

Regeneration of East Flood Canal :

Urban and Landscape Strategies
for Jakarta's Water System



POLITECNICO
MILANO 1863

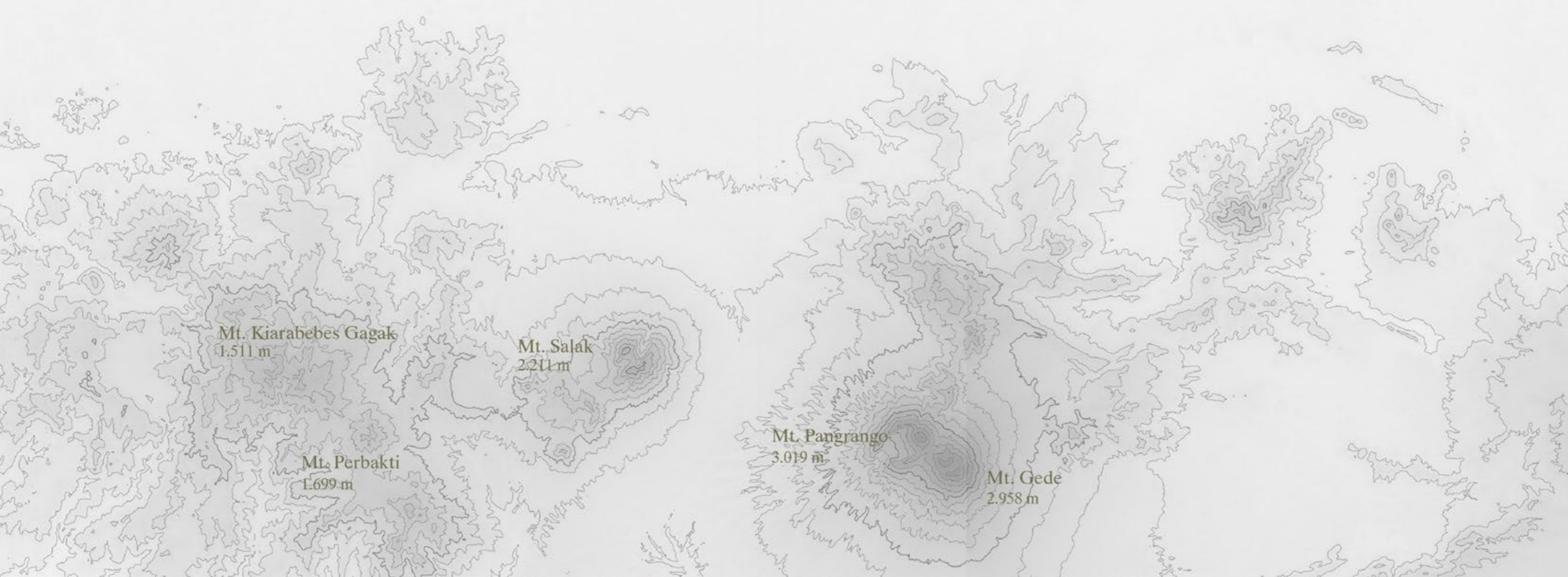
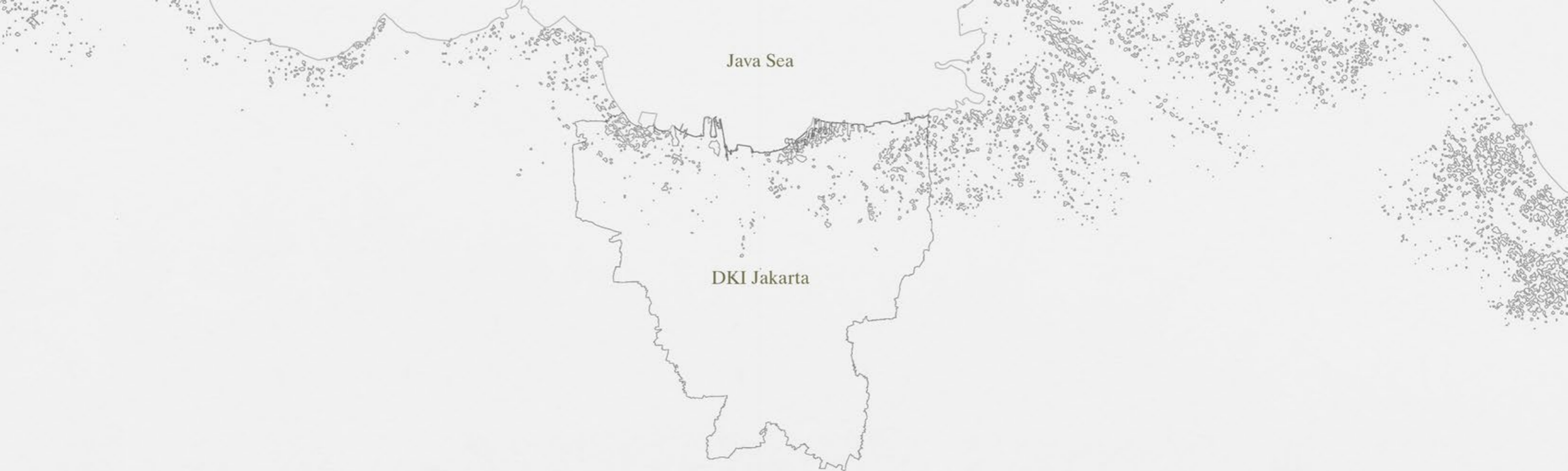
School of Architecture Urban Planning
Construction Engineering

MASTER OF SCIENCE IN SUSTAINABLE ARCHITECTURE
AND LANDSCAPE DESIGN

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To all family and friends that always support me through this journey.

I am truly grateful.

abstract

Jakarta is the capital city of Indonesia that was founded and built above soil from 13 rivers delta back then. Developed since the 15th century, Jakarta never stopped being the center of economy, government, and industry. As a result, this city is continually growing and expanding. This development invites people to work and resides. However, its downside is that the annual flooding, heavy rainfall, rising sea level, and land subsidence make Jakarta sinks way faster than the other coastal megacities. One of the working flooding solutions from the government is the East Flood Canal. It is built from 2003 - 2010. This canal mitigates the water flow from 6 natural rivers and brings it to the Java Sea gulf.

Over time, East Flood Canal developed other events that activated the surrounding neighborhood. From the sport and biking track, the lively night market every day, additional agricultural activities alongside the canal, and fishing - aquaculture ponds. It provokes possibilities to enhance the canal's condition with existing activities that have already appeared in urban and ecological contexts.

East Flood Canal stretched for 23.5 km from East Jakarta until North Jakarta, through 13 different neighborhoods and particular types of urban fabrics. Four different urban fabrics will be deeply analyzed throughout this thesis to support the whole strategy for the canal. Each of these eras reflects the many factors that shaped the urban landscape. The first fabric is the Residential area surrounded by different housing types and active commercial facilities. The second combines residential, industrial, and agricultural fields, called Mixed Area. Fields and water retention basins surround this third fabric, which will be called Agriculture Area. The last one is Industrial Area. This area is occupied by enormous square buildings and factories, a shipment harbor, aquaculture ponds, and fisherman villages.

The Regeneration of East Flood Canal: Urban and Landscape Strategies for Jakarta's Water System explores possibilities through each fabric to support the primary strategy; enhancing and improving the condition of the East Flood Canal. This project opens up to other possible solutions to overcome this canal's complex situation. It highlighted the role of urban and ecological strategies that mediate between three essential city aspects; environment, economy, and social.



Introduction

Geographical Location

Jakarta as a Delta City

Jakarta's History and Urban Development

Land Subsidence

Flood Events

Jakarta's Blue Infrastructure Development

Jakarta's Canals

What Makes East Flood Canal Different?

INDONESIA GEOGRAPHICAL LOCATION



0° Equator Line

Indonesia Location

Southeastern Asia, archipelago between the Indian Ocean and the Pacific Ocean

Area

total: 1,904,569 sq km
land: 1,811,569 sq km
water: 93,000 sq km

Border Countries (3):

Malaysia 1,881 km; Papua New Guinea 824 km;
Timor-Leste 253 km

INDONESIA GEOGRAPHICAL LOCATION

0.7893° S, 113.9213° E



With five major islands and about 30 smaller groups, Indonesia is the largest archipelago in the world. There are a total number of 17,508 islands, of which about 6000 are inhabited.

With an area of 1,904,569 km², Indonesia is the largest country consisting only of islands. The combined area of the archipelago is slightly smaller than Mexico or larger than five times the size of Germany.

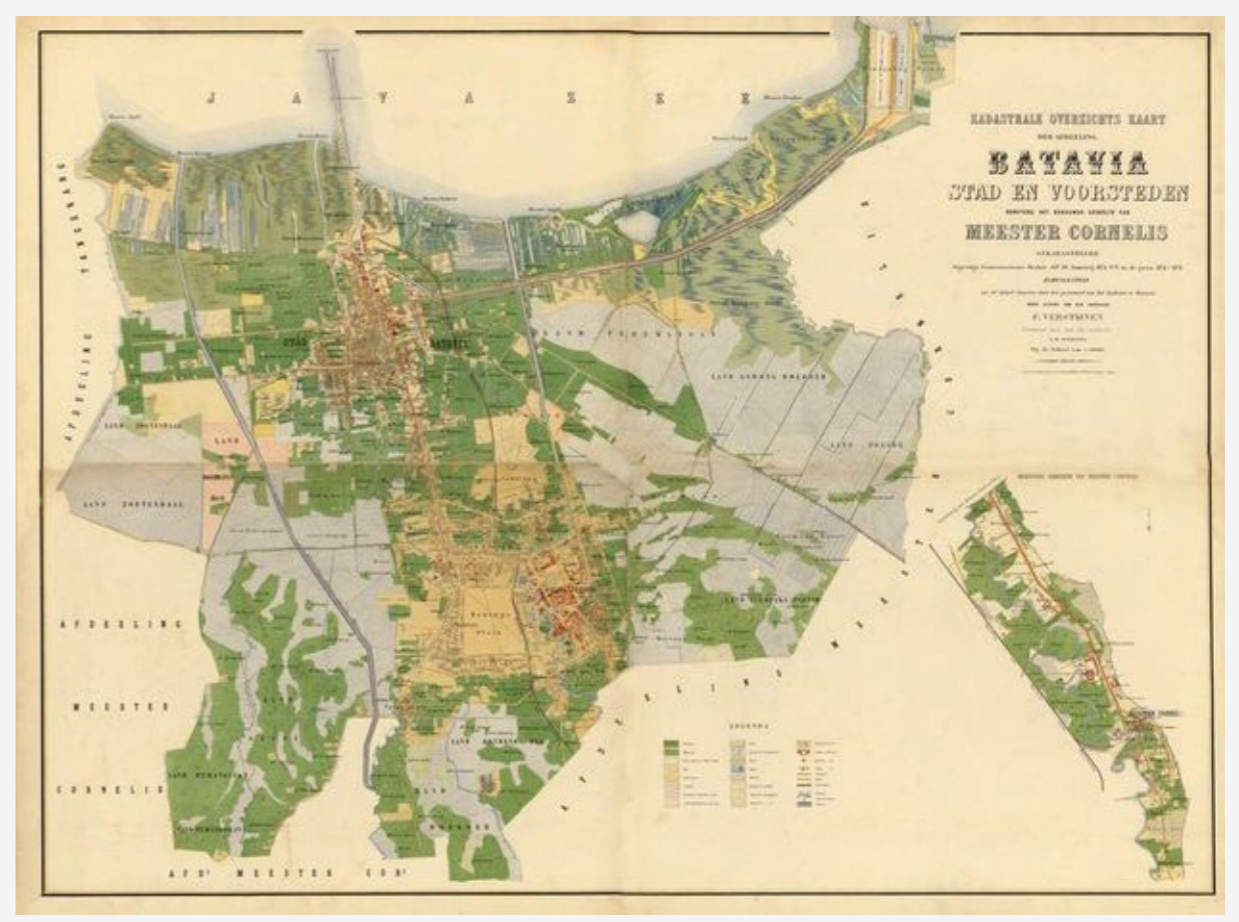
The multi-ethnic country has more than 279,3 million people (in June 2022). It is by far the most populous island nation in the world. There are more than 1,300 recognized ethnic groups in Indonesia. The six most prominent ethnic groups are Javanese (40%), Sundanese (16%), Batak (4%), Sulawesi (3%), Madurese (3%), and Betawi (3%).





Jakarta is the capital city of Indonesia. Lying on the northwest coast of Java island, Jakarta makes this island the world's most populous island.

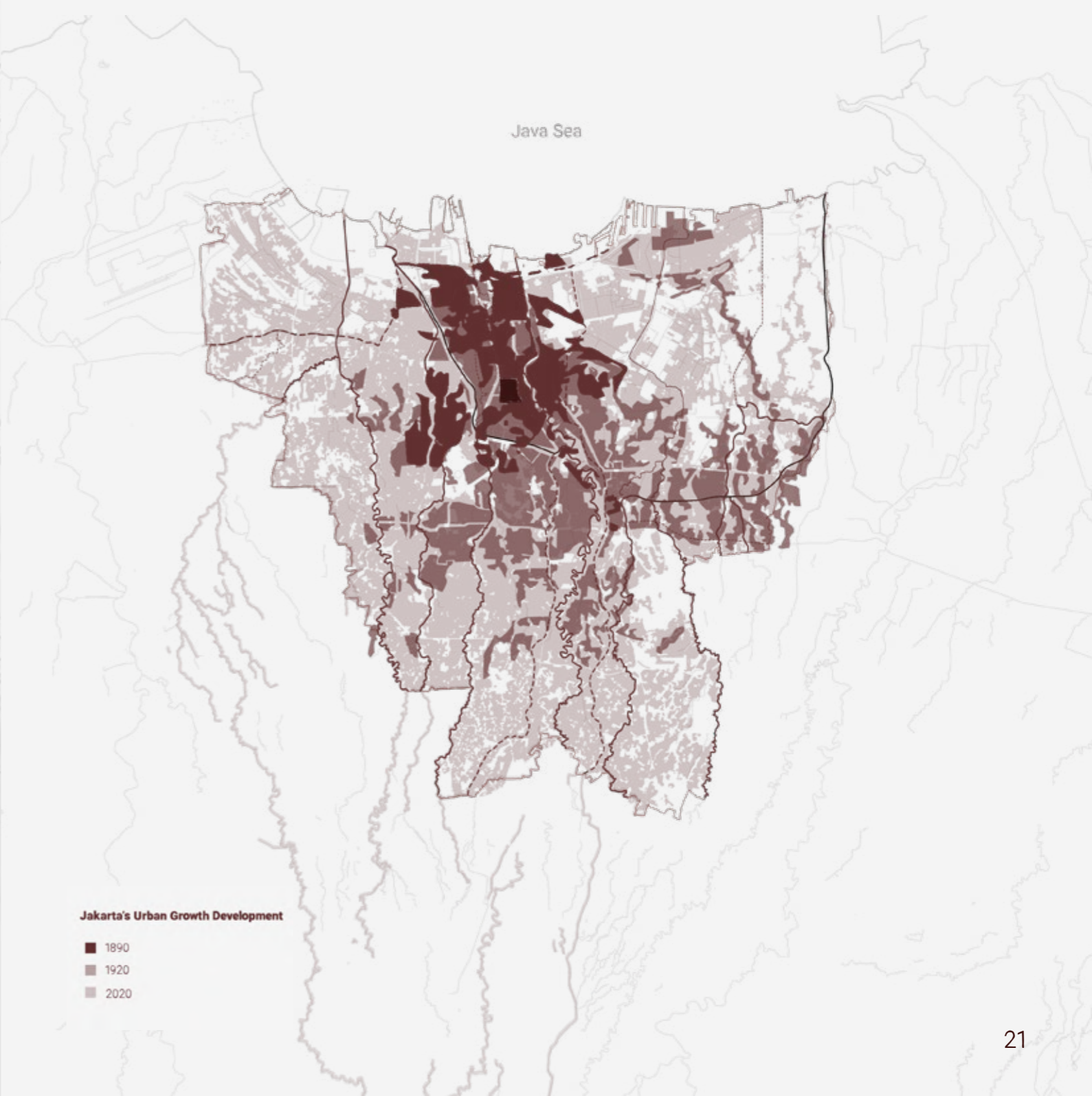
Jakarta also serves as ASEAN's diplomatic capital since it is the largest capital in the South-east Asia region. The city of Jakarta covers more than 650 square km and has a population of over 11 million people (as of June 2022). Besides facilitating as a government headquarters, Jakarta is the center of Indonesian business and industry. This city is distinctive from other cities in Indonesia because it has the status of a province (gained in 1966) and its government is administered by a governor rather than a mayor.



Batavia (now Jakarta) Map 1876



Thousands of years ago, Jakarta was built on mud sediment from 13 natural rivers crossing this area and heading to the gulf of Java sea. These rivers come from neighboring cities on the southern side of Jakarta. The sedimentation is hardened and forms a stable land or a delta. This used to be mud area evolved into a busy business center in the 14th and 15th centuries, called "Sunda Kelapa" harbor.



Jakarta's Historical Timeline



ONE OF THE NARROW STREETS IN THE CRUISE QUARTER OF OLD BATAVIA.



397 BC - 16th Century

A port town called **Sunda Kelapa** was built

Portuguese colonized Sunda Kelapa harbor, changed its name to **Jayakarta**

1513

1610

Dutch trading post established, city was renamed into **Batavia**

Townhall, Ammsterdam Gate and other Dutch related infrastructure were built

1710

1864 - 1899

Massive development of transportation infrastructure to support the activity of the harbour

Canals were built to counter the flooding problem and for goods transportation

1880 - 1920

Japanese invasion leads to the destruction of most infrastructure. The city's name returned to **Jakarta**

Indonesia Independeny Declaration

1942

1945

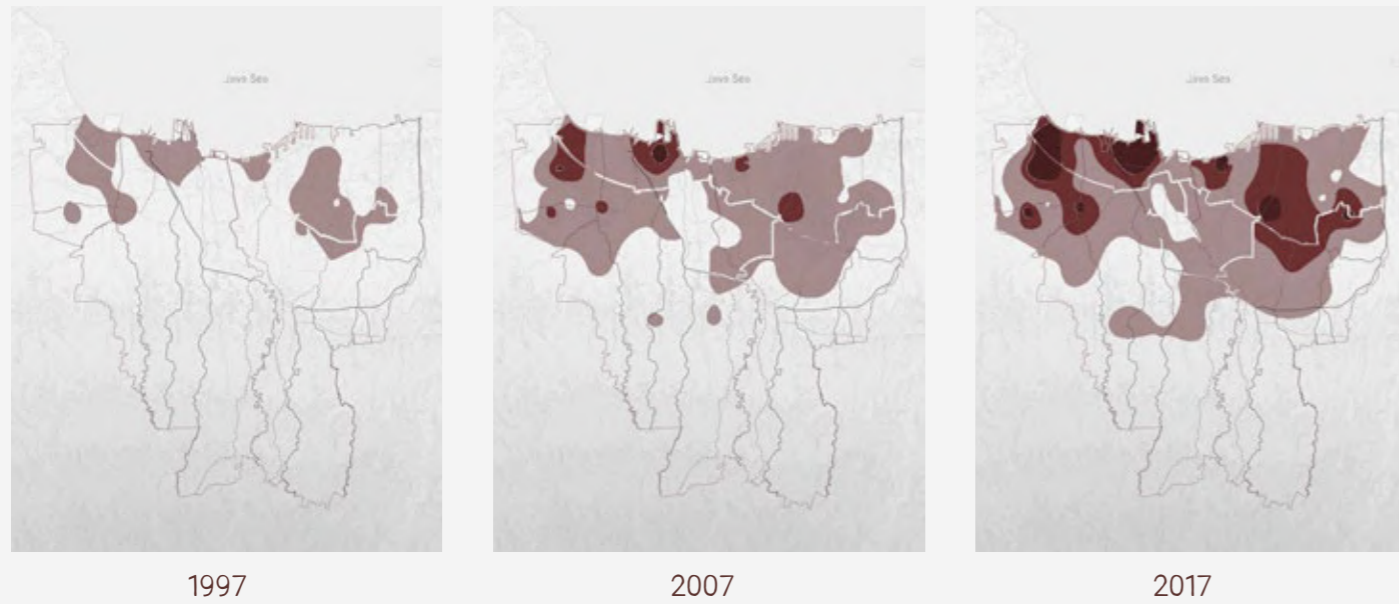
1965 - now

Vast urban growth in Jakarta

Jakarta's Land Subsidence

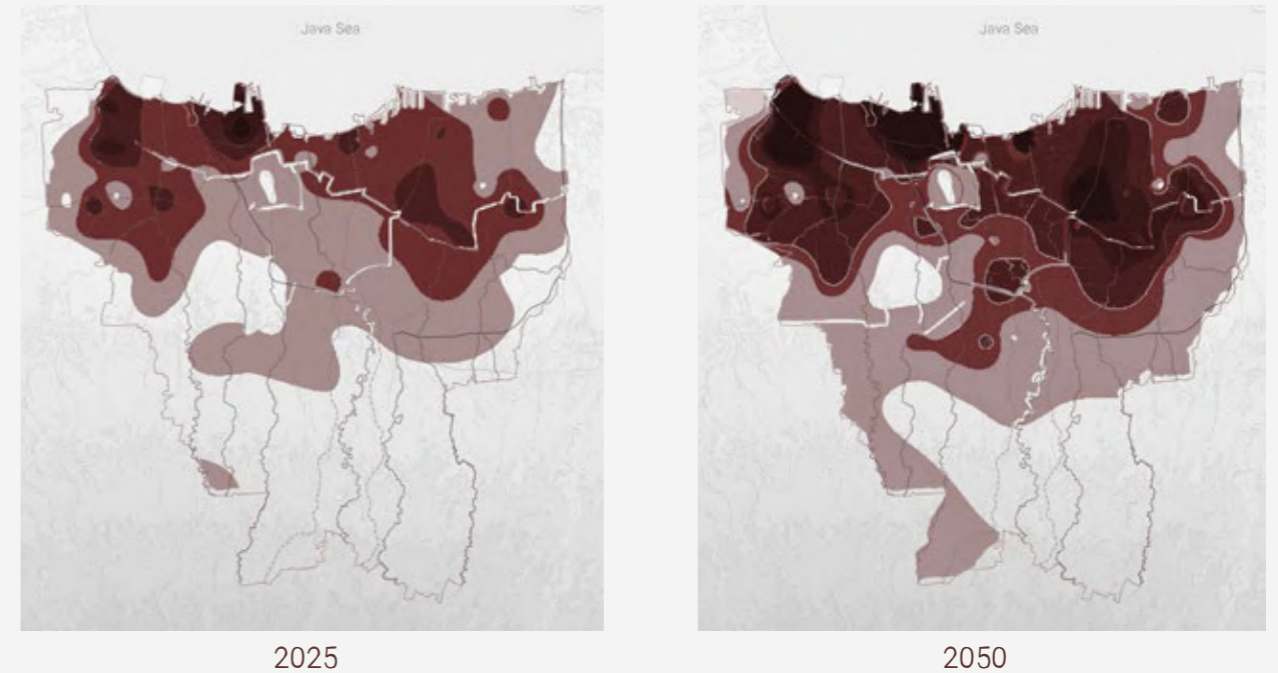
Since thirteen rivers run through Jakarta, it is a typical case that flooding is frequent in Jakarta. According to experts, it is getting worse. It is not only about the flooding event; the city will disappear into the ground.

Jakarta is sinking by an average of 1 - 1.5 cm a year. As a result, almost half of the city is now sitting below sea level.



Source: Dr. Heri Andreas, Faculty of Earth Sciences and Technology, Bandung Institute of Technology.

Note: 2025 and 2050 predictions are based on research by Dr. Heri Andreas.



It is happening right now. North Jakarta has sunk into 2,5 meters in 10 years and continues to decrease as much as 25 cm per year in some areas, which is more than twice the global average for coastal megacities.

The rest of the area in Jakarta is also sinking but at a slower rate. In the west part of Jakarta, the ground is sinking by 15 cm per year, by 10 cm in East Jakarta, 2 cm in Central Jakarta, and 1 cm in the south.

The vast rate at which Jakarta is sinking is mainly down to the excessive extraction of groundwater for everyday purposes by city dwellers. Piped water cannot reach and is not available in most areas. Therefore people have no choice but to extract the water from the aquifers deep underground. When the groundwater is pumped out, the land above it sinks since nothing can hold the pressure above the ground. This phenomenon leads to **land subsidence**.

“There is not sufficient water delivery, so people are pumping out too much groundwater, and because of the rapid urbanisation over the last 30 years, the amount of permeable surface in the city has decreased to a point where you don’t have enough recharge in the groundwater,” says Kian Goh, assistant professor of urban planning at the University of California, Los Angeles, who has studied Jakarta in depth.

Jakarta's Flooding Event



2002



2007



2013



2017

With the tropic geographic location, Jakarta had storm surges and heavy rain from annual cyclones. Along with global temperatures rising and ice sheets melting, many coastal cities face a growing risk of flooding due to sea-level rise. Few places, however, face challenges like those in front of the Jakarta metropolitan area.

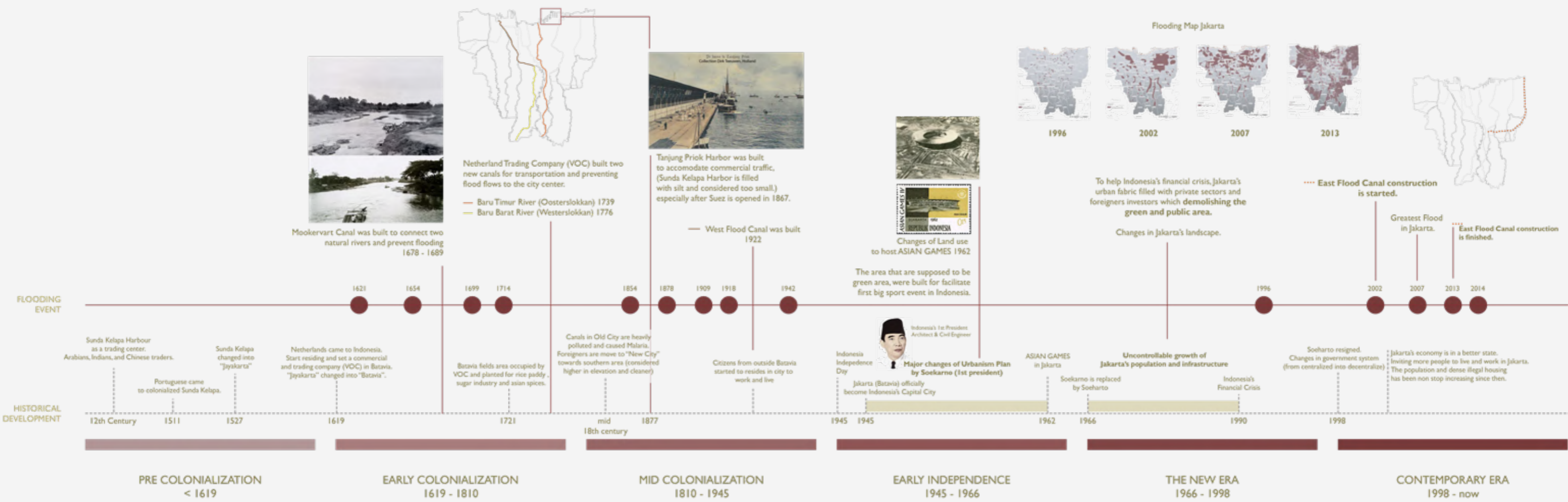
Since Jakarta was founded in the early days, flooding has been an issue in Jakarta because its location is in low-lying rivers that swell during the monsoon season. Recently, the flooding issue has grown excessively because of the land subsidence as well.

With mean and average global sea levels rising by 3.3 millimeters per year and rainstorms getting more intense as the temperature heats up, damaging floods have become common in Jakarta. Since 1990, major floods have happened every year in Jakarta, with ten thousand people displaced. The heavy rain and monsoon in 2007 severely damaged the city, with more than 70 percent of the city submerged in the water.



pic credit: <https://www.dw.com/en/indonesia-jakarta-hit-with-deadly-floods/a-51851607>

Jakarta's Blue Infrastructure Development & Flooding Event Timeline



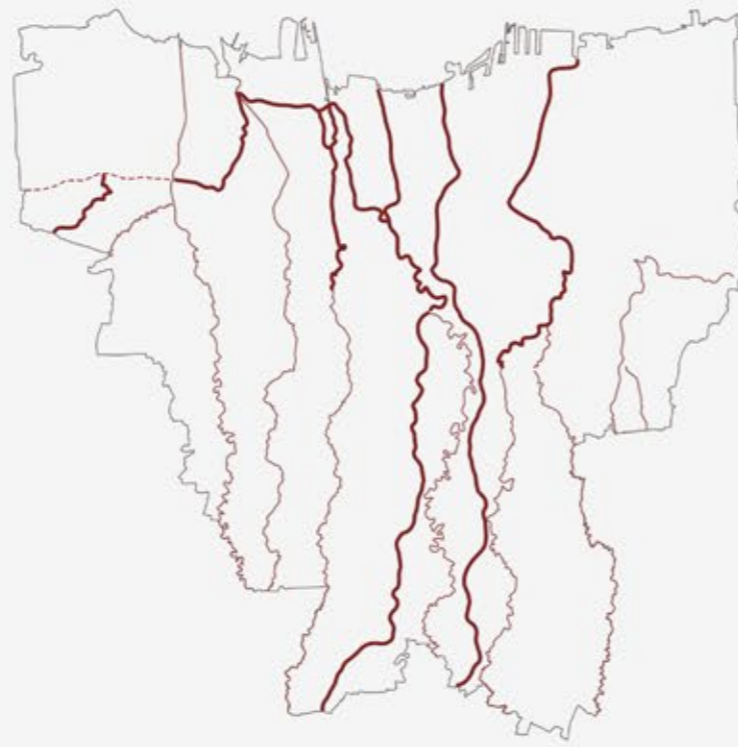
Jakarta's Blue Infrastructure Development



< 16th Century

Pre Colonialization

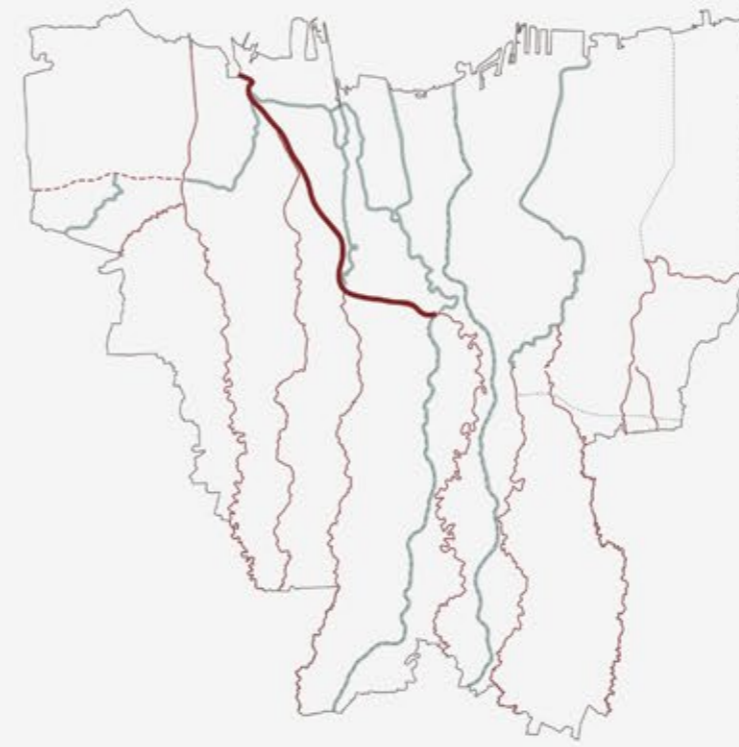
Jakarta still acts as a Trading Harbour called "Sunda Kelapa" Harbour



16th - 18th Century

Colonialized by Portuguese & the Netherlands

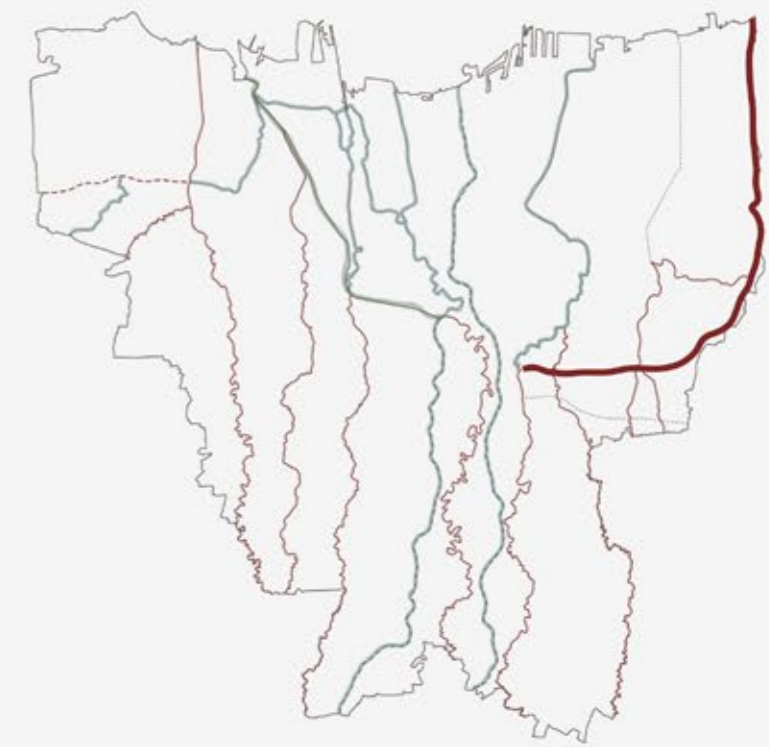
Netherlands made canals as a solution for flooding issues in Jakarta, and as an access for goods transportation.



19th - 20th Century

Colonialized by the Netherlands & Japanese

The Netherlands made West Flood Canal to handle the water debit and help the flooding.



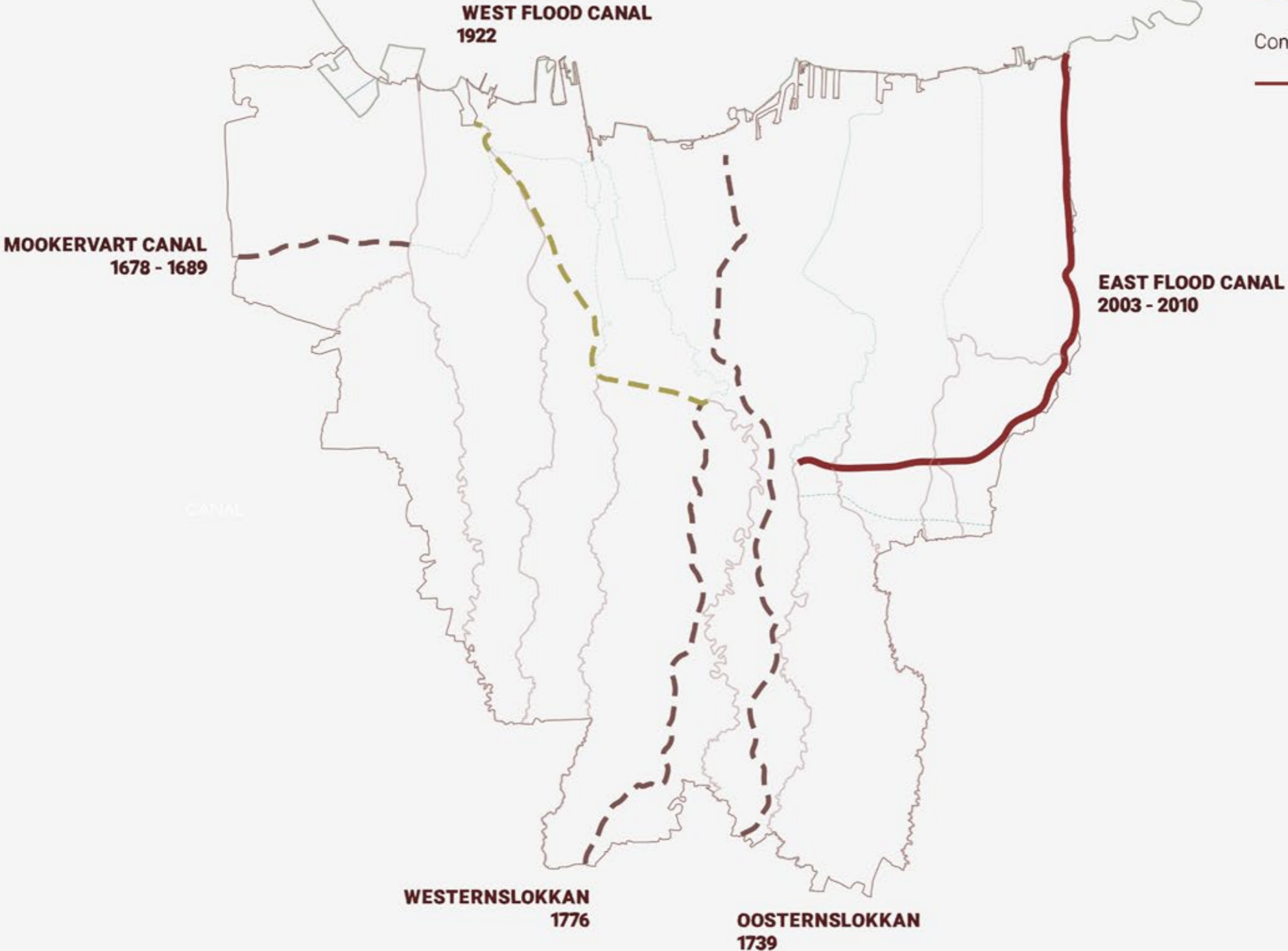
20th Century - Now

Indonesia's Independency

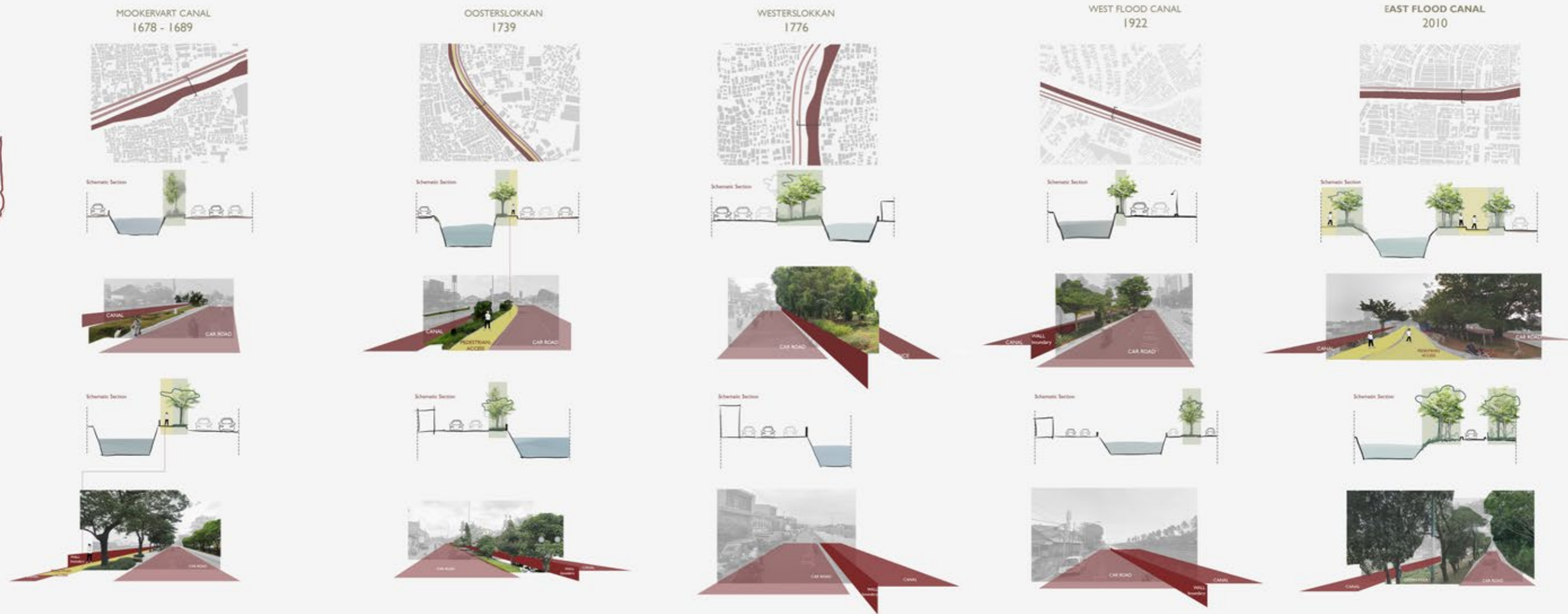
Jakarta become a capital city. Indonesia made their own locally made Flooding Canal in the East (East Flood Canal)

ARTIFICIAL CANALS FUNCTION

- Colonialization Era
 - Transportation Canal
 - - - Flooding Control Canal
- Contemporary (Independency) Era
 - Flooding Control Canal



Jakarta's Artificial Canal Analysis



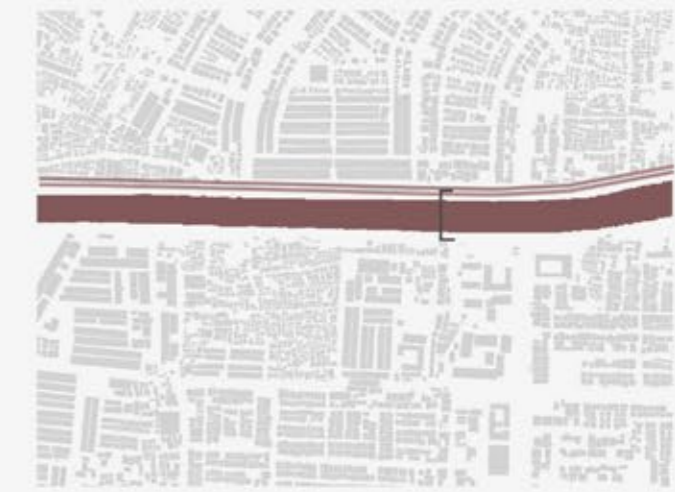
After analyzing the condition of Canals in Jakarta, East Flood Canal has distinctive features that are different from other canals in Jakarta. The other four canals were built when the Netherlands colonized Indonesia and resided in Jakarta. These canals were the main ones for the city.

As time evolved, these canals developed as the main axis for Jakarta's transportation infrastructure and as guidelines for the main road. These four canals always have wide car roads on their side, and as a result, they have a small space of green buffer, and only a few of them have pedestrian access.

On the other hand, East Flood Canal was made when Indonesia already had independence. East Flood Canals was entirely made by locals, from the planning until the construction. It adapted the lesson learned from the previous canals. East Flood Canal is designed to have a green buffer and, most importantly, access for pedestrian and bike paths.

What makes East Flood Canal Different than others?

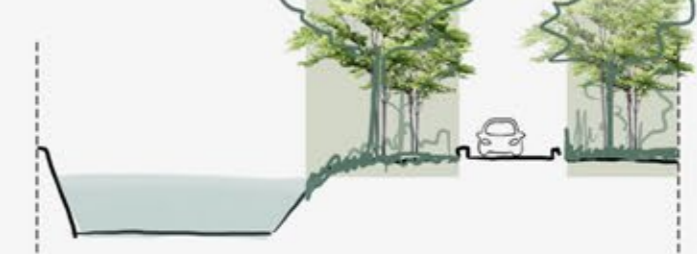
The provided infrastructure inviting other activities to merged in. East Flood Canal activates the surrounding neighborhood through **social** activity, **economy** and for the **environment**.



Schematic Section



Schematic Section



Java Sea



1

2

3

4

5

6

7

8

9

10

11

12

13

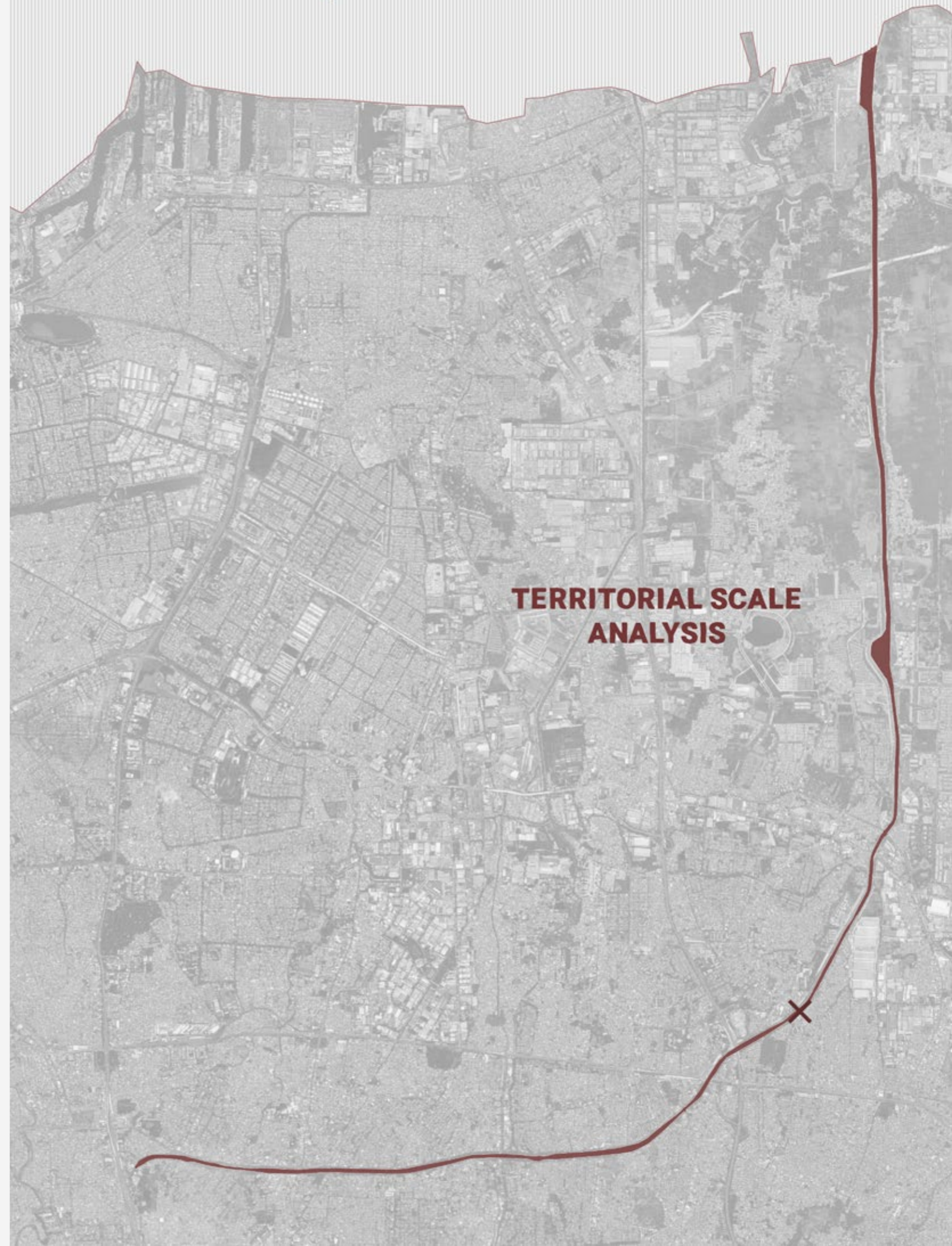
B

A

East Flood Canal

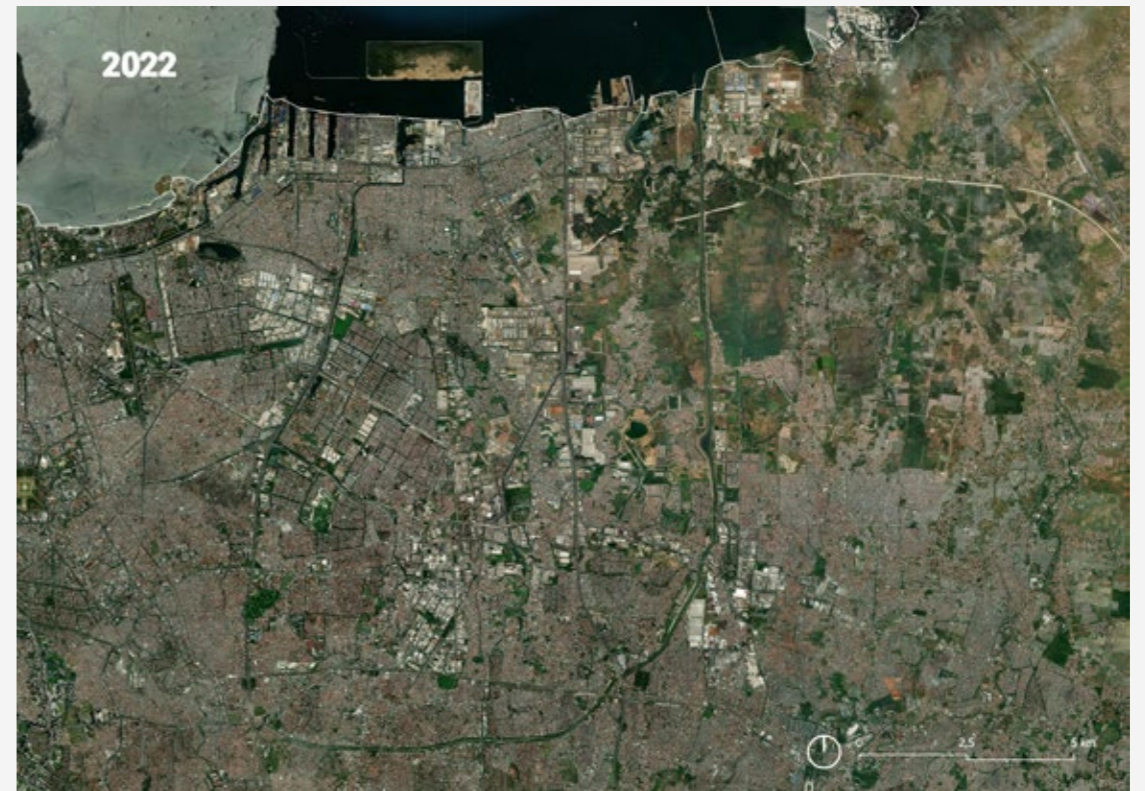


Øystein Lund Andersen / ØYSTEINLUNDANDERSEN.com



**TERRITORIAL SCALE
ANALYSIS**





Territorial Scale
East Flood Canal

Java Sea

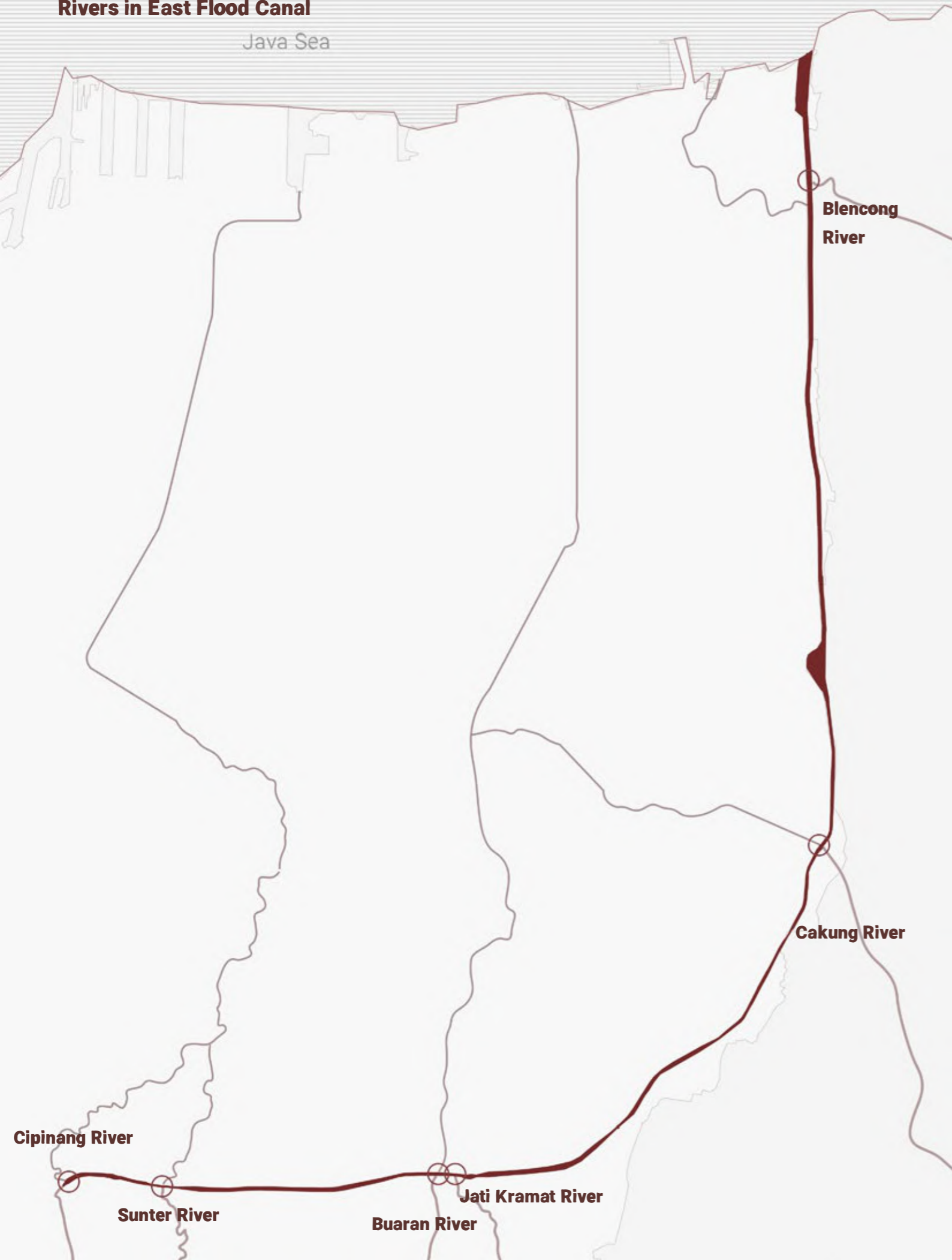
JAKARTA

WEST JAVA



Rivers in East Flood Canal

Java Sea



East Flood Canal is located between two provinces, DKI Jakarta and West Java. This canal was essentially made to hold the debit of the water that flowed from 6 rivers and distributed to the gulf of Java Sea. It can hold the water for 390 m³/second.

Mr. Mustajab, the coordinator and controller of East Flood Canal construction, mentioned the function of the East Flood Canal in his interview with Zahranum Ramadhyanti, which are:

1. Flood Control
2. Water Conservation
3. Water Transportation Facilities and Improve the Green Open Space for the Public
4. Driving force of Growth in the East and North sides of area in Jakarta

The government and other stakeholders handling East Flood Canals keep maintaining and improving the condition of East Flood Canals and using these four main functions as a guideline.

Contour Lines and Flooding Prone Area

The flooding-prone areas indicate areas that would sink in the rainy season. The lands in these areas are the lowest in Jakarta. Therefore, when the rainy season comes, the east flood canal water level would be higher than the land and flooding into the land.

Furthermore, the flood damages agricultural fields and wetlands, which serve as water retention. Hence, the flood gets worse in these flooding-prone areas.

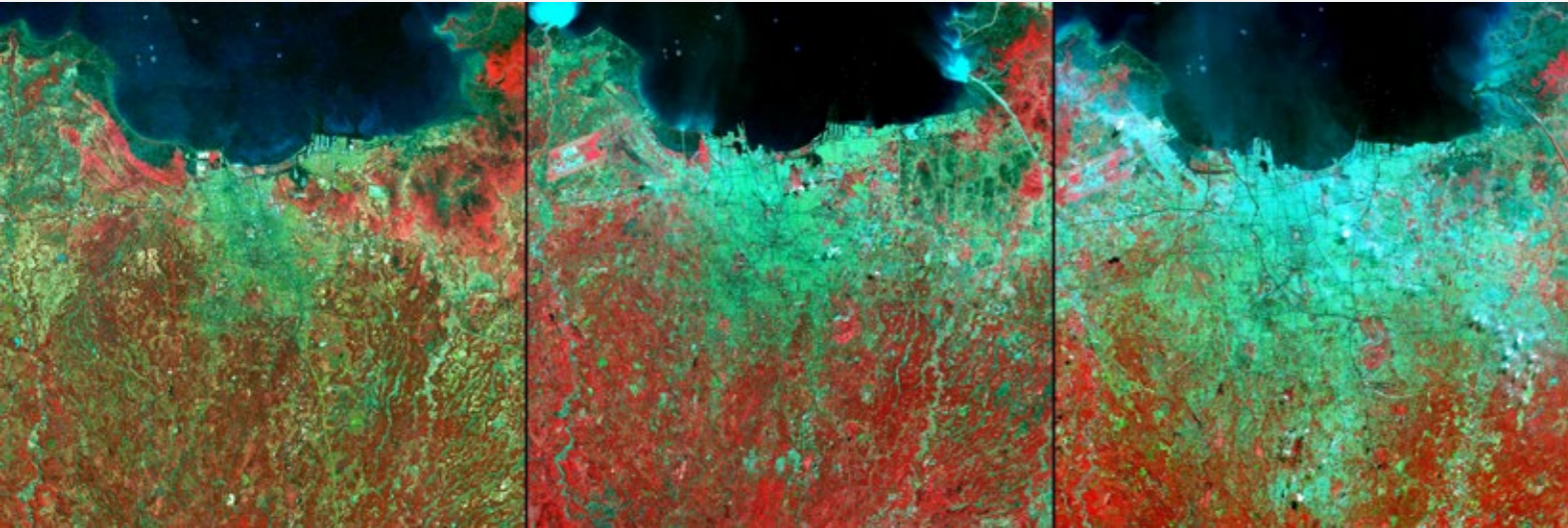


Territorial Scale
Residential Area

1976
population 6 million

1989
population 9 million

2004
population 13 million



Vegetation appears red, and urban areas appear light green.
Image satellite from NASA.

Jakarta is the most populated city and has the highest urban growth in Indonesia. The urbanization started when Jakarta was still called Batavia and controlled by the Netherland. What used to be a wetland later became the center of economy and governmental activities.

Many locals from other cities and foreigners migrated to Jakarta to conduct business, and some were looking for jobs. Since then, the housing development in Jakarta has expanded fast until it reached the point that Jakarta does not have the space anymore, and the housing price is high.

Bappenas (Indonesia National Development Planning Agency) noted that the land use for housing reached 456,626 km² (45,662.6 Ha) or 69.86% of the total area of built land use which was equivalent to 65.27% from its total area.



Territorial Scale
Agriculture Field

Agriculture and civilization are two things that cannot be separated. Jakarta is one of the cities that evolves around agriculture. The agriculture patch in Jakarta is decreasing from time to time because of land used for development. We can find more agricultural fields in the north and west-east of East Flood Canal.

Bappenas (Indonesia National Development Planning Agency) noted that green open spaces, such as agricultural land, parks, and urban forests, covered only 42.94 km² (4,294.5 hectares) or 6.57% of Jakarta's area.

the products



Territorial Scale
Industrial Area

Located in a strategic location makes Jakarta the biggest industrial city in Indonesia. It provides all types of supporting infrastructures, such as toll roads for land transportation, well-developed seaports for conducting business through the ocean, and airports. The north part of Jakarta is the center of industrial activities. Factories, warehouses, and seaports are located there. The industrial area started expanding as time passed, and due to limited spaces, it expanded to neighboring cities. From only the north part of Jakarta, the industrial area first expanded to the east side, Bekasi, and later kept expanding to surrounding cities.

This rapid industrial expansion led to high urban growth. With non-strict control of land-changes uses from local governments, this expansion raised an issue. Many essential agriculture fields, mostly rice fields, transformed into houses and industrial estates, causing a declination of rice stocks in Java.

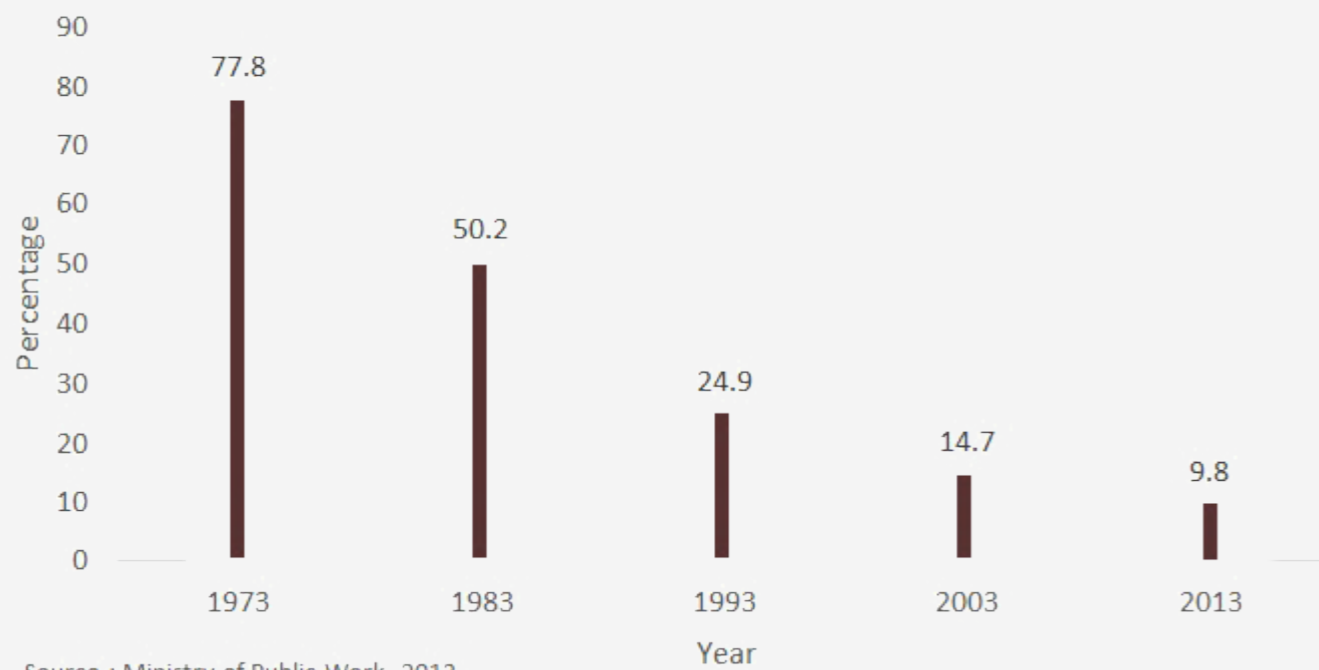


Industrial estate development in the delta area of East Flood Canal (2022)



The existence of green areas in Jakarta is facing a high-risk issue because of the constant change in land utilization for more profitable activities. Green spaces in Jakarta are one essential element to give balance to the city. There are green natural parks that are provided by the government for the people. East Flood Canal development is one of the ways to increase the number of green belt areas throughout the city.

Percentage of Green Space Area to Total Jakarta Area

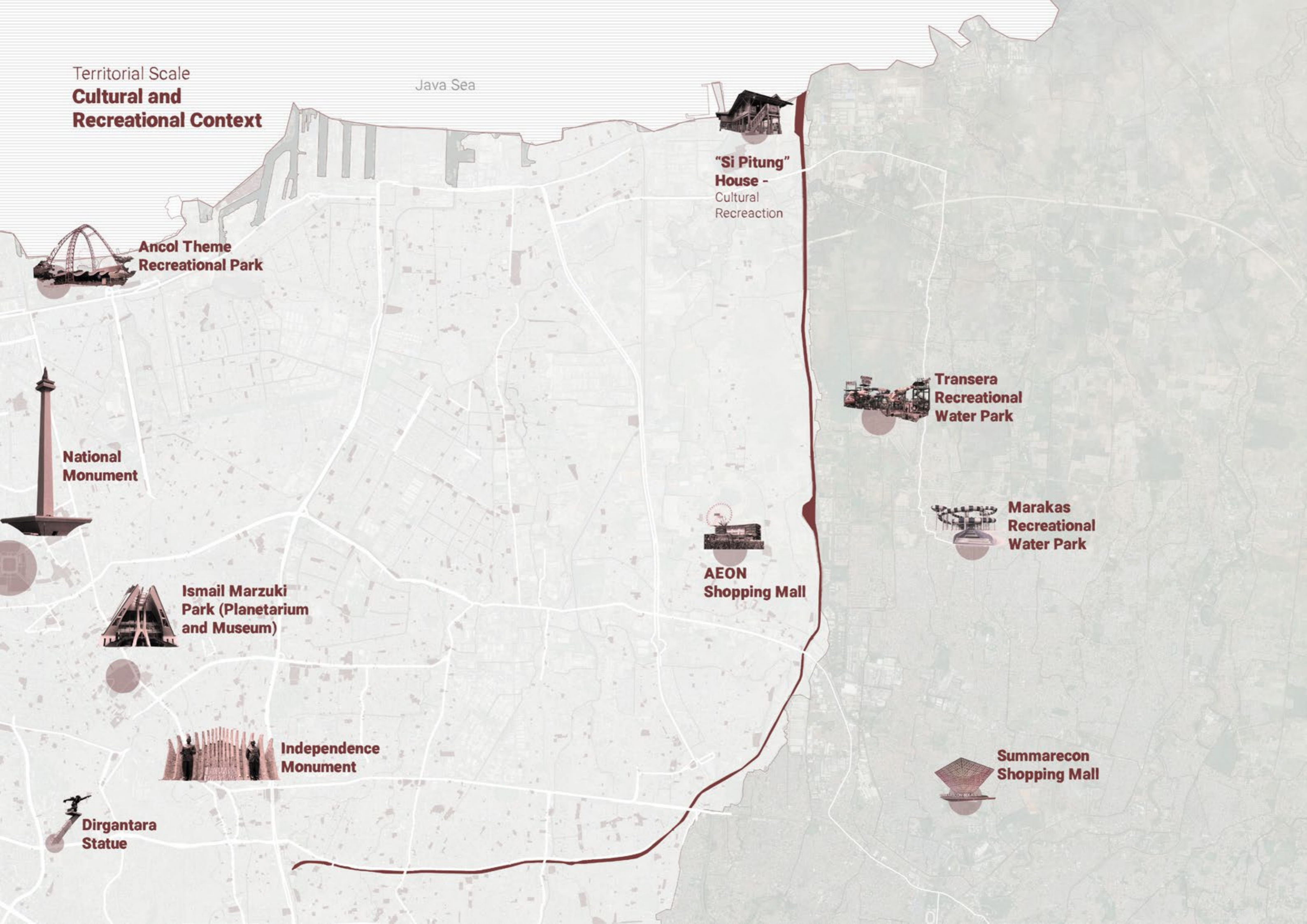


Source : Ministry of Public Work, 2013



Territorial Scale
**Cultural and
Recreational Context**

Java Sea



**Ancol Theme
Recreational Park**

**National
Monument**

**Ismail Marzuki
Park (Planetarium
and Museum)**

**Independence
Monument**

**Dirgantara
Statue**

**"Si Pitung"
House -
Cultural
Recreation**

**AEON
Shopping Mall**

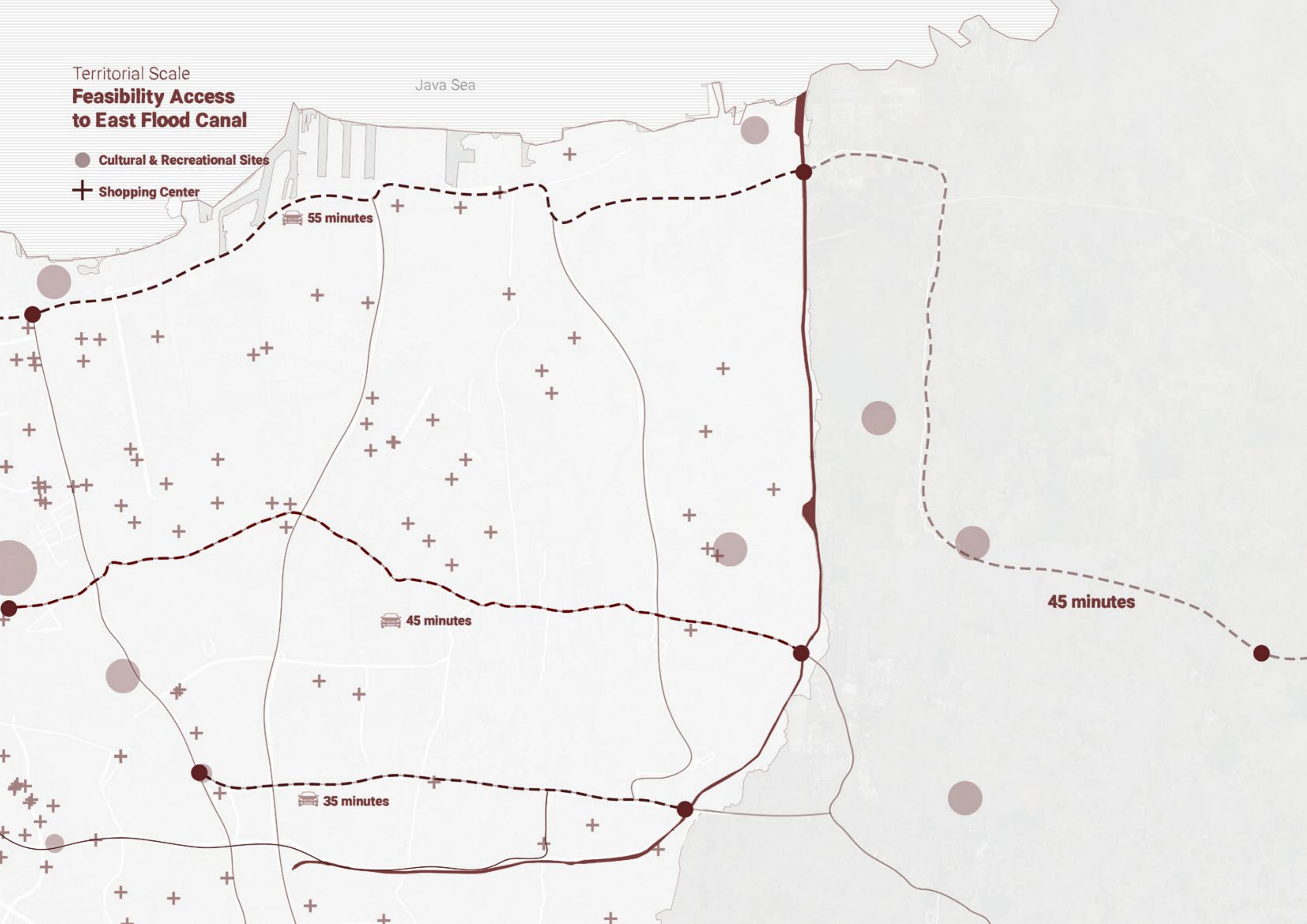
**Transera
Recreational
Water Park**

**Marakas
Recreational
Water Park**

**Summarecon
Shopping Mall**

Territorial Scale
**Feasibility Access
to East Flood Canal**

- Cultural & Recreational Sites
- + Shopping Center



Territorial Scale Social Activity in East Flood Canal

day time ———
night time ———

Many activities are happening every day at East Flood Canal. The activities can be divided into two timelines, in the daytime and in the evening.

In the daytime, during weekdays, Most people are there to work alongside the canal. Most of them are fishing and farming. Only a few people use the infrastructure to do exercise and biking. On weekends, they have a market during the day. People go there to visit the market, exercise together, paint, and have a recreational and relaxing time with family and friends.

In the nighttime, Both on weekdays and weekends, the night market is always bright and full of people. Other than the street food and goods, people go there also to sit and relax by the canal while enjoying their evening.

● fishing



● farming



exercise
bike path



● night market



Territorial Scale
Area Analysis

- Industrial Area
- Residential Area
- Agricultural Area
- Green Area

Java Sea



Territorial Scale
Study Case Area

Java Sea



Industrial



Agricultural

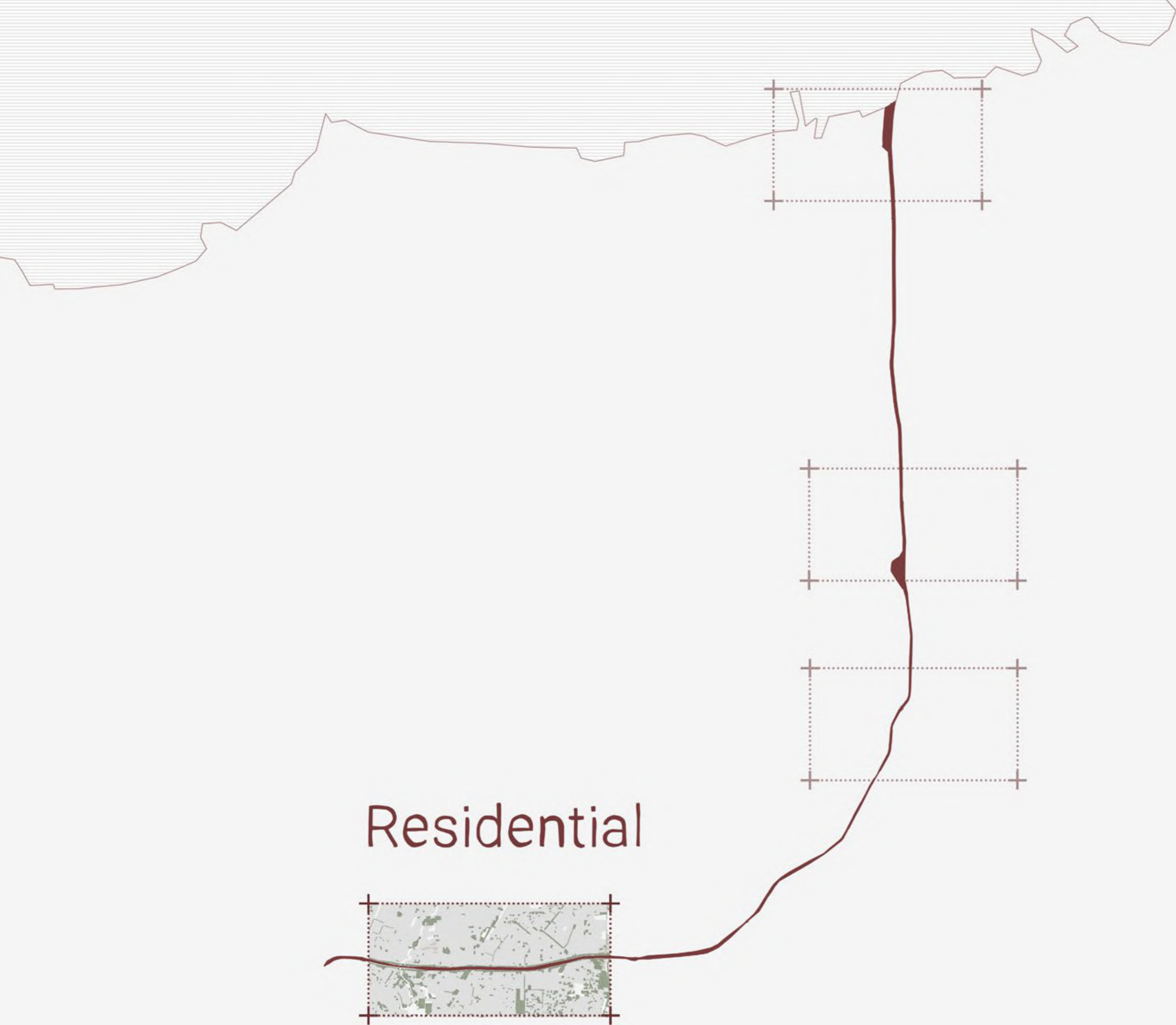


**Residential
Industrial
Agricultural**



Residential

These areas, alongside East Flood Canals, are focused due to the types of the city's fabric. Each fabric has its own identity, issues, and potential that will be analysed deeper in order to put an effective solution.



Residential



2003

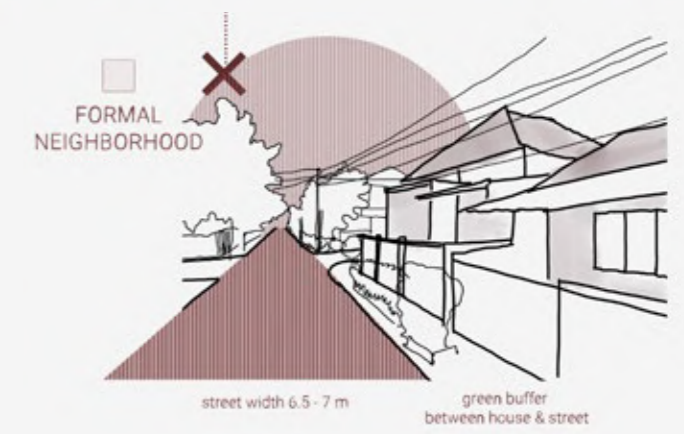
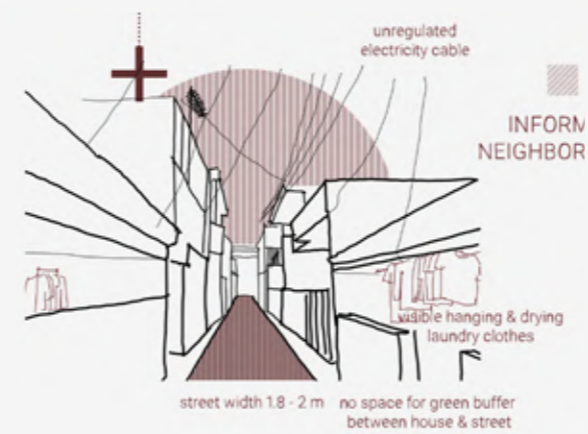


2022



RESIDENTIAL AREA

- FORMAL HOUSING
- INFORMAL HOUSING
- COMMERCIAL AREA
- SCHOOL
- GREEN AREA
- PUBLIC PARK
- EAST FLOOD CANAL

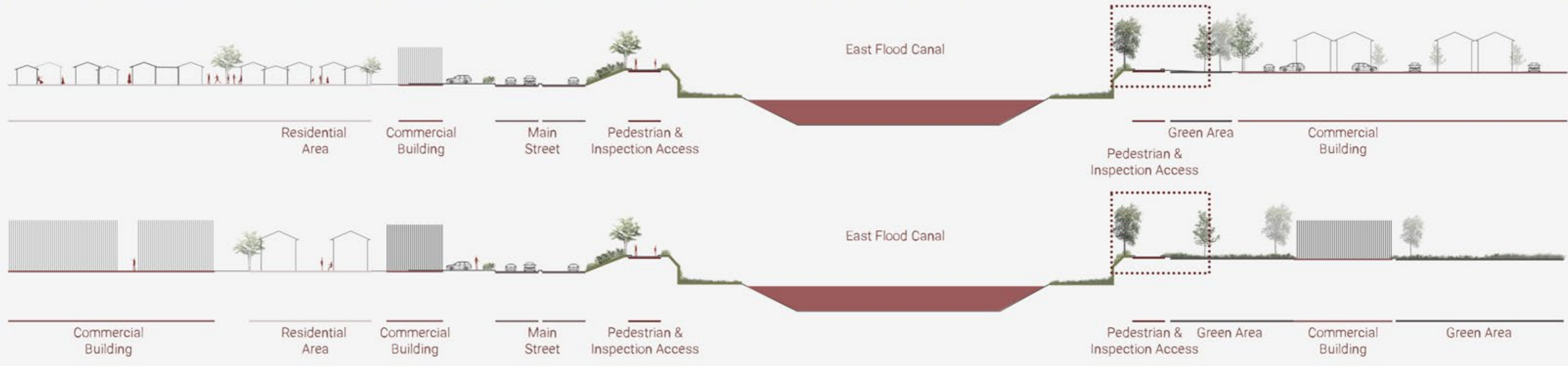




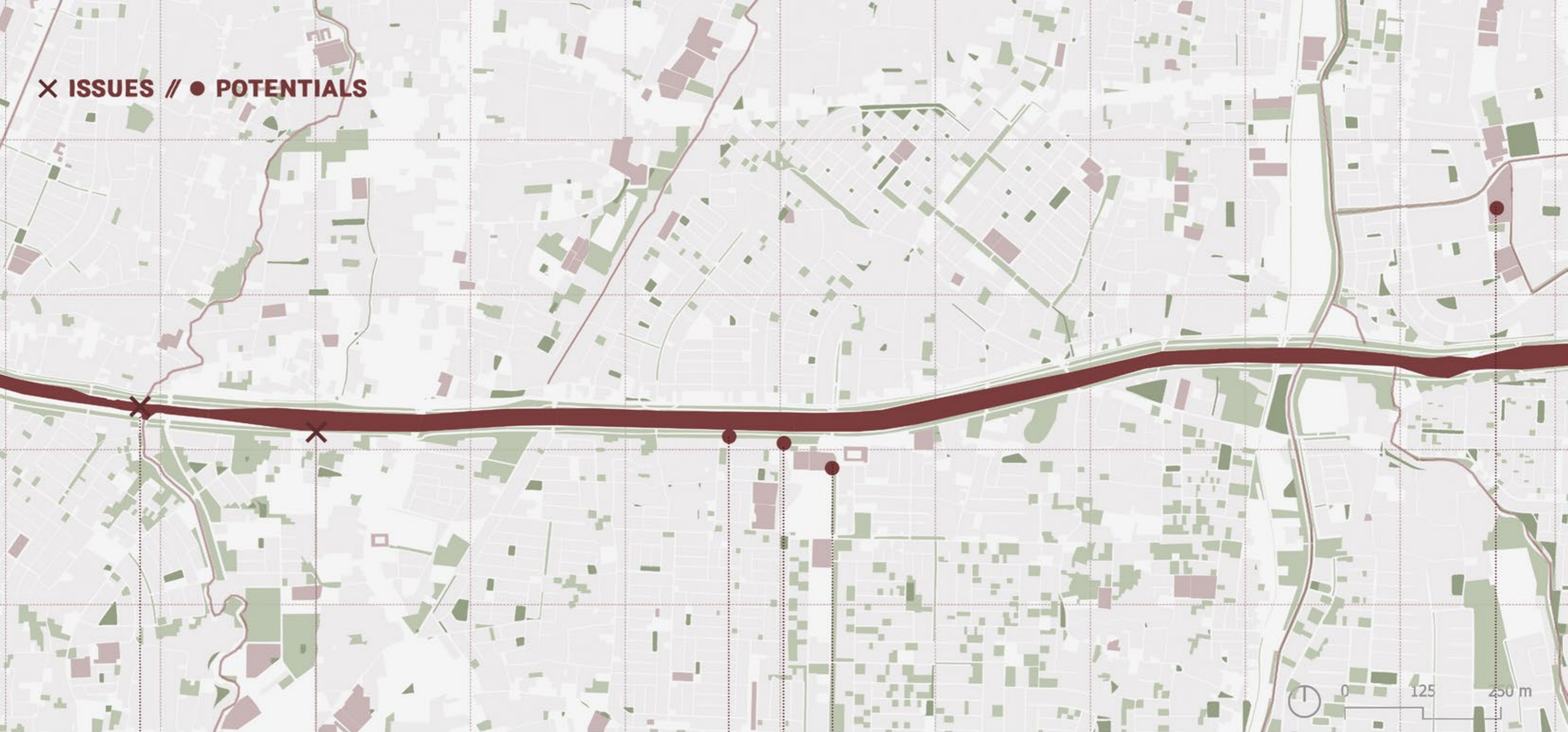
Day time



Night time



✕ ISSUES // ● POTENTIALS



✕ LACK OF PUBLIC - URBAN FACILITIES

✕ NEGLECTED CONDITION OF NATURAL RIVER



PRESENCE OF SCHOOL & HOSPITAL

● PRESENCE OF GREEN AREA

● AN ACTIVE COMMERCIAL ACTIVITY





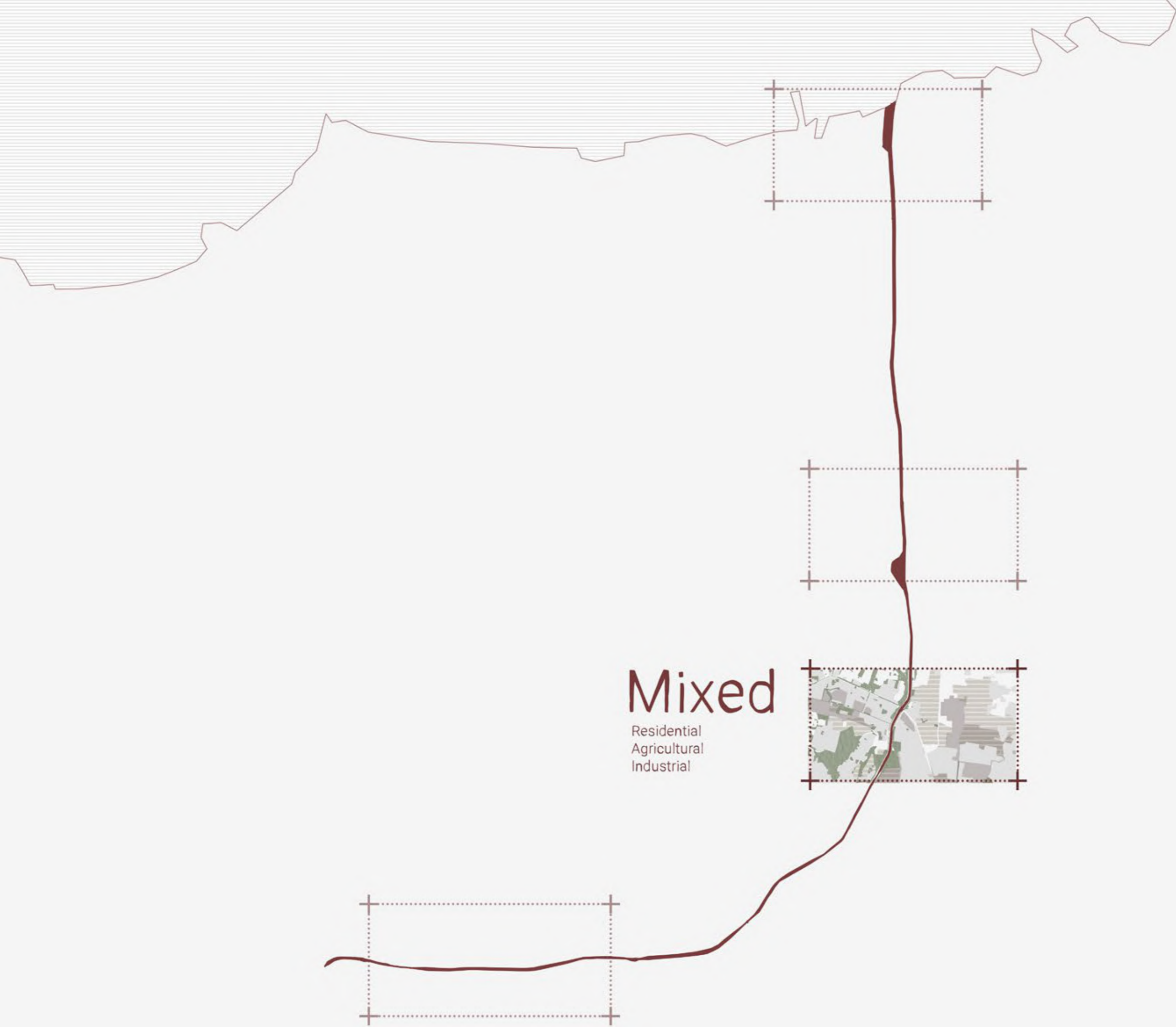
Darmo, 26, waiting for visitors to ride his horse for a trip in East Flood Canal

photo by Ilham Anas in nationalgeographic.grid.id



Every Saturday night, the street alongside the canal from Cipinang Besar until Malakasari got brighten up by the night live.

photo by Ilham Anas in nationalgeographic.grid.id



Mixed

Residential
Agricultural
Industrial

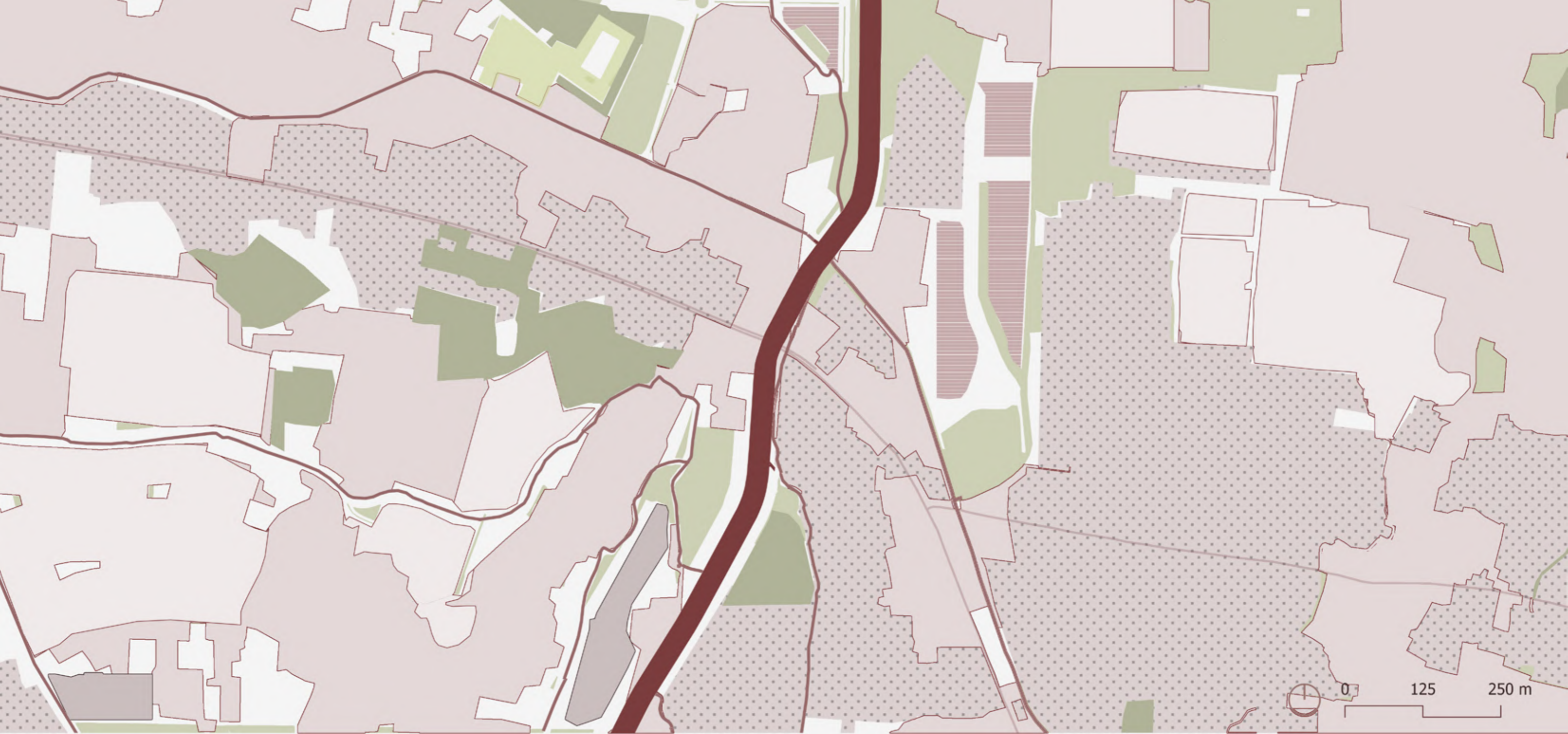




2003



2022



MIXED AREA

- | | |
|---|--|
|  DEVELOPER HOUSING |  INDUSTRIAL AREA |
|  INFORMAL HOUSING |  GREEN AREA |
|  SOCIAL HOUSING |  AGRICULTURE FIELDS |
|  COMMERCIAL AREA |  EAST FLOOD CANAL |

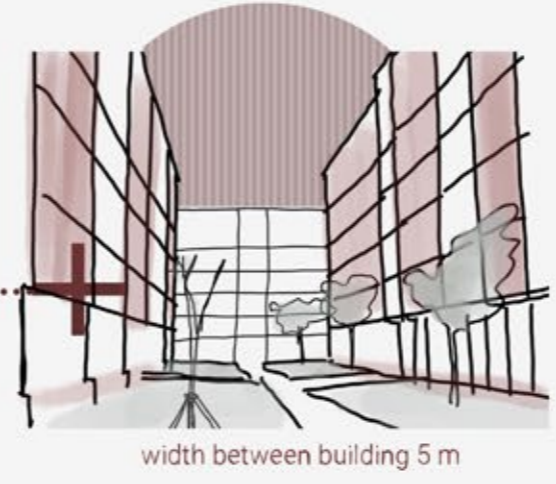
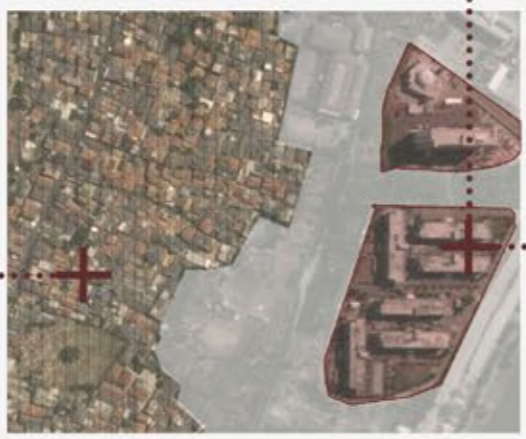


0 125 250 m

HOUSING NEIGHBORHOOD

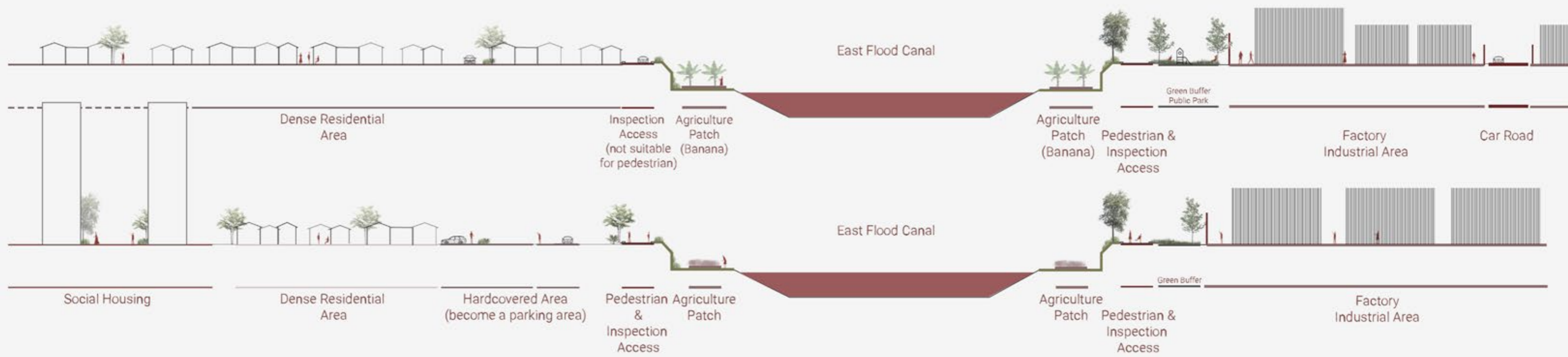
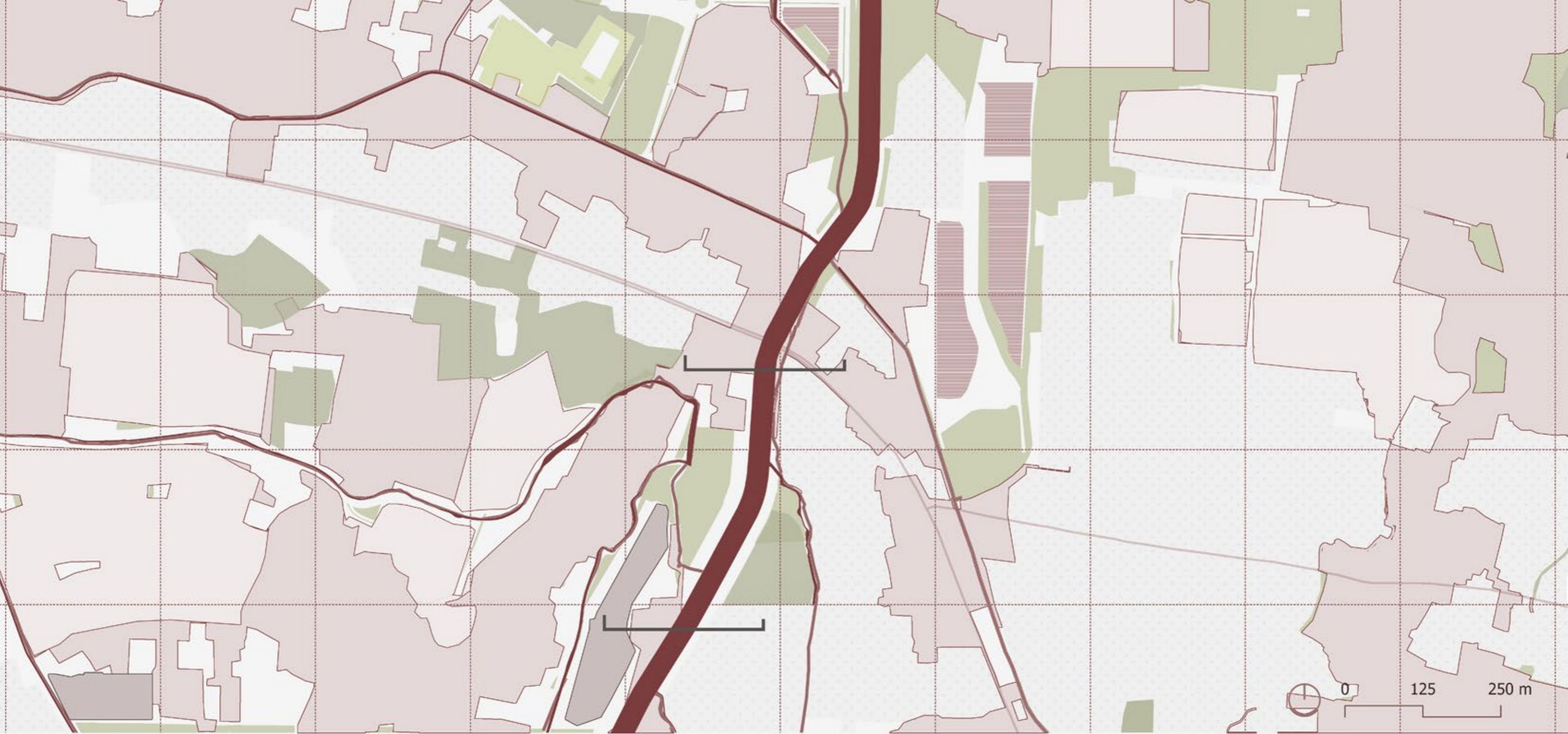


HIGH RISE SOCIAL HOUSING NEIGHBORHOOD

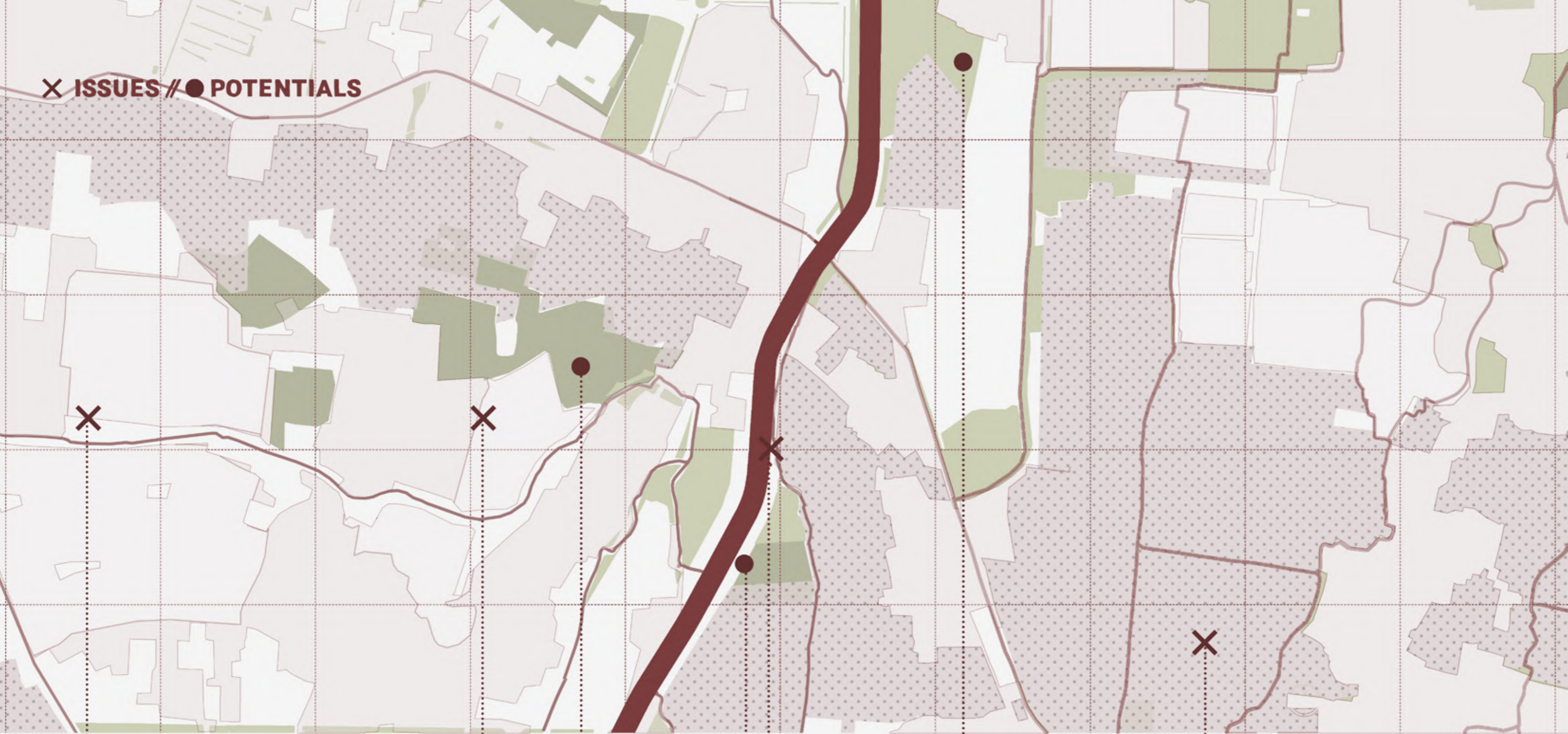


DEVELOPER HOUSING NEIGHBORHOOD

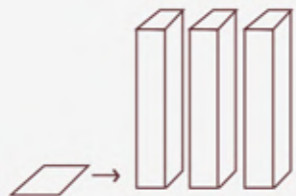




X ISSUES // ● POTENTIALS



LACK OF GREEN AREA



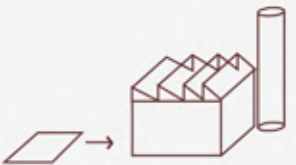
INCREASE OF HOUSING DEVELOPMENT

**POOR CONDITION OF
NATURAL RIVER**

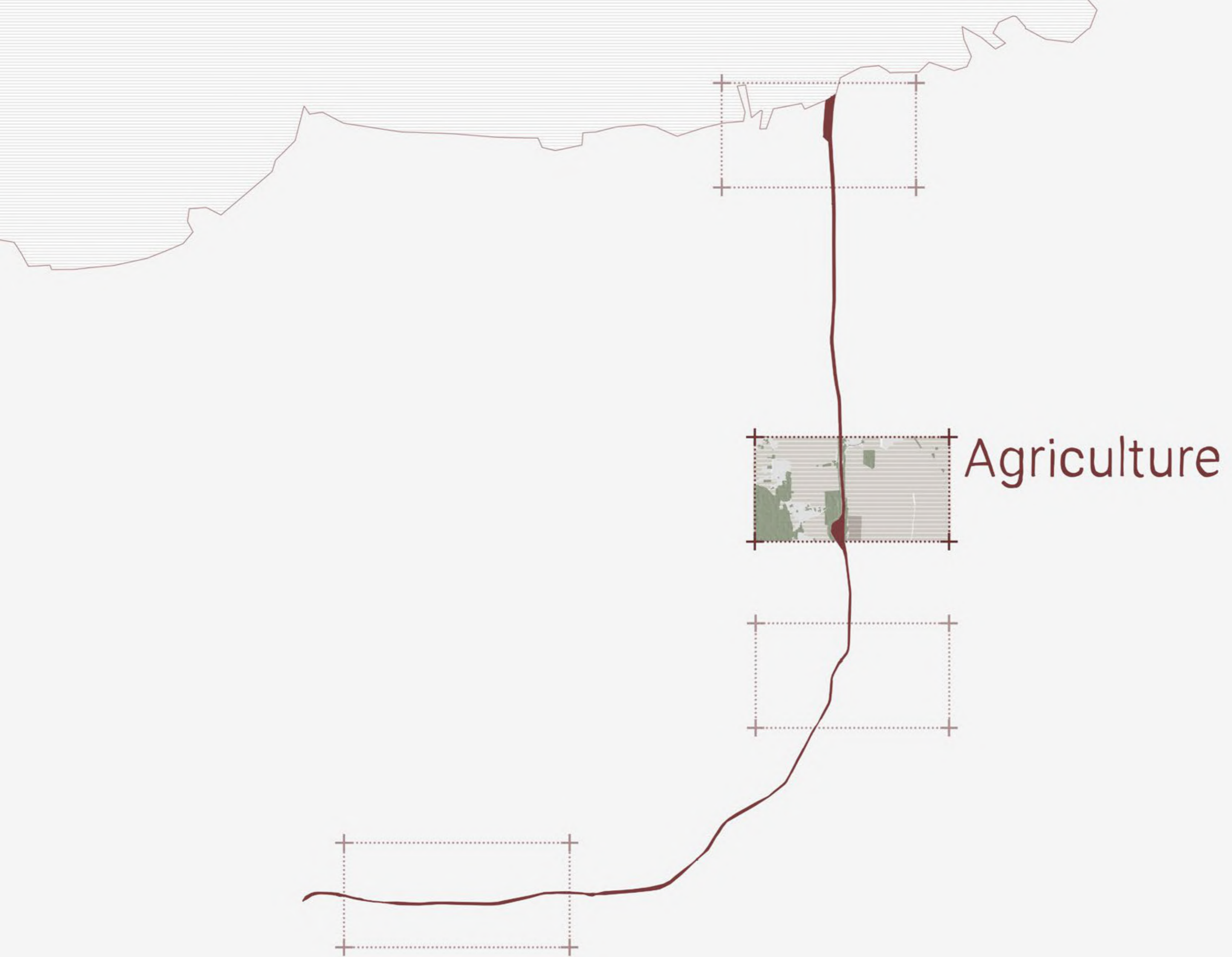
**ON GOING
AGRICULTURAL ACTIVITY**

PRESENCE OF CITY PARK

LACK OF GREEN AREA



INCREASE OF
INDUSTRIAL DEVELOPMENT

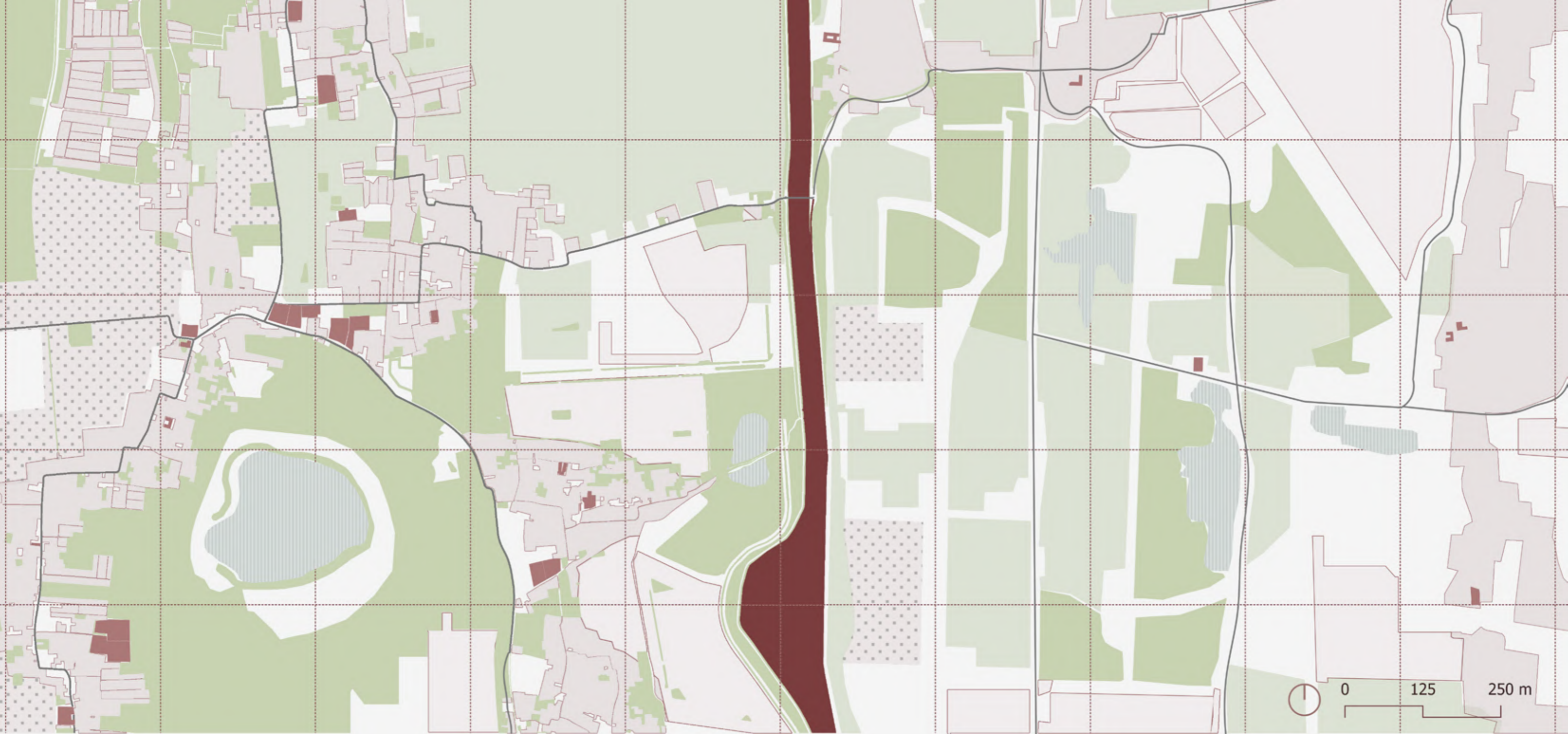




2003

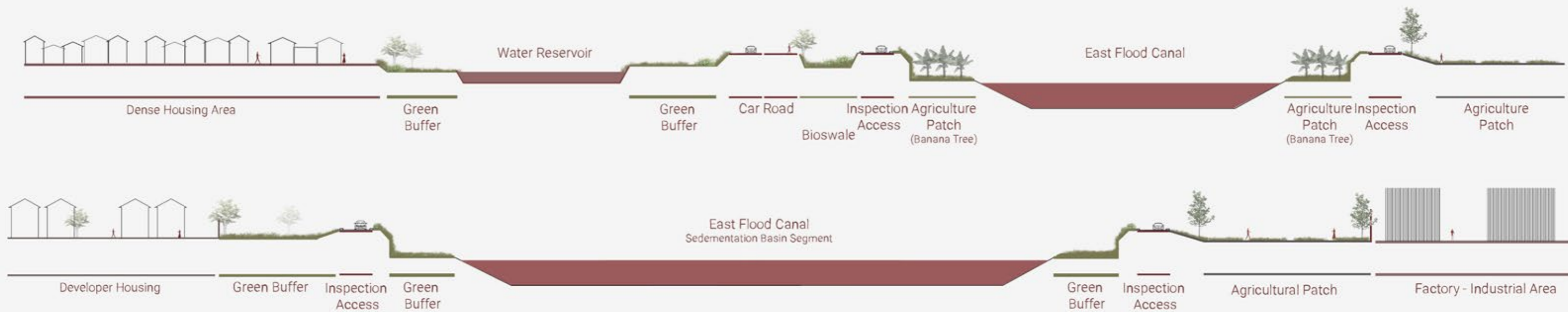
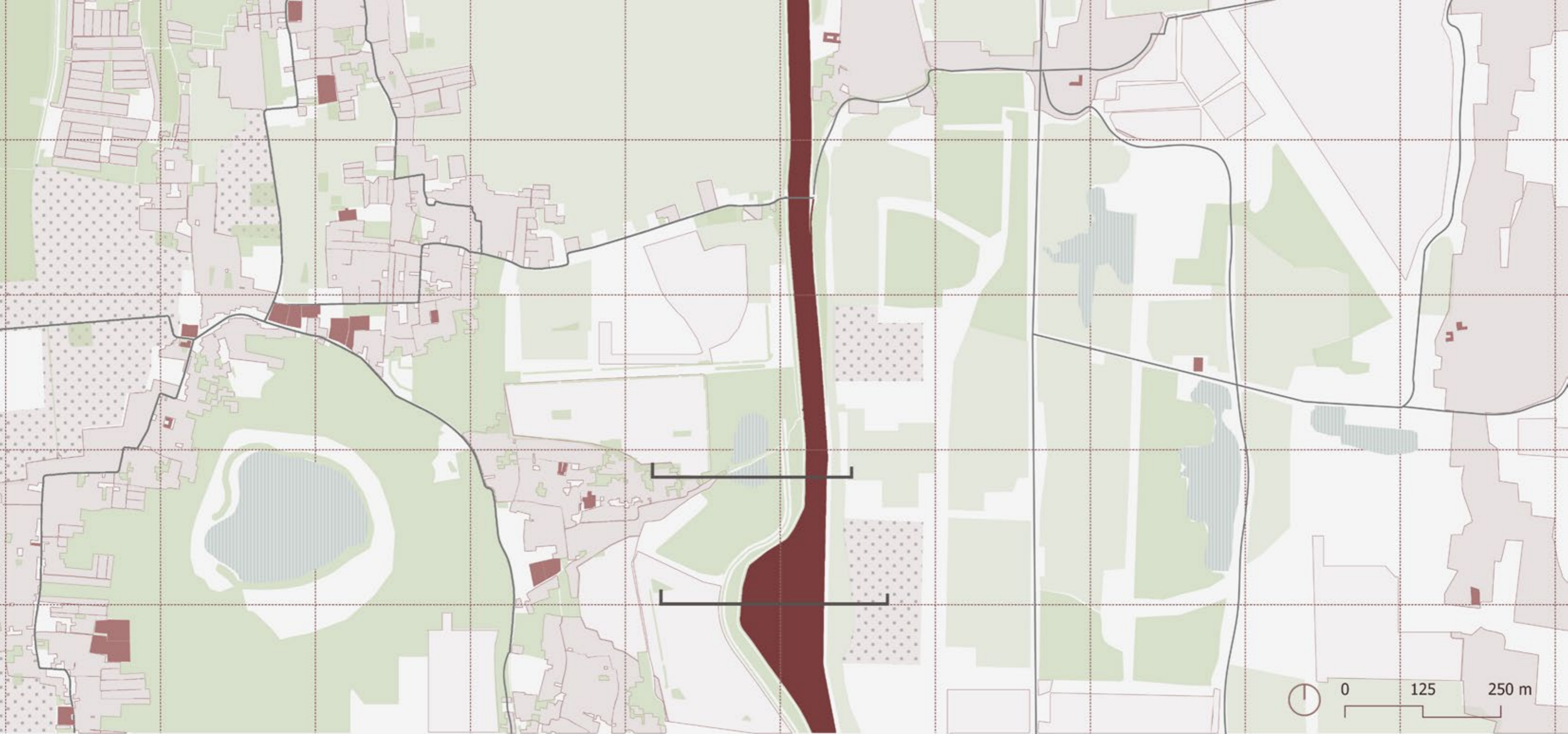


2022

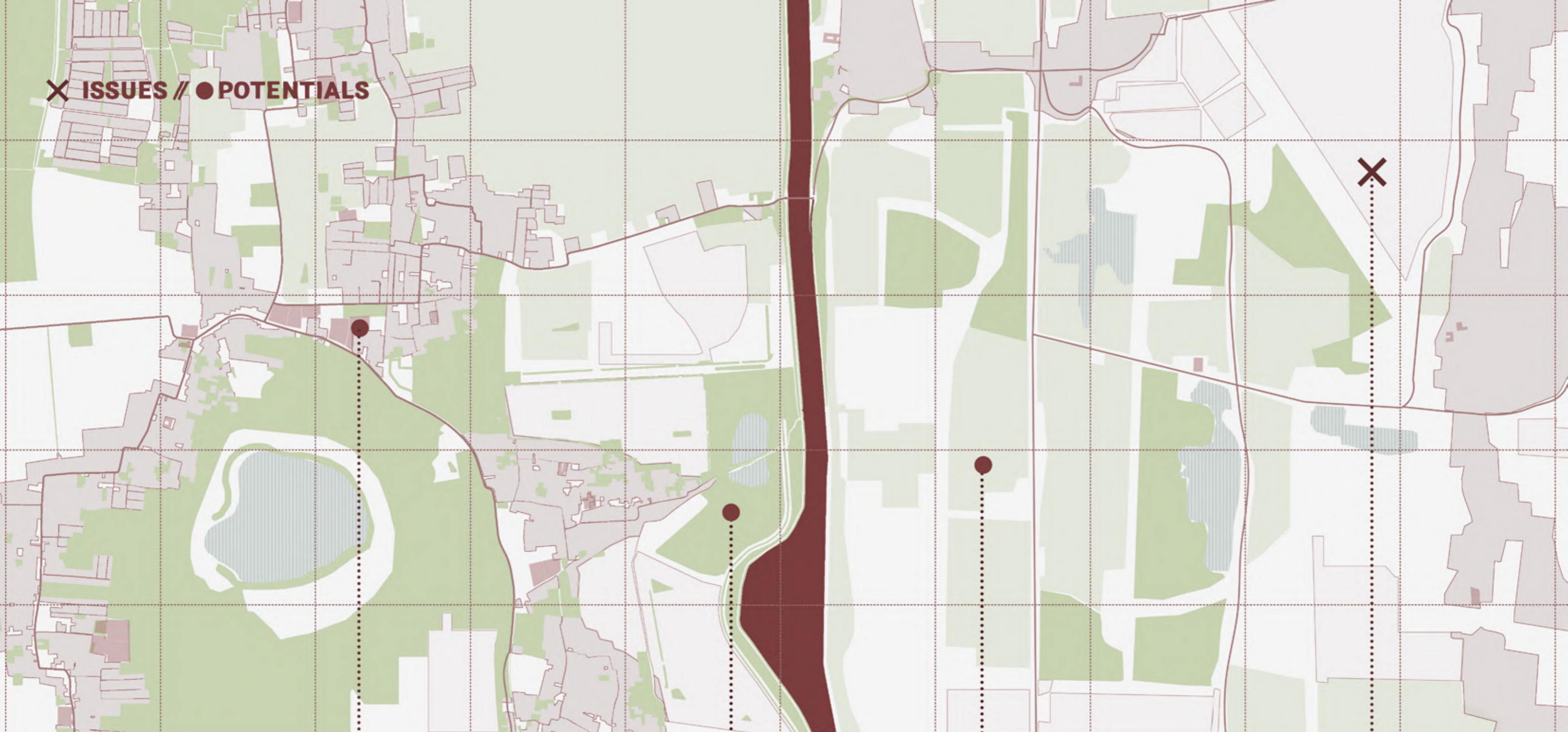


AGRICULTURAL AREA

- | | | | |
|---|-----------------------|---|--------------------|
|  | DEVELOPER HOUSING |  | WATER RESERVOIR |
|  | INFORMAL HOUSING |  | GREEN AREA |
|  | INDUSTRIAL AREA |  | AGRICULTURE FIELDS |
|  | EDUCATION INSTITUTION |  | EAST FLOOD CANAL |



X ISSUES // ● POTENTIALS

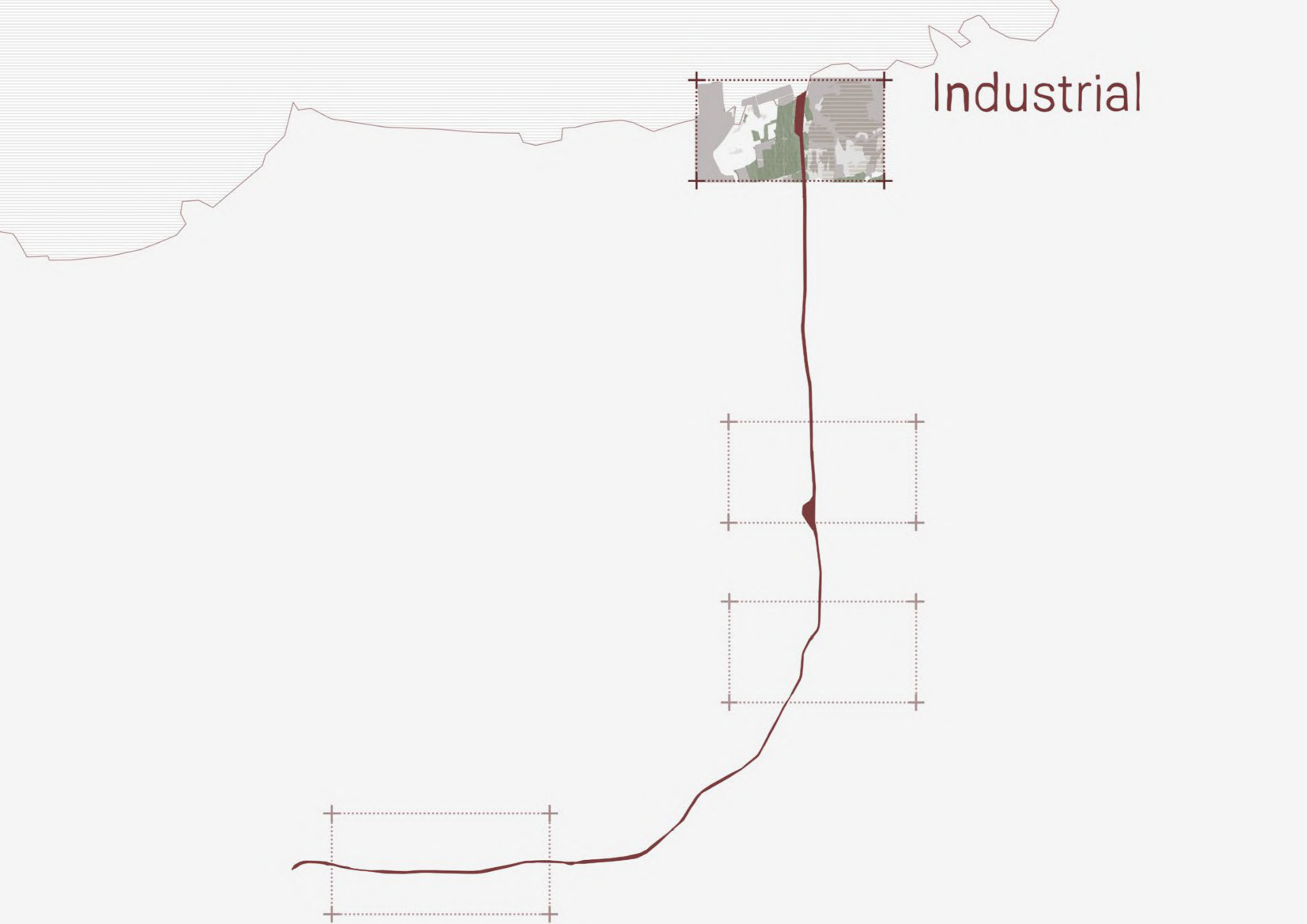


**PRESENCE OF PUBLIC FACILITIES
(SCHOOL)**

**PRESENCE OF
URBAN PARK**

**ON GOING INTEGRATED
AGRICULTURE - AQUACULTURE ACTIVITY**


LACK OF GREEN SPACE
INCREASE OF
DEVELOPER HOUSES



Industrial



2000

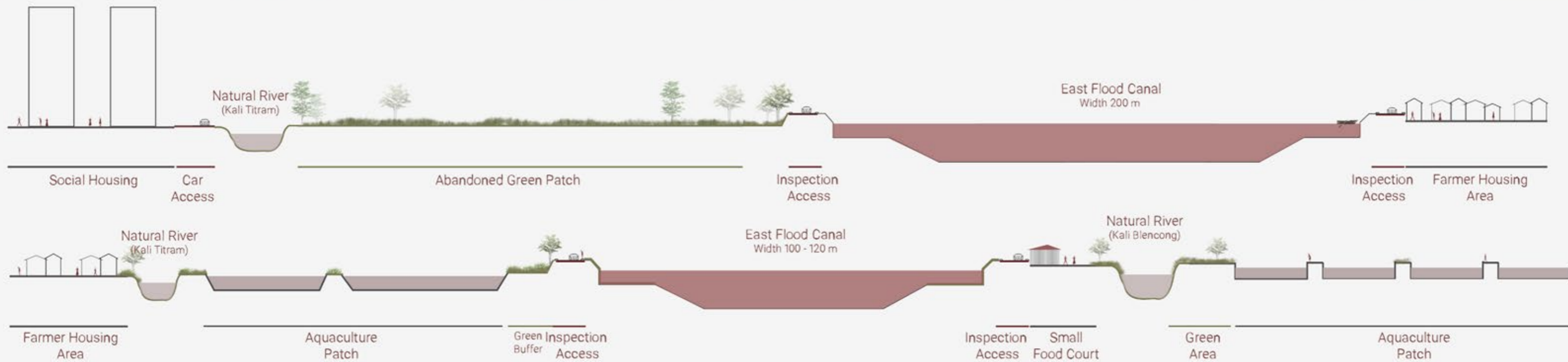


2022

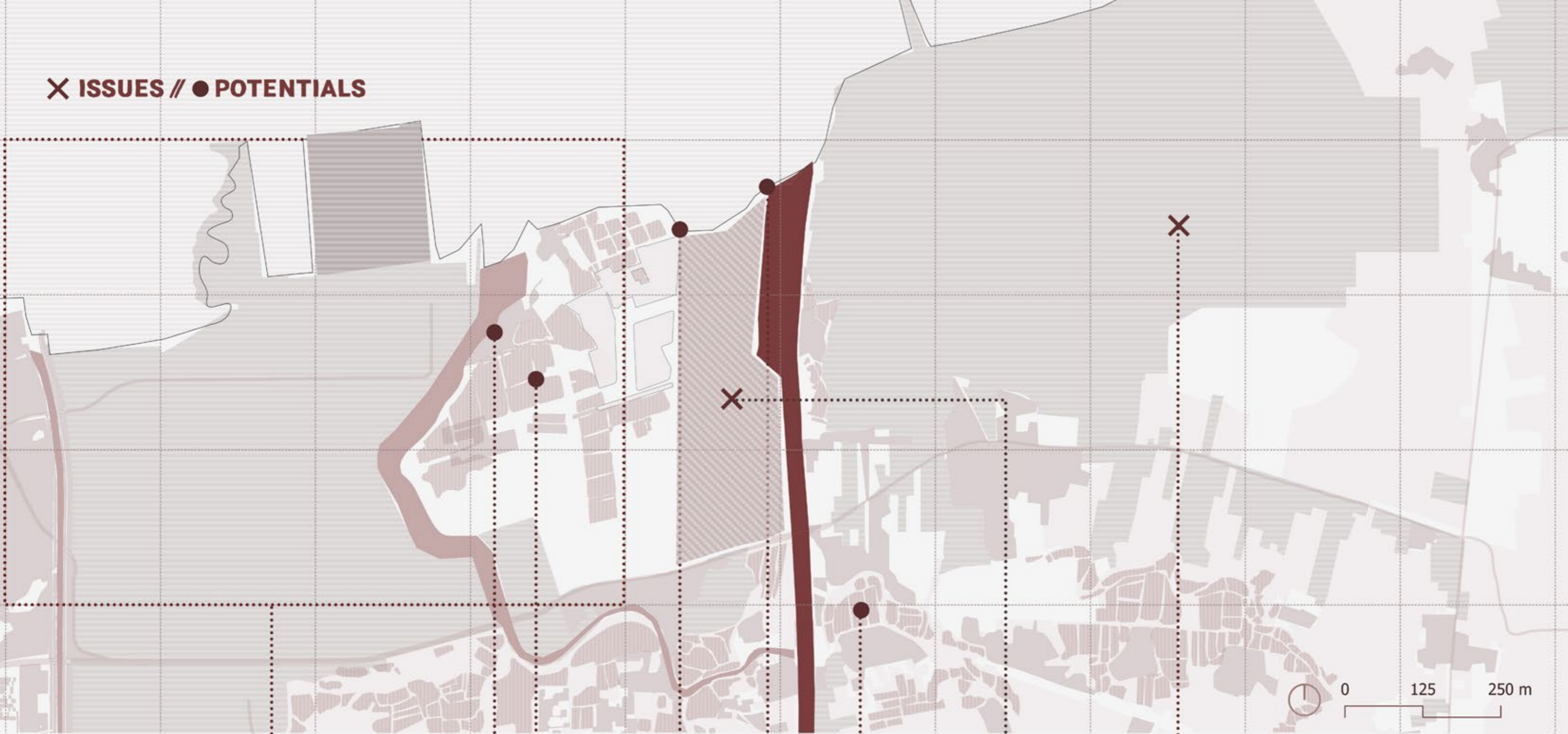


INDUSTRIAL - DELTA AREA

- | | | | |
|---|-----------------------|---|--------------------|
|  | INDUSTRIAL BUILDINGS |  | AQUACULTURE PONDS |
|  | INDUSTRIAL AREA |  | GREEN AREA |
|  | RESIDENTIAL BUILDINGS |  | AGRICULTURE FIELDS |
|  | RESIDENTIAL AREA |  | EAST FLOOD CANAL |



✕ ISSUES // ● POTENTIALS



HISTORICAL PORT



"SI PITUNG" House
(Urban Legend)



ACTIVE AQUACULTURE

RECREATIONAL ACTIVITY

MANGROVE FOREST

ACTIVE AQUACULTURE

ABANDONED PRIVATE GREEN SPACE

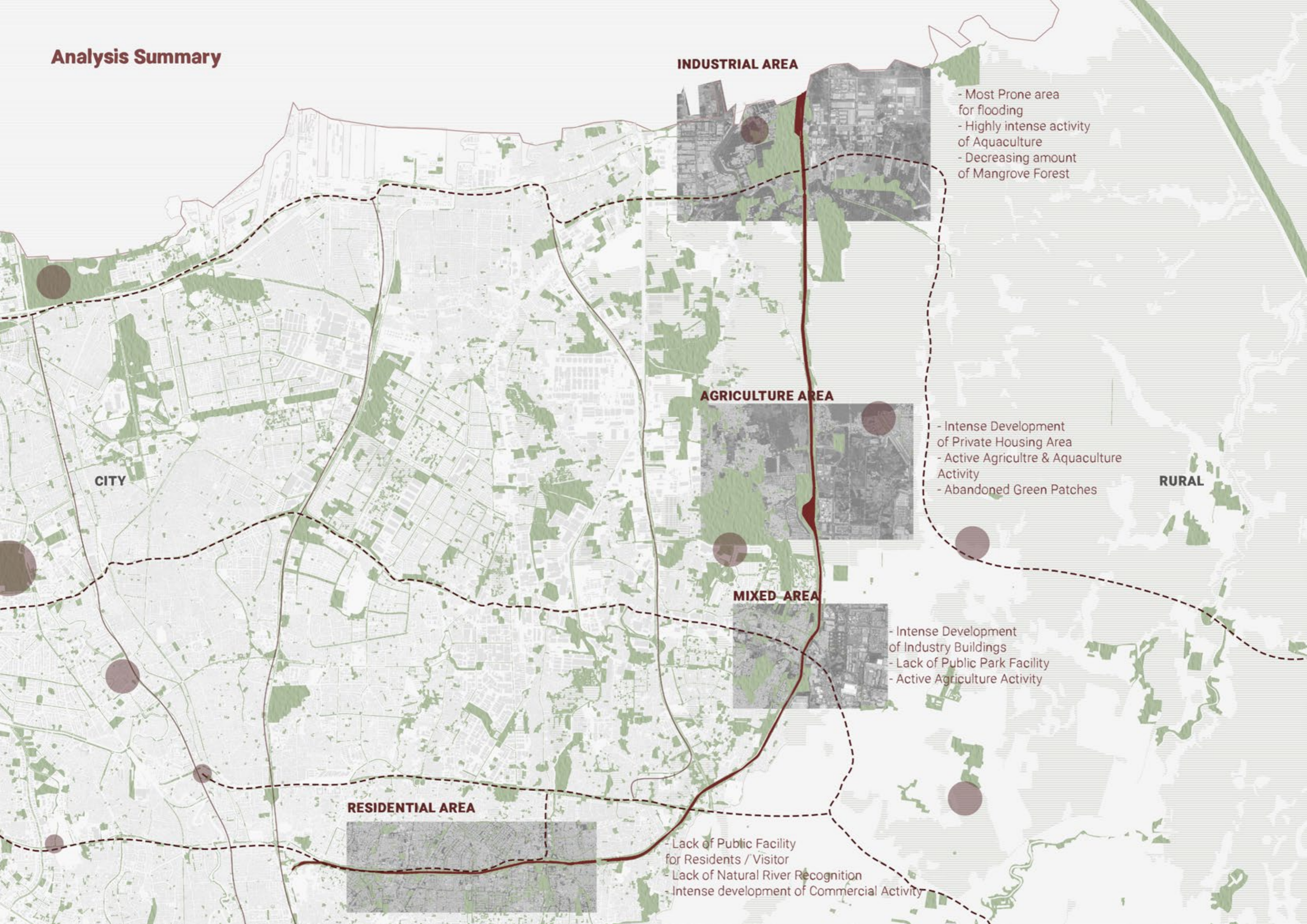
EXPANSION OF INDUSTRIAL AREA

LOCAL FISHING COMMUNITY





Analysis Summary



INDUSTRIAL AREA

- Most Prone area for flooding
- Highly intense activity of Aquaculture
- Decreasing amount of Mangrove Forest

AGRICULTURE AREA

- Intense Development of Private Housing Area
- Active Agriculture & Aquaculture Activity
- Abandoned Green Patches

MIXED AREA

- Intense Development of Industry Buildings
- Lack of Public Park Facility
- Active Agriculture Activity

RESIDENTIAL AREA

- Lack of Public Facility for Residents / Visitor
- Lack of Natural River Recognition
- Intense development of Commercial Activity

CITY

RURAL

Territorial Scale
Main Strategy

- Point of Interest
- - Feasibility Access

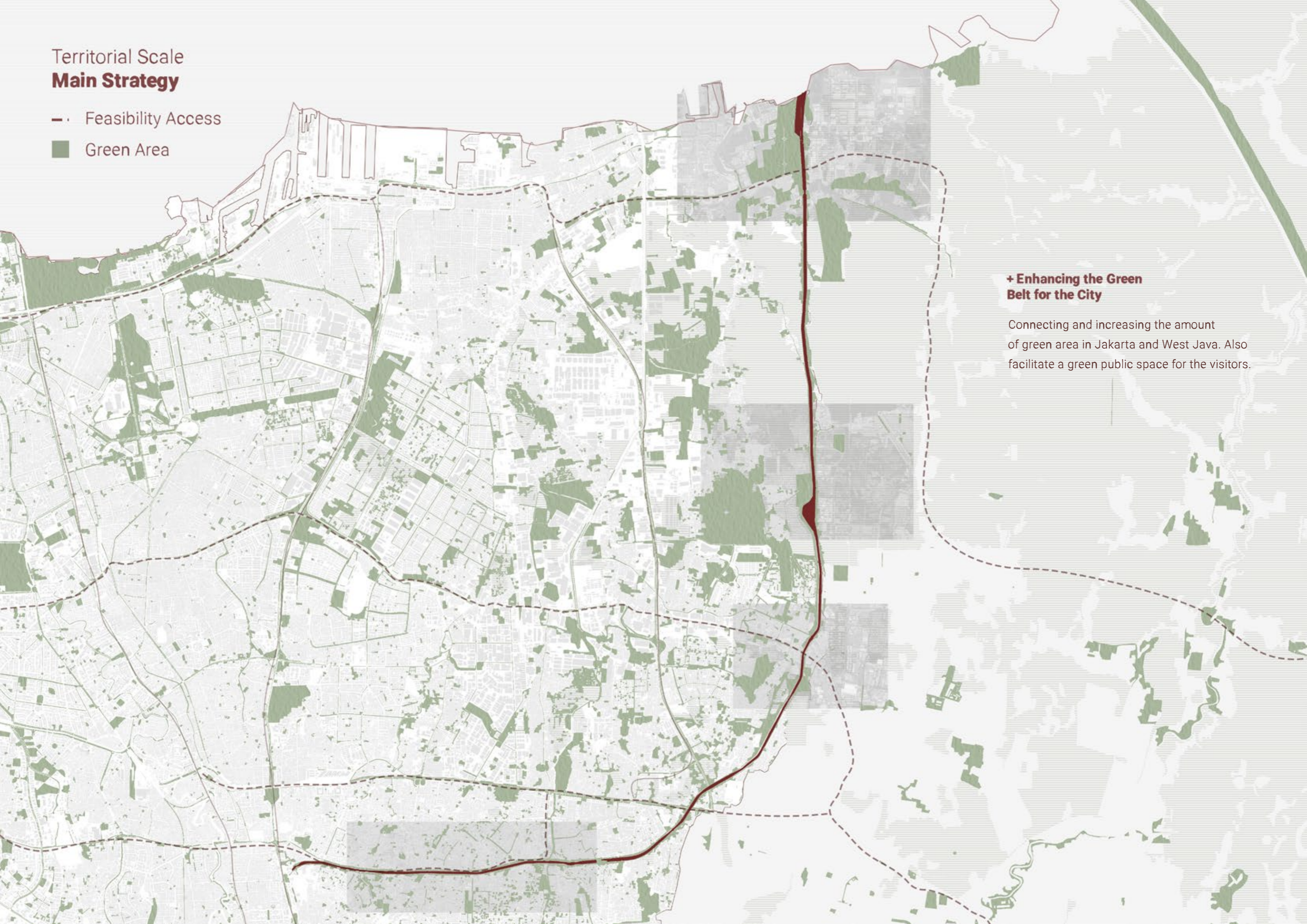


+ Bridging the City Fabric of Jakarta and Rural Fabric of Bekasi (West Java)

Demolish the idea of East Flood Canal as a physical boundary between city and rural fabric through public facilities and green areas.

Territorial Scale
Main Strategy

- - Feasibility Access
- Green Area



+ Enhancing the Green Belt for the City

Connecting and increasing the amount of green area in Jakarta and West Java. Also facilitate a green public space for the visitors.

Territorial Scale
Main Strategy

— Blue System
Infrastructure



**+ Re-Introducing Jakarta
as a Delta City for its Citizen**

Improve the condition of water infrastructure in East Flood Canal and introduce the natural rivers to the citizen to increase the sense of belonging.

Territorial Scale
Main Strategy

- Feasibility Access
- Point of Interest
- Green Area

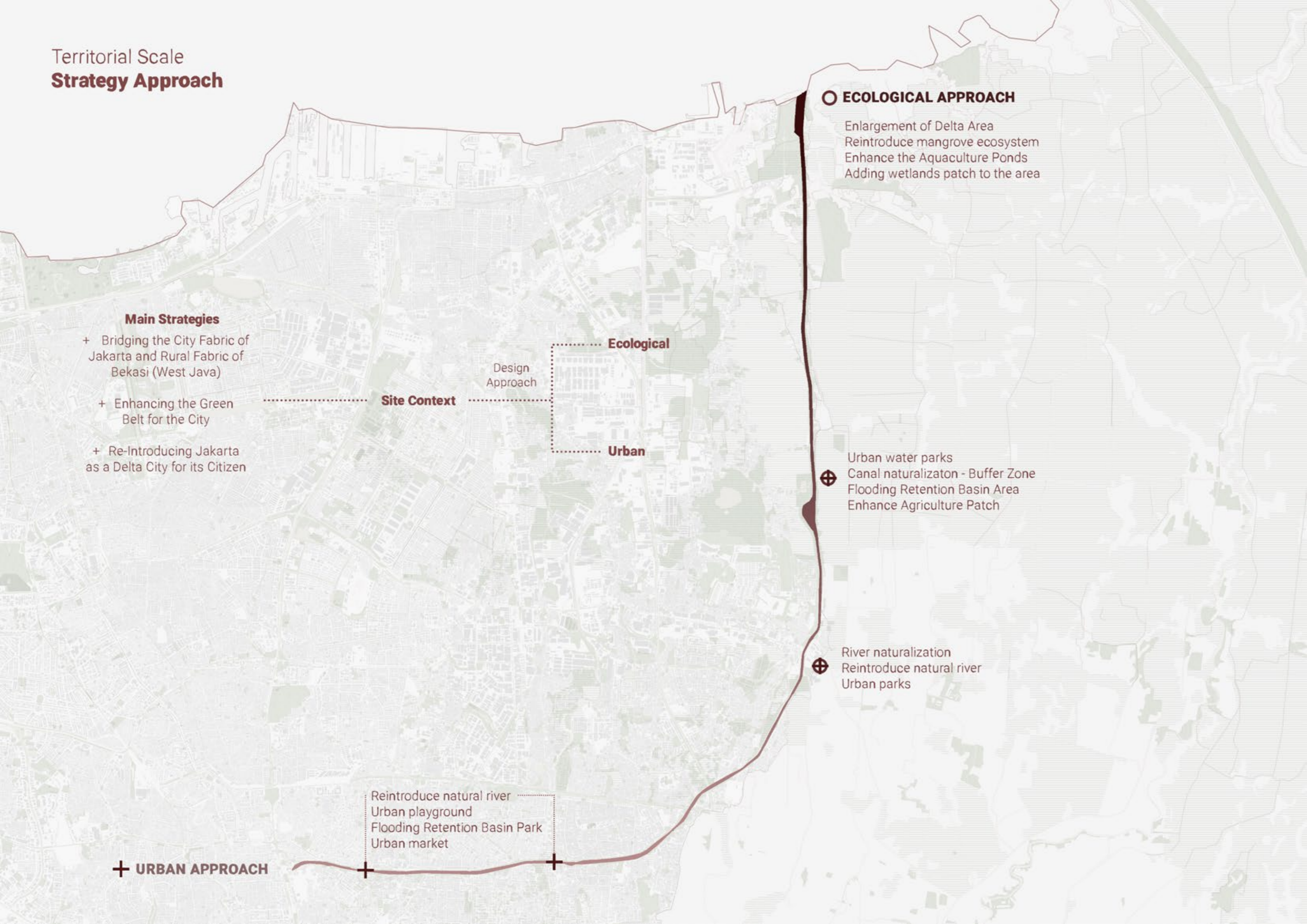


+ **Bridging the City Fabric of Jakarta and Rural Fabric of Bekasi (West Java)**

+ **Enhancing the Green Belt for the City**

+ **Re-Introducing Jakarta as a Delta City for its Citizen**

Territorial Scale
Strategy Approach



- Main Strategies**
- + Bridging the City Fabric of Jakarta and Rural Fabric of Bekasi (West Java)
 - + Enhancing the Green Belt for the City
 - + Re-Introducing Jakarta as a Delta City for its Citizen

Site Context

Design Approach

Ecological

Urban

○ ECOLOGICAL APPROACH

- Enlargement of Delta Area
- Reintroduce mangrove ecosystem
- Enhance the Aquaculture Ponds
- Adding wetlands patch to the area



- Urban water parks
- Canal naturalization - Buffer Zone
- Flooding Retention Basin Area
- Enhance Agriculture Patch



- River naturalization
- Reintroduce natural river
- Urban parks

- Reintroduce natural river
- Urban playground
- Flooding Retention Basin Park
- Urban market

+ URBAN APPROACH

**RESIDENTIAL
AREA**



**MIXED
AREA**



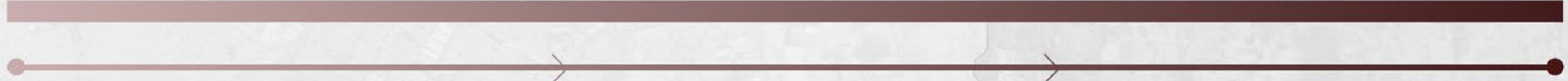
**AGRICULTURE
AREA**



**INDUSTRIAL
- DELTA AREA**



CITY



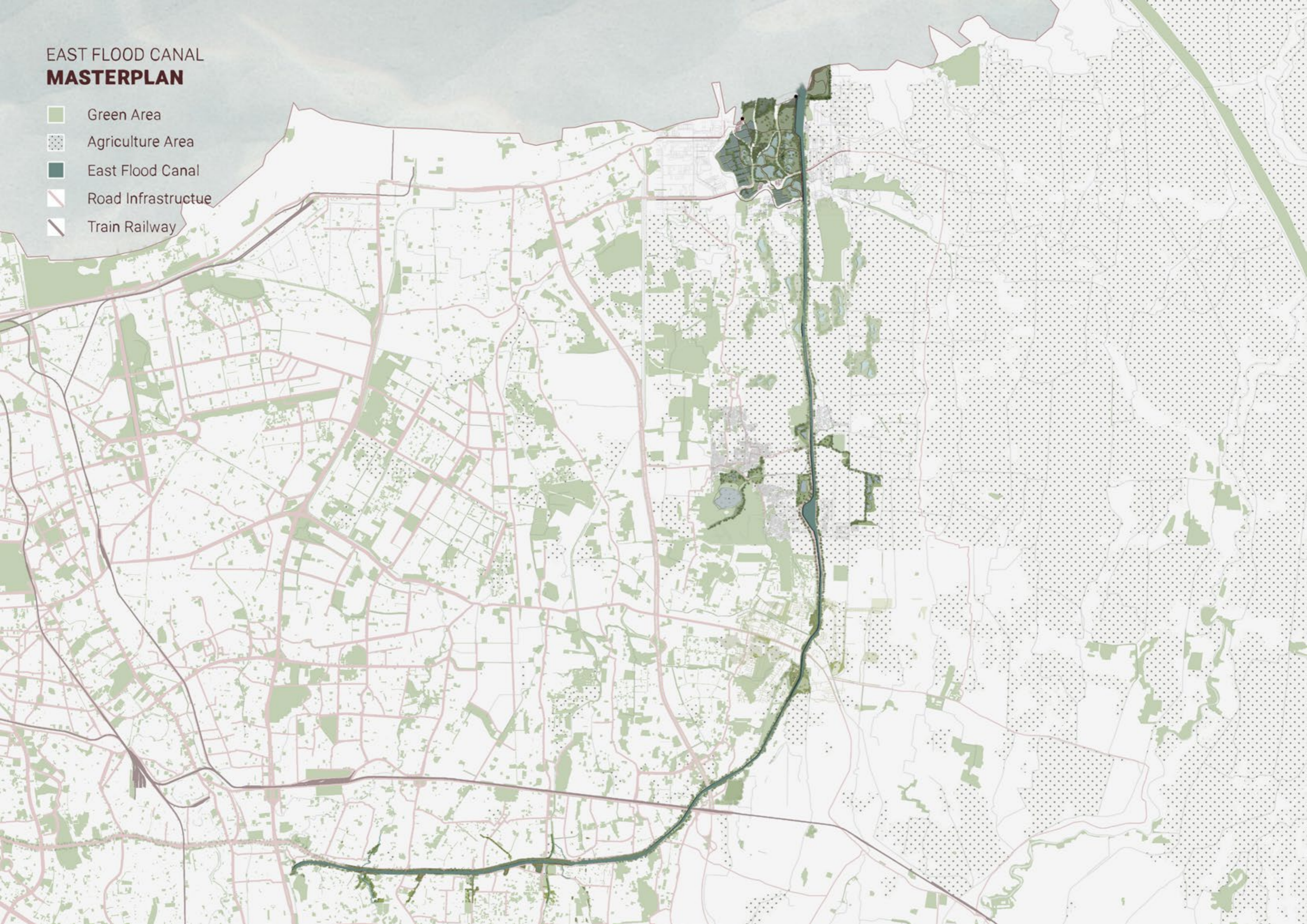
SEA

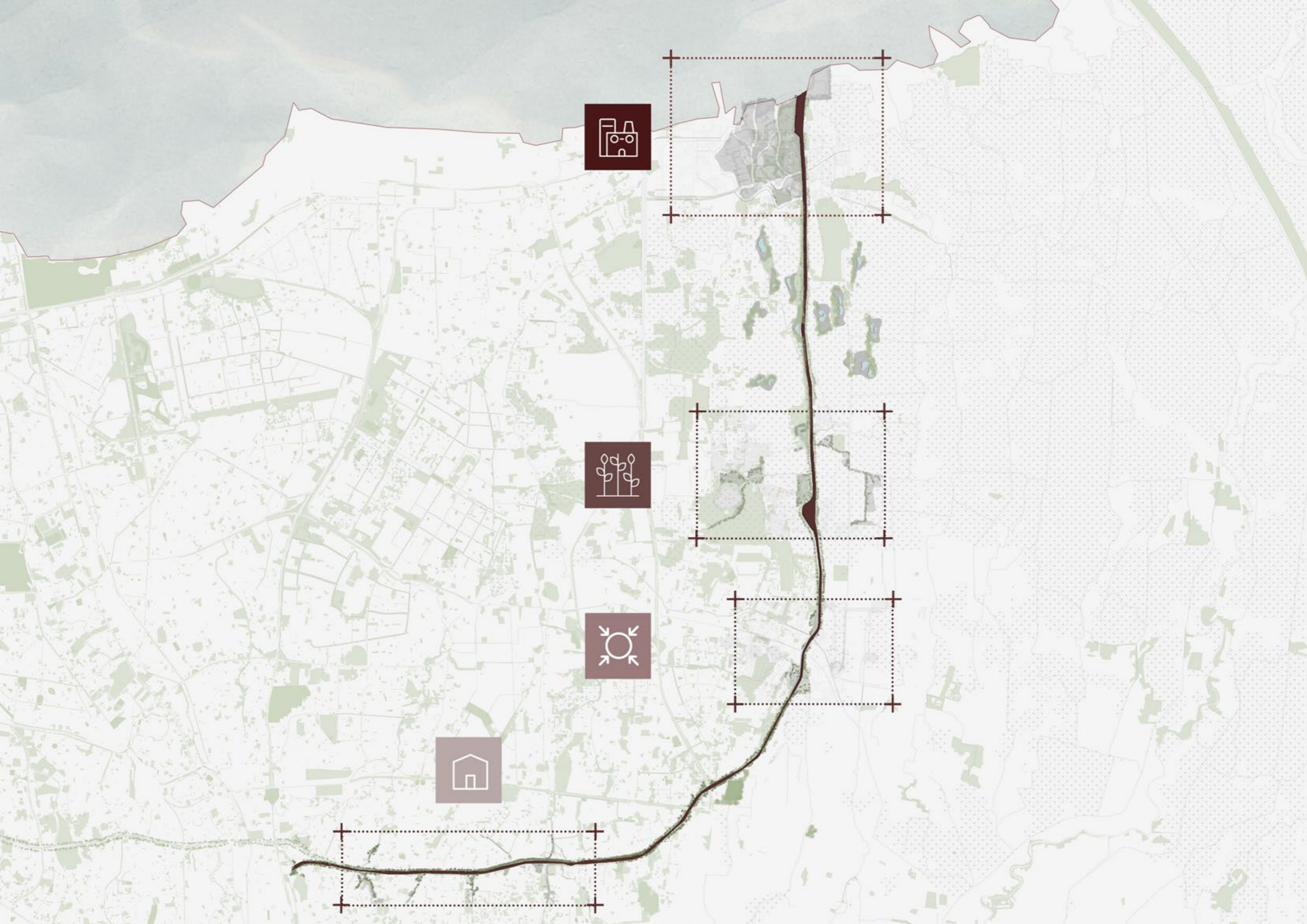
URBAN STRATEGY

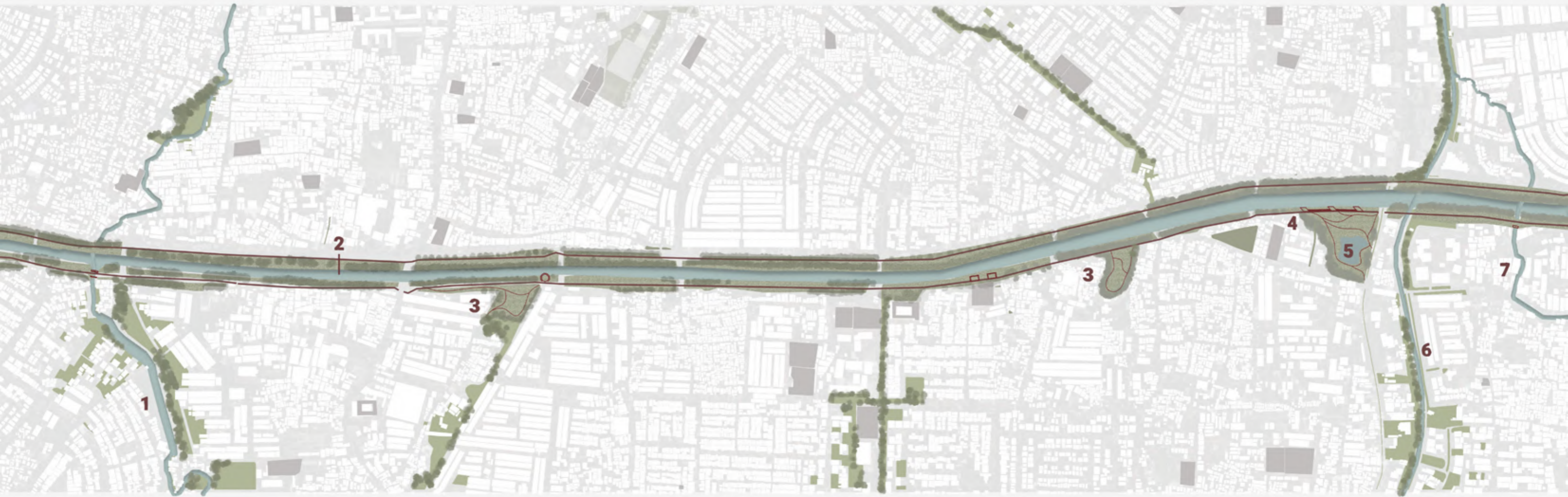
ECOLOGICAL STRATEGY

EAST FLOOD CANAL MASTERPLAN

- Green Area
- Agriculture Area
- East Flood Canal
- Road Infrastructure
- Train Railway



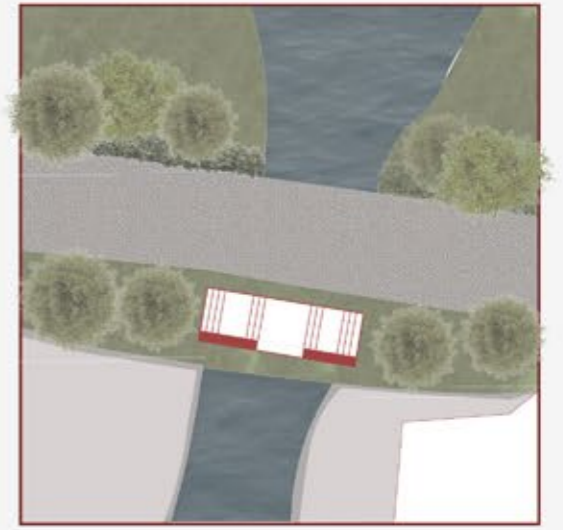
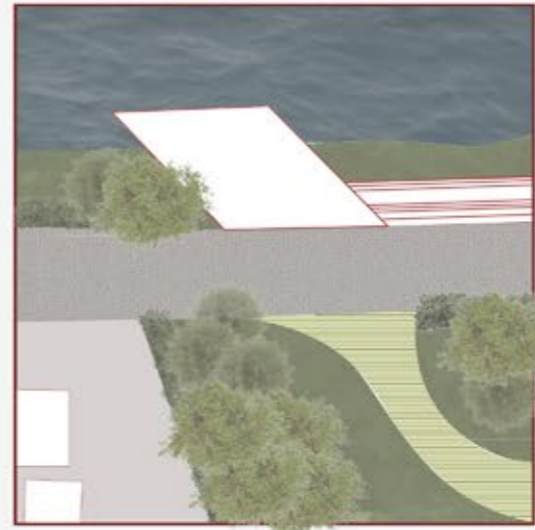
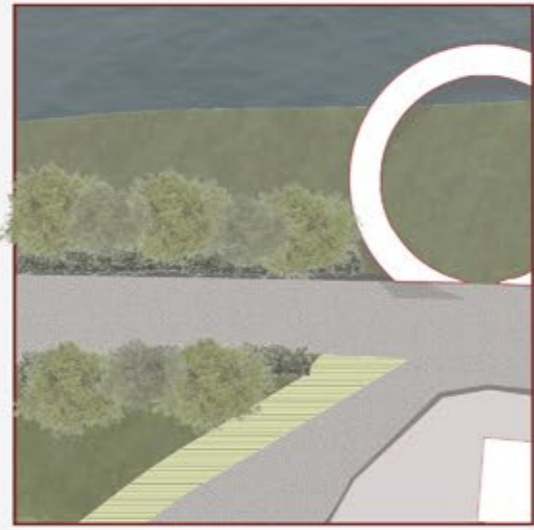
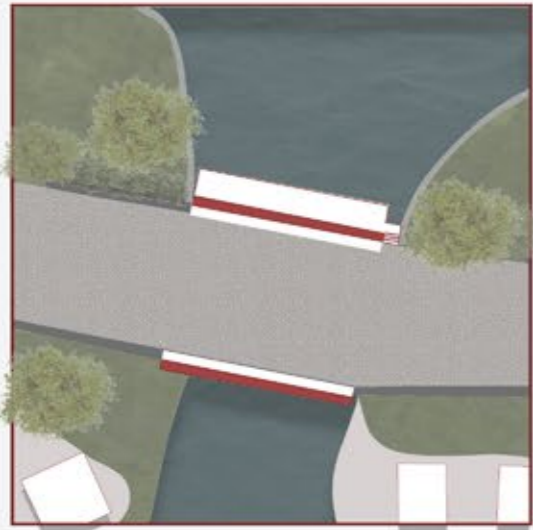




MASTERPLAN
RESIDENTIAL AREA

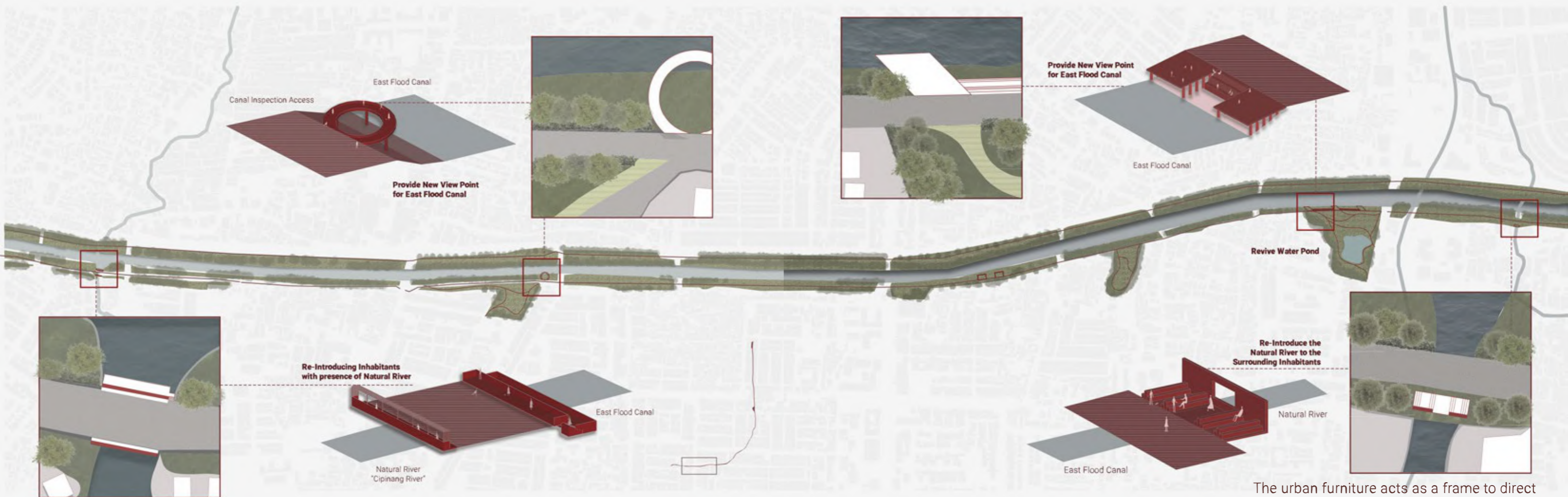
- 1. CIPINANG RIVER** (Natural)
- 2. EAST FLOOD CANAL**
- 3. RECREATIONAL PARK**
- 4. URBAN TERRACE**
- 5. WATER RESERVOIR PUBLIC PARK**
- 6. SUNTER RIVER** (Natural)
- 7. BUARAN RIVER** (Natural)
- BUILDING
- PUBLIC FACILITIES BUILDING
(School and Hospital)





The pier provides a new way of experiencing space in East Flood Canal.

The infrastructure alongside the canal provide a new seating space for the visitors that wants to enjoy the scenery of East Flood Canal.



The infrastructure framed the natural river and provide a river "terrace" for the visitors.

The urban furniture acts as a frame to direct people to enjoy and see the natural river that flows into East Flood Canal.



MIXED





MIXED AREA
DESIGN CONCEPT

EXISTING
PUBLIC PARK

RESIDENTIAL
AREA

**PROVIDE PUBLIC
AREA FACILITY**

Local Residents

**INTEGRATE
AGRICULTURE AREA**

Local Residents

Urban Strategy

**PROVIDE GREEN
BUFFER AREA**

**IMPROVE
GREEN SYSTEM**

**RENATURALIZATION
OF NATURAL RIVER**

Ecological Strategy

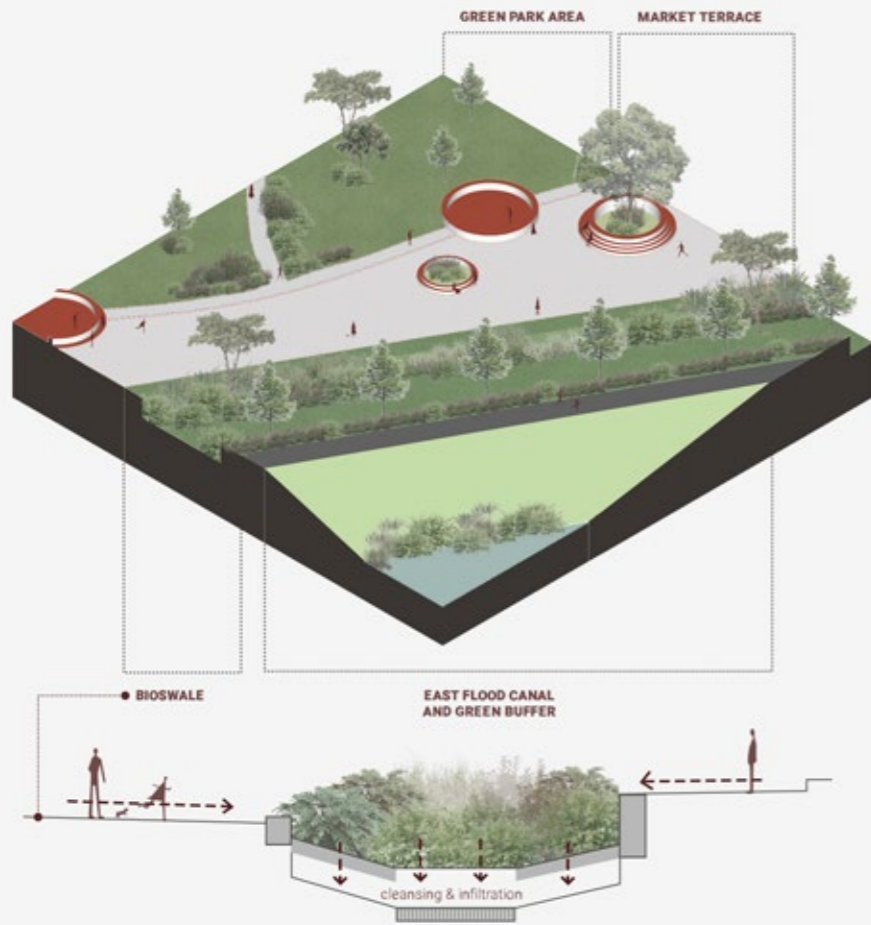


MASTERPLAN

MIXED AREA

1. **CAKUNG RIVER** (Natural)
2. **GREEN BUFFER AREA**
3. **AGRICULTURAL AREA**
4. **EAST FLOOD CANAL**
5. **GREEN PUBLIC PARK**
6. **MARKET TERRACE**
7. **BIOSWALE AREA**



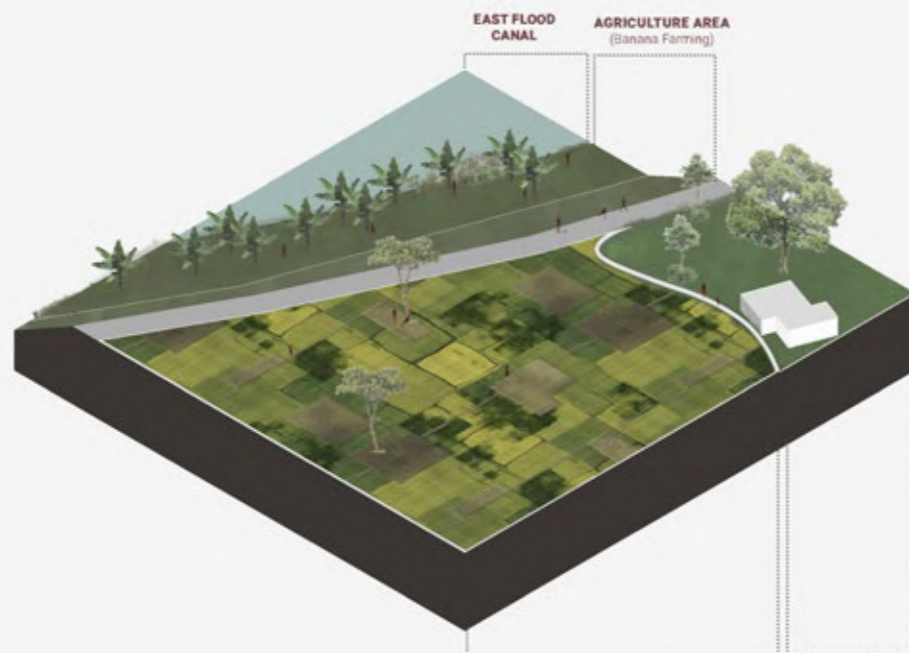


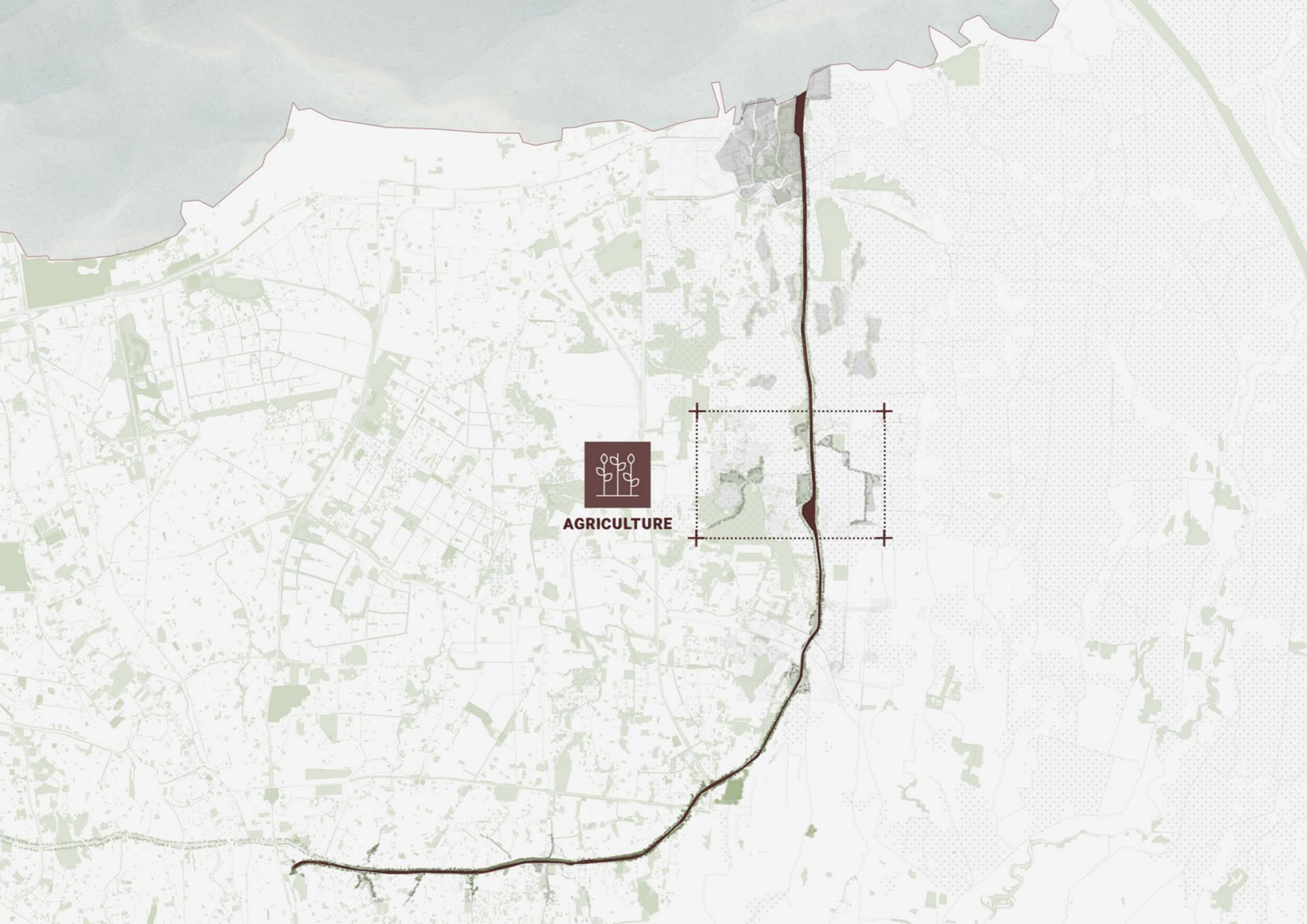
1 The Market Terrace provide a space for people to sell or buy their agriculture or other local products. As a buffer area between East Flood Canal and Green Market Terrace, there will be a bioswale that will hold the water and filter it before going to East Flood Canal. Bioswales will also increase the biodiversity in the area.



3 Naturalisation will increase the green buffer area between the natural river and the surrounding. This proposal will also increase the number of biodiversity. In a long term, it'll be an opportunity to introduce to visitors about the native plants and animals.

2 Increase the agriculture area alongside the canal by using a green buffer area in the canal as an extra agriculture patch. This proposal can increase the products for the farmers to sell.





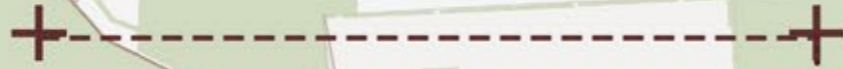
AGRICULTURE



AGRICULTURE AREA
DESIGN CONCEPT



**FLOOD RETENTION
BASIN**



**FACILITATE
URBAN WATER PARK**

Integrate to the
Existing Park



**IMPROVE THE
GREEN AREA**

**BIOSWALE
ALONGSIDE THE CANAL**



**ENHANCE THE GREEN
BUFFER AREA**



**FLOOD RETENTION
BASIN**

Urban Strategy

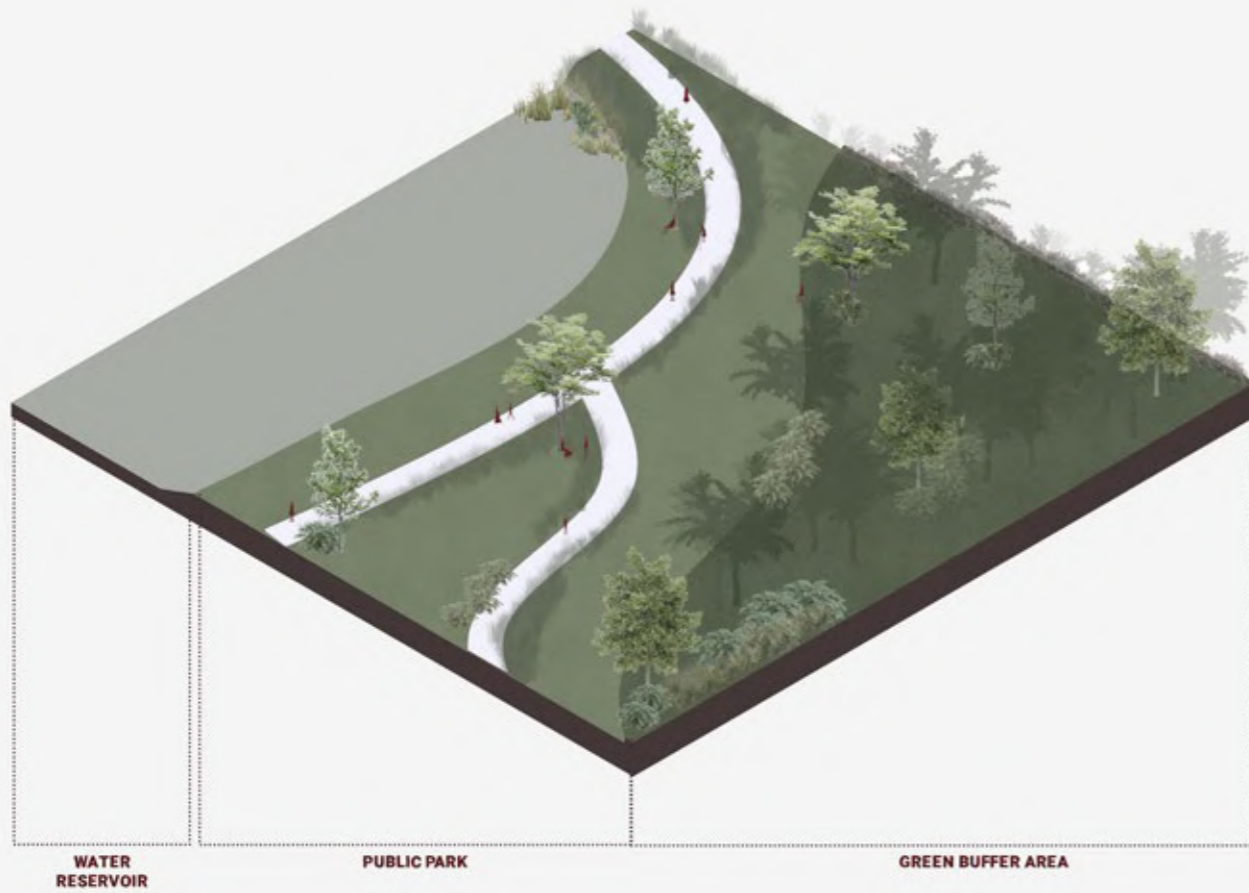
Ecological Strategy



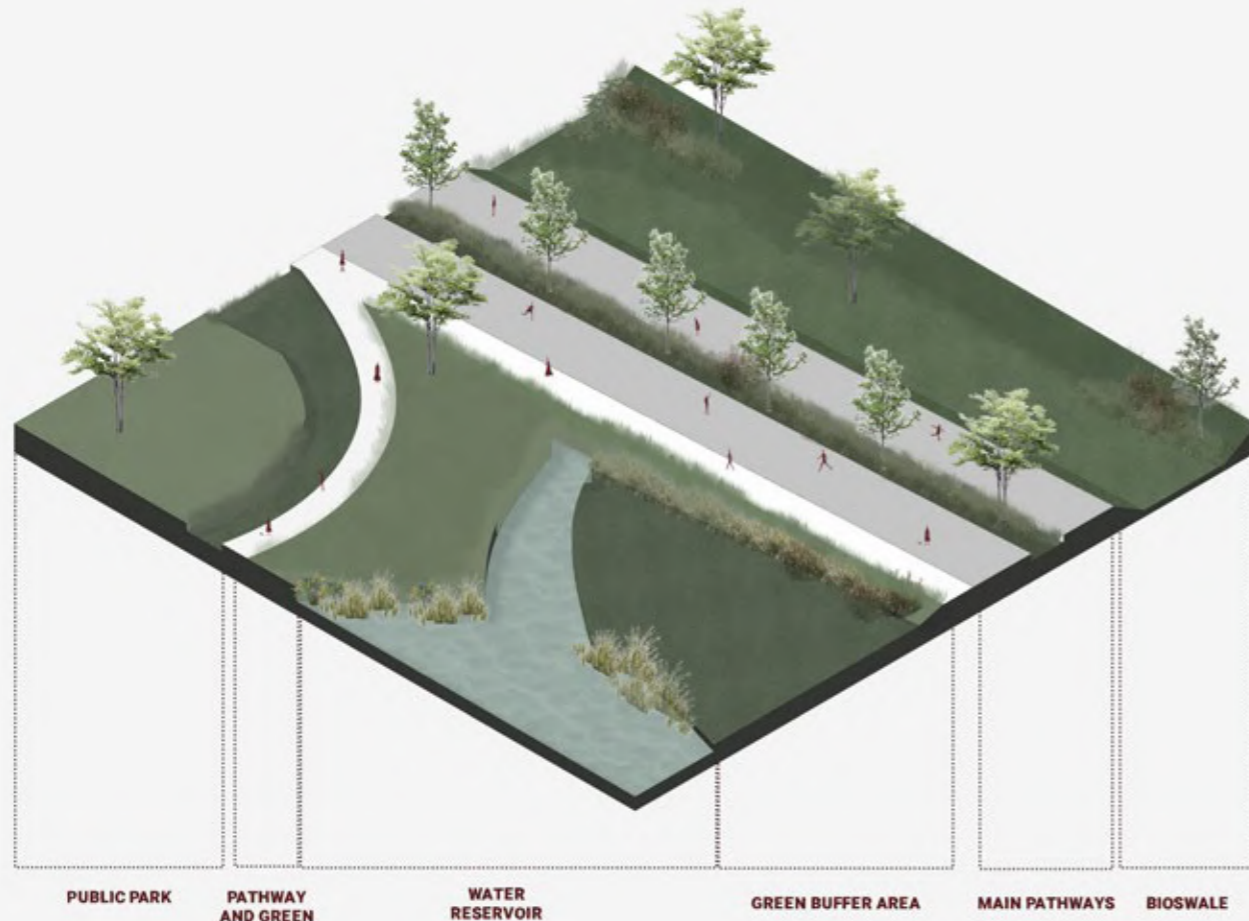
AGRICULTURE AREA
MASTERPLAN

- 1. EAST FLOOD CANAL**
- 2. SEDIMENTATION BASIN**
- 3. BIOSWALE**
- 4. GREEN NATURAL AREA**
- 5. WATER RETENTION BASIN PARK**
- 6. EXISTING WATER RESERVOIR**





1 This water retention pond designed to store water and supporting aquatic and emergent vegetation. Beside increasing biodiversity in this area, the water retention pond also helps the decreasing the flooding issue.

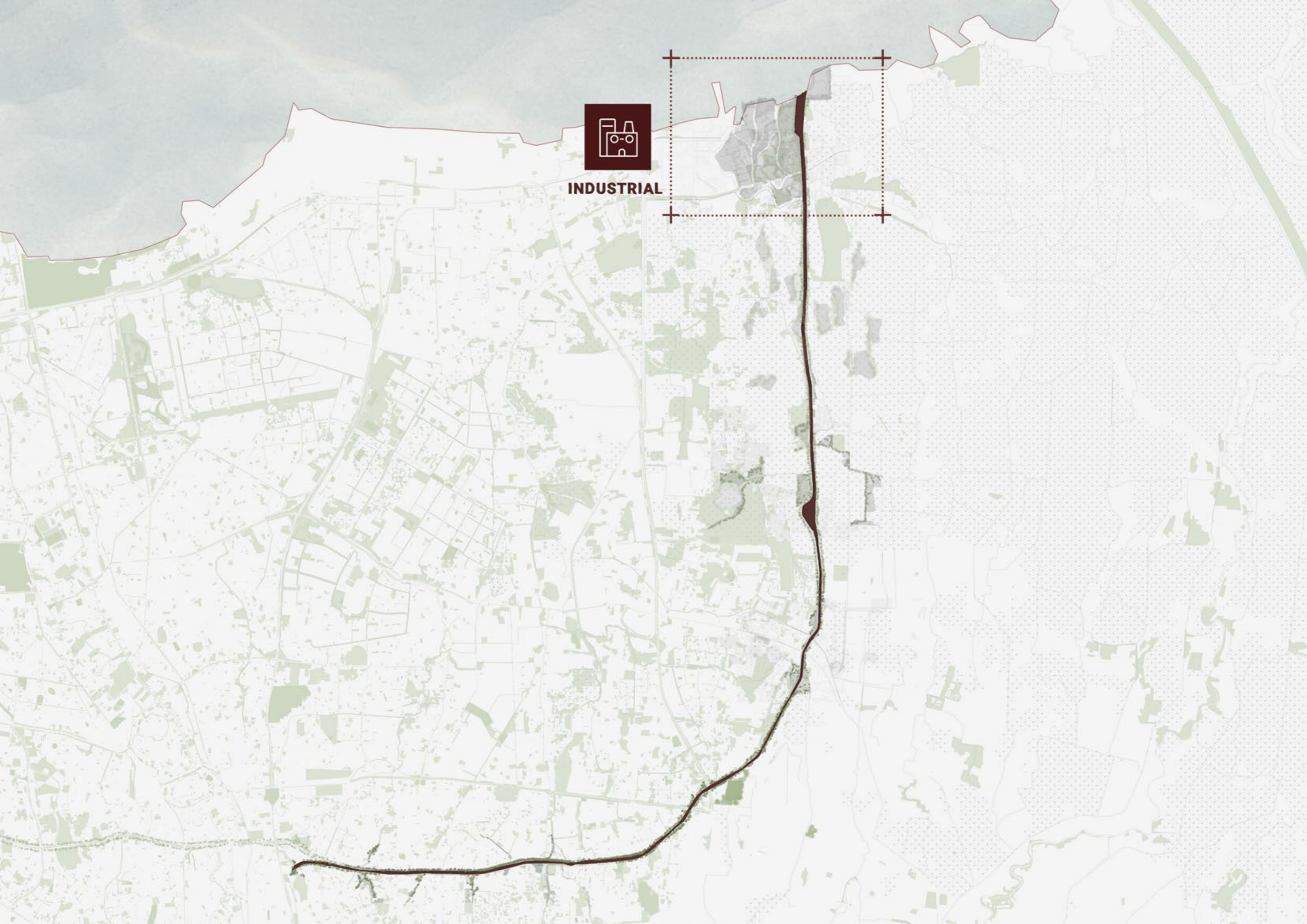


2 Alongside the canal, there are bioswales to catch and filter the water before it runs to the East Flood Canal. Besides that, the existing car road will be functional as a public space for people to enjoy before going to the water reservoir urban park.



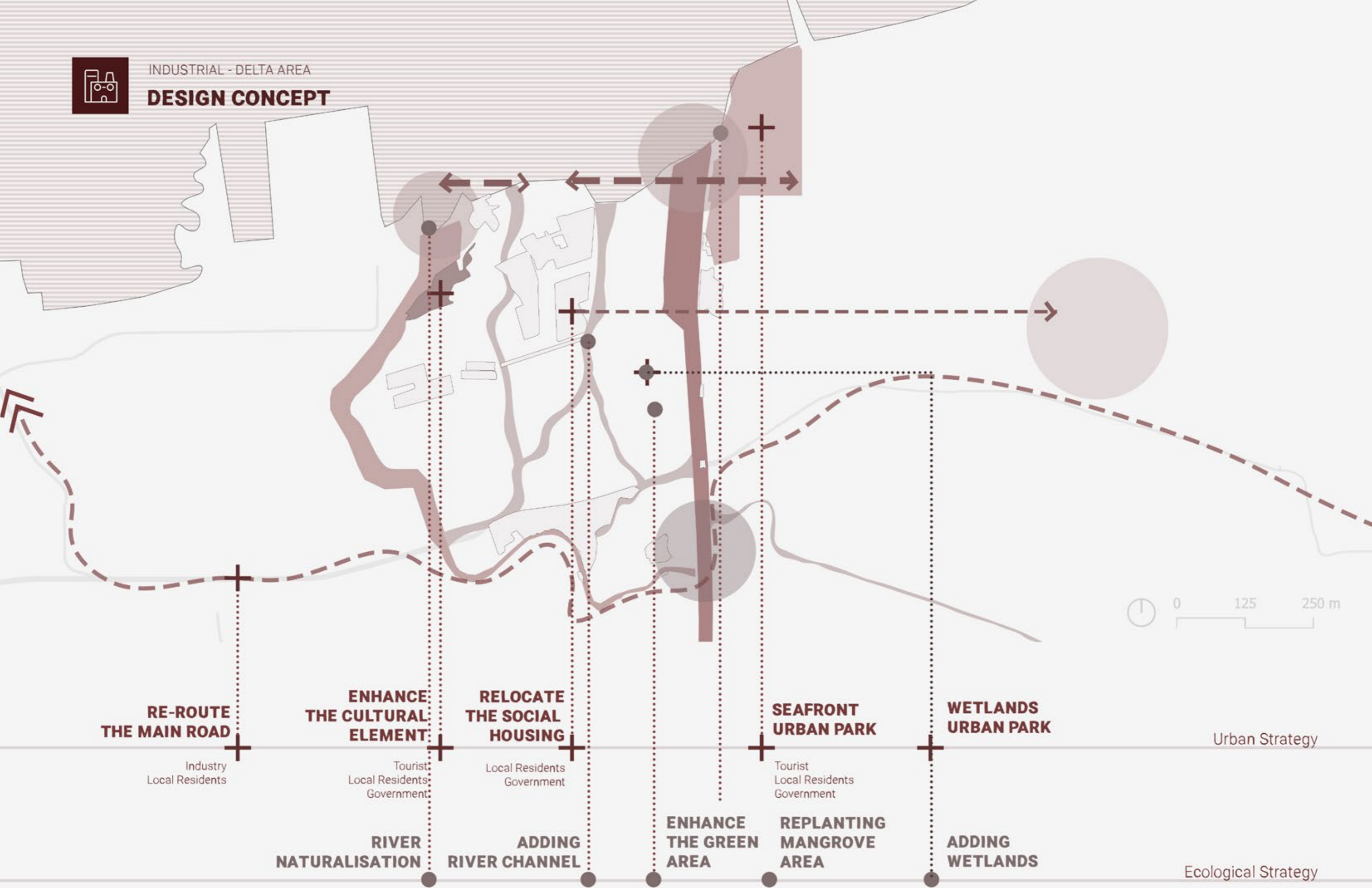


INDUSTRIAL





INDUSTRIAL - DELTA AREA
DESIGN CONCEPT

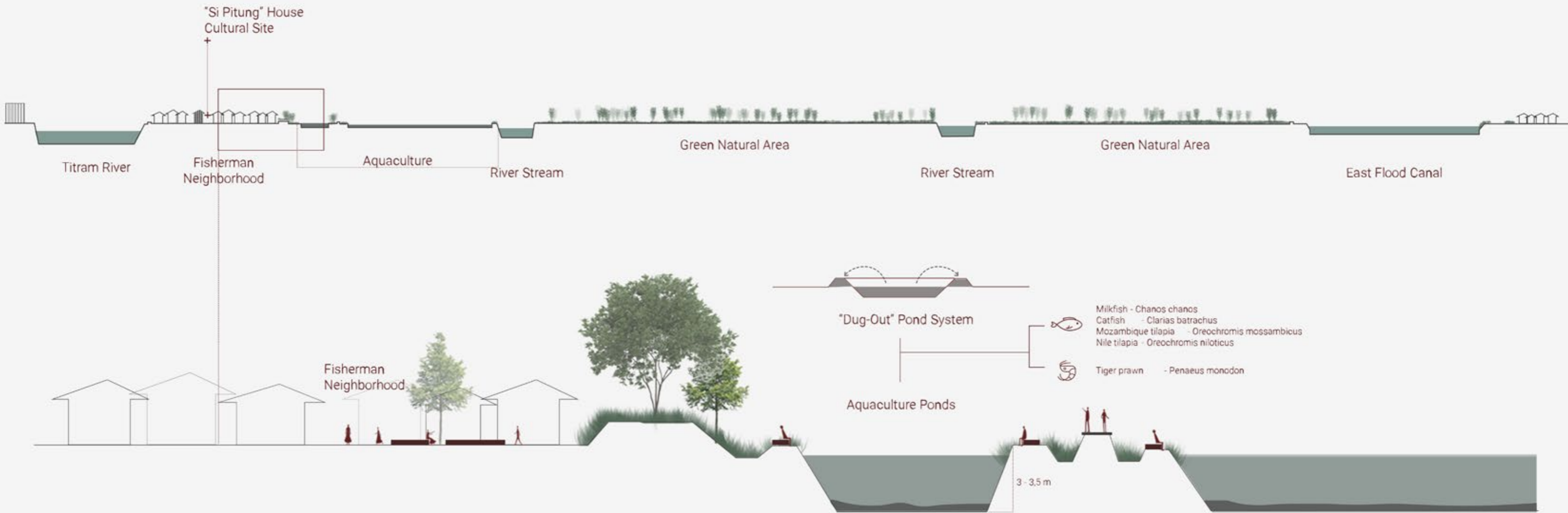


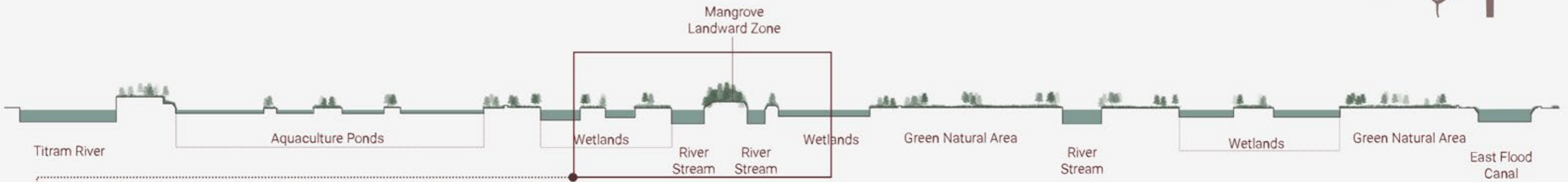


Industrial - Delta Area
MASTERPLAN

- 1. EAST FLOOD CANAL - DELTA AREA
- 2. RIVER TITRAM - NATURAL RIVER
- 3. ADDITIONAL RIVER BEDS
- 4. PRESERVED CULTURAL & RESIDENTIAL AREA
- 5. AQUACULTURE
- 6. WETLANDS
- 7. MANGROVE PATCHES
- 8. WALKWAY PLATFORM
- 9. URBAN SHORELINE PARK
- 10. CAR ROAD
- 11. PEDESTRIAN ACCESS



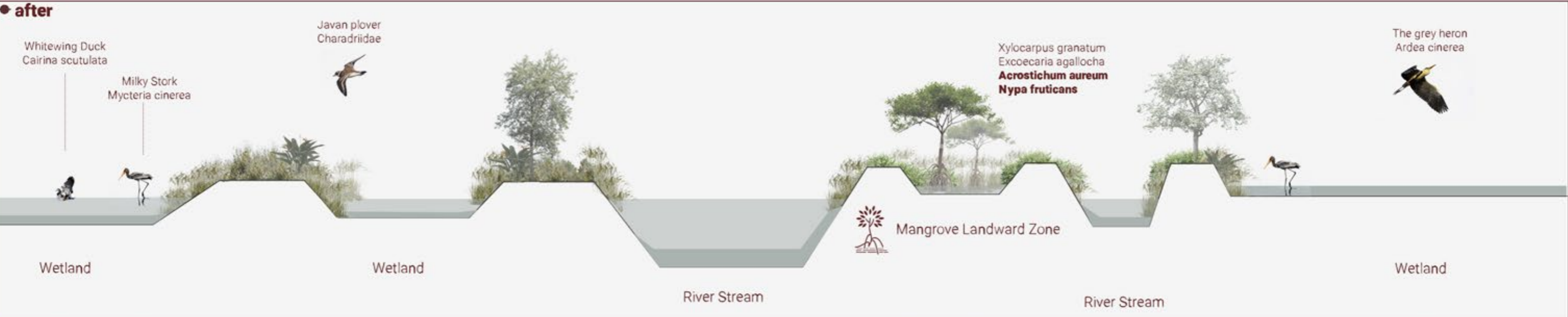


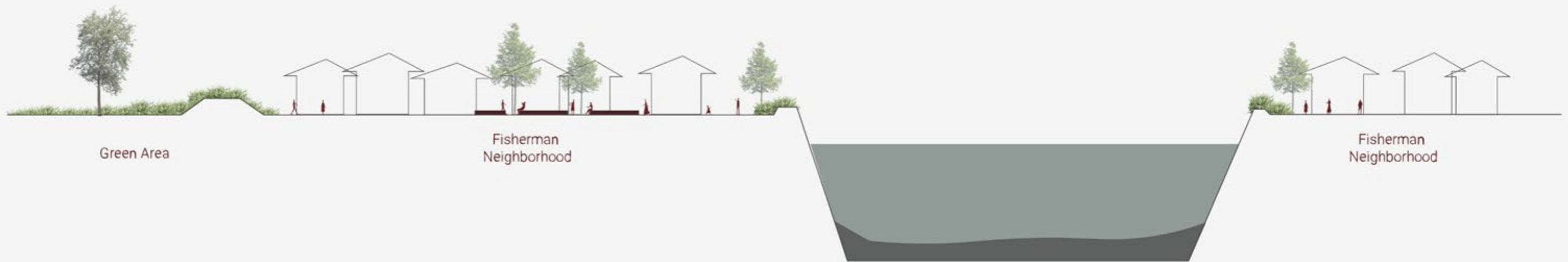
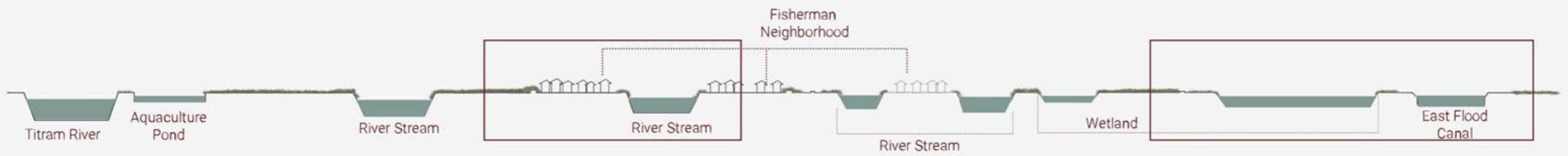
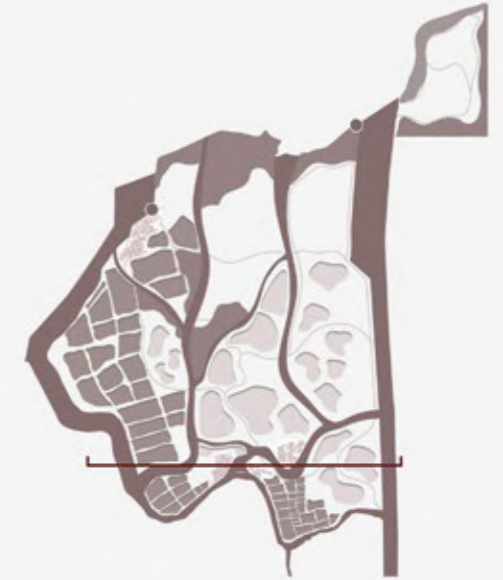


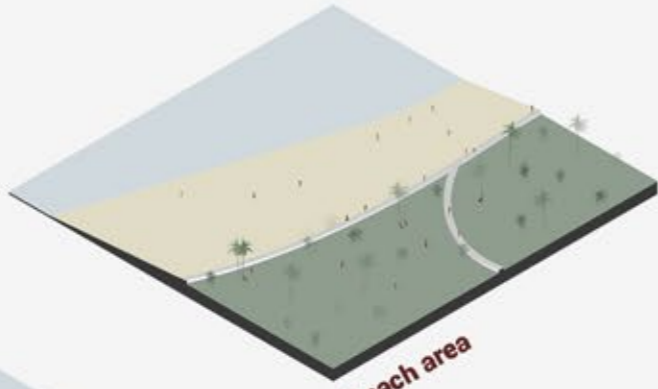
before



after







beach area



mangrove forest
visitor pathway



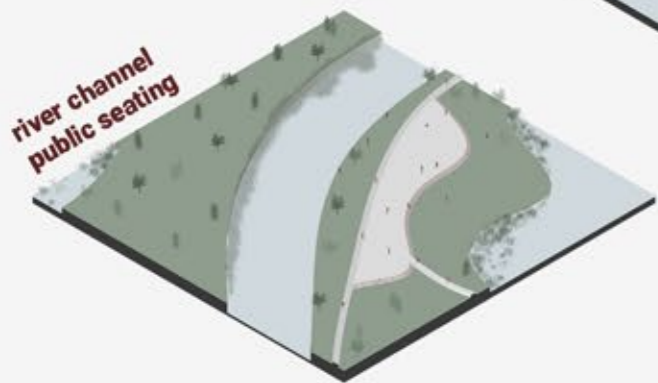
public platform



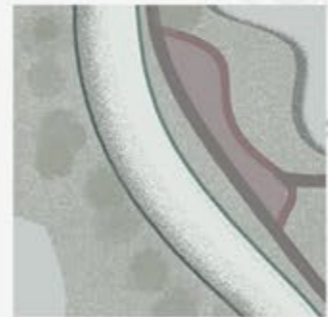
aquaculture
wetlands



cultural & fisherman village
aquaculture



river channel
public seating

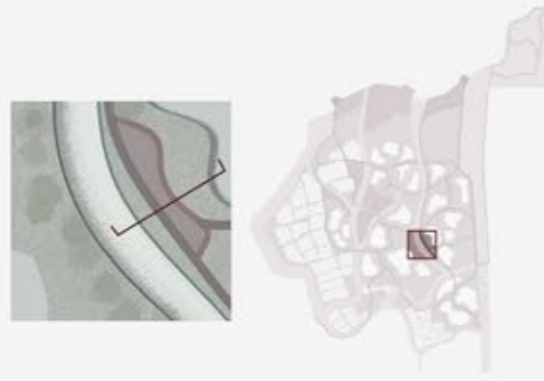
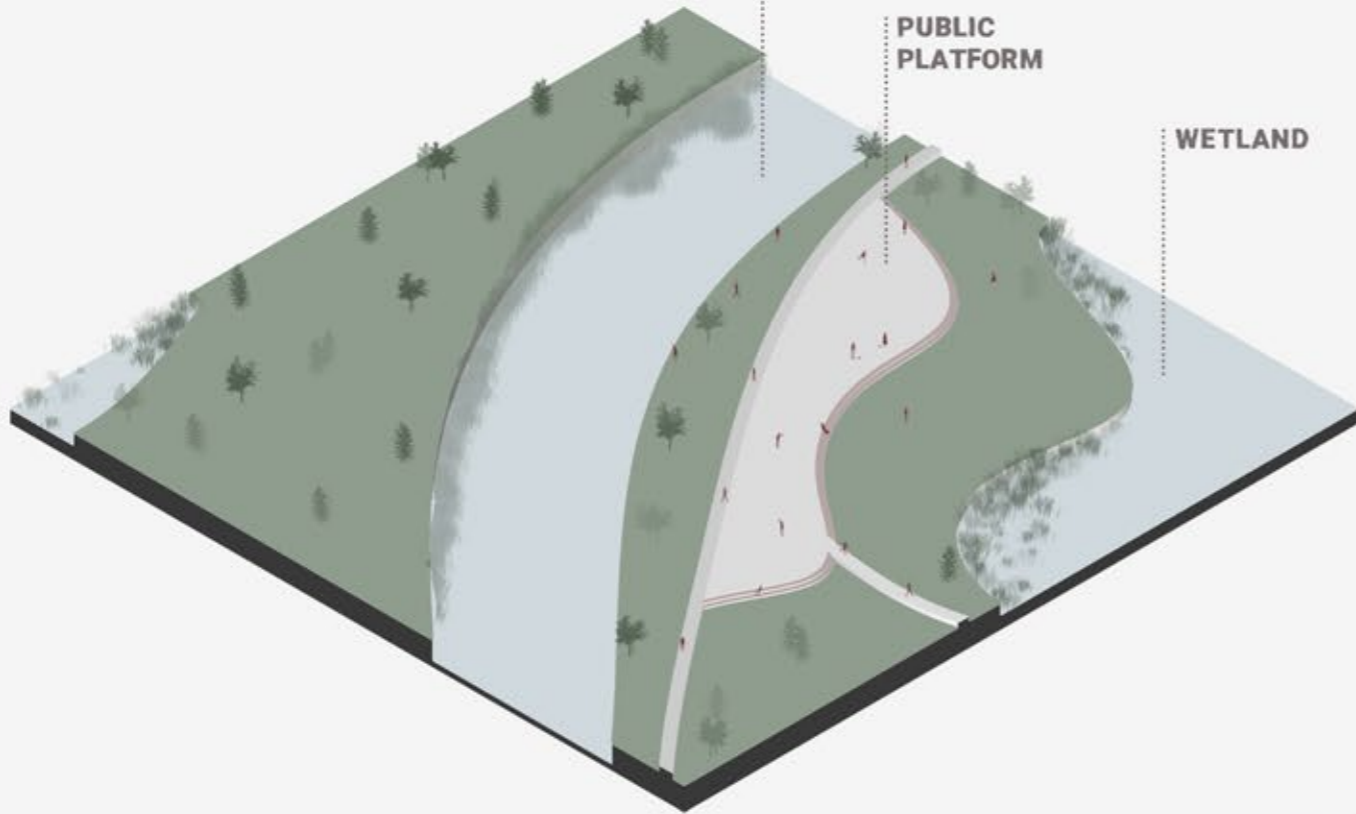




RIVER CHANNEL

PUBLIC PLATFORM

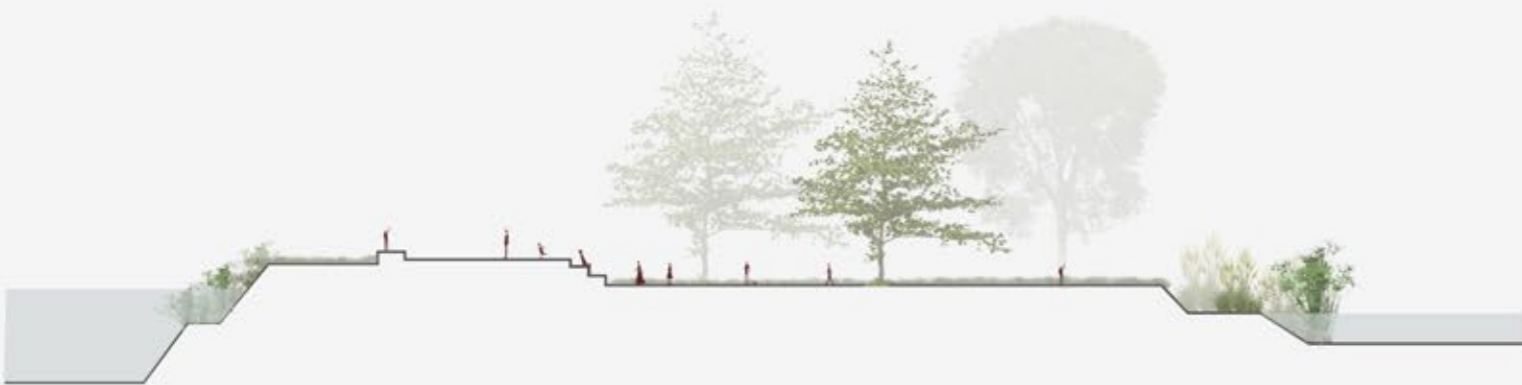
WETLAND

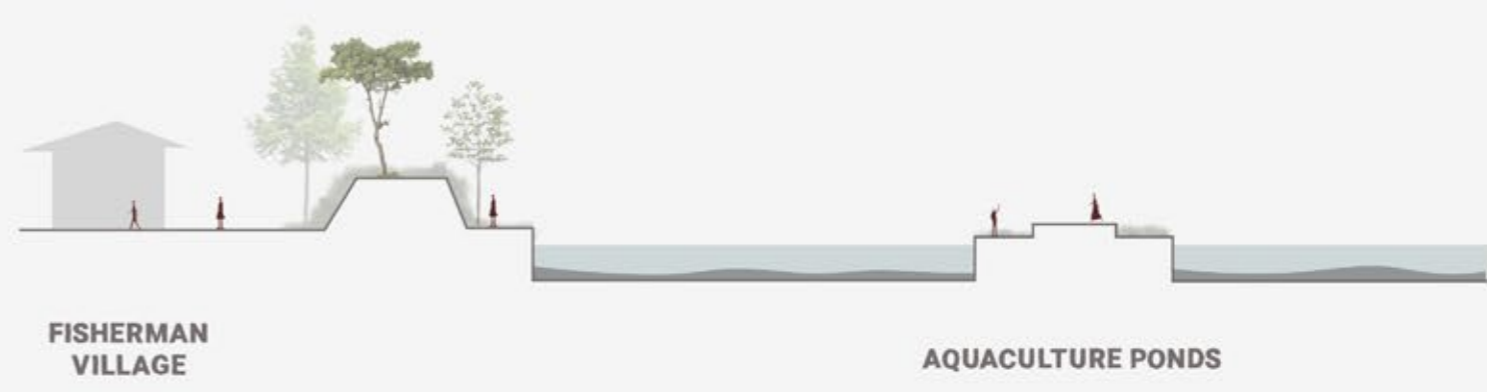
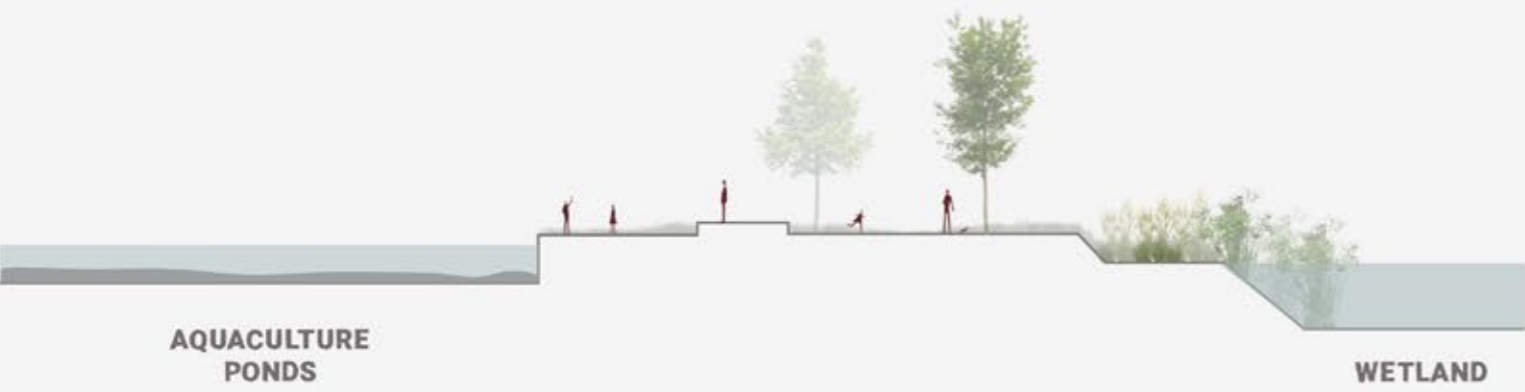


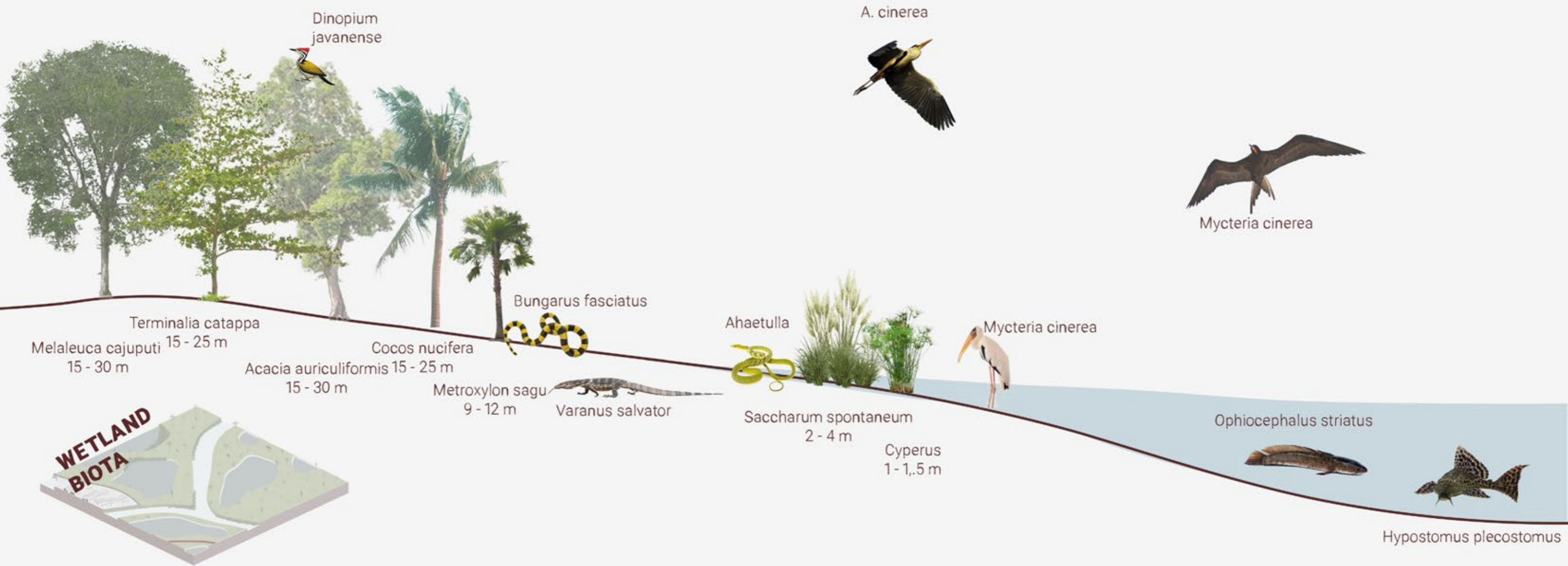
WETLAND

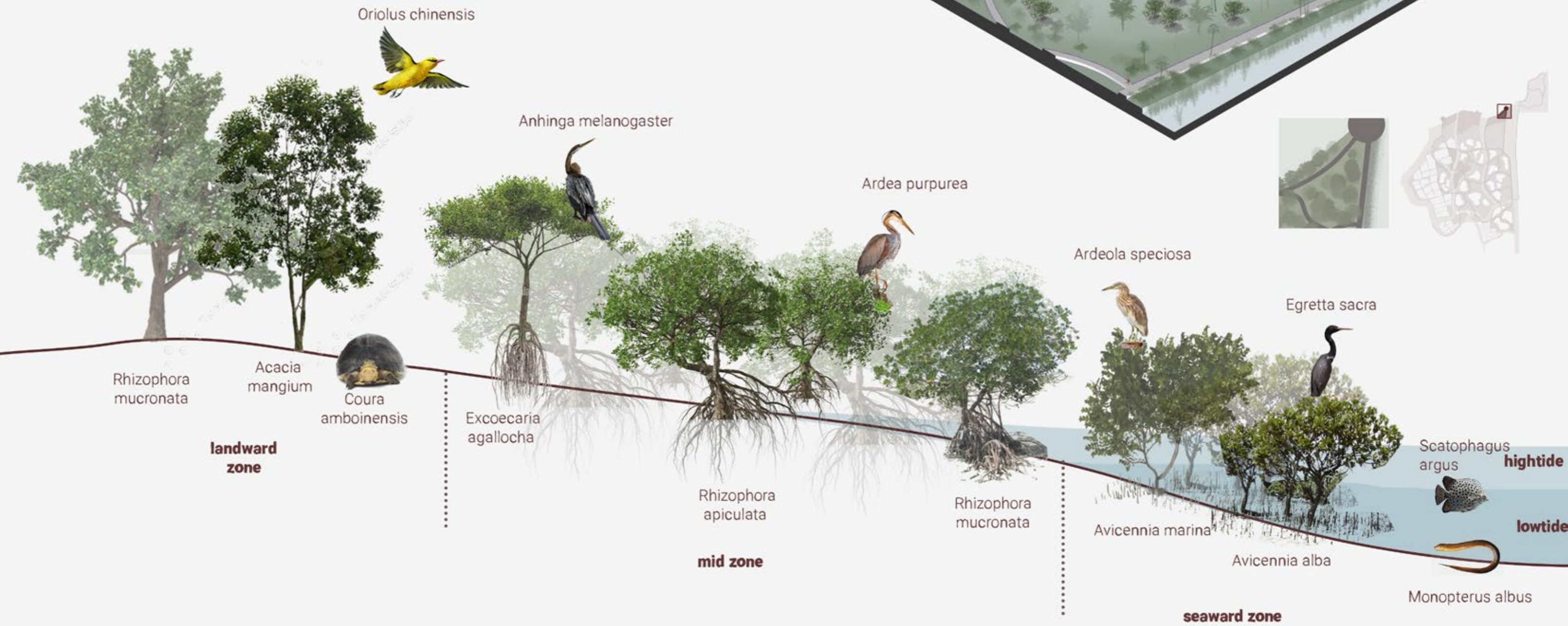
WETLAND

PUBLIC PLATFORM

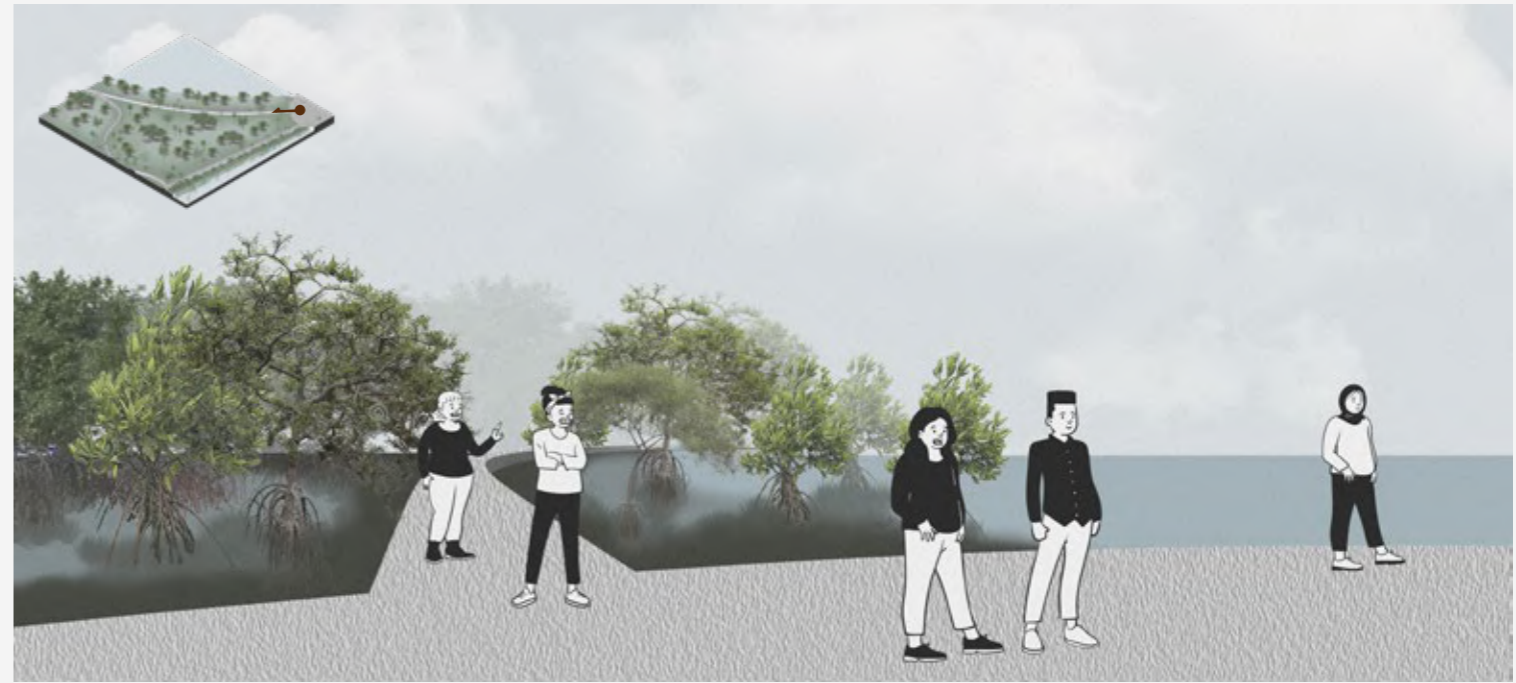










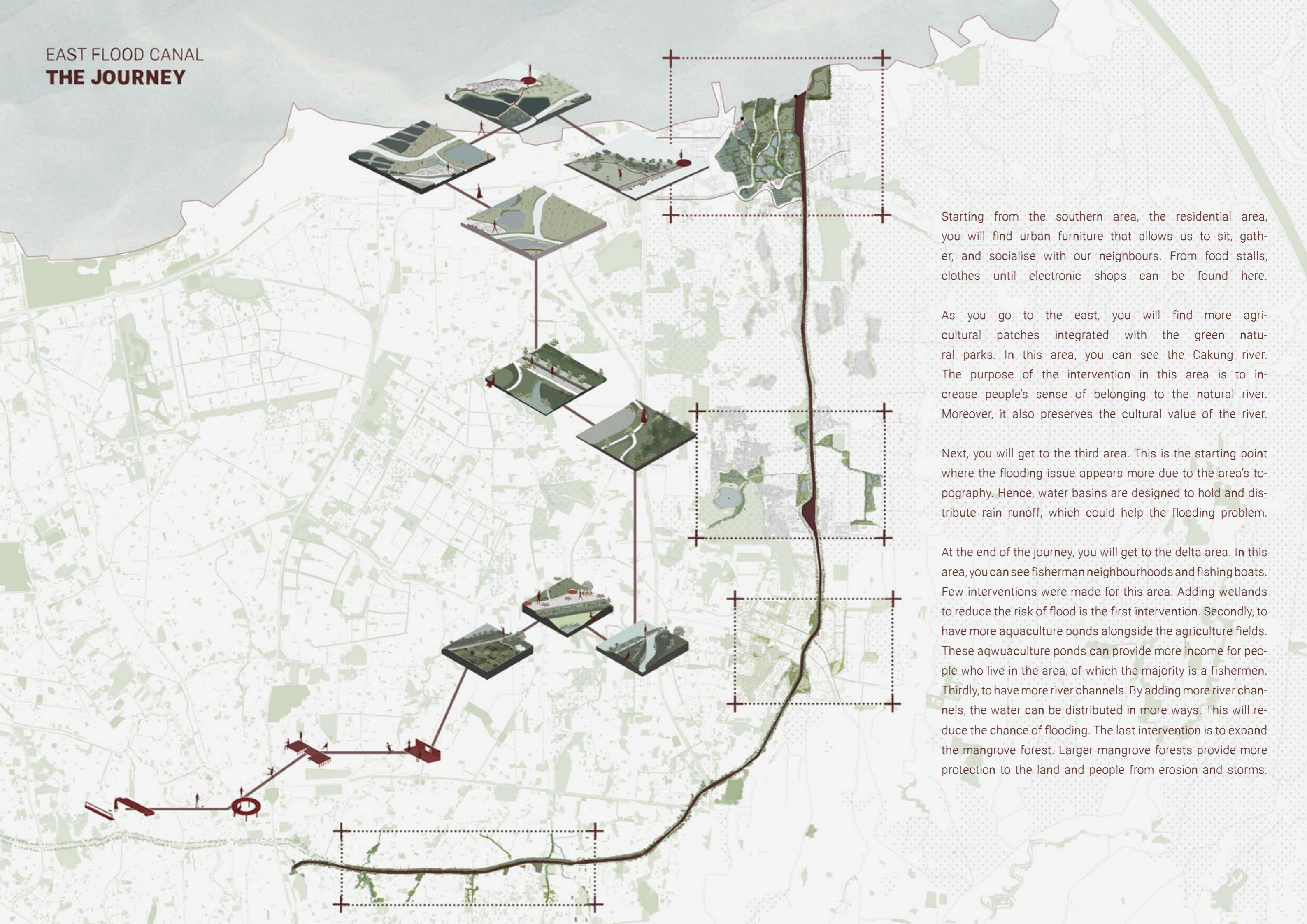




Jakarta Mangrove Forest

source : indahfajarwati.blogspot.com

EAST FLOOD CANAL THE JOURNEY



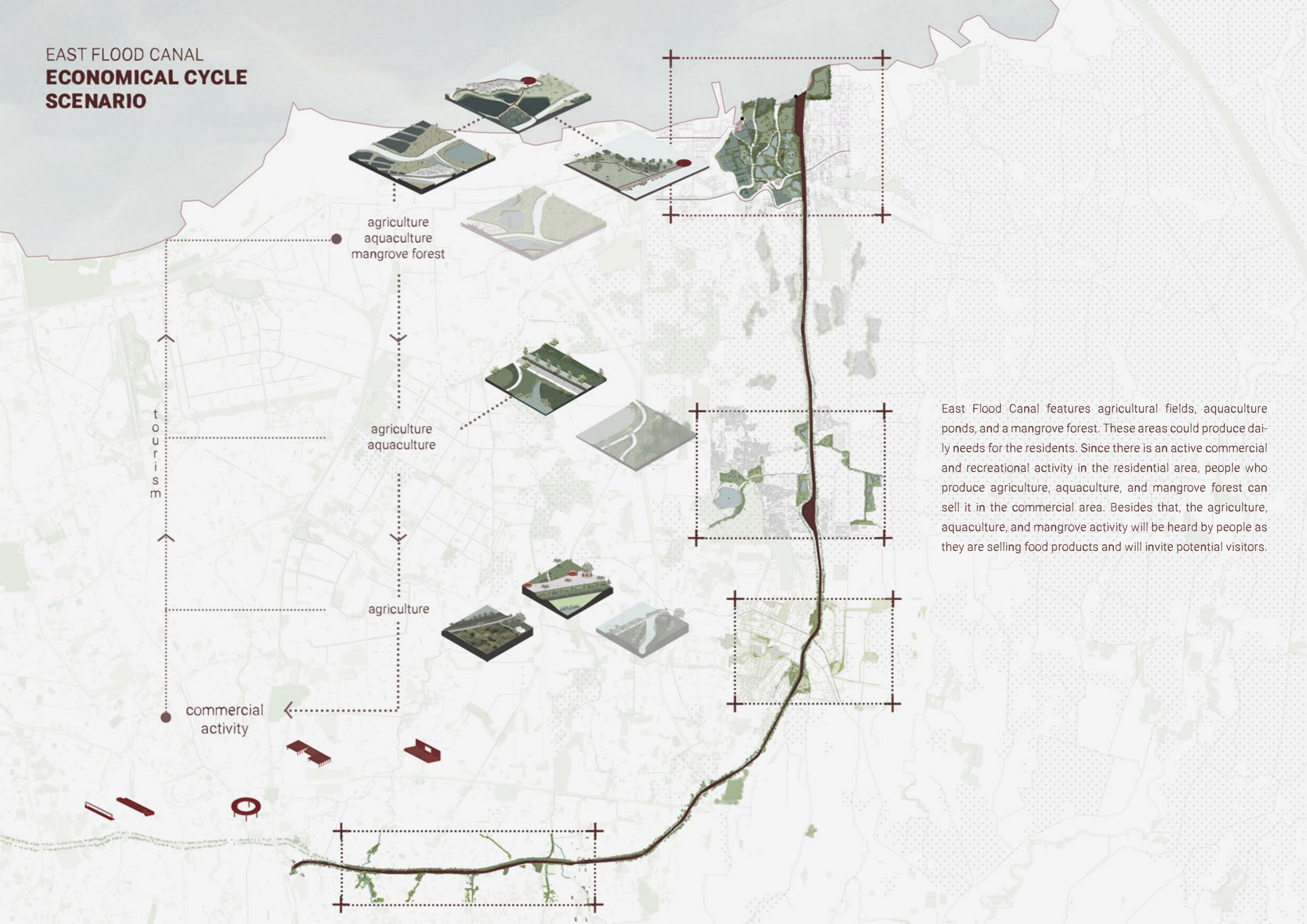
Starting from the southern area, the residential area, you will find urban furniture that allows us to sit, gather, and socialise with our neighbours. From food stalls, clothes until electronic shops can be found here.

As you go to the east, you will find more agricultural patches integrated with the green natural parks. In this area, you can see the Cakung river. The purpose of the intervention in this area is to increase people's sense of belonging to the natural river. Moreover, it also preserves the cultural value of the river.

Next, you will get to the third area. This is the starting point where the flooding issue appears more due to the area's topography. Hence, water basins are designed to hold and distribute rain runoff, which could help the flooding problem.

At the end of the journey, you will get to the delta area. In this area, you can see fisherman neighbourhoods and fishing boats. Few interventions were made for this area. Adding wetlands to reduce the risk of flood is the first intervention. Secondly, to have more aquaculture ponds alongside the agriculture fields. These aquaculture ponds can provide more income for people who live in the area, of which the majority is a fishermen. Thirdly, to have more river channels. By adding more river channels, the water can be distributed in more ways. This will reduce the chance of flooding. The last intervention is to expand the mangrove forest. Larger mangrove forests provide more protection to the land and people from erosion and storms.

EAST FLOOD CANAL ECONOMICAL CYCLE SCENARIO



agriculture
aquaculture
mangrove forest

agriculture
aquaculture

agriculture

t
o
u
r
i
s
m

commercial
activity

East Flood Canal features agricultural fields, aquaculture ponds, and a mangrove forest. These areas could produce daily needs for the residents. Since there is an active commercial and recreational activity in the residential area, people who produce agriculture, aquaculture, and mangrove forest can sell it in the commercial area. Besides that, the agriculture, aquaculture, and mangrove activity will be heard by people as they are selling food products and will invite potential visitors.



conclusion

This thesis aims to implement urban and ecological strategies to regenerate East Flood Canal in Jakarta and how each fabric could activate and initiate development throughout the canal. Moreover, improving the canal will bring a domino effect for other aspects on the bigger scale (the city), from an environmental aspect, social - cultural, and economic.

This project opens possibilities for possible solutions to overcome this canal's complex intertwining fabrics and issues. Through the observation of the city's fabric typologies, green space networks, the public spaces, the accessibility, and the water system condition, this project proposal can bridge the gap between the existing situation, Jakarta's annual issues, and its future scenarios.

Furthermore, this thesis project can still be improved by future academic researchers, community organization developments, and stakeholders with similar backgrounds. Hopefully, the Regeneration of East Flood Canal inspires others to improve and look deeper into a city's flood mitigation canals.

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