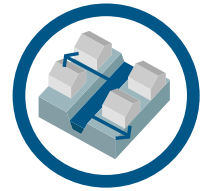


# CASCADING SEMARANG RECHANNELING THE CITY



## PROGRAM DESCRIPTION

'Rechanneling the City' aims at the improvement of inner city urban water management, creating additional capacity for the storage and regulation of waterflow. This system promotes the local handling of stormwater instead of discharging water as fast as possible. The upgrade of the water infrastructure will improve the sanitary conditions and enhance existing public spaces as well as creating new ones, which will stimulate an urban repair process and provide ground for new commercial and residential development in the city center.





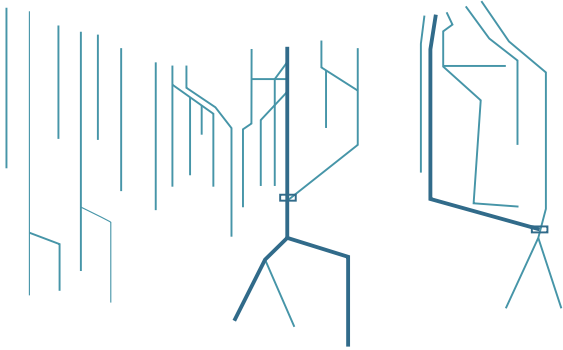
# WHAT?

## CONCEPT OVERVIEW

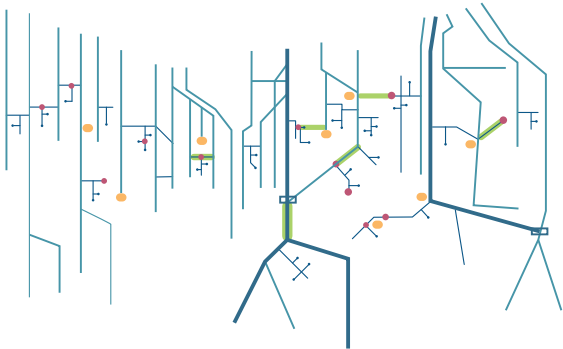
### THE STRATEGY

This program focuses on the existing urban fabric of Semarang where opportunities lie in (re)connecting the existing streams and canals to the more fine-grain water network. By carefully choosing the locations for these improved water networks within the overall water system, the highest flood risk mitigation will be achieved. Local context will dictate scale and opportunities. As the approach focuses on existing urban fabric and established communities, the participation of the local communities will be key.

This program improves urban water network by integrated measures aiming at water storage, - conveyance and - cleansing. It stores stormwater locally and slowly discharges it after the storm, which reduces pluvial and fluvial flood risk. At the same time this program creates synergetic community hubs for additional beneficial programs like solid waste management, harvesting materials and energy, social public facilities. The infrastructural projects also give an opportunity to improve and create new public space.



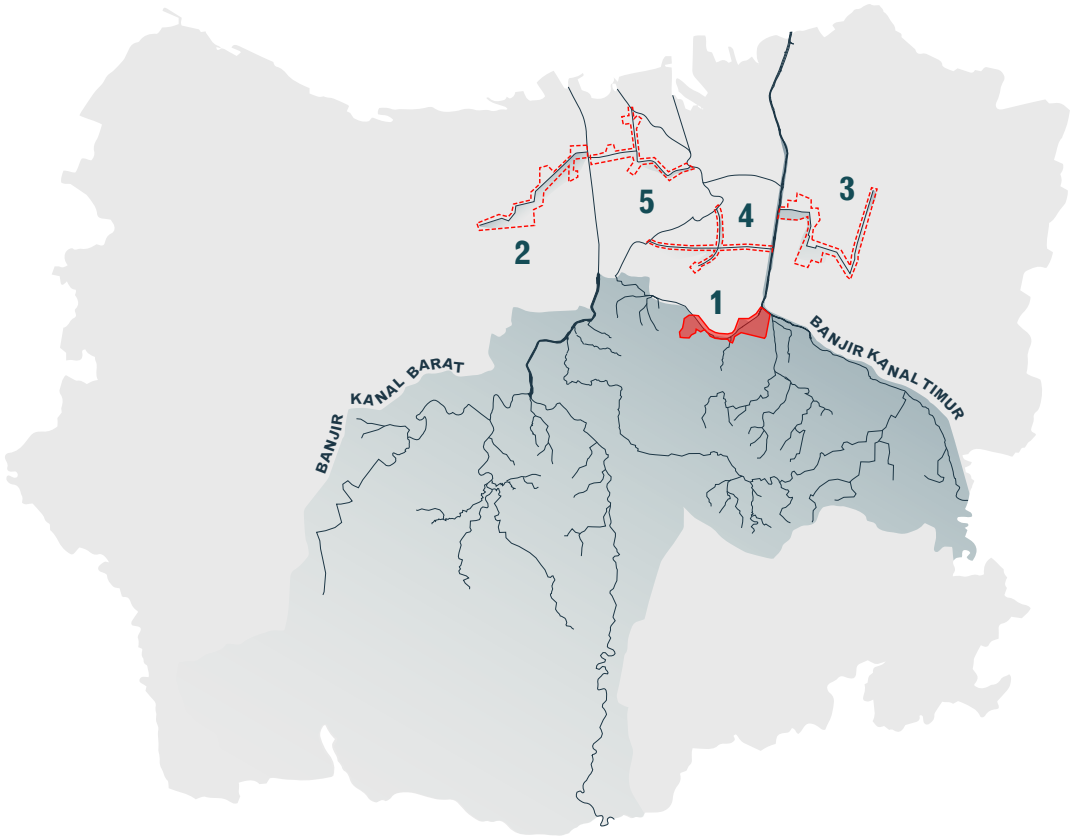
Current Drainage Masterplan



Recanalization of the downhill area

# WHERE?

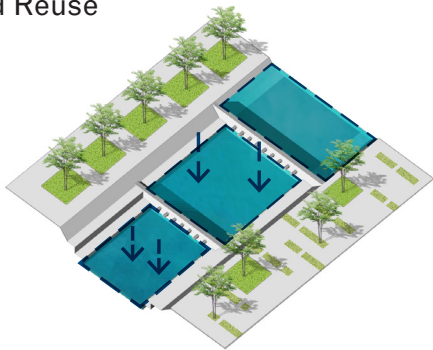
## PROJECT EXTENSION



### CONCEPT STRATEGY

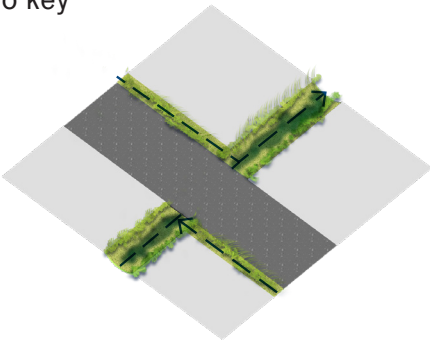
#### STORE

Capture and Reuse



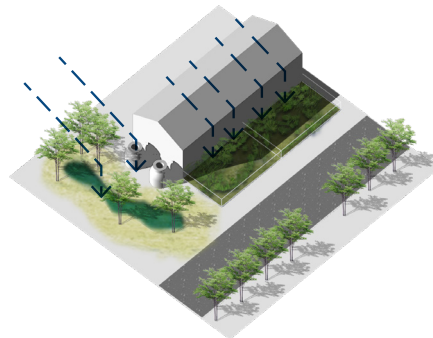
#### CONVEY

Diverge to key



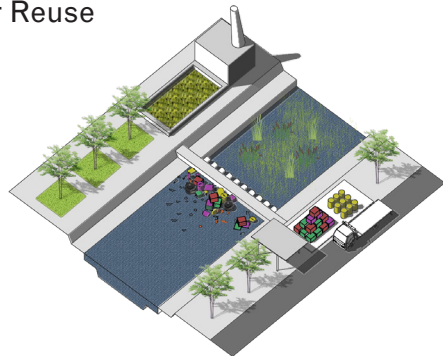
#### DELAY

Infiltrate and Retain



#### CLEANSE

Clean for Reuse



### RECHANNELING THE CITY

#### TOTAL SURFACE

#### PETERONGAN SRIWIJAYA

Project Site 1

152 ha

20 ha

#### KARANGAYU BANJIR KANAL

Project Site 2

18 ha

#### BANJIR KANAL BARAT KANAL

Project Site 3

19 ha

#### KANAL SEMARANG DEVIATION

Project Site 4

3.4 ha

#### KARANGAYU BANJIR KANAL

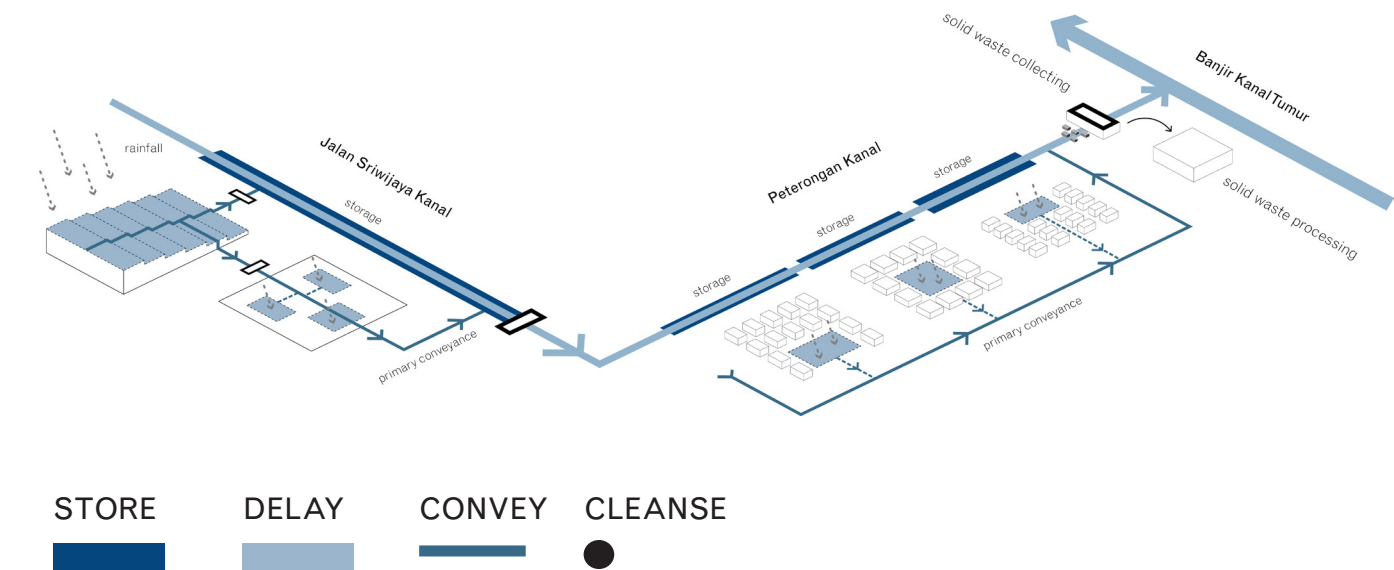
Project Site 5

7.2 ha



# HOW? SYSTEMIC APPROACH

SYSTEM DIAGRAM



# HOW? SUSTAINABLE DEVELOPMENT

- 01

TERRACED JUNGLE
- 02

WETLAND PARK
- 03

WATER SQUARES
- 04

CANAL FRONT
- 05

STEPPING STONE
- 06

KAMPUNG SQUARE

**HEALTHY LIVING**

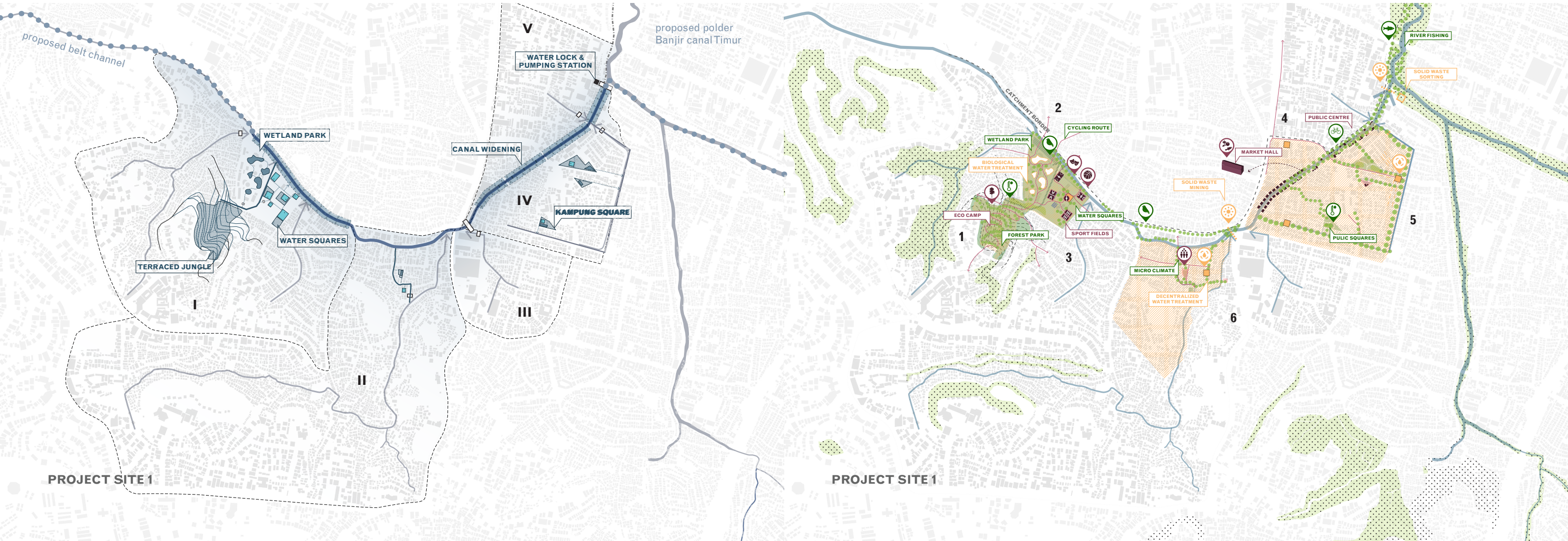
By implementing a decentralised wastewater treatment and organic filters into the water system, the quality of water available is improved, which leads to further positive effects for the local population. Firstly, an increase in the levels of biodiversity is achieved. In turn, this leads to an improvement in the quality of the environment due to increased diversity of species. Lastly, there is a reduction in water-related health risks as larger swathes of the population gains access to treated water.

**SOCIAL CULTURAL**

The proposed interventions work to improve social inclusiveness by providing public spaces that cater to a diversity of people. The resettlement of informalities also improves spaces that are underutilised, instead creating new spaces for the community that have a strong urban identity. In the process new jobs are created which will boost the local economy.

**MATERIAL & WASTE FLOW**

Improving the solid waste management system in the pilot project areas will have the additional benefit of reducing sanitation-related health issues. Collected waste can then be used to create a sustainable material cycle, providing employment. Lastly, the environment quality of the area will improve greatly due to the appropriate treatment of solid waste that no longer ends up in waterways.

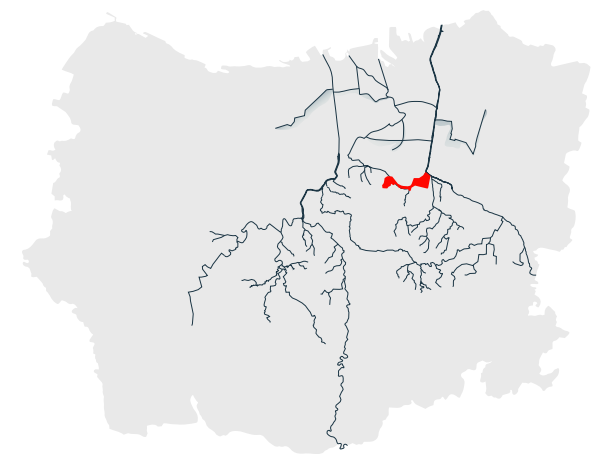




# SITES PROJECT LOCATIONS

## LOCATION 1

The pilot project of the proposed 'belt canal' serves as a connector, simultaneously increasing the storage capacity of the urban fabric and expanding the canals to avoid an overspill of water between Wondaria and Peterongan.



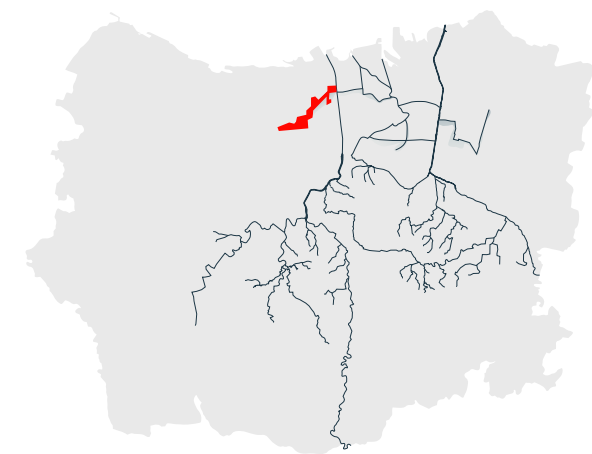
1

**PETERONGAN SRIWIJAYA**  
20 ha

<b>WATER RETENTION (INCREASE)</b>	17,000 m3
<b>PUBLIC SPACE GAINED</b>	13 ha
<b>PERMEABLE SURFACE (% OF PUBLIC SPACE)</b>	8.45 ha (65%)
<b>URBAN WATERFRONT</b>	1.2 km
<b>NATURAL WATERFRONT</b>	1 km

## LOCATION 2

Connector canal with large public spaces attached to its edges, activating a corridor along the urban waterfront that leads to a long natural waterfront, creating a public space destination.



2

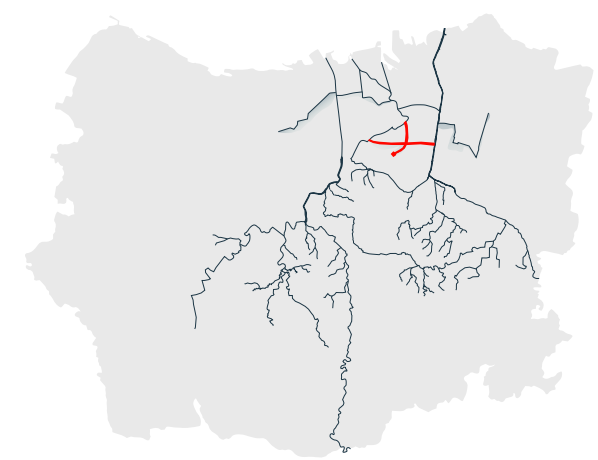
**KARANGAYU BANJIR**  
KANAL BARAT CONNECTOR  
40 ha

<b>WATER RETENTION (INCREASE)</b>	27%
<b>PUBLIC SPACE GAINED</b>	22.5 ha
<b>PERMEABLE SURFACE (% OF PUBLIC SPACE)</b>	18 ha (80%)
<b>URBAN WATERFRONT</b>	1.6 km
<b>NATURAL WATERFRONT</b>	1.8 km



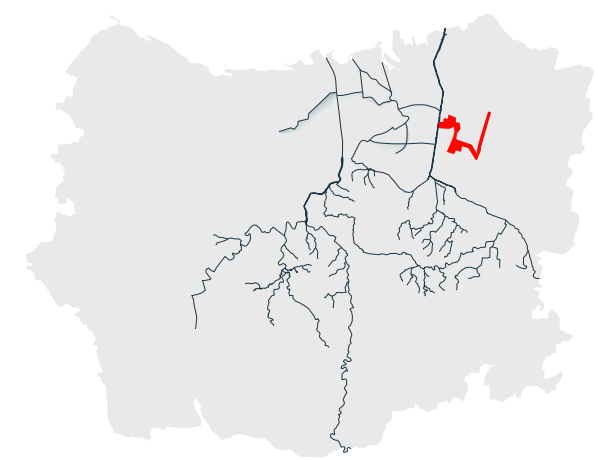


**LOCATION 3**  
Connector canal with a large natural waterfront, serving as an important connection to the water for the urban population due to the large amount of public space created.



<div>3</div> <div>BANJIR KANAL BARAT</div> <div>KANAL SEMARANG CONNECTOR</div> <div>27.7 ha</div>	
WATER RETENTION (INCREASE)	21%
PUBLIC SPACE GAINED	22.3 ha
PERMEABLE SURFACE (% OF PUBLIC SPACE)	19 ha (85%)
URBAN WATERFRONT	1.2 km
NATURAL WATERFRONT	3.5 km

**LOCATION 4**  
This canal serves to deviate water between existing waterways, while also incorporating a central public space for the community in a dense urban setting.



<div>4</div> <div>KANAL SEMARANG DEVIATION</div> <div>20 ha</div>	
WATER RETENTION (INCREASE)	21%
PUBLIC SPACE GAINED	5.7 ha
PERMEABLE SURFACE (% OF PUBLIC SPACE)	3.4 ha (60%)
URBAN WATERFRONT	3.6 km
NATURAL WATERFRONT	1 km





# WHY?

## COST BENEFIT ANALYSIS

### LOCATION & SCALE

The pilot project researched, Peterongan market that connects Banjir Kanal Timur (BKT) to Banjir Kanal Barat (BKB) along Jl. Sriwijaya, is part of that belt canal that will result in increased storage capacity. Other proposed test sites are located within the polder system contributing as connectors between the large rivers, BKT and BKB, and secondary canals.

Main benefits in terms of water management directly relate to the added value generated by the project. The new water infrastructure empowers public space, local economy and living quality because it directly generates a rediscovered urban quality.

### WATER CANAL - BUSINESS AS USUAL

10.80 Million USD /  
151.3 Billion IDR

152 ha - Limited Retention capacity

### RECHANNELING THE CITY

25.2 Million USD /  
353.5 Billion IDR

Capacity increased up to **27%**

**72ha** Public Space Gained

**56ha** of Permeable Surface

**8,8 Km** of Urban Waterfront

**10 Km** of Natural Waterfront



### PRIMARY SERVICES

### BENEFITS

### CO-BENEFITS

### WATER INFRASTRUCTURE

### COSTS



### FLASH FLOOD RISK REDUCTION

Up to **21% runoff reduction** in whole SMR area (by increasing the retention area of the urban fabric by 1%)

1. Reduce heat island effect through water bodies
2. Increase biodiversity
3. Increase infiltration due to less land subsidence

1. Canals
2. Sub-conveyance system
3. Water squares
4. Ponds
5. New market building



### IMPROVE WATER QUALITY

Up to treatment of **1600 households' waste water** by implementing decentralised wastewater treatment

1. Increase biodiversity
2. Improve quality of environment
3. Less water-related health risk

1. Genap UV Water Box
2. Decentralised Waste Water Treatment System (DEWAT)



### IMPROVE SOLID WASTE MANAGEMENT

**No solid waste** in the canal of the pilot project area by implementing a new waste management system on neighborhood scale

1. Reduced sanitation issues improving health of residents
2. Improve sustainable material cycle
3. Improve environmental quality

1. Waste Traps



### PROVIDE BETTER PUBLIC SPACE

Increase **72 ha** of quality public space  
Increase **8.8 km** accessible waterfront

1. Improve social inclusiveness
2. Resettlement of informalities
3. Create strong community and urban identity
4. New jobs and economy created

1. Urban Park

### Pilot project area:

**1.27 Million USD /  
17.8 Billion IDR**

based the cost of water infrastructure

**1.80 Million USD /  
25.2 Billion IDR**

based the cost of leverage investment

### Rechanneling the city program:

**10.80 Million USD /  
151.3 Billion IDR**

based the cost of water infrastructure

**14.42 Million USD /  
202.2 Billion IDR**

based the cost of leverage investment

*\* This is a pre-feasibility study. Cost estimates are based on empirical values*



# WHO? WHEN?

## TOWARDS IMPLEMENTATION

### ENABLING ENVIRONMENT

Necessary conditions to enable the sustainable financing of this infrastructure operation are:

1. the implementation of a monitoring system to collect the necessary information to build the development, water security and climate rational of this large infrastructure investment,
2. historic performance baseline gathered through the monitoring system may allow the engagement of the private sector in the management and operation of this infrastructure.

### FINANCE STRATEGY

The suggested implementation and financing strategy for this concept is the following:

1. **Funding** - public investments unless energy generation is possible which creates a significant flow of revenues.
2. **Derisking strategy** - if private participation is wanted, then probably guarantees to cover country risks or their important risks should be offered by MDB's
3. **Private sector participation** - even in the case of public investments it could be wise to use performance based contracts for the Operation and Management/Maintenance of reservoirs and channels, to ensure sustained operation and service delivery
4. **Financing** - in case of the project being funded by public budgets, then finance could be raised through the issuing of municipal (green) bonds; in case private finance is possible then the model would be project finance (PPP).
5. **Technical assistant grants** for project preparation could help to raise the quality and bankability of the project and could be requested to financiers such as AIIB and GCF.

### KEY ACTORS AND NECESSARY STEPS

#### 1. Kota Semarang and Agency of Public Works

\_Draft a canal revitalization program that maps out potential canals that have critical position in the water network

#### COMMUNITY GROUPS

##### 2. Leaders of Kelurahan

\_Take ownership of revitalizing canals within the own administrative boundaries.

#### RELEVANT STAKEHOLDERS

##### 3. Local Market - in Peterongan Canal Regeneration

\_These relevant partners need to be involved in the decision making process during the planning phase. Consequently they need to be activated as key actors for the plan implementation. Thus it is crucial to facilitate their needs and benefits.

### IMPLEMENTATION TIMELINE

