

Towards a Flood-Resilient Civil Society

Explore Flood Risk Adaptive Design and Governance
Strategies in Roermond

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Transitional Territories Studio | P5 Presentation | 2022.06.23
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Origin

Problem

Methodology

Context

Planning

Design

Conclusion

Origin

Problem

Methodology

Context

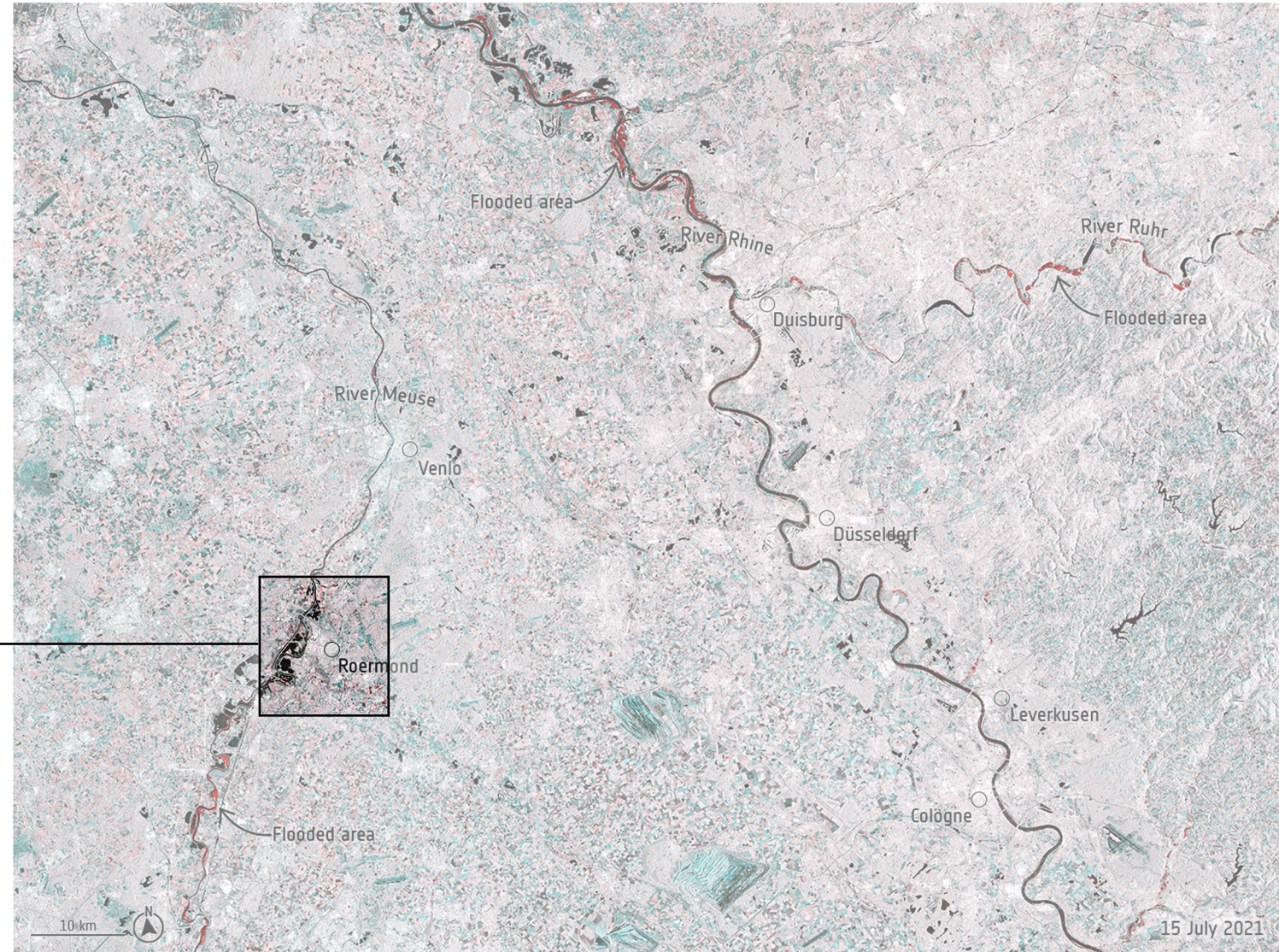
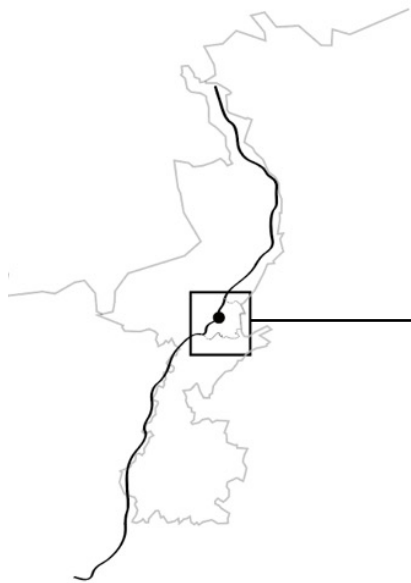
Planning

Design

Conclusion



Roermond,
Limburg Province, NL



Origin
Location

Map by European Space Agency(ESA), 2021



Origin
Location

Image from Google Earth, 2022



Origin
Location



Photo by Netherland News Live, 2021



Photo by 1Limburg, 2021

Origin
Location

Fluvial flooding

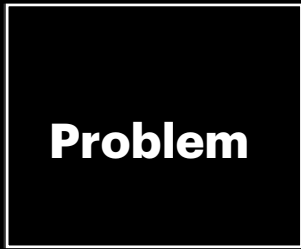


Pluvial flooding



Origin
Location

Origin



Methodology

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What if heavy rains had happened in the NL?



Problem

Identification

News screenshots, 2021

**“We are diehards,
we will stay.”**



Problem

Identification

Photo by Mac van Dinther, 2021

**Disaster tourists rush
to take selfies.**



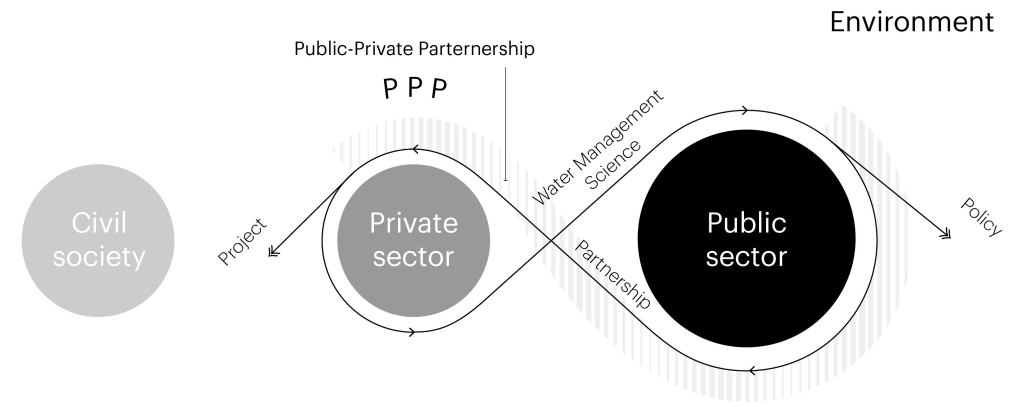
Problem

Identification

Photo from Waterboard Limburg, 2021

Lack of

- Crisis Awareness
- Academic Collaboration

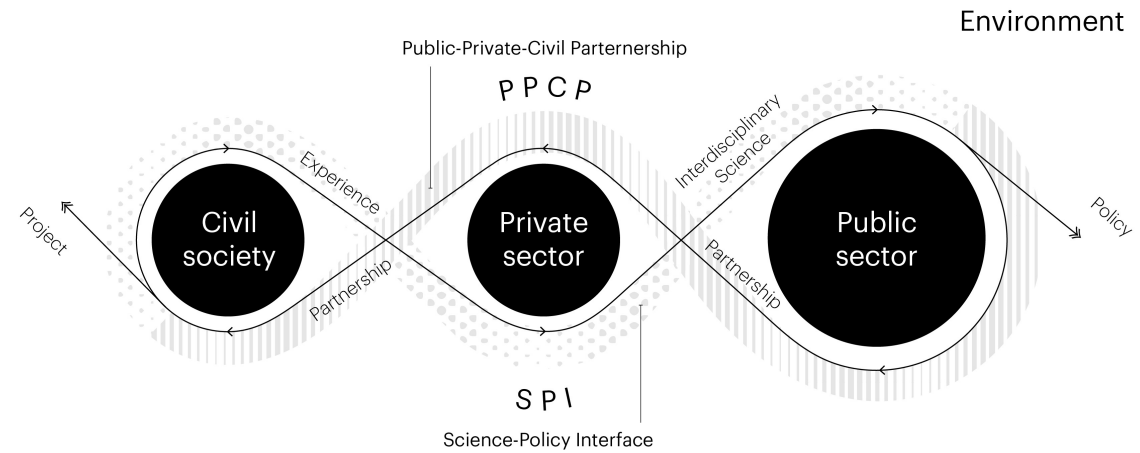


Problem

Statement

Engage

- Civil society and entrepreneurs
- Spatial planning



Problem

Goals

Origin

Problem

Methodology

Context

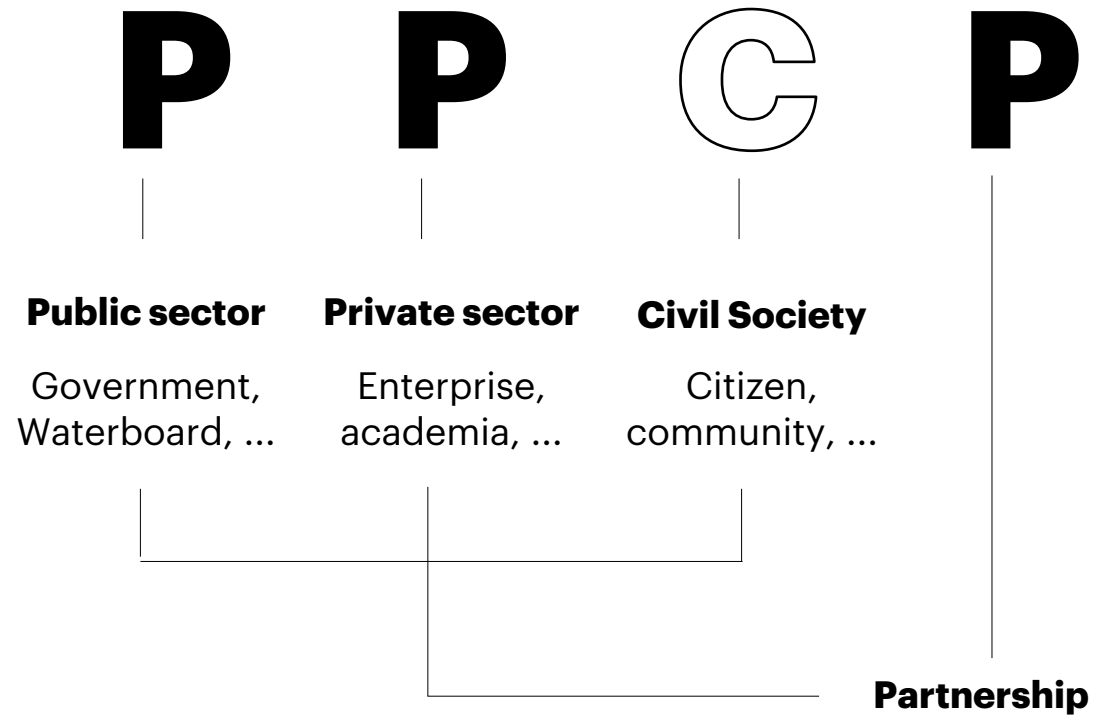
Planning

Design

Conclusion

Research Question

“What role can **Public-Private-Civil Partnership (PPCP)** play in facilitating the mechanisms of a **Science-Policy Interface (SPI)** that aims at **flood resilience?**”



S

Science

Hydraulic science,
environmental
science

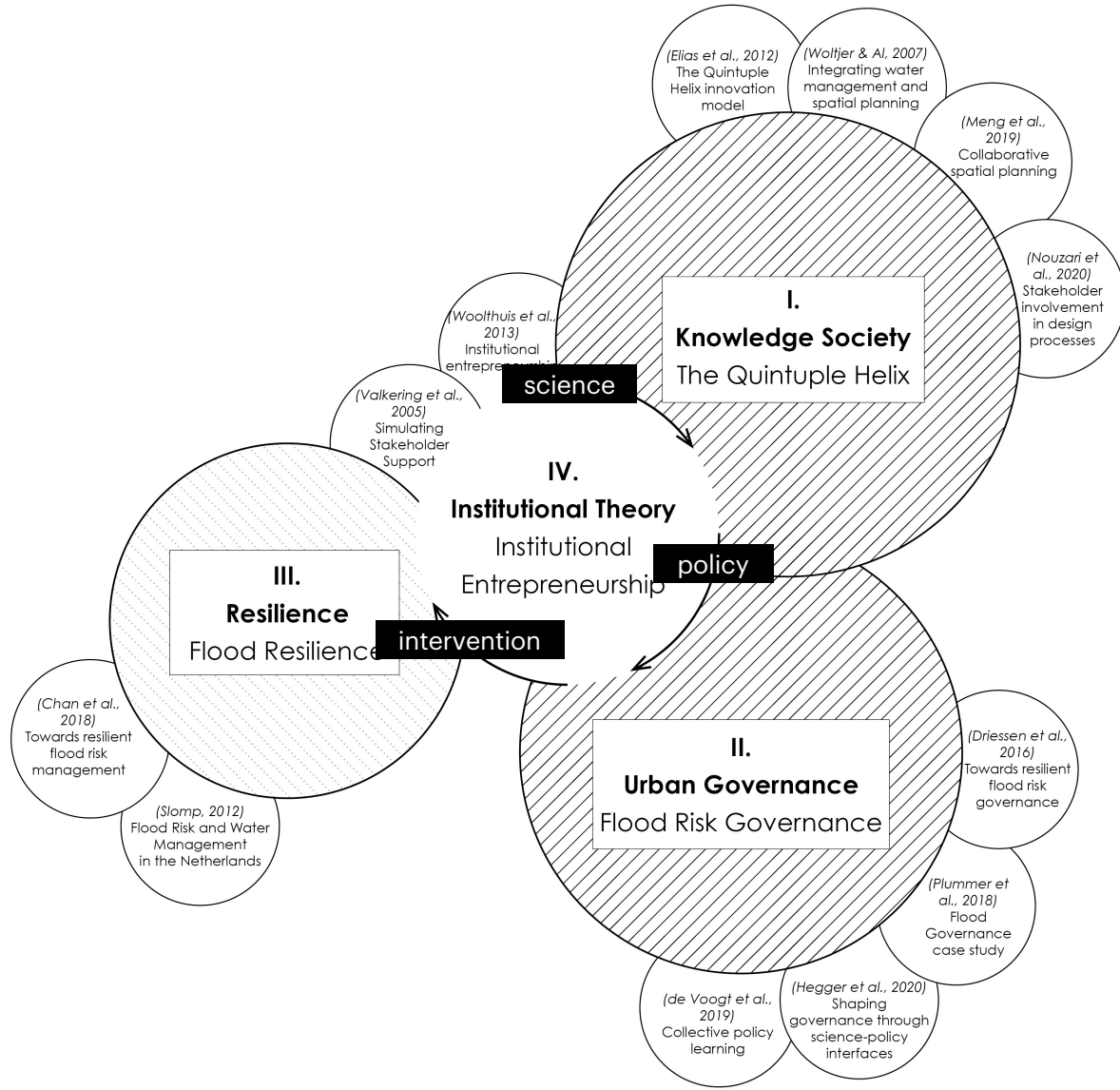
P

Policy

Water management, Flood
risk management, Spatial
planning

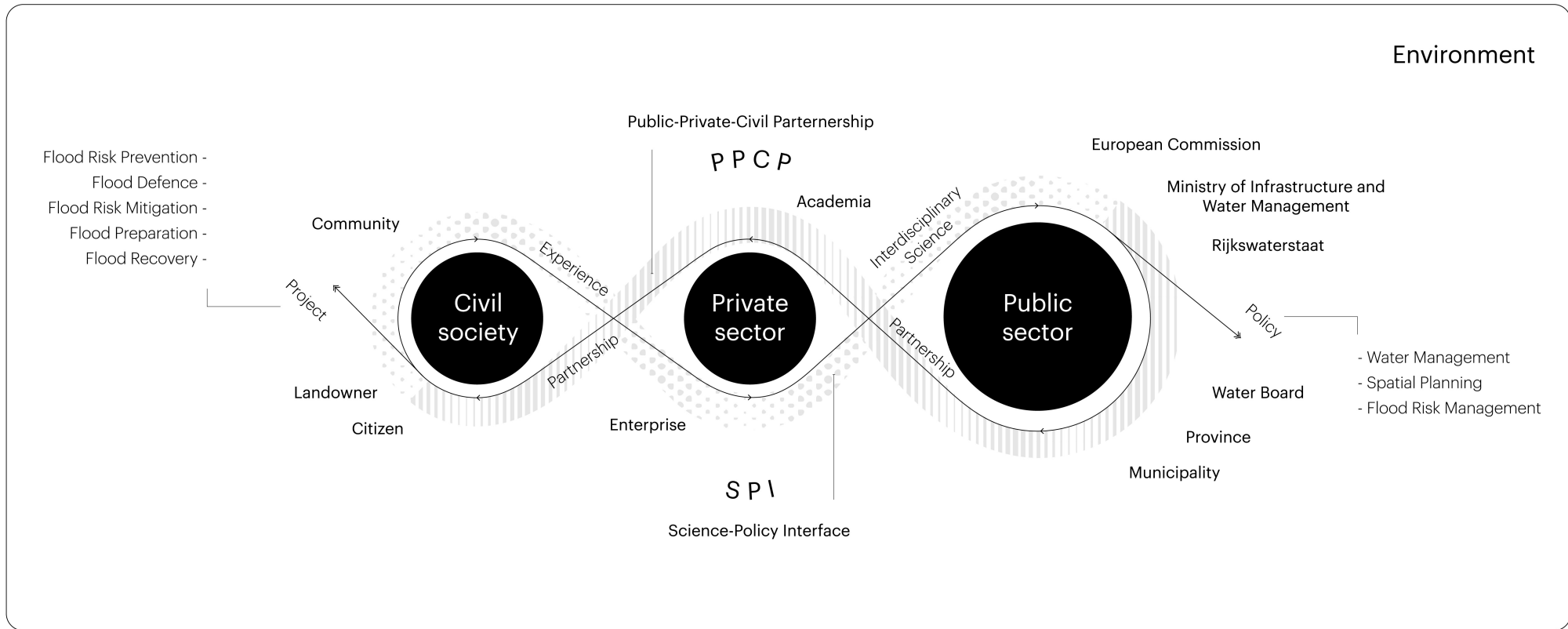
I

Interface



Methodology

Theory



Methodology

Conceptual framework

Origin

Problem

Methodology

Context

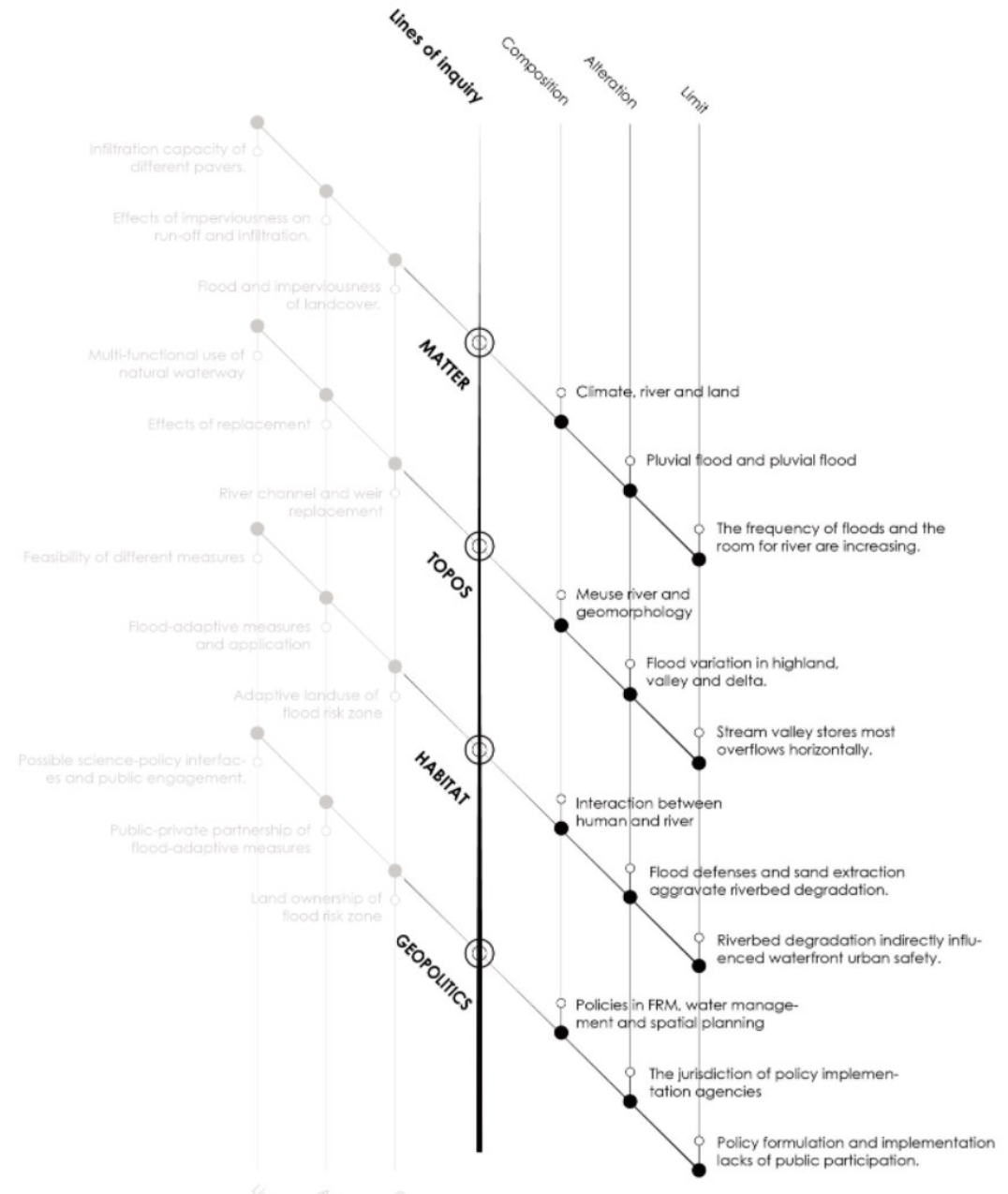
Planning

Design

Conclusion

4 inquiry lines:

- Matter – Topos – Habitat - Geopolitics

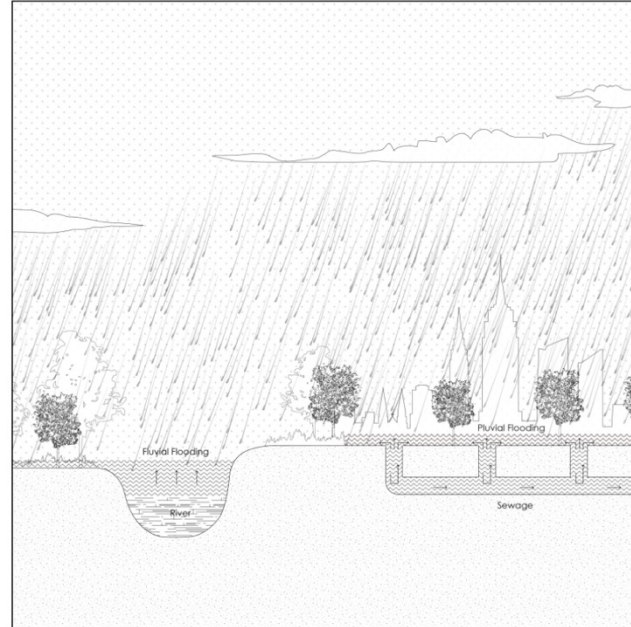


Matter

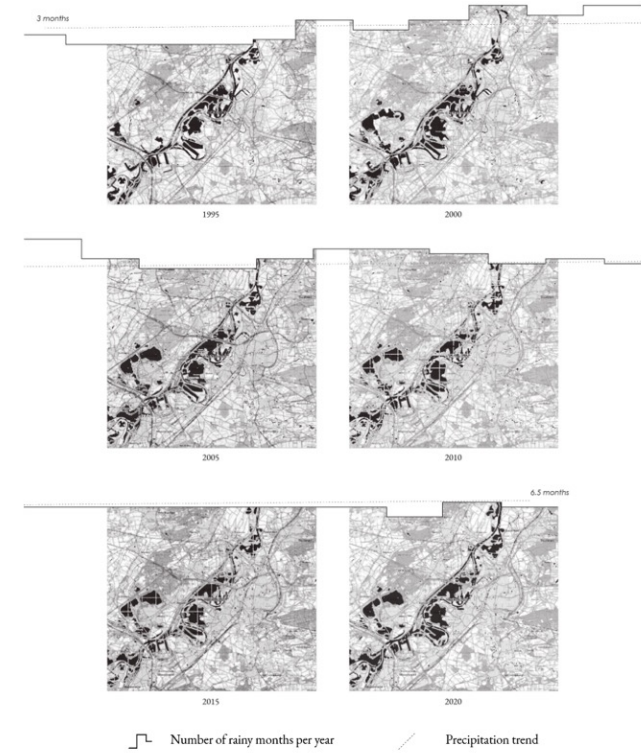


Meuse river Water body Wet area Flood area Roermond

Composition



Alteration

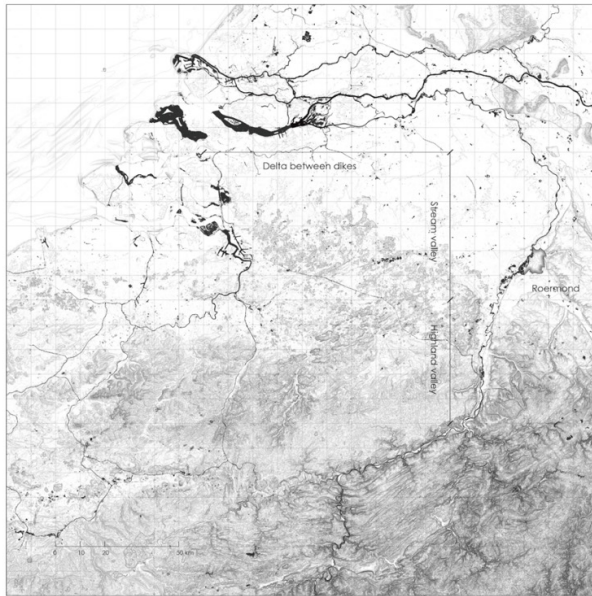


Limit

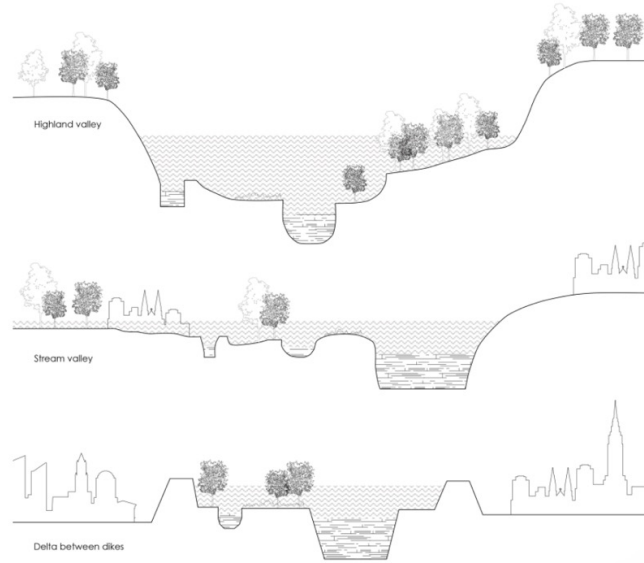
Context

Monograph Series: Accumulation

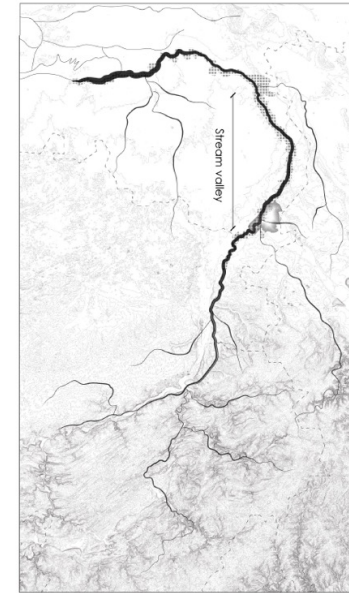
Topos



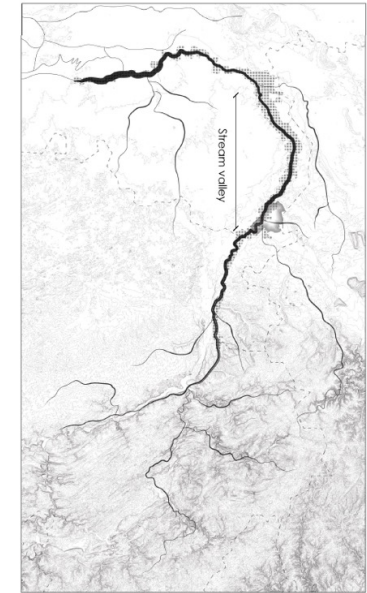
Composition



Alteration



Overflowing Meuse at a discharge of 3950 m³/s



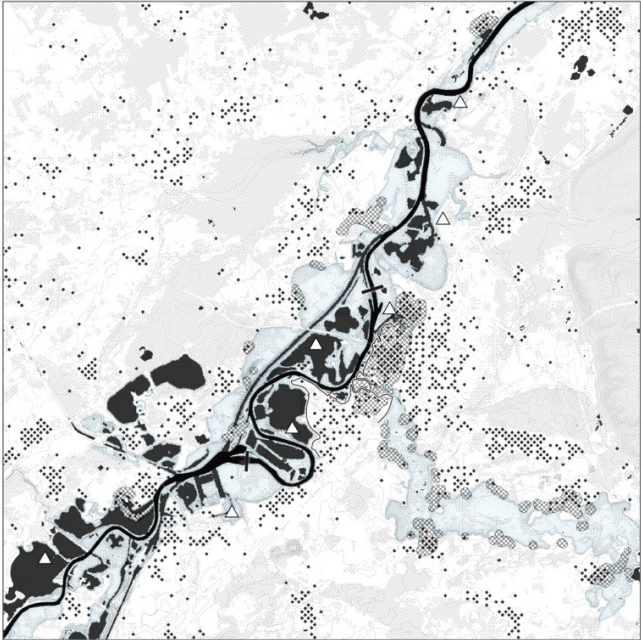
Overflowing Meuse at a discharge of 4600 m³/s

Limit

Context

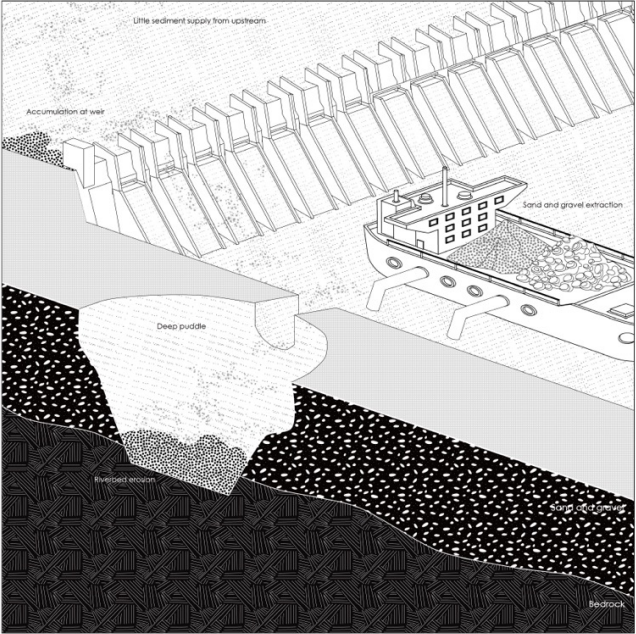
Monograph Series: Accumulation

Habitat

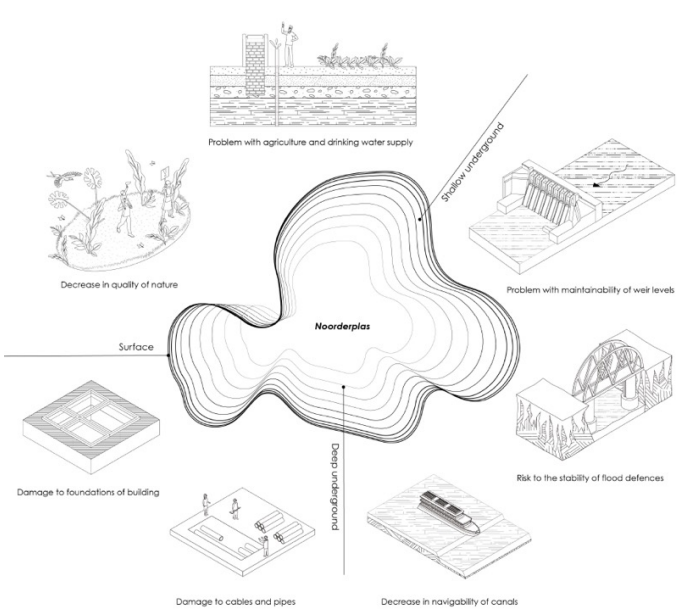


Meuse river Urban area Forest Grass

Composition



Alteration

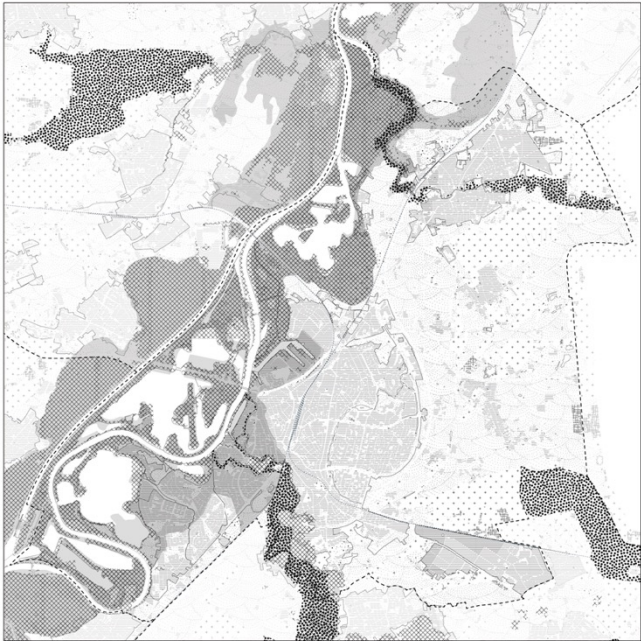


Limit

Context

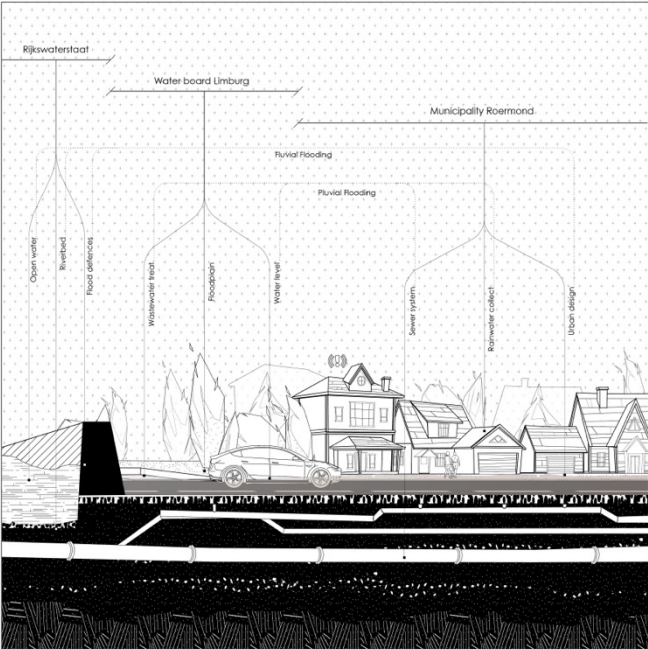
Monograph Series: Accumulation

Geopolitics

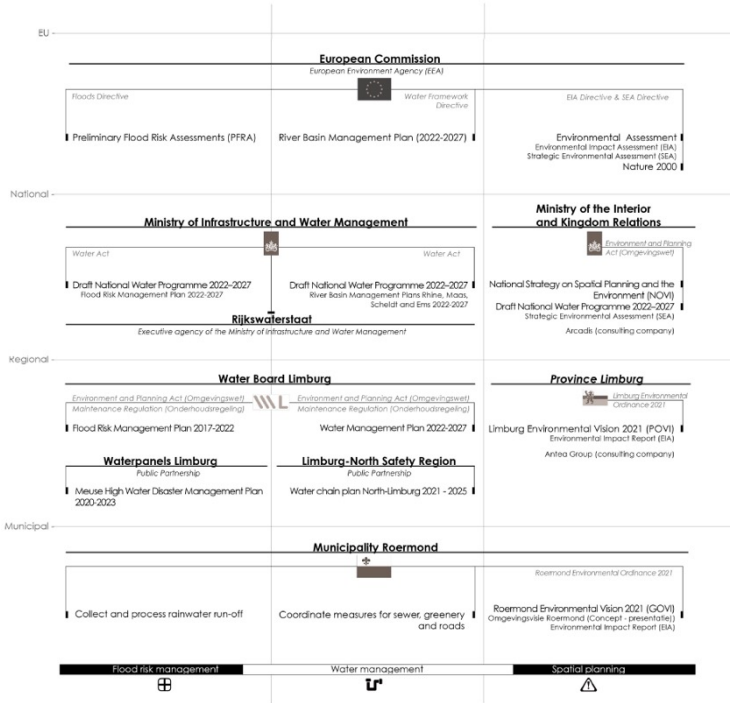


- Administrative boundary
- Flood 2021
- Water body
- Nature 2000
- Flood risk zone

Composition



Alteration

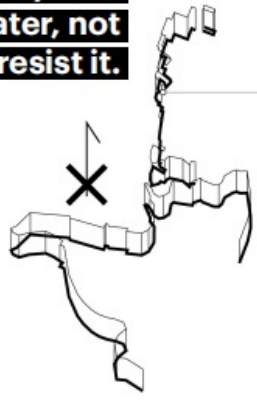


Limit

Context

Monograph Series: Accumulation

In the interests of national security, the priority is to store water, not resist it.



Topos



Matter



There is a battle for space between historic towns and flood plains.

Habitat



The effect of flood is not only on the surface, but also on the foundations and basements of waterfront built-ups.

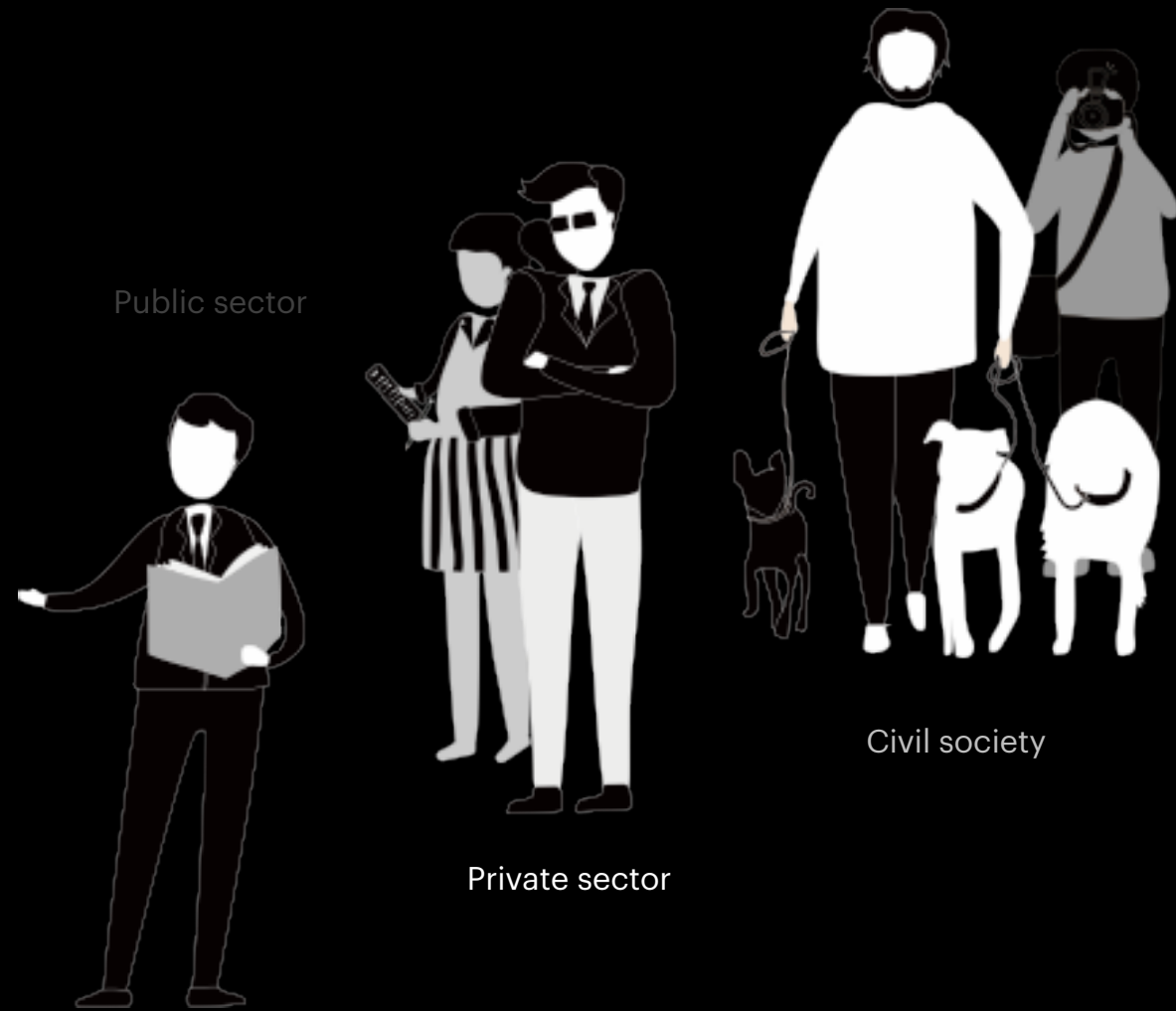
Geopolitics

The impact of climate change and tributaries on Meuse flooding has been underestimated in flood prediction.



Classifications

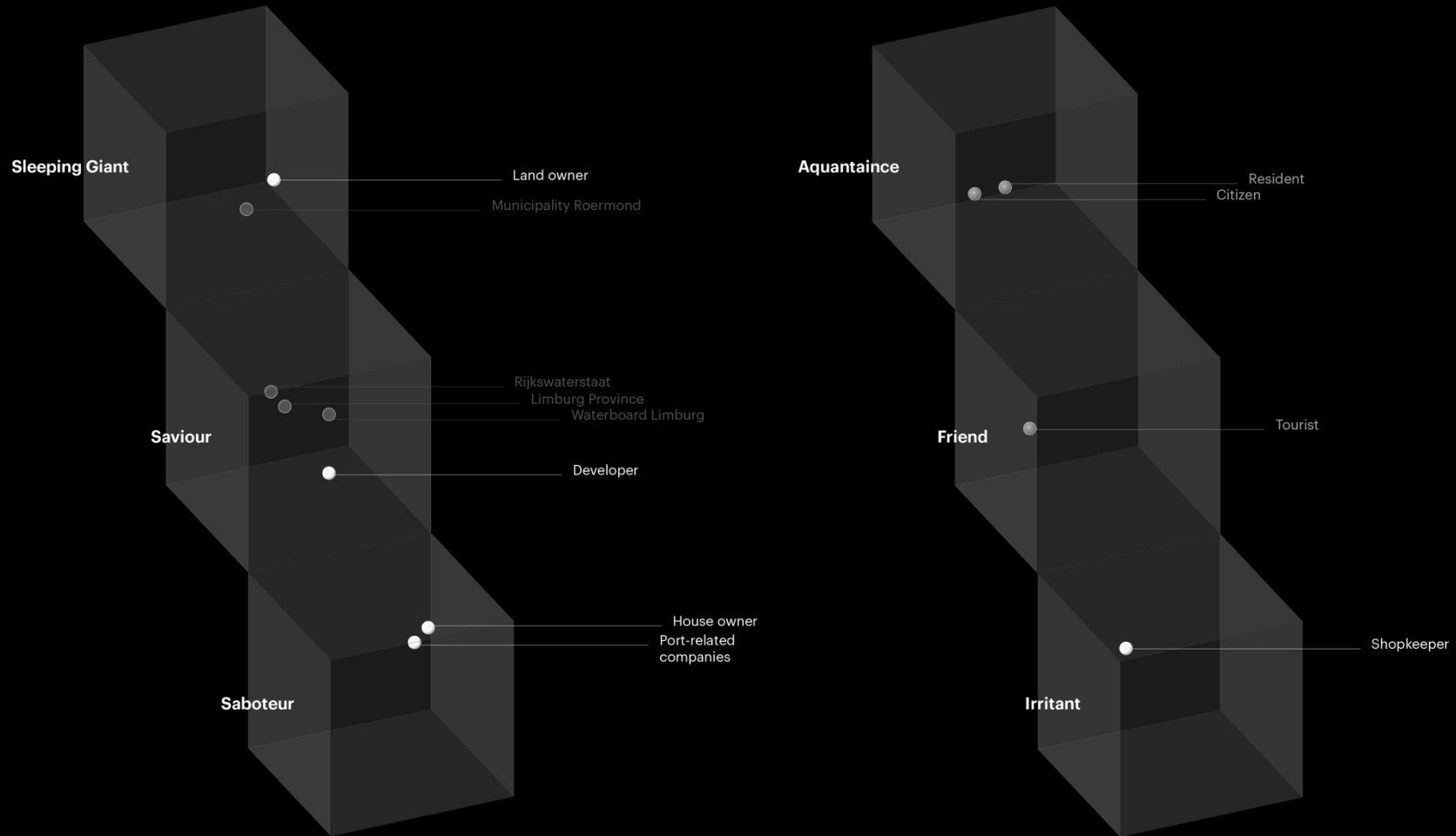
- Public - Private - Civil
- Power - Interest - Attitude



Context

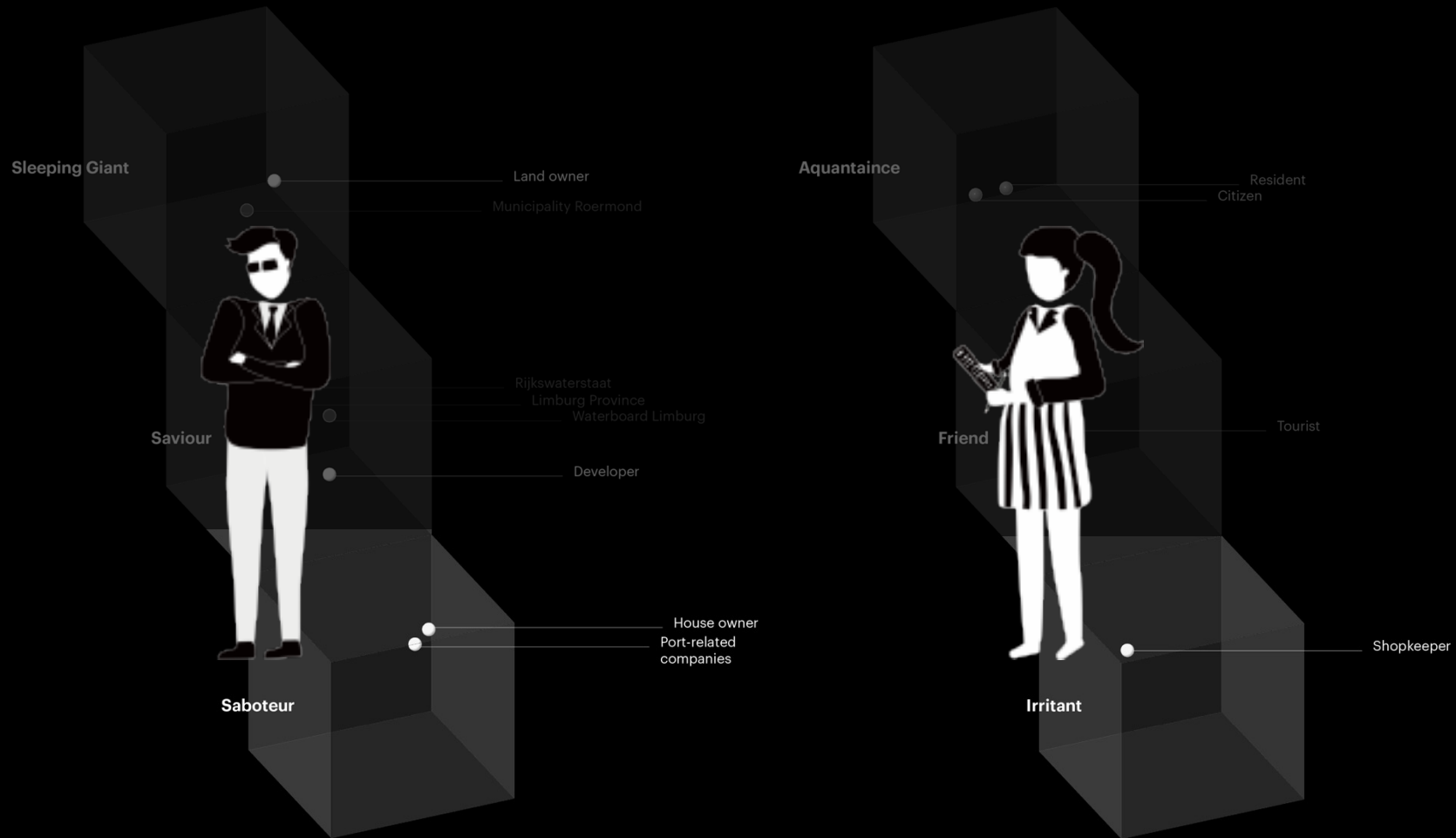
Stakeholders

Public sector
Private sector
Civil society



Context

Stakeholders



Context

Stakeholders

Spatial planning policies



Water management policies



Context

Flood-related Policy

Screenshot of document covers, 2022

Origin

Problem


Methodology

Context

Planning

Design

Conclusion

Existed policies 

New policies 

Maasplassen

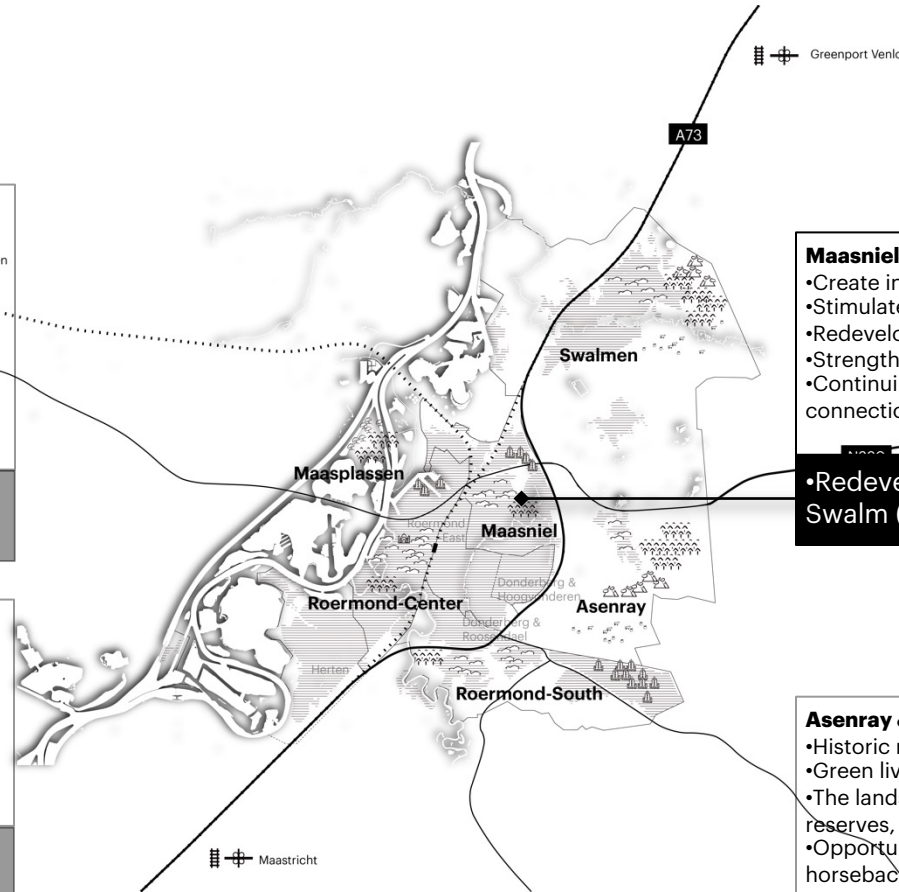
- Protect natural values of meandering, natural course of the Maas with natural banks, in particular the Asseltse Plassen and the Linde Loop.
- Conservation of underwater biodiversity, and biodiversity of swam and rudders.
- Make physical and visual connections with city center and residential areas.
- Attractive water recreation areas, such as the marina, beach clubs and city beaches around De Weerd.

•River widening can be a (partial) alternative for dyke reinforcement (National Water Program 2022-2027).

Roermond-South

- Create international and domestic business activity and jobs.
- Stimulate the development of small economies in residential areas.
- Redevelopment opportunities for old industrial buildings.
- Protect the Nature Reserve Zone along the Roer.
- The landscape is rich with open agricultural areas, forests, nature reserves, stream valleys of the Roer and Swam.

•Take physical measures along the Roer, might include the creation of water storage areas, stream widening and locally also flood defence facilities around built-up areas. Implementing these measures requires the input of water board, municipalities, public, farmers, businesses, site managers and often takes several years. (Limburg Water Management Program 2022-2027).



Maasniel

- Create international and domestic business activity and jobs.
- Stimulate the development of small economies in residential areas.
- Redevelopment opportunities for old industrial buildings.
- Strengthen green structure along the Maasnielderbeek.
- Continuing the atmosphere of the compact city and strengthening the connection with the inner city, the water and the countryside.

•Redevelop Maasnielderbeek to connect River Roer and Swalm (Limburg Water Management Program 2022-2027).

Asenray & Swalmen

- Historic ribbon pattern, located on high ground along the Maas River
- Green living in the villages.
- The landscape is rich with open agricultural areas, forests, nature reserves, stream valleys of the Roer and Swam.
- Opportunities for recreation, including routes for fetching, walking and horseback riding.

•Maasnielderbeek-bovenloop stream restoration (Limburg Water Management Program 2022-2027).

Planning

New policies: Opportunity

Maasplassen

- The identity of the various Maasplassen could be made more visible and recognizable.
- Access to the Maasplassen is only possible via the N280 road, which is designed for car and bicycle traffic only and not for pedestrians.
- Along the Maasplassen there is no contiguous route for walking and cycling and fetch.
- The city lies with its back and at a distance from the water.

- Enlarging the storage and drainage capacity of flooding waters(National Water Program 2022-2027).
- Flooding impact to swimming water locations (National Water Program 2022-2027).

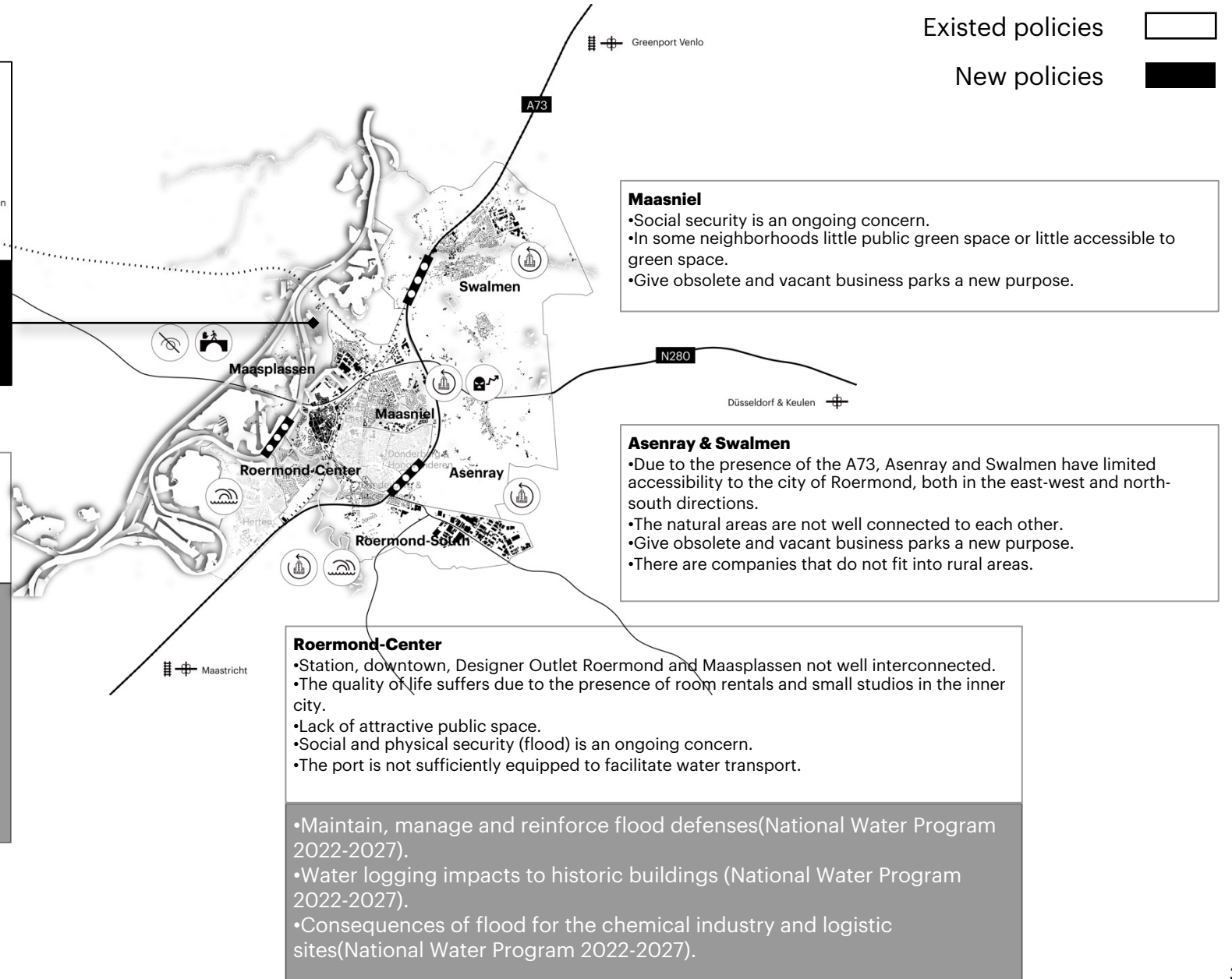
Roermond-South

- Social and physical security (flood) is and ongoing concern.
- The natural areas are not well connected to each other.
- There are companies that do not fit into rural areas.
- Give obsolete and vacant business parks a new purpose.

- Flooding impact to Nature 2000 zones(National Water Program 2022-2027).
- In the area outside the dykes, municipalities are responsible for assessing the safety situation and informing the users to take measures themselves (National Water Program 2022-2027).
- Where new paved surface is laid, compensation is required by creating extra space for water storage and infiltration near the intervention. (National Water Program 2022-2027).

Planning

New policies: Threat



Policy

1. Develop innovative alternatives before dyke reinforcement.
2. Enhance cooperation between citizens, the Municipality, and Waterboard.
3. Redevelop Maasnielderbeek.
4. Restore stream.
5. Avoid the sense of obstruction while raising the dike.
6. Enlarge the storage and drainage capacity of rainwater and floodwater.
7. Protect the natural values of floodplains and nature reserves.
8. Strengthen the green structure along Maasnielderbeek.
9. Consider flooding impact on nature.
10. Develop routes between forest, farmland, and stream valleys.
11. Create jobs for domestic and international workers.
12. Stimulate the development of small economies in residential areas and the city center.
13. Redevelop the old industrial building.
14. Promote the diverse Massplassen.
15. Give vacant industrial buildings a new purpose.
16. Consider flooding impact on monuments and logistic sites.
17. Enhance physical and visual connections between inner-city and water.
18. Diversify the function of water recreation areas.
19. Strengthen the connectivity between urban and suburban.
20. Tap into the recreational value of suburban.
21. Consider the accessibility of the Meuse for pedestrians.
22. Create more attractive public spaces.

Theme

Water

Health and safety

Vitality

Culture, sports and heritage

Mobility

Housing and living environment

Landscape

Soil and subsoil

Agriculture and horticulture

Nature

Economy

Work locations

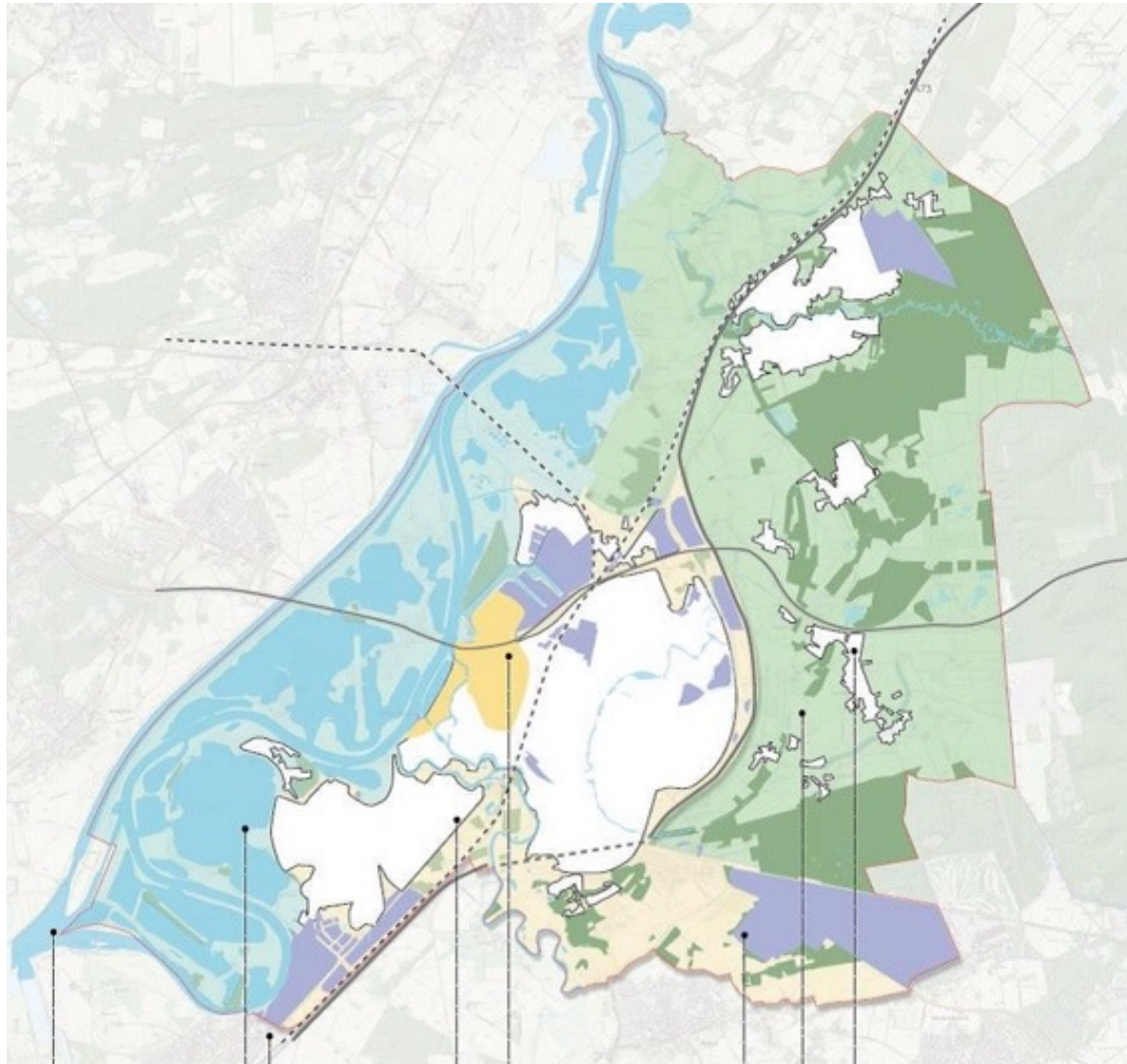
Energy

Policy

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3. Redevelop Maasnielderbeek.
4. Restore stream.
5. Avoid the sense of obstruction while raising the dike.
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Planning

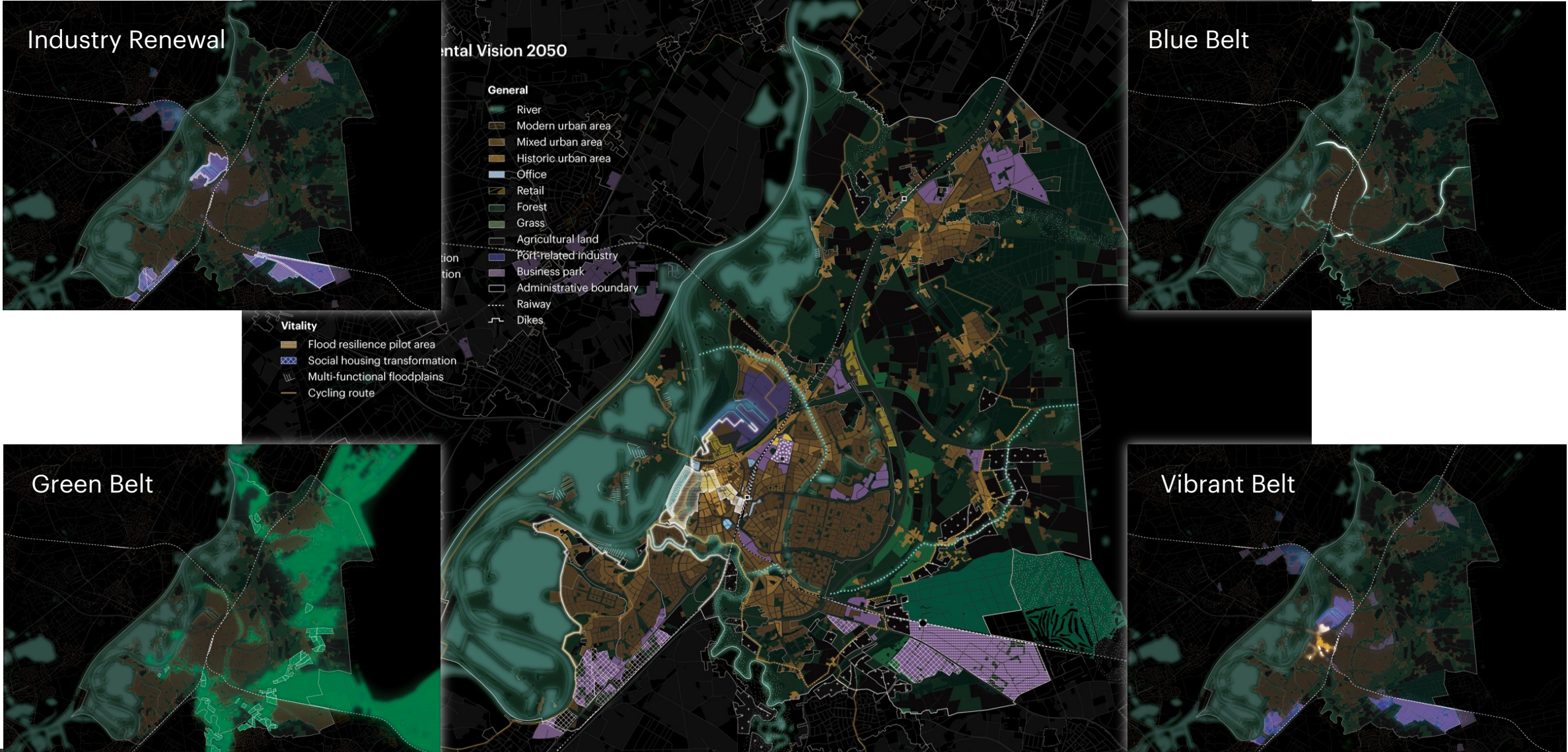
New policies: General guidelines



Planning

Status quo land use

Map from Municipality Roermond, 2021



Planning

Environmental Vision 2050



Roermond-Center

“a place to be and meet”

Incorporate flood adaptation measures in a variety of functional spaces such as restaurants, parks, and ports to mitigate urban flooding.

Transform several existing public spaces into accessible and attractive green spaces for citizens, with links to the Meuse River and the suburbs.

WATER



LANDSCAPE



VITALITY



ECONOMY



Raising the visibility of landmarks beyond the outlet, enriching the types of activities in the old town, and creating special flood education routes.

Refocus economic development away from retail and toward the innovation of device production needed for flood resilience, such as garden centers, home improvement stores, etc.

Planning

District-specific strategy



Planning

District-specific strategy



Roermond-South

“innovation hub”

Re-predict the impact of upstream flooding on the Roer River. River widening could be a (partial) alternative to building a new dike system.

Protect the stream valleys of the Roer River and reinforce the landscape differences between open agricultural areas, forests and nature reserves.

WATER



LANDSCAPE



VITALITY



ECONOMY



Transform vacant buildings in industrial parks into social housings for vulnerable groups and international workers.

Plan higher education and research centers in the region close to the Roer River to foster an innovation base for flood risk management.

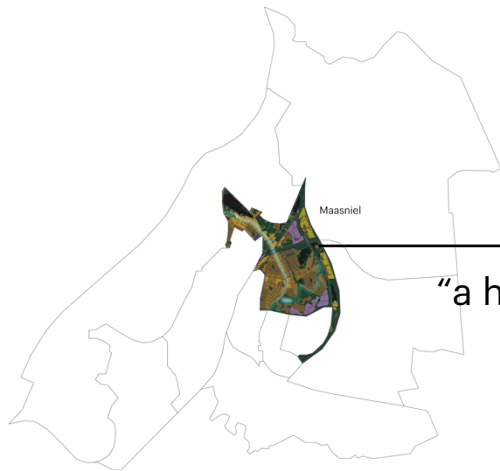
Planning

District-specific strategy



Planning

District-specific strategy



Maasniel

Maasniel

"a healthy and safe neighborhood"

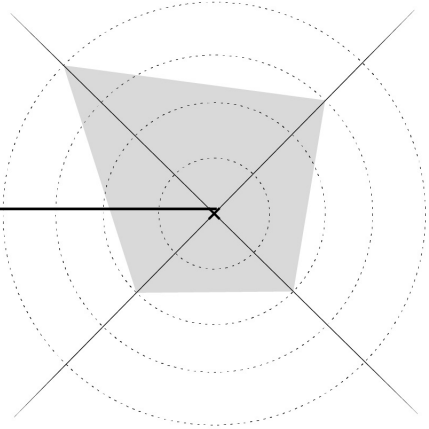
Re-establish Maasnielderbeek hydrological conditions similar to historical ones, expand the flood-plain, and mitigate flood hazards on the Meuse and Roer.

Create small-scale and diverse landscapes with hedges, walking trails and boulevards along the river.

WATER



LANDSCAPE



VITALITY

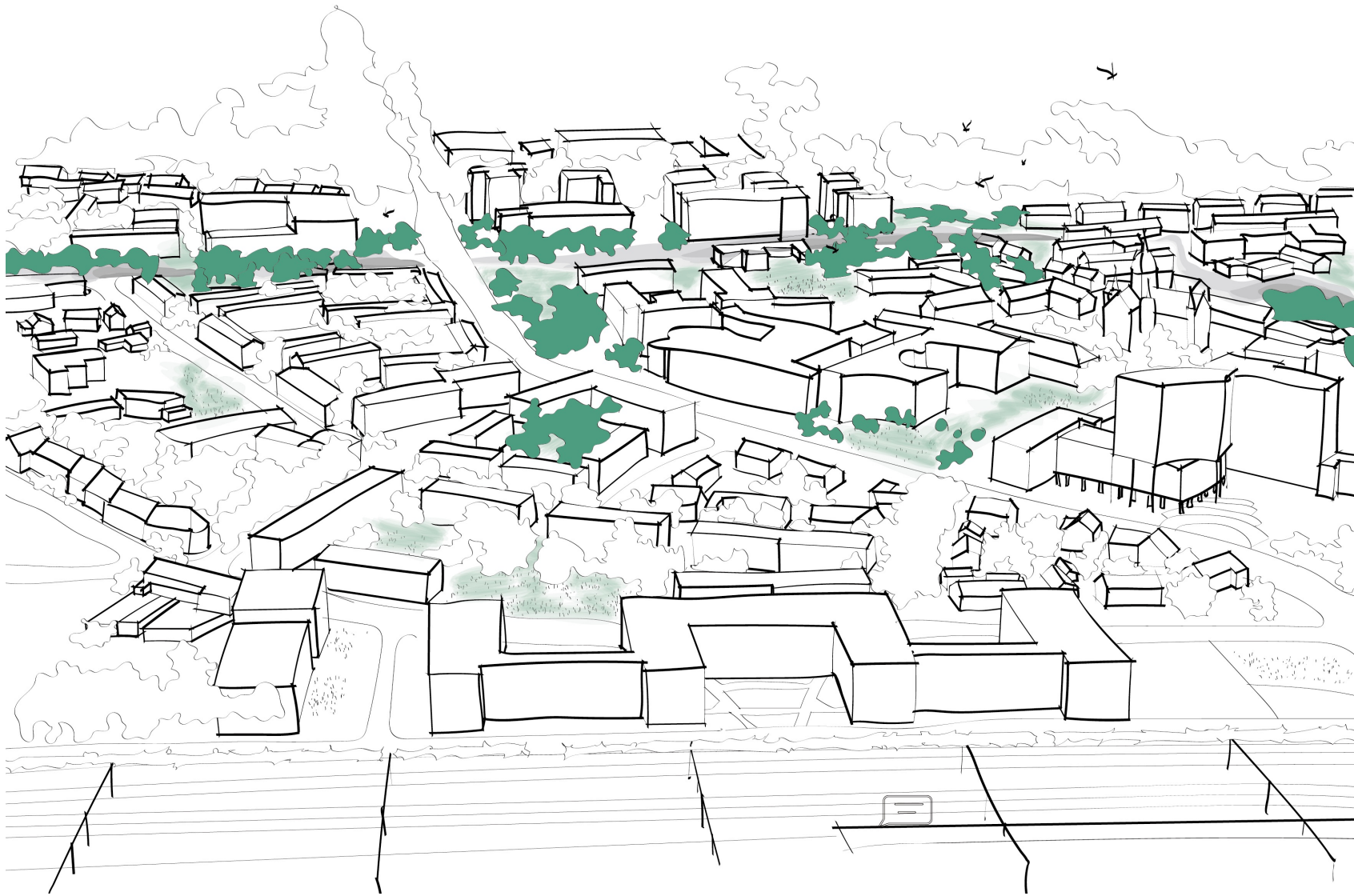


ECONOMY



In the long run, the river restoration will bring more public space and improve the overall spatial quality and attractiveness of the neighborhood.

Drive the employment attractiveness of the region by improving spatial quality and attract suburban labor by enhancing river mobility.



Planning

District-specific strategy



Maasplassen

Maasplassen

“water as a brand”

After the new Maasnielderbeek River was opened, the water level management plan was redeveloped to restore the historical natural form of the river as much as possible.

Preserve the historical identifiable portions of the river landscape and develop bicycle trails to connect with suburban forest parks.

WATER



LANDSCAPE



VITALITY



ECONOMY



Enrich the types of activities in the floodplains, convert some of the camping sites into waterfront public spaces, and create a promenade connecting to the city center to improve accessibility for pedestrian.

Increase publicity at home and abroad to expand the popularity of water sports bases.

Planning

District-specific strategy



Planning

District-specific strategy



Asenray & Swalmen

“green living villages”

Excavate Maasnielderbeek to provide irrigation water for agricultural land and improve water quality through stream restoration.

Change land-based agriculture to nature-based agriculture to connect fragmented forests and national parks.

WATER



LANDSCAPE



VITALITY

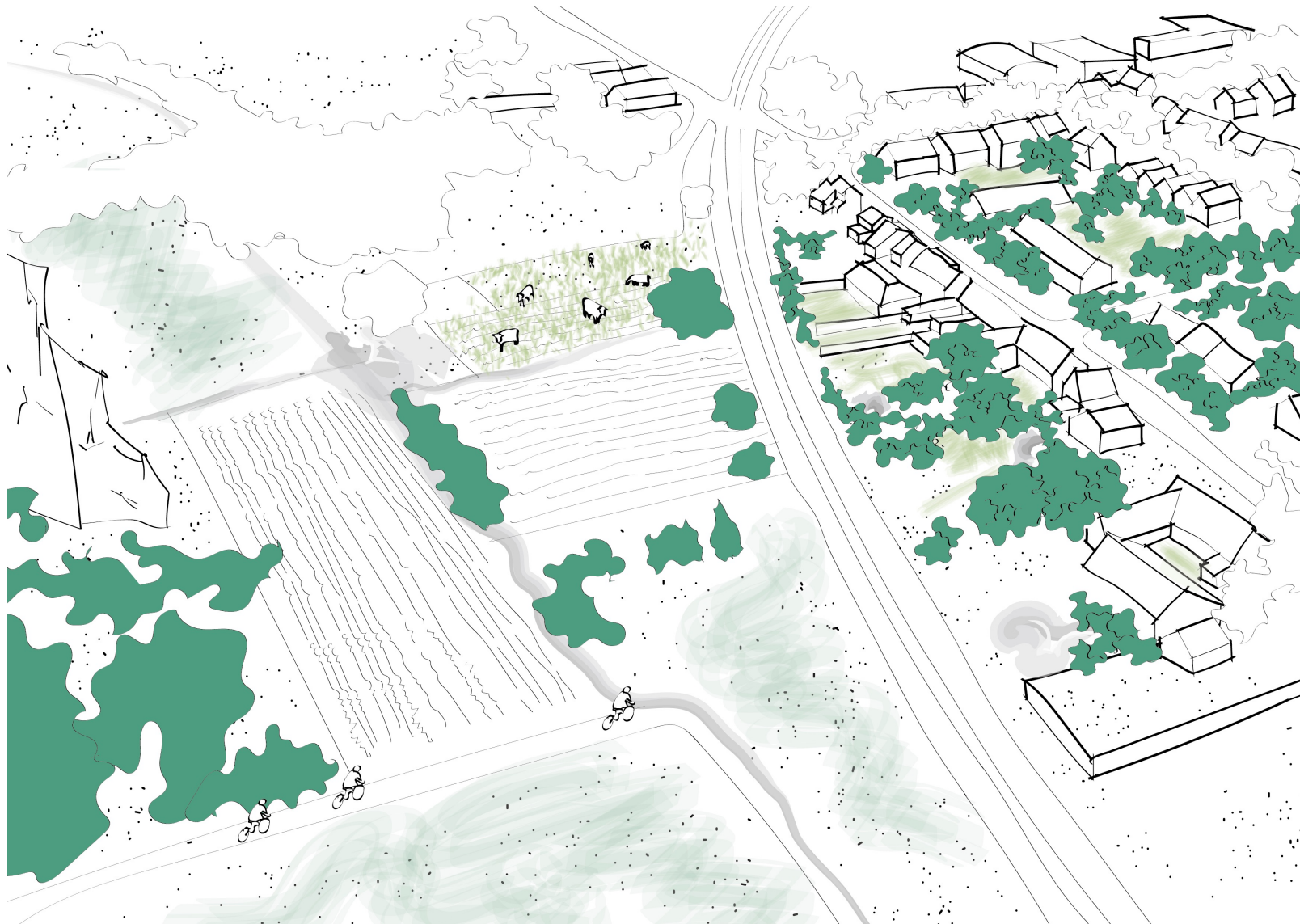


ECONOMY



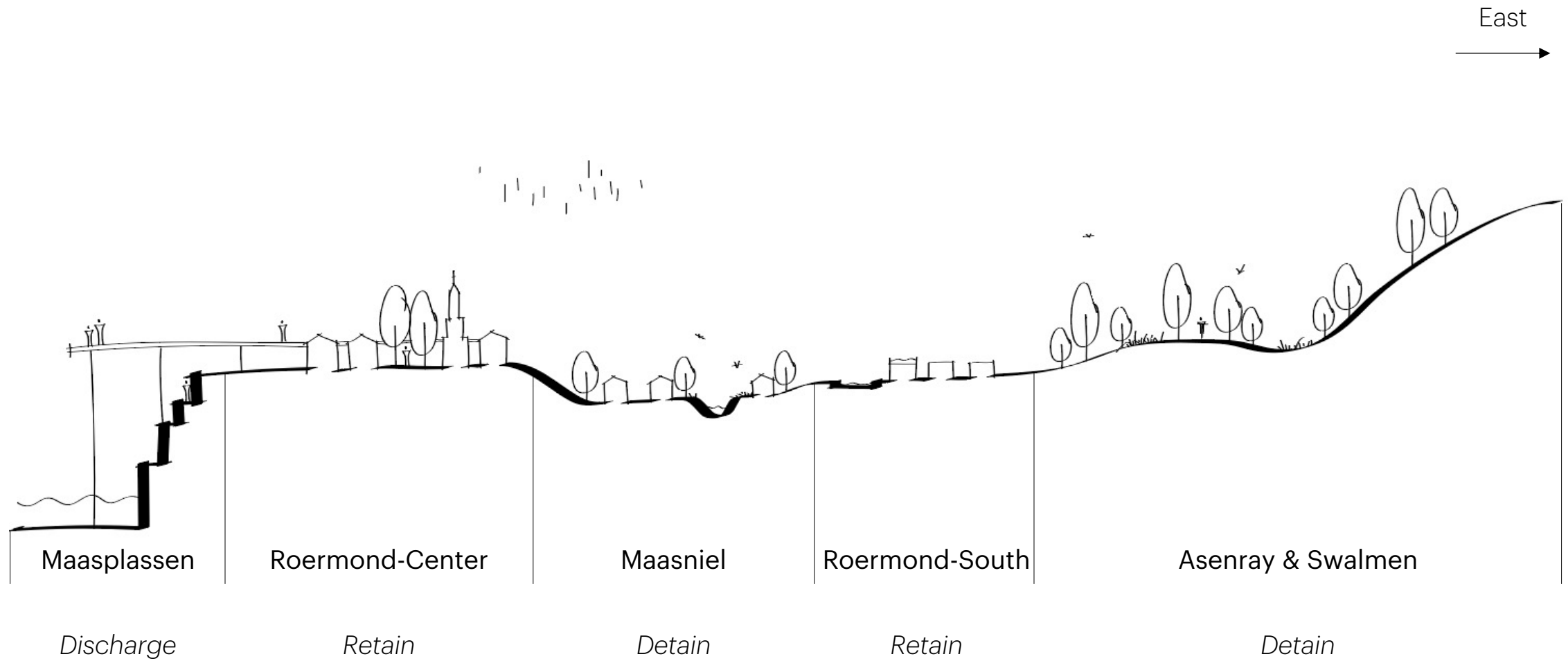
Introduce bicycle touring paths in a continuous green structure to attract national and international visitors.

The new river channel connecting the Meuse River provides an alternative means of transportation between the suburbs and the city center, which could boost the tourism economy.



Planning

District-specific strategy



Planning

Flood-resilient system

Origin

Problem

Methodology

Context

Planning

Design

Conclusion



Adapted from Google Earth, 2022

Design

Status quo Roerdelta



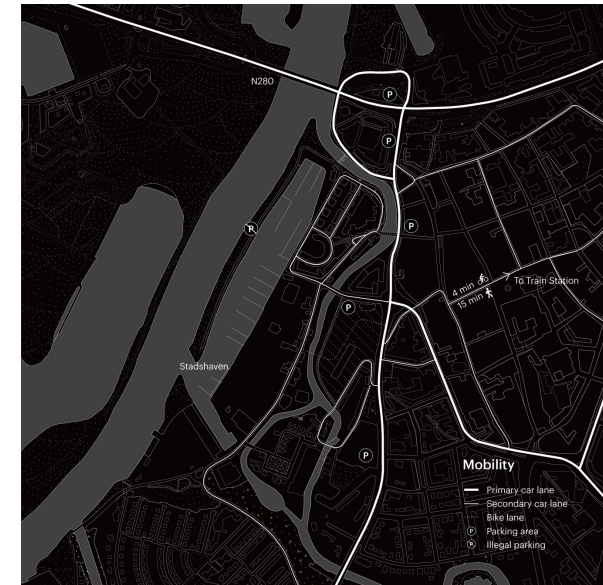
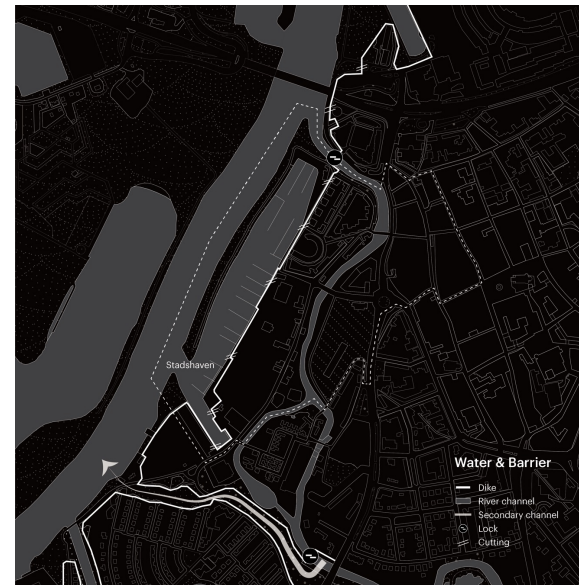
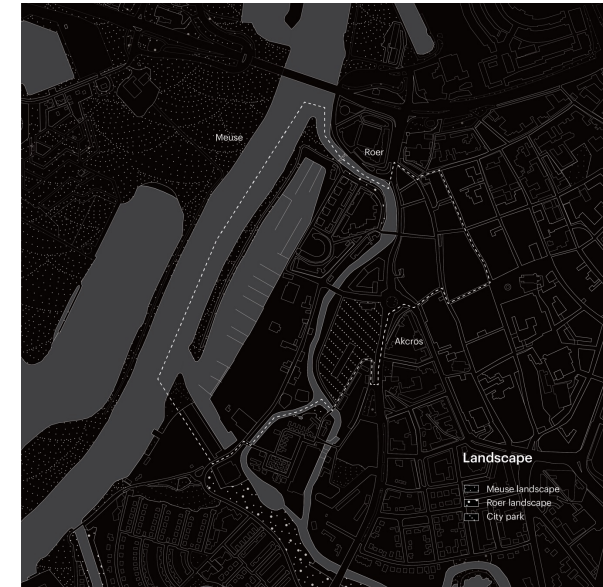
Photo by John Gundlach, 2017

Design

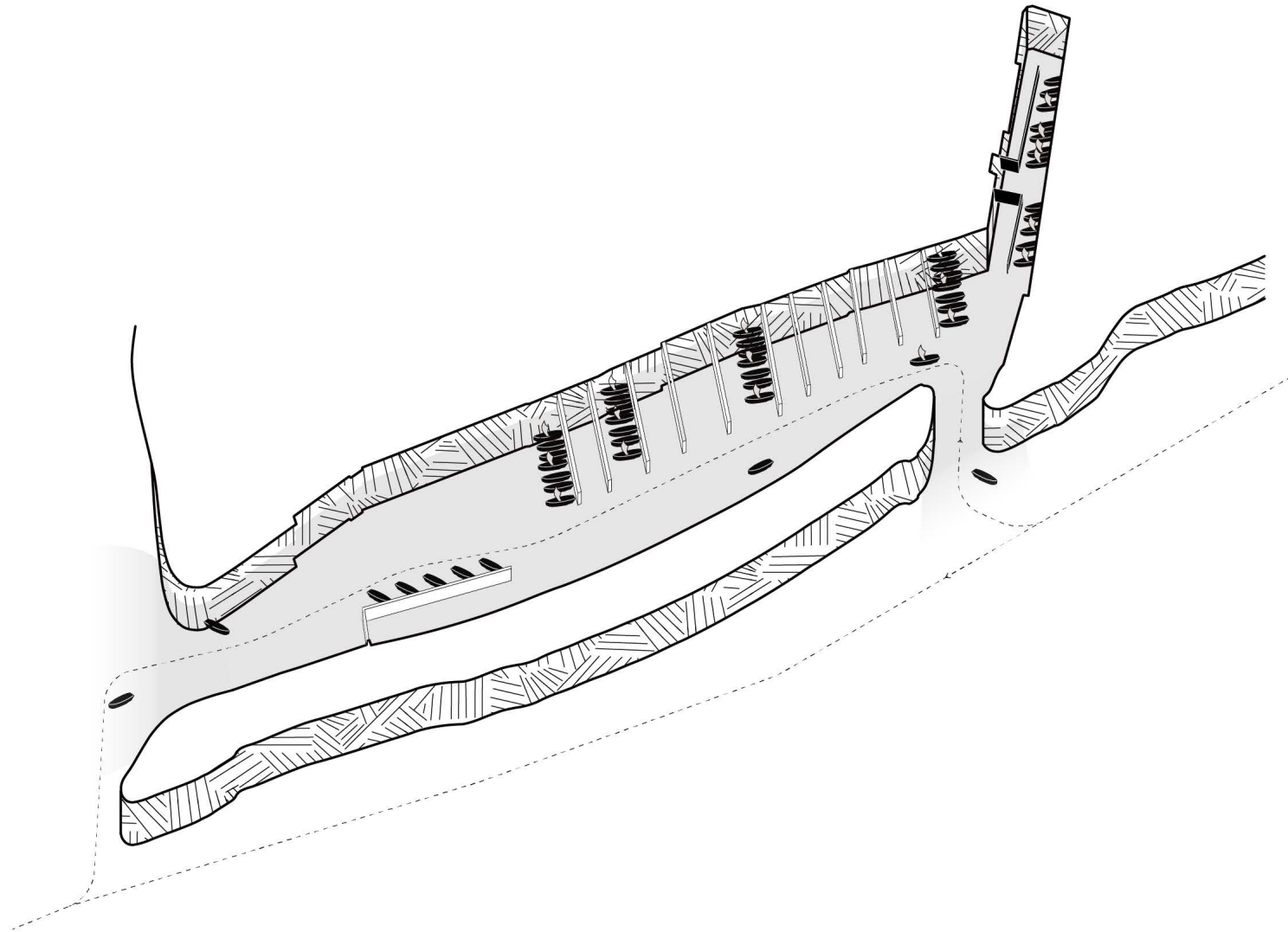
Status quo Roerdelta

Spatial structure

- Building
- Landscape
- Water & Barrier
- Mobility

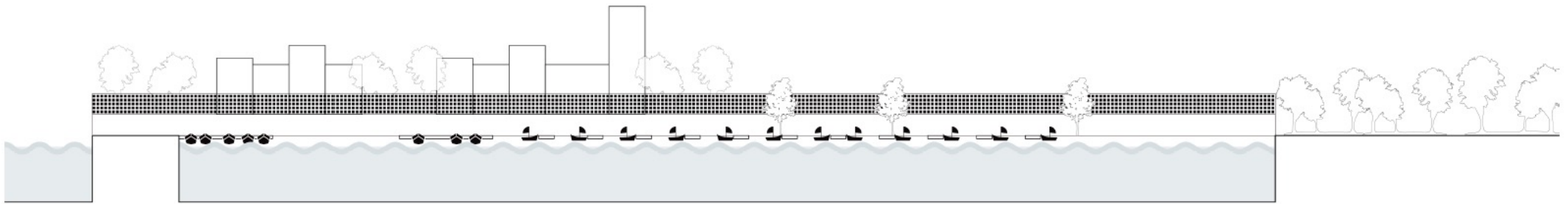




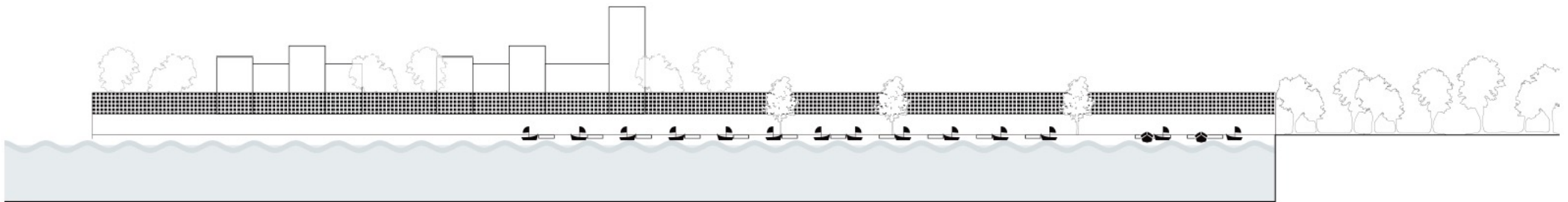


Design

Intervention 1: Port replanning



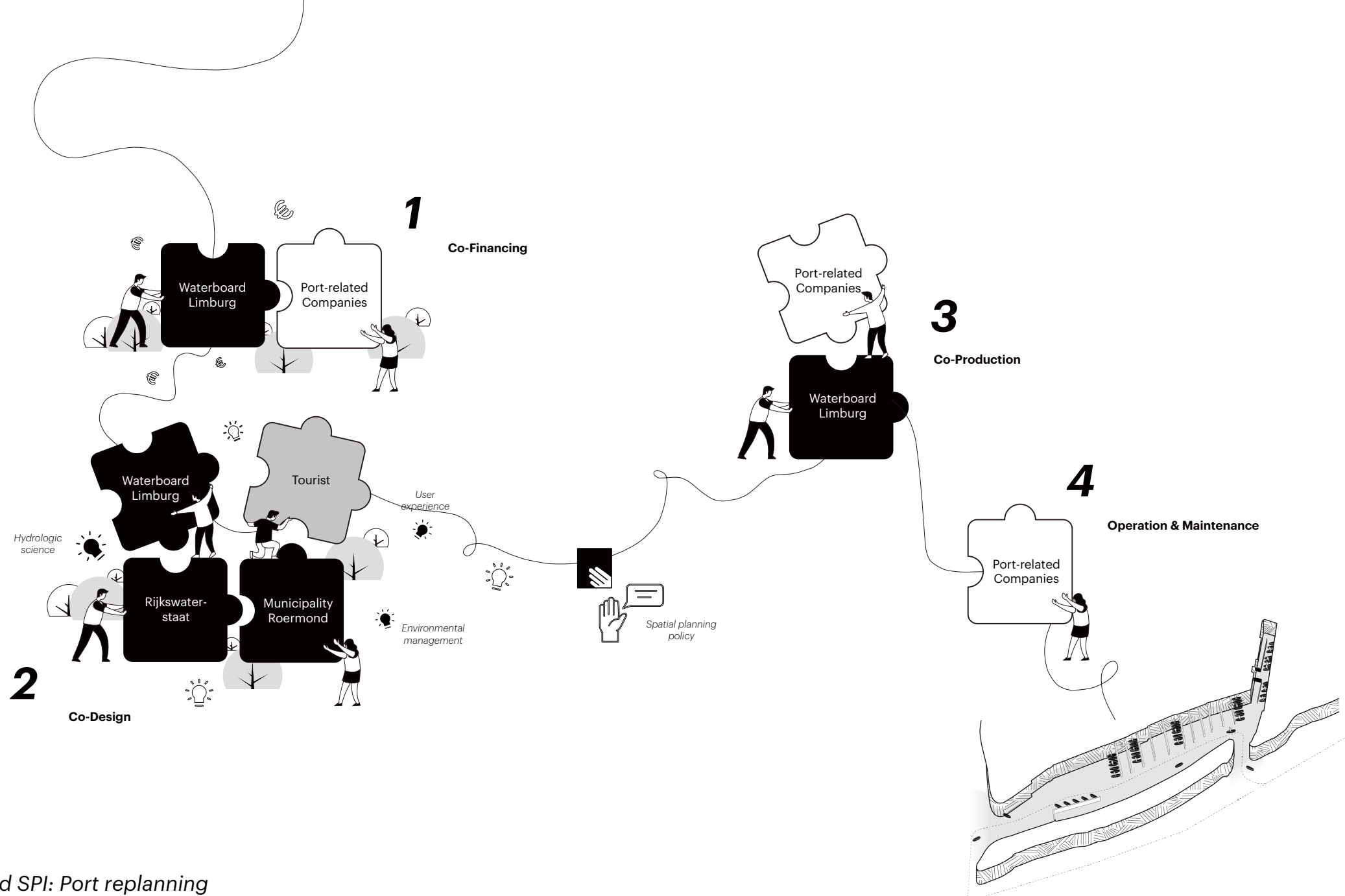
Before



After

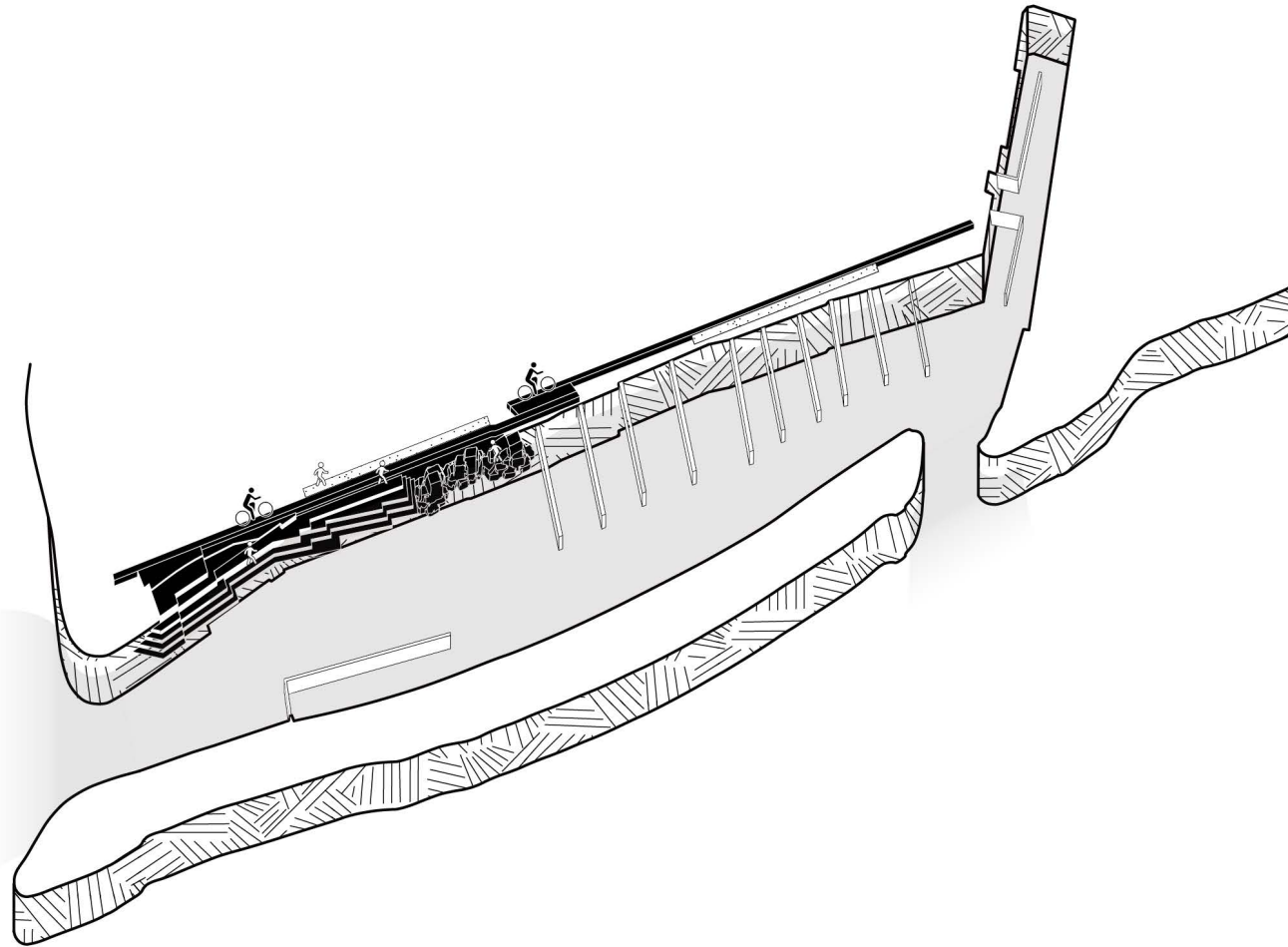
Design

Intervention 1: Port replanning



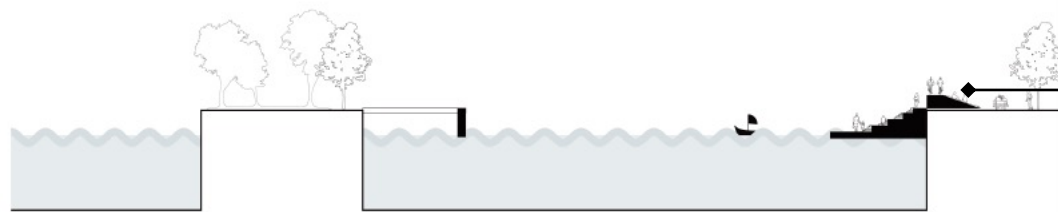
Design

PPCP and SPI: Port replanning

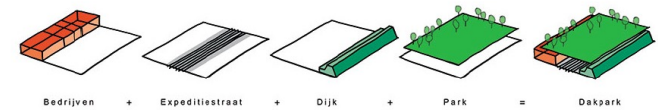


Design

Intervention 2: Multifunctional dike



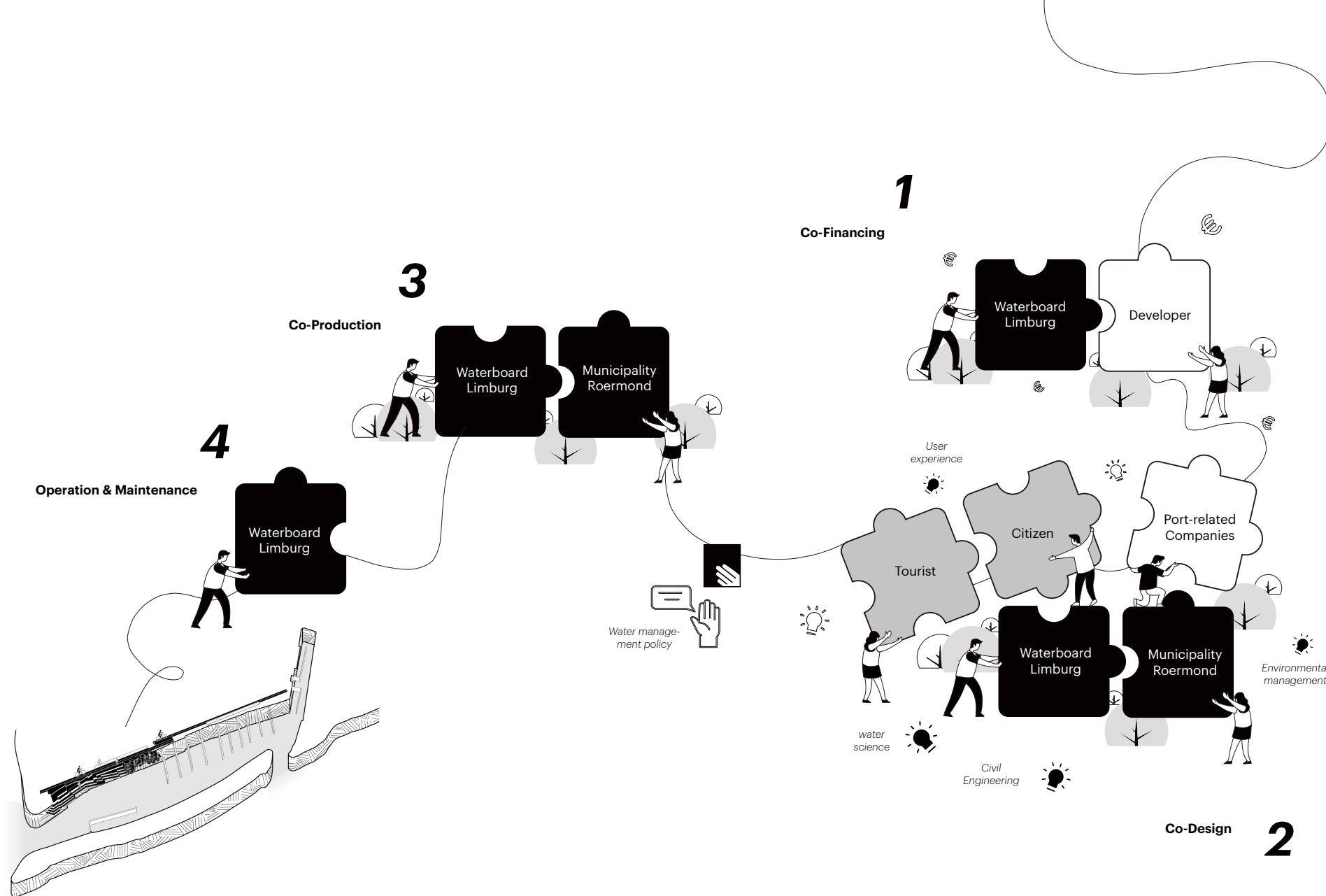
After



The Rotterdam Roof Park. Images by Buro Sant en Co, 2014

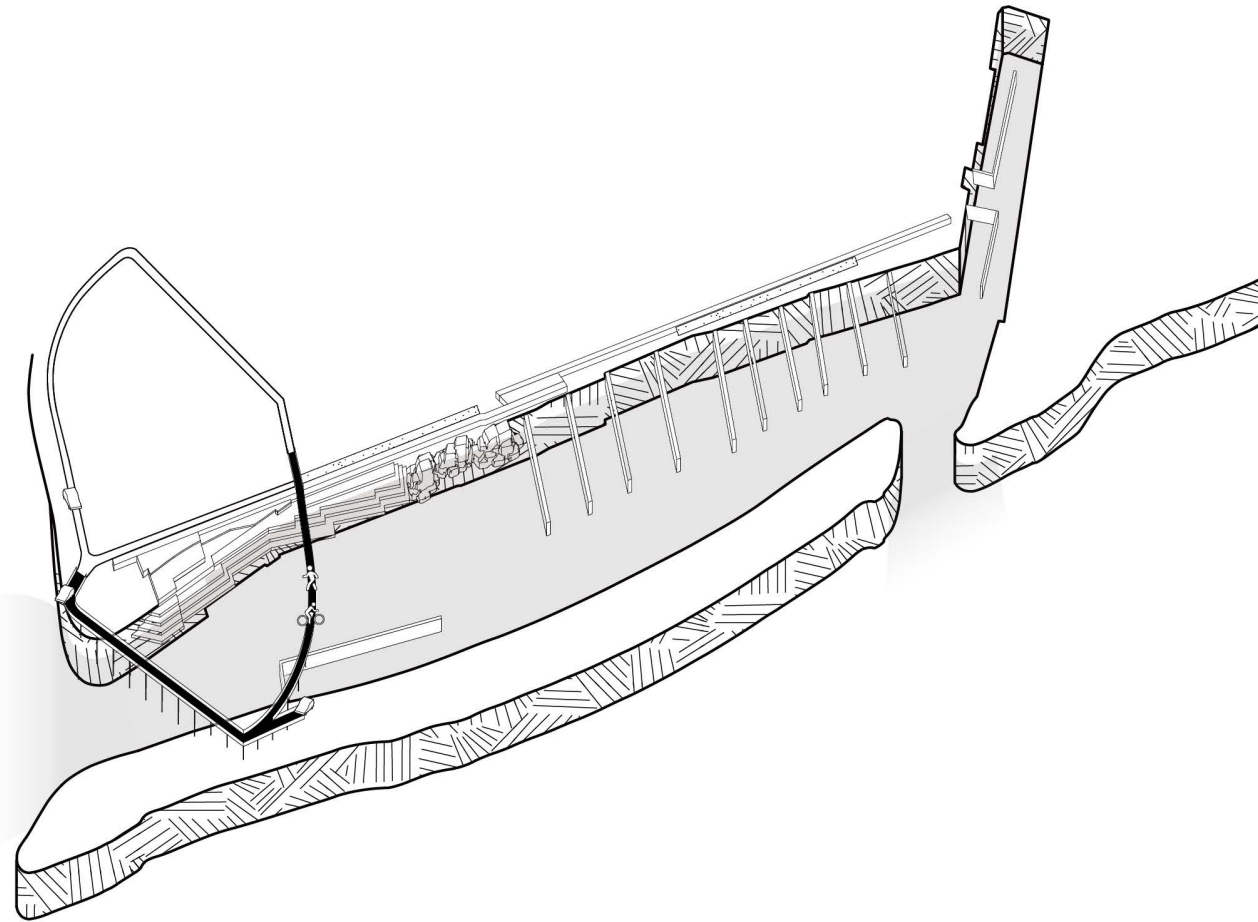
Design

Intervention 2: Multifunctional dike



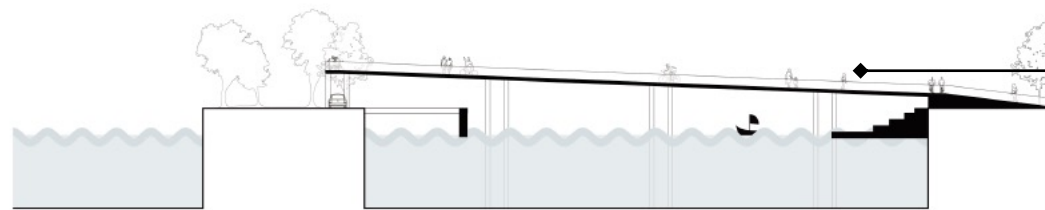
Design

PPCP and SPI: Multifunctional dike



Design

Intervention 3: The promenade



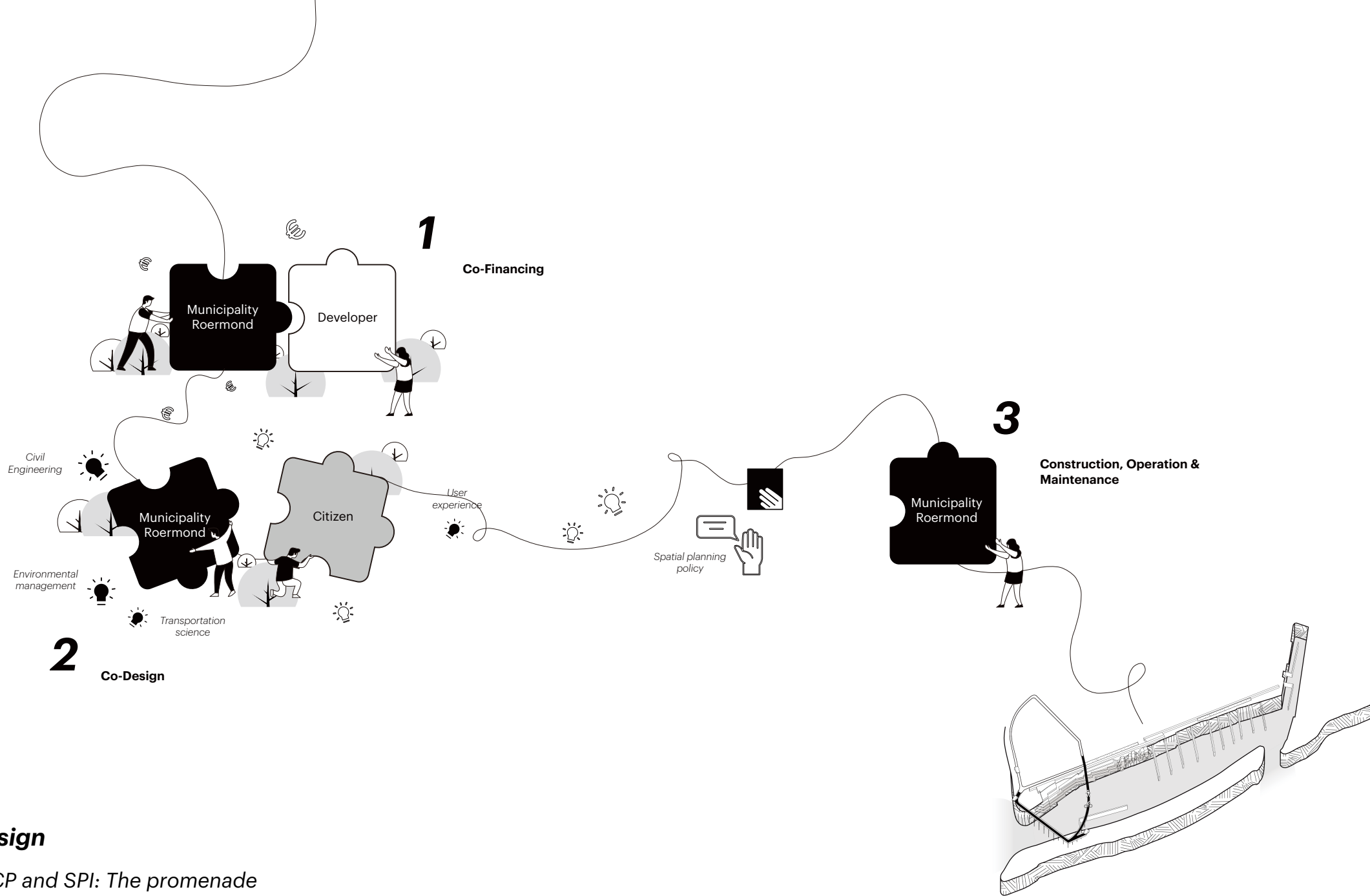
After



Design

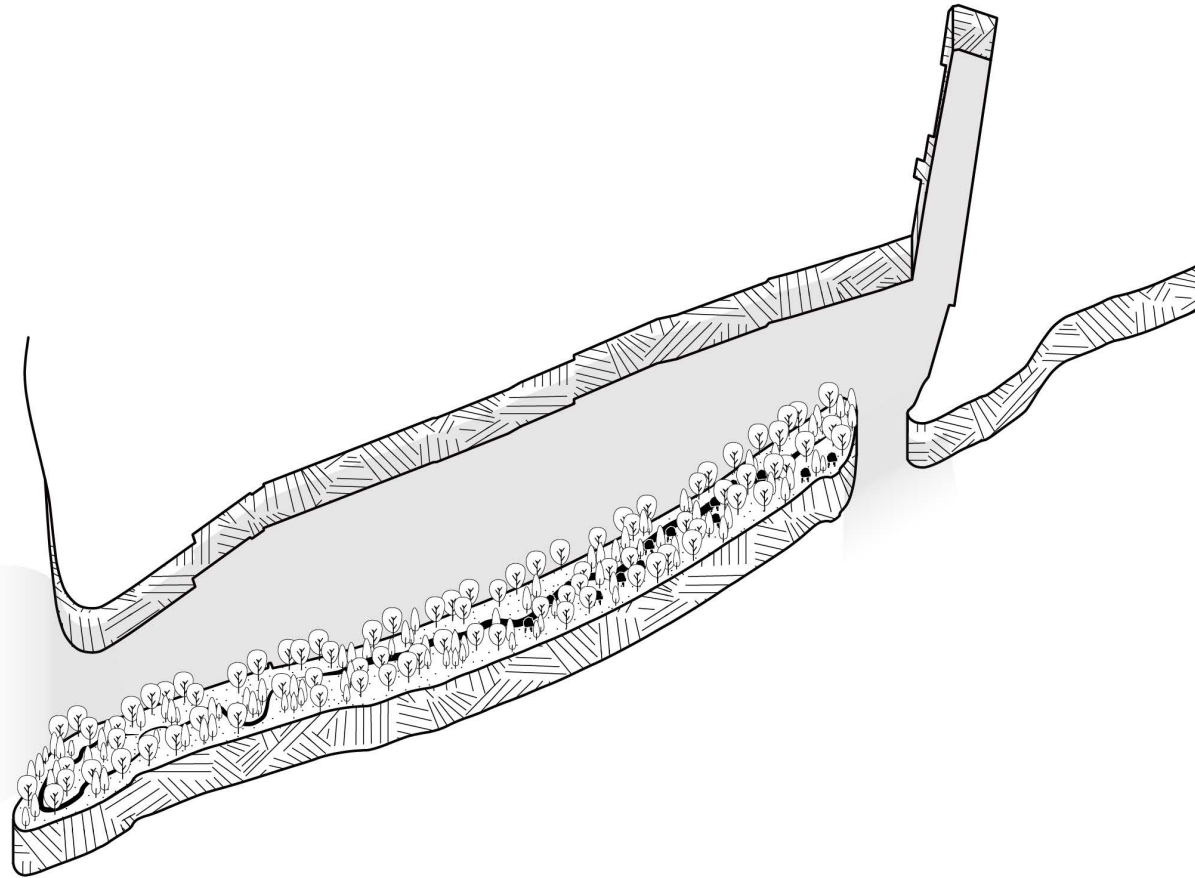
Intervention 3: The promenade

Keelung Maritime Plaza. Images from Guallart.com



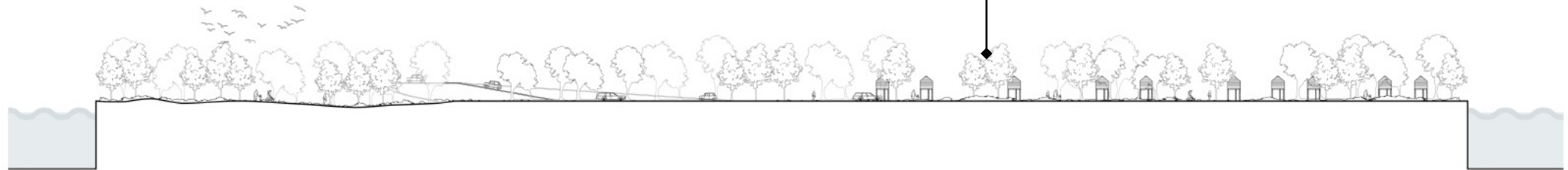
Design

PPCP and SPI: The promenade



Design

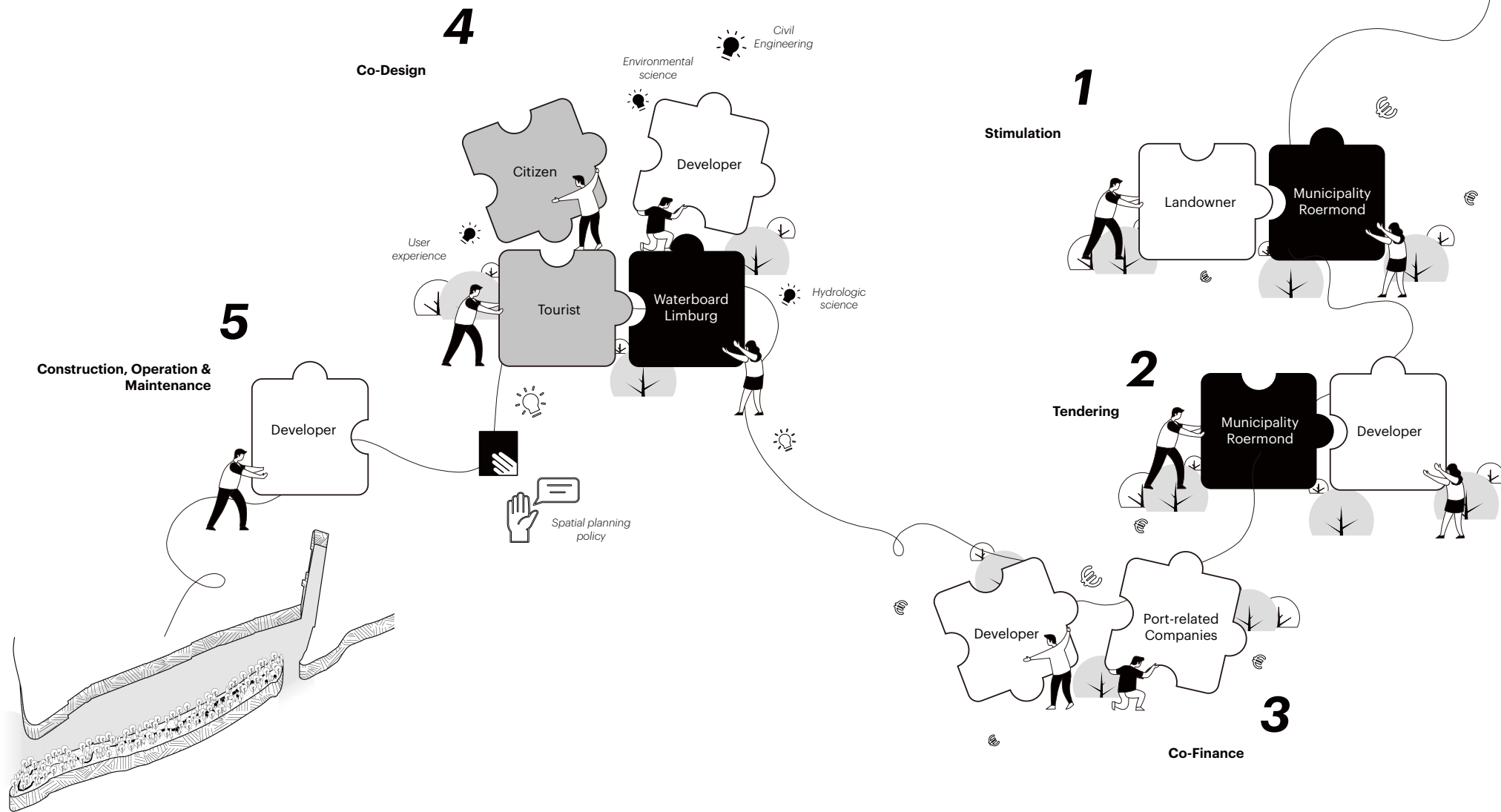
Intervention 4: From parking to park



After

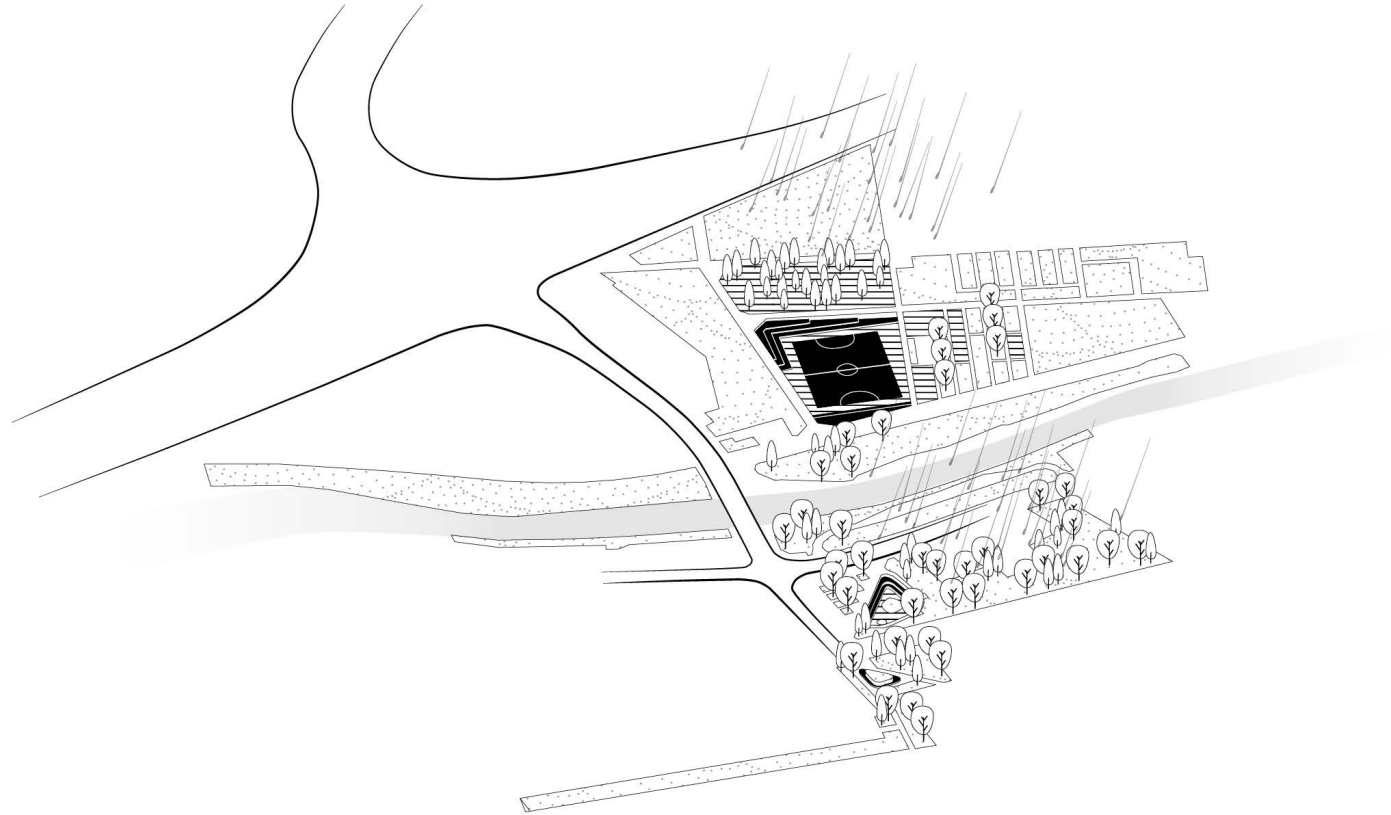
Design

Intervention 4: From parking to park



Design

PPCP and SPI: From parking to park



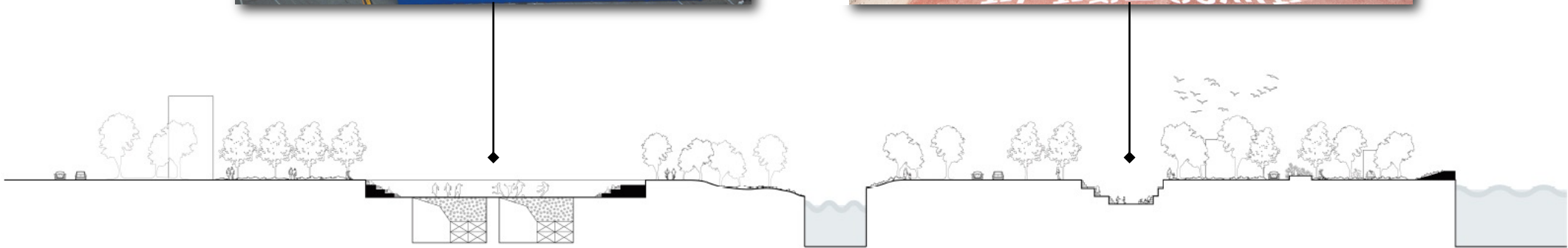
Design

Intervention 5: Akcros park extension

Water-Harvesting Soccer Field. Photo from PITCHAfrica



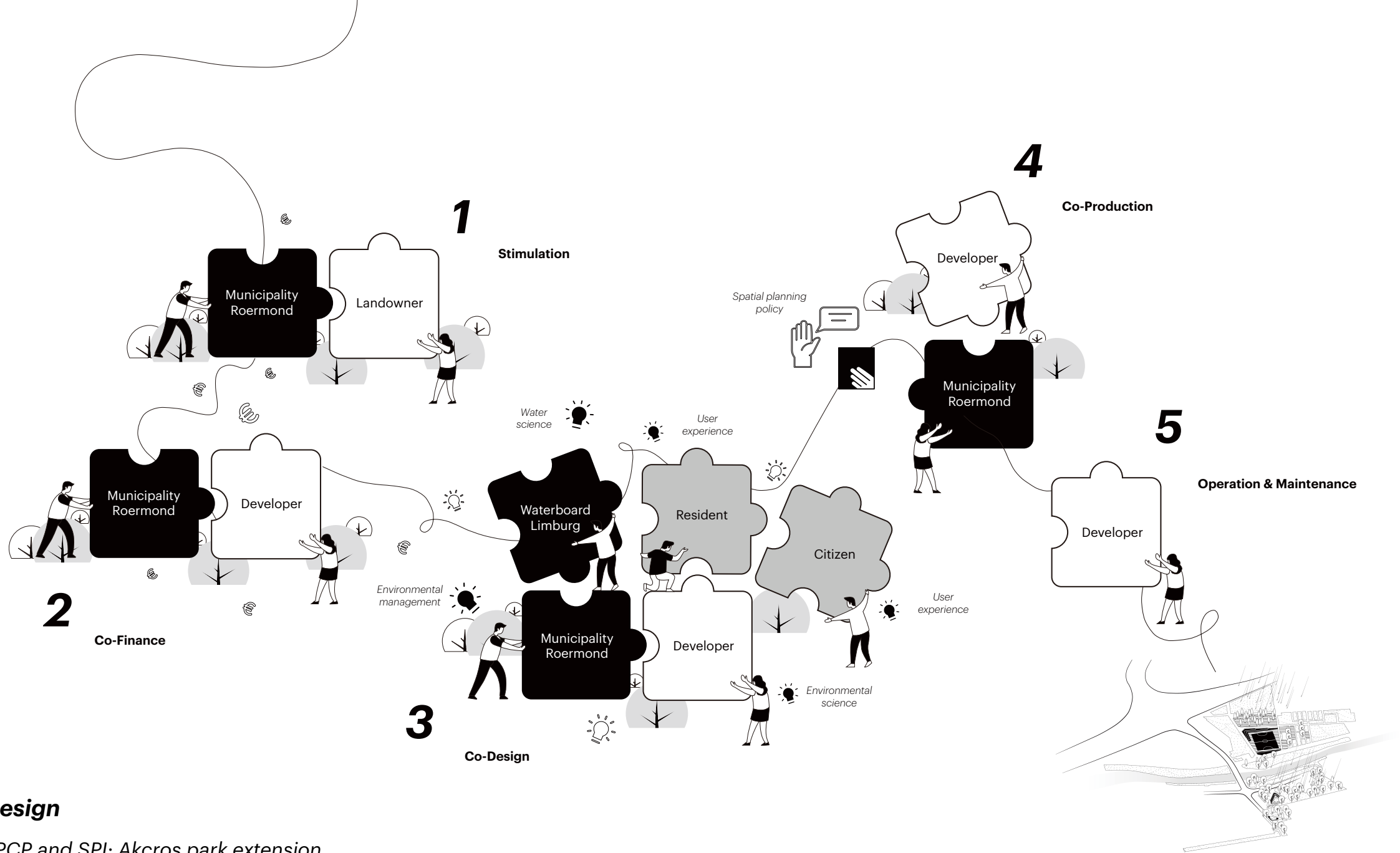
La Pau Square. Images by DEL RIO BANI, 2020



After

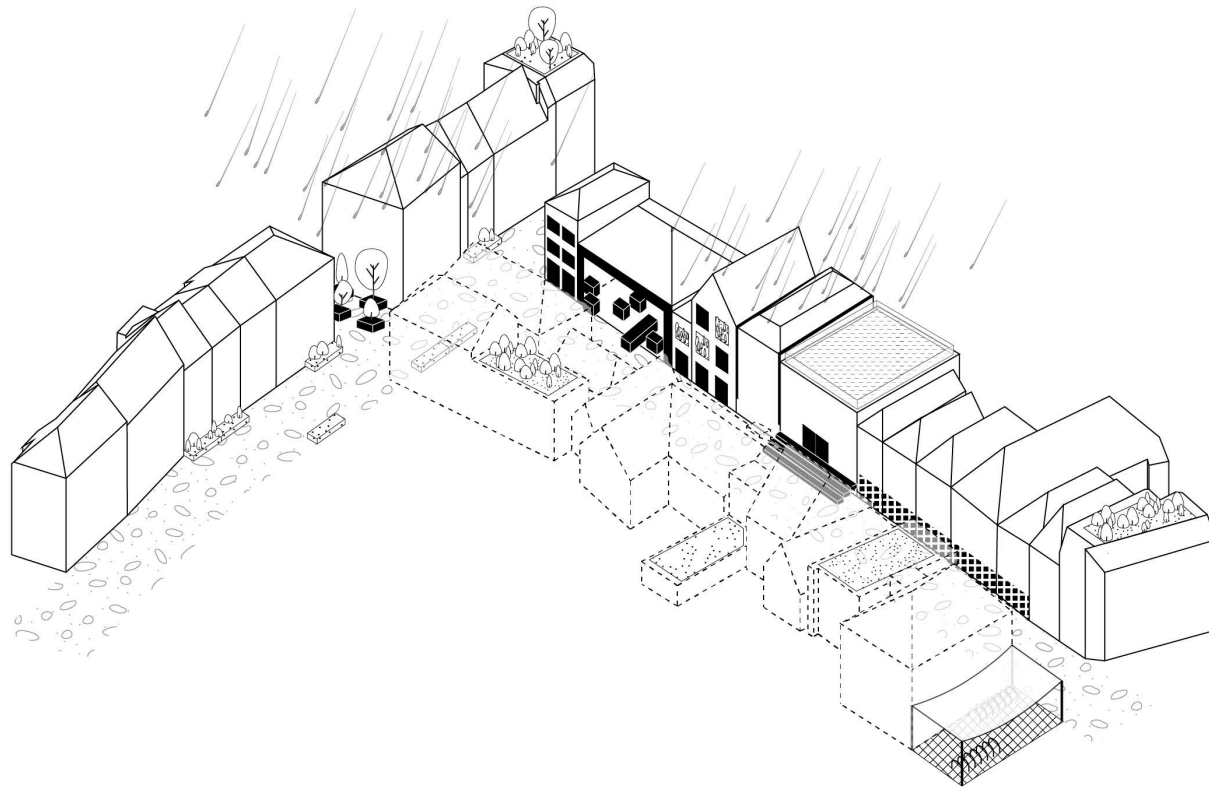
Design

Intervention 5: Akcros park extension



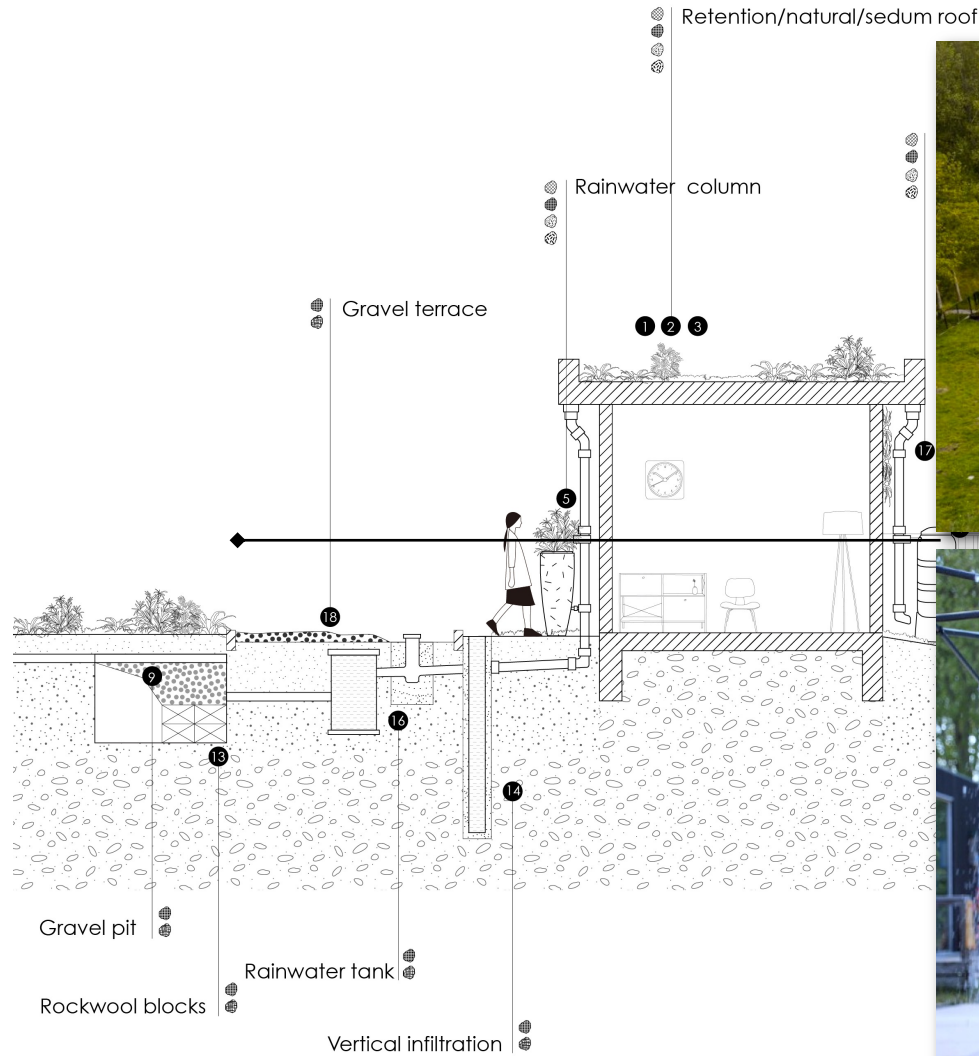
Design

PPCP and SPI: Akcross park extension



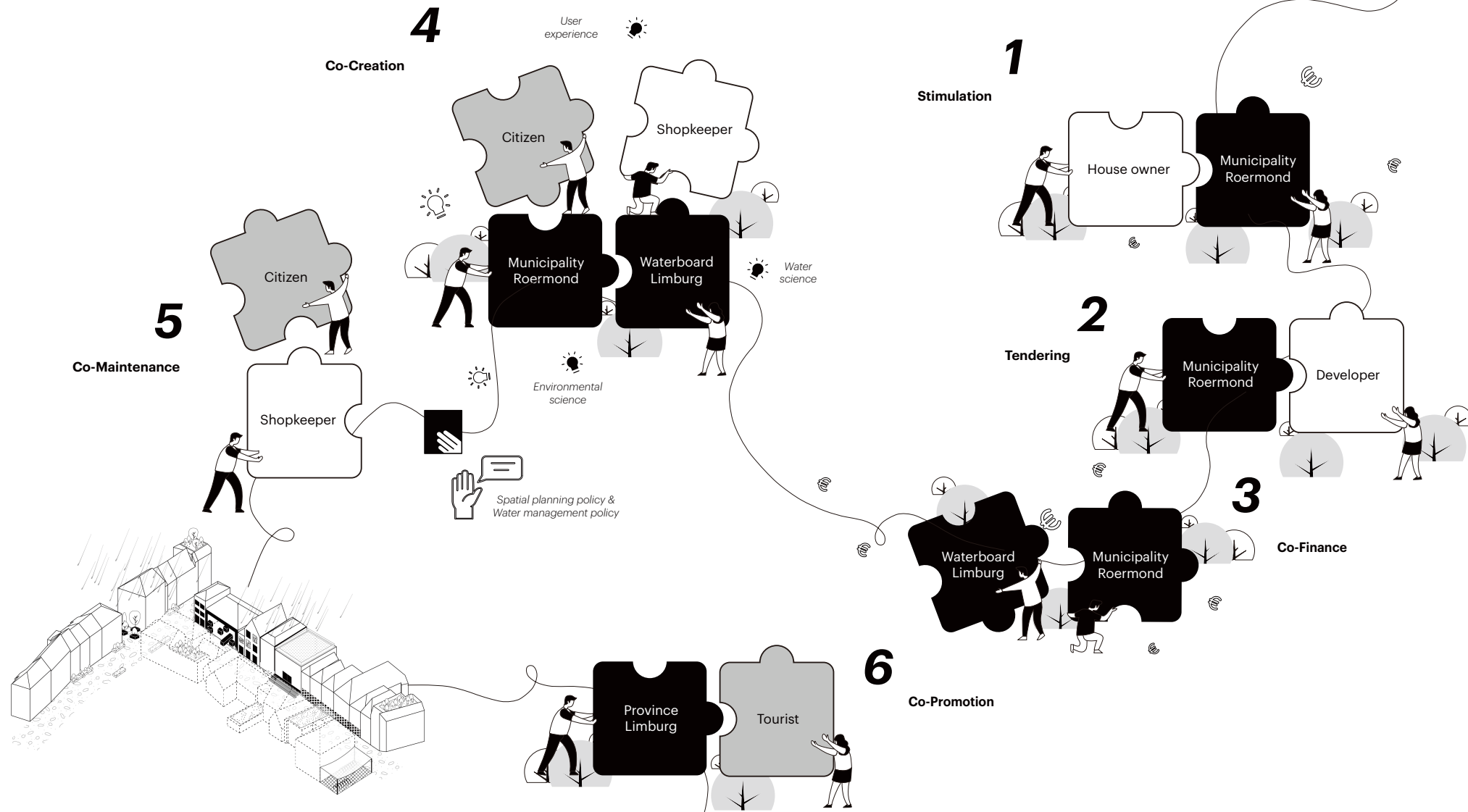
Design

Intervention 6: Blue street



Design

Intervention 6: Blue street

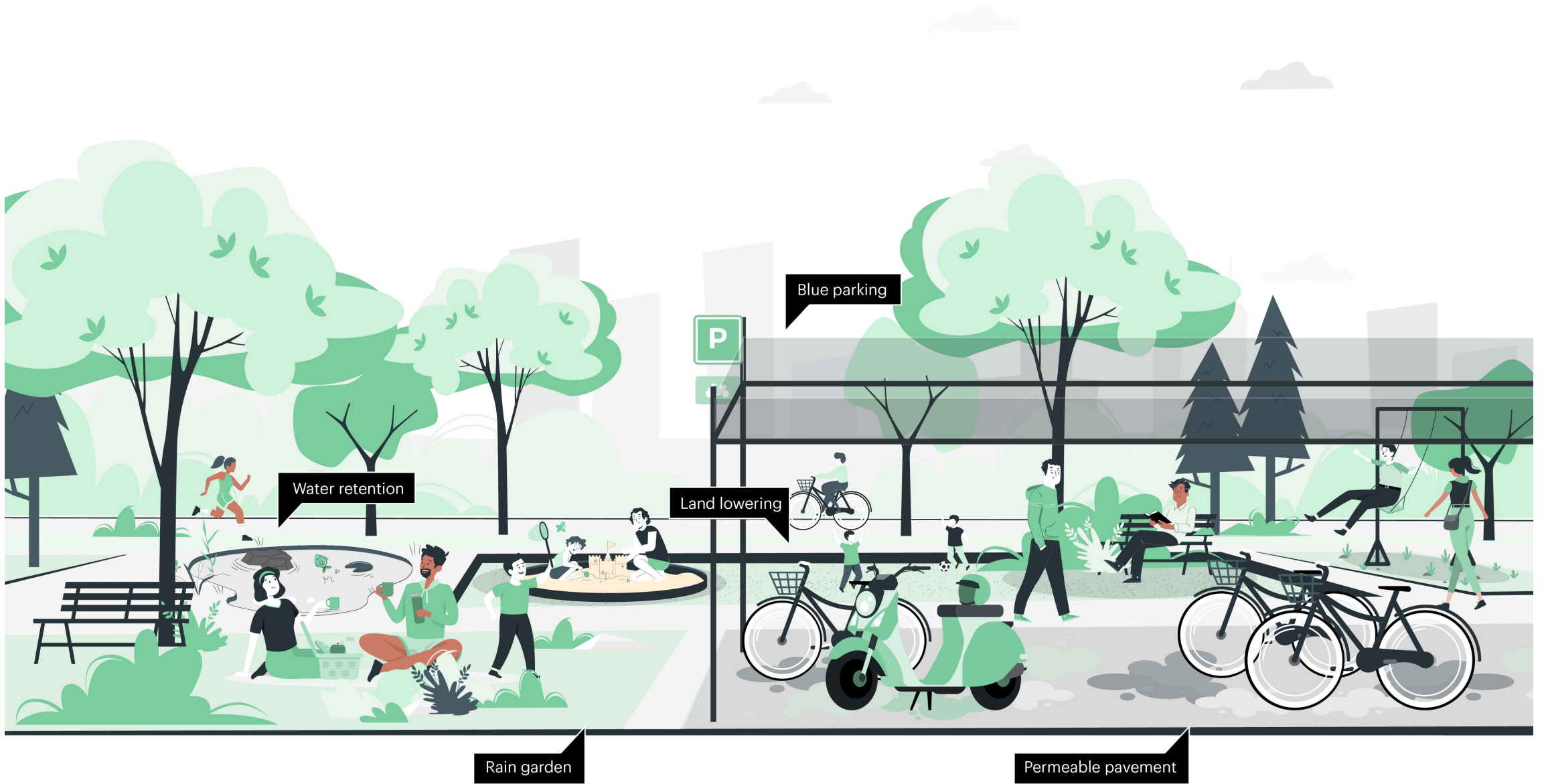


Design

PPCP and SPI: Blue street



Inner city



City park



Evacuation promenade

Multifunctional dike

Glass floodwall

Living riverbank

Port

Origin

Problem

Methodology

Context

Planning

Design

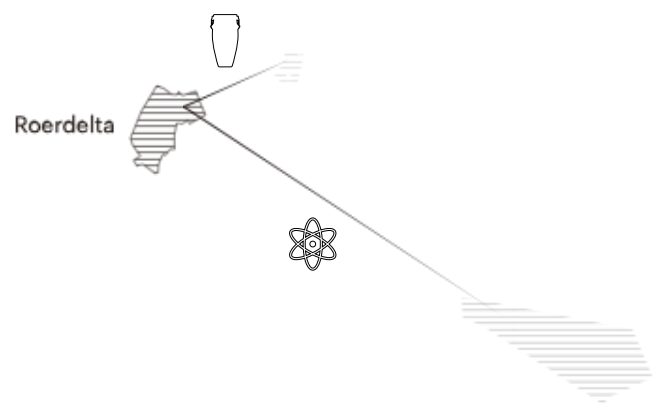
Conclusion

Roerdelta



Roerdelta

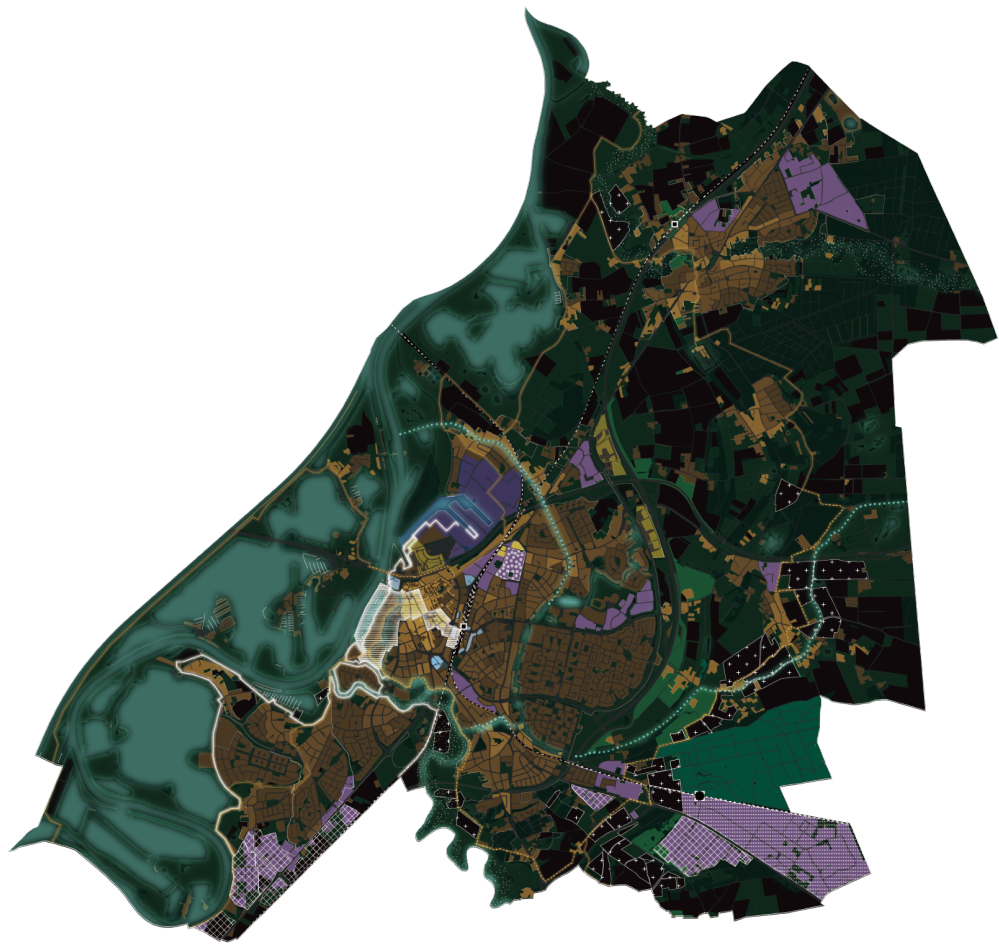






Roerdelta

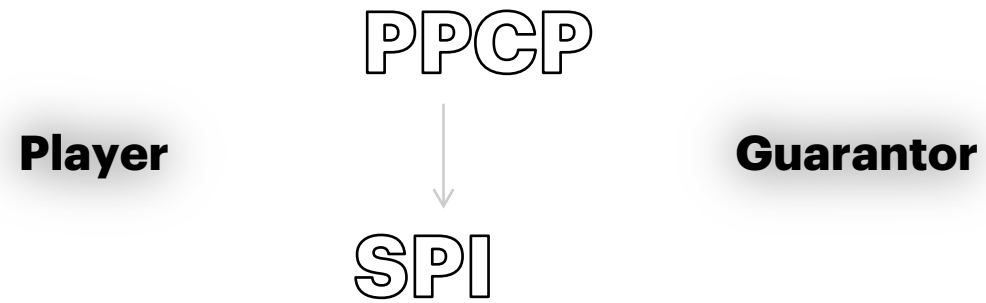




Research Question

“What role can **Public-Private-Civil Partnership** (PPCP) play in facilitating the mechanisms of a **Science-Policy Interface** (SPI) that aims at **flood resilience**?”

Conclusion



Thanks!

