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



01 PROBLEM &RESEARCH QUESTION

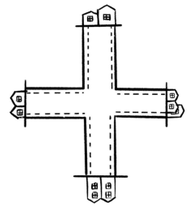
02 CHILD-RELATED RESEARCH

DEFINITION

WHAT IS A CHILD-FRIENDLY CITY?



Safety



Accessibility



Health



Play



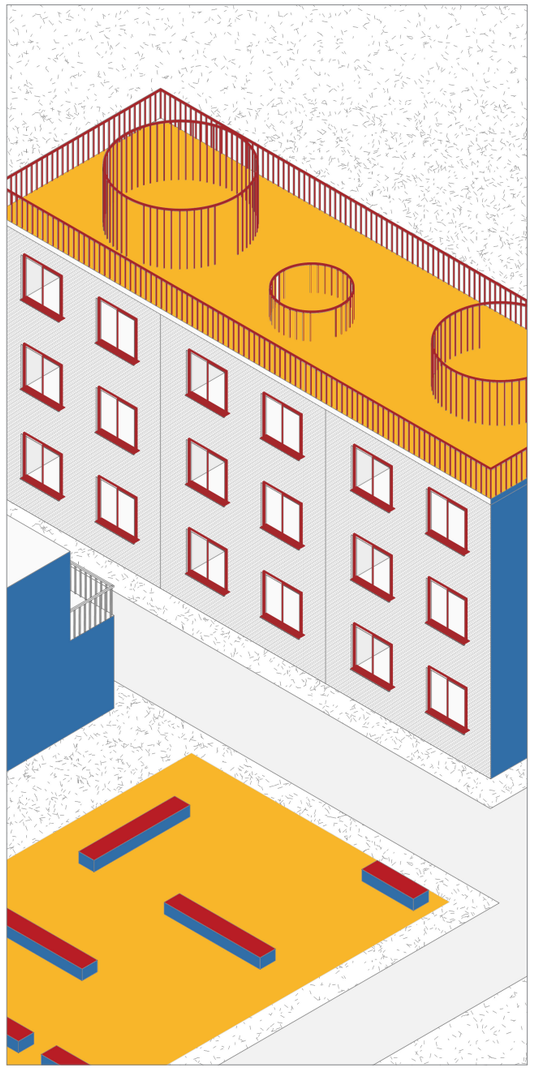
Education



Inclusivity

CASE STUDY

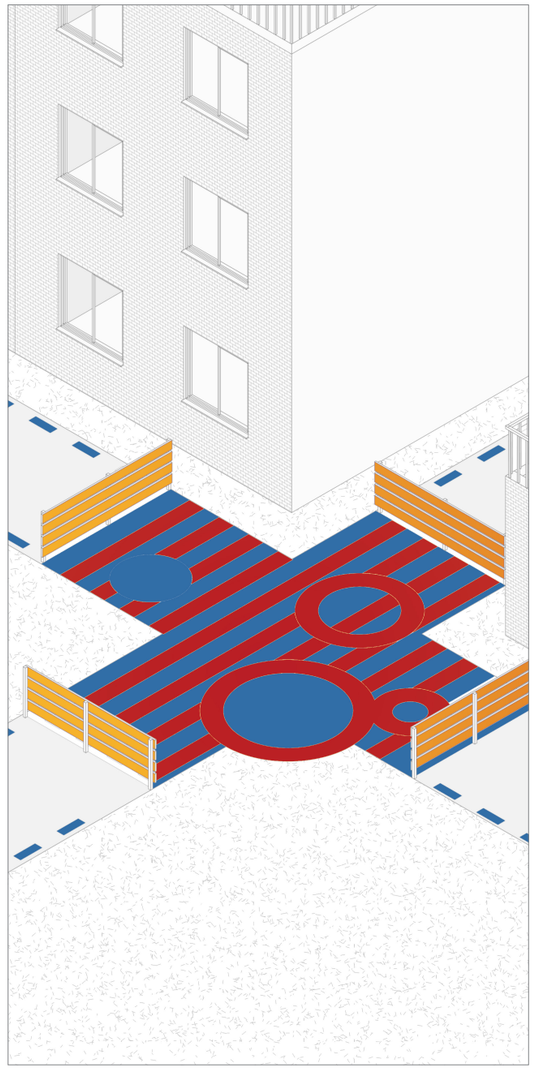
TYPICAL CHILD-FRIENDLY CITY



'Outdoor children's park'

On the ground or roof top of buildings

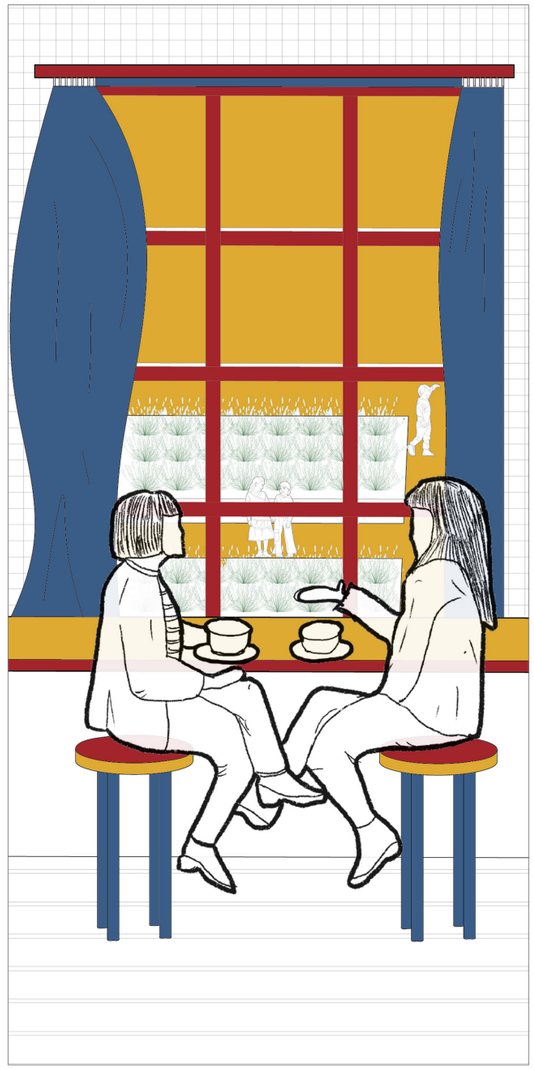
Integrate natural elements



'Streets for kids'

Car-free

Safe-linear play space on the ground



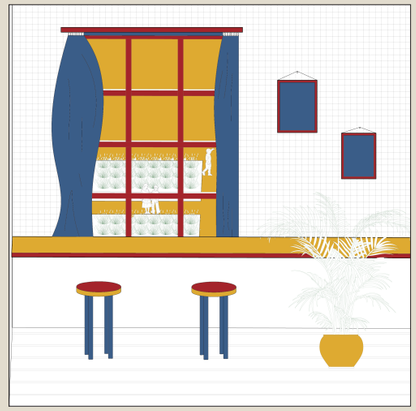
'Staffed playground'

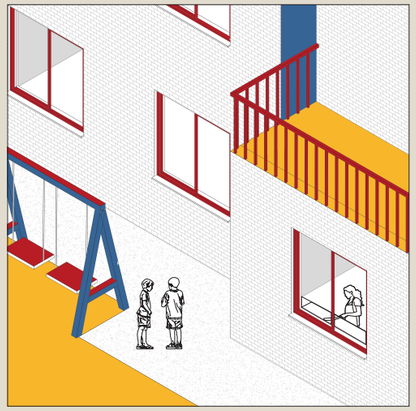
Indoor play space

Space for parents to have a rest

CONCLUSION

PRINCIPLES OF A CHILD-CENTRIC COMMUNITY

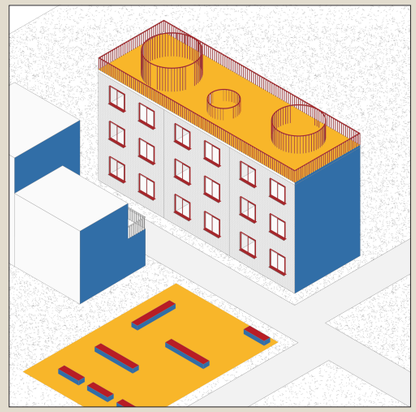


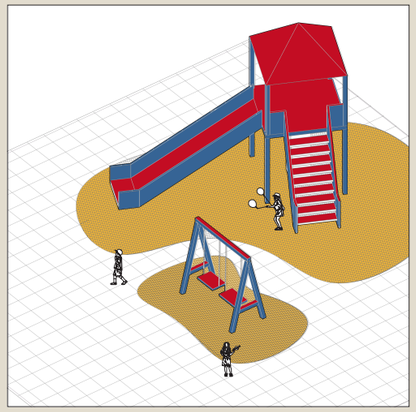


'Liveable Housing'

Gives easy access to outdoor space;

Let parents keep an eye on children outside close by

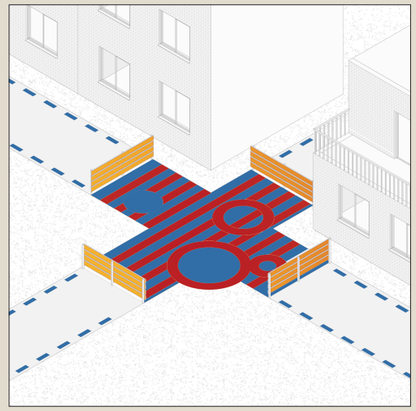


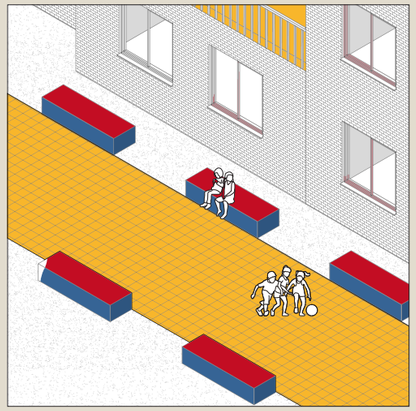


'Playful Public Space'

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, leisuree activities)

CHILDREN'S LIKED SPACES

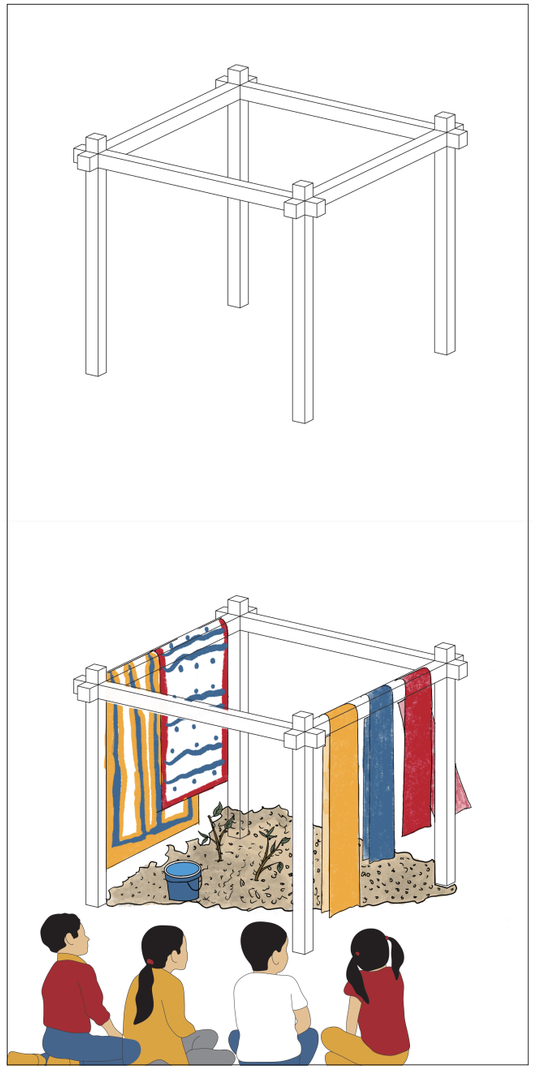
FACTOR 1 ECONOMIC LEVEL

CHILDREN IN NON-CHILD-FRIENDLY CITIES



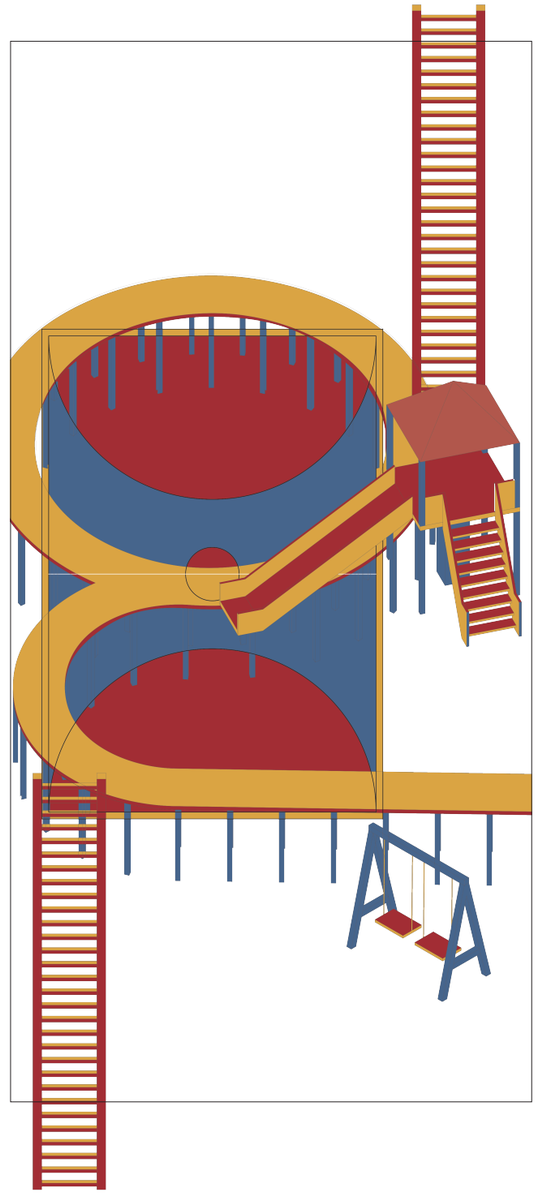
'Outdoor natural elements'

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, in some cases, multifunctional

CHILDREN'S LIKED SPACES

NECESSARY FUNCTIONS



Education

Reading
(Indoor)

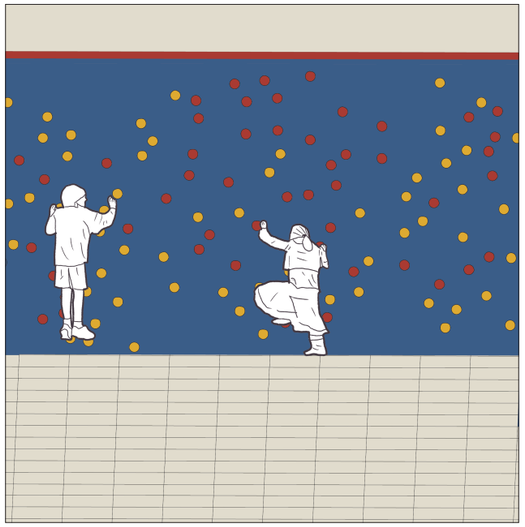
Art activities
(Indoor)



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

Infancy (0-2 years old)

Attachment to their mothers

Safe & closed indoor space



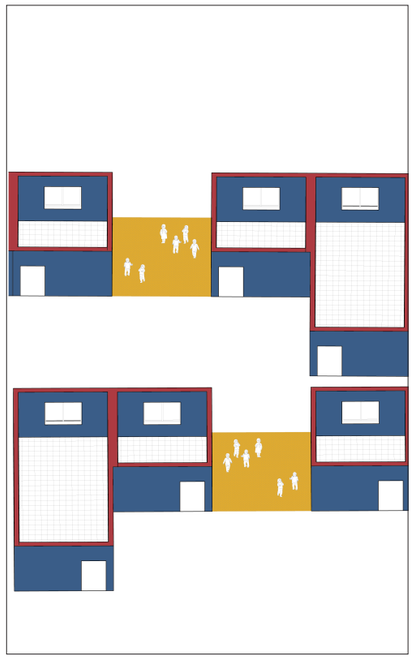
85.5cm 86.8cm

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)



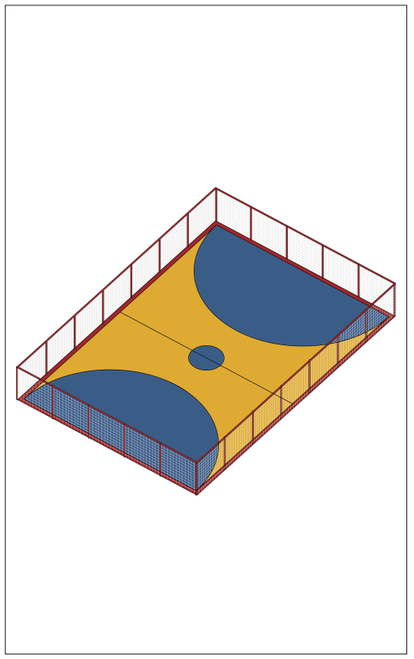
115.5cm 115.5cm

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

Middle childhood (6-12 years old)

Advanced skill developement

Outdoor space for sports



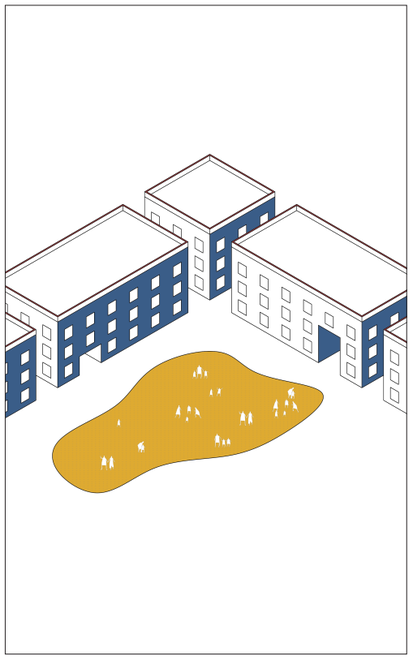
149.8cm 149.1cm

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

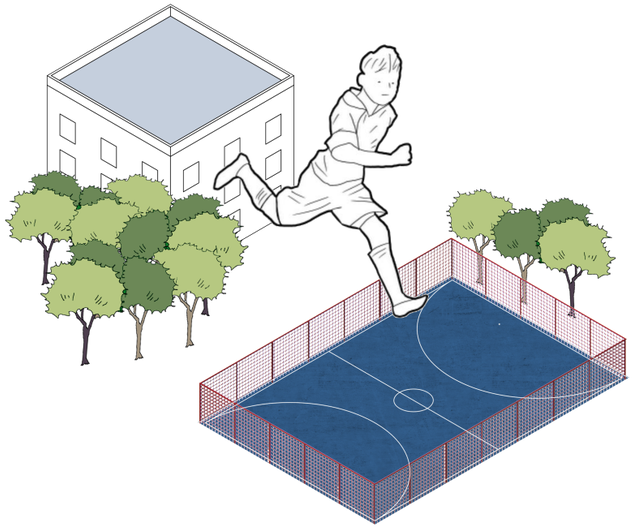
Average height of **18-year-old** youth in Bangladesh

CHILDREN'S LIKED SPACES

FACTOR 3 GENDER

SPACE FOR BOYS AND GIRLS





Girls

Less sporty activities

Near-home nature

Boys

Sports, adventure games

Away from home

Child-Centric Community

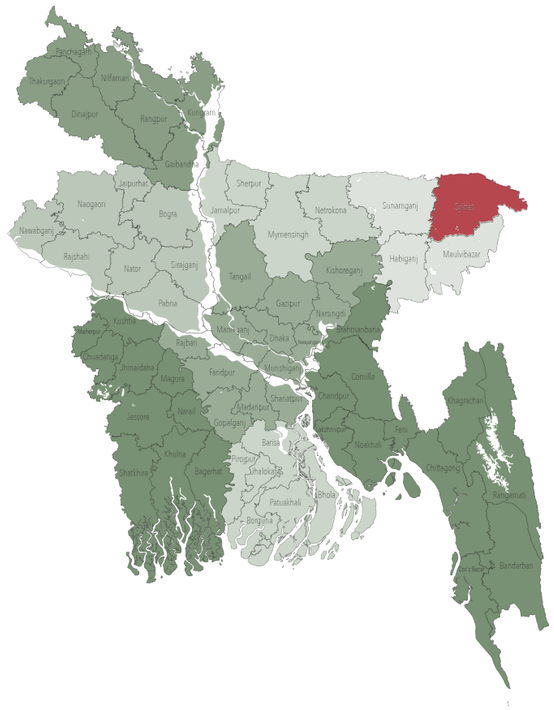
in urban context

- **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

COUNTRY, CITY, LOCATION



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



Site location in urban scale

SITE INFORMATION

COUNTRY, CITY, LOCATION



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)

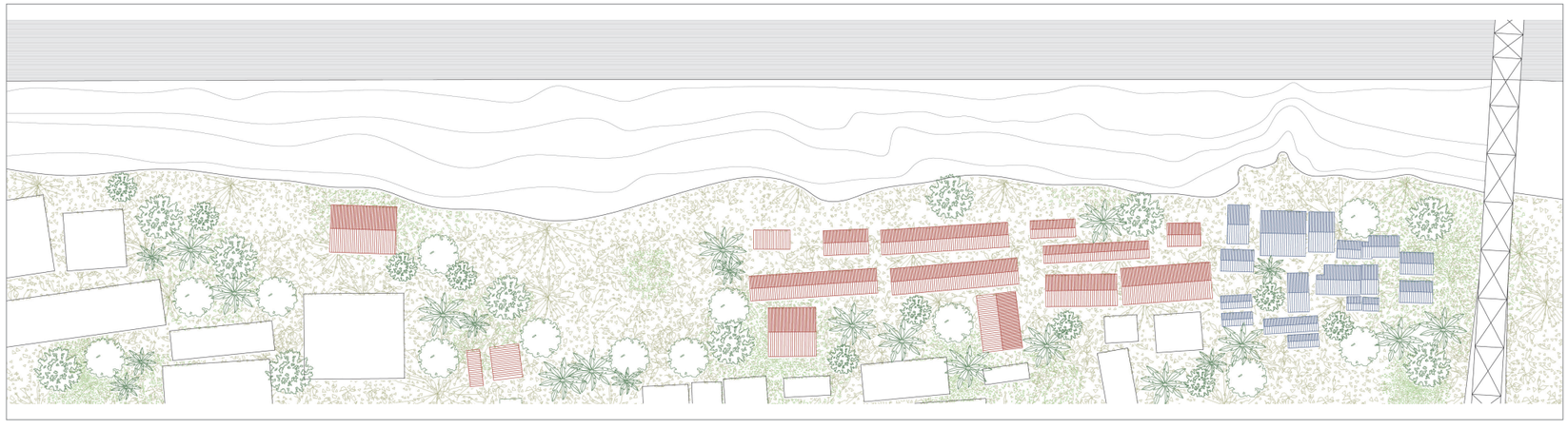
SITE INFORMATION

COUNTRY, CITY, LOCATION



CONTEXTUAL ANALYSIS

BUILDING, PEOPLE, LANDSCAPE





CONTEXTUAL ANALYSIS

BUILDING, PEOPLE, LANDSCAPE



Housing of Hindu community



Housing of Muslim community



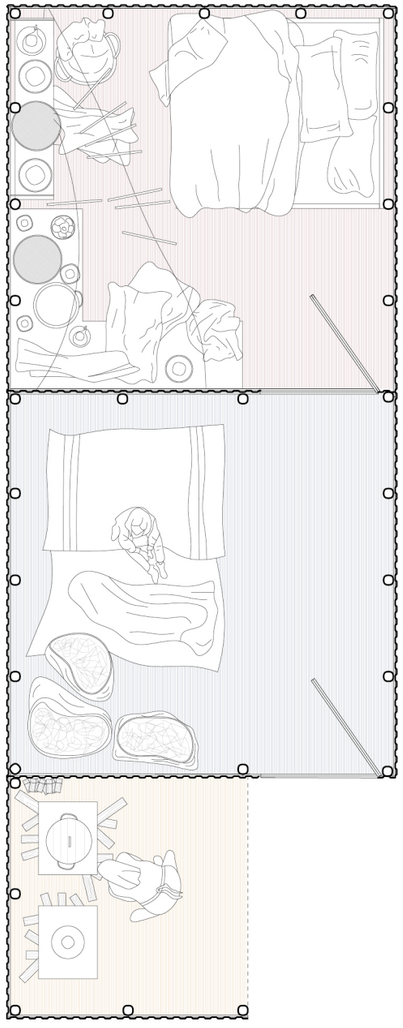
A small temple in Hindu community



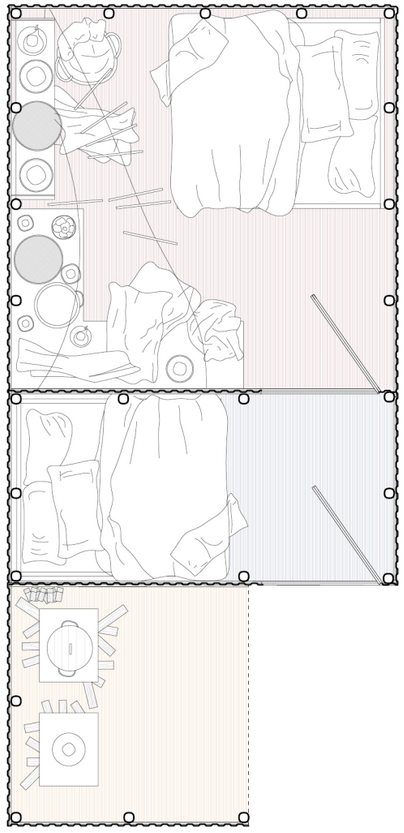
Communal space in Muslim community

CONTEXTUAL ANALYSIS

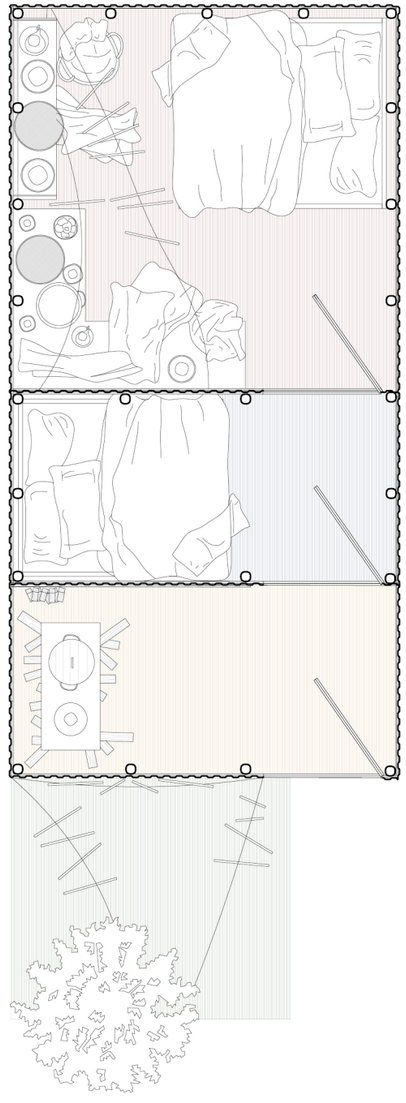
LAYOUT OF EXISTING MUSLIM HOUSING



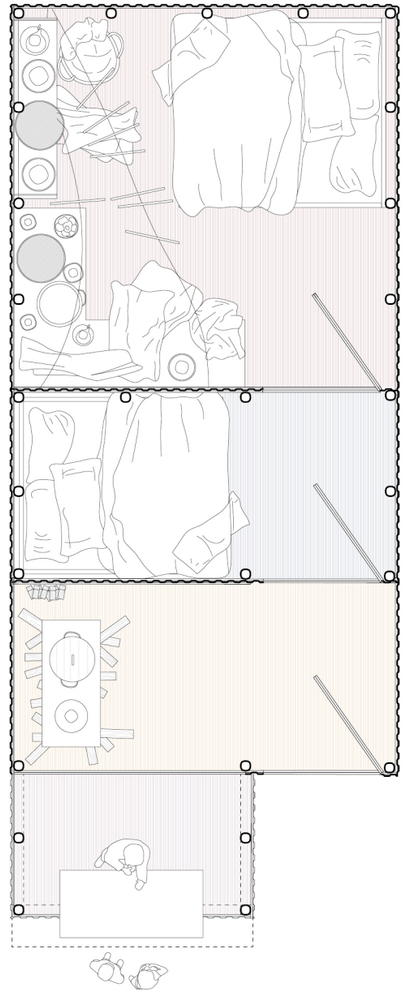
Main bedroom
Storage+bedroom
Kitchen



Main bedroom
Bedroom
Kitchen



Main bedroom
Storage+bedroom
Kitchen
Courtyard

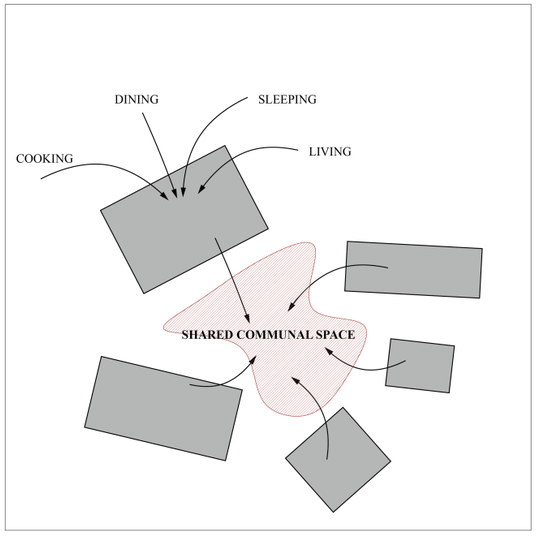


Main bedroom
Bedroom
Kitchen
Shop

0 1 3m

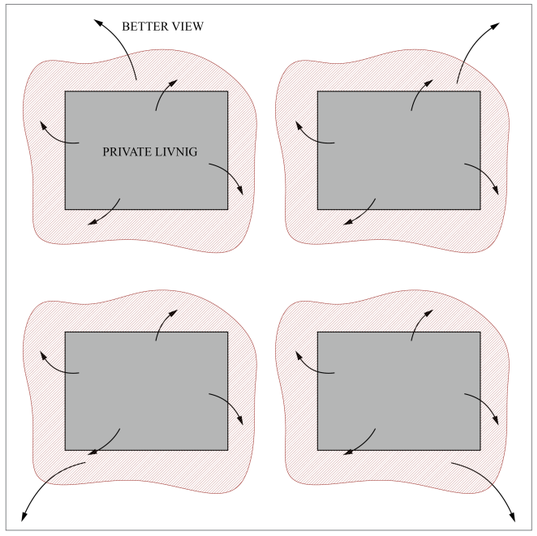
LIVING MODE ANALYSIS

TARGET GROUPS
AND THEIR LIFESTYLES



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

- **Context: A new city image**
  - Relation with Keane bridge
  - Relation with Surma river
- **Residents: Co-living of different groups**
  - Hindu: possible to upgrade+provide extra amenities
  - Low-income group: community-based living
  - Middle-income group: private living

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

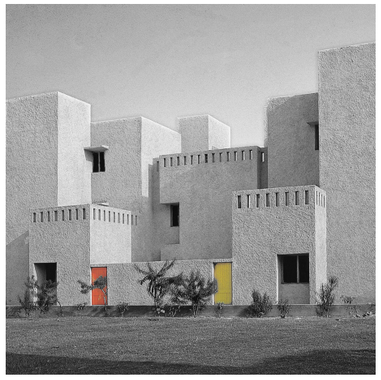
• CIDCO Housing, 1988-1993

• Housing Apartment at Bedade Nagar, 2022

• Kanchanjunga Apartments, 1983

CASE STUDY ON URBAN STRATEGY

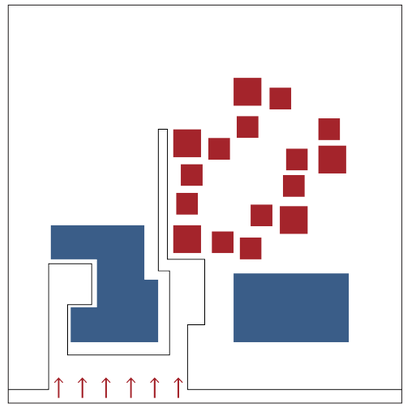
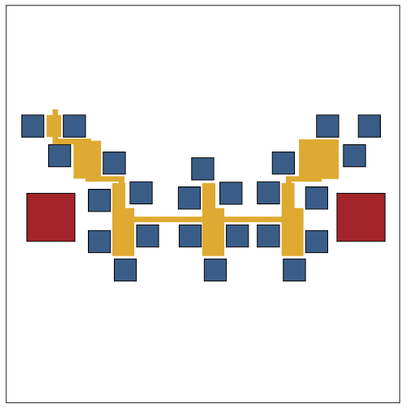
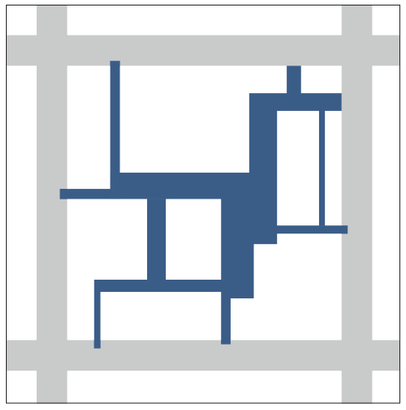
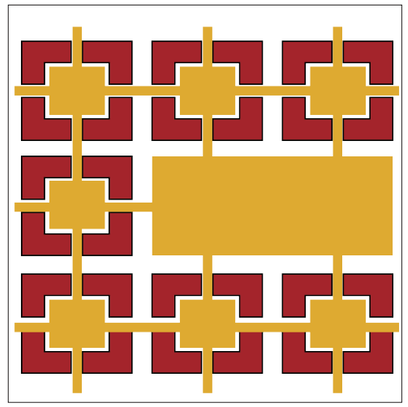
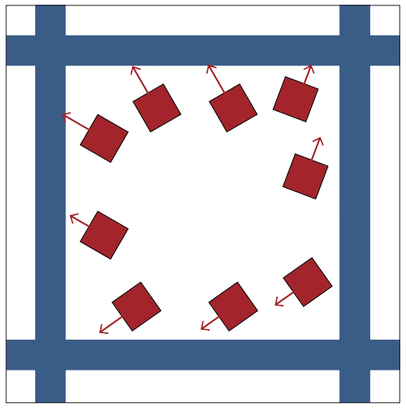
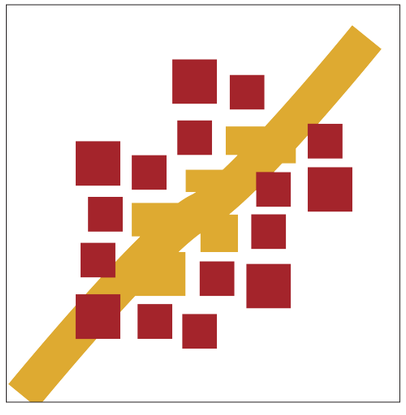
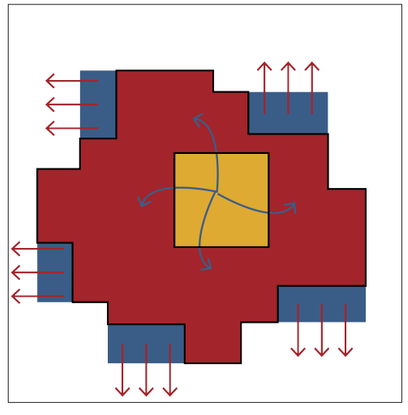
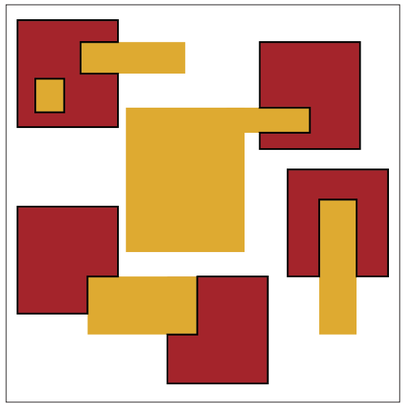
CONCLUSION:
PLANNING & CLUSTERING PRINCIPLES









	Networking	Public space	Cluster
Neighbourhood			
Cluster distribution			
Inside cluster			

CASE STUDY ON HOUSING UNIT

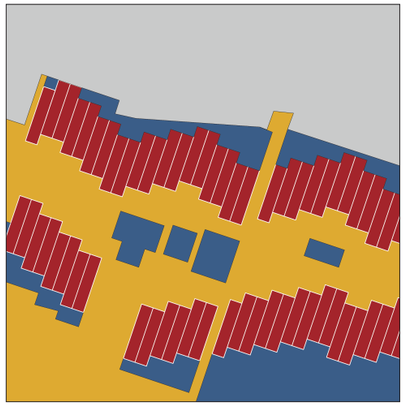
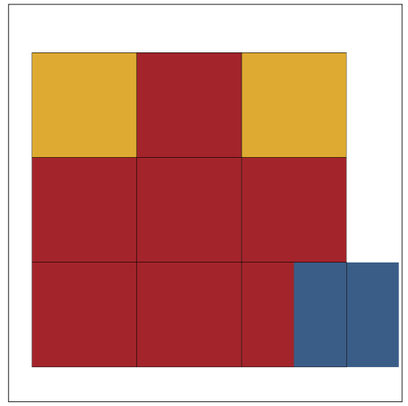
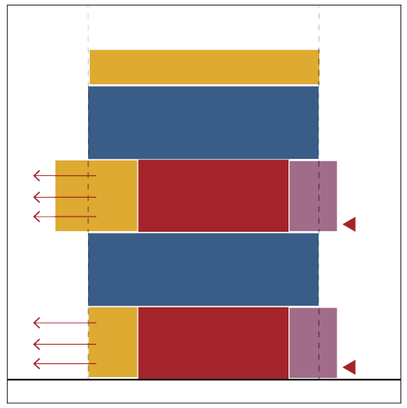
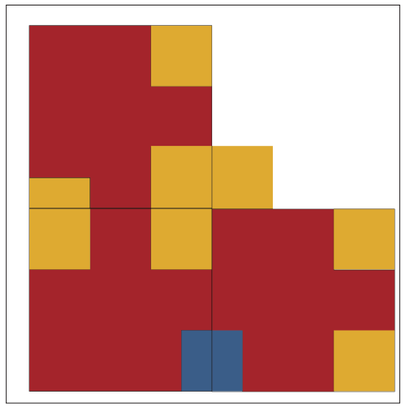
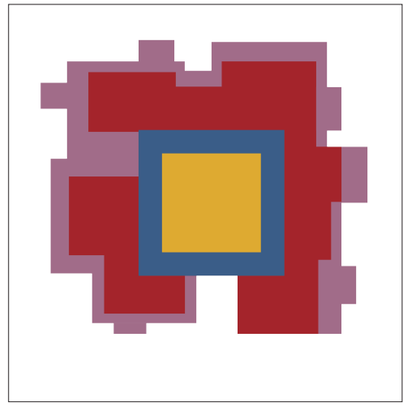
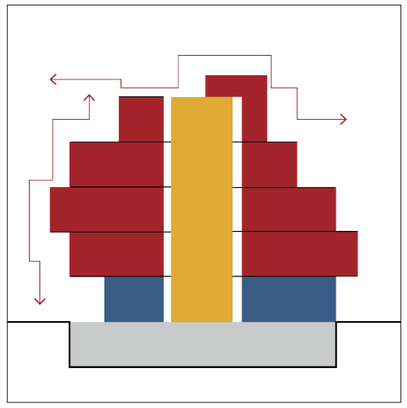
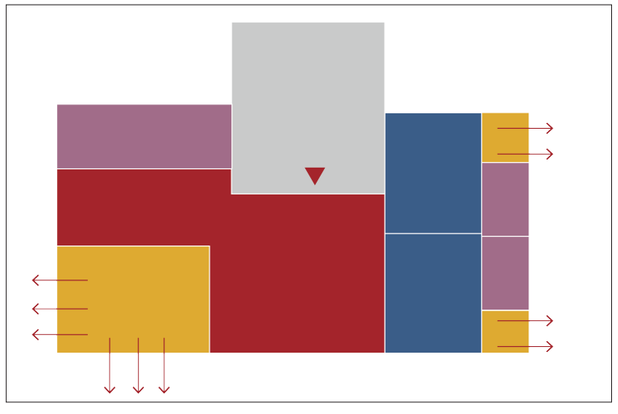
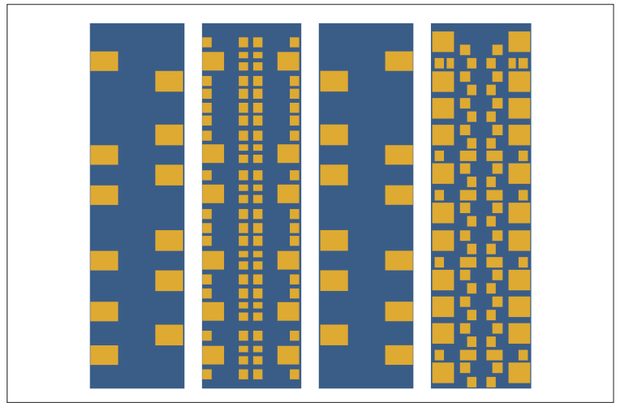
CONCLUSION:
LAYOUT OF HOUSING UNIT









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

Design approach

Master planning

- **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

Cluster&housing unit

- **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 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

Site Analysis

Design goal

- **Context: A new city image**
  - Relation with Keane bridge
  - Relation with Surma river
- **Residents: Co-living of different groups**
  - Hindu: possible to upgrade+provide extra amenities
  - Low-income group: community-based living
  - Middle-income group: private living

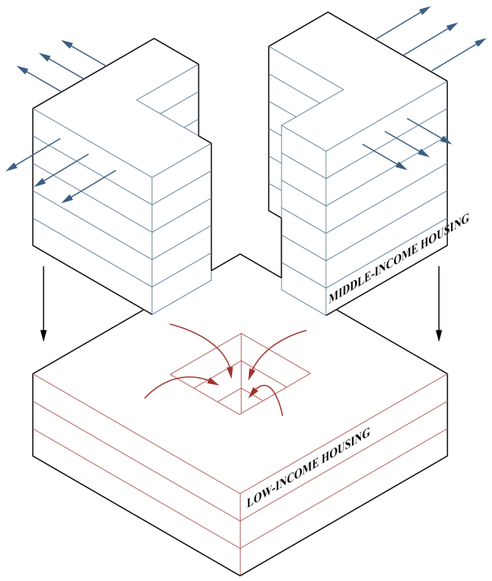
Case Study

Design approach

- **Master planning**
  - 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*
- **Cluster&housing 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

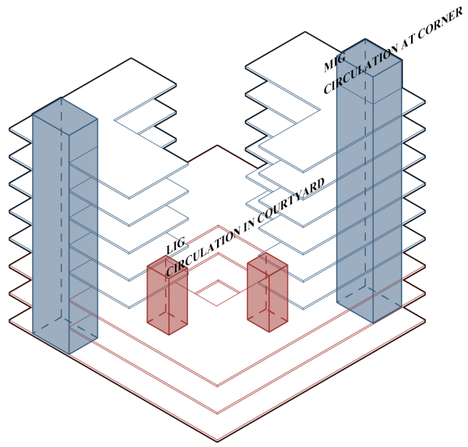
CONCEPT OF CLUSTER



Massing

LIG: community-based

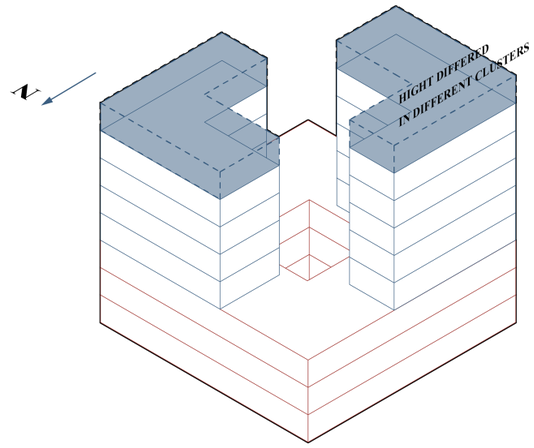
MIG: private



Separate Access

LIG: access from the courtyard

MIG: access from outside, with elevator



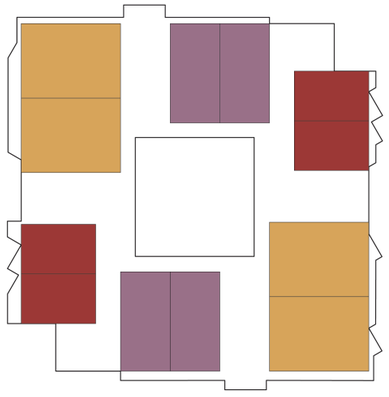
Height difference

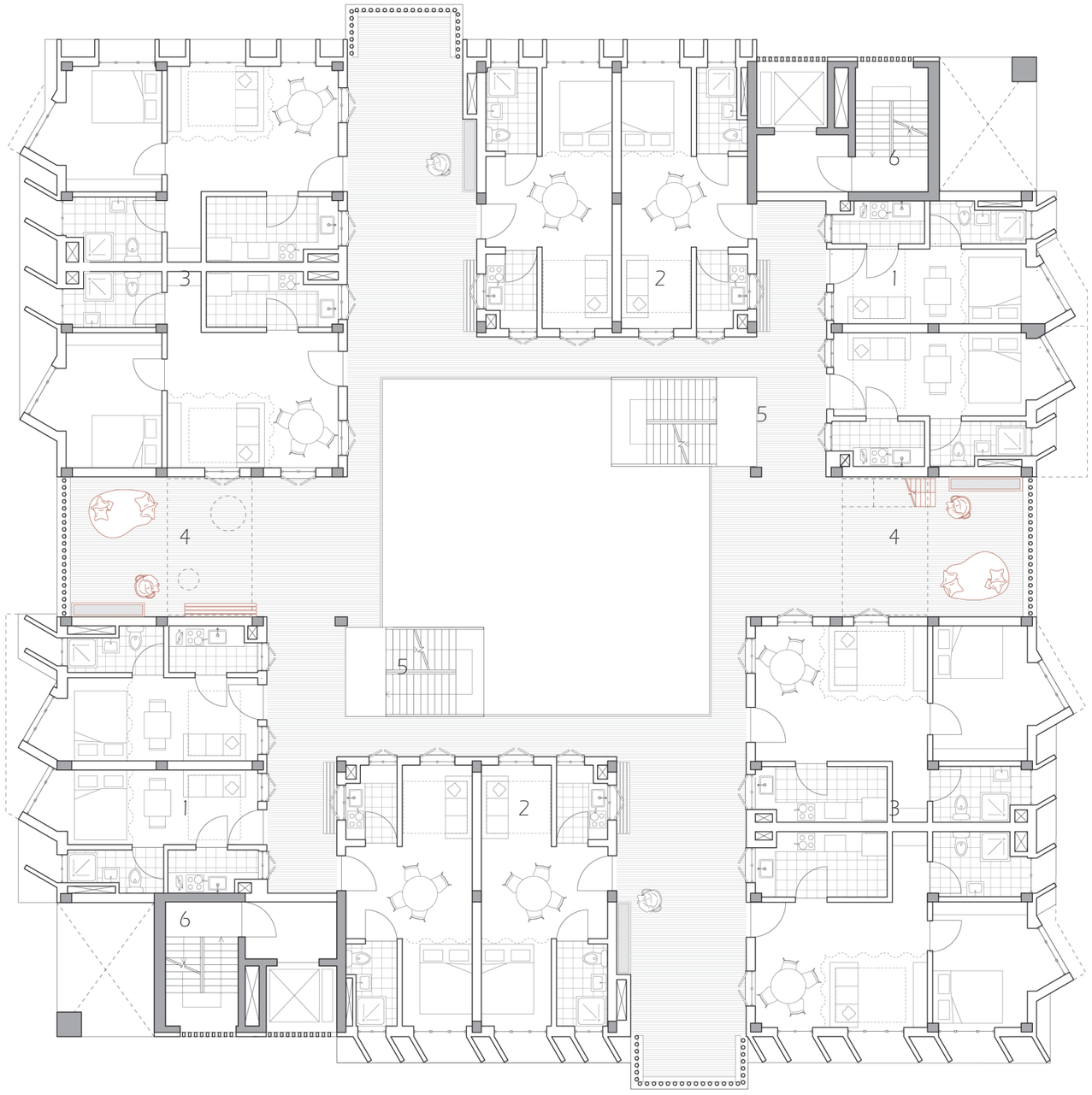
Towers on northeast and southwest corners

The north tower is lower than the south one

LOW-INCOME LIVING

CLUSTER LAYOUT





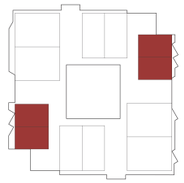
1 Housing Type A 24 m²
2 Housing Type B 32 m²
3 Housing Type C 48 m²
4 Pocket play space +planting
5 Circulation for LIG
6 Circulation for MIG
(not accessible from this storey)

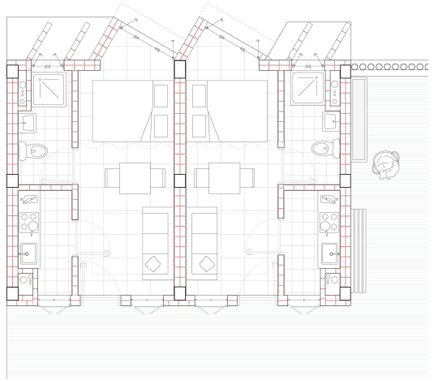
First floor plan 1:150

0 4 8 m

LOW-INCOME LIVING

HOUSING UNIT

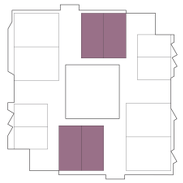


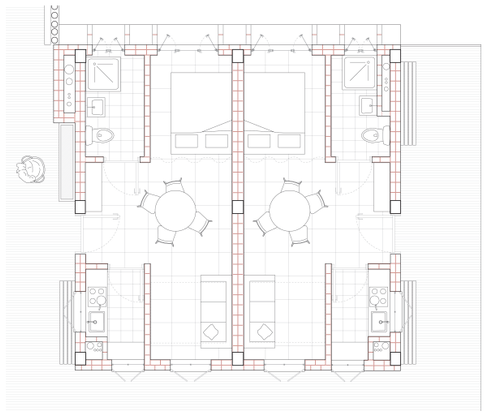


Type A Studio

24 m^2 (4×6m)
2-4 ppl

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

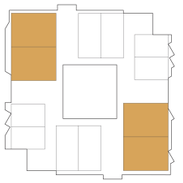


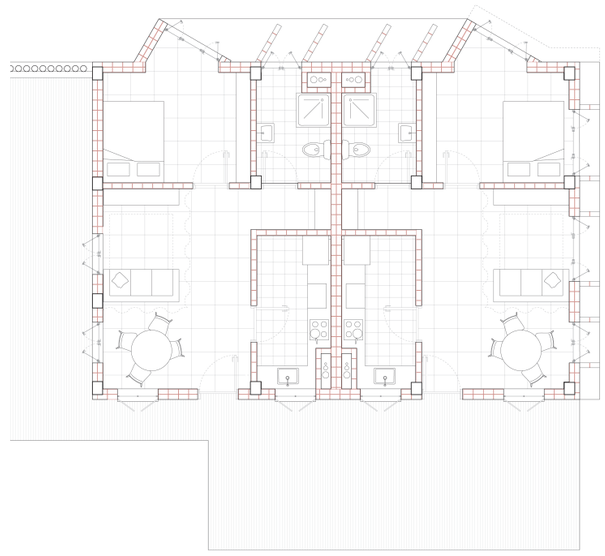


Type B Studio

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

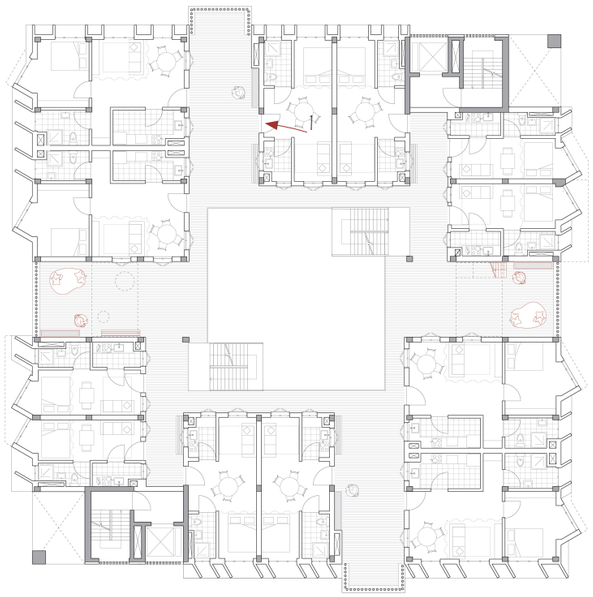
Living space
(can be turned into bedroom at night)
Dining
Bedroom
kitchen
Toilet

0 1 3m



LOW-INCOME LIVING

ATMOSPHERE
Living space





LOW-INCOME LIVING

ATMOSPHERE

Kitchen open to the gallery



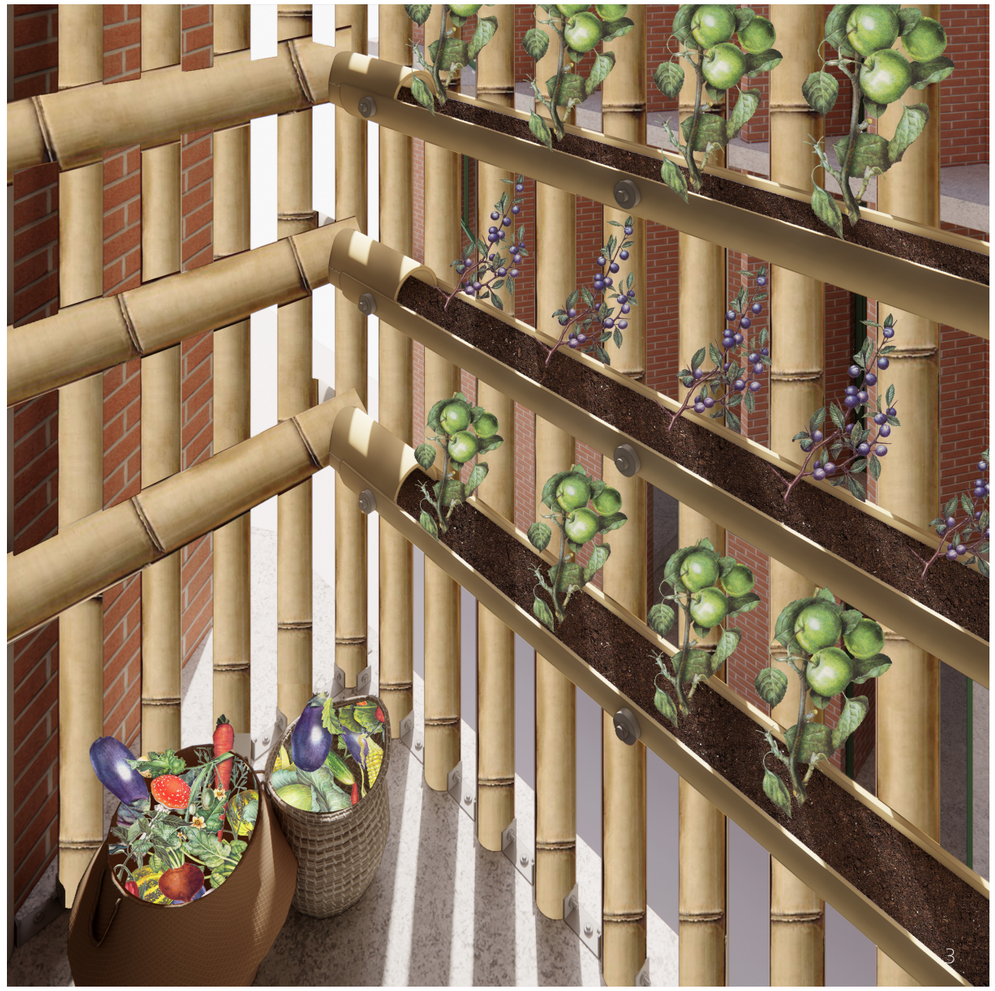


LOW-INCOME LIVING

ATMOSPHERE

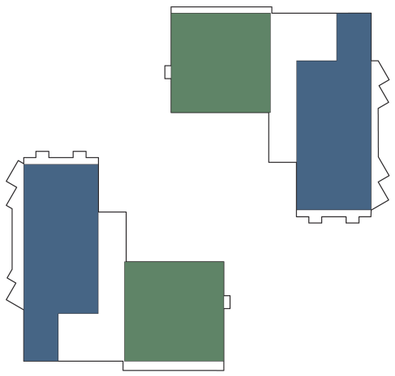
Planting facade in common space





MIDDLE -INCOME LIVING

CLUSTER LAYOUT





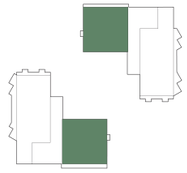
7 Housing Type D 64 m²
8 Housing Type E 84 m²
9 Circulation for LIG
(not accessible from this storey)
10 Circulation for MIG
11 Roof top of the second floor

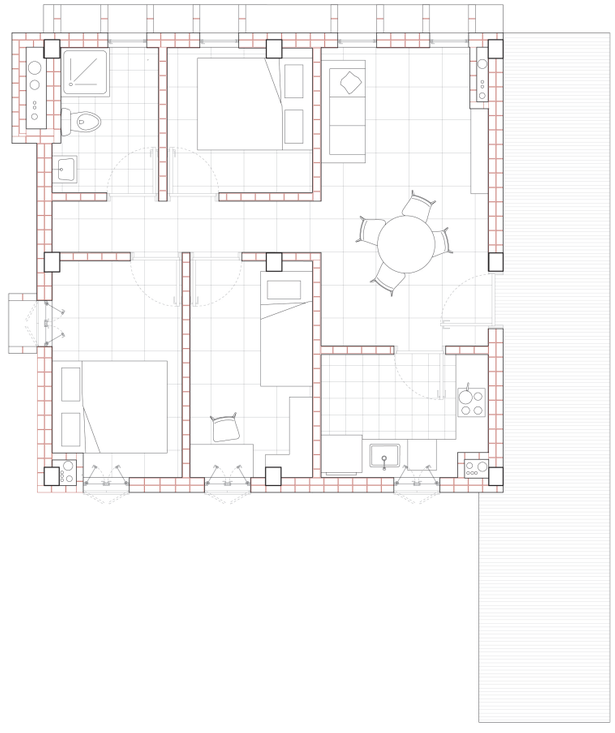
Typical floor plan above third floor 1:150

0 4 8 m

MIDDLE-INCOME LIVING

HOUSING UNIT

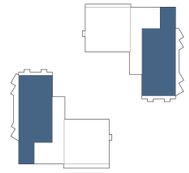


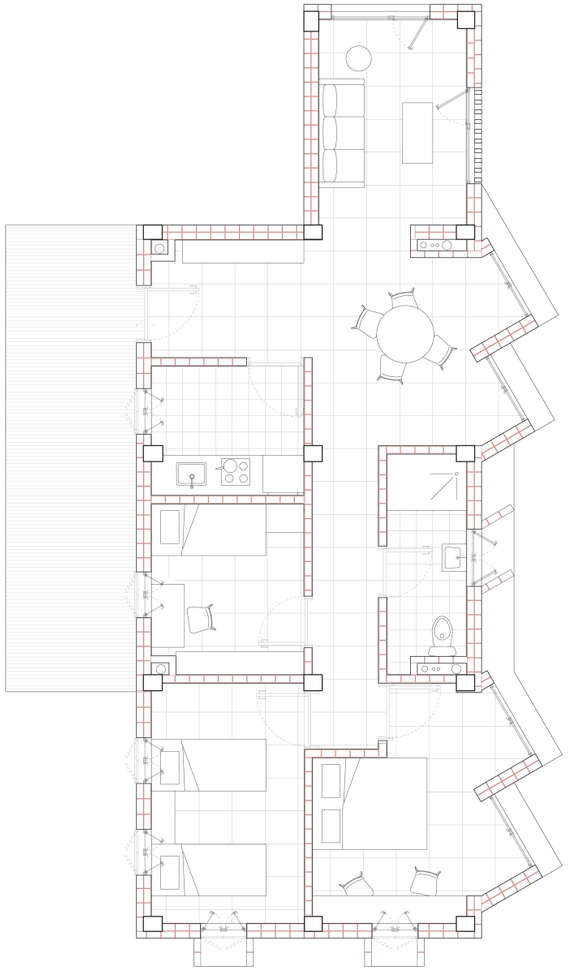


Type D 3 bedroom unit

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

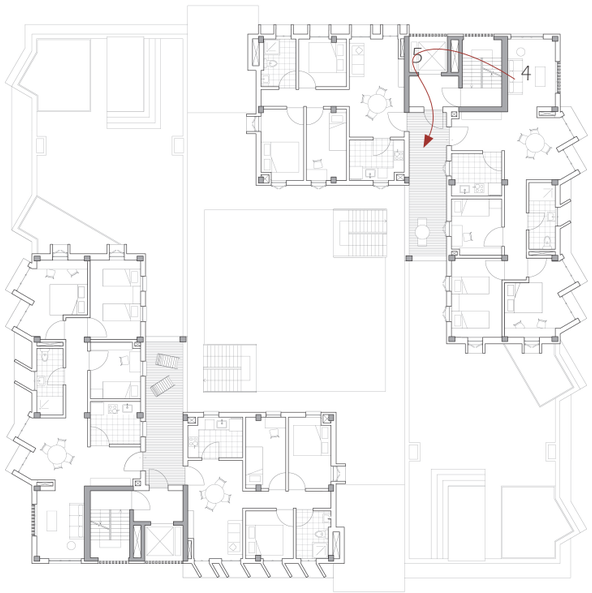
ATMOSPHERE
Living space





MIDDLE-INCOME LIVING

ATMOSPHERE
Riverview elevator





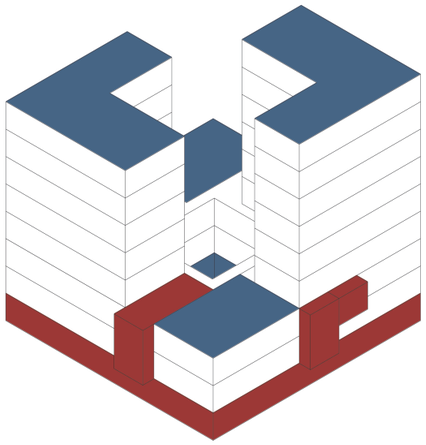
CO-LIVING OF TWO GROUPS

CLUSTER INTEGRITY



06 DESIGN-PLAYFUL PUBLIC SPACE

CONCEPT OF SPACE FOR CHILDREN

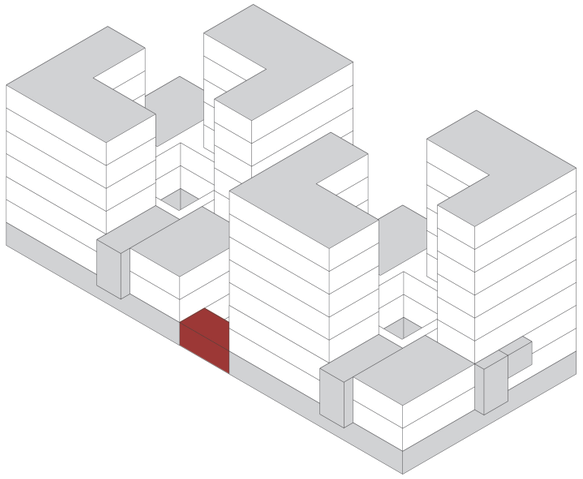


Within a cluster

Pocket play space (low-income)

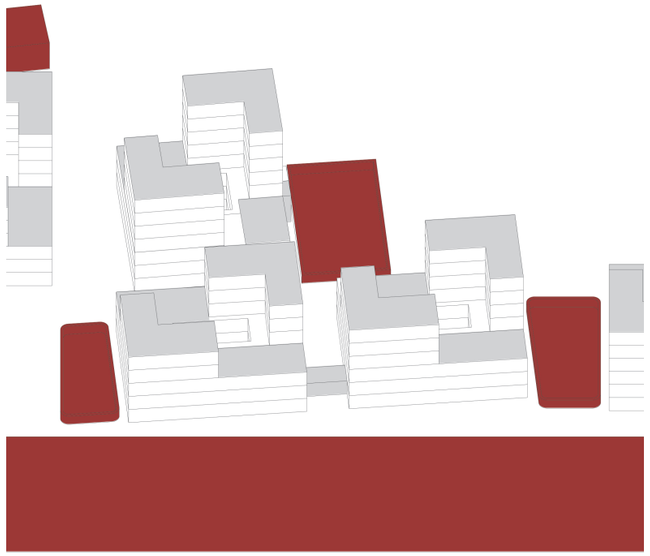
Roof terrace (middle-income)

Ground floor (shared)



Between clusters

Open gallery



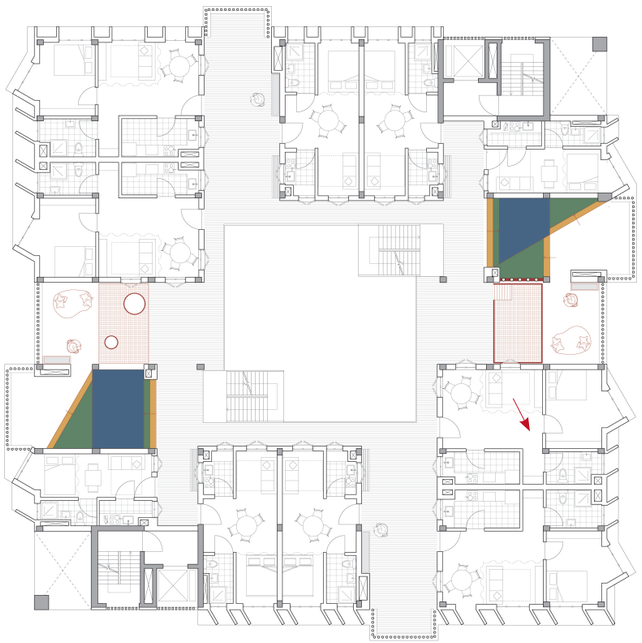
Community amenities

Park

Playground

WITHIN A CLUSTER

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



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)



Third floor plan



Roof terrace on the third floor

WITHIN A CLUSTER

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



Ground floor plan



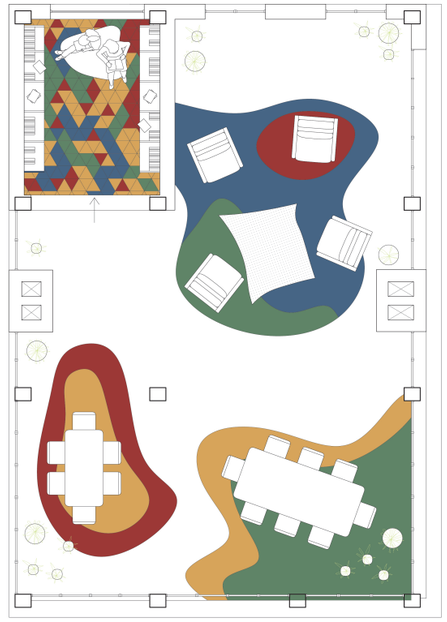
Ground floor courtyard

WITHIN A CLUSTER

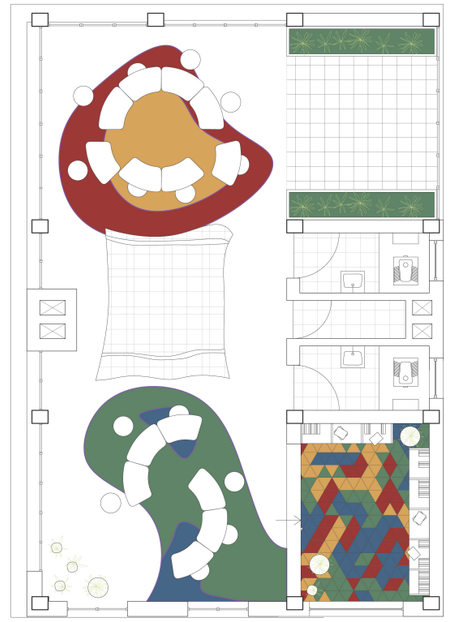
Alternatives for indoor play



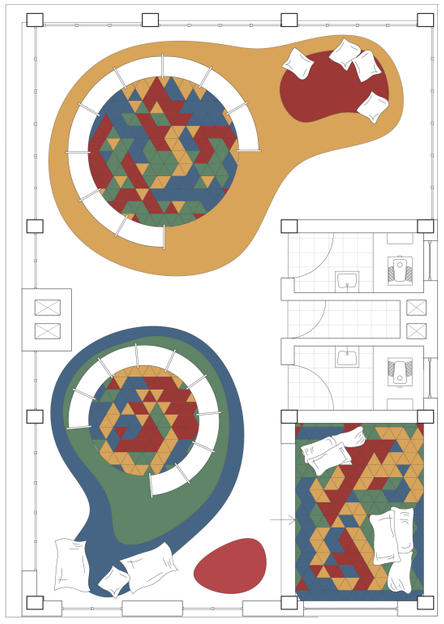
Indoor play rooms on the ground floor



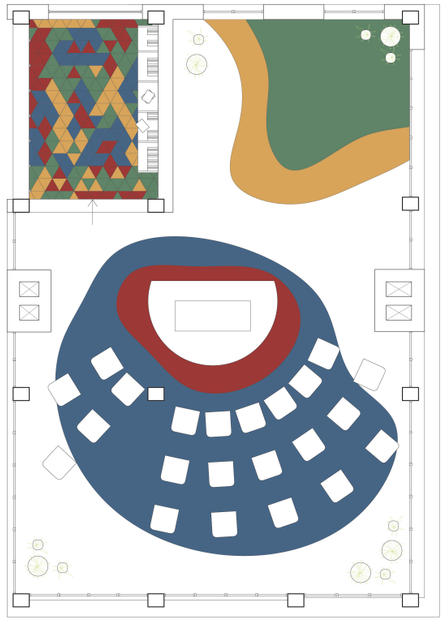
Reading



Education+planting



Intergenerational play



Large gathering

A

A'

IN BETWEEN THE CLUSTERS

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

0 2 6 10m

Ground floor plan
1:200



East-west section
1:200



Perspective from the street

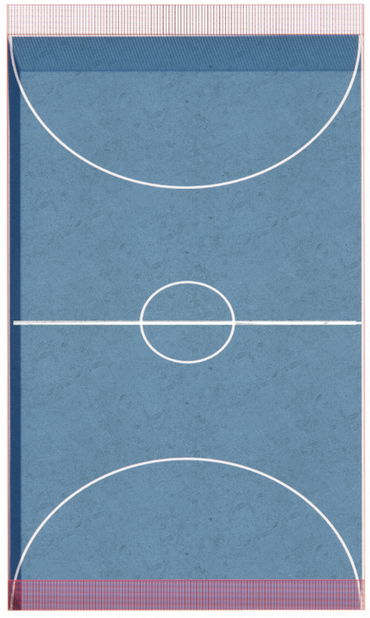
COMMUNITY AMENITIES

For adolescence (above 12 years old)



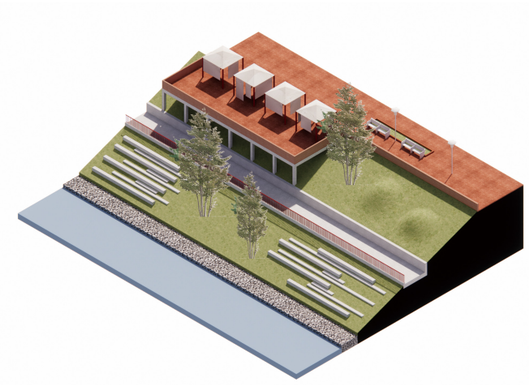
Play yard

one for every two clusters



Sport court

Around school area



Riverside playground

Landscape & children's park

SYNTHESIS

Ground floor - master scale

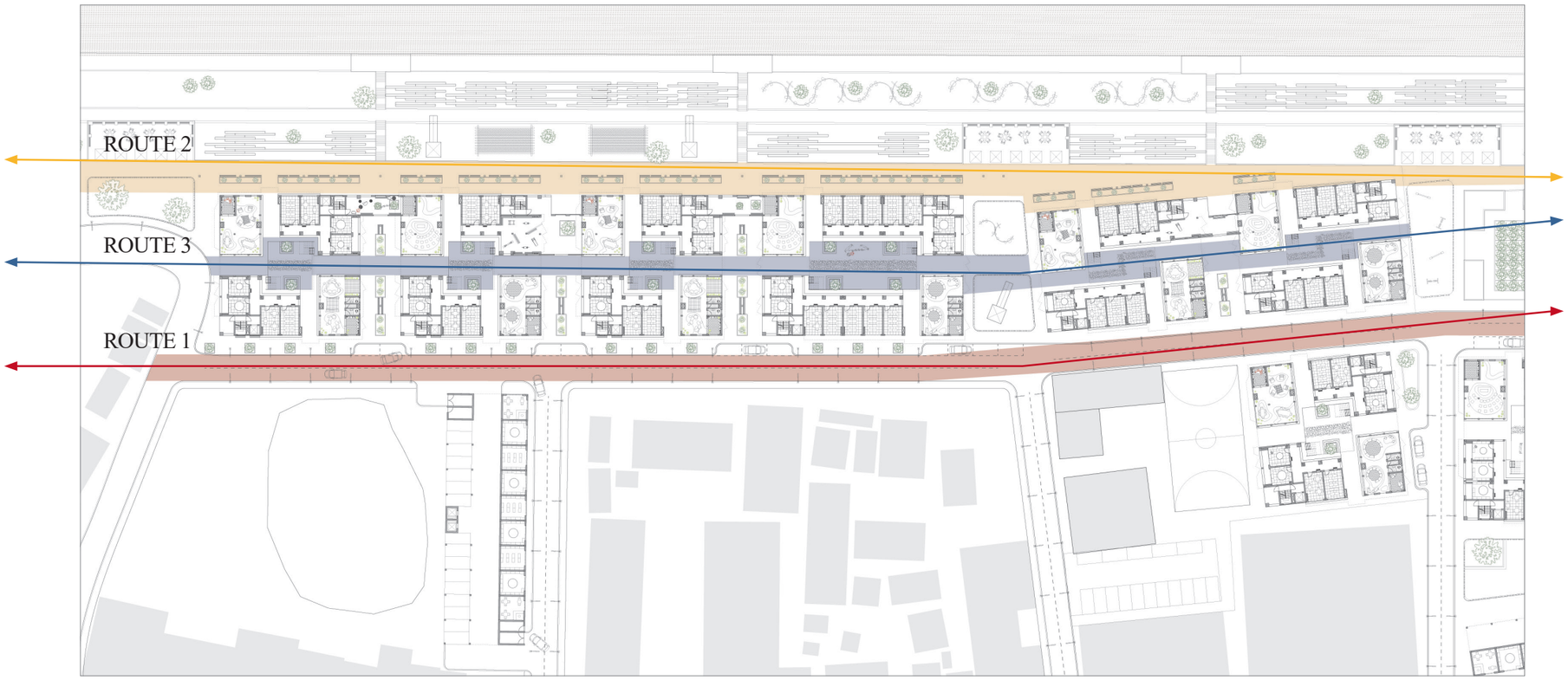
Ground floor plan
1:1000

0 10 20 30 m

07 DESIGN-WALKABLE STREET

CONCEPT OF FLOW ON THE SITE

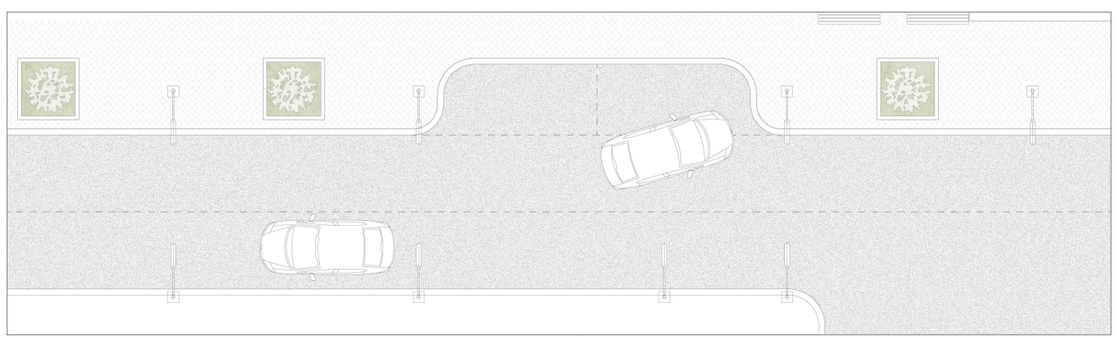
3 east-west connection



ROUTE 1

Public: vehicle road

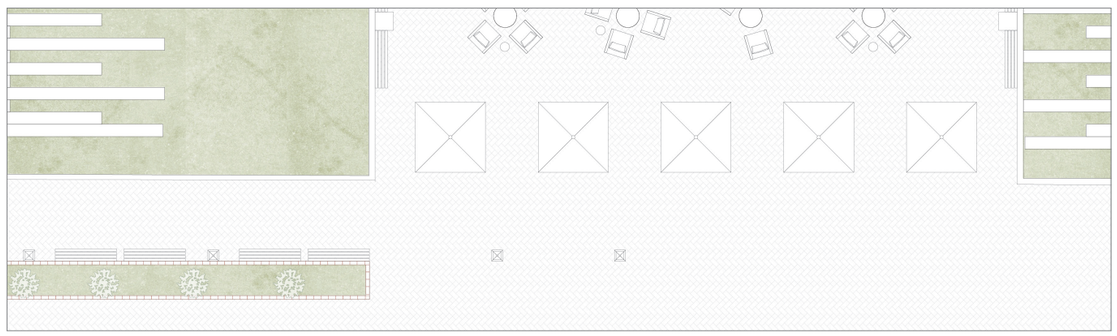






ROUTE 2

Community: riverside commercial street

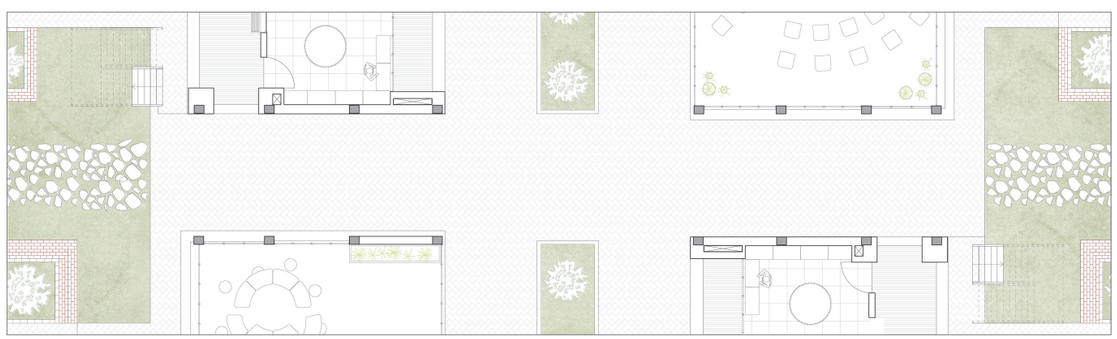




ROUTE 3

Private: courtyard linkage









SCENARIO

Cluster scale

SCENARIO

Master scale

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



SYNTHESIS

Overall image of the whole site - master plan

Master plan
1:1000

0 10 20 30 m



SYNTHESIS

Overall image of the whole site - riverside elevation



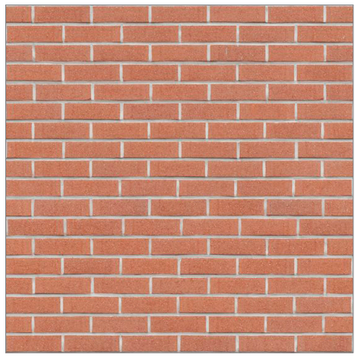
SYNTHESIS

Overall image of the whole site - Axonometric

08 BUILDING TECHNOLOGY

MATERIALITY







Concrete

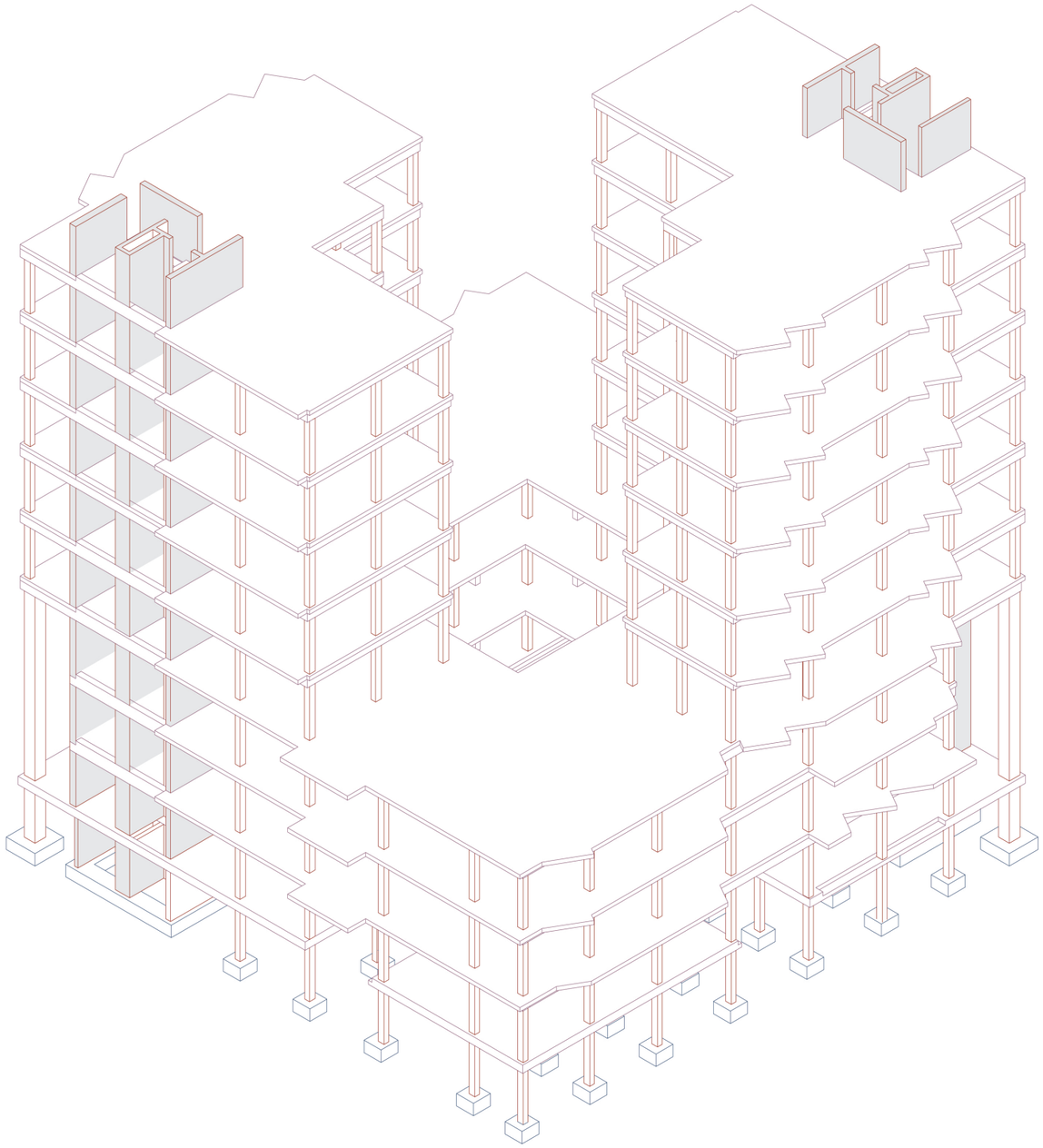
Brick

Bamboo

Frame structure	Infill	Facade
Affordability	Affordability	Affordability
Availability	Availability	Availability
Durability	**Recyclability**	**Cultural acceptance**
Flexibility	**Aesthetics**	**Sustainability**

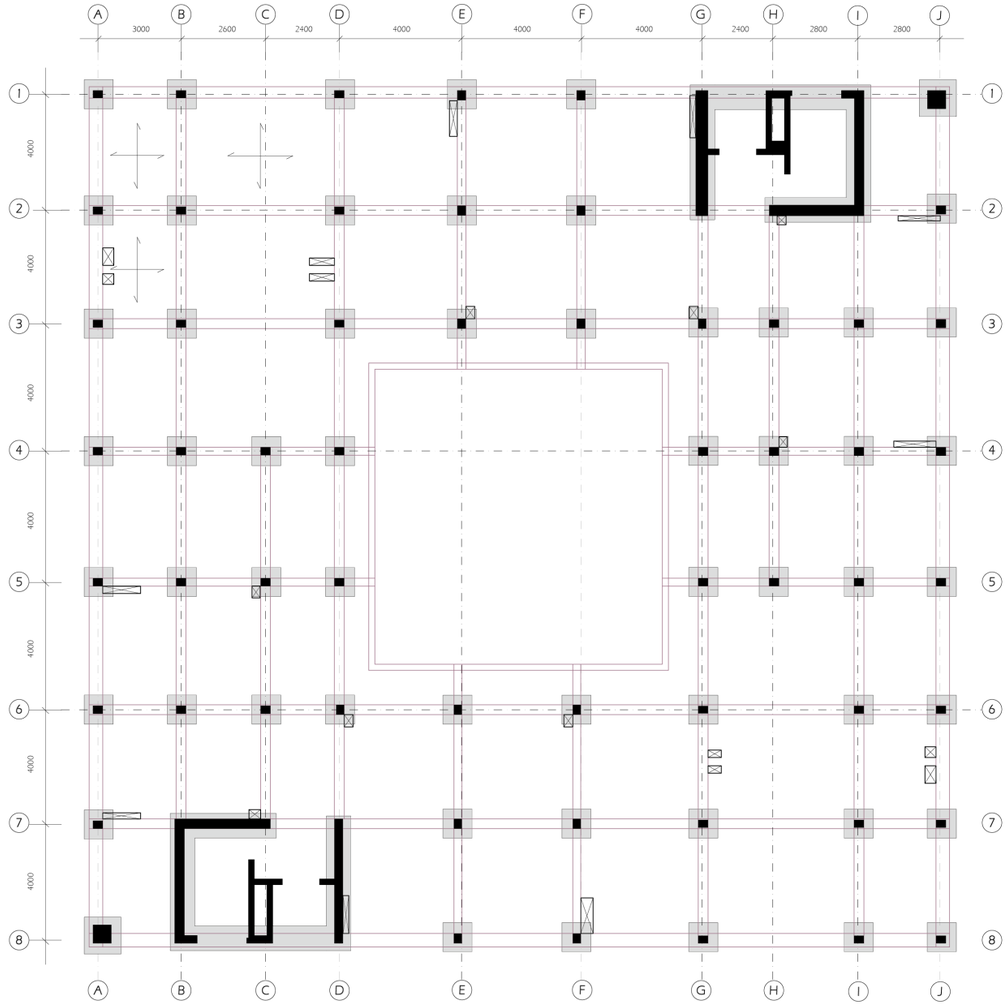
PRINCIPLE STRUCTURE

LOAD-BEARING STRUCTURE



PRINCIPLE STRUCTURE

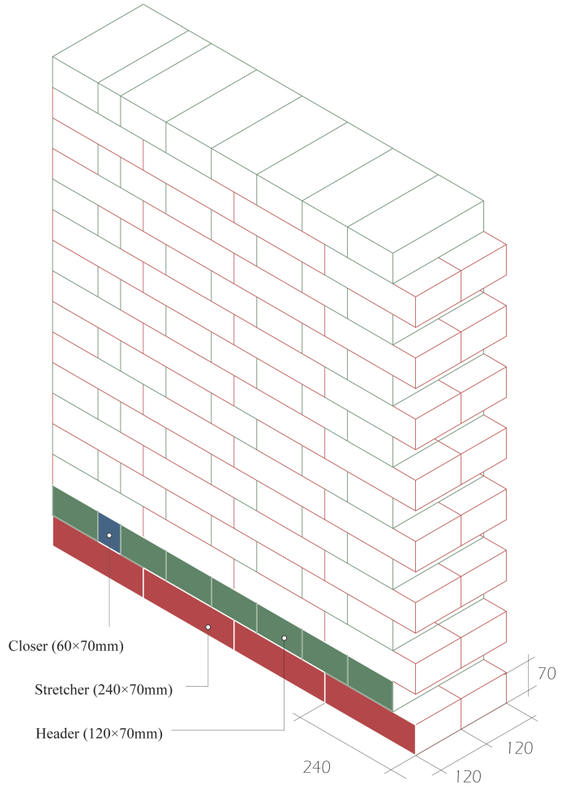
STRUCTURAL PLAN



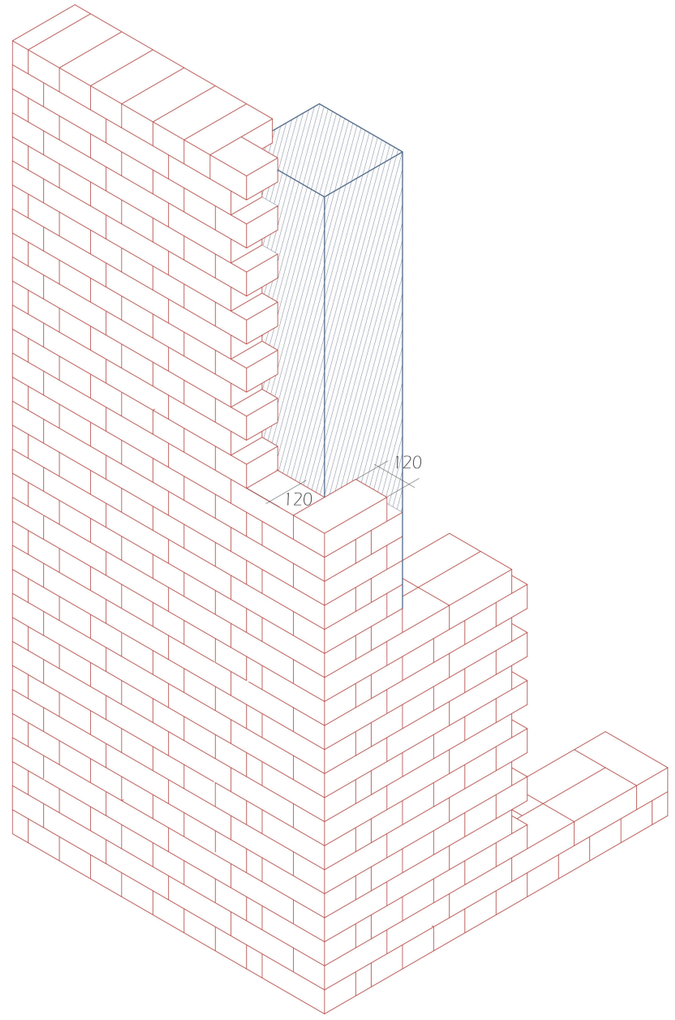
Structural plan 1:200

PRINCIPLE STRUCTURE

BRICK INFILL

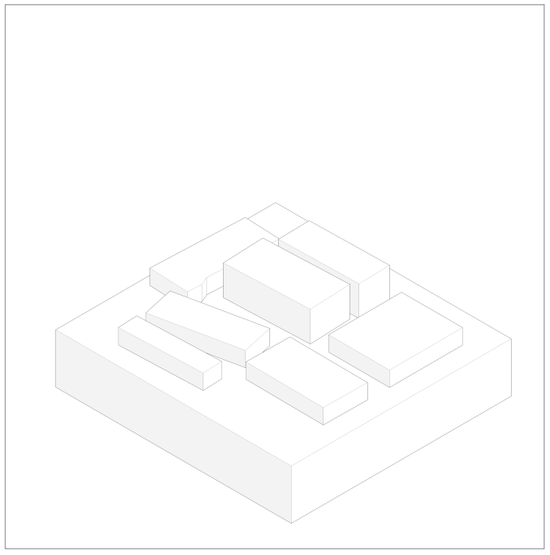


English bond

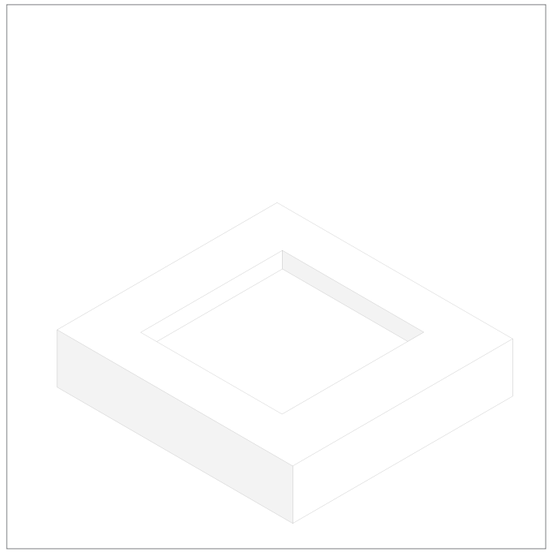


Hide the column

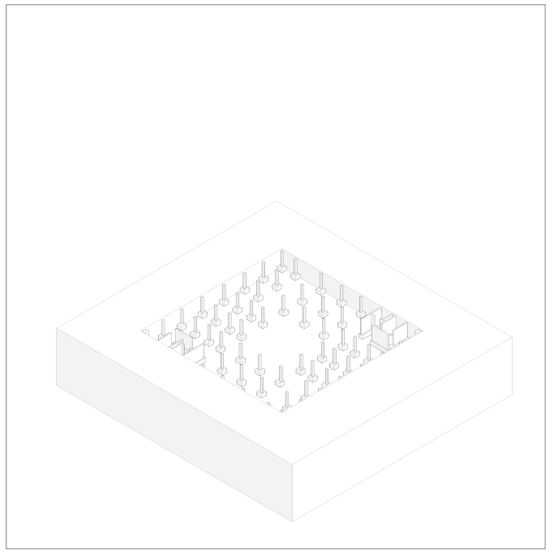
CONSTRUCTION PROCESS



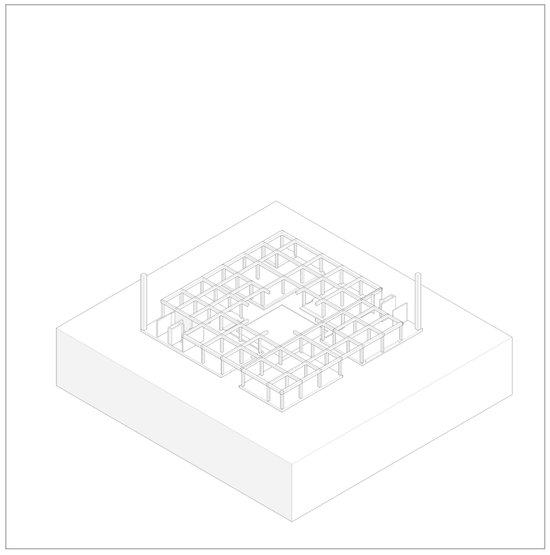
1 Site preparation



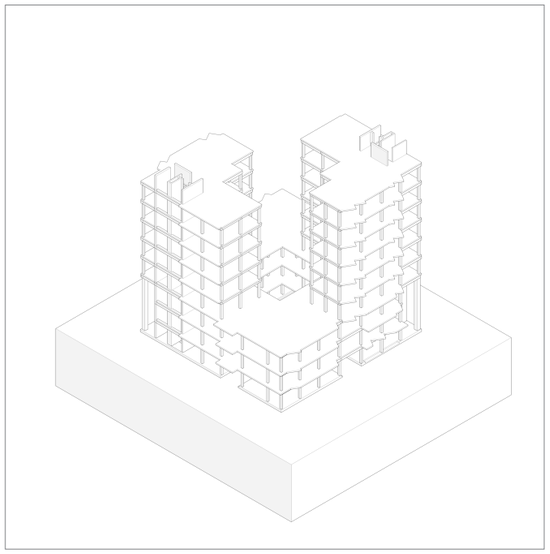
2 Excavation



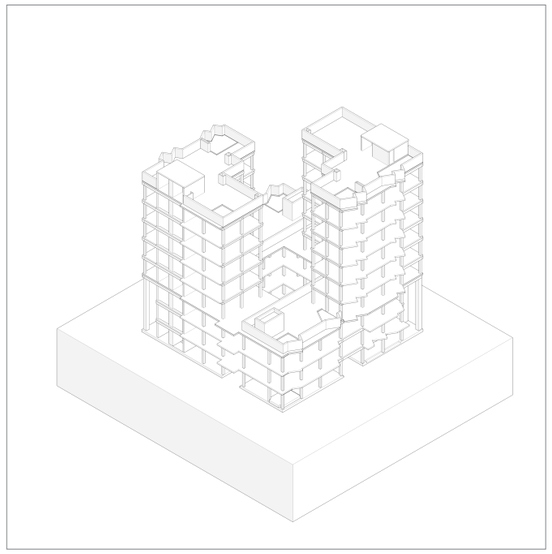
3 Foundation



4 Concrete frame one floor



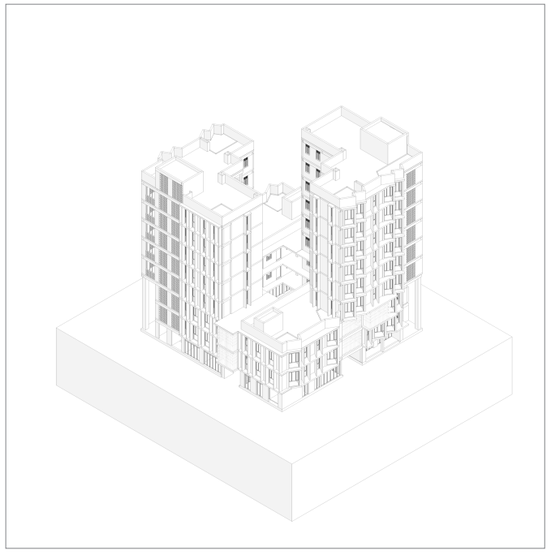
5 Repeat on each floor



6 Roof & waterproof



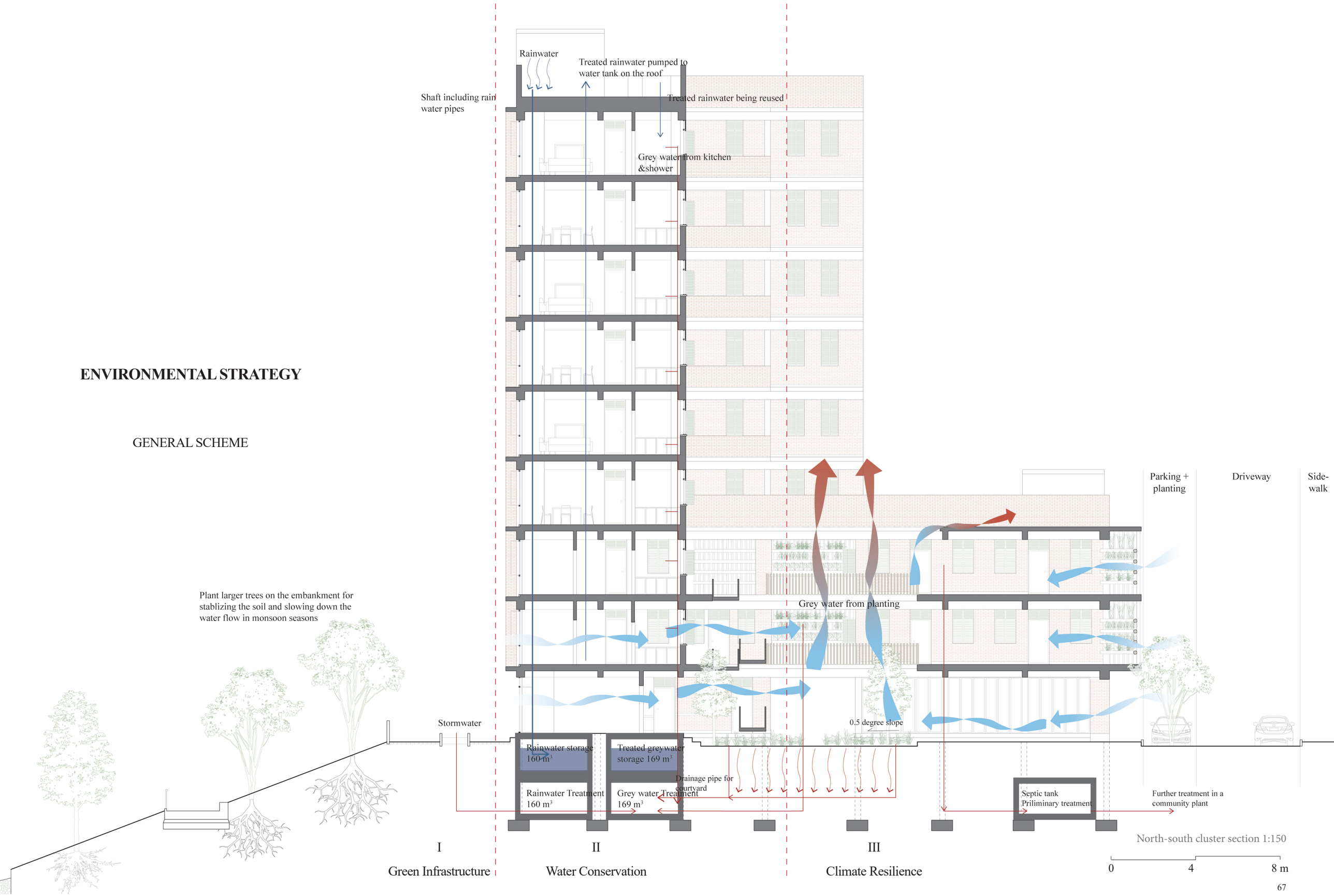
7 Brick infill



8 Door & window

ENVIRONMENTAL STRATEGY

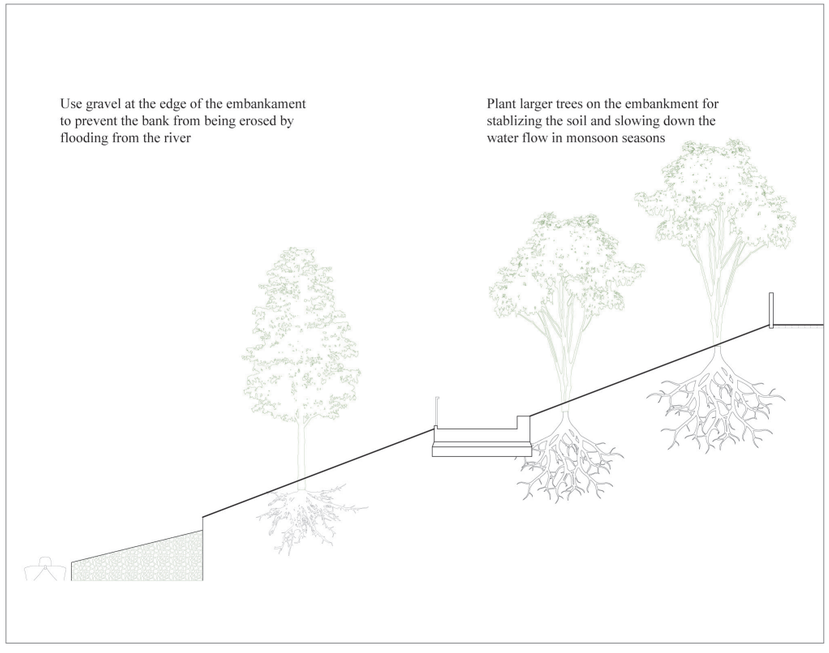
GENERAL SCHEME



ENVIRONMENTAL STRATEGY

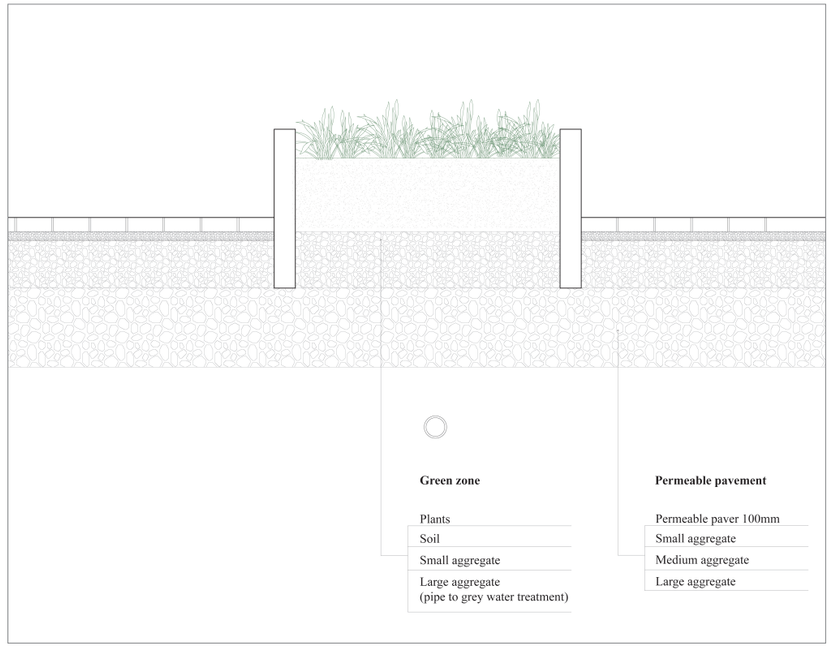
GREEN INFRASTRUCTURE





Green embankment

Stabilize the river bank+landscape

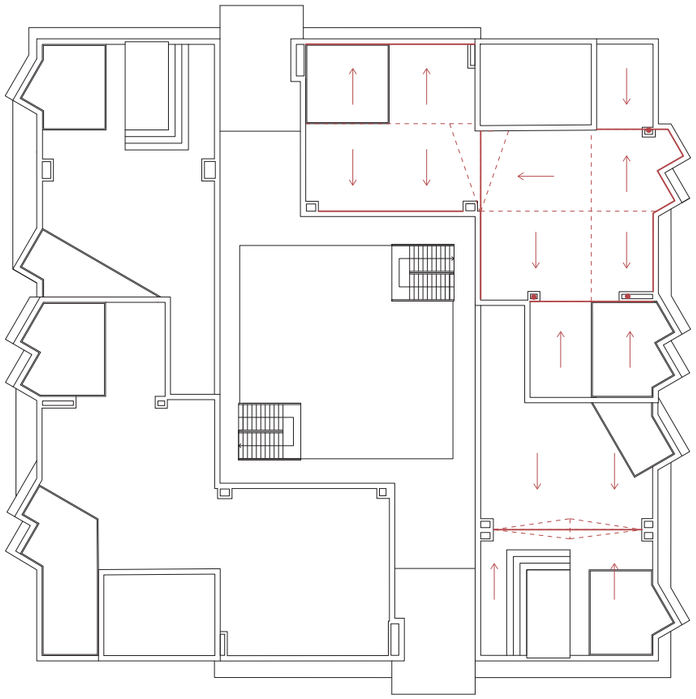


Green zones & permeable pavement

Stormwater management

ENVIRONMENTAL STRATEGY

WATER CONSERVATION



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

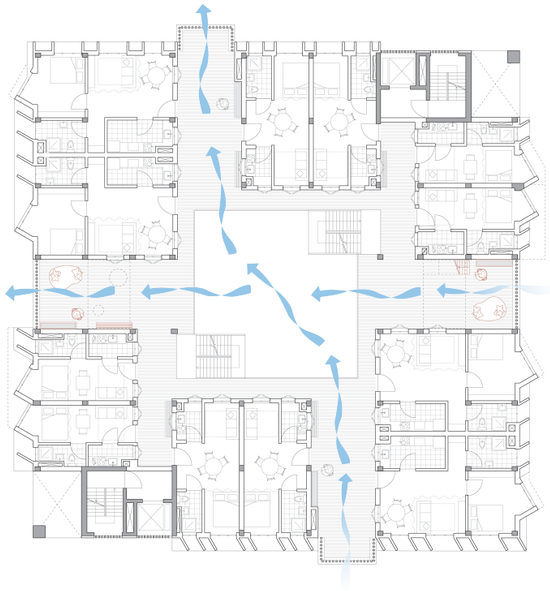
Water consumption of a cluster per day:
228×100 L =22800L=22.8 m^3

Reusability: 60%-80%

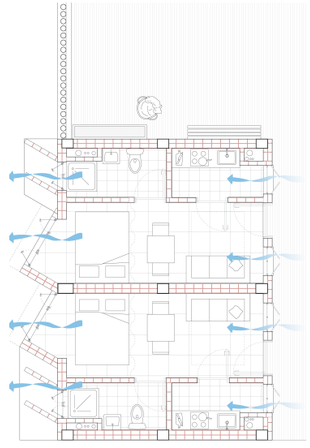
ENVIRONMENTAL STRATEGY

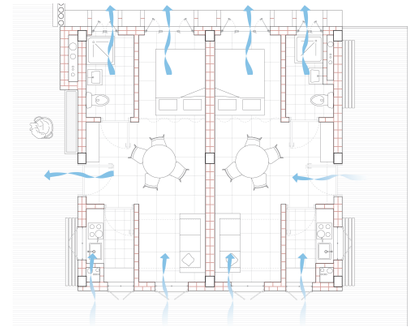
CLIMATE RESILIENCE

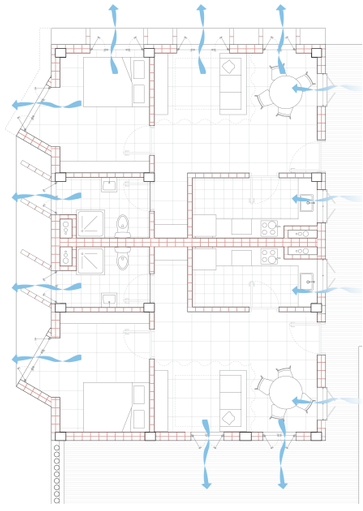
Ventilation



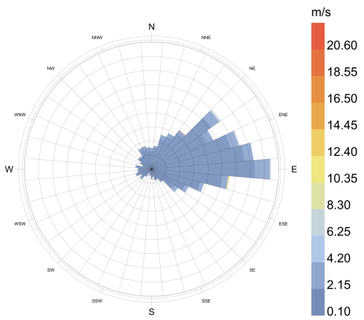
Cross ventilation at low-income level





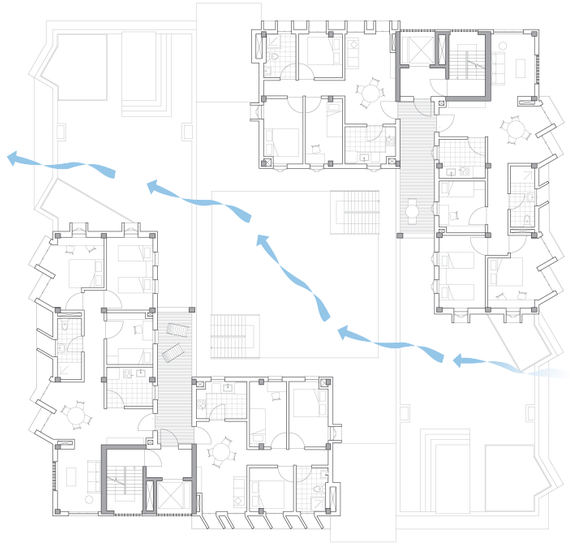


Passive ventilation in low-income housing units

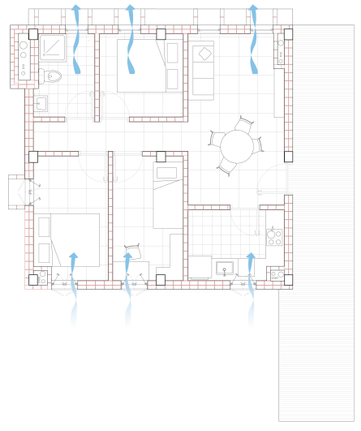


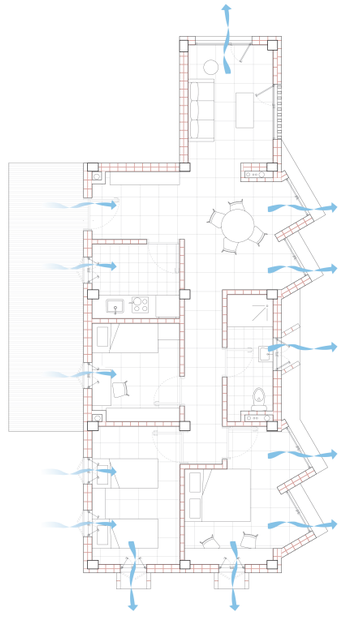
Wind Speed (m/s)
city: Sylhet
country: BGD
time-zone: 6.0
source: SRC-TMYx
period: 1/1 to 12/31 between 0 and 23 @1
Calm for 5.14% of the time = 218 hours.
Each closed polyline shows frequency of 1.2% = 50 hours.

Windrose of Sylhet



Cross ventilation at middle-income level



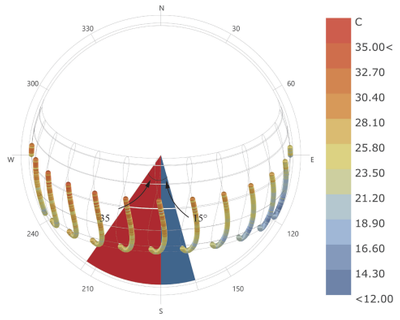


Passive ventilation in middle-income housing units

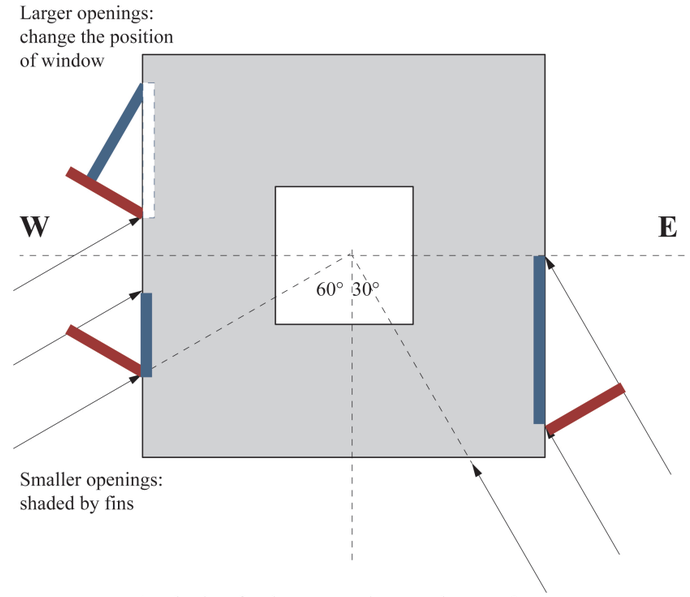
ENVIRONMENTAL STRATEGY

CLIMATE RESILIENCE

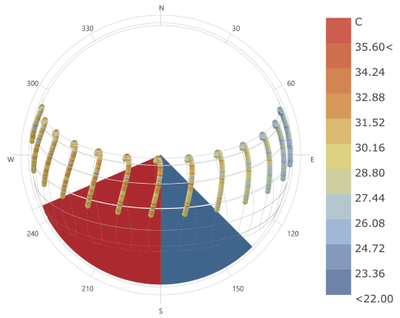
Solar protection



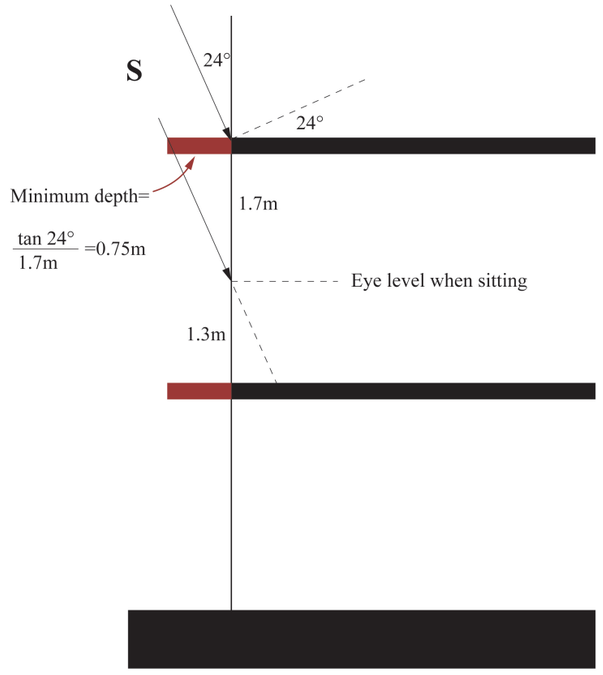
Sunlight in winter



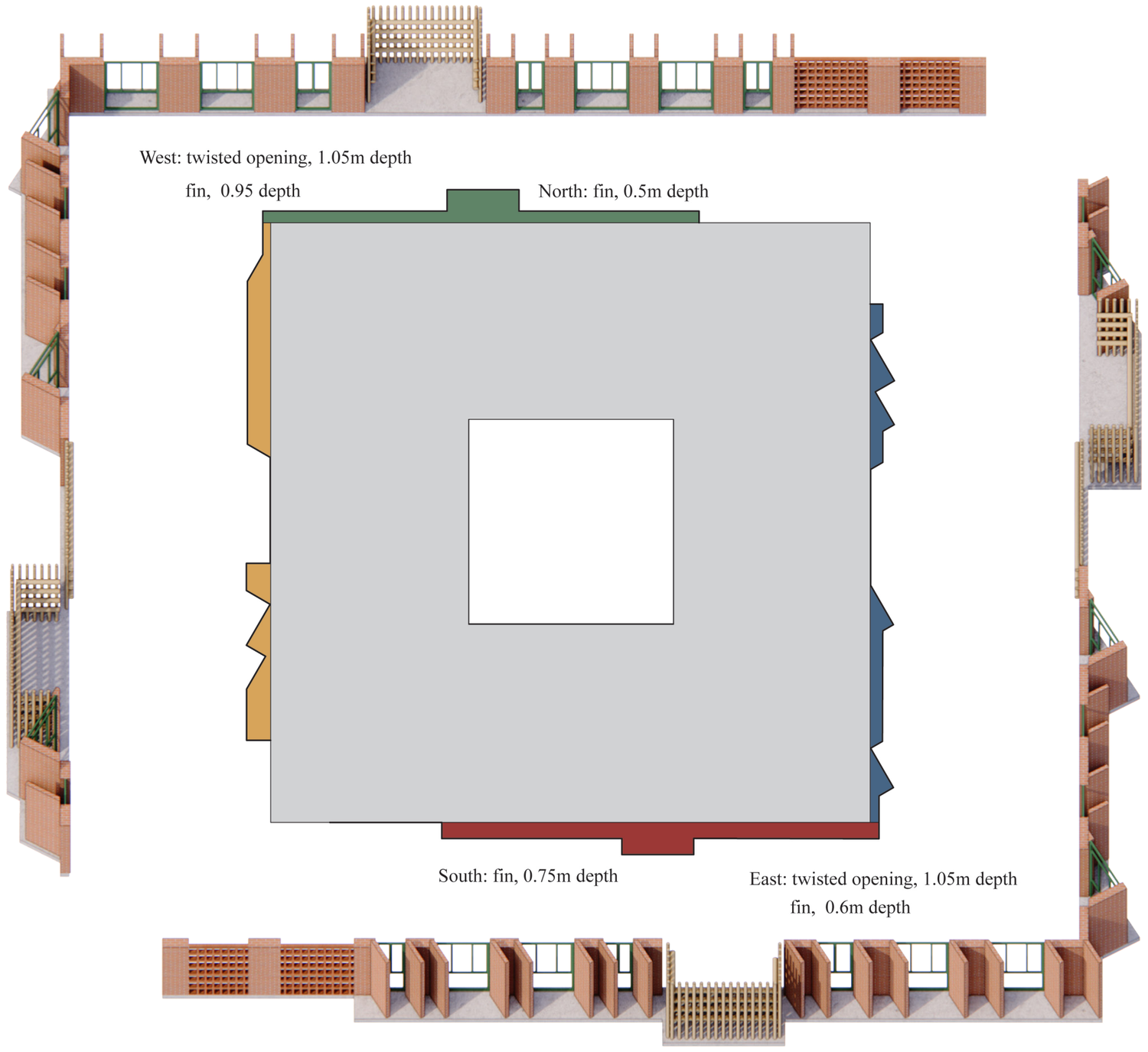
Analysis of solar protection on the east&west



Sunlight in summer



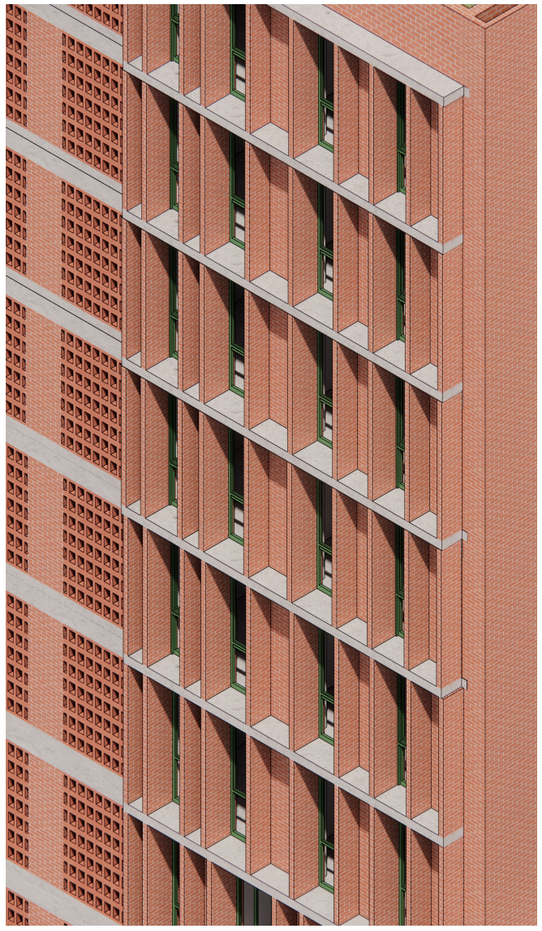
Analysis of solar protection on the south



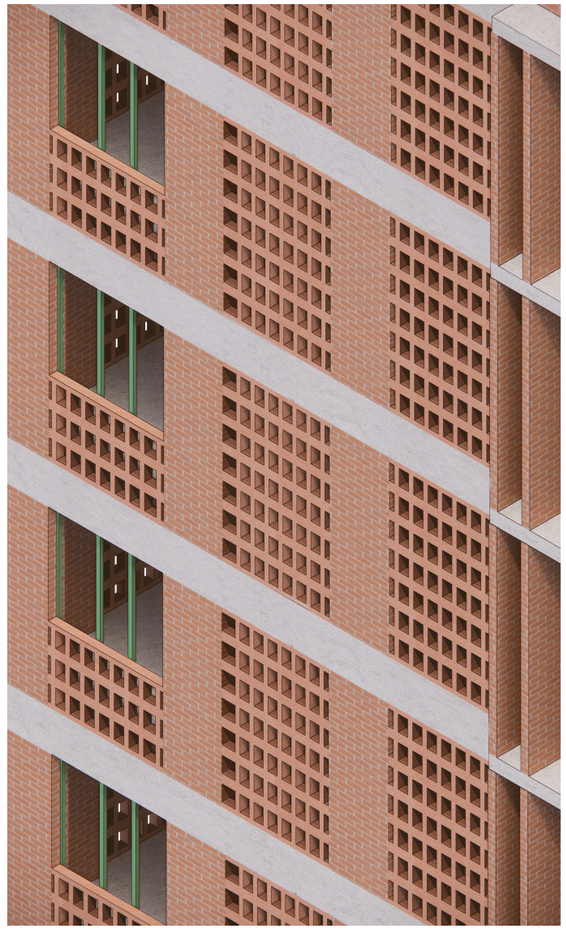
Shading design on different facades

FACADE

CONCEPT: 3 TYPES



Brick fin



Open brick

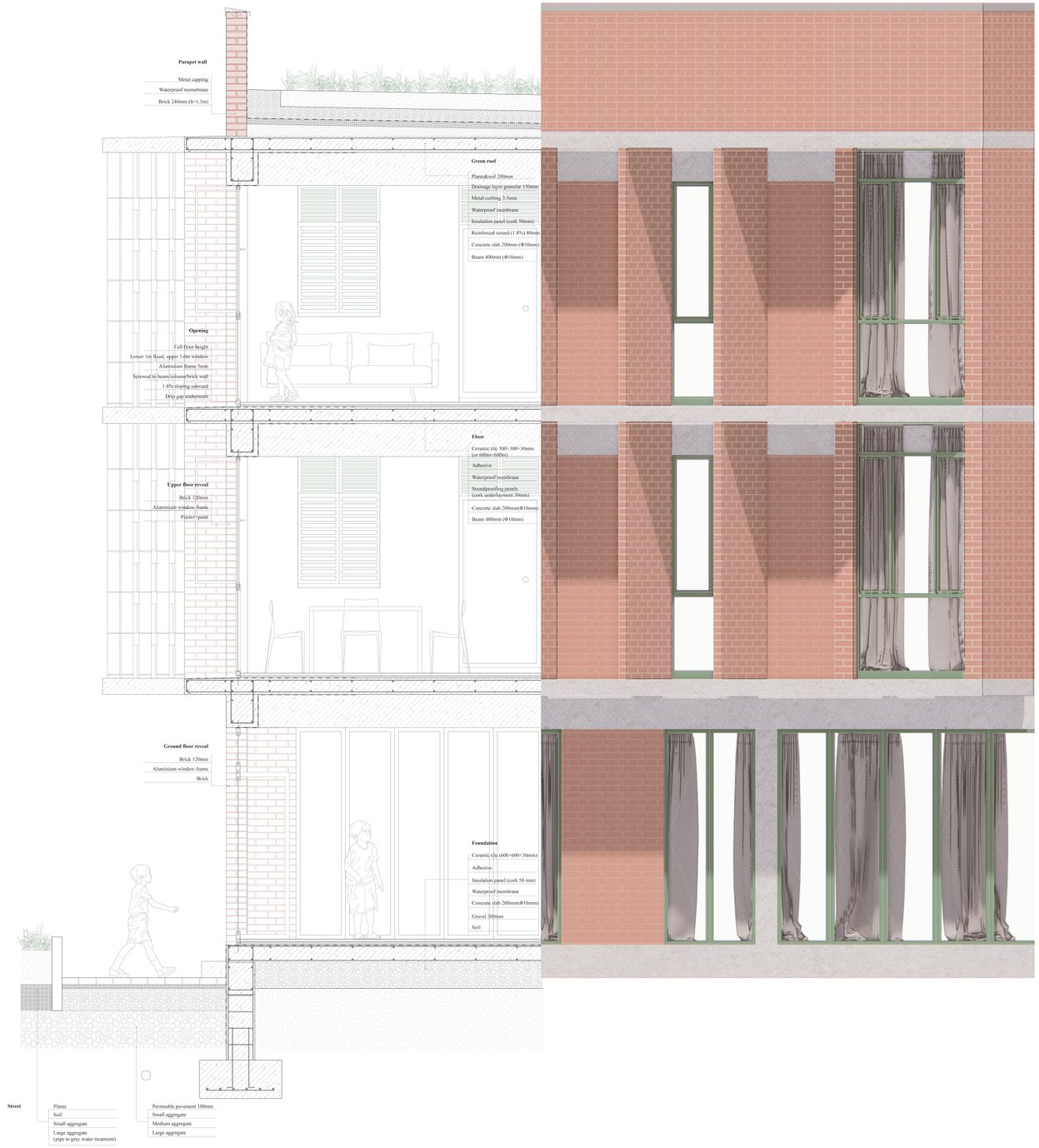


Bamboo

FACADE

FRAGMENT (WEST-FACING)

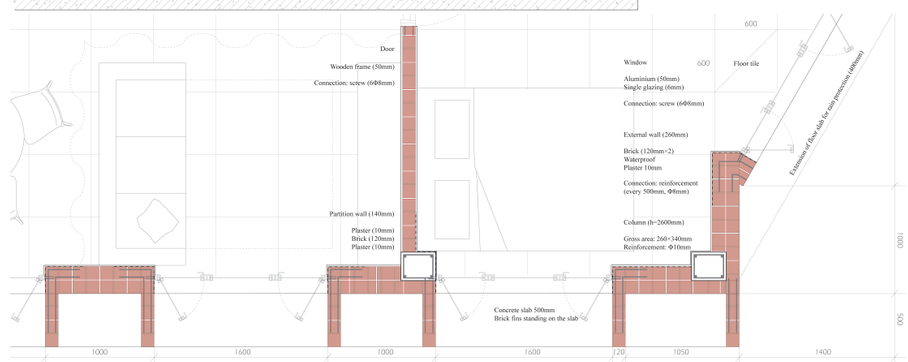
FRAGMENT (WEST-FACING)



FACADE

FRAGMENT (NORTH-FACING)

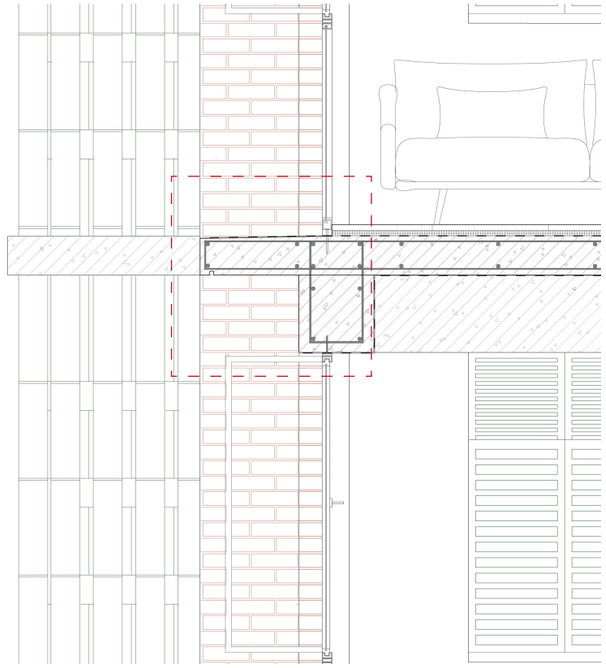


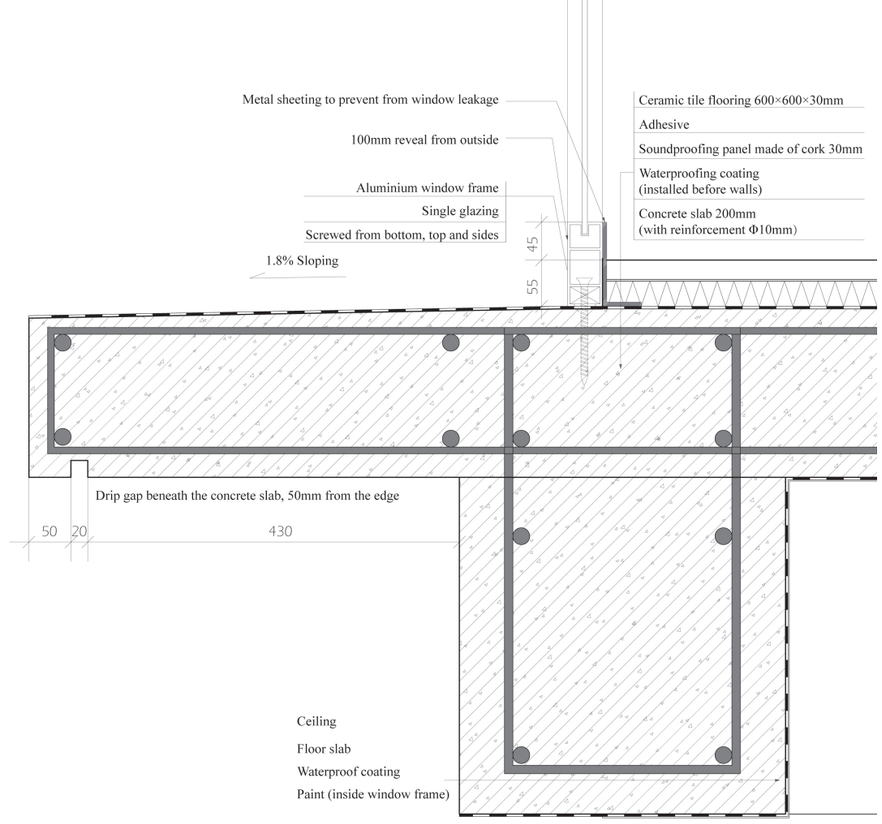


FACADE

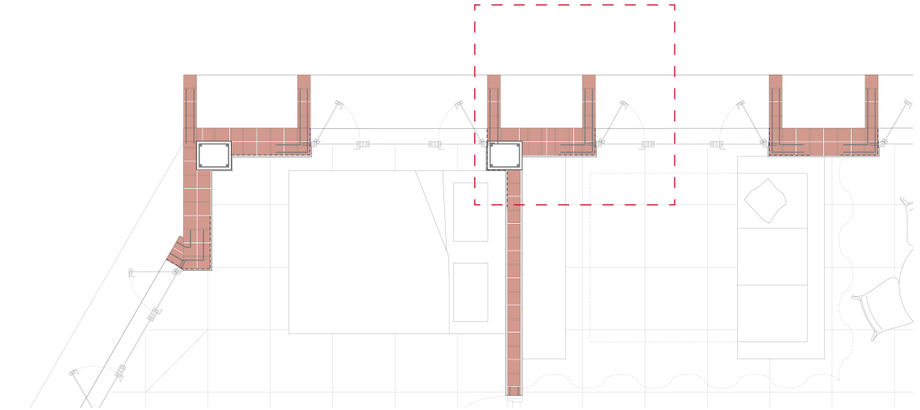
DETAIL

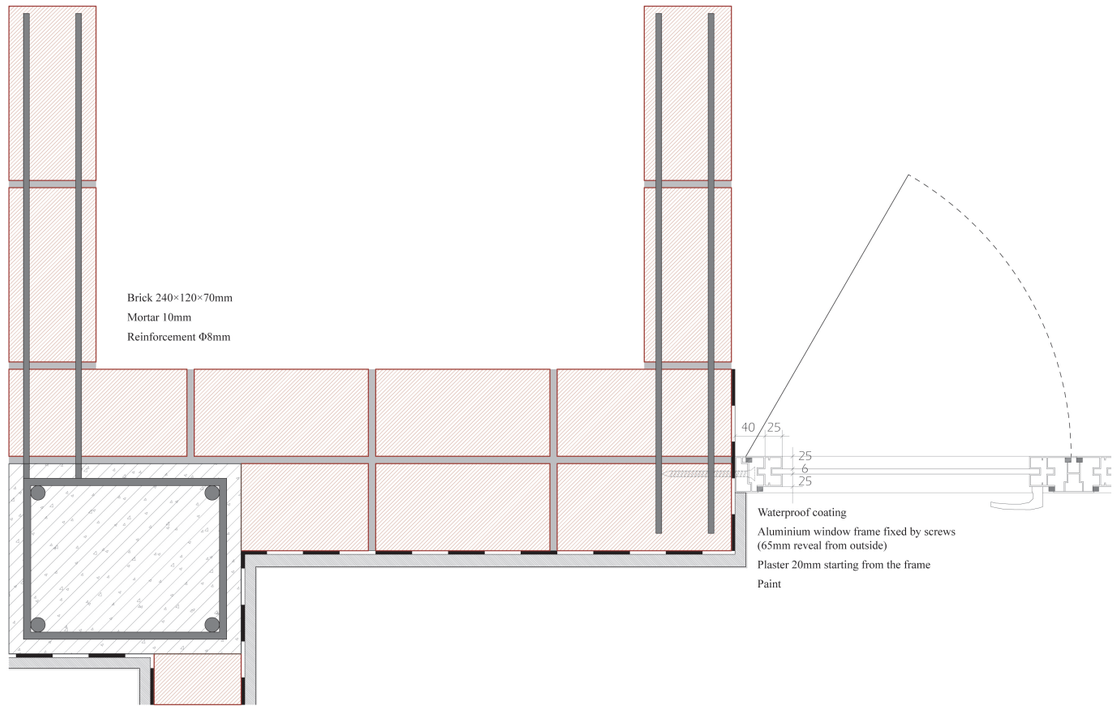
Floor&window





Wall&window

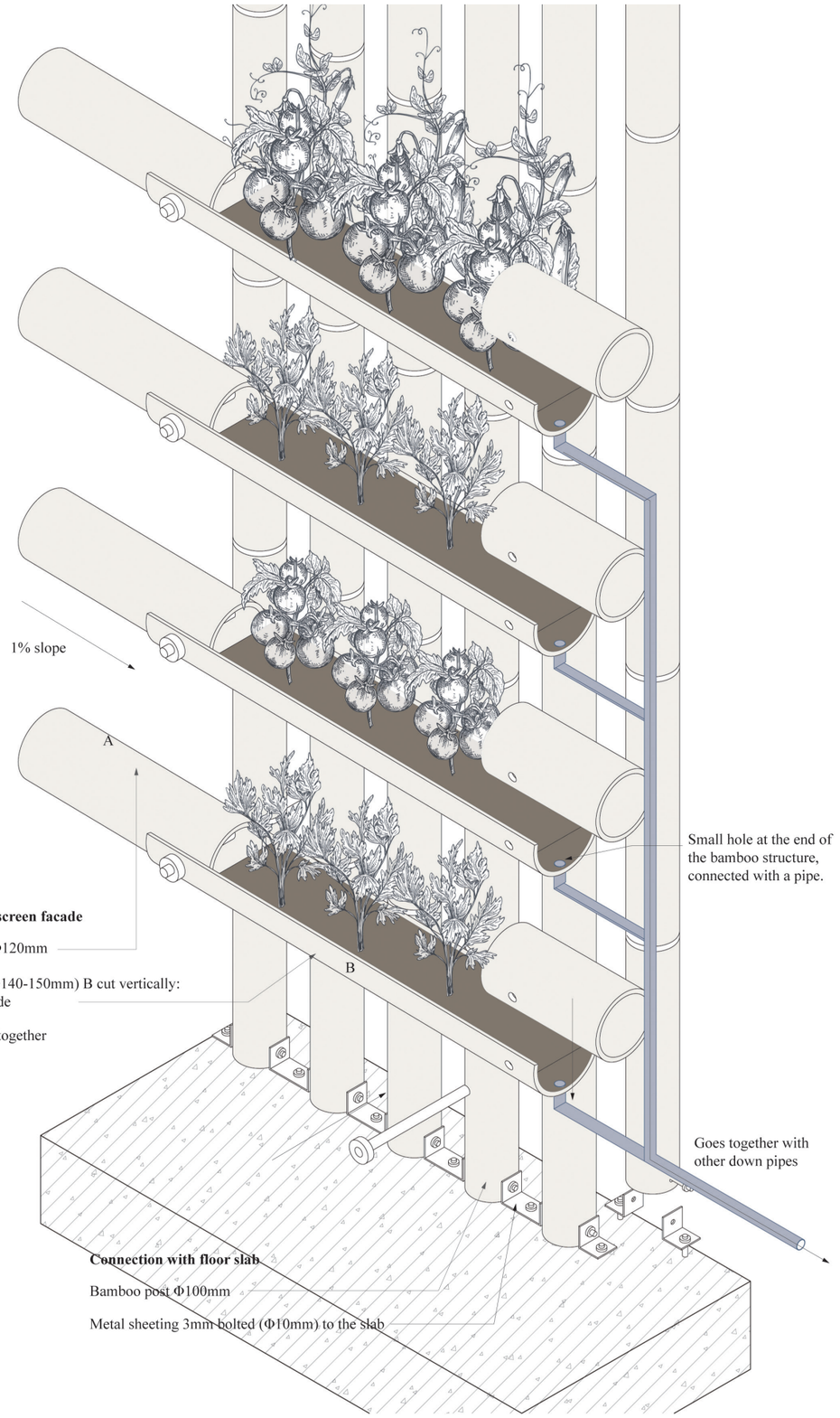




FACADE

DETAIL

Bamboo facade



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

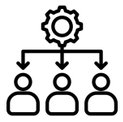
Connection with floor slab

Bamboo post Φ100mm

Metal sheeting 3mm bolted (Φ10mm) to the slab

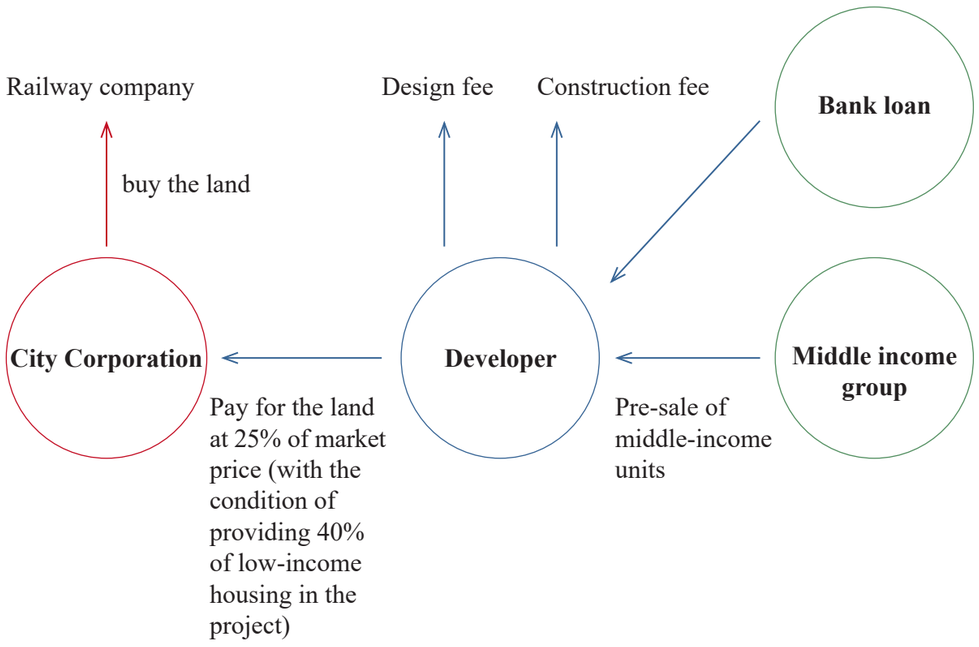
09 MANAGERIAL STRATEGY

PROJECT STAGES & STAKEHOLDER

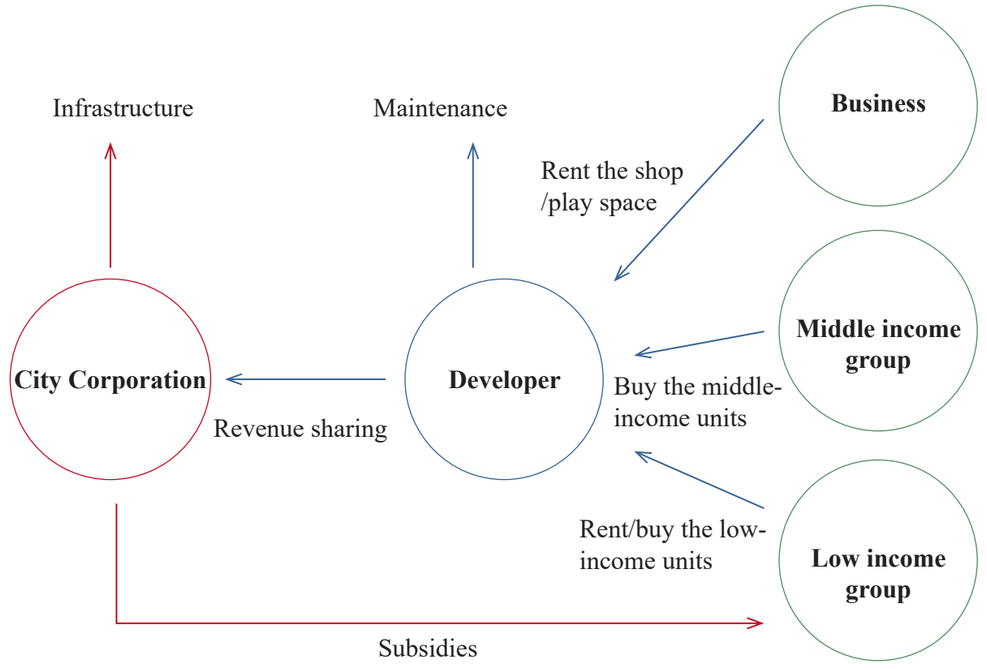
Current mode			Task	Stakeholder	Responsibility
Land owned by the railway company	Stage 1		**Transfer of land ownership**	Railway company	Current land owner
				City Corporation	New land owner
ca. 200 Low-income households	Stage 2		**Set up a private-public partnership (ppp)**	City Corporation	Agree on a coorporation scheme
				Private developer	
Pay rents to a third party	Stage 3		**Planning and design**	Private developer	Hire an architectural firm
				City Corporation	Regulation, Evaluation
				Architectural firm	Design the project
	Stage 4		**Financing**	Private developer	Pre-sale of the property; bank loan
				City Corporation	Provide financial support or incentives
	Stage 5		**Construction**	Private developer	Hire the construction team
				City Corporation	Regulation, Evaluation
				Construction team	Construct the project
	Stage 6		**Operation**	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
			Ownership	Private developer	Building
				City Corporation	Land

FINANCIAL MODEL

Developing



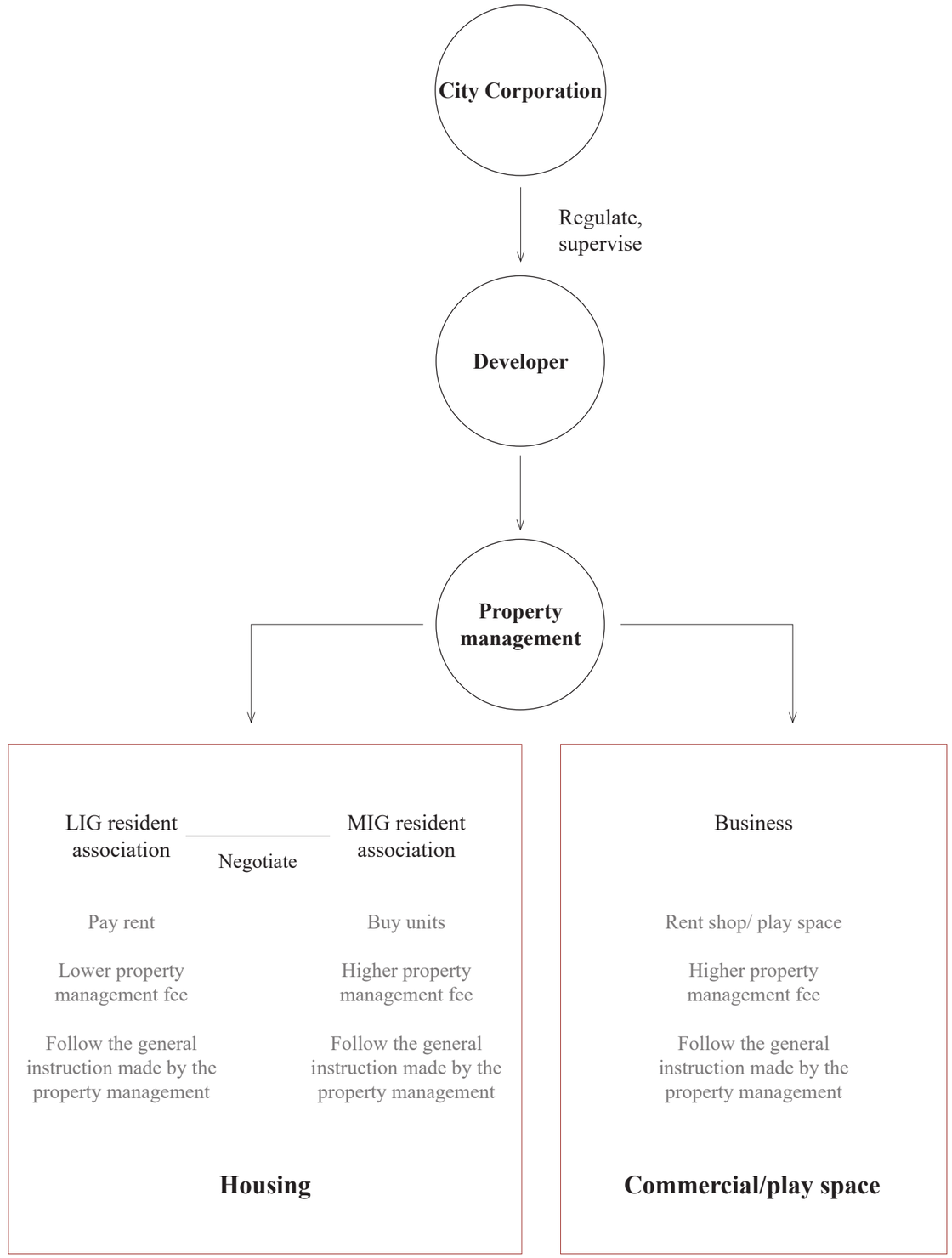
Operation



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

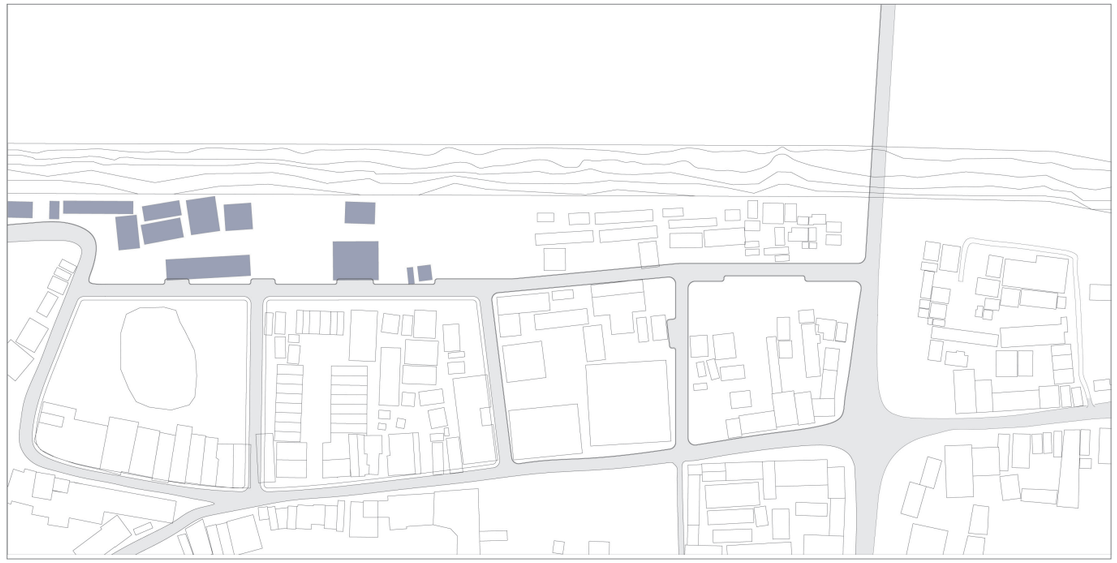
OPERATION & MAINTENANCE



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



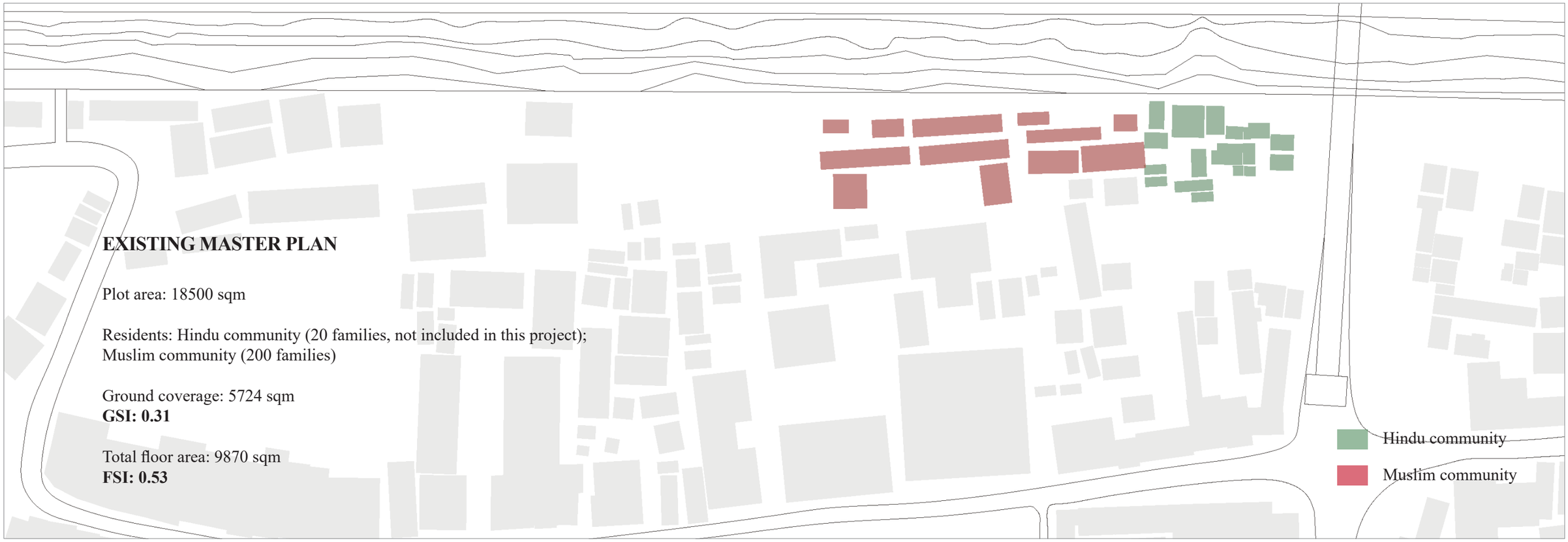
6 Parks & amenities for Hindu community



7 Greenery



8 Riverside park

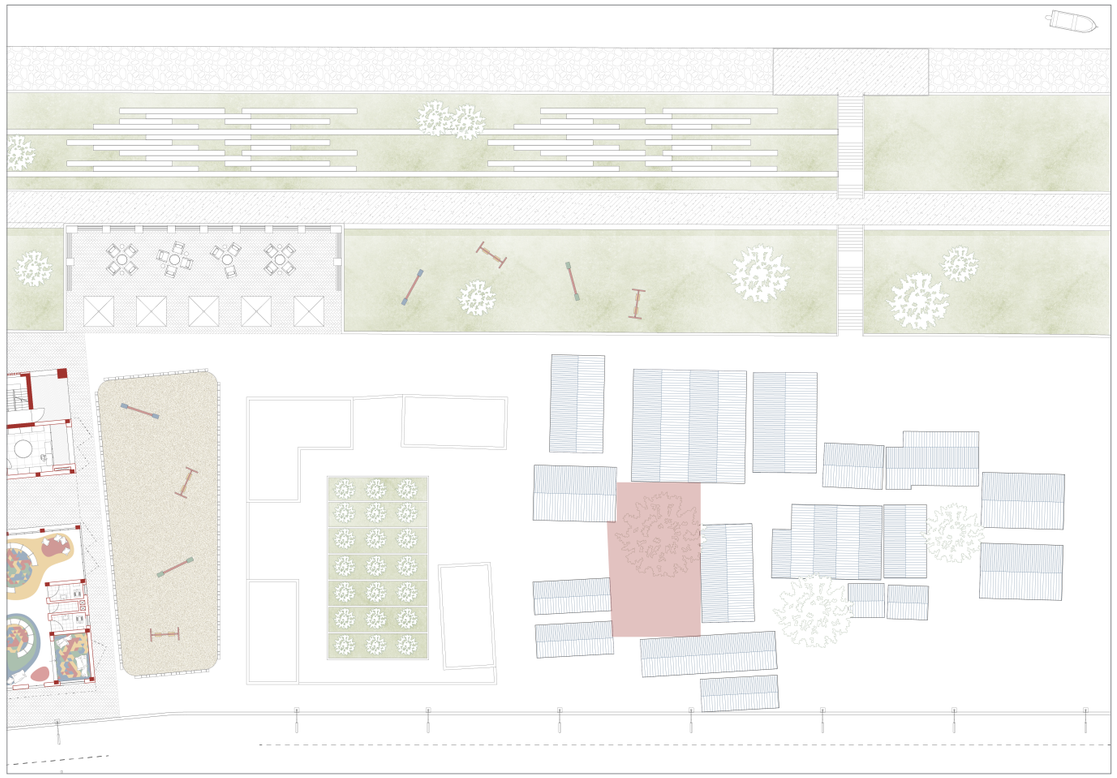

EXISTING MASTER PLAN
Plot area: 18500 sqm
Residents: Hindu community (20 families, not included in this project);
Muslim community (200 families)
Ground coverage: 5724 sqm
GSI: 0.31
Total floor area: 9870 sqm
FSI: 0.53
Hindu community
Muslim community


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

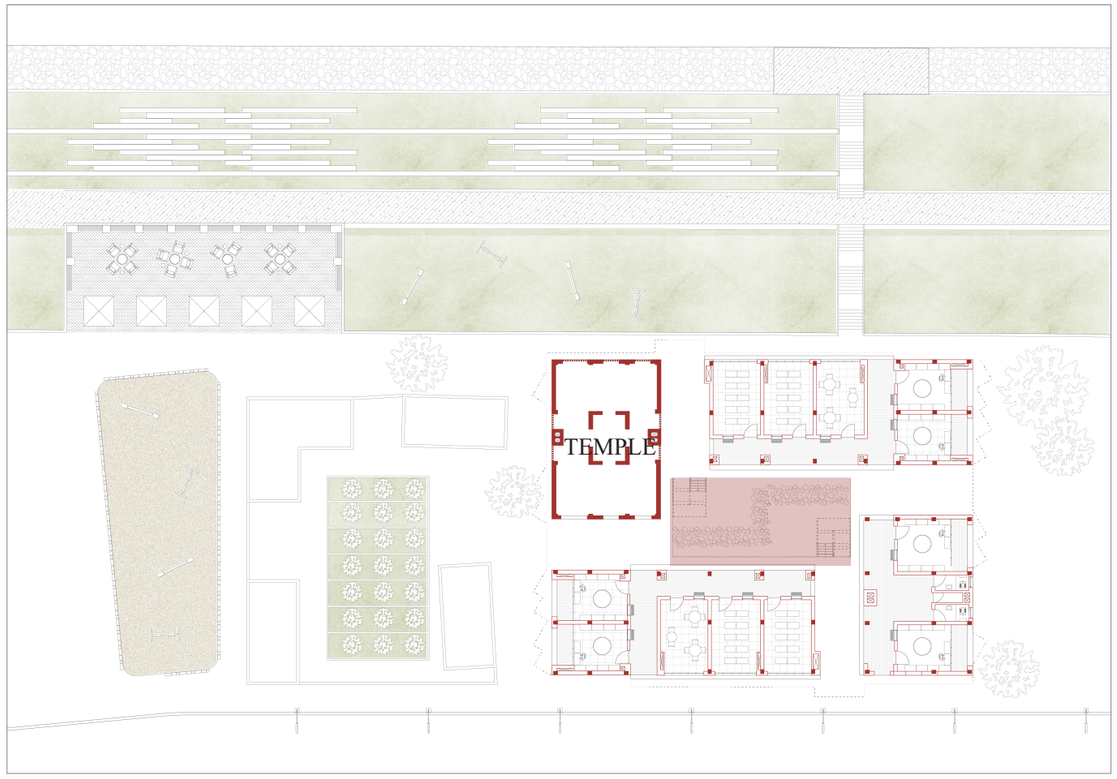
10 ADAPTABILITY

PROPOSAL FOR HINDU COMMUNITY

Possible to upgrade



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





HOUSING





COMMON SPACE

Thank you !

