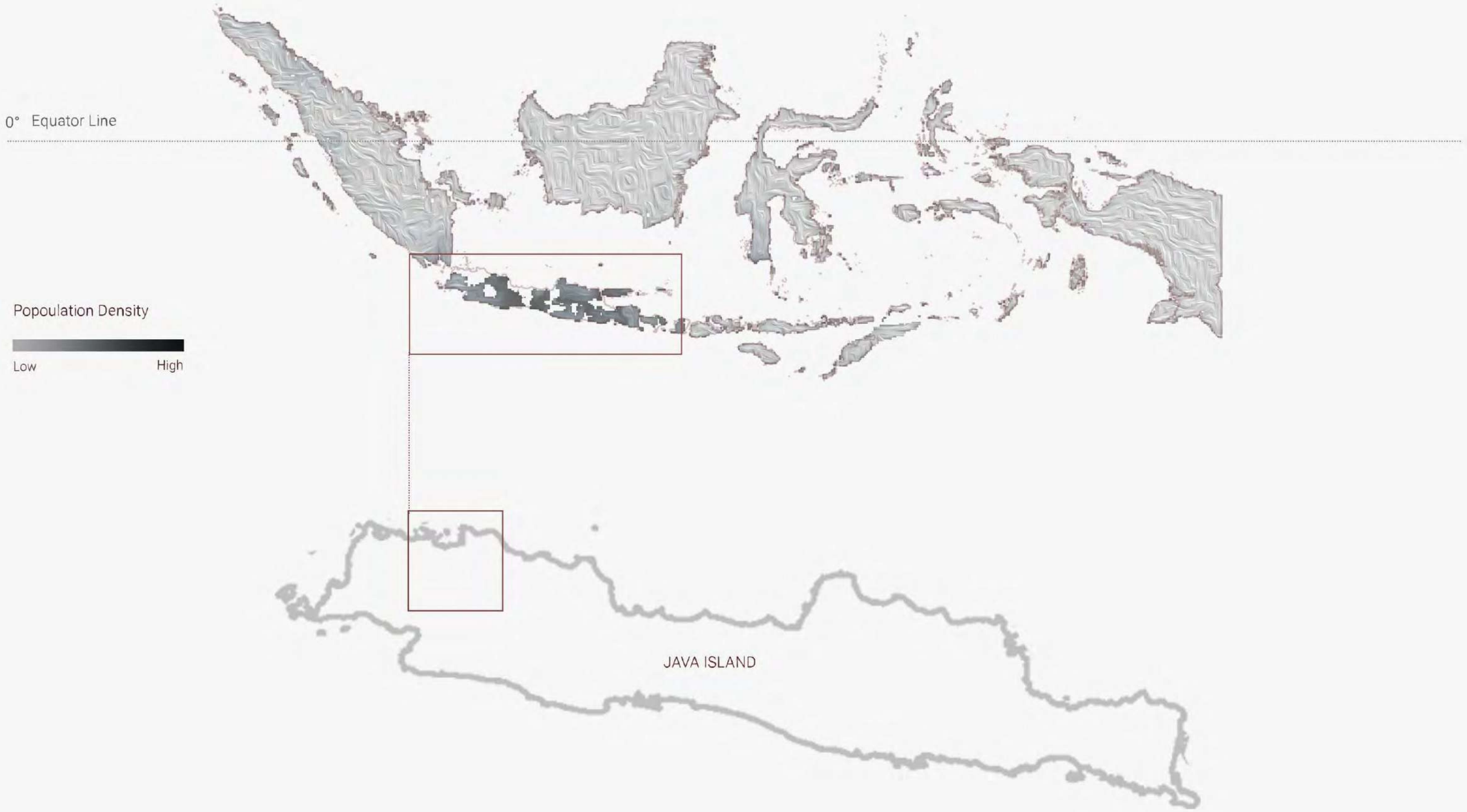
Regeneration of East Flood Canal:
Urban and Landscape Strategies for Jakarta's Water System

Diandra Zahra Karima
950999

INDONESIA GEOGRAPHICAL LOCATION

INDONESIA GEOGRAPHICAL LOCATION

0.7893° S, 113.9213° E



Geographical Location

TOPOGRAPHY LINES

Java Sea

DKI Jakarta

Mt. Kiarabebes Gagak
1,511 m

Mt. Salak
2,211 m

Mt. Perbakti
1,699 m

Mt. Pangrango
3,019 m

Mt. Gede
2,958 m

Geographical Location

WATERSHED

Geographical Location

JAKARTA'S WATERSHED

Jakarta's Urban Growth Development

1890

Java Sea

1650; a Merchant & His Wife with Batavia Background

An 18th-century drawing of the Stadthuis (State House) in Batavia

Current condition - 2022

Jakarta's Urban Growth Development

1890

1920

Java Sea

Netherlands built CANALS as a flooding barrier & goods transportation

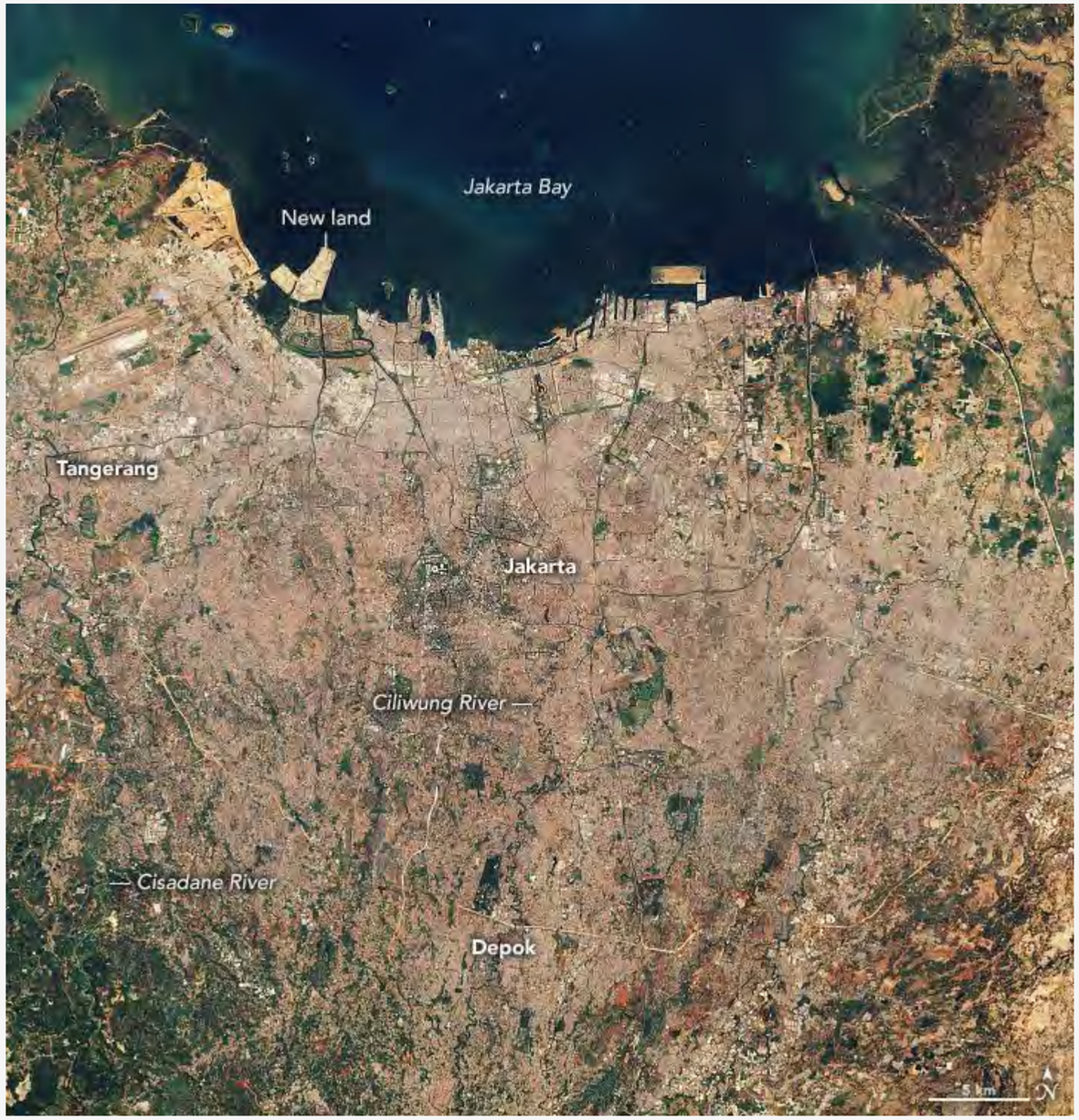
Jakarta's Urban Growth Development

- 1890
- 1920
- 2020

Java Sea


Jakarta Bay
Tangerang
Jakarta
Ciliwung River
Cisadane River
Depok
5 km
N

1990


Jakarta Bay
New land
Tangerang
Jakarta
Ciliwung River
Cisadane River
Depok
5 km
N

2019

Jakarta's Flooding Event Timeline and Blue Infrastructure Development

Mookervart Canal was built to connect two natural rivers and prevent flooding 1678 - 1689

Netherland Trading Company (VOC) built two new canals for transportation and preventing flood flows to the city center.

— Baru Timur River (Oosterslokkan) 1739
— Baru Barat River (Westerslokkan) 1776

Tanjung Priok Harbor was built to accomodate commercial traffic, (Sunda Kelapa Harbor is filled with silt and considered too small.) especially after Suez is opened in 1867.

— West Flood Canal was built 1922

Changes of Land use to host ASIAN GAMES 1962

The area that are supposed to be green area, were built for facilitate first big sport event in Indonesia.

Flooding Map Jakarta

1996 2002 2007 2013

To help Indonesia's financial crisis, Jakarta's urban fabric filled with private sectors and foreigners investors which **demolishing the green and public area.**

Changes in Jakarta's landscape.

···· **East Flood Canal construction is started.**

Greatest Flood in Jakarta.

···· **East Flood Canal construction is finished.**

FLOODING EVENT

1621 1654 1699 1714 1854 1878 1909 1918 1942 1996 2002 2007 2013 2014

HISTORICAL DEVELOPMENT

12th Century — Sunda Kelapa Harbour as a trading center. Arabians, Indians, and Chinese traders.

1511 — Portuguese came to colonialized Sunda Kelapa.

1527 — Sunda Kelapa changed into "Jayakarta"

1619 — Netherlands came to Indonesia. Start residing and set a commercial and trading company (VOC) in Batavia. "Jayakarta" changed into "Batavia".

1721 — Batavia fields area occupied by VOC and planted for rice paddy , sugar industry and asian spices.

mid 18th century — Canals in Old City are heavily polluted and caused Malaria. Foreigners are move to "New City" towards southern area (considered higher in elevation and cleaner)

1877 — Citizens from outside Batavia started to resides in city to work and live

Indonesia's 1st President. Architect & Civil Engineer

1945 — Indonesia Independence Day

Major changes of Urbanism Plan by Soekarno (1st president)

1945 — Jakarta (Batavia) officially become Indonesia's Capital City

1962 — ASIAN GAMES in Jakarta

1966 — Soekarno is replaced by Soeharto

Uncontrollable growth of Jakarta's population and infrastructure

1990 — Indonesia's Financial Crisis

1998 — Soeharto resigned. Changes in government system (from centralized into decentralize)

Jakarta's economy is in a better state. Inviting more people to live and work in Jakarta. The population and dense illegal housing has been non stop increasing since then.

PRE COLONIALIZATION
< 1619

EARLY COLONIALIZATION
1619 - 1810

MID COLONIALIZATION
1810 - 1945

EARLY INDEPENDENCE
1945 - 1966

THE NEW ERA
1966 - 1998

CONTEMPORARY ERA
1998 - now

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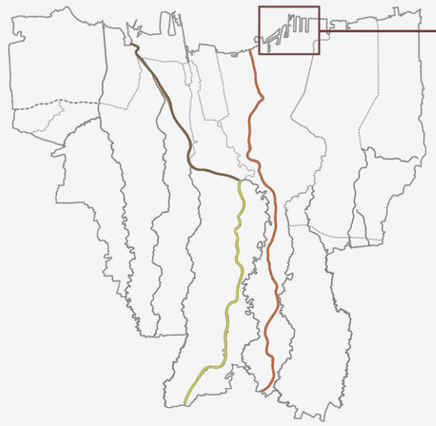

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Jakarta's Flooding Event Timeline and Blue Infrastructure Development

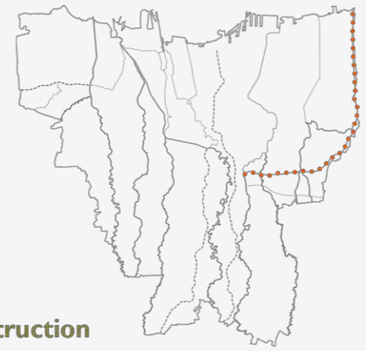
Flooding Map Jakarta

1996

2002

2007

2013



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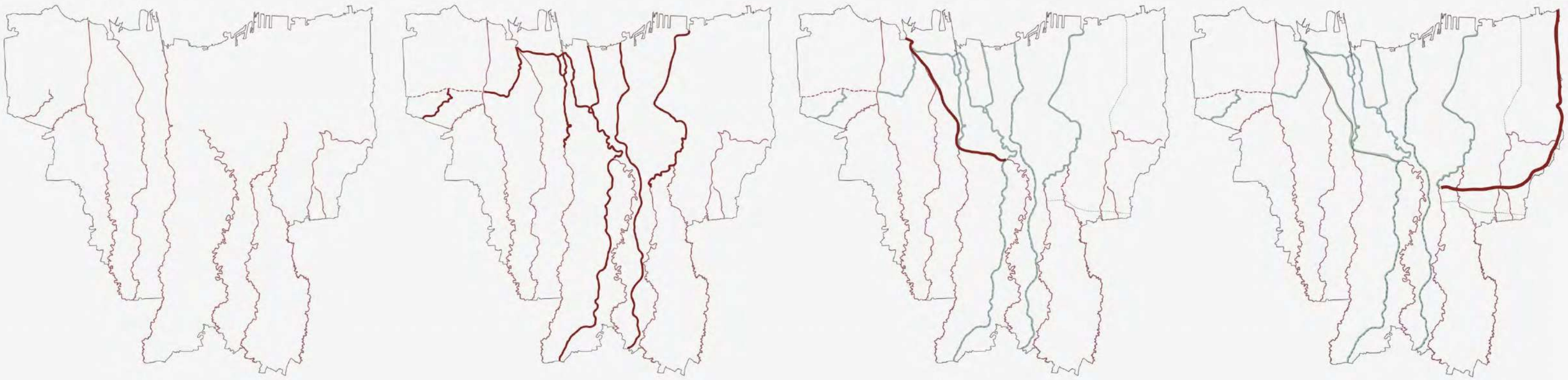
2014

EARLY INDEPENDENCE
1945 - 1966

THE NEW ERA
1966 - 1998

CONTEMPORARY ERA
1998 - now

BLUE SYSTEM DEVELOPMENT IN JAKARTA



< 16th Century

16th - 18th Century

19th - 20th Century

20th Century - Now

ARTIFICIAL CANALS FUNCTION

Colonialization Era

- - - - Transportation Canal

- - - - Flooding Control Canal

Contemporary (Independency) Era

——— Flooding Control Canal

WEST FLOOD CANAL
1922

MOOKERVART CANAL
1678 - 1689

EAST FLOOD CANAL
2003 - 2010

WESTERNSLOKKAN
1776

OOSTERNSLOKKAN
1739

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- Flooding Control Canal

Contemporary (Independency) Era

- Flooding Control Canal

MOOKERVART CANAL
1678 - 1689

OOSTERSLOKKAN
1739

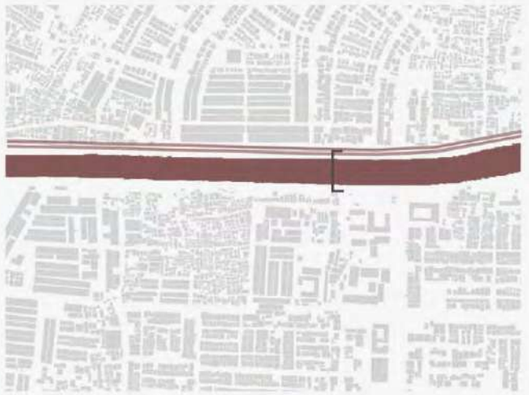
WESTERSLOKKAN
1776

WEST FLOOD CANAL
1922

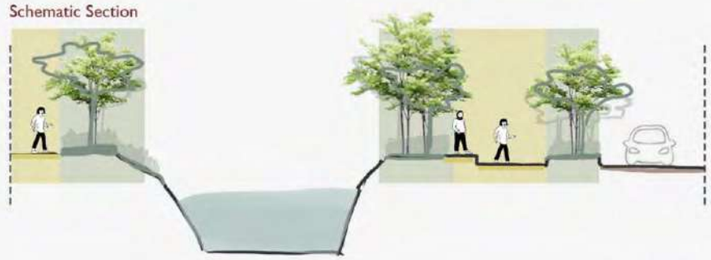
EAST FLOOD CANAL
2010

What makes **East Flood Canal** different than others?

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



Schematic Section



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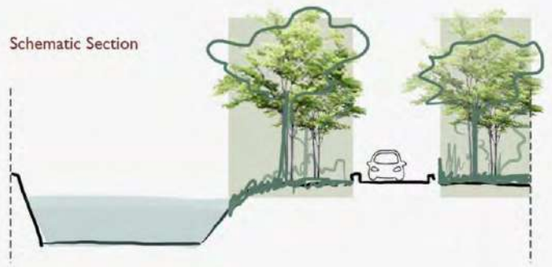



Java Sea
1
2
3
4
5
6
7
8
9
10
11
12
13
B
A
East Flood Canal

TERRITORIAL SCALE ANALYSIS

Territorial Scale
East Flood Canal

Java Sea

JAKARTA

WEST JAVA

Territorial Scale
East Flood Canal

Java Sea

0 2,5 5 km

Territorial Scale

Contour Line and Flood Prone Area

Java Sea

Territorial Scale
Residential

Java Sea

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

0 2,5 5 km

Territorial Scale

Agriculture

Java Sea

0 2,5 5 km

Territorial Scale
Industrial

Java Sea

0 2,5 5 km

Territorial Scale

Green Area

Java Sea

Territorial Scale

Cultural and Recreational Context

Java Sea

"Si Pitung" House - Cultural Recreaction

Ancol Theme Recreational Park

National Monument

Ismail Marzuki Park (Planetarium and Museum)

Independence Monument

Dirgantara Statue

Transera Recreational Water Park

AEON Shopping Mall

Marakas Recreational Water Park

Summarecon Shopping Mall

Territorial Scale

Feasibility Access to East Flood Canal

Java Sea

Cultural & Recreational Sites

Shopping Center

55 minutes

45 minutes

35 minutes

45 minutes

Territorial Scale

Area Analysis

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

Java Sea

Territorial Scale

Study Case Area

Java Sea

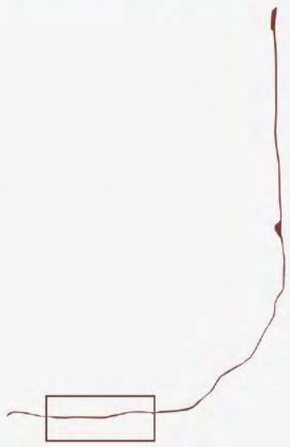
Industrial

Agricultural

Residential
Industrial
Agricultural

Residential

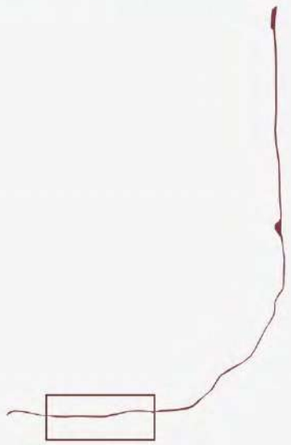
Residential

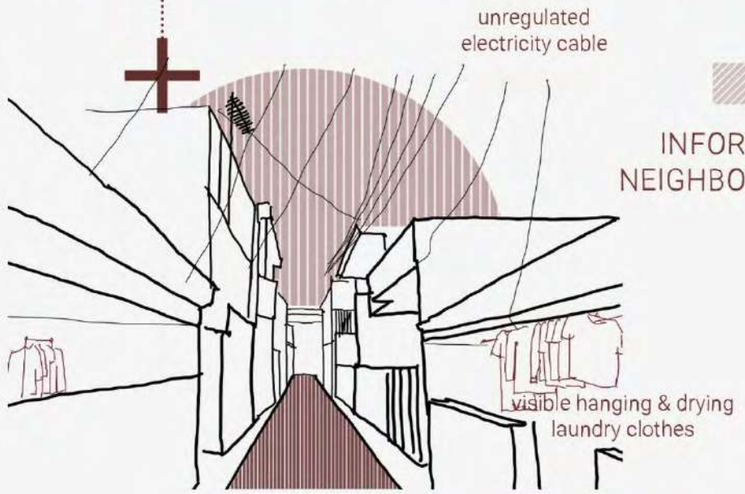


RESIDENTIAL AREA

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

0 125 250 m



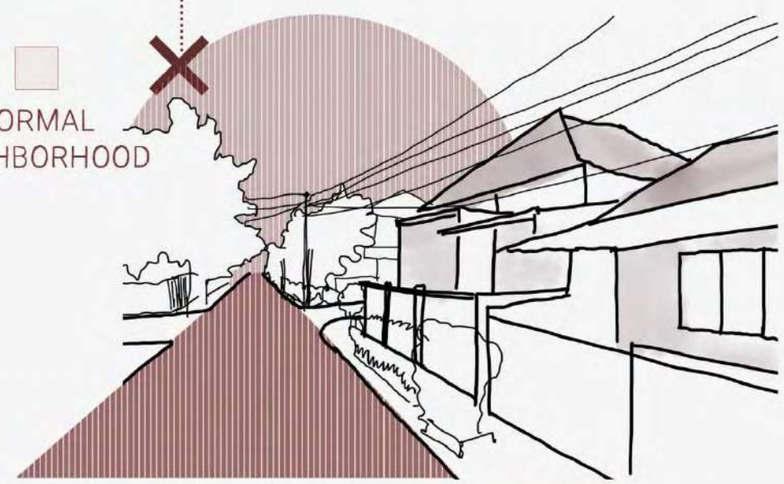


INFORMAL
NEIGHBORHOOD

street width 1.8 - 2 m

no space for green buffer
between house & street

FORMAL
NEIGHBORHOOD

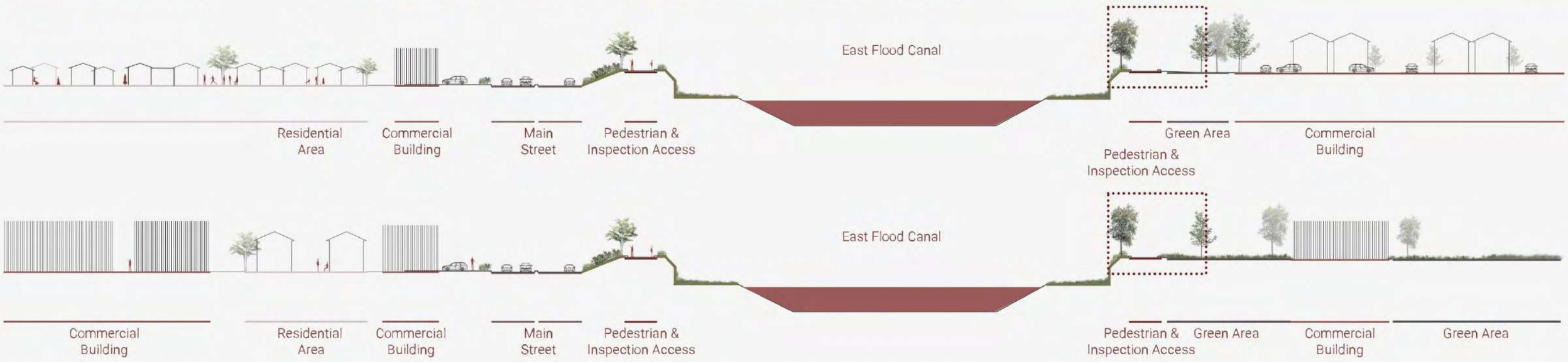


street width 6.5 - 7 m

green buffer
between house & street

Day time

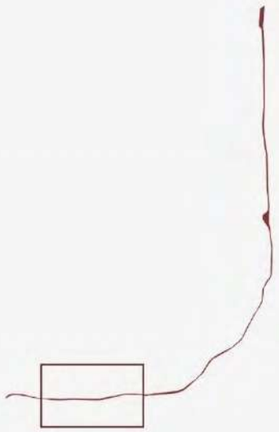
Night time



× ISSUES // ● POTENTIALS

0 125 250 m

× NEGLECTED CONDITION OF NATURAL RIVER



× LACK OF PUBLIC - URBAN FACILITIES

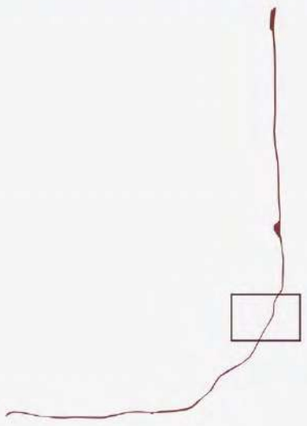
PRESENCE OF SCHOOL & HOSPITAL

● PRESENCE OF GREEN AREA

● AN ACTIVE COMMERCIAL ACTIVITY

Mixed

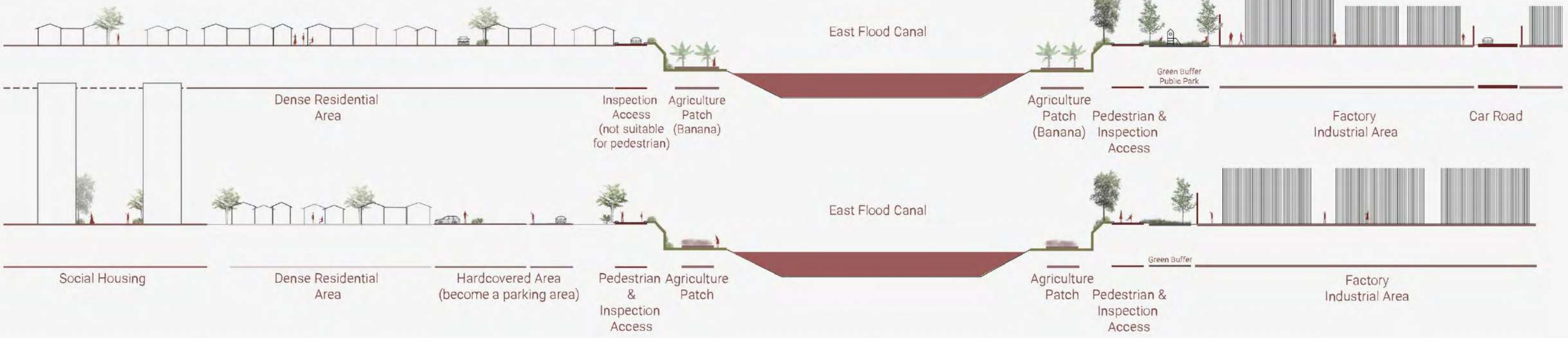
Residential
Agricultural
Industrial



MIXED AREA

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

0 125 250 m


East Flood Canal
Dense Residential Area
Inspection Access (not suitable for pedestrian)
Agriculture Patch (Banana)
Green Buffer Public Park
Agriculture Patch (Banana)
Pedestrian & Inspection Access
Factory Industrial Area
Car Road
East Flood Canal
Social Housing
Dense Residential Area
Hardcovered Area (become a parking area)
Pedestrian & Inspection Access
Agriculture Patch
Green Buffer
Agriculture Patch
Pedestrian & Inspection Access
Factory Industrial Area

✕ ISSUES // ● POTENTIALS

LACK OF GREEN AREA →

INCREASE OF HOUSING DEVELOPMENT

ON GOING AGRICULTURAL ACTIVITY

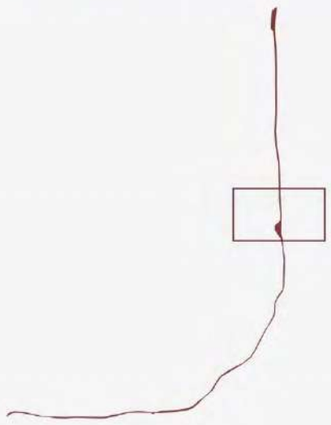
POOR CONDITION OF NATURAL RIVER

PRESENCE OF CITY PARK

LACK OF GREEN AREA →

INCREASE OF INDUSTRIAL DEVELOPMENT

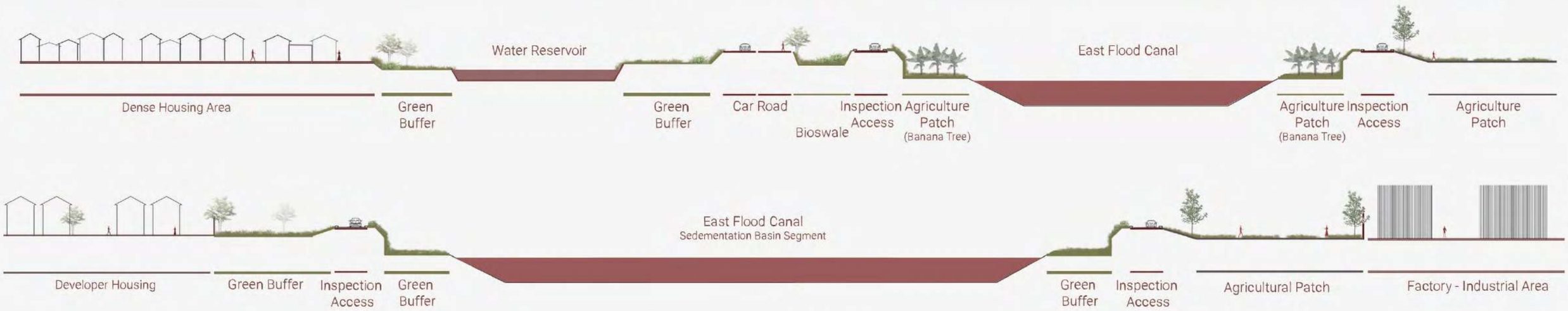

Agriculture



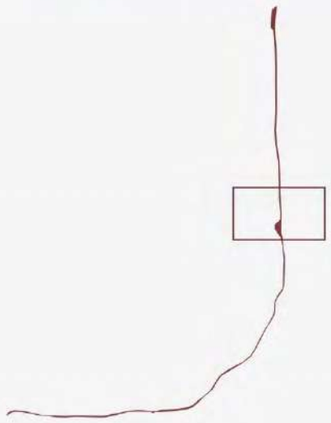
AGRICULTURAL AREA

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

0 125 250 m


Dense Housing Area
Green Buffer
Water Reservoir
Green Buffer
Car Road
Bioswale
Inspection Access
Agriculture Patch (Banana Tree)
East Flood Canal
Agriculture Patch (Banana Tree)
Inspection Access
Agriculture Patch
Developer Housing
Green Buffer
Inspection Access
Green Buffer
East Flood Canal
Sedementation Basin Segment
Green Buffer
Inspection Access
Agricultural Patch
Factory - Industrial Area

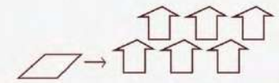
X ISSUES // ● POTENTIALS



PRESENCE OF PUBLIC FACILITIES (SCHOOL)

PRESENCE OF URBAN PARK

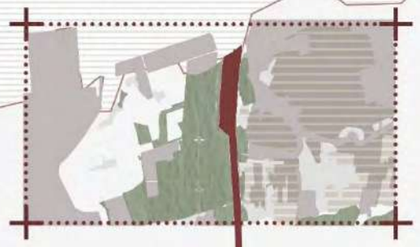
ON GOING INTEGRATED AGRICULTURE - AQUACULTURE ACTIVITY

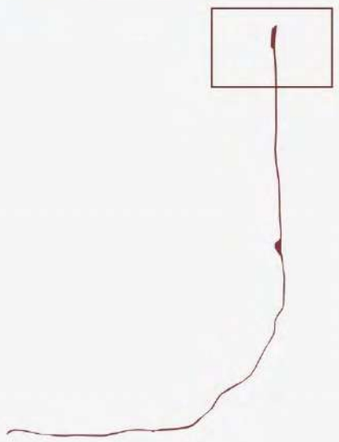


LACK OF GREEN SPACE

INCREASE OF DEVELOPER HOUSES

Industrial

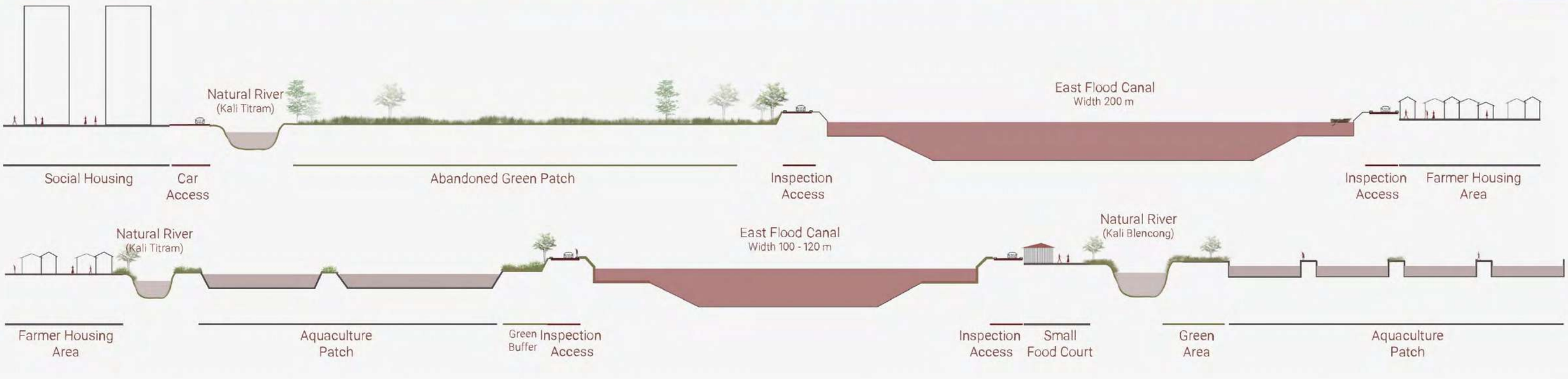




INDUSTRIAL - DELTA AREA

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

0 125 250 m


Natural River
(Kali Titram)
East Flood Canal
Width 200 m
Social Housing
Car Access
Abandoned Green Patch
Inspection Access
Inspection Access
Farmer Housing Area
Natural River
(Kali Titram)
East Flood Canal
Width 100 - 120 m
Natural River
(Kali Blencong)
Farmer Housing Area
Aquaculture Patch
Green Buffer
Inspection Access
Inspection Access
Small Food Court
Green Area
Aquaculture Patch

INDUSTRIAL - DELTA AREA

DESIGN CONCEPT

RE-ROUTE THE MAIN ROAD

Industry
Local Residents

ENHANCE THE CULTURAL ELEMENT

Tourist
Local Residents
Government

RELOCATE THE SOCIAL HOUSING

Local Residents
Government

SEAFRONT URBAN PARK

Tourist
Local Residents
Government

WETLANDS URBAN PARK

Urban Strategy

RIVER NATURALISATION

ADDING RIVER CHANNEL

ENHANCE THE GREEN AREA

REPLANTING MANGROVE AREA

ADDING WETLANDS

Ecological Strategy

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 Agricultre & Aquaculture Activity
- Abandoned Green Patches

CITY

RURAL

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

Territorial Scale

Main Strategy

- Point of Interest
- Feasibility Access

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

Territorial Scale

Main Strategy

Feasibility Access

Green Area

+ Enhancing the Green Belt for the City

Territorial Scale

Main Strategy

— Blue System Infrastructure

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

Territorial Scale

Main Strategy

- Feasibility Access
- Point of Interest
- Green Area

+ Bridging the City Fabric of Jakarta and Rural Fabric of Bekas (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 naturalizaton - 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

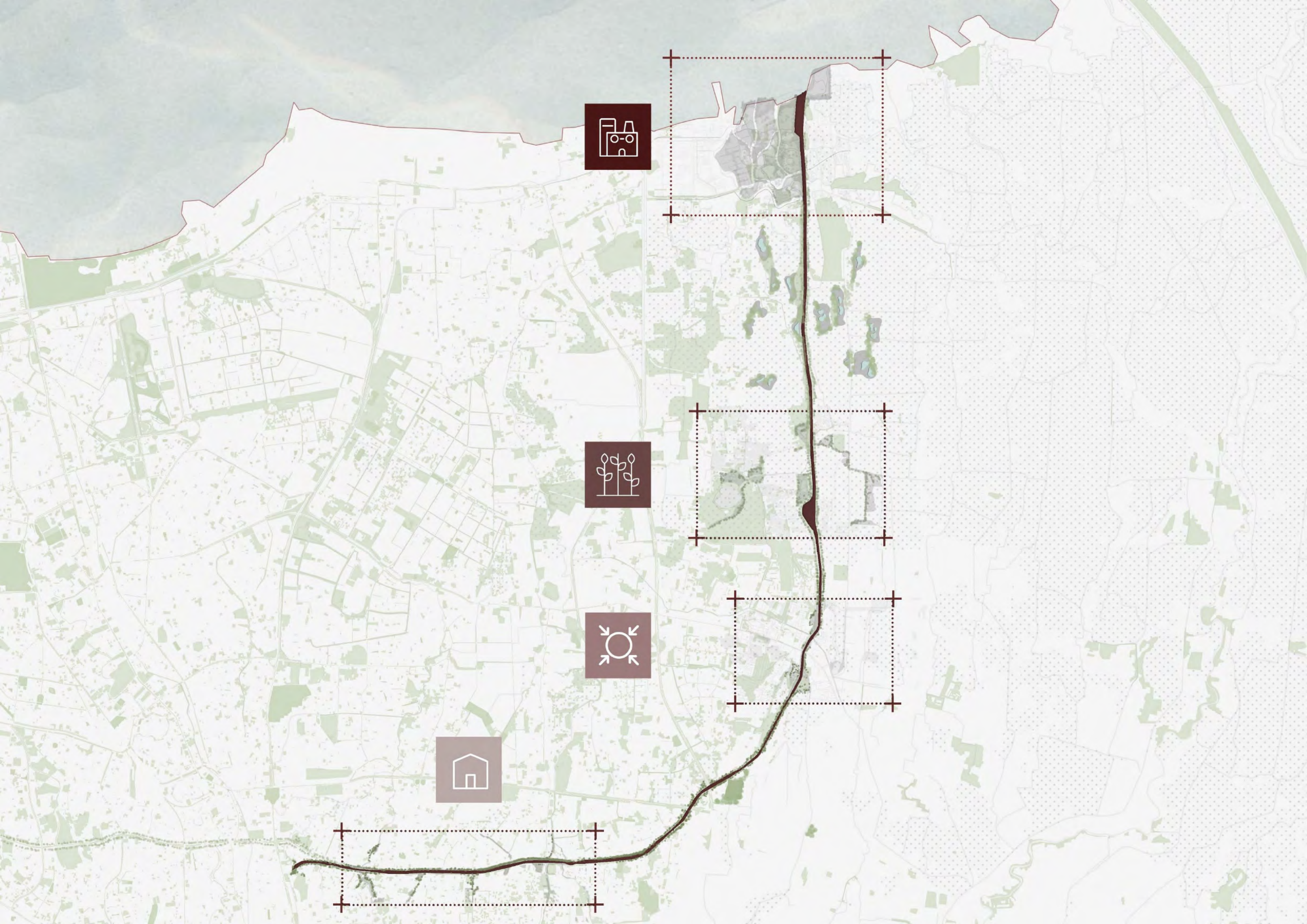
URBAN STRATEGY

ECOLOGICAL STRATEGY

EAST FLOOD CANAL

MASTERPLAN

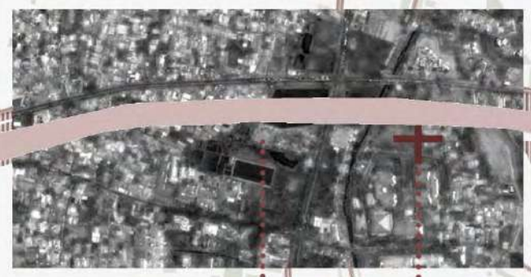
- Green Area
- Agriculture Area
- East Flood Canal
- Road Infrastructue
- Train Railway



RESIDENTIAL

RESIDENTIAL

DESIGN CONCEPT



IMPROVE PUBLIC FACILITIES

RE-INTRODUCE NATURAL BLUE SYSTEM

Urban Strategy

Local Residents
Tourist

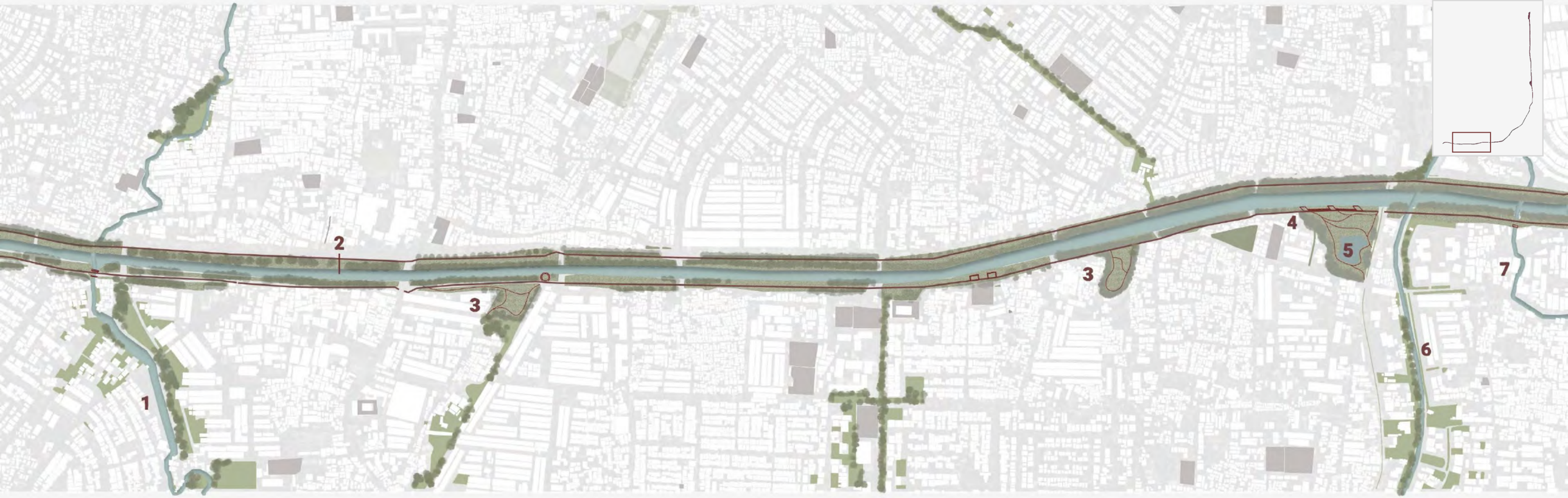
RIVER NATURALISATION

IMPROVE GREEN SYSTEM

INTEGRATE WITH
EXISTING PUBLIC PARK

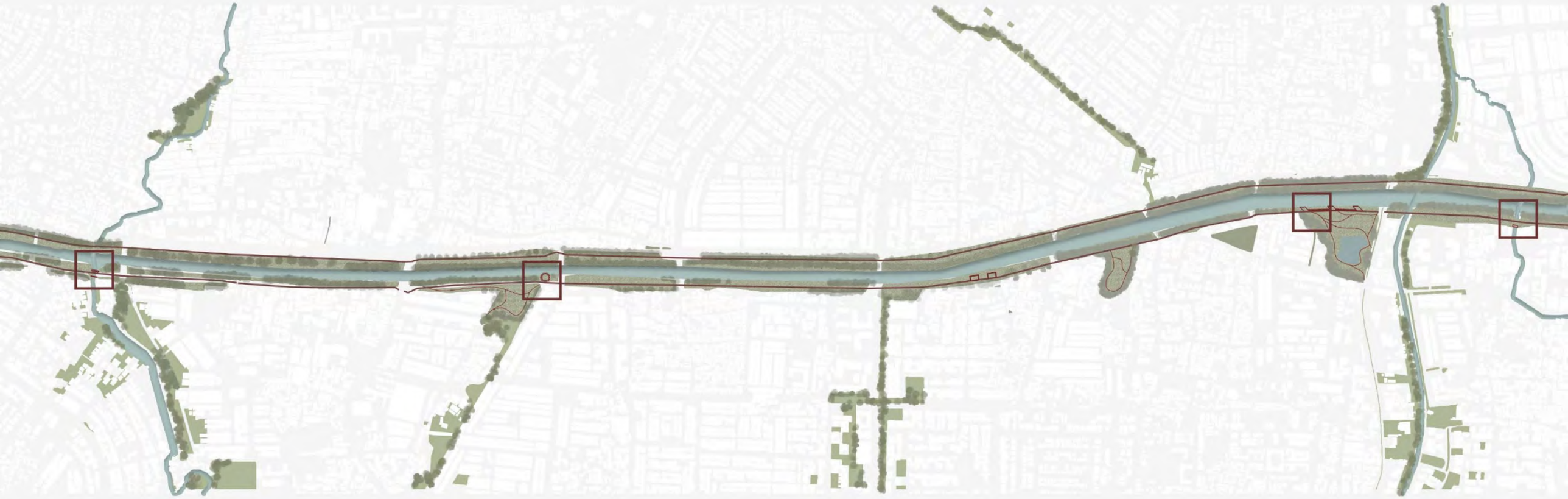
REVIVE WATER BASIN

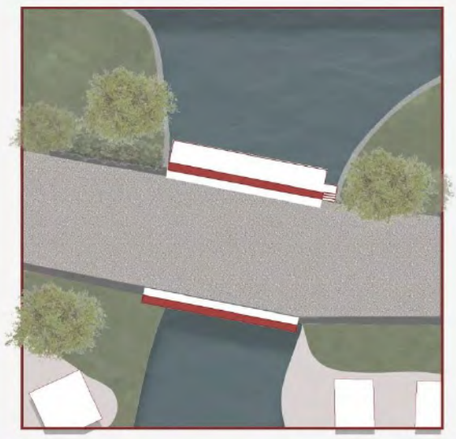
Ecological Strategy

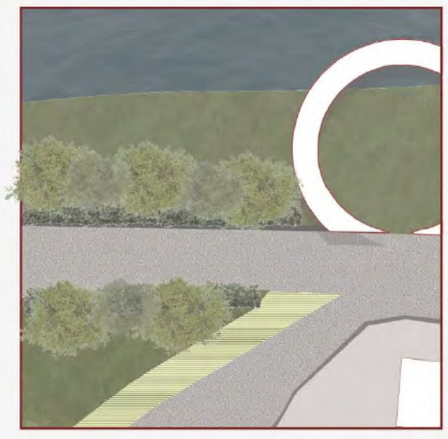


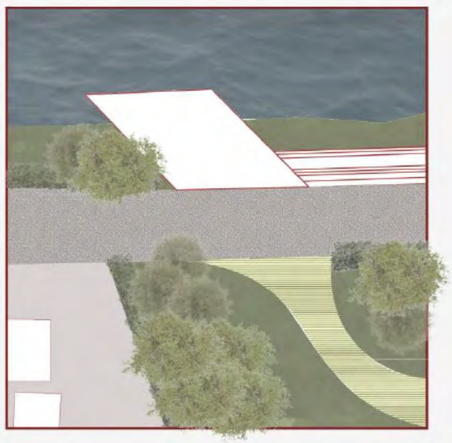
MASTERPLAN
RESIDENTIAL AREA

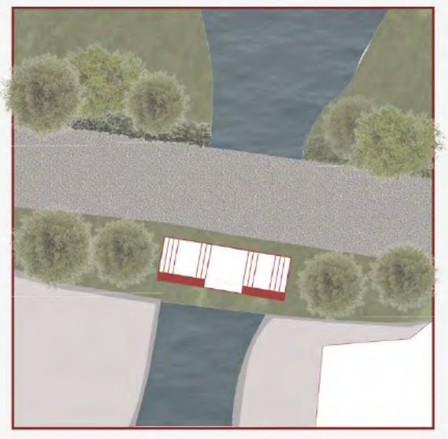
1. CIPINANG RIVER (Natural)
2. EAST FLOOD CANAL
3. RECREATIONAL PARK
4. URBAN TERRACE
5. WATER RESERVOIR PUBLIC PARK
6. SUNTER RIVER (Natural)
7. BUARAN RIVER (Natural)
BUILDING
PUBLIC FACILITIES BUILDING
(School and Hospital)

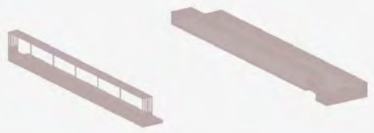






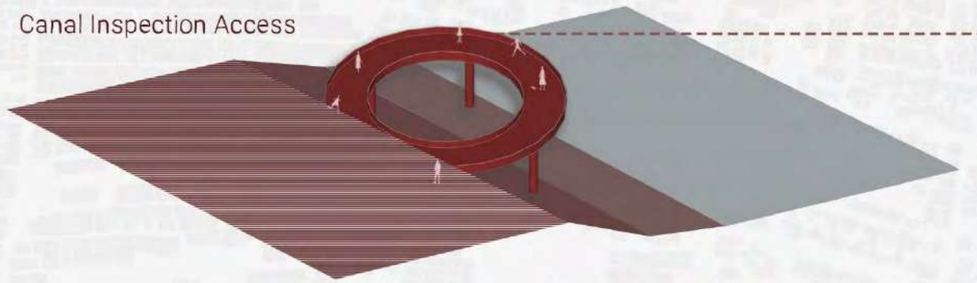




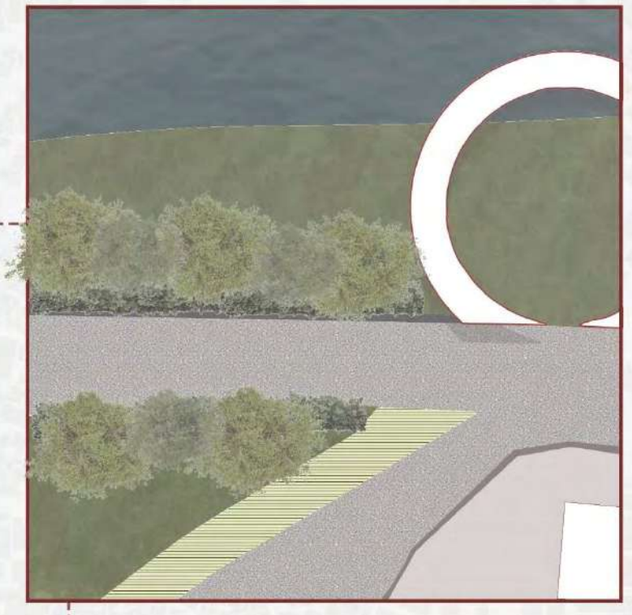


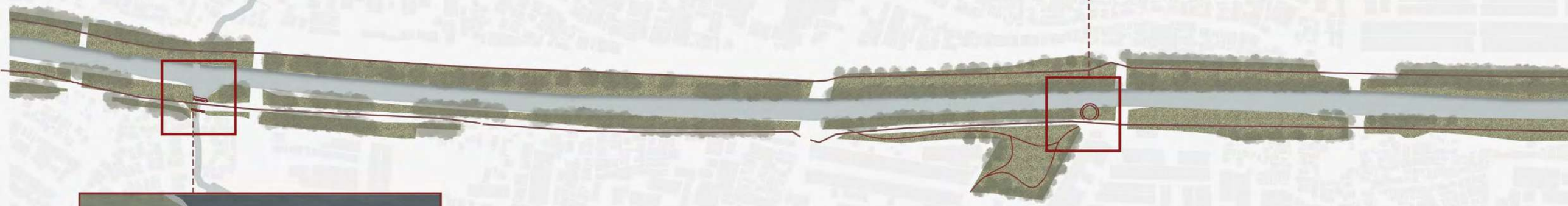
East Flood Canal

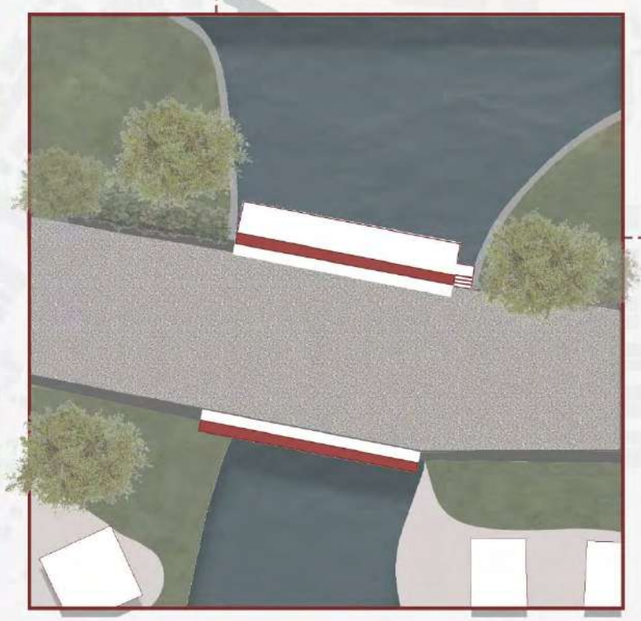
Canal Inspection Access



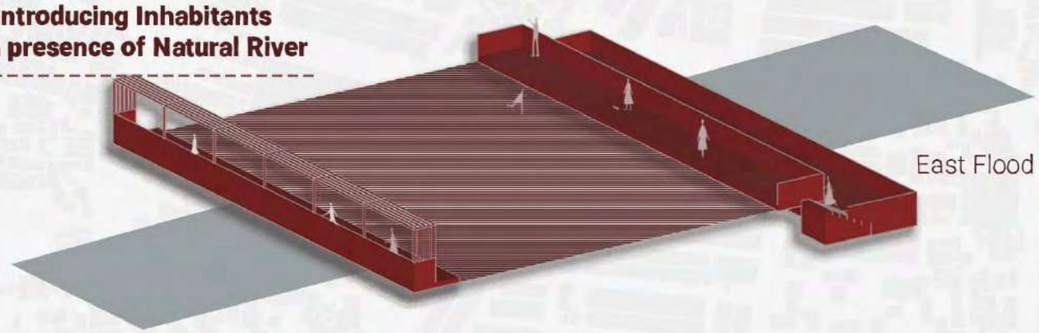
Provide New View Point for East Flood Canal







Re-Introducing Inhabitants with presence of Natural River

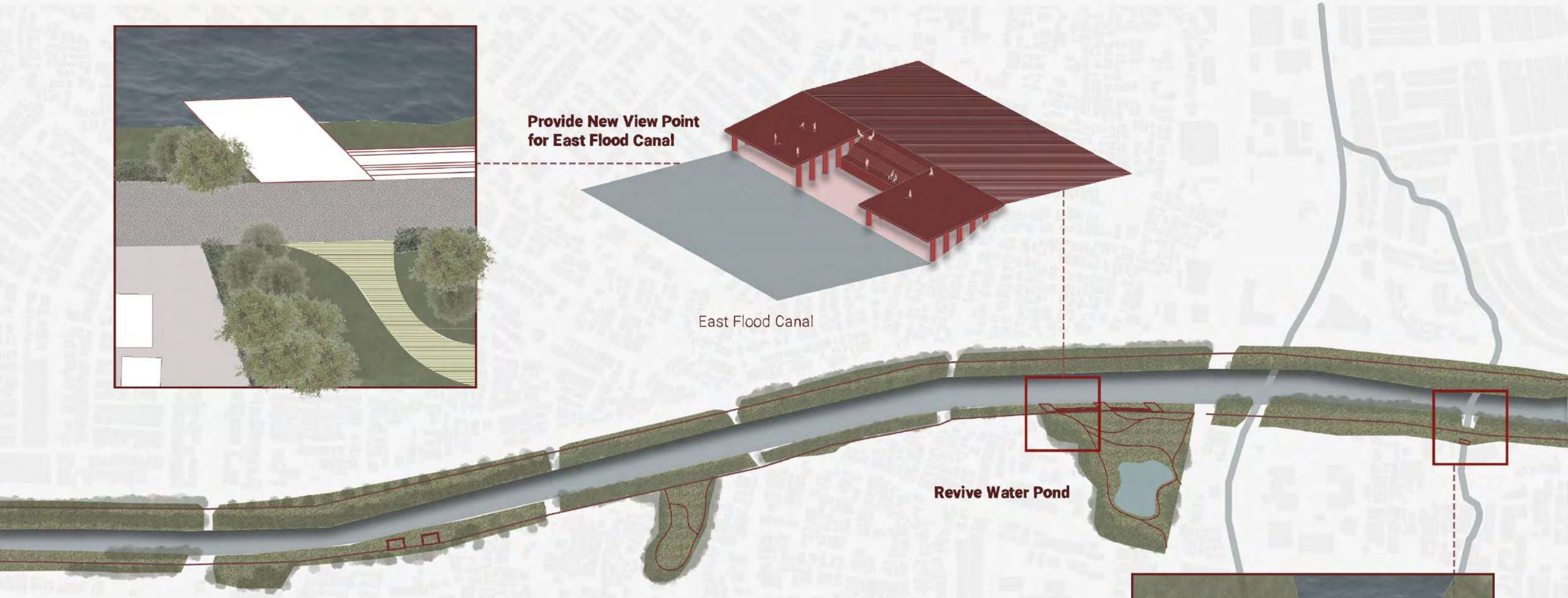


East Flood Canal

Natural River
"Cipinang River"

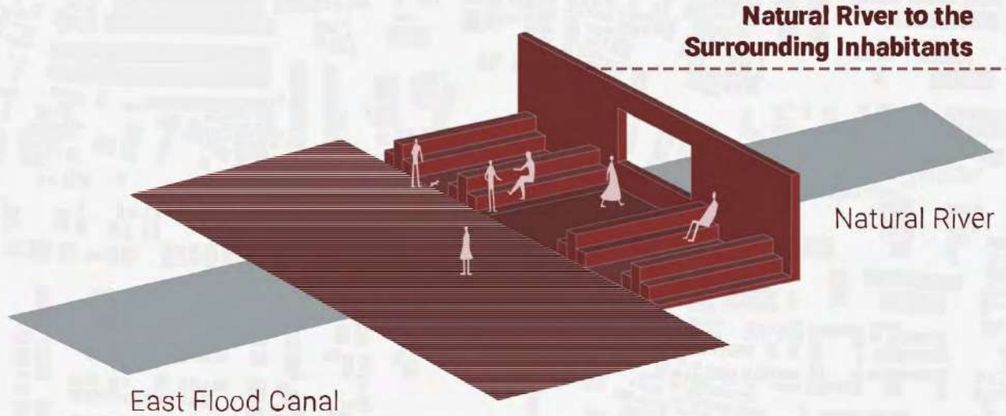
Provide New View Point for East Flood Canal

East Flood Canal



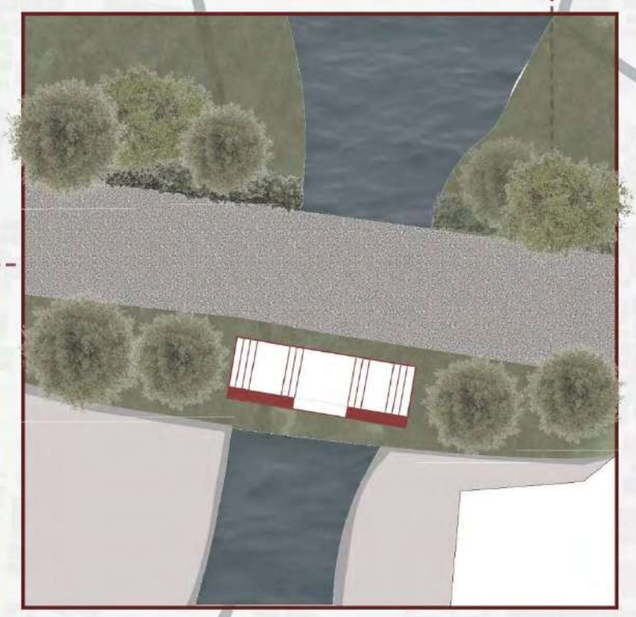
Revive Water Pond

Re-Introduce the Natural River to the Surrounding Inhabitants



Natural River

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

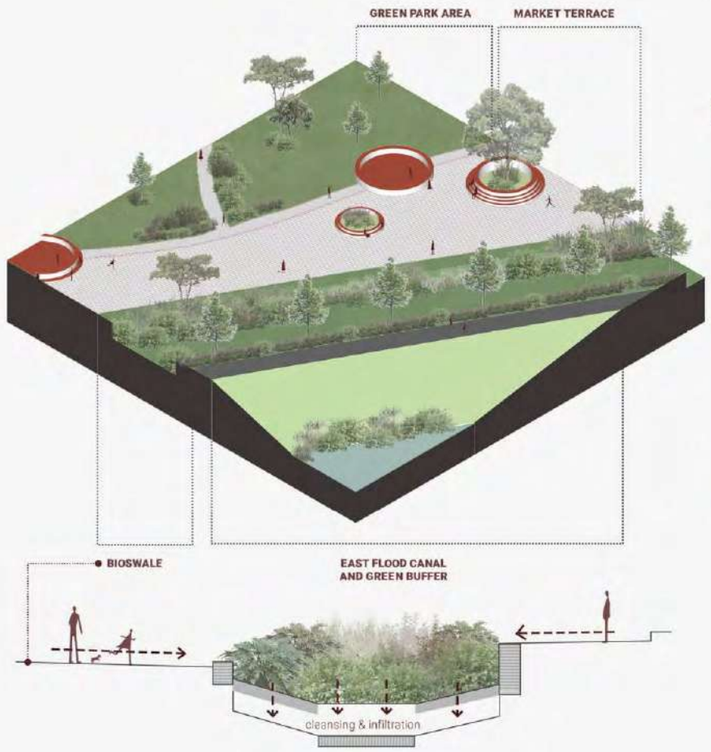
RENATURALIZATION OF NATURAL RIVER

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**

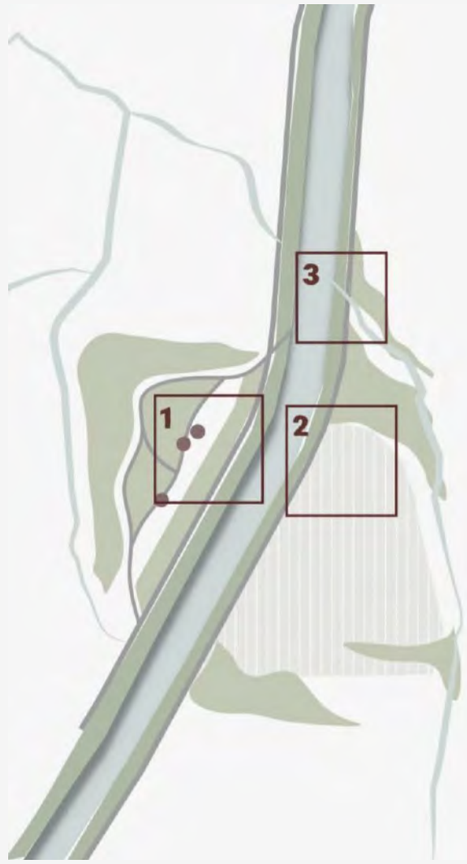


1 The Market Terrace provide a space for people to sell or buy their agriculture or other local products. As a buffer area between East Flood Canal and Green Market Terrace, there will be a bioswale that will hold the water and filter it before going to East Flood Canal. Bioswales will also increase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

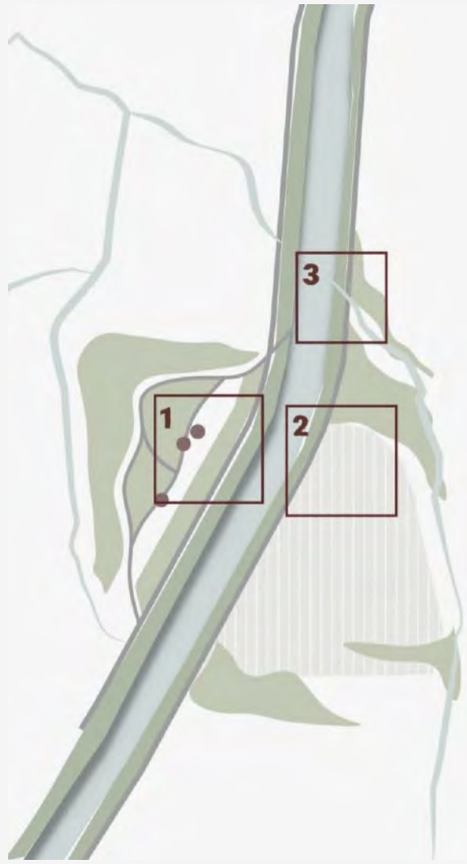
2 Increase the agriculture area alongside the canal by using a green buffer area in the canal as an extra agriculture patch. This proposal can increase the products for the farmers to sell.

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.

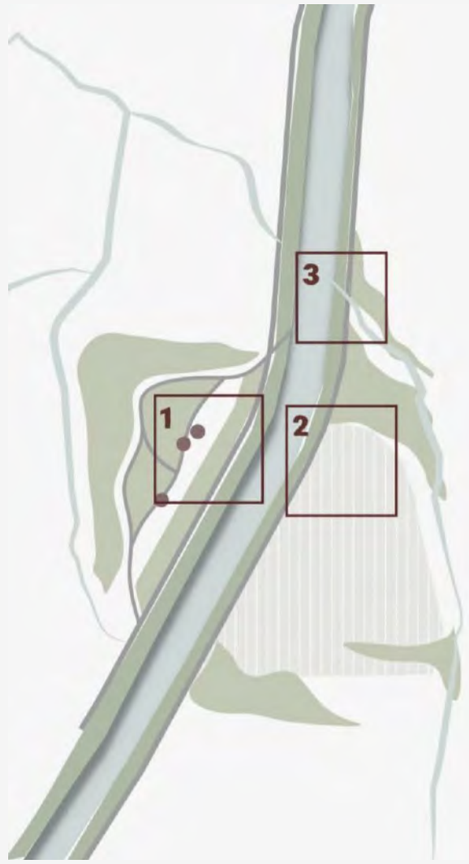
ISONOMETRIC 01 :
Market Terrace



ISONOMETRIC 02 :
Agriculture Patch



ISONOMETRIC 03 :
River Naturalisation



AGRICULTURE

AGRICULTURE AREA

DESIGN CONCEPT

FACILITATE URBAN WATER PARK

Integrate to the Existing Park

Urban Strategy

FLOOD RETENTION BASIN

IMPROVE THE GREEN AREA

ENHANCE THE GREEN BUFFER AREA

FLOOD RETENTION BASIN

Ecological Strategy

BIOSWALE ALONGSIDE THE CANAL

AGRICULTURE AREA

MASTERPLAN

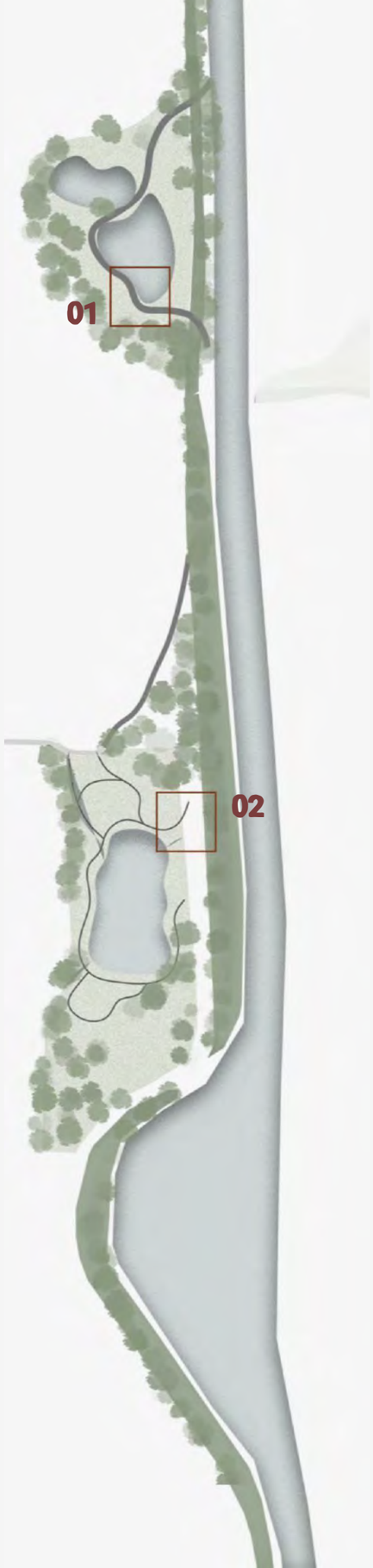
1. EAST FLOOD CANAL
2. SEDIMENTATION BASIN
3. BIOSWALE
4. GREEN NATURAL AREA
5. WATER RETENTION BASIN PARK
6. EXISTING WATER RESERVOIR

ISONOMETRIC 01 :
Water Retention Pond

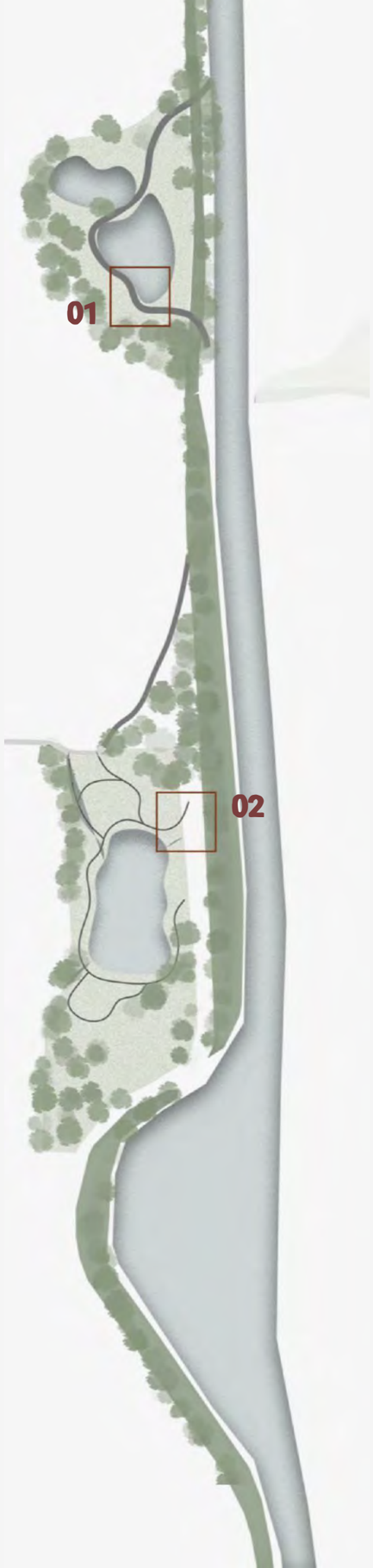
WATER RETENTION POND

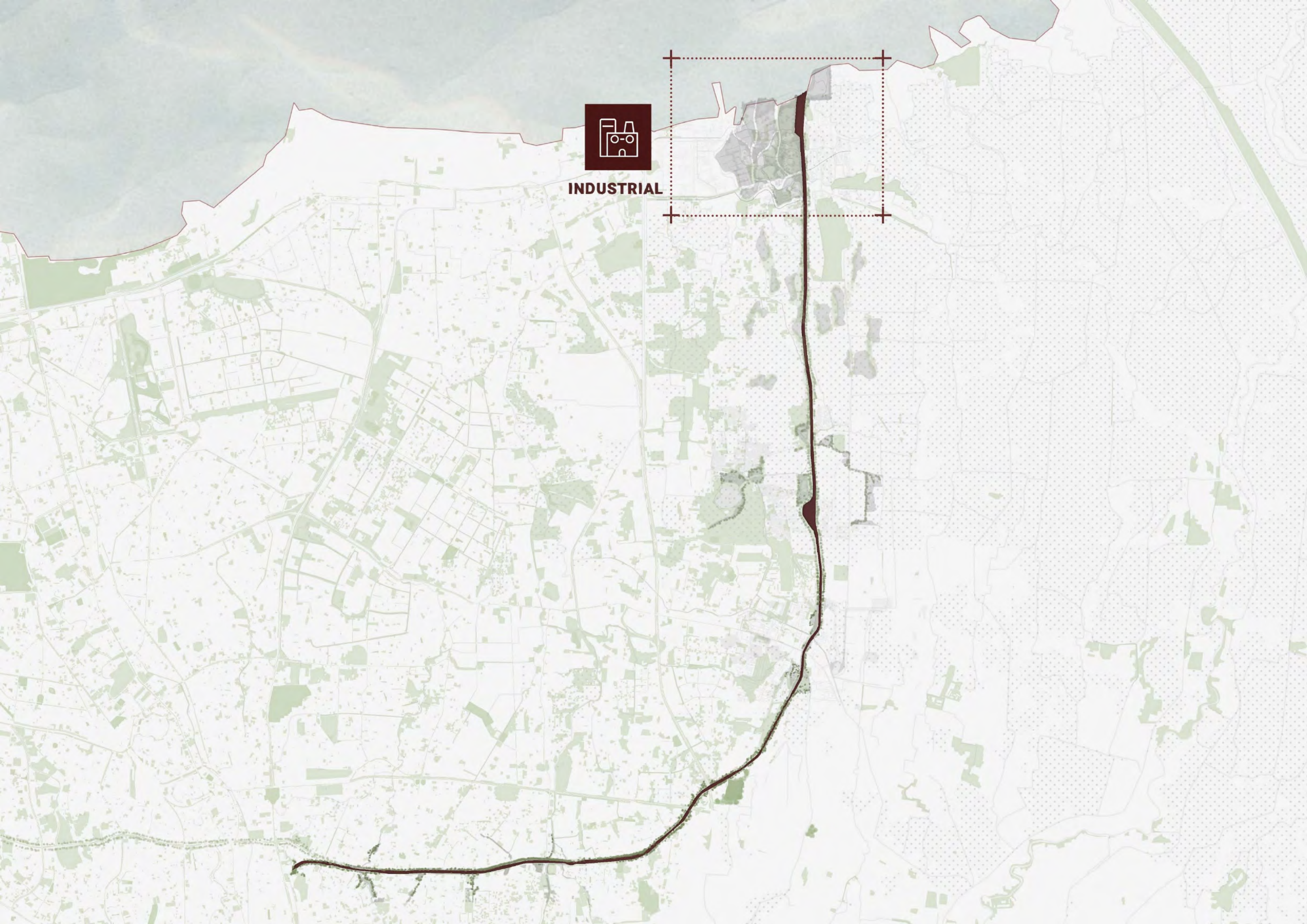
PUBLIC PARK

GREEN BUFFER AREA



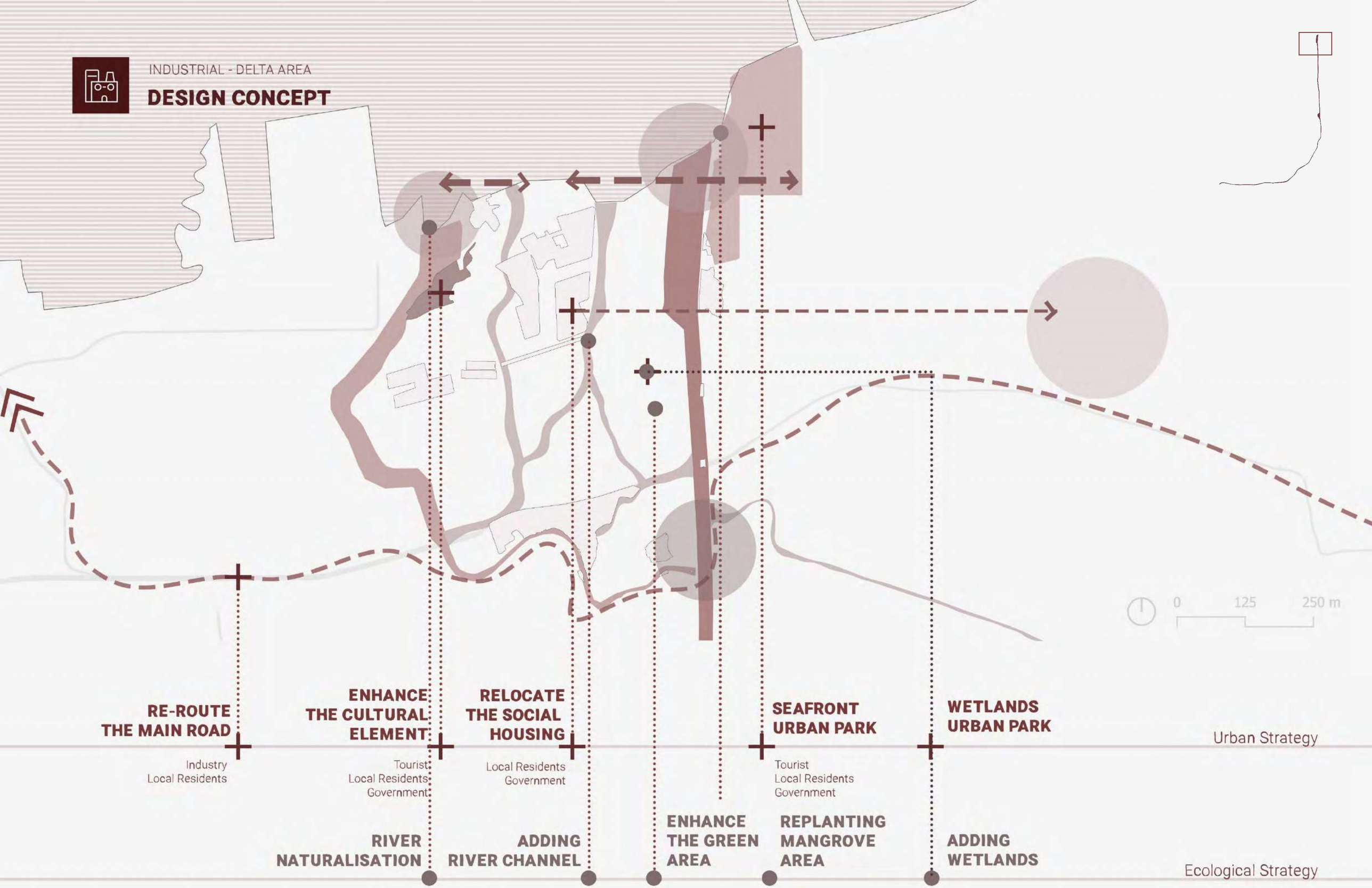
ISONOMETRIC 02 : Bioswale and Water Reservoir Park




INDUSTRIAL

INDUSTRIAL - DELTA AREA

DESIGN CONCEPT



Industrial - Delta Area

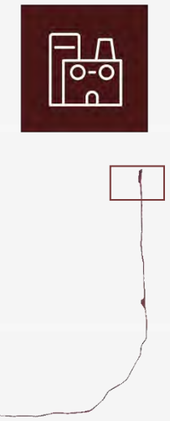
MASTERPLAN

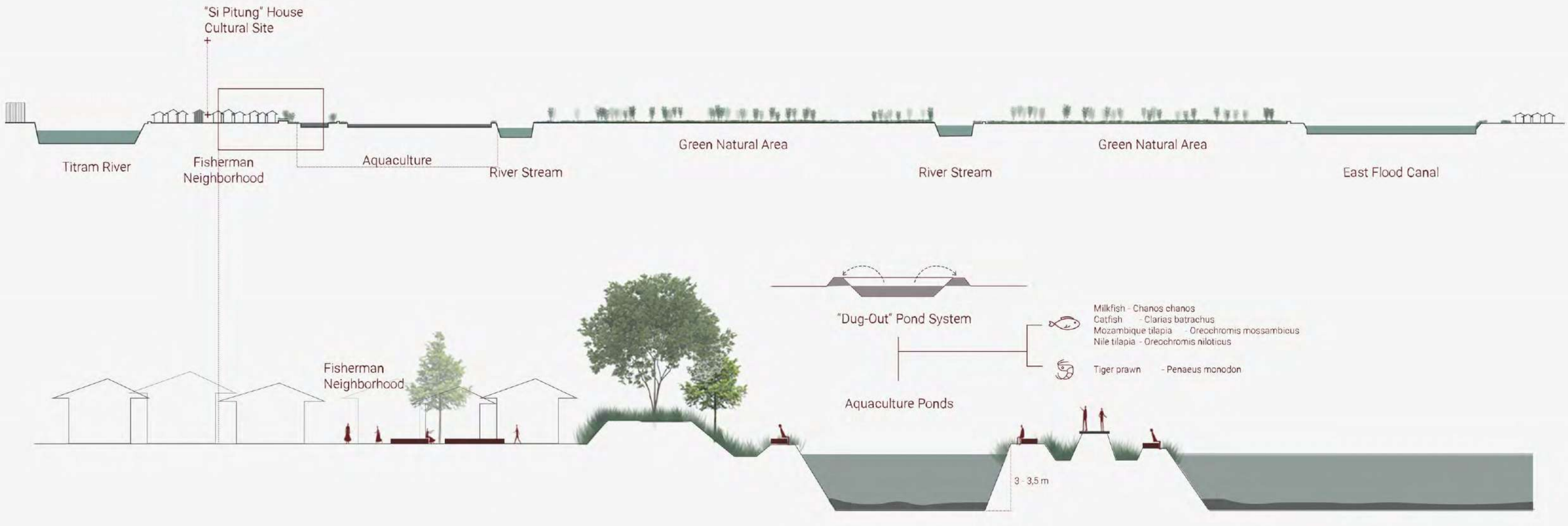
1. EAST FLOOD CANAL - DELTA AREA
2. RIVER TITRAM - NATURAL RIVER
3. ADDITIONAL RIVER BEDS
4. PRESERVED CULTURAL & FISHERMAN'S RESIDENTIAL AREA
5. AQUACULTURE
6. WETLANDS
7. MANGROVE PATCHES
8. URBAN SHORELINE PARK

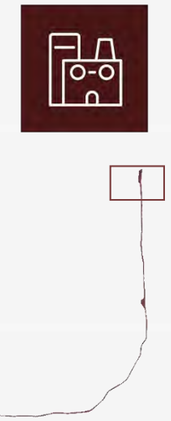
Industrial - Delta Area

MASTERPLAN

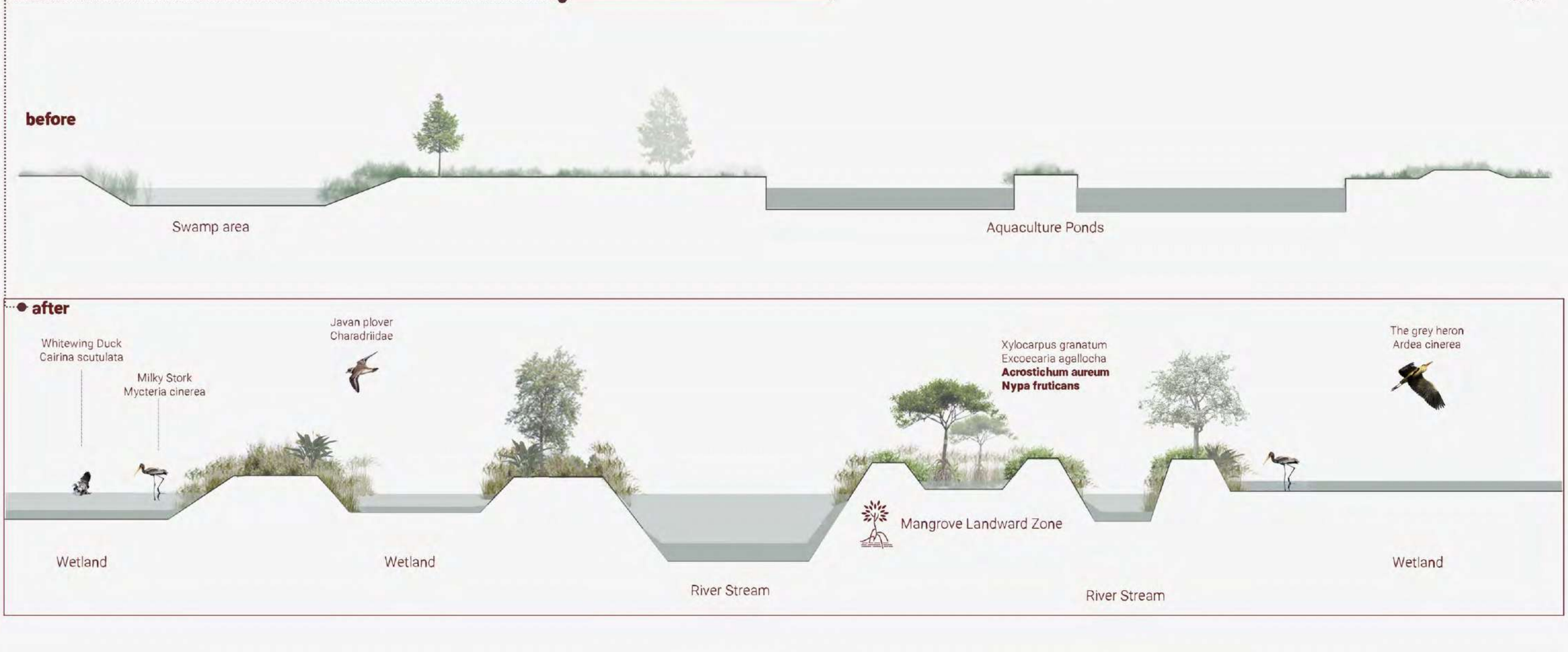
1. EAST FLOOD CANAL - DELTA AREA
2. RIVER TITRAM - NATURAL RIVER
3. ADDITIONAL RIVER BEDS
4. PRESERVED CULTURAL & RESIDENTIAL AREA
5. AQUACULTURE
6. WETLANDS
7. MANGROVE PATCHES
8. WALKWAY PLATFORM
9. URBAN SHORELINE PARK
10. CAR ROAD
11. PEDESTRIAN ACCESS

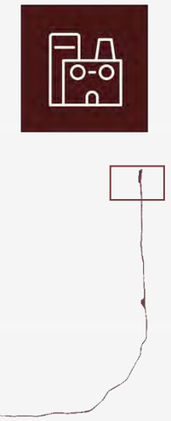


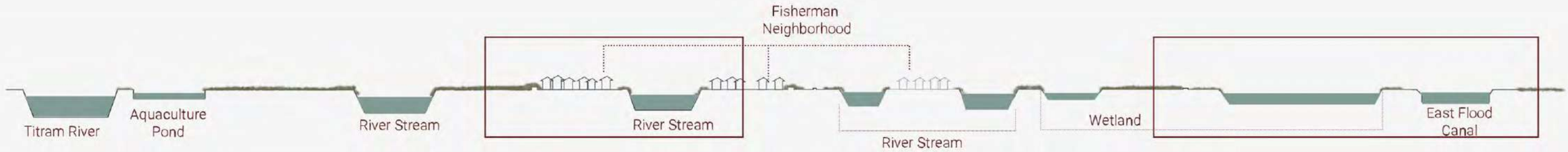

"Si Pitung" House
Cultural Site
Titram River
Fisherman
Neighborhood
Aquaculture
River Stream
Green Natural Area
River Stream
Green Natural Area
East Flood Canal
Fisherman
Neighborhood
"Dug-Out" Pond System
Milkfish - Chanos chanos
Catfish - Clarias batrachus
Mozambique tilapia - Oreochromis mossambicus
Nile tilapia - Oreochromis niloticus
Tiger prawn - Penaeus monodon
Aquaculture Ponds
3 - 3,5 m

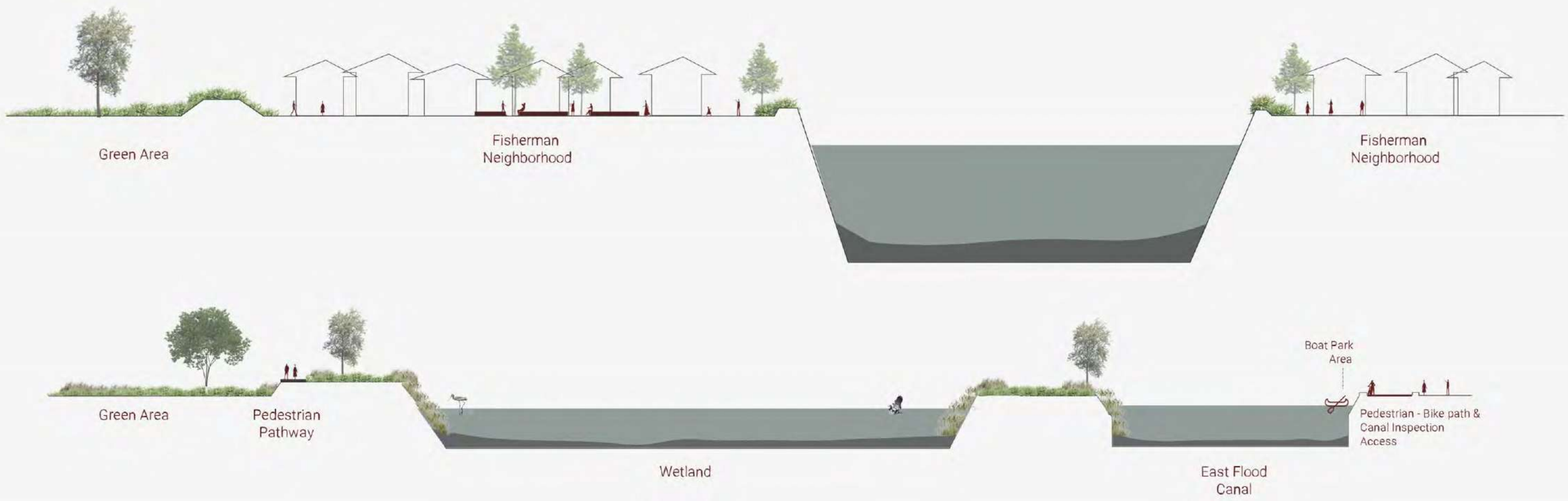


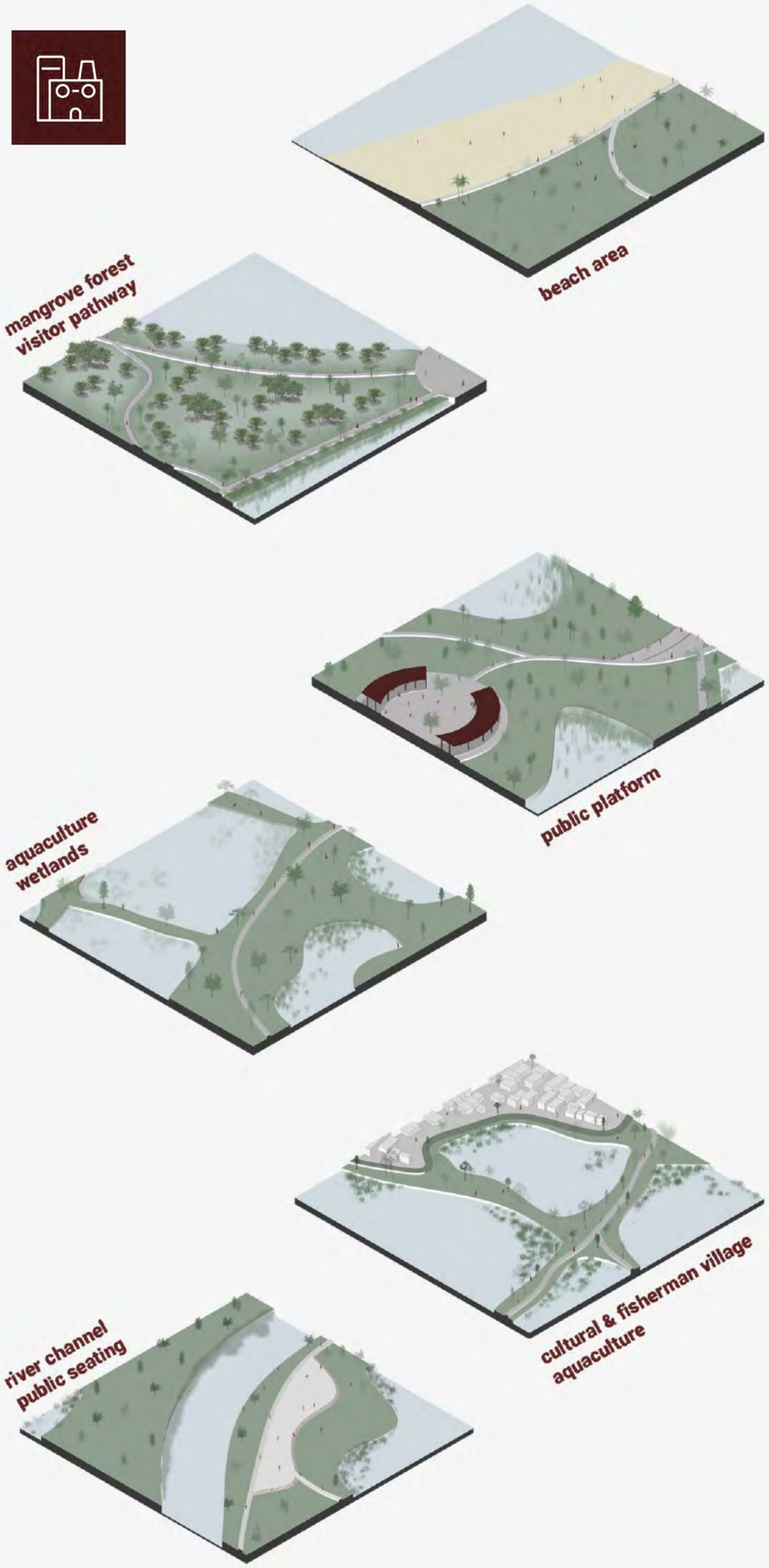

Mangrove
Landward Zone
Titram River
Aquaculture Ponds
Wetlands
River
Stream
River
Stream
Wetlands
Green Natural Area
River
Stream
Wetlands
Green Natural Area
East Flood
Canal


before
Swamp area
Aquaculture Ponds
after
Whitewing Duck
Cairina scutulata
Milky Stork
Mycteria cinerea
Javan plover
Charadriidae
Xylocarpus granatum
Excoecaria agallocha
Acrostichum aureum
Nypa fruticans
The grey heron
Ardea cinerea
Mangrove Landward Zone
Wetland
Wetland
River Stream
River Stream
Wetland

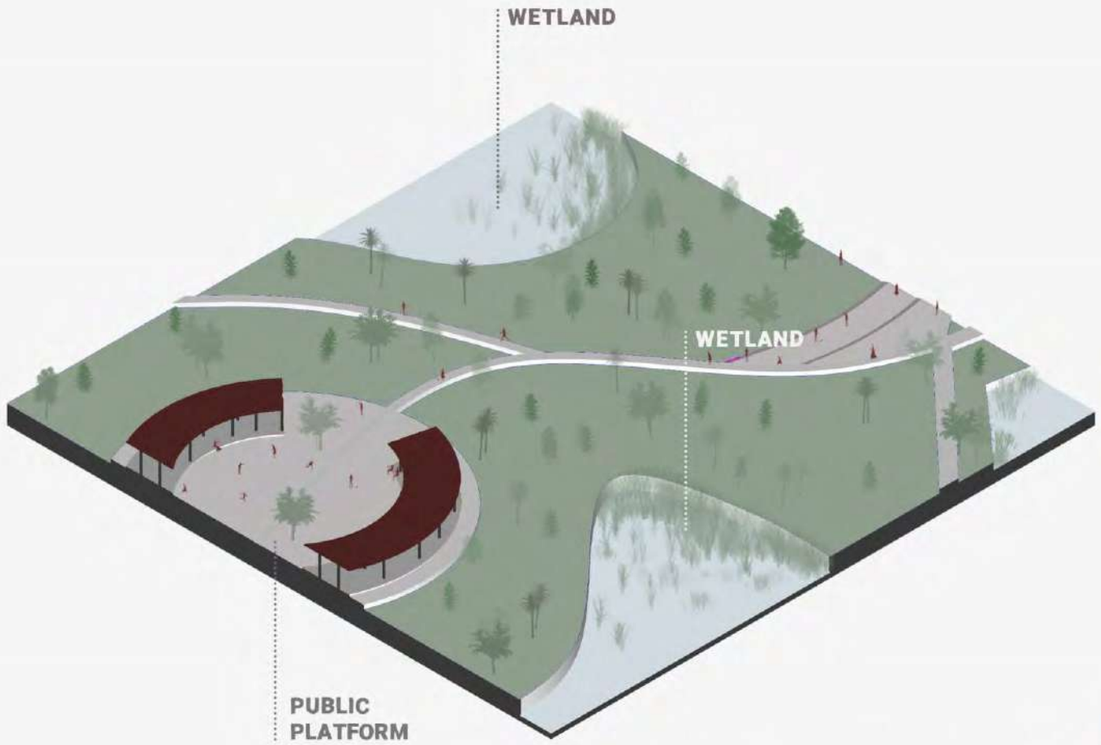


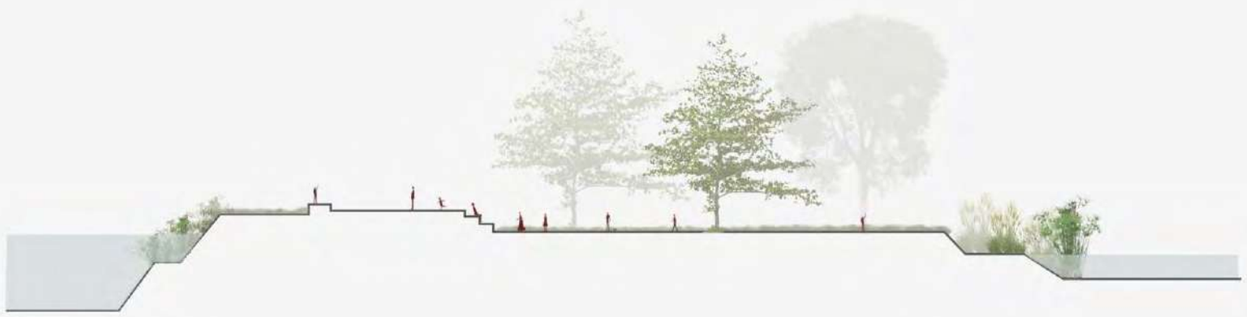

Fisherman
Neighborhood
Titram River
Aquaculture
Pond
River Stream
River Stream
River Stream
Wetland
East Flood
Canal

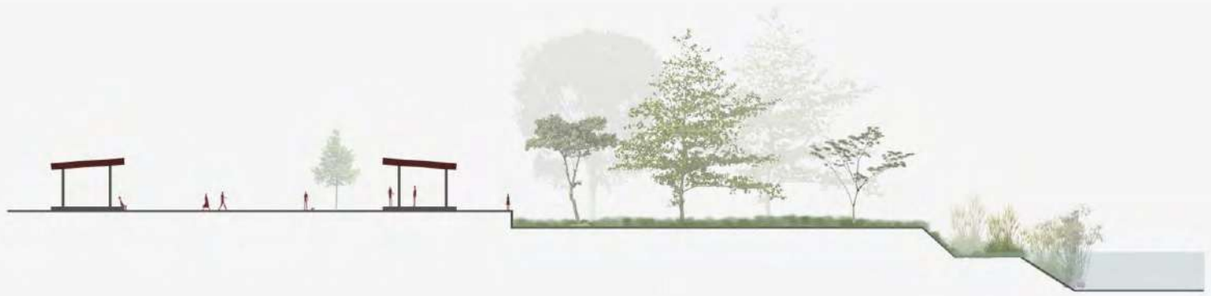

Green Area
Fisherman
Neighborhood
Fisherman
Neighborhood
Green Area
Pedestrian
Pathway
Wetland
Boat Park
Area
Pedestrian - Bike path &
Canal Inspection
Access
East Flood
Canal


beach area
mangrove forest
visitor pathway
public platform
aquaculture
wetlands
cultural & fisherman village
aquaculture
river channel
public seating


RIVER
CHANNEL
PUBLIC
PLATFORM
WETLAND

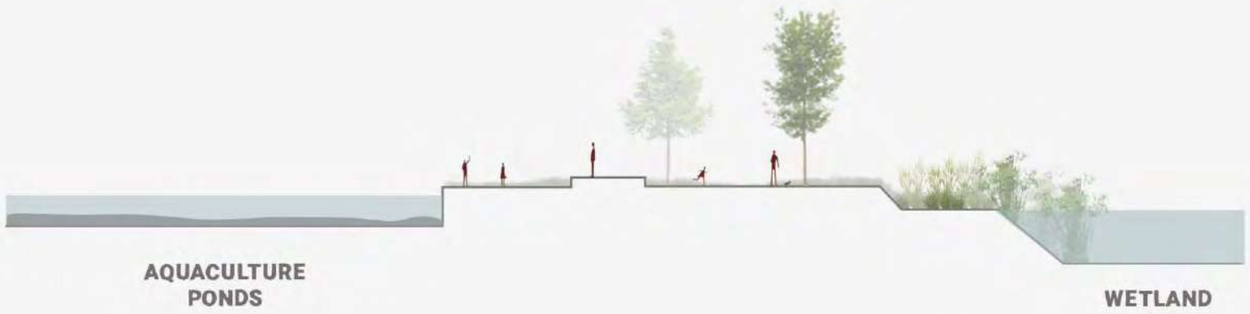

WETLAND
WETLAND
PUBLIC
PLATFORM

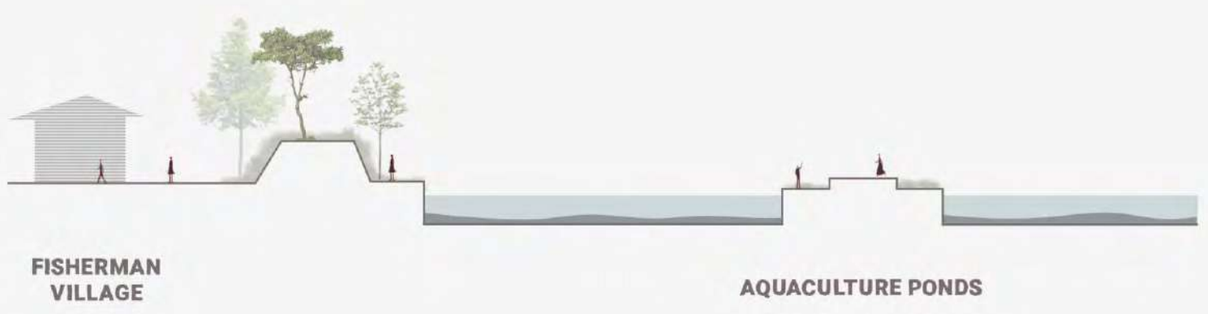





AQUACULTURE
PONDS
WETLAND


FISHERMAN &
CULTURAL
VILLAGE
AQUACULTURE
PONDS


AQUACULTURE
PONDS
WETLAND


FISHERMAN
VILLAGE
AQUACULTURE PONDS

Dinopium javanense

A. cinerea

Mycteria cinerea

Terminalia catappa
15 - 25 m

Melaleuca cajuputi
15 - 30 m

Acacia auriculiformis
15 - 30 m

Cocos nucifera
15 - 25 m

Bungarus fasciatus

Metroxylon sagu
9 - 12 m

Varanus salvator

Ahaetulla

Saccharum spontaneum
2 - 4 m

Mycteria cinerea

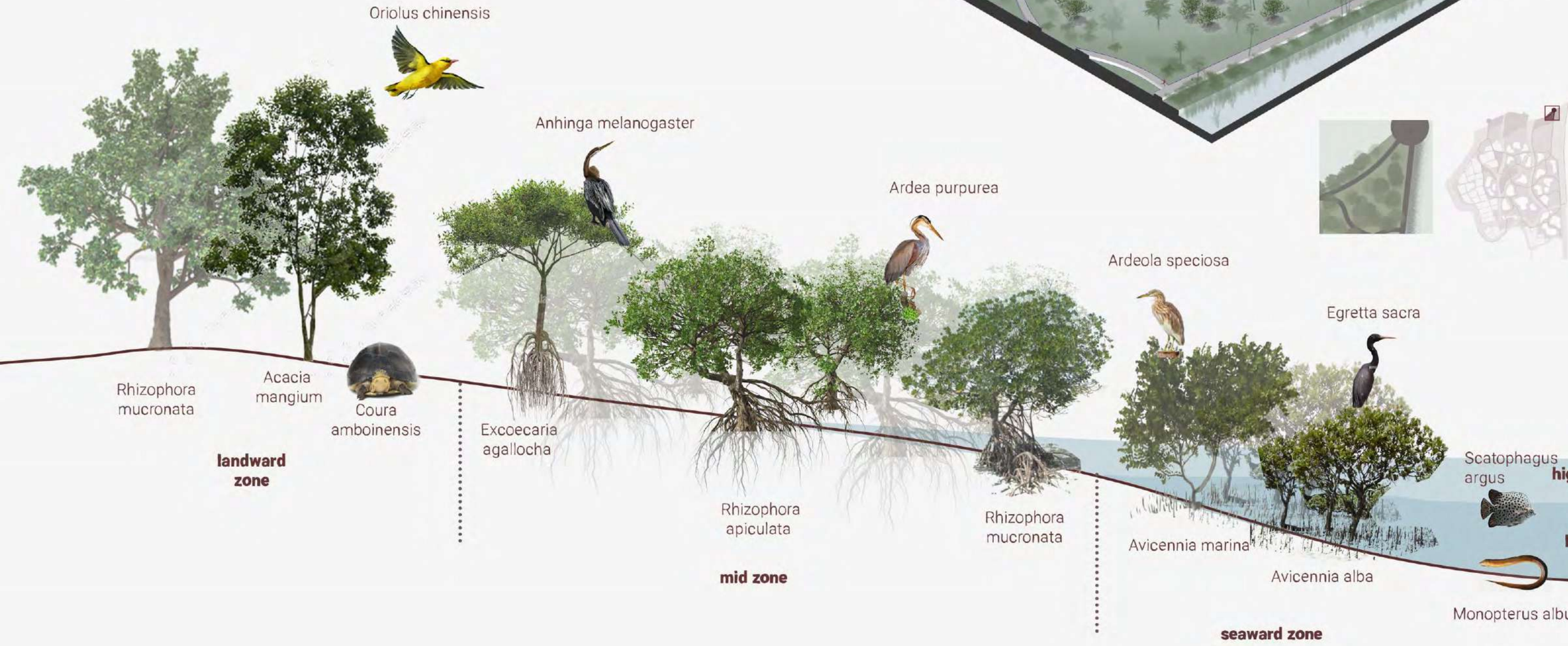
Cyperus
1 - 1,.5 m

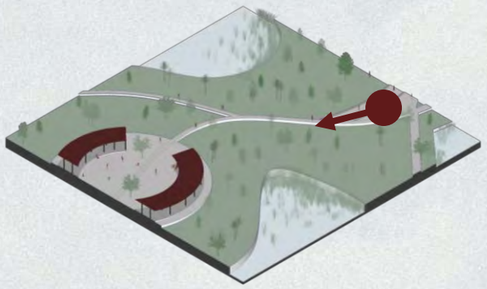
Ophiocephalus striatus

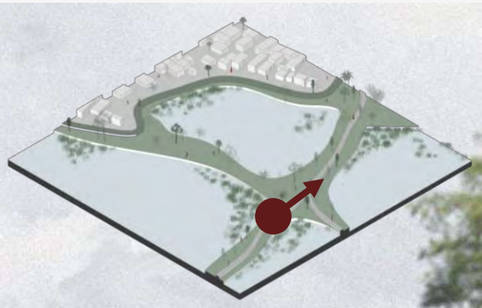
Hypostomus plecostomus

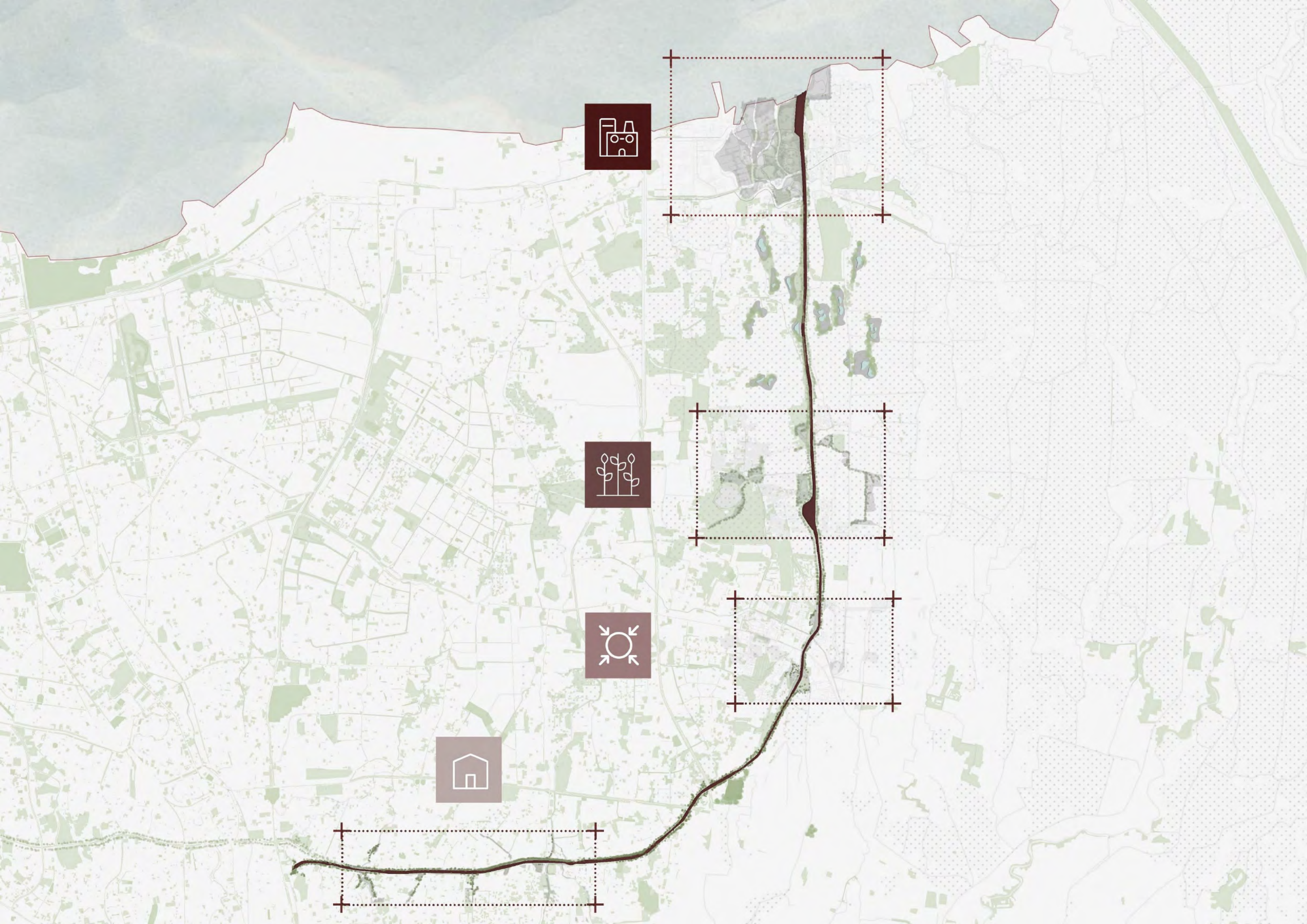

pathway
mangrove forest patch
java sea


WETLAND


Oriolus chinensis
Anhinga melanogaster
Ardea purpurea
Ardeola speciosa
Egretta sacra
Rhizophora mucronata
Acacia mangium
Coura amboinensis
landward zone
Excoecaria agallocha
Rhizophora apiculata
mid zone
Rhizophora mucronata
Avicennia marina
Avicennia alba
seaward zone
Scatophagus argus
hightide
lowtide
Monopterus albus

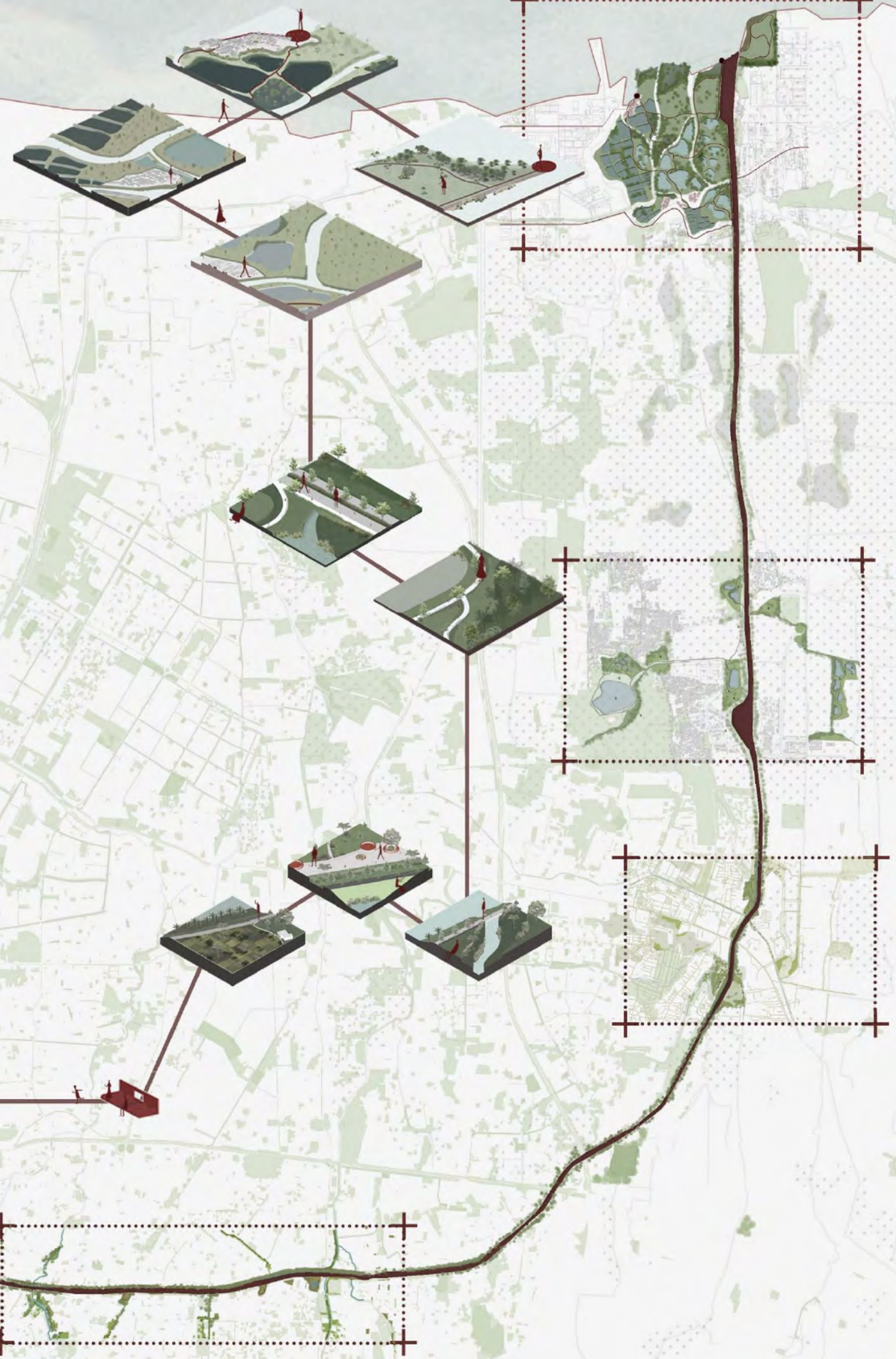






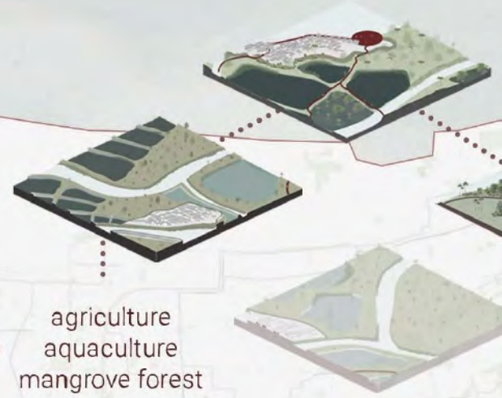
EAST FLOOD CANAL

THE JOURNEY

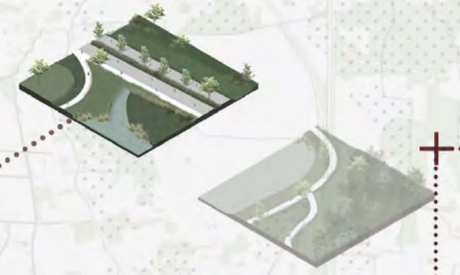


EAST FLOOD CANAL

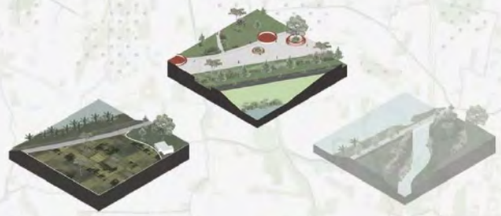
ECONOMICAL CYCLE SCENARIO



agriculture
aquaculture
mangrove forest



agriculture
aquaculture



agriculture

tourism

commercial
activity