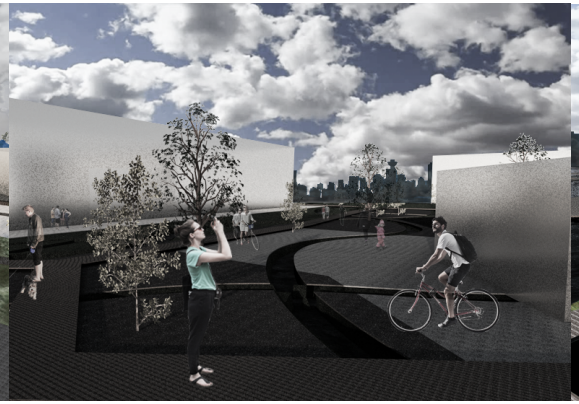
INTERACTIVE WATER STORAGE FOR BUIKSLOTERHAM

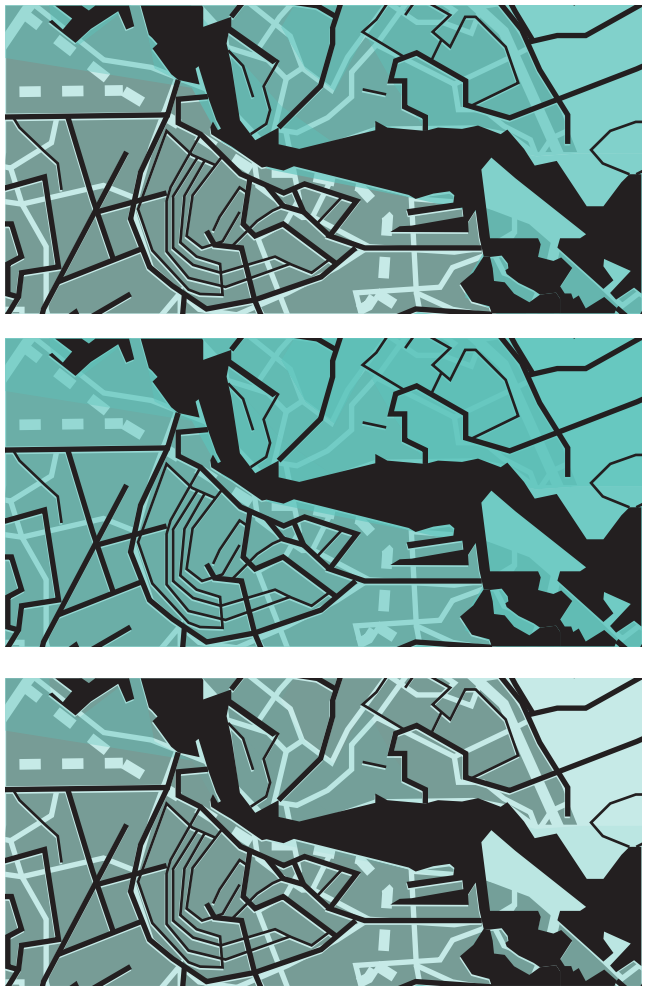



INTERACTIVE WATER STORAGE FOR BUIKSLOTERHAM

LISANNE VIERGEVER 4144449
KRISTEL AALBERS & FRITS VAN LOON
DELTA INTERVENTIONS URBANISM TUDELFT

P2 Presentation 24 Januari 2017

BUIKSLOTERHAM'S MOST URGENT



flood threat

hard surfaces

density

BUIKSLOTERHAM VS LANDSCAPE

air pollution

sound pollution

green structures

RAINPROOF AMSTERDAM*
+
SUSTAINABLE METROPOLITAN AREA
+
RESILLIENT, CLEAN & FUNCTIONAL WATER

Rainproof: Capacity of 60 mm/h to the sewage system, rest stored in public space
(Gemeentelijk Rioleringsplan Amsterdam 2016-2021)
Sustainable Metropolitan area (De Structuurvisie Amsterdam (2011))
Resillient, clean & functional water (Keur AGV (2011))

HOW CAN A SPATIAL FLEXIBILE INTERACTIVE WATER STORAGE SYSTEM BE DESIGNED FOR BUISLOTERHAM

To help it prepare for climate change, in x years, in a way that is also creates sustainable awareness through neighbourhood participation?

The research question will always be approached from an angle where the results creates an attractive identity for the Buiksloterham area.

WATER SYSTEM

WHAT IS THE WATER SYSTEM OF BUIKSLOTERHAM?

In order to be able to store rainwater, first the **existing water system** has to be made clear. The water systems will be analysed, showing their **opportunities and weaknesses**, for both the big scale of the Amsterdam metropolitan region and the small scale for Buiksloterham. The **relationship between these two** systems will also be determined, showing the possibilities Buiksloterham might offer in relationship to the bigger scale.

CLIMATE CHANGE

WHAT PROBLEMS IS BUIKSLOTERHAM GOING TO FACE BECAUSE OF CLIMATE CHAGE?

For the climate change issues that influence the plan it will look at the **general problems** that come from climate change, what these problems mean for Amsterdam and what they **mean for Buiksloterham**.

WATER STORAGE BUIKSLOTERHAM

WHAT IS THE BEST WATER STORAGE METHOD FOR BUIKSLOTERHAM?

For the design of the water storage system, first the **existing water storage systems** will be analysed and evaluated on whether or not they can be made **interactive**. Not all of the systems might be preferable for Buiksloterham, so for the design they need to be evaluated. Then the question arises on the interactive part of the water storage system, it needs to be investigated from which point of construction they will be **flexible**, in what way they will remain flexible and to what scale should they be flexible.

HOW CAN WE COMBINE THE USE OF A FLEXIBLE INTERACTIVE WATER STORAGE SYSTEM TO SUSTAINABLE AWARENESS IN A WAY THAT IT CREATES AN ATTRACTIVE IDENTITY?

When designing for Buiksloterham, the **existing elements** of Buiksloterham need to be analysed in order to understand the starting point of the project. The **current problems and opportunities** of the neighbourhood need to be made visible, as well as the **identity** it has now and the identity that would be preferable for the area in the future.

TIMEFRAME

WHAT WOULD BE A SUITABLE TIMEFRAME FOR THE DESIGN OF BUIKSLOTERHAM?

For the timeframe it is important that we realize that all the different aspects that have an influence on the design have a **different rhythm**. By looking at the different timeframes there are for water management, society, the built environment, **day and night rhythms, seasonal change** and water storage, the difference in pace will become clear. These different paces will be combined together to determine the best suitable timeframe for the project, and to realize which timeframes have the biggest effect at different elements of the design.

AMSTERDAM

HOW CAN AMSTERDAM BENEFIT FROM THE DESIGN OF BUIKSLOTERHAM?

Buiksloterham's water storage will have an impact on the entire city of Amsterdam as well. For the design it needs to become clear in what way, and the possibilities the design **offers for the entire city**. Also the design needs to be evaluated on whether or not it could be implemented in a **different location**.

SUSTAINABLE AWARENESS

HOW DOES THE WATER STORAGE SYSTEM CREATE SUSTAINABLE AWARENESS IN BUIKSLOTERHAM?

When the design has to increase sustainable awareness, first it needs to become clear what sustainable awareness currently is, in relation to water. And it needs to become clear what the sustainable awareness of the current and **future inhabitants** of Buiksloterham is. This will then be related to the different design choices, so that the methods are picked that also **benefit the sustainable awareness** of the neighbourhood.

THE THEORY

THE CITY AS A COMPLEX SYSTEM

P. ALLMENDINGER & M. SCHEFFER

The last 50 years urbanism has gone from system thinking to seeing the city as a complex system, which better shows the **unpredictable nature** of the development of the urban fabric and its surroundings.
This unpredictableness calls for **flexibility in design approaches**.

FROM COMPLEX SYSTEM TO DESIGN

F. VAN DE VEN & S. TJALLINGII

In design practise we need to **create this flexbility**, but in a very practicle and concrete way. In order to help with the design the thesis will use the **guiding principle**. The guiding theme of the thesis is to create a flexible, interactive water storage system for Buiksloterham, that also helps Buiksloterham prepare for and gain from climate change and increases sustainable awareness through neighbourhood participation.

Later in the process it will function more as a target image approach, where the design will strive towards a certain image which is set as a goal for the design of Buiksloterham.

PEOPLE, PLANET, PROFIT

T. STRANGE & A. BAYLEY

To achieve sustainability, there needs to be a **balance** between the **environment** (planet), its **inhabitants** (people) and the **economy** (profit). In urban planning and design we take an approach that is always planet based, but in order to succeed we need to involve people and profit aswell.

In the project the people get involved by the possibility to decide for themselves how they want to store water, and when. This also ties into the profit side, since doing this will have certain benefits for their household.

THE NEED FOR INTERACTIVENESS

A. KOLLMUSS & C. CHOGUILL

In order for people to change their behavirous, there needs to be a **direct personal relation, result and connection.** Interactivity and flexibility in the design of the built environment helps with this, because it creates a more **direct connection** between the inhabitants and their living environment.

Self-sufficient in water use

Water becomes part of the identity

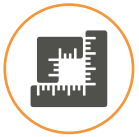
The area functions as a sustainable water community

Re-use rainwater

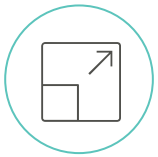
Re-use grey water

Create good quality water

Water storage will be flexible



Water storage will be interactive



Water storage will be applied through the different scales

Relieve heatstress

Increase biodiversity

Clean soil

The area functions as a sustainable water community

Make inhabitants decide together on water storage

Create a connection between every household and the water storage system

Allow for households to work together on storage

Allow inhabitants to work on the maintenance of the water storage elements

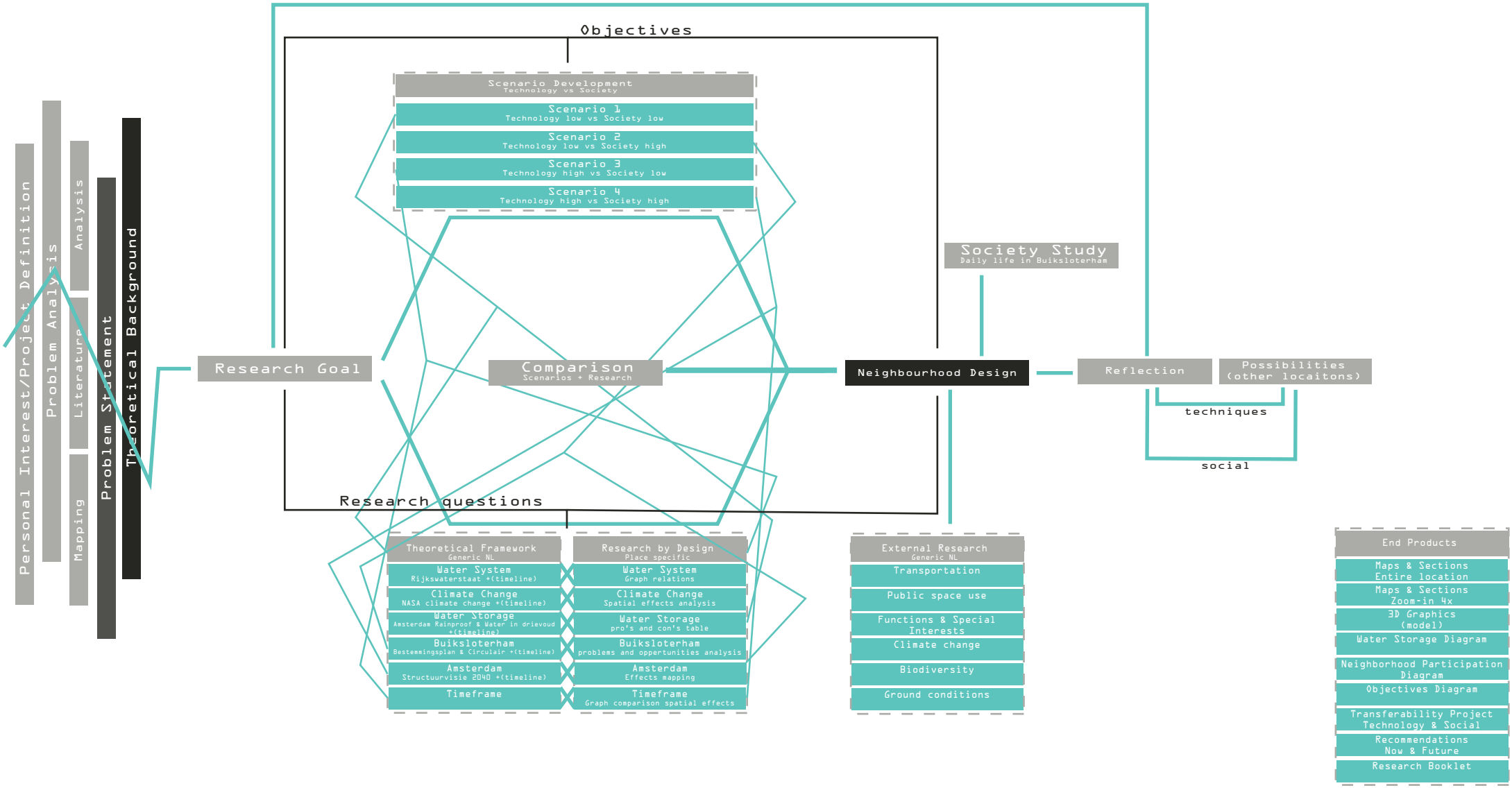
Self-sufficient in water use

Water becomes part of the identity

Re-use rainwater

Re-use grey water

Create good quality water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Problem Analysis
Literature Analysis
Mapping
Problem Statement
Theoretical Background
Objectives
Scenario Development
Technology vs Society
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Scenario 2
Technology low vs Society high
Scenario 3
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Scenario 4
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Comparison
Scenarios + Research
Neighbourhood Design
Society Study
Daily life in Buiksloterham
Reflection
Possibilities
(other locaitons)
techniques
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Research questions
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Structuurvisie 2040 +(timeline)
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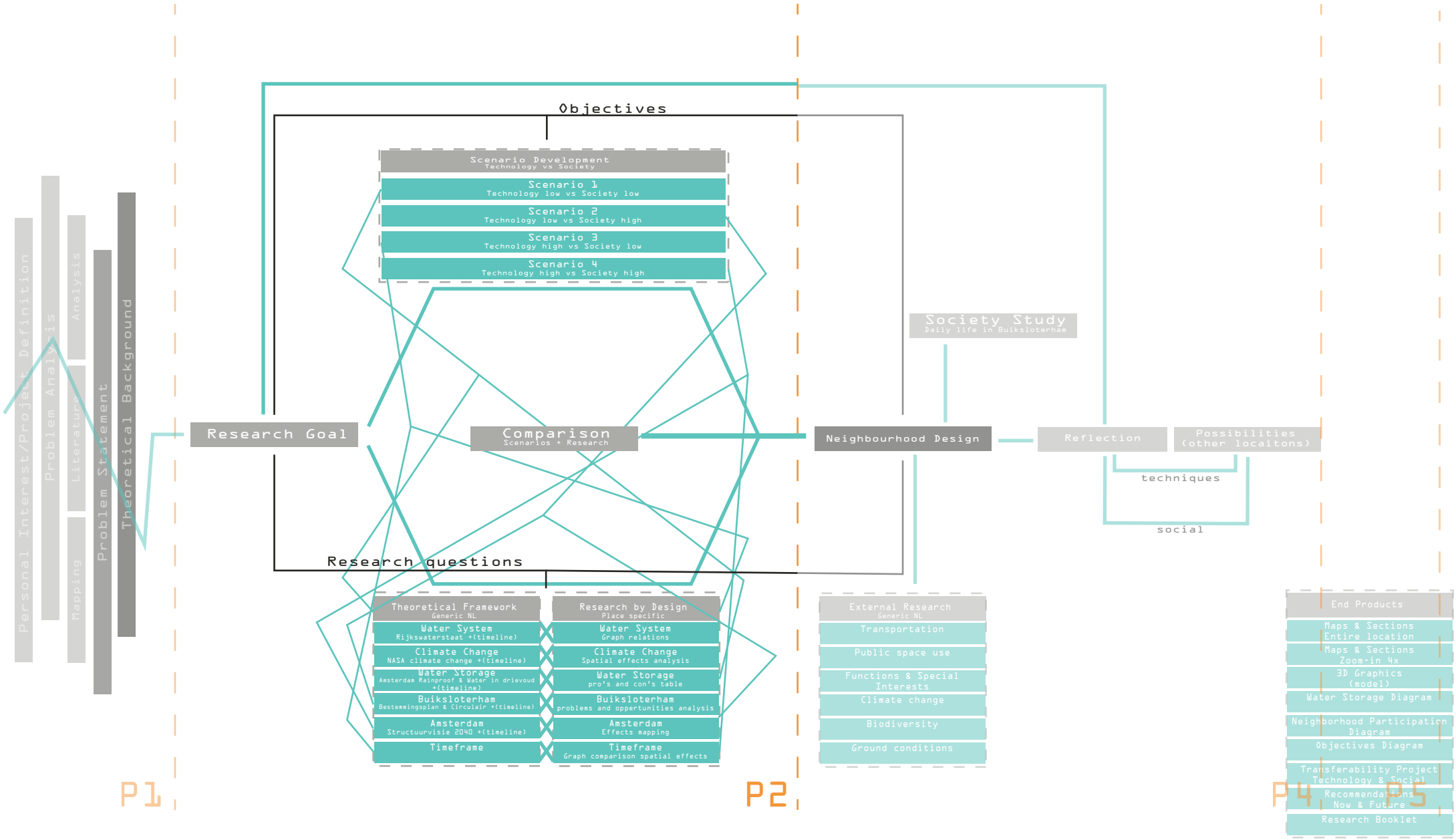
Biodiversity
Ground conditions
End Products
Maps & Sections
Entire location
Maps & Sections
Zoom-in 4x
3D Graphics
(model)
Water Storage Diagram
Neighborhood Participation Diagram
Objectives Diagram
Transferability Project
Technology & Social
Recommendations
Now & Future
Research Booklet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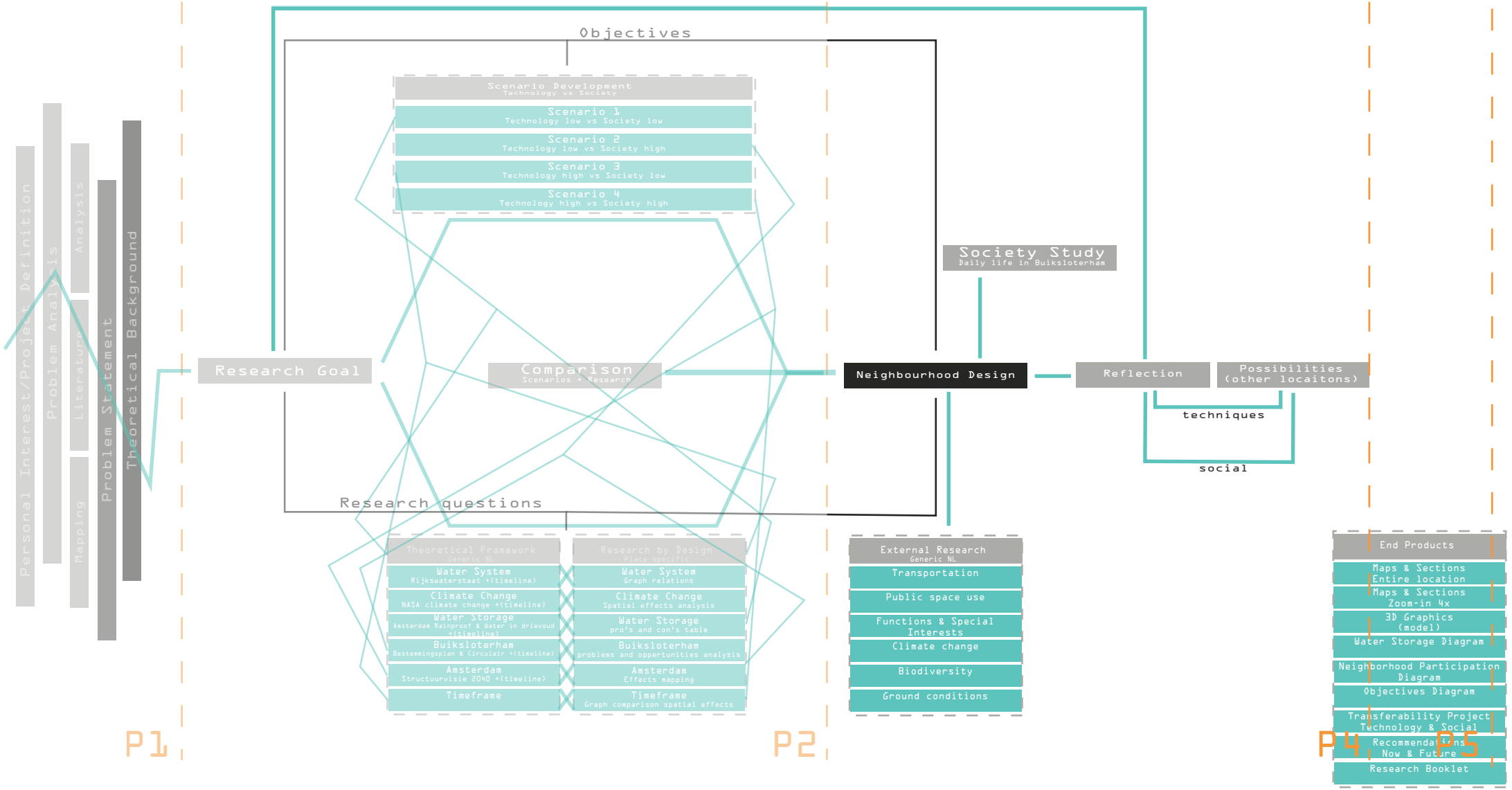
P5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SCENARIO APPROACH

Society
High

WATER
COMMUNITY

SUSTAINABLE
NEIGHBOURHOOD

Technology
Low

Technology
High

GREEN
NEIGHBOURHOOD

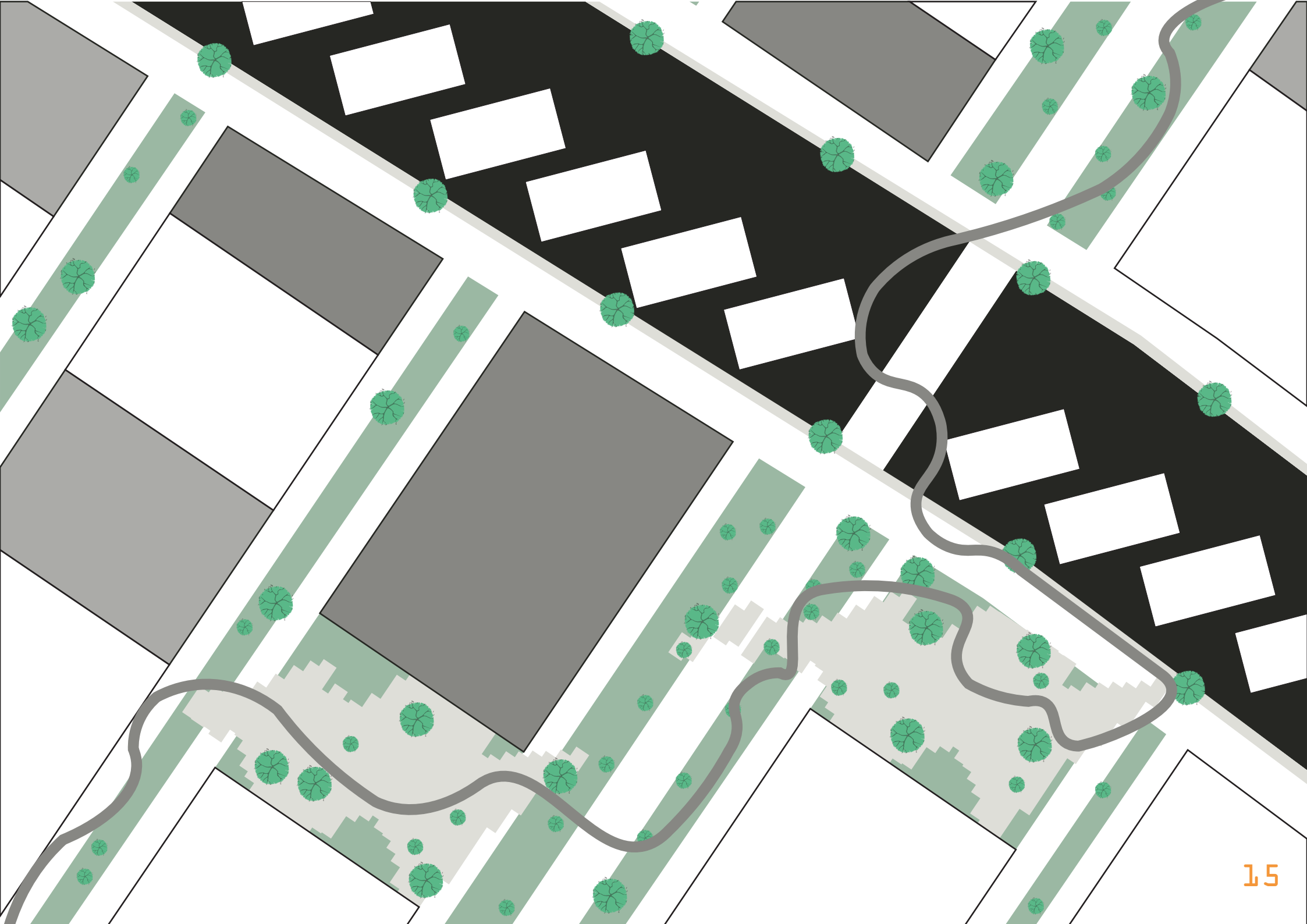
Society
Low

TECHNOLOGY
COMMUNITY

SCENARIO APPROACH

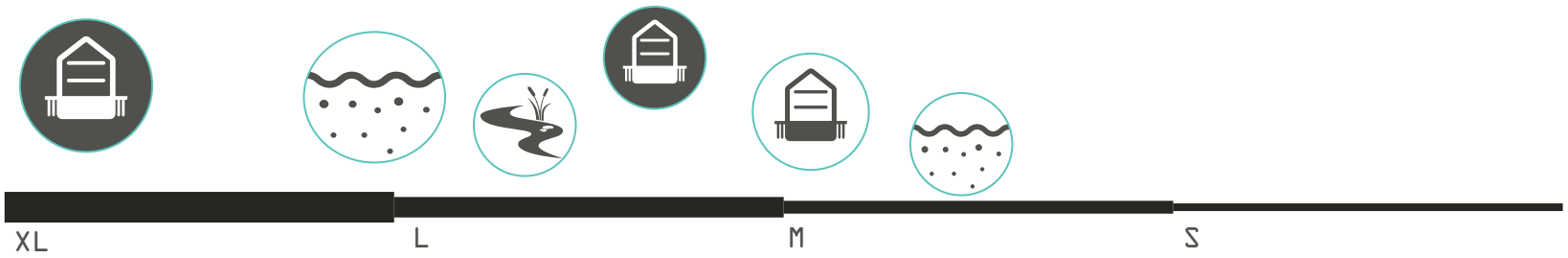
Scenario 0: GREEN NEIGHBOURHOOD. Self-sufficient, zero perspective, low visibility
Scenario 1: WATER COMMUNITY, living with water, natural storage, flexible flood areas
Scenario 2: TECHNOLOGY COMMUNITY, integrated storage, large scale, waterfront
Scenario 3: SUSTAINABLE COMMUNITY, integrated storage, through scales, connected

SCENARIO 0



THE METHODS


Rainwater ponds
Wadi
Storage under buildings
Underground storage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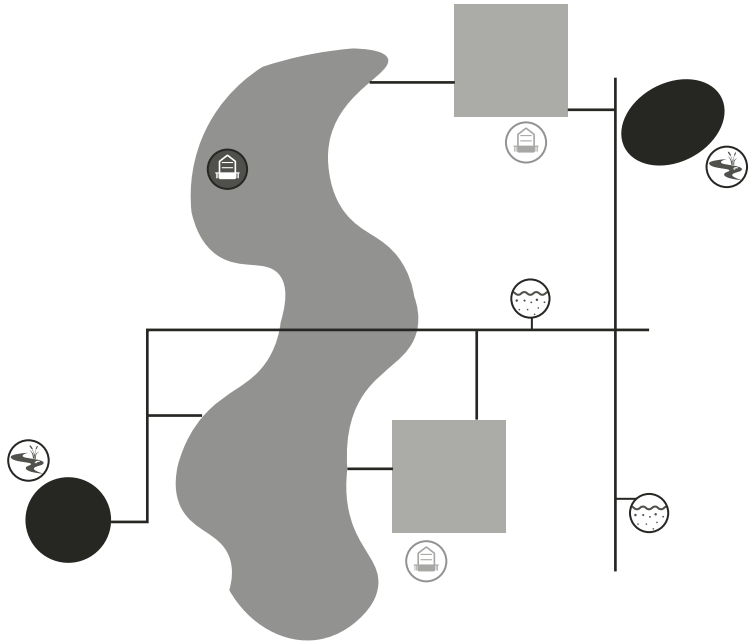
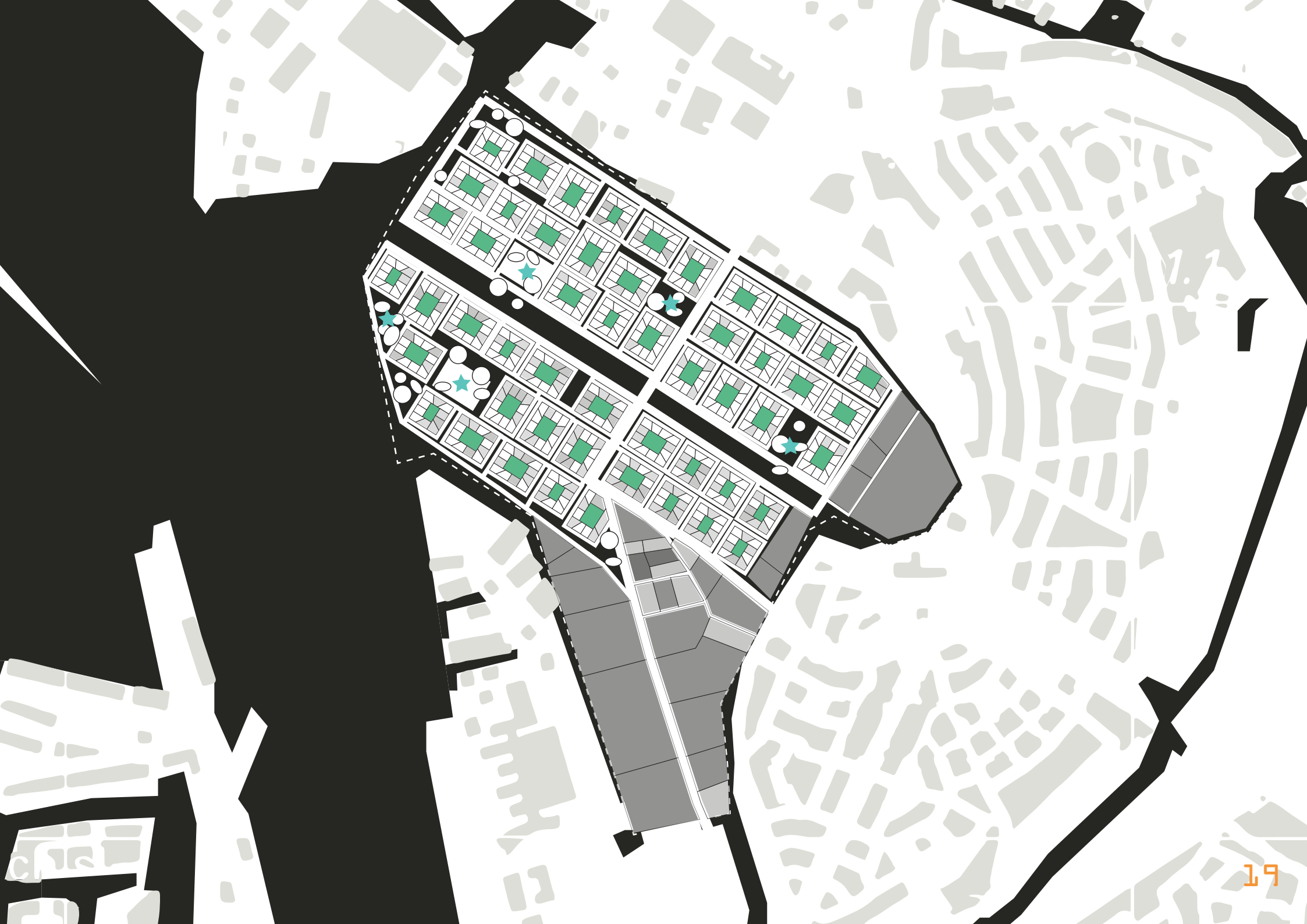
THE PRINCIPLE



THE PRINCIPLE

SCENARIO 1

S1 reference beeld



Rainwater ponds

Rainbarrels

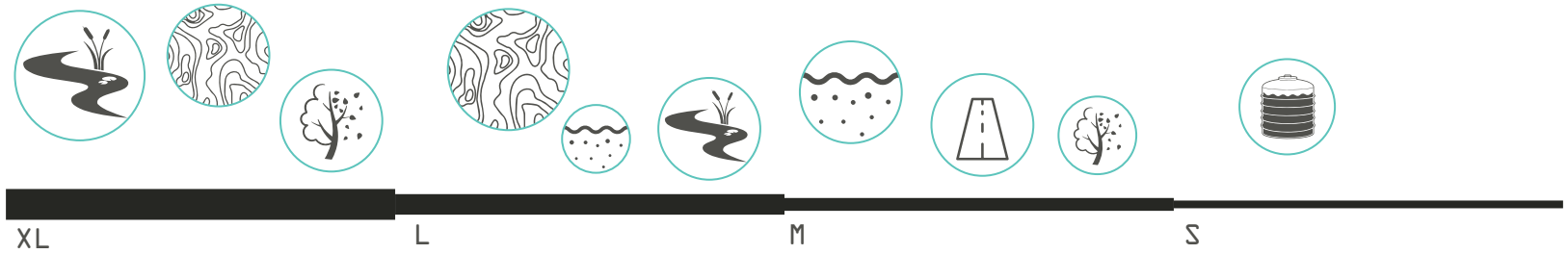
Urban waterways

Wadi

Relief

Seasonal storage

THE METHODS



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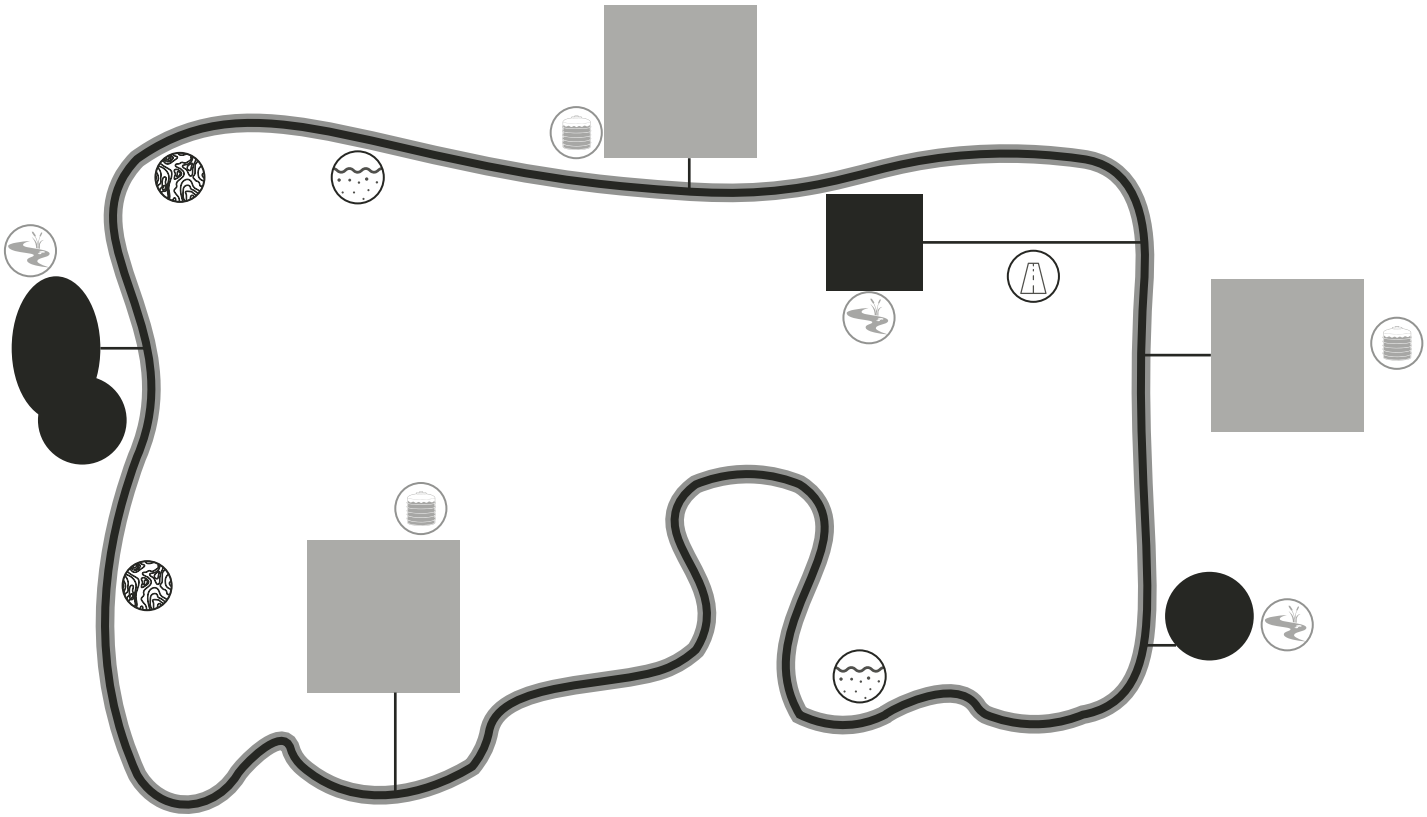

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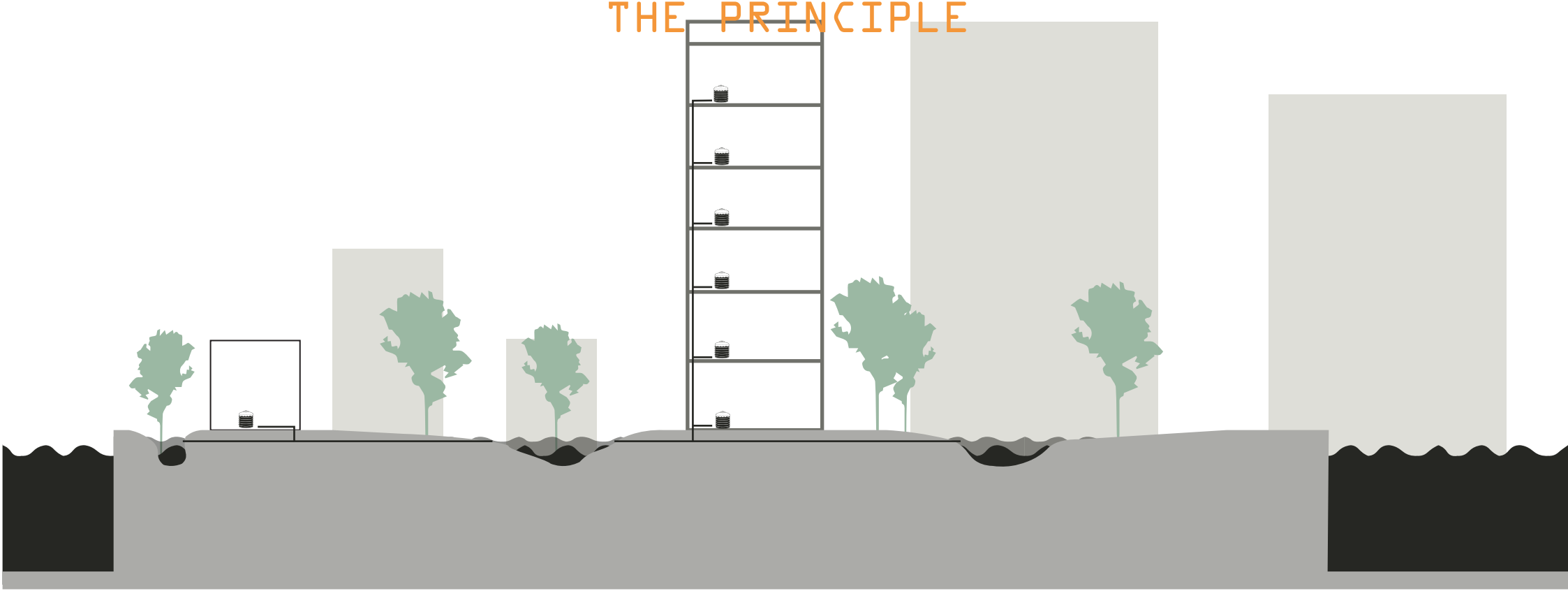
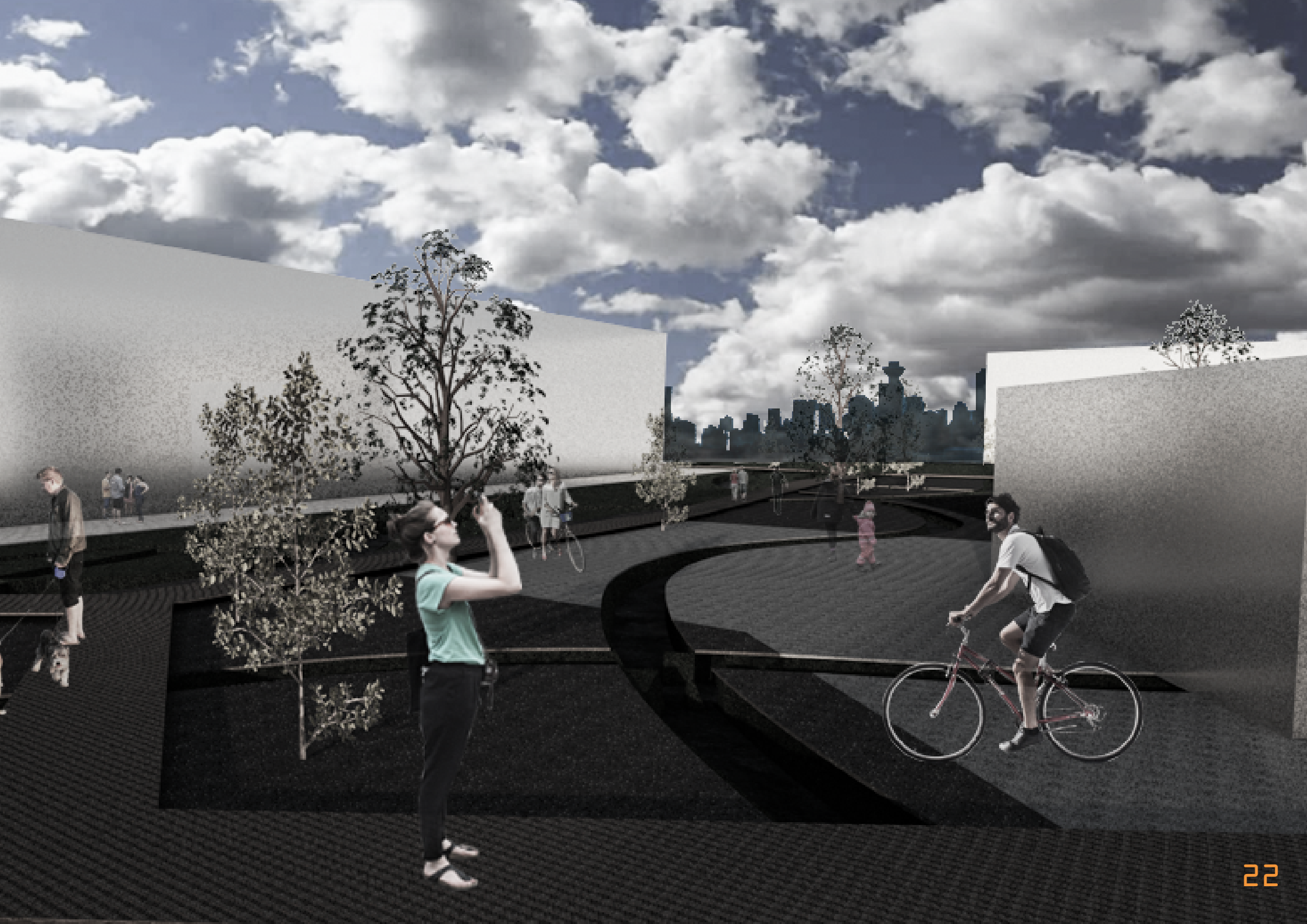
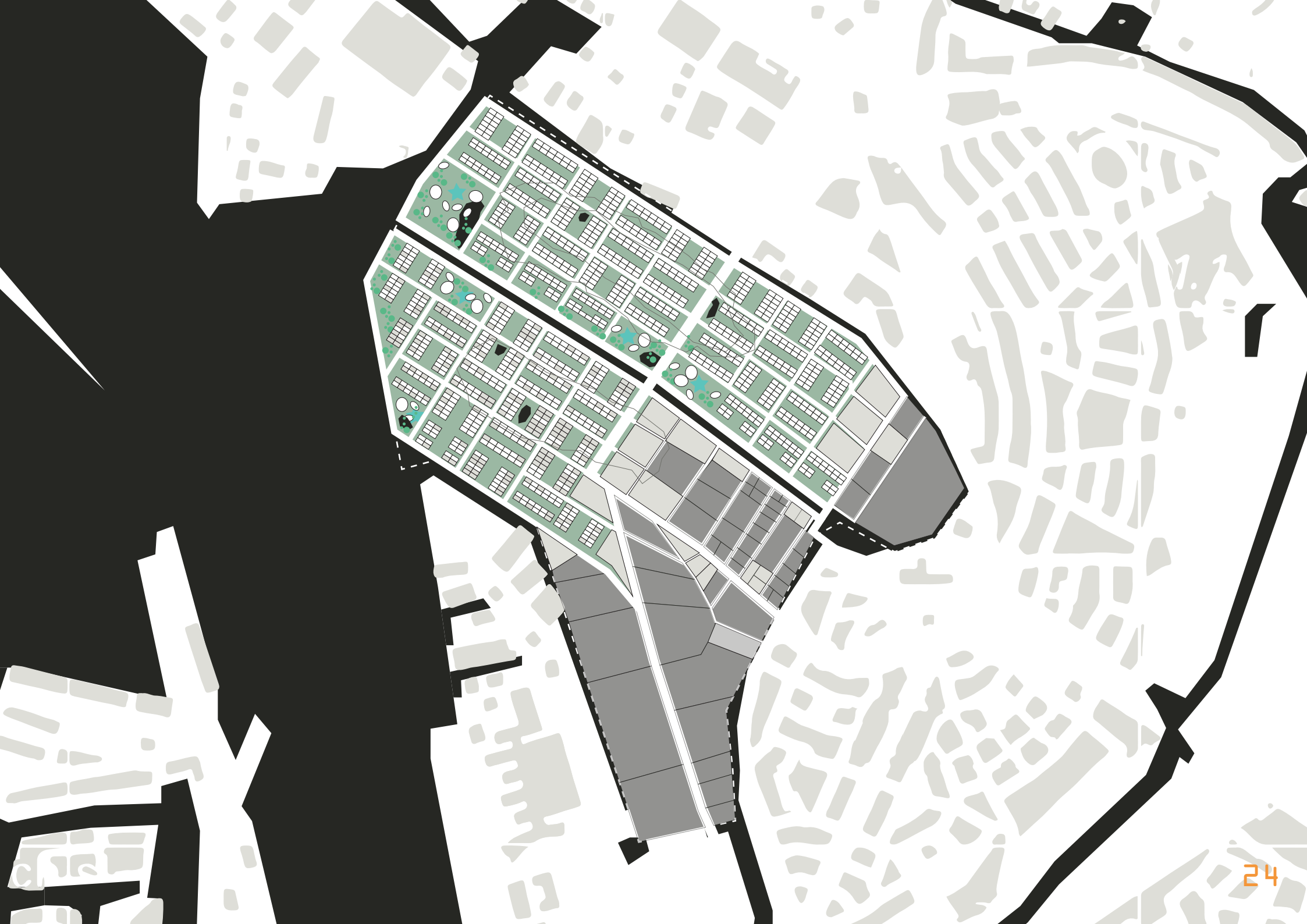




SCENARIO 2



Rainwater ponds

Intensive green roof

Relief

Infiltration barrels

Watersquares

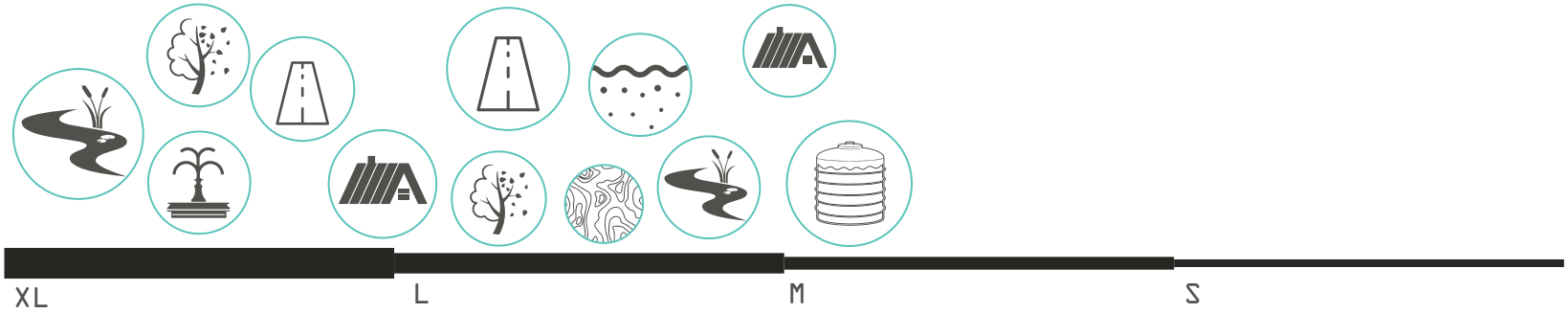
Urban waterways

Seasonal storage

Water roofs

Wadi

THE METHODS



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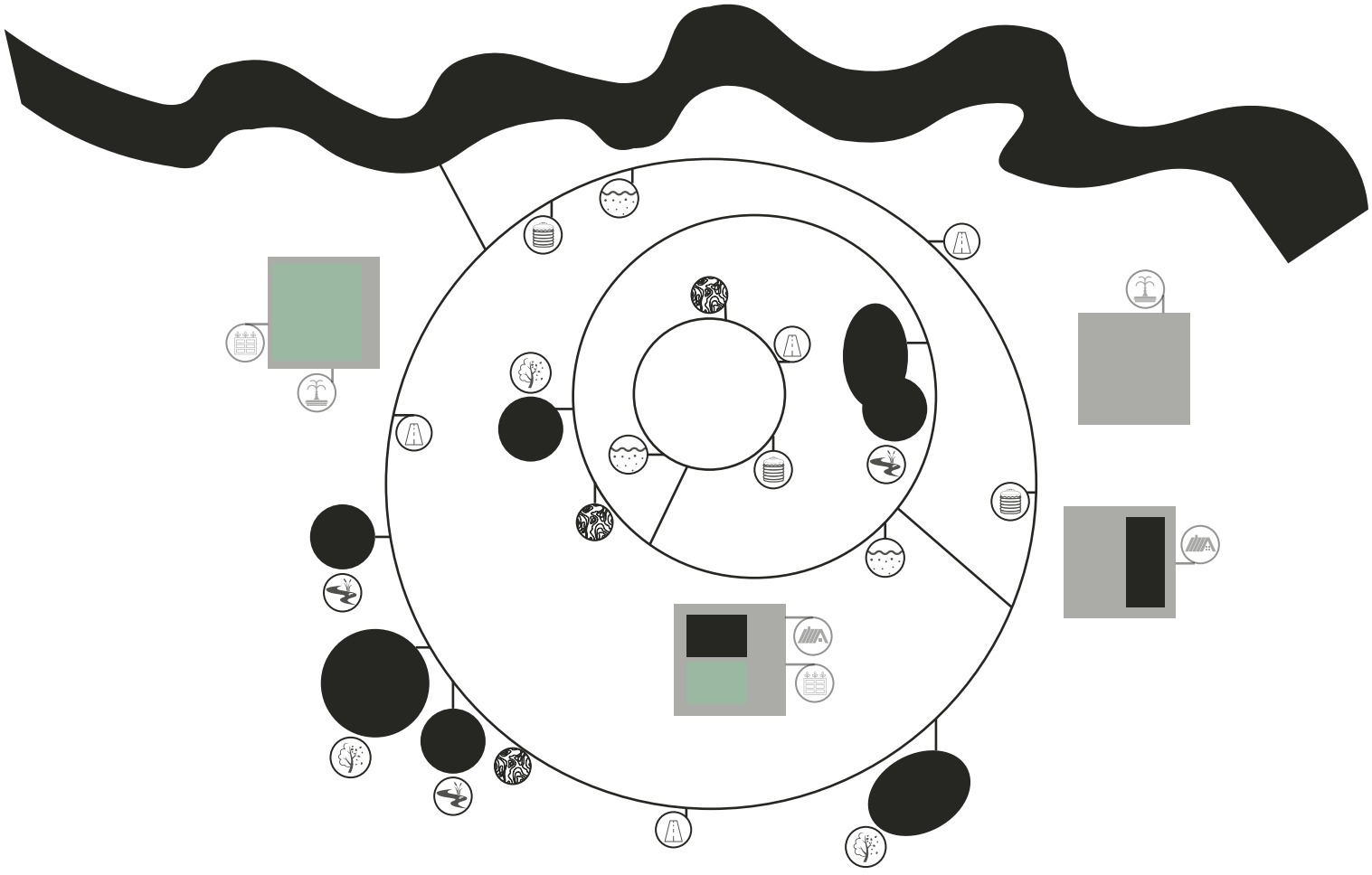

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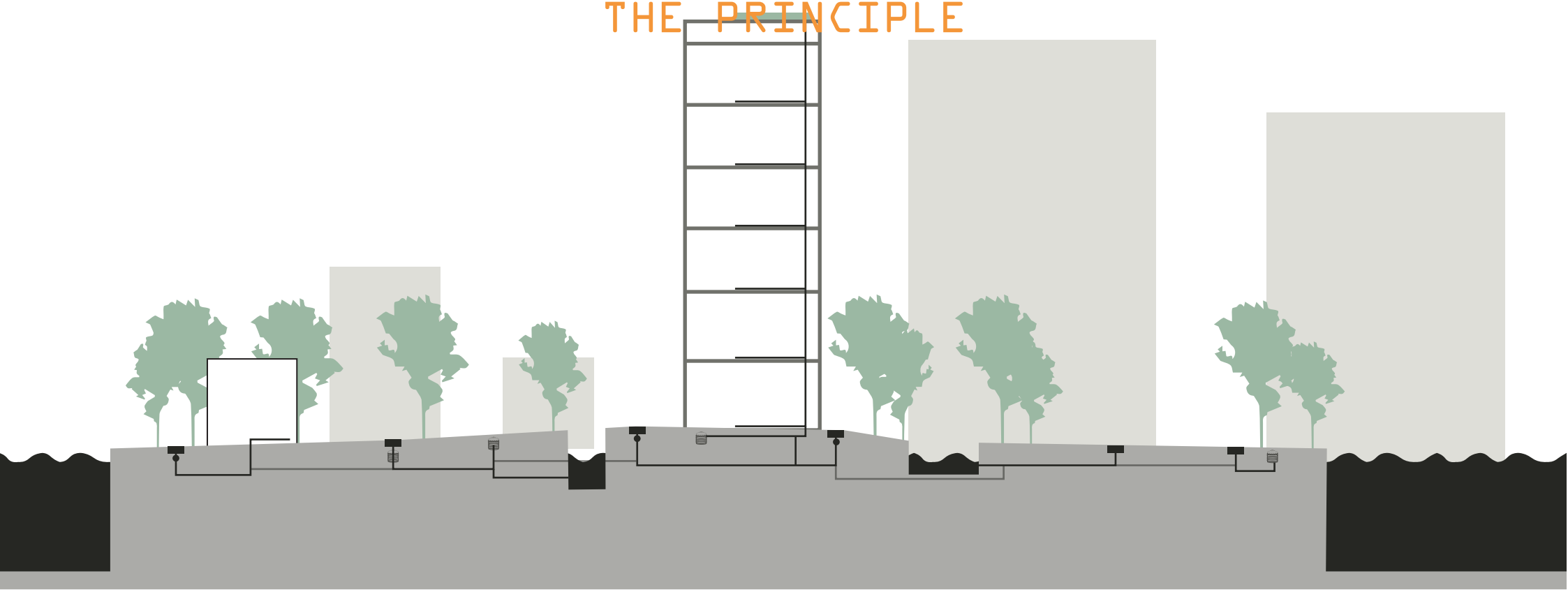
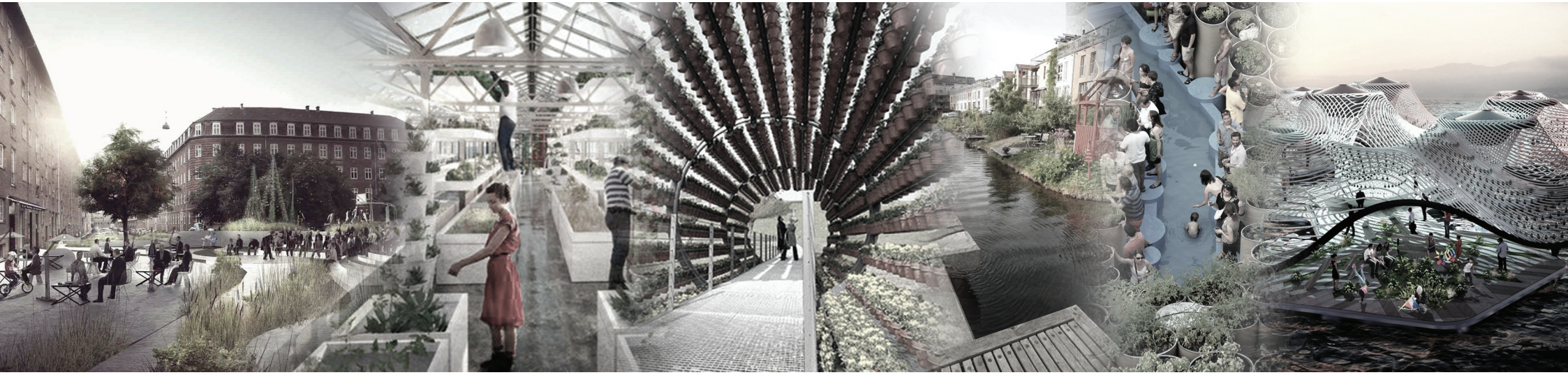
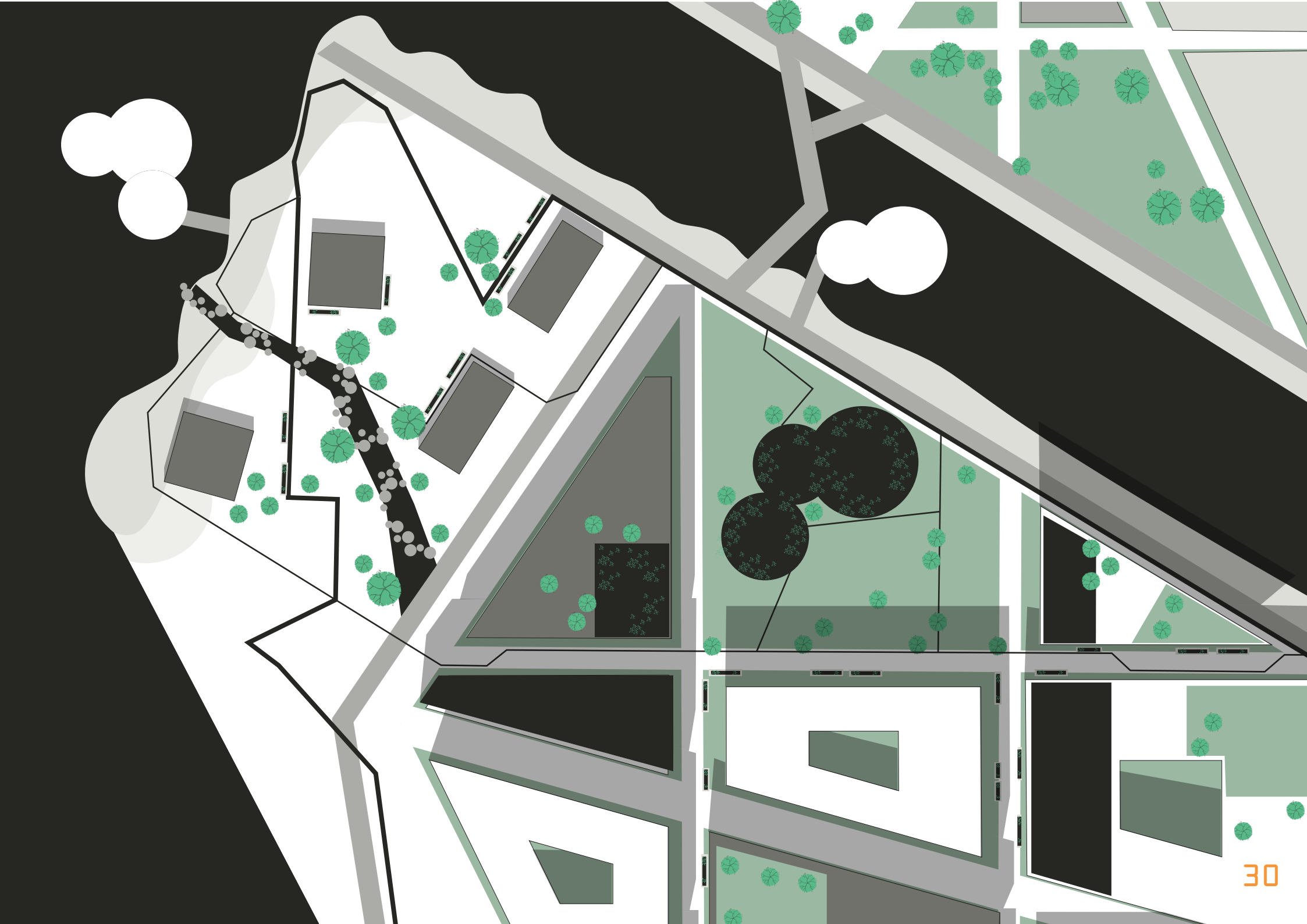


SCENARIO 3





Rainwater ponds

Intensive green roof

Rainbarrels

Infiltration barrels

Watersquares

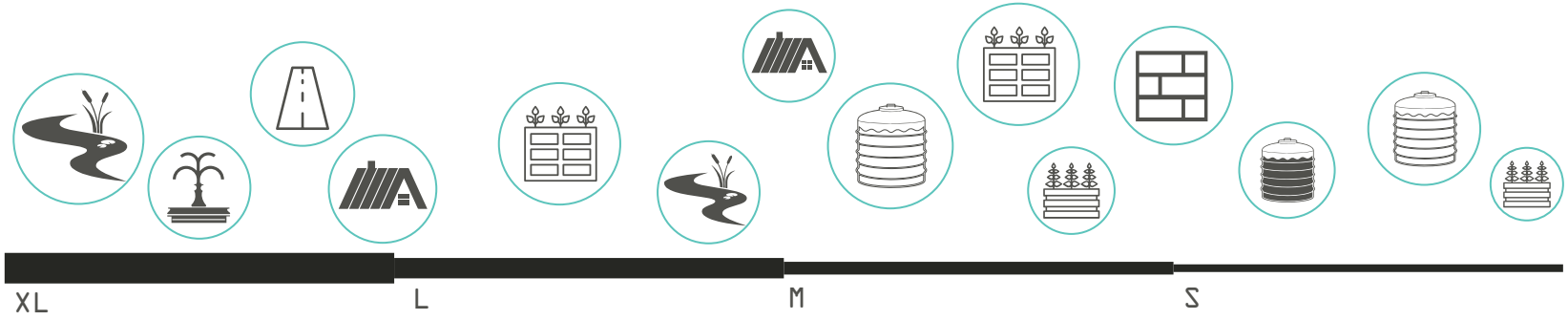
Urban waterways

Water holding planters

Water roofs

Water walls

THE METHODS



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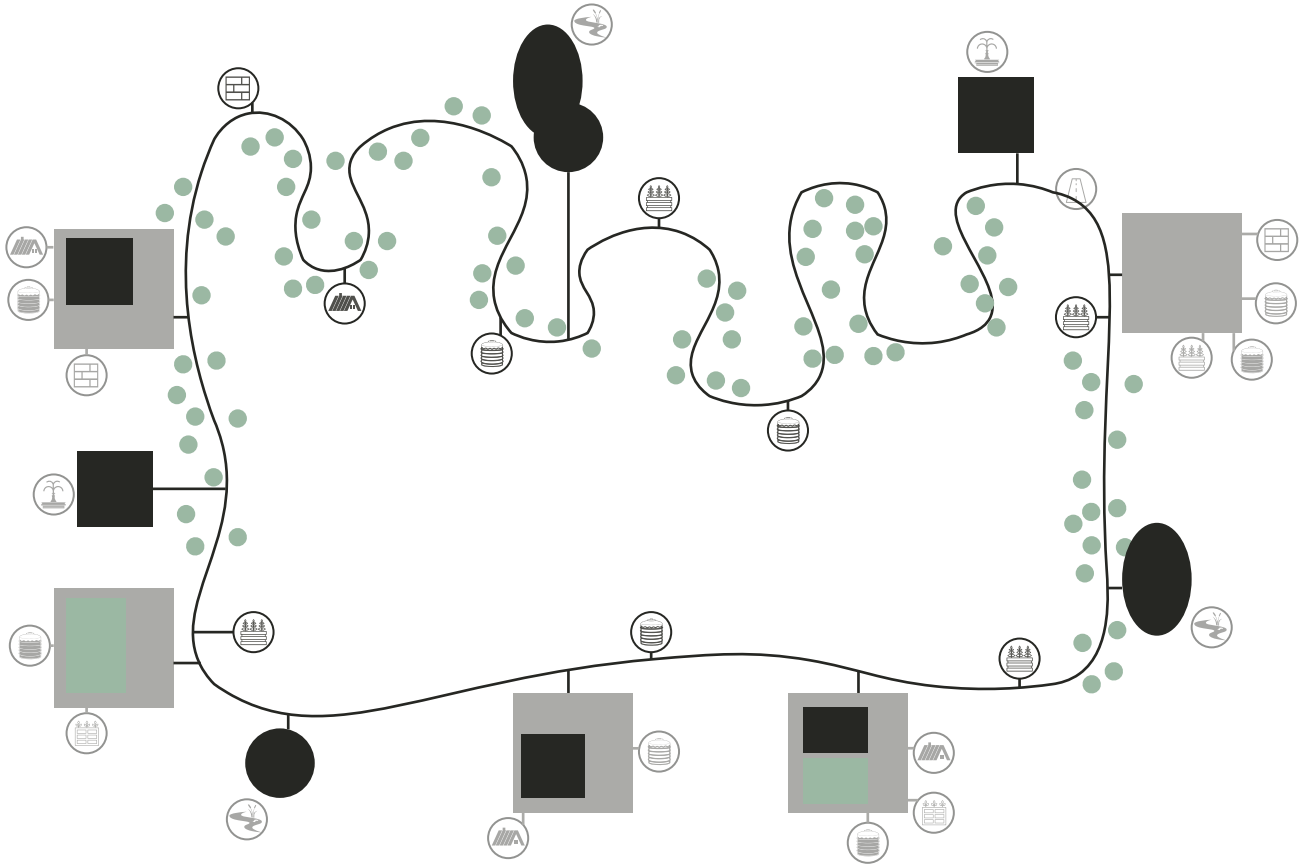

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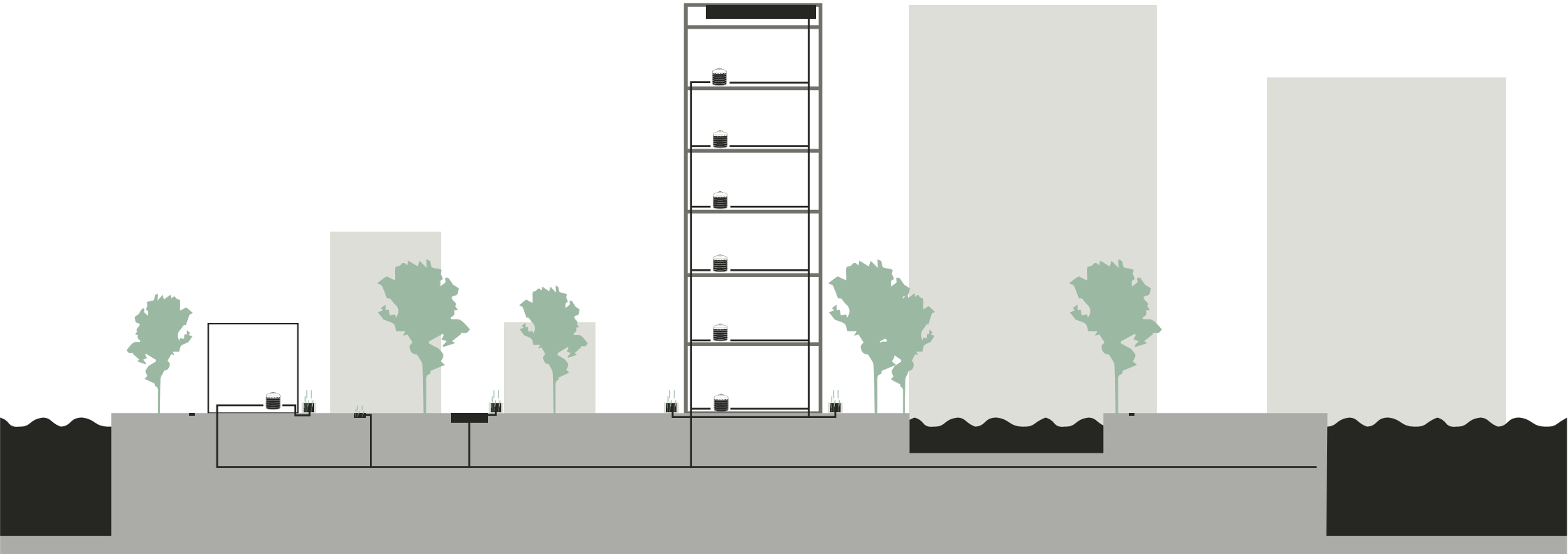

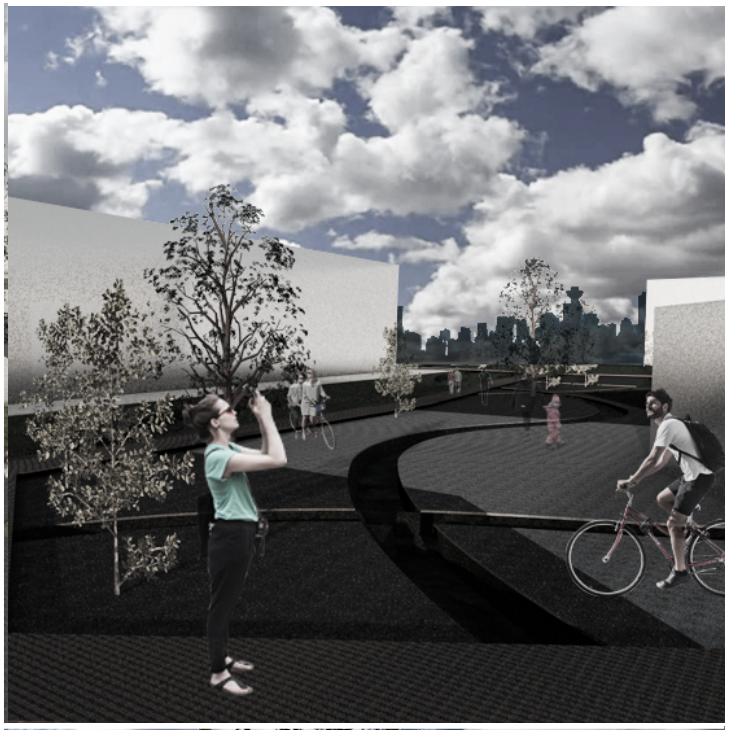

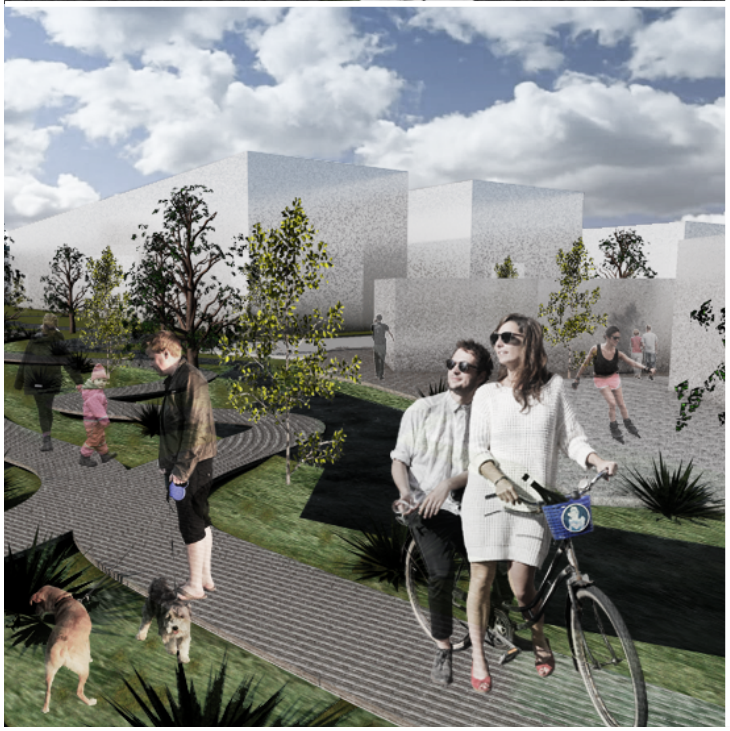

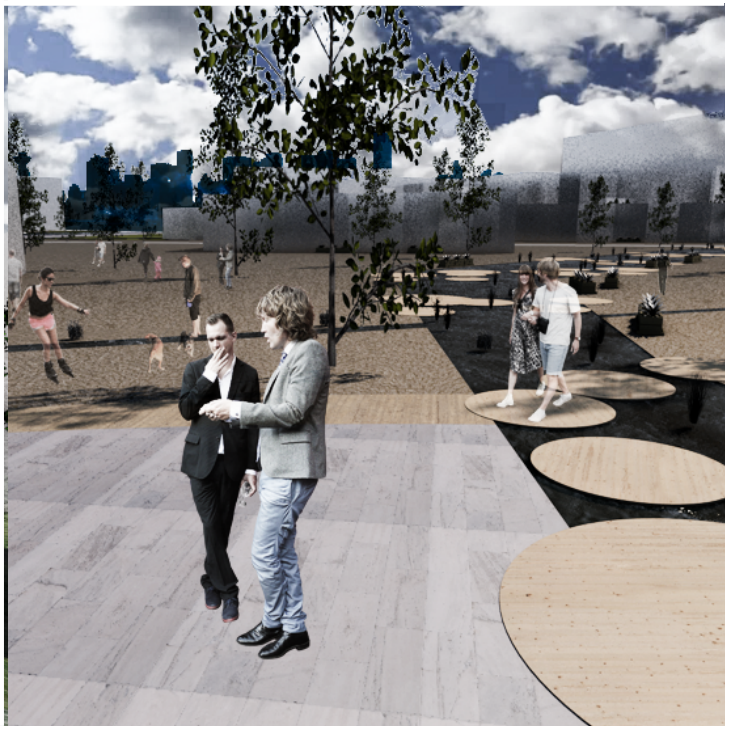

PICK & CHOOSE

		SCENARIO 0	SCENARIO 1	SCENARIO 2	SCENARIO 3
WATERSYSTEM	direct connection IJ		✓	✓	✓
	no additional flood defense		✓	✓	
	heavy rain stress	✓	✓	✓	✓
CLIMATE CHANGE	heavy rainfall	✓	✓	✓	✓
	heat stress		✓	✓	✓
	increased flood risk		✓	✓	✓
	longer dry periods	✓		✓	✓
WATERSTORAGE	visible water storage		✓	✓	✓
	interactive storage				✓
	flexible storage	✓	✓	✓	✓
	storage through scales		✓	✓	✓
	selfsufficient water use BSH	✓		✓	✓
BUIKSLOTERHAM	visible water		✓	✓	✓
	water in public space		✓	✓	✓
	connection houses with water		✓	✓	✓
TIMEFRAME	day/night dependency			✓	✓
	seasonal variation	✓	✓	✓	✓
	lifespan	50-100 years	50-100 years	50-100 years	5-50 years
AMSTERDAM	selfsufficient water use BSH	✓		✓	✓
	relieve stress sewage system	✓	✓	✓	✓
	transferability technology	✓	✓	✓	✓
	transferability social aspect		✓		✓
SUSTAINABLE AWARENESS	connecting people				✓
	feedback from municipality			✓	✓
	connection houses with water		✓	✓	✓
	storage through scales		✓		✓

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	interactive storage				✓
	flexible storage	✓	✓	✓	✓
	storage through scales		✓	✓	✓
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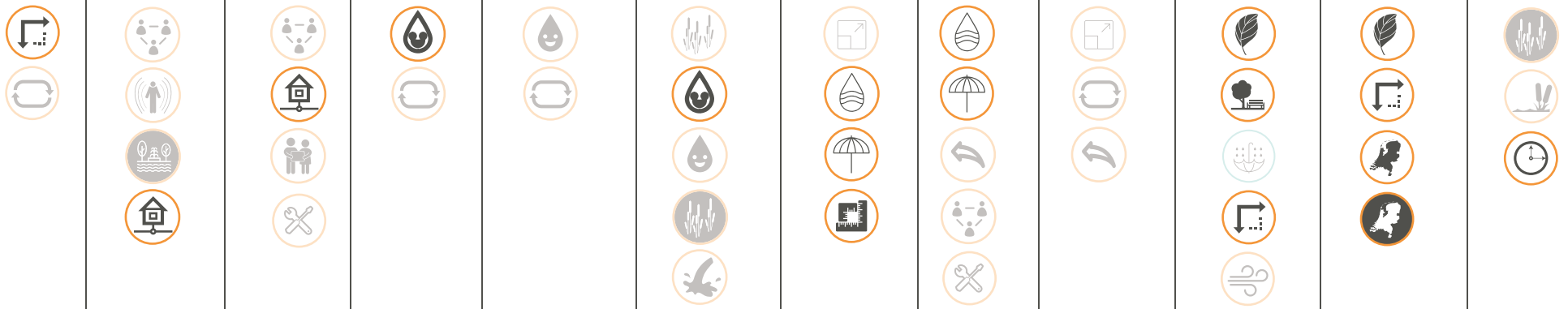
	relieve stress sewage system	✓	✓	✓	✓
	transferability technology	✓	✓	✓	✓
	transferability social aspect		✓		✓
SUSTAINABLE AWARENESS	connecting people				✓
	feedback from municipality			✓	✓
	connection houses with water		✓	✓	✓
	storage through scales		✓		✓

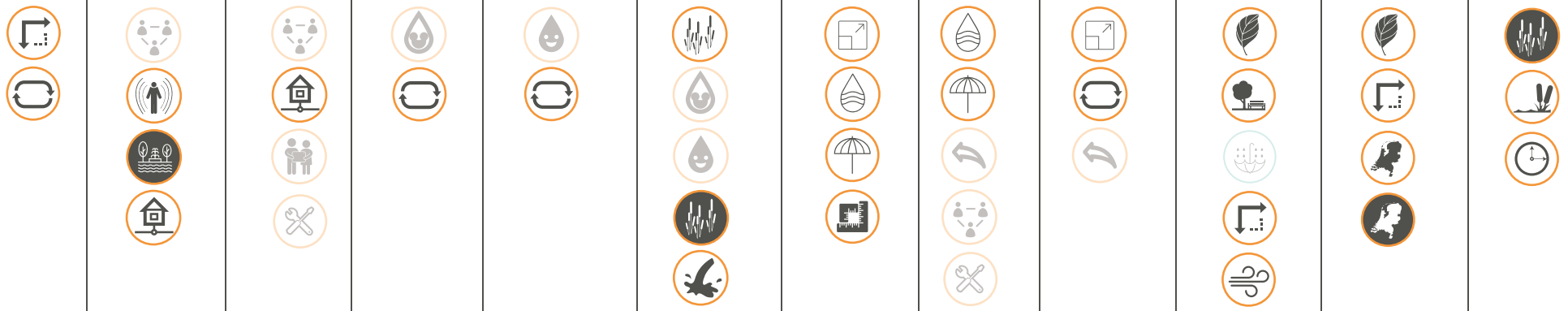
SCENARIO 0

0	−	− −	0	− −	− −	+ +	0	− −	+	+ +	−



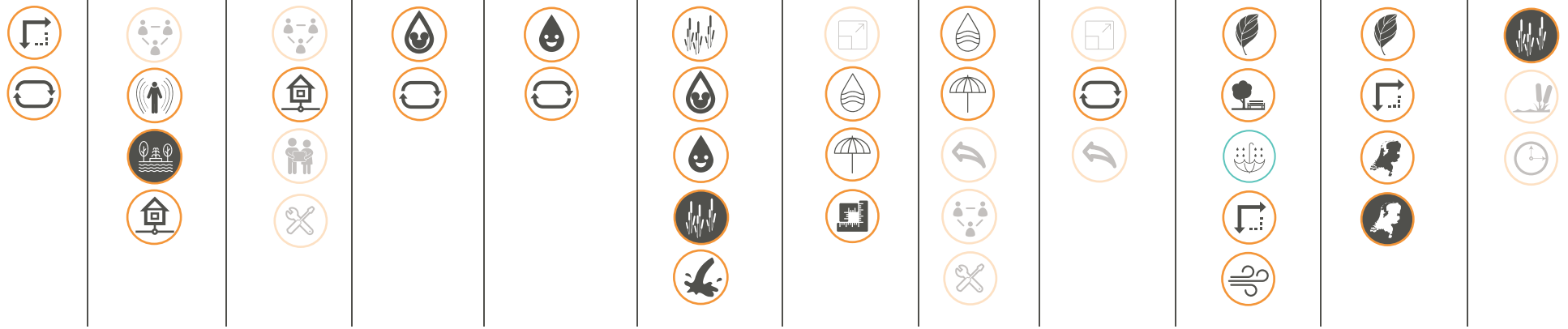
SCENARIO 1

+ +	+	− −	0	0	+	+ +	0	+	+ +	+ +	+ +



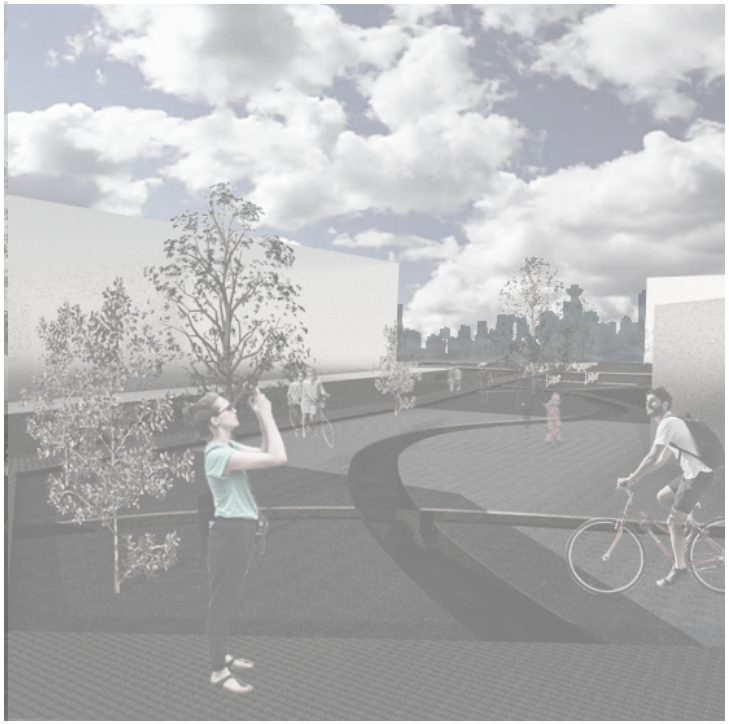
SCENARIO 2

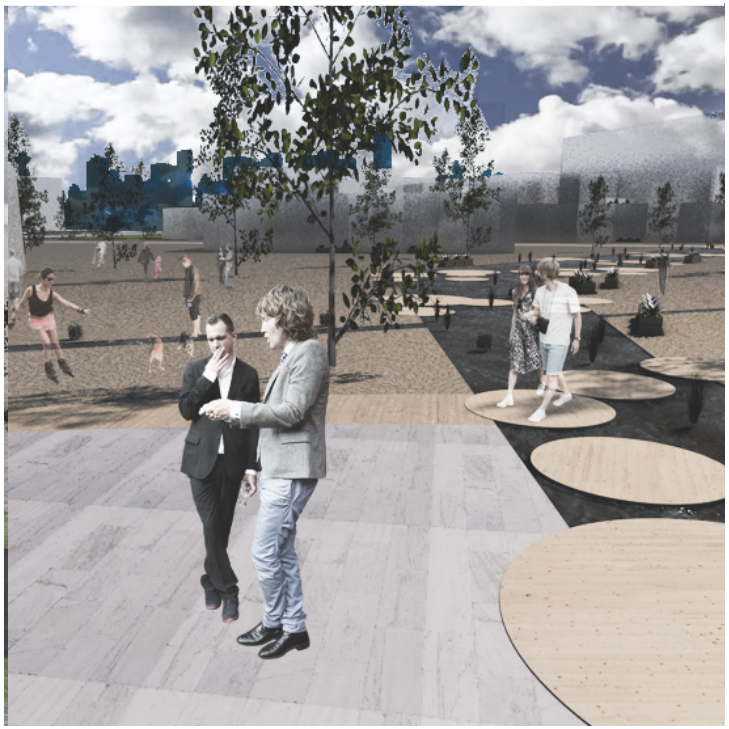
+ +	+ +	− −	+ +	+ +	+ +	+ +	0	−	+ +	+ +	−



SCENARIO 3

+ +	+ +	+ +	+ +	0	+ +	+ +	+ +	+ +	+ +	+ +	−





THE ONLY WAY TO MAKE AMSTERDAM THE MOST INNOVATIVE WATER CITY OF THE NETHERLANDS IS TOGETHER

INTERACTIVE WATER STORAGE FOR BUIKSLOTERHAM