Inclusive neighbourhoods across urban waters

A spatial design for intensifying socio-ecological resilience in communities in Addis Ababa positioned between tradition and transition.

Problem Field and Research Question

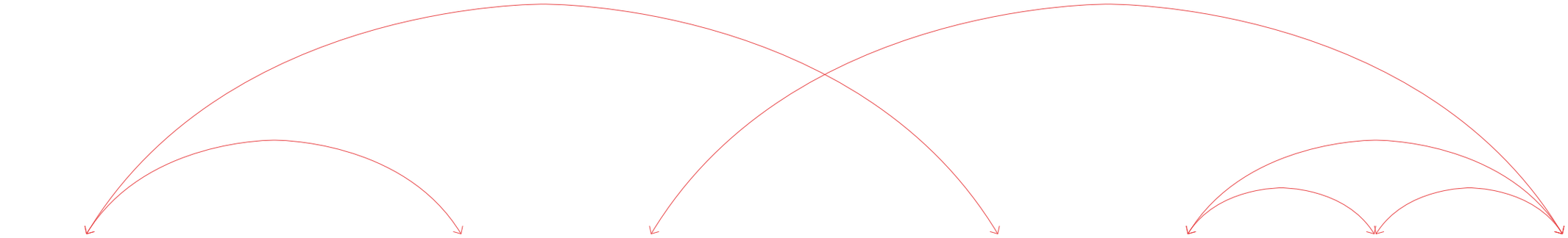
Water Crisis

Housing Crisis

2 Main problem fields

Water Crisis

Housing Crisis



Flooding of rivers

Polluted rivers

Poor drainage system

Poor water supply system

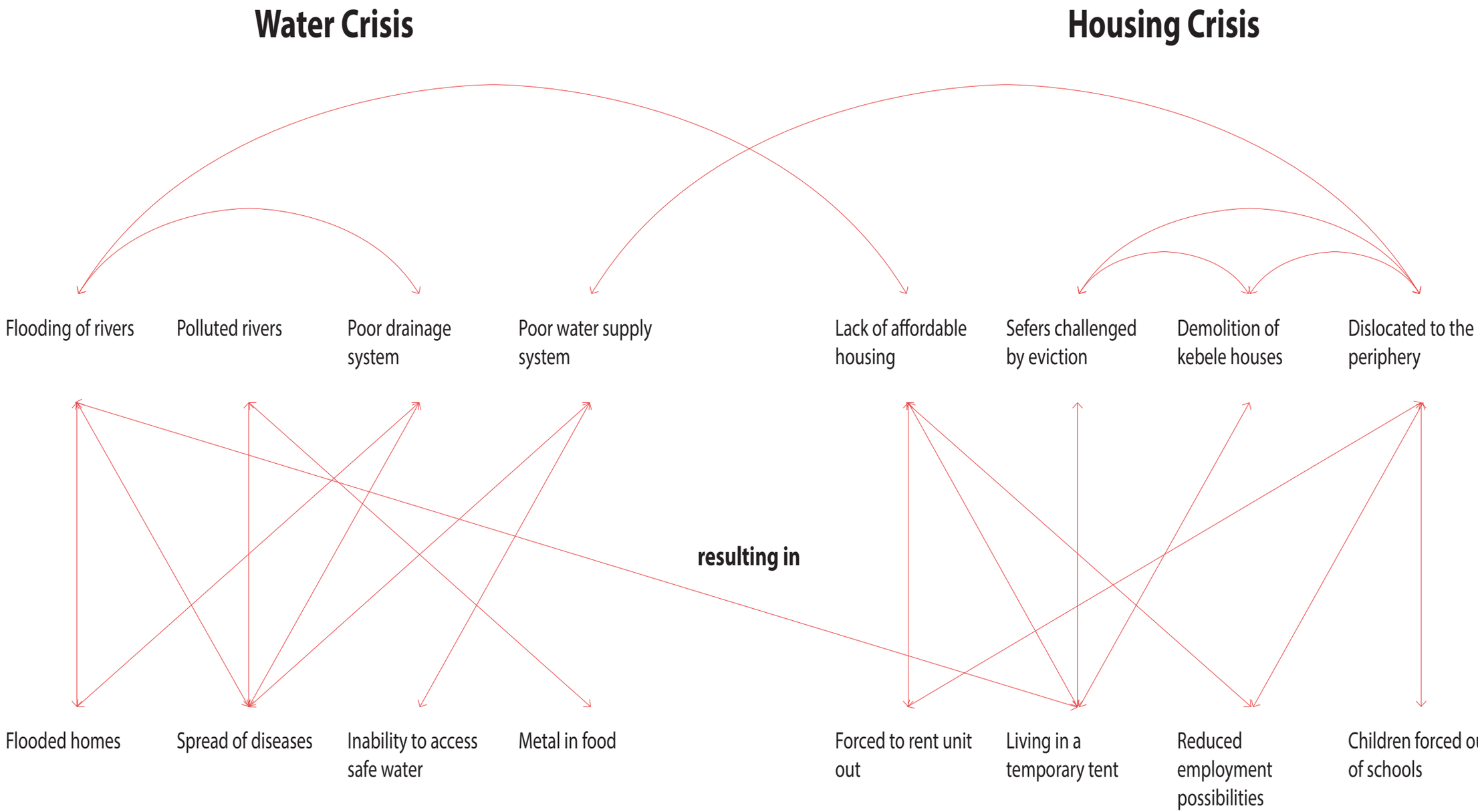
Lack of affordable housing

Sefers challenged by eviction

Demolition of kebele houses

Dislocated to the periphery

Partial problems



Consequences

Addis Ababa Riverside Project

Design for nature

Artificial landscaping

No strategy for flooding

Evicted existing community

Condominium Housing

Not inclusive for the urban poor

Located far from social services

Lack of necessary infrastructure

Evicting existing communities

Addis Ababa riverside project gives priority to development over residents

Published on 12/03/2020, 6:00am

Ethiopia wants $900 million riverside project to be a model of green development – yet one resident says shelters were demolished 'without warning'

- Climate home news

Megaprojects in Addis Ababa raise questions about spatial justice

June 23, 2020 3.11pm BST

- The conversation

Chinese firm works on project to beautify Ethiopia's capital

August 6, 2019

- Nazret

Current solutions by beautification projects

resulting in gentrification of the inner city

Opportunity to deal with

Water and Housing

at once

To what extent can the unsustainable relationship
between the urban **waters** and the urban **neighbourhoods**
be seen as an opportunity for the government
to create a **socio-ecological resilient**
urban river corridor
towards a more **inclusive** and **sustainable** Addis Ababa?

Design with Nature

River Conservation

Housing as Infrastructure

Socio-Ecological Resilience

Multidisciplinary theories

Design with Nature

River Conservation

Housing as Infrastructure

Socio-Ecological Resilience

Using possibilities and restrictions that nature offers

Harmony between man and nature

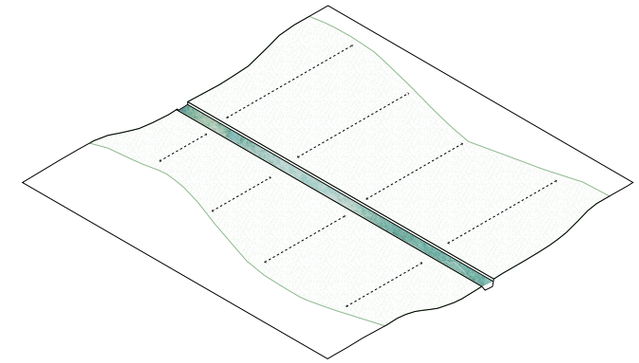
Floodplains should become prohibited to live in.

(McHarg, 1969)

= Erodible corridor
= Streamway
= Floodscape
= Room for the river

= Space for the rivers by letting them flood in a safe way

(Sijmons et al., 2017)



Design with Nature

River Conservation

Housing as Infrastructure

Socio-Ecological Resilience

Housing should be viewed as infrastructure since adequate supply should be assured through planning.

(Kushner, 2010)

Socio-Ecological Resilience

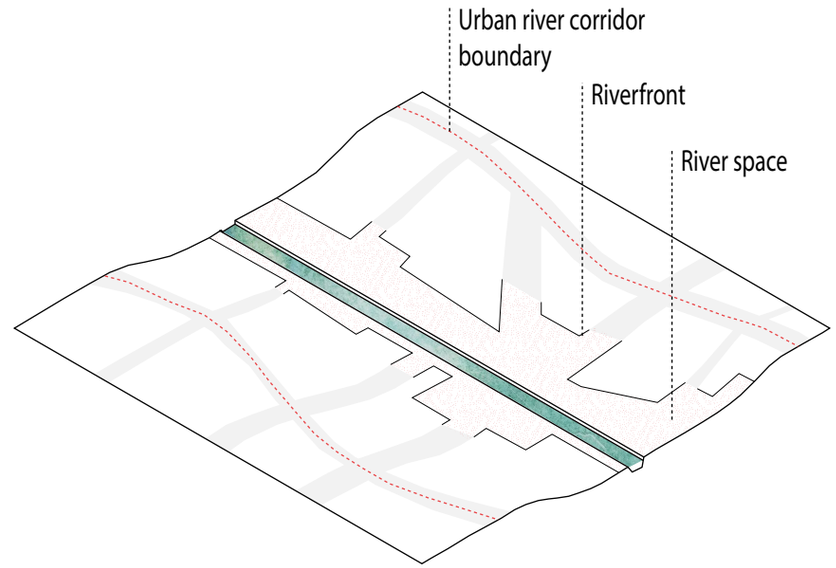
Resilience = a recovery from forces or pressures which occur in time.

(Sennett, 2018)

Urban River Corridor

= A materialisation of socio-ecological resilience due to the interaction between the social systems of the city and the ecological system of rivers.

(Forgaci, 2018)



Urban river corridor

Urban River Corridor

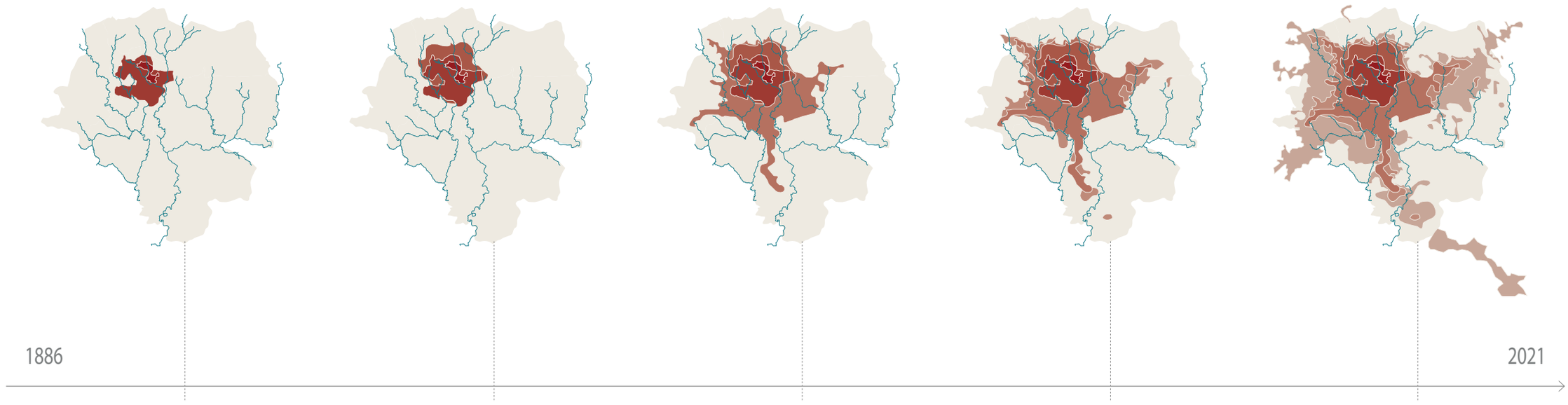
Neighbourhood which is **adapted to flooding**

Clean and attractive rivers

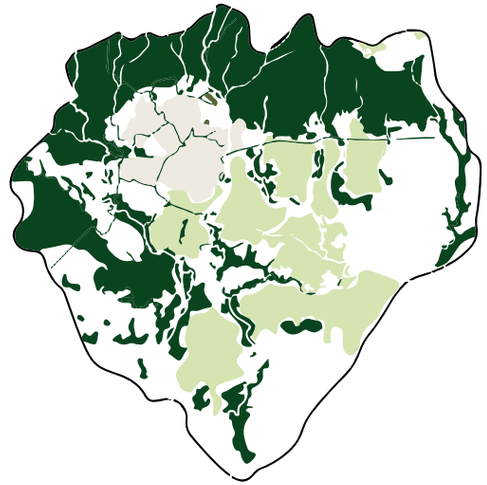
A housing system which is genuinely **inclusive for the urban poor**

A **river conservation scheme** which is sensible to the internal dynamics within the water itself

A **socially and ecologically connected** housing and river conservation scheme



Expansion
of Addis Ababa



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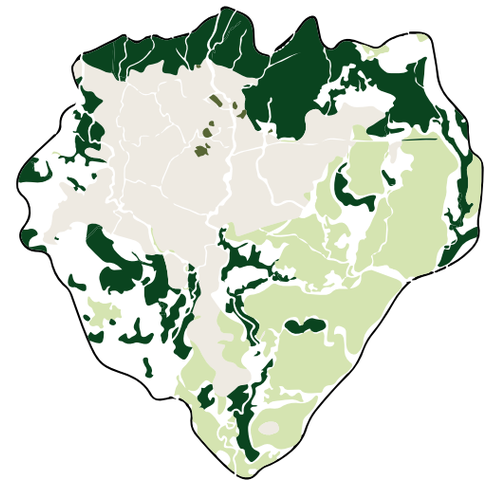
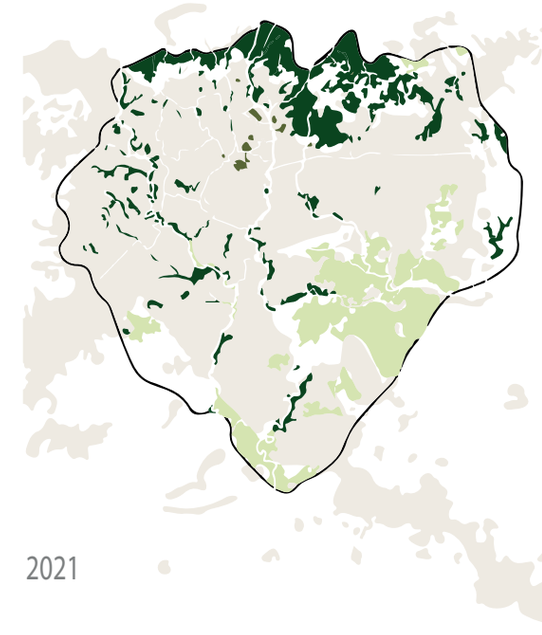


1999

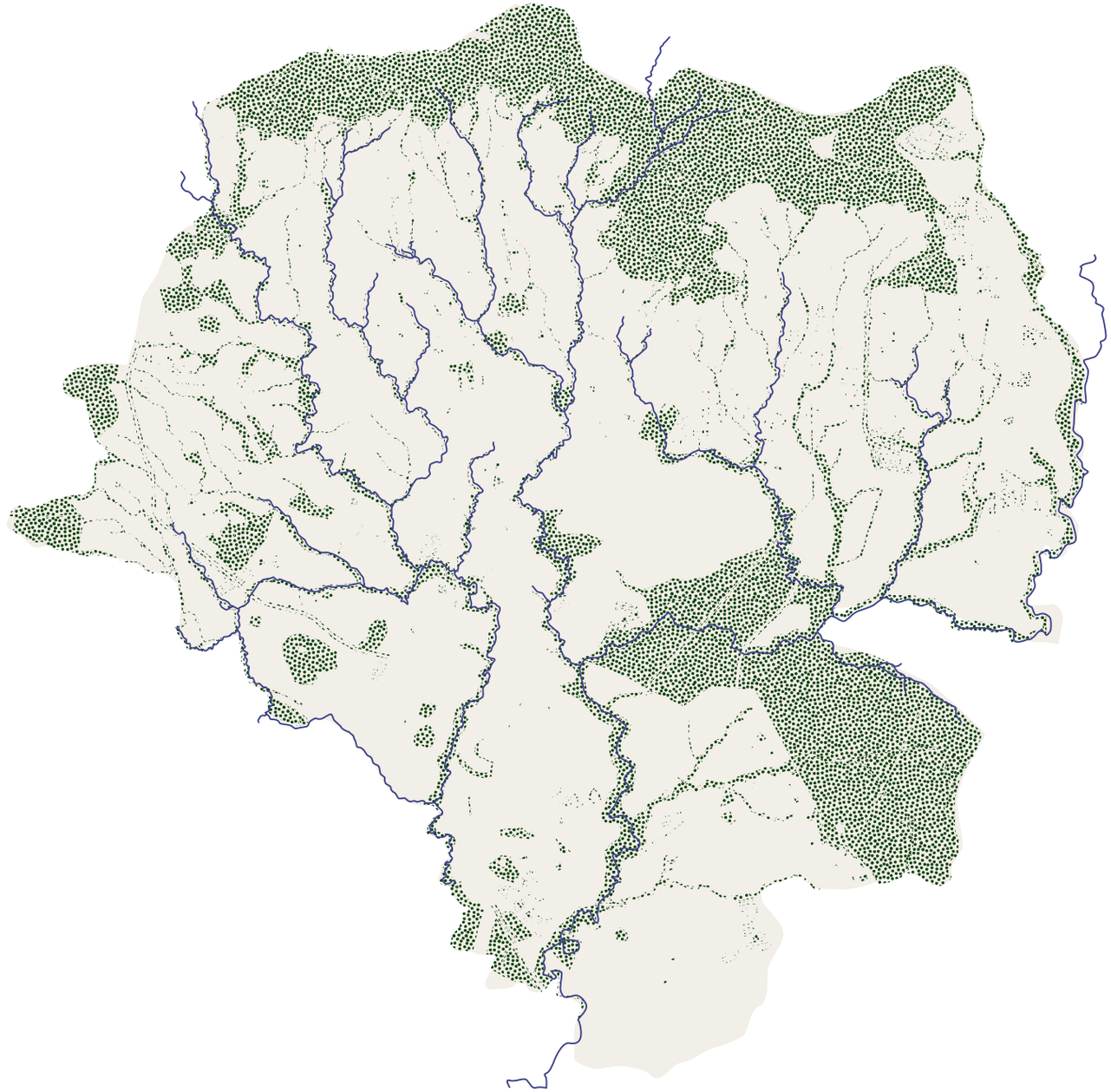


2021

Forest
Park
Agriculture
Urbanisation

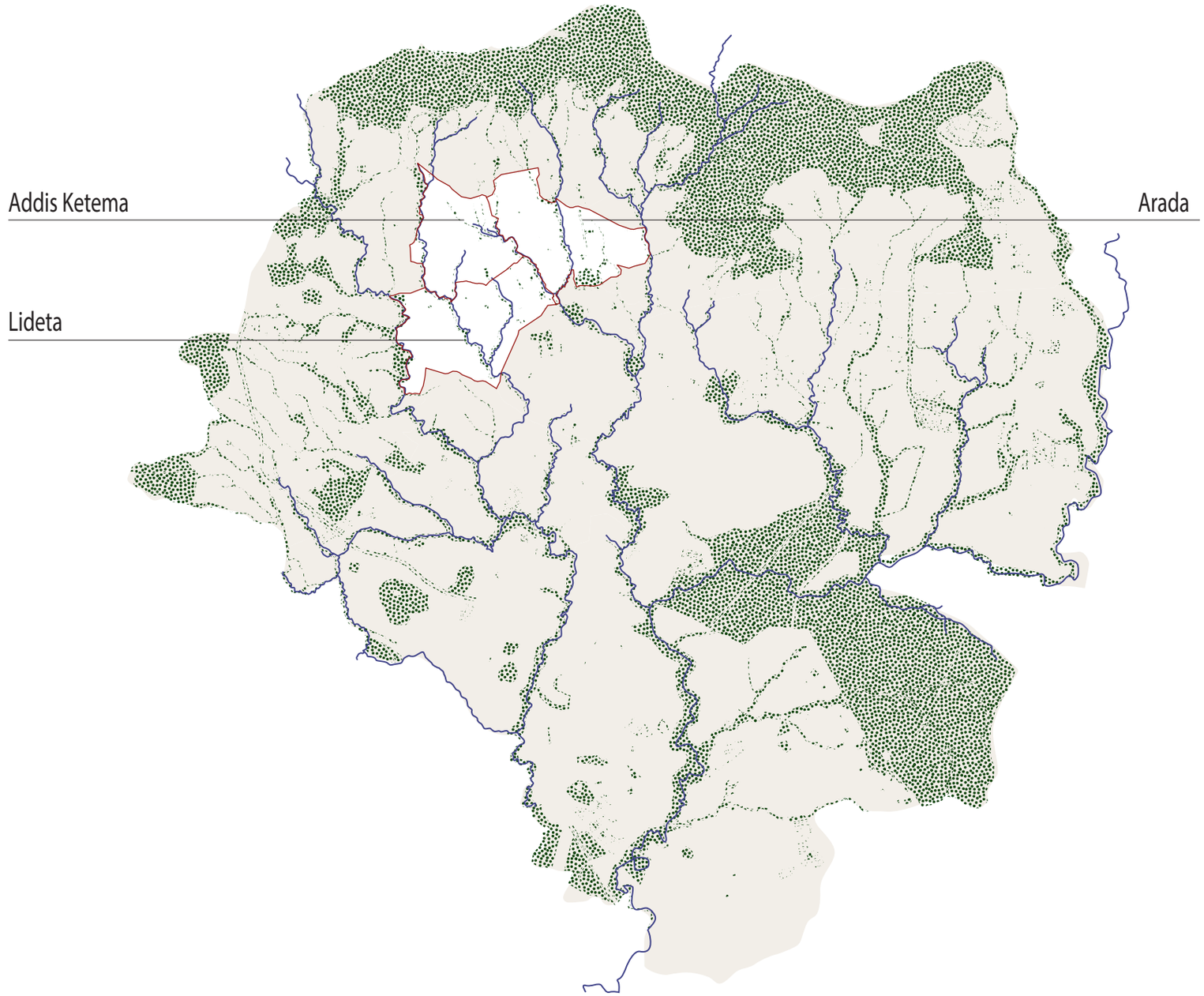
Destruction of greenery

in Addis Ababa due to urbanisation



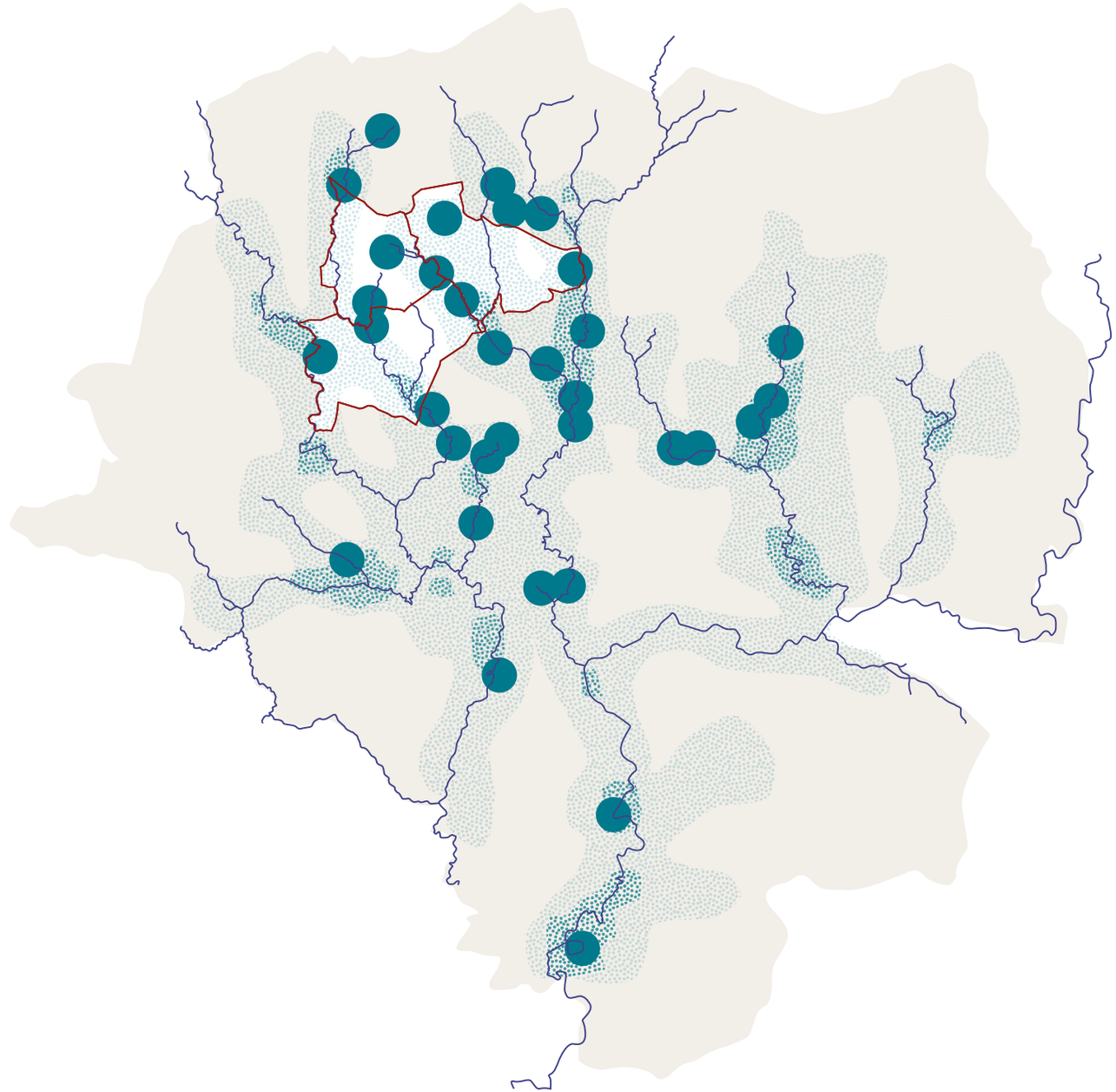
Green infrastructure

often near rivers



Lack of green infrastructure

Sub cities with most problematic accessibility to green infrastructure

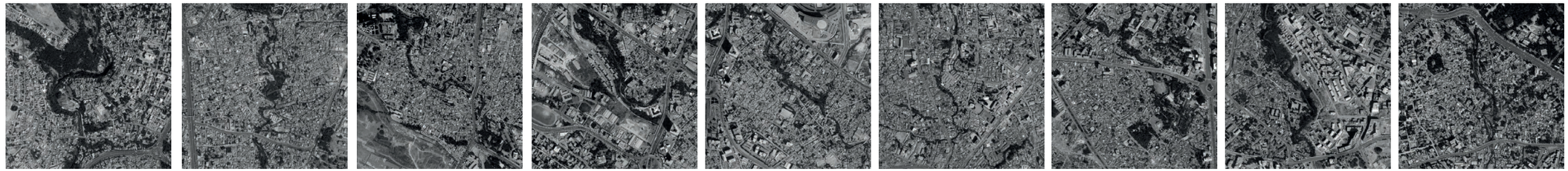


Floods registered between 2010-2021

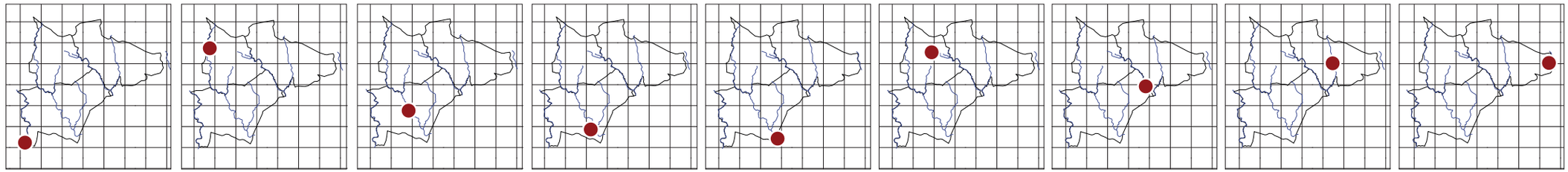
and potential risk for future flooding

Size (ha)	43	42	42	48	45	42	43	47	43
RE-building	X	X	X	X	X	X	X	X	X
Building	X			X				X	

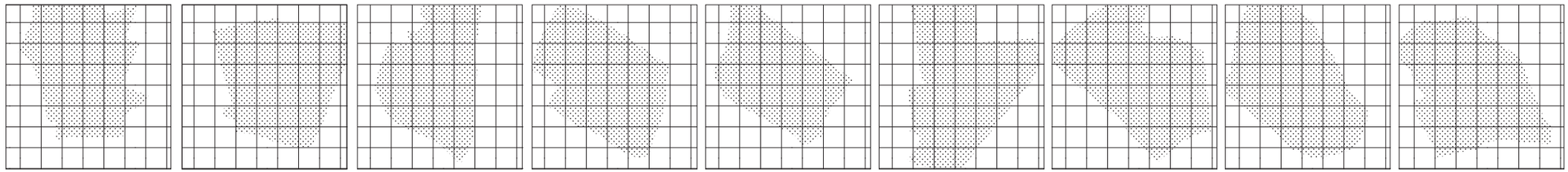
Top view



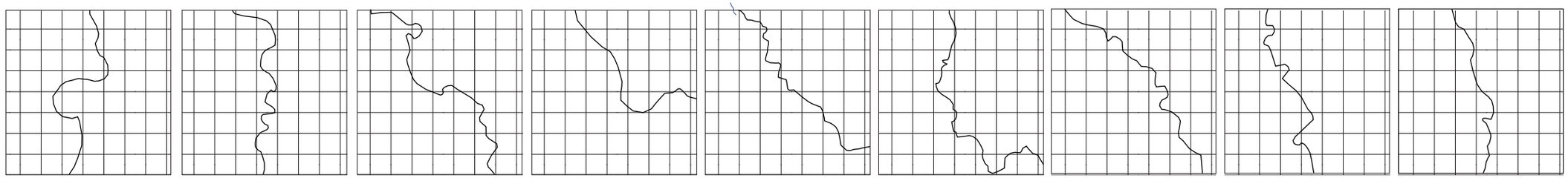
Location



Outline



River



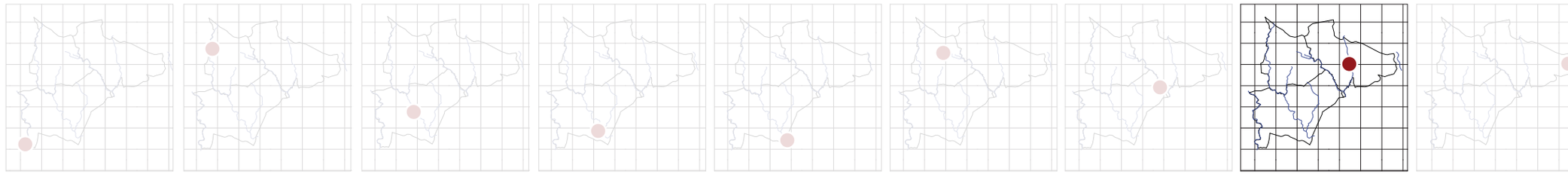
The urban river condition

Possible locations (42-48ha) near rivers within the inner city

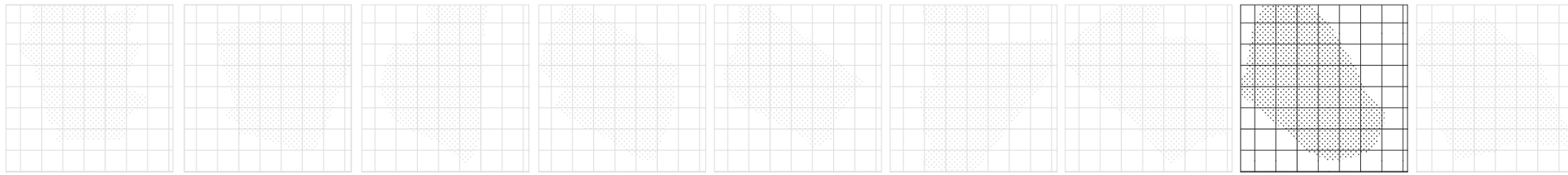
Size (ha)	43	42	42	48	45	42	43	47	43
RE-building	X	X	X	X	X	X	X	X	X
Building	X			X				X	

Top view

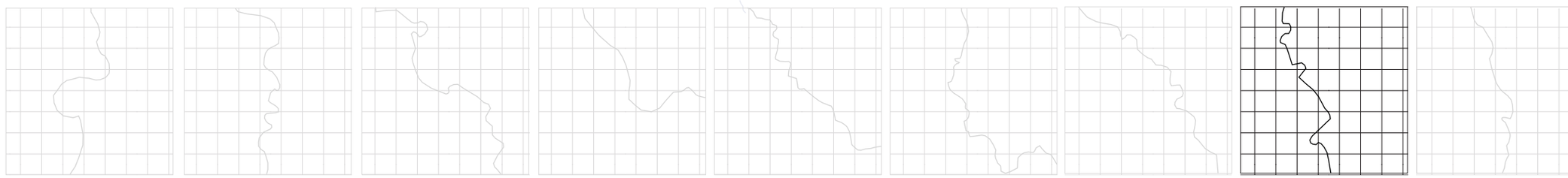
Location



Outline

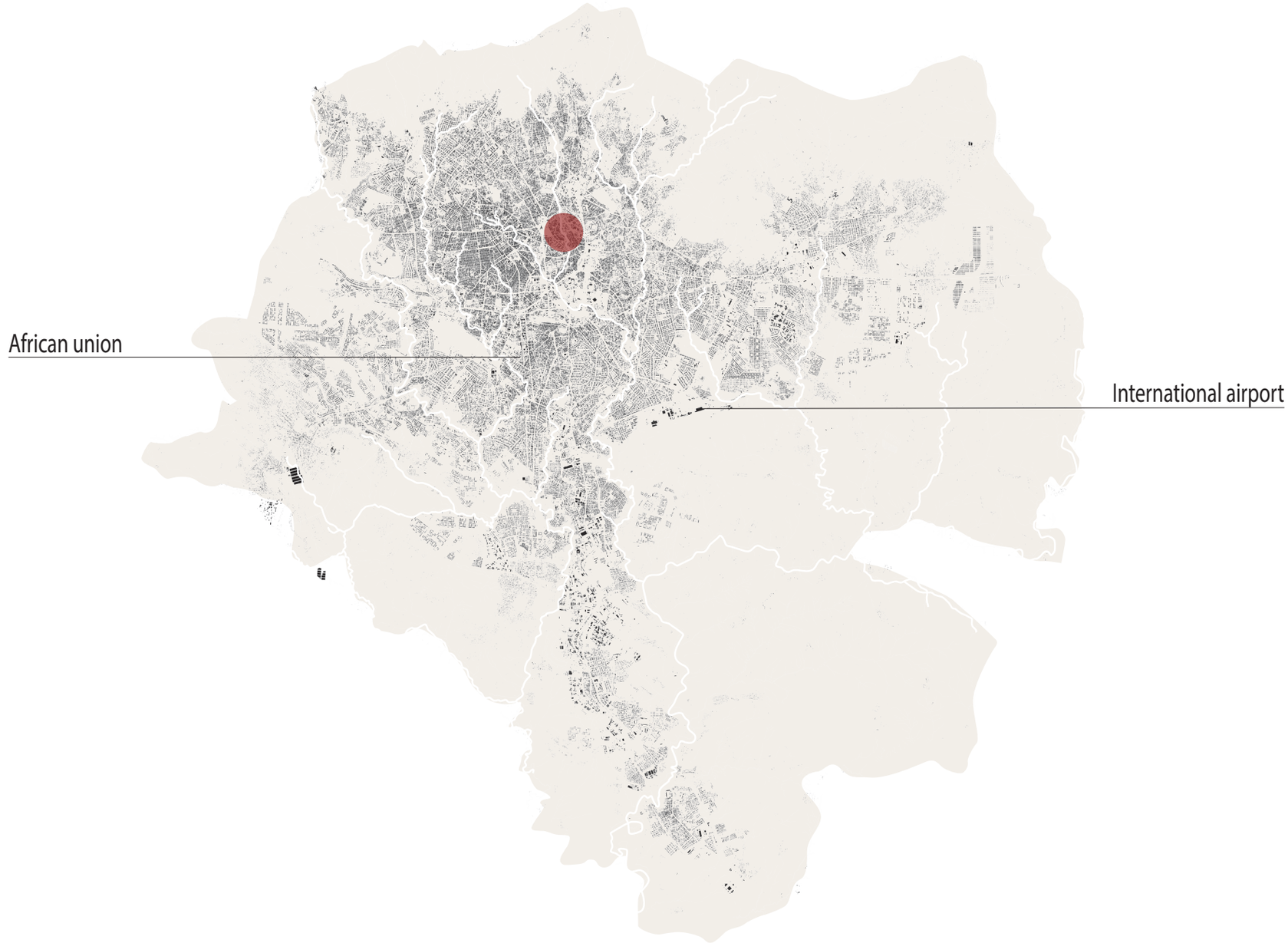


River

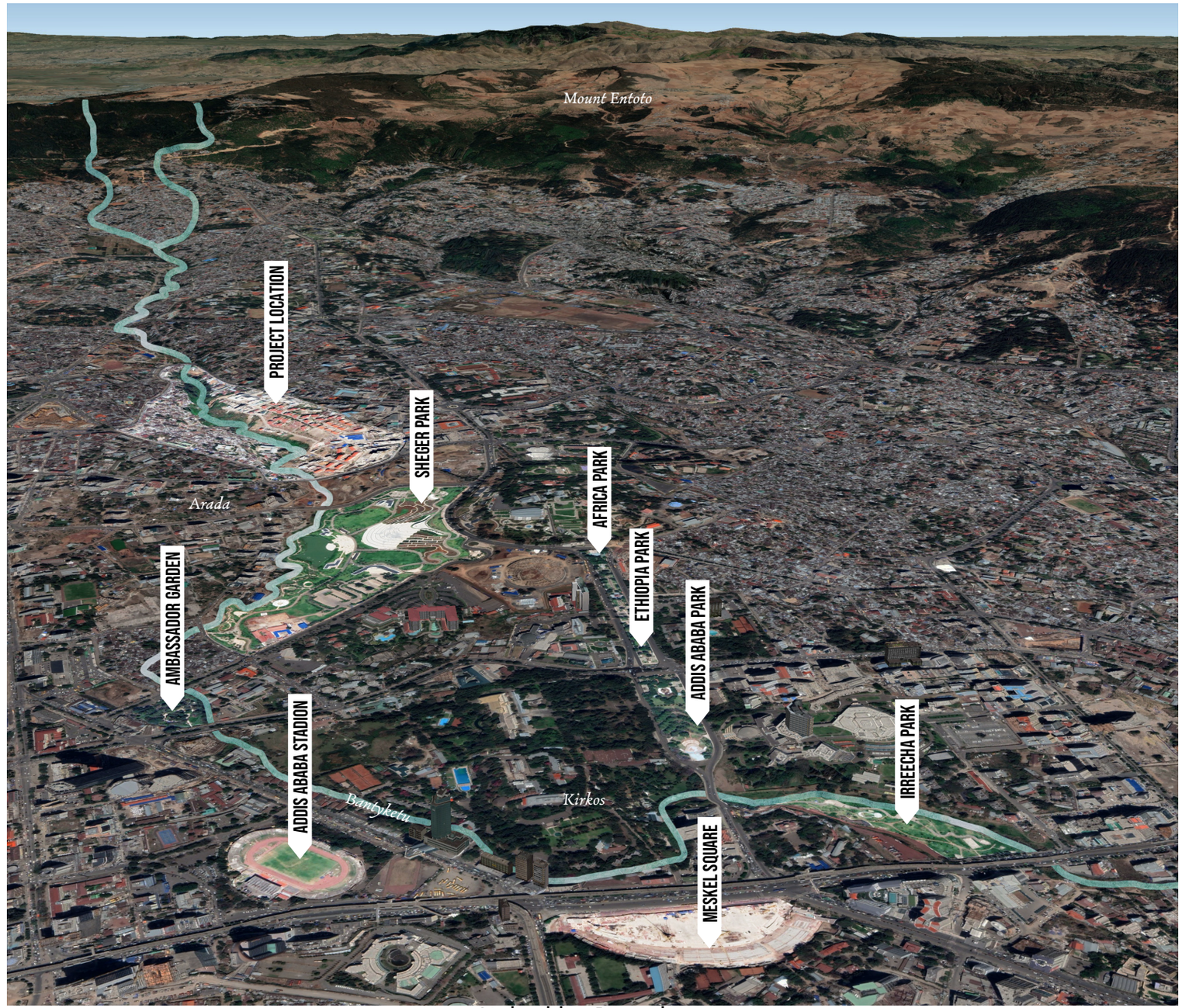


A prime location

with Re-building **and** Building



A prime location



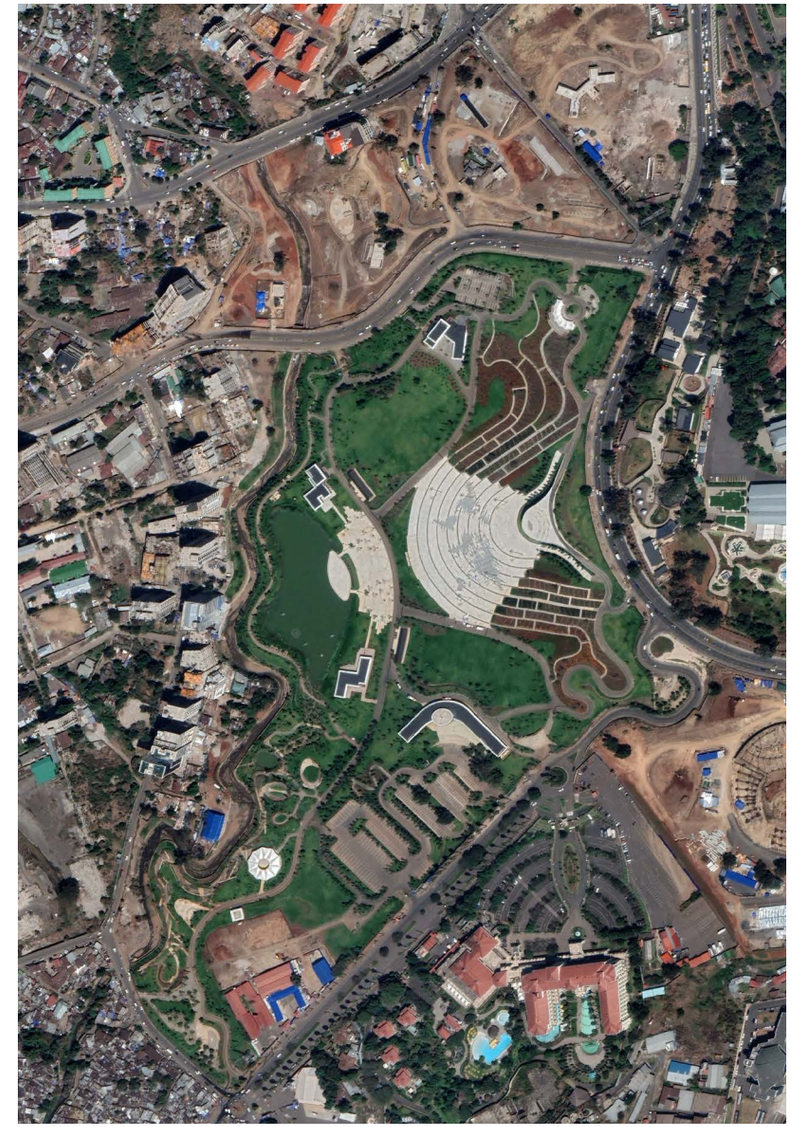
Linked by Bantyketu

to important locations in Addis Ababa

Important buildings
near and on location

2002

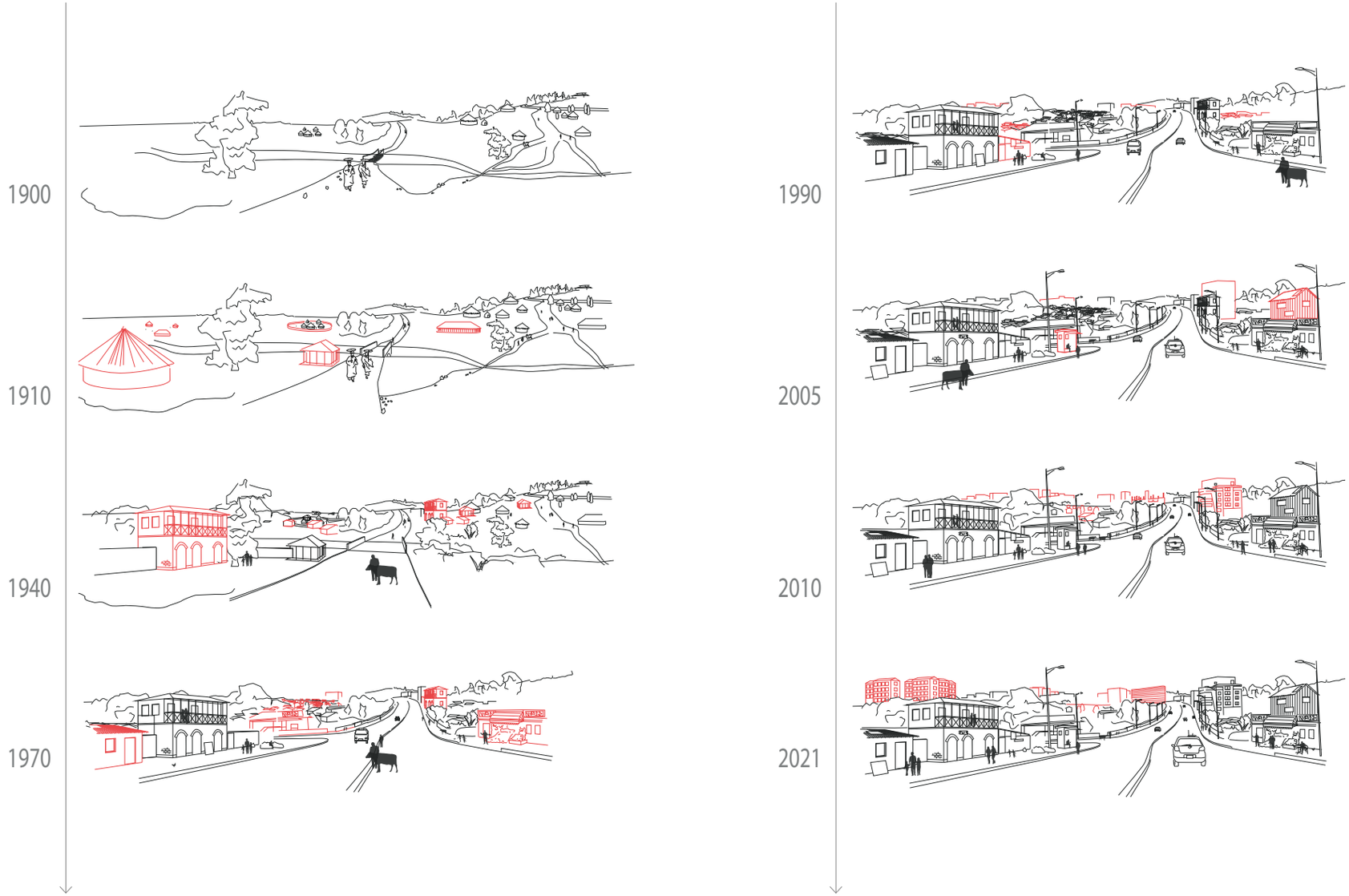
2021



Development
of the adjacent Sheger park

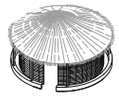
Demolition

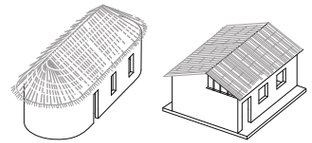
of sefers

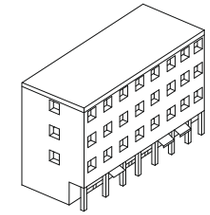


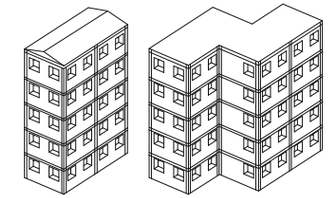
Development through time

Source: Collective booklet "Addis Ababa as a Palimpsest"









Tukul hut

Foreign influenced hut

Armenian
influenced dwelling

Building block

Condominium block

1900

2021

Evolution of dwelling types on site

Kebele
Small scale
Threatened by demolition

Condominium
Large scale
Result of previous demolition

Development through time

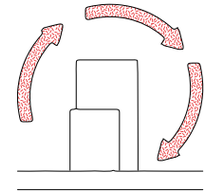
of 20/80 condominiums

Design Proposal

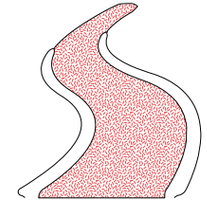
XL	Neighbourhood	->	8 design principles
L	Sector	->	4 urban conditions
M	Cluster	->	2 types of clusters
S	Building	->	4 building typologies

Neighbourhood

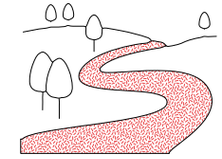
1. **Densify** the neighbourhood



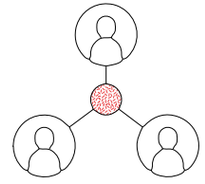
2. **Conserve** existing buildings



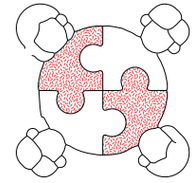
3. **Conserve** existing road patterns



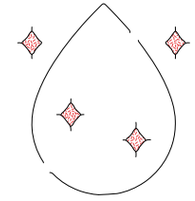
4. **Connect** river to neighbourhood



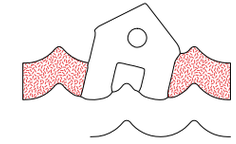
5. **Connect** inhabitants



6. **Mix** income groups



7. **Clean** river



8. **Adapt** to flooding

8 Design strategies

Access to safe and affordable drinking water;
Access to adequate and equitable sanitation;
Improve water quality;
Protect and restore water-related ecosystems.

Develop quality, reliable, sustainable and resilient infrastructure.

Access to adequate, safe and affordable housing and basic services;
Reduce the number of deaths and the number of people affected by water-related disasters;
Access to safe, inclusive and accessible, green and public spaces.

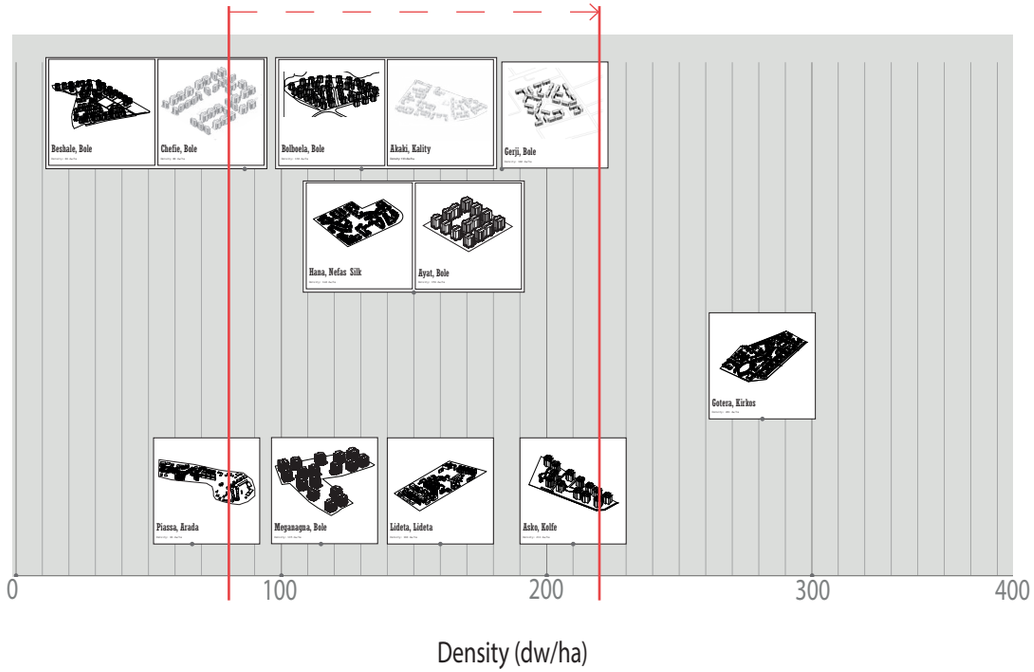
Make efficient use of natural resources.

Ensure the conservation, restoration and sustainable use of freshwater ecosystems;
Halt deforestation and restore degraded forests.

Sustainable development goals

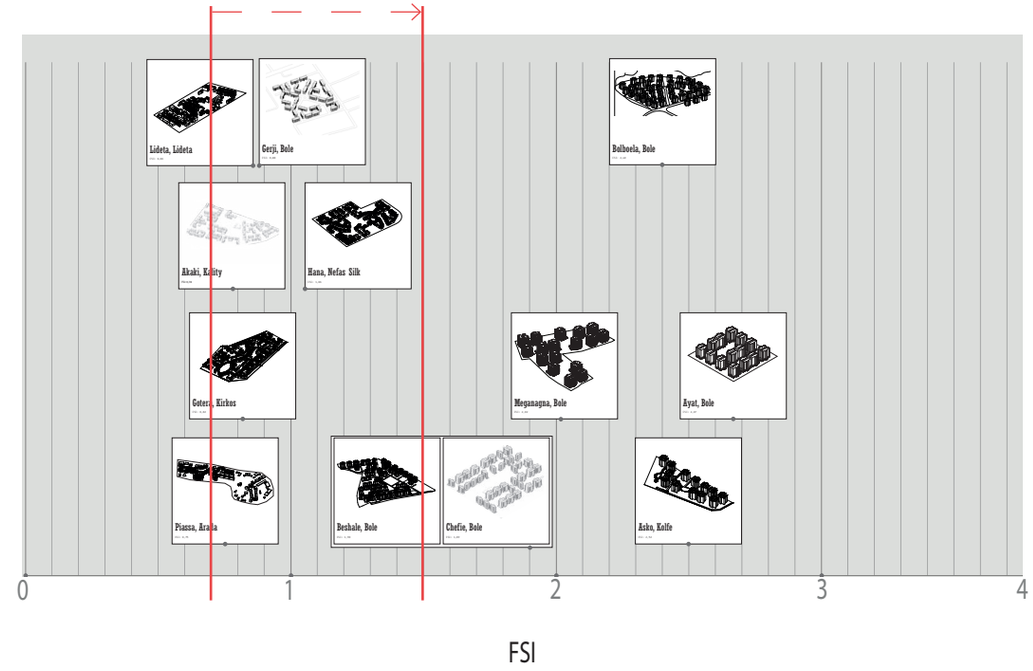
Currently

Number of Dwellings: 3850
Density: 82 dw/ha
FSI: 0,7
GSI: 0,3



Goal

Number of Dwellings: 10000 (x 2,5)
Density: 213 dw/ha (x 2,5)
FSI: 1,5 (x 2)
GSI: 0,3



Density
dw/ha - FSI

"The **boundary** is an edge where things end."

Richard Sennett in Building and Dwelling

Physical boundary
High tide in rainy season

Mental boundary
Smell

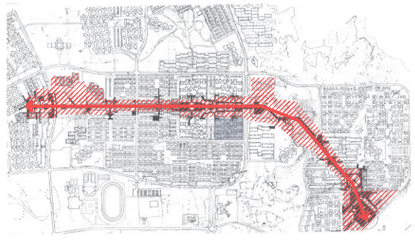
River as a boundary

physical and mental

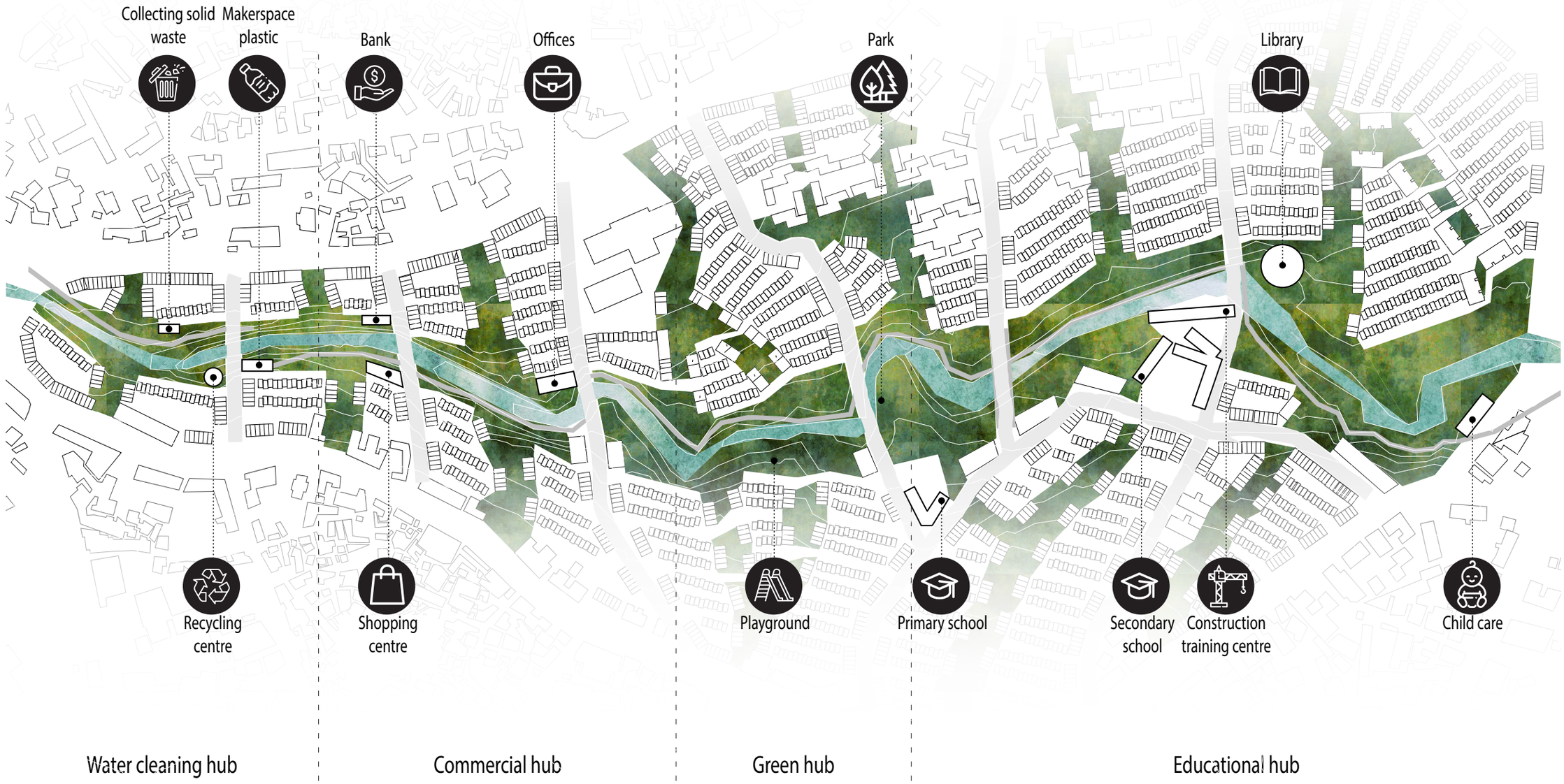
“The border is an edge where different groups interact.”

Richard Sennett in Building and Dwelling

Shushtar New Town
DAZ Architects



Connect neighbourhood
by large-scale amenities



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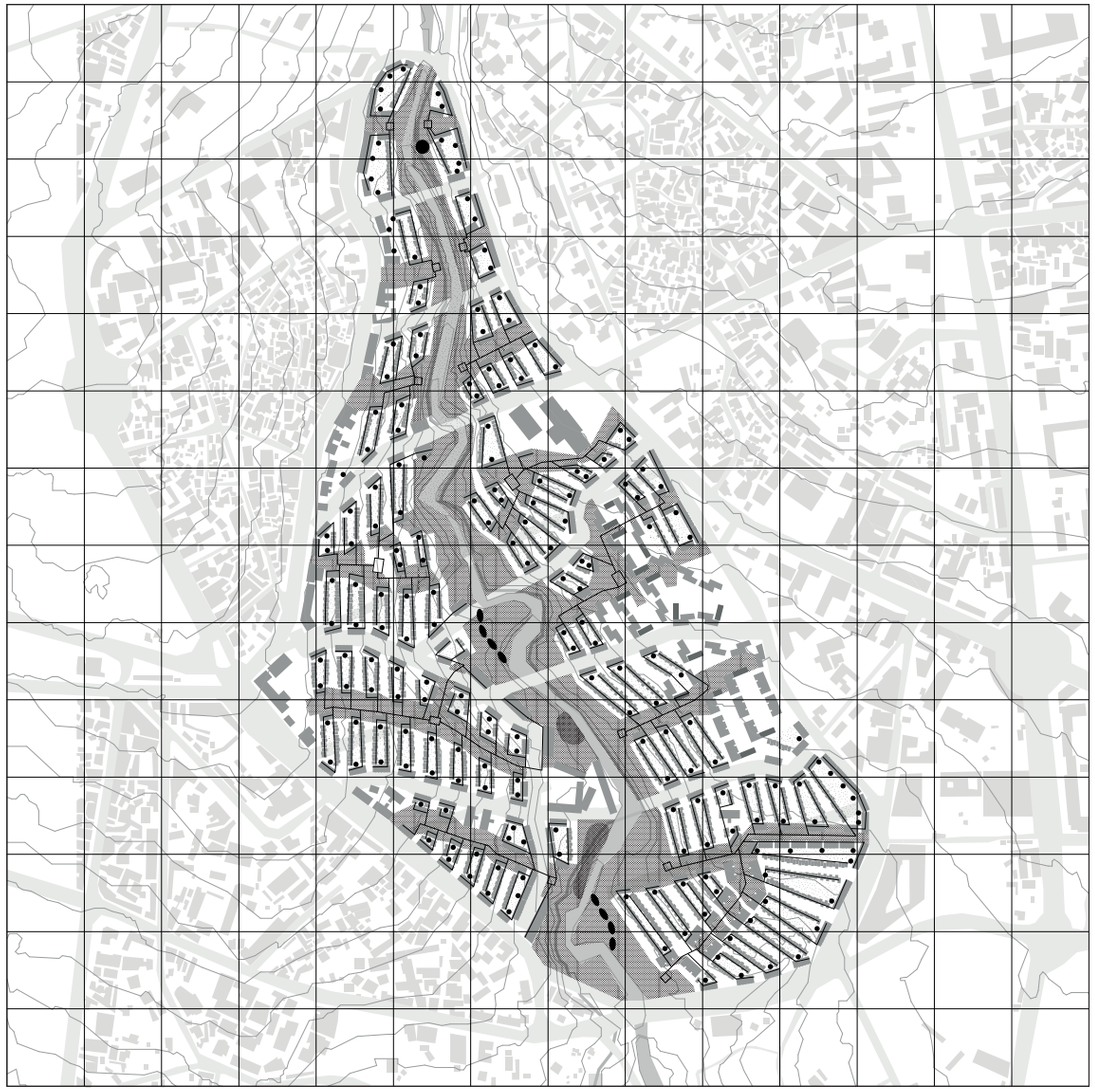
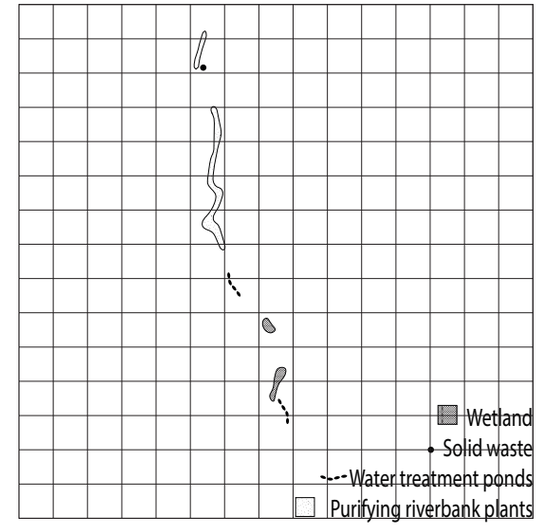
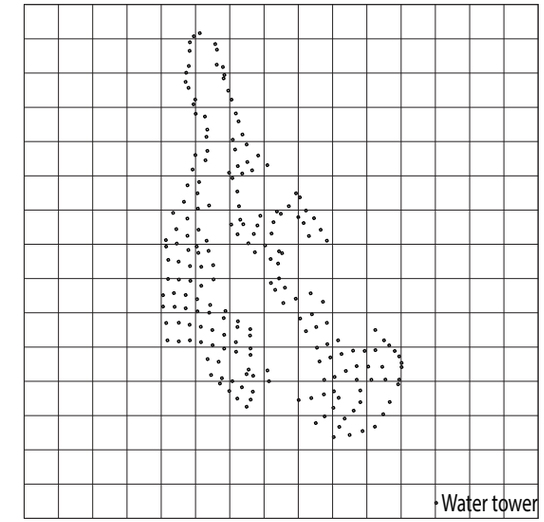


100 m

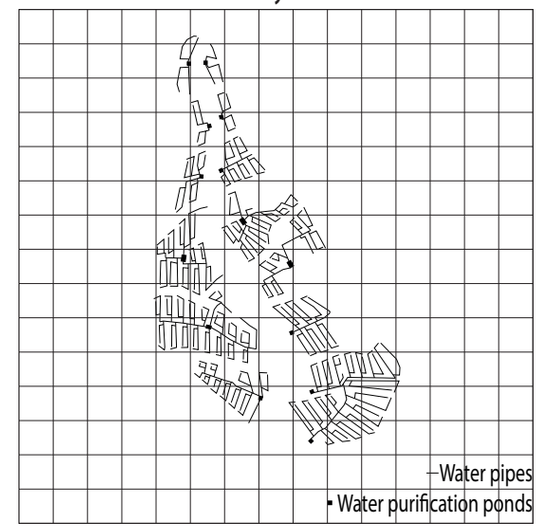
Filter



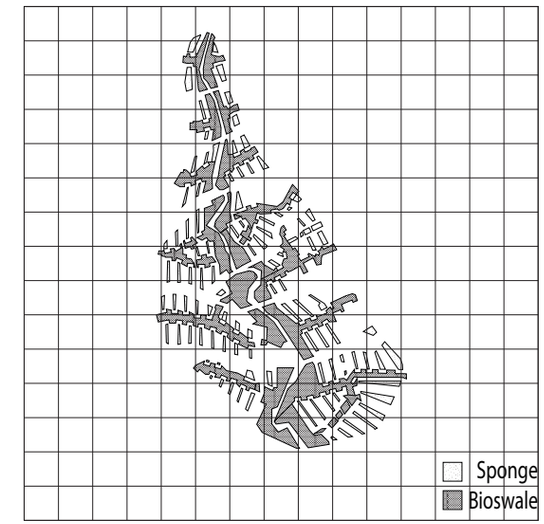
Store



Recycle



Buffer



100 m

Urban water strategy

Filter - Store - Recycle - Buffer

Revert image of living near river

by strategically positioning high income inhabitants along it

Residence of Moussie Minas

Besmelian Residence

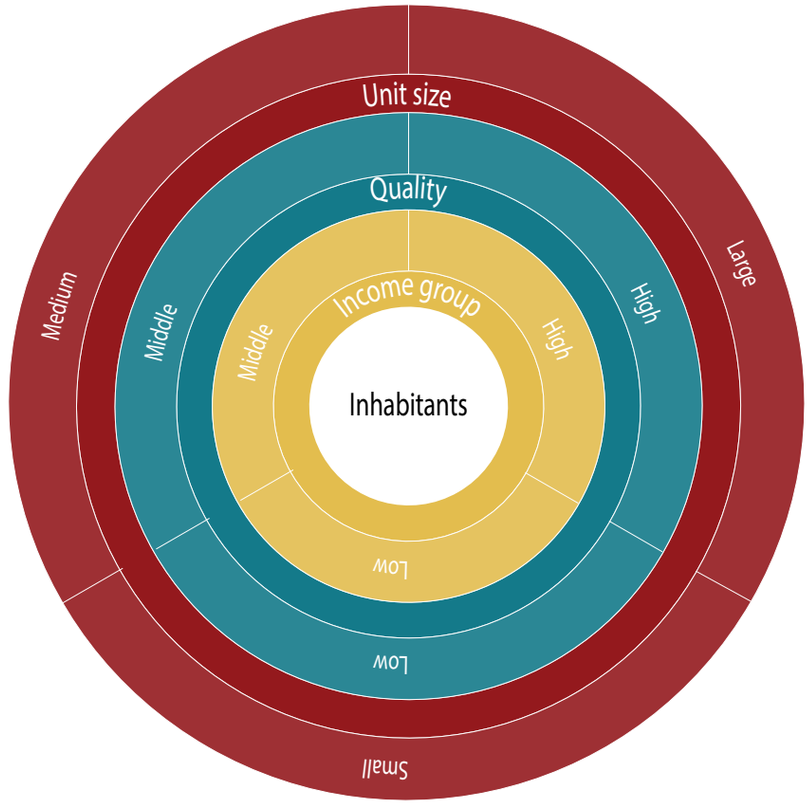
Condominium blocks

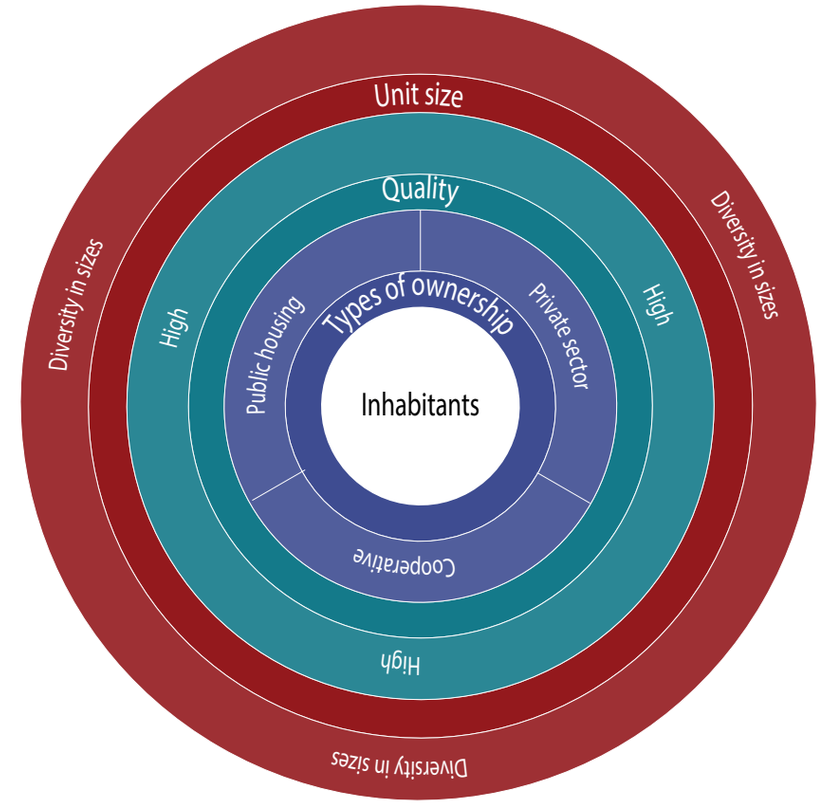
Housing
- Built
- Re-built
- Demolition
- Conservation

Roads
- Conservation
- Connection

Densify, Conserve & Connect

Buildings & roads





Diversity

in type of ownership

(Re)development in phases

Current phase

CONSTRUCTION CENTRE

Financed: NGO (Selam Children's Village & Training Centres)

Built by: Building contractor (concrete plateau and wall)
Local builder (chika wall, corrugated metal roof)

(Re)development in phases
Phase 1

(Re)development in phases

Phase 2

NEW DWELLINGS

Phase 2

Public	228
Private	120
Cooperative	336
Total	**684**

(Re)development in phases

Phase 3

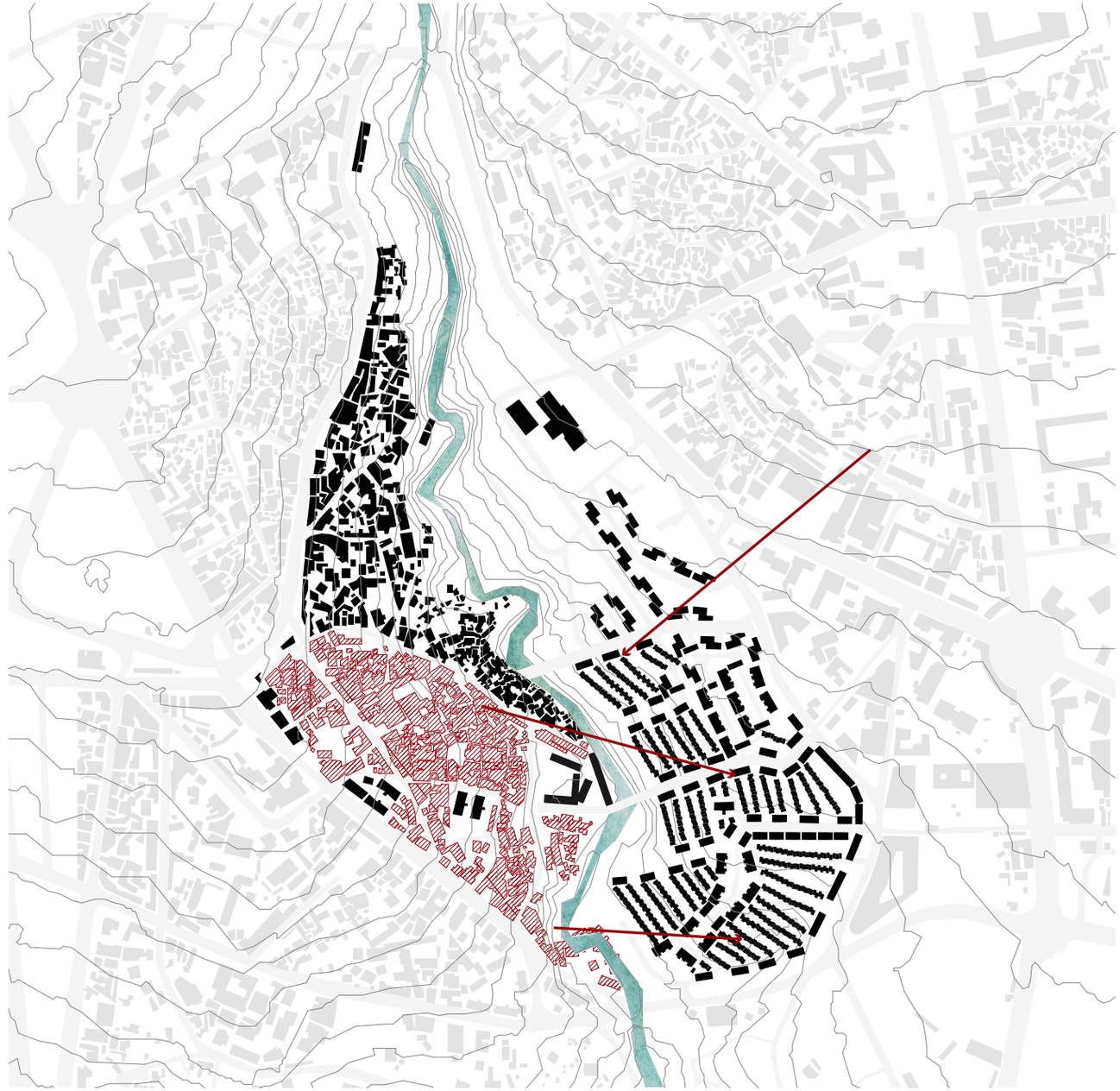
(Re)development in phases

Phase 4

NEW DWELLINGS

Phase 4

Public	399
Private	205
Cooperative	588
Total	**1192**



(Re)development in phases

Phase 5

(Re)development in phases

Phase 6

NEW DWELLINGS

Phase 6

Public	769
Private	395
Cooperative	1134
Total	**2298**

(Re)development in phases

Phase 7

(Re)development in phases

Phase 8

NEW DWELLINGS

Phase 8

Public	941
Private	495
Cooperative	1386
Total	**2822**

(Re)development in phases

Phase 9

(Re)development in phases

Phase 10

NEW DWELLINGS

Phase 10

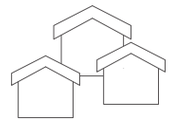
Public	513
Private	285
Cooperative	756
Total	**1554**

(Re)development in phases

Phase 11

CURRENT SITUATION

3850 dwellings

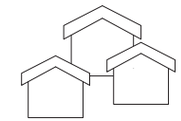


2400 demolished

1450 conserved

FUTURE SITUATION

10 000 dwellings



1450 conserved

8550 newly built

4200 cooperative dwellings

Rent-to-own

2850 public dwellings

Rent

1500 private dwellings

Sale

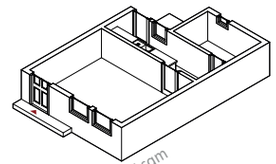
Development goal

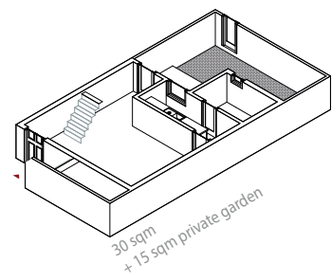
10 000 dwellings

CROSS SUBSIDY

4200 cooperative dwellings

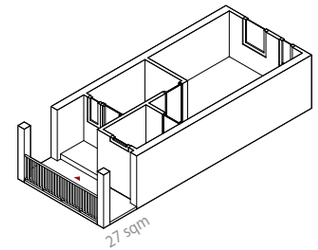
Rent-to-own

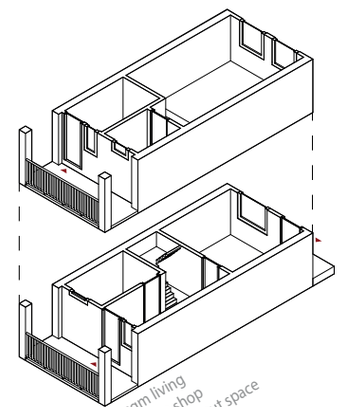




2850 public dwellings

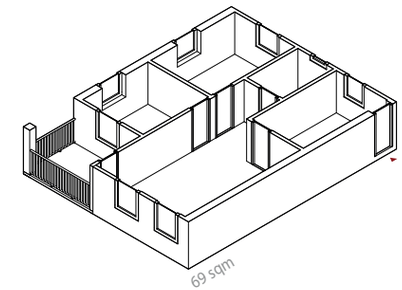
Rent

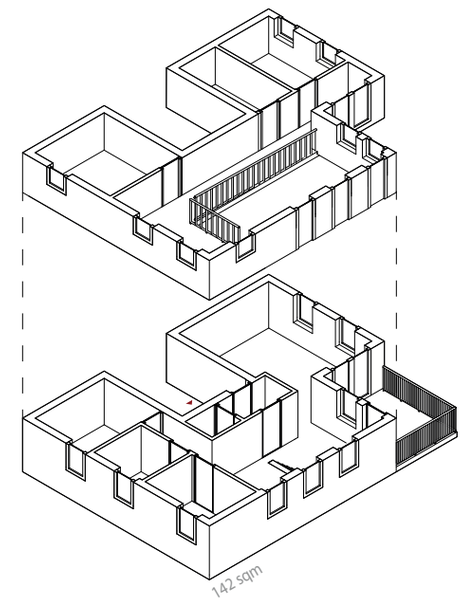




1500 private dwellings

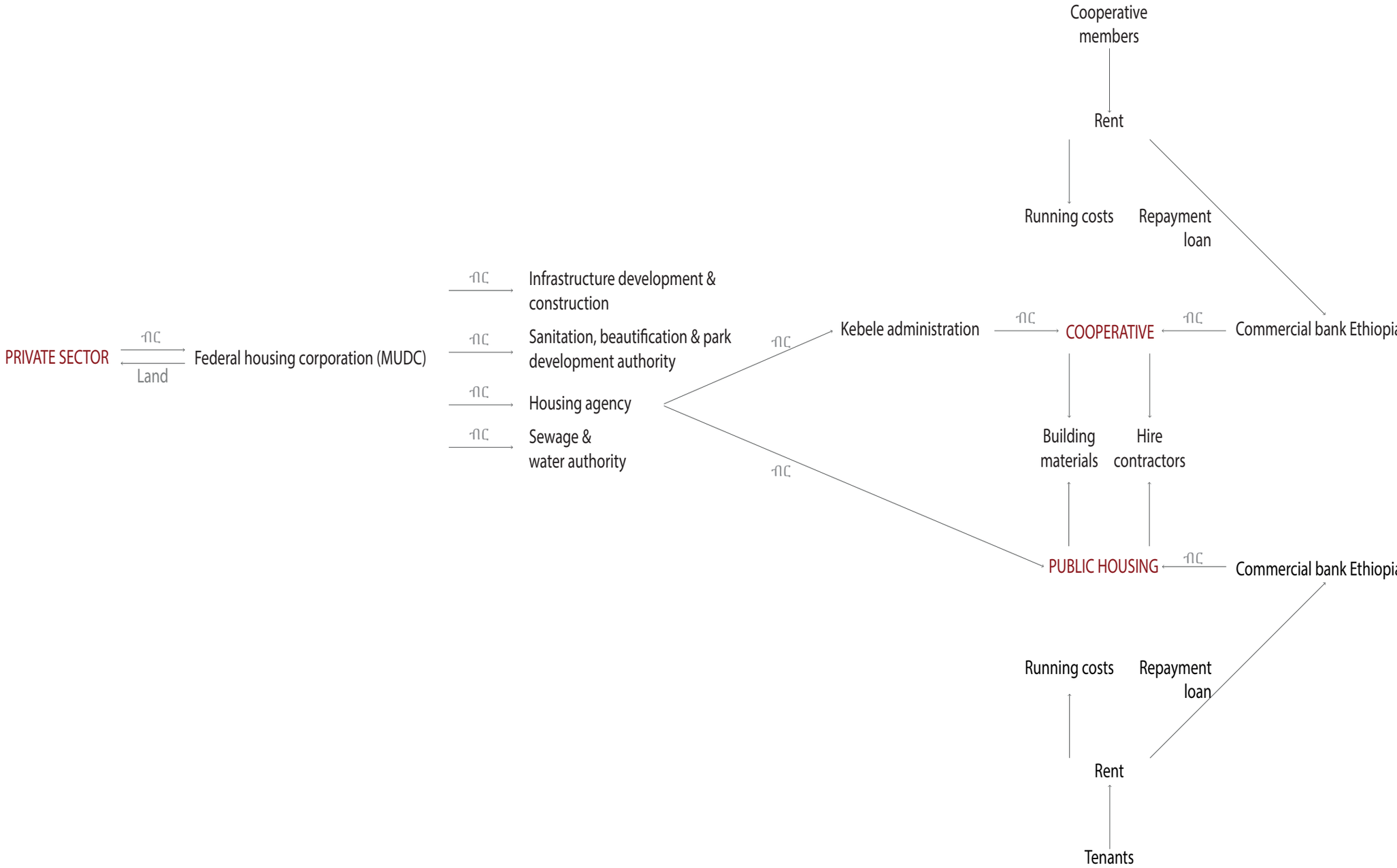
Sale



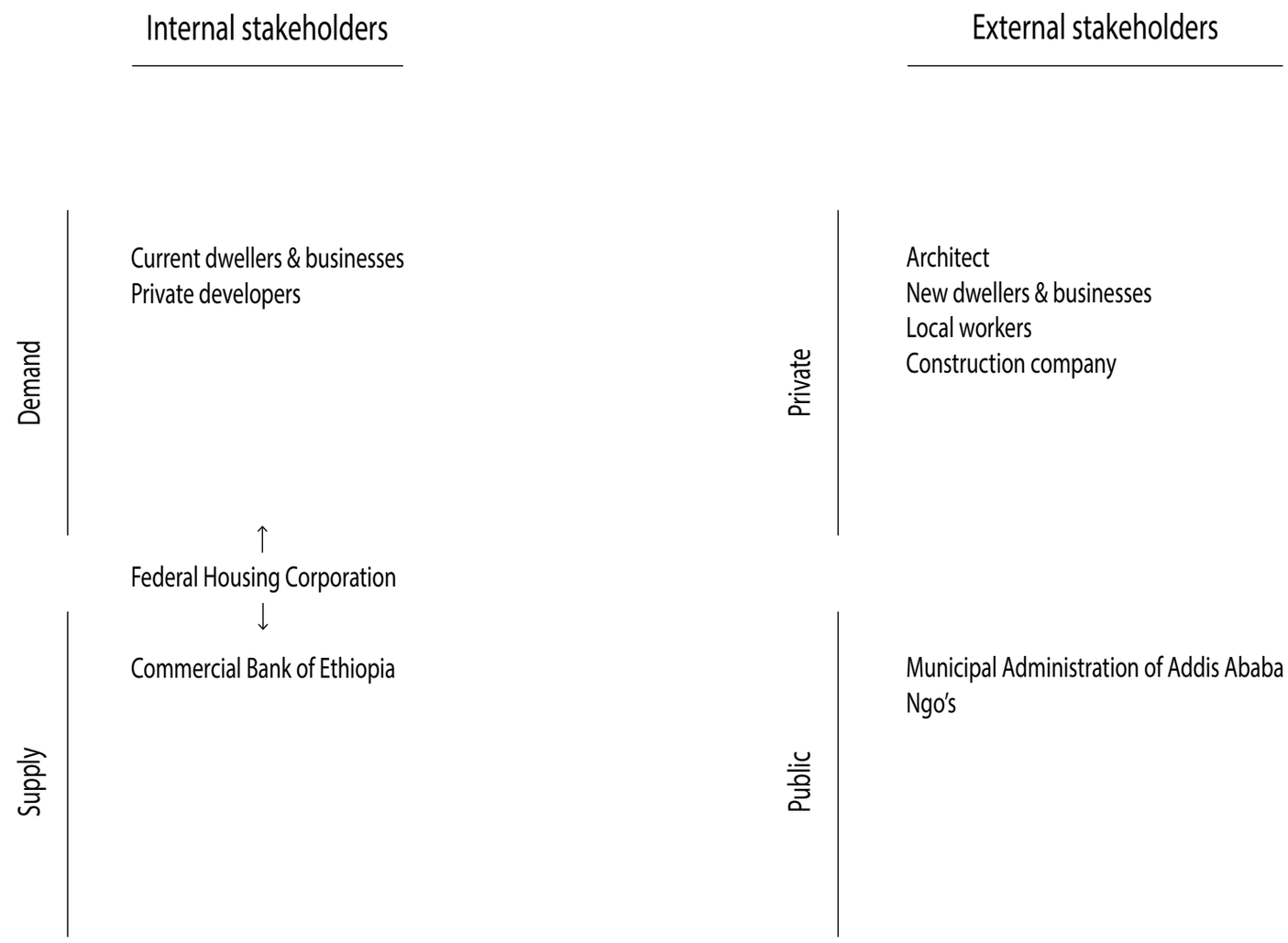


Cross subsidy

Private ⟶ Cooperative & Public

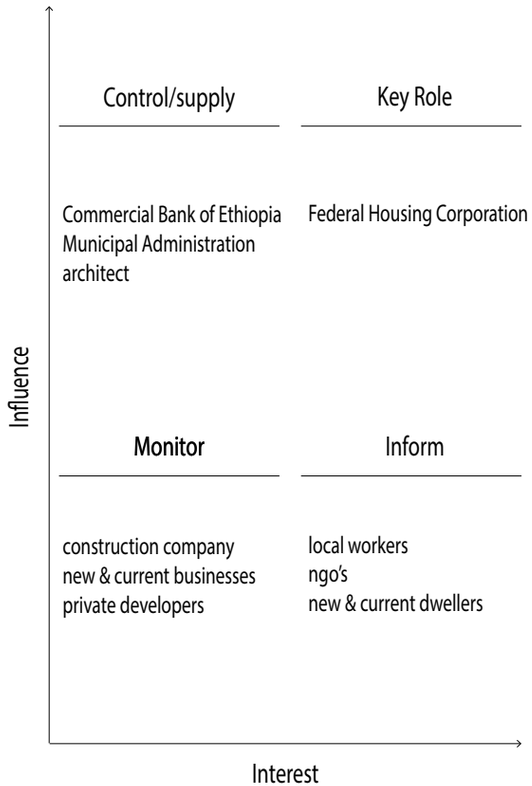

Cooperative members
Rent
Running costs
Repayment loan
Infrastructure development & construction
Sanitation, beautification & park development authority
Housing agency
Sewage & water authority
PRIVATE SECTOR
Land
Federal housing corporation (MUDC)
Kebele administration
COOPERATIVE
Commercial bank Ethiopia
Building materials
Hire contractors
PUBLIC HOUSING
Commercial bank Ethiopia
Running costs
Repayment loan
Rent
Tenants

Cash flow

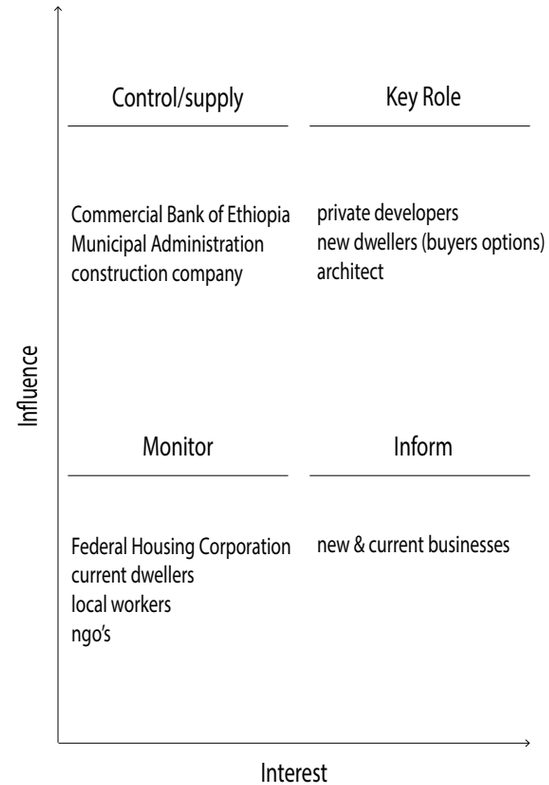


Stakeholder mapping

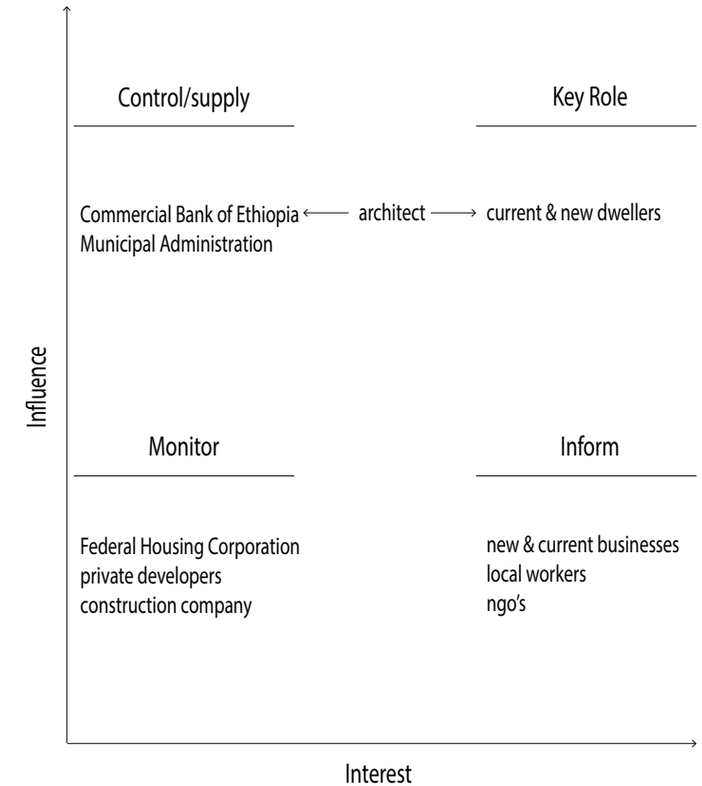
Public dwellings



Private dwellings

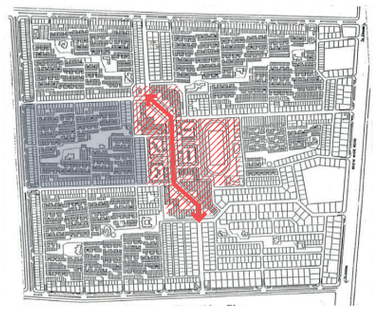


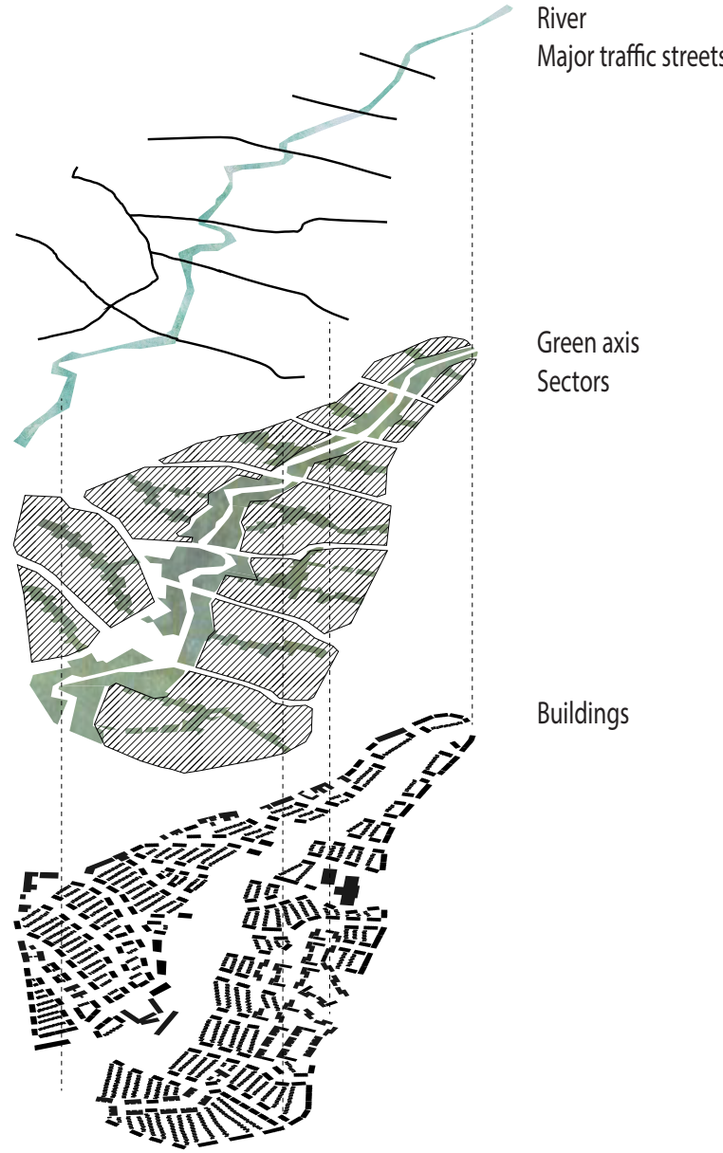
Cooperative dwellings



Role of stakeholders

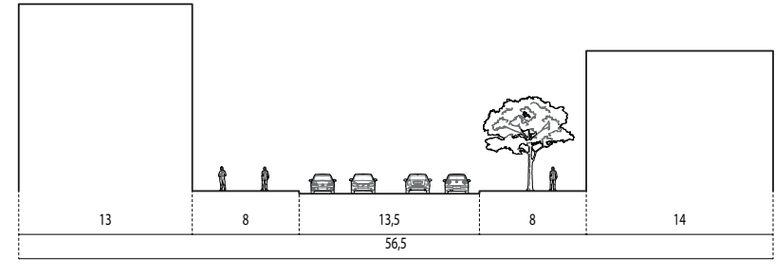
Aranya
B.V. Doshi



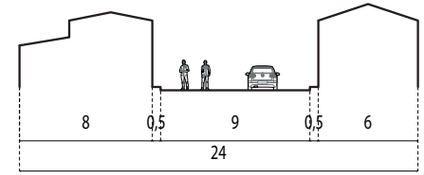


Sectors

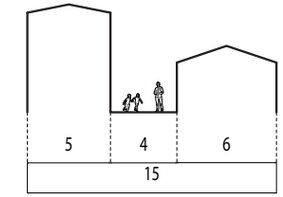
Sector 4



Street condition

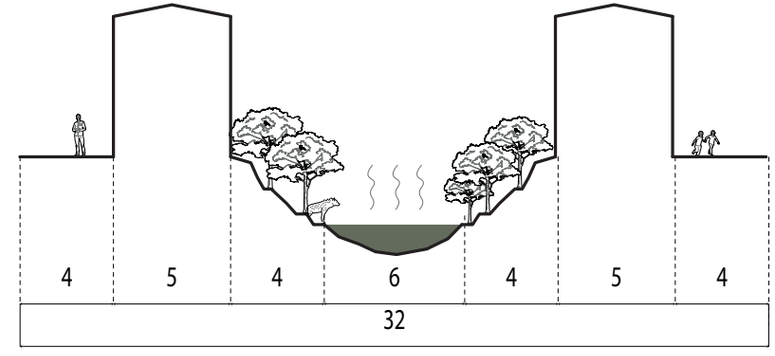


Car traffic

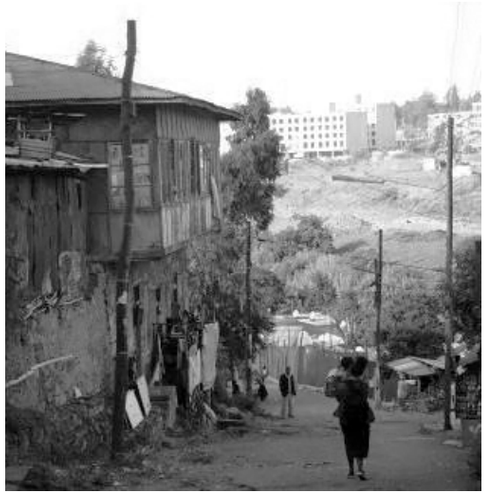


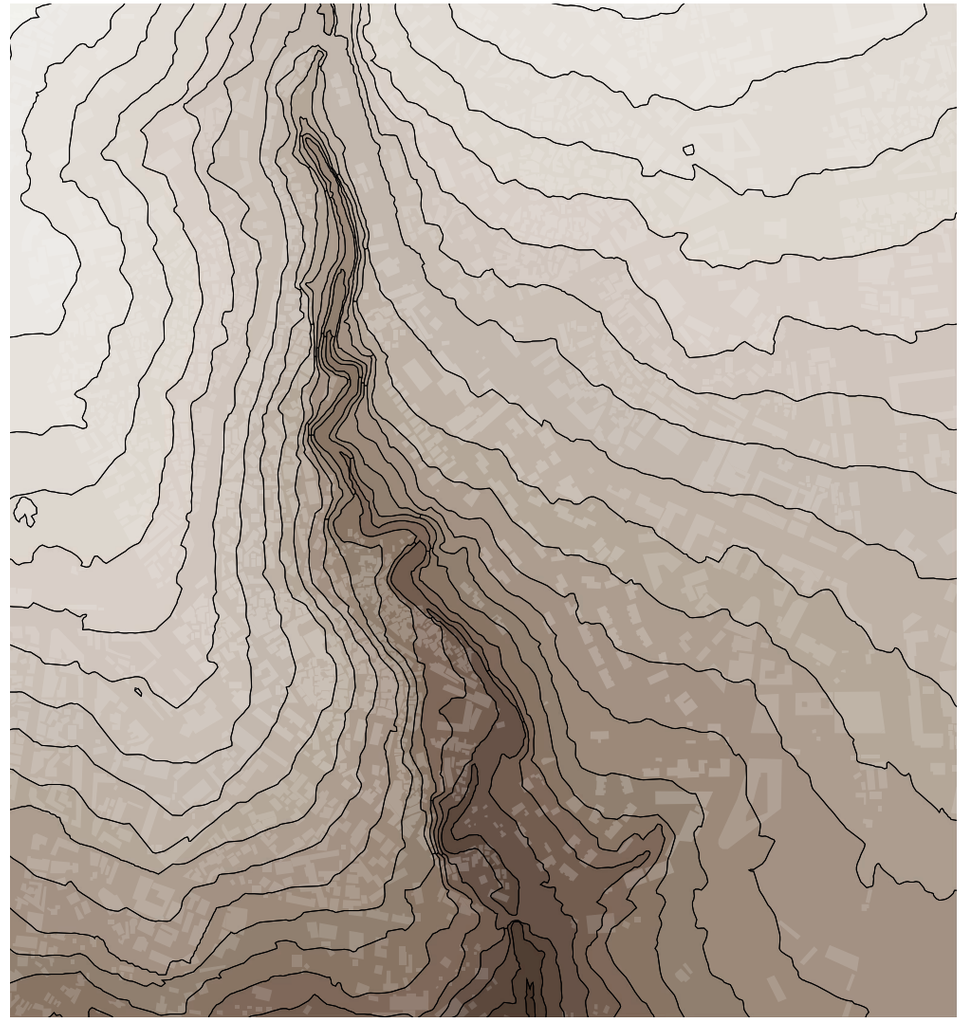
Pedestrian traffic

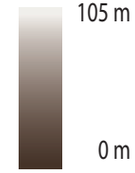
In-between condition



River condition

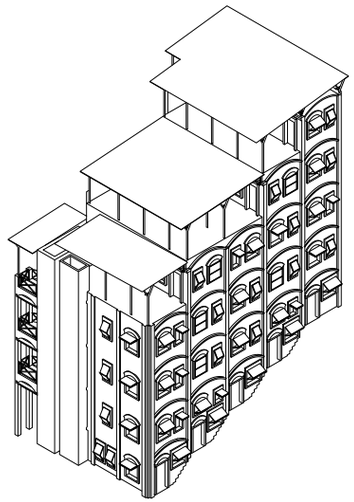


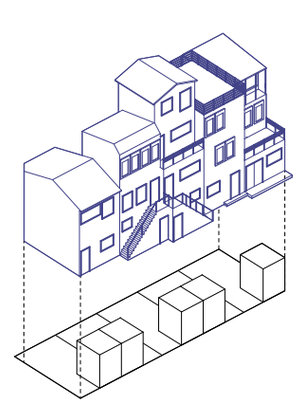


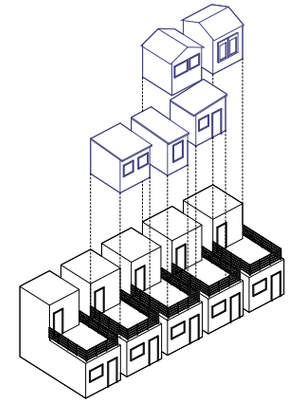


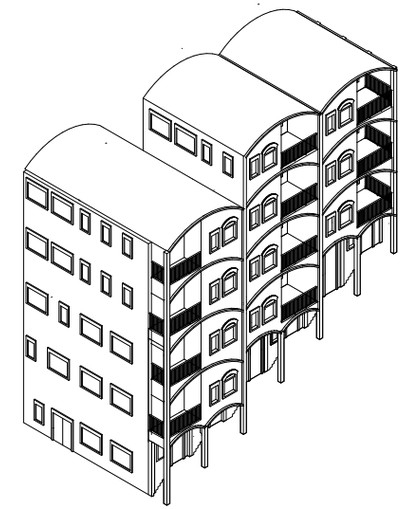
Topography

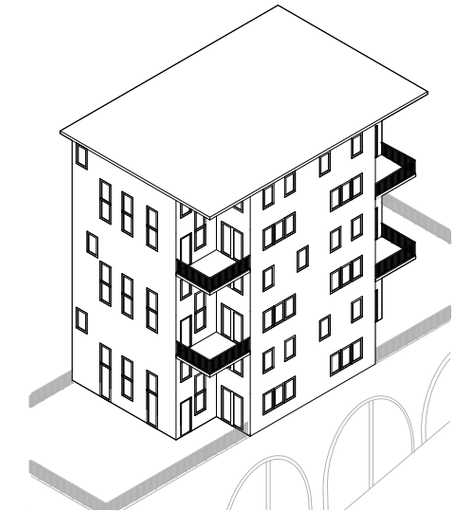
Four urban conditions











Building typologies

adjusted to the urban condition

Vegetable seller at Atikilt Tera

Income

Family size

Amara sells vegetables everyday at the local market. She lives together with her mother and four children.

Carpenter at local workshop

Income

Family size

Kaleb repairs furniture and roofs to provide for his wife and his two children.

Teacher at elementary school

Income

Family size

While her husband is out for work, Kayla teaches children at the local school. Their three kids also go to that particular school.

Employee at embassy

Income

Family size

Salim works at the embassy at weekdays and enjoys the weekend with his wife and their two children.

community feeling

underground parking

elevator

informal markets

privacy

renting out extra room

safe neighbourhood

flexible housing arangment

panoramic view

large balcony

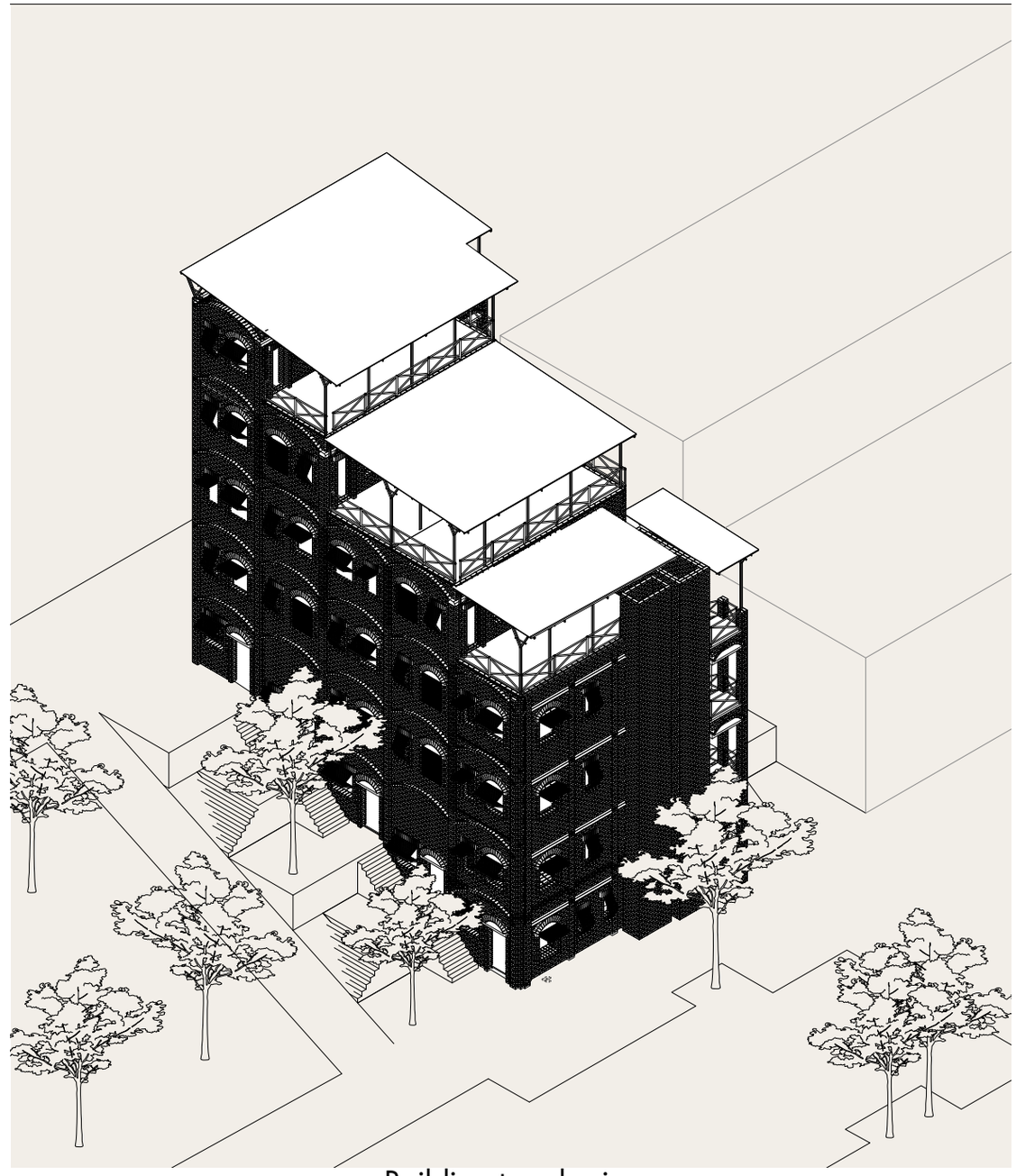
live/work unit

formal shops

open space

Aspirations

of different income groups



Amara

Amara sells vegetables everyday at the local market. She lives together with her mother and four children.

Job

Vegetable seller at Atikilt Tera

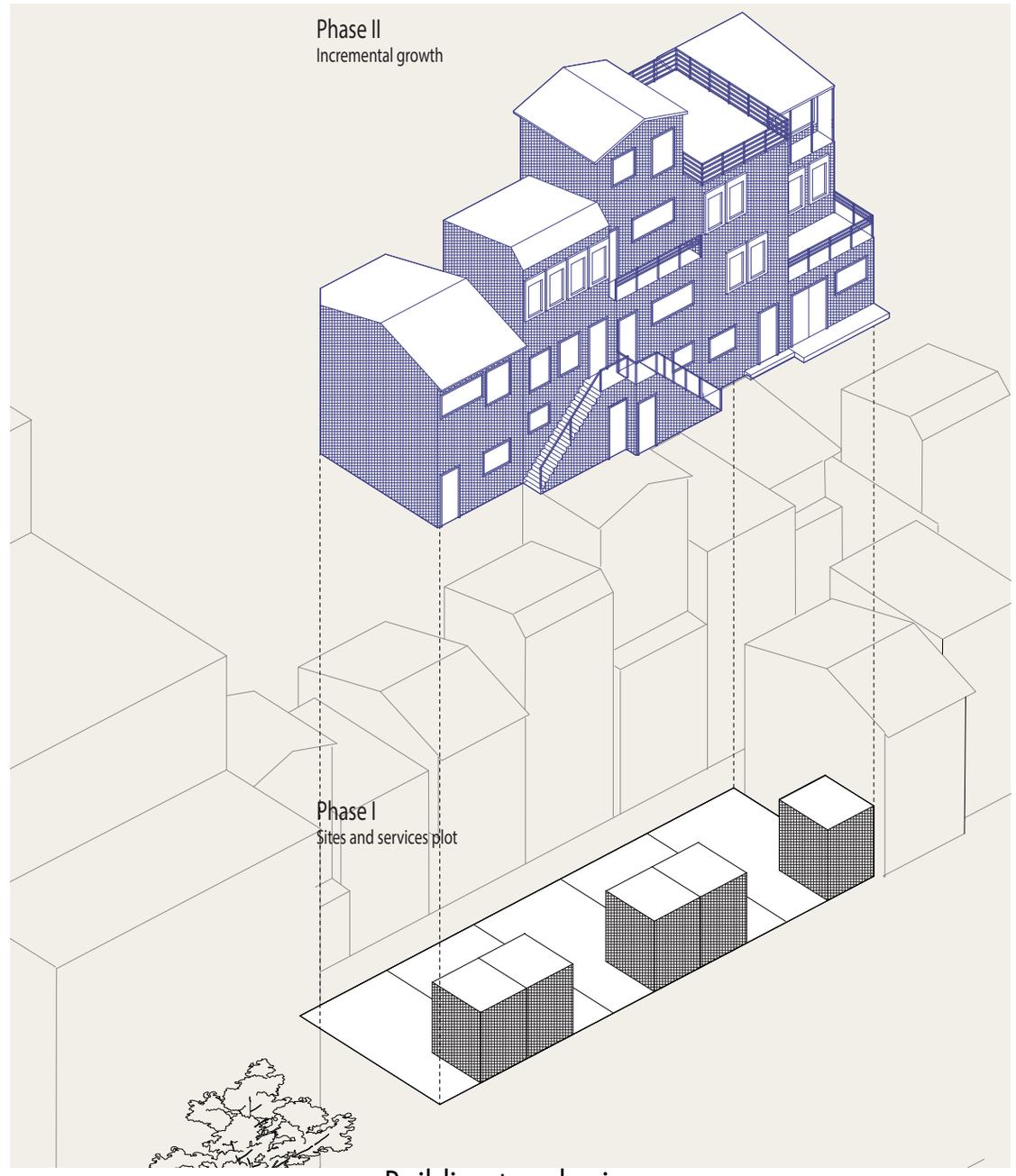
Income

Family size

Aspirations

Community feeling
Informal markets
Renting out extra room
Safe neighbourhood
Flexible housing arangement
Live/work unit
Open space

Building typologies
EWS-Park building



Carpenter at local workshop

Income

Family size

Kaleb repairs furniture and roofs to provide for his wife and his two children.

community feeling

informal markets

renting out extra room

safe neighbourhood

flexible housing arangment

live/work unit

open space

<10%

Building typologies

LI-Incremental building

>10%

Phase II
Incremental growth

Phase I
Starters home

Carpenter at local workshop

Income

Family size

Kaleb repairs furniture and roofs to provide for his wife and his two children.

community feeling

informal markets

renting out extra room

safe neighbourhood

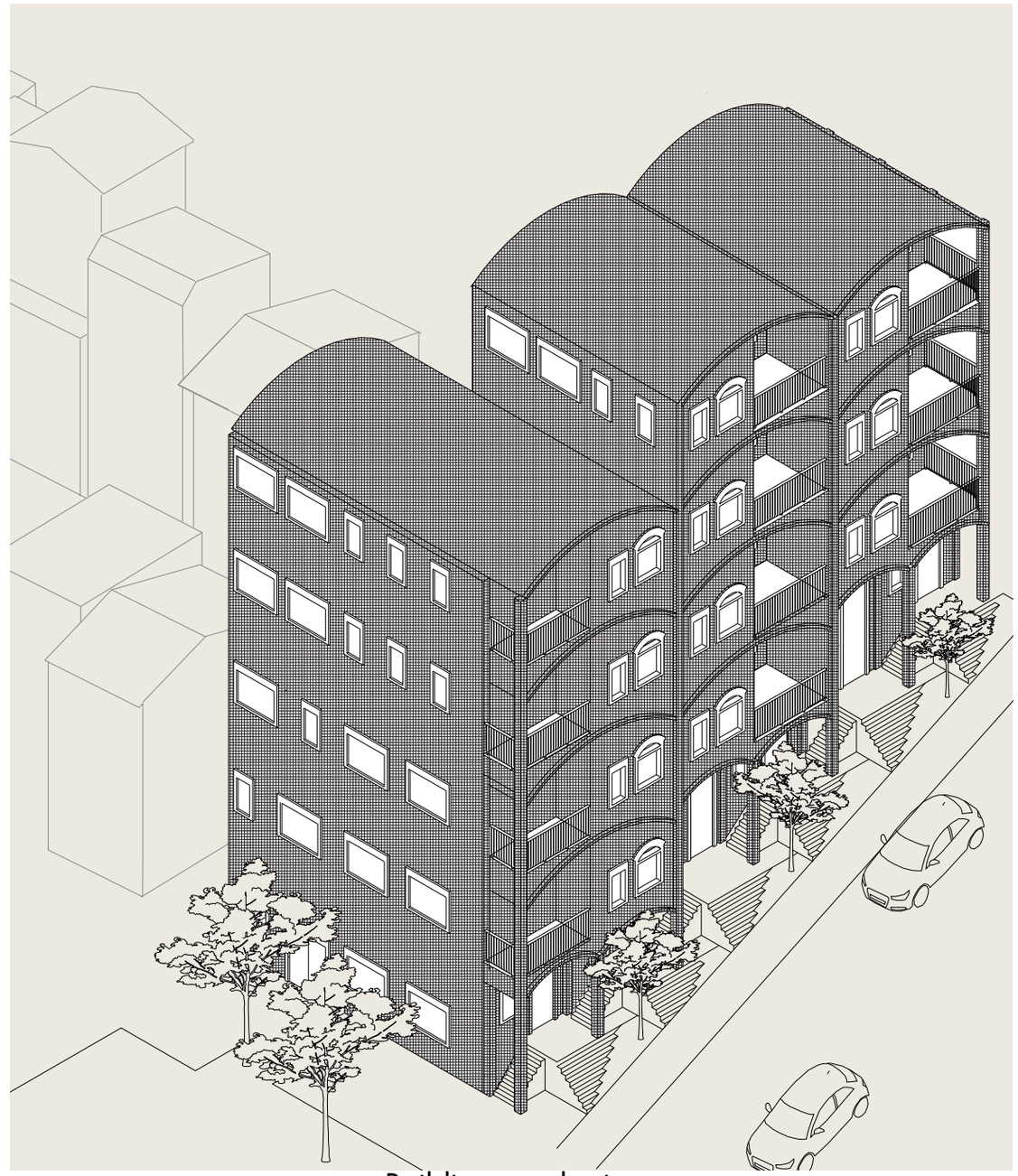
flexible housing arangment

live/work unit

open space

Building typologies

LI-Incremental building



Teacher at elementary school

Income

Family size

While her husband is out for work, Kayla teaches children at the local school. Their three kids also go to that particular school.

community feeling

underground parking

elevator

safe neighbourhood

flexible housing arangment

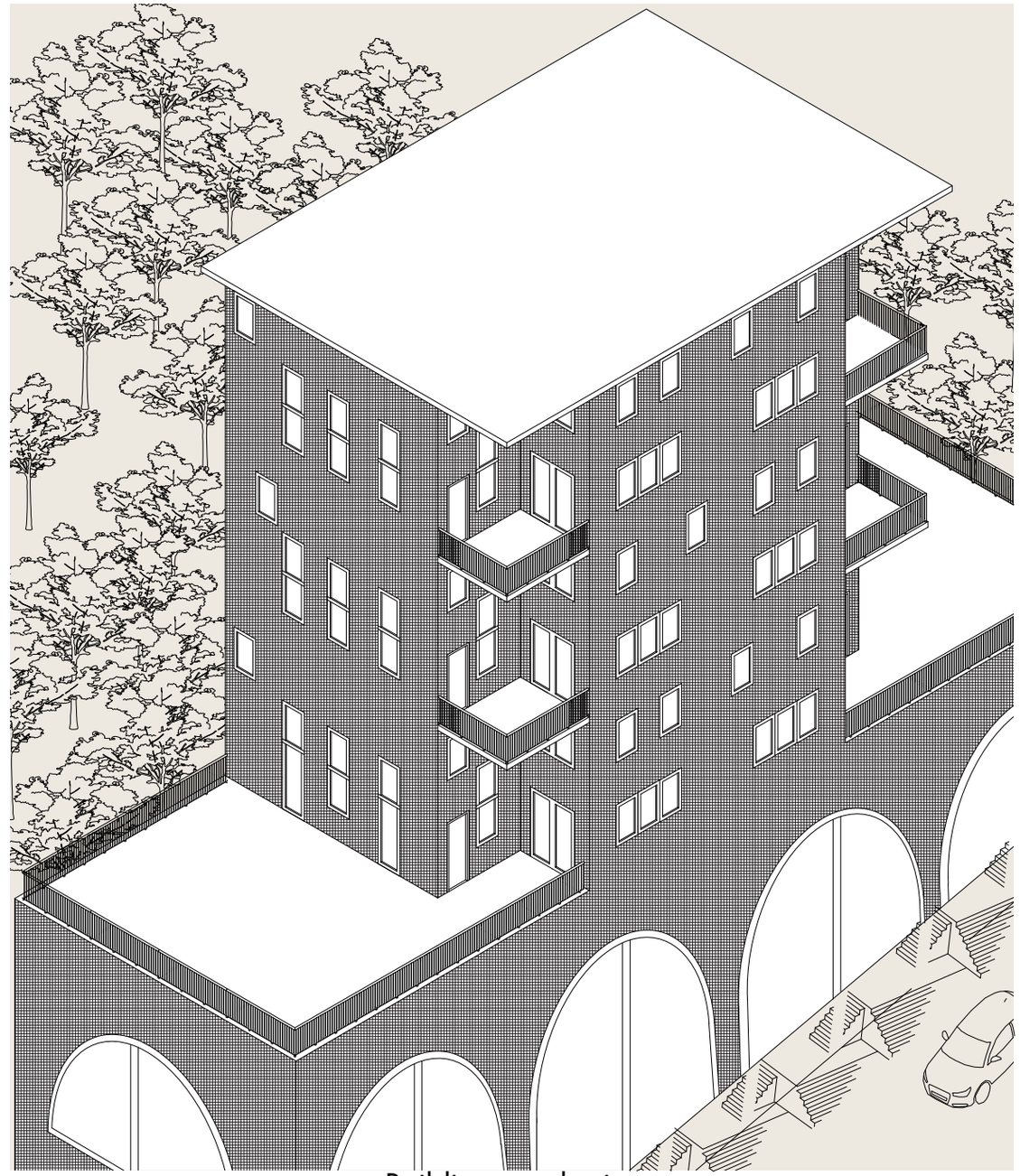
large balcony

formal shops

open space

Building typologies

MI - street building



Employee at embassy

Income

Family size

Salim works at the embassy at weekdays and enjoys the weekend with his wife and their two children.

underground parking

elevator

privacy

safe neighbourhood

panoramic view

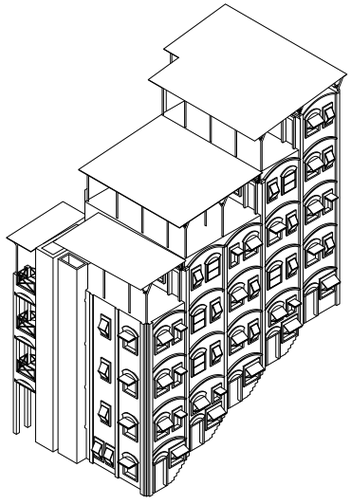
large balcony

formal shops

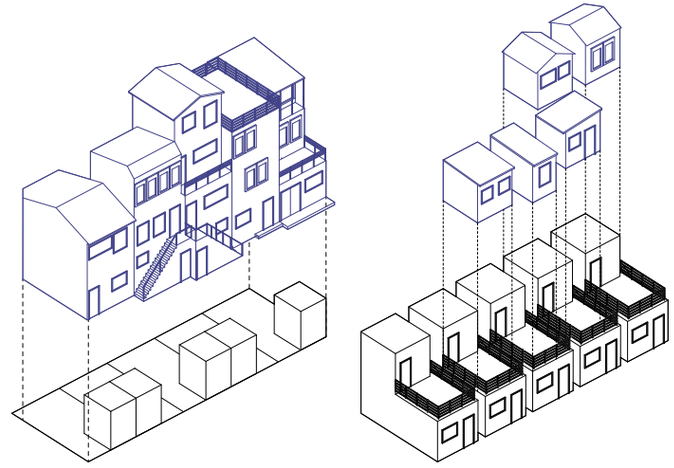
open space

Building typologies

HI - river building



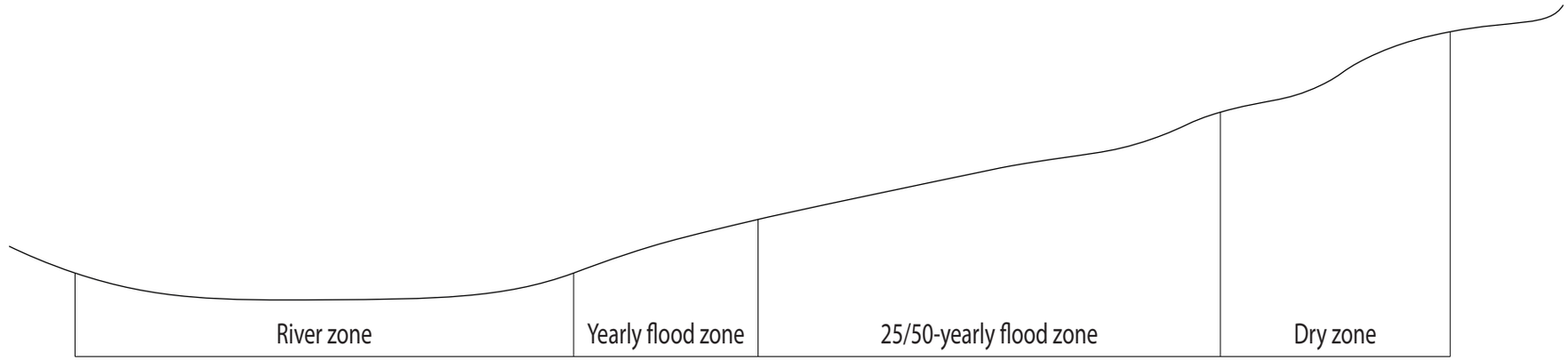
Public housing



Cooperative housing

Private housing

Type of ownership
for each building block



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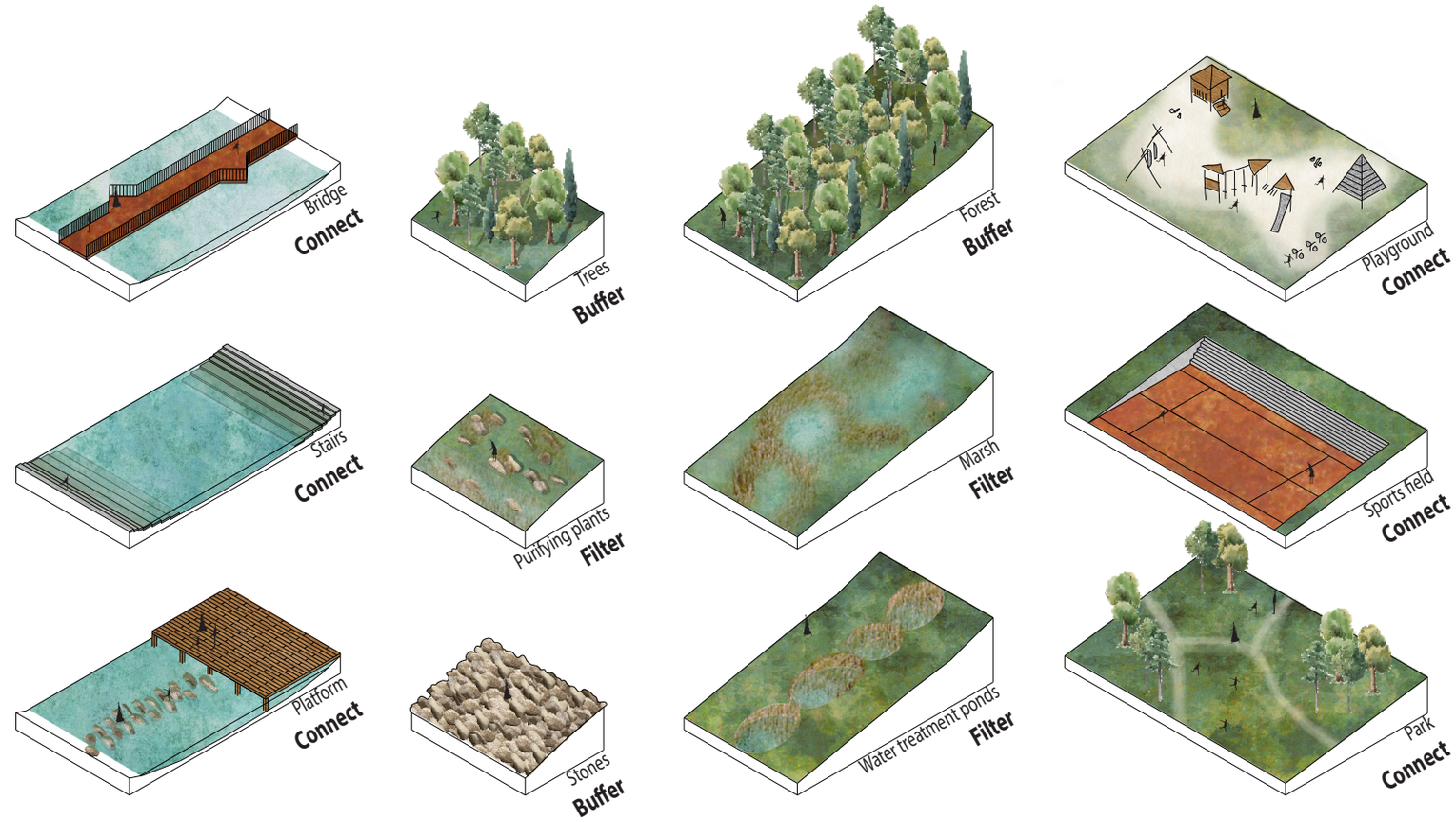
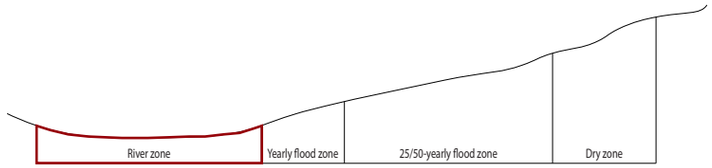
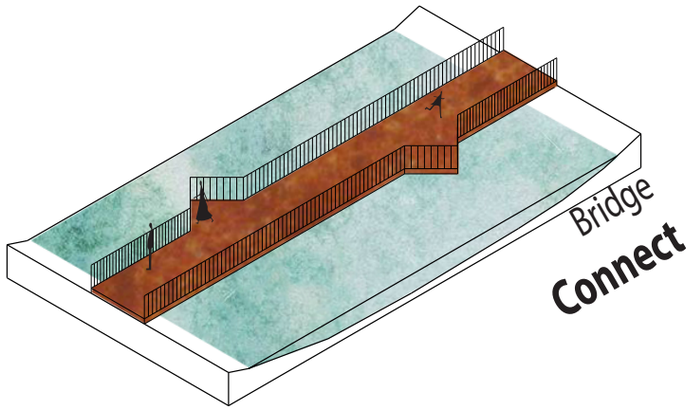
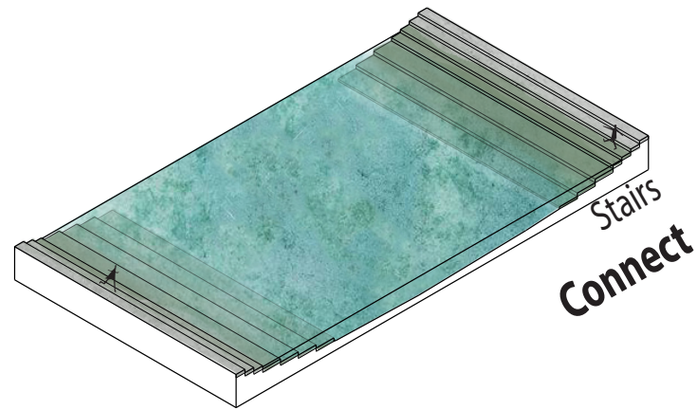
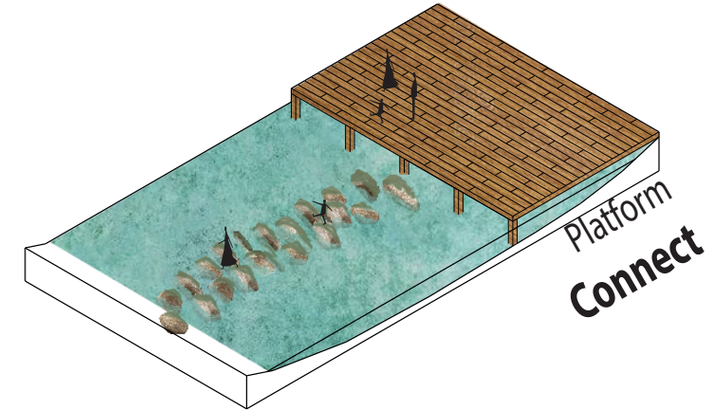


Riverine area
different conditions

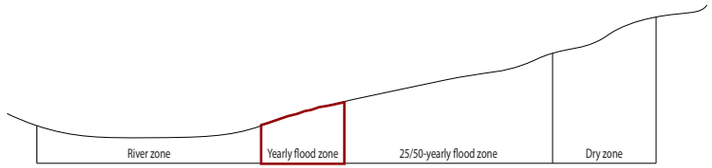

River zone
Yearly flood zone
25/50-yearly flood zone
Dry zone

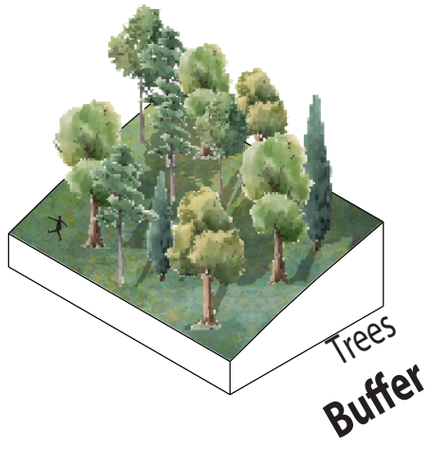

Bridge
Connect

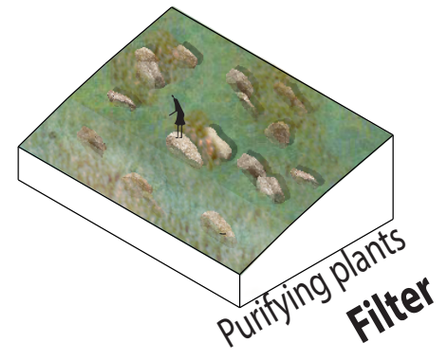

Stairs
Connect

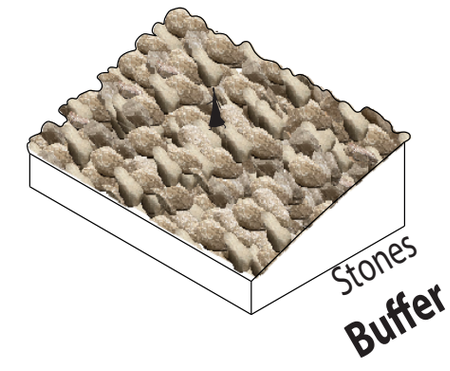

Platform
Connect

River zone

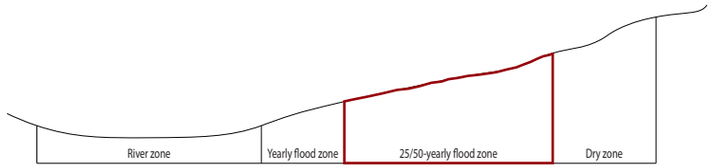


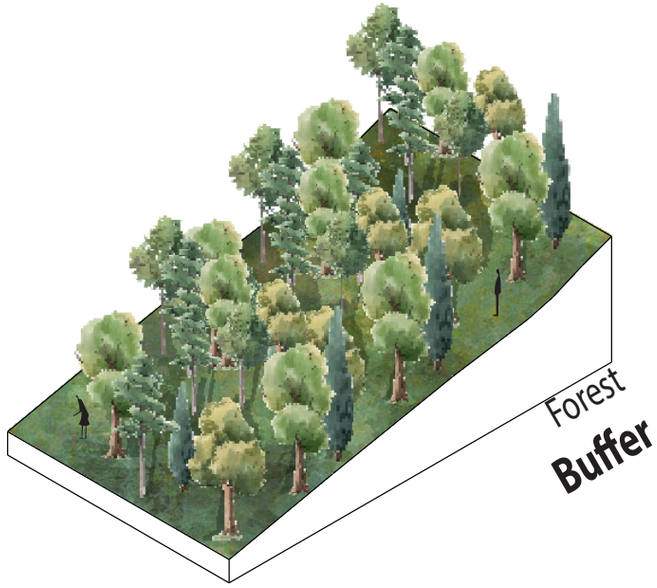


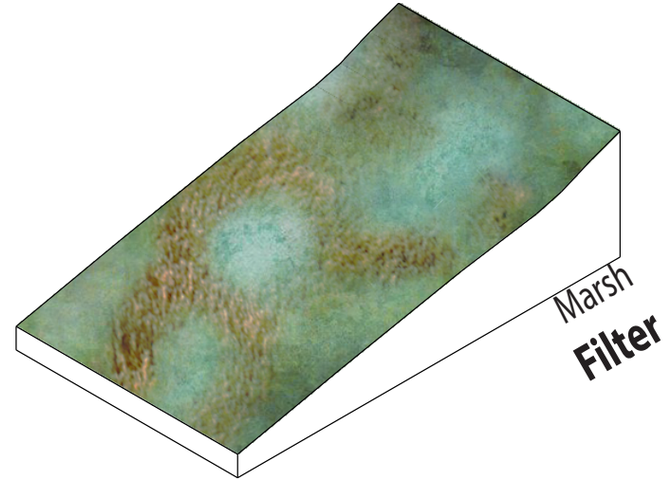


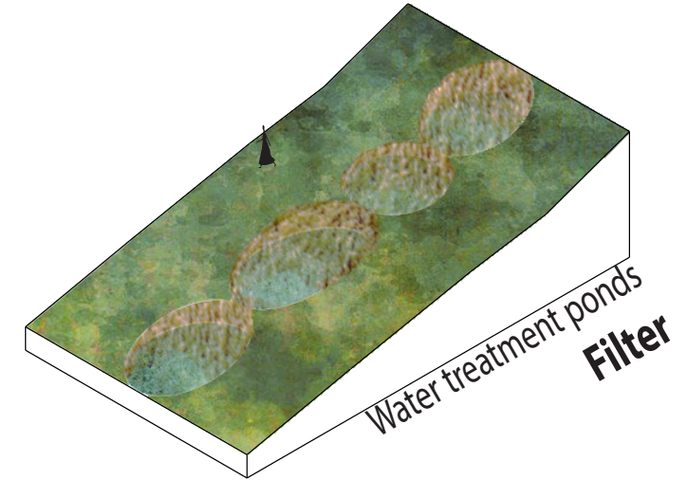


Yearly flood zone

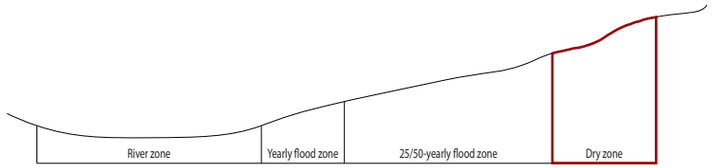


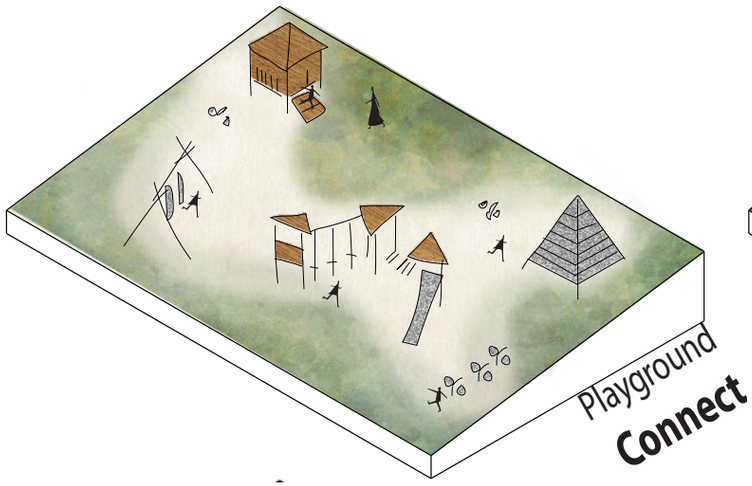


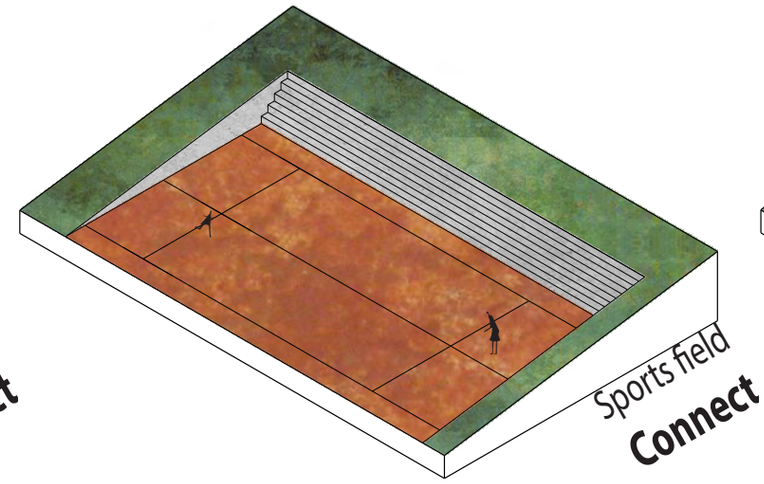


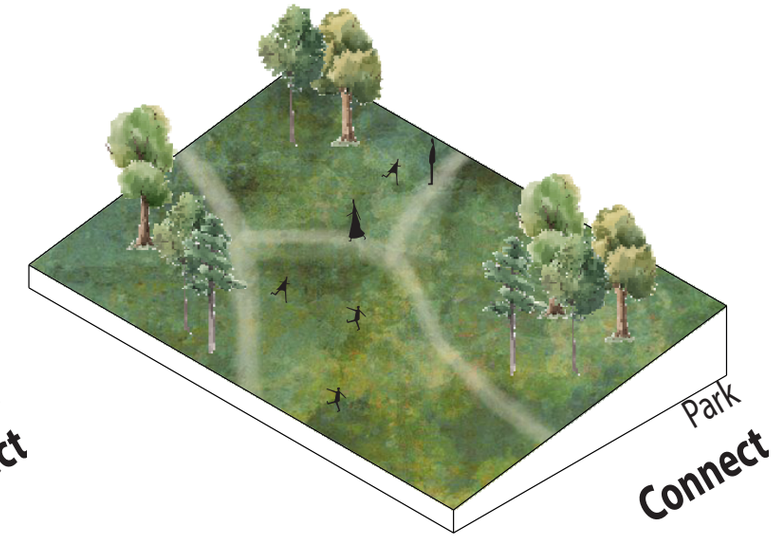


25/50-Yearly flood zone

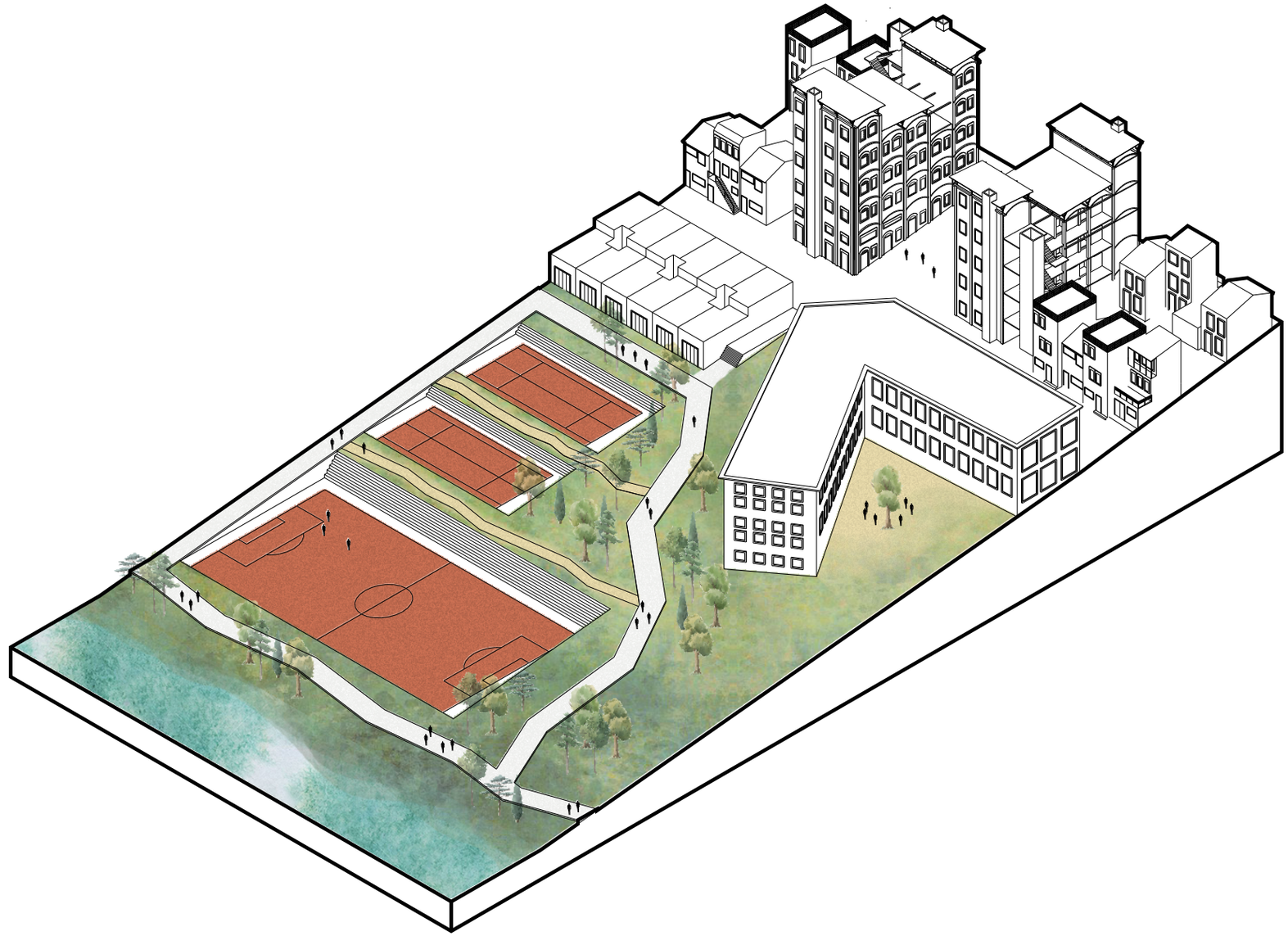

River zone
Yearly flood zone
25/50-yearly flood zone
Dry zone


Playground
Connect


Sports field
Connect


Park
Connect

Dry zone



River

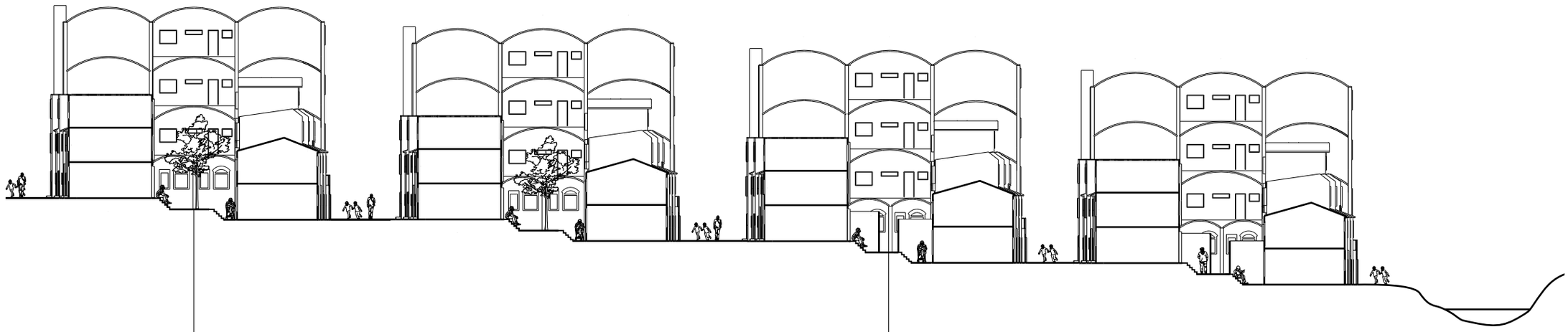
combination of the different zones

Cluster

Two types of clusters

Communal compound

Byelaw terraced cluster



Collective garden
- Washing
- Cooking
- Playing
- Drinking coffee

Private open-to-sky space
- Service corridor
- Backdoor access
- Putting out garbage

Section through clusters

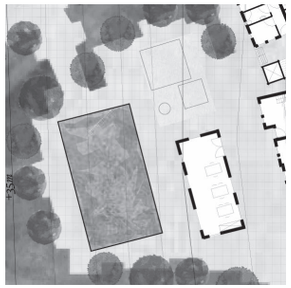
Communal compound

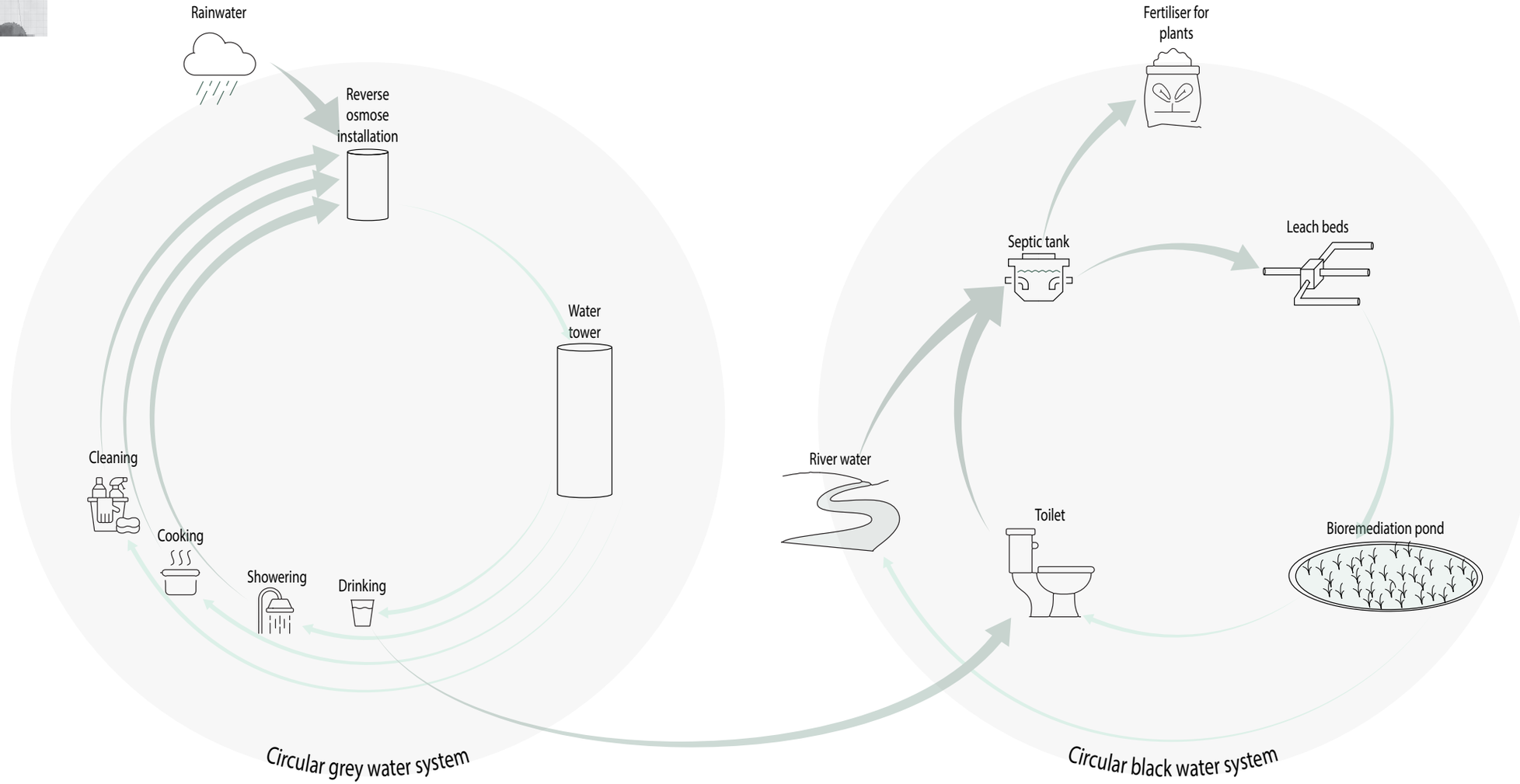
Communal compound

Plan 0

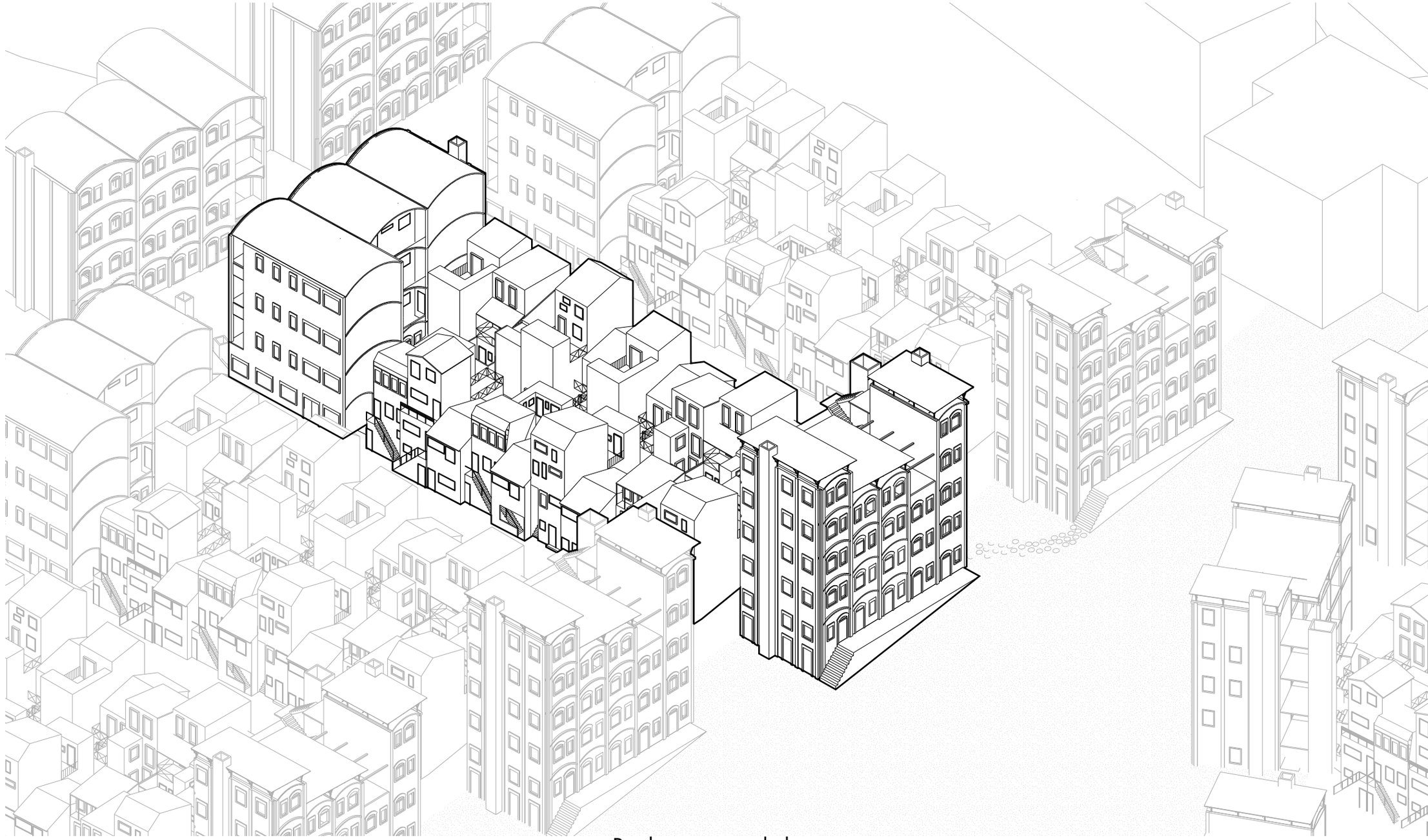
Communal compound

Plan 1





Decentralised water system



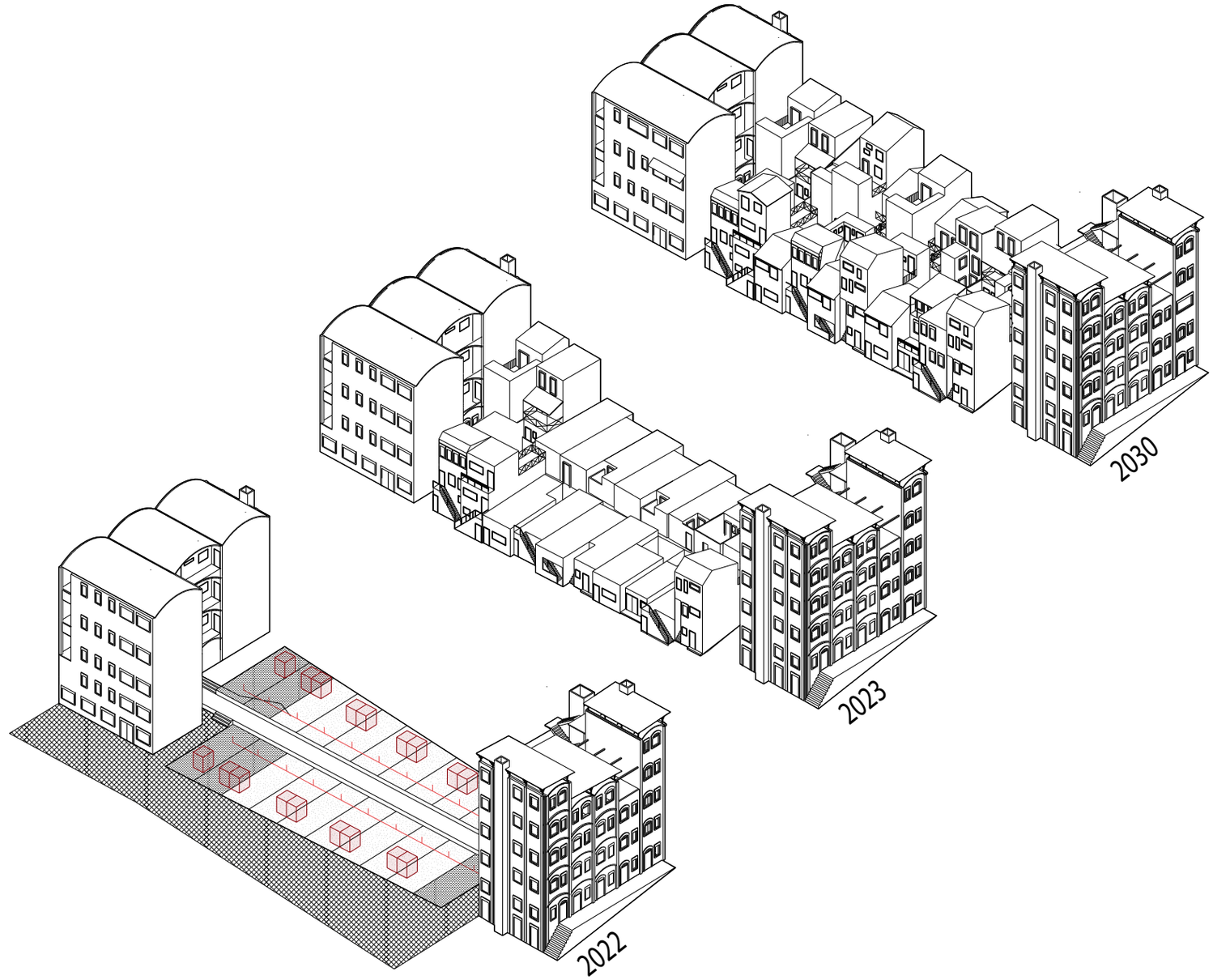
Byelaw terraced cluster

Byelaw terraced cluster

Plan 0

Byelaw terraced cluster

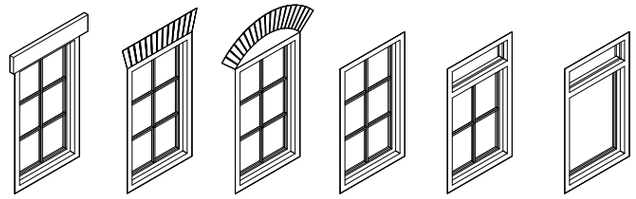
Plan 1



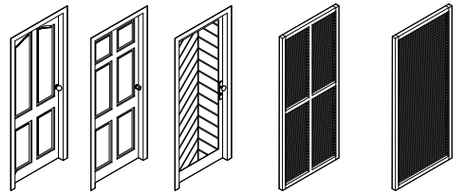
Development over time

Byelaw terraced cluster

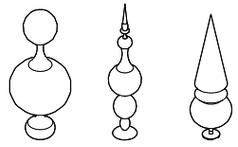
Window



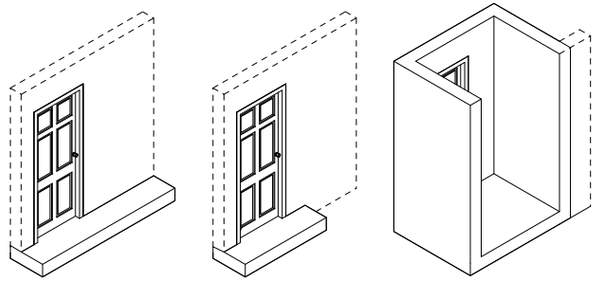
Door



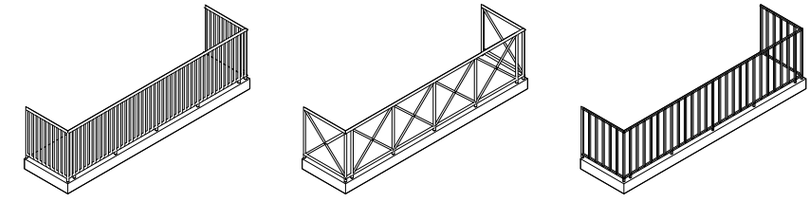
Filial



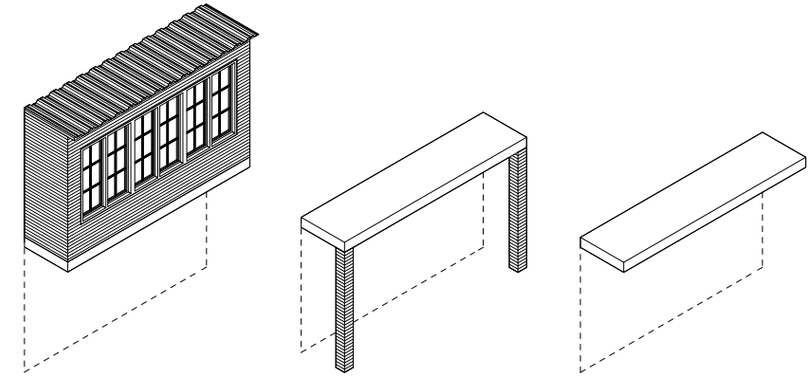
Threshold



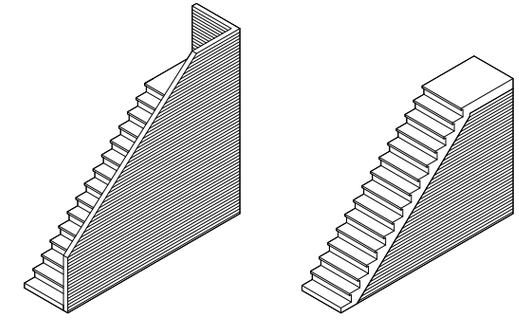
Railing



Balcony



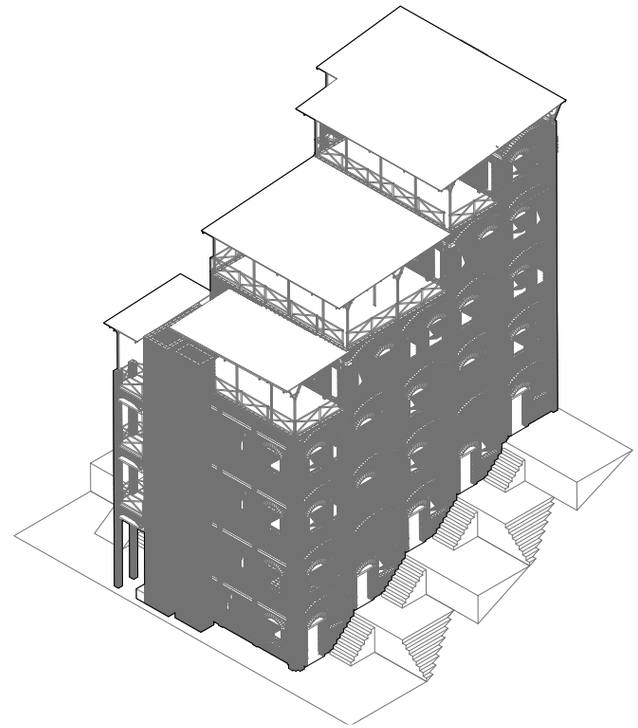
Stair

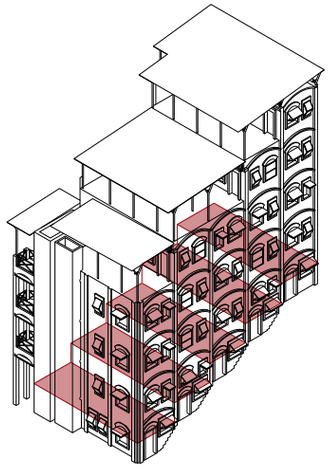


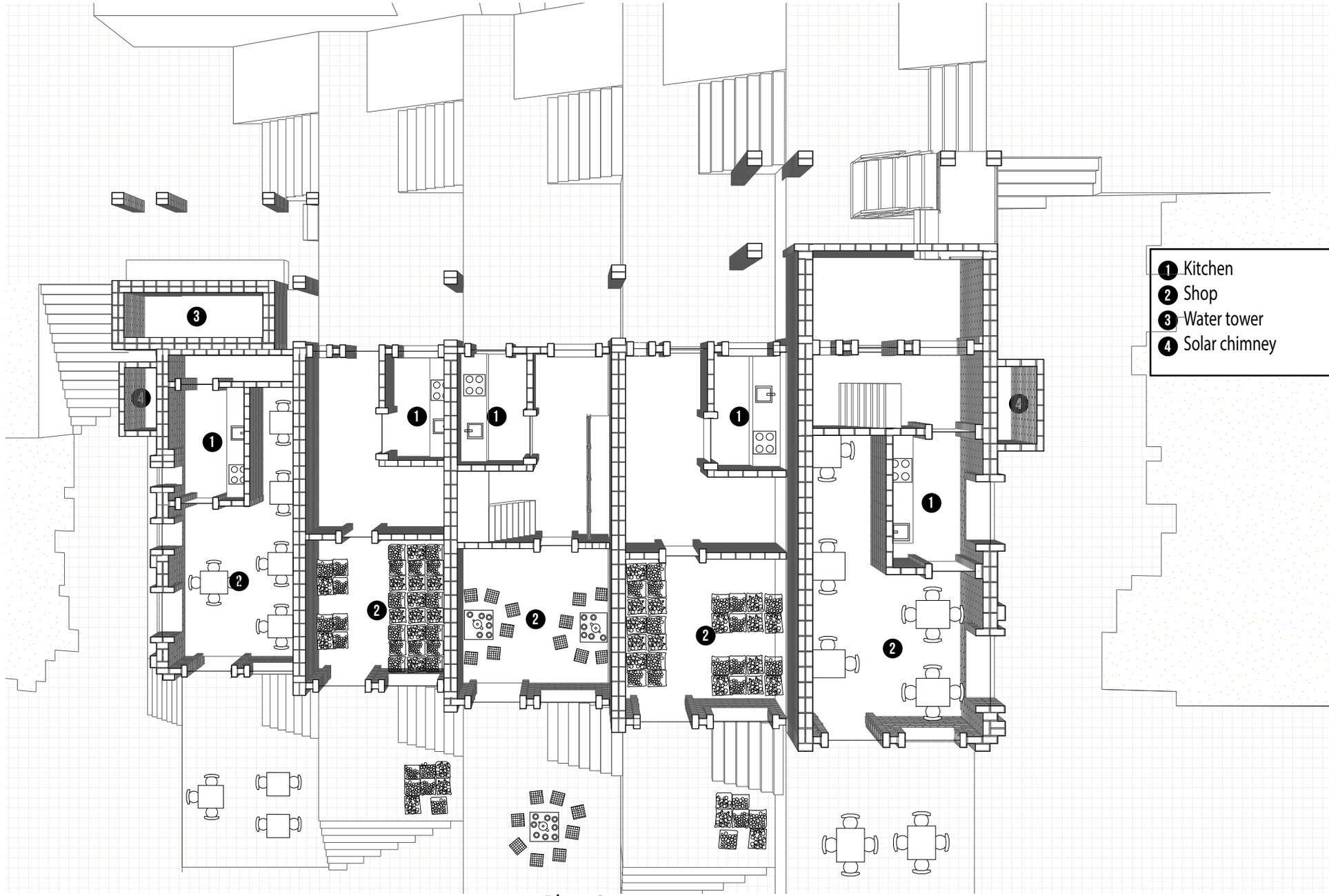
Building components

for Cooperative housing

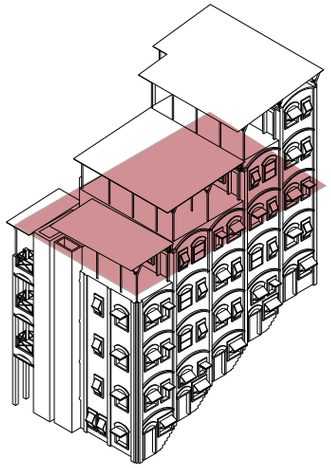
Park building

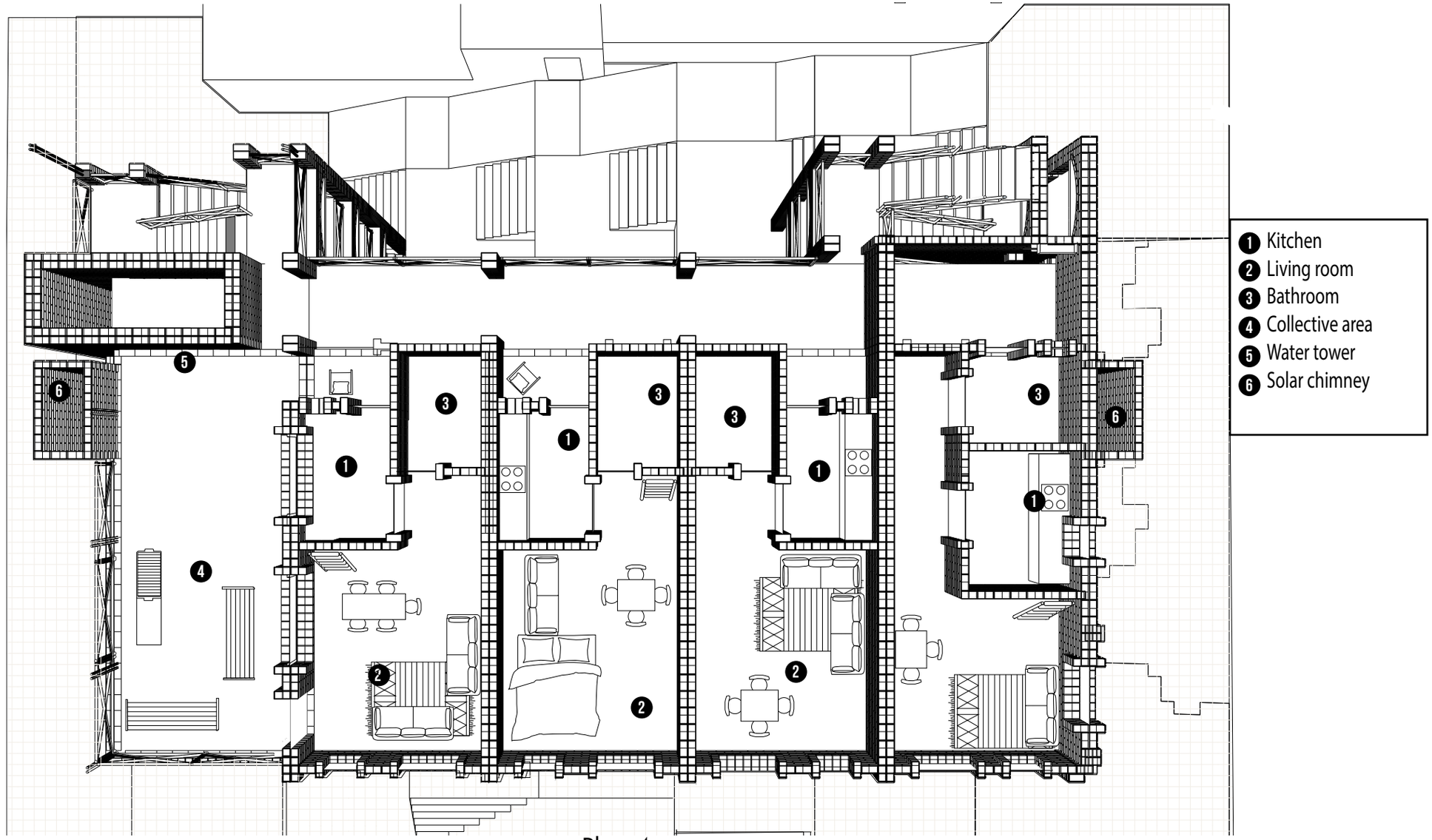






Plan 0




1 Kitchen
2 Living room
3 Bathroom
4 Collective area
5 Water tower
6 Solar chimney

Plan 4

Type A Simplex living unit

Type A.1 **35 sqm**

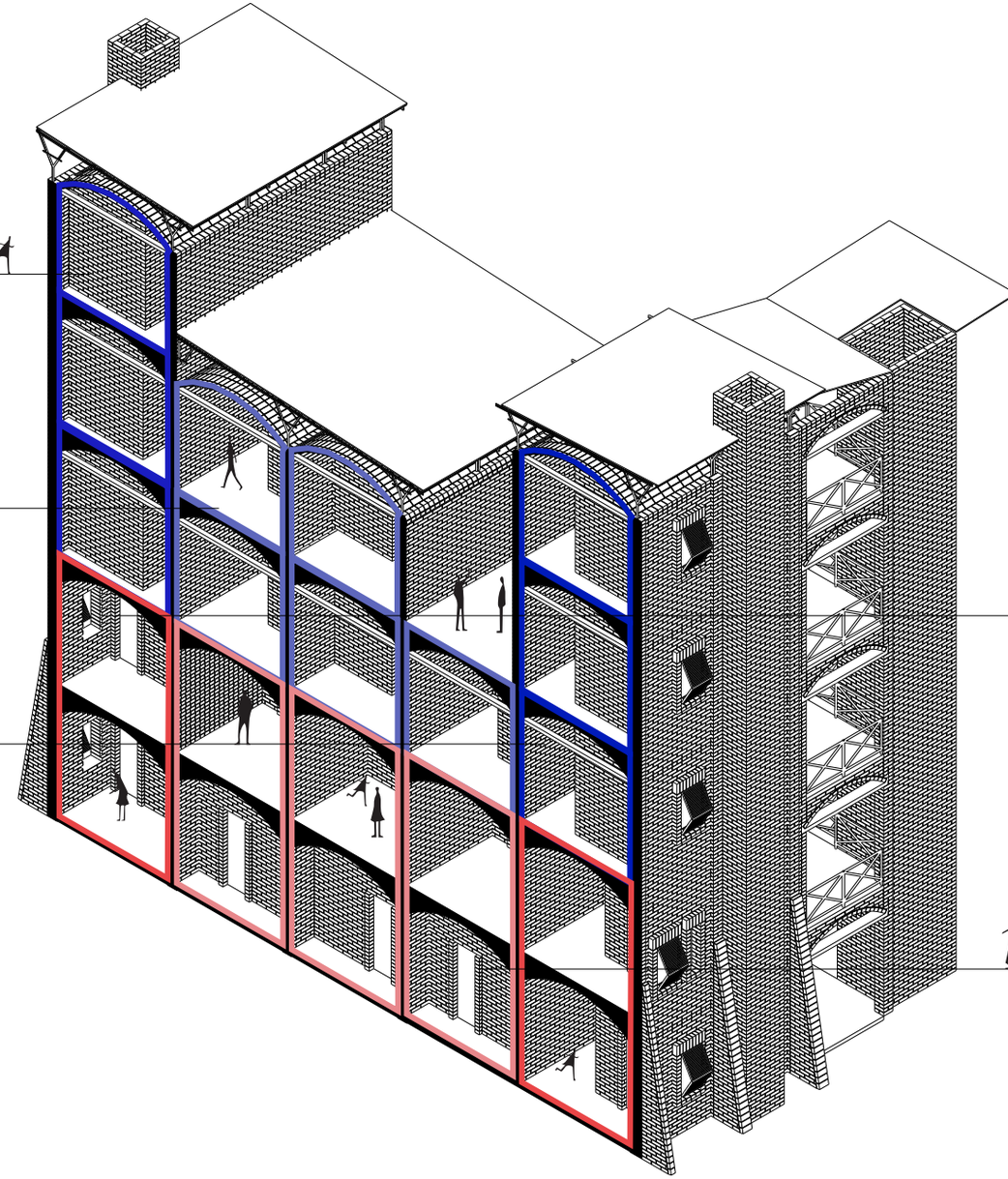
Living room
Kitchen
Bathroom
2 Bedrooms

Type A.2 **27 sqm**

Living room
kitchen
bathroom

Type A.3 **27 sqm**

Living room
Kitchen
Bathroom
Bedroom



Type B Duplex work-live unit

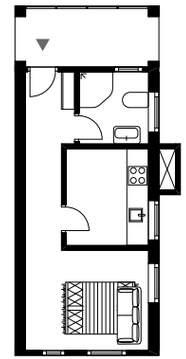
70 sqm Type B.1

Shop
Unit that can be rented out
Living room
kitchen
bathroom
Bedroom

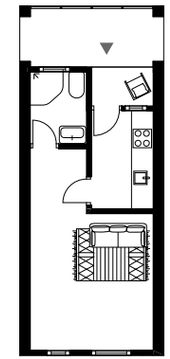
54 sqm Type B.2

Shop
Unit that can be rented out
Living room
kitchen
bathroom
Bedroom

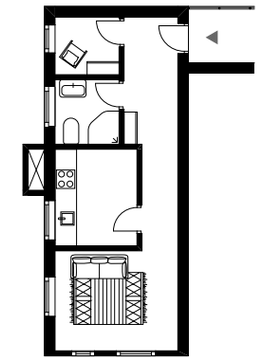
Division units



Type A.1

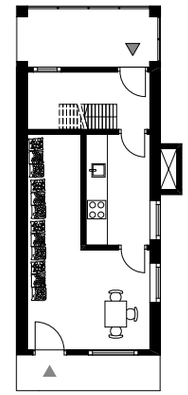


Type A.2

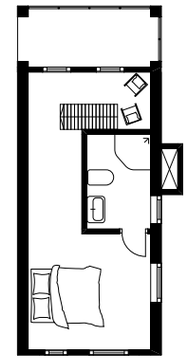


Type A.3

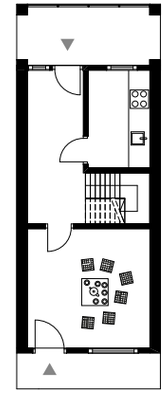
Simplex living units



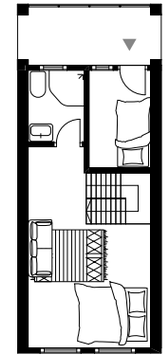
Type B.1
Plan 0



Plan 1



Type B.2
Plan 0



Plan 1

Duplex work-live unit

Building Material	Adobe blocks	Compressed earth blocks	Compressed stabilised earth blocks	Rammed earth	Concrete	Steel	Bamboo
Composition	Earth, straw, water	Earth, water	Earth, water, sand, lime or cement	Sand, gravel, clay	Stone, cement, sand, water	Steel	Bamboo
Time for production	--	--	--	-	+	++	++
Price	++	++	+	+	--	-	++
Resistance to moisture	--	--	+	--	++	++	-
Local/Imported	Local	Local	Local	Local	Imported	Imported	Local
Availability	++	++	+	++	--	-	++

Amara: *"I do not want to built with* CSEB*, but use it because it is the only thing I can afford."*

Salim: *"I would like to built with* CSEB *because it is good for the environment."*

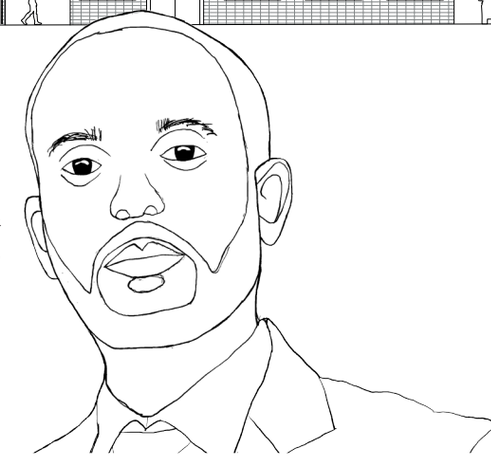
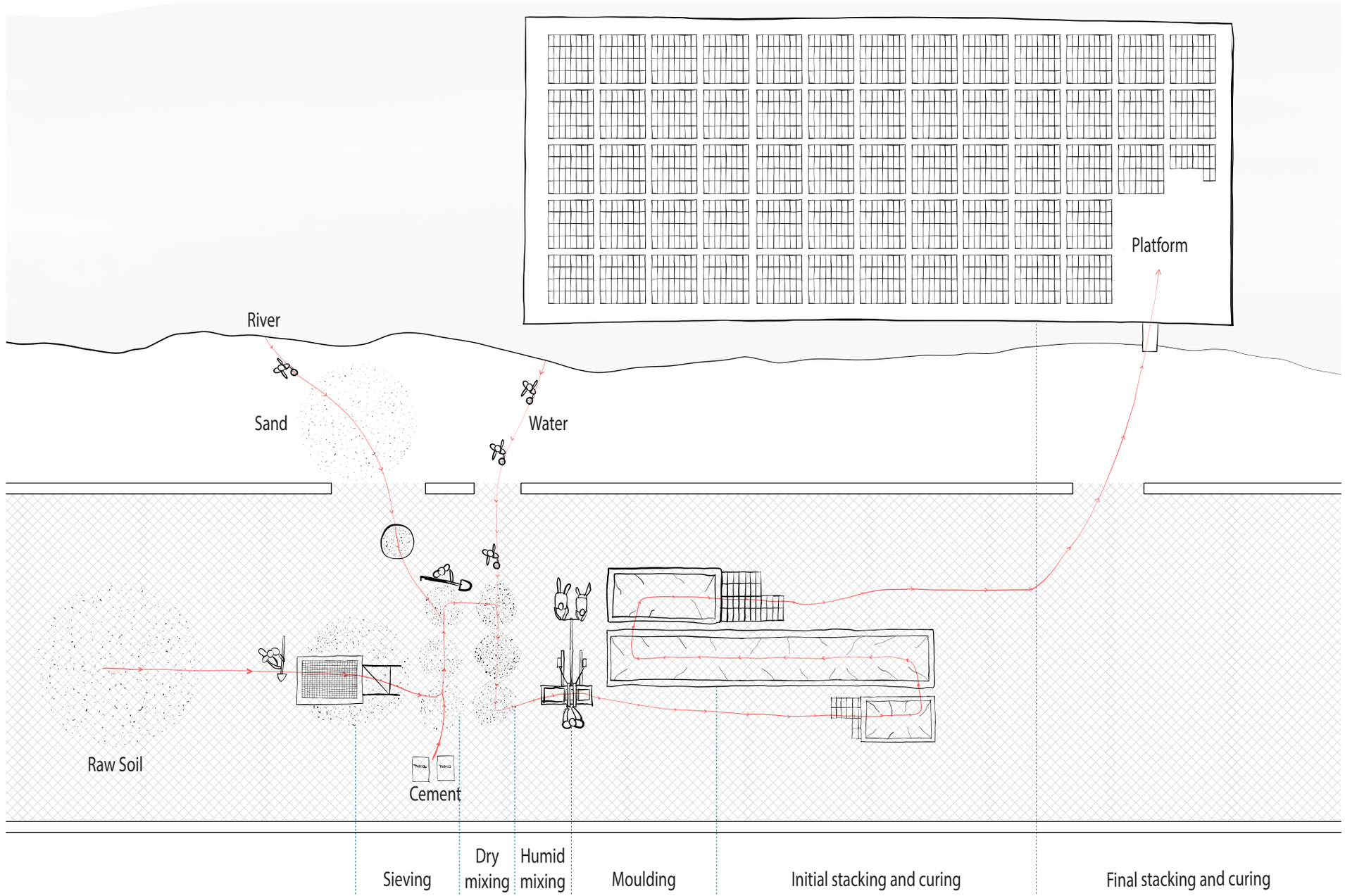
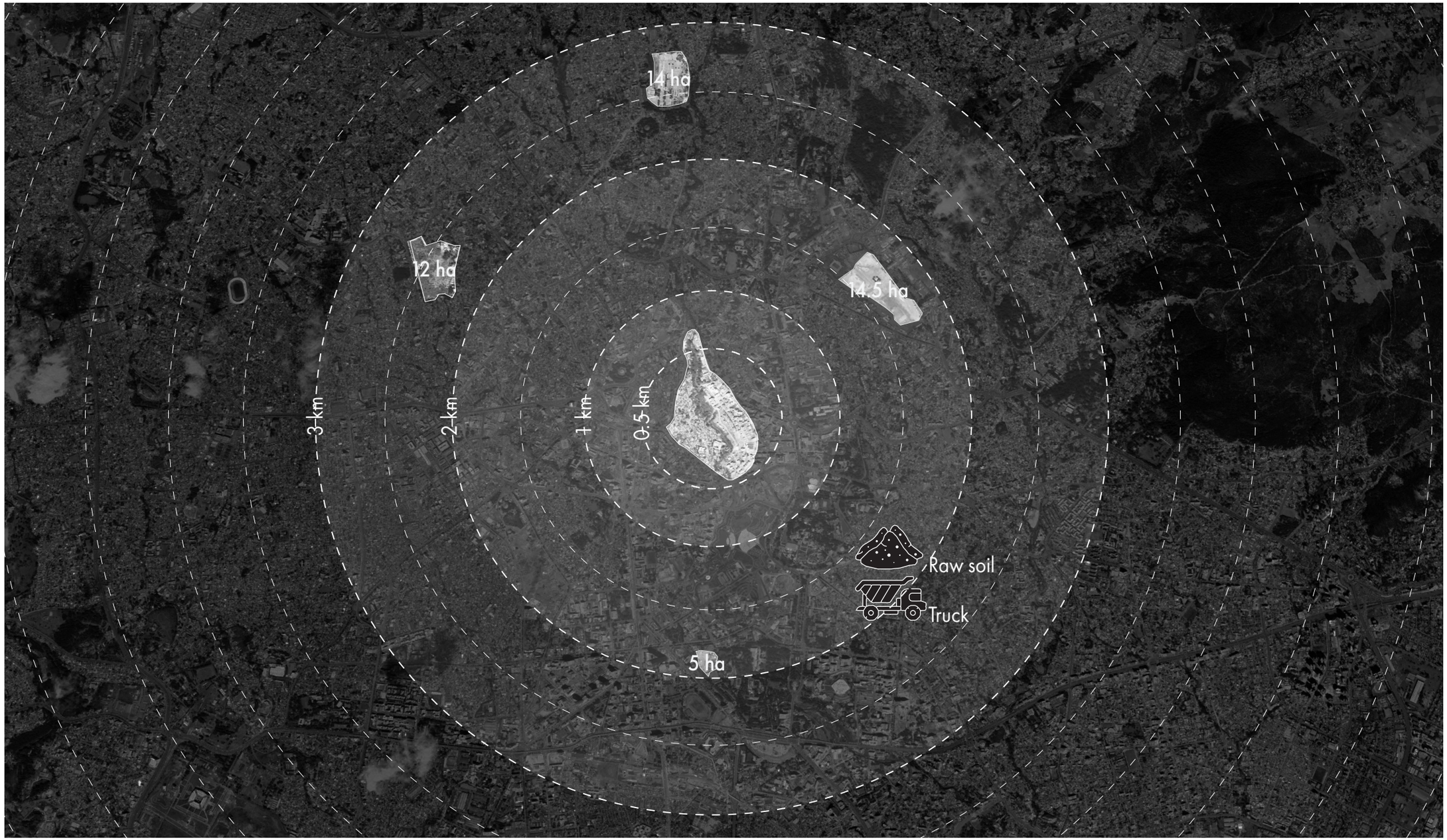


Image of earthen building materials



CSEB production

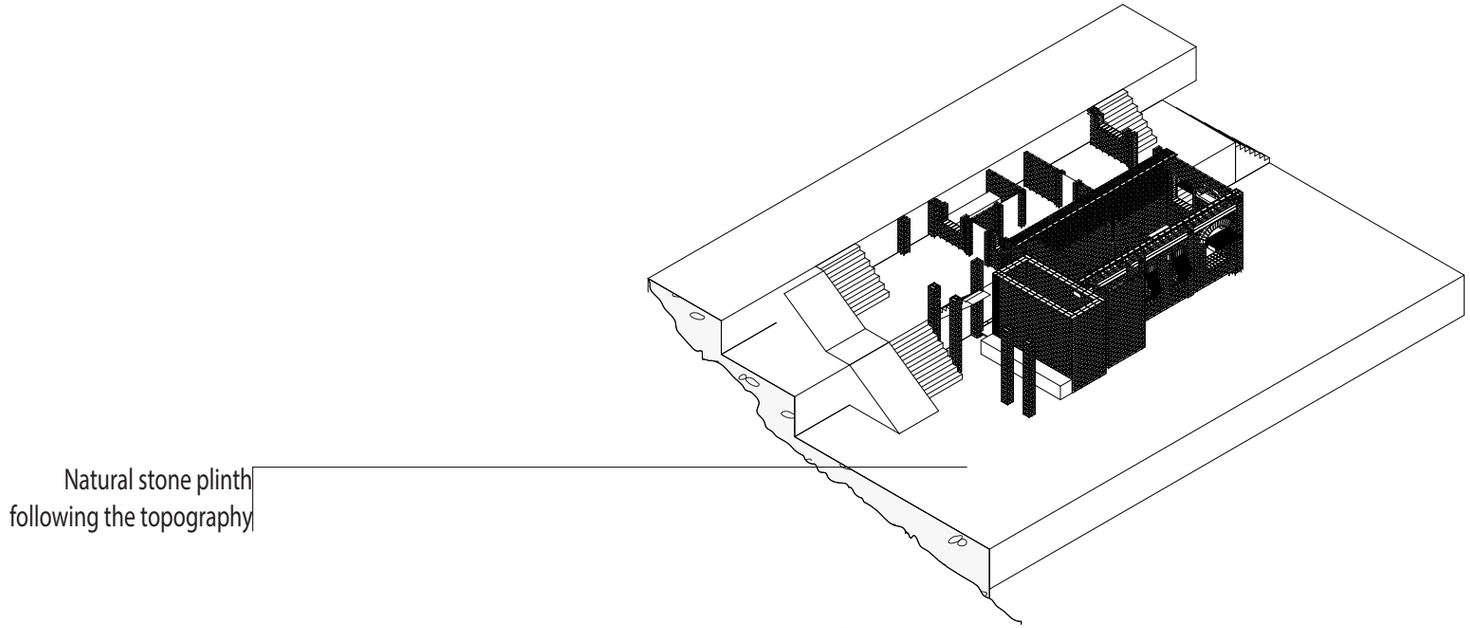
Construction centre and platform



Raw soil

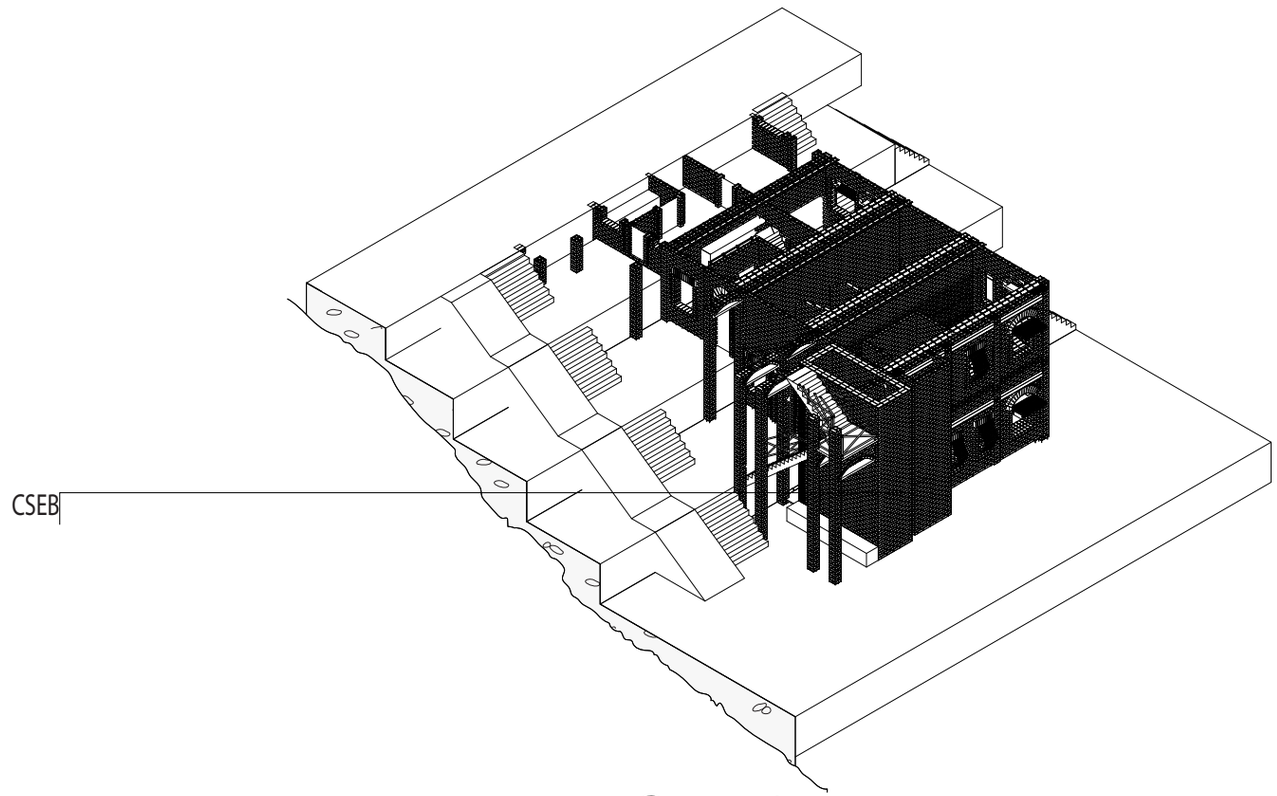
Location

Traditional building method in Ethiopia with a plinth from natural stone to protect the dwelling from water.



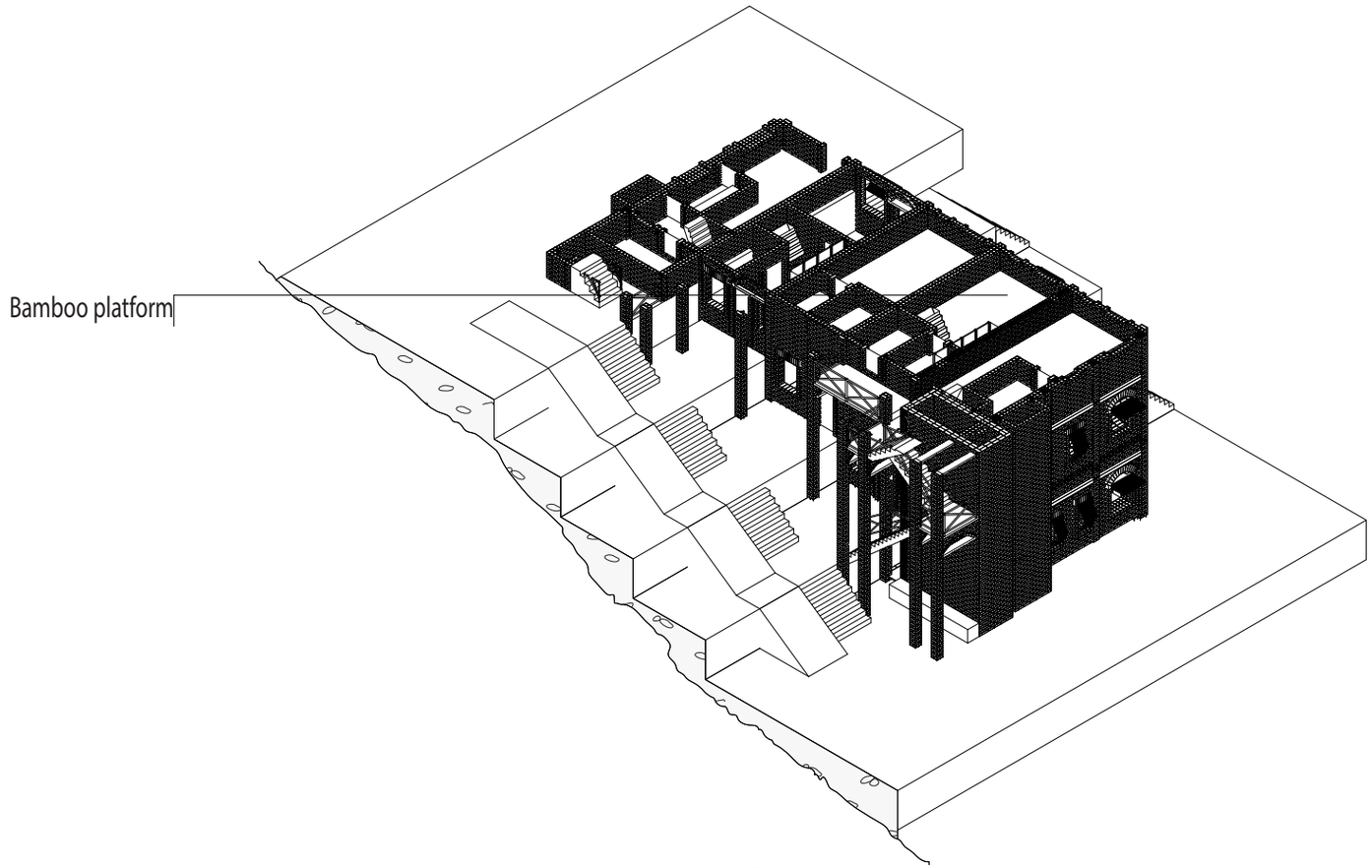
Construction

Phase 0



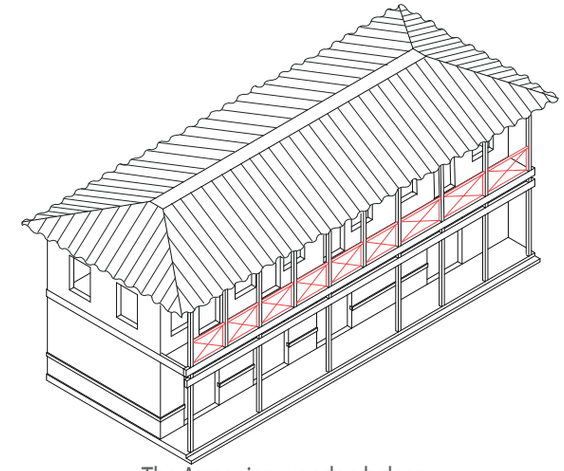
Construction

Phase 1

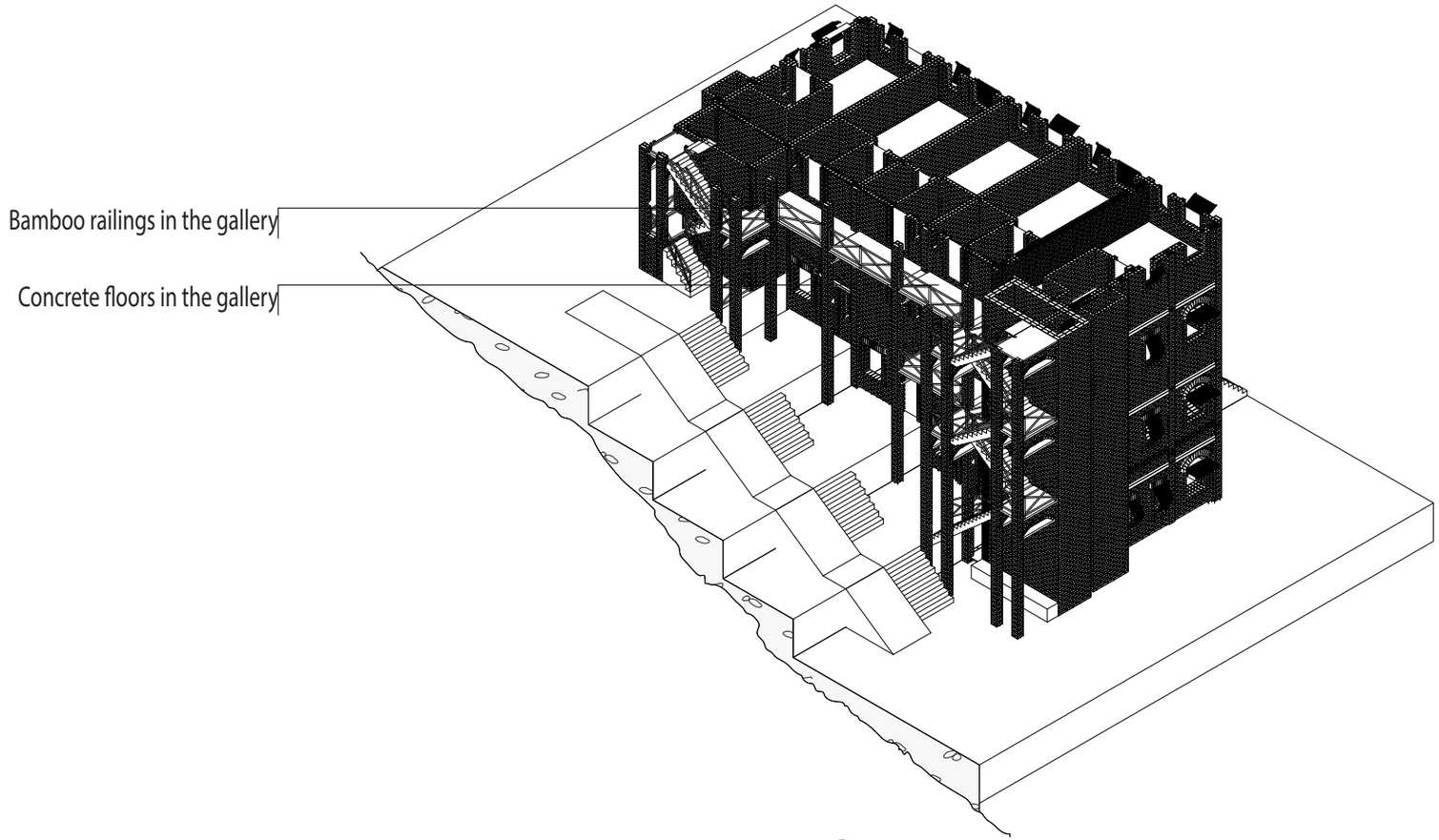


Construction

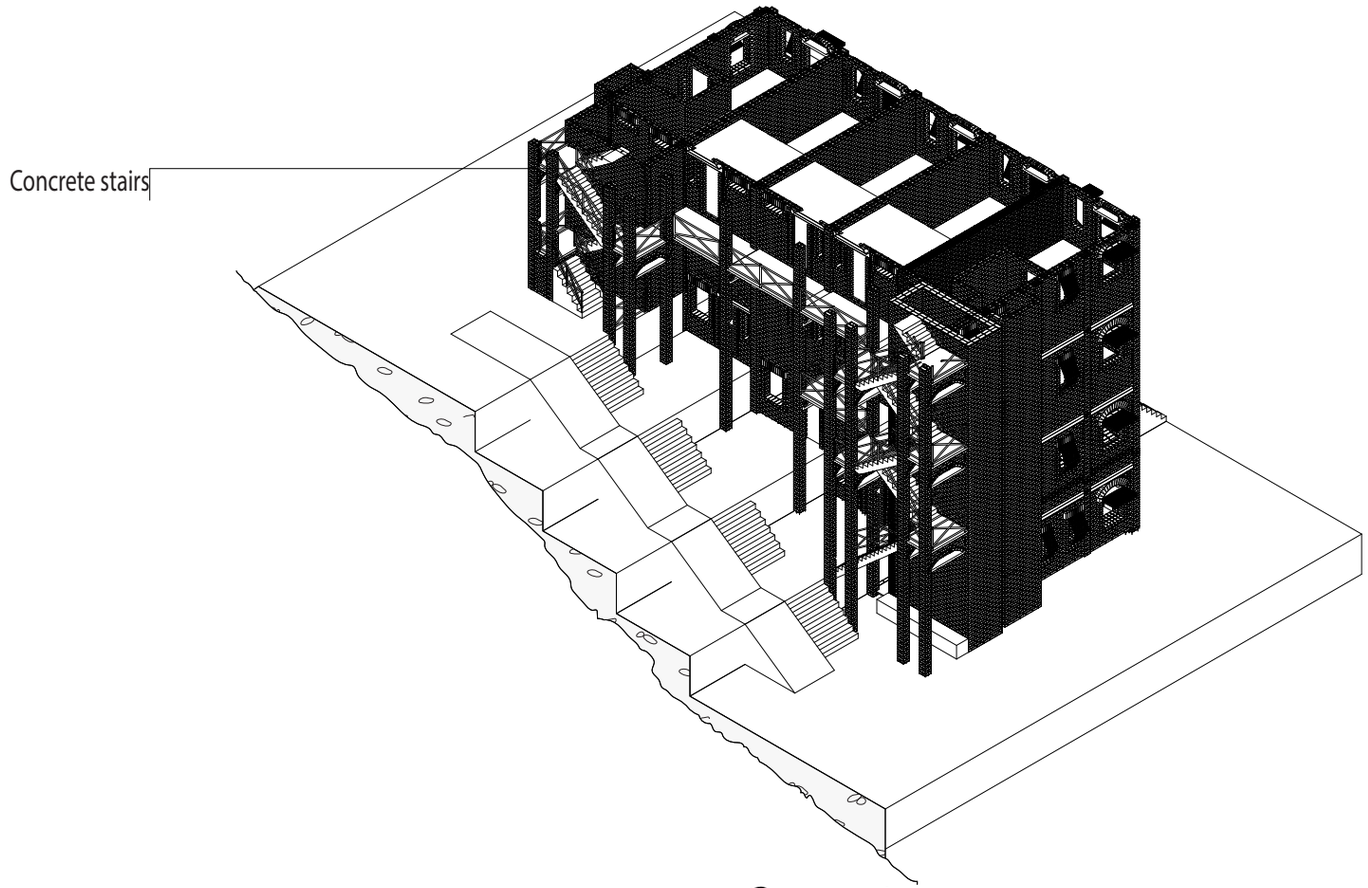
Phase 2



The Armenian wooden balcony
Piassa

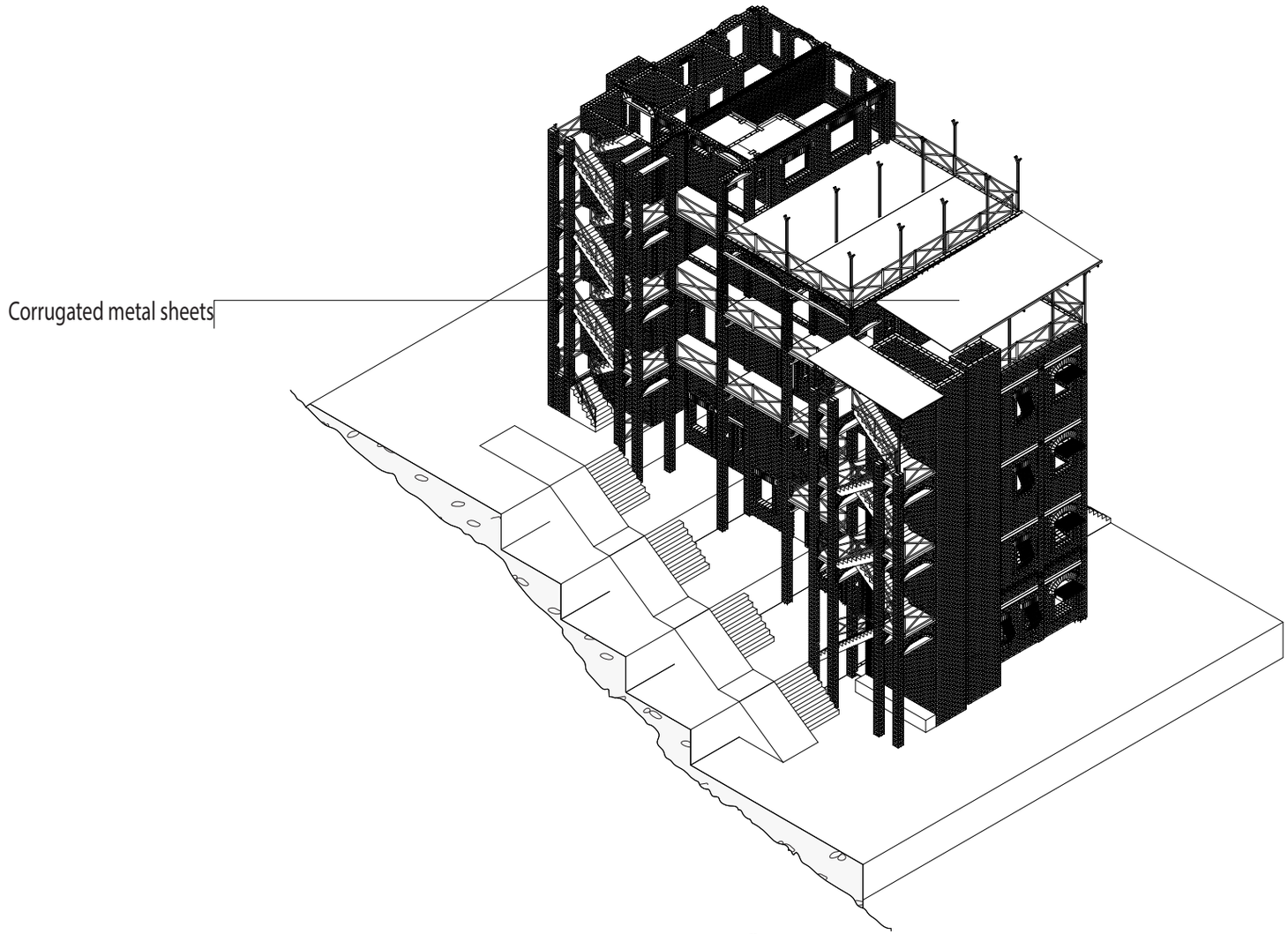


Construction
Phase 3



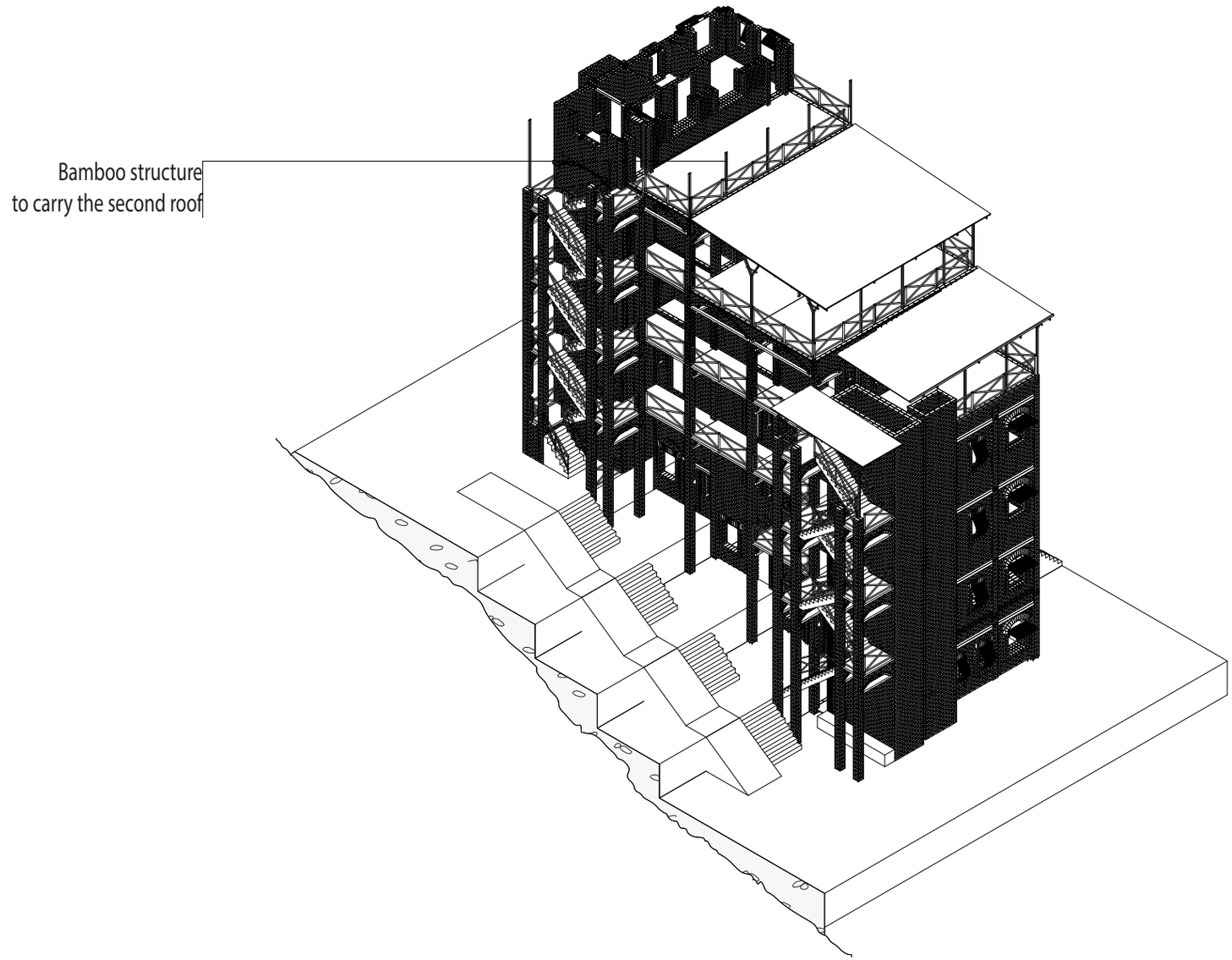
Construction

Phase 4



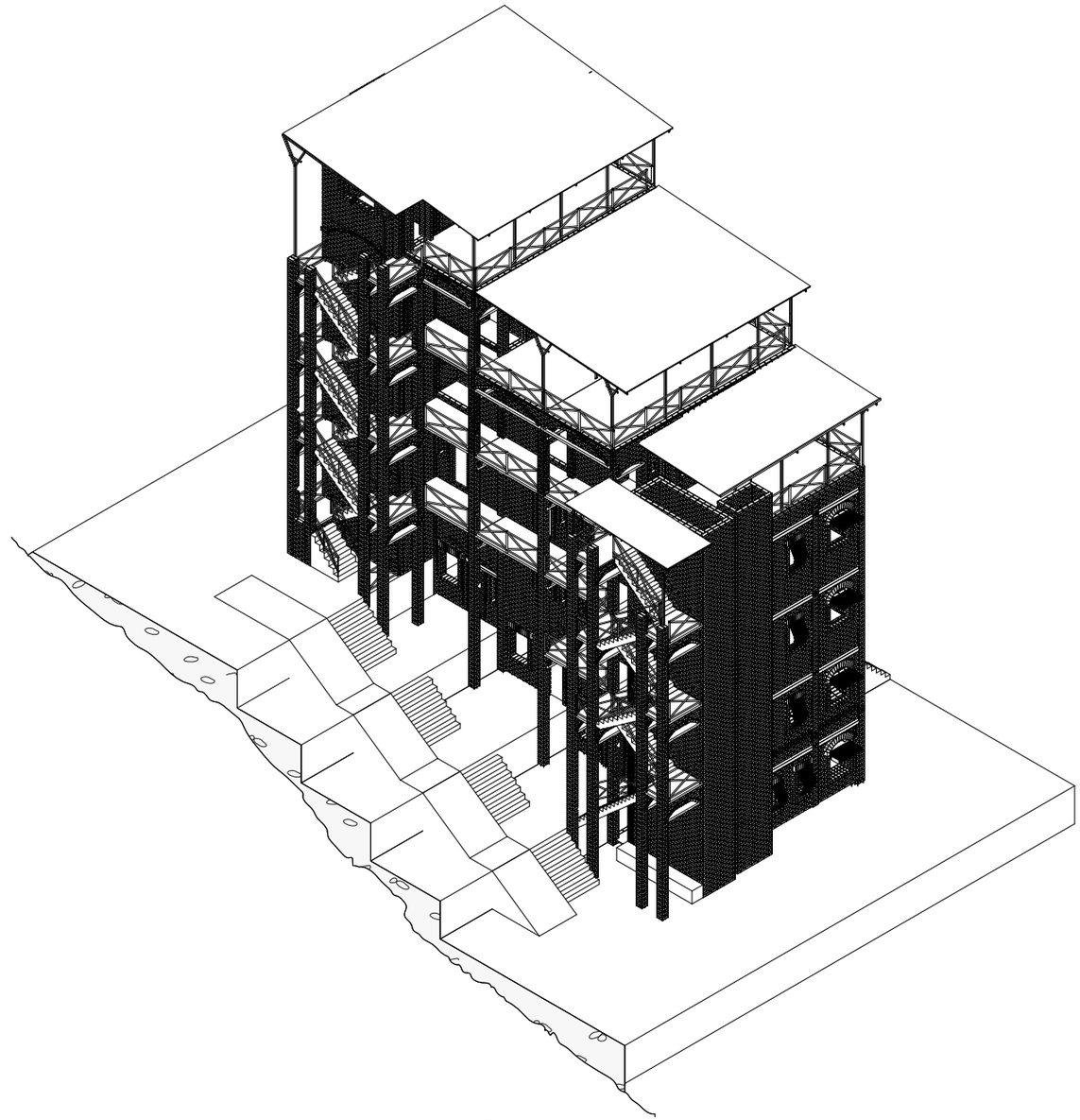
Construction

Phase 5



Construction

Phase 6

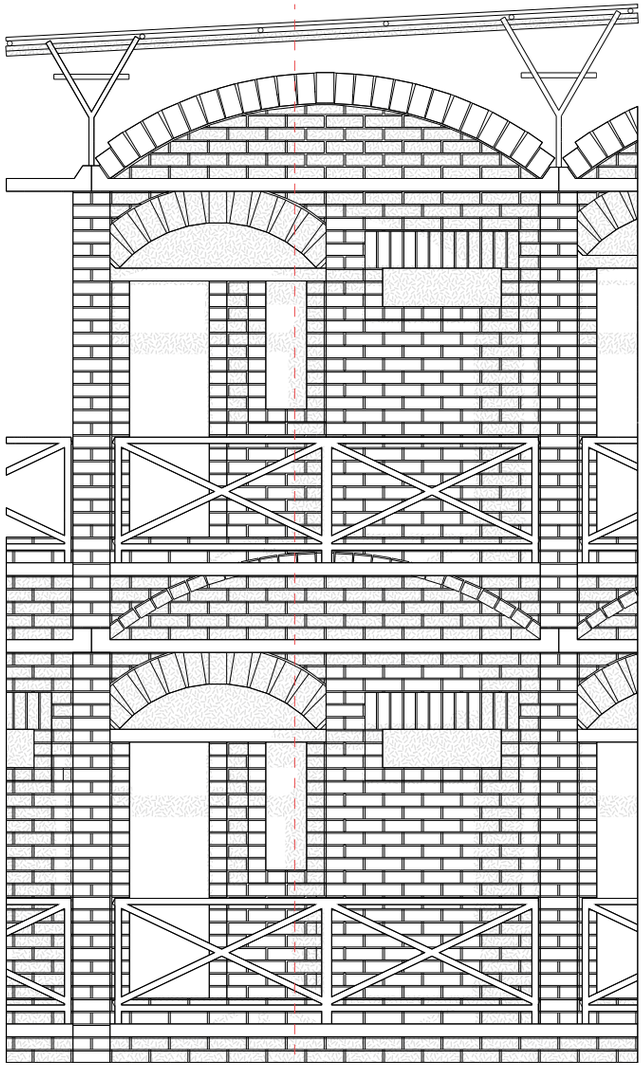


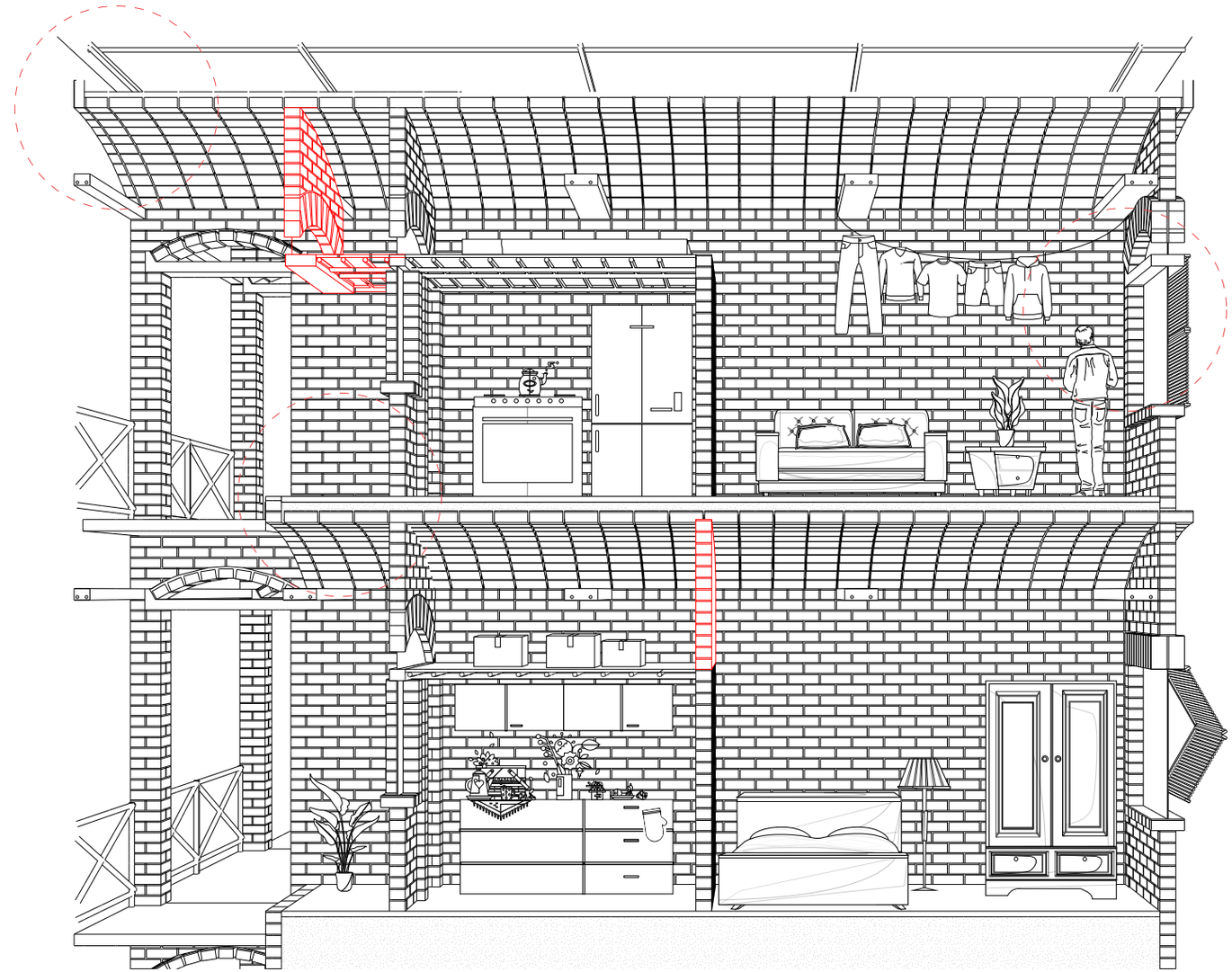
Construction

Phase 7

Who builds what?

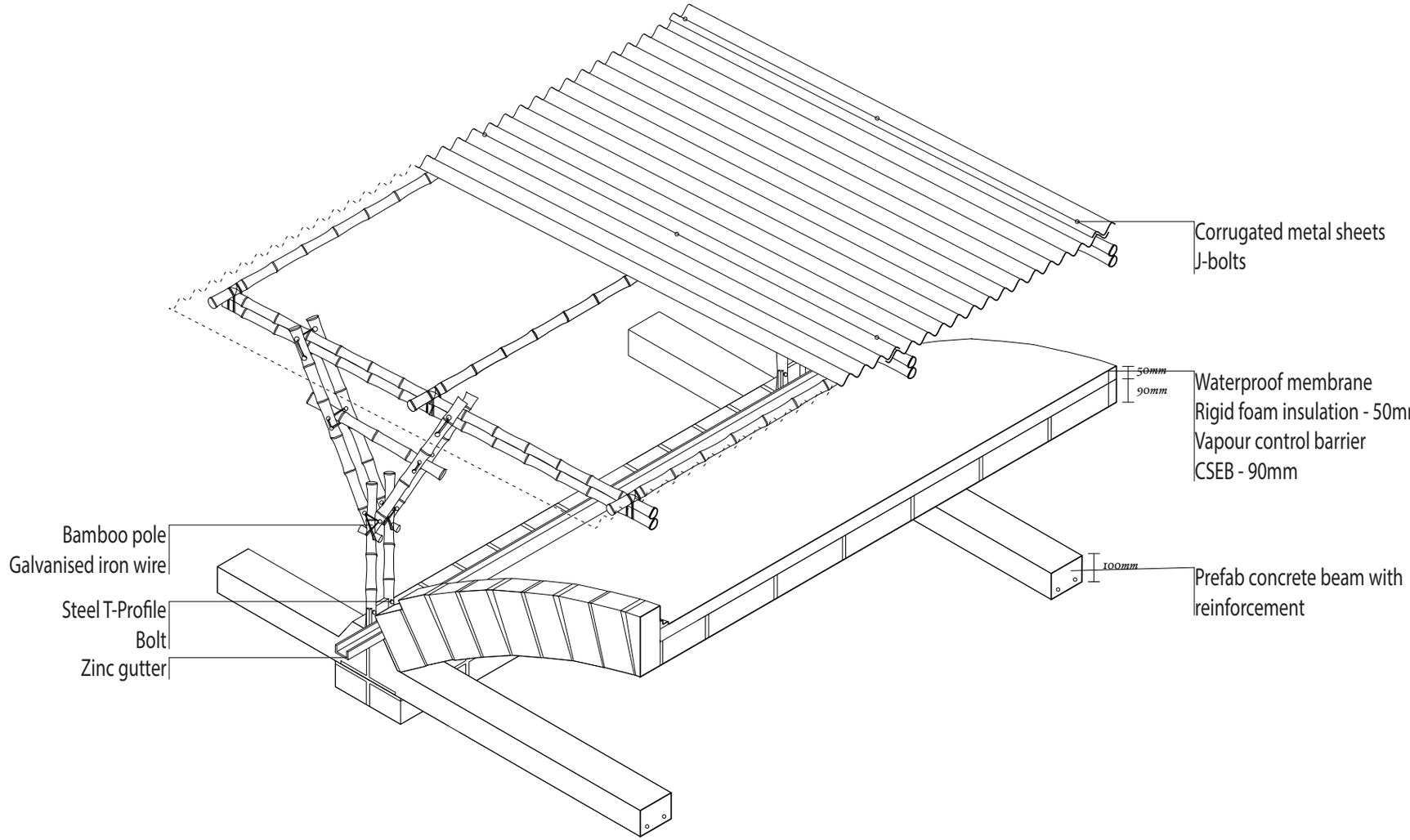
Local builders
Construction company
Government

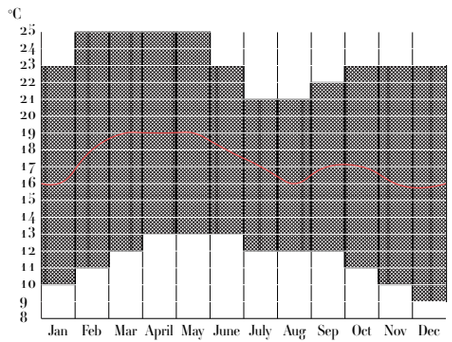


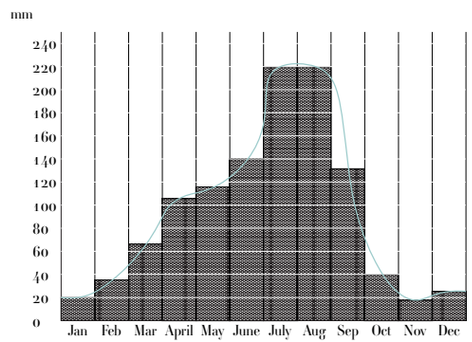


Adaptability

on the scale of the dwelling

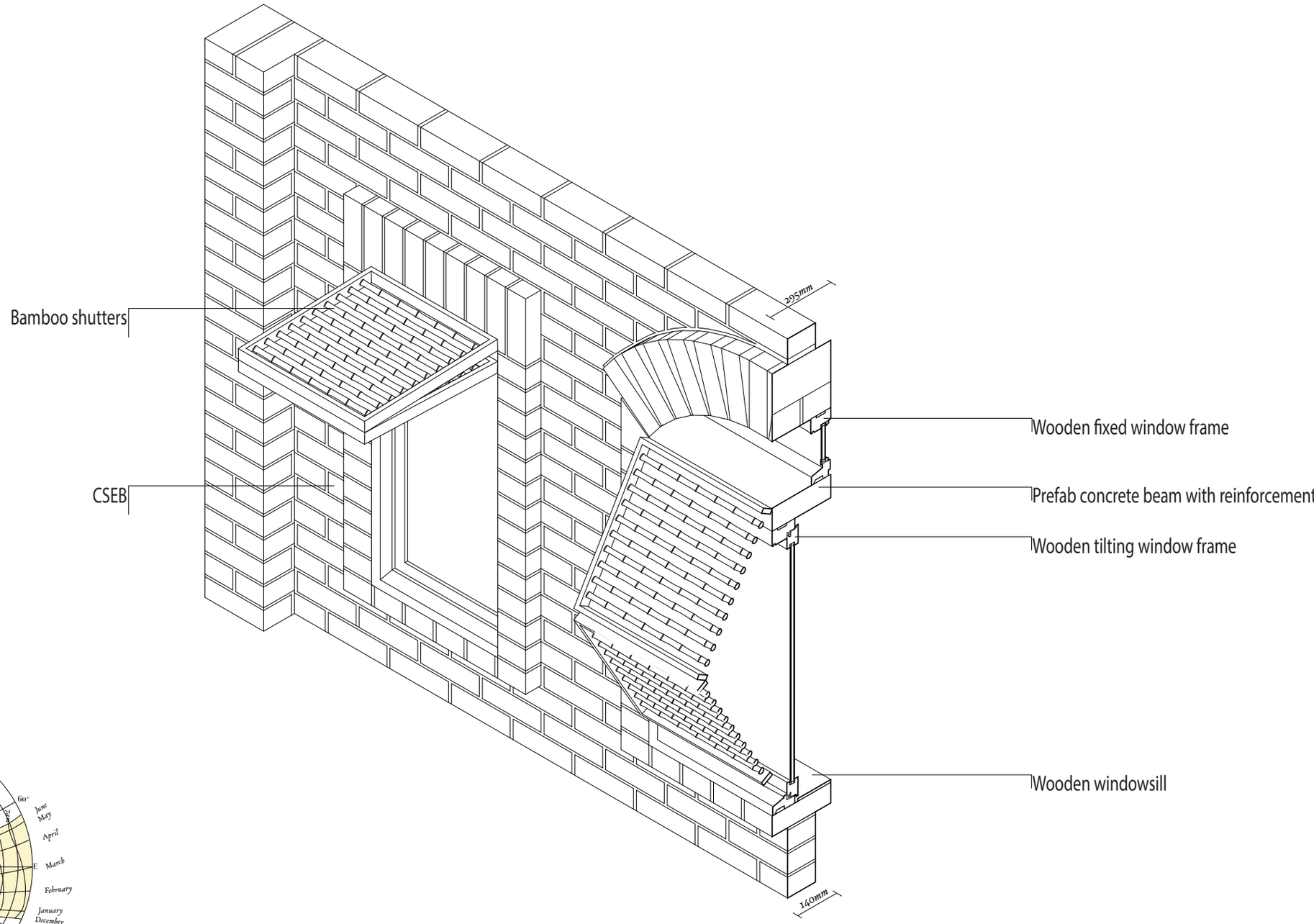


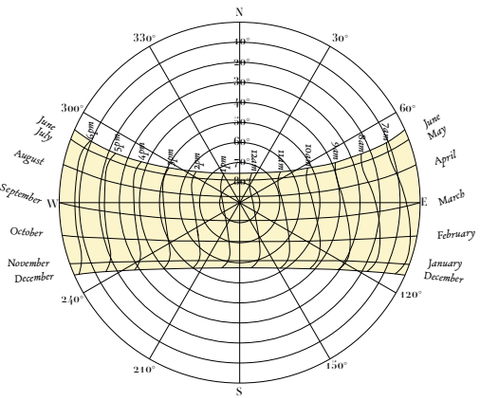




Double roof

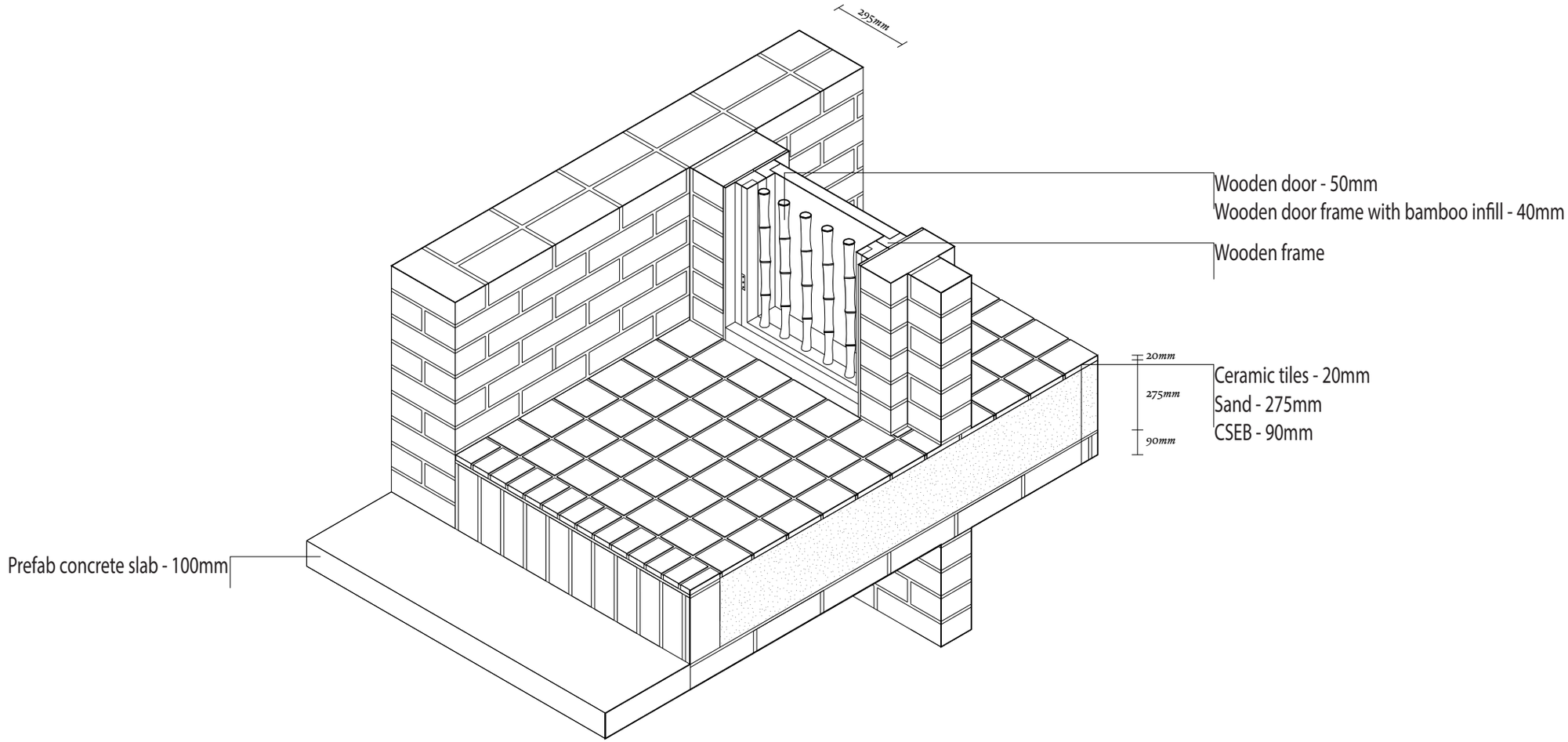
protects against solar radiation and rain





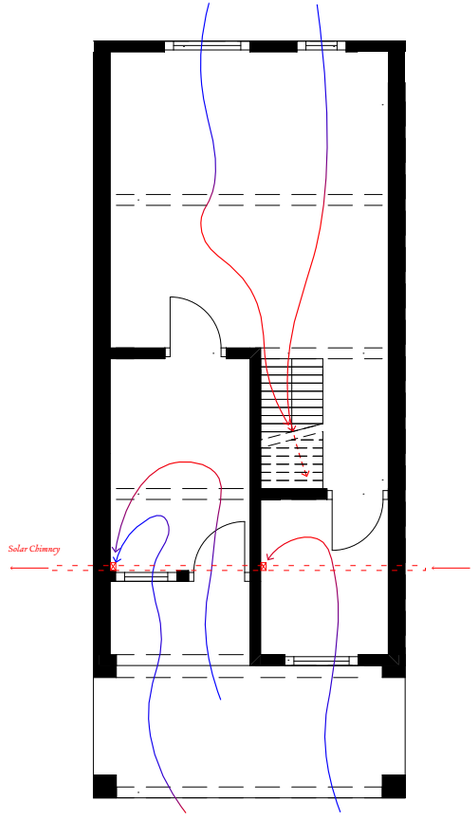
Window shutters

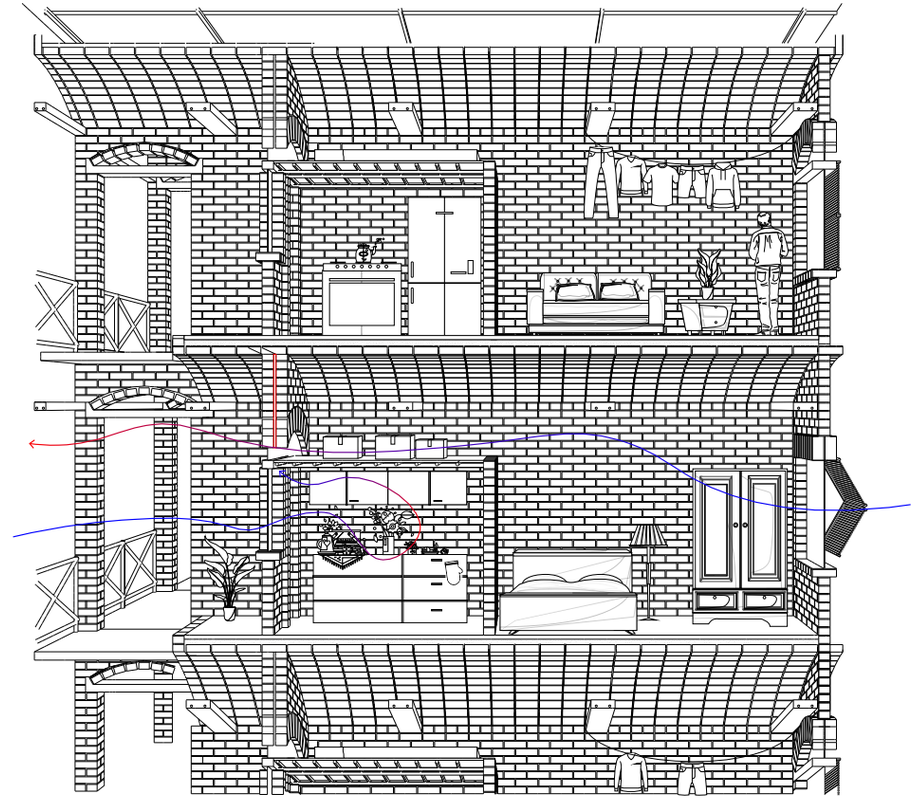
protect against the sun



Double door and threshold

creating different scales of privacy





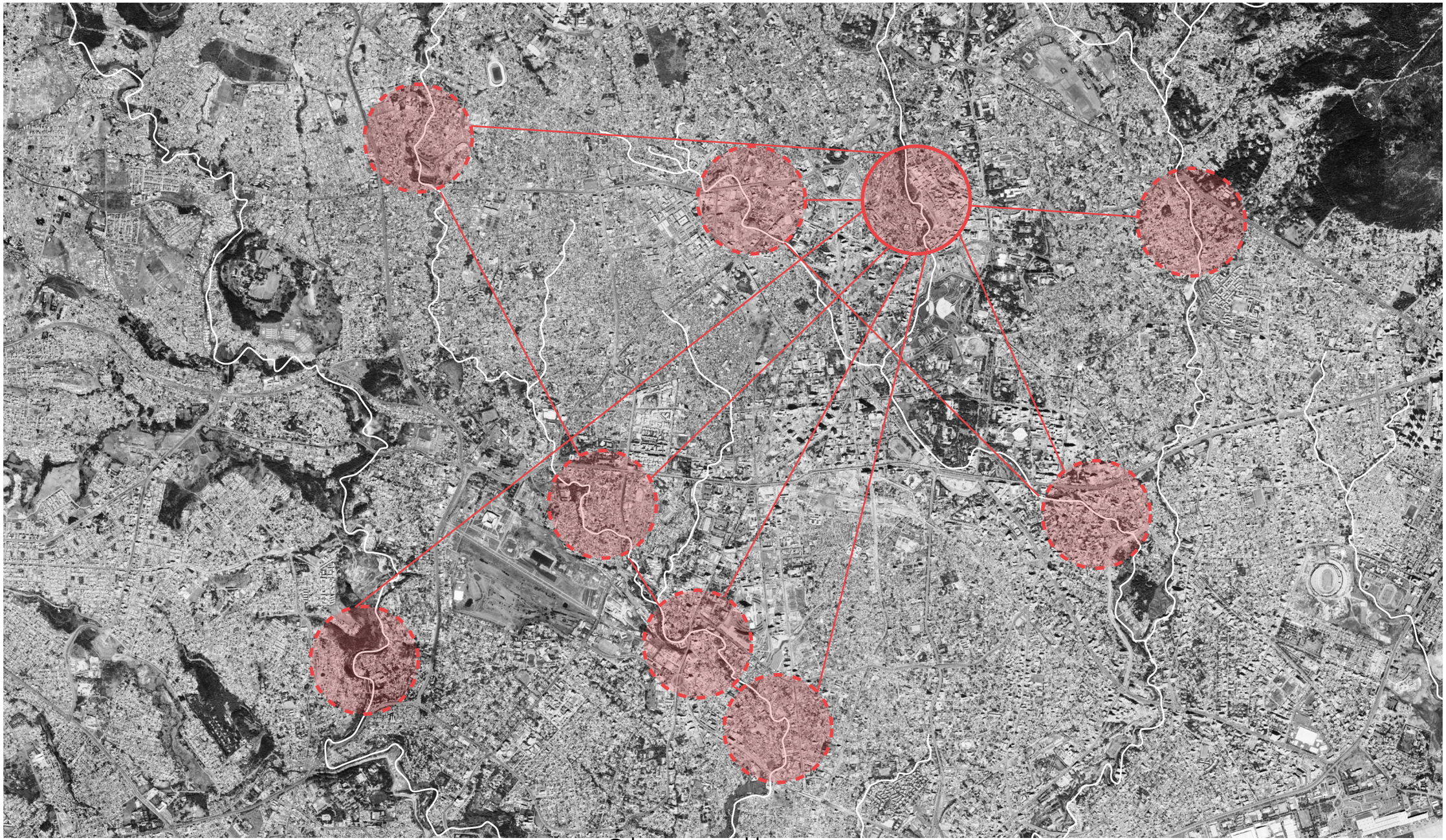
Ventilation

Atmospheric impressions

Car traffic street

Green axis

River



Other potential locations

Thank you