

YANG ZHANG

WORK-LIFE NEXUS

Exploring a new housing system that combines local housing and industries based on haor condition in Tahirpur, Sylhet.

July, 2024

AR3AD105 Global Housing Graduation Studio:
Tahirpur, Sylhet, Bangladesh

RESEARCH

Background, Problem, Research Question

— urban scenario —

Tahirpur, Sylhet, Bangladesh



Figure 1. Mass housing in old Dhaka.
Author own photograph



Figure 2. Mass housing in old Dhaka.
Author own photograph



Figure 3. Mass housing in old Dhaka.
Author own photograph

Background

Internal migration

Multiple forces from the economic, environmental, cultural, and political domains weave an intricate web of migration, which means that a mix of these elements frequently influences the decision of people to migrate from one place to another. Within Bangladesh, a developing country grappling with the obstacles of its socio-economic condition, internal migration is largely viewed as a calculated reaction to concerns about one's means of subsistence. Chowdhury et al. (2012) state that the desire for more job possibilities and a reduction in the weight of poverty is one of the primary reasons why individuals migrate from rural areas to city centers. This implies that workers from outlying regions are coming to cities in pursuit of employment. Within this intricate dynamic, the allure of urban area is the chance of gainful employment and higher earnings—a self-generated coping mechanism given the scarcity of job opportunities in peripheral areas.

Problem Statment

————— *Between urabn and rural area*

Housing, in the words of Bhan (2020), is a collection of places, services, and employment opportunities that must meet the criteria of being adequate, affordable and viable. Also, in many Asian countries, including Bangladesh, housing is not only used for residential purposes, but also as a workplace where important economic activities take place (Chen and Sinha, 2016). In other words, housing must consider the needs of its occupants in both their working and living conditions. This involves the distance between housing and work and the convenience of nearby transportation, as well as the material adequacy of being a suitable size, reasonable cost, and secure ownership. This idea helps to explain, at least in part, Bangladesh's internal migration patterns, where people from rural areas go to the metropolis in pursuit of jobs that will improve their income at the expense of their standard of living. During this process, housing becomes more accessible to work while losing some of its material adequacy. This phenomenon also implies that it is challenging to meet both criteria of housing at the same time and that achieving one frequently comes at the expense of achieving the other.

Based on information from the Labour Force Survey (LFS), BBS (2010) and ADB (2012) report that 75.9% of all jobs in cities are informally held by people. This makes up the majority of the employment sector. Street vending, rickshaw pulling, and domestic work are examples of informal jobs in urban Bangladesh. Some informal workers may also reside in urban slums where they must deal with subpar housing, poor sanitary conditions, and cramped living arrangements. According to Urbz (2017), private mass housing, which is close to work centers, small and medium-sized businesses, and affluent residential areas but has little space and subpar living conditions, is common in Bangladeshi cities. This suggests that rather than prioritizing accommodation quality, people from peripheral areas move to urban centers primarily in order to increase their income and find job opportunities. In other words, people have to choose between having more comfortable living spaces and being close to possible places of employment (Correa, 1989). This phenomenon draws attention to the difficulties and economic realities that peripheral area residents usually face. People living in rural areas of Bangladesh are often forced to migrate to cities in search of work. This results in them having to choose between overcrowded dwellings and higher incomes. Enhancing industrial development in rural areas and creating more employment opportunities could alleviate this problem to some extent, and the income and quality of life of rural residents could be improved.

As the data from BBS (2010) and ADB (2012), a mere 22.9% of Bangladesh's workforce is engaged in urban employment, while a substantial 77.1% are employed in rural sectors. This demonstrates the continued need to give rural residents more attention. The living and working conditions of the whole workforce will not be considerably improved by concentrating just on the needs of urban workers. The lack of funding and job prospects in rural areas is a significant issue for people there. People relocating to cities in pursuit of jobs has resulted in a considerable fall in living standards, and there is a complicated conflict between these two problems. One possible solution is to invest in improving rural economic life and opportunities, enhancing living and working circumstances nearby and generating employment prospects in the suburbs, which lessens the need for people to relocate to metropolitan areas in search of employment. Stated differently, the expectation is that a new system that combines housing and local industries can be designed in this area, which is able to reduce the mismatch between job opportunities and housing quality. At the same time, the vitality of rural regions will be increased. There will be a growth and development in both the economy and living quality for the residents.

Excessive rural-to-urban migration

Seeking Job Opportunities



Overcrowded urban living conditions

Housing needs to ensure proximity to the workplace

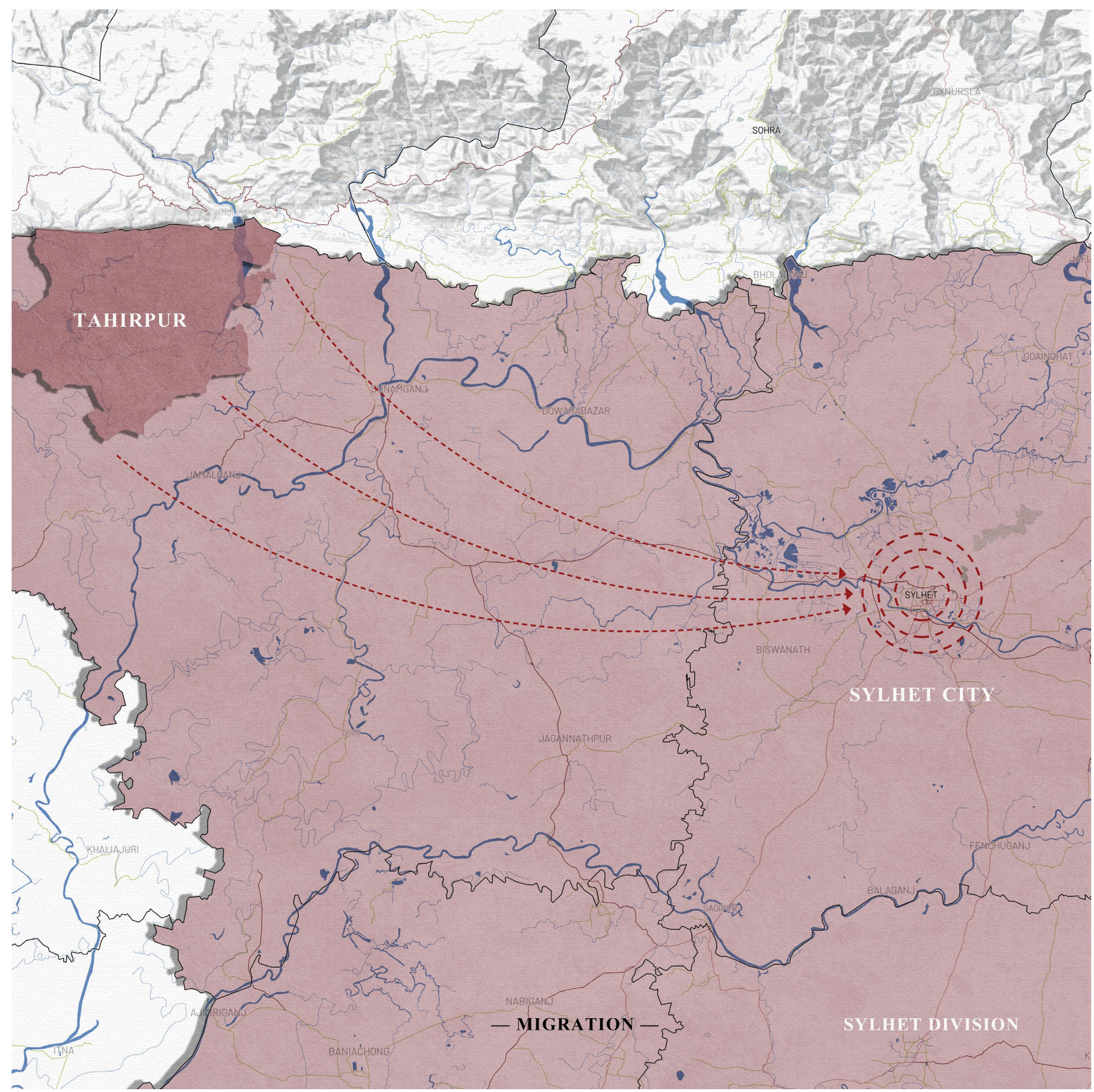


Figure 4. Migration from rural to urban area.
Author own drawing

— rural scenario —



Figure 5. Housing in rural area of Sylhet.
Author own photograph



Figure 6. Housing in rural area of Sylhet.
Author own photograph



Figure 7. Housing in haor in Tahirpur.
Author own photograph

Local Industry Analysis

————— *Between living and working*

In Bangladesh, land is categorized according to the depth and duration of its inundation (Uddin, 2019), which means that people are encouraged to grow different crops based on different land types. Meanwhile, the hills and water bodies of Sylhet form a fascinating and unique topography with a unique diversity of fish species and a well-developed fishing industry (Alam, 2001). Furthermore, the fishing sector's correlation with the rainy season significantly impacts the productivity of the industry, which means that the extent of land inundation plays a significant role in determining the fishery's output. That is to say, varying seasons offer the local inhabitants opportunities to work in different local industries, including crop cultivation, fisheries, and livestock rearing. In addition, since the degree of inundation of the land changes according to the weather, the housing of the inhabitants will need to meet the demand for dismantling and relocation, and at the same time, the changing industries will require that the inhabitants' dwellings show a kind of resilience, diversity and adjustability.

Industry specific analysis in Tahirpur:

The research focuses on the Tahirpur region of Sylhet, which is rich in wetlands that known as haor in Bangladesh. Haor is a seasonal wetland that is primarily characterised by the formation of water bodies during the monsoon season, which dry up in the winter and return to a land. In Tahirpur, the primary local industries are crop farming, fisheries, and animal husbandry, but many people only work in one of them, and there is little collaboration or integration between these industries. Before the monsoon season, farmers harvest the paddy and store it in their rooms; after the monsoon season, fisherman may not work or may fish in smaller rivers or ponds. Farmers then depart for the city in quest of employment. For the Tahirpur region, there is a relative separation between industrial activities, and a lack of a system that would integrate local industries and housing. A new system is required to increase individual productivity and provide more job opportunities, while at the same time mitigating the negative impacts of housing displacement due to inundation of the land.

Develop local industries in rural areas and reduce internal migration

Balancing rural and urban population distribution



Create work-life nexus

A system that integrates living and livelihoods

— research question —

Gautam Bhan:

*Housing is a collection of places, services, and
employment opportunities that must meet the criteria of
being adequate, affordable and viable.*

Based on the current situation in the rural area, how can industrial upgrading be promoted in this rural area and adaptable housing be constructed to improve the working and living conditions of the people and to alleviate the problem of over-migration to urban centres?

How to better integrate the existing industries and introduce new industries to the rural area to help upgrade local industries and improve economic efficiency, so as to alleviate the problem of excessive migration to urban centres?

Based on the living patterns of the inhabitants of the rural area, how can housing be designed to fulfil both living and livelihood needs?

How can flexible and adaptable housing be built to cope with the seasonal industrial changes in the Sylhet rural area in order to provide comfortable living conditions?

— framework —

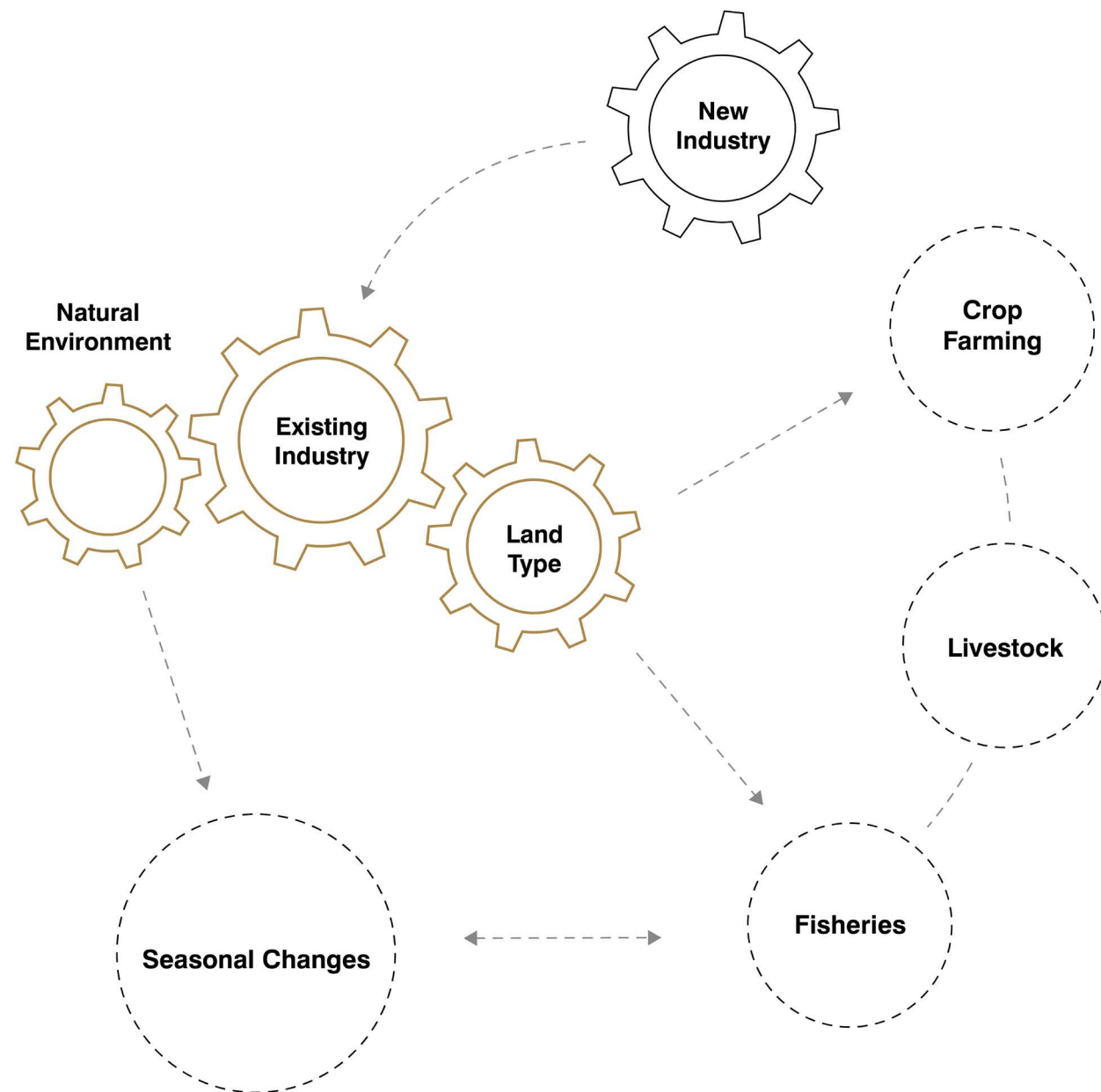


Figure 8. Existing industry and new industry with potential.
Author own drawing

Theoretical Framework

Housing and local industry

Sylhet's agricultural industries, such as crop cultivation, fisheries and livestock, are heavily dependent on natural resources and are subject to seasonal variations (World Bank Group, 2016). During the monsoon season, parts of the land are submerged and cultivation is restricted while fisheries are developed. In other words, the availability of land directly affects the viability and scale of multiple industries in the haor area, which in turn affects people's jobs and incomes. Different industries will have their peaks at different times of the year. This seasonal change in industries presents challenges as well as unique opportunities for each industry, meaning that the haor area has a wealth of economic potential (Uddin et al., 2019).

In addition, there is a lack of co-operation and upgrading between these existing industries, as well as a lack of more new industries being added to this region. By combining existing industries and adding new ones, it can help expand the diversity of industries and improve the economic efficiency of the entire region. This diversified industrial situation can create more job opportunities and help alleviate the employment pressure on the local residents (World Bank Group, 2019).

This research focuses on the relationship between local industries and residents' lives. It is hoped that a new system can be created that combines housing and people's livelihood to improve their working and living conditions. In other words, local residents will be able to use their housing as a centre for a wider variety of more financially rewarding jobs around them. The necessity for people to travel to city centres in search of work will be greatly reduced.

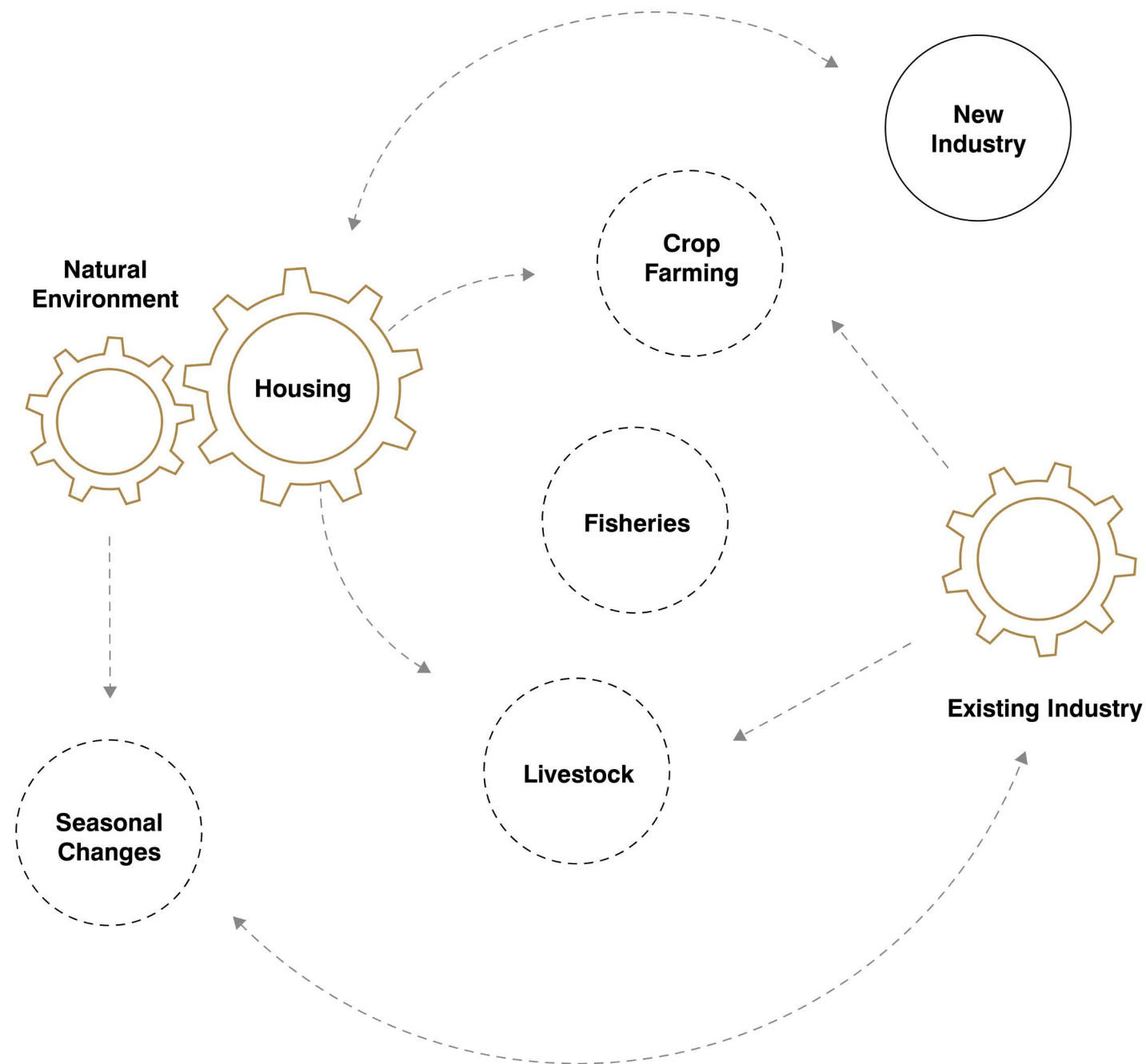


Figure 9. Local housing considering local industry changes.
Author own drawing

Housing design needs to be based on people's daily lives to help solve the problems they encounter in their daily lives (Anderson, 2016). We should recognise that the environment, local industry and housing are interconnected rather than independent of each other. In the Sylhet haor area, there are seasonal changes in the weather such as monsoon and dry seasons, which can cause the amount of land available to change with the seasons and affect the work that people do. People's daily lives, including working, affect the overall architectural form of the dwelling.

In other words, the design of the house must also take into account the local industry, not just the house itself. In the haor area of sylhet, there are mainly crop cultivation, fishing and animal husbandry, and these industries will change in different seasons. Some industries will disappear in a certain season. This seasonal change will also be reflected in housing. That is to say, housing needs to be relatively adjustable and adaptable, able to face possible changes in local industries in a flexible way.

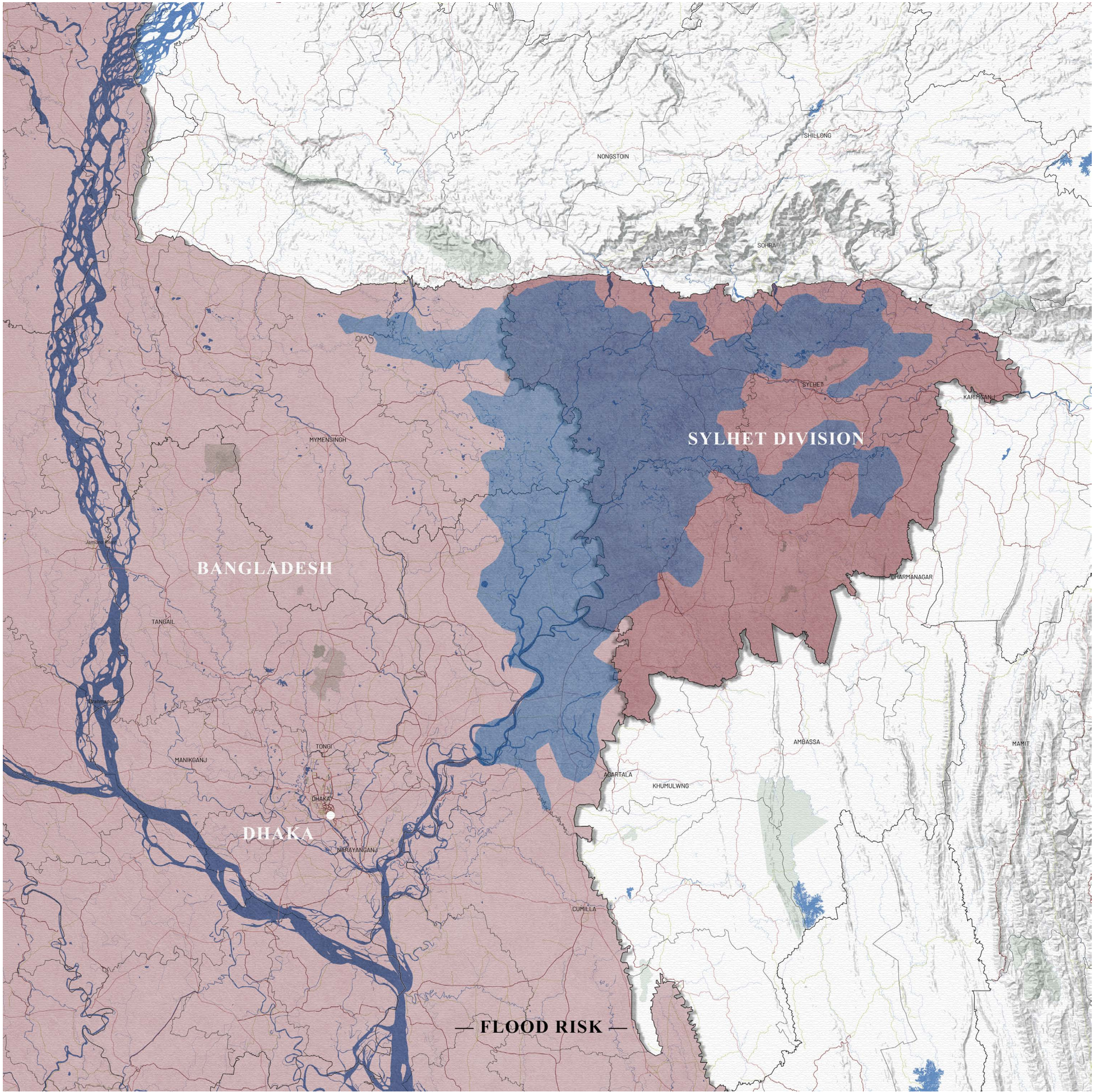
In addition, with its beautiful natural environment, the haor region has the potential to develop tourism (Hasan, 2022). At the same time, other new industries may be introduced to the haor region. The addition of these new industries will not only affect the layout of local industries, but also the pattern of local housing, as people's lives will be changed. Therefore, the sustainability and adaptability of buildings becomes particularly important. Housing needs to be able to continually adjust to changes in local industries to meet the needs of people's lives and livelihoods.

SITE

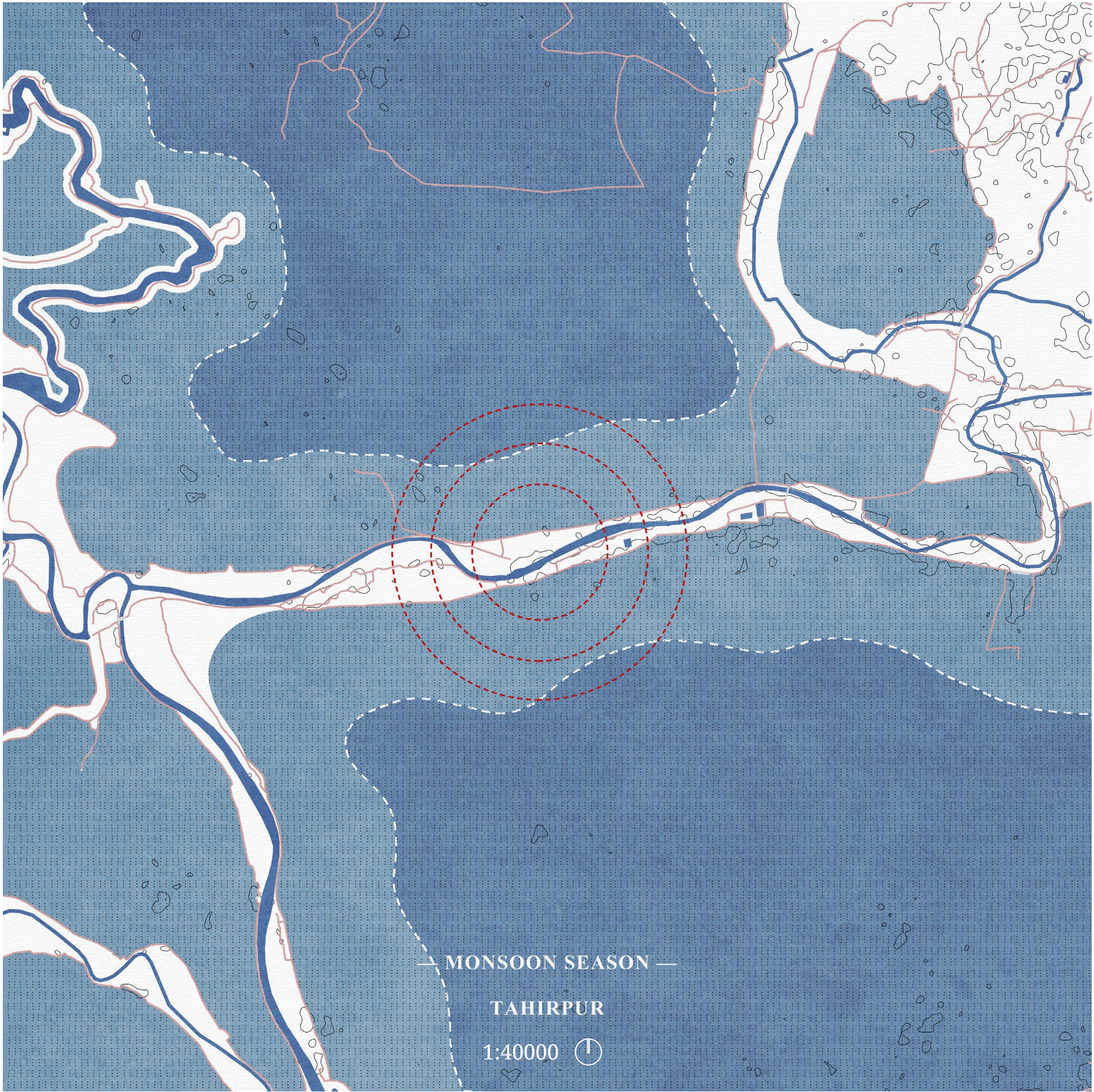
Site Condition, Site Strategy

— flood mapping —

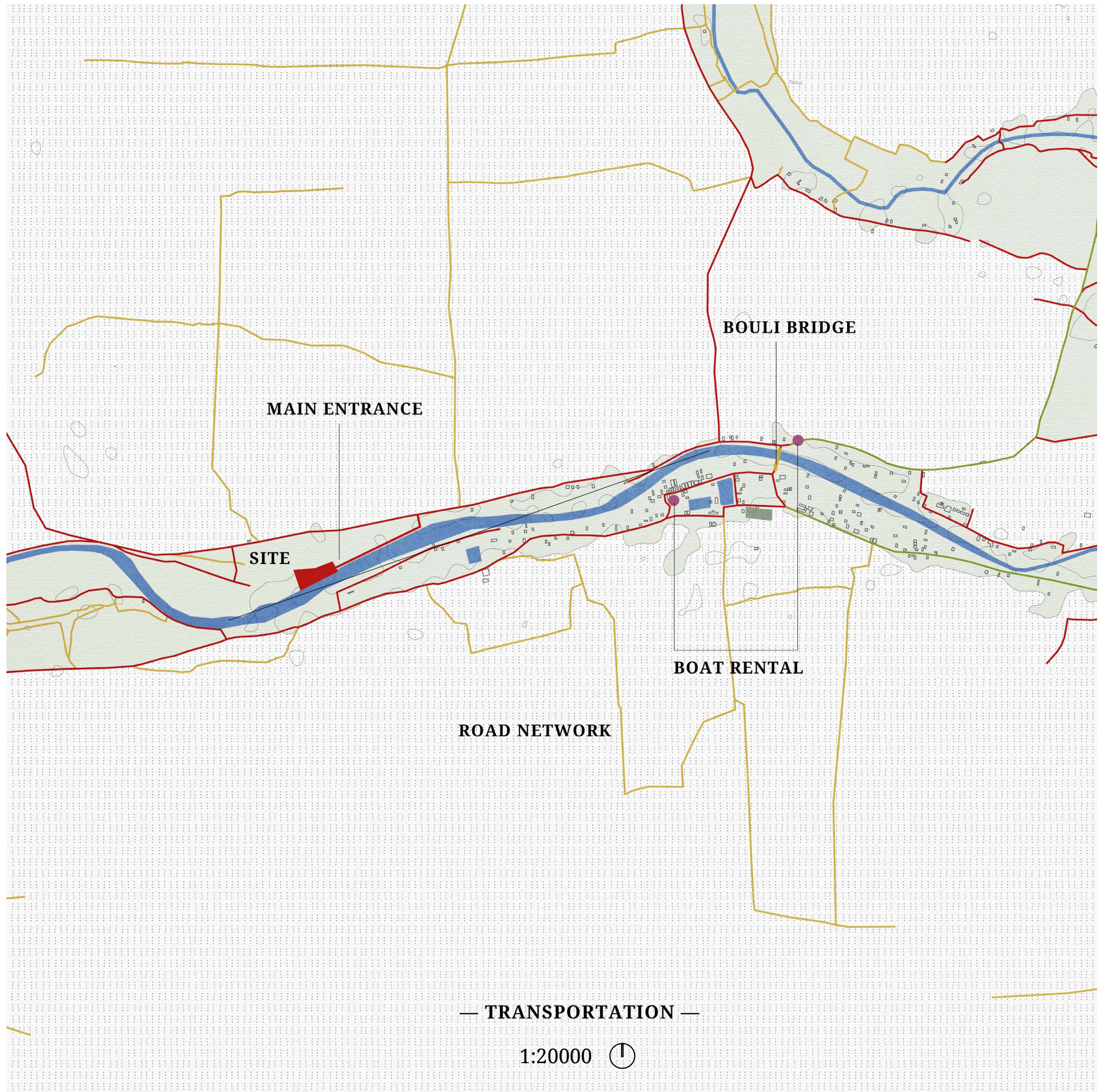
Tahirpur, Sylhet, Bangladesh

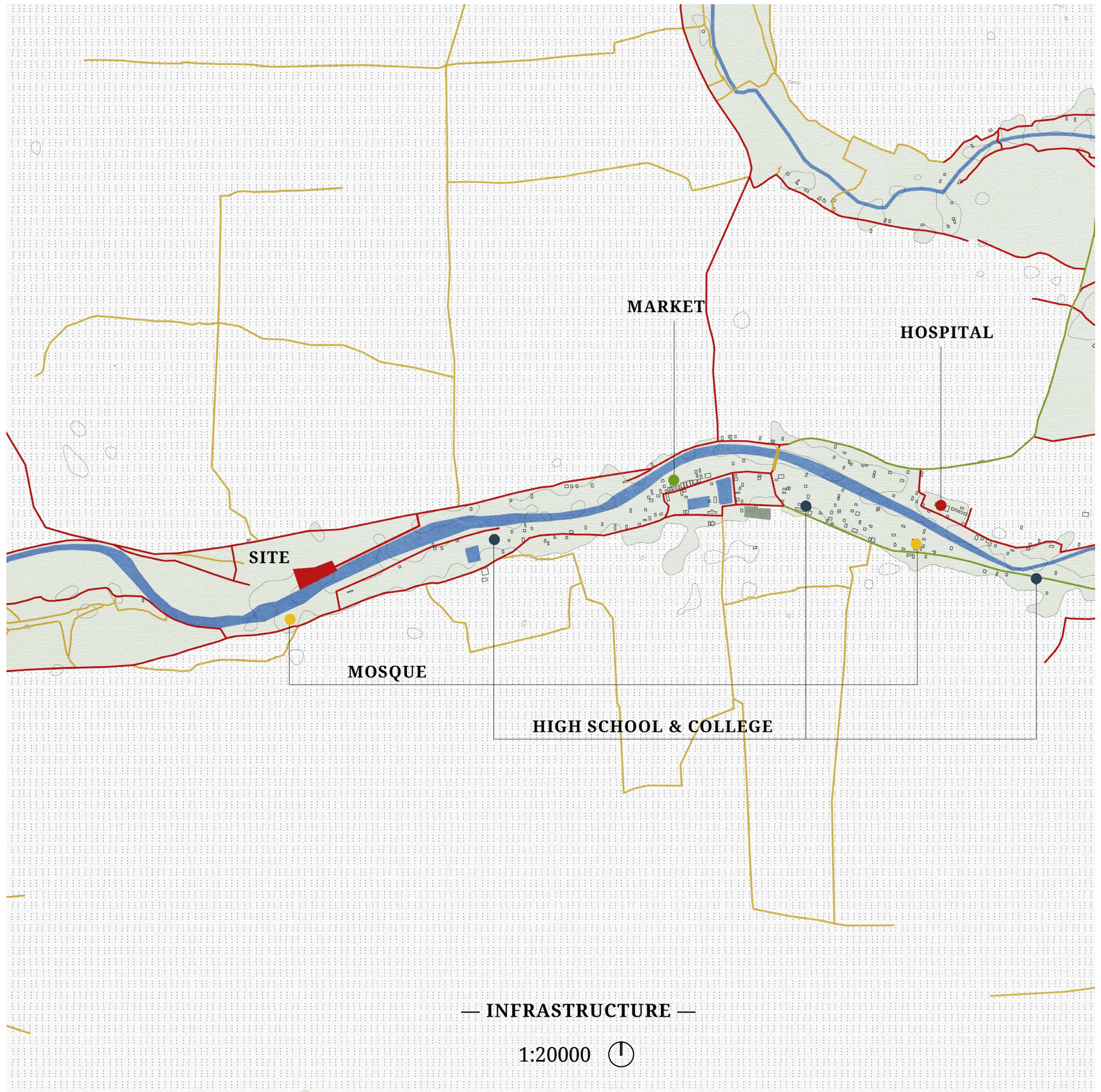


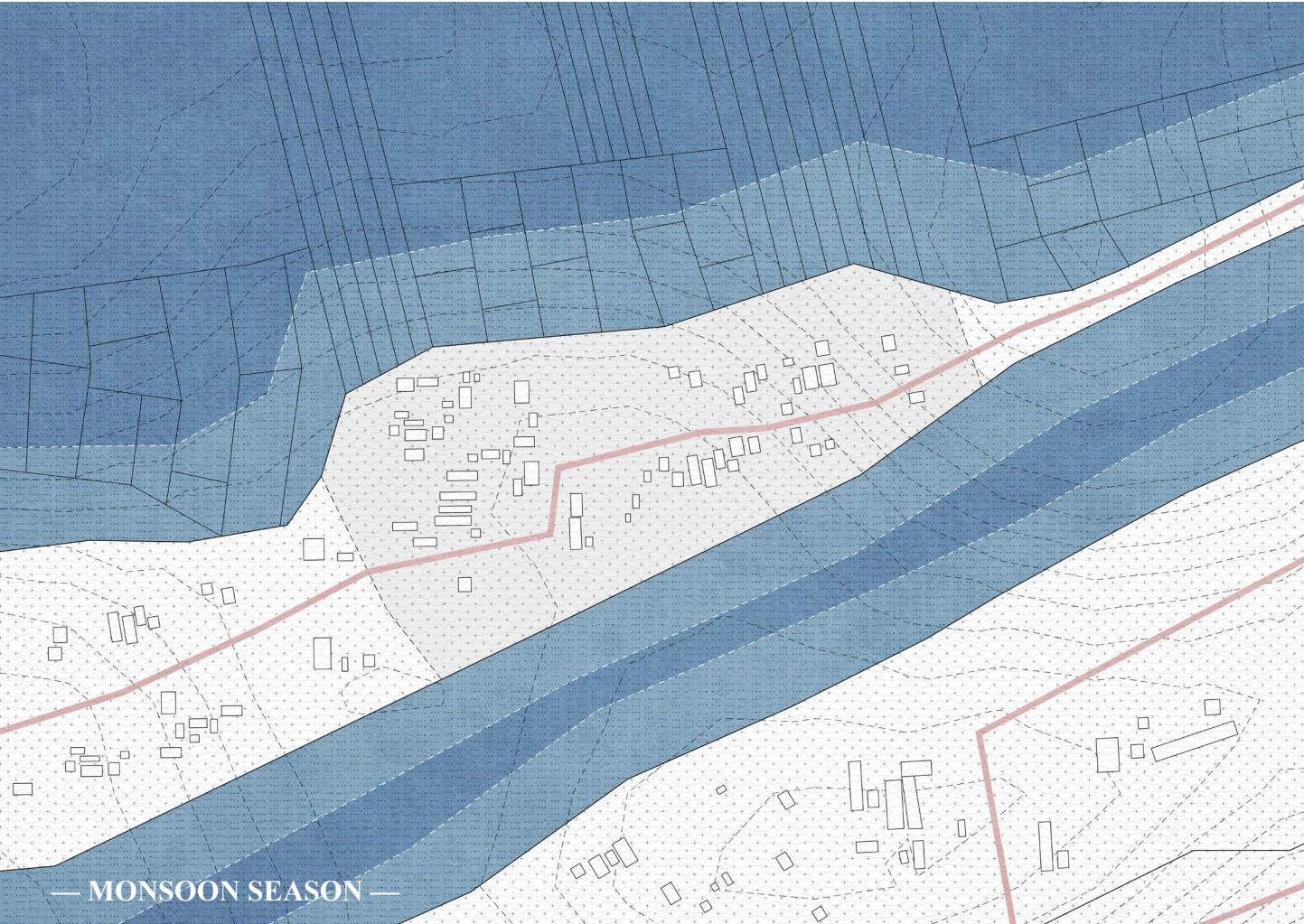
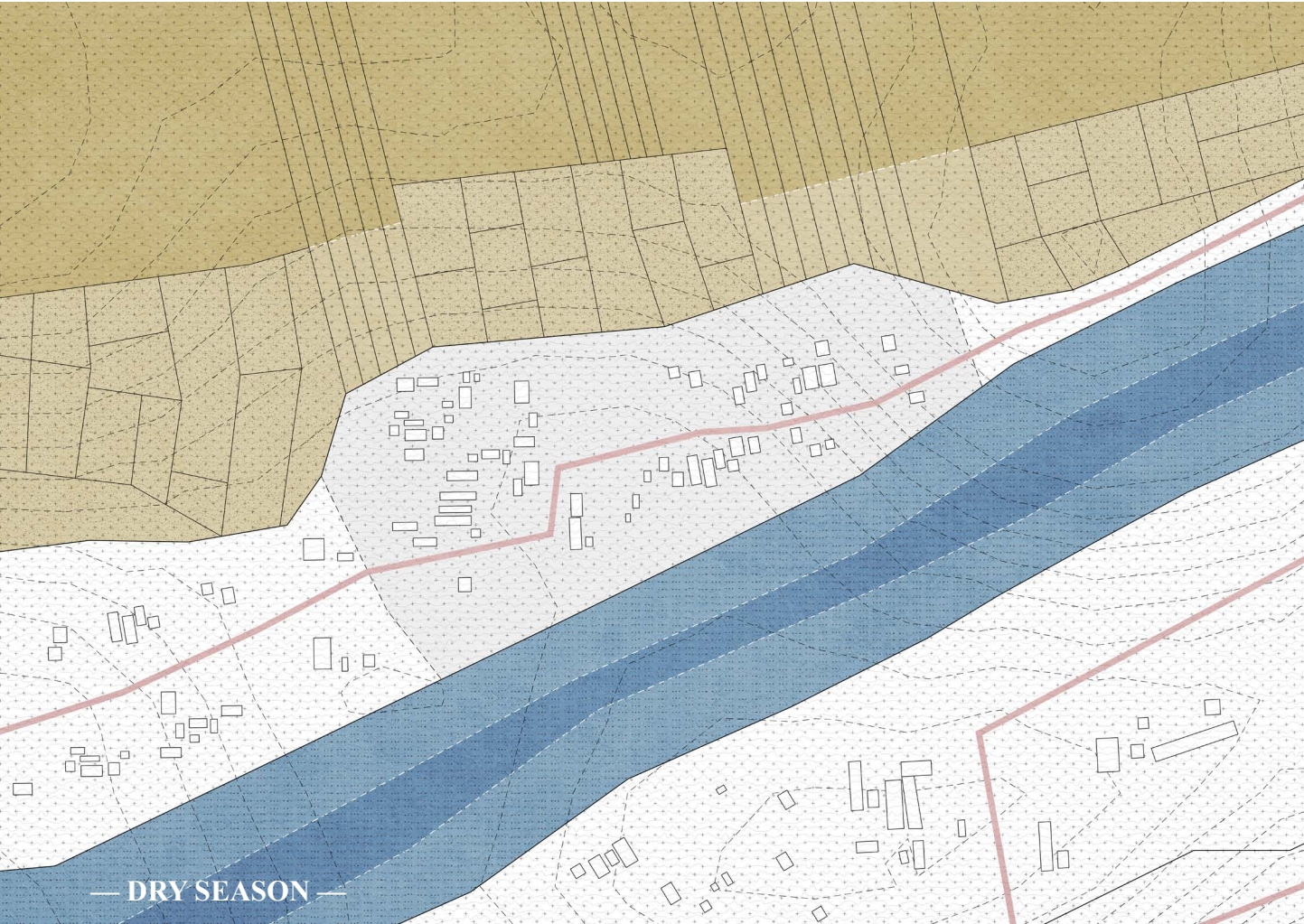




— transportation and infrastructure —



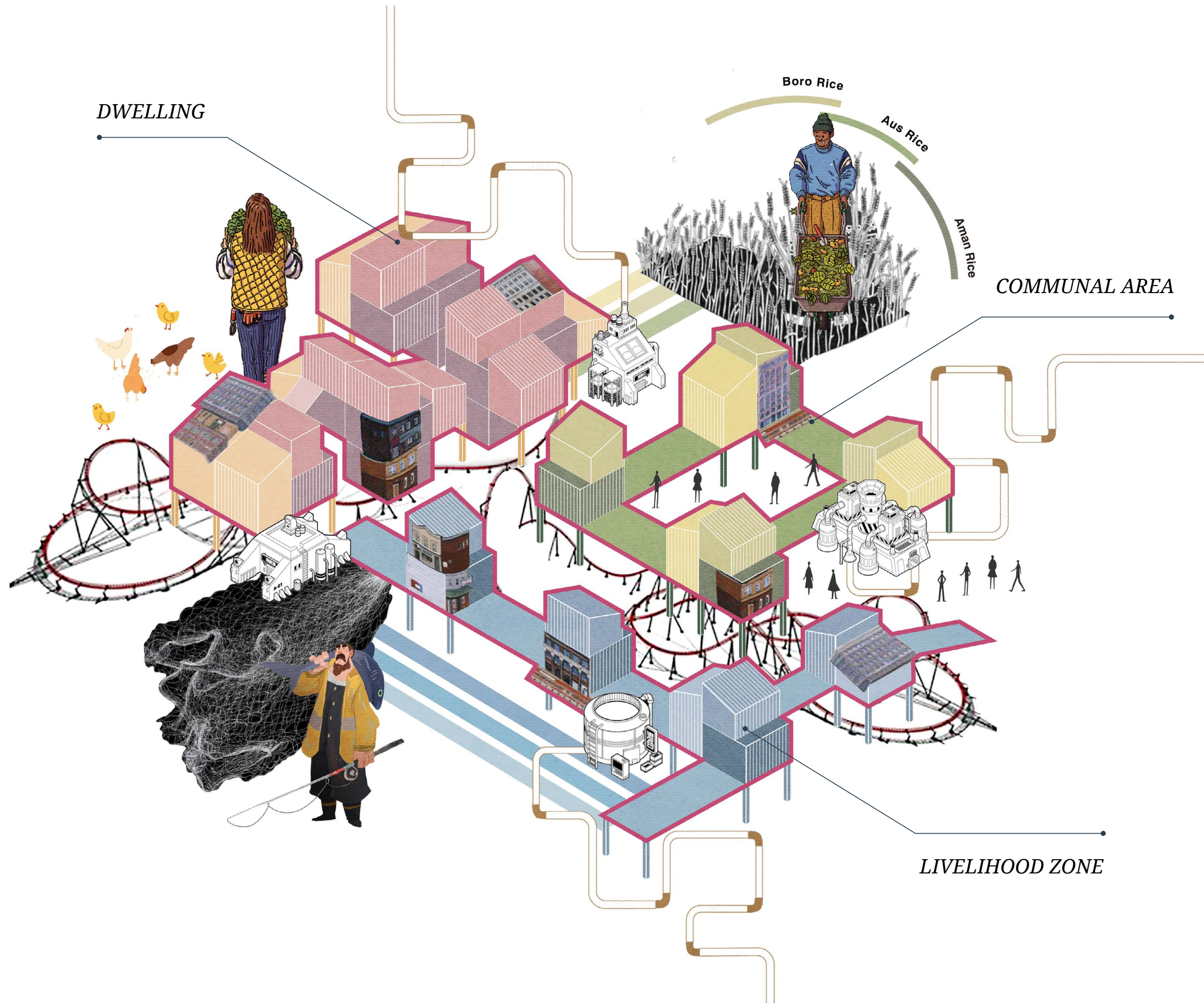


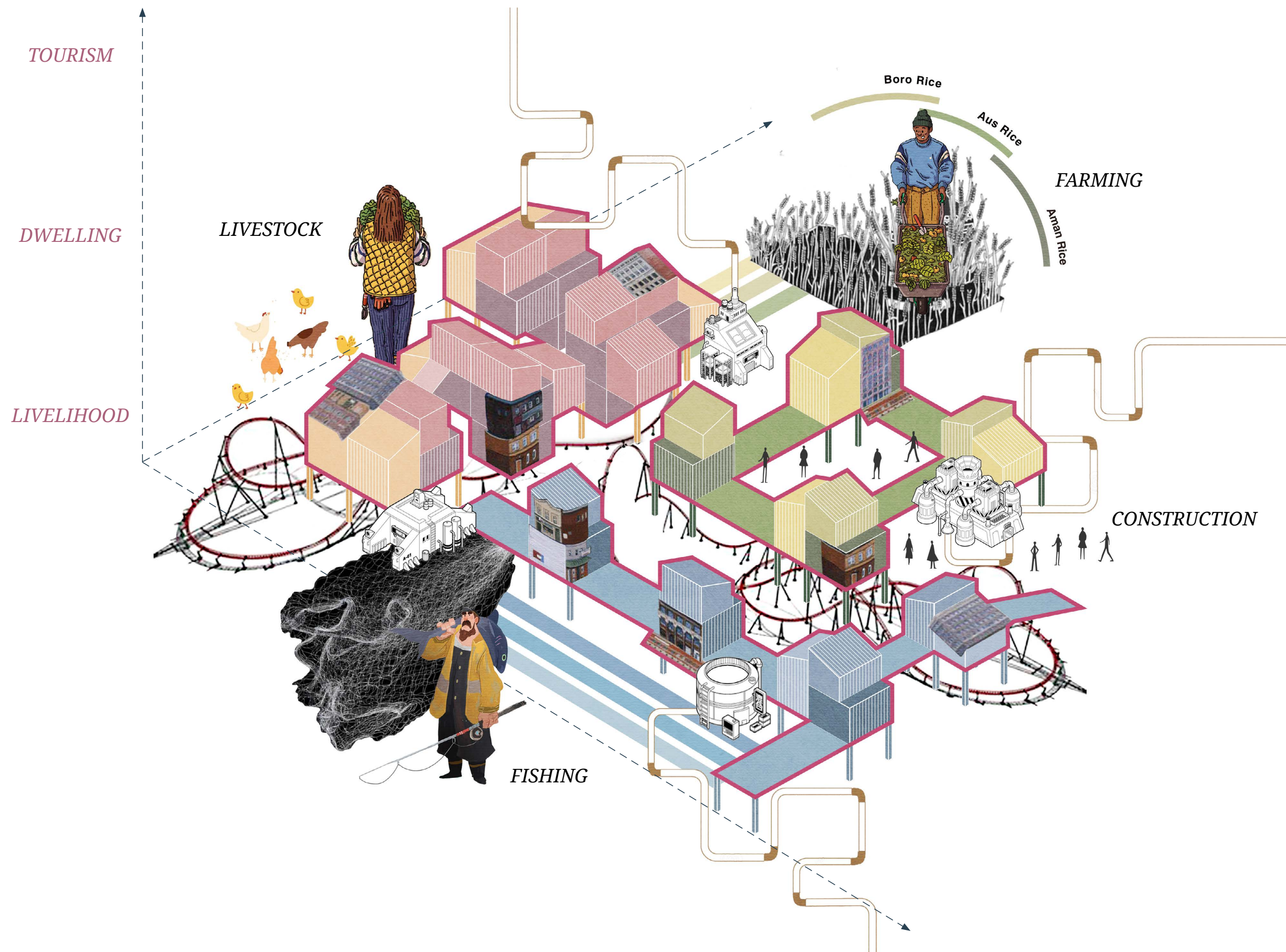


— DRY AND MONSOON SEASON CONDITIONS OF THE SITE —

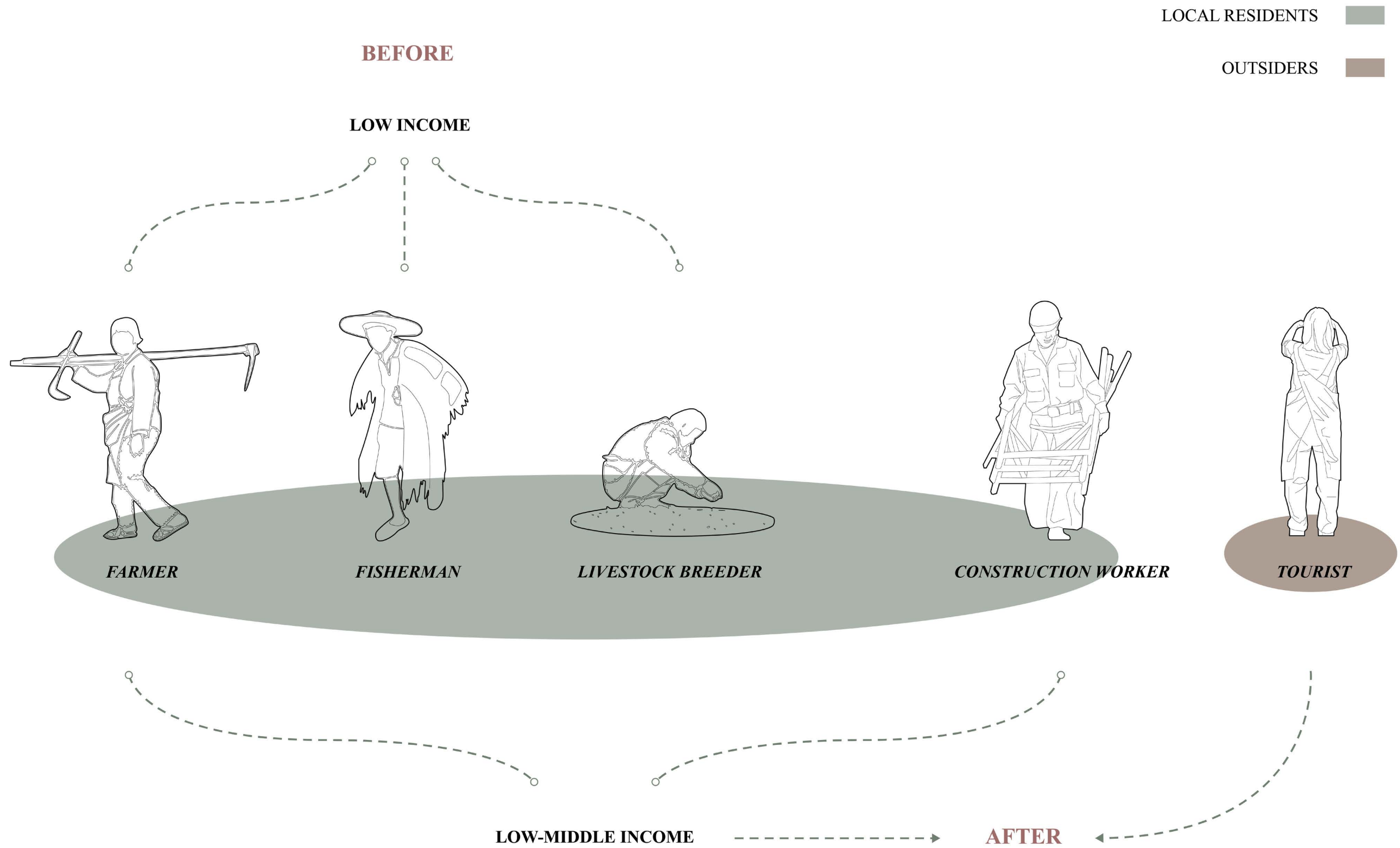
1:2000 ⓘ

— main concept —





— inhabitant groups —



— site strategy —



— DRY SEASON —

1:1000





— MONSOON SEASON —

1:1000 ①

— SITE INFORMATION —

Site area: 16,000 m²

Residents: originally 500, currently 800

Density: 500 residents/ha

Fsi: 0.86

Gsi: 0.32

— SITE PLAN —

1:1000









Service point / Market

Kindergarten / Primary school / Workshop

Health clinic

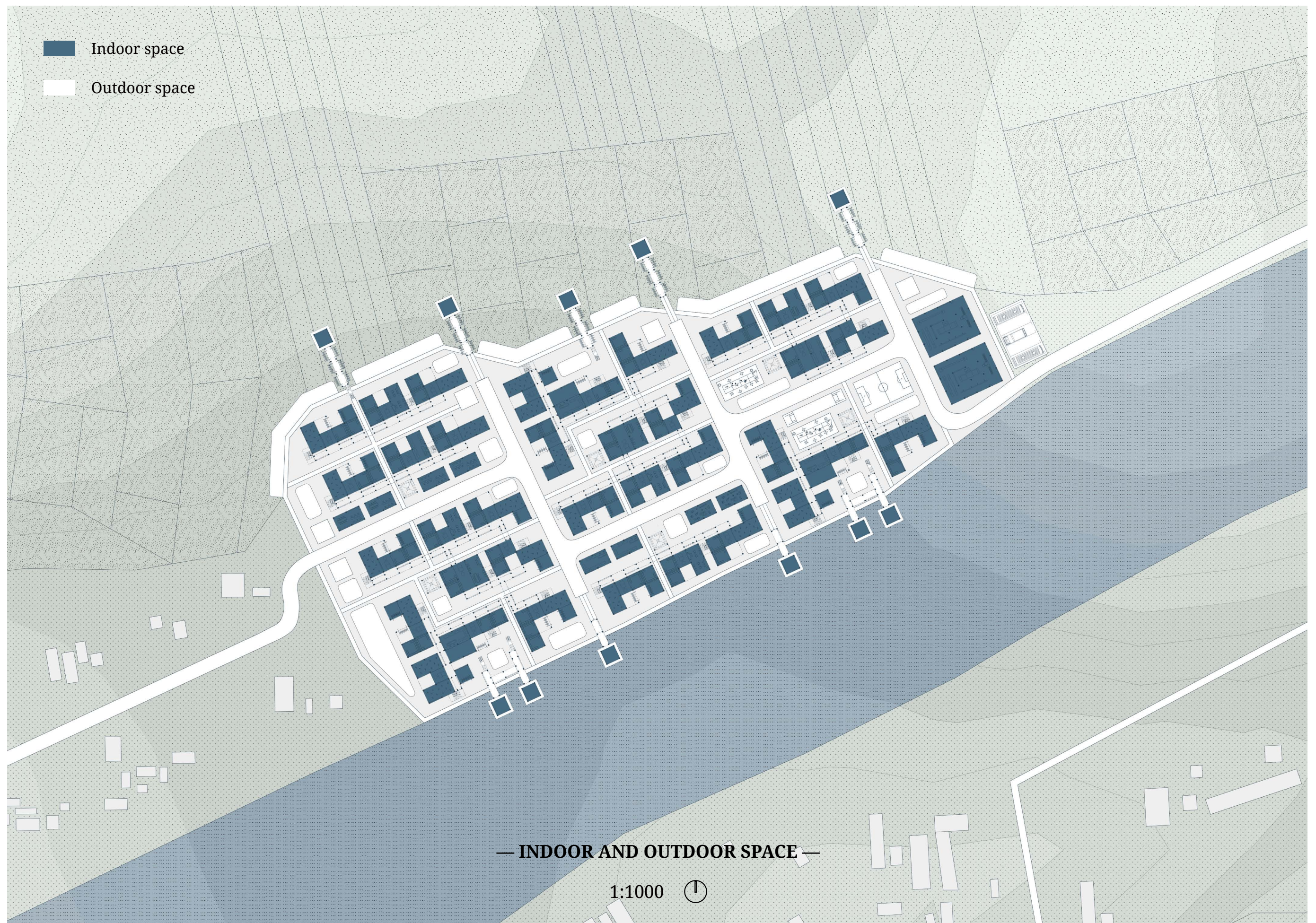
Gathering area

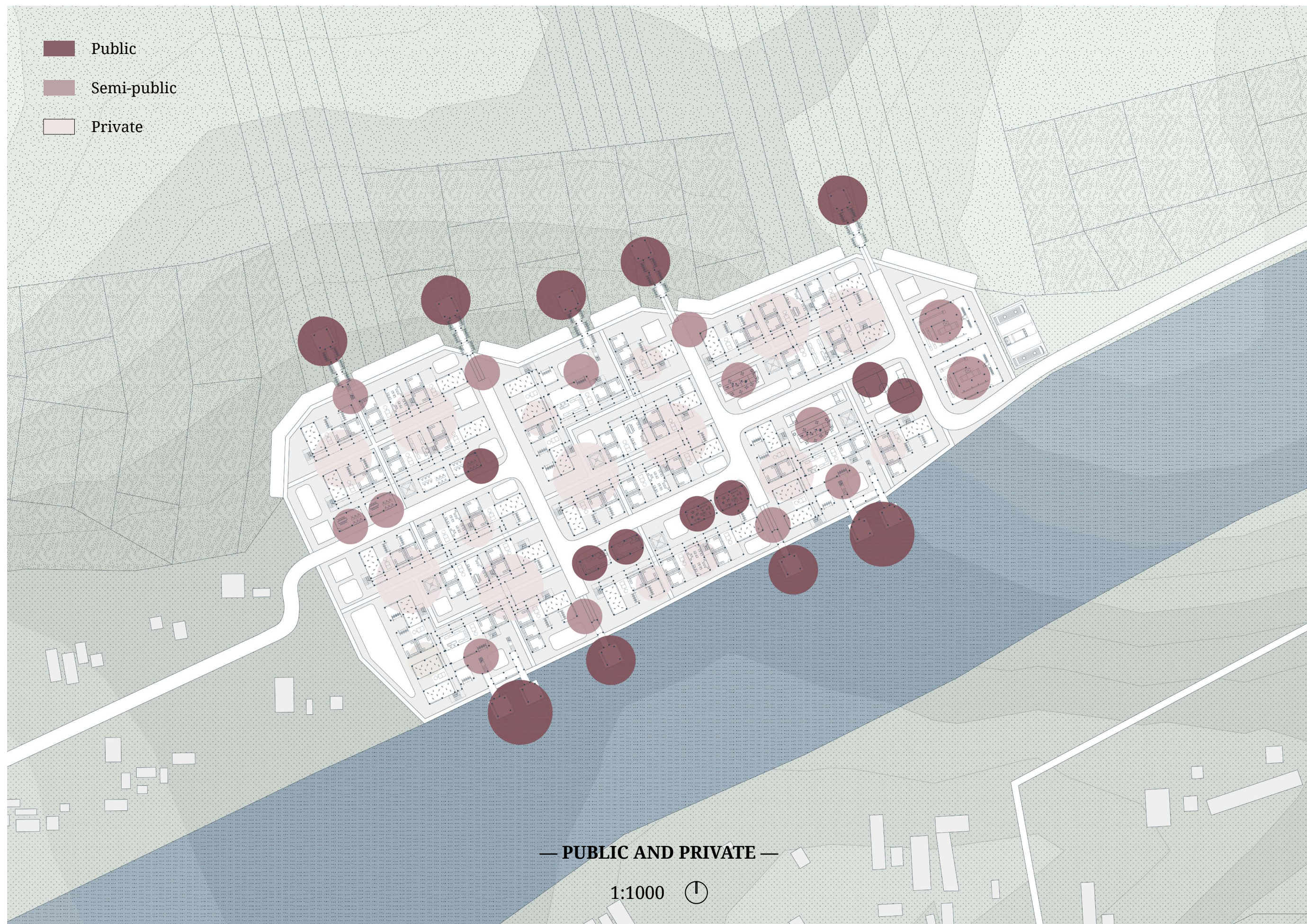
Cricket / Football pitch

— PUBLIC PROGRAM —

1:1000



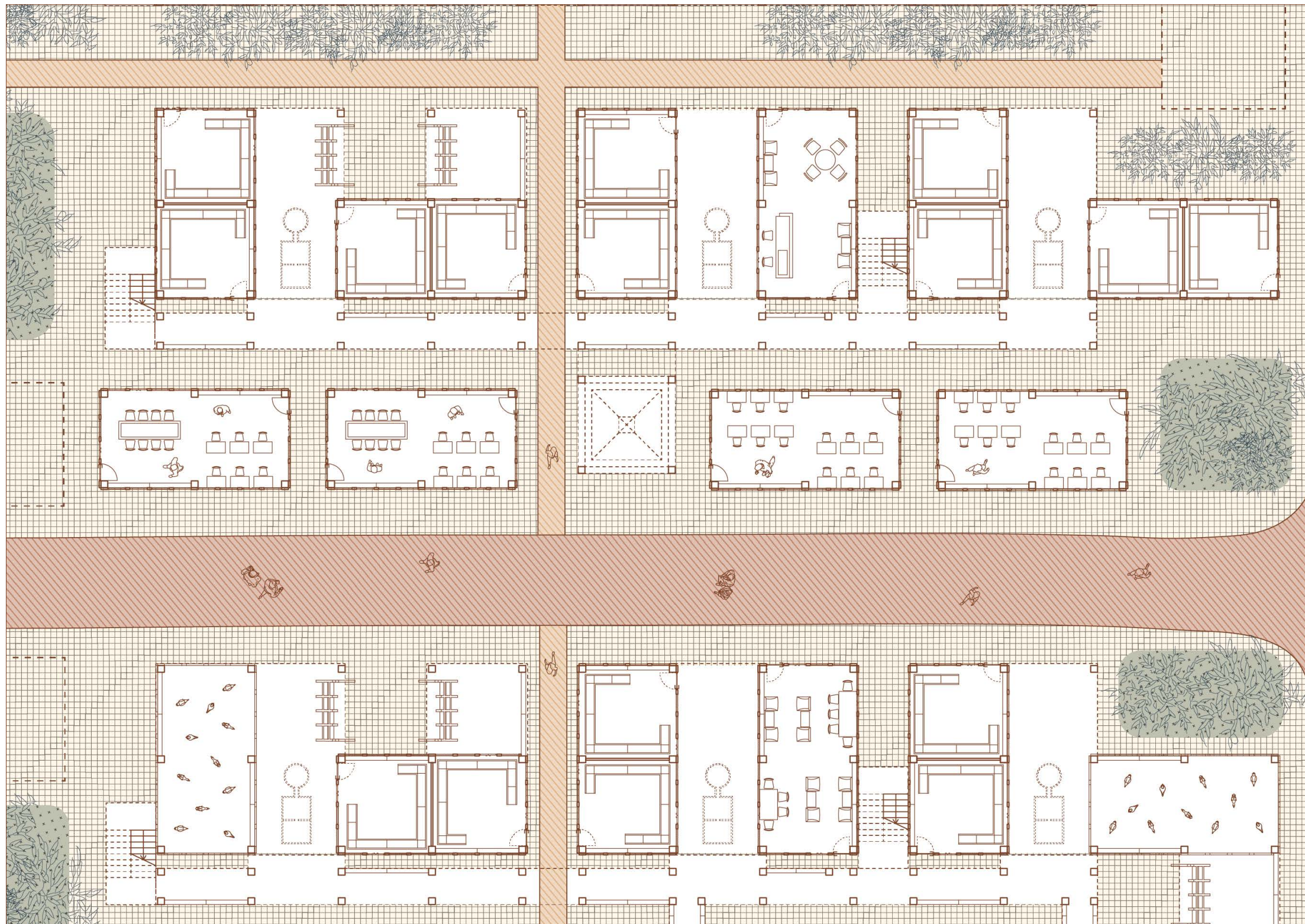








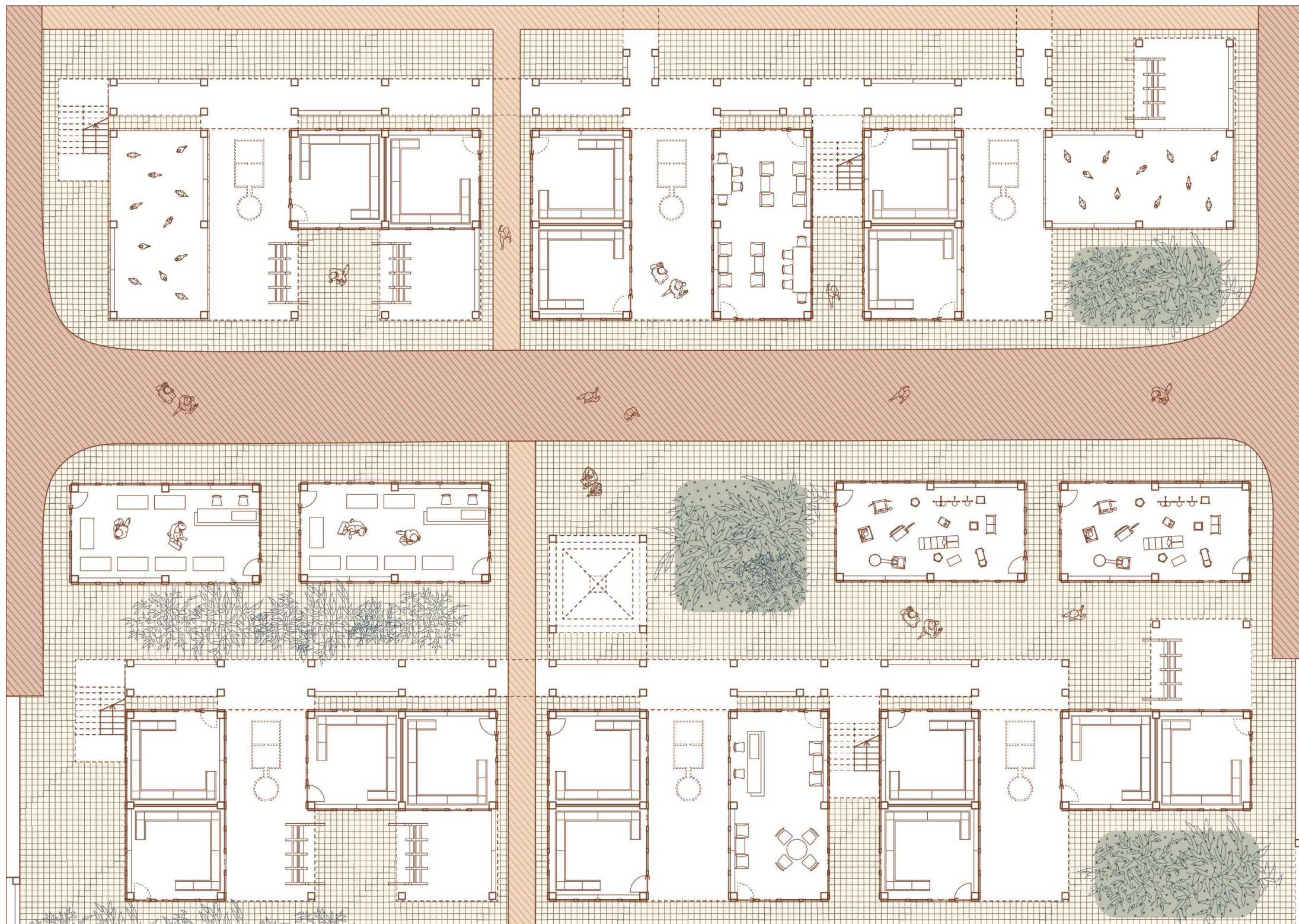
— community public area —



— KINDERGARTEN / PRIMARY SCHOOL / WORKSHOP —

1:200

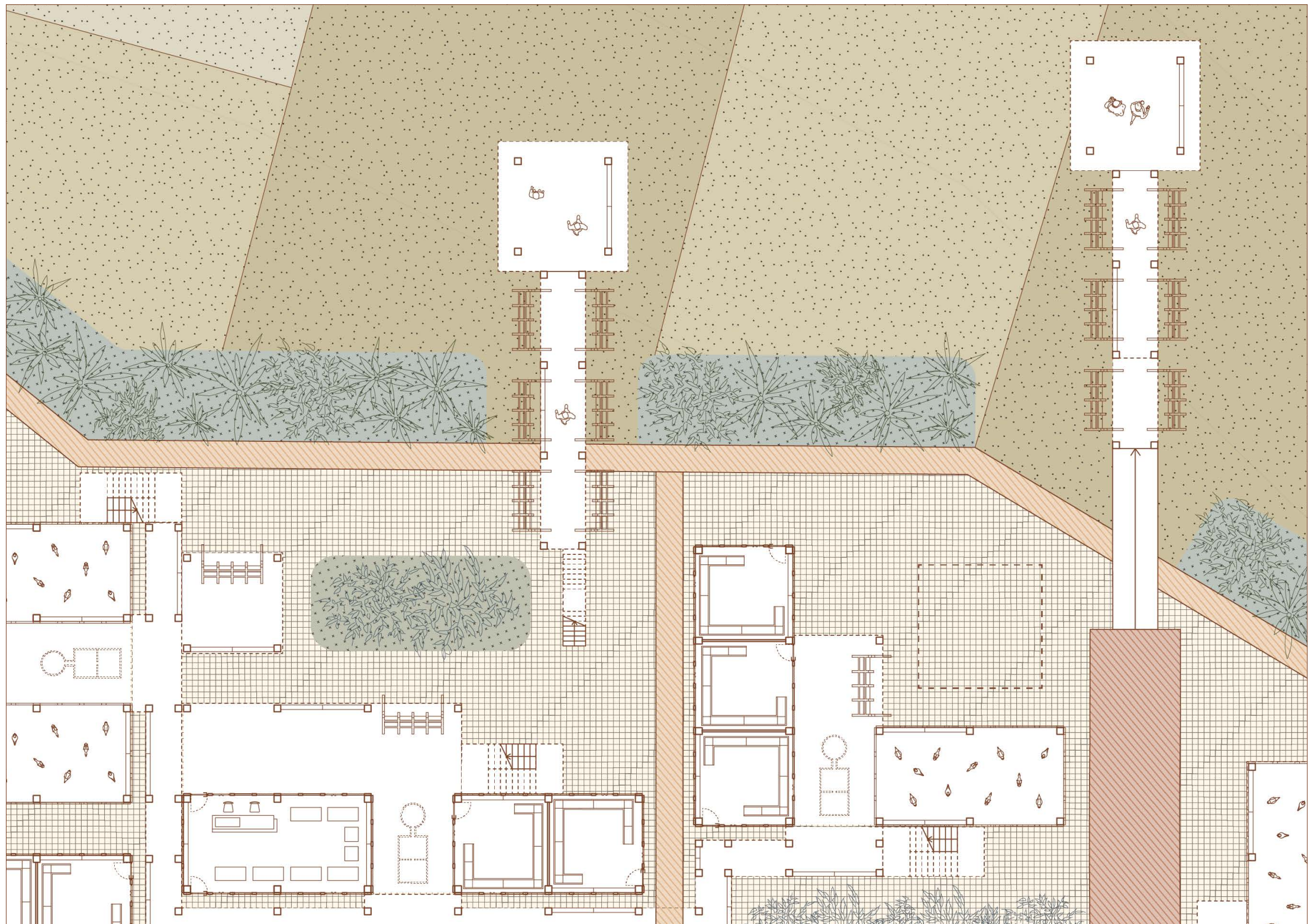
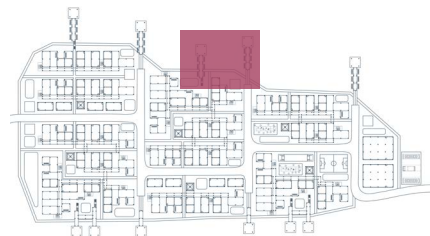




— SERVICE POINT / MARKET / HEALTH CLINIC —

1:200

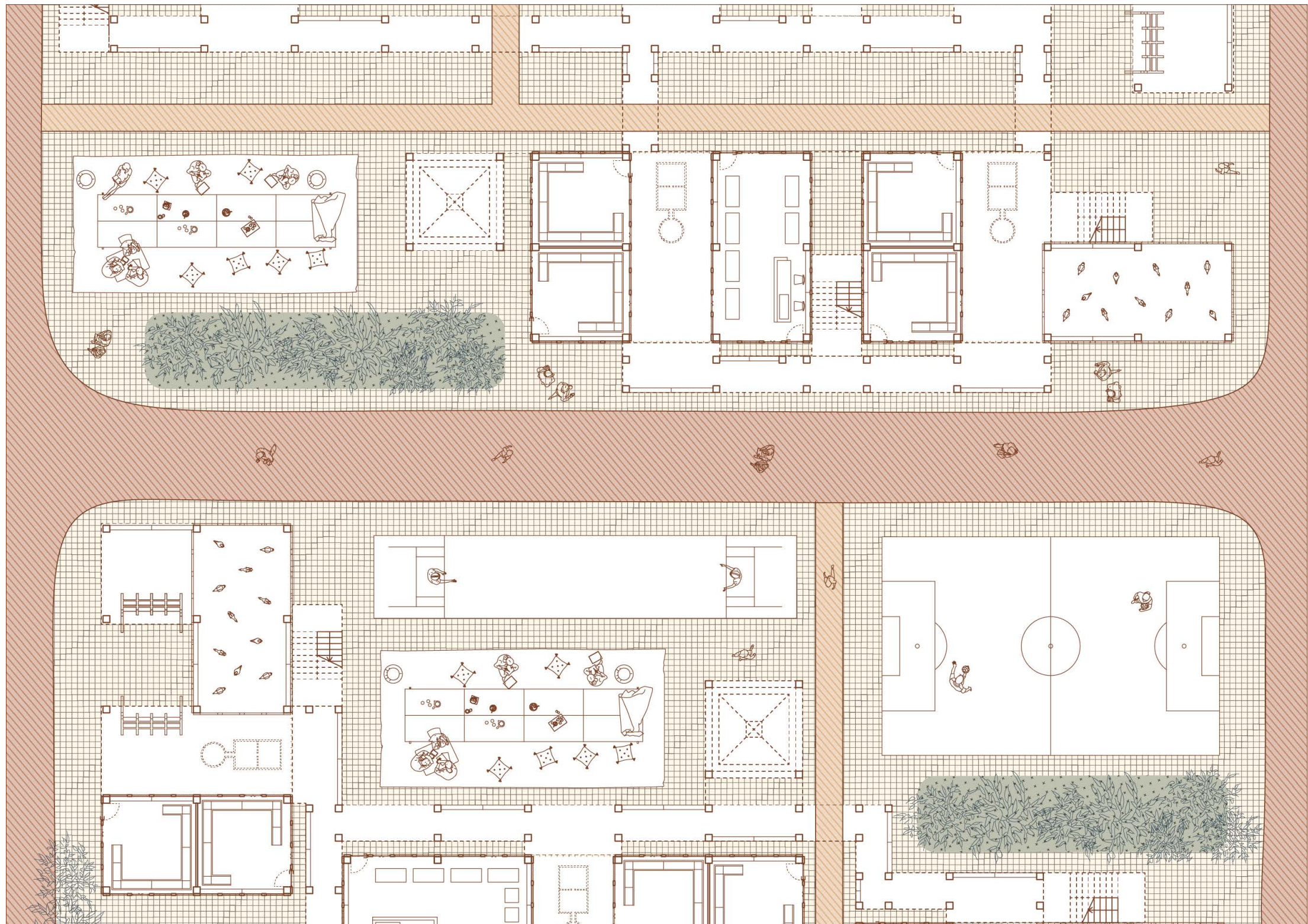
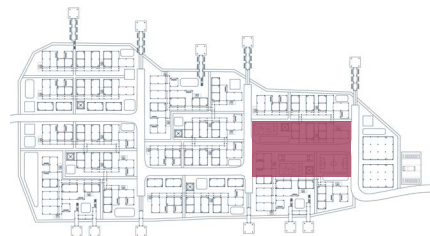




— FARMING —

1:200





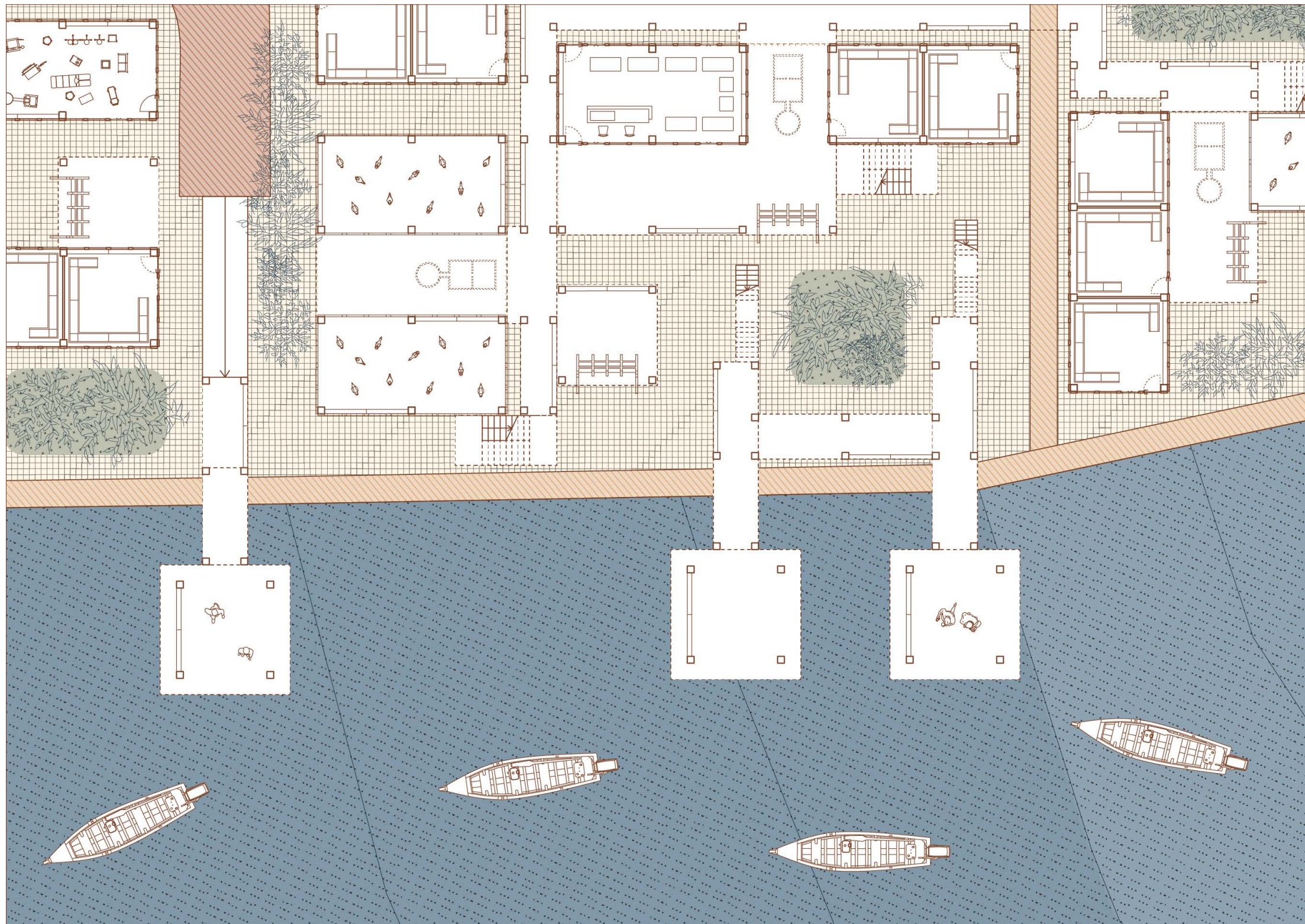
— GATHERING AREA / CRICKET / FOOTBALL PITCH —

1:200



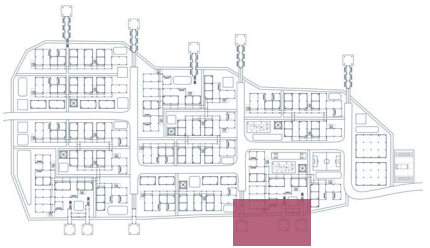


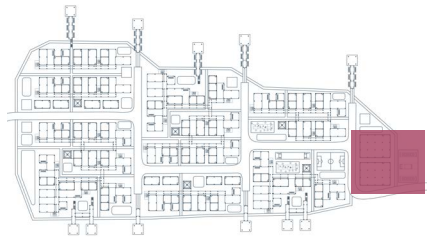
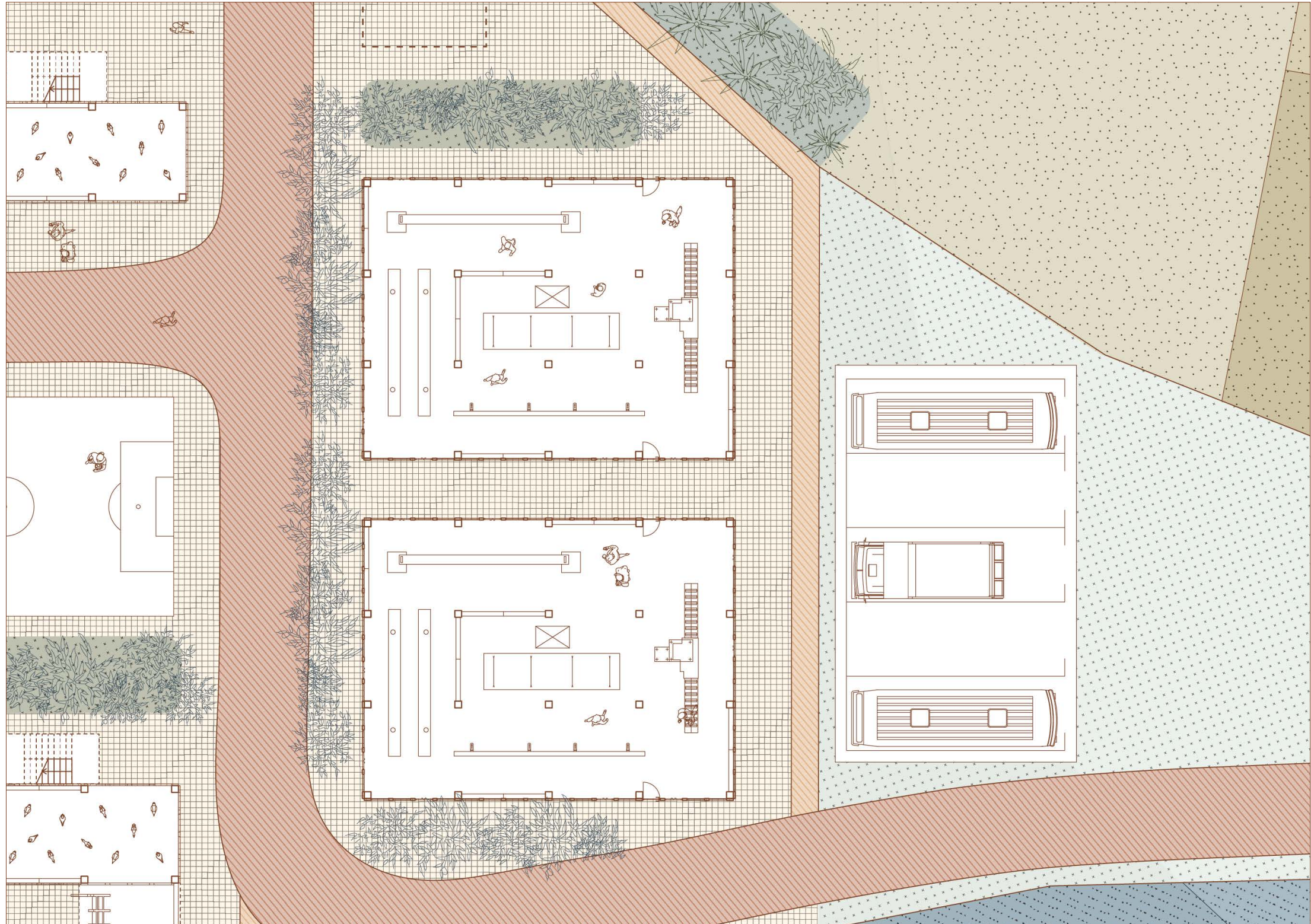
— COURTYARD VIEW —



— FISHING / BOAT LANDING —

1:200 ⌚





— CONSTRUCTION INDUSTRY / MAIN ENTRANCE / VEHICLE-PARKING / VAN CONNECTION NOD —

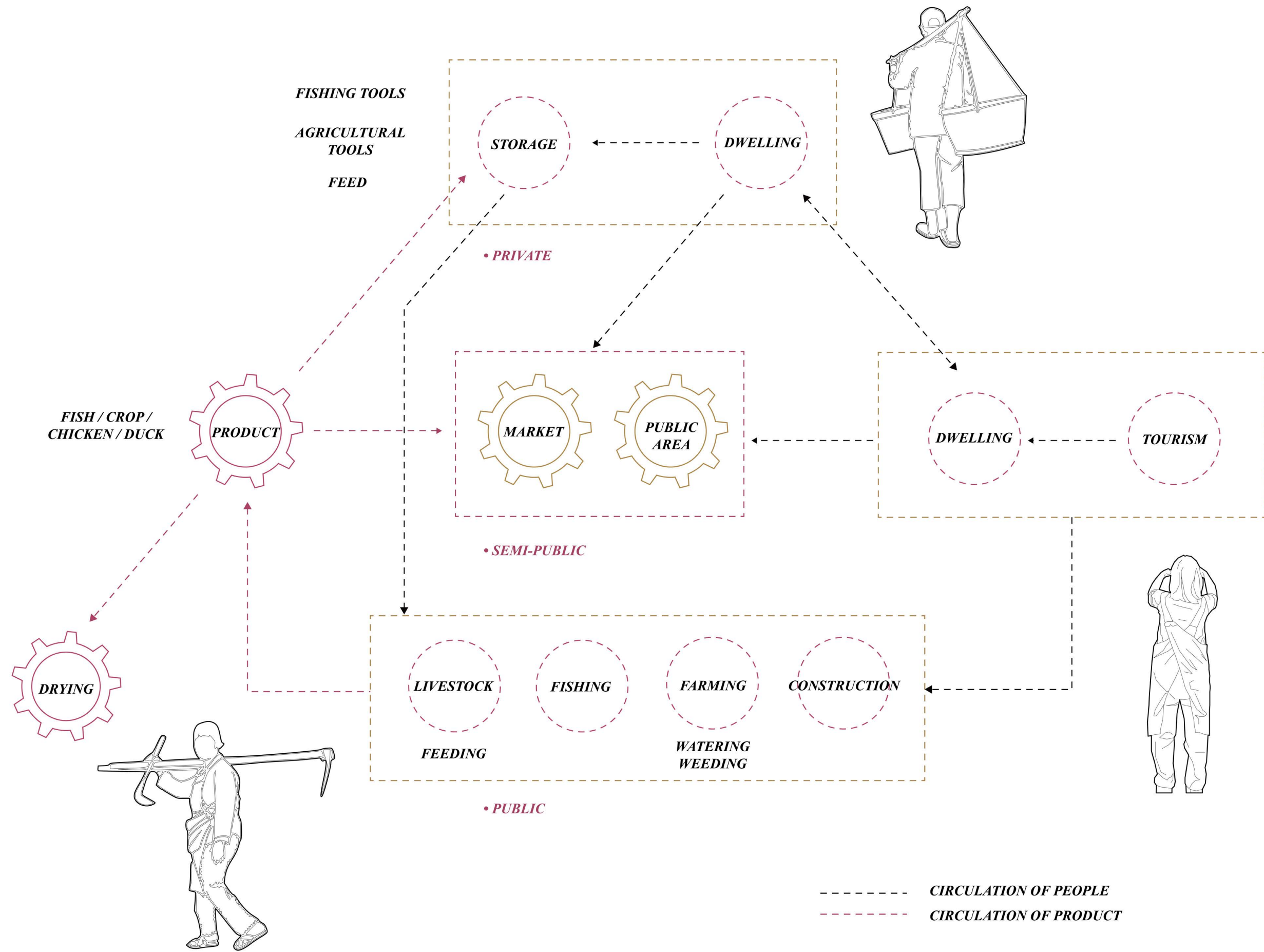
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CLUSTER

New Housing System, Layout, Program

Tahirpur, Sylhet, Bangladesh



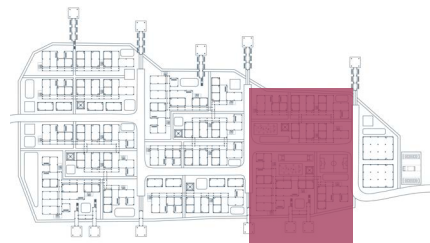
— local-resident dominated complex —



— LOCAL-RESIDENT DOMINATED COMPLEX —

1:300

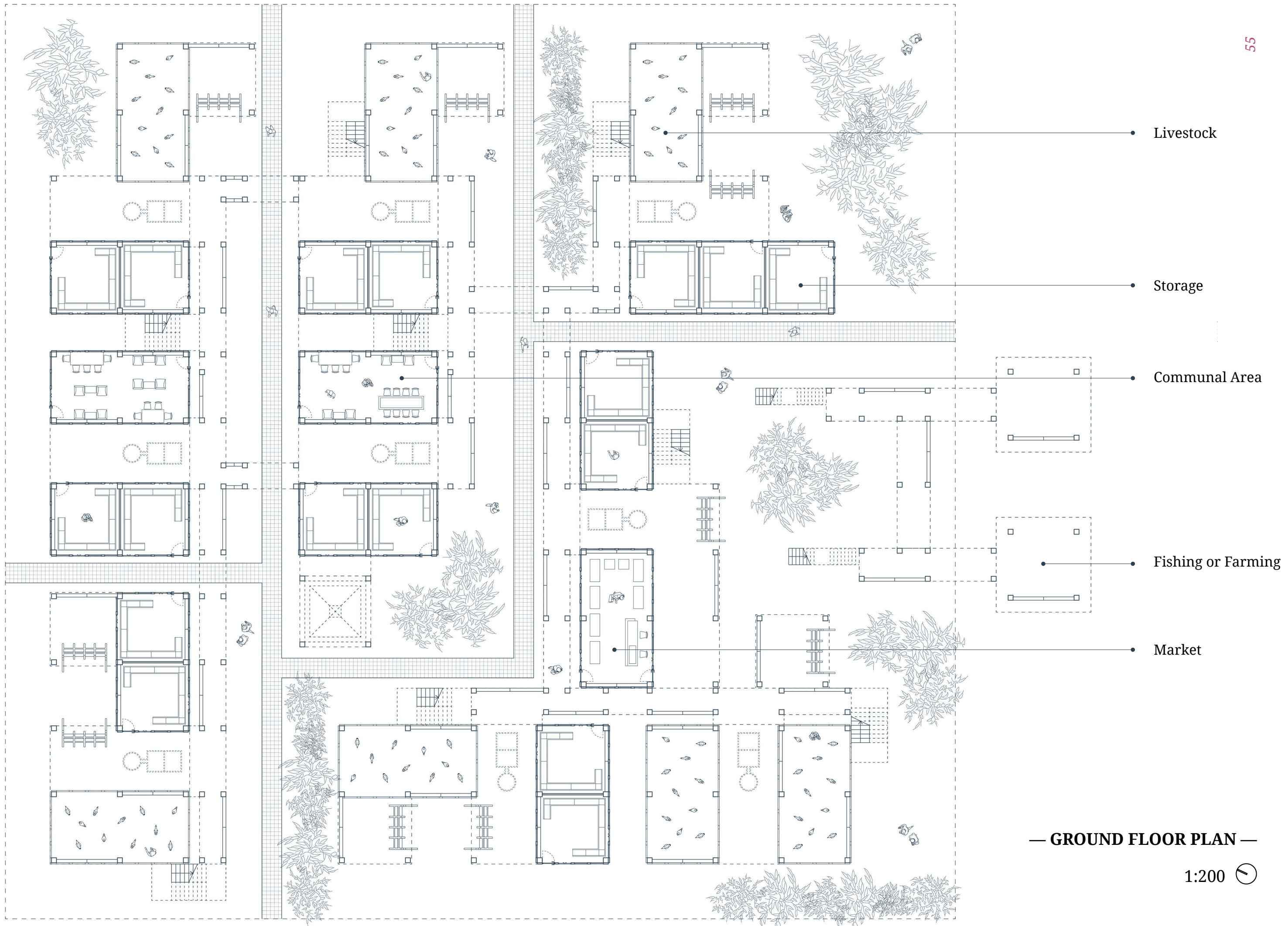




— LAYOUT OF CLUSTER VARIES ACCORDING TO SITE —

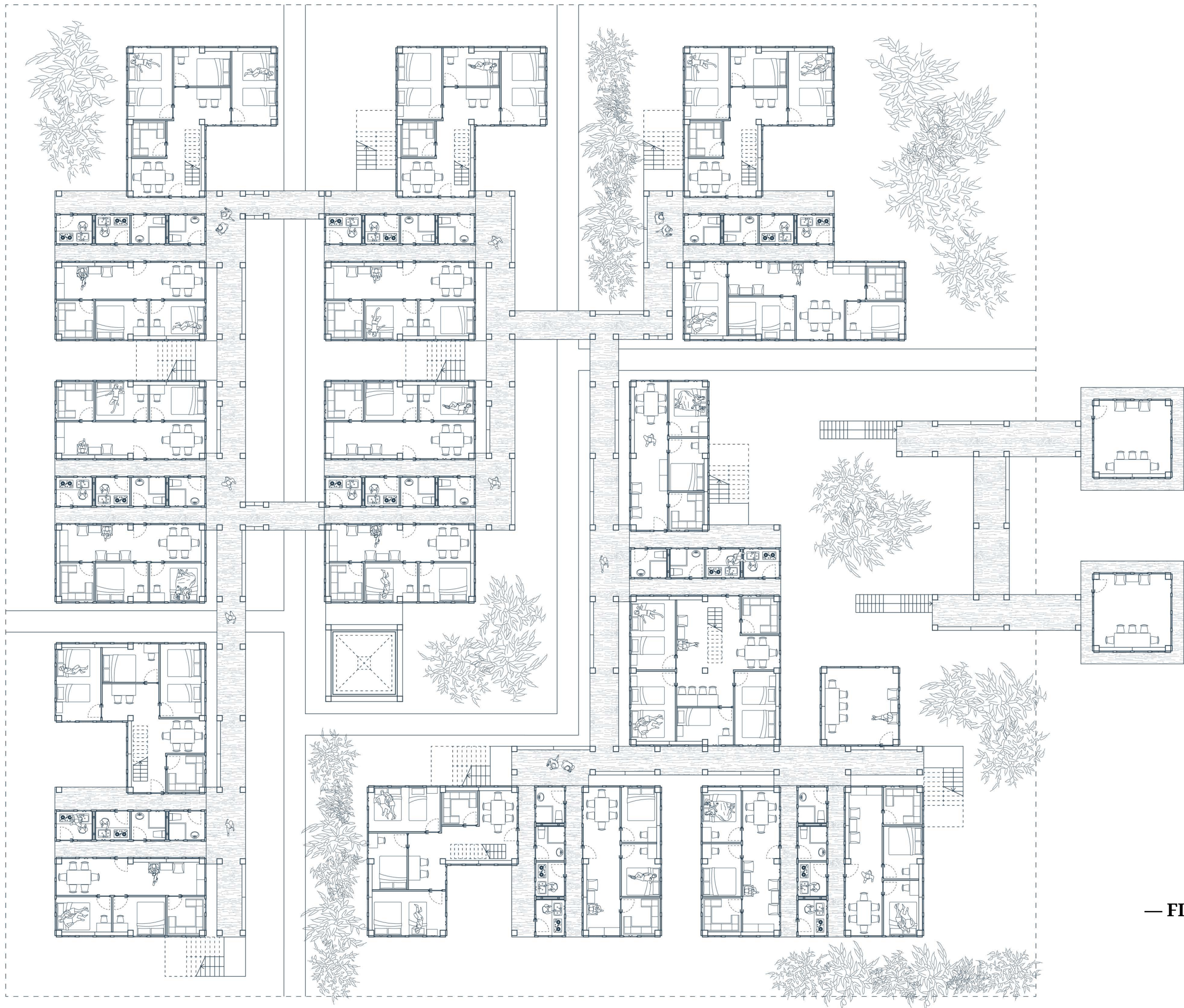
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— GROUND FLOOR PLAN —

1:200



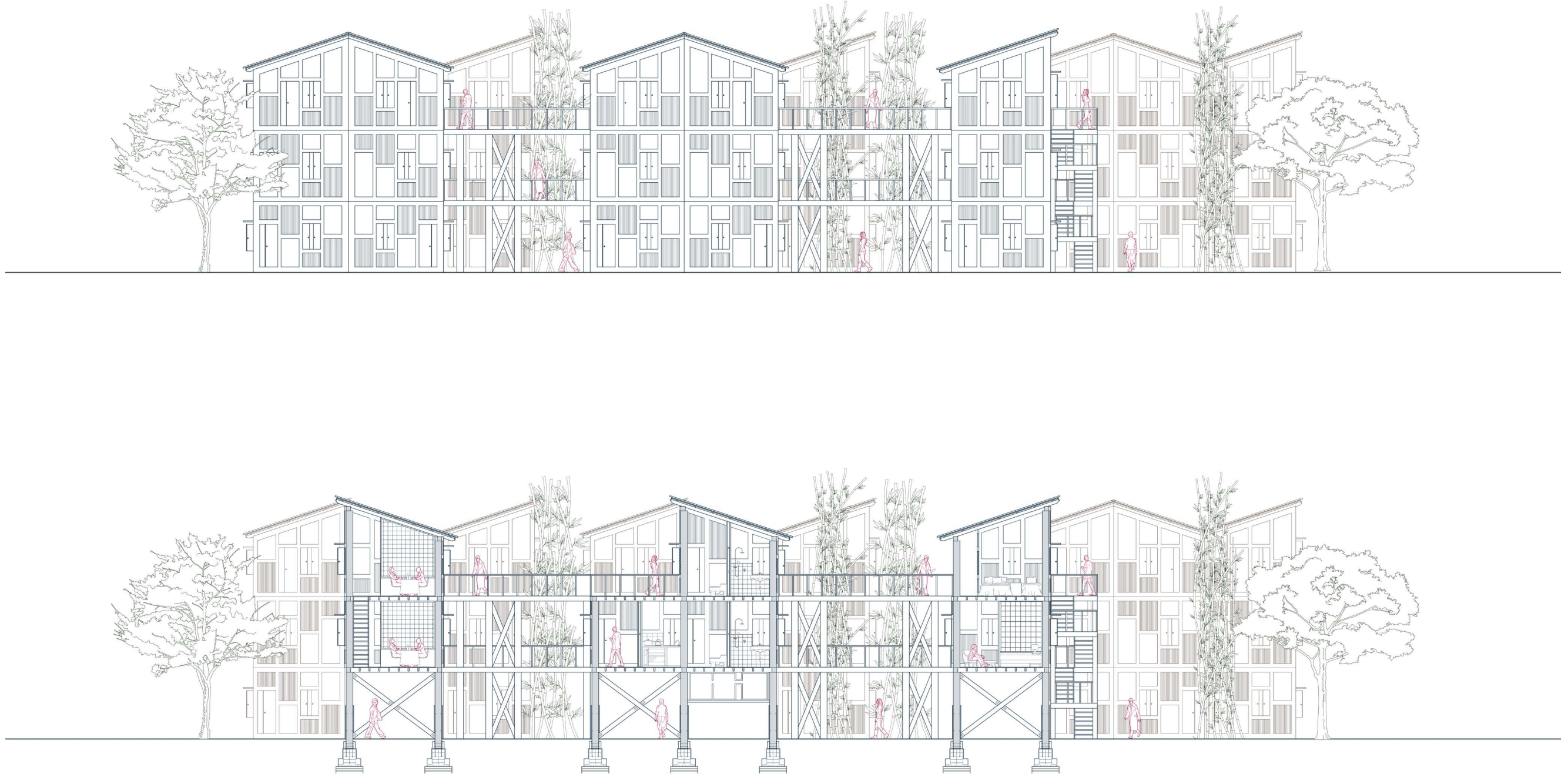
— FIRST FLOOR PLAN —

1:200



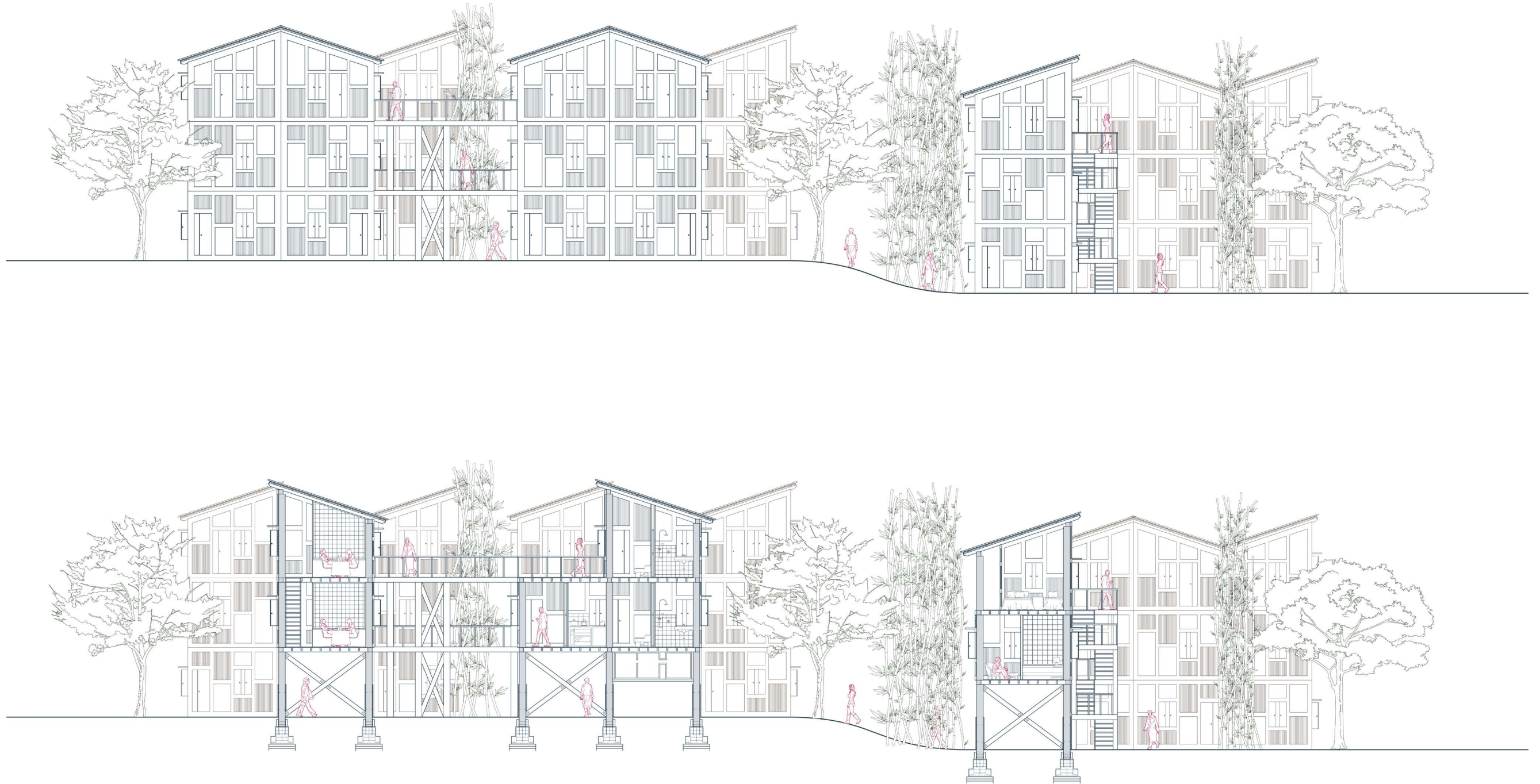
— SECOND FLOOR PLAN —

1:200



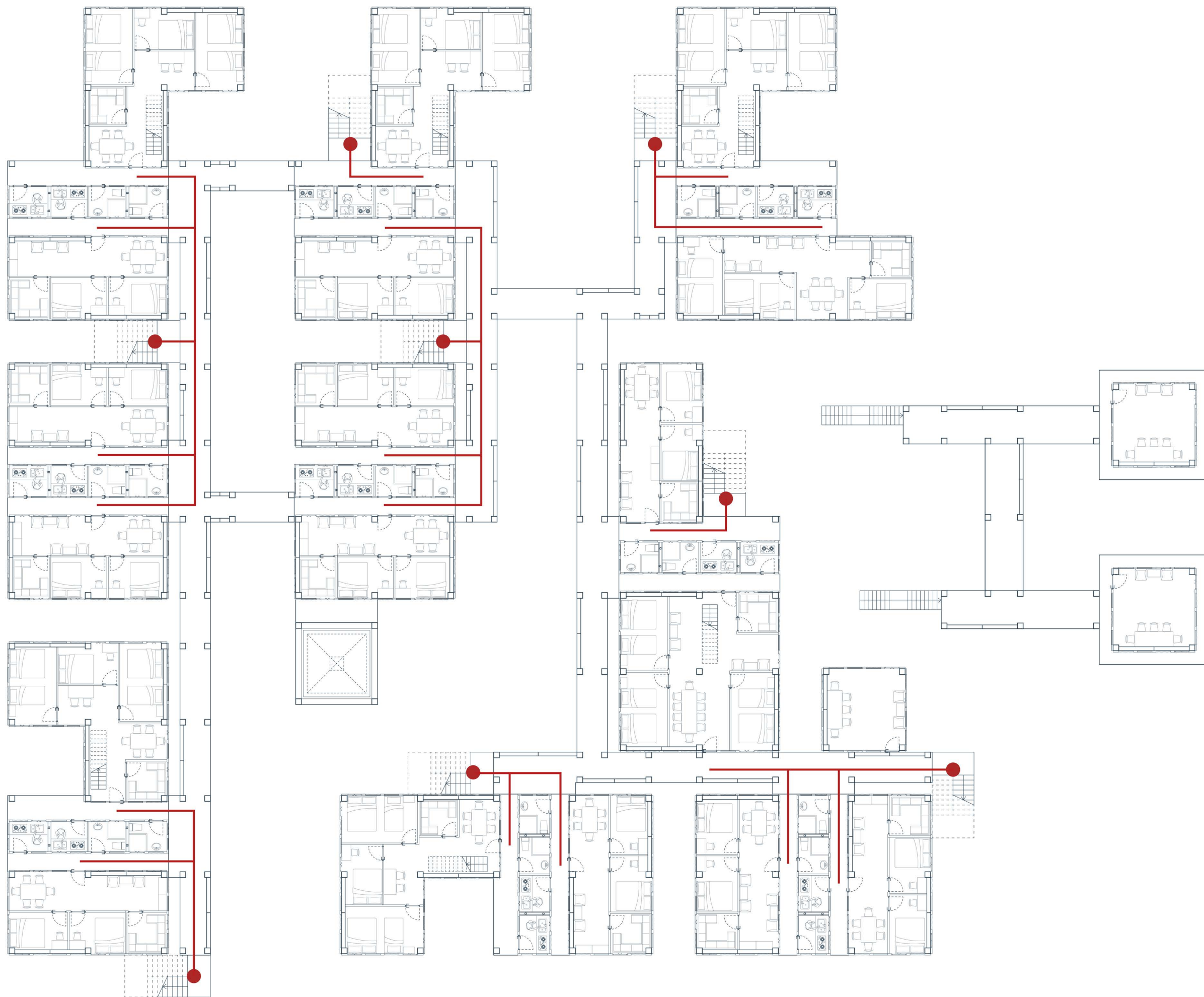
— WEST ELEVATION & SECTION A-A —

1:200



— WEST ELEVATION & SECTION A'-A' —

1:200



— FIRE ESCAPE —

1:200

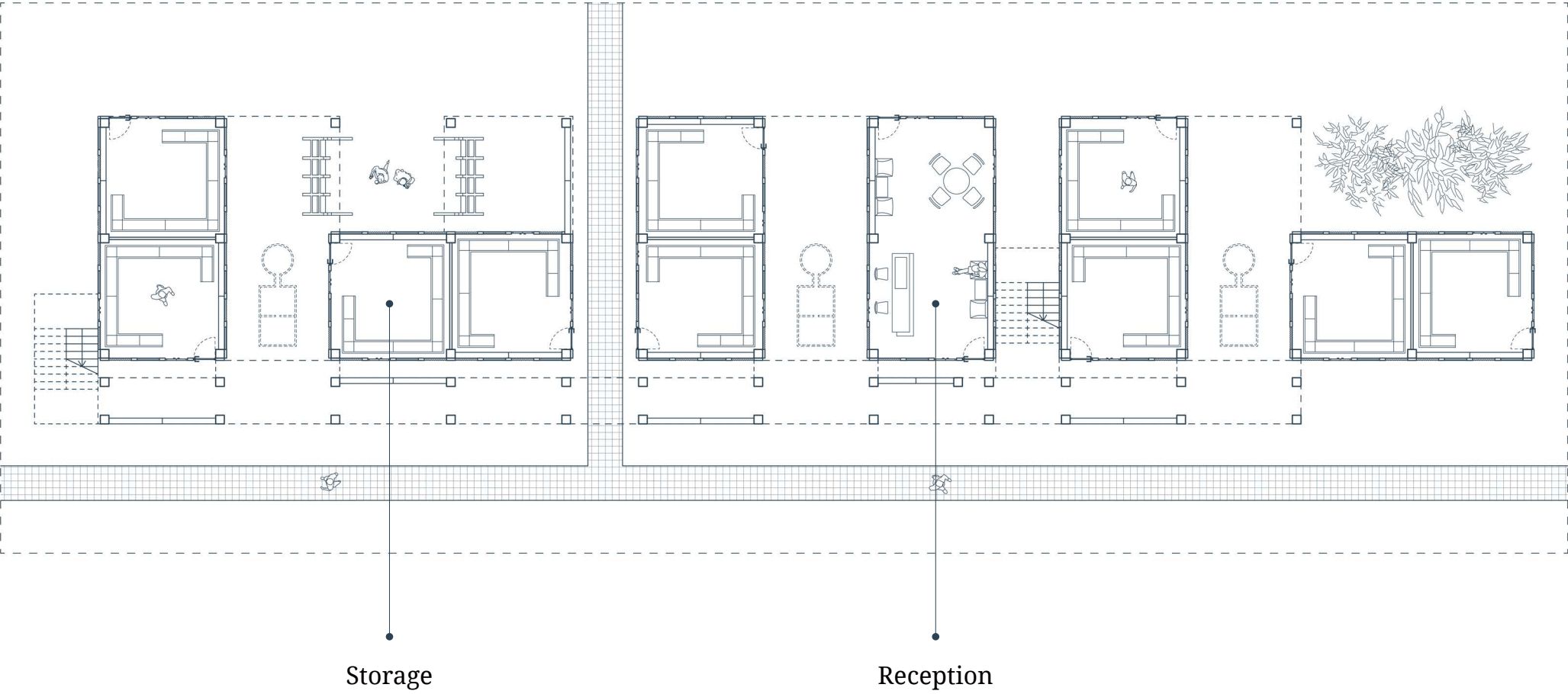
— tourist-exclusive complex —



— TOURIST-EXCLUSIVE COMPLEX —

1:300

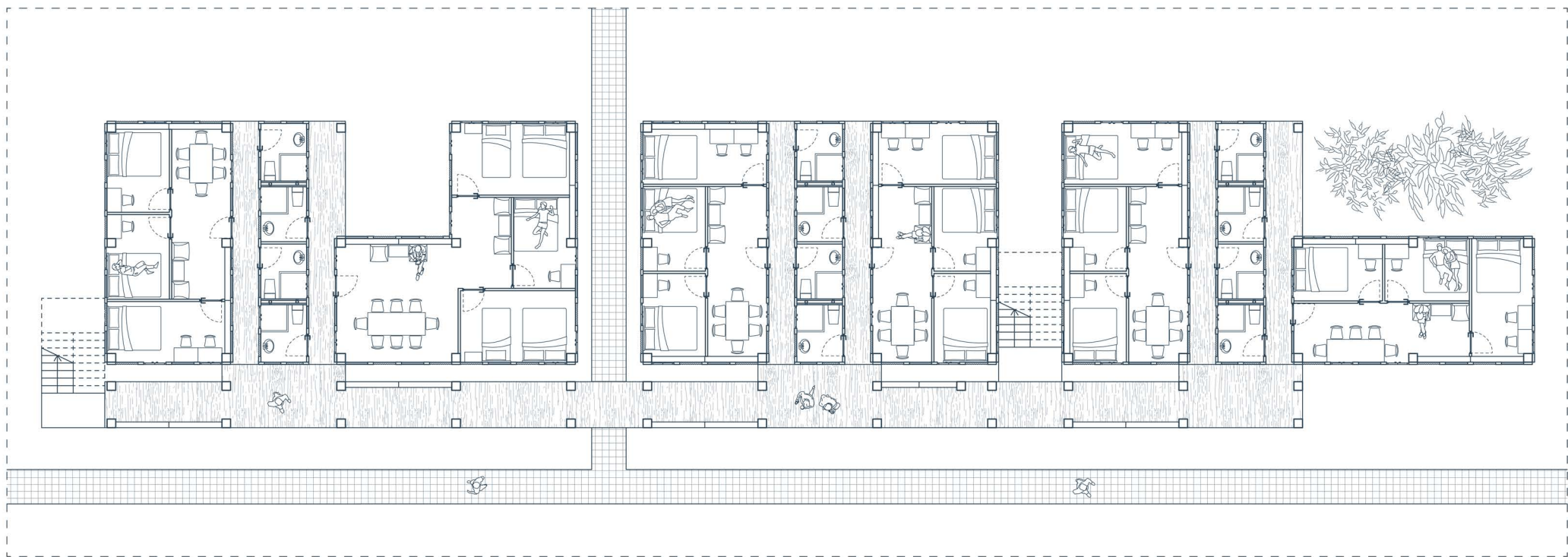




— GROUND FLOOR PLAN —

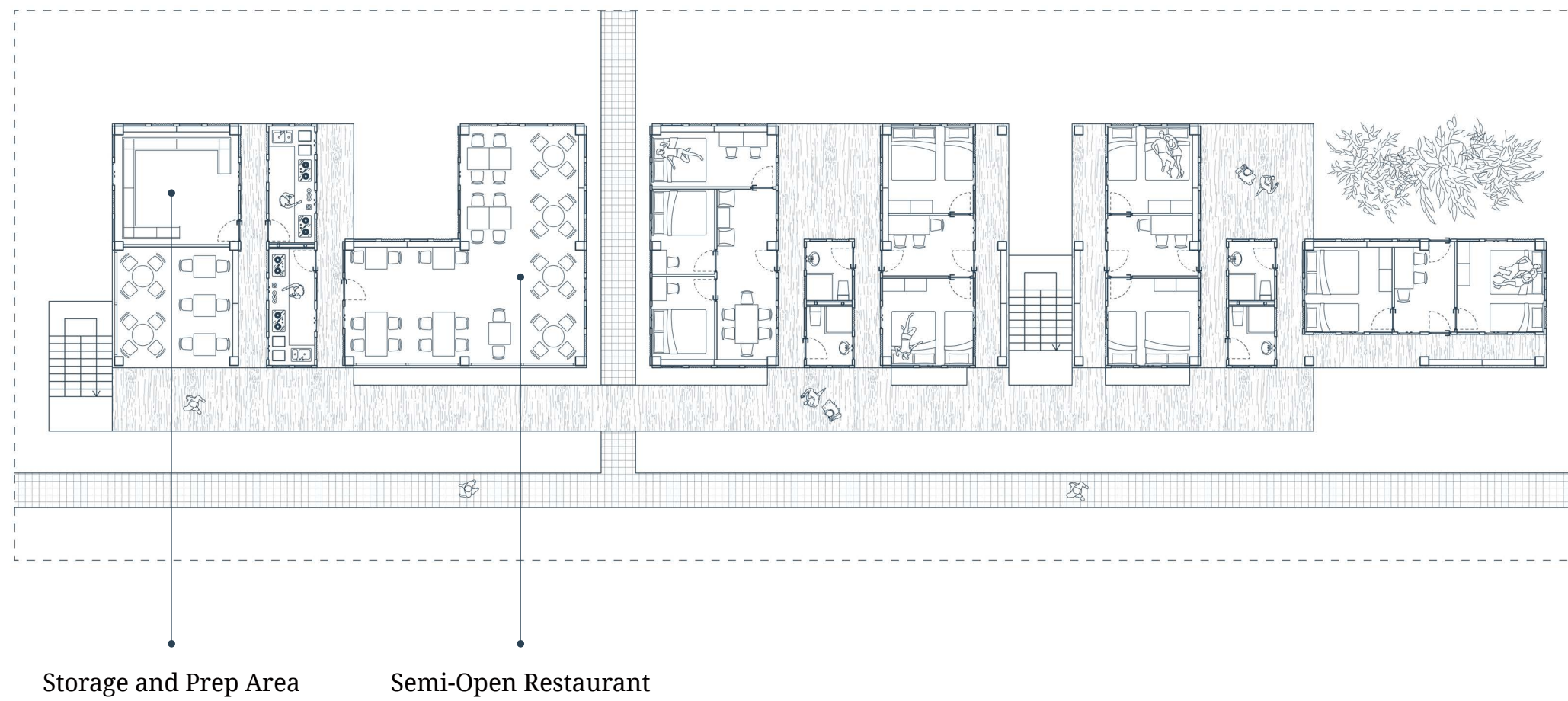
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— FIRST FLOOR PLAN —

1:200 



— SECOND FLOOR PLAN —

1:200 ⌚

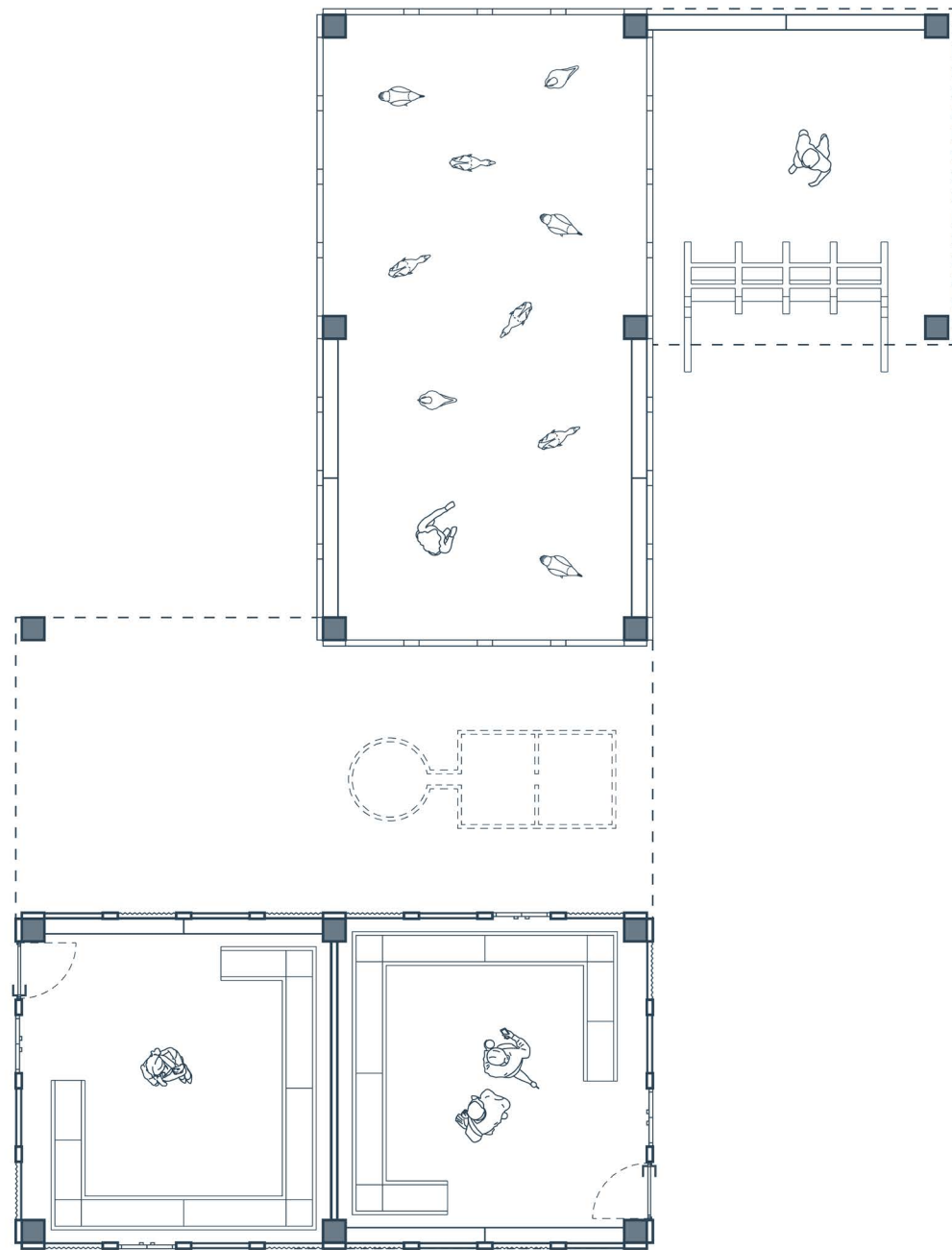
UNIT

Dwelling Unit Types, Livelihood Unit Types

— dwelling unit 1 —

Tahirpur, Sylhet, Bangladesh

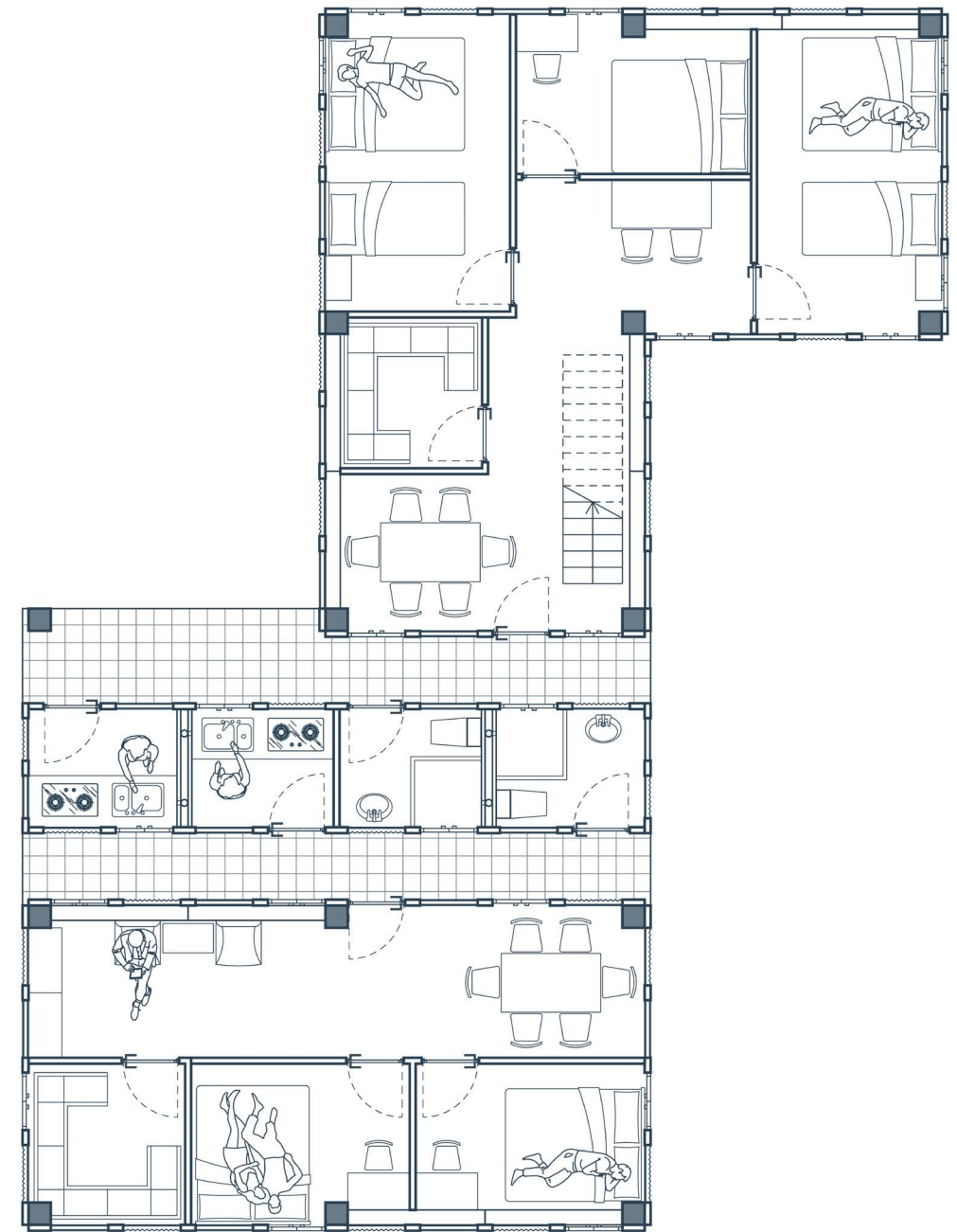




— **GROUND FLOOR** —

STORAGE / LIVESTOCK

124 m²

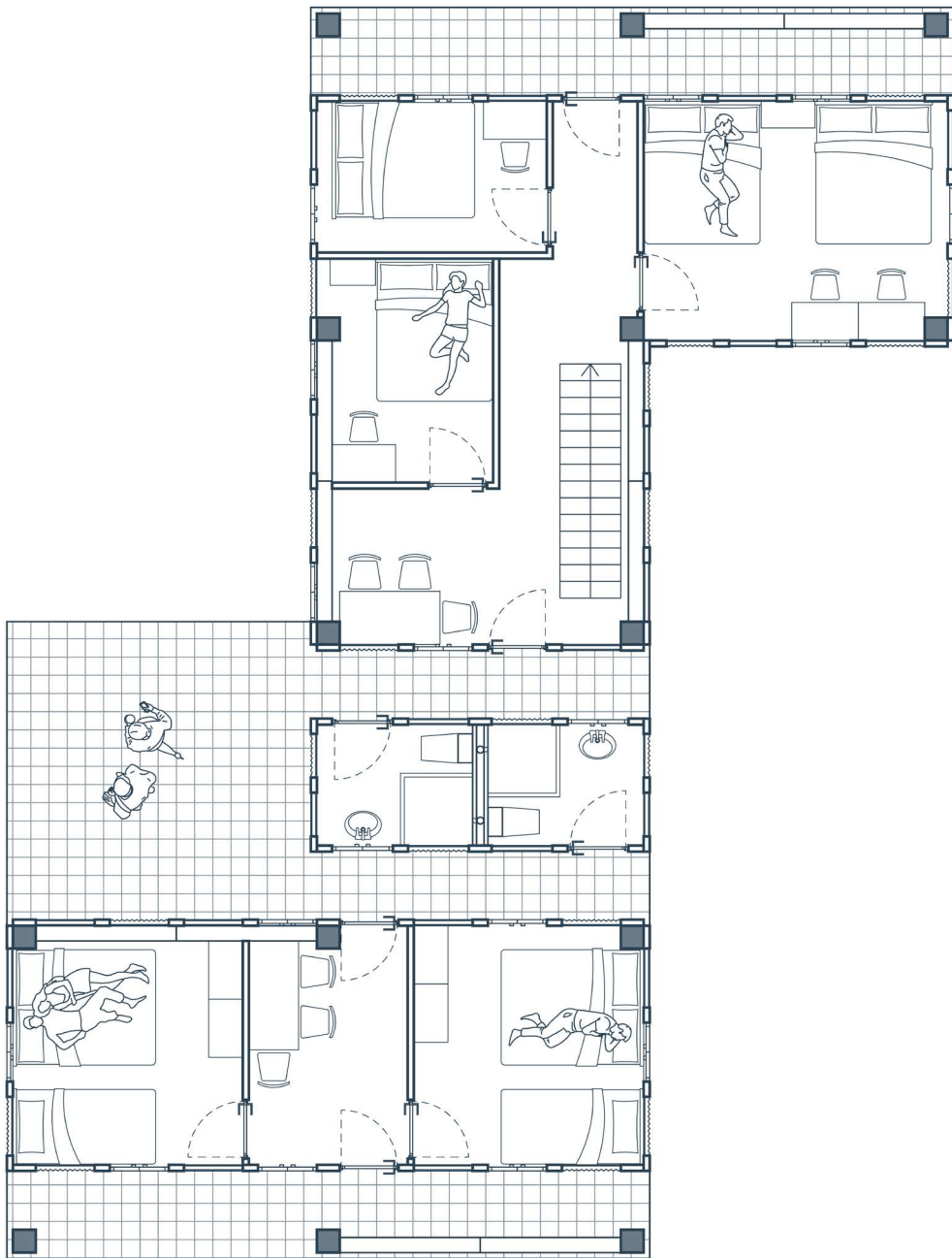


— **FIRST FLOOR** —

3 BEDROOMS — 2 BEDROOMS

LOCAL RESIDENTS

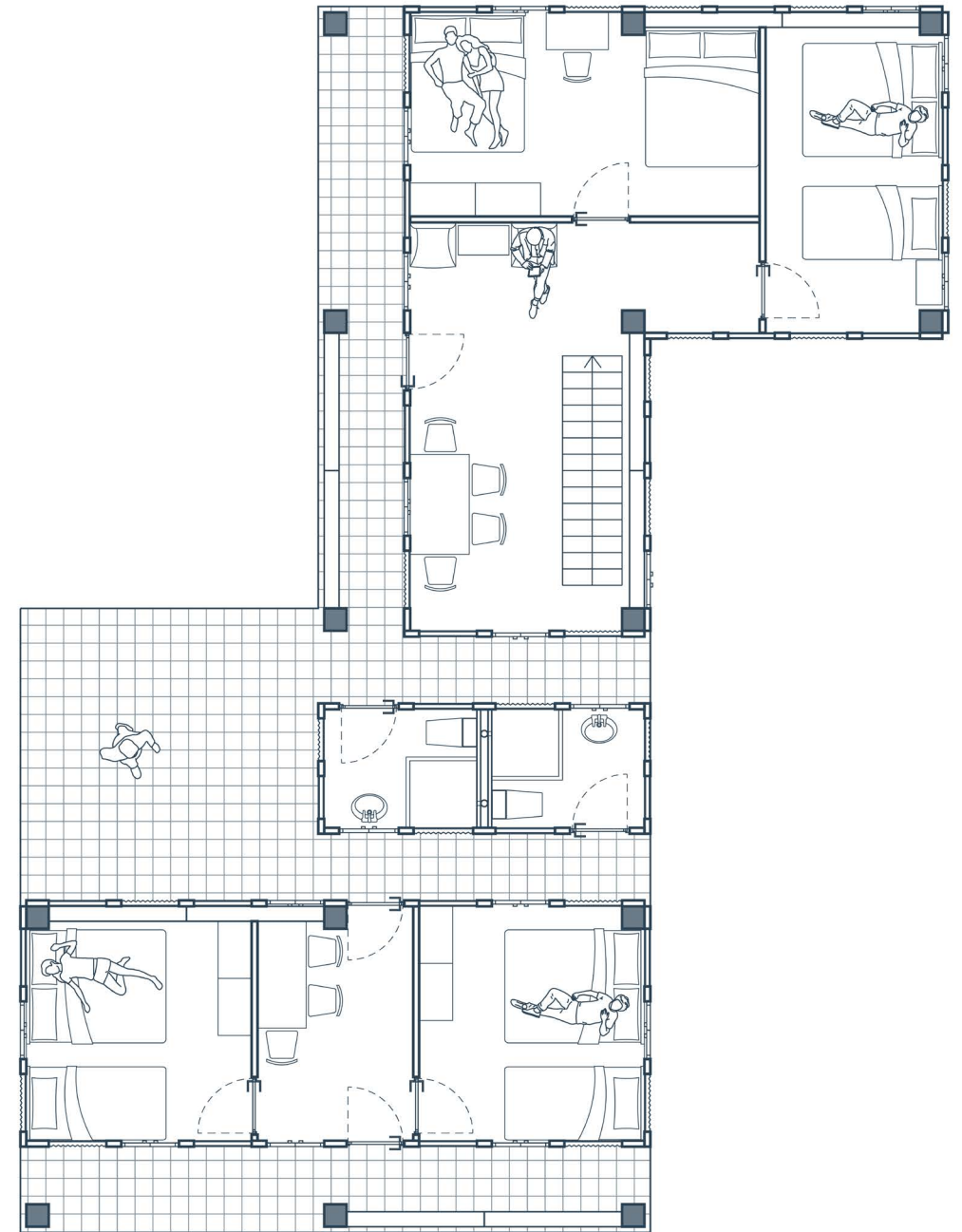
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— SECOND FLOOR —

3 BEDROOMS — MIXED RESIDENCE

2 BEDROOMS — TOURISTS

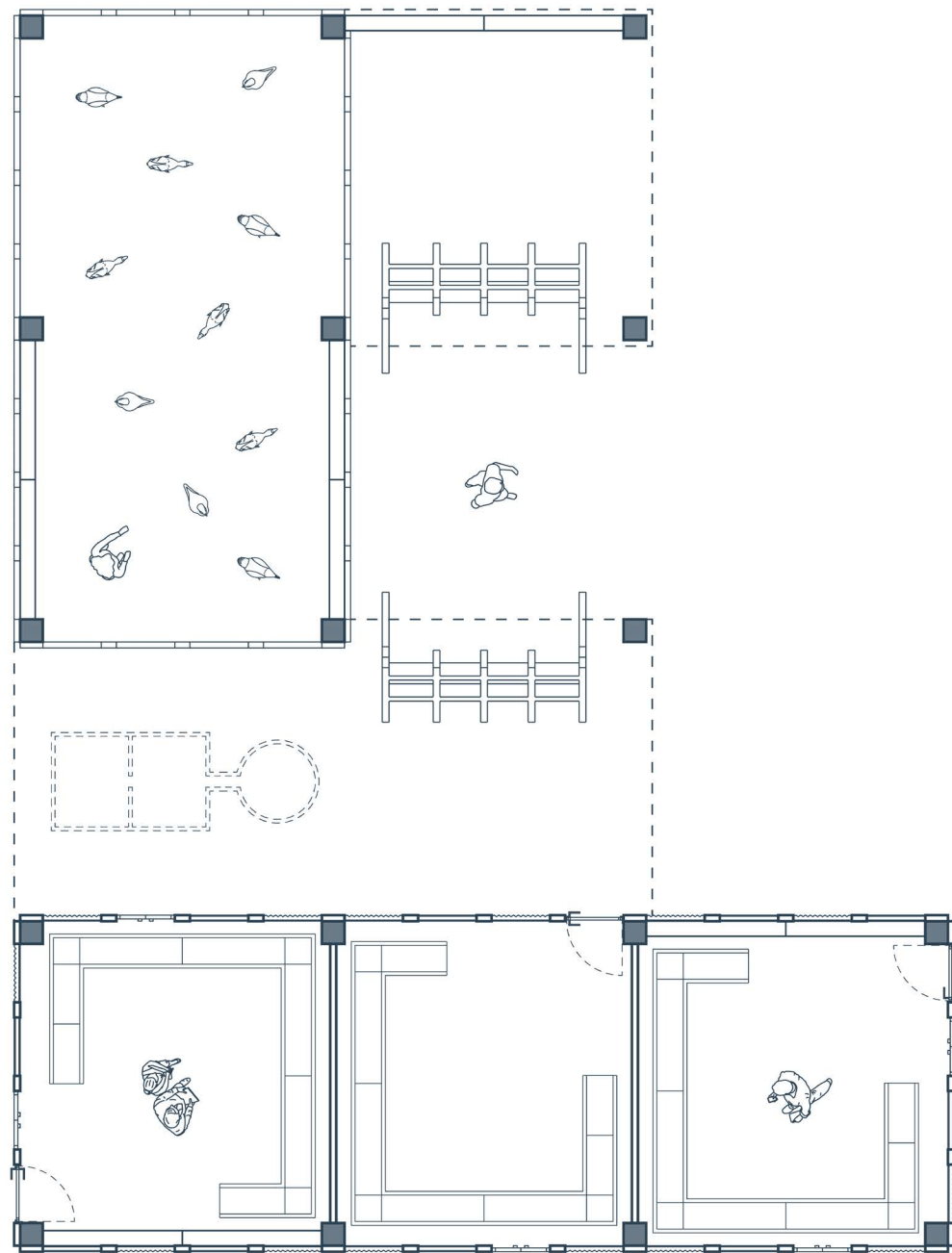


— SECOND FLOOR —

2 BEDROOMS — MIXED RESIDENCE

2 BEDROOMS — TOURISTS

— scale: 1:50 —



— **GROUND FLOOR** —

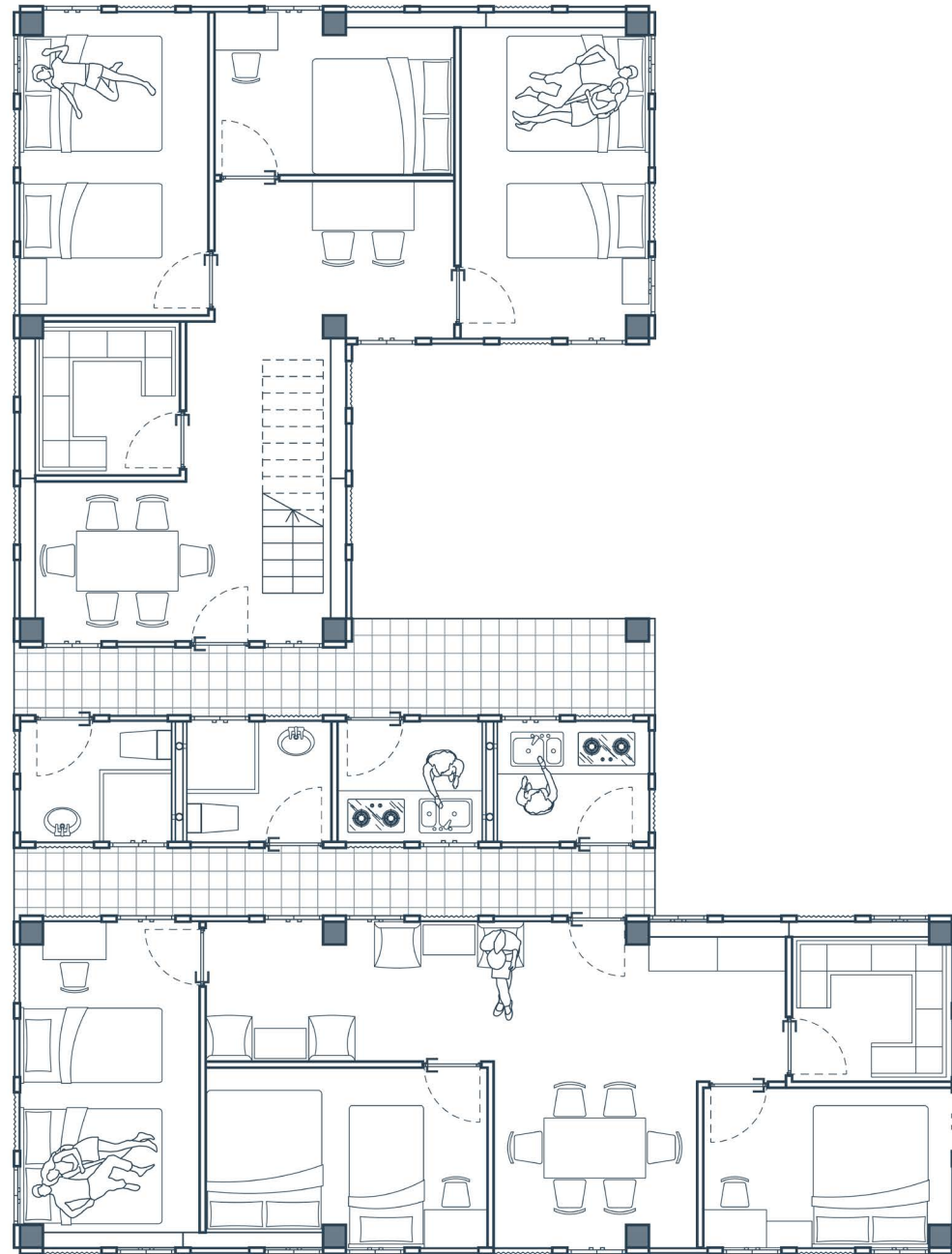
STORAGE / LIVESTOCK

140 m²

— scale: 1:50 —

— dwelling unit 2 —





— FIRST FLOOR —

3 BEDROOMS — 3 BEDROOMS

LOCAL RESIDENTS



— SECOND FLOOR —

2 BEDROOMS — MIXED RESIDENCE

3 BEDROOMS — TOURISTS

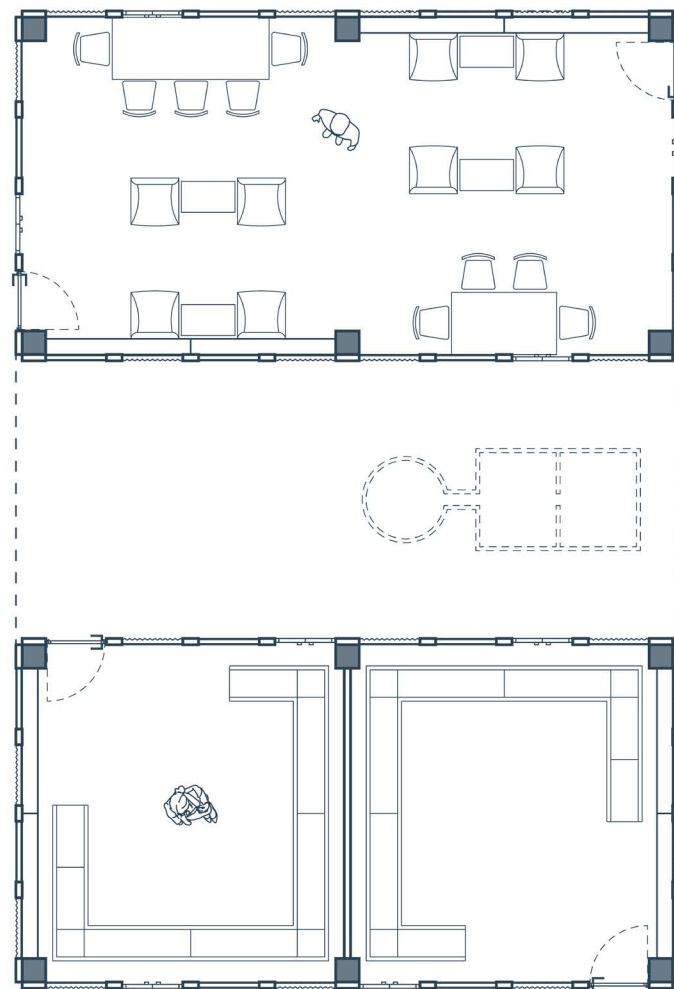
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— LIVING AREA —

— dwelling unit 3 —

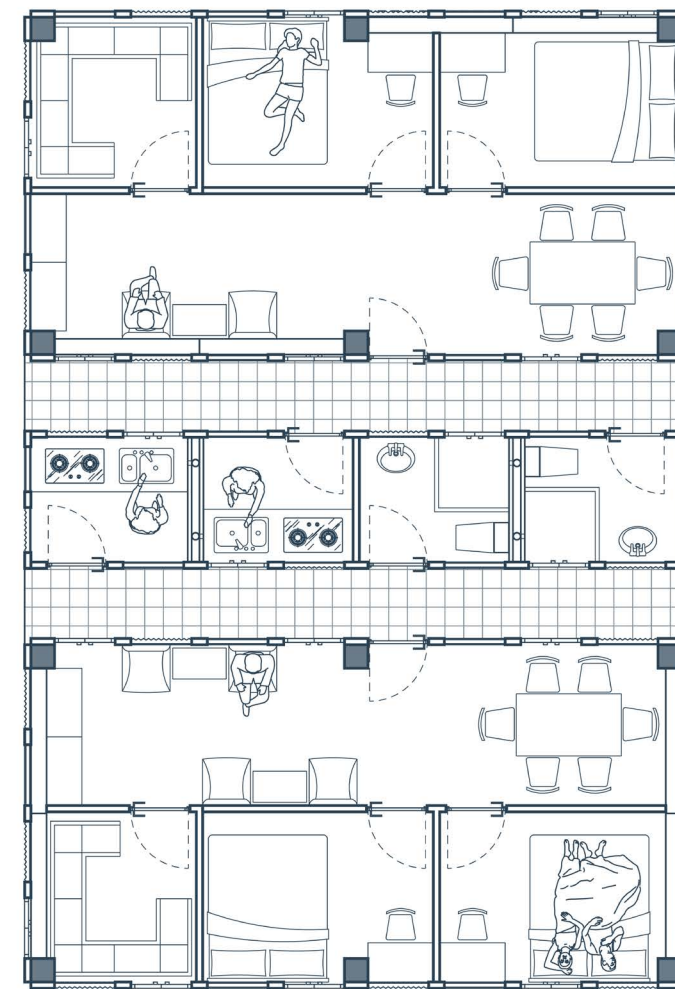




— GROUND FLOOR —

STORAGE / COMMUNAL AREA

104 m²

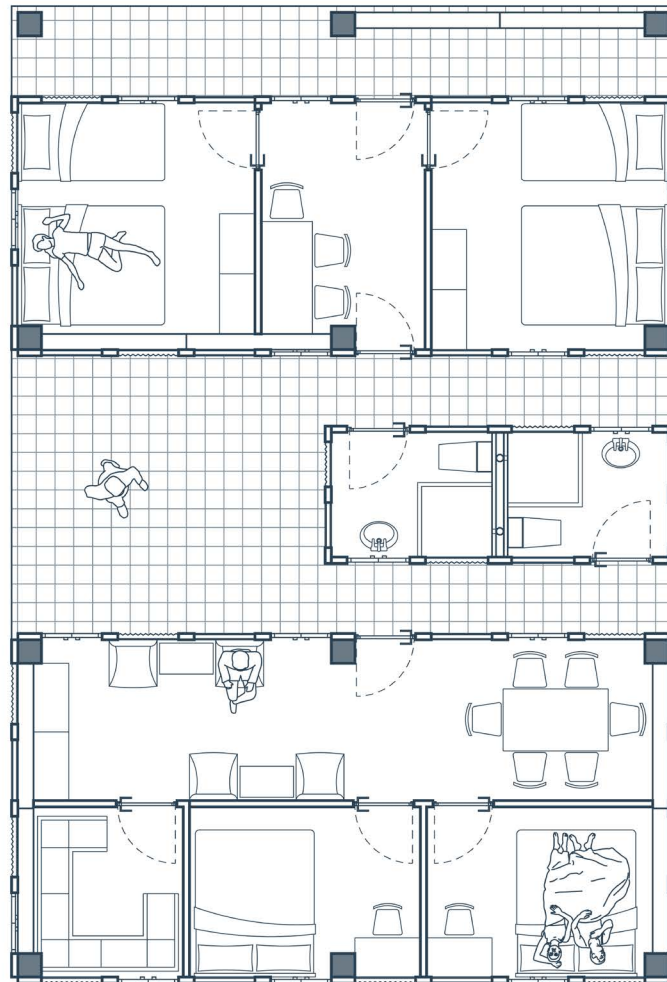


— FIRST FLOOR —

2 BEDROOMS — 2 BEDROOMS

LOCAL RESIDENTS

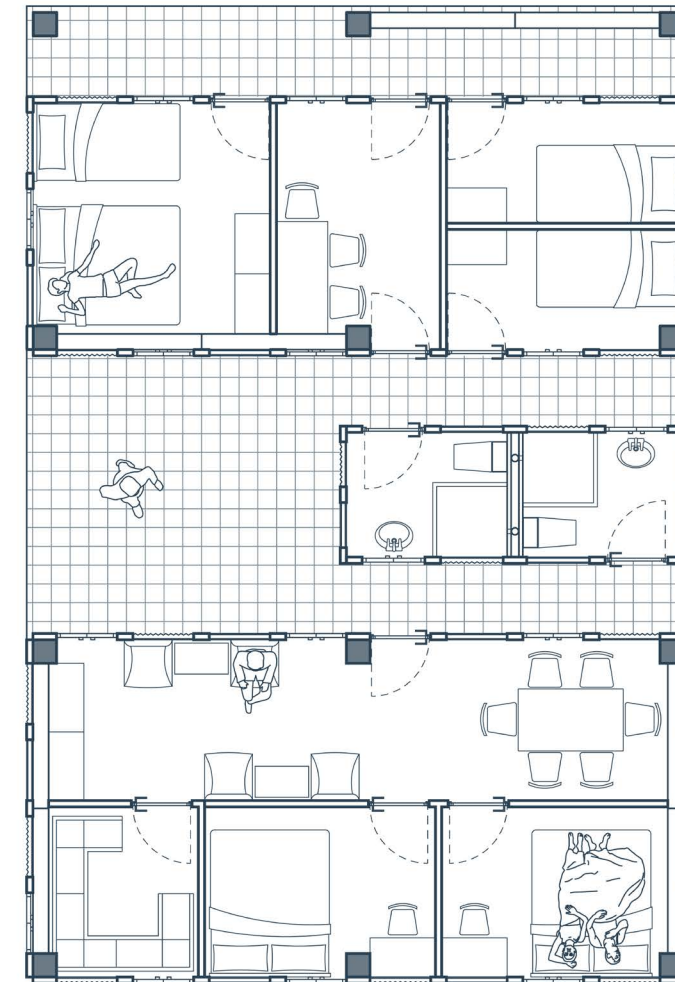
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— SECOND FLOOR —

2 BEDROOMS — TOURISTS

2 BEDROOMS — TOURISTS



— SECOND FLOOR —

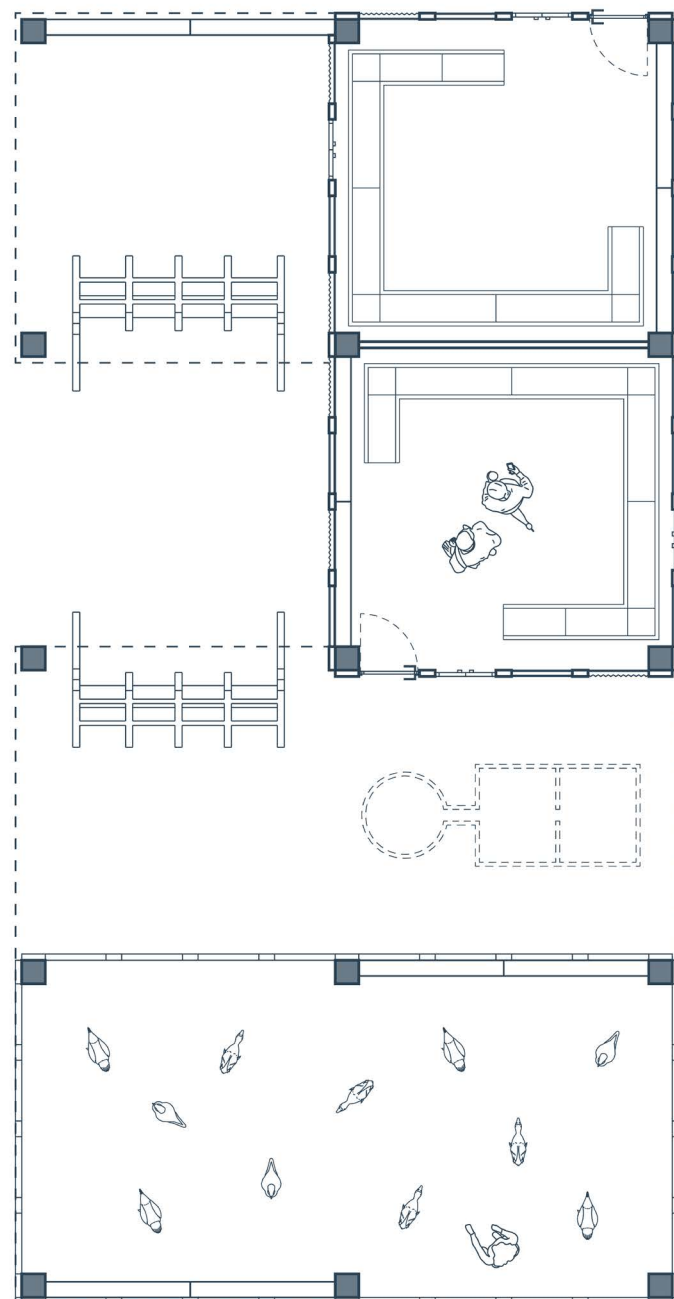
3 BEDROOMS — TOURISTS

2 BEDROOMS — TOURISTS

— scale: 1:50 —

— dwelling unit 4 —

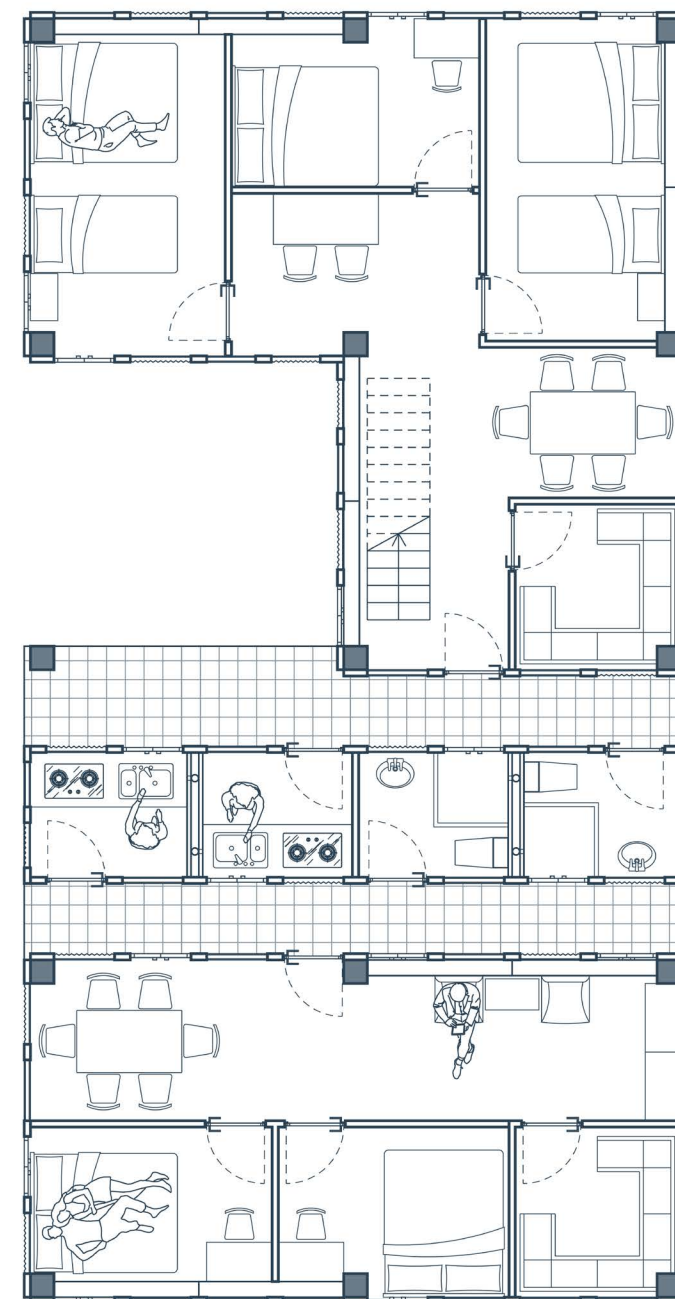




— GROUND FLOOR —

STORAGE / LIVESTOCK

124 m²

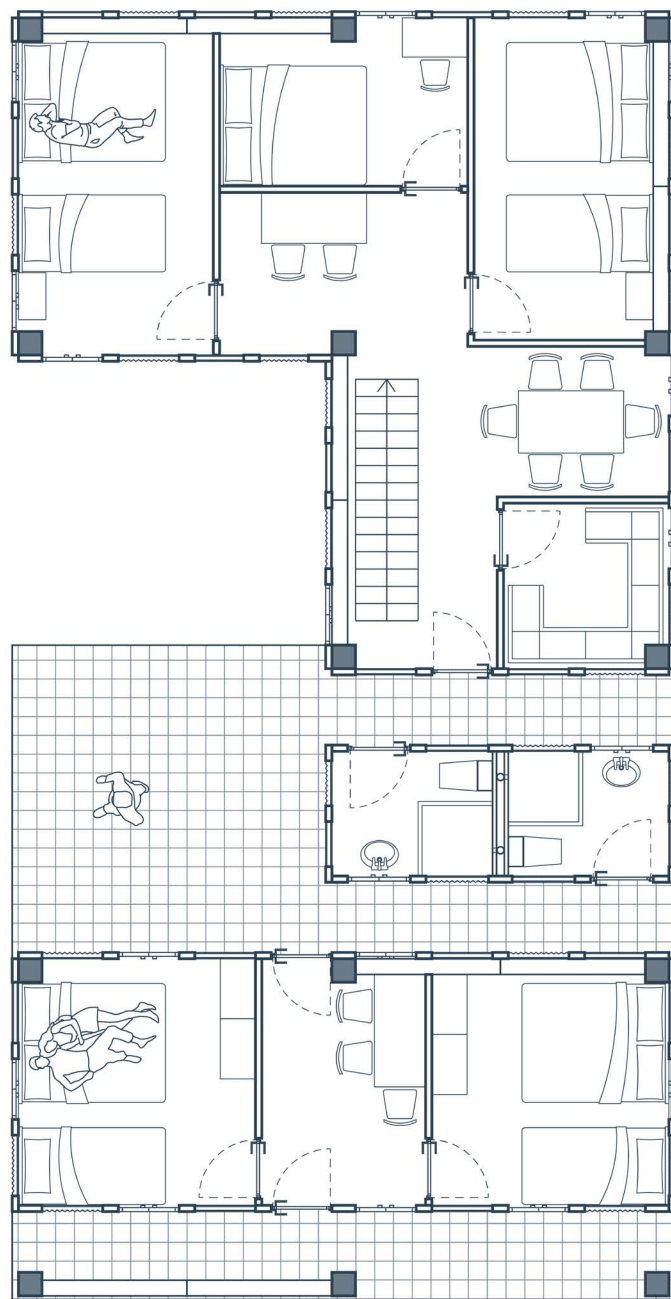


— FIRST FLOOR —

3 BEDROOMS — 2 BEDROOMS

LOCAL RESIDENTS

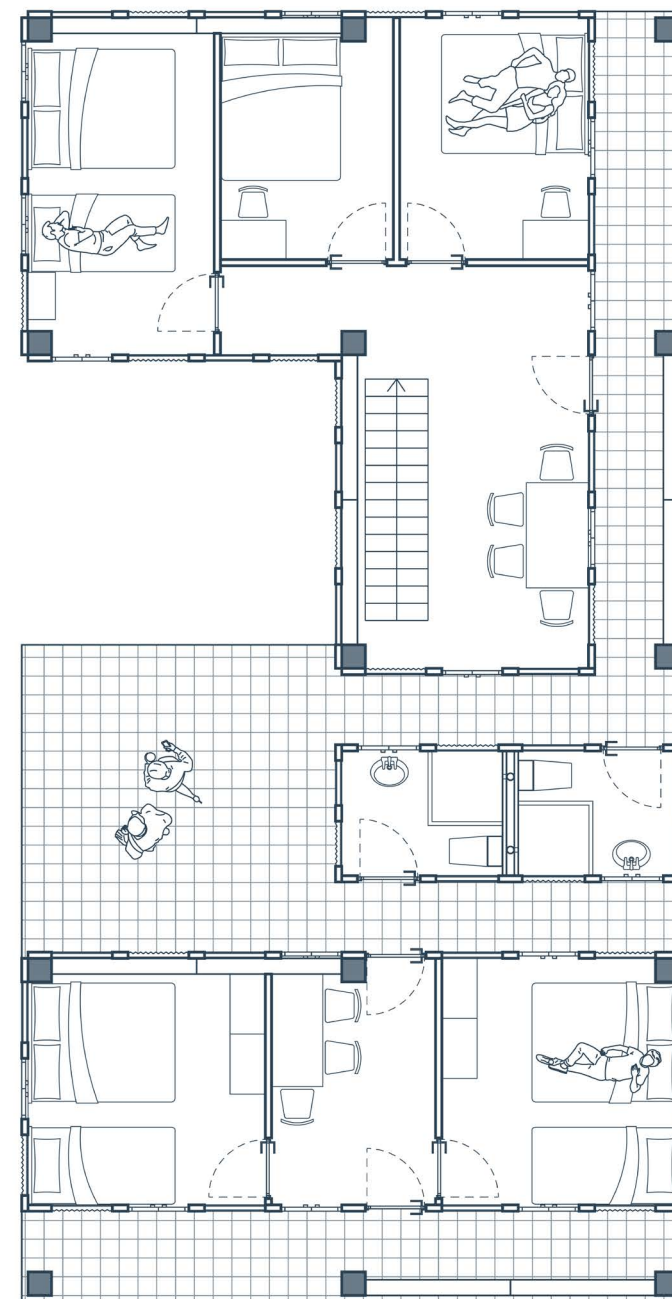
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— SECOND FLOOR —

3 BEDROOMS — MIXED RESIDENCE

2 BEDROOMS — TOURISTS

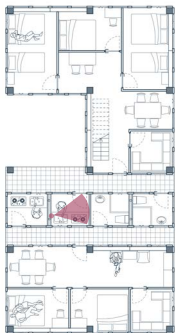


— SECOND FLOOR —

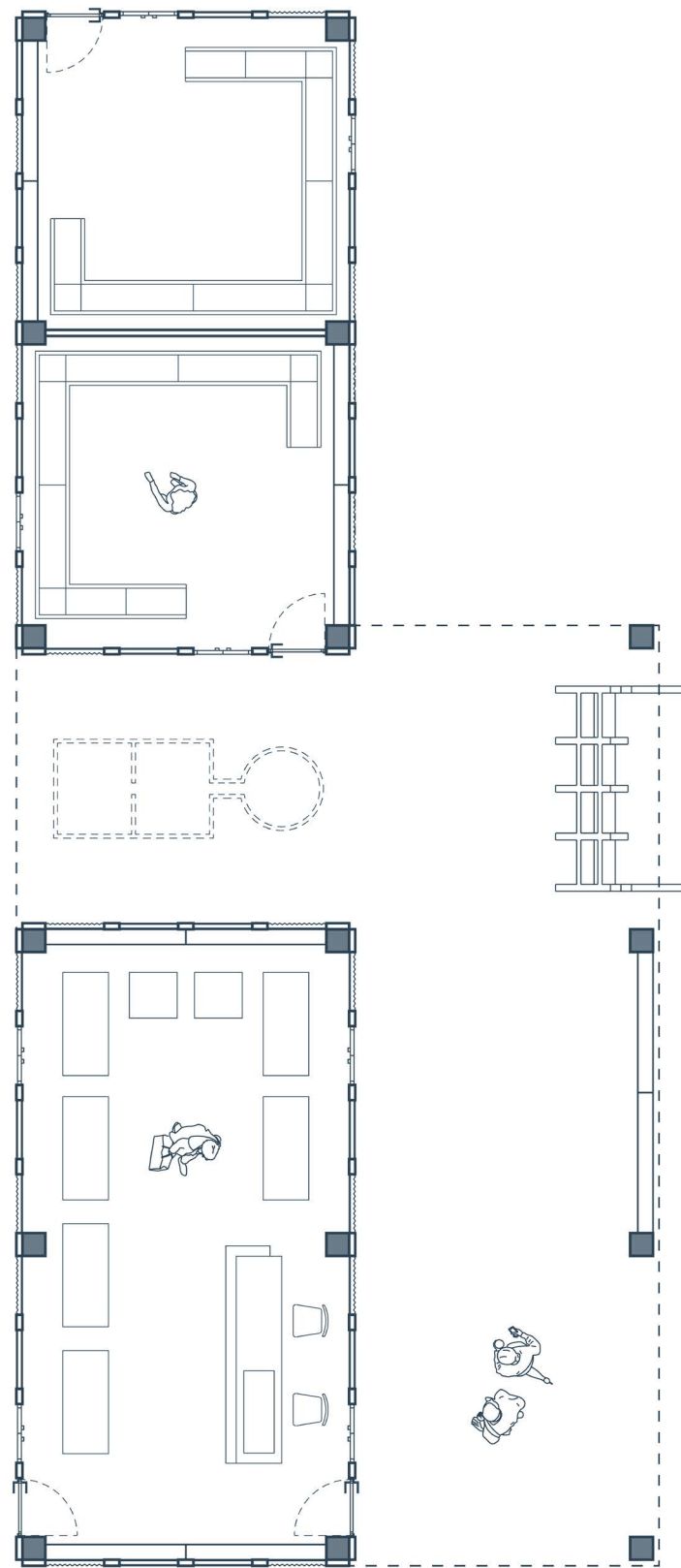
3 BEDROOMS — MIXED RESIDENCE

2 BEDROOMS — TOURISTS

— scale: 1:50 —



— KITCHEN —



— GROUND FLOOR —

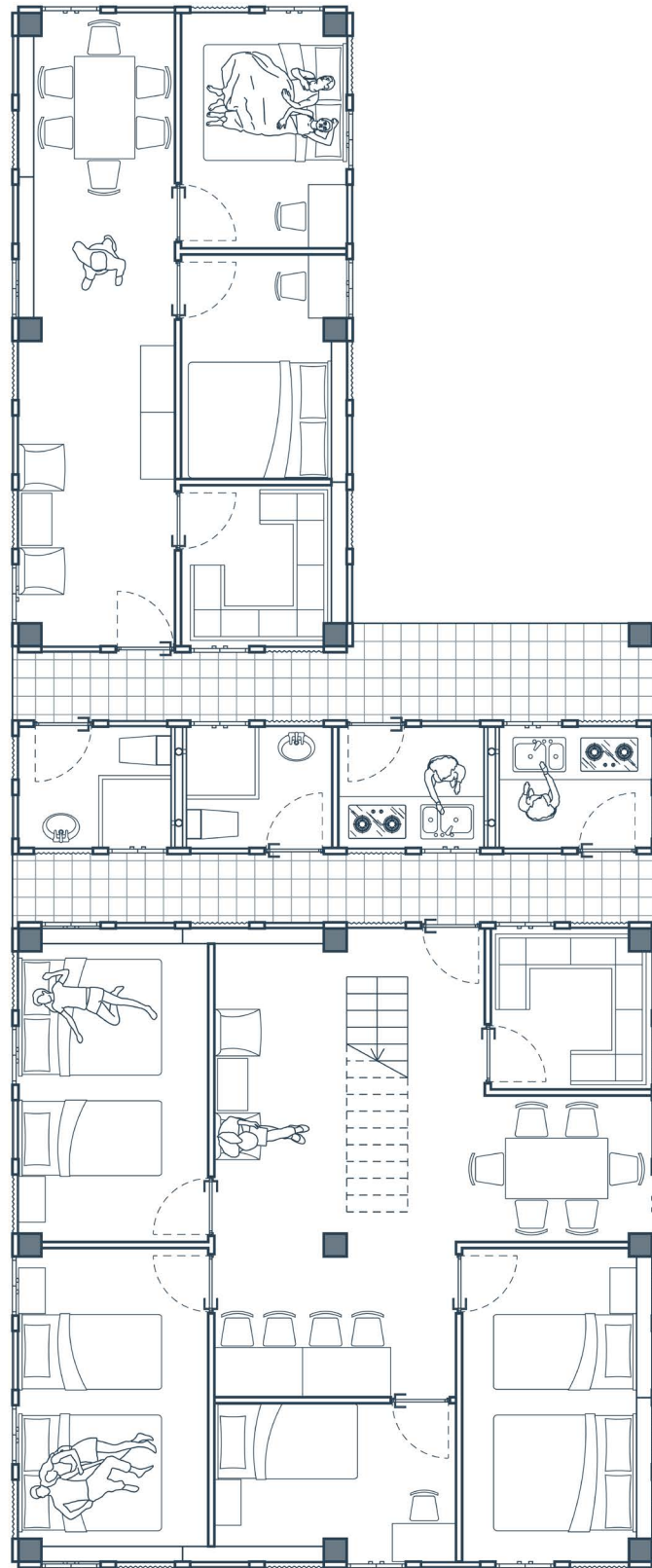
STORAGE / MARKET

140 m²

— scale: 1:50 —

— dwelling unit 5 —



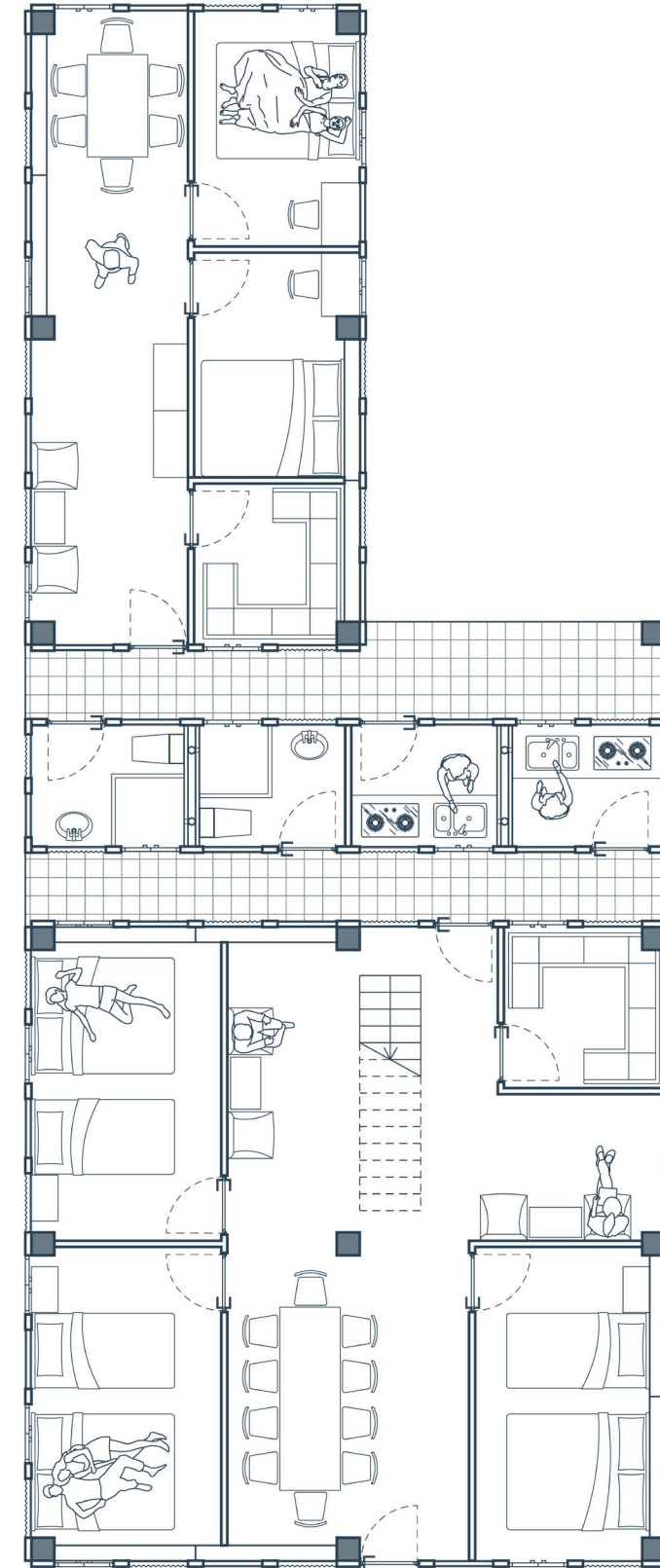


— FIRST FLOOR —

2 BEDROOMS — 4 BEDROOMS

LOCAL RESIDENTS

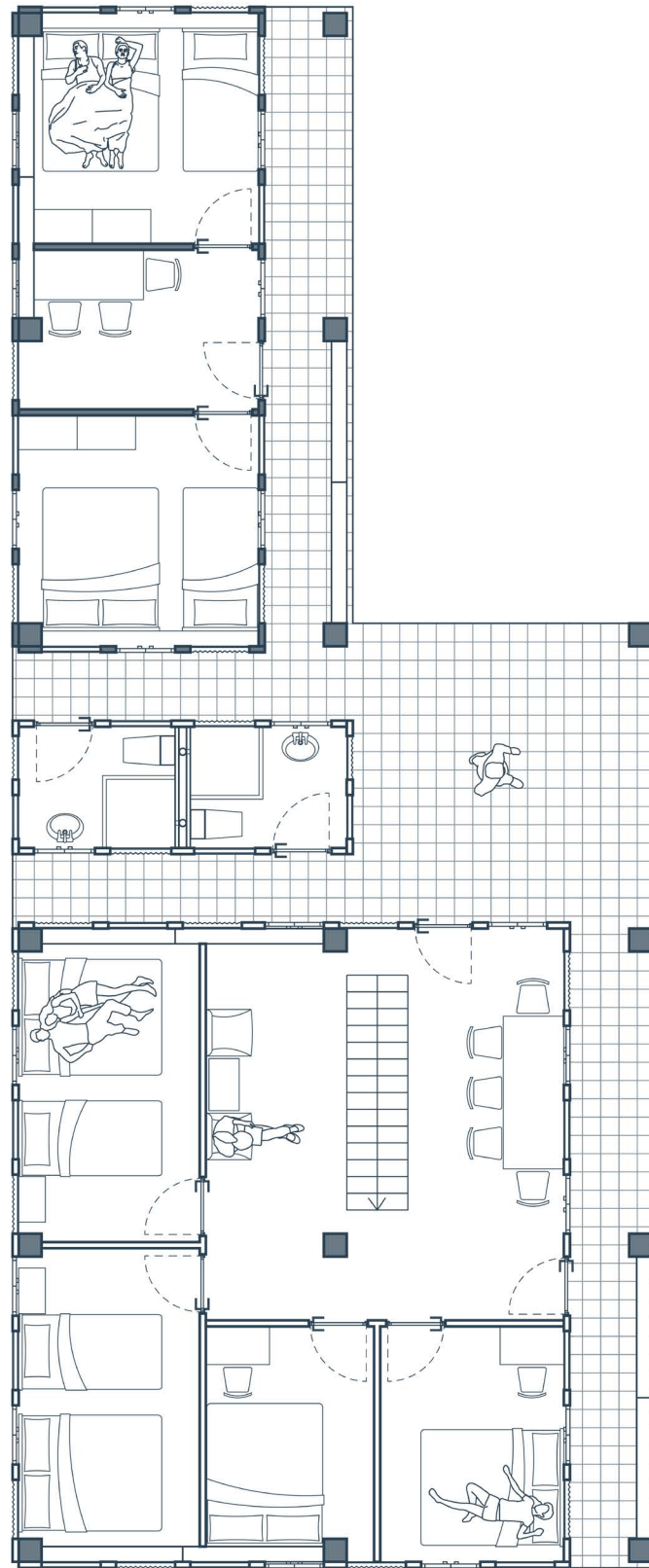
— scale: 1:50 —



— FIRST FLOOR —

2 BEDROOMS — 3 BEDROOMS

LOCAL RESIDENTS

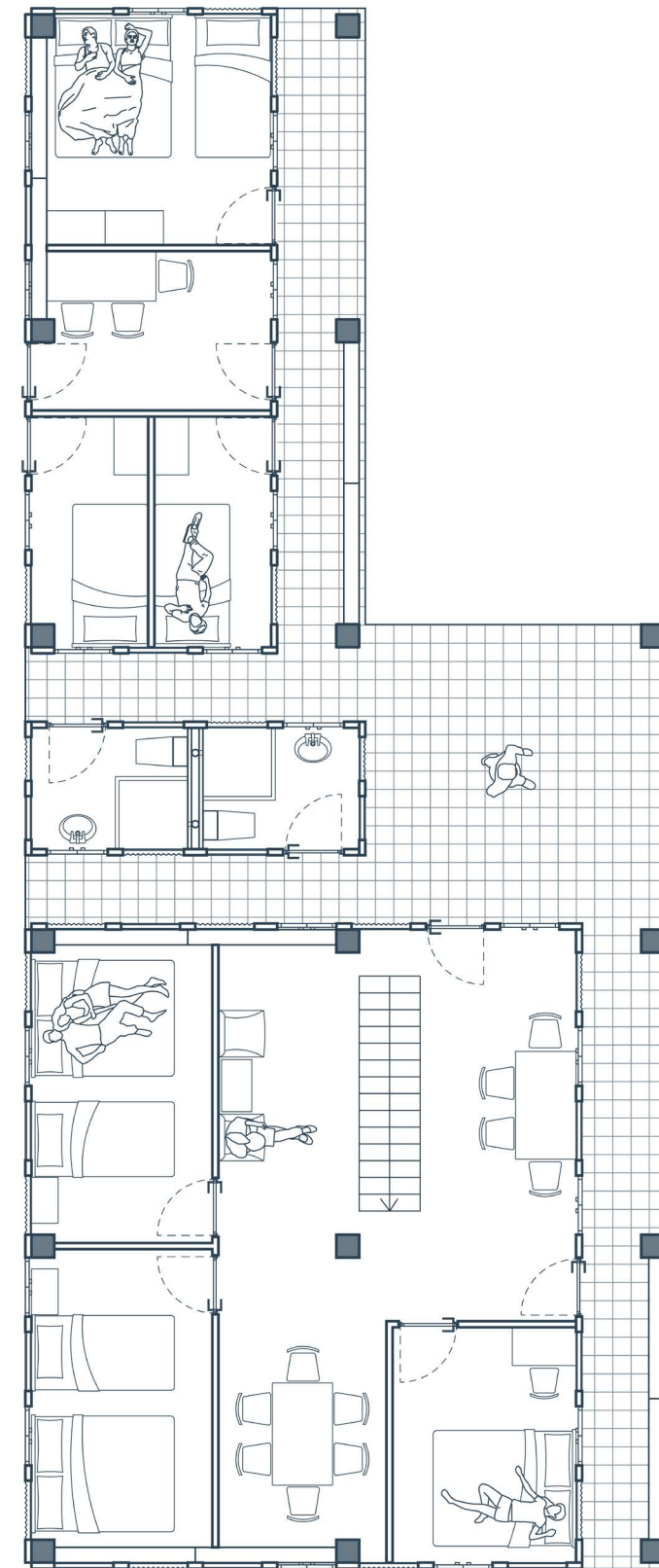


— SECOND FLOOR —

2 BEDROOMS — TOURISTS

4 BEDROOMS — MIXED RESIDENCE

— scale: 1:50 —



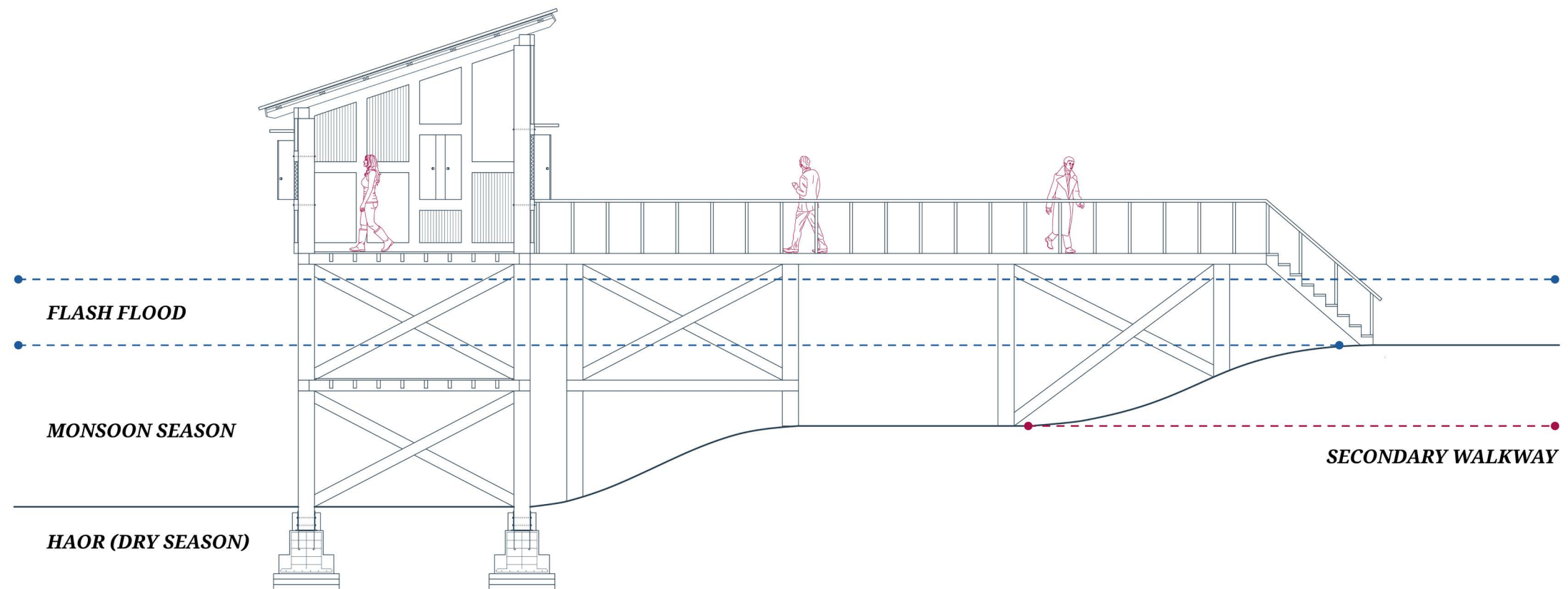
— SECOND FLOOR —

3 BEDROOMS — TOURISTS

3 BEDROOMS — MIXED RESIDENCE

— livelihood unit 1 —

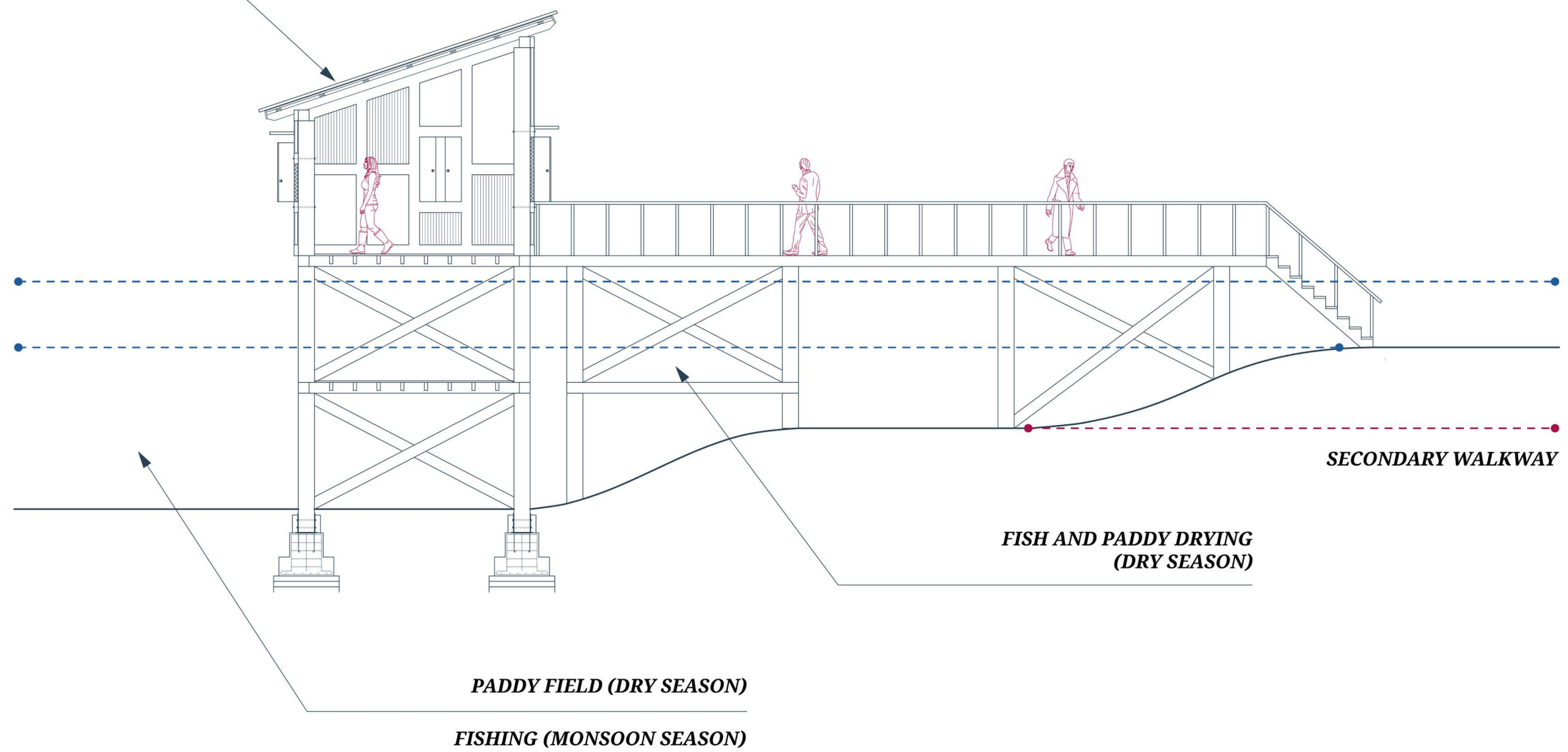




— HAOR AREA WATER LEVEL —

1:100

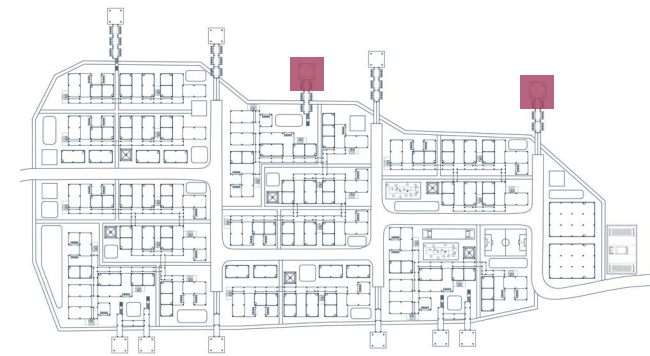
**VIEWPOINT &
COMMUNAL AREA**

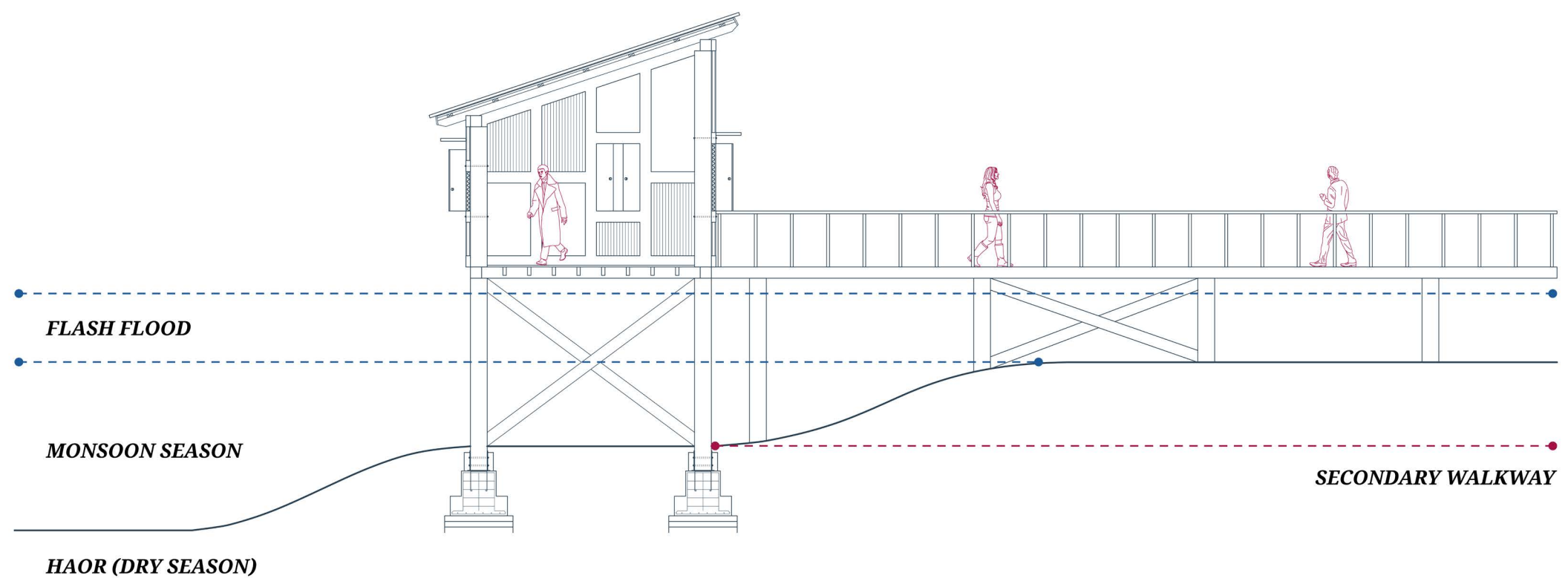


— HAOR AREA PROGRAM —

1:100

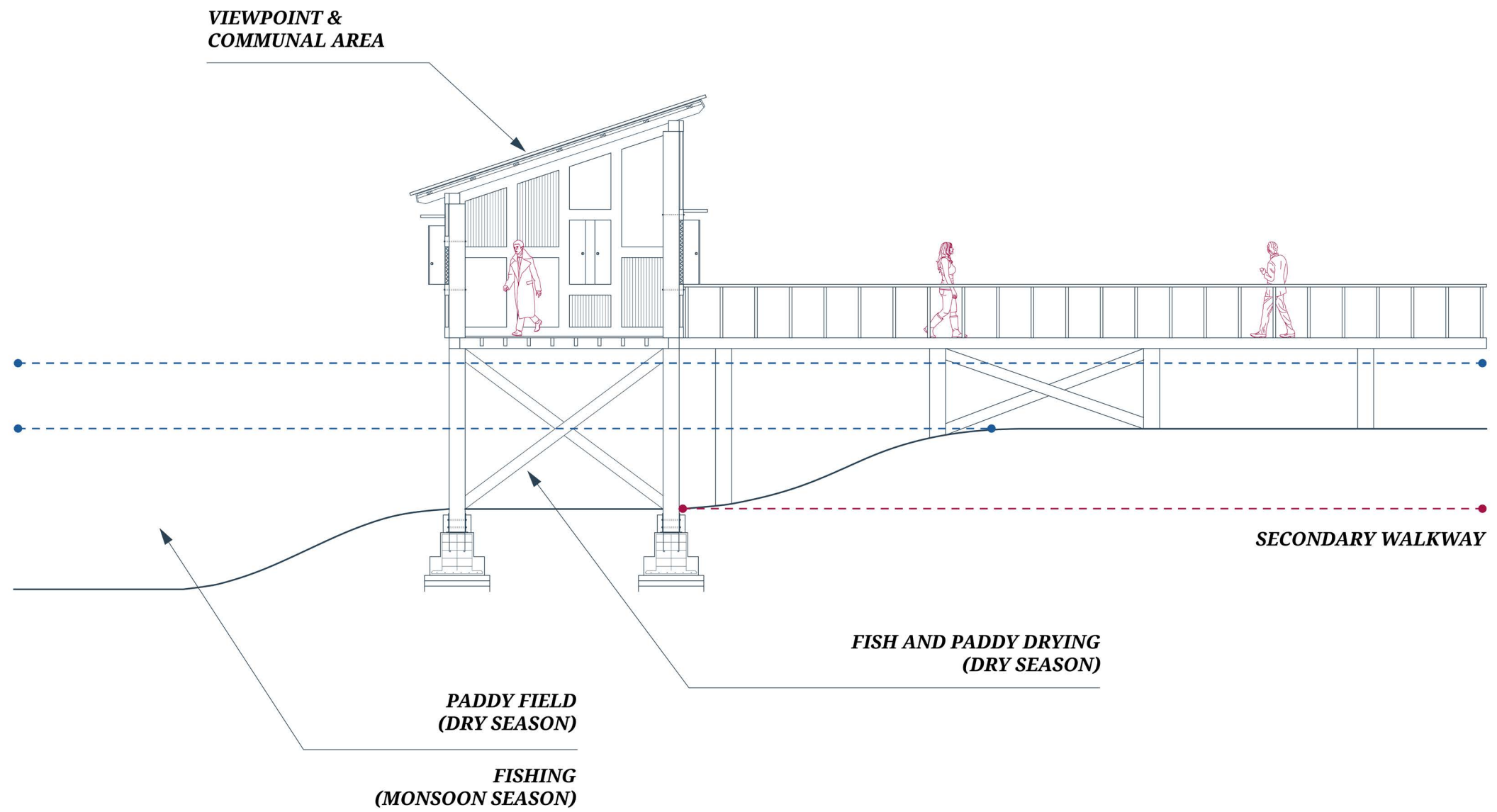
— livelihood unit 2 —





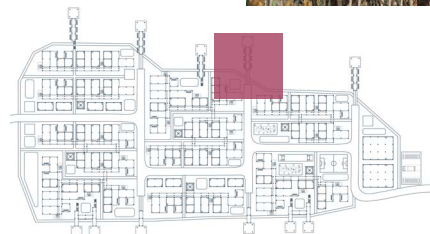
— HAOR AREA WATER LEVEL —

1:100



— HAOR AREA PROGRAM —

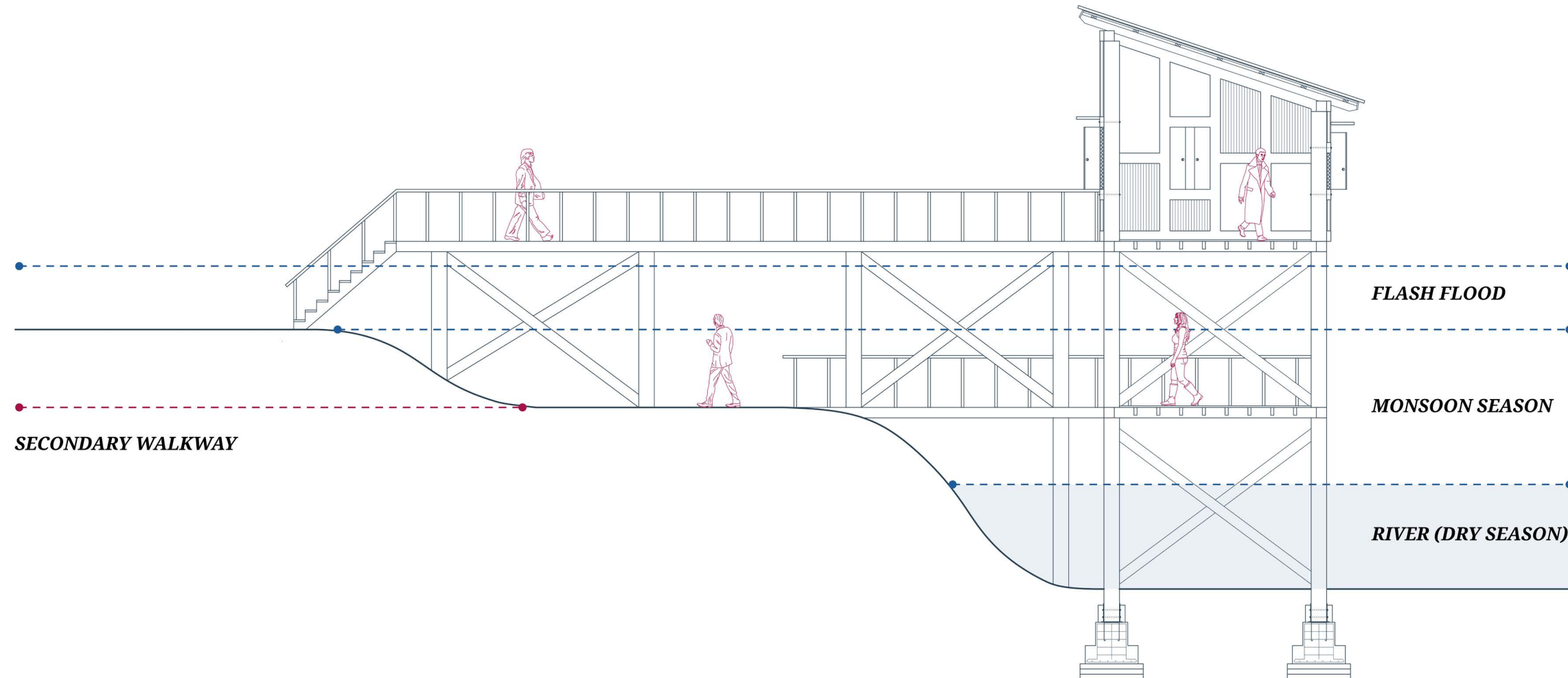
1:100



— HAOR AREA —

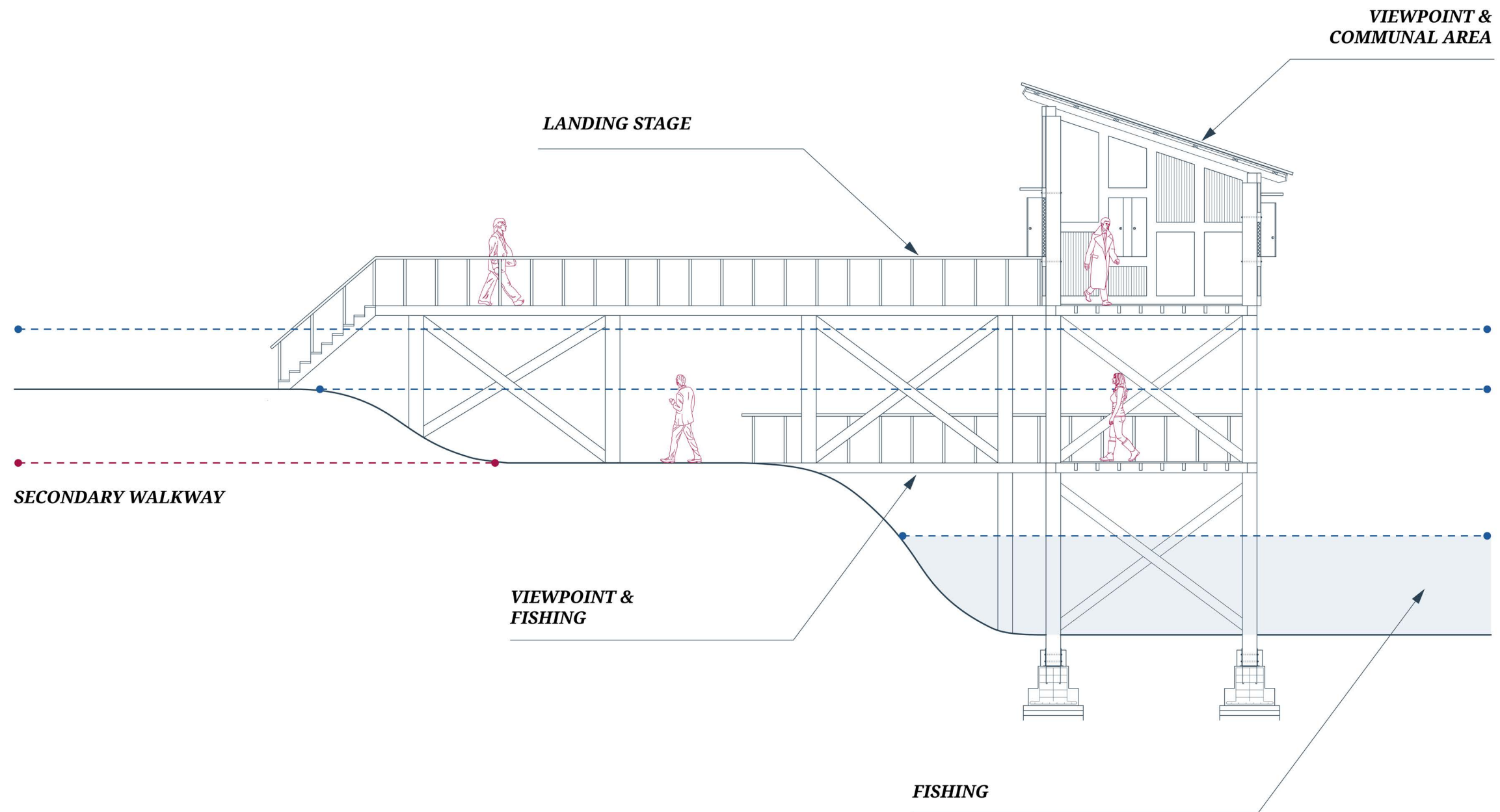
— livelihood unit 3 —





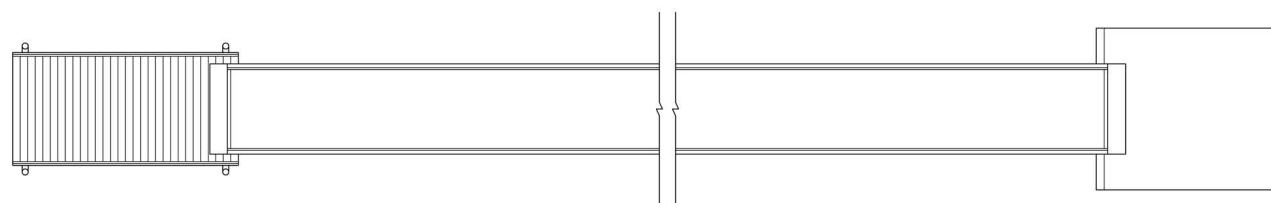
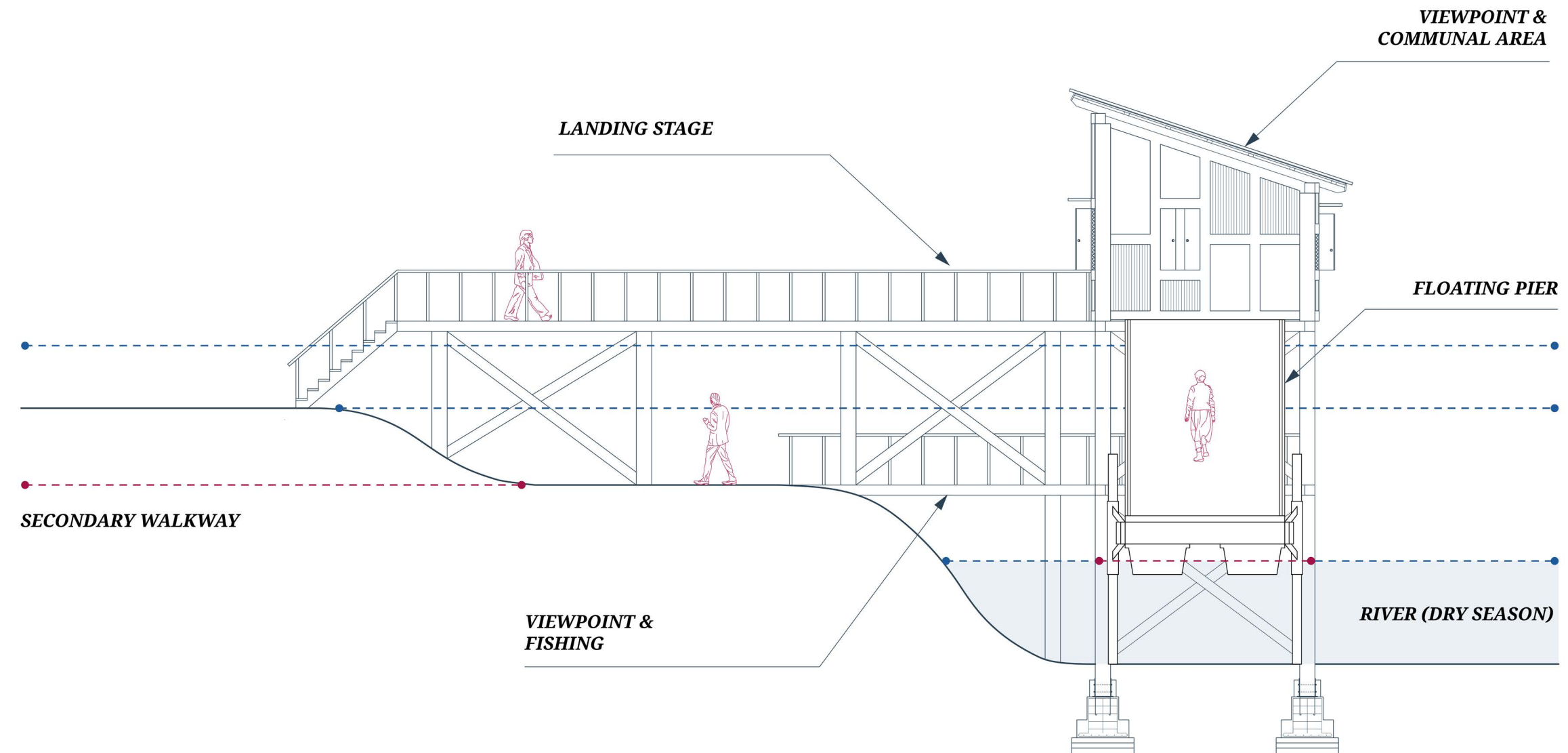
— RIVER SIDE WATER LEVEL —

1:100



— RIVER SIDE PROGRAM —

1:100

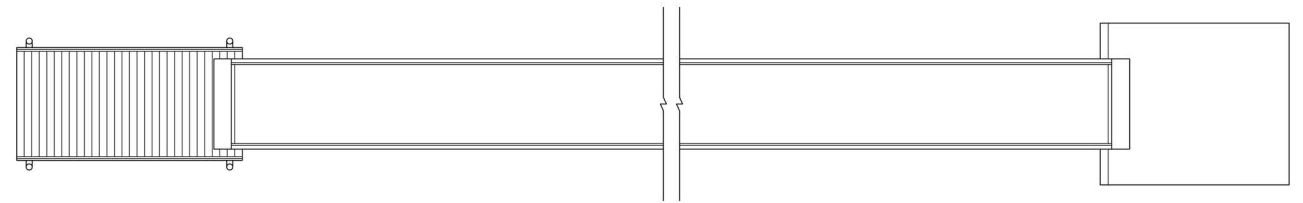
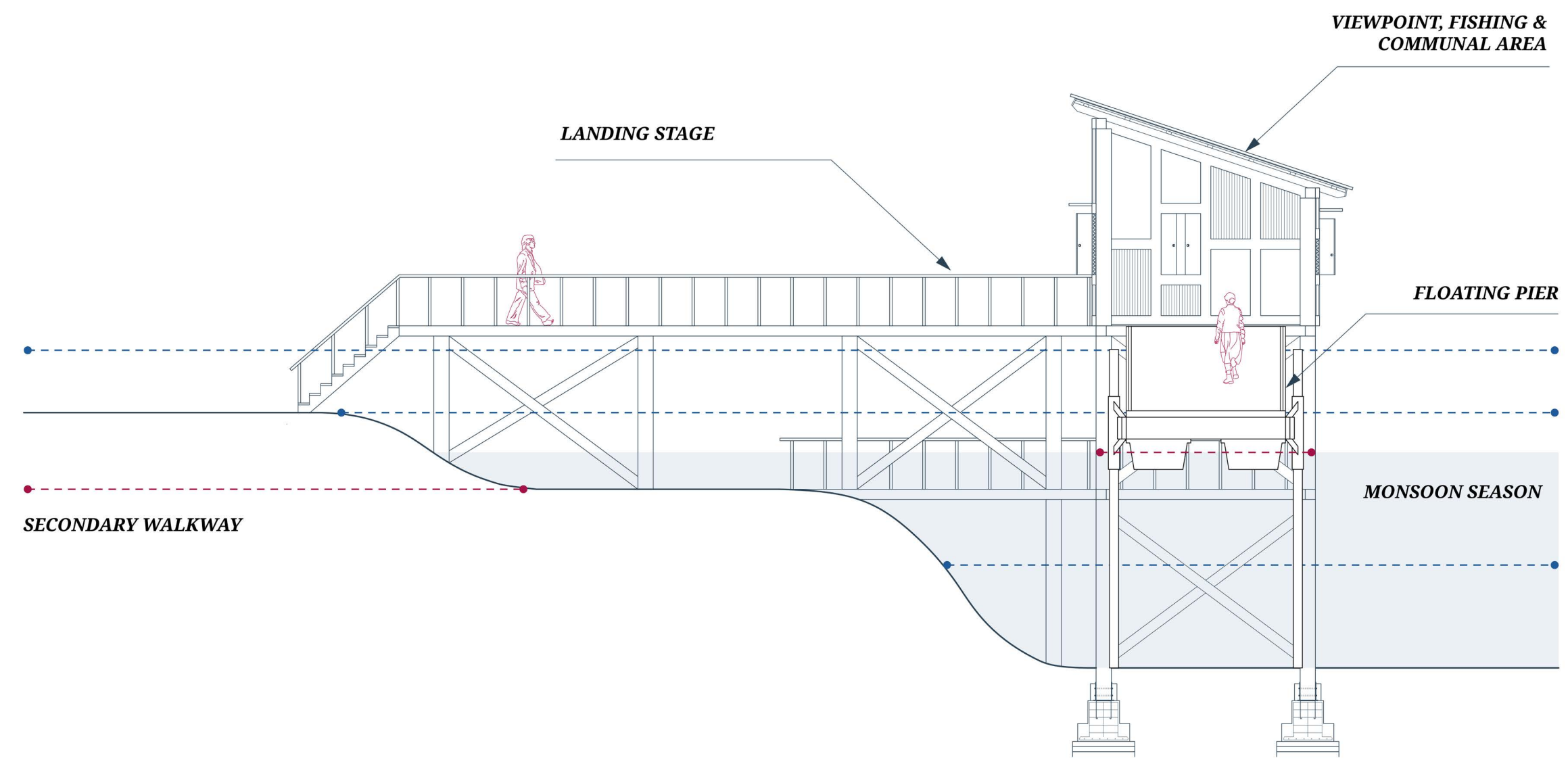


FLOATING PIER TOP VIEW

scale: 1:200

— RIVER SIDE FLOATING PIER (DRY SEASON) —

1:100



FLOATING PIER TOP VIEW

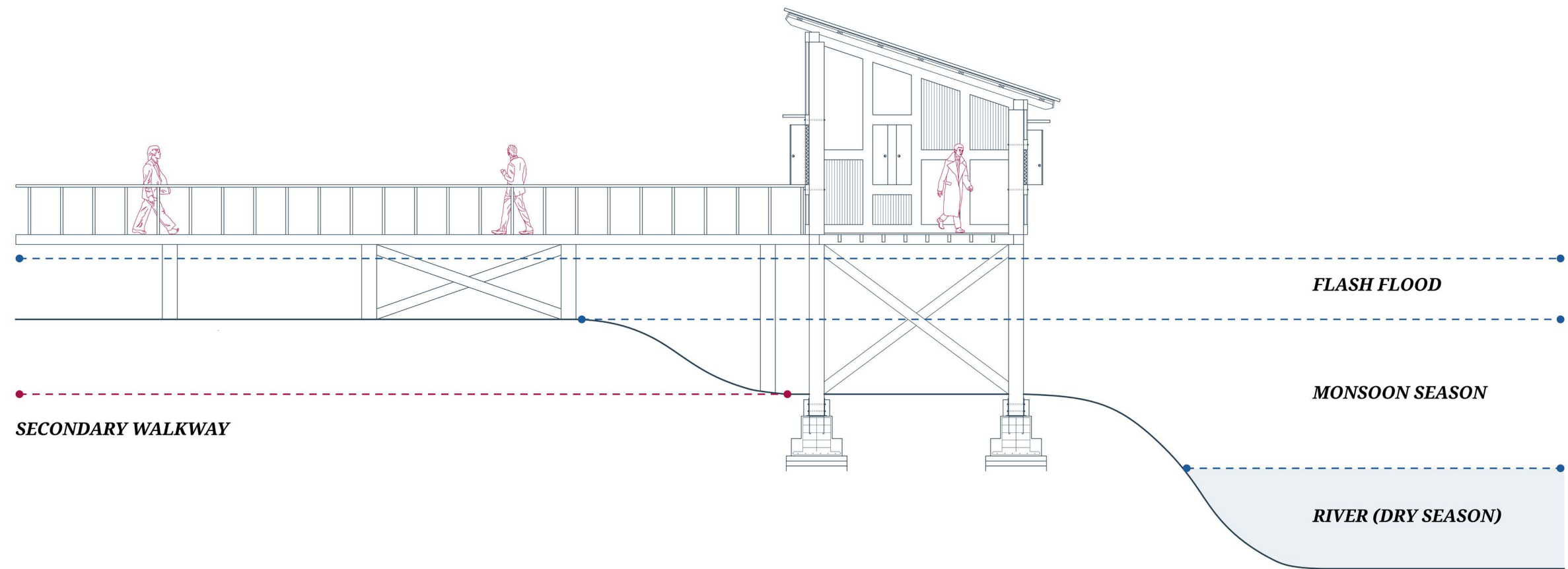
scale: 1:200

— RIVER SIDE FLOATING PIER (MONSOON SEASON) —

1:100

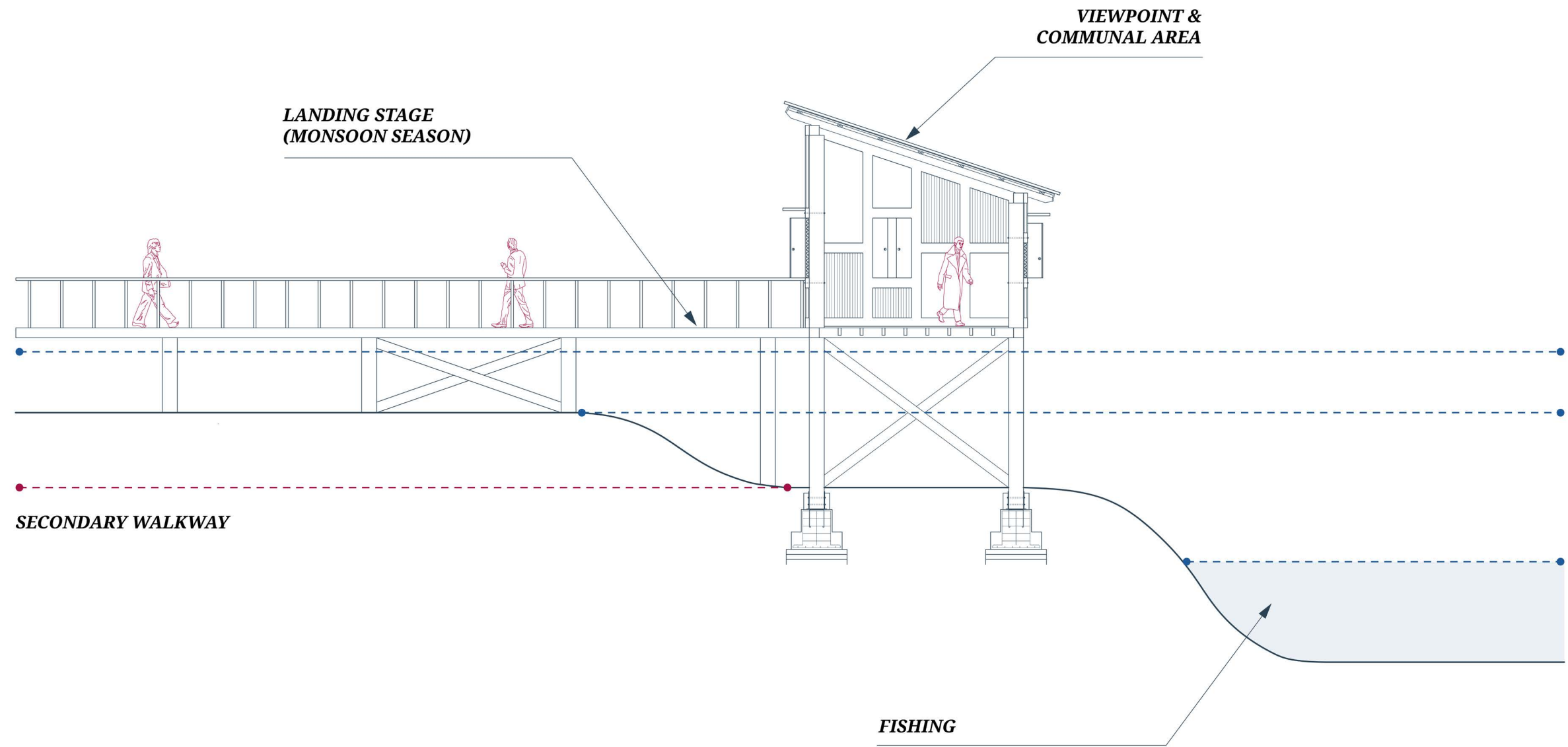
— livelihood unit 4 —





— RIVER SIDE WATER LEVEL —

1:100



— RIVER SIDE PROGRAM —

1:100

BUILDING TECHNOLOGY

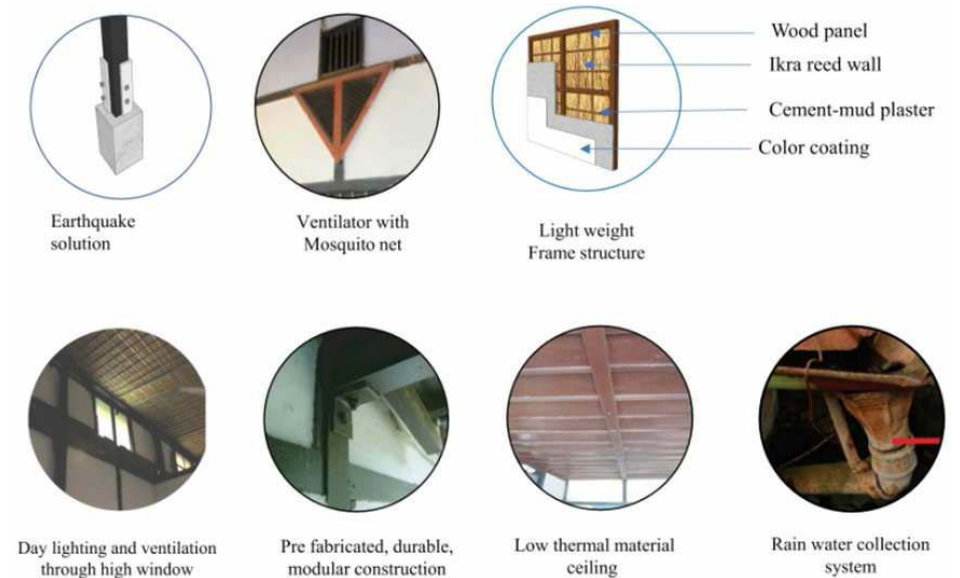
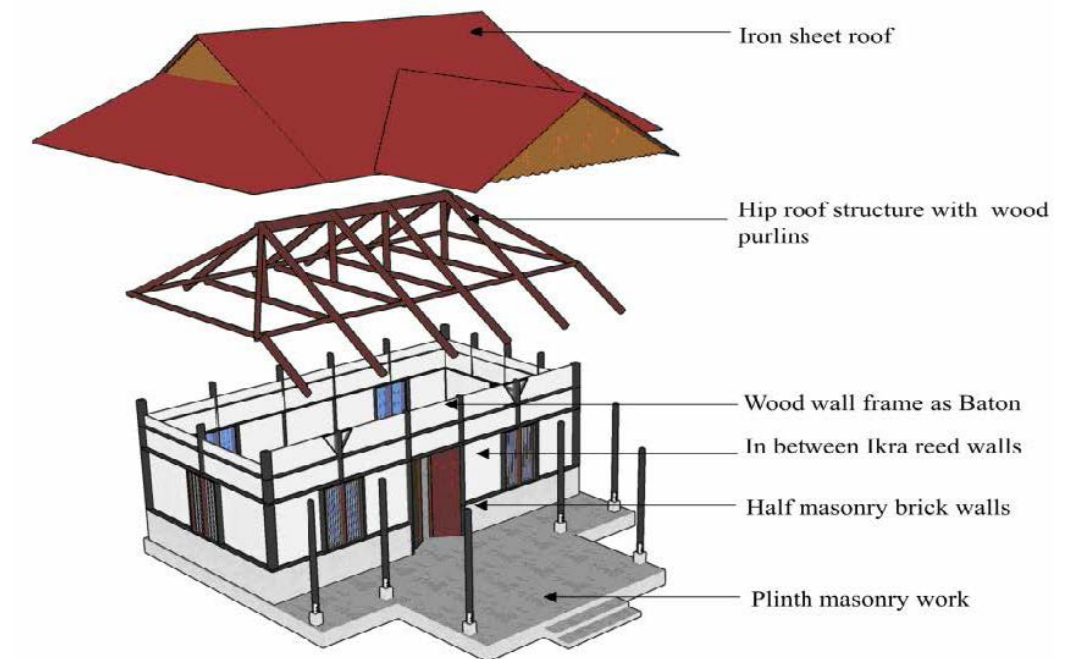
Material, Structure, Details

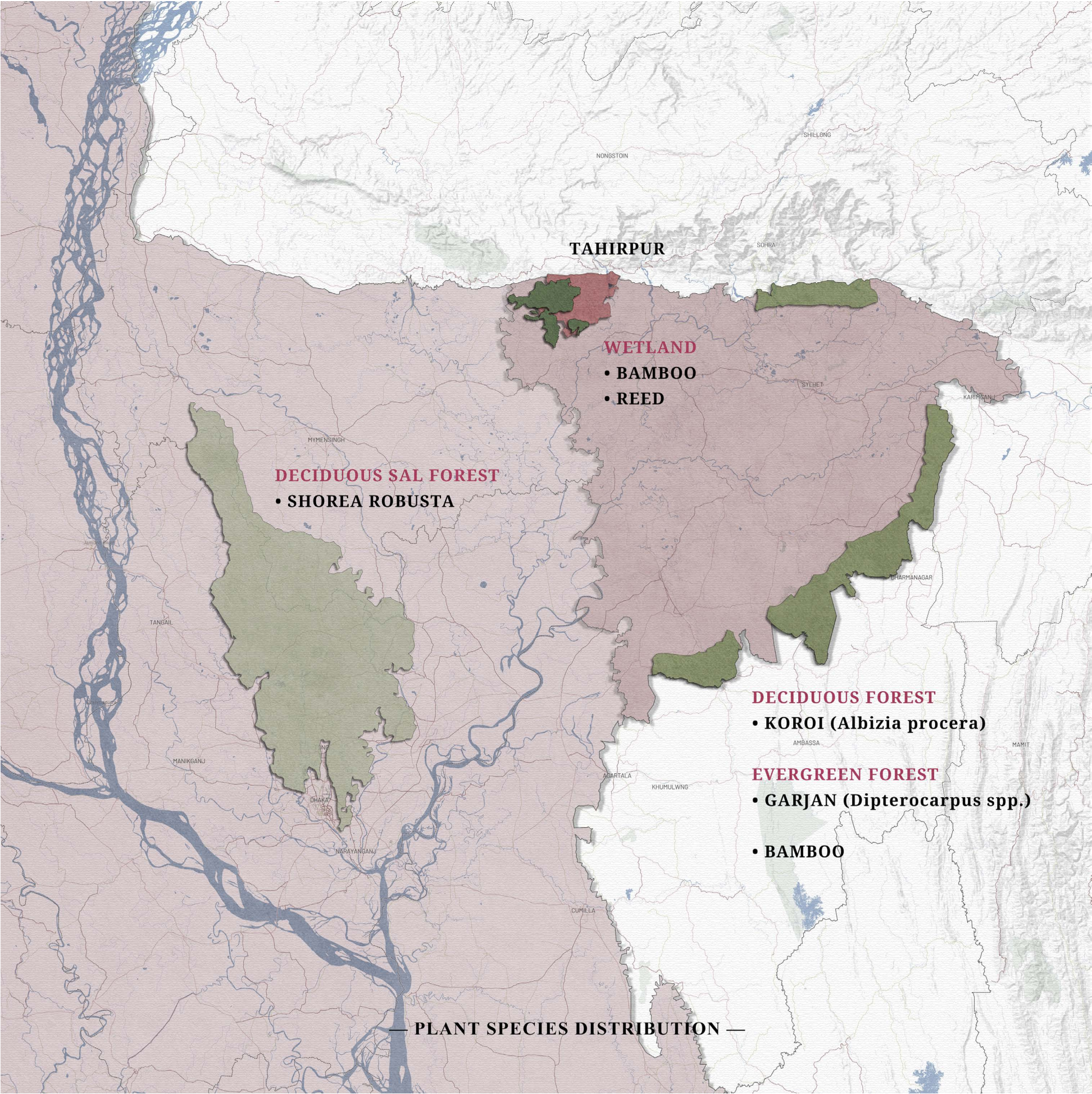
— material —

Tahirpur, Sylhet, Bangladesh



Modular Construction





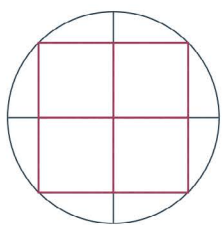
• SHOREA ROBUSTA

BEAM

COLUMN

BRACING

Load bearing structure

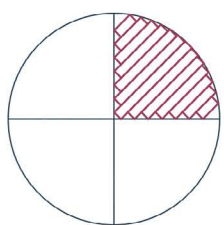


• Quarter sawn

• GARJAN
(DIPTEROCARPUS SPP.)

FLOORING

PLYWOOD

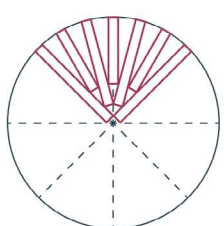


• Quarter sawn

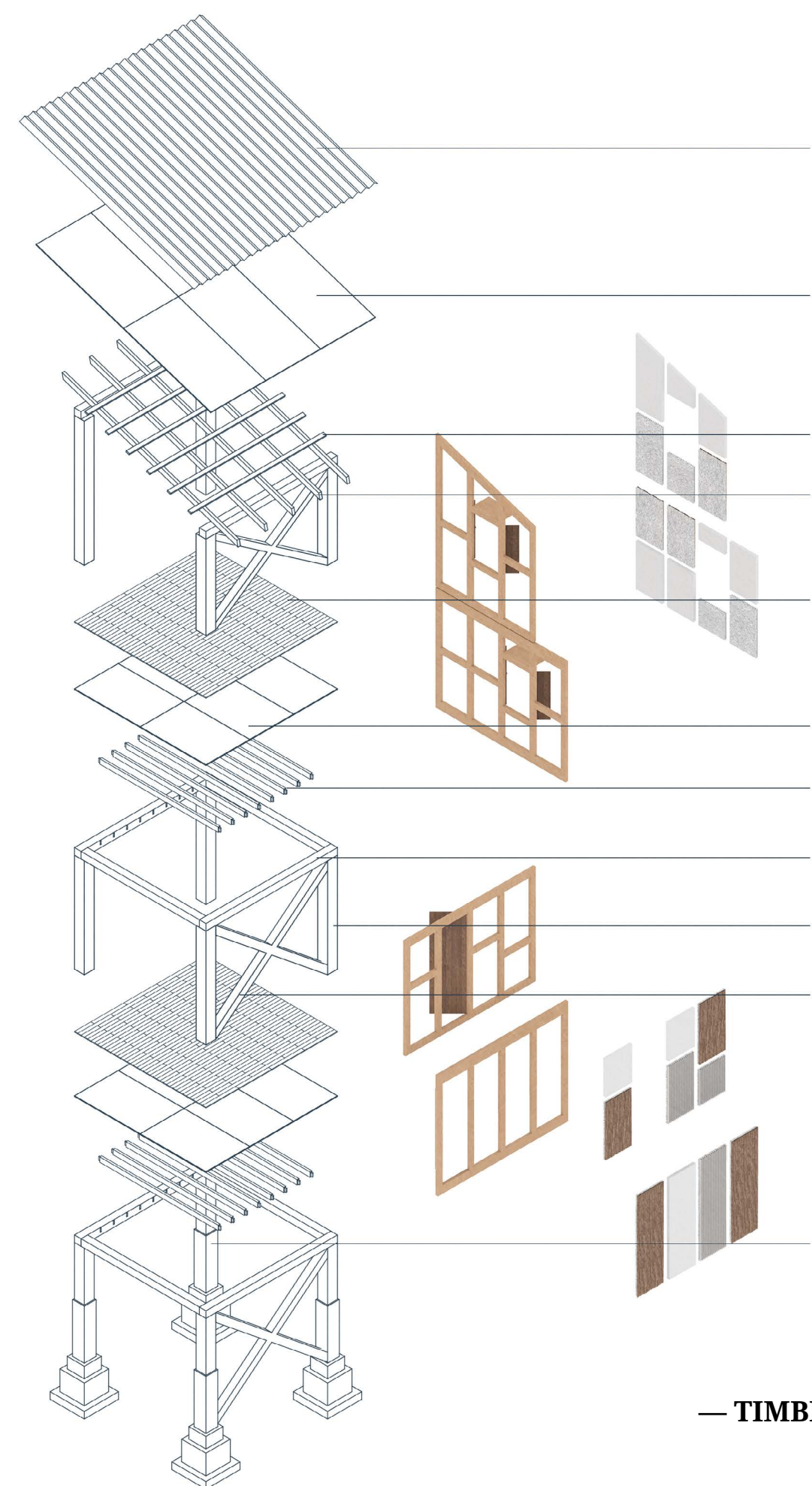
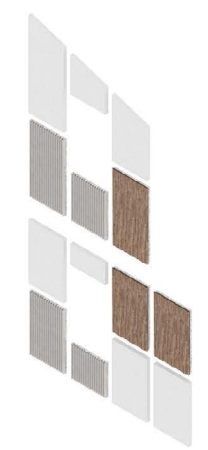
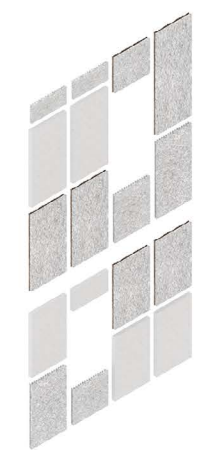
• KOROI
(ALBIZIA PROCERA)

FACADE

Lightweight structure



• Rift Sawn



CORRUGATED IRON SHEET

Waterproof membrane underneath

TIMBER PANEL

ROOF BATTEN

ROOF RAFTER

TIMBER FLOORING

Waterproof membrane underneath

SUBFLOOR

FLOOR JOIST

BEAM

COLUMN

BRACING

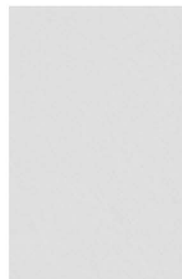
TIMBER PANEL WITH STEEL CONNECTORS

— TIMBER TYPES AND STRUCTURES —



①

Timber panel



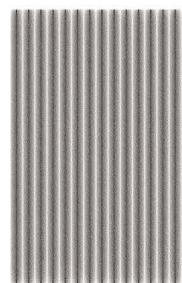
②

*Ikra reed panel
with plasterboard*



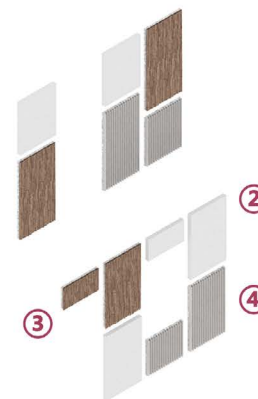
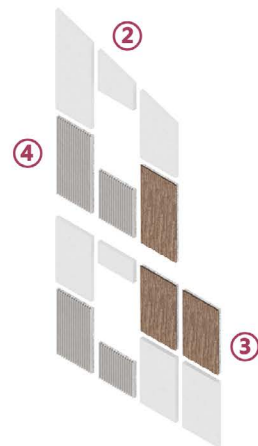
③

*Bamboo cladding
with plasterboard*



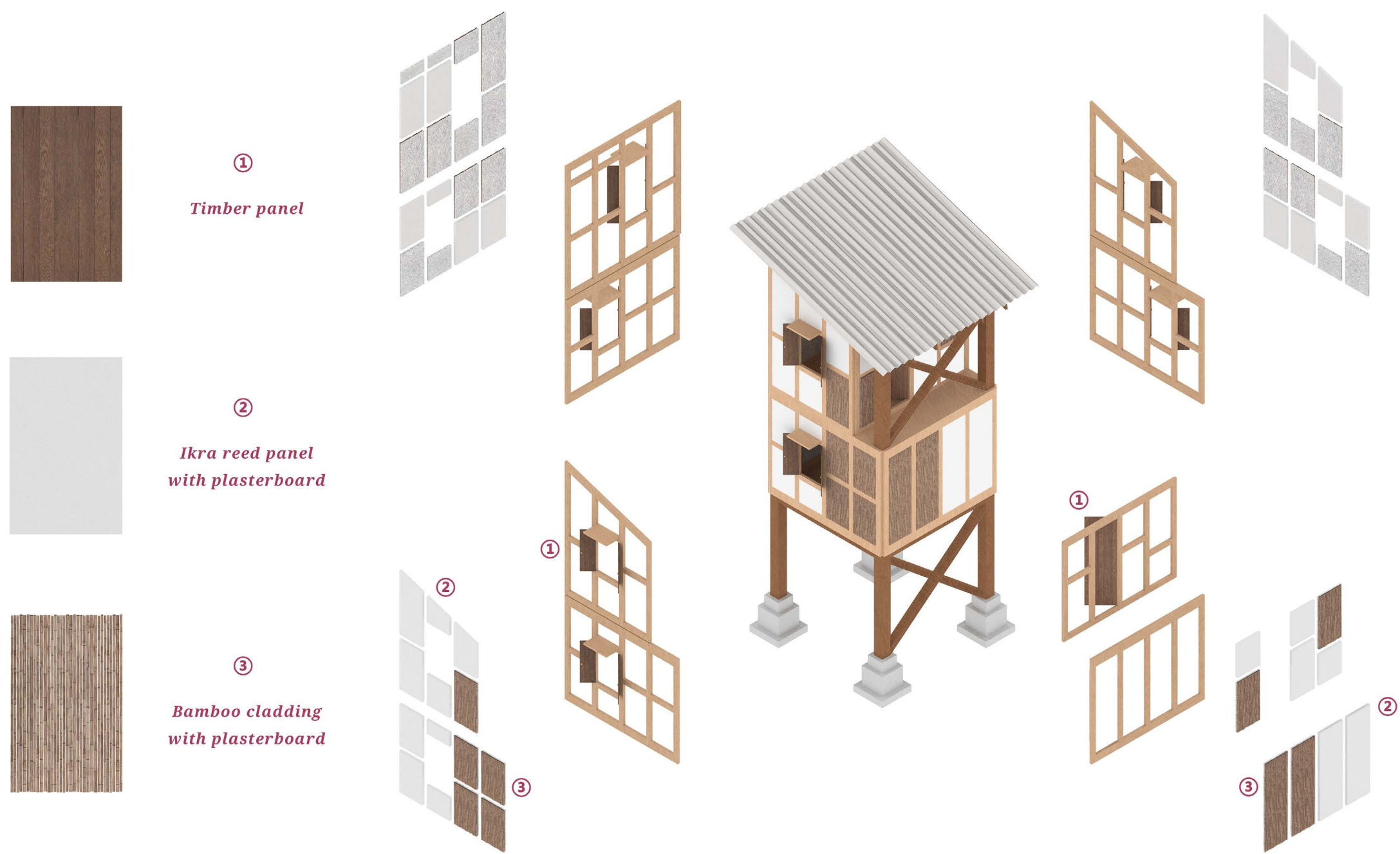
④

*Corrugated iron sheet
with plasterboard*



— FACADE MATERIAL (STRATEGY 1)—

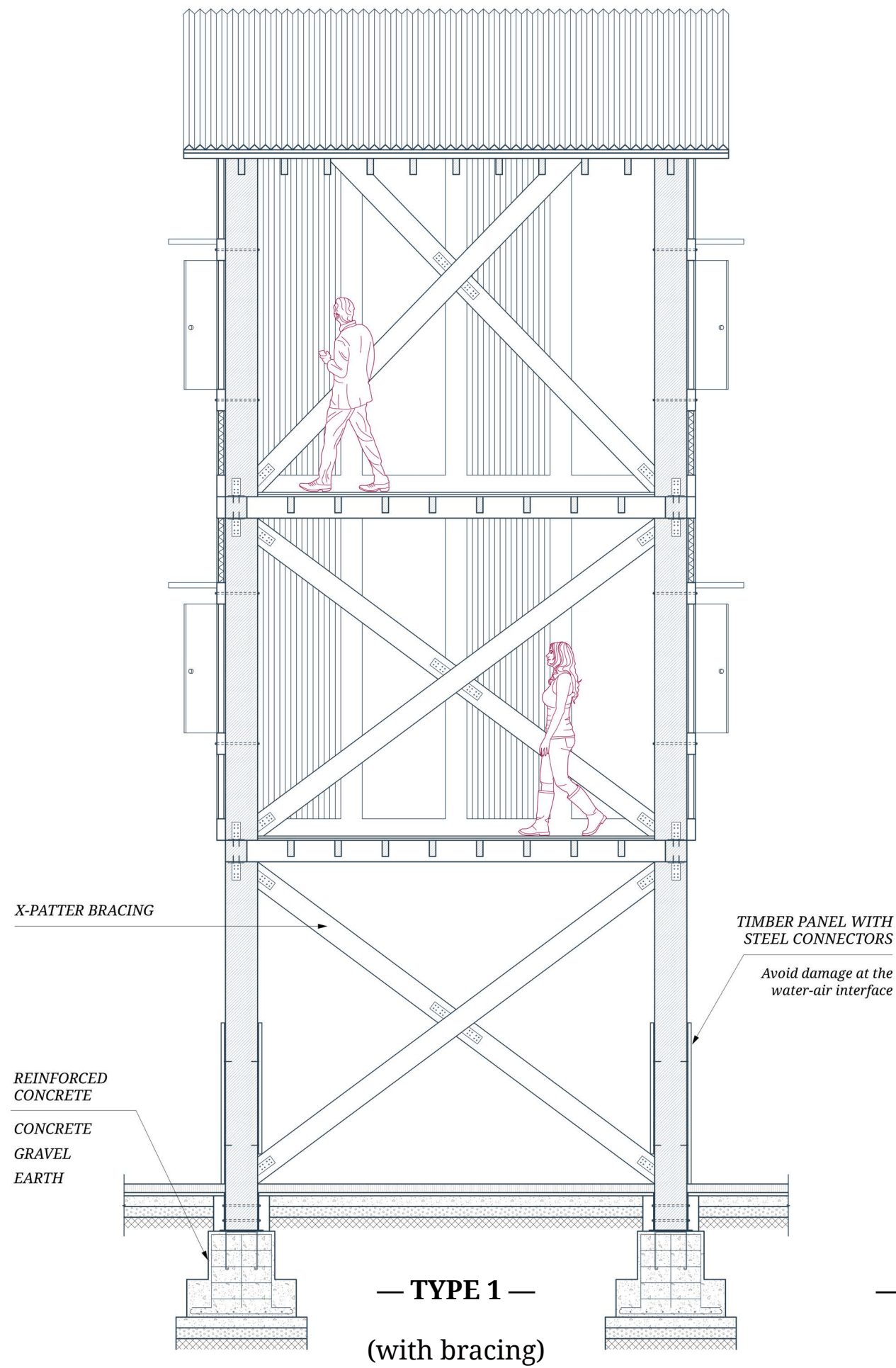
1:150



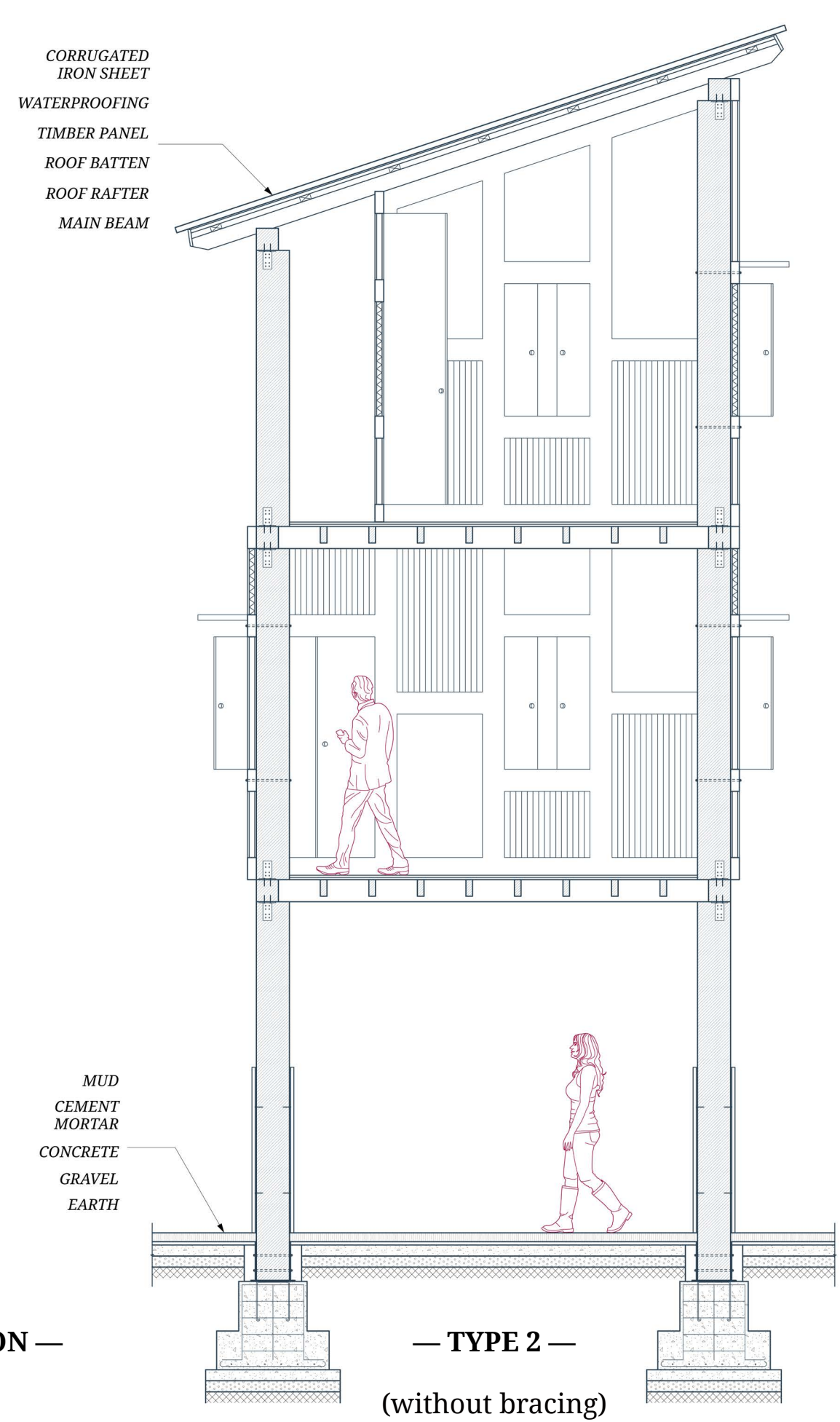
— FACADE MATERIAL (STRATEGY 2)—

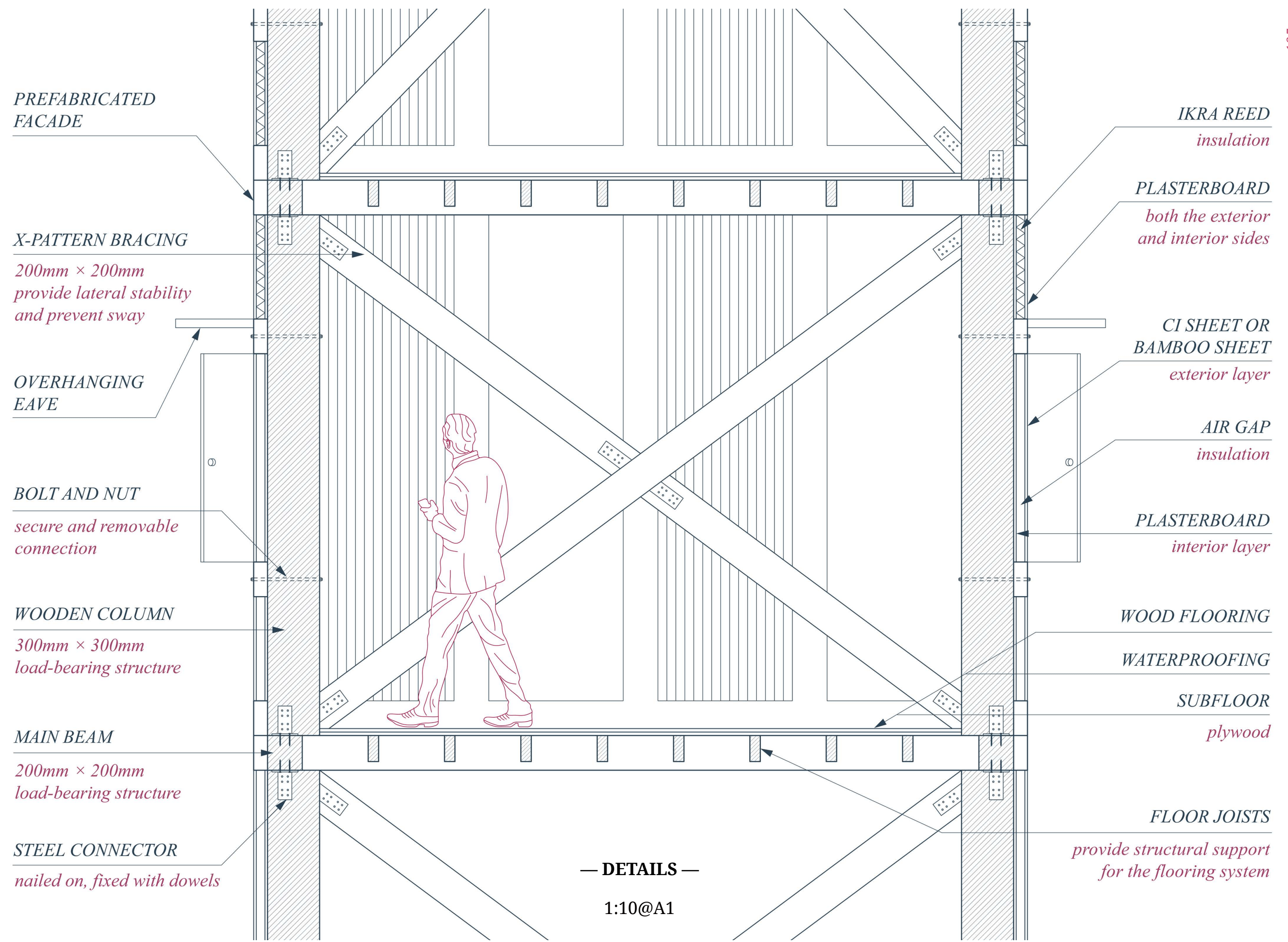
1:150

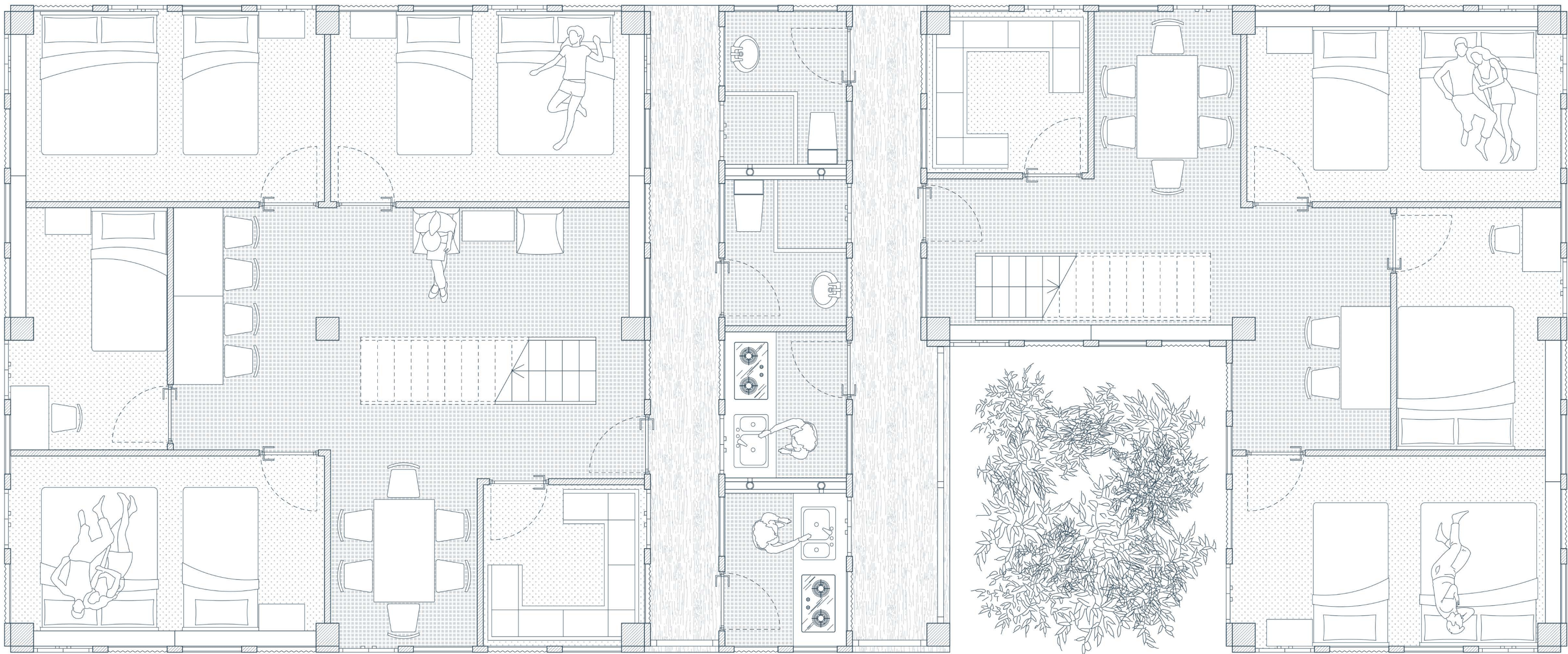
— structure —



— PART SECTION —
1:50

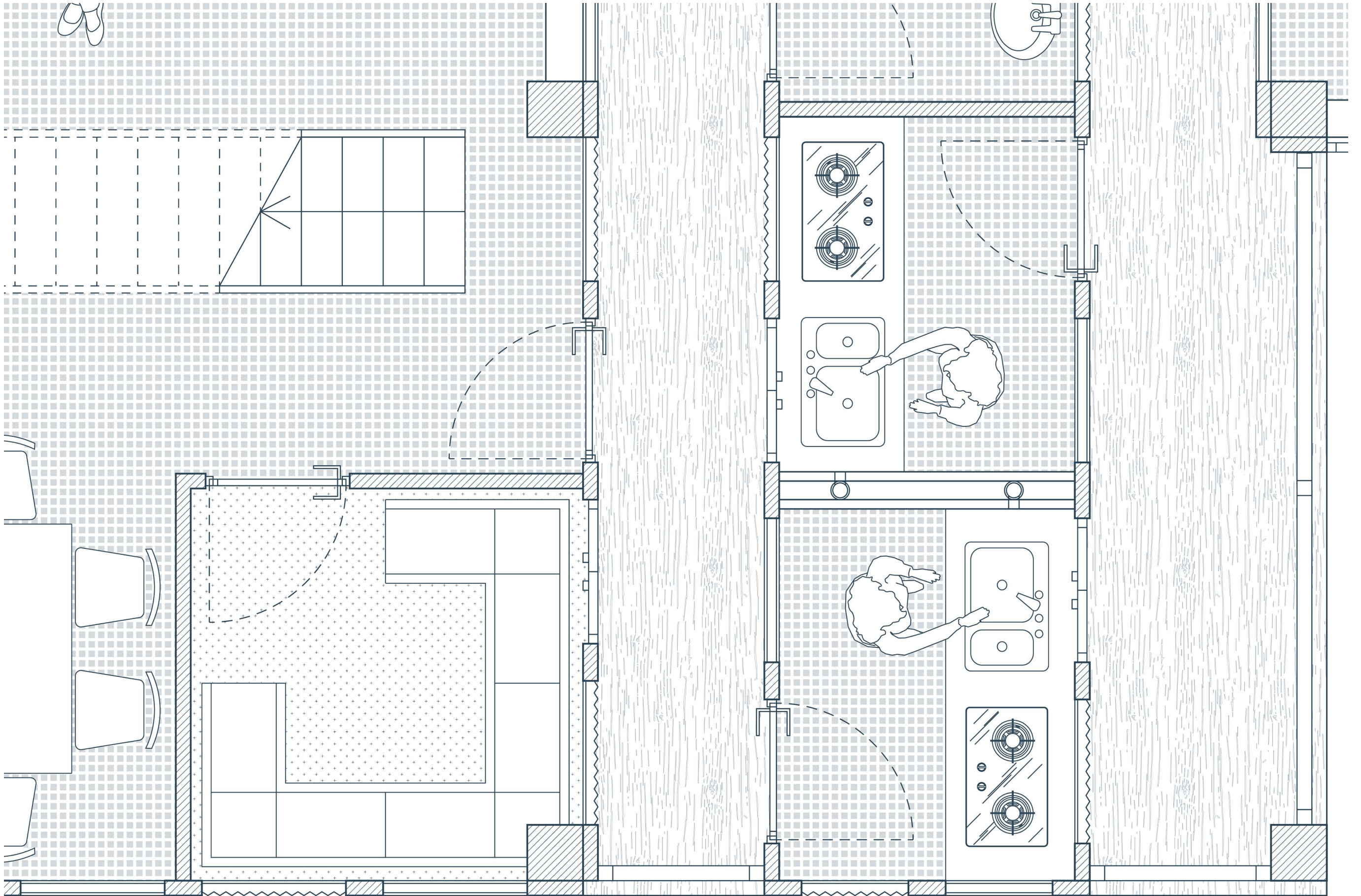


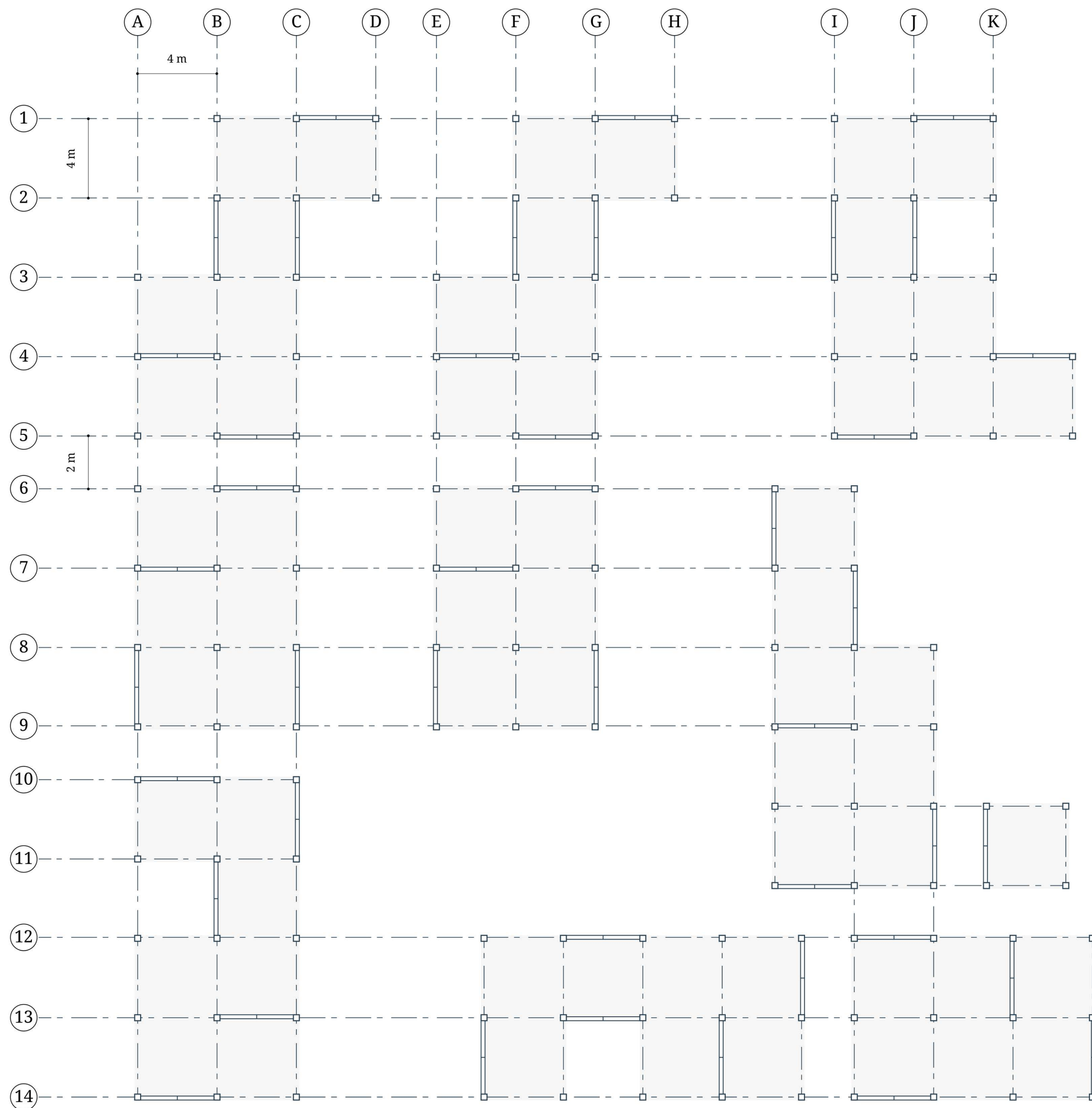




— PART FIRST FLOOR PLAN —

1:50

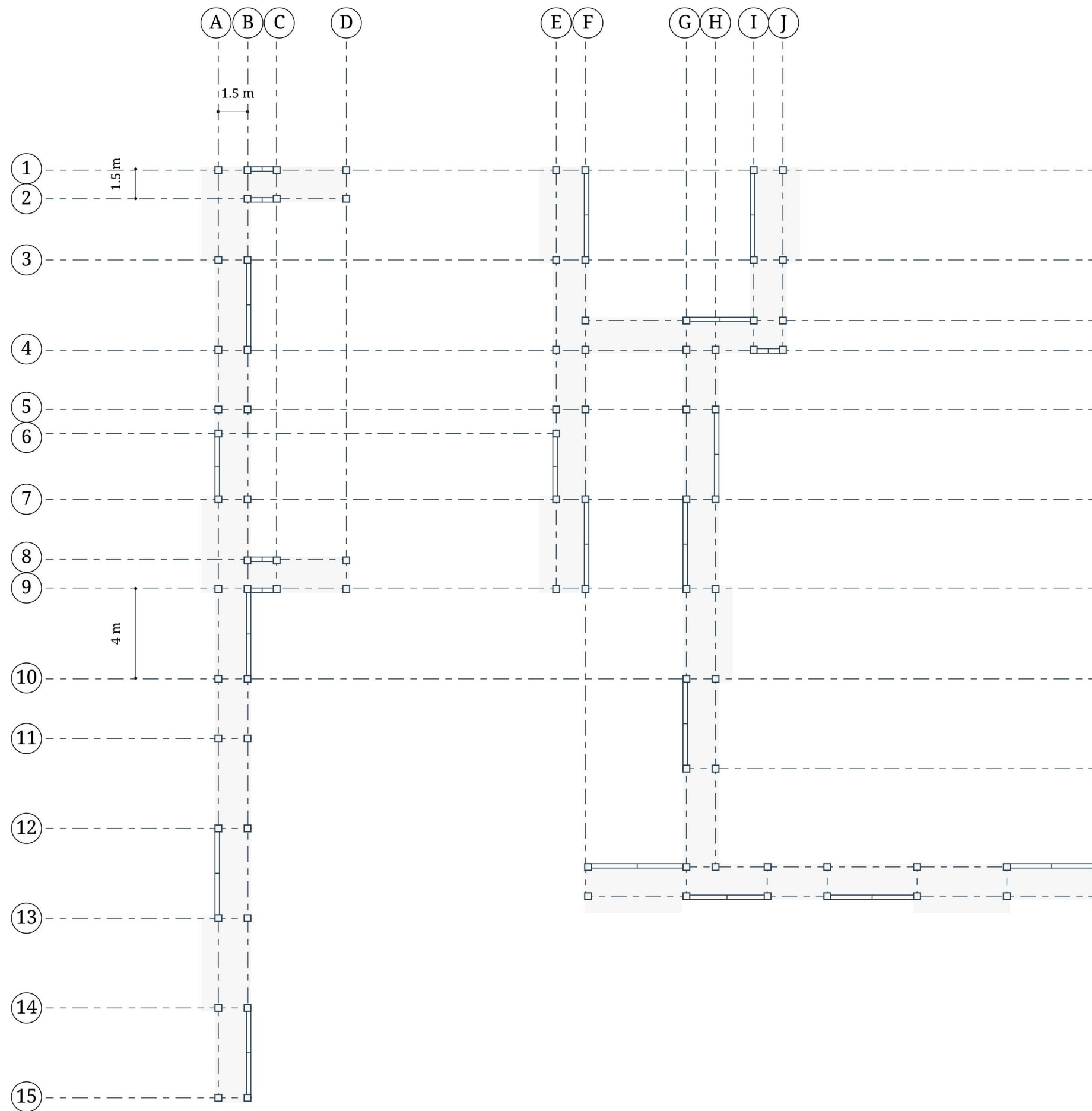




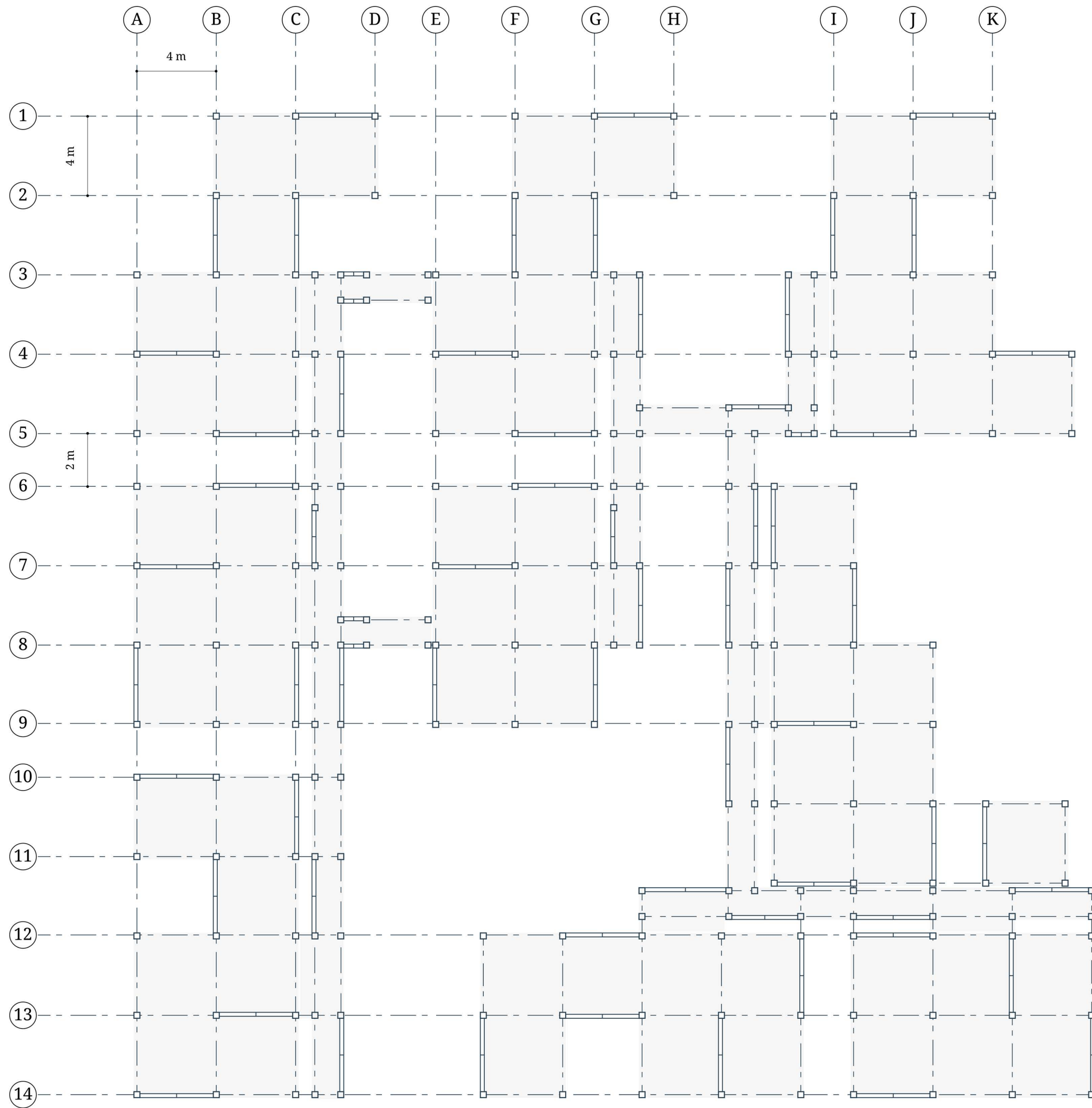
**STRUCTURE GRID OF
— COLUMN AND BRACING —
(DWELLING UNIT)**

1:200





**STRUCTURE GRID OF
— COLUMN AND BRACING —
(PLATFORM)**



**STRUCTURE GRID OF
— COLUMN AND BRACING —
(COMBINATION)**

1:200

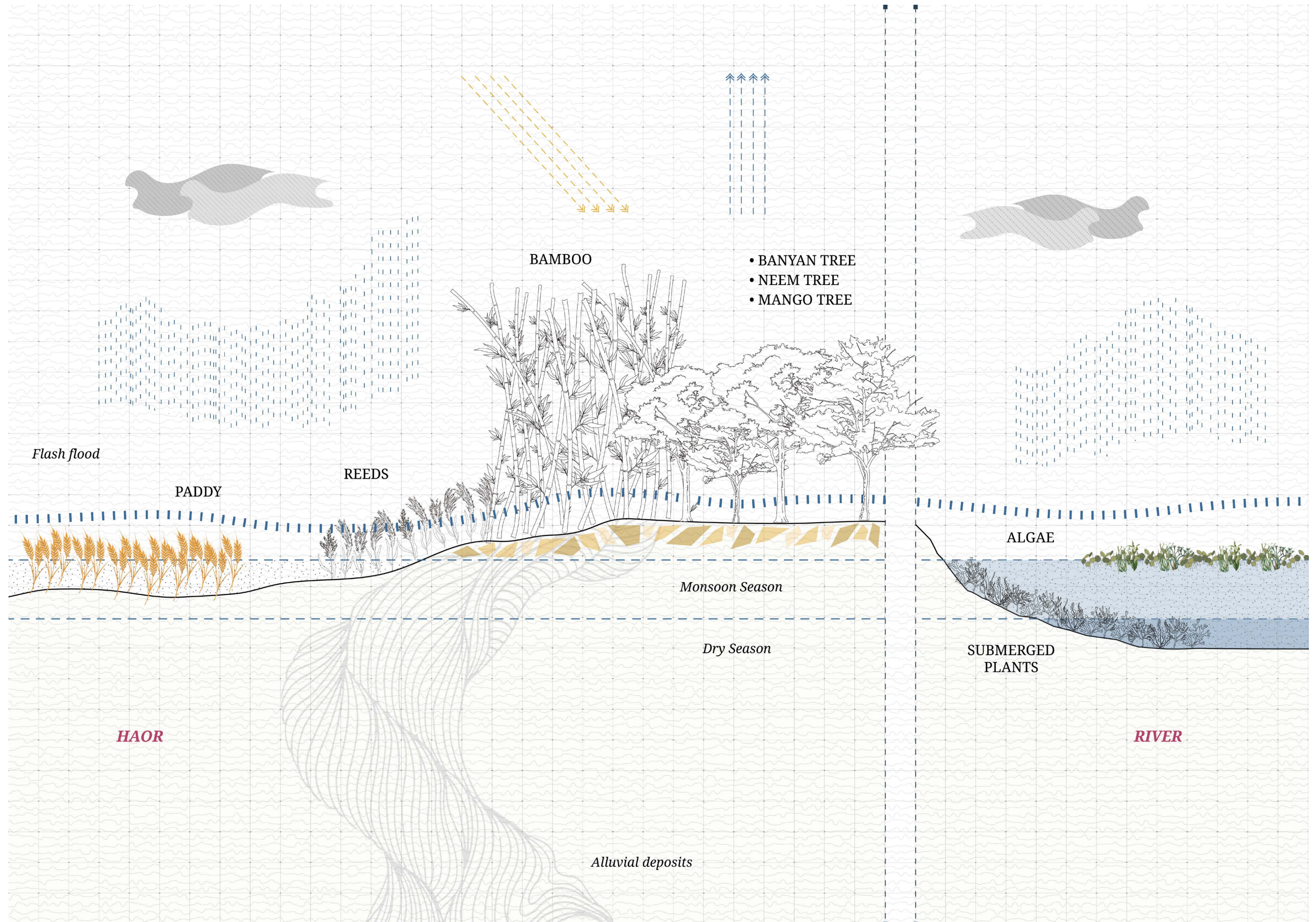


ENVIRONMENTAL SUSTAINABILITY

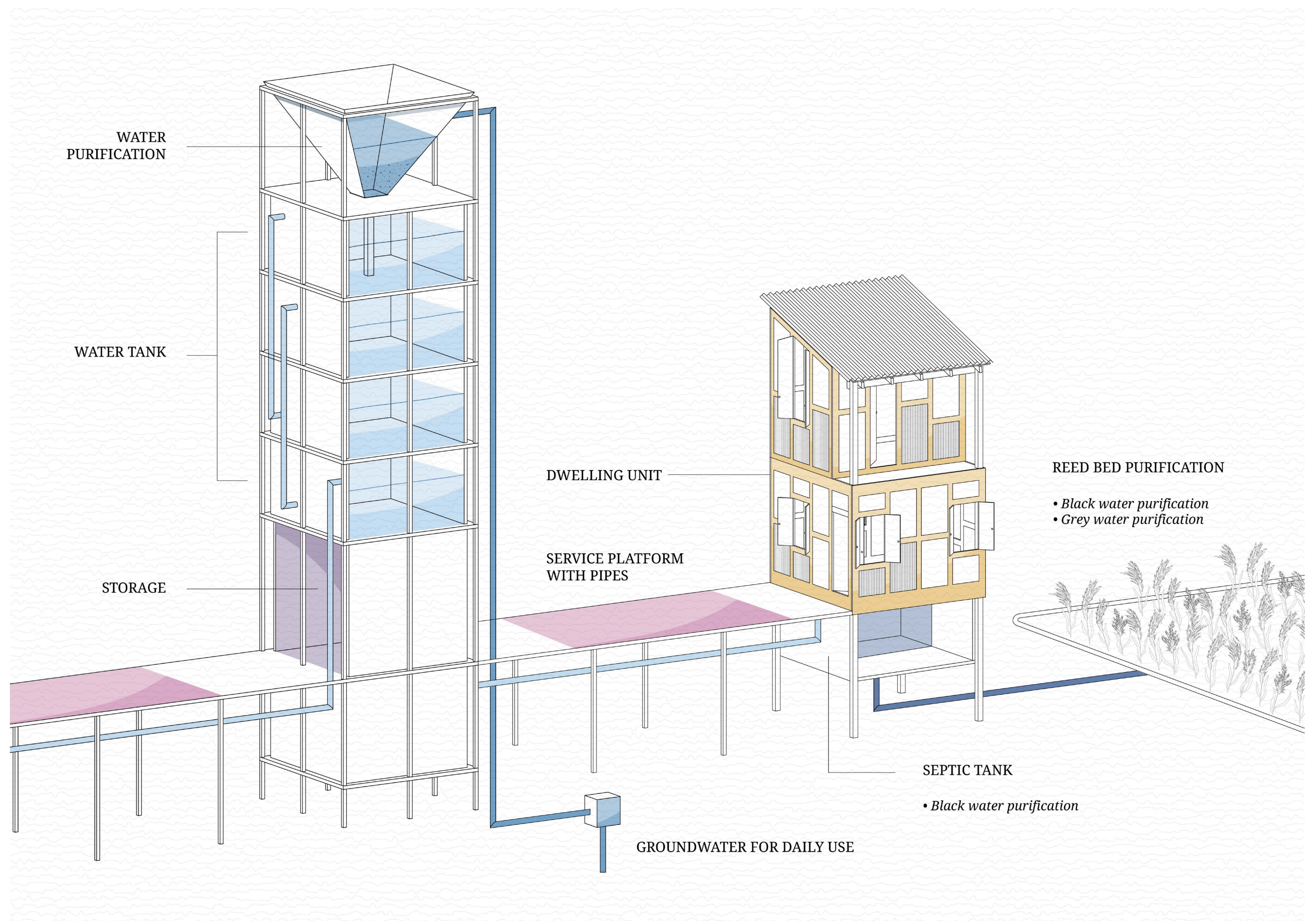
*Landscape, Climate Design, Water Treatment,
Product Circulation*

— landscape —

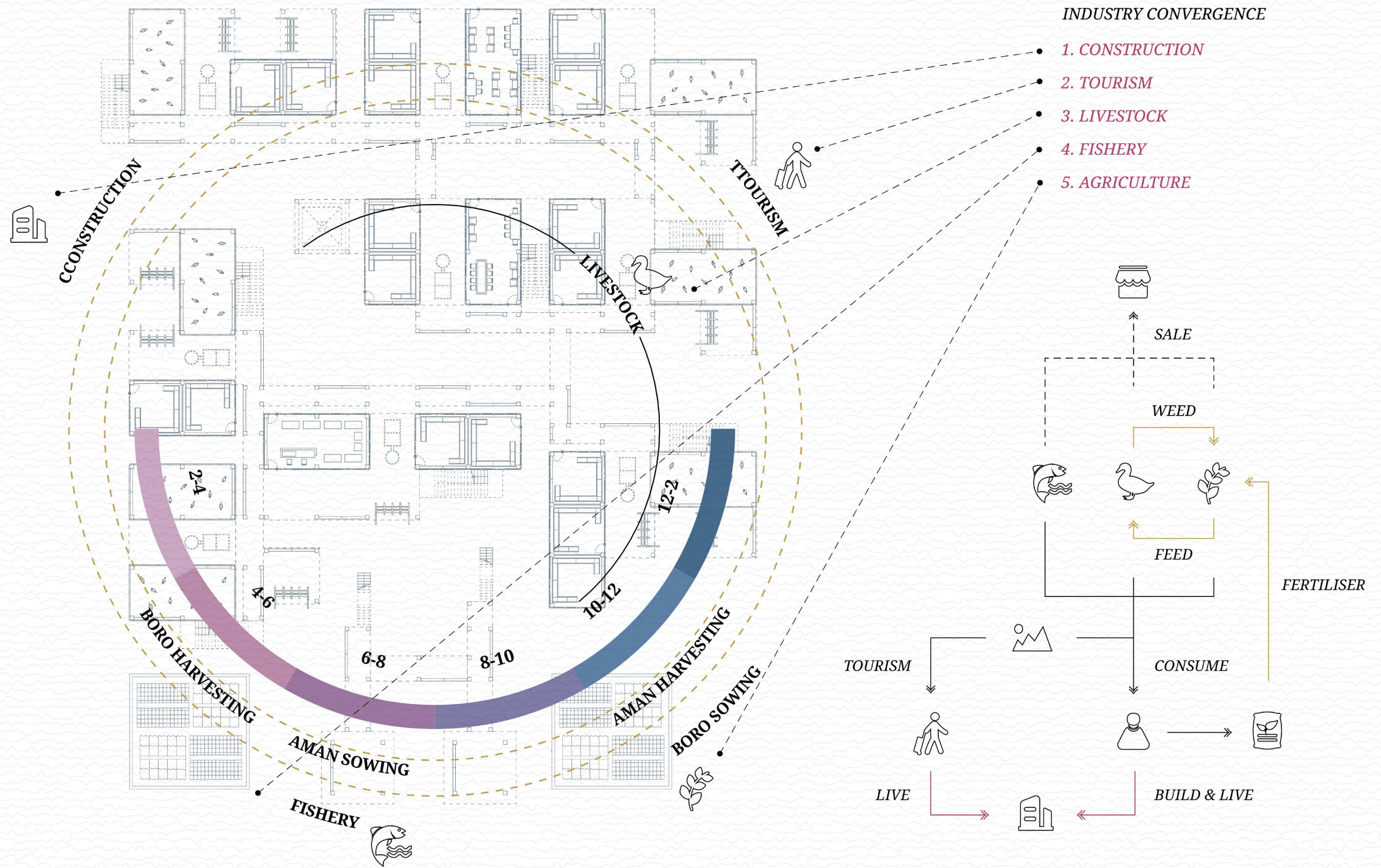
Tahirpur, Sylhet, Bangladesh



— water treatment —



— product circulation —

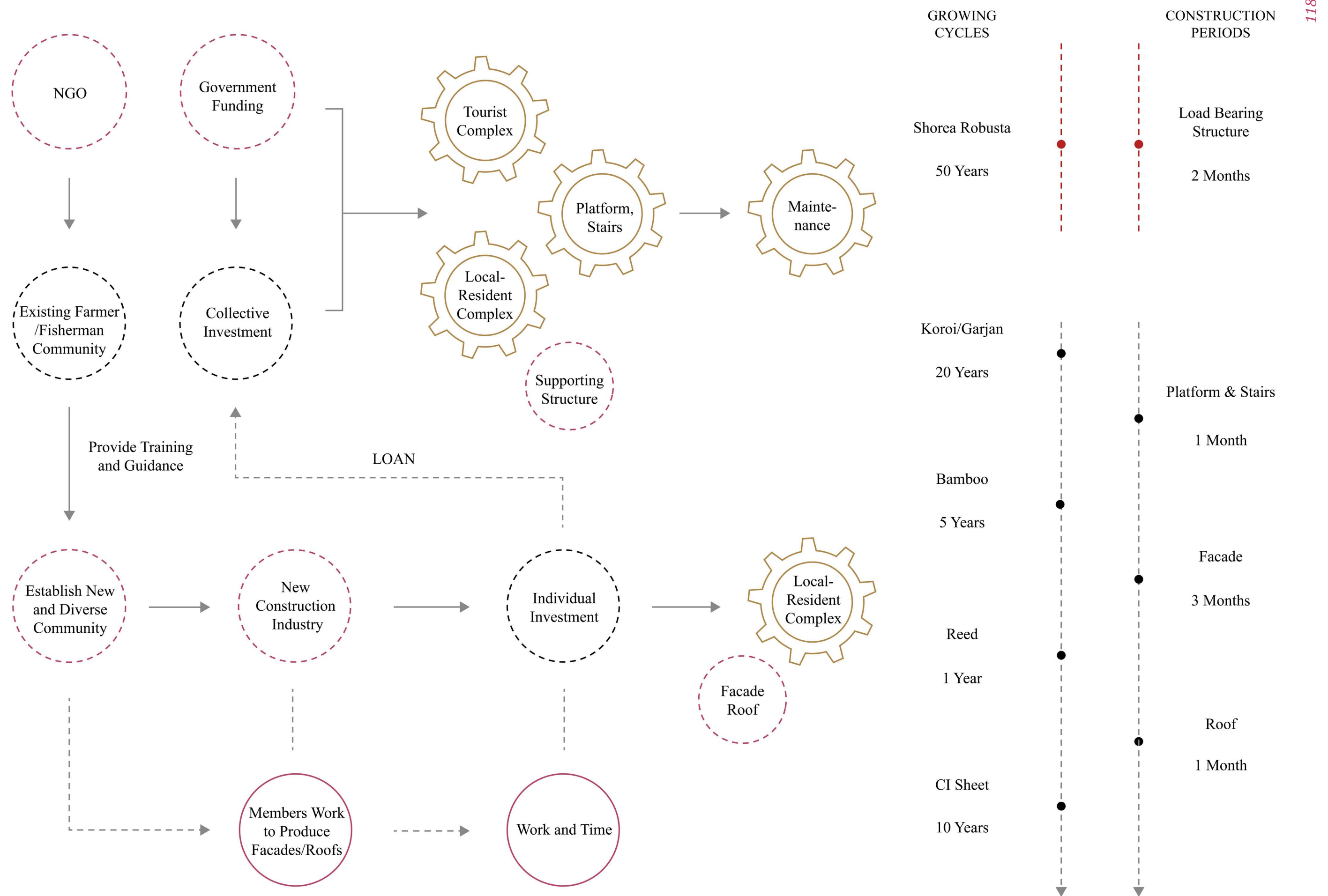


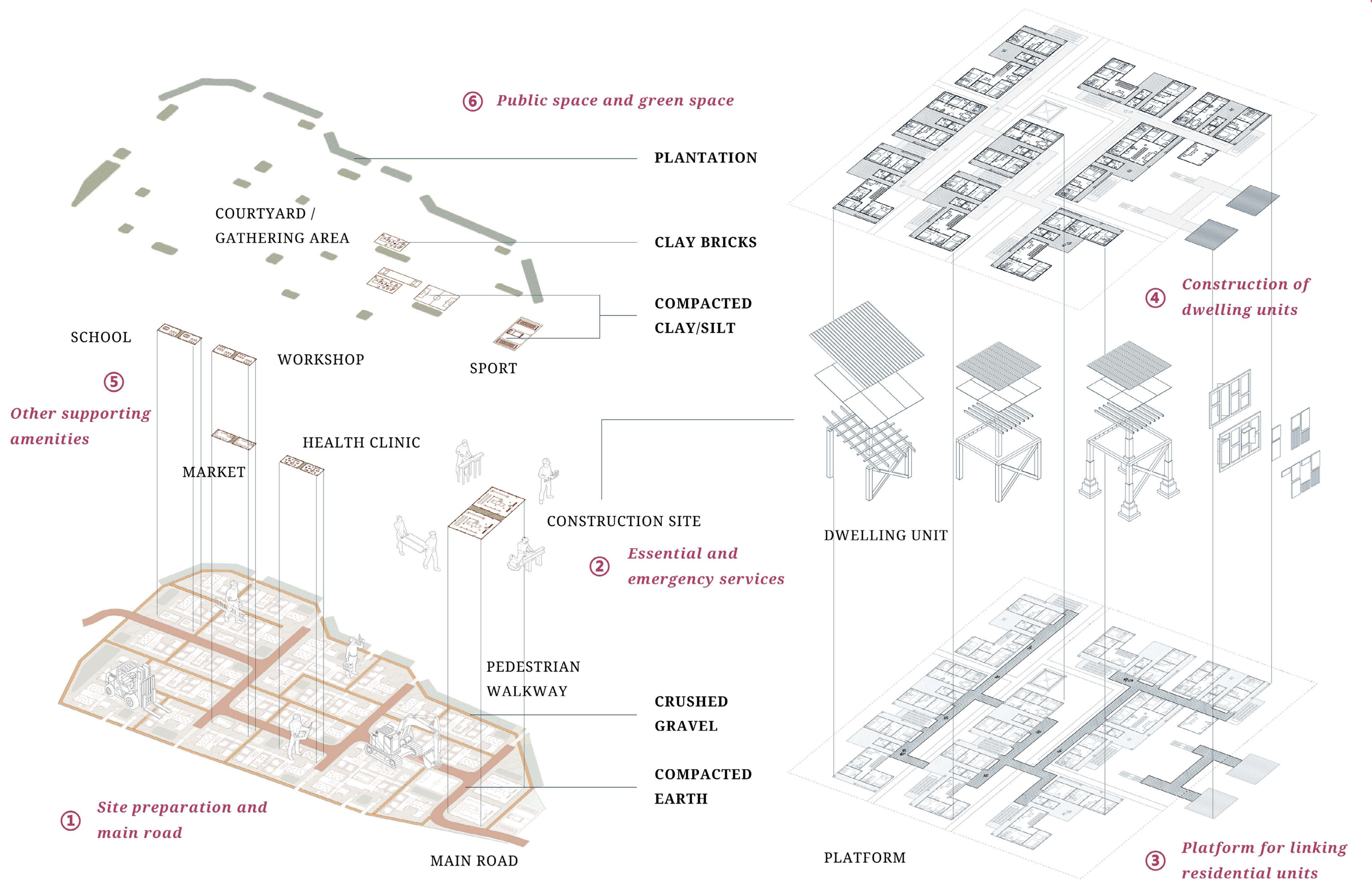
SOCIAL SUSTAINABILITY

Managerial Strategy

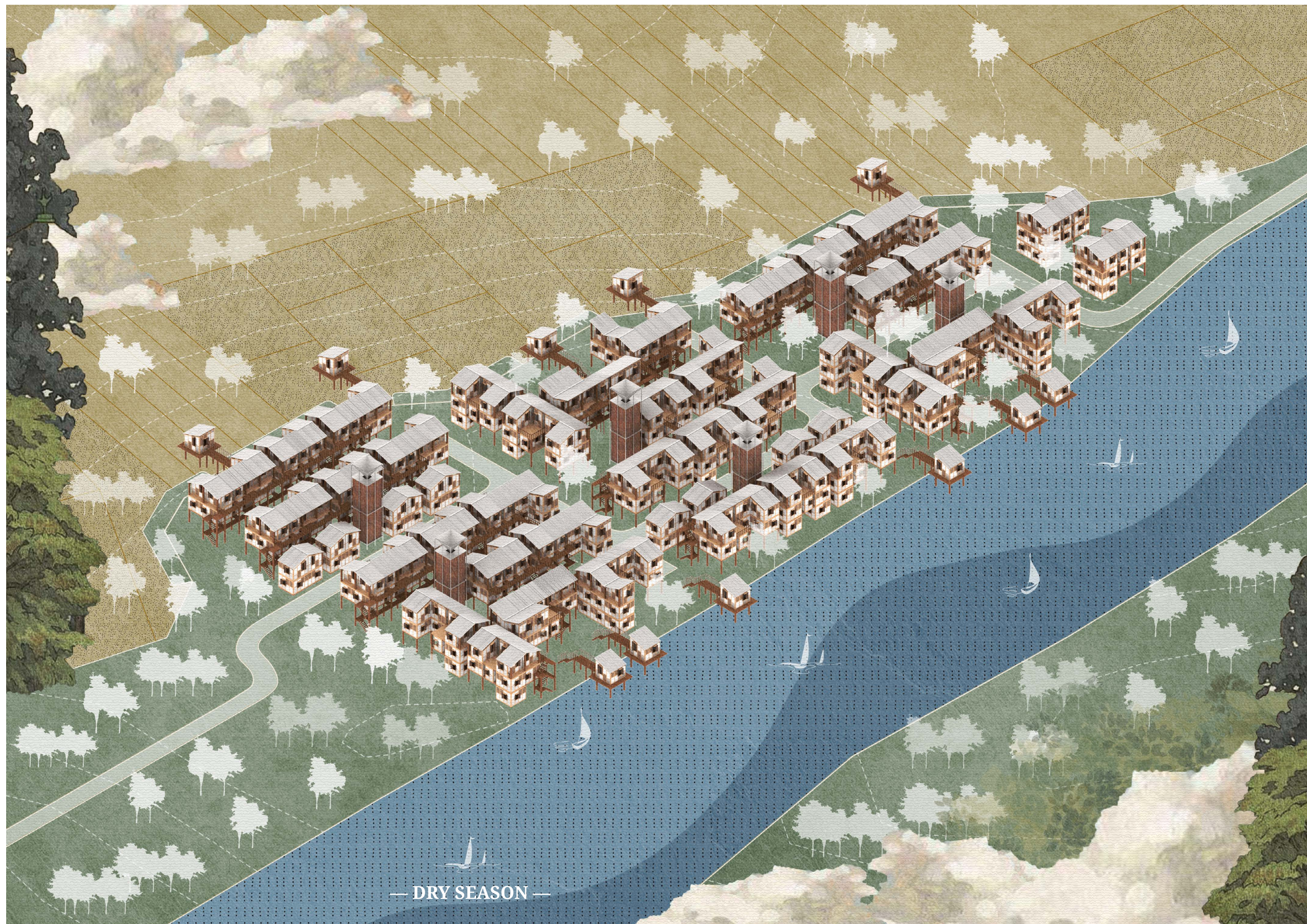
— managerial strategy —

Tahirpur, Sylhet, Bangladesh





— isometric view —



— DRY SEASON —

