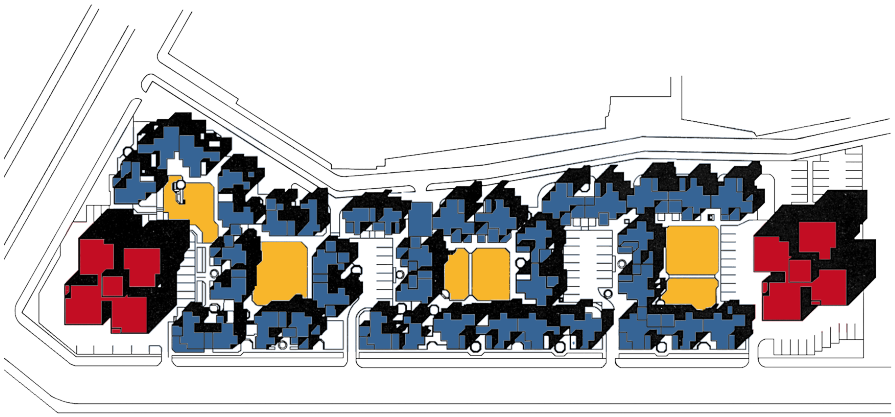
ZAKIR HUSSAIN CO-OPERATIVE HOUSING

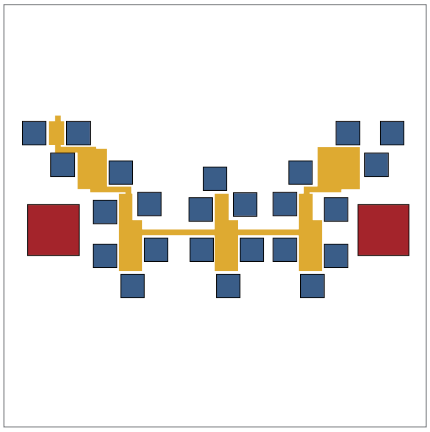
1979-1984, New Delhi, Raj Rewal

130 dw/ha

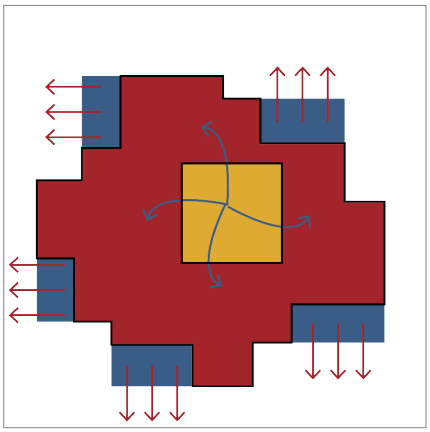
This cooperative housing project is also a high-density, low-rise project in the south of New Delhi. 204 apartments are provided through the new project for a Muslim community. The site is a linear plot with a dense neighbourhood on its east. The project has six entries, all of which are directly linked to a parking lot. There are two types of cluster, namely **low-rise (4-storey) in the middle and tower (8-storey) on both ends.** The low-rises are **arranged around either commen spaces or green spaces**, and have 16 housing types in total with small floor area (50-100 m^2); while the tower has 8 unit variations ranging from 130 to 160 m^2, and at the corners of the block, there are **balconies in double height**.

(Image source: https://rajrewal.in/wp/portfolio/zakir-hussain-co-operative-housing/)





Layout of two cluster types



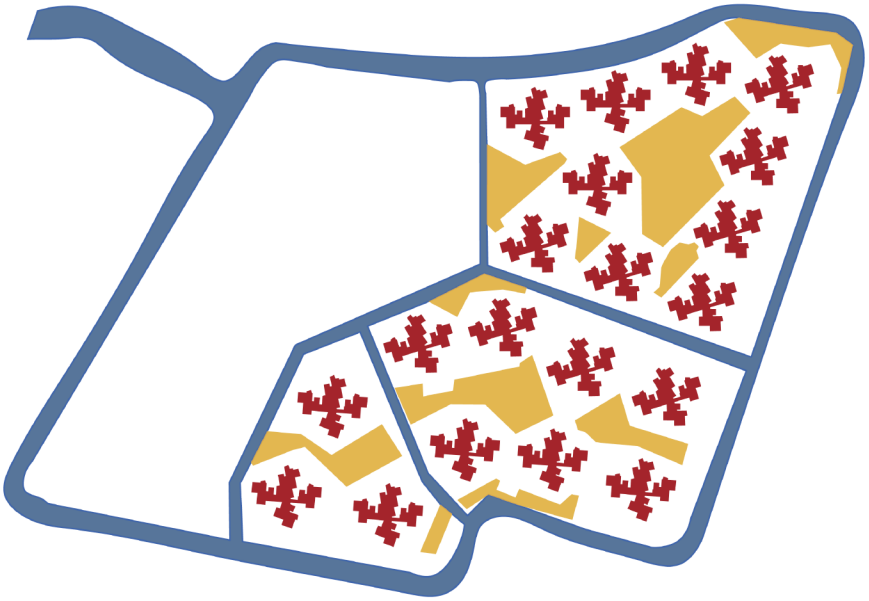
Public space in a cluster

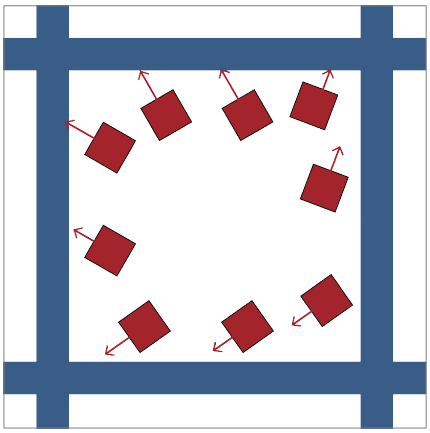
SHREE TOWN

2020, Raipur, VSanjay Puri Architects

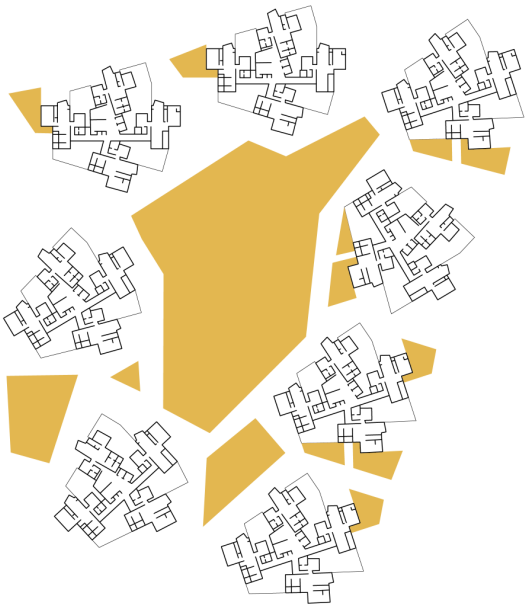
This is a latest project compared to the previous cases located 3 kilometers away from the city for the employees of a cement factory. The overall master plan is more like **a park with various landscape features**. The layout of the buildings is irregular, which results in common spaces with **diverse spatial patterns** in every building. Each residential block has a **sheltered courtyard and garden spaces** in between, and three apartment types (studio, 2-bedroom and 3-bedroom) are provided. In each apartment, there are **recessed windows and sheltered balconies**, concerning the cross ventilation in response to the local climate. Additionally, the project is designed with water reuse and recycle plant, showing the consideration on **rainwater harvesting and treatment** in master planning.

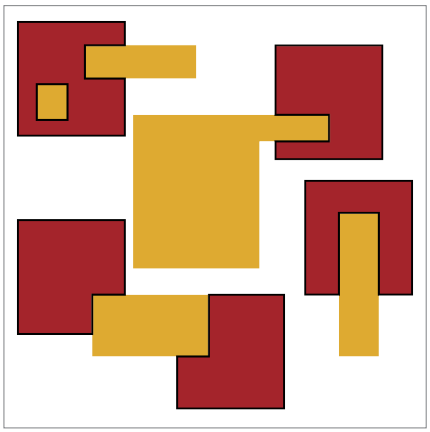
(Image source: https://sanjaypuriarchitects.com/architecture/township/shree-township-raipur/)





Irregular configuration





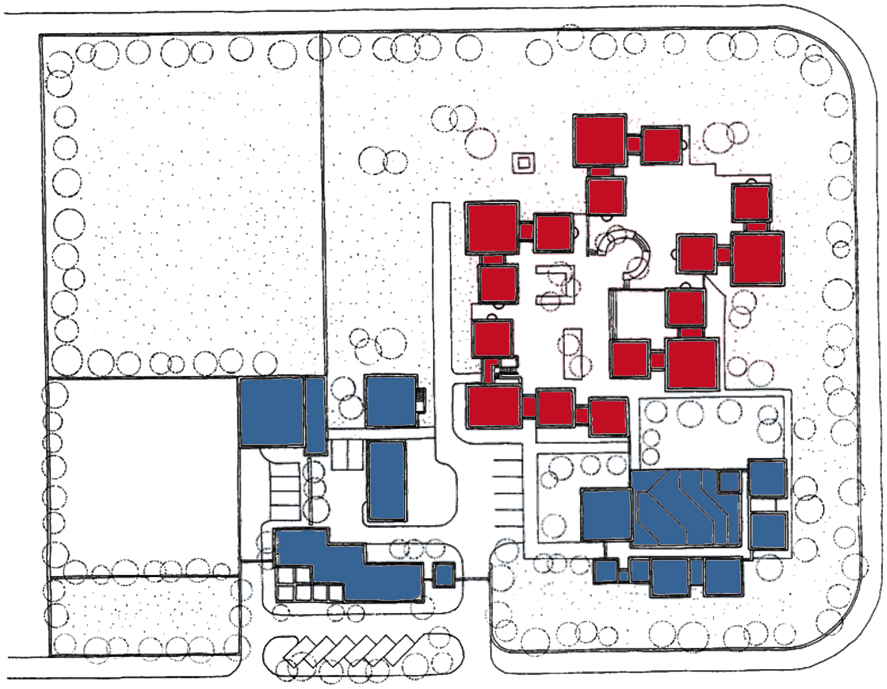
Relation between green space and housing

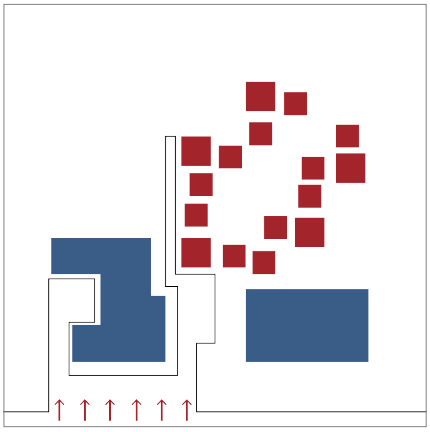
SOS CHILDREN'S VILLAGE IN JORDAN

1991, Aqaba, Jafar Tukan & Partners

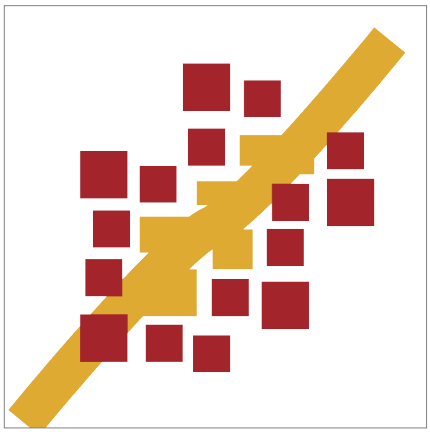
This is an orphanage consists of nine 2-storey buidlings located in Jordan in middle east. The main functions included in the project are: houses, kindergarten, administration and sport area, all of which are **linked by pedestrian pathways**. Buildings with more public functions are arranged closer to the entrance, while the more private ones are inside the village. Each house has three bedrroms, a caregiver's room, two bathrooms, a dining room and a kitchen with stores. In between the buildings, **outdoor areas** are specially designed, involving playgrounds, parking and landscape. **Precast concrete filled with local mansonry** is used as the main construction materials, and additional **light wells and ventilation towers** are applied in the project.

(Image source: https://the.akdn/en/how-we-work/our-agencies/aga-khan-trust-culture/akaa/sos-childrens-village)





Public & private function distribution



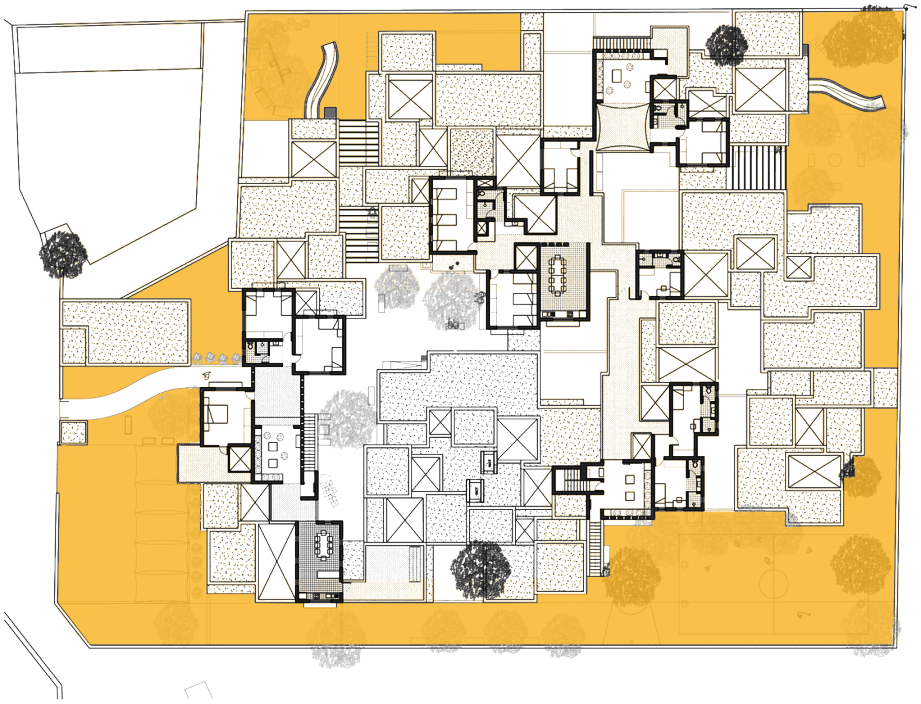
Relation among clusters

SOS CHILDREN'S VILLAGE IN DJIBOUTI

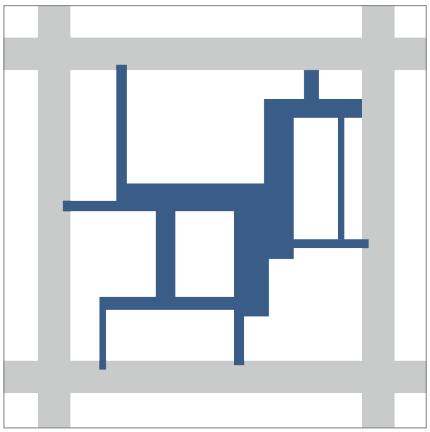
2014, Tadjoura, Urko Sanchez Architects

Another children's village project is in Djibouti, East Africa. It has more or less the same functions as the previous case, but there are 15 houses in total. The houses are distributed less regularly, so that **the witdth of the pathways varies** everywhere. Three main ideas can be concluded for the project:
1 the streets and squares are **car-free**, for children to play;
2 providing **abundant open spaces** in the clusters to connect inside and outside space;
3 **vegetation** as an important element in the design; **natural ventilation towers** are applied.

(Image source: https://www.archdaily.com/773319/sos-childrens-village-in-djibouti-urko-sanchez-architects?ad_medium=gallery)



Playground at the corner



Pedestrian pathway in different width

CASE STUDY ON URBAN STRATEGY

CONCLUSION:
PLANNING & CLUSTERING PRINCIPLES

Based on the three cases on affordable housing in South Asia and two children's social housing projects, the following conclusions can be summarized:

1 Target group: mix-income group;

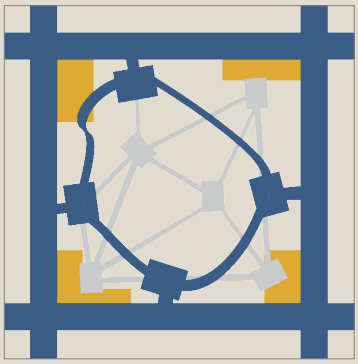
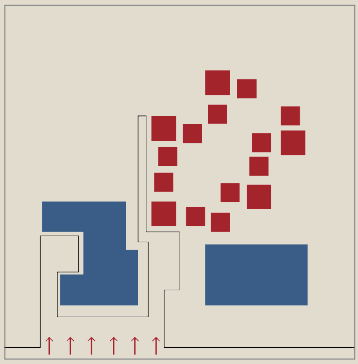
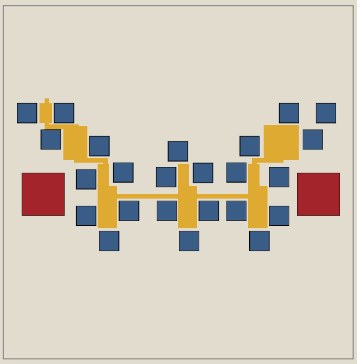
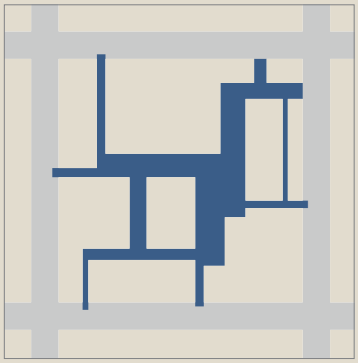
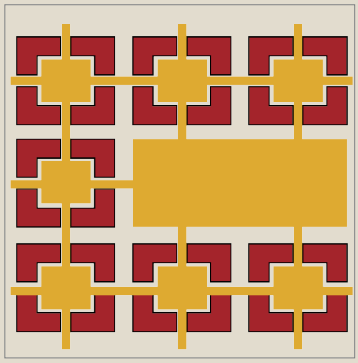
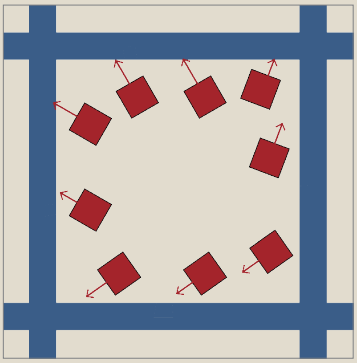
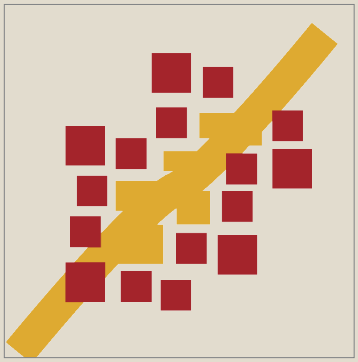
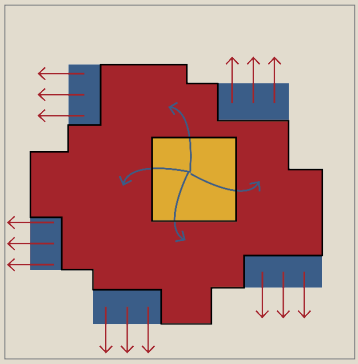
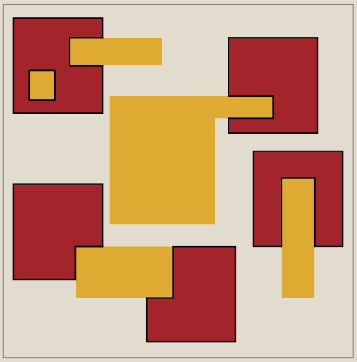
2 Planning: large public function/landscape/residential clusters arranged along the spine;

3 Networking: roads for vehicles in peripheral linking the parking lots, pedestrian paths between clusters (fit for children's needs);

4 Clustering: centered on a courtyard, living space facing the courtyard, bedrooms facing outward;

5 Cluster typology: multiple types for each income group;

6 Construction: concrete structure+brick infill, breathing facade, natural ventilation tower.

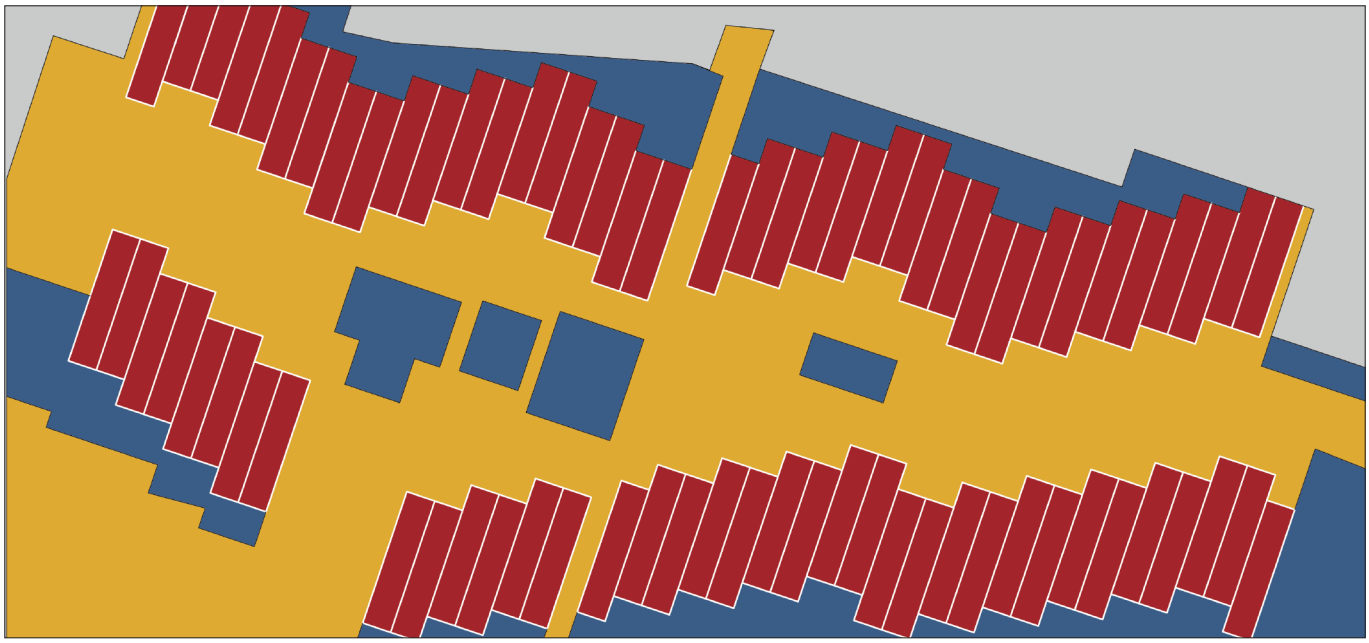
	Networking	Public space	Cluster
Neighbourhood			
Cluster distribution			
Inside cluster			

TARA HOUSING

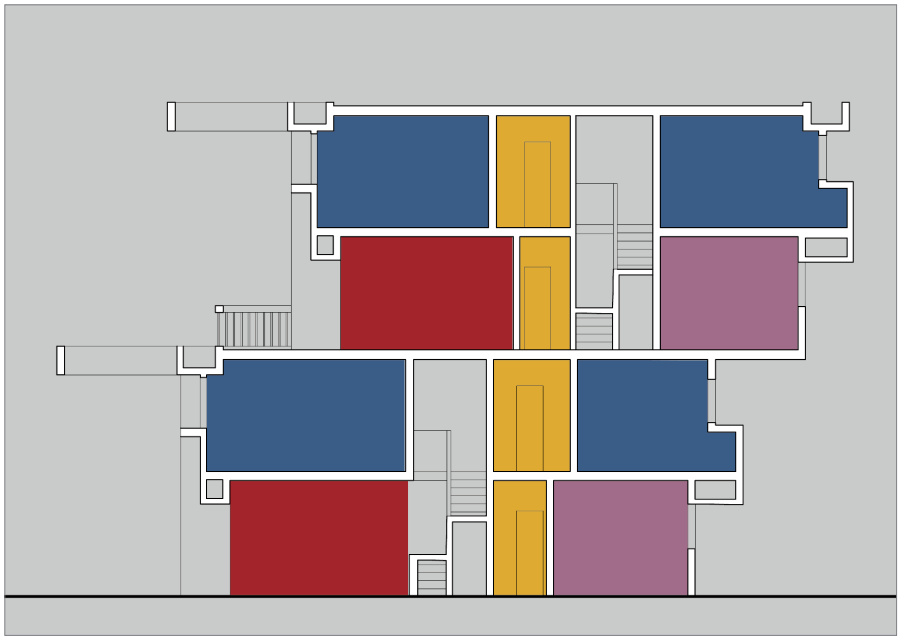
1975-1978, New Delhi, Charles Correa

125 dw/ha

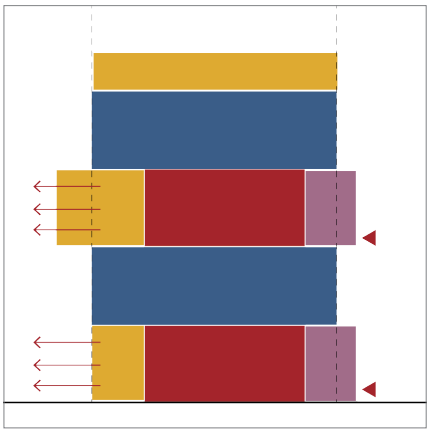
Tara housing is an early project by Charles Correa in New Delhi, India. It is a high-density project with 125 dwellings and 375 people per hectare. The project consists of two rows of residential building (4 storeys), with **a linear central courtyard** in between, but turning backward to the two streets to avoid noise. There are two housing types: a **2-bedroom type (84 m^2) and a 3-bedroom type (duplex, 130 m^2)**. One staircase is shared by every two uints. These units are grouped in different ways into larger blocks, each of which may consist of only 2-bedroom units, only 3-bedrooms units, or both. The upper levels **have a set back on the street side**, so that the courtyard side can be shaded properly.



Cluster layout: relation with street and courtyard



Section of a single block



Setback, terraces and function distribution

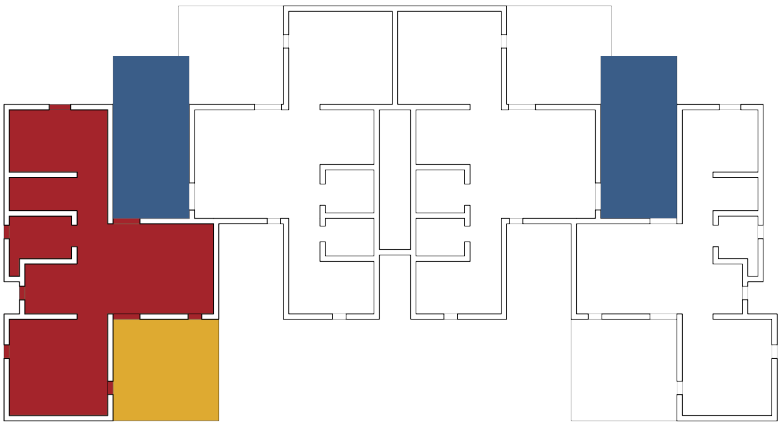
CIDCO HOUSING

1988-1993, Navi Mumbai, Raj Rewal

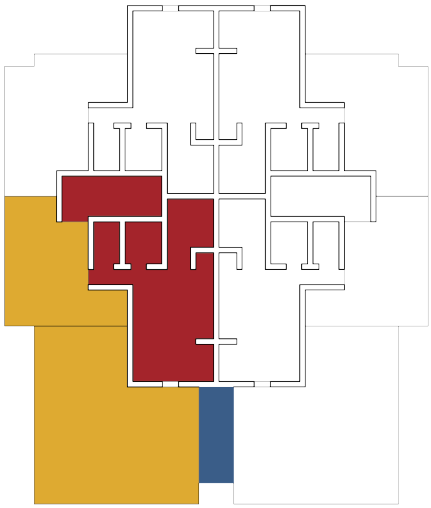
55 dw/ha

The project is located in Belapur Central Business District in Navi Mumbai, consisting of 1048 housing units in total, with the floor area ranging from **18 to 105 m^2**, most of which are **1- to 2- room units**. The units are arranged differently based on the unit types in terms of orientation, circulation and clustering patterns. Through the various layout, **a network of courtyards and terraces** is formed which fosters a sense of community.

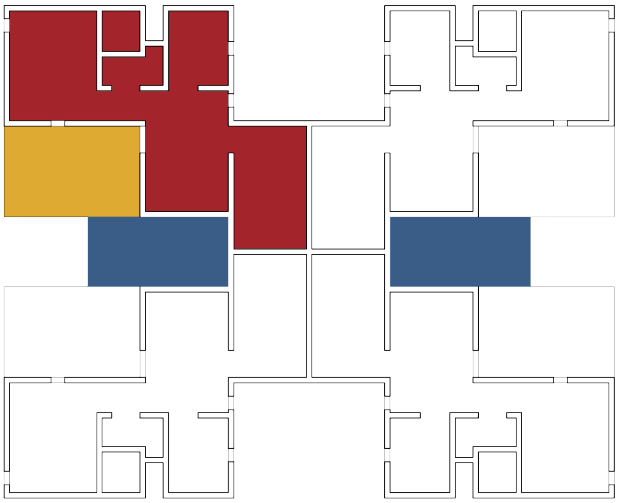
(Image source: https://rajrewal.in/portfolio/cidco-housing-navi-mumbai/)



Type 1



Type 2



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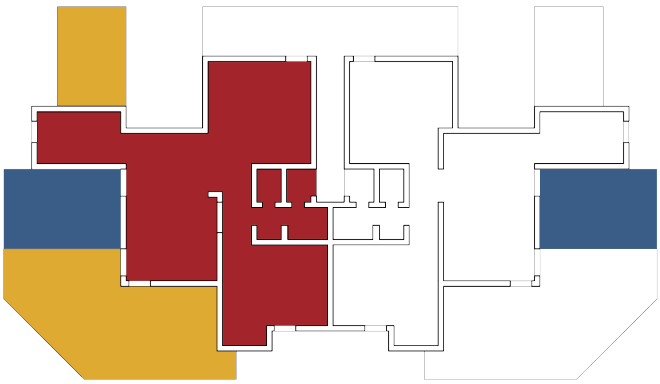
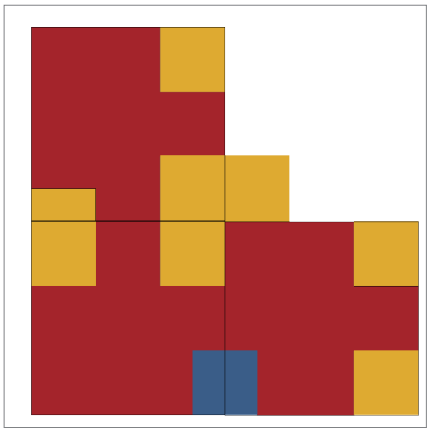
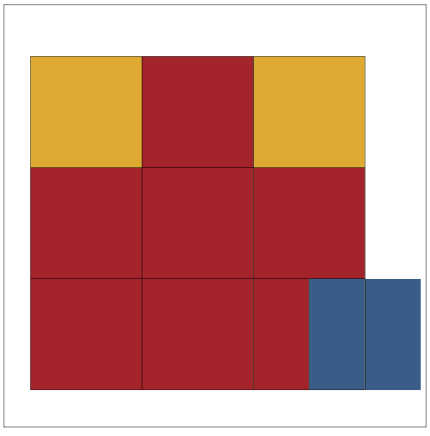


Type 4



Diverse composition



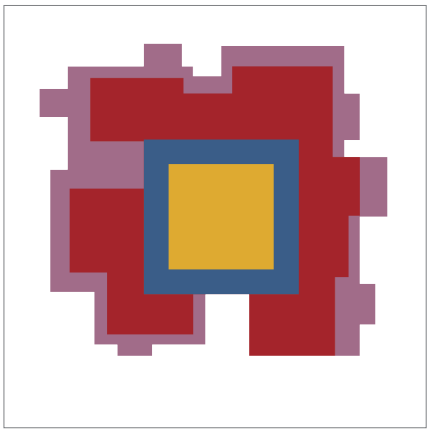
Plot & housing relation

HOUSING APARTMENT AT BEDADE NAGAR

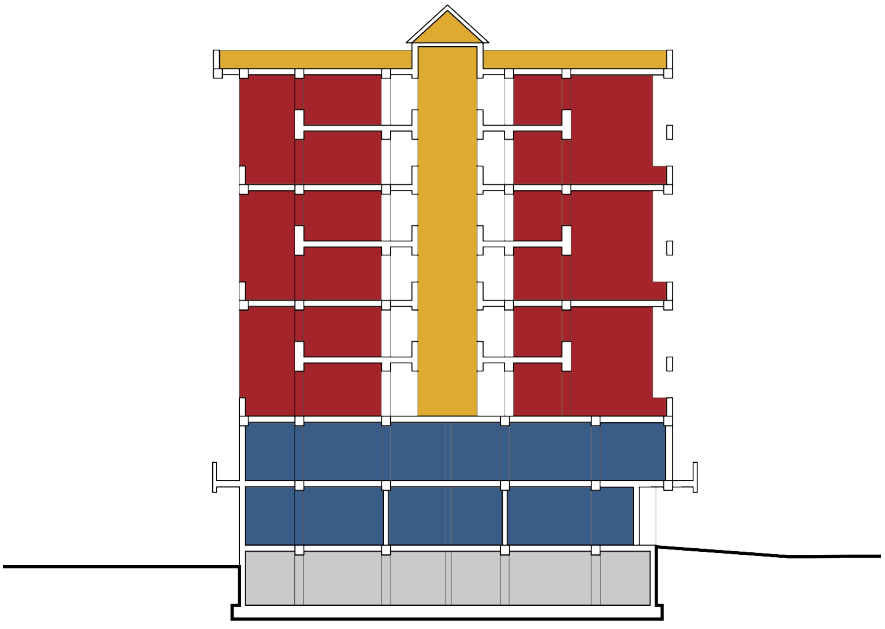
2022, Nashik, Studio Frozen Music

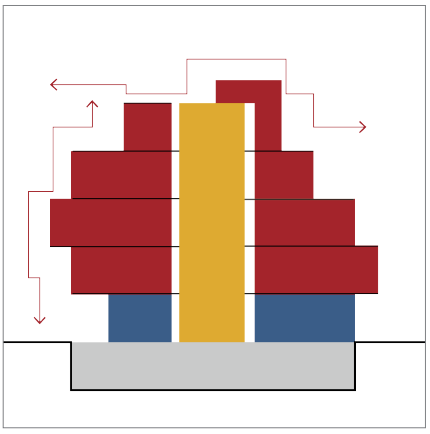
This an 8-storey residential building in Nashik in India with **a courtyard in the center and 6 housing units on each floor**. Three housing types (1BHK, 2BHK and 3 BHK) are designed, and **every floor includes all three types**, making the floor plan irregular with extensions of different lengths on each side. Different income groups live together to form a equal and harmonious community. In terms of construction, **RCC frame structure is exposed together with brick** to convey a feeling of simplicity and purity. At the same time, the brickwork of different components varies, such as the facade of the corridor and handrails.

(Image source: https://www.archdaily.com/992589/housing-apartment-at-badade-nagar-studio-frozen-music?ad_medium=gallery)



Irregular plan outline resulting from the layout of different units and balcony





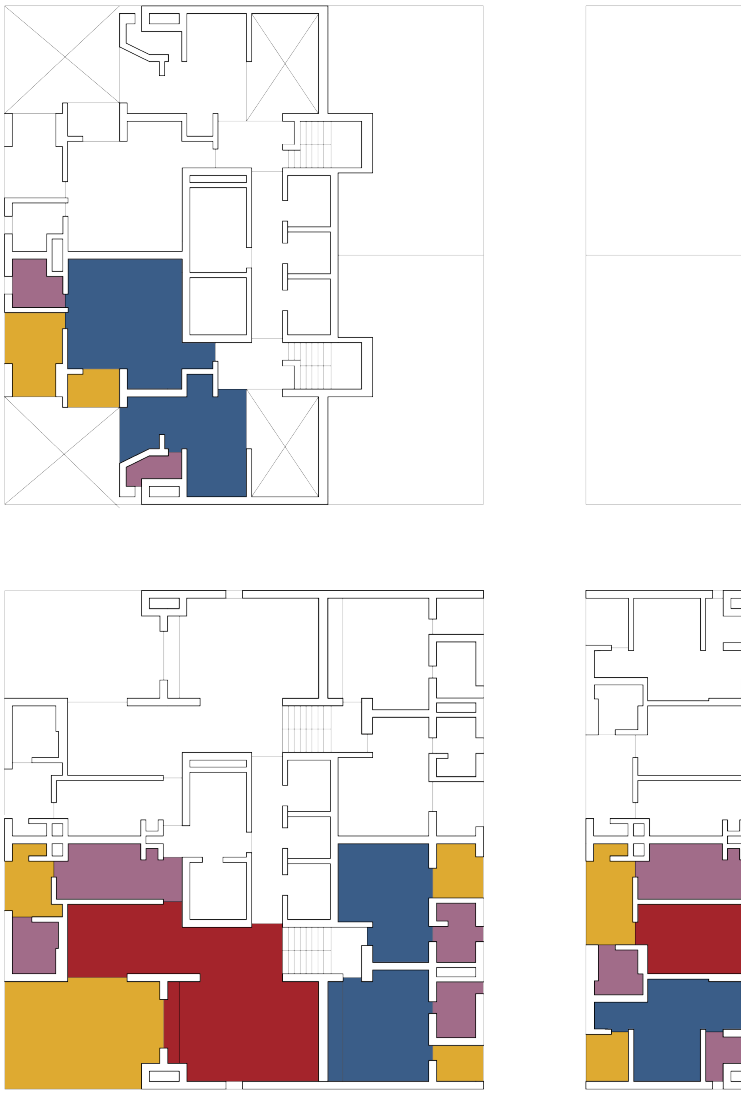
Irregular outline in section

KANCHANJUNGA APARTMENT

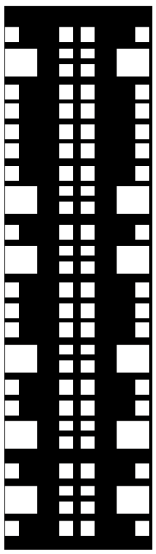
1983, Mumbai, Charles Correa

Kanchanjunga apartment is a **27-storey tower apartment** building responding the rapid urbanization in Mumbai. The building has **a square floor plan with the circulation core in the center and 2 units on each level**. The units have **3-6 bedrooms** playing with **floor differences and double-floor-high terraces**. These features ensure each unit receives enough daylight and ventilation, and from the outside, the facade has a regular pattern of solids and voids.

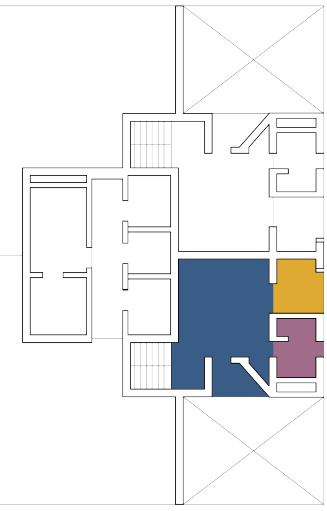
(Image source: https://www.archdaily.com/151844/ad-classics-kanchanjunga-apartments-charles-correa)



Type 1 plan

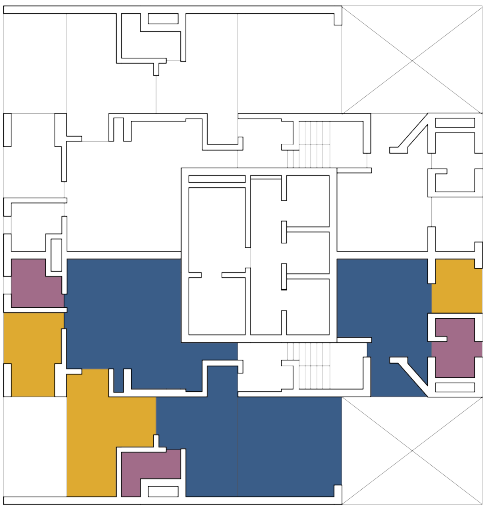


West facade

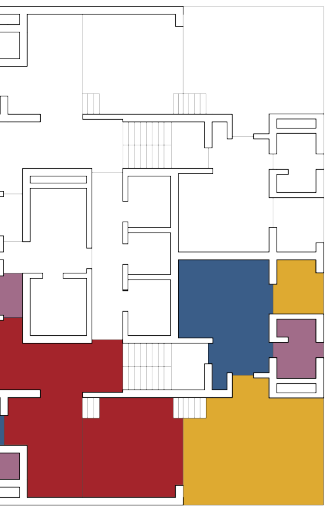


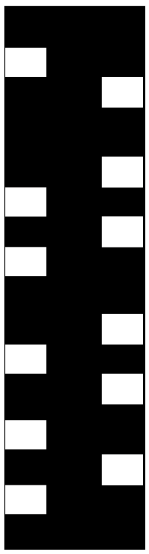
Type 2 plan

Type 3 plan

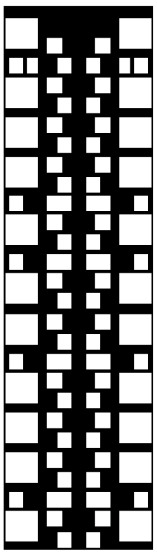


Type 4 plan

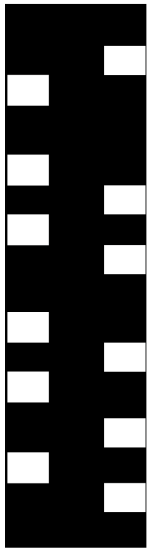




South facade



East facade



North facade

CASE STUDY ON HOUSING UNIT

CONCLUSION:
LAYOUT OF HOUSING UNIT

Based on the 4 housing project with specific focus on housing units and their layout in clusters, following conclusions can be summarized based on the building typology:

Row housing:

1 Diverse considerations for the sides facing different elements;

2 Cluster layout: plot-based;

3 Vertical layout: (shop)-residential (duplex unit, 2 units in four floors, kitchen/toilet/living room on lower level, bedrooms on upper level).

Courtyard apartment:

1 Cluster from the center to the periphery: courtyard-gallery-housing-terrace/balcony;

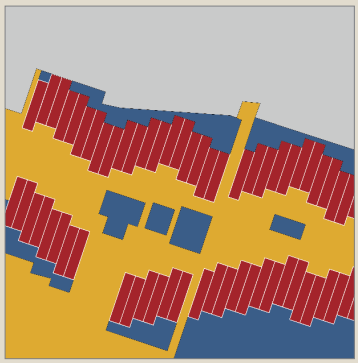
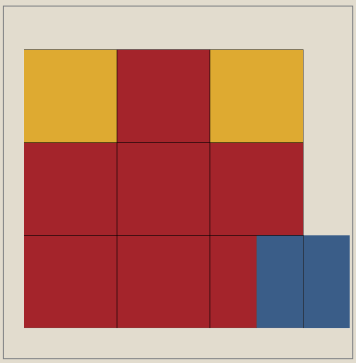
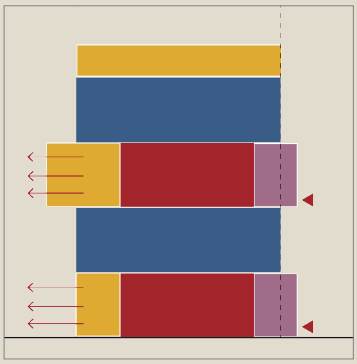
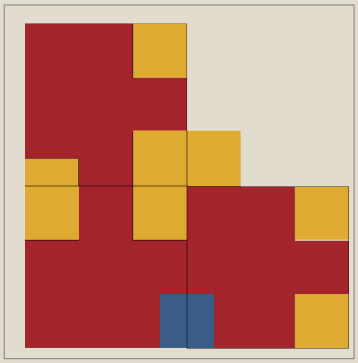
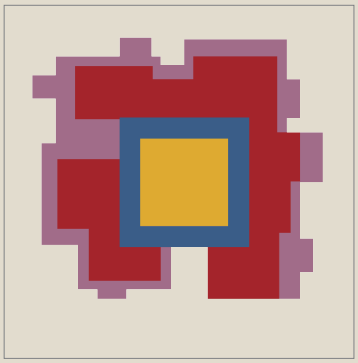
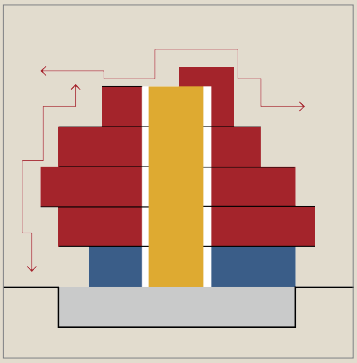
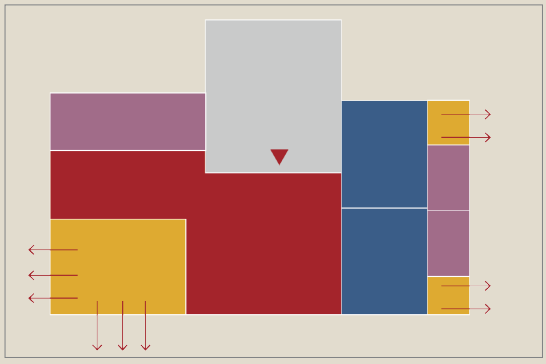
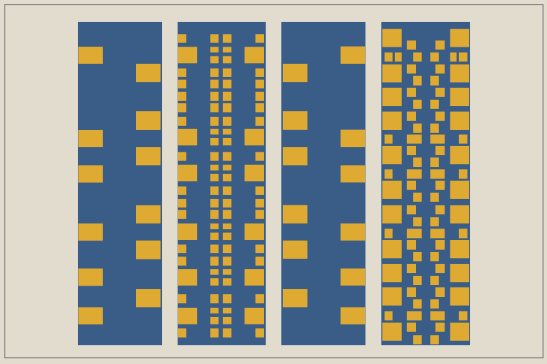
2 Cluster layout: different housing unit types and common space on each floor;

3 Vertical layout: public functions (shops, space for children's activities)-residential-roof terrace.

Tower apartment:

1 Facade: variety of facade elements (overhang, setback...);

2 Cluster layout: circulation core in the center, mirrored distribution.

	Cluster layout	Unit layout (plan)	Unit layout (section)
Row housing			
Courtyard apartment			
Tower apartment			

Design approach

Master planning

Cluster&housing unit

Land use — Relative position and size of residetial building and other amenities

Infrastructure (road, utilities.....) — Separation between vehicle and pedestrian access

Landscape — Green space & sustainable practices

Low-income: courtyard-centered — Smaller housing unit
Shared common space

Middle-income: Tower — Larger housing unit
Better view to the surroundings

Thematic Research

Child-Centric Community
in urban context

- **Liveable housi**
- **Playful public**
- **Walkable stree**

Site Analysis

Design goal

- **Location: A ne**
- **Residents: Co-living of di**
- **Relation wih S**

Case Study

Design approach

- **Master plannir**
- **Cluster&housi**

ng

- Meet basic needs of life
- Safe house for children

space

- Scale of the space
- Indoor&outdoor play
- Flexible & specific functions

et

- Accessibility to all clusters and amenities
- Safe walking/playing experience

w city image

- Riverside elevation

fferent groups

- Hindu: possible to upgrade
  provide extra amenities
- Low-income group: community-based living
- Middle-income group: private living

urma river

- Embankment
- Building facing the river

ng

- Land use
  Relative position and size of residetial building and other amenities
- Infrastructure (road, utilities.....)
  Separation between vehicle and pedestrian access
- Landscape
  Green space & sustainable practices

ng unit

- Low-income: courtyard-centered
  Small housing unit
  Shared common space
- Middle-income: Tower
  Larger housing unit
  Better view to the surroundings

05 DESIGN-LIVEABLE HOUSING

- Concept of cluster
- Low-income living
- Middle-income living
- Co-living of two groups

CONCEPT OF CLUSTER

Massing: the residential massing can be divided into two parts, lower levels in **courtyard form for low-income group** to keep the community-based lifestyle, while the upper levels in **tower form for middle-income group**. The intention is to make a sample of social-mix at this important area of Sylhet.

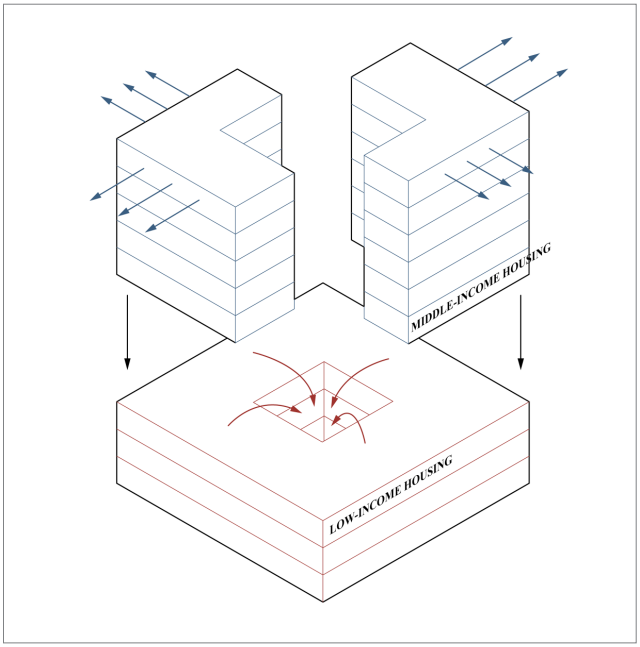
Access: in order to keep the privacy, the two groups access the building in different ways. The stairs for **low-income housing** are **in the courtyard (2 for each cluster)**, and the stairs and elevator for **middle-income housing** are at the corner, which can be **accessed from outside directly (2 for each cluster)**.

Building height: within one cluster, the two towers are at the northeast and southwest corners, and the north one is lower than the south one to form a decreasing gradient toward the river. In community scale, the clusters become higher from east to west.

Massing

LIG: courtyard form, community-based

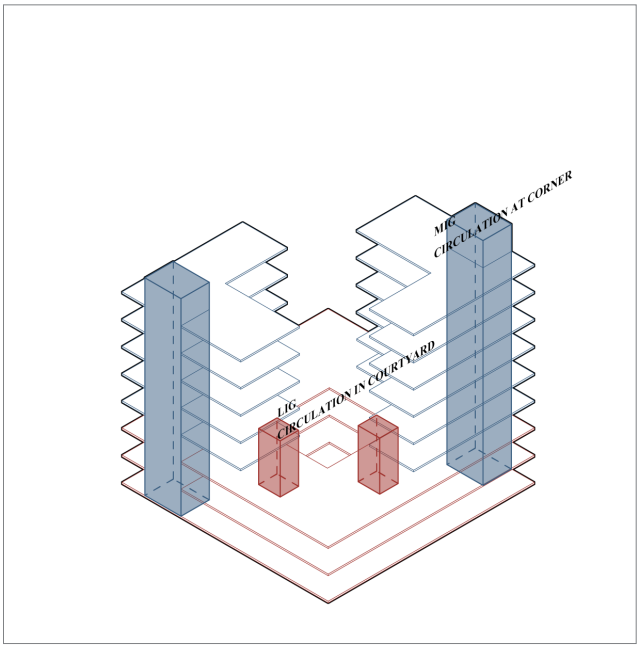
MIG: tower, private



Separate Access

LIG: access from the courtyard

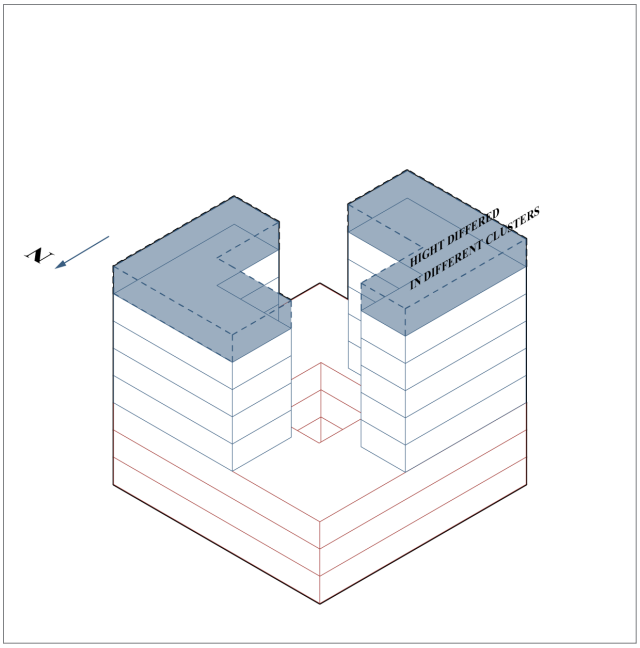
MIG: access from outside, with elevator



Height difference

Towers on northeast and southwest corners

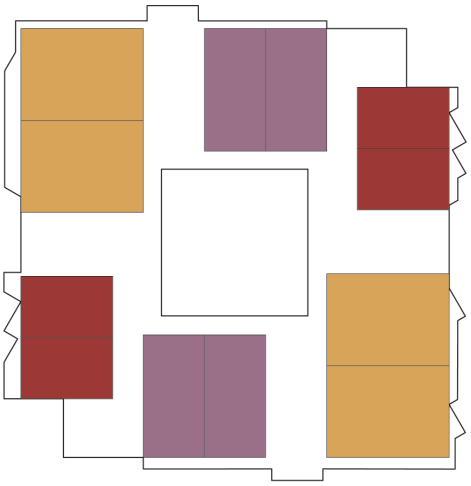
The north tower is lower than the south one

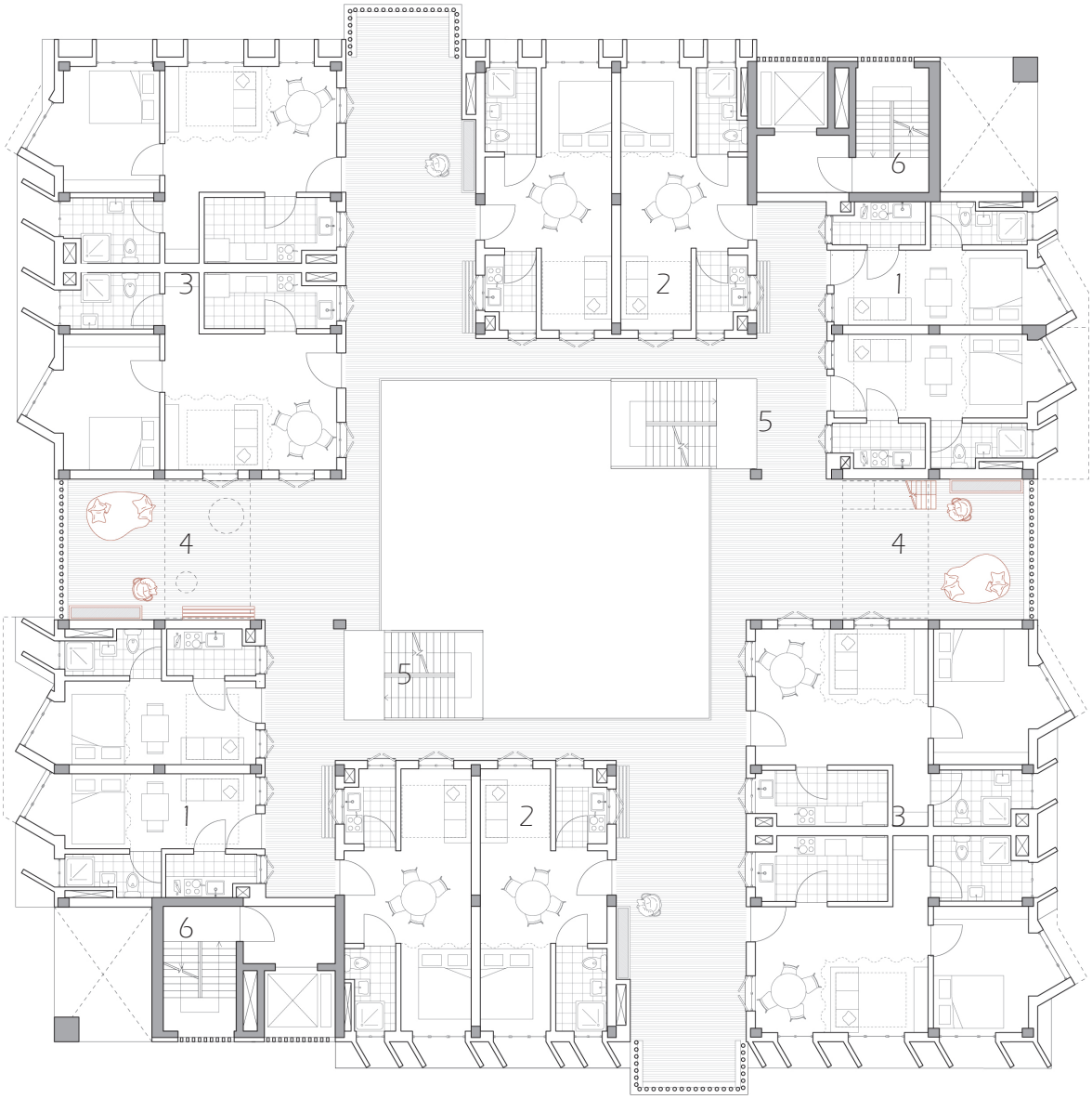


LOW-INCOME LIVING

CLUSTER LAYOUT

The low-income housing are on the **first and second floors** of each cluster, with **10-12 units on each floor**, linked by a gallery in the middle and sharing 2 staircases. In all units, the living spaces and kitchen are connected with the gallery, while the sleeping area and toilet are facing outward to keep a privacy as well as the natural ventilation for each space.



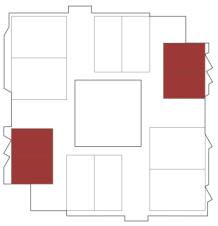


1 Housing Type A 24 m^2
2 Housing Type B 32 m^2
3 Housing Type C 48 m^2
4 Pocket play space +planting
5 Circulation for LIG
6 Circulation for MIG
(not accessible from this storey)

First floor plan 1:200

0 4 8 m

LOW-INCOME LIVING



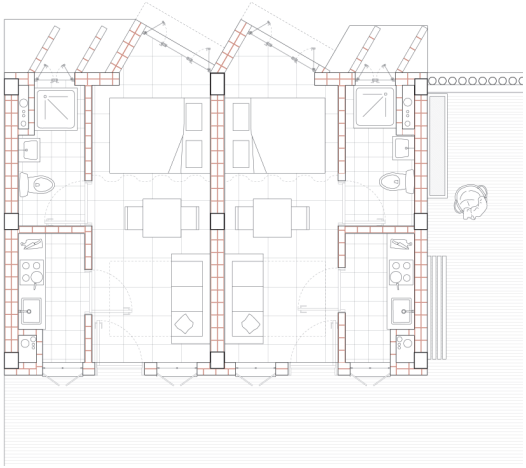
HOUSING UNIT

There are 3 low-income housing types with different areas:

Type A: 24 m^2 (4×6m) for 2-4 people, where living, dining and sleeping spaces are all together (but can be divided through temporary partitions), and separate kitchen and toilet;

Type B: 32 m^2 (4×8m) for 2-4 people, has larger space for sleeping, dining and living activities compared to type A;

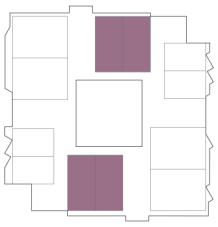
Type C: 48 m^2 (6×8m) for 4-6 people, has a proper bedroom compared to type B.

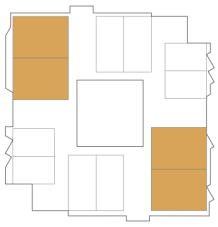


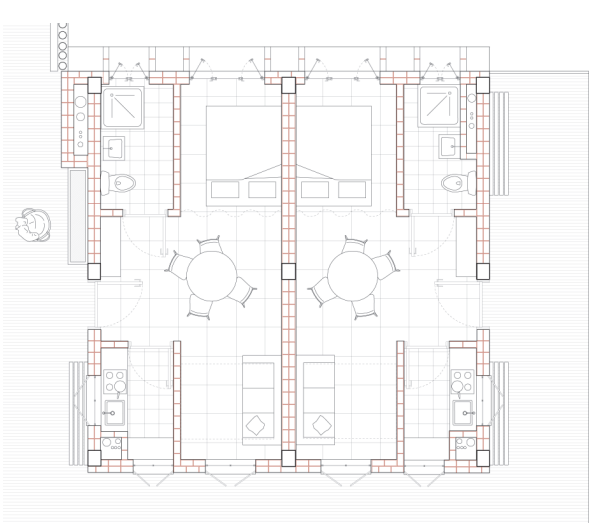
Type A Studio

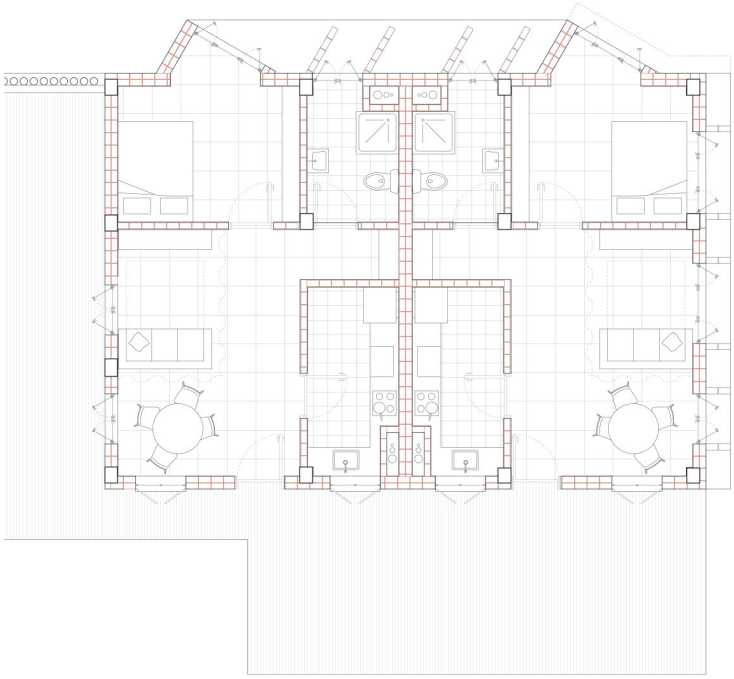
24 m^2 (4×6m)
2-4 ppl

Living space
(can be turned into bedroom at night)
Dining table
Bed
kitchen
Toilet









Type B Studio

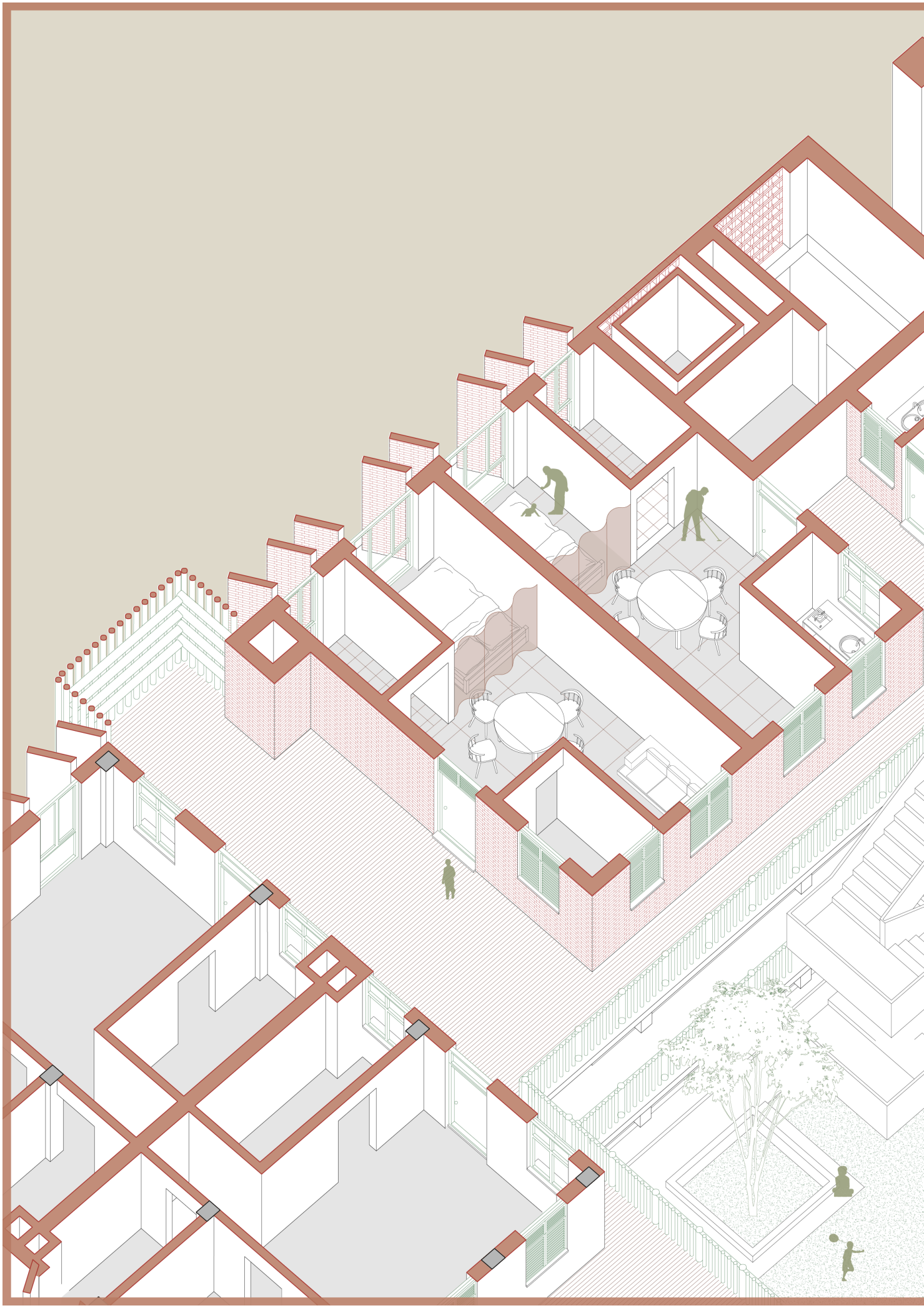
32 m^2 (4×8m)
2-4 ppl

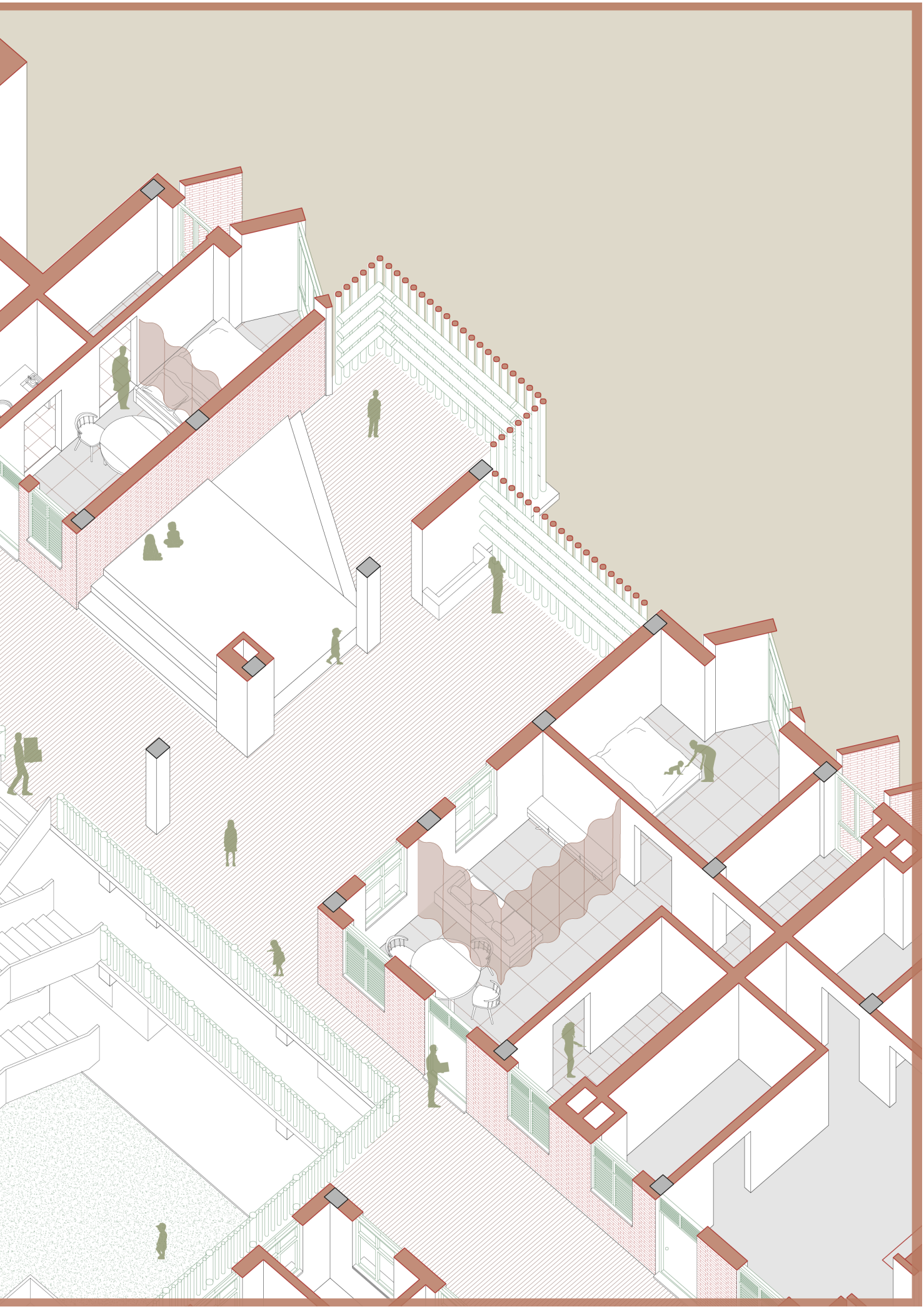
Living space
(can be turned into bedroom at night)
Dining
Bed
kitchen
Toilet

Type C 1 bedroom unit

48 m^2 (6×8m)
4-6 ppl

Living space
(can be turned into bedroom at night)
Dining
Bedroom
kitchen
Toilet





LOW-INCOME LIVING

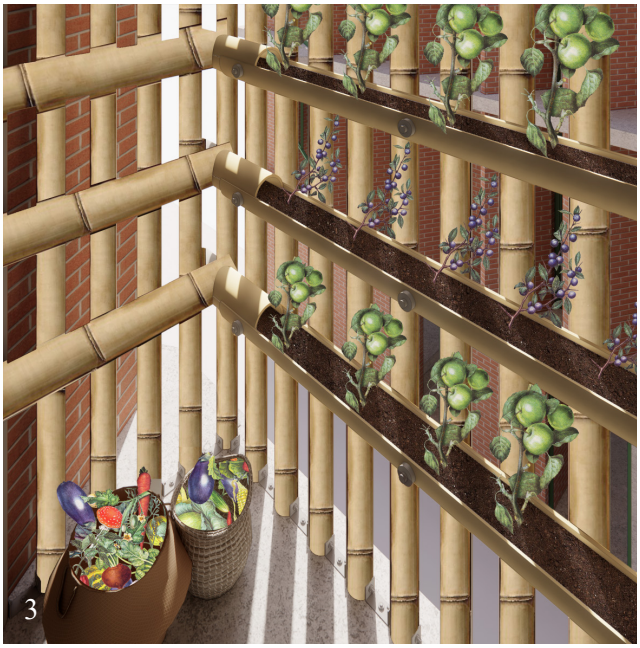
ATMOSPHERE

Low-income housing units are always compact but designed to be adaptable in terms of spatial use. The living space used during the day can be turned into a sleeping area at night. The kitchens have windows facing the common space, allowing women to chat with others while cooking. Moreover, the planting facade in the common space not only preserves an important existing activity but also has the potential to generate income for the low-income group.

Living/sleeping space in day/night

Kitchen open to the gallery

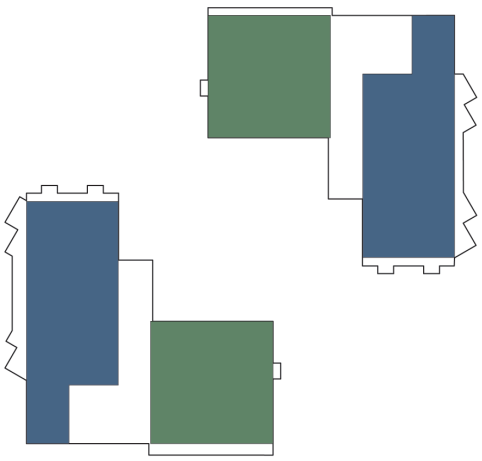
Planting facade in common space

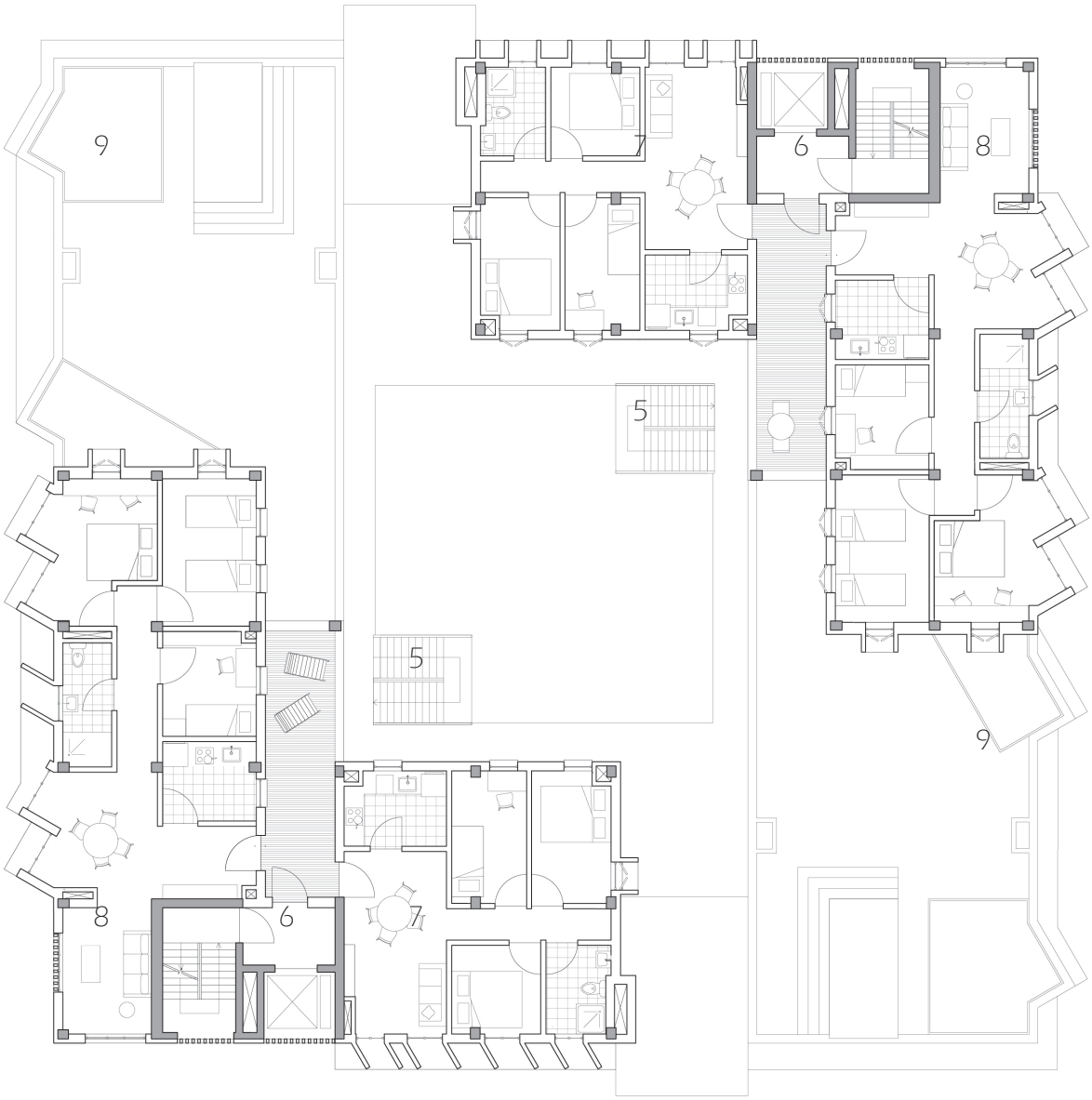


MIDDLE -INCOME LIVING

CLUSTER LAYOUT

The middle-income housing are from the third floor above, with four units sharing two circulation cores on each floor. The living spaces are facing outward to have better view of the surroundings, and every two units have a common balcony facing the courtyard.





5 Circulation for LIG
(not accessible from this storey)
6 Circulation for MIG
7 Housing Type D 64 m^2
8 Housing Type E 84 m^2
9 Roof top of the second floor

Typical floor plan above third floor 1:200

0 4 8 m

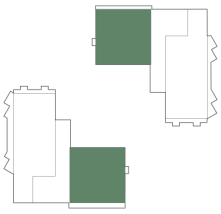
MIDDLE-INCOME LIVING

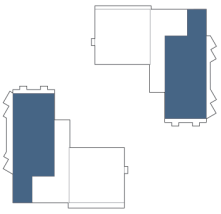
HOUSING UNIT

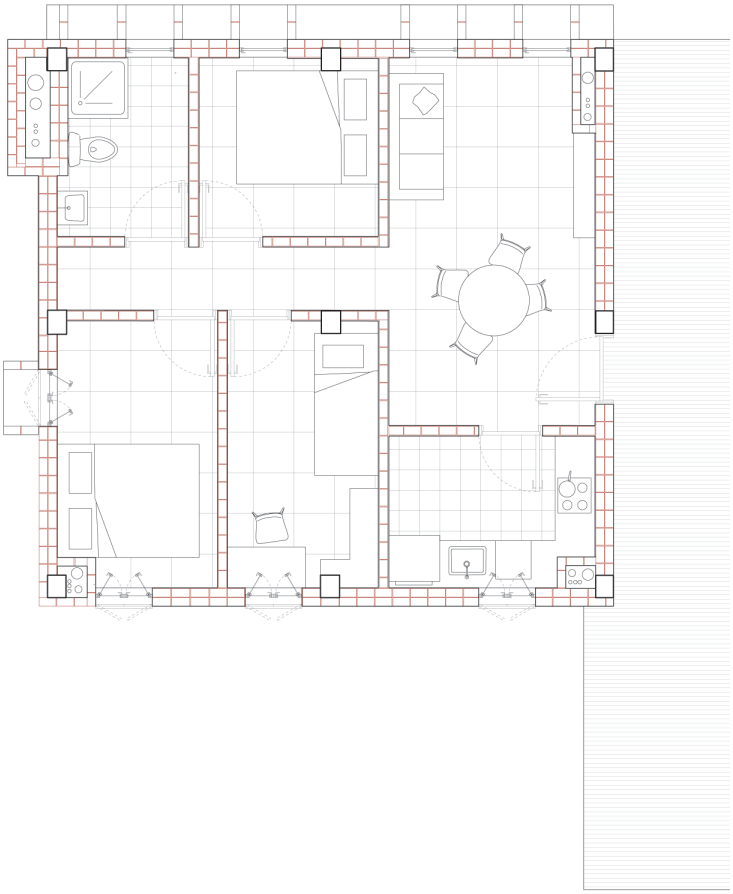
There are 2 middle-income housing types:

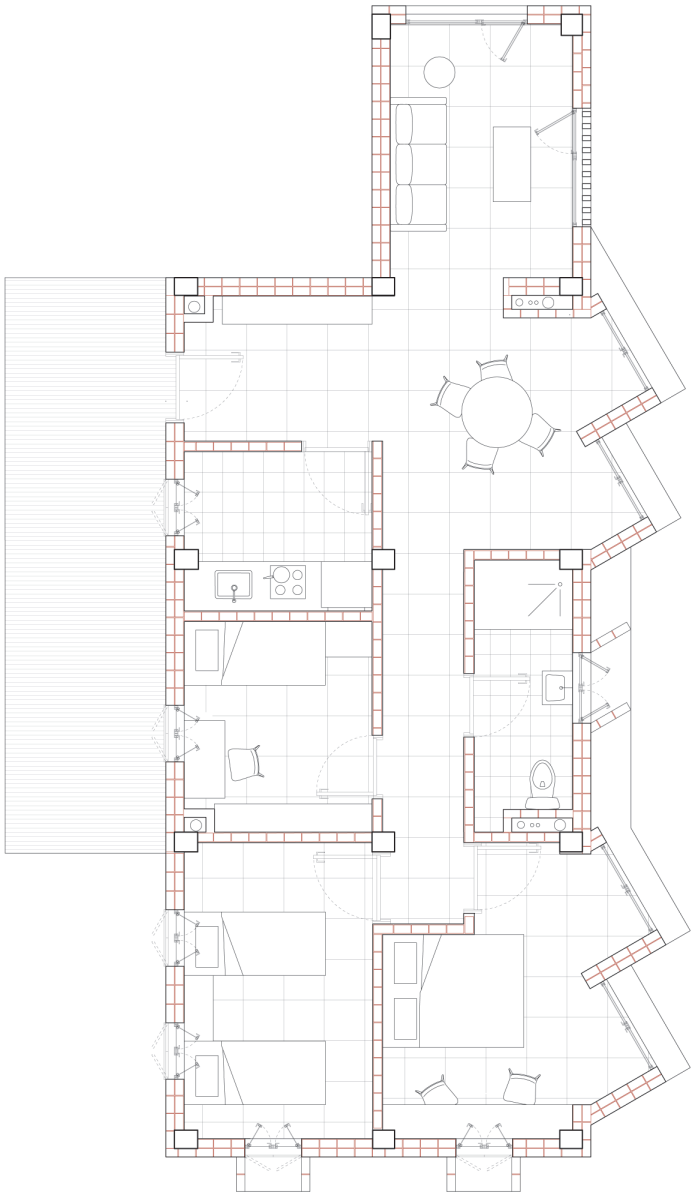
Type D: 64 m^2 (8×8m) for 4-6 people, including living room, 3 bedrooms, a toilet and a kitchen;

Type E: 84 m^2 (4×8m) for 4-6 people, has clearly separate dining and living area, and a better view in the living space compared to type D.









Type D 3 bedroom unit

64 m^2 (8×8m)
4-6 ppl

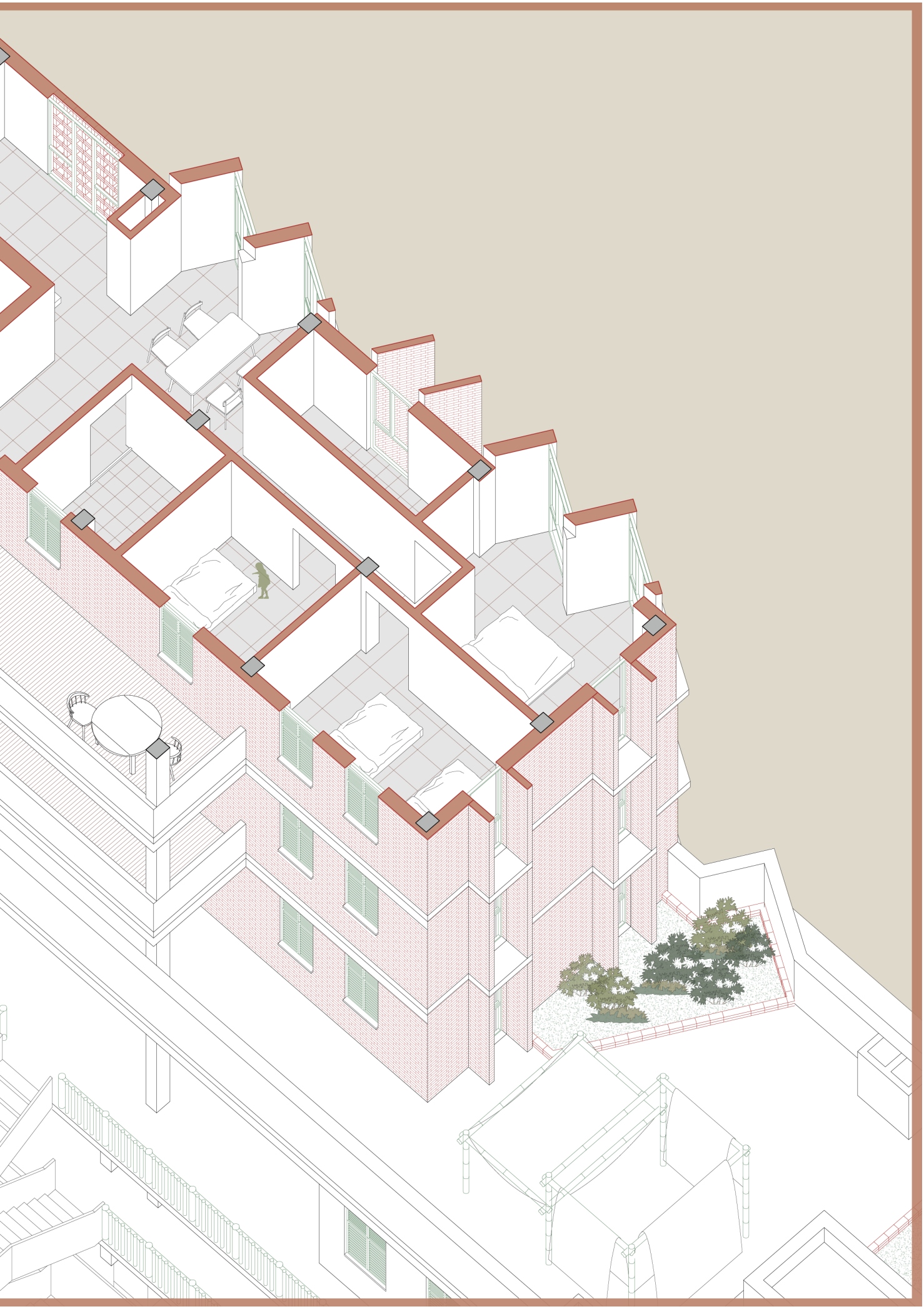
Living space
Dining
3 Bedrooms
kitchen
Toilet

Type E 3 bedroom unit

84 m^2 (6×8m)
4-6 ppl

Living space
Dining
3 Bedrooms
kitchen
Toilet

0 1 3m



MIDDLE-INCOME LIVING

ATMOSPHERE

The most important feature of middle-income housing （on the north side） is that it aims to provide river views from more spaces. In both the housing units and the circulation areas, people can see outside either through large openings or an open brick facade.

Living room facing the river

Elevator with river view

CO-LIVING OF TWO GROUPS

CLUSTER INTEGRITY

At the residential level, this project aims to break the common physical segregation caused by socioeconomic factors and realize the possibility of social mixing at a critical location in the city. Although the living habits and spatial characteristics of low-income and middle-income groups are different, by separating circulation while appropriately sharing common spaces, a harmonious balance can hopefully be achieved.

06 DESIGN-PLAYFUL PUBLIC SPACE

- Concept of spcae for children
- Within a cluster (for 2-6 & 6-12 year-old children)
- In between the clusters (for 6-12 year-old children)
- Community amenities (for children above 12 years old)
- Synthesis

CONCEPT OF SPACE FOR CHILDREN

IN MULTIPLE SCALES

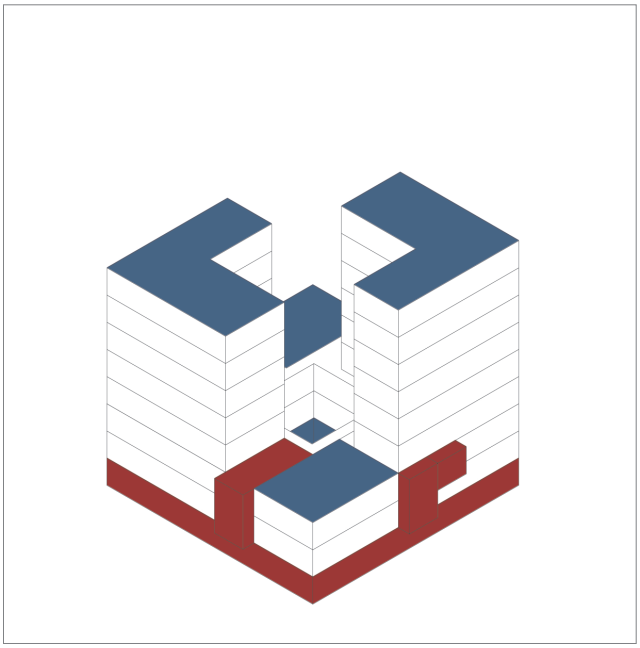
The second important element in creating a child-centric community is playful public spaces. According to research, different groups of children have varying spatial needs that should be considered separately in the design. Based on age groups, public spaces for children can be introduced on three scales: within a cluster, between clusters, and in the community.

Within a cluster

Pocket play space (low-income)

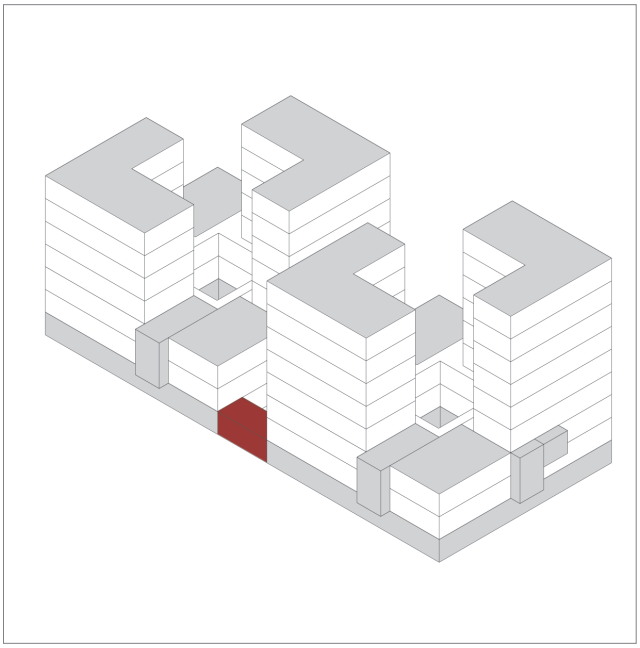
Roof terrace (middle-income)

Ground floor (shared)



Between clusters

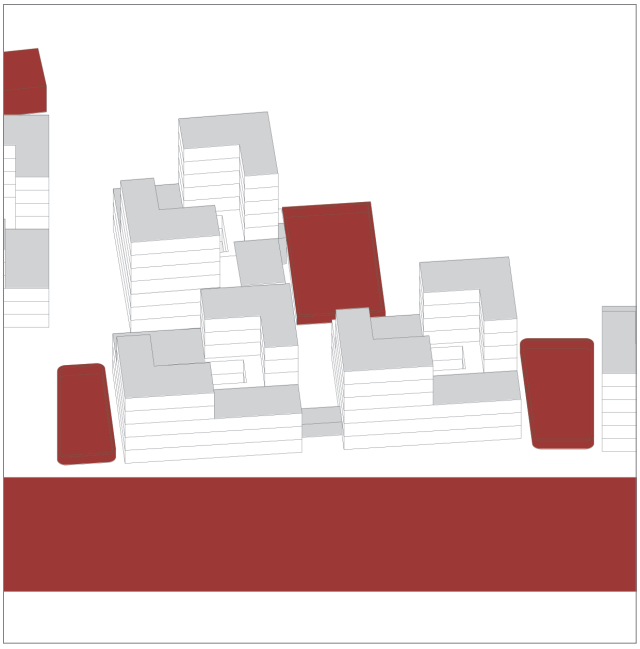
Open gallery



Community amenities

Park

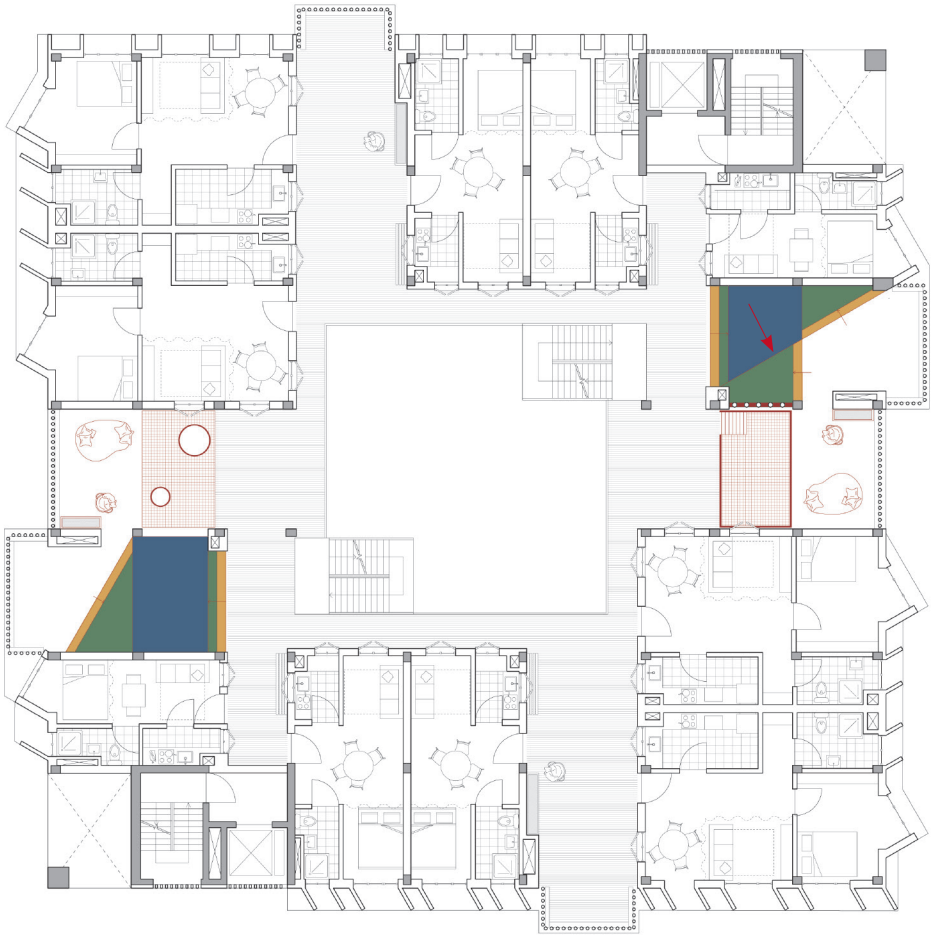
Playground



WITHIN A CLUSTER

Pocket play space
(for 2-6 year-old children of low-income group)

Children in early childhood are not mature enough to go very far by themselves, so the play spaces for them are close to their homes. The pocket play spaces are the common areas between the low-income housing units. There are four on each low-income floor, varying in size and specific functions. The facade of these spaces is a bamboo planting facade, which can benefit the internal micro-climate as well as provide food or generate income for low-income families.



Second floor plan

Pocket play space on the second floor

WITHIN A CLUSTER

Roof terrace
(for 2-6 year-old children of middle-income group)

For children of middle-income families, the roof terraces on both the third floor and the top floor are designated as play spaces. Part of the terrace features a green roof, and there are constructed water tanks with steps for sitting beside them. With this change in floor material, height, and function, the aim is to transform the roof terrace into a new playground.

Third floor plan

Roof terrace on the third floor

WITHIN A CLUSTER

Courtyard & indoor play space
(for 6-12 year-old children)

As children get older, they can stay on their own for some time but still cannot go too far, so the ground floor can serve as a gathering space for them. The central courtyard and the two flexible rooms are designed for outdoor and indoor play, respectively, where various activities can take place.

Ground floor plan

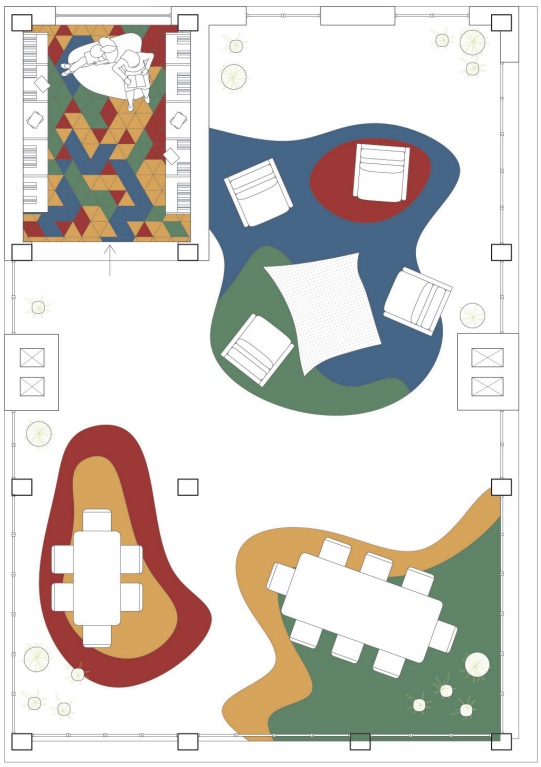
Ground floor courtyard

WITHIN A CLUSTER

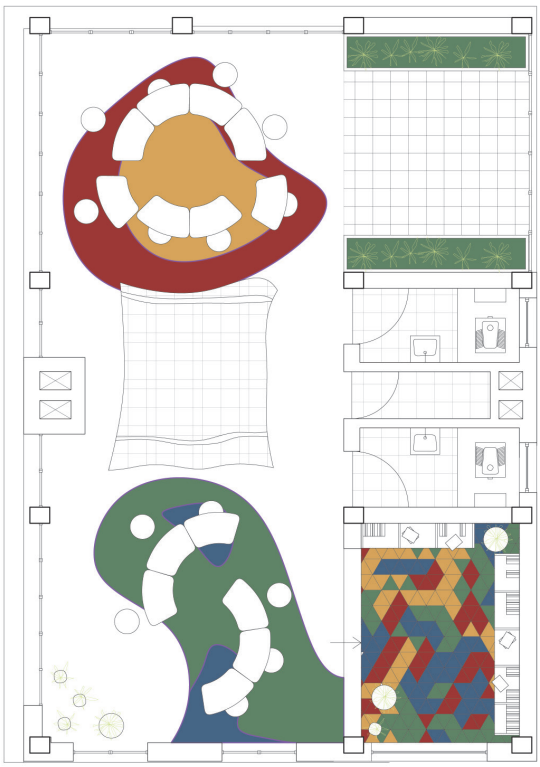
Alternatives for indoor play

As mentioned in the research, children need three types of public functions: education, socialization, and recreation. These activities can take place on the ground floor with changes to the internal layout and furnishing. On the right, four possible ways to use the space are provided, but many other options can be created as well.

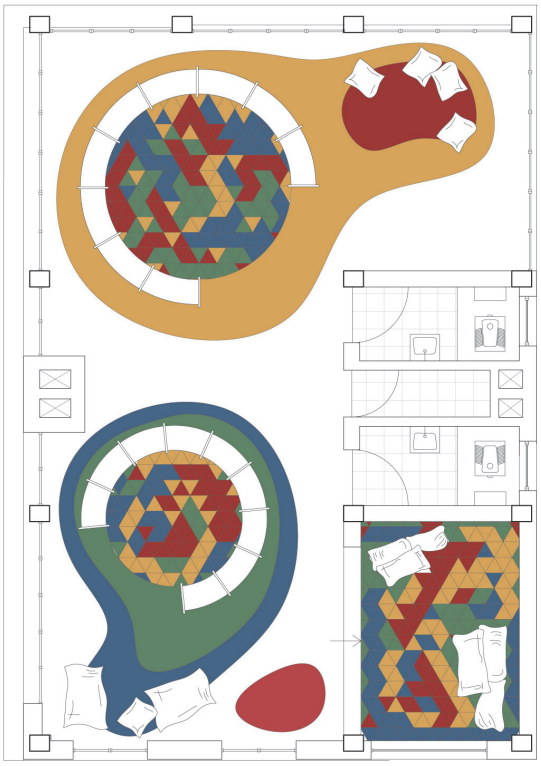
Indoor play rooms on the ground floor



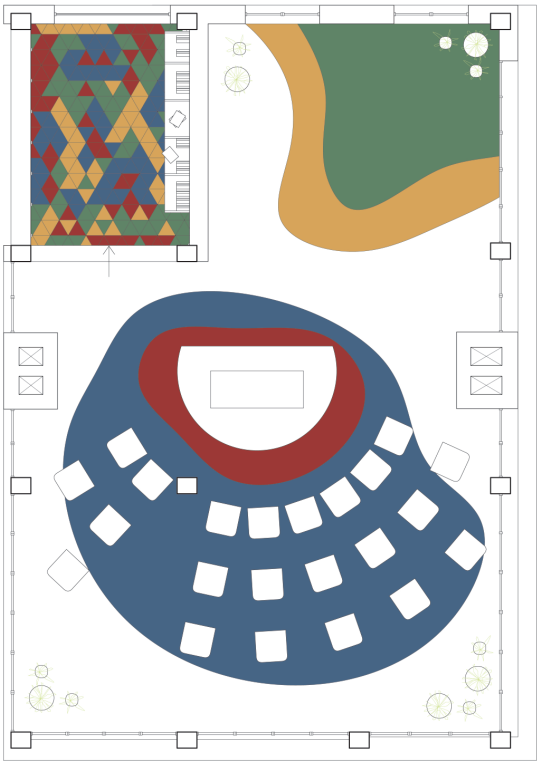
Reading



Education+planting



Intergenerational play



Large gathering

IN BETWEEN THE CLUSTERS

Outdoor gallery for middle childhood (6-12 years old)

Besides the ground floor of their own cluster, children may
Therefore, an open gallery is created on the side closer to the riv

want to interact with people from neighboring clusters.
ver between the indoor play spaces of neighboring buildings.

0 2 6 10m

Ground floor plan
1:200

The open gallery is semi-closed by open brick facade but without roof, so from the elevation, a continuous brick 'line' is formed along the riverside from east to the west.

East-west section
1:200

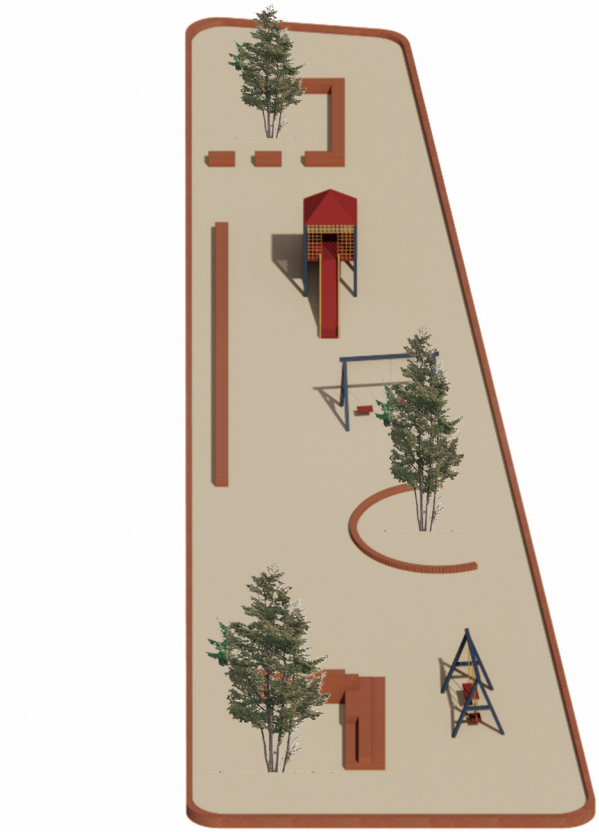
Perspective fr

om the street

COMMUNITY AMENITIES

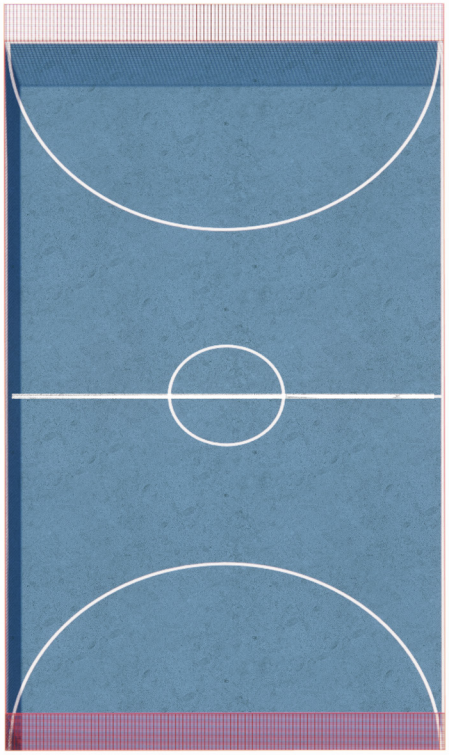
For adolescence (above 12 years old)

Above the age of 12, children become more independent and may need larger spaces for activities such as sports. Therefore, several elements are designed for children at the community scale, including a play yard, a sports court, and a riverside playground.



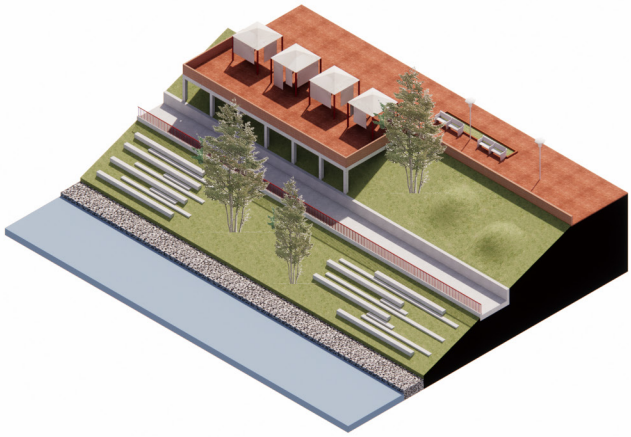
Play yard

one for every two clusters



Sport court

Around school area



Riverside playground

Landscape & children's park

In conclusion, public spaces for children are designed on various scales to meet the needs of different age groups, from the cluster level to connections between clusters and ultimately to master planning. These spaces encompass multiple types, including open green spaces, constructed amenities, and indoor rooms, all of which enrich children's experiences while living in the community.

SYNTHESIS

Ground floor - master scale

Ground floor plan
1:1000

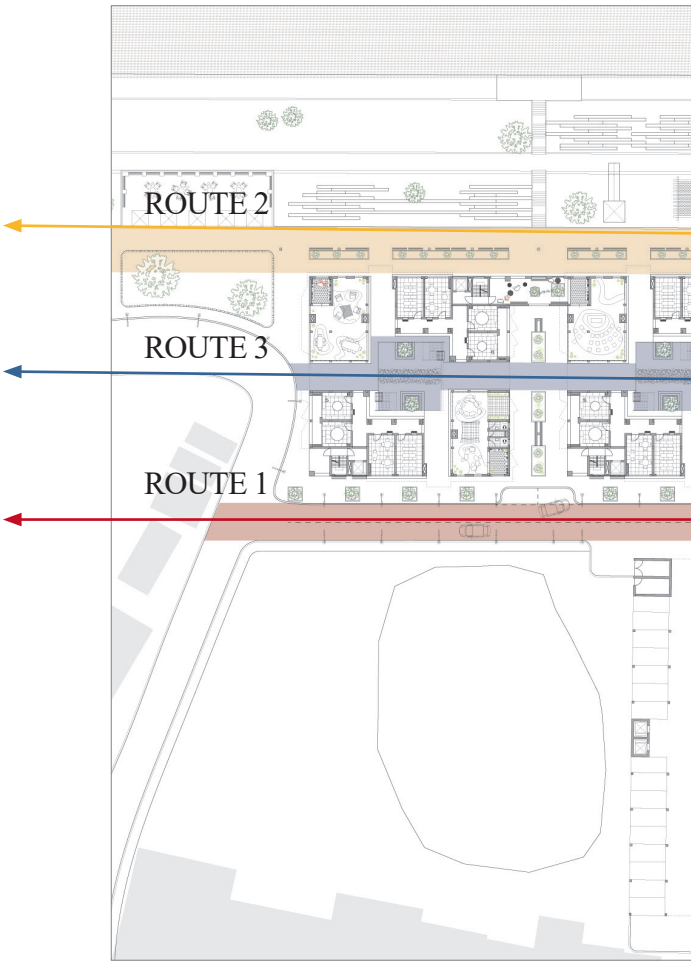
0 10 20 30 m

07 DESIGN-WALKABLE STREET

- Concept of flow on the site
- Route 1 (public): vehicle road
- Route 2 (community): riverside commercial street
- Route 3 (private): courtyard linkage
- Synthesis

CONCEPT OF FLOW ON THE SITE

3 east-west connection

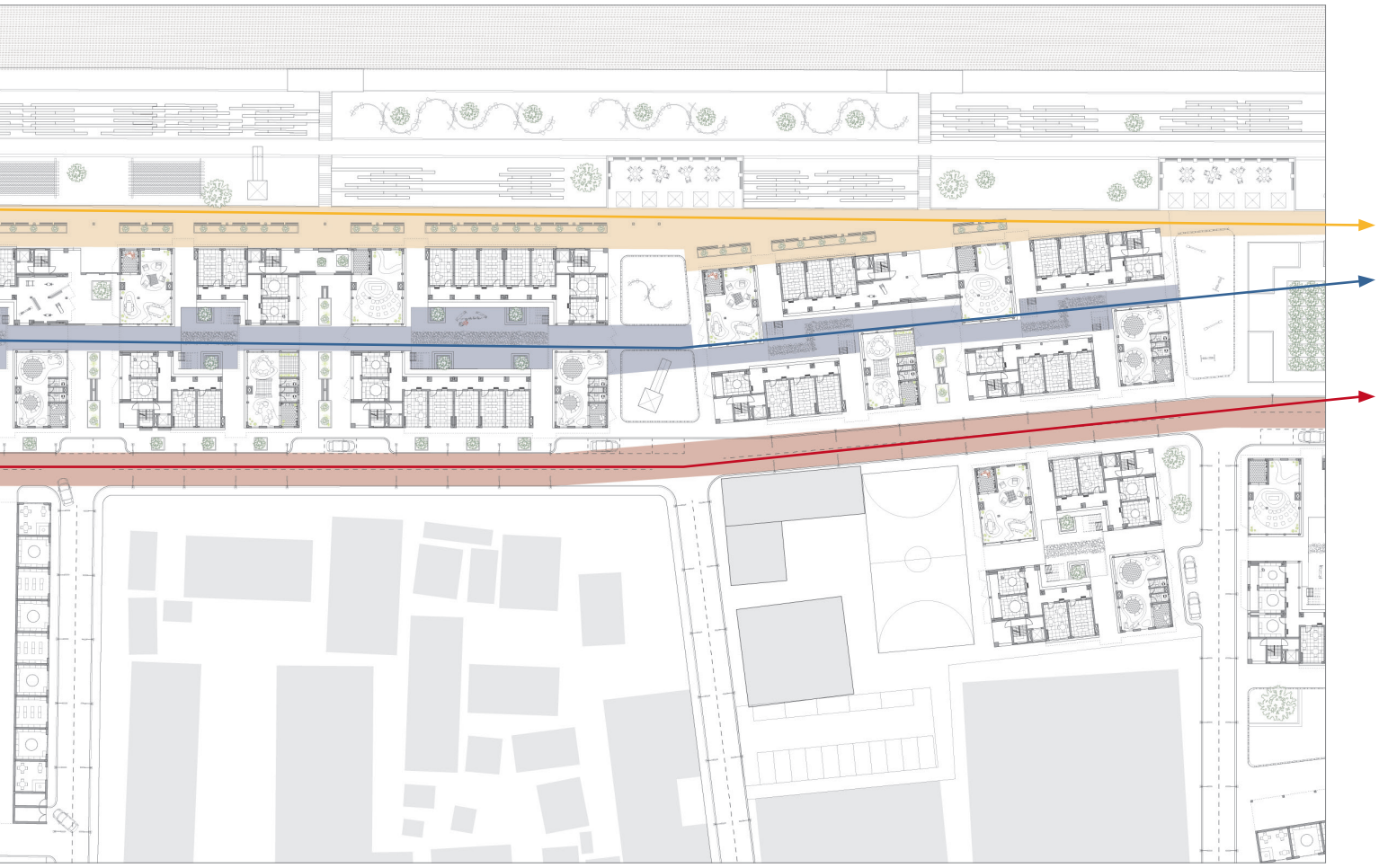


On the east-west direction, there are three lines that traverse the entire site, each offering different levels of privacy:

Route 1: a vehicle road on the south side, linked with the highway, providing public access to the site;

Route 2: a commercial pedestrian street along the river, busy street for residents;

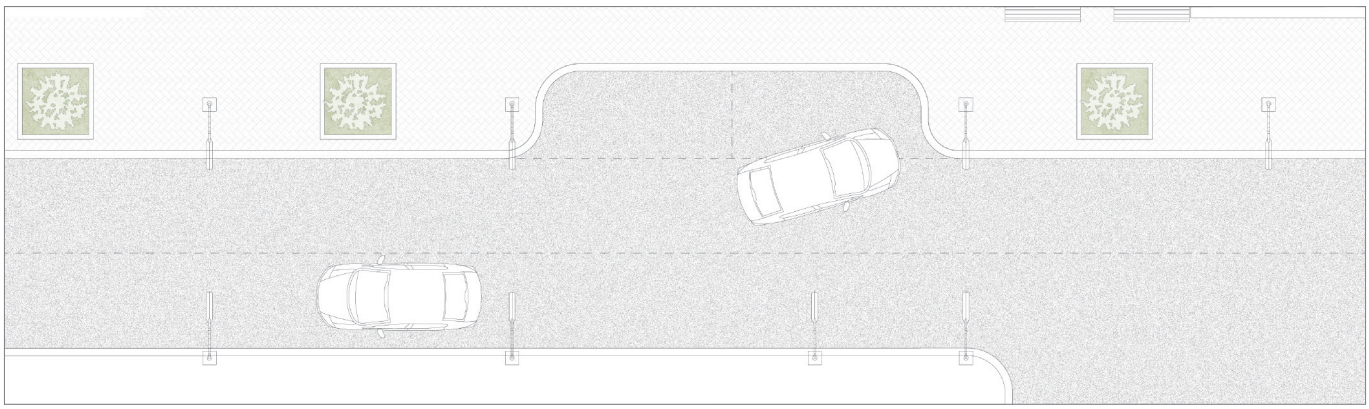
Route 3: a small lane linking courtyards, offering the highest level of safety and privacy.



ROUTE 1

Public: vehicle road

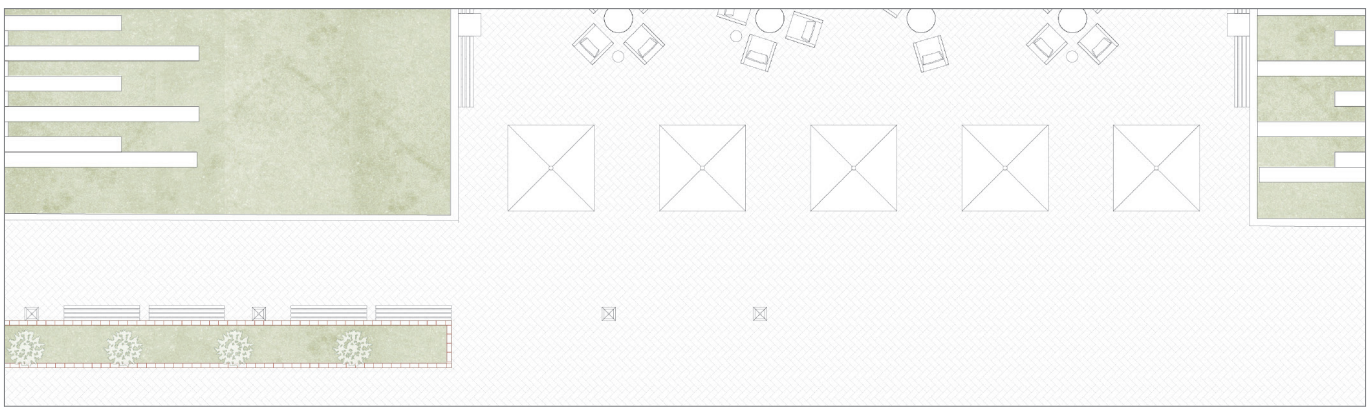
The vehicle road is located on the south side of the site, serving as the main access from the city. On both sides of the road, there are spaces for temporary parking and greenery.



ROUTE 2

Community: riverside commercial street

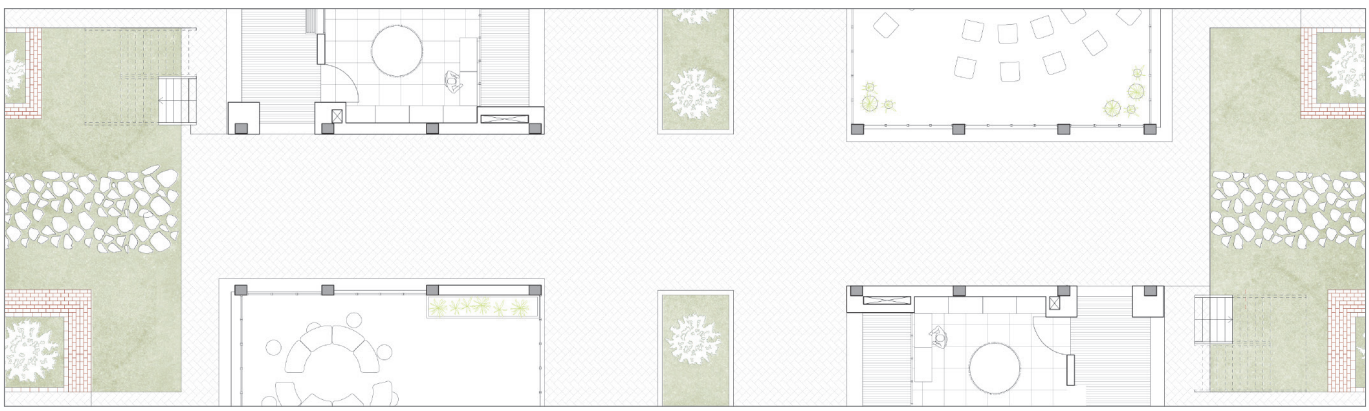
This route is a pedestrian street with the river on one side and shops on the other. Along the street, there are greenery and benches, creating a pleasant environment for people to sit and chat along the riverside. This also allows parents to keep an eye on their children playing in the riverside playground.

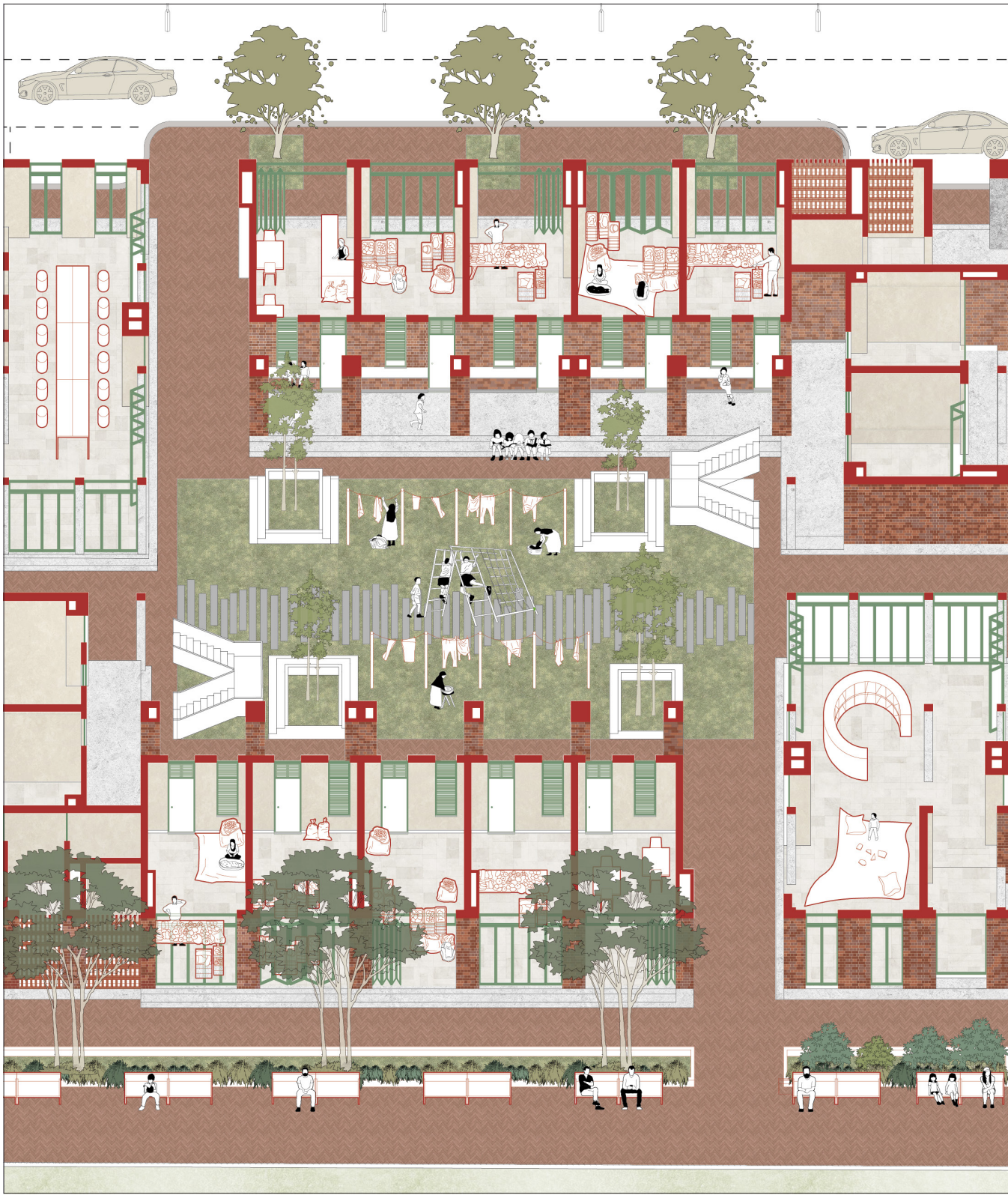


ROUTE 3

Private: courtyard linkage

This route offers the highest level of privacy and safety for children, as it passes through the inner courtyard of each cluster. Between the clusters, it is paved like Route 2, but within the courtyards, it transforms into a stone path, blending with the natural atmosphere created by the courtyards.



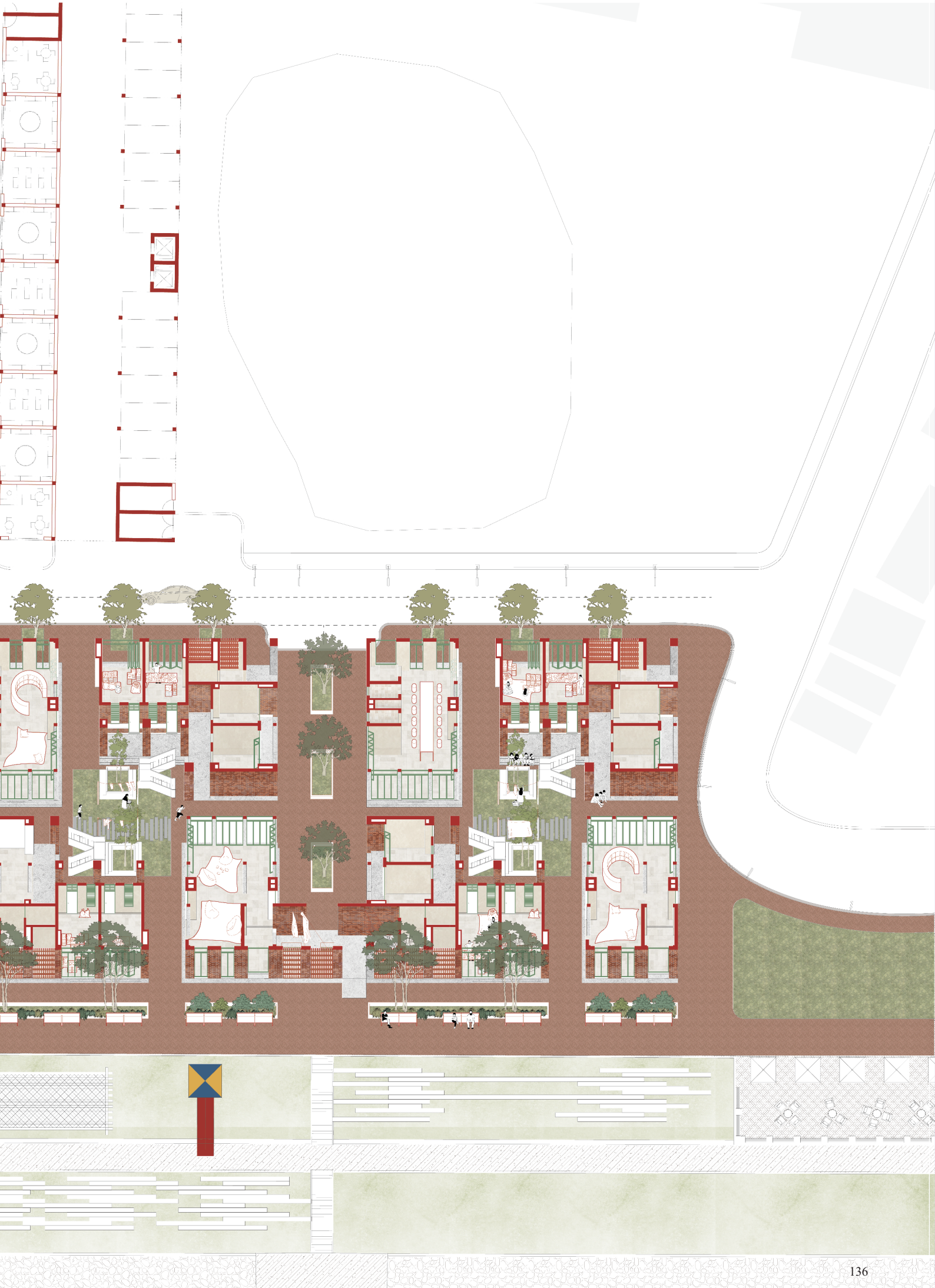


SCENARIO

Cluster scale

SCENARIO

Master scale



SYNTHESIS

Overall image of the whole site - master plan

1-8 Residential cluster — 1-3 floors LIG (24-48 sqm)
4+ floors MIG (64-84 sqm)

9 Community space for Hindu — Planting, sanitation, water management

10 Parking building for the neighbourhood — 5-storey building, ground floor for commmercial

11 Parking lot for public

12 Community center — 2-storey building, Ground floor for commercial;first floor for activities and office

13 Sport court

14 Play yard

15 Sanitary treatment — Collect from the primary treatment under each cluster

Master plan
1:1000

0 10 20 30 m

SYNTHESIS

Overall image of the whole site - riverside elevation

SYNTHESIS

Overall image of the whole site - Axonometric


0
10
30 m

08 BUILDING TECHNOLOGY

- Principle structure
- Construction process
- Environmental strategy
- Facade

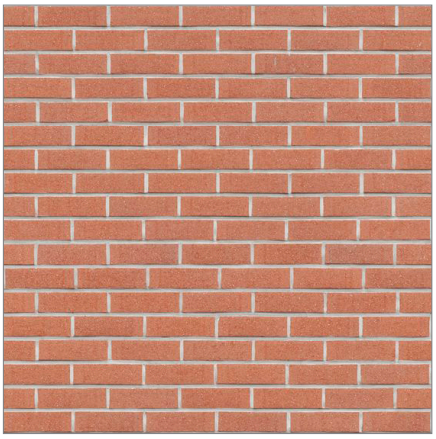
MATERIALITY

In the project, three major materials are used, namely **concrete, brick and bamboo**. Since this is an affordable housing project, the **affordability and availability** are the main concern when choosing the materials, and all these three meet this requirement. Besides that, each material has other advantages:

Concrete is used as the frame structure for loadbearing mainly because of the structural requirement. Half of the project **reaches more than 5-storey high**, so concrete frame structure is the best way to provide enough stability for a high building. Aditionally, frame structure allows a large **flexibility** which is also a feature of the design.

The red brick is another most commonly used material in Bangladesh, which is **recyclable and reusable**. Moreover, different brick bond can enhance the **aesthetics** of the project.

Bamboo is chosen because it is used for the main supporting component in the existing housing on the site, so it has a strong **cultural acceptance**. Using bamboo as a facade material can be **beneficial for the micro-climate** inside the cluster, as the it allows ventilation and daylight.



Concrete

Frame structure

Affordability

Availability

Durability

Flexiblity

Brick

Infill

Affordability

Availability

Recyclability

Aesthetics

Bamboo

Facade

Affordability

Availability

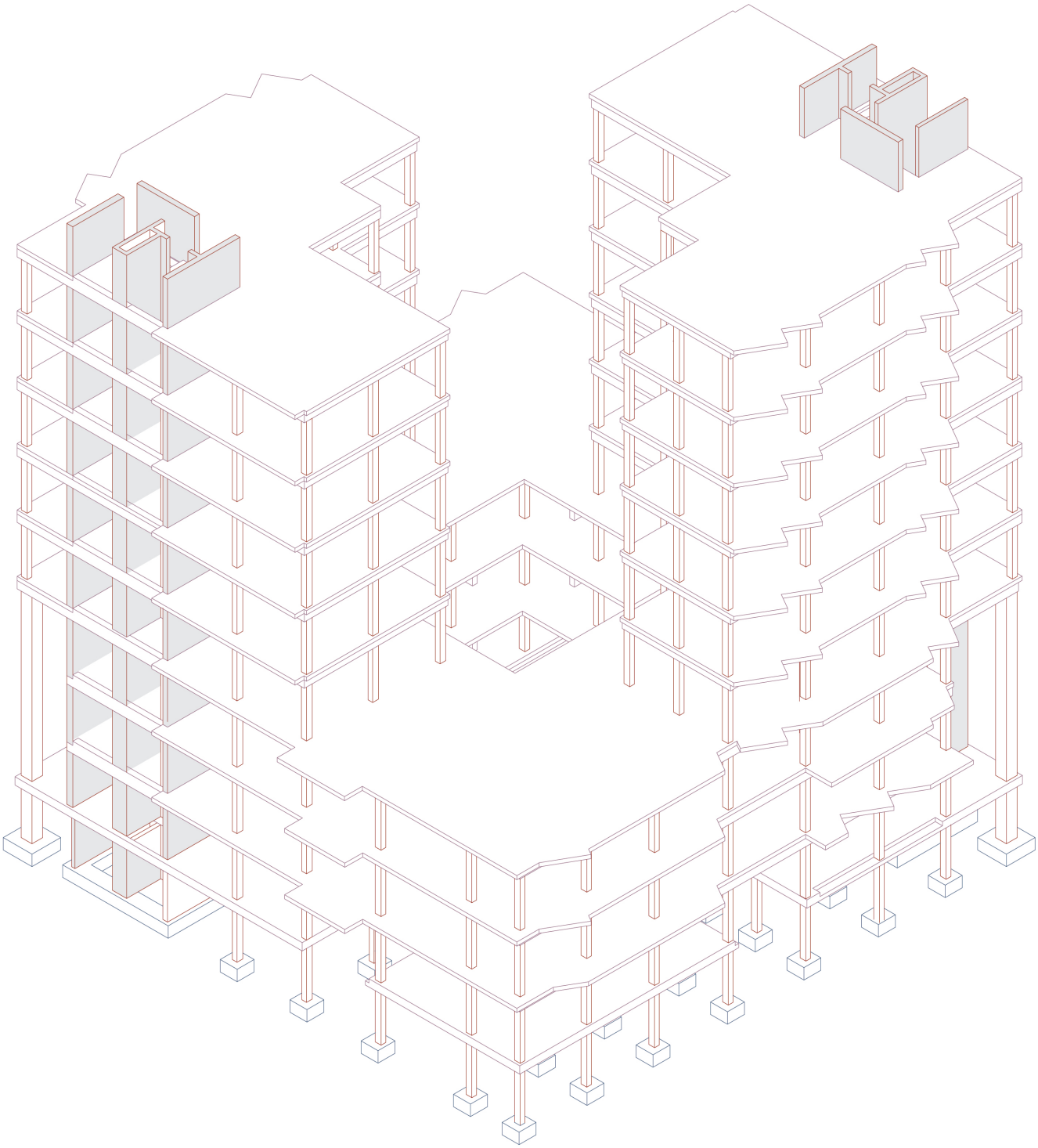
Cultural acceptance

Sustainability

PRINCIPLE STRUCTURE

LOAD-BEARING STRUCTURE

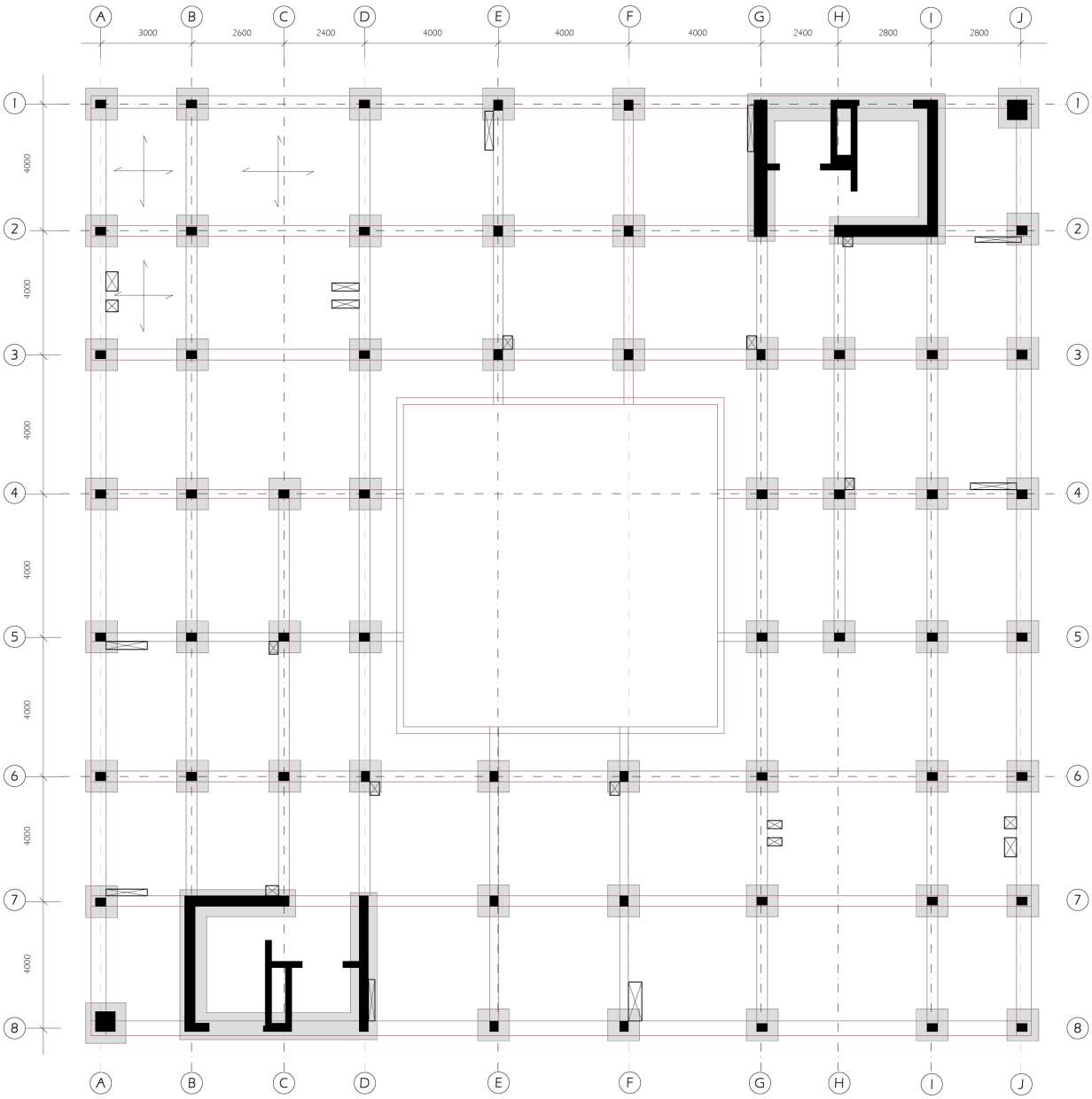
Considering the availability and price of the material in the context and the height of building needed to be built, concrete frame structure is chosen for the load bearing structure. So from the foundation to the frame structure (column and beam) and floor slab are made of concrete, and the structure will be poured on site.



PRINCIPLE STRUCTURE

STRUCTURAL PLAN

The span of the beams is basically from 2.5 to 5 meters. At the northeast and southwest corner, there are two shear cores for circulation, which can enhance the lateral stability of the whole structure. The floor slab is two-way concrete slab.

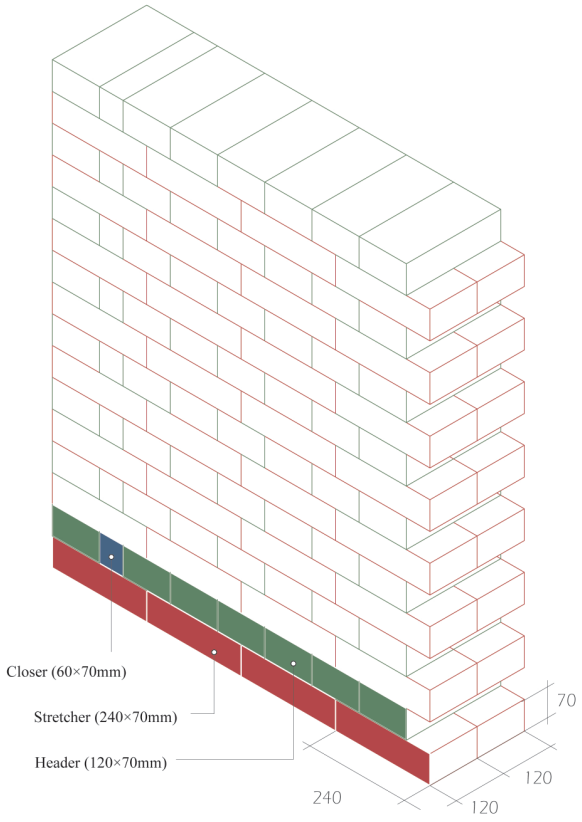


Structural plan 1:200

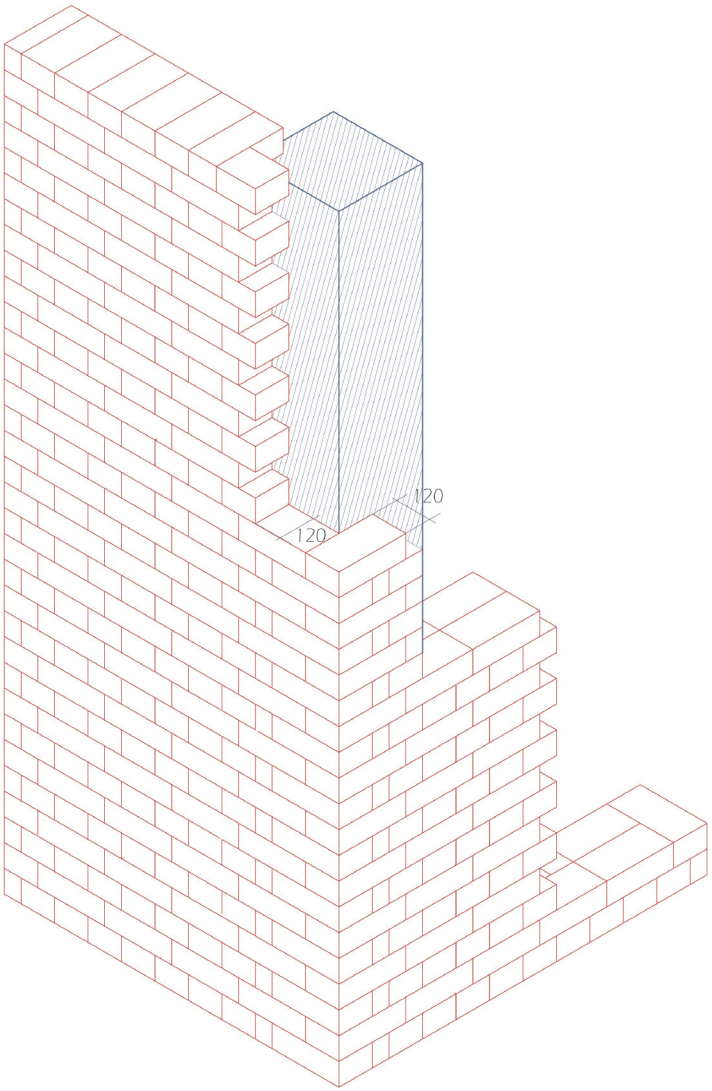
PRINCIPLE STRUCTURE

BRICK INFILL

After building the loadbearing structure, the frame will then be filled with brick walls. The brick wall adopts English bond, and on the external facade, the columns are hidden behind the bricks.

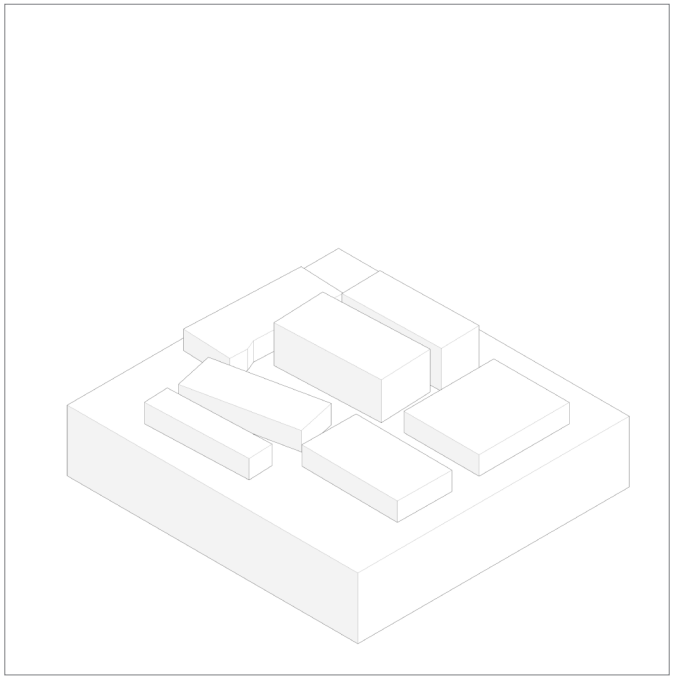


English bond

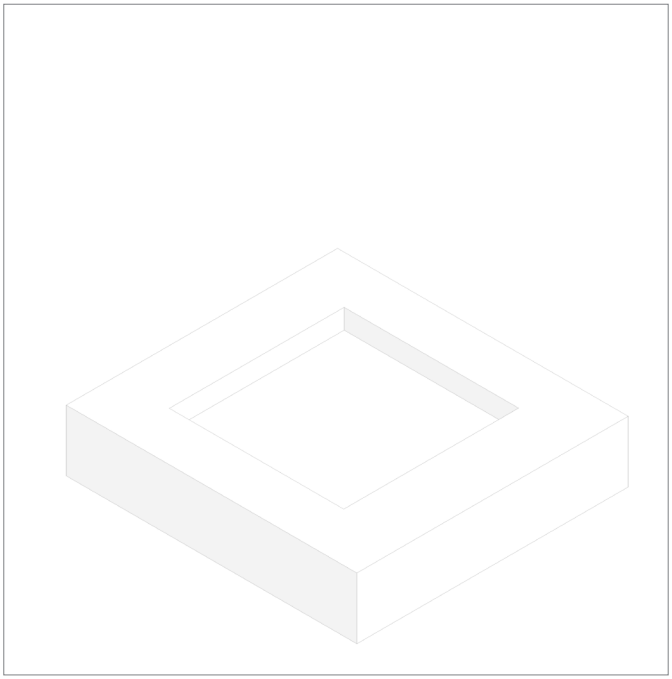


Hide the column

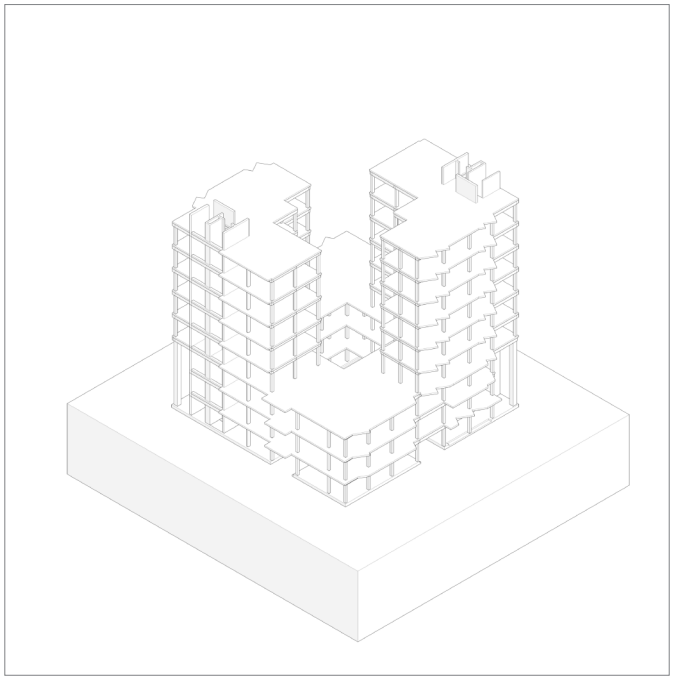
CONSTRUCTION PROCESS



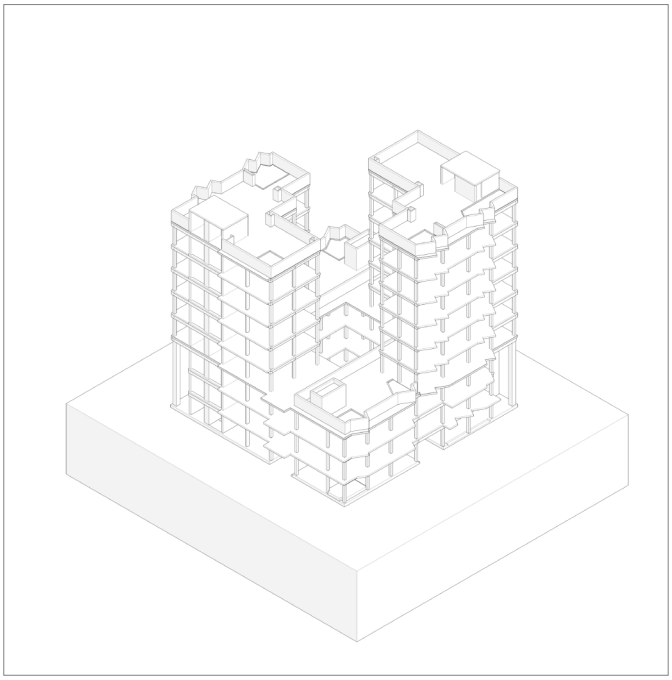
1 Site preparation



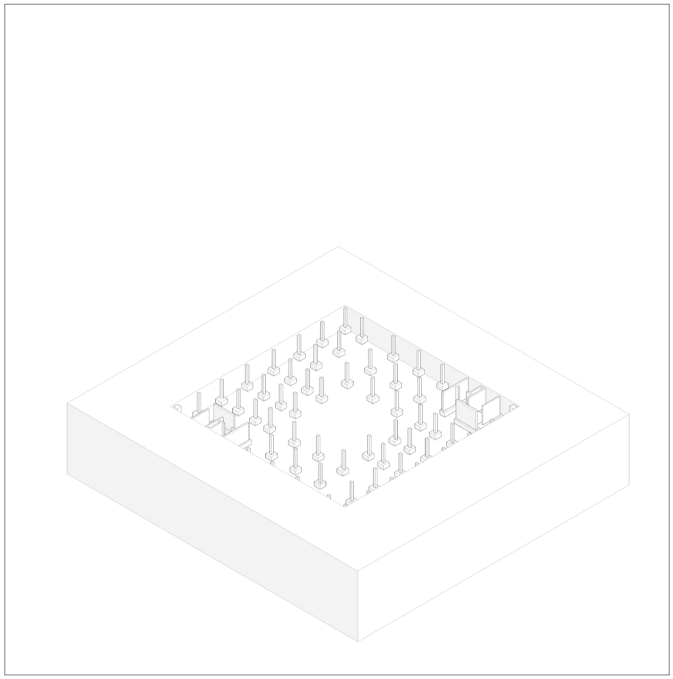
2 Excavation



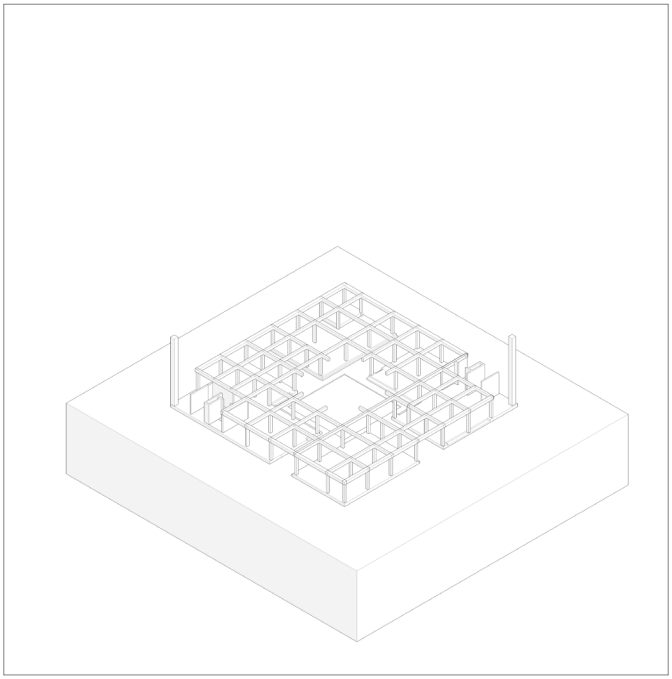
5 Repeat on each floor



6 Roof & waterproof

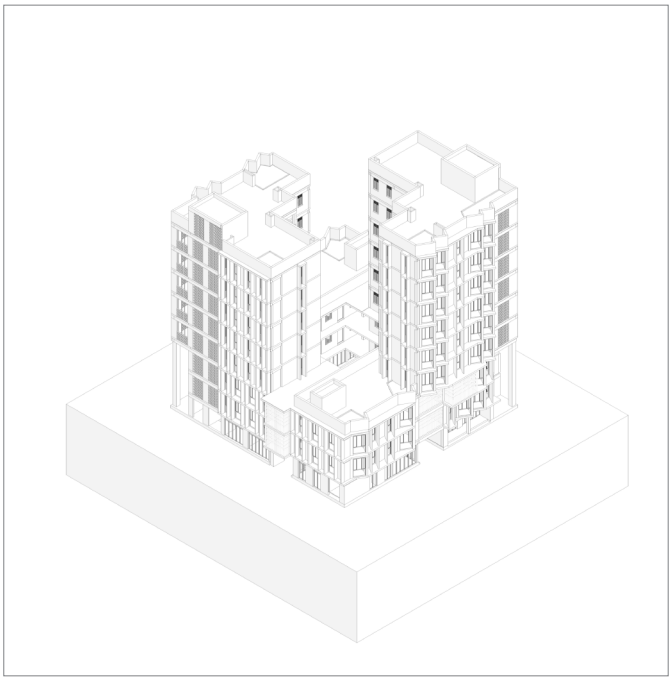


3 Foundation



4 Concrete frame one floor

7 Brick infill



8 Door & window

ENVIRONMENTAL STRATEGY

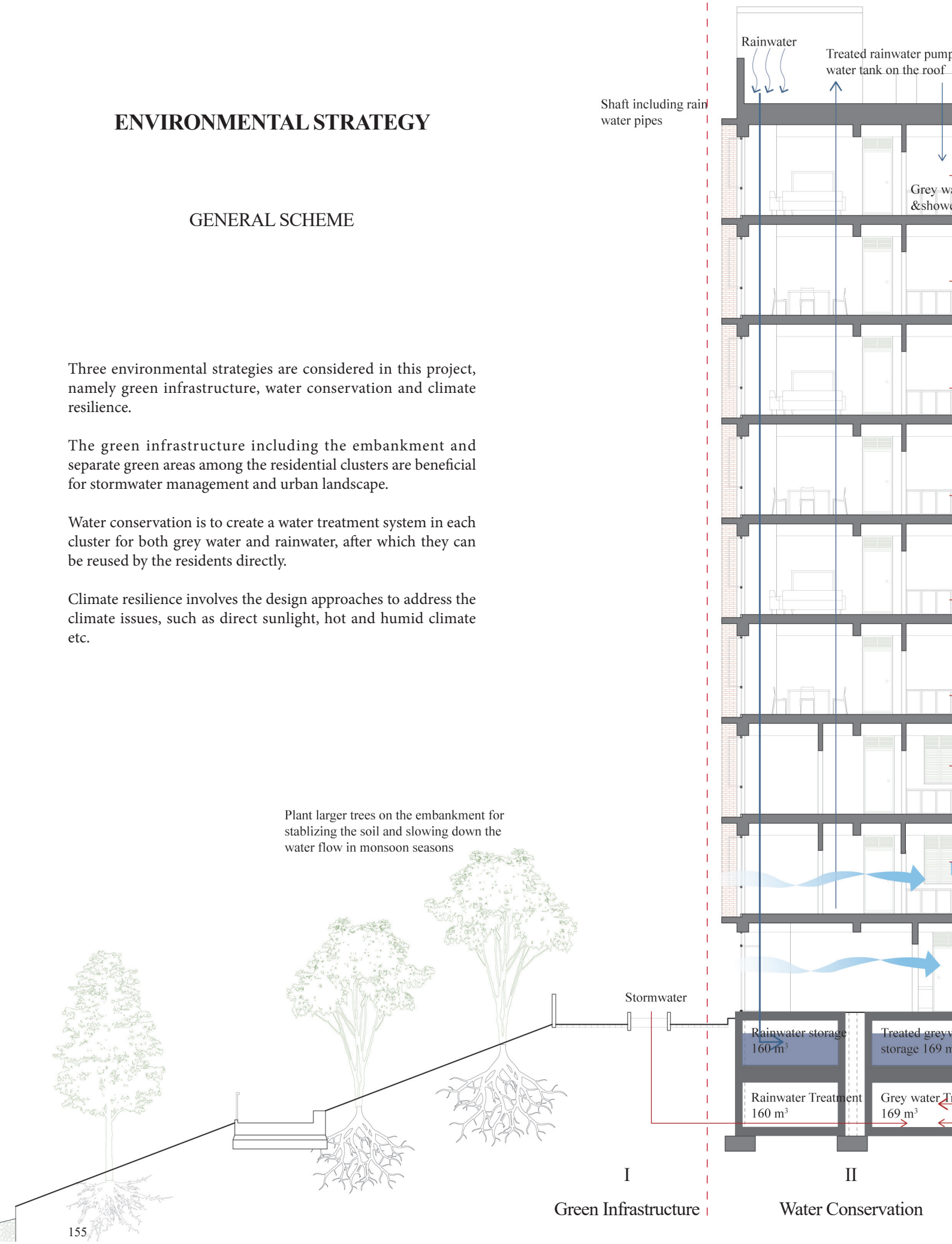
GENERAL SCHEME

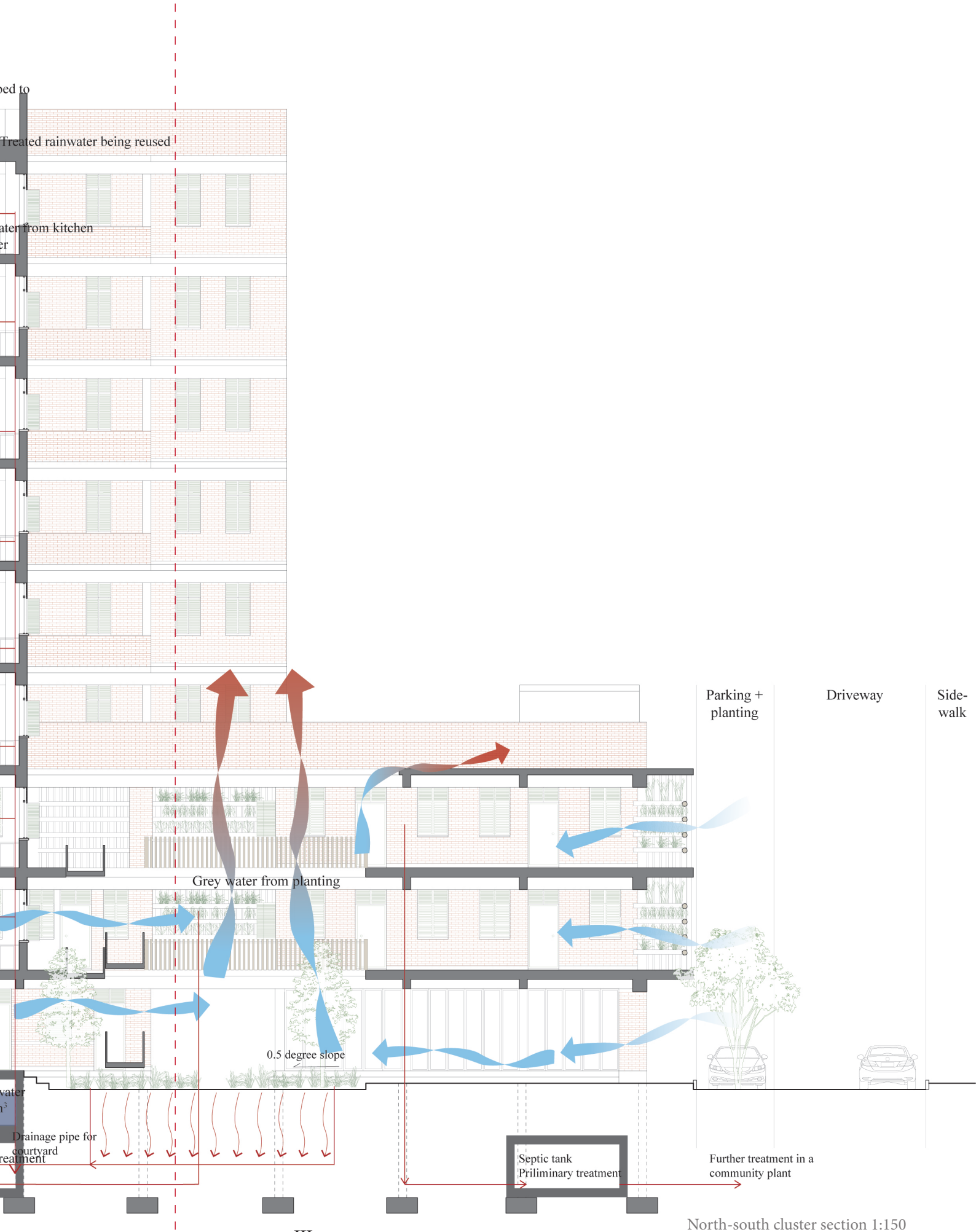
Three environmental strategies are considered in this project, namely green infrastructure, water conservation and climate resilience.

The green infrastructure including the embankment and separate green areas among the residential clusters are beneficial for stormwater management and urban landscape.

Water conservation is to create a water treatment system in each cluster for both grey water and rainwater, after which they can be reused by the residents directly.

Climate resilience involves the design approaches to address the climate issues, such as direct sunlight, hot and humid climate etc.





III

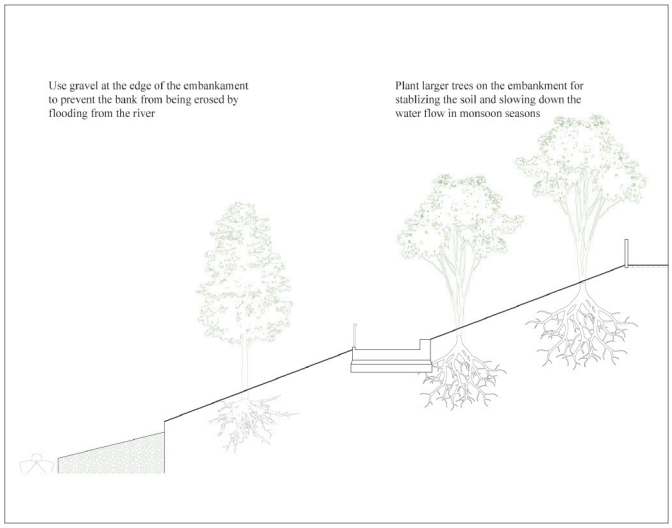
Climate Resilience

ENVIRONMENTAL STRATEGY

GREEN INFRASTRUCTURE

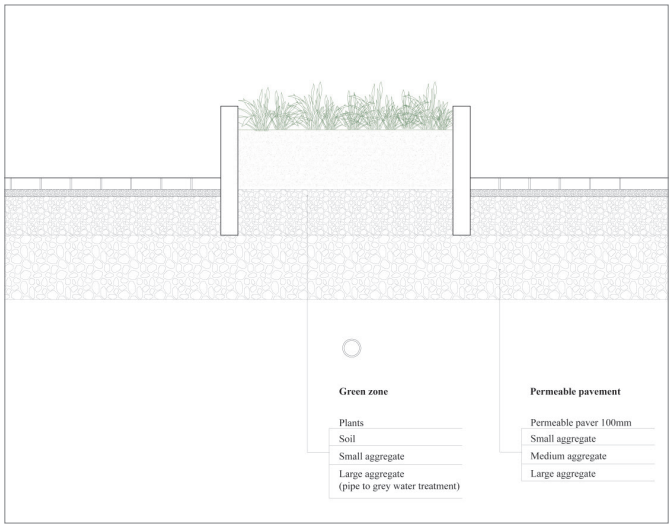
On the urban scale, there are mainly two types of green spaces in this project, the riverside large landscape and the courtyards & green zones in or among the clusters. The embankment is proposed to be all green, planting with larger trees, so that the roots may help to stabilize the embankment especially when severe flooding happens. The green zones among the clusters are used to adjust micro climate in the community, and also as a way to collect the stormwater.

Overall green map



Green embankment

Stabilize the river bank+landscape



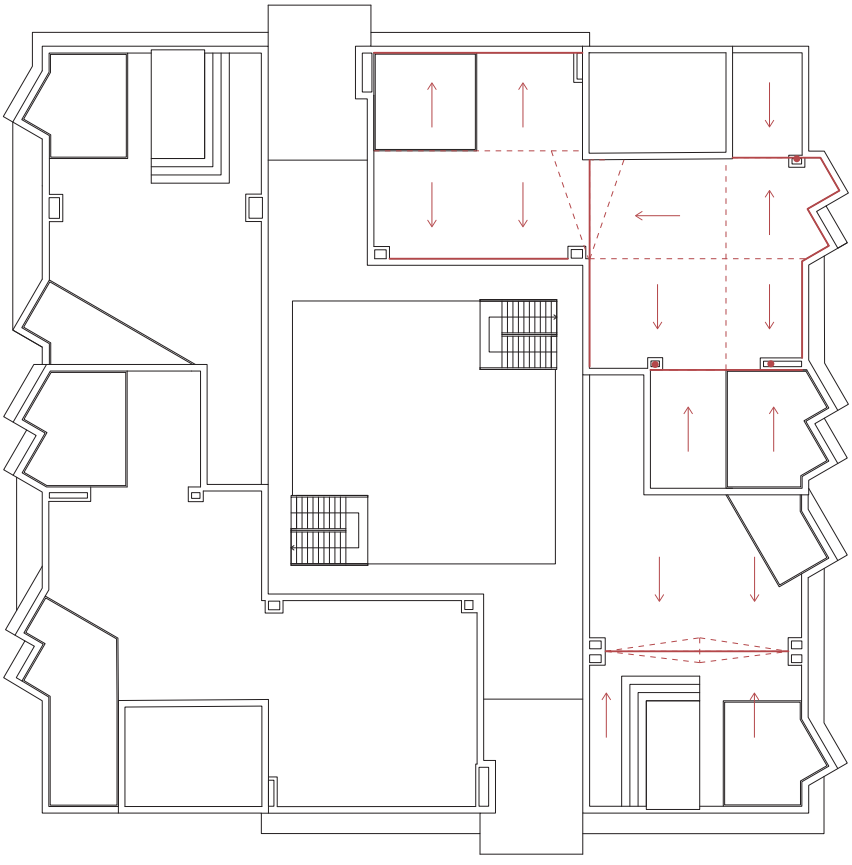
Green zones & permeable pavement

Stormwater management

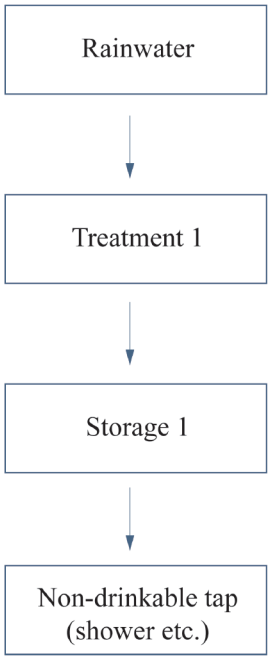
ENVIRONMENTAL STRATEGY

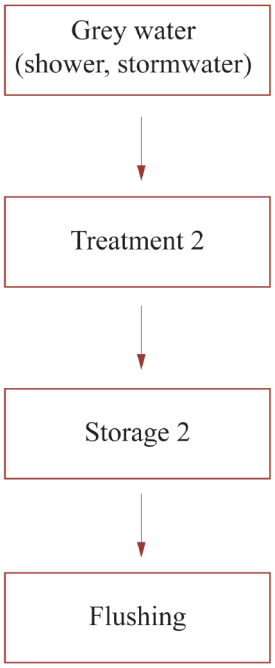
WATER CONSERVATION

Considering the climate, rainwater may have a large impact on human living, so this project also takes the water treatment into account. The basic principle is that there are two separate treatment and storage systems, for rainwater and grey water repectively. The treated rainwater can be reused by non-drinkable tap like shower, while the treated grey water is mainly used for flushing. The major tanks are underground, and there are several smaller ones on the roof top, so the water will be firstly pumped (1-2 times a day) from the underground tank to the roof, and then goes down to each household. The capacity of each water tank is decided according to the quantity of rainwater in monsoon season and the daily water usage of that area.



Rainwater drainage on roof





Rainwater harvesting

For a flat roof, around 70% of the rainwater can be collected, and go to the treatment tank, after that, the treated water will be stored and pumped to be reused for shower, irrigation and other non-drinkable tap.

Calculation:

Roof area of a cluster: 576 m^2
Maximum rainfall per day: 303.8 mm
collection rate: 70%

Maximum collection capacity:
576 m^2×0.3 m ×70% = 121 m^3

Grey water reycling and reuse

Grey water include the waste water from laundry and shower, and the stormwater collected from the street, after treatment, they can be reused for flushing

Calculation:

Number of residents (average): 228
Water consumption per person: 100 L/day

Water consumption of a cluster per day:
228×100 L =22800L=22.8 m^3

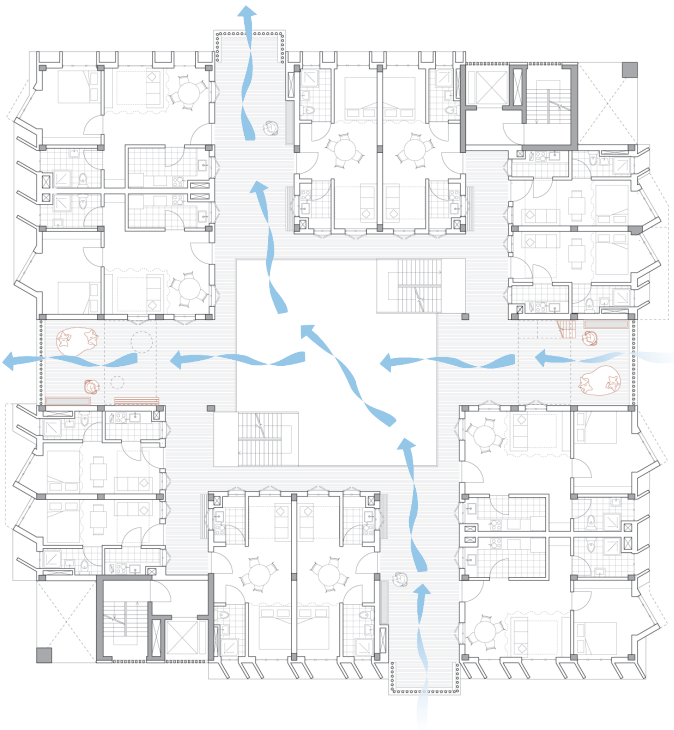
Reusability: 60%-80%

ENVIRONMENTAL STRATEGY

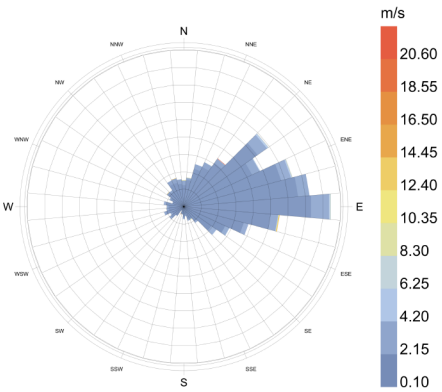
CLIMATE RESILIENCE

Ventilation

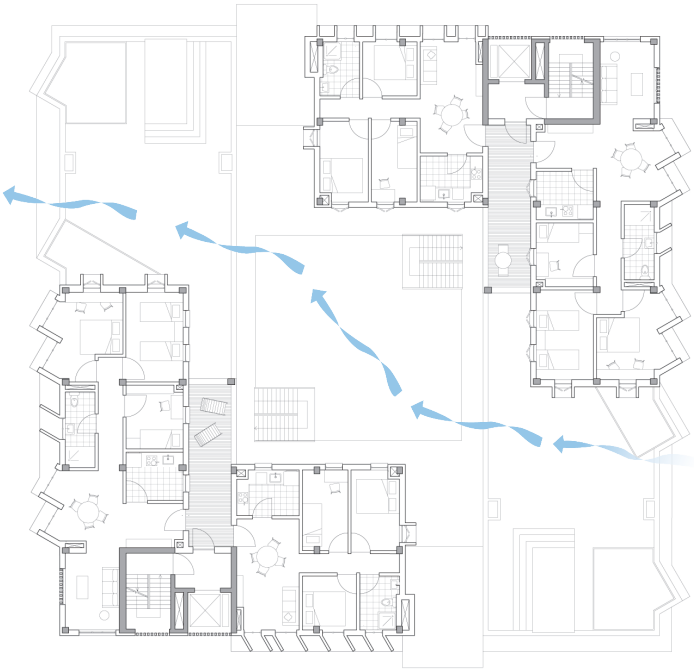
According to the climate analysis, the prevailing wind in Sylhet is from east, northeast and southeast, so in order to maximize the effects of passive ventilation, in building scale, for low-income housing levels, the bamboo facade is used on all four sides allowing the ventilation in both direction, while on middle-income levels, the two corners are open. On unit scale, every housing unit is naturally ventilated, with windows for kitchen, toilet, living space and sleeping area.



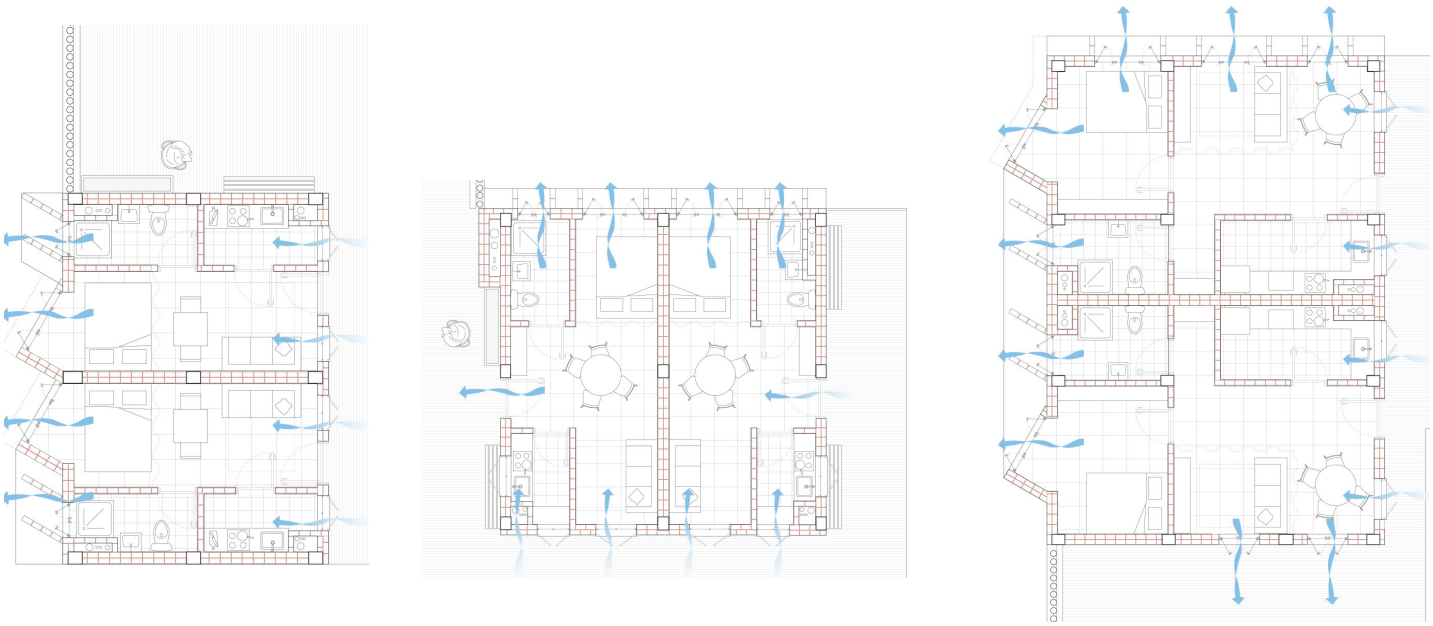
Cross ventilation at low-income level



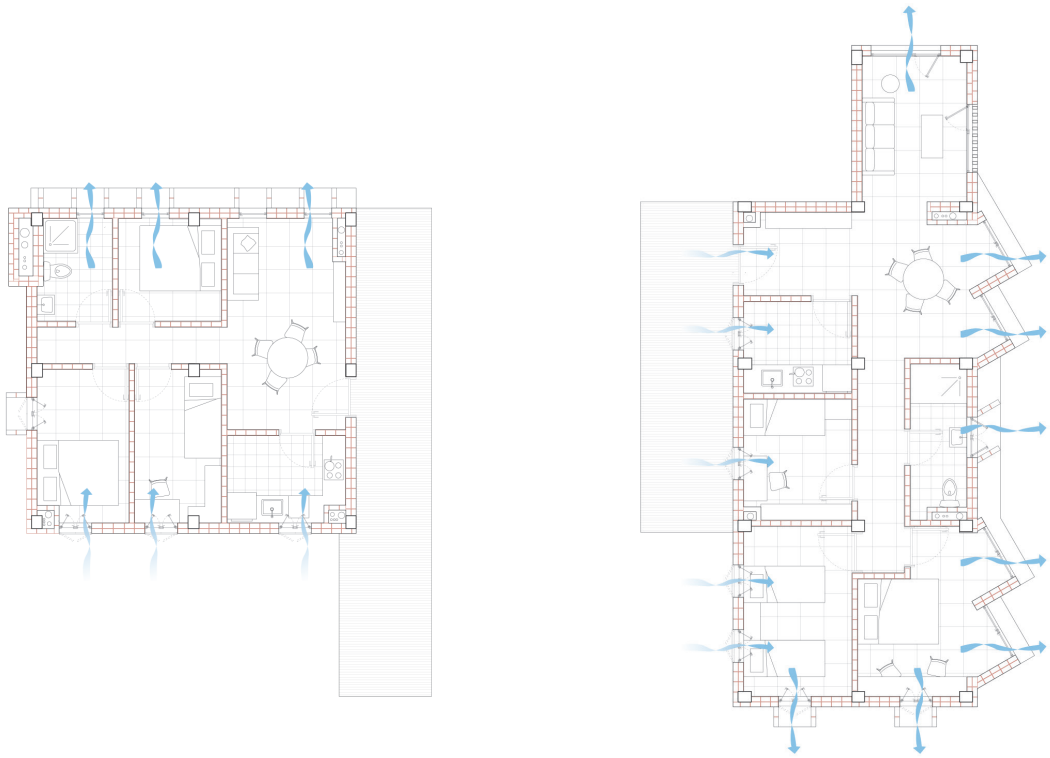
Windrose of Sylhet



Cross ventilation at middle-income level



Passive ventilation in low-income housing units



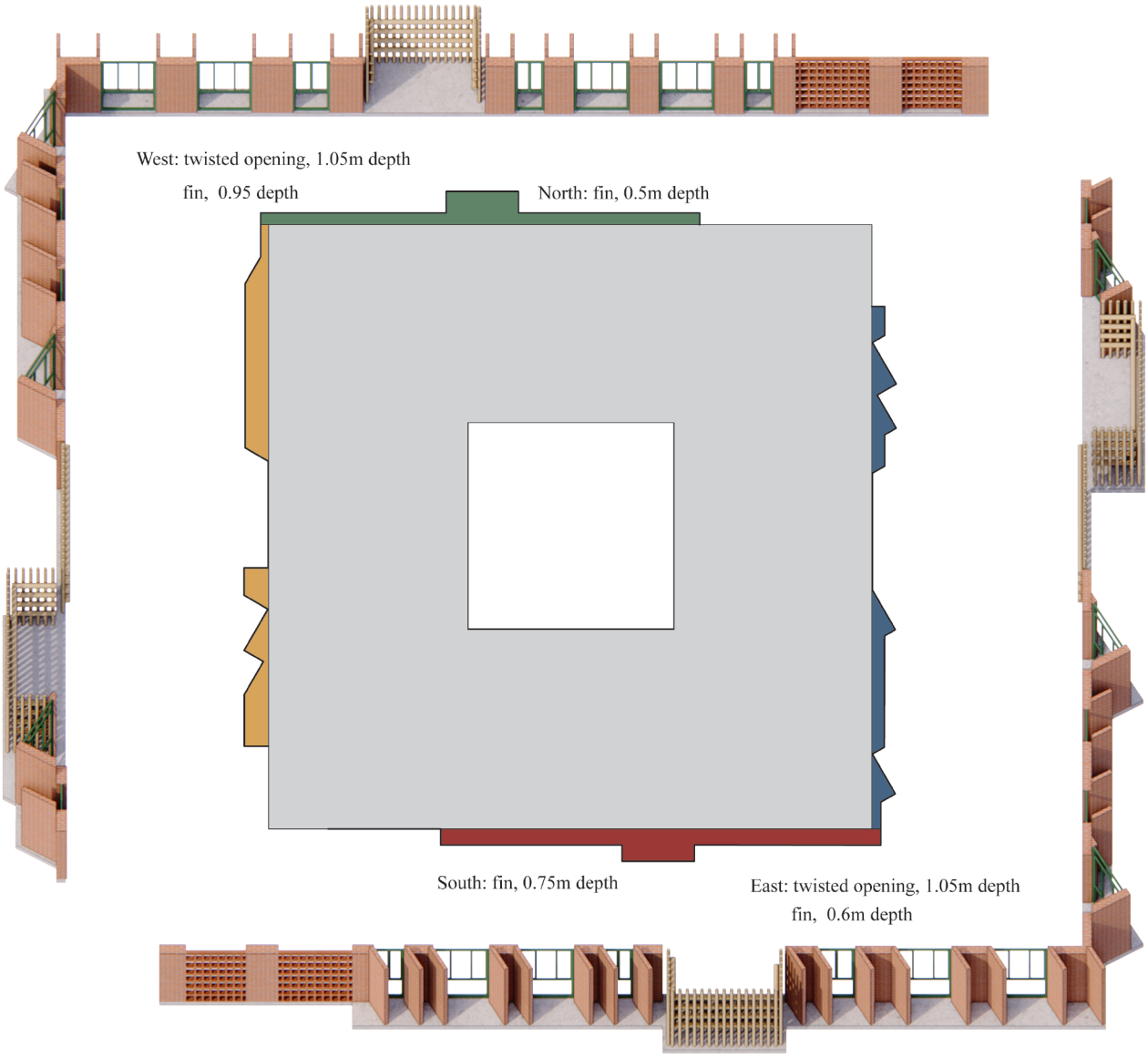
Passive ventilation in middle-income housing units

ENVIRONMENTAL STRATEGY

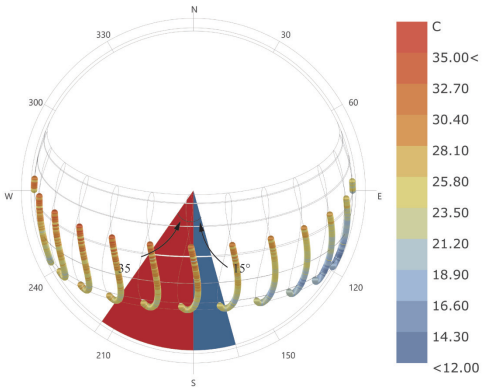
CLIMATE RESILIENCE

Solar protection

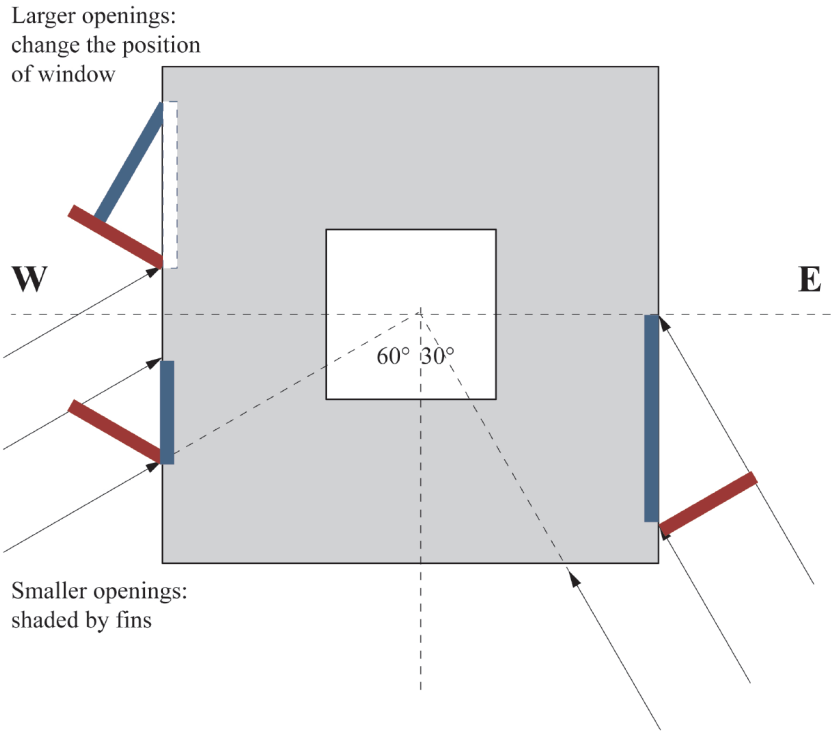
Based on the climate information, the shading on four sides are designed differently. On the north and south side, shading mainly depends on the depth of the overhang, and the one on the south is deeper than the north one. On the east and west side, the small openings (less than 1m wide) also adopt fins, but for those large openings, the window itself is twisted to avoid a long fin or a small angle between fin and facade.



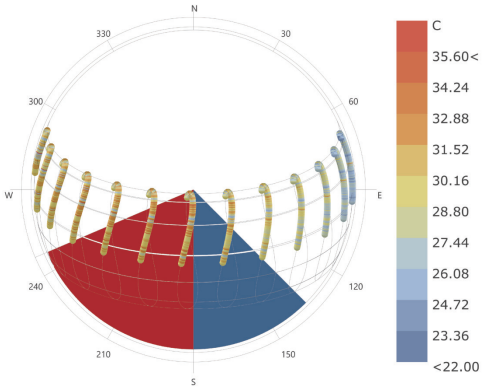
Shading design on different facades



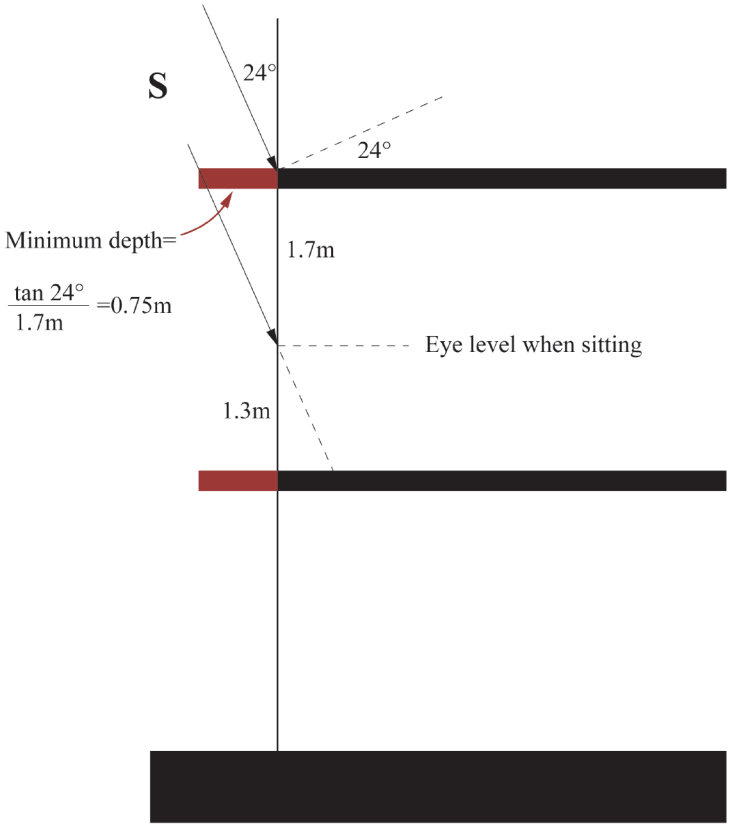
Sunlight in winter



Analysis of solar protection on the east & west



Sunlight in summer

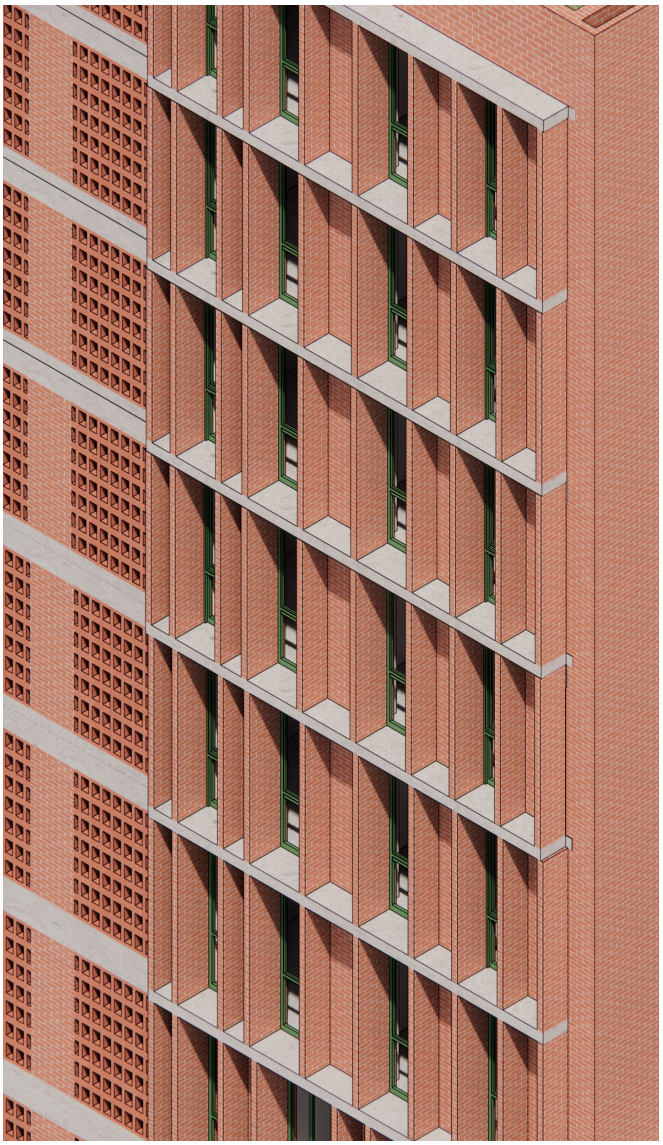


Analysis of solar protection on the south

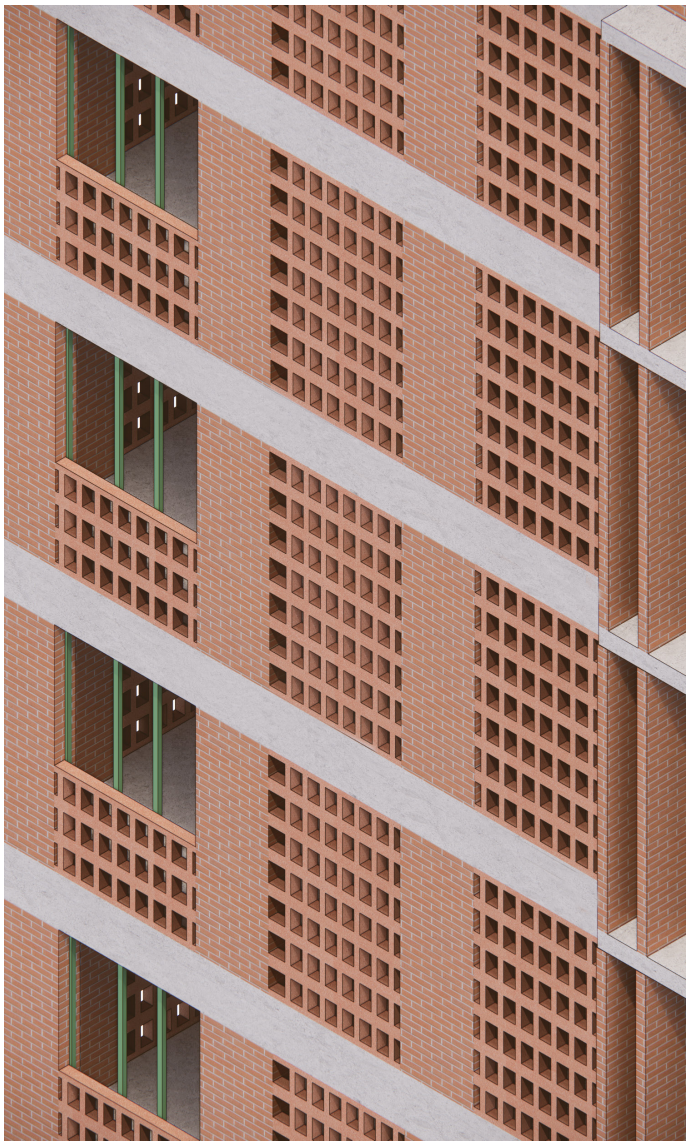
FACADE

CONCEPT: 3 TYPES

As described in the previous pages, brick fin is the primary form of the facade, but there are two other types. For the circulation space of middle income group at the corner, open brick is used for facade; while the common space of low-income floors adopts bamboo planting facade.



Brick fin

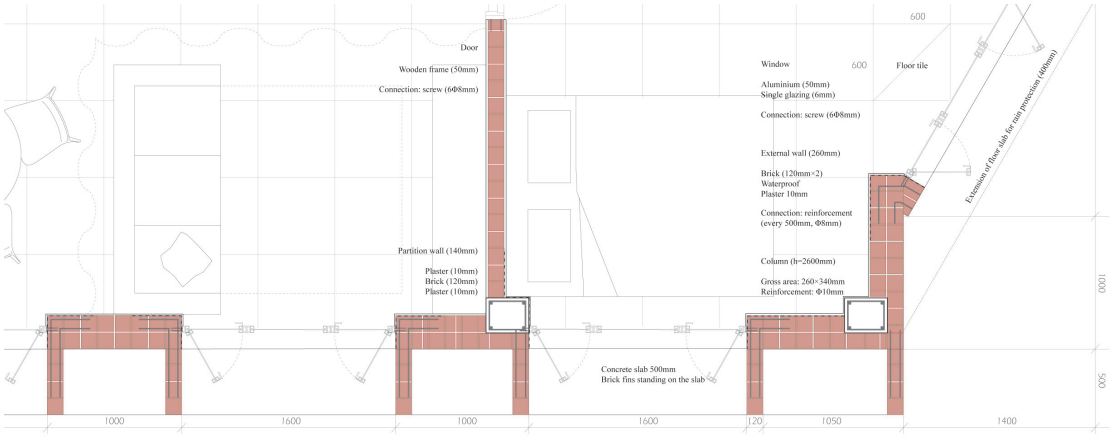


Open brick

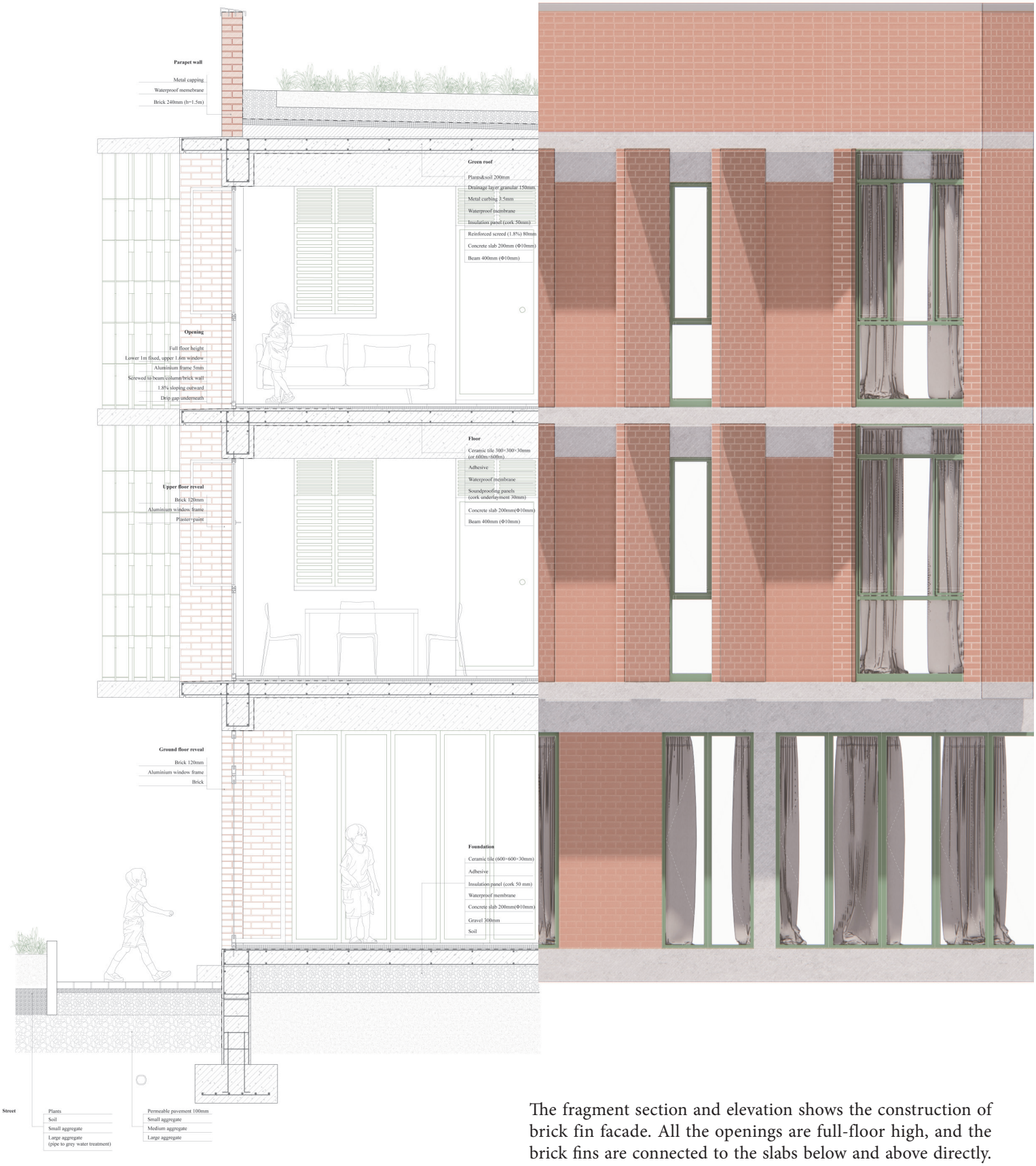
Bamboo

FACADE

FRAGMENT (NORTH-FACING)



FRAGMENT (WEST-FACING)

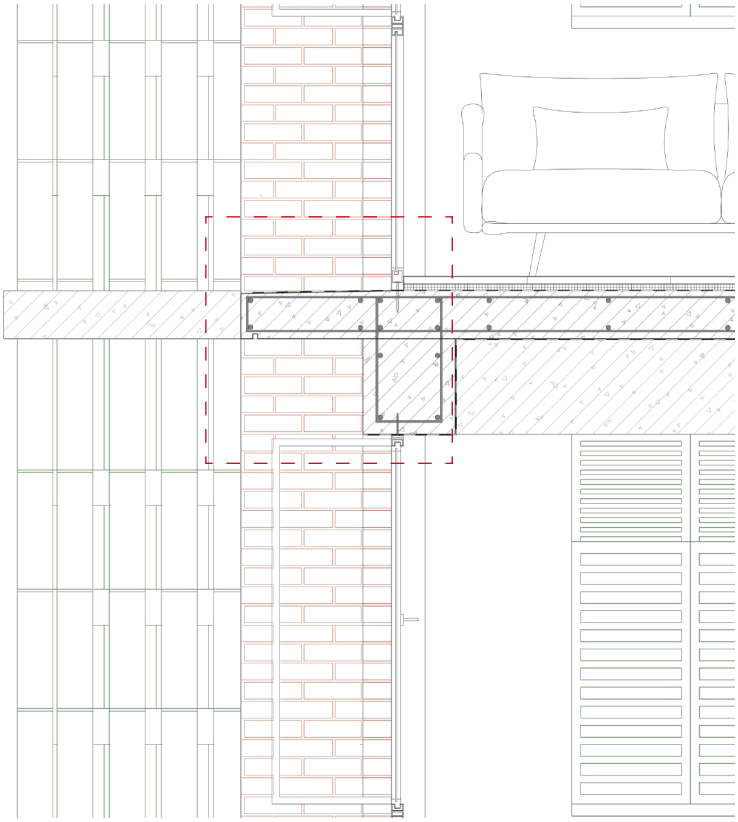


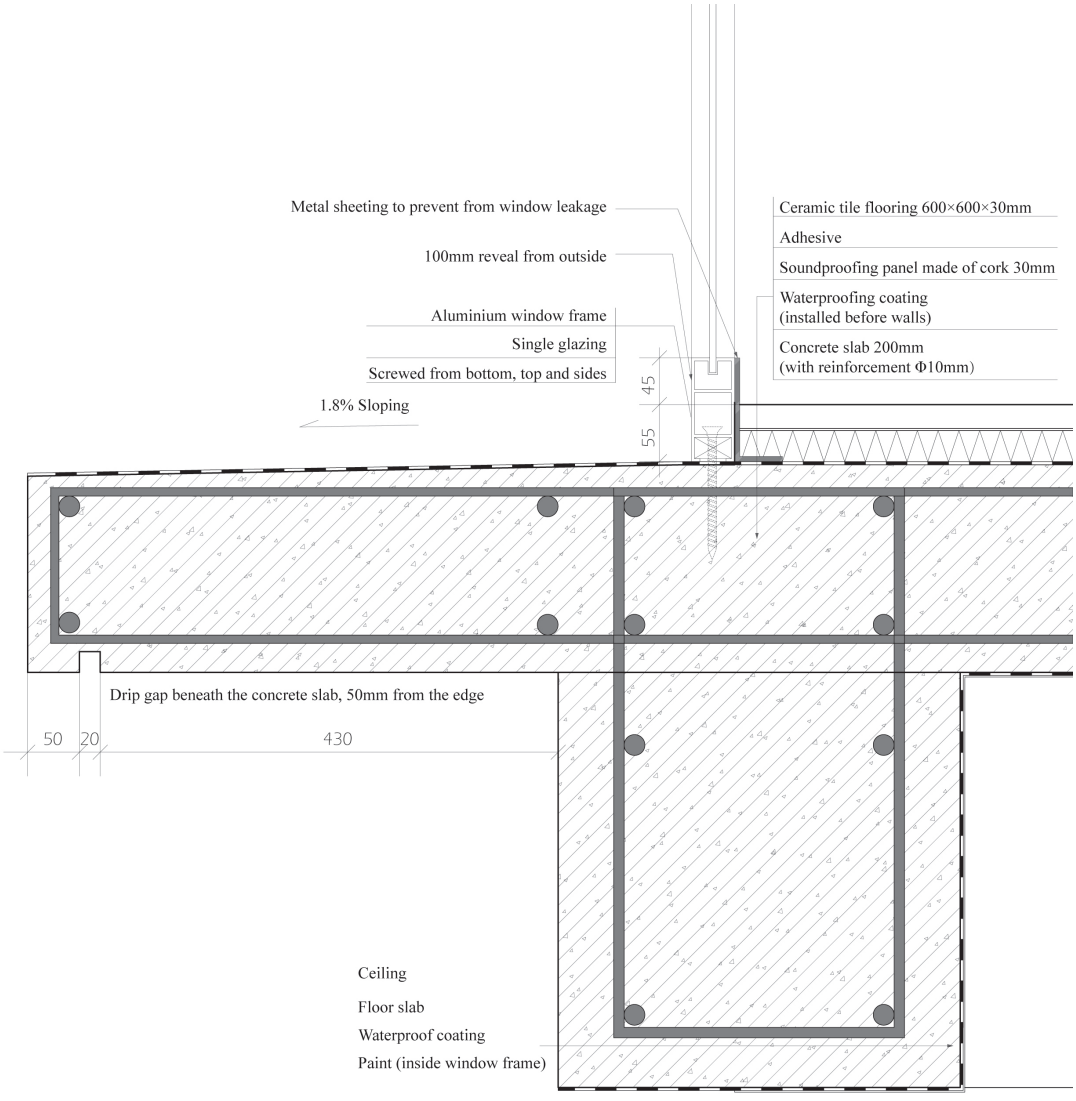
The fragment section and elevation shows the construction of brick fin facade. All the openings are full-floor high, and the brick fins are connected to the slabs below and above directly. On the elevation, beams and slabs are exposed but columns are hidden.

FACADE

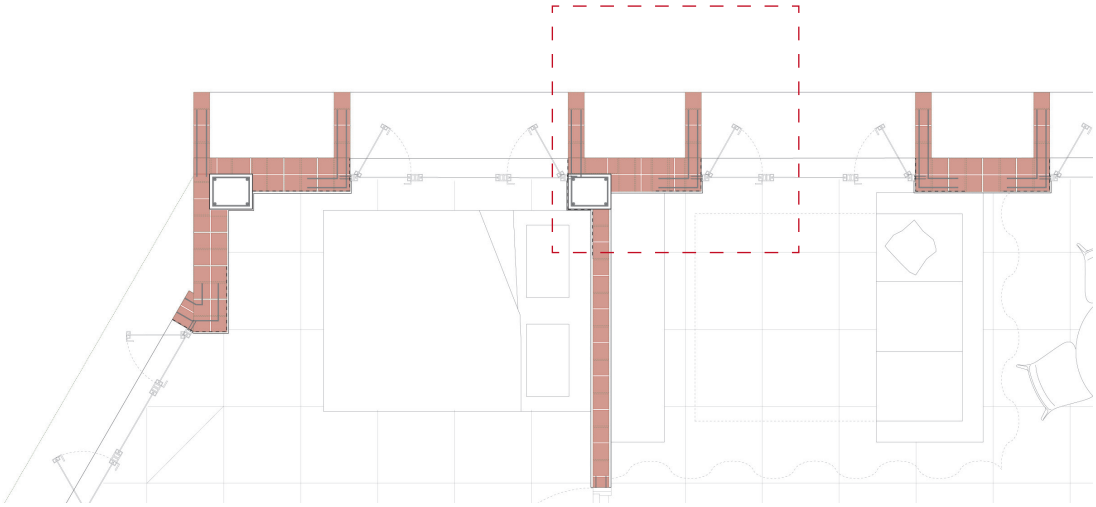
DETAIL

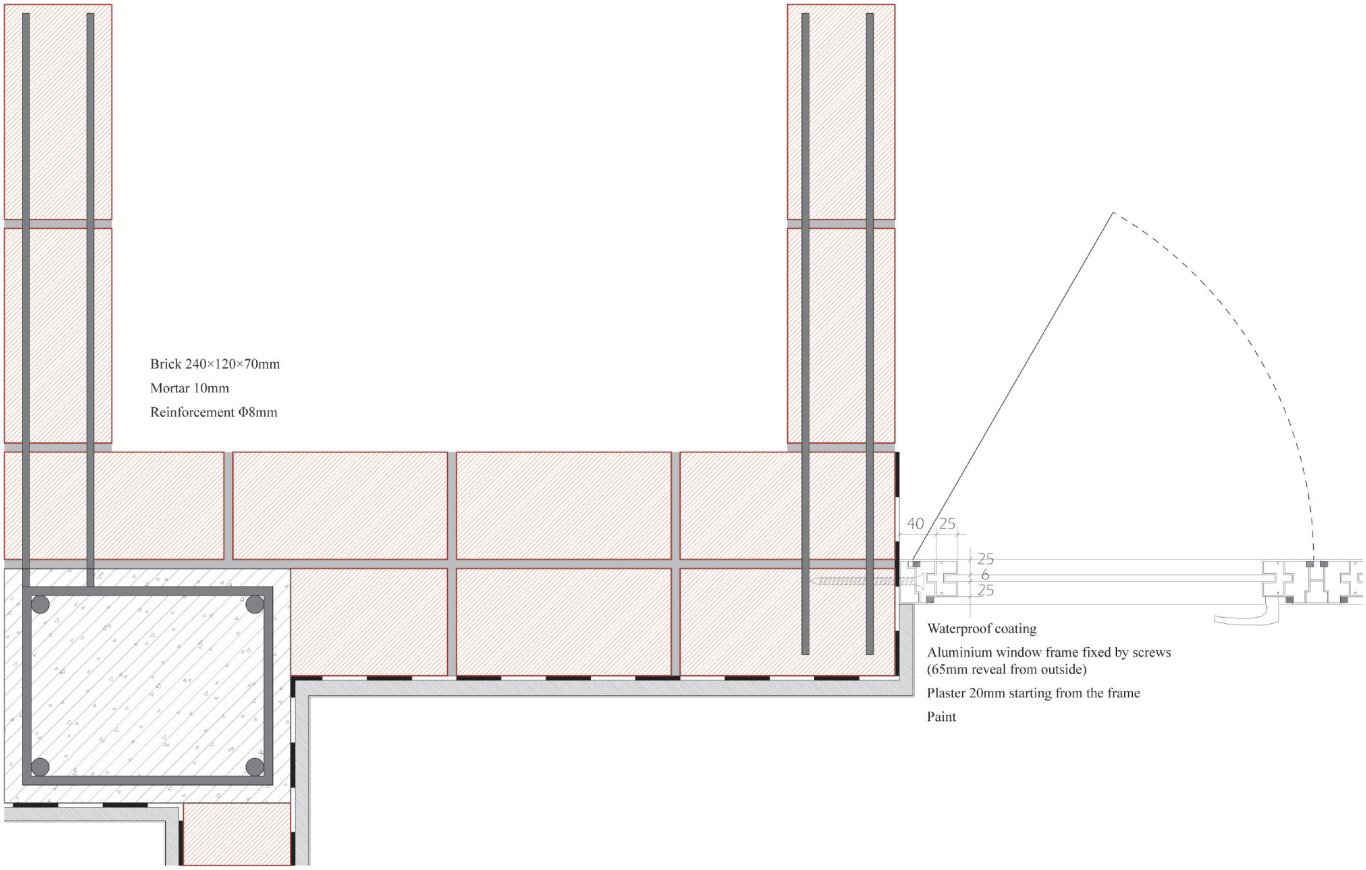
Floor&window





Wall&window



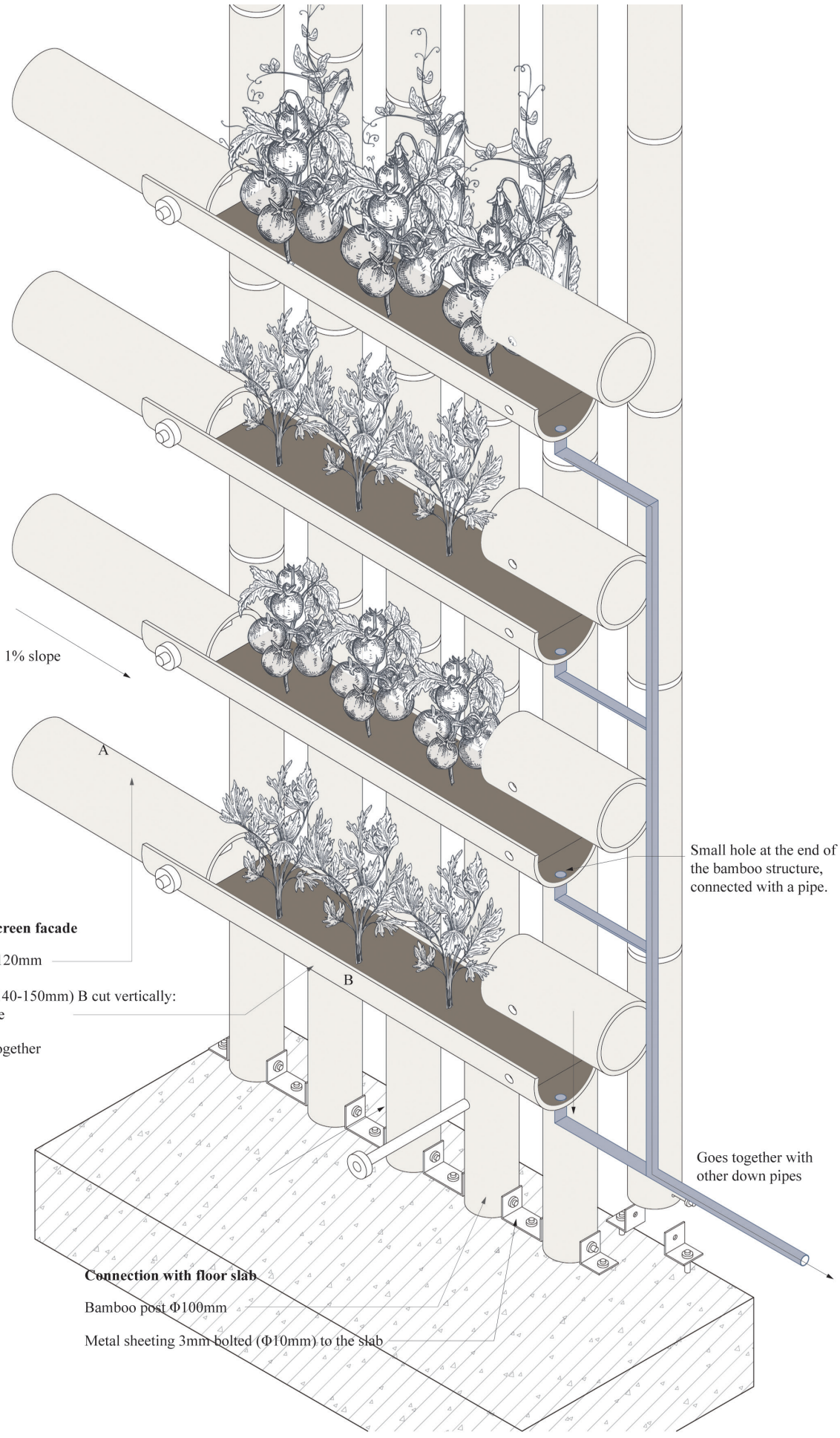

Brick 240×120×70mm
Mortar 10mm
Reinforcement Φ8mm
40
25
25
6
25
Waterproof coating
Aluminium window frame fixed by screws
(65mm reveal from outside)
Plaster 20mm starting from the frame
Paint

FACADE

DETAIL

Bamboo facade

In the bamboo planting facade, the vertical posts are firstly bolted to the floor slabs, and then the horizontal elements are bolted to the posts. Since the horizontal ones need to hold soil and plants inside, thicker bamboos are selected. Considering the drainage, the horizontal bamboos have 1 degree sloping to one side, and at the lowest point, a pipe is connected, which finally goes to the shaft nearby as the other down pipes.



Bamboo planting screen facade

Bamboo pieces A Φ120mm

Thicker bamboo (Φ140-150mm) B cut vertically:
Soil and plants inside

Bolt A, B and post together

Connection with floor slab

Bamboo post Φ100mm

Metal sheeting 3mm bolted (Φ10mm) to the slab

09 MANAGERIAL STRATEGY

- Stakeholder analysis
- Financial model
- Operation & maintenance
- Phasing
- Socio-spatial data comparison

PROJECT STAGES & STAKEHOLDER

Current mode

Land owned by the railway company

ca. 200 Low-income households

Pay rents to a third party

Task

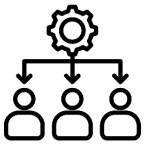
Stage 1  **Transfer of land ownership**

Stage 2  **Set up a private-public partnership (ppp)**

Stage 3  **Planning and design**

Stage 4  **Financing**

Stage 5  **Construction**

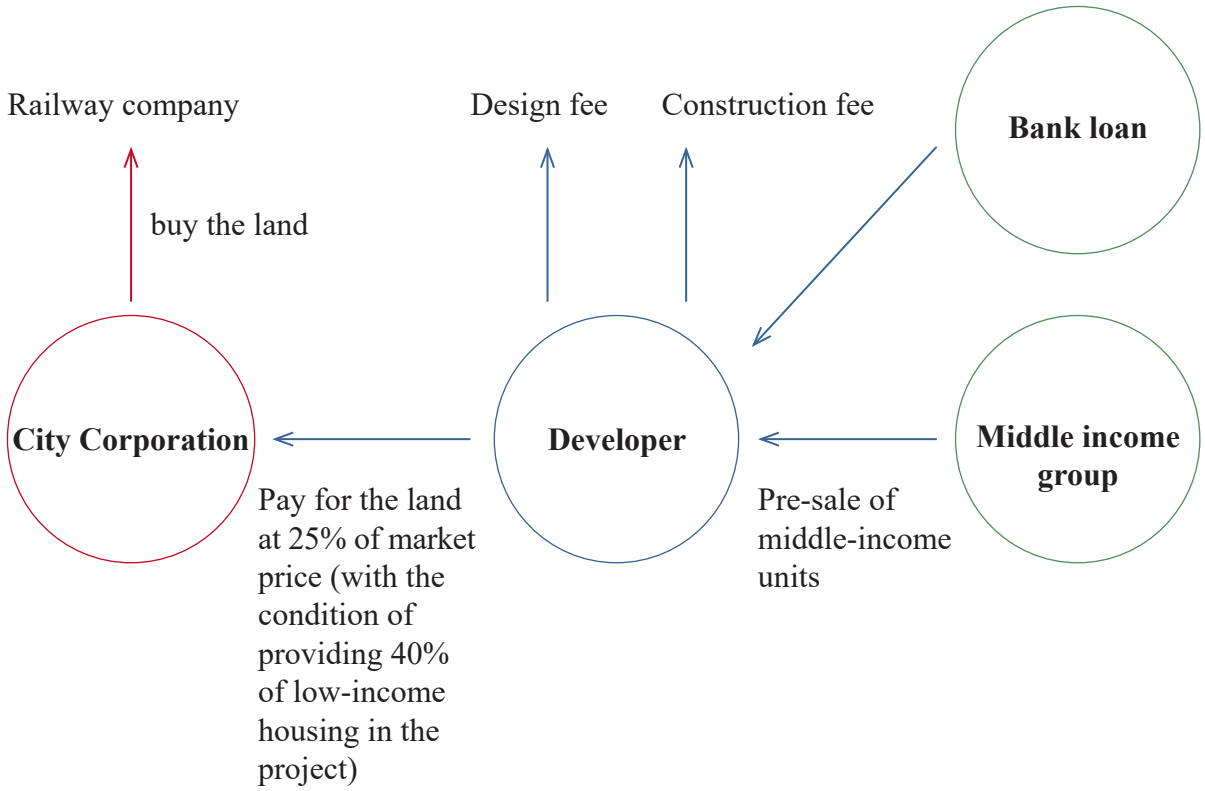
Stage 6  **Operation**

Ownership

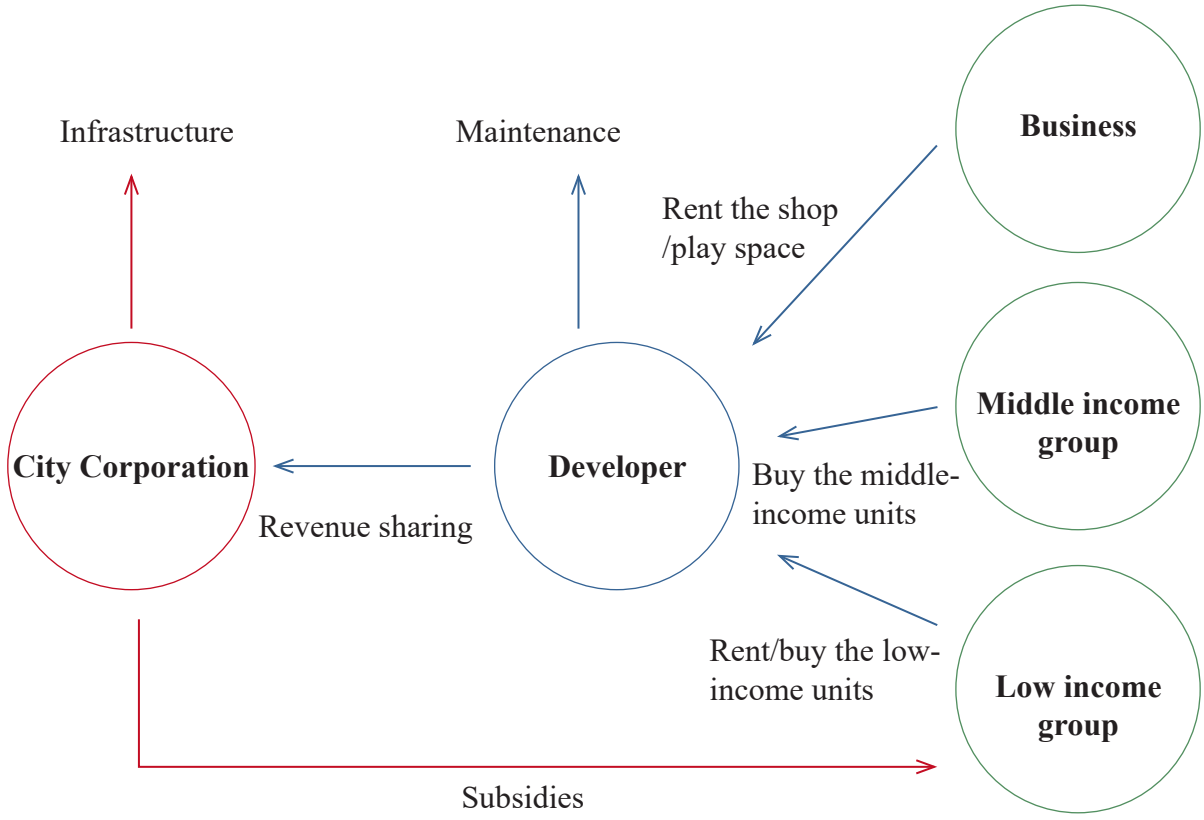
Stakeholder	Responsibility
Railway company	Current land owner
City Corporation	New land owner
City Corporation Private developer	Agree on a coorporation scheme
Private developer	Hire an architectural firm
City Corporation	Regulation, Evaluation
Architectural firm	Design the project
Private developer	Pre-sale of the property; bank loan
City Corporation	Provide financial support or incentives
Private developer	Hire the construction team
City Corporation	Regulation, Evaluation
Construction team	Construct the project
Private developer	Maintenance, service delivery, risk management
City Corporation	Regulation, supervision
Property management	Manage and coordinate the two income groups
Low-income residents	Buy/Rent the low-income units
Middle-income residents	Buy the middle-income units
Business	Rent the shop/play space
Private developer	Building
City Corporation	Land

FINANCIAL MODEL

Developing



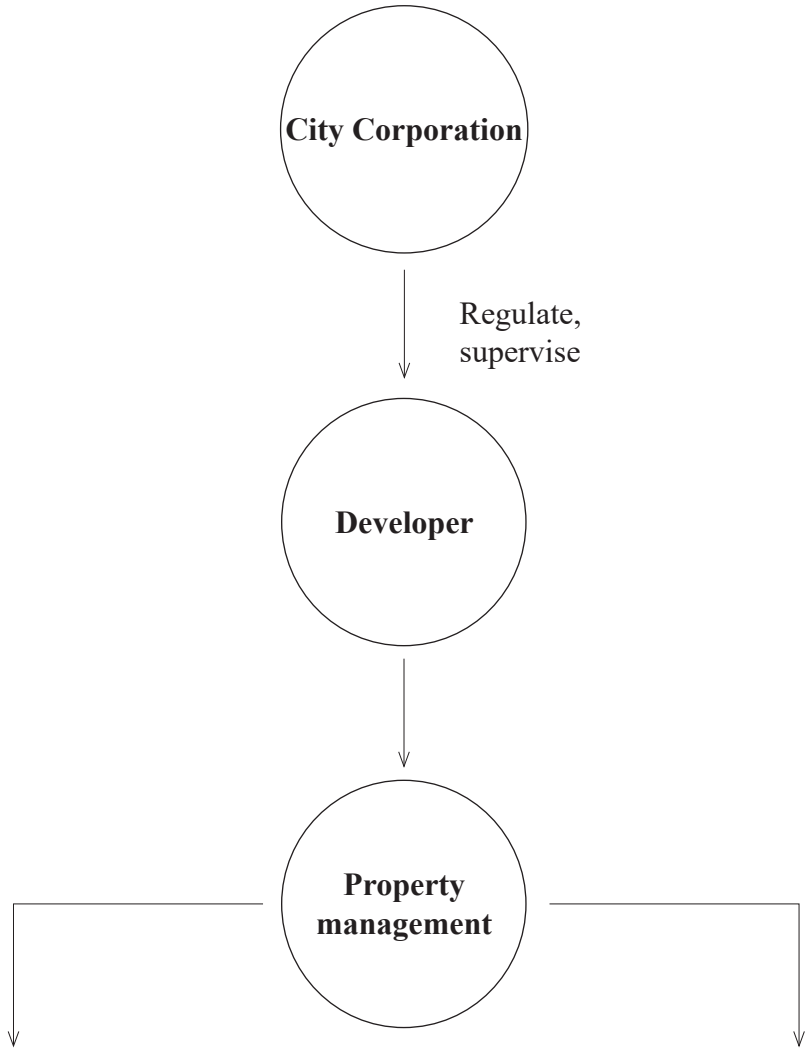
Operation


Infrastructure
Maintenance
Business
Rent the shop
/play space
Middle income
group
City Corporation
Developer
Buy the middle-
income units
Revenue sharing
Rent/buy the low-
income units
Low income
group
Subsidies

Main function list

Low-income housing			212 units	11416 m^2 (38.5%) 122,880 ft^2
	Type A	24 m^2	44 units	
	Type B	32 m^2	104 units	
	Type C	48 m^2	64 units	
	Construction costs			122,880,000 Tk
Middle-income housing			157 units	18198 m^2 (61.5%) 195,881 ft^2
	Type D	64 m^2	101 units	
	Type E	84 m^2	56 units	
	Construction costs			391,762,000 Tk
	Potential revenue			783,524,000 Tk
Shops			106 (+16) units	3891 m^2
	Riverside	24 m^2	17 units	
	Street side	24 m^2	26 units	
		25 m^2	27 units	
	Inner type	16 m^2	27 units	
		24 m^2	9 units	
	Larger type	96 m^2	16 units	
Parking			161 parking space	3758 m^2

OPERATION & MAINTENANCE



LIG resident association — Negotiate — MIG resident association

Pay rent

Lower property management fee

Follow the general instruction made by the property management

Buy units

Higher property management fee

Follow the general instruction made by the property management

Housing

Business

Rent shop/ play space

Higher property management fee

Follow the general instruction made by the property management

Commercial/play space

PHASING

1 Current site

2 Infrastructure (road), demolition for cluster 1-4 (public buildings, no need for relocation)

3 Build cluster 1-4, relocate part of the existing residents in new clusters, demolish their houses

4 Build cluster 8 and community center, demolish the rest housing

5 Build cluster 5-7 and the playground

6 Parks & amenities for Hindu community

7 Greenery

8 Riverside park

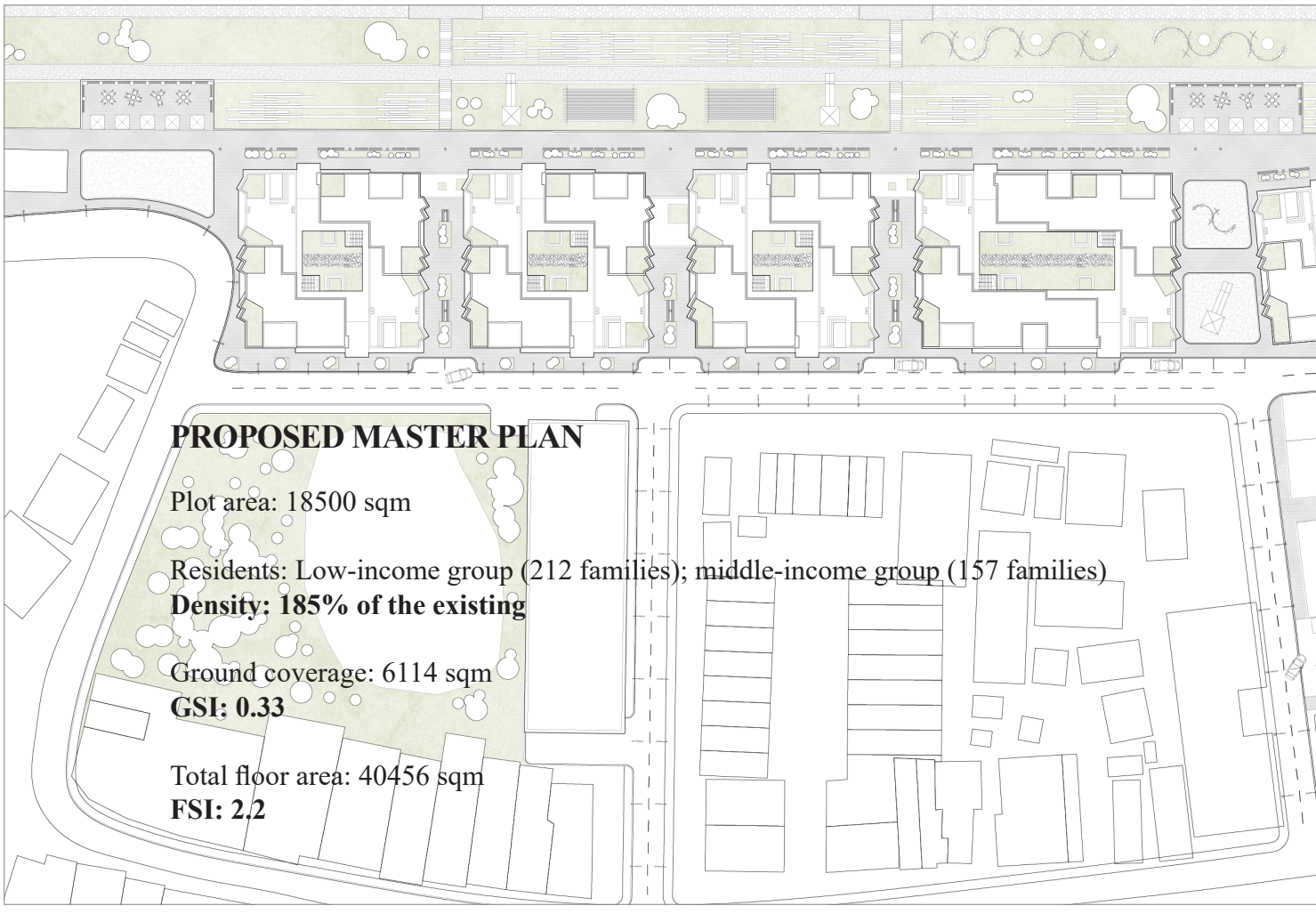
EXISTING MASTER PLAN

Plot area: 18500 sqm

Residents: Hindu community (20 families, not included in this project);
Muslim community (200 families)

Ground coverage: 5724 sqm
GSI: 0.31

Total floor area: 9870 sqm
FSI: 0.53



PROPOSED MASTER PLAN

Plot area: 18500 sqm

Residents: Low-income group (212 families); middle-income group (157 families)
Density: 185% of the existing

Ground coverage: 6114 sqm
GSI: 0.33

Total floor area: 40456 sqm
FSI: 2.2


Hindu community
Muslim community

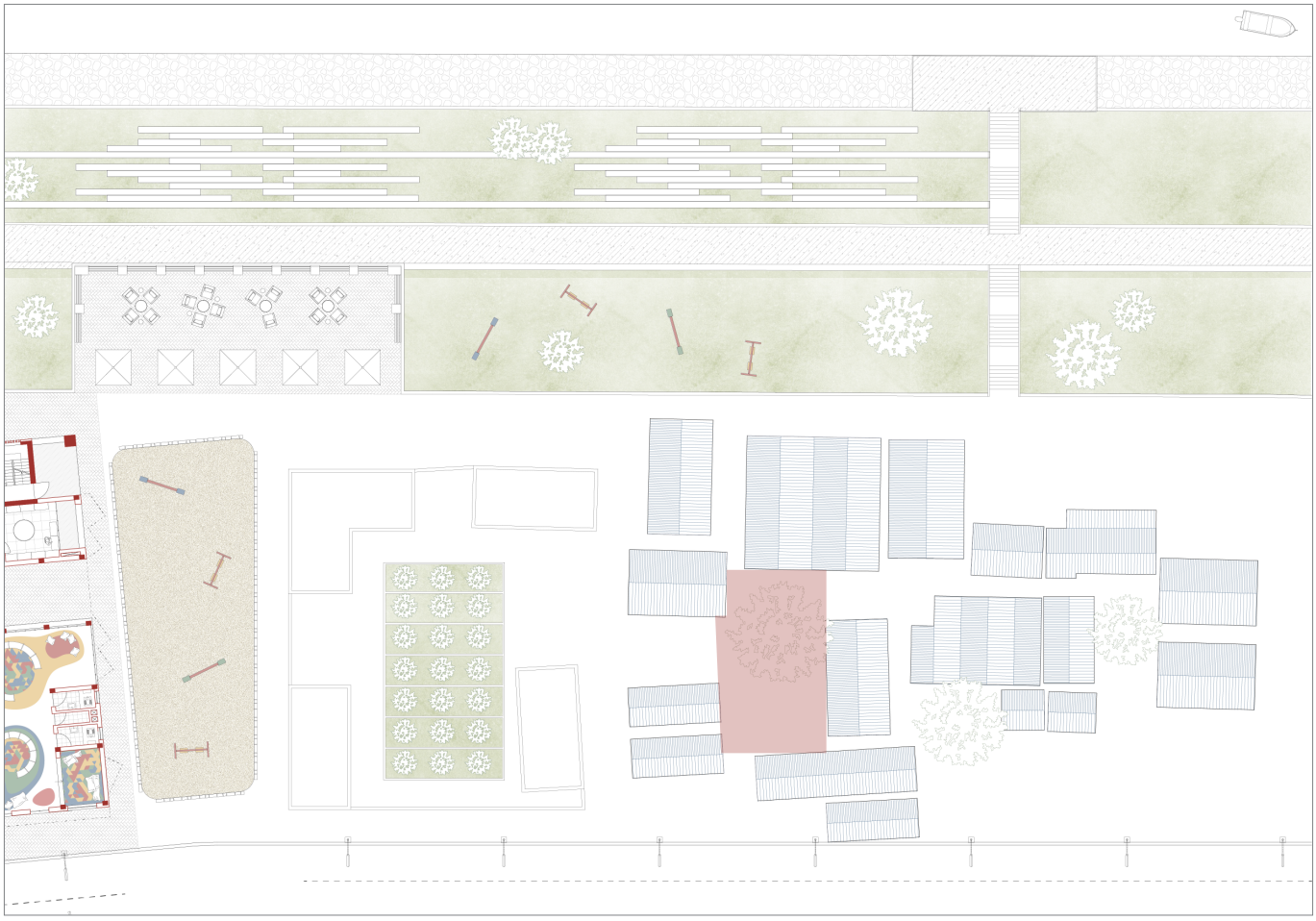
10 ADAPTABILITY

- Hindu community
- New buildings after years

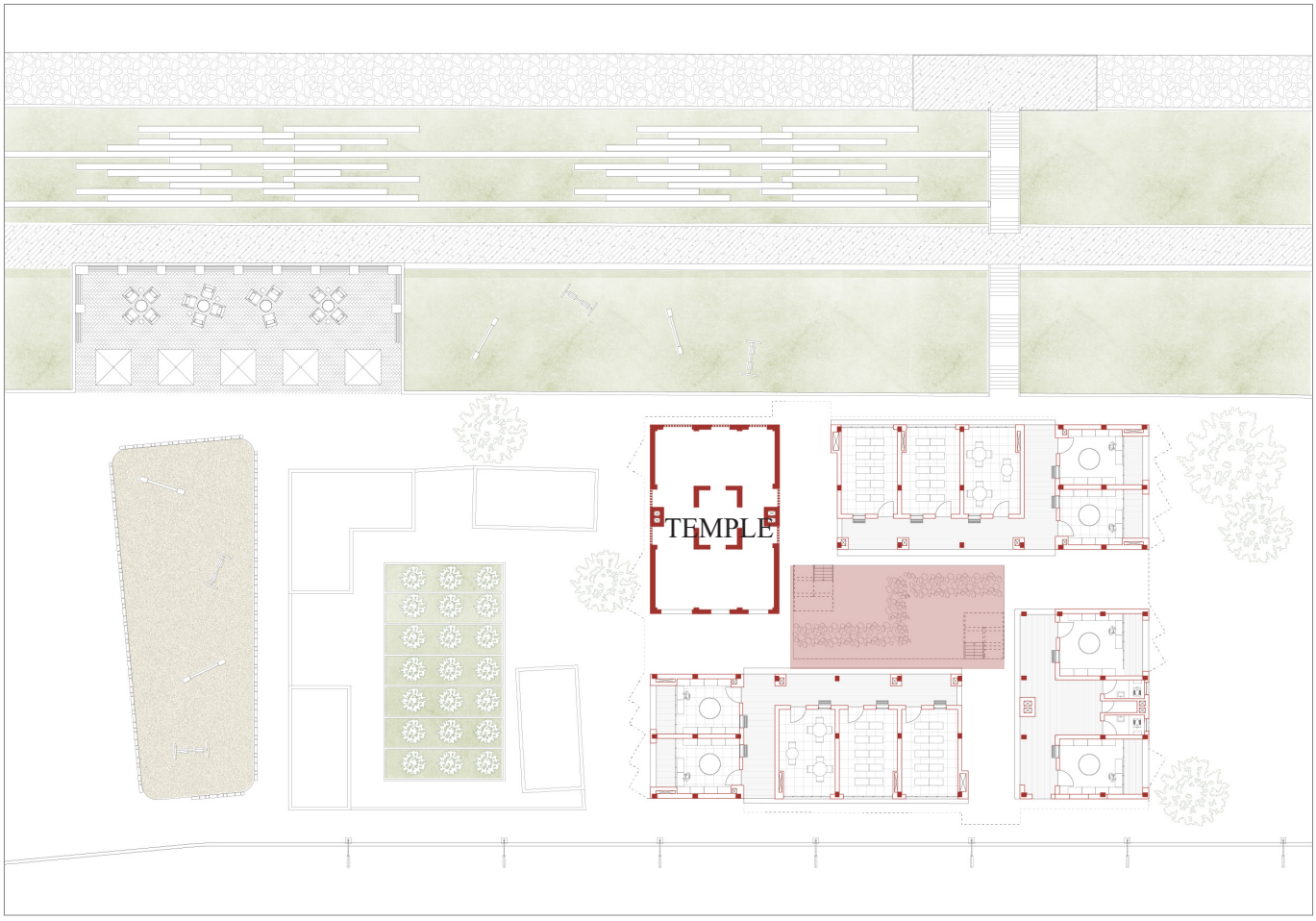
PROPOSAL FOR HINDU COMMUNITY

Possible to upgrade

The proposal decides to prioritize the upgrading work for Muslim community, so the Hindu housing is supposed to be kept at the time the new buildings are constructed. However, the new proposal can be applied to the Hindu community as well in the future if upgrading is required. The cluster idea is basically the same, keeping the form of courtyard block and types of units, but only low-income housing are provided here to make sure the building is only for Hindu community. Since there is a small mosque in the center of the community, the northwest corner on the ground floor can be reserved for the mosque, considering the requirements for privacy and views.



Existing hindu community



Possible upgrading plan for Hindu community

NEW BUILDINGS AFTER YEARS

Typical cluster section 1:200

NEW BUILDINGS AFTER YEARS

USE OF THE SPACE

In terms of the new buildings, although the function of common space and the layout of each unit is designed in the proposal, the residents may change them according to their needs. For example, the bedroom may be changed into a study, while the common space with the bamboo facade at low-income levels may trigger more daily activities such as hanging clothes and temporary storage.

HOUSING

COMMON SPACE

10 APPENDIX

- Research plan
- Reflection
- Poster layout

YOUNG LIVES IN NO PLACE

Sijie Song

2023-2024| Global Housing Graduation Studio| Research Plan

00 _Contents

Figure 1: Urbanization seen in Dhaka (photo by author, 2023)

Figure 2: A sweeper doing his work in Dhaka (Kazal, 2020)

01 _Introduction

1.1 Rapid Urbanization - Urban Poor in Bangladesh

From the 19th century, rapid urbanization has brought a huge population growth in urban areas and it is continuously happening worldwide. According to United Nations (2018), more than half of the population currently lives in urban areas and the figure will rise to 68% in the coming two decades. However, as most of the countries in North America, South America and Europe are already urbanized, eastern Africa and south Asia will be the main growth area for population in the near future. Nevertheless, as a south Asian country, in the census of 2022, the population of Bangladesh already reached nearly 170 million, in which 67 million was urban population (Macrotrends, 2023). In this case, it is inevitable that the economic growth cannot keep pace with population growth, resulting in the emergence and expansion of 'urban poor'. Currently, around 20 percent of urban population is reported living in poverty in Bangladesh, and it is estimated that over half of the poor households will be in urban areas by 2030 (Rahman and Hill, 2019). In The Truly Disadvantaged by Wilson (1987), he proposed the concept of 'neighborhood concentration effects' on the urban poor, arguing that the poor families or individuals instinctively tend to gather as a community in the city, which probably become isolated, and then the physical segregation may exacerbate the poverty again. This is indeed reflected in urban Bangladesh, as the gap between the living conditions of slum and non-slum neighborhoods is gradually widening. Although the government of Bangladesh has taken economic measurements which resulted in a decline of poverty rate, the progress is slowing since 2010 compared to the first decade of the 21st century (Rahman and Hill, 2019). Thus, the urban poverty in Bangladesh remains an intractable problem.

1.2 A Special Case of Urban Poor - Sweeper Colony

A special group of urban poor in Bangladesh is called the sweeper colony (or many other names, such as Rabidashpalli, Rishipalli etc.), with a history of nearly three centuries and a population of 3.5 to 5.5 million currently in the country, in which people take up the most arduous but indispensable work for the city, such as cleaning the street and sewer system (Chowdhury, 2011). According to Sultana and Subedi (2016), this group was initially made up of Dalits (the lowest class in caste system), hired by the British colonial rulers for municipal work in the 18th century. Since the land provided by the government is the only place they can use and other land owners refuse to lease land to them, they are completely passive in their lives, suffering from the adaptation to the expansion of family, forced resettlement and displacement, which makes them the poorest group in the country. Moreover, due to the inherent social exclusion based on the caste system, their descendants have no choice but inherit the job as cleaners. 300 years later, urbanization required more land to accommodate the increasing population, so urban poor communities of other religions such as Muslims gradually occupied the surrounding areas of sweeper colony. As a result, besides the common living problems faced by other urban poor, they also have to deal with the possible conflicts with and discrimination from other religions.

1.3 A Young Society - Children in Bangladesh

One positive sign shown by demographics of Bangladesh is the high percentage of children and youth, with 36% of overall population under 18 years old (RAPID, GED & UNICEF, 2020). In other words, Bangladesh is supposed to have abundant labor force in the near future when these children grow up. However, one surprising finding by Sharmin (2010) is that there is no one unified definition of children in different files of Bangladesh, indicating an ignorance on children at national level. At the same time, poverty has a wide influence on the country, so a large number of children, for example in urban poor families, do not grow up in a child-friendly environment. Instead, they live without a permanent shelter or basic amenities, severely damaging their health as well as exposing them to dangerous environment. UN General Assembly declared five basic children's rights in 1959 as protection, education, health care, shelter and good nutrition. Unfortunately, none of these rights is fully defended for urban poor children in Bangladesh. By combining the information form Demographic and Health Survey 2022 by NIPORT and ICF (2023) and Survey on Children's Education in Bangladesh 2021 by BBS & UNICEF (2022), children in Bangladesh (both urban and rural) are facing health problems such as childhood mortality, malnutrition and illness, as well as lack the access to education, inducing the problem of child labor, especially in urban areas. Regarding this fact, even if the number of children is considerable, survival is already a challenge for them, let alone contributing to the future labor force. Hence, among all age groups, children need urgent and particular concerns in the urban Bangladesh.

This research will keep the scope in the urban context, elaborate the inproper living conditions of children in urban poor families in Bangladesh, and finally find housing together with other spatial solutions.

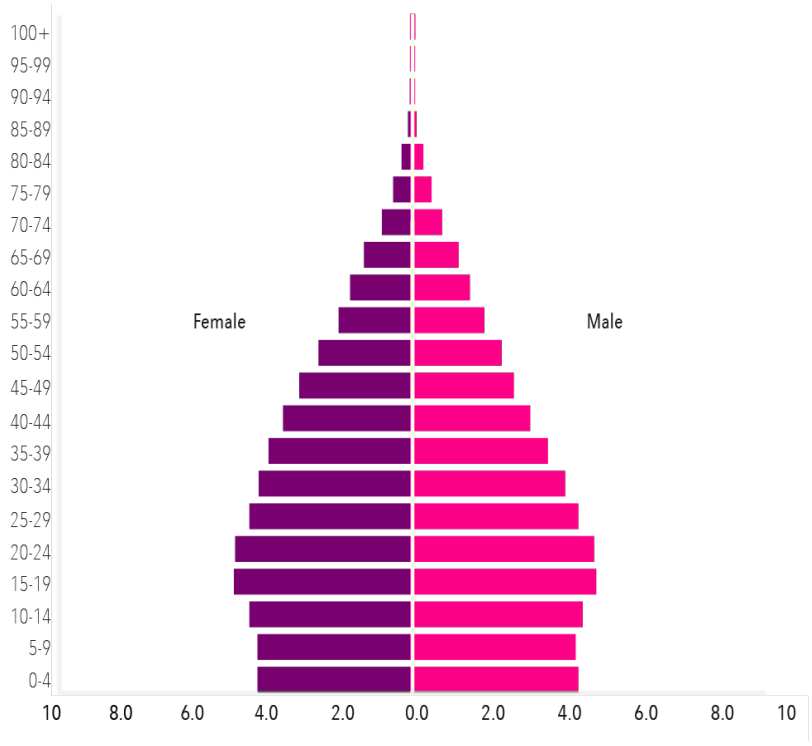


Figure 3: Age pyramid Bangladesh 2022 (Group research, 2023)

02 _Problem Statement

2.1 General Situation of Children in Urban Poor Families

As mentioned in 1.3, children in urban poor families in Bangladesh are exposed to multiple threats at different stages of their childhood. Their health is not well protected from infancy and as they grow up, they remain vulnerable due to the lack of proper food and sanitation. Additionally, around 40 percent of children in urban areas in Bangladesh do not have access to formal education, instead, they start working or doing domestic chores from a young age (avg. 9 years old nationally, avg. 7 years old in Sylhet), and change their work frequently. These jobs are basically manual labor offering little salary but requiring a long working hour, and some are even in hazardous environment, which increases their vulnerability (RAPID, GED & UNICEF, 2020). Moreover, when asked how they feel about the present lifestyle, the majority expressed a dissatisfaction with the status quo and helplessness to change it.

In order to encompass these problems more comprehensively, this study will mainly focus on the children aged 7-17, who are capable of studying or working alone. The research site is the sweeper colony and its surrounding areas in the center of Sylhet city, on the southwest side of the Keane Bridge (figure 4), acting as a example for settlements of urban poor. Chapter 2.2 to 2.4 will discuss the issue of urban poor children in passive roles in space at three levels, from family life to collectively in a community and finally to a broader social life. At each level, the problem will be start with the urban poor as a whole and then move on to children.

Figure 4: Site location (Google Earth image, 2023)

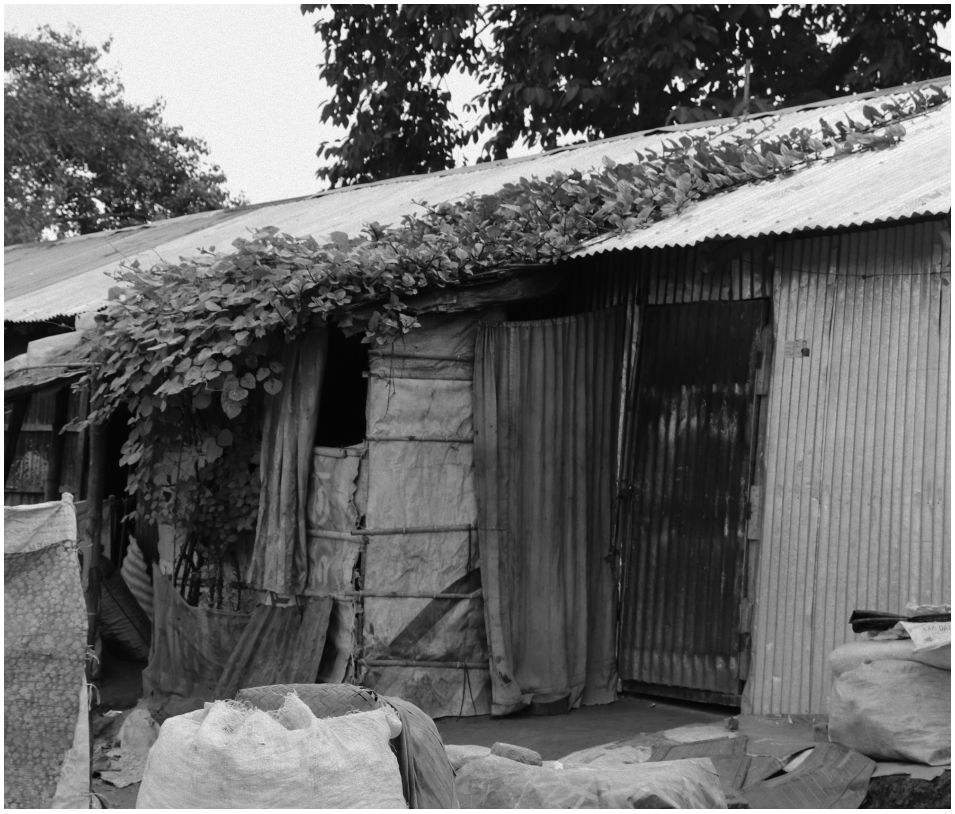


Figure 5: Simple shelter of urban poor in Sylhet (photo by author, 2023)

Figure 6: Children playing on the street (photo by author, 2023)

2.2 Privacy: Family Life and Dwelling

On the basis of a family-centered culture in Bangladesh, the family life is strongly valued by all Bangladeshis, including children. According to the survey by BBS and UNICEF (2022), a safe family life is desired the most by children (far more than the second top answer), especially staying with their nuclear family. Even the ones who lost the connection with their families aspire to company from peer group, also indicating the needs of intimate relations. Dyson et al. (2009) affirm the symbolic meaning of home to children, as a spiritual sustenance and protection from the 'outside'. Another study exploring the effects of different housing conditions (shelter, transitional housing program, own place and so on) on family relations (Mayberry et al., 2014) shows that a stable housing condition facilitates healthy family routines and rituals, which thereafter promote the development of children's habits, especially in poor families. However, on the contrary, Ghafur (2006) in his study on social exclusion suffered by urban poor in Bangladesh, points out that the housing situation of the them is not stable. Especially under the conditions of land scarcity in recent years, their living area is compressed before the other social groups, resulting in either super dense informal housing, or those simple shelter made of the cheapest and most accessible materials (e. g. corrugated metal sheets) (figure 5). In both cases, people's living spaces are drastically reduced, limiting family activities only to eating and sleeping, so that children's development is hampered due to the loss of a healthy family routine.

2.3 Inward Publicness: Collective Life and Common Space

Besides the interaction with family members, urban poor in Bangladesh predominantly live a collective life. Normally, the range of 'collective life' extends to urban scale, but in this study, it is limited in community scale. The place required by collective life is called 'common space' in this research, similar to public space but more about the facilities shared in daily routine. According to Lata (2021), the urban poor, seen as informal population, usually do not have their common space in their colony as all spaces that they have tend to be fully used for family life. Consequently, they take for themselves the 'community commons' such as the street, through which not only do they fail to meet their own needs, but they hinder the collective life of the community as a whole as well. Similarly, as children of urban poor reported, their collective activities largely rely on random places, such as the street or open spaces between houses, rather than specially defined areas (RAPID, GED & UNICEF, 2020) (figure 6). In fact, Woolly (2015) names these two types of open space in her research about children's spatial agency as found and constructed space, where the former exactly means the space generated by children themselves unconsciously. In addition, Elsley (2004) proves that children have their own opinions on public spaces, which are commonly not heard unfortunately, because they are seen subordinate to their family. Another finding in the same study says that children prefer playing in informal spaces, which provides a basis for a rational exploration of the value of the space occupation issues mentioned above.

2.4 Outward Publicness: Communal life and Social Space

Another topic usually discussed in urban contexts is the spatial equality, as the city is shared by multiple social groups at the same time and the social space in which is supposed to serve for everyone. Taylor (1989) argues that 'one cannot be a self on one's own', but it is the social network that forms each individual. Communal life is therefore inevitable, and its realization is related to the corresponding space. The theory of Production of Space, developed by Lefebvre (1974/1991), proposes that every society produces its own space, which covers three attributes, namely lived, conceived, and perceived space. Trussell and Mair (2020) named the social space as ‘judgement free space’, where everyone is equal, so people can get rid of the discrimination brought by races, poverty and other factors. Nevertheless, the urban poor in Bangladesh do not experience 'judgement free' as supposed. On the one hand, they are active participants of communal life, particularly in street vending, but on the other hand, they are explicitly prohibited from accessing some social spaces, or in the case where they can access, they still face the risk of exclusion or even eviction (Etzold, Hossain & Rahman, 2013). Similar contradiction happens to urban poor children, as they are involved in social spaces, but in a dangerous way, suffering from abuse or harassment, especially when they are working. Hence, the existing social space in urban Bangladesh does not reflect spatial equality for children.

In conclusion, the urban poor children in Bangladesh are facing three main issues. Firstly, from the private perspective, they lack the most basic surviving conditions in dwelling, so that an ideal family life cannot be realized; secondly, the common space is either absent or not well-defined both in general and specially for children to form a close-knit, healthy community; lastly, they do not experience equality and belonging in communal life and social space in the city. Combining all three aspects, it indicates the passive position of urban poor children in space especially housing.

Figure 7: Preliminary social space within informal settlements (photos by author, 2023)

Figure 8: A man and a woman doing washing and shower beside Surma river (photos by author, 2023)

03 _Research Question

3.1 Main Research Question

How can design help to build child-centered housing for urban poor children in Bangladesh?

3.2 Family Life and Dwelling

Sub-question 1: What are the rituals and daily routine of urban poor children? What kind of spaces do children need and expect to improve their family life?

3.3 Collective Life and Common Spaces

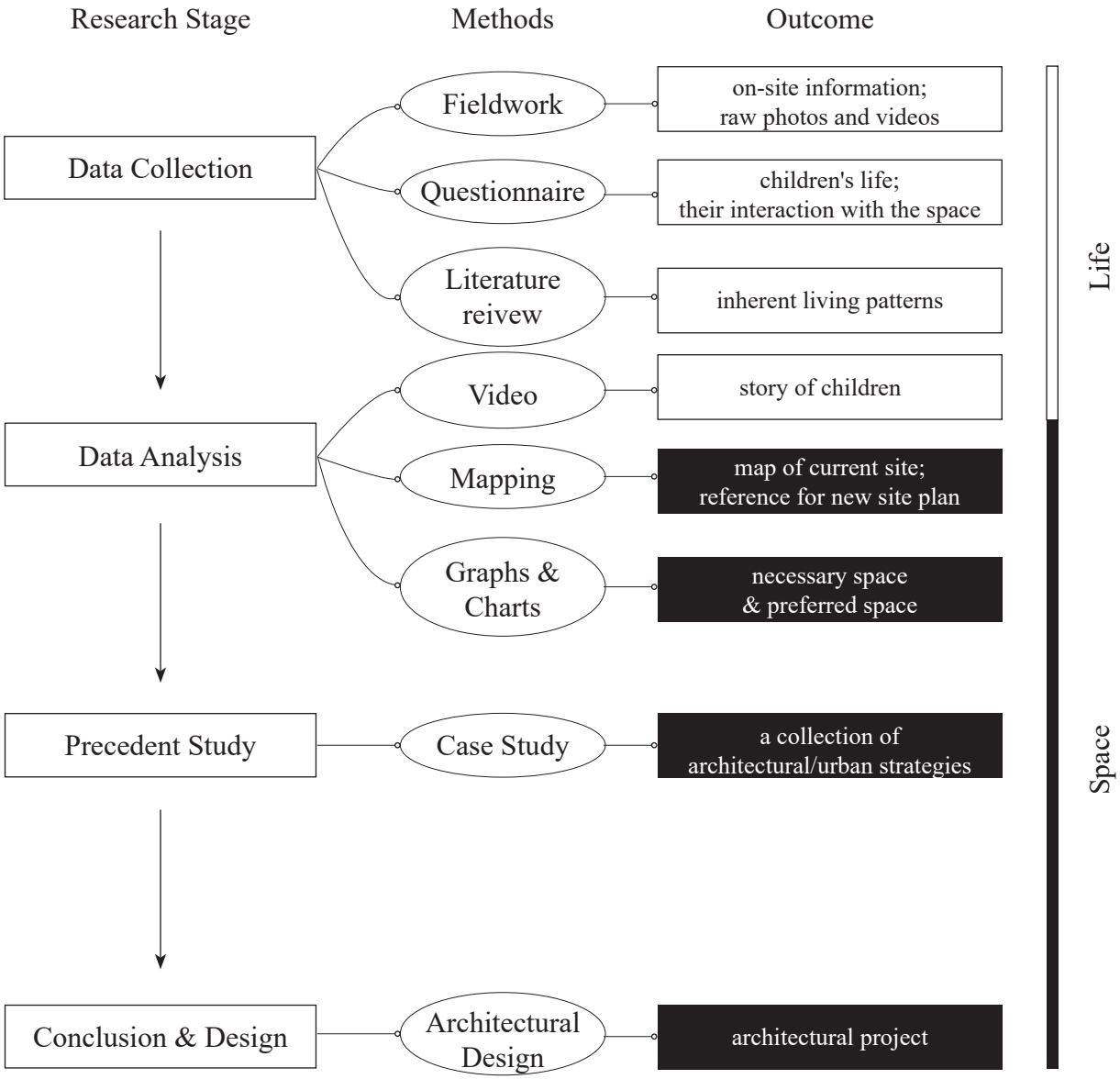
Sub-question 2: How do urban poor children interact with others within a community? How do these interactions define the space?

3.4 Communal Life and Social Spaces

Sub-question 3: How can urban poor children be equally involved into social life through space design?

04 _Methodology

In order to explore both the life of children and the corresponding spaces through three levels described in previous two chapters, four steps are needed, namely data collection, data analysis, precedent study and conclusion and design. The research will adopt ethnography as the main methodology, but take different methods in addressing each detailed question. With all the ingredients on children's needs of their life and possible spatial strategies, a new model of children-centered community will be created and hopefully, it can be effectively contribute to solving general urban poor children's issues of urban poor in Bangladesh.



Methodology diagram

4.1 Data Collection

4.1.1 Fieldwork, Observation and Questionnaire

The first two sub-questions aim to seek the relation between children's behavior and their needs for space, and then improve their living quality according to their living patterns. Therefore, fieldwork, observation and questionnaire can be helpful for this stage. The fieldwork will be conducted at the research site and its surrounding areas. During the fieldwork, observation will mainly look into the physical and mental state of children, their living spaces and ancillary amenities. Afterwards, questionnaire will be used to construct a deeper understanding on their family structure, daily routine, the use of the existing spaces and their subjective feelings. The distribution of questionnaire and interviews will be conducted with the assistance of volunteers who speak the local language. With a relatively thorough first-hand sources, the research in the first stage is trying to find the one-to-one relation between the problems of children's life and their representation on spaces.

4.1.2 Literature Review

The third sub-question discusses the strong socio-spatial interventions, so literature may be effective in addition to the behavioral and spatial relations mentioned above. The literature used here is to find the function and quality of the social space that is the most suitable for the site.

4.2 Data Analysis: Mapping and Analysis of information from questionnaire

According to the methods in first step, there will be basically two types of data, namely visual data and data from questionnaire, which require different ways to analyze. As for visual data, mapping will be applied to add the third dimension, spatial logic, to the one-to-one relation concluded in 4.1.1. Regarding the data from questionnaire, it will be summarized and analyzed through graphs and charts. The aim of this step is to form a systematic collection of existing spaces related to children through integrating fragmented data.

4.3 Precedent Study

On the basis of understanding the current life and existing space of children, it is worth to explore the ways to improve the latter on the basis of the former. By browsing through projects from all over the world dealing with similar issues from the past to present and taking children's wishes into account, basic characteristics of a space in different scales can be summarized. Although the cause might vary under different context, the result appears alike reflected in children's livelihood. The outcome will be spatial elements that can improve the situations of 4.2 and used for generating the community model in 4.4.

4.4 Conclusion and Design

With a collection of spatial elements, a new model can be created by reorganizing them. Finally, the housing project should be child-centered for urban poor children in Bangladesh.

05 _Theoretical Framework

According to the process in which the research will be conducted, the theoretical framework consists of three parts, namely the theme and scope of the research, the relationship between children, life and space, and global cases of child-centered housing or other projects. Each of them can be further divided into sub-topics and supported through literature.

5.1 Scope of the Research and Related Terms

The research is revolving around the children in urban poor in Bangladesh, so these keywords need to be explained contextually with the help of existing literature.

Urban poor: people living in the urban area in a poor condition, who are mostly immigrants from surrounding. In The Truly Disadvantaged, Wilson (1987) mentions the urban poor as a group and explains why they usually emerged in the form of mass; Rahman and Hill (2019) discuss the current situations of urban poverty in Bangladesh and propose four potential measures that may mitigate the problem; Choguill (1988) then relates urban poverty with low-income housing by examining the impact of national finance, housing policies and urban planning.

Sweeper colony: originally known as Hindu community, working as cleaners or other municipal jobs. Chowdhury's (2011) research introduces both the history and status quo of sweeper colony, and points out the biggest issue for them is landless; Sultana and Subedi (2015) show how sweepers in Dhaka as a marginalized group resist the social discrimination.

Children: aged 7-17, who are capable of studying or working alone. Sharmin (2010) discusses the abuses and exploitation experienced by children in Bangladesh, and finds surprisingly that the definition of children varies in different files, which indicates a lack of attention on children at the national level; Hosen, Khandoker and Islam (2010) look into the child labor, child education and malnutrition issue in Bangladesh, and call for concerns on education as well as reducing the wealth gap.

5.2 Children, Life and Space

The second part includes three m
research. Through literature, the rel
and each set of relation will be sul
space.

5.2.1 Children and Life

Different experiences in life result va
Family rituals and routine are one o
processes mentioned Mayberry et a
health of parents and then indirectl
Research on families living in ha
after interviewing 70 low-income
culture, ethnicity and class, emphas
symbolism of home and the divers
(2007) and Woolley (2008) both
children, but in terms of family bond

5.2.2 Children and Space

Children are influenced by but also
defines two types of open space,
differed from the space designed or
are constructed spaces including p
for them, the found ones such as t
more frequently. Moreover, Elsley
understandings and attitudes towa
decision makers usually ignore the

ost essential elements that is discussing in the ations between each two of them can be found, b-divided according to the publicness of life or

ariously in physical and mental states of children. f the essential indicators that contribute to family l. (2014), which may firstly help to maintain the y benefit children especially in poor conditions. rdship in Bangladesh by Dyson et al. (2009), households with various background regarding izes the significance of faith, protectiveness and sity of community contexts. Besides, Ginsburg stress the developmental benefits of play for ls and social participation respectively.

o shape the space around them. Woolley (2015) , namely constructed space and found space, n purpose or not. As for children, although there playgrounds and skateparks specially designed he open spaces between housing areas are used (2004) suggests that children have their own rds public space, which change with age, but ir voices because of their subordinate status to their family. For example, they prefer to play in informal places and after reaching a certain age, they tend to choose places far from home.

5.2.3 Life and Space

Life and space are proved to be relational and transformable by literature. Lefebvre (1974/1991) emphasizes that each social space presents uniquely as 'social practice' due to the specific social groups behind, and Atelier Bow-Wow (2010) further explains that the behavior of each individual has the power to define a space. Additionally, Trussell and Mair (2010) focus on the homeless people and find that leisure time, connection to a broader community and safe private space are factors to improve their living quality.

5.3 Cases of Child-Centered Projects

The final part consists of cases focusing on different aspects of child-centered housing and other projects in global context. For example, with the lens of the whole community, Chatterjee (2015) analyzes and compares two successful cases of slum renewal projects in India which faced the same child issue as Bangladesh do; in terms of single spaces, van Lingen and Kollarová (2016) collect the information of the seventeen playgrounds designed by van Eyck, served initially for children but finally as urban catalysts.

5.1 Scope of the Research

Terms

Urban Poor

Sweeper Colony

Children

Life

5.2 Children, Life and Space

Topic	Literature
Children's health & Family rituals	Mayberry, L. S. et al. (2014) Families Experiencing Housing Instability: The Effects of Housing Programs on Family Routines and Rituals;
Children & home	Dyson, C. et al. (2009) Bangladeshi families living in hardship: findings from research using a life-history approach;
Children's play & family bonds	Ginsburg, K. R. (2007) The importance of play in promoting healthy child development and maintaining strong parent-child bonds;
Children's play & social participation	Woolley, H. (2008) Watch This Space! Designing for Children's Play in Public Open Spaces.

Topic	Literature
Society & space	Lefebvre, H. (1974) Product
Behavior & space	Atelier Bow-Wow (2010) A
Leisure time & space	Trussell, D. E. and Mair, H. Spaces: Poverty, Leisure, an

Privacy

Inward publicness

Outward publicness

and Related Terms

Definition	Topic	Literature
People living in the urban area in a poor condition, who are mostly immigrants from surrounding	Cause of formation Current situation in Bangladesh Poverty & housing	Wilson, W. J. (1987) The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy.; Rahman, H. Z. & Hill, R. (2019) Poverty in Urban Bangladesh: Trends, Profiles and Spatial Differences; Choguill, C.L. (1988) Problems in Providing Low-Income Urban Housing in Bangladesh.
Originally known as Hindu community, working as cleaners or other municipal job	History & Status quo Resistance	Chowdhury, S. L. K. (2011) Traditional Profession and Livelihood: A Study on Sweeper Community; Sultana, H. & Subedi, D. B. (2016) Caste System and Resistance: The Case of Untouchable Hindu Sweepers in Bangladesh.
Aged 7-17, who are capable of studying or working alone	Neglect of child issue at national level Child education & child labor	Sharmin, S. (2010) Children in the Socio-Cultural Context of Bangladesh; Hosen, A., Khandoker, M. S. H. & Islam, S. M. M. (2010) Child Labor and Child Education in Bangladesh: Issues, Consequences and Involvements

Topic	Literature
Pre-defined and randomly formed children's space Children's experience & public space	Woolley, H. (2015) Children and Young People's Spatial Agency; Elsley, S. (2004) Children's Experience of Public Space.

5.3 Cases of Child-Centered Project

Space

Topic	Literature
Slum renewal	Chatterjee, S. (2015) Making Children Matter in Slum Transformations: Lessons from India's National Urban Renewal Mission;
Children's playground Social space for everyone	van Lingen, A. and Kollarová, D. (2016) Aldo Van Eyck: Seventeen Playgrounds; Finotti, L. (2014) Futebul: Urban Euphoria in Brazil.

ion of Space;

rchitectural behaviorology;

(2010) Seeking Judgment Free
d Social Inclusion.

Theoretical framework diagram

06 _Relevance

Sixty years after the ‘five basic rights of children’ was first introduced to the global discourse, it is a pity to note that there are still numerous children around the world who do not have full access to these rights, or even worse, do not have access to any of them, and the children of urban poor in Bangladesh are one of them. The issue of children in poverty is urgent and significant in the context of Bangladesh, as it concerns the future development of the country. However, it has existed for years but few proper solutions or positive results have been seen, and therefore, requires more considerations in academia. Admittedly, child issue is a topic in the field of sociology, but existing research and theories suggest a connection between behavior and space. Thus, this study will try to dive into this connection more, aiming to establish a relatively comprehensive spatial logic from the perspective of children, which may thereafter complement the common top-down planning approach. Additionally, the study will explore children’s lives from individual to communal, reflected as a transformation from private to inward public and outward public in space. Compared to most of the existing research for Bangladesh with the focus in Dhaka, this research is based in Sylhet, intends to bring non-capital cities into discussion when considering child issues in the future. Basically, this research aims to find the possibilities for housing design in changing the passive position of children, especailly urban poor children, in space, and in creating a child-centered community.

Figure 9-10: A girl playing alone in the river (photos by author, 2023)

07_Bibliography

Atelier Bow-Wow (2010) *The Architectures of Atelier Bow-Wow-Behaviorology*. Rizzoli.

Bangladesh Bureau of Statistics (BBS) and UNICEF (2022). Survey on Children's Education in Bangladesh 2021- Report. https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2023-03-20-08-41-f6201bfaee0bea350a847316841990e9.pdf

Chatterjee, S. (2015) Making Children Matter in Slum Transformations: Lessons from India's National Urban Renewal Mission, *Journal of Urban Design*, 20:4, 479-506. https://doi.org/10.1080/13574809.2015.1044506

Choguill, C. L. (1988) Problems in Providing Low-Income Urban Housing in Bangladesh, *Habitat Intl.*, 12:3, 29-39. https://doi.org/10.1016/0197-3975(88)90059-8

Chowdhury, S. L. K. (2011) Traditional Profession and Livelihood: A Study on Sweeper Community, *Journal of Economics and Sustainable Development*, 2:3, 87-94. https://www.iiste.org/Journals/index.php/JEDS/article/view/240

Dyson, C. et al. (2009) Bangladeshi families living in hardship: findings from research using a life-history approach, *Child & Family Social Work*, 14:3, 362-371. https://doi.org/10.1111/j.1365-2206.2008.00608.x

Elsley, S. (2004) Children's Experience of Public Space, 18, 155-164. DOI: 10.1002/CHI.822

Etzold, B., Hossain, M. A., & Rahman, S. (2013). Street food vending in Dhaka: livelihoods of the urban poor and the encroachment of public space. *Dhaka Metropolitan Development Area and Its Planning: Problems, Issues and Policies*. Bangladesh Institute of Planners(BIP) Dhaka: http://www. bip. org. bd/SharingFiles/journal_book/20140427160, 39.

Finotti, L. (2014) *Futebol: Urban Euphoria in Brazil.* Lars Müller Publishers.

Ghafur, S. (2006) Social Exclusion and Residential Densification: Implication for Integrattion of the Urban Poor in Dhaka, Bangladesh, *Protibesh BUET,* 10, 2-14.

Ginsbrug, K. R. et al. (2007) The importance of play in promoting healthy child development and maintaining strong parent-child bonds, *American Academy of Pediatrics*, 119:1, 182-191. https://doi.org/10.1542/peds.2006-2697

Hosen, A., Khandoker, M. S. H. & Islam, S. M. M. (2010) Child Labor and Child Education in Bangladesh: Issues, Consequences and Involvements, *International Business Research*, 3:2. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1755146#paper-references-widget

Kazal, S. A. (2020). Unseen Heroes: The Clearners of Dhaka City [Photograph]. https://www.privatephotoreview.com/2020/04/unseen-heroes-the-cleaners-of-dhaka-city/

Lata, L. N. (2021) To Whom Does the City Belong? Obstacles to Right to the City for the Urban Poor in Bangladesh, *Journal of Contemporary Asia*, 51:4, 638-659, DOI: 10.1080/00472336.2020.1791934

Lefebvre, H. (1991) *The Production of Space* (Smith D. N. Trans.). Basil Blackwell. (Original work published 1974)

Macrotrends (2023) Bangladesh Urban Population 1960-2023. https://www.macrotrends.net/countries/BGD/bangladesh/urban-population

Mayberry et al. (2014) Families Experiencing Housing Instability: The Effects of Housing Programs on Family Routines and Rituals, *American Journal of Orthopsychiatry*, 84:1, 95-109. https://www.researchgate.net/publication/262338595

National Institute of Population Research and Training (NIPORT) and ICF (2023) Bangladesh Demographic and Health Survey 2022: Key Indicators Report. NIPORT and ICF.

Rahman, H. Z. & Hill, R. (2019) Poverty in Urban Bangladesh: Trends, Profiles and Spatial Differences, *Bangladesh Development Studies*, 12:2/3, 131-171. https://www.jstor.org/stable/27031110

RAPID, GED & UNICEF (2020) Policy Brief: The Situation of Children in Bangladesh. RAPID. https://www.rapidbd.org/situation-analysis-of-children-in-bangladesh-2019/

Sharmin, S. (2010) Children in the Socio-Cultural Context of Bangladesh, *OIDA International Journal of Sustainable Development*, 1:4, 39-46. http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html

Sultana, H. & Subedi, D. B. (2016) Caste System and Resistance: The Case of Untouchable Hindu Sweepers in Bangladesh, *Int J Polit Cult Soc*, 29:1, 19-32. https://www.jstor.org/stable/48720334

Taylor, C. (1989) *Sources of the Self: the making of the modern identity*. Harvard University Press.

Trussell, D. E. & Mair H. (2010) Seeking Judgment Free Spaces: Poverty, Leisure, and Social Inclusion, *Journal of Leisure Research*, 42:2, 513-533. https://doi.org/10.1080/00222216.2010.11950216

UN General Assembly (1959) Declaration of the Rights of the Child. https://www.ohchr.org/en/resources/educators/human-rights-education-training/1-declaration-rights-child-1959

United Nations (2018) 68% of the world population projected to live in urban areas by 2050, says UN. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

Van Lingen, A. & Kollarová, d. (2016) *Aldo Van Eyck. Seventeen Playground*. Lecturis.

Wilson, W. J. (1987) *The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy.* The University of Chicago Press.

Woolley, H. (2015). Children and Young People's Spatial Agency. In: Hackett, A., Procter, L., Seymour, J. (eds) *Children's Spatialities. Studies in Childhood and Youth.* Palgrave Macmillan. https://doi.org/10.1057/9781137464989_10

Woolley, H. (2008) Watch This Space! Designing for Children's Play in Public Open Spaces, *Geography Compass*, 2:2, 495-512. https://compass.onlinelibrary.wiley.com/doi/epdf/10.1111/j.1749-8198.2008.00077.x

Reflection

LIVING IN A GAME

A Child-Centric Community for Urban Poor Children in Sylhet, Bangladesh

Sijie Song 5817196
2023-2024| Reflection
Global Housing Graduation Studio
Architecture of Transition: In the Bangladesh Delta

00 _Contents

01 _Introduction

1.1 Research topic

In the past several decades, urbanization has influenced Bangladesh and brought a massive population growth in urban areas, therefore, a large number of urban population is now living in poverty (so-called the 'urban poor'), lacking the basic living conditions. Additionally, Bangladesh has a relatively young society, where children and youth make up a large proportion. However, growing up in an 'urban poor' family negatively impacts their well-being, so children are one of the most vulnerable groups within the 'urban poor', and this problem leads to the research question:

How can design help to build a child-centric community for urban poor children in Bangladesh?

1.2 Context and design goal

With this research question, the first goal of the design is to create a child-centric living environment adapting to the context of Bangladesh. Moreover, since the site is along the Surma river, next to the Keane bridge (a landmark of Sylhet), the second aim is to develop a new city image for Sylhet. Furthermore, there are now two religious groups living on the site, including 20 Hindu families (working as sweepers for City Corporation) and 200 Muslim families, and if developing a new project, higher income groups will be also introduced, so the other aim is to find a balanced way to accommodate different social groups.

1.3 Design project

The final design proposal is a residential zone with the plot area of 18500 square meters, including eight residential clusters and other amenities (school, community center, shops, parks etc.), aiming to provide a comfortable living environment for the residents and at the same time, contribute to the improvement of the urban landscape. The residential clusters are in the form of two towers on top of the courtyard block, with the ground floor for public functions, the first and second floors for low-income groups, and from the third floor above for middle-income group (figure 1). In addition, spaces for children are designed on different scales to meet the needs of children with different identities.

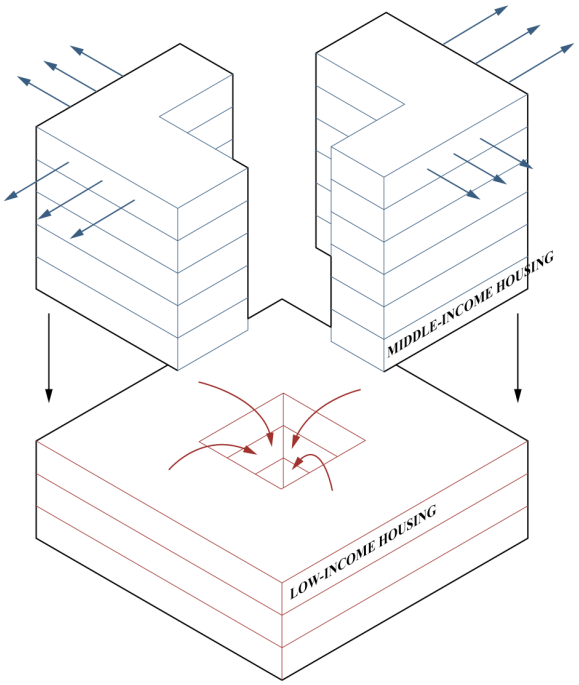


Figure 1: Design concept diagram (drawn by author)

02 _Position of the topic in master track and program

What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master programme (MSc AUBS)?

As mentioned in the introduction, my graduation project topic focuses on the urban poor children in Bangladesh, since it is an affordable housing project, what I am doing is to make a housing project child-centric in addition to a comfortable living environment. The project is mainly considered on three scales, which make the topic also relevant to other tracks in the program. For example, on the largest scale, the project looks at each single dwelling unit and the building technology used to construct it, while on the middle scale, where architectural features are elaborated more, it examines the possible way to combine the units into a cluster, and finally on the urban scale, the urban surroundings and landscape (especially the riverside) are also important components of the project. Thus, the topic on the one hand has a humanized perspective by understanding and analyzing the daily routine and living area of a group of people, but on the other hand, may end up broadly to ensure the rational position of the project in the city.

03_Assessment of working approaches

How do you assess the value of your way of working (your approach, your used methods, used methodology)?

In terms of the research methodology and methods, there are three stages included in the research process, namely data collection, data analysis and precedent study. In data collection stage, fieldwork on the site and literature review were used to get first-hand experiences and objective information respectively, and thereafter, the collection of the information was then analyzed conceptually and graphically, to form a 'knowledge base' for the transition to the design. Simultaneously, cases with similar topics or in similar context were examined as well to enrich this knowledge base, where more concrete and specific design approaches can be found.

After the preparation and understanding the background through research, in the design phase, I firstly prioritized the design of housing, and then tried to return back to the topic to see the possibility of integration. In both process, I thought about the design from different scales. After this, I considered the environmental and technical part, focusing on the balance between affordability and sustainability, where the passive environmental strategies are integrated into the low-tech building construction.

With these approaches (figure 2), at first the design may seem fragmented because of the separate consideration on different aspects, but after a while, I do see the project being defined and refined step by step, and finally become an integrity. Hence, I would evaluate the approaches used in the graduation studio positive and feasible.

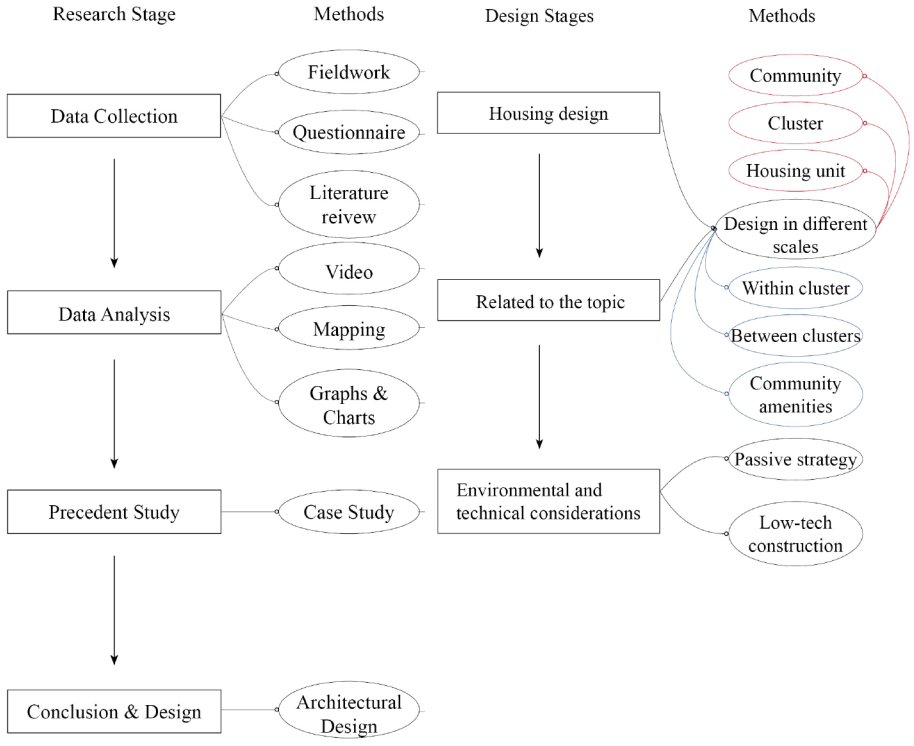


Figure 2: Approach diagram (drawn by author)

04_Interrelationship between research and design

How did your research influence your design and how did the design influence your research?

The research and design of the graduation studio is an iterative process for me, so in every step of improvement, research and design are complemented and alternated with each other. In the answer to the previous question, the working approaches of research and design are discussed according to the time course, but the whole process can be also divided based on the research subtopics. In general, there are three stages, exploring children's living, ways of living in Bangladesh and environmental strategies (figure 3).

After determining the research question, the first part of (theoretical) research was about children's living. From the research, the spaces needed by children in different age groups, gender and economic groups were concluded, and I tried to integrate these conclusions into the design, but at that moment, I saw my understanding on the context of the site was missing, which made the design proposal not convincing, so I then started the research on the ways of living in Bangladesh, mainly through case studies. This research leads to a design result of different dwelling units for low and middle income groups as well as the form of the cluster. After confirming the general idea of cluster, for further refinement, I did research on more technical aspects such as climate, commonly used environmental strategies and material in that specific context. The results were reflected on the façade design and materiality. Besides these three points, there are also several 'failed trials' in transferring the research results into design, but those are also helpful in shaping my own understanding on the context and the project. Hence, design and research in my process are always mutual influenced, as the design applies the research results and at the same time opens a new direction for the next research phase.

Figure 3: Research and design result of space for children (drawn by author)

05_Value and relevance

How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

The value of this graduation project covers three main aspects, in academic research, social and cultural relevance and economic and environmental impact. The issue of urban poor children focused by the project is urgent in Bangladesh and other third world countries, which has existed for years but still not effectively addressed, so it needs more attention in both academia and practices. The project as an example, proposes a possible solution, but more importantly, aims to arouse more thoughts from the public on this issue.

In terms of the cultural and social value, in the project, the living patterns and living spaces of local people are studies in research and reflected in different forms in design to preserve the collective memory. For instance, the form of courtyard for low-income housing is to keep the community-based lifestyle, while the middle-income housing is outward-facing and has separate circulation to satisfy their requirement on privacy (figure 4). The functions and spaces inside a dwelling unit are determined according to the existing houses on the site. Additionally, bamboo, as the main structure of the existing houses are partially used for the façade of new clusters, by adding a new function, planting, to it.

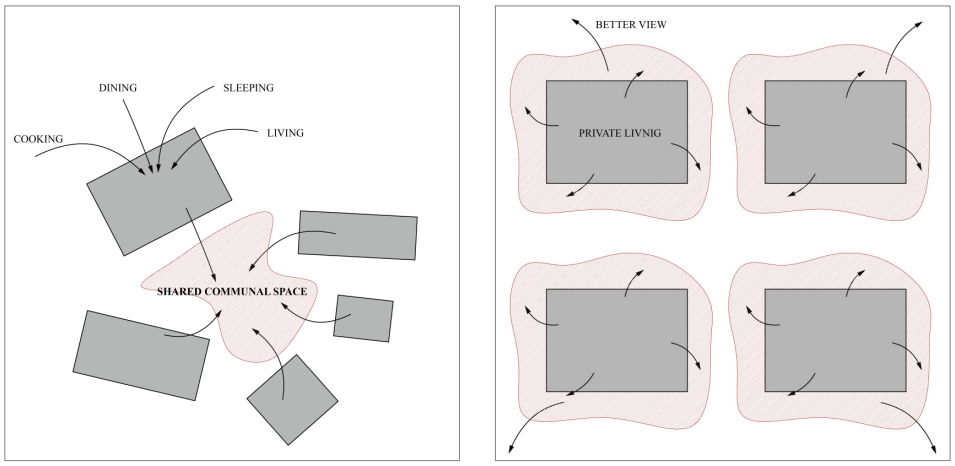


Figure 4: Low-income (left) and middle-income (right) living modes (drawn by author)

Considering economic aspect, a financial model is set up based on exiting funding modes to enhance the practicality of the project (figure 5). Moreover, concrete frame structure with brick infill is used as the main structure due to the availability and durability of these materials in that specific context. Environmentally speaking, the project has strategies to increase climate resilience. The orientation and depth of the brick fins on each façade are carefully designed to protect housing from direct sunshine and rainfall, and natural ventilation is maintained in cluster and each dwelling unit. A water storage and treatment system is designed and applied in every cluster, collecting and reusing the rainwater and grey water, which may help especially during monsoon seasons.

	Land	Design	Construction	Dwelling units	Other responsibility
City Corporation	Ownership	Issue the building permits	Supervision &reulation	ownership of low-income housing (40% of total units)	Developement and rennovation of public amenities (park, school etc.)
Developer	Pay for the land at 25% of market price	Pay for architectural design of both low-income and middle-income housing	Pay for the construction of the whole project (with materials in different prices for LIH and MIH)	ownership of middle-income housing (60% of total units)	Maintenance of the project

Figure 5: stakeholder and financing analysis for the project (drawn by author)

06_Transferability

How do you assess the value of the transferability of your project results?

The project results have a relatively positive potential in transferability. Although the situation varies from country to country, both the housing shortage and children issue are global topics, so the solutions to them are highly demanded. Secondly, these problems could be more acute in economically vulnerable areas, so the low-tech construction of this project can be effective in saving construction costs and adapting to these areas. Thirdly, the project has several environmental strategies for hot and humid climate in Bangladesh, which can be transferred to the areas with similar climate as well.

07_Reflection question(s)

1 How do you assess the balance between keeping the lifestyle and the pursuit of efficiency?

2 How do you perceive the situation and value of this project in ten or more years?

08_The next step (P5)

In terms of the design, till this point, the general concept has been realized in urban, cluster and unit scales, so in the coming weeks, there might be only some small adjustments in design, but I need to find a more proper way of representation to communicate the project and the whole process.

Living in A Game:
A Child-Centric Community for Urban Poor Children in Sylhet, Bangladesh

Sijie Song 5817196

2023-2024 Global Housing Graduation Studio

Architecture of Transition: In the Bangladesh Delta