# Narrative Infrastructure and Functional Heritage

The Renovation of the New Dutch Waterline around Utrecht

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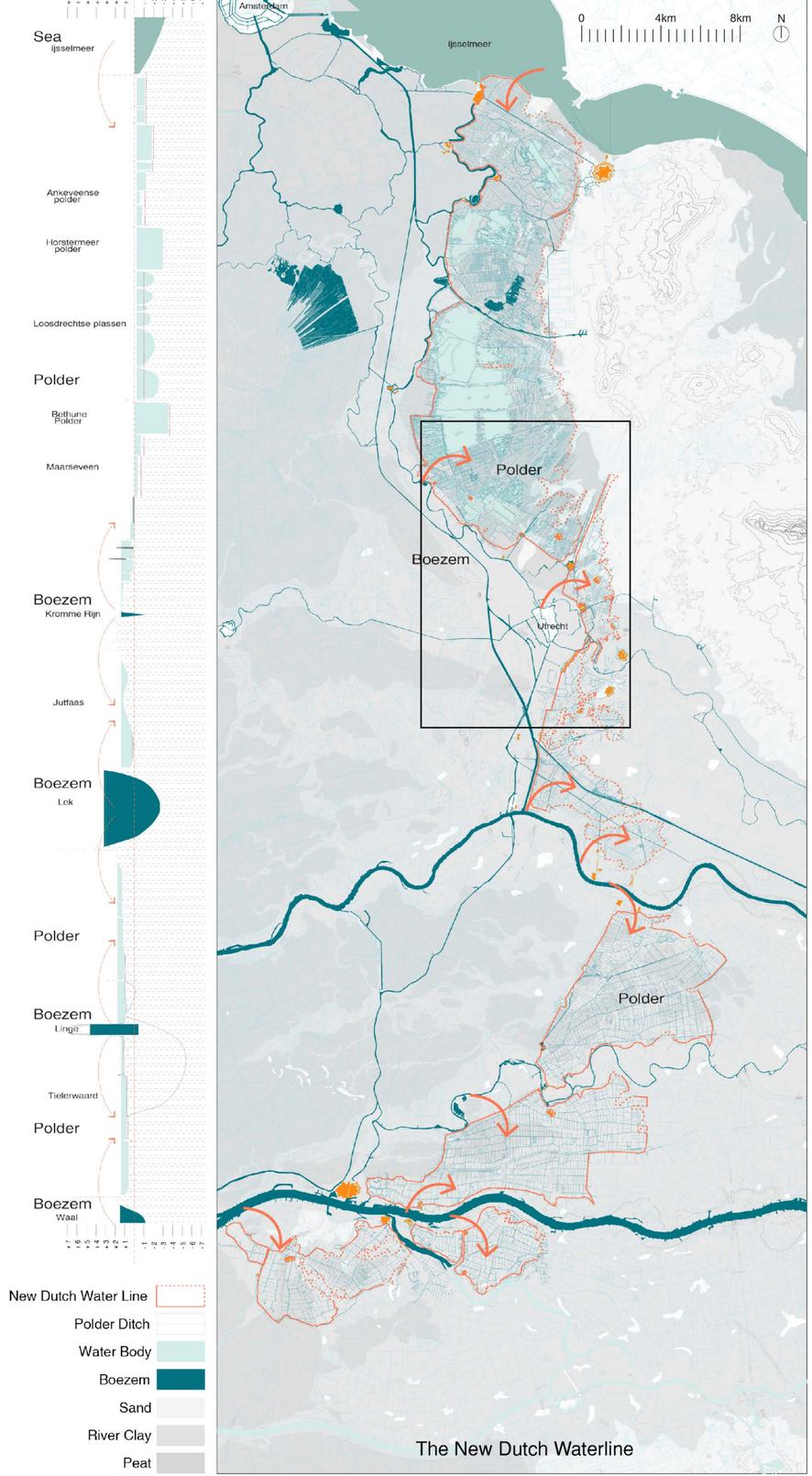
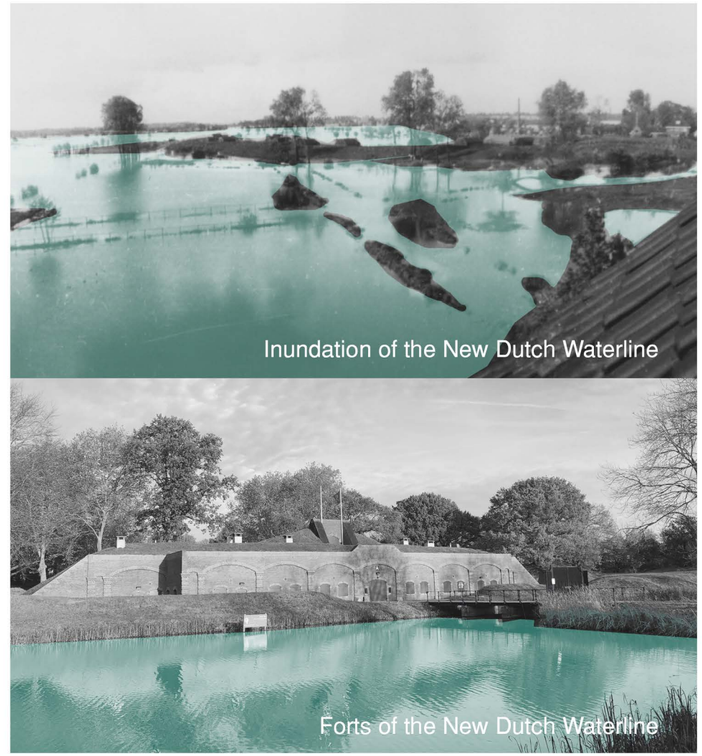
TUDelft Landscape Architecture
2019.5

# 1. Introduction

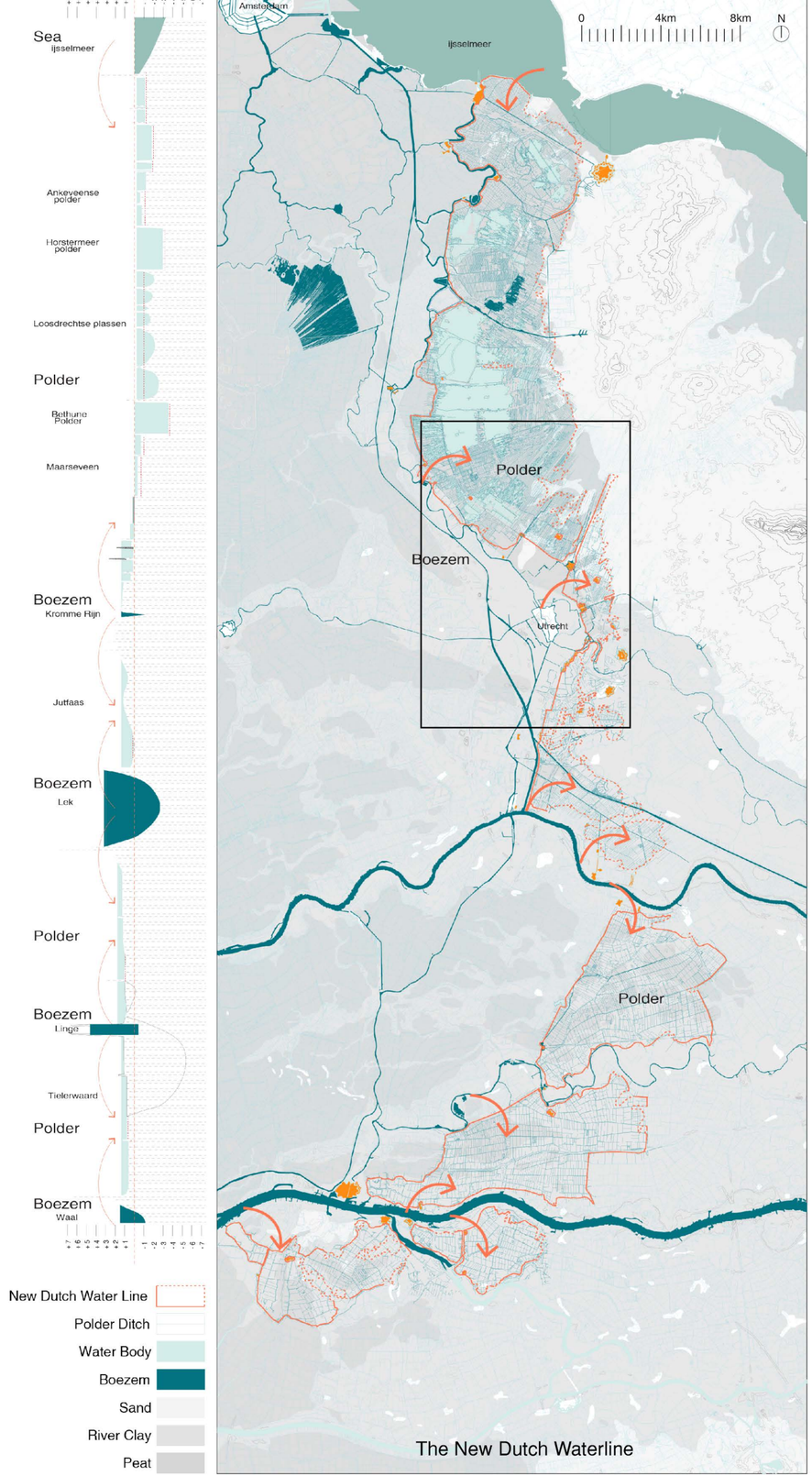
New Dutch Waterline in the Netherlands

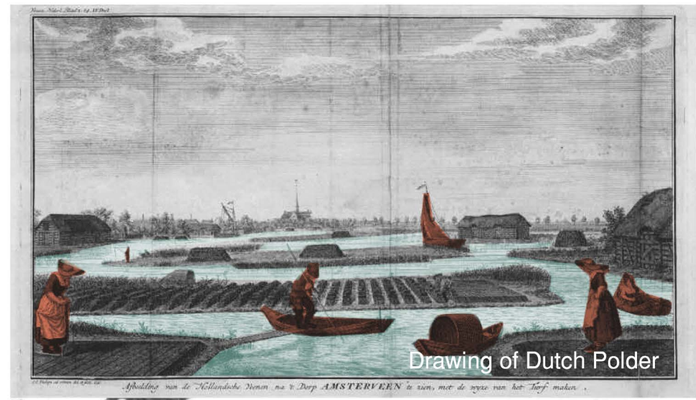
# The New Dutch Waterline



# The New Dutch Waterline

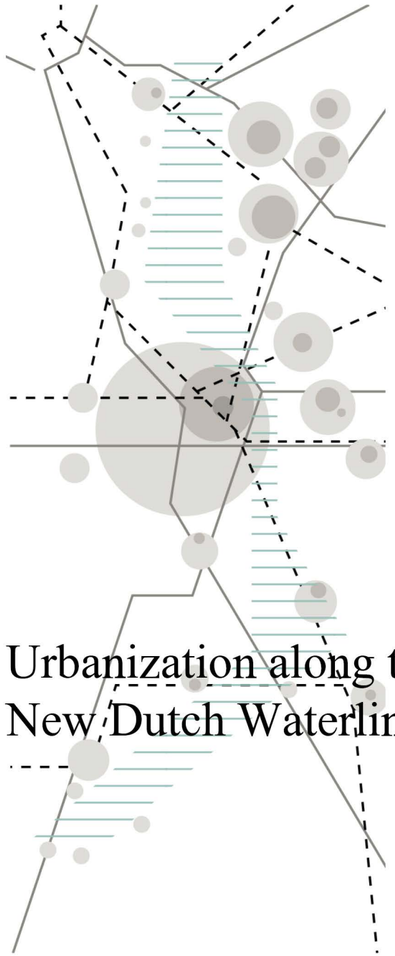




Drawing of Dutch Polder

Soldiers the New Dutch Waterline

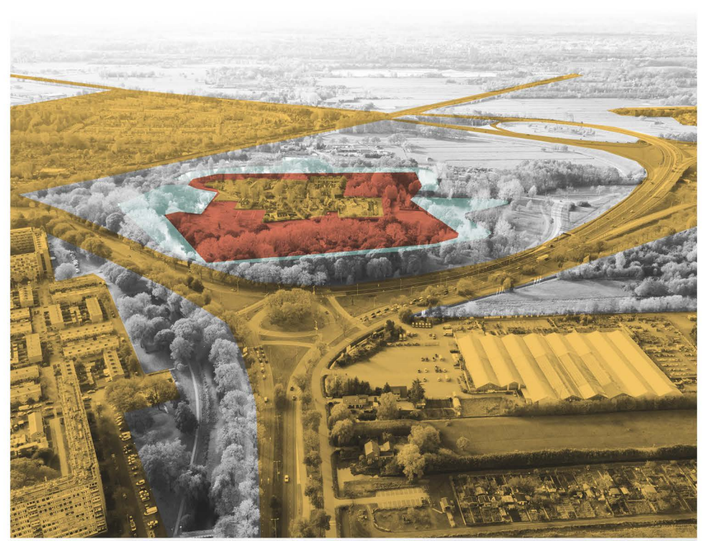
**Linie as Heritage and Infrastructure**

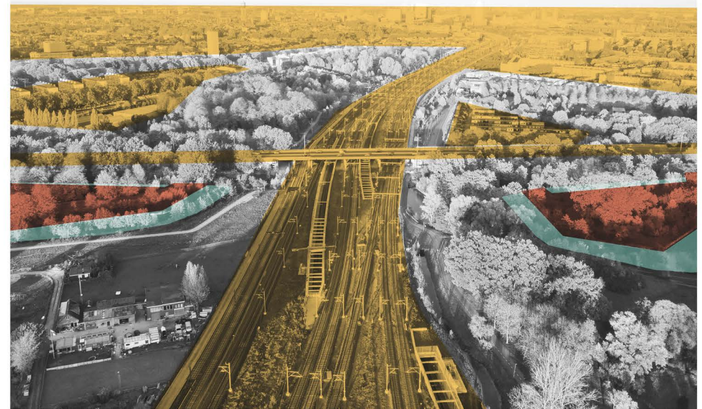
Introduction I Narrative Infrastructure and Functional Heritage

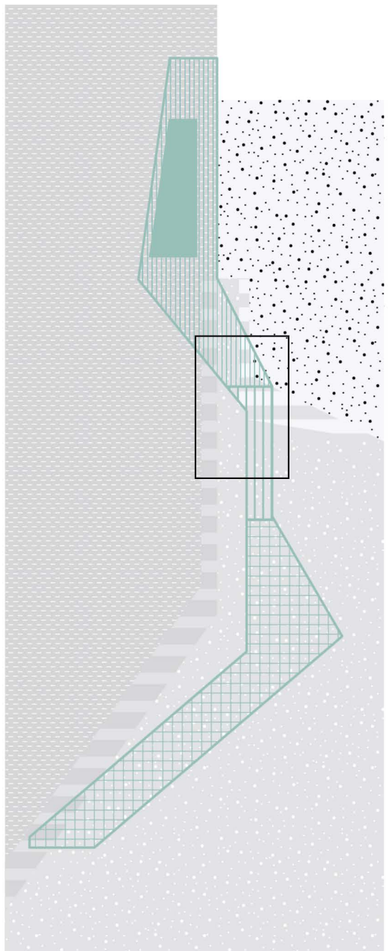


# Urbanization along the New Dutch Waterline

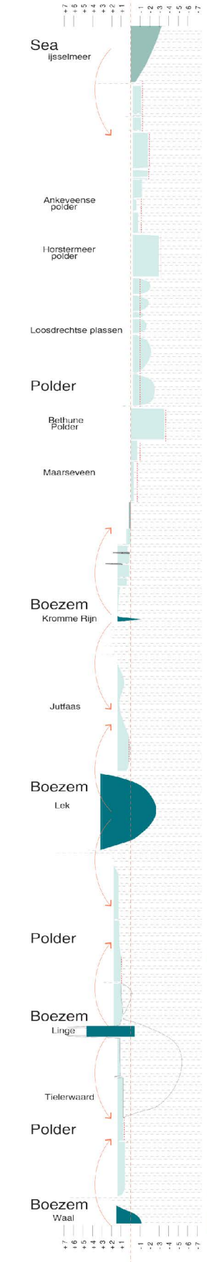
The New Dutch Waterline

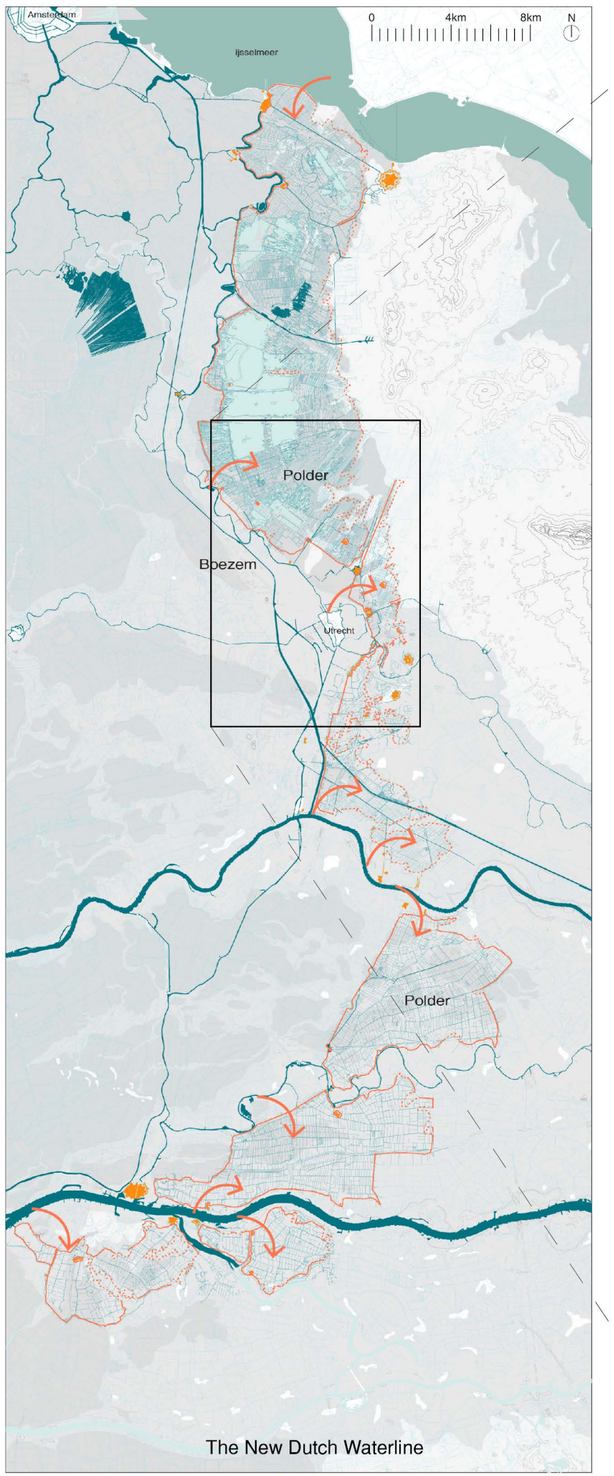




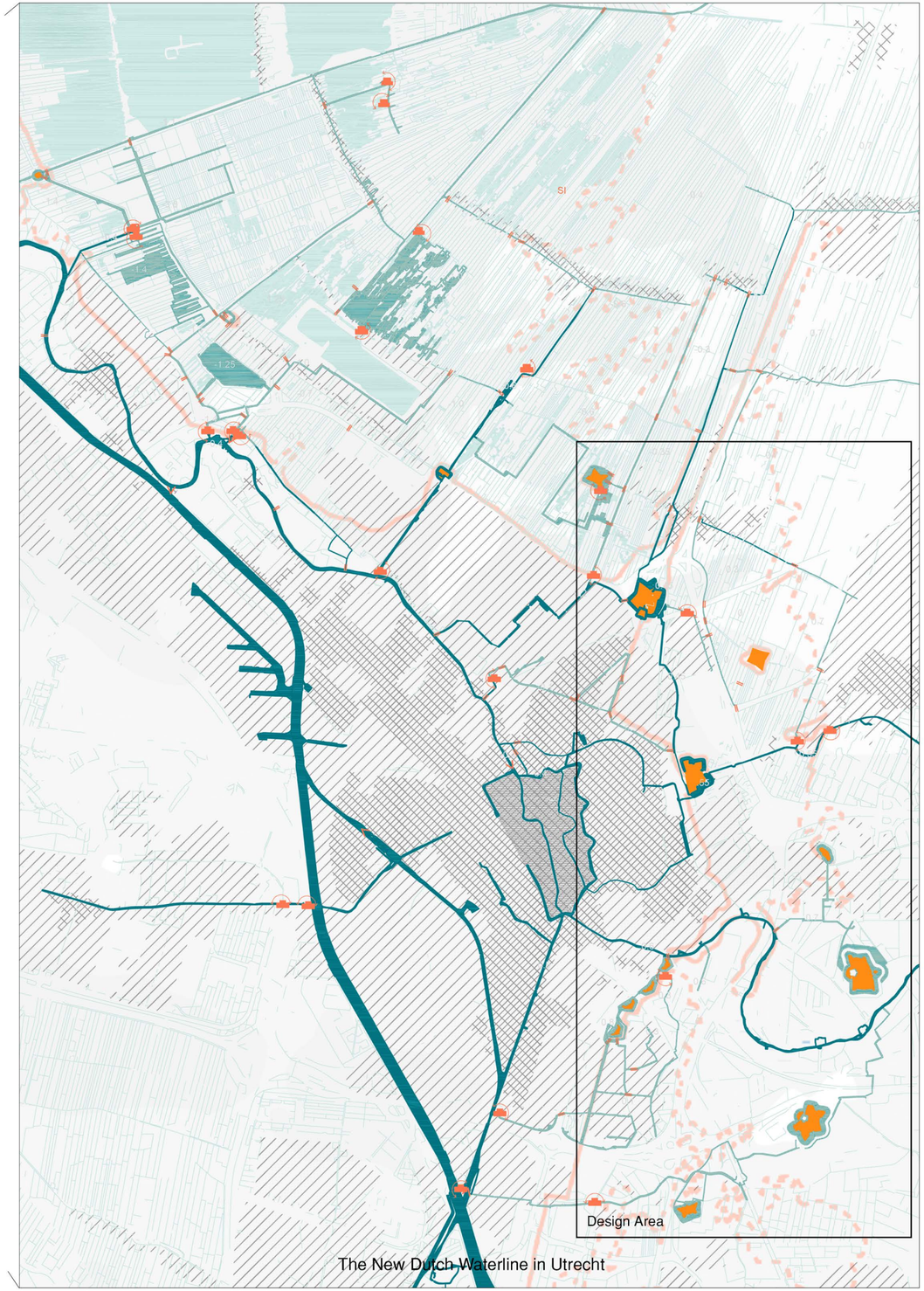


The New Dutch Waterline in different soil



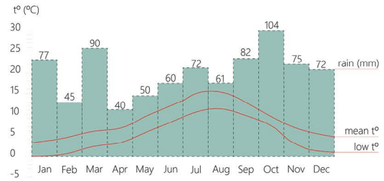

The New Dutch Waterline

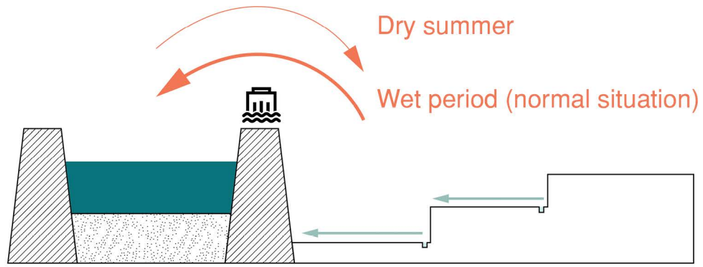


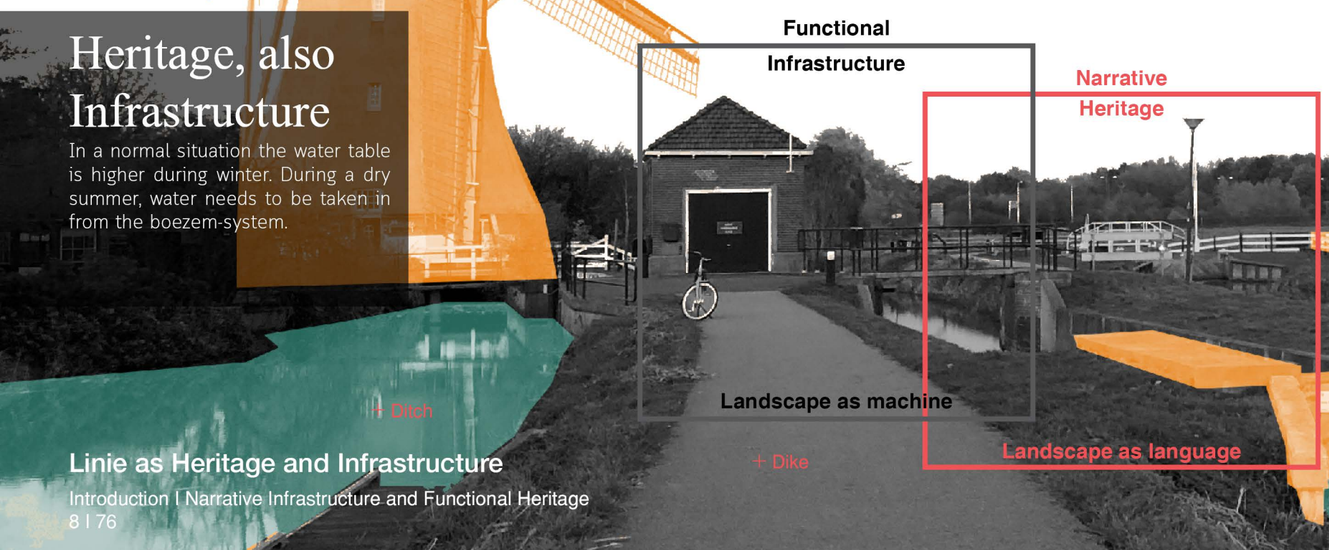

The New Dutch Waterline in Utrecht

## Linie as Heritage and Infrastructure

## Water direction during the normal days



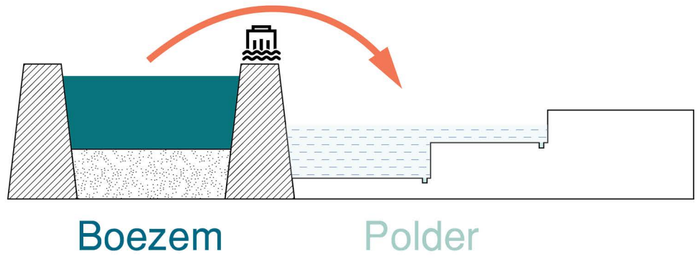



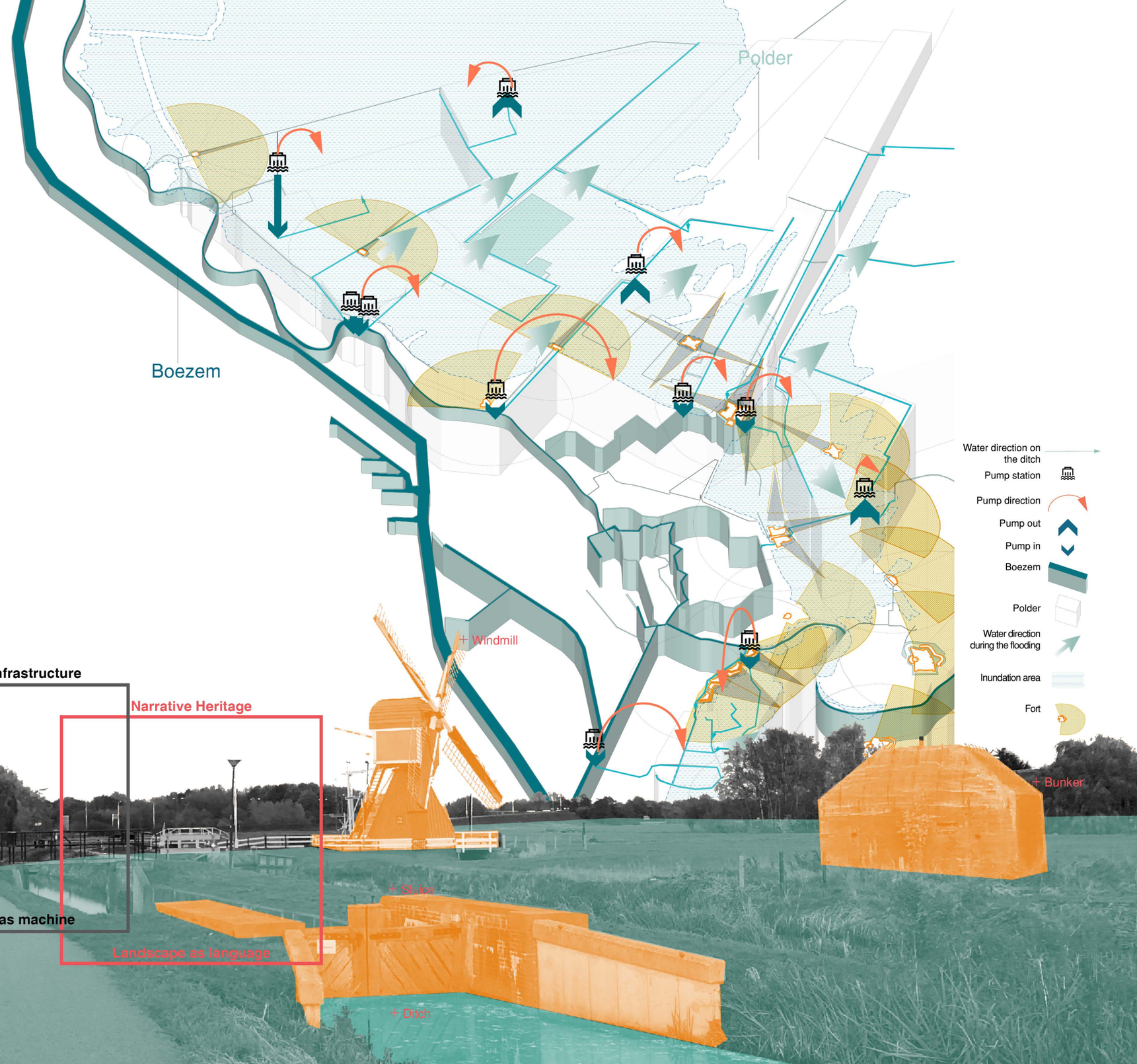


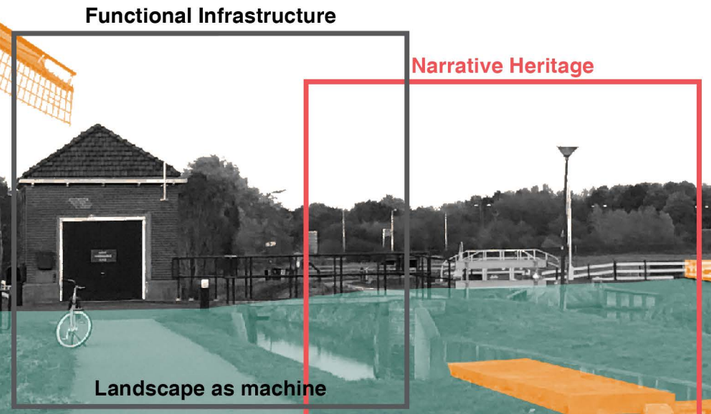

# Heritage, also Infrastructure

In a normal situation the water table is higher during winter. During a dry summer, water needs to be taken in from the boezem-system.

Water direction
during the war









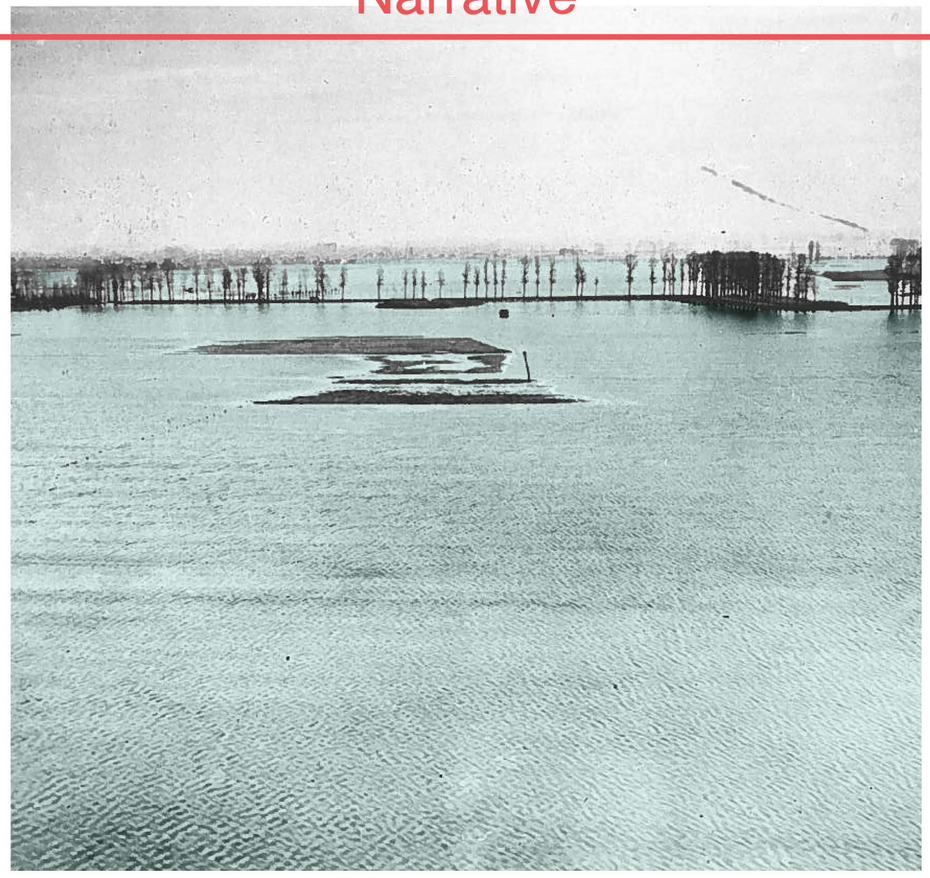



# Heritage, also Infrastructure

In a normal situation the water table is higher during winter. During a dry summer, water needs to be taken in from the boezem-system.

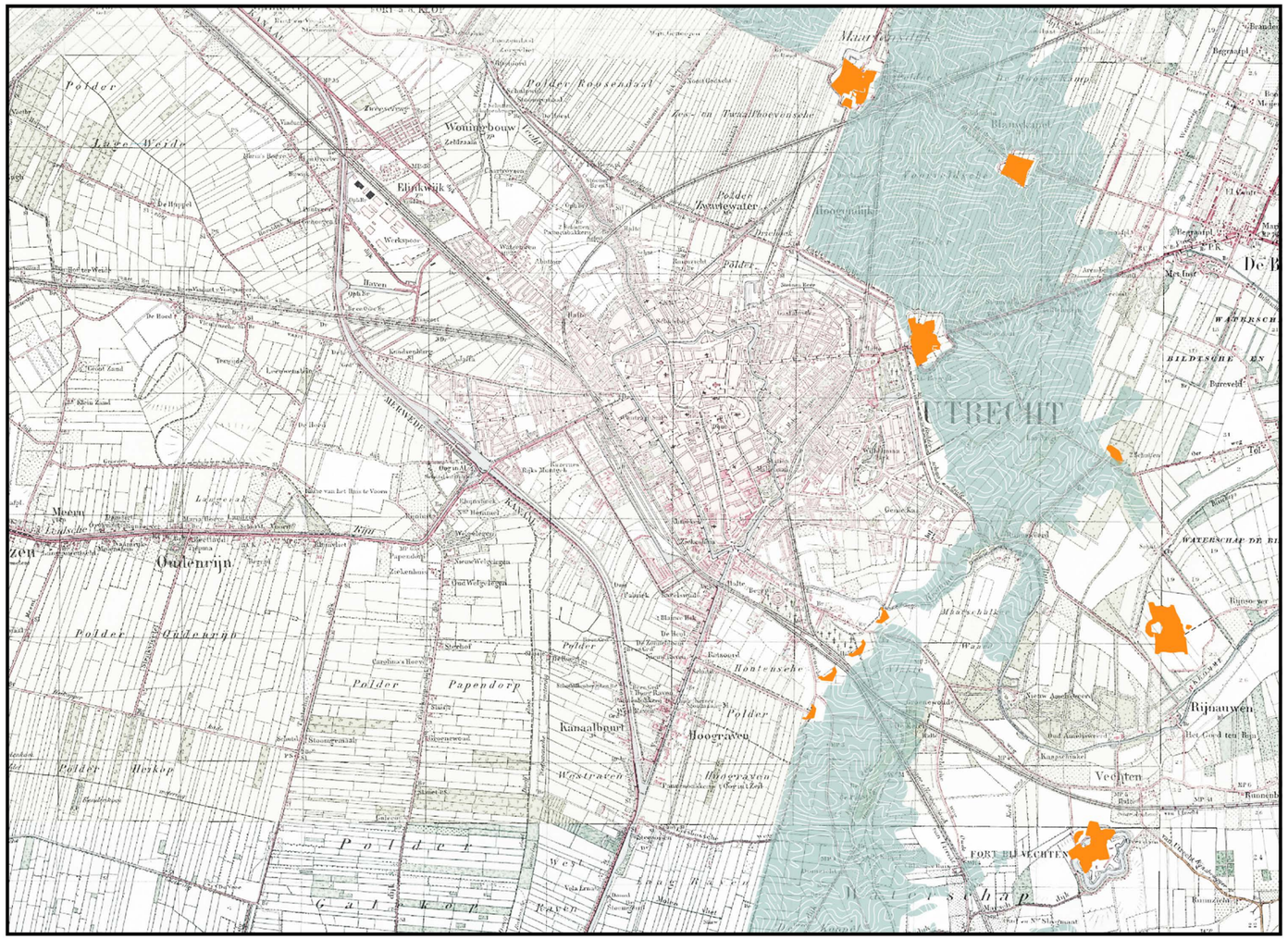
Functional

Narrative



# The New Dutch Waterline

# Urbanization along the NDW in Utrecht


Polder
Laan Weide
Woningbouw
Elinkwijk
Polder Roosendaal
Polder Zwanswater
Hoogmadijk
Blauwkapel
Hoogmadijk
Polder
Hoogmade
Haven
Meerwade
Meerwade
Oudenrijn
Polder Oudenrijn
Polder
Papendorp
Polder
Hoskop
Kanaalbuurt
Polder
Hoograven
Hoograven
Westraven
Polder
Galecop
Weyl
Raven
Polder
Rontensche
Maarschalk
Waar
Rijnauwen
Vechten
FORT BIJ VECHTEN
Waterschap
UTRECHT
Bilt
Bilt
Bilt

Utrecht Urban Plan in 1924

Urban Expantion in Utrecht by now

## Linie is Urbanized

Urban Expantion in Utrecht by now

## Linie is Urbanized

Urban Expantion alonge the New Dutch Waterline in Utrecht by now

## Linie is Urbanized

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Urban Expantion in Utrecht by now

## Linie is Urbanized

Visible and invisible landscape along the New Dutch Waterline in Utrecht

# 2. Reasearch Question

# Research Question

Is it possible to **transform the language (historical image, composition grammar and spatial features)** of Nieuwe Hollandse Waterlinie into a **functional and narrative** framework of urbanization?

Specifically, the design is aimed to **make the visible and invisible heritage legible** (represent historical stories and the new characters of heritage colored by the complex environments) and **solve the urban problems** (de-fragment and water management challenge).

In this case, landscape plays the role as language and machine at the same time.

# Research Question

Functional

- repaire fragmented heritage and urban space

- resilient water management

**solve the urban problems**

Narrative

- represent historical stories on inundation and defence

- represent ther spatial characters of heritage which is being colored by the urban territory

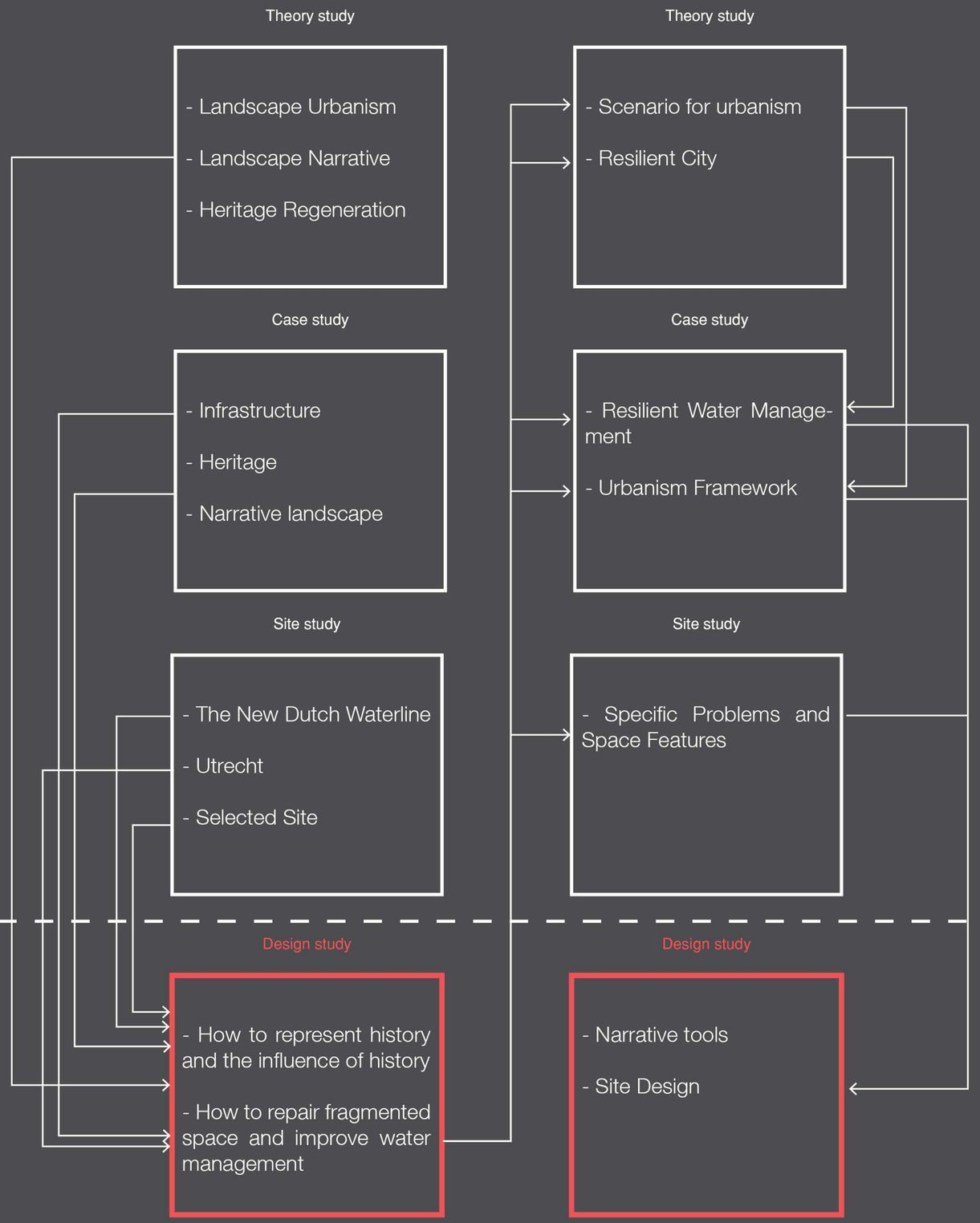
**make the visible and invisible heritage legible**

Functional and Narrative Infrastructure

# Methodology

Research

Design



# 3. Site Reasearch: Problem Statement

Functional

Narrative

Water Management
Challenge

Fragment

Illegible Heritage

# The New Dutch Waterline

## Functional

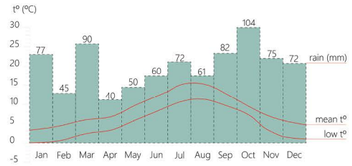
Water Management Challenge

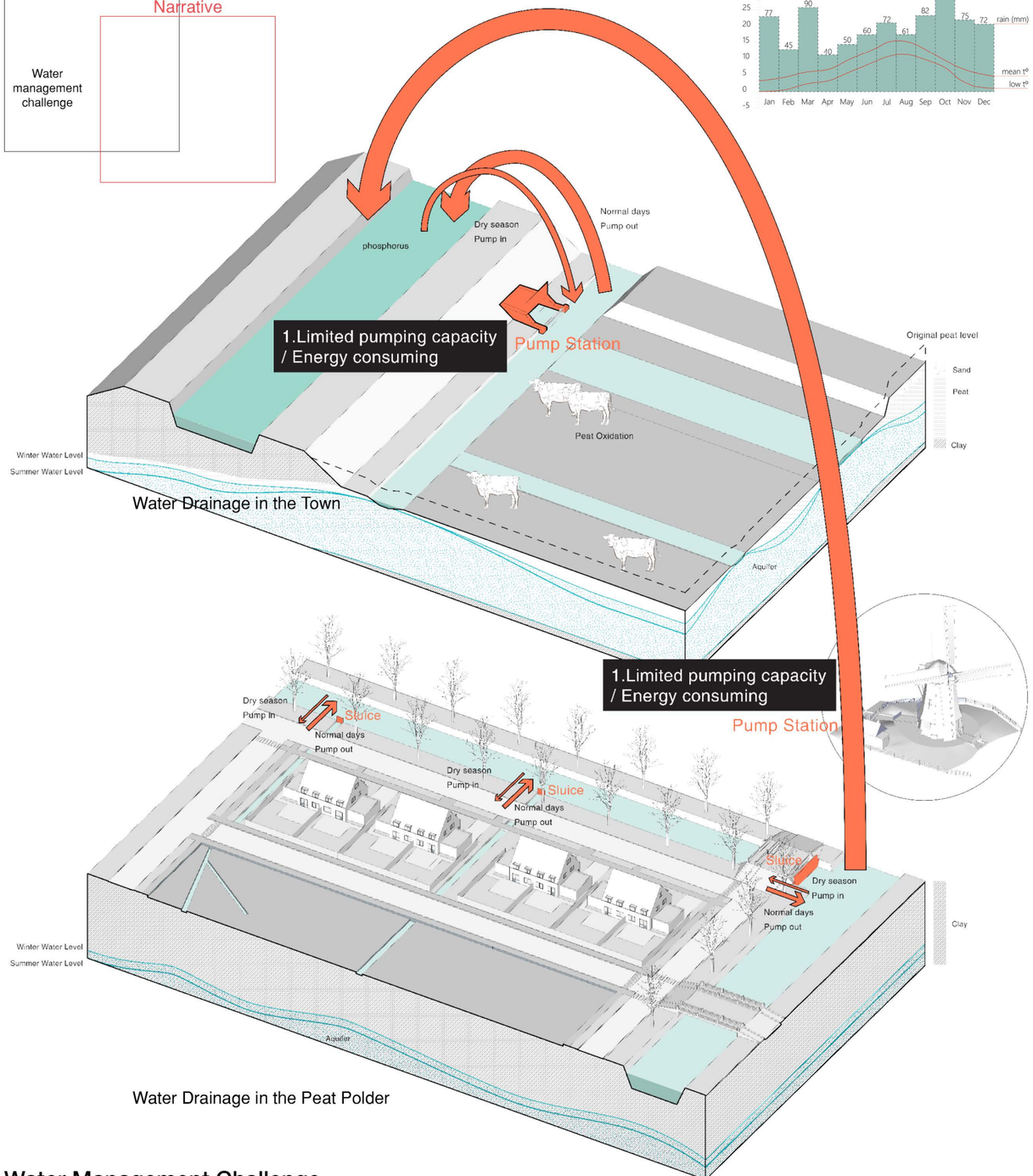
## Narrative

Functional

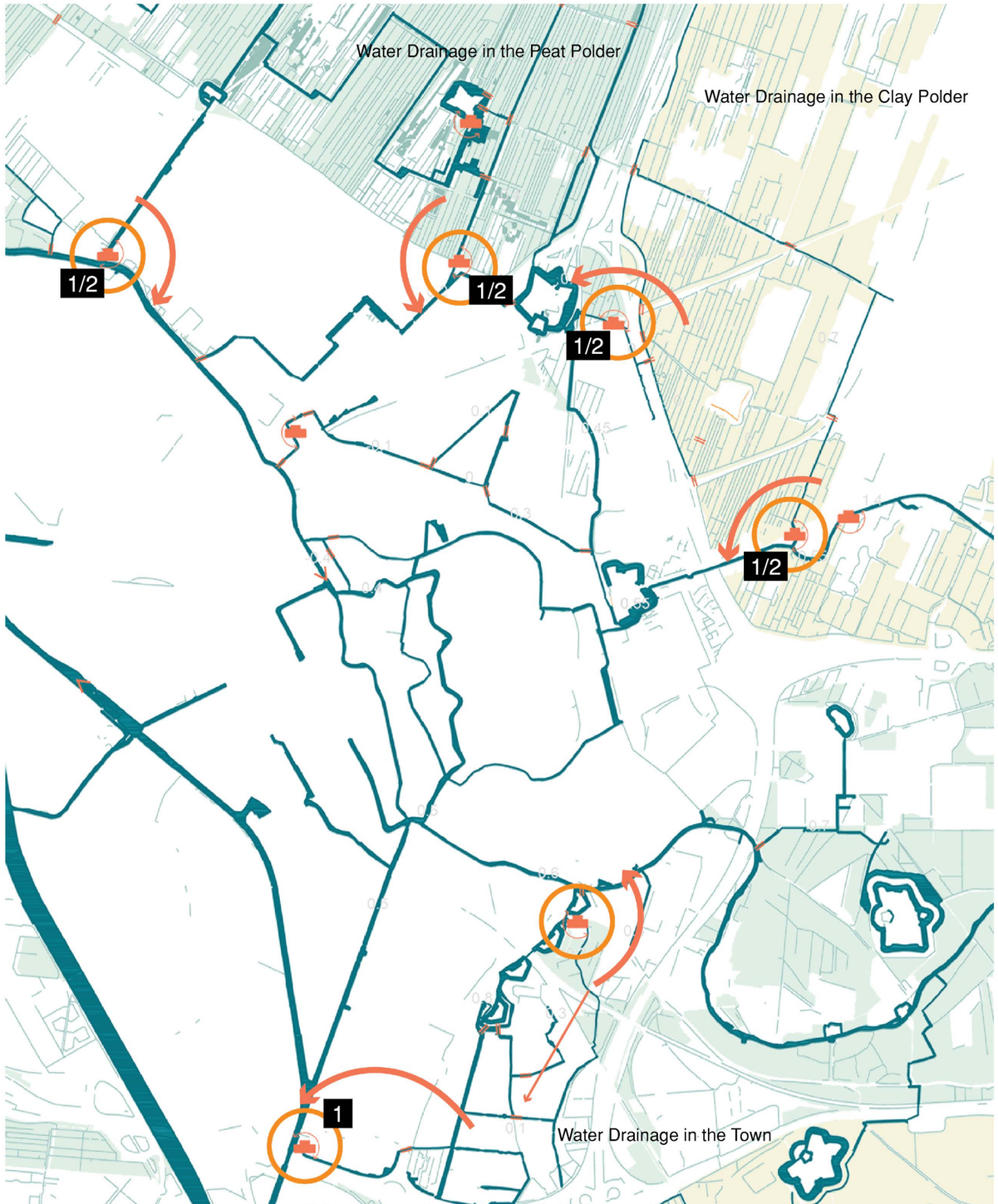
Narrative

Water management challenge




Water Drainage in the Peat Polder




Water Drainage in the Town during the normal time

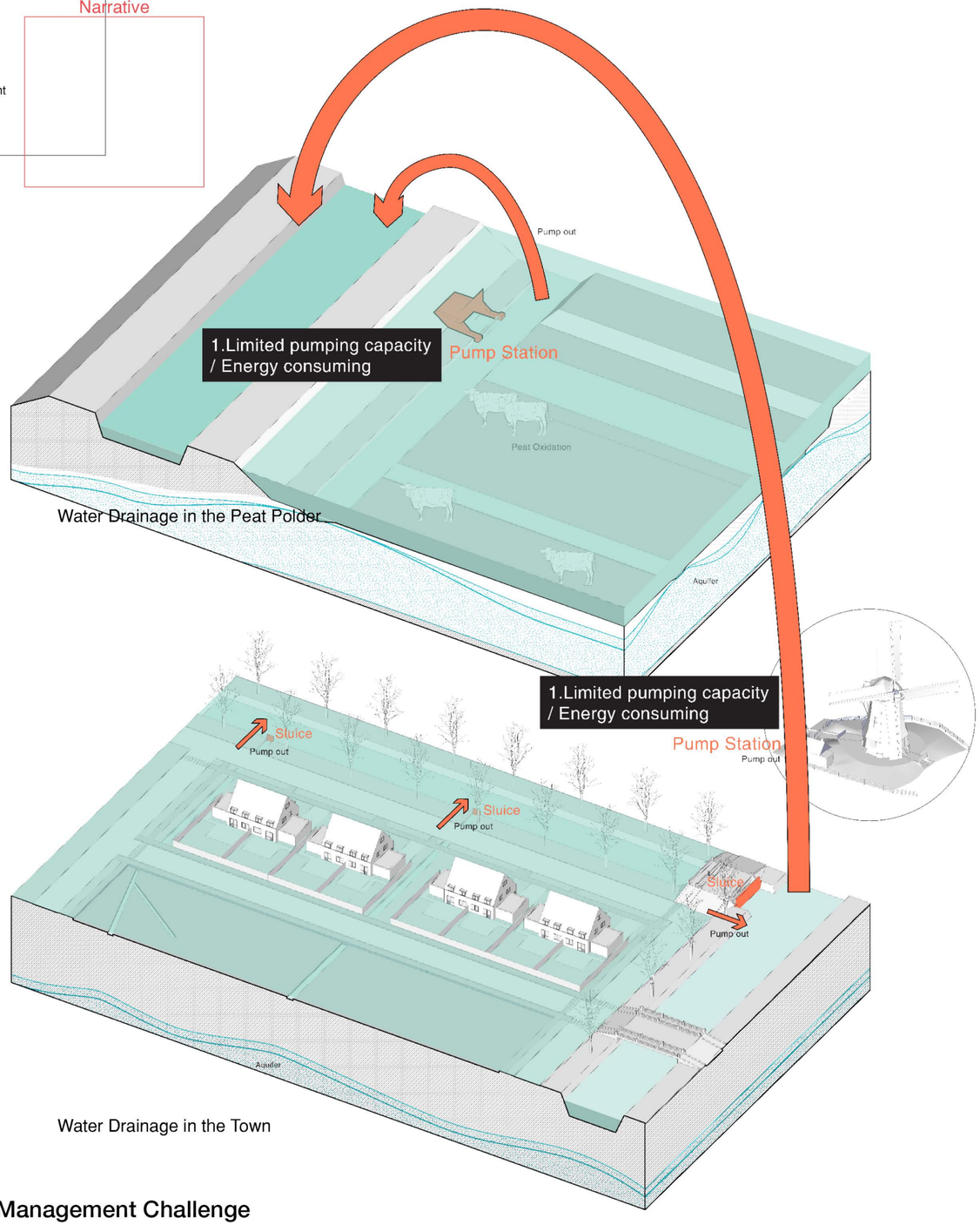
## Water Management Challenge

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage

Functional

Narrative

Water management challenge

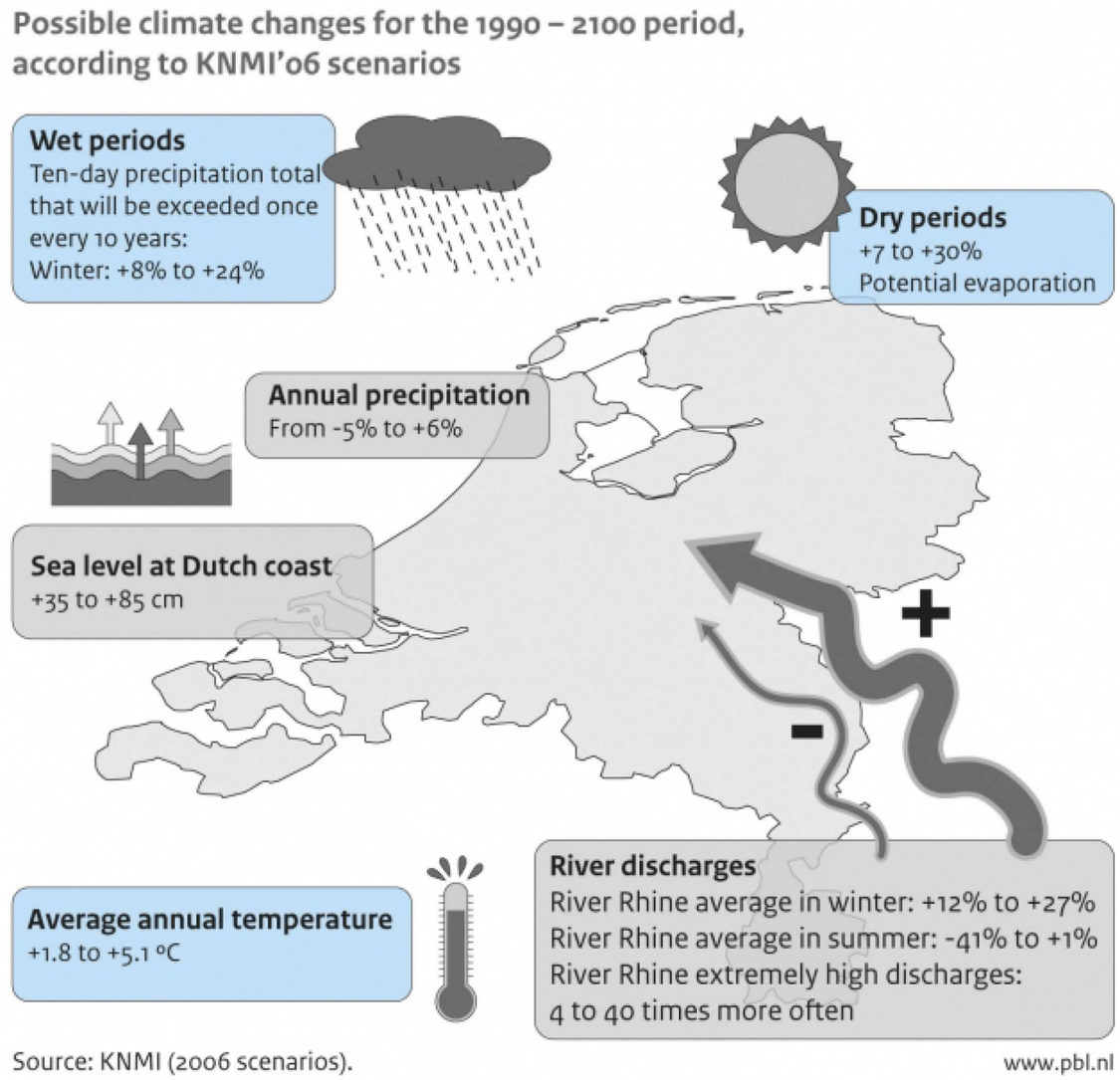



Water Drainage in the Town

## Water Management Challenge

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage



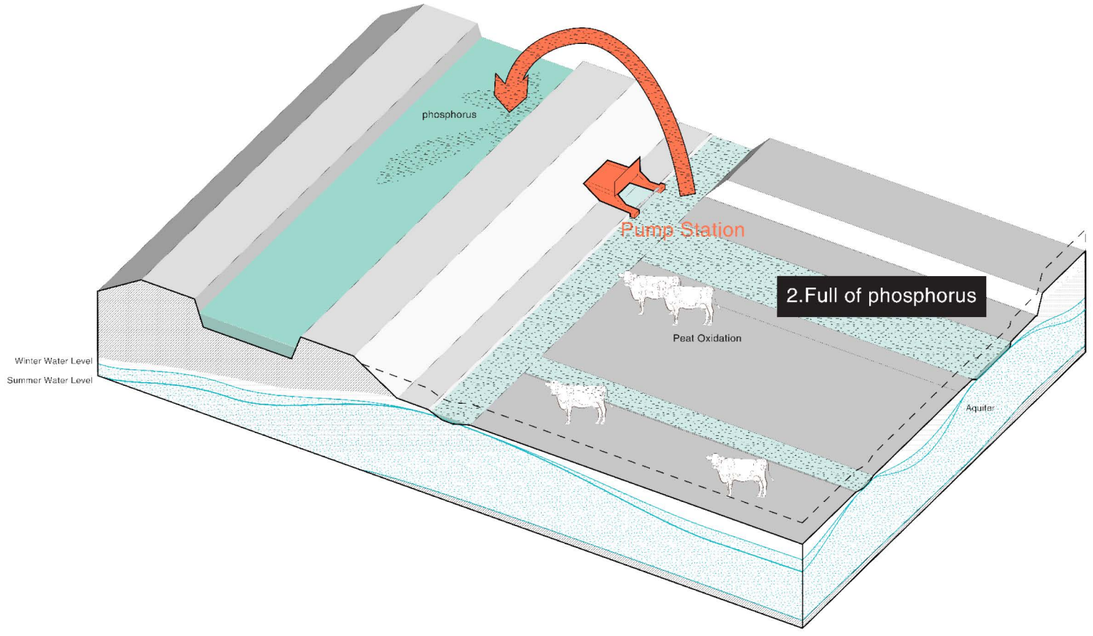


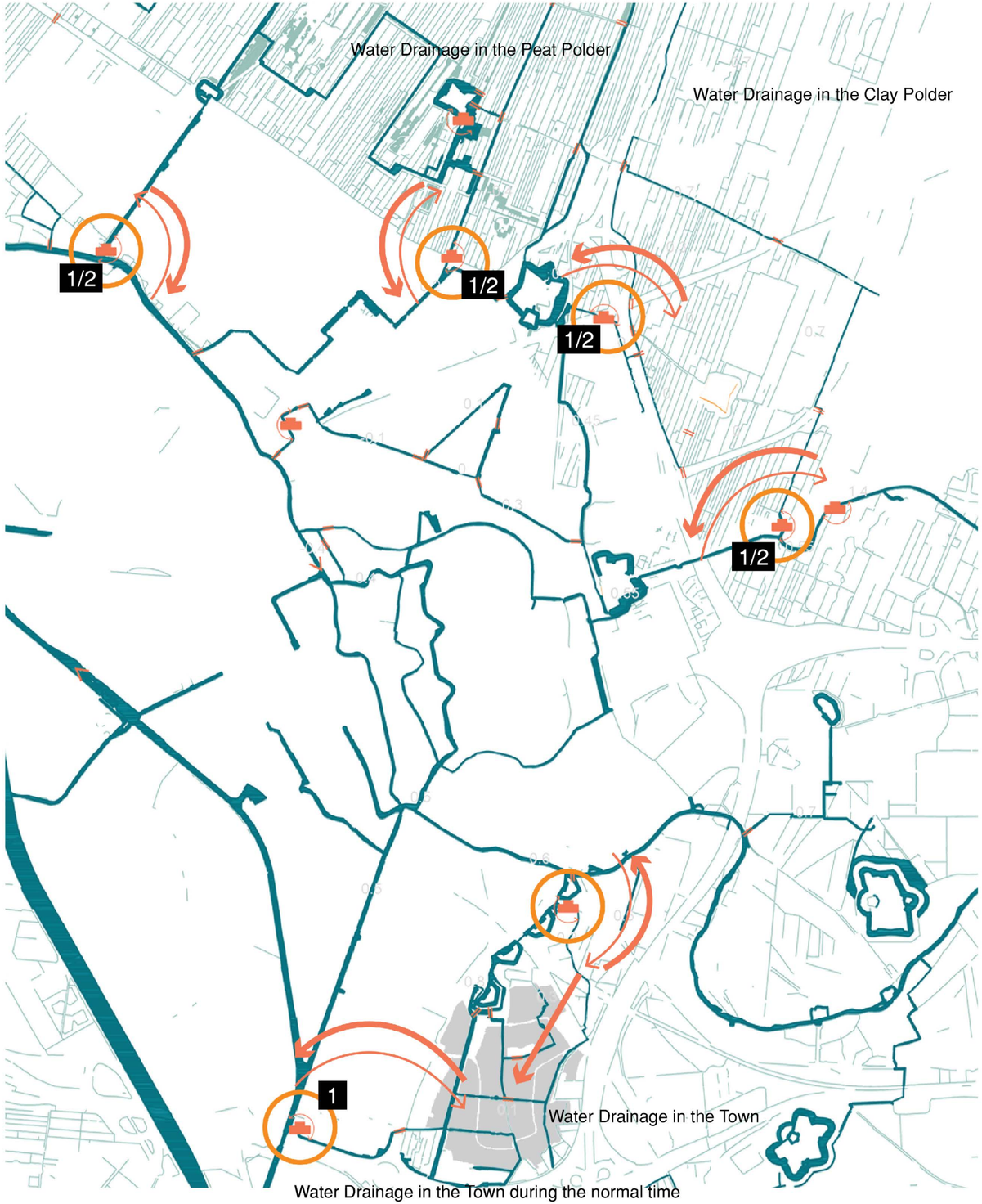

Climate Change

Functional

Narrative

Water management challenge




Water Drainage in the Town during the normal time

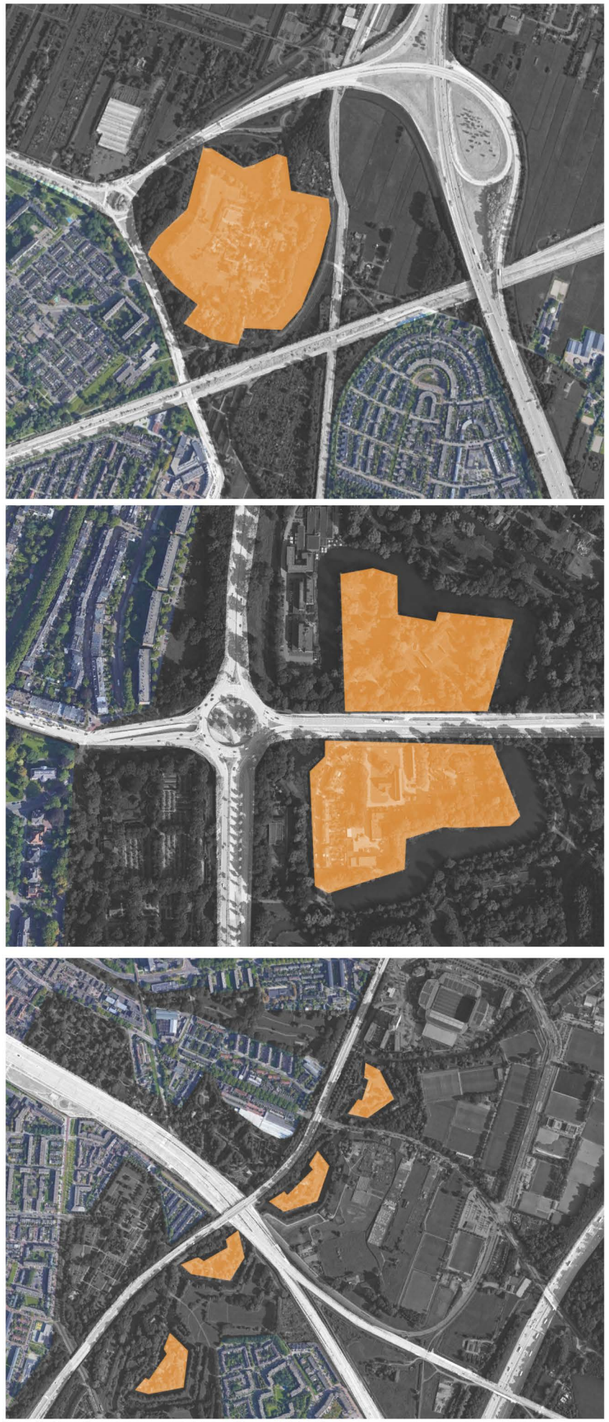
## Water Management Challenge

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage

Functional

Narrative

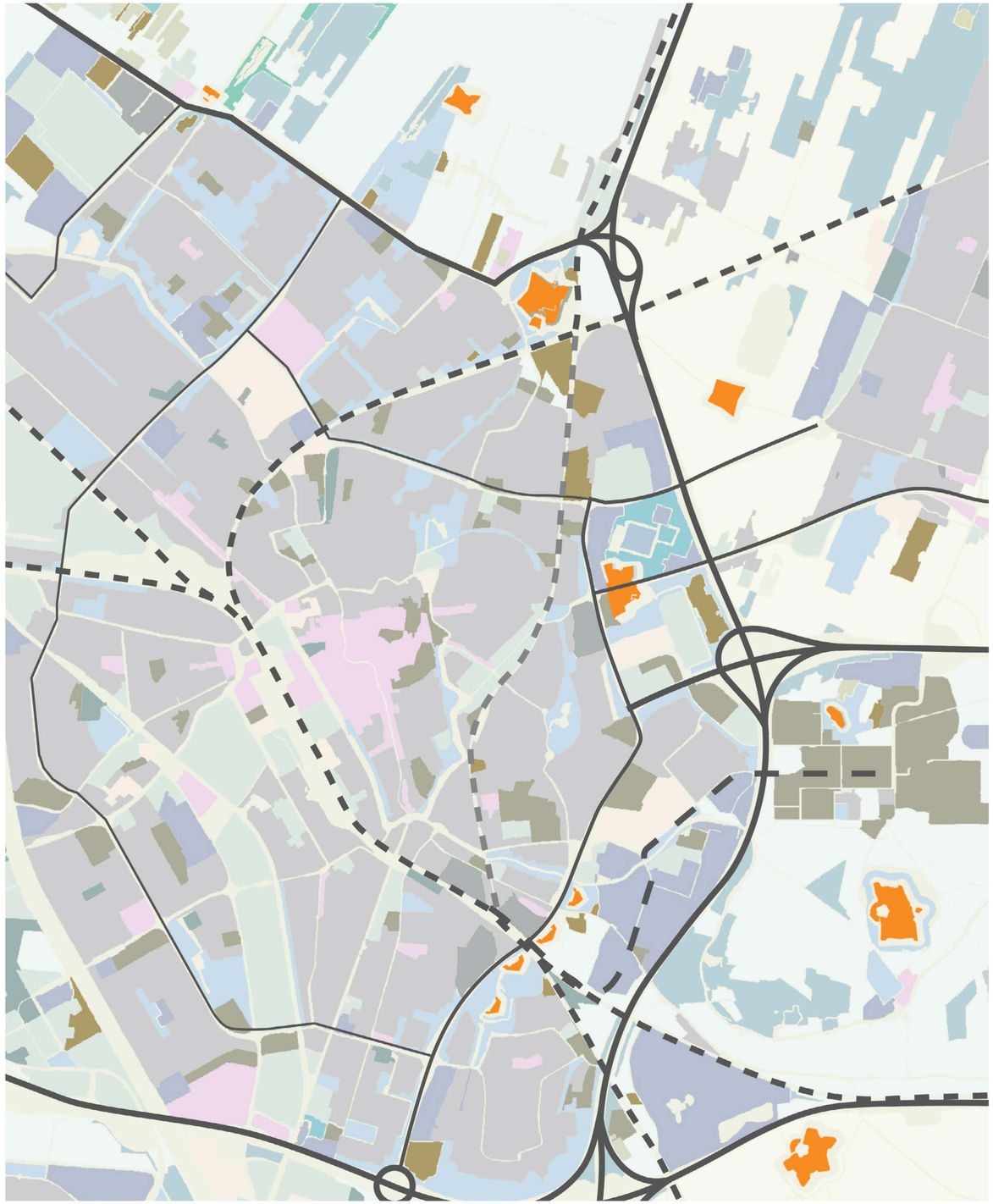
Fragment



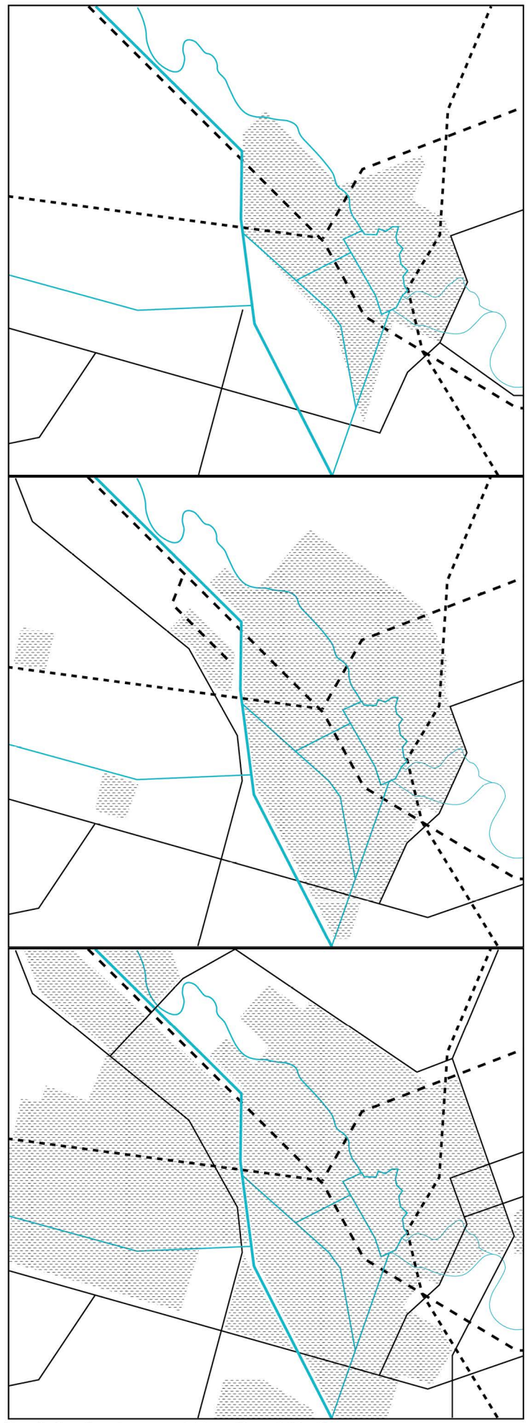
**Fragment**

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage





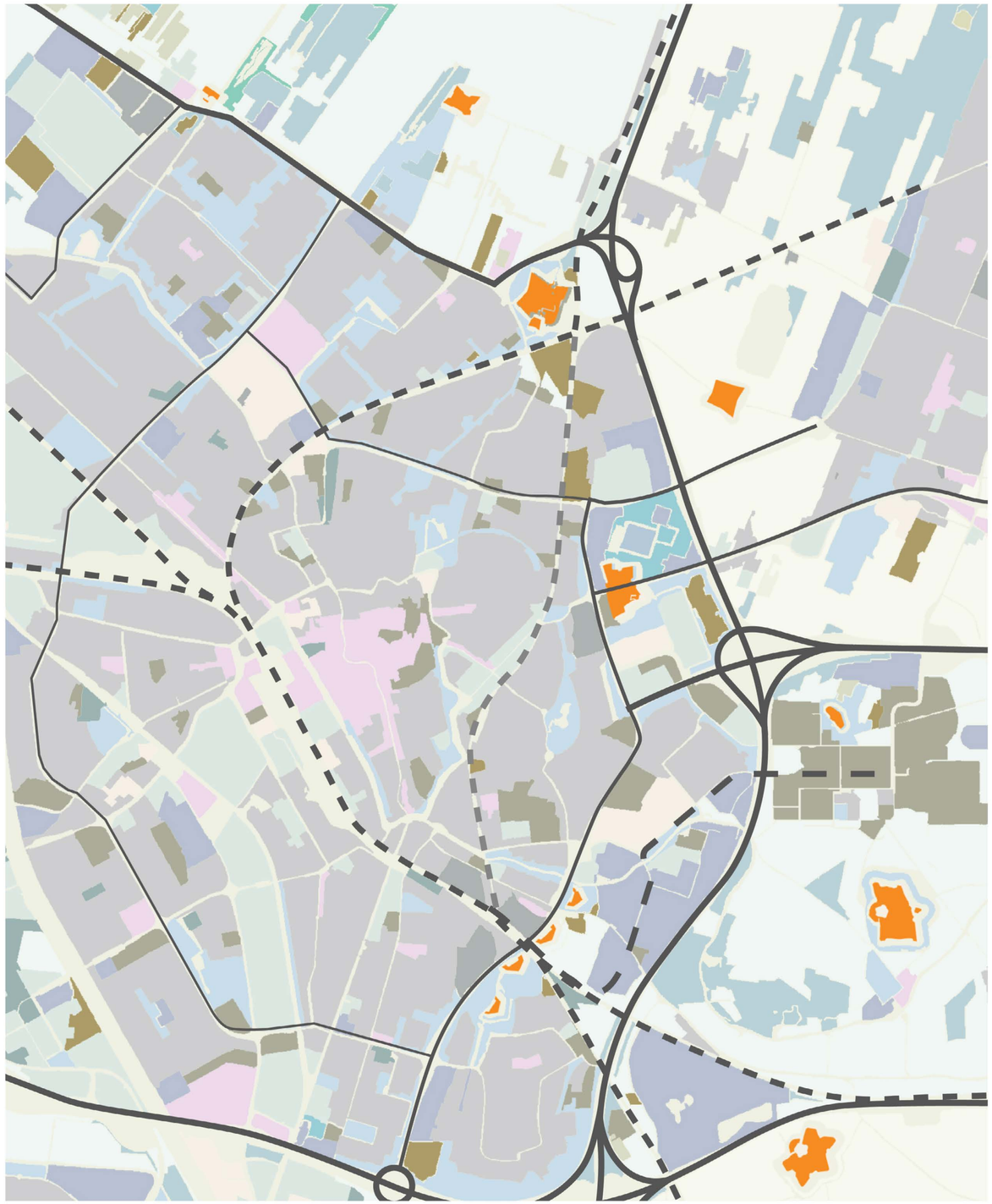
Fragmented urban fabrics




**Fragment**

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage





Fragmented urban fabrics

cyclying paths cross the infrastructure

Poor conection between urban fabrics

Functional

Infrastructure

Narrative

Heritage

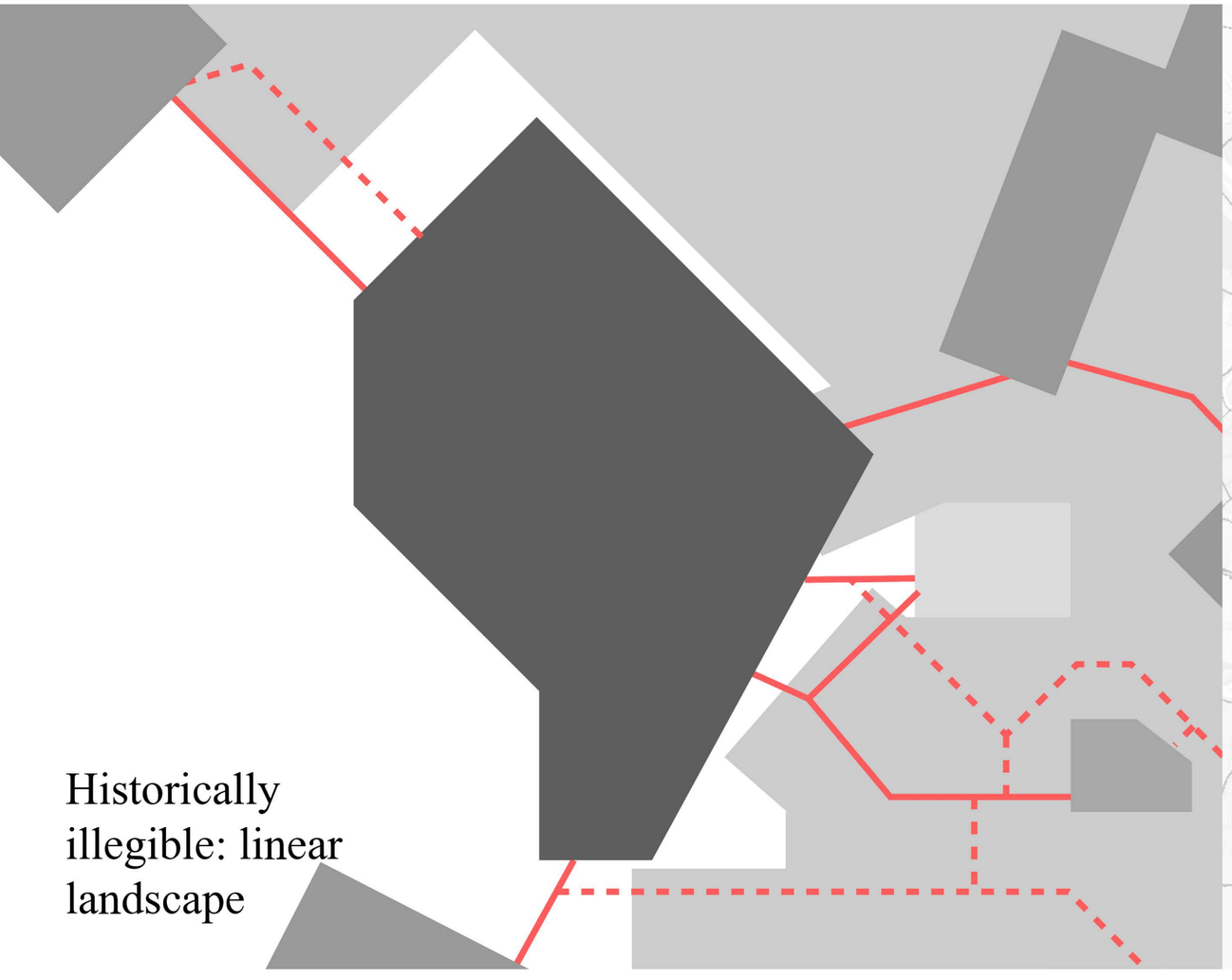
Illegible Heritage

Landscape as machine

Landsape as language

# The New Dutch Waterline

Historically illegible: linear landscape



Functional Cycling Corridors connect towns

Industrial area
Green Space
Residential area
Campus
Main cycling corridor
Other cycling corridor

Cycling Corridors and the New Dutch Waterline

Fort
Cycling Route

## Illegible Heritage

Historically illegible:
illegible image

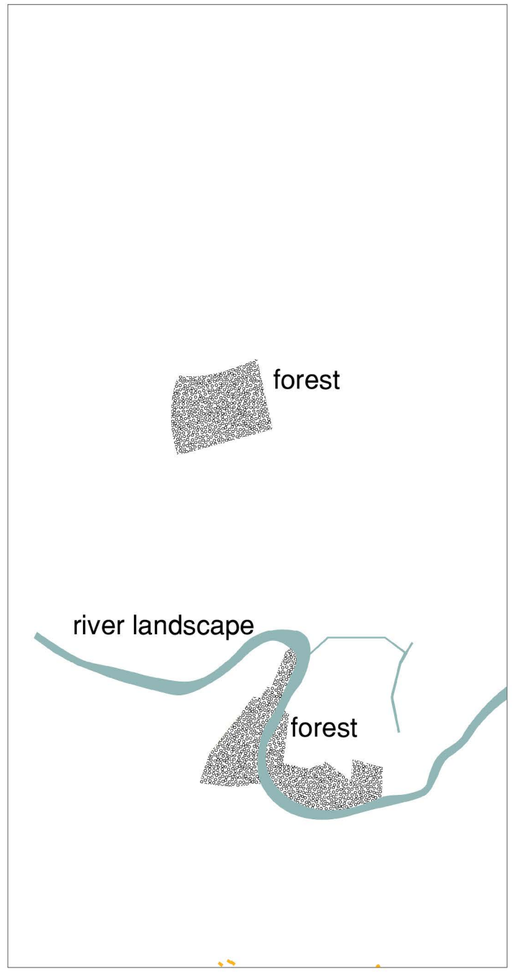
Poor maintainance and function change

# Territorially illegible:
# heritage on the complex environments

# Territorially illegible:
# heritage on the complex environments

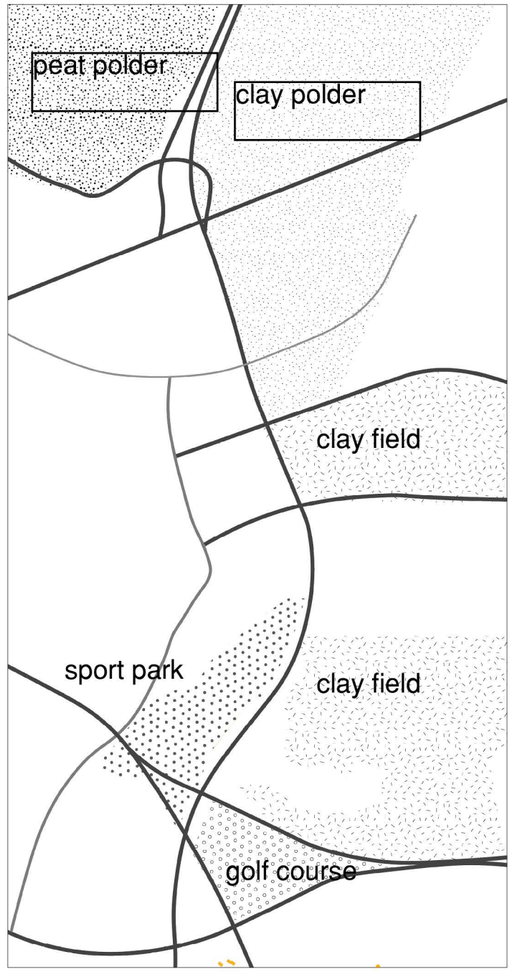
**Illegible Heritage**

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage




Natural Layer

+




Cultural Layer

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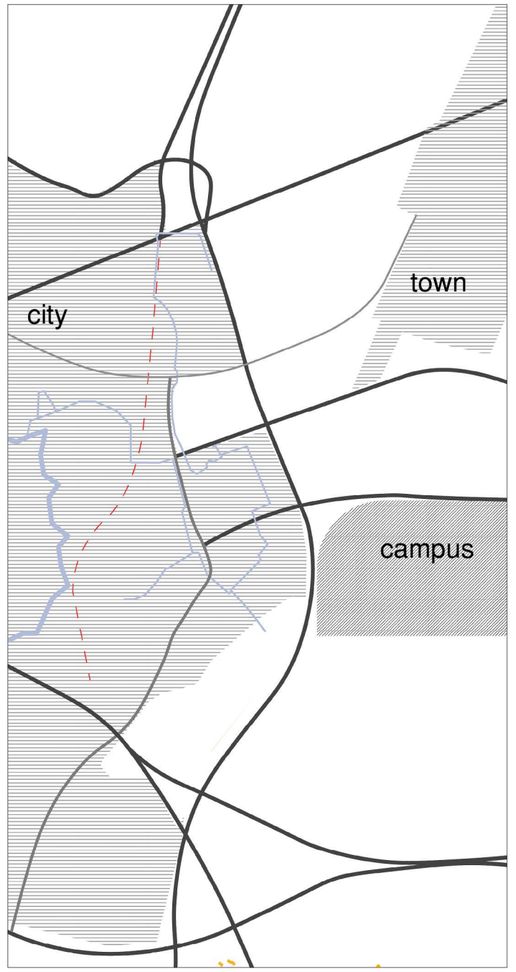
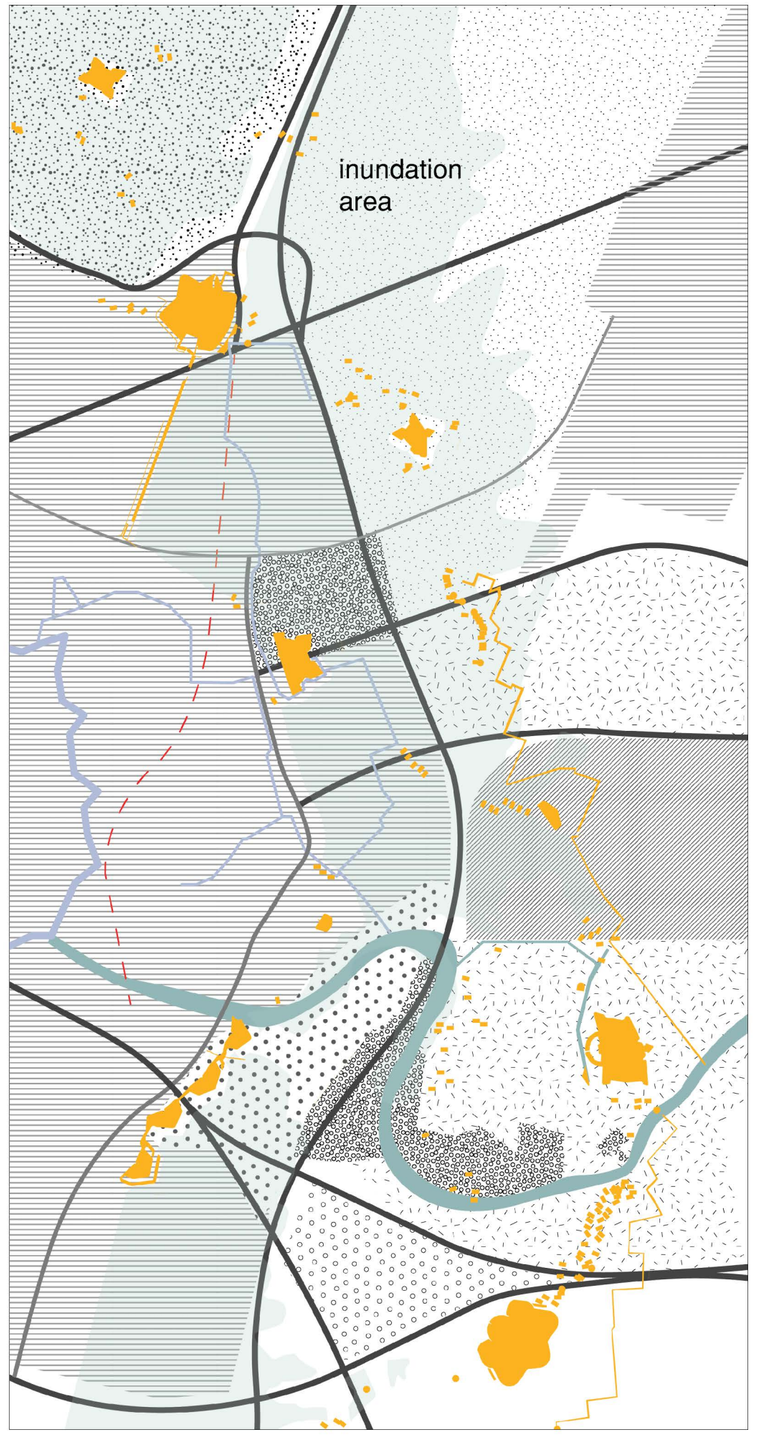



Urban Layer

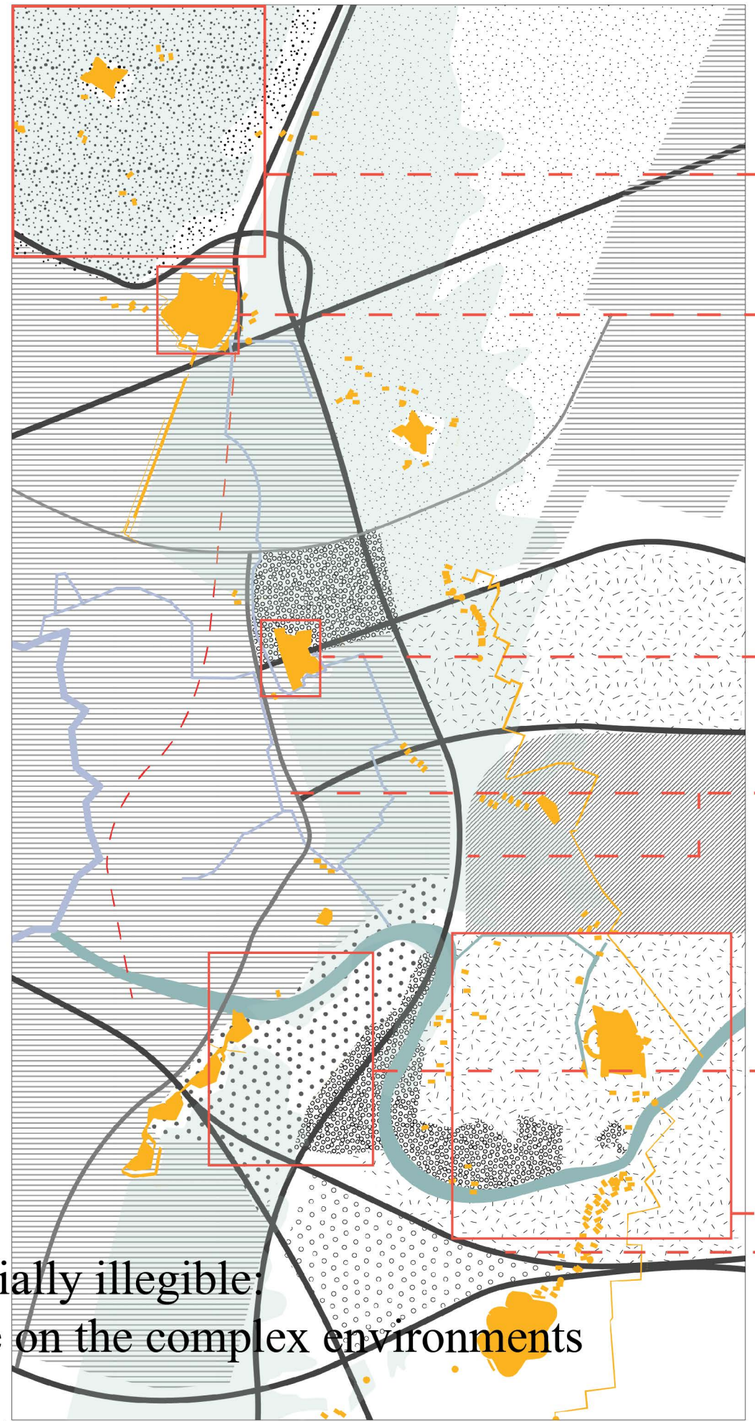



the environments of heritage

# Territorially illegible:
# heritage on the complex environments

**Illegible Heritage**

Site Reasearch : Problem Statement I Narrative Infrastructure and Functional Heritage



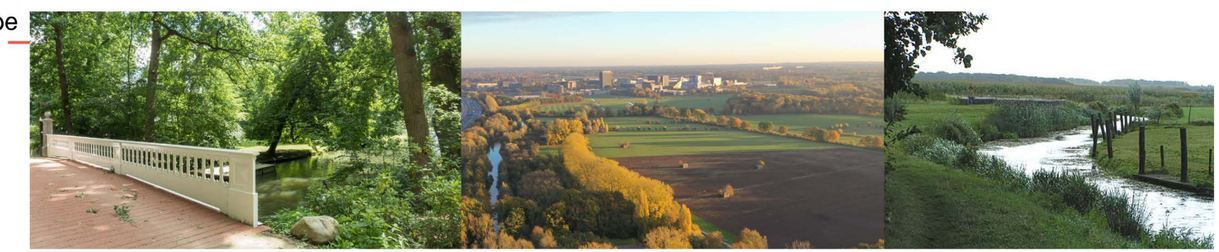
Peat Landscape

Forts as Village

Liner Modern Infrastructure

Productive Landscape

Clay Landscape



# Territorially illegible: heritage on the complex environments

**Illegible Heritage**

A fort inside the polder

A fort inside the city

Experience of the path inside the polder

Experience of the path inside the city

# Territorially illegible: illegible heritage environments

# 4. Design

Functional

Narrative

- repaire fragmented heritage and urban space

- represent historical stories on inundation and defence

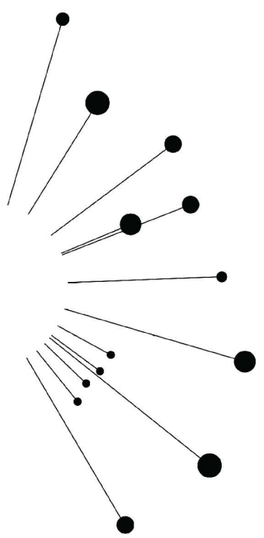
Territorial park system

Narrative water infrastructure

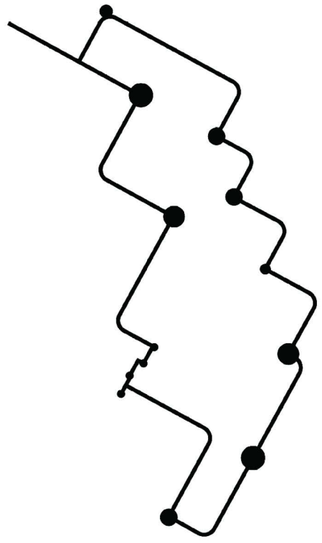
- resilient water management

- represent ther spatial characters of heritage which is being colored by the urban territory

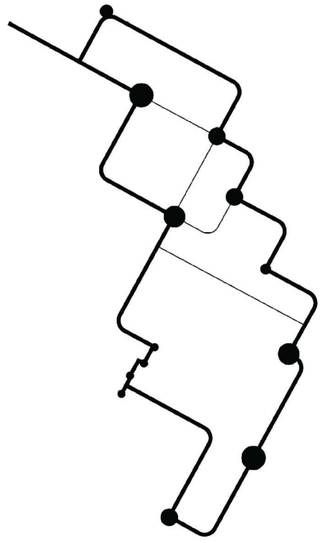
**The New Dutch Waterline**



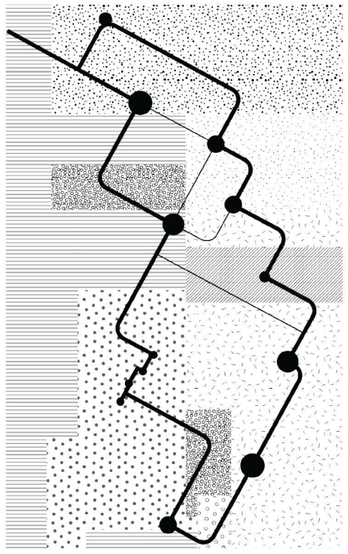
Segregated forts



Loop for connection

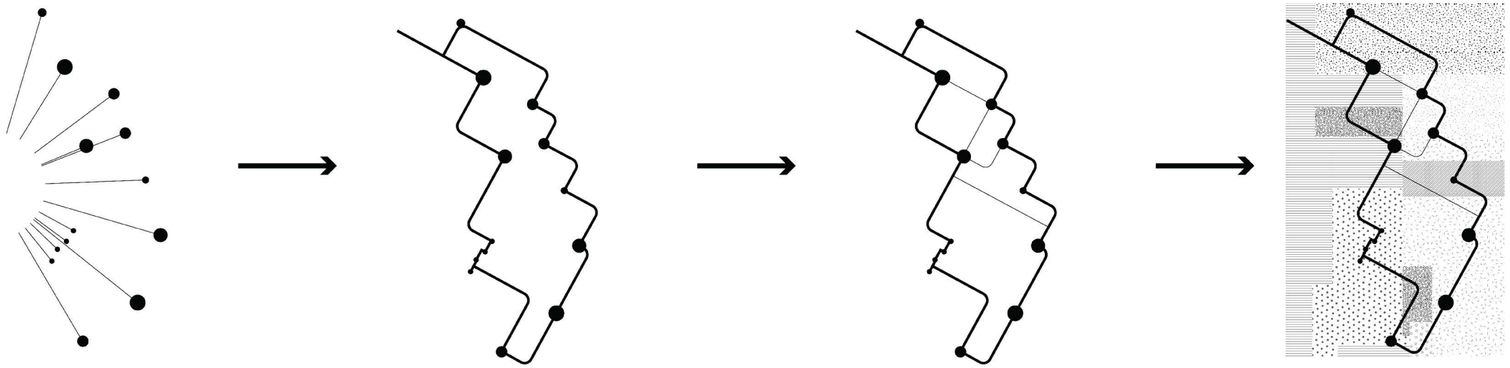


Sub-loop



Territorial park system
for legible heritage

# Territorial park system

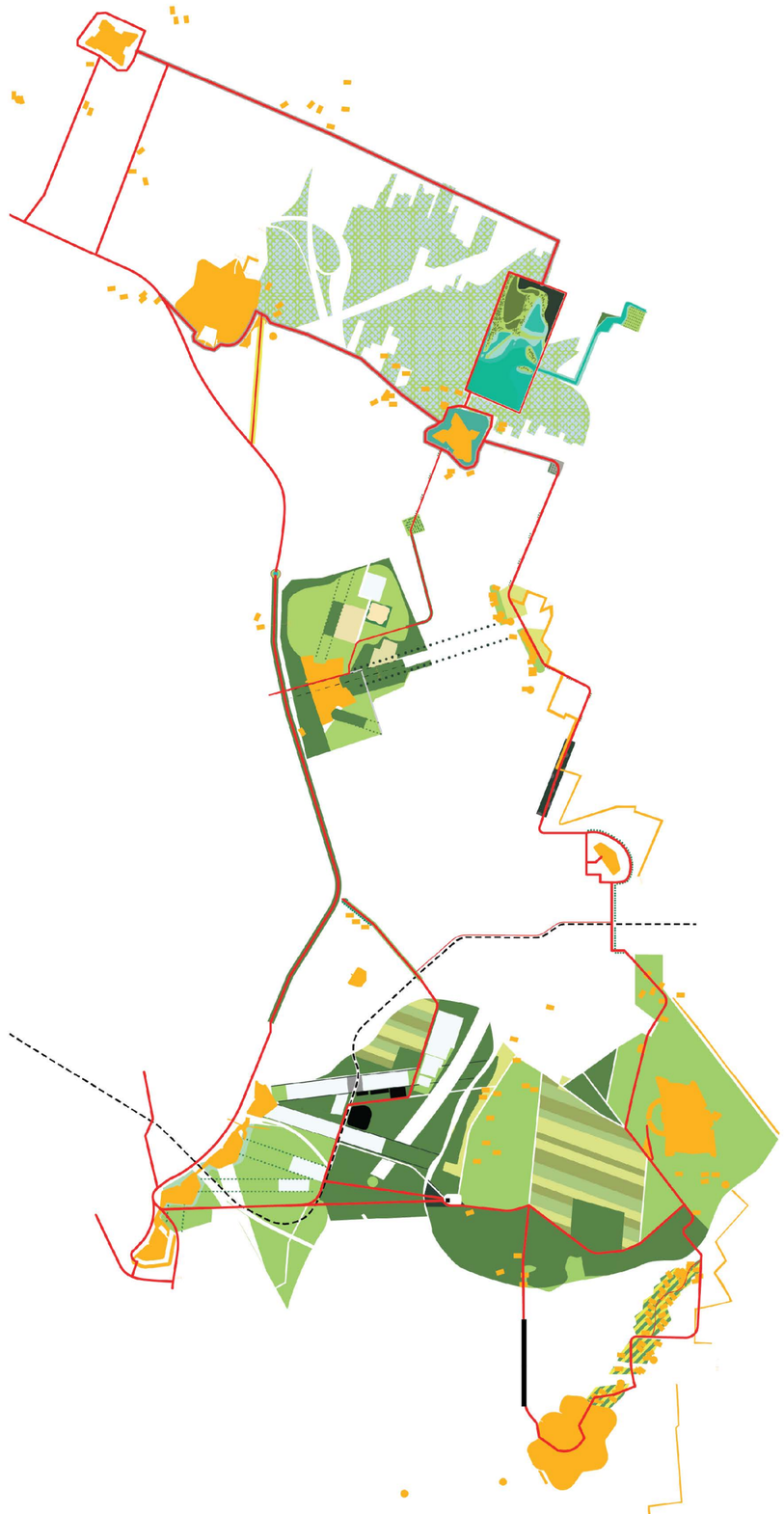


Segregated forts

Loop for connection

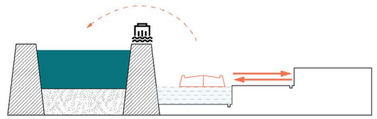
Sub-loop

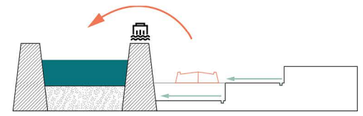
Territorial park system
for legible heritage

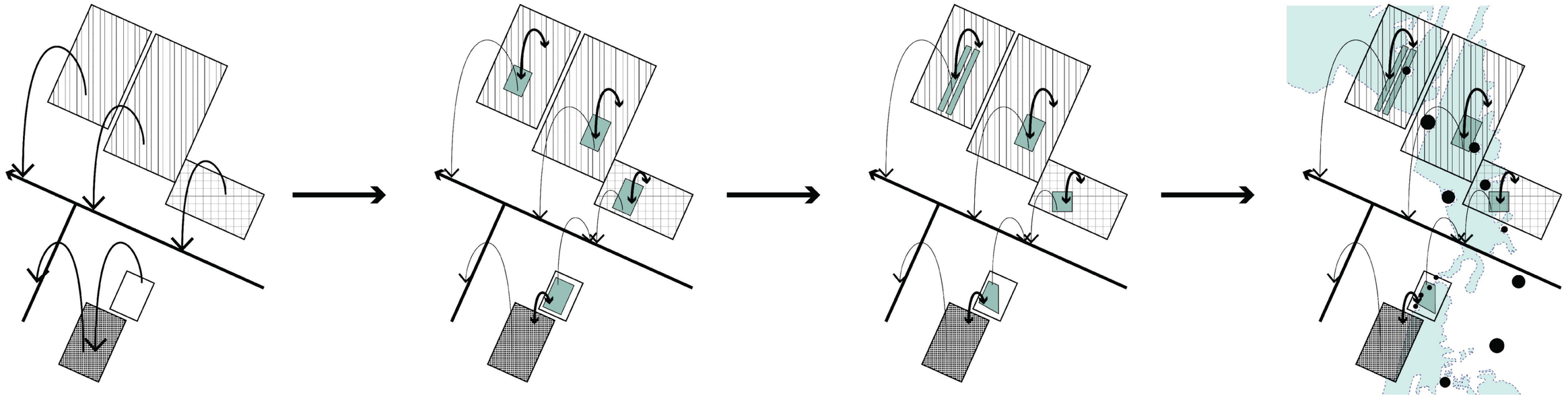


# Territorial park system

## Strategy







Existing
irrigation system

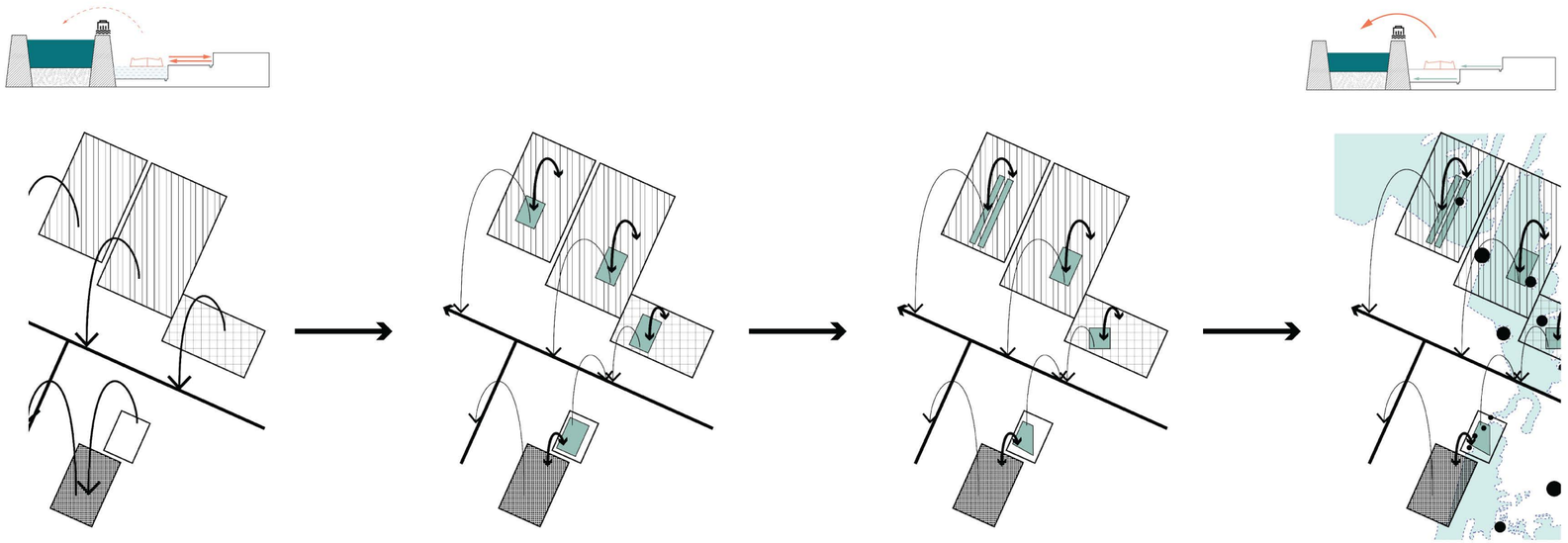
Resilient water
management

Resilient wetland in
different context

Representation
of inundation

# Narrative water infrastructure

**Strategy**



Existing
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Resilient water
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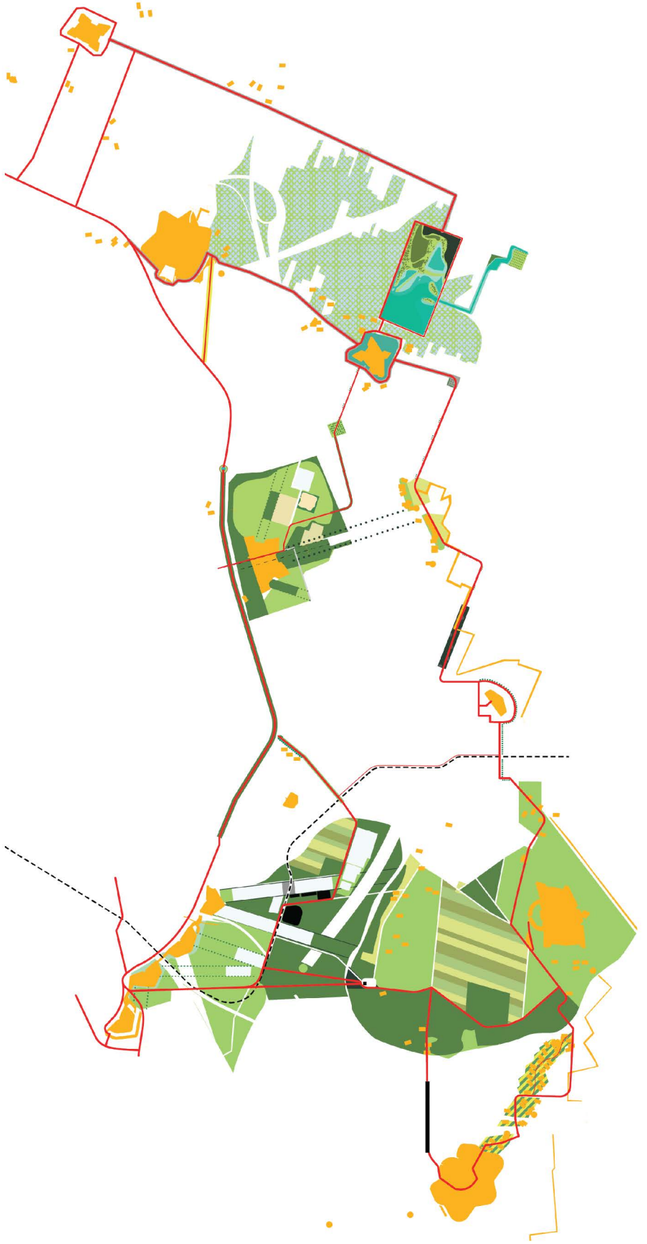
Resilient wetland in
different context

Representation
of inundation

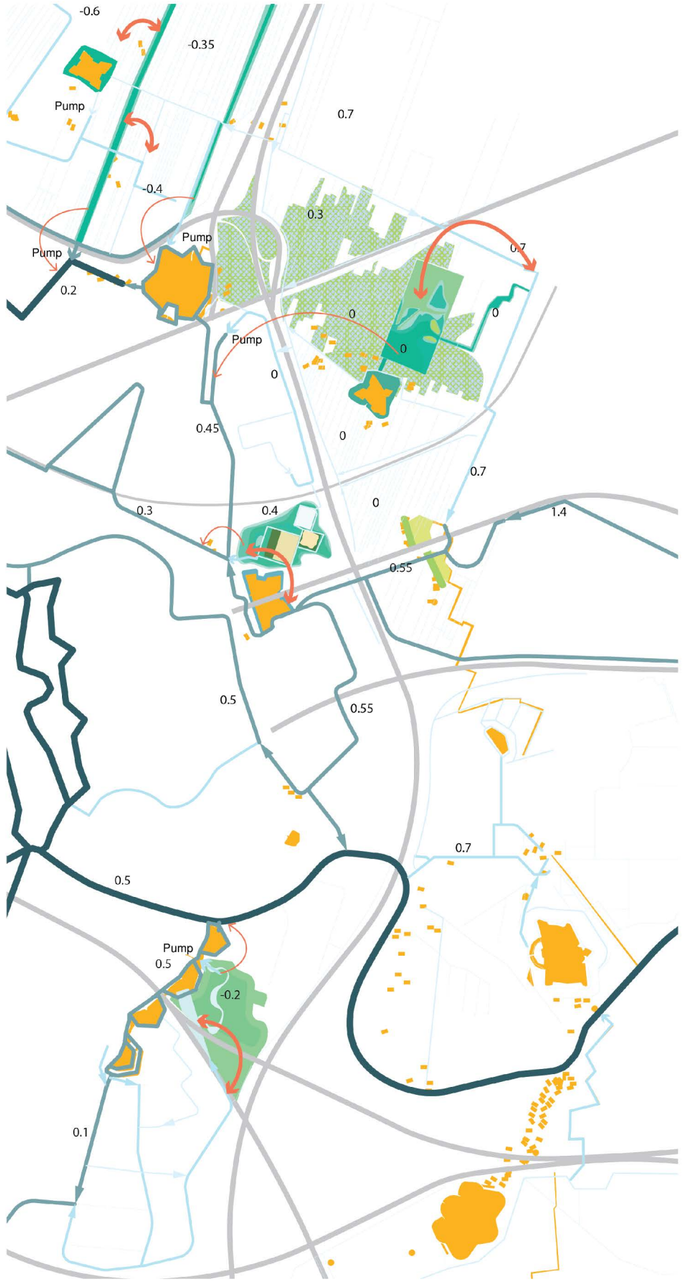
# Narrative water infrastructure

## Strategy

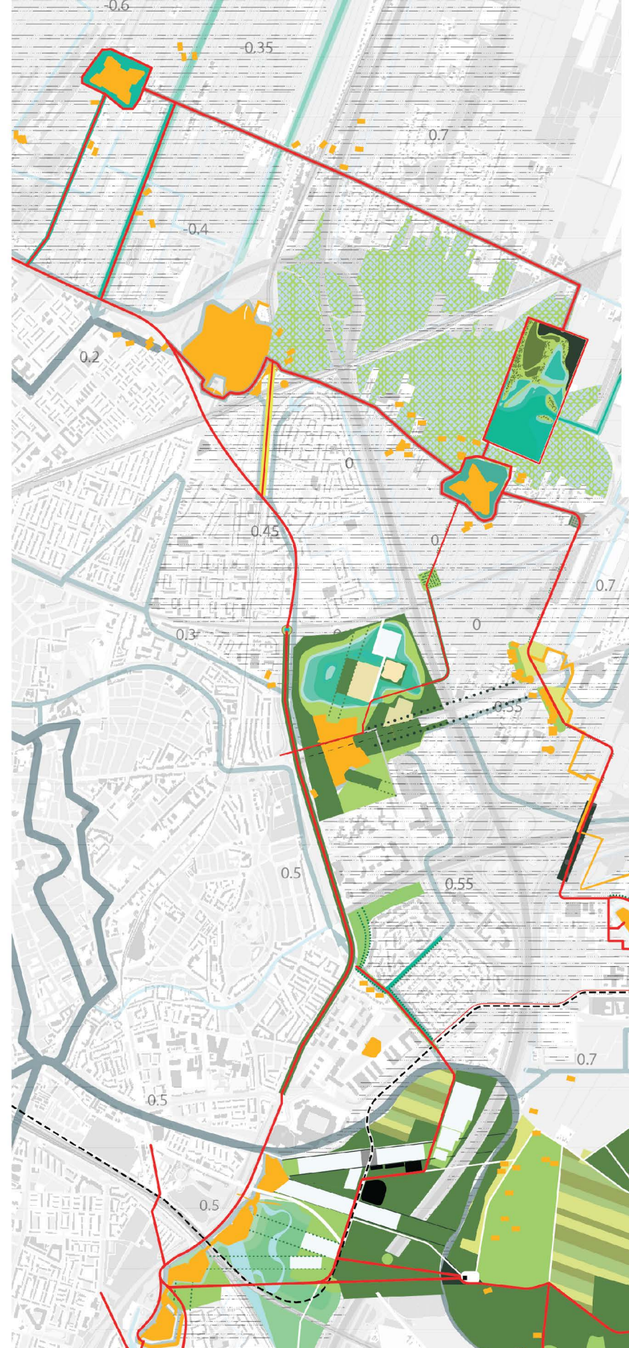


Territorial park system

+




Narrative water infrastructure

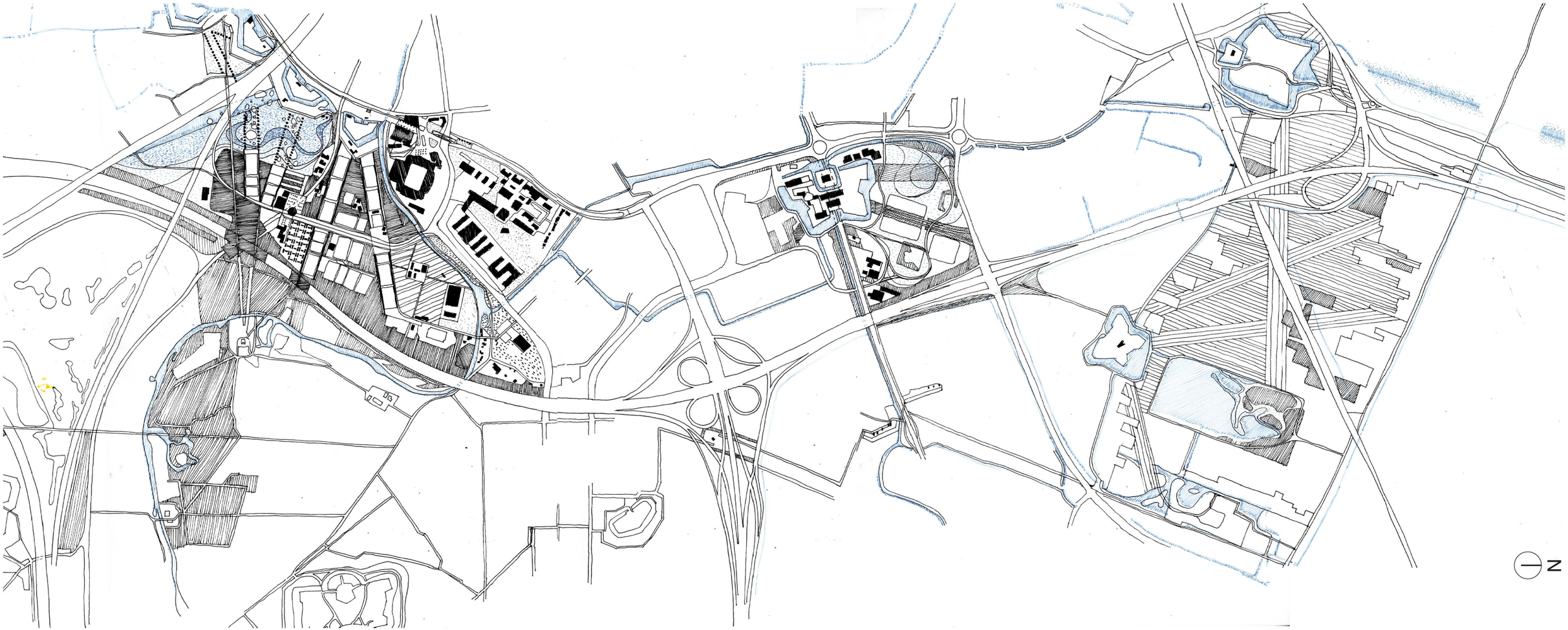


Master Plan

New Dutch Waterline Park System in Utrecht

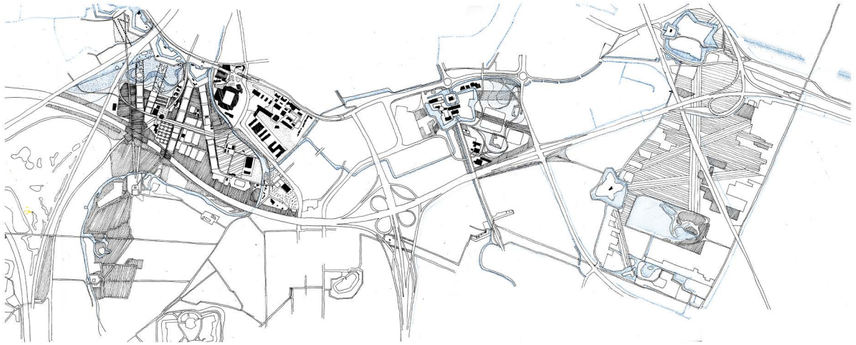
## Master Plan nad Strategy

Design I Narrative Infrastructure and Functional Heritage



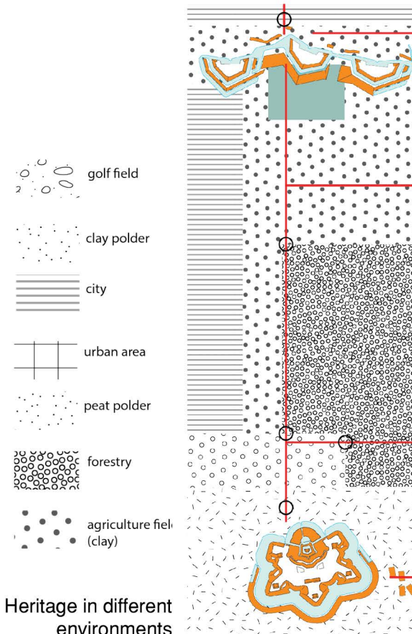

**Master Plan nad Strategy**

Design I Narrative Infrastructure and Functional Heritage
48 I 76

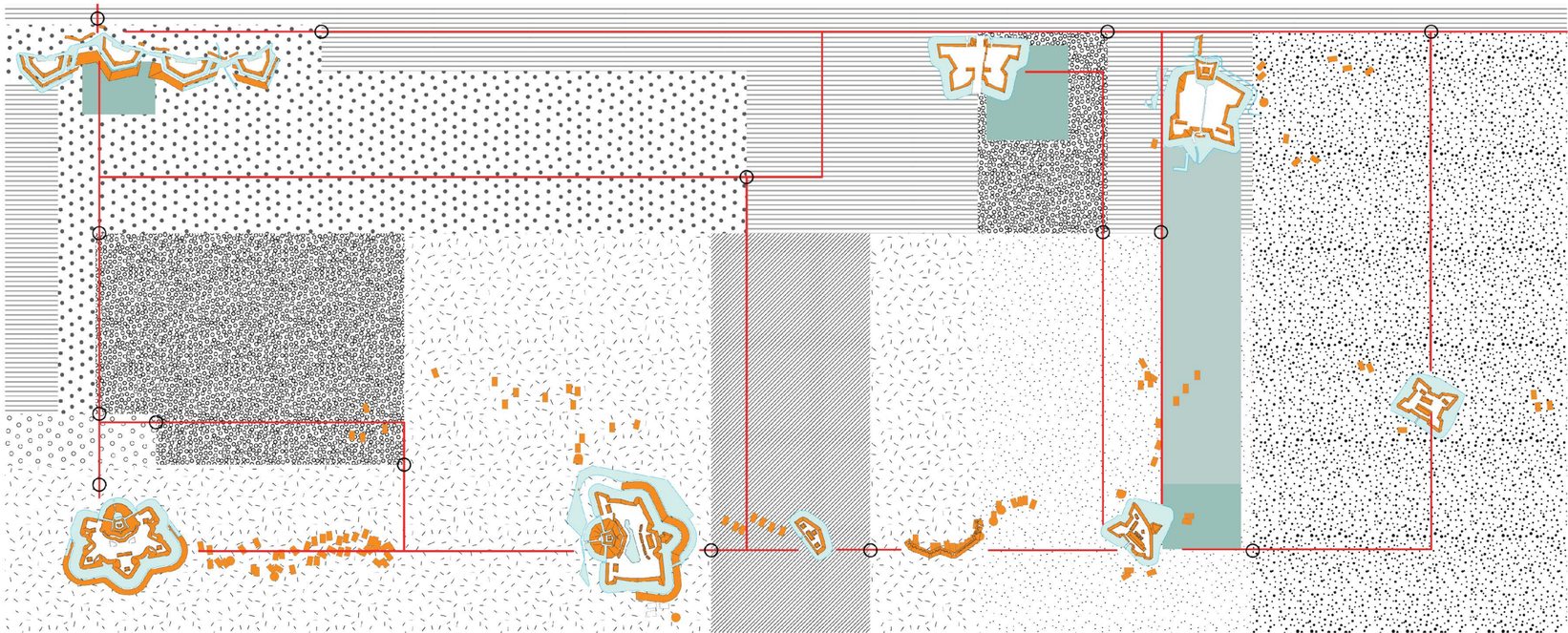


Masterplan

The experience of the linear landscape

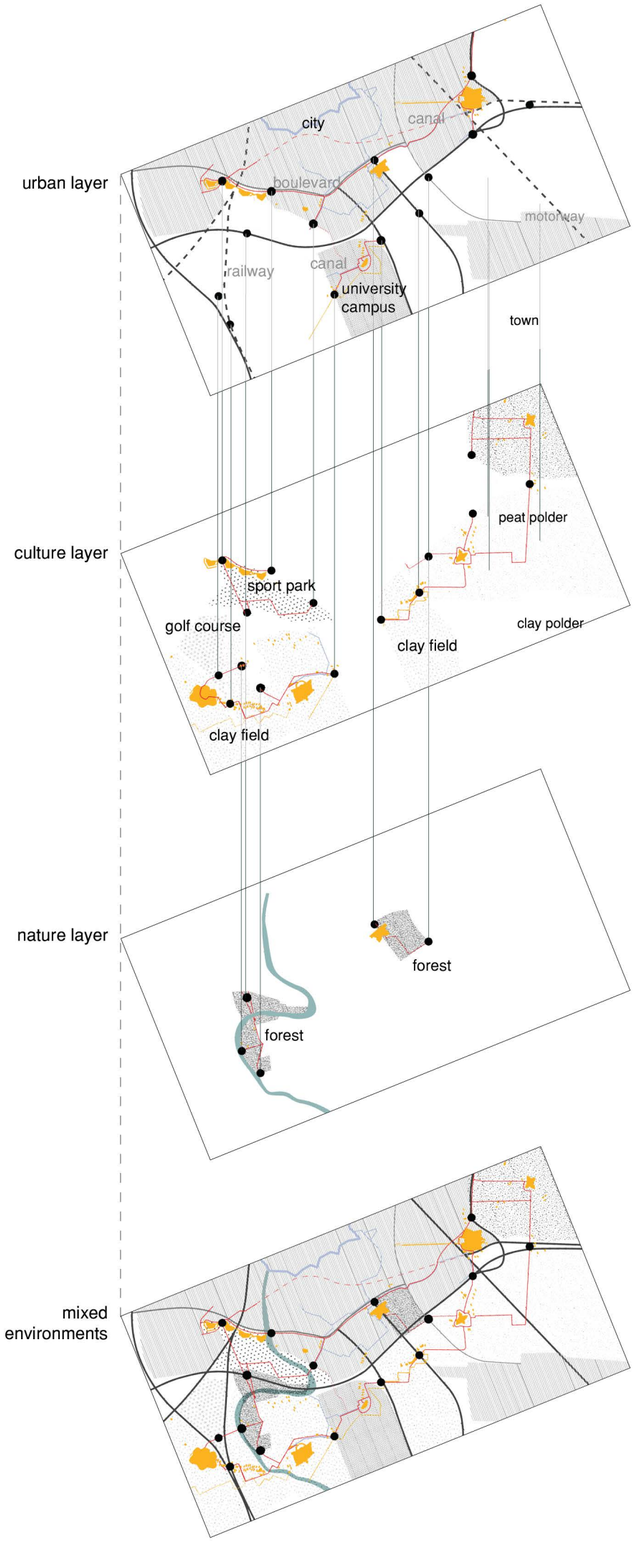


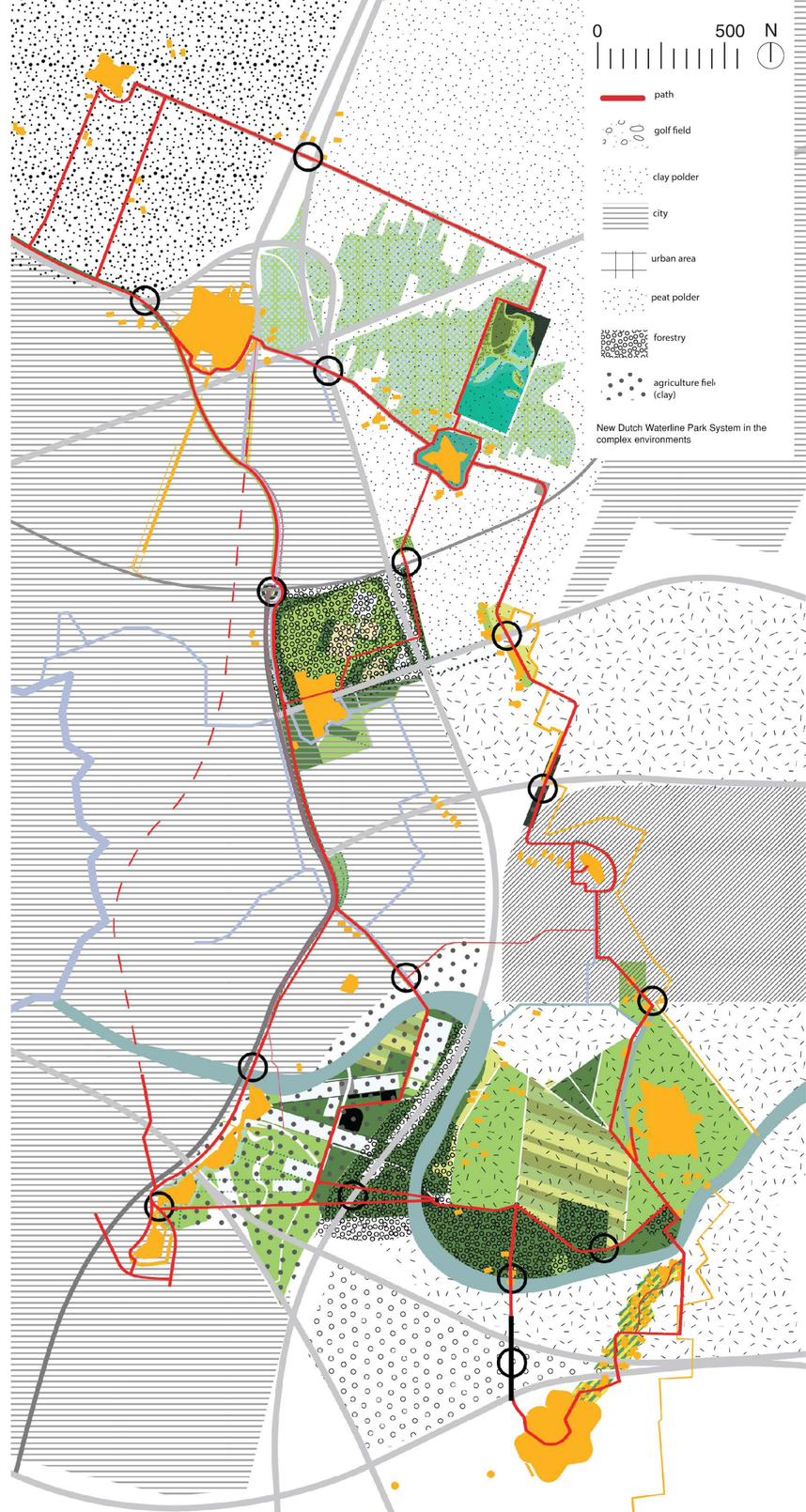

Heritage in different environments

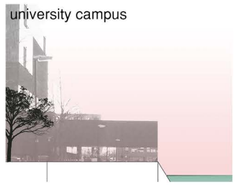


## Experience

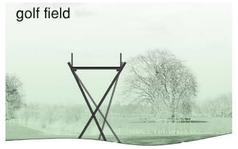
Functional
Infrastructure
Narrative
Heritage
Territorial park system
Landscape as Machine
Landscape as Language

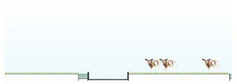

urban layer
city
canal
boulevard
motorway
railway
canal
university
campus
town
culture layer
peat polder
sport park
golf course
clay field
clay polder
clay field
nature layer
forest
forest
mixed
environments

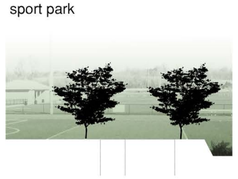

0
500
N
path
golf field
clay polder
city
urban area
peat polder
forestry
agriculture field
(clay)
New Dutch Waterline Park System in the
complex environments

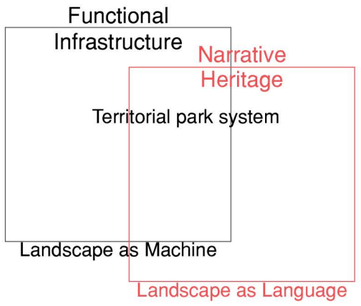



peat polder






Design I Narrative Infrastructure and Functional Heritage
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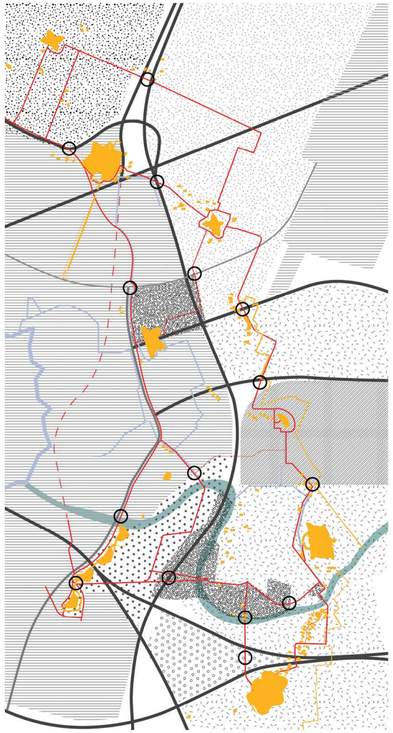
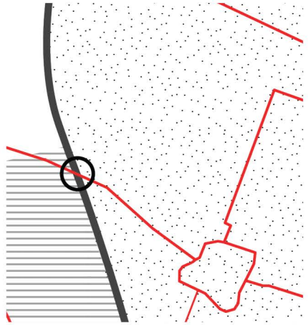


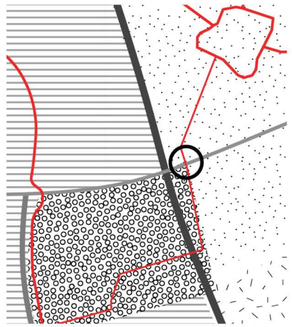


Transition node 1
from the city to clay polder

the city

transition node: the door from city to clay polder

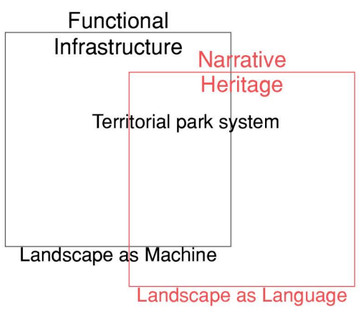
clay polder



Transition node 2
from the forest to clay polder

the forest

transition node: the buffer zone from forest to clay polder




## Transition nodes

Design I Narrative Infrastructure and Functional Heritage
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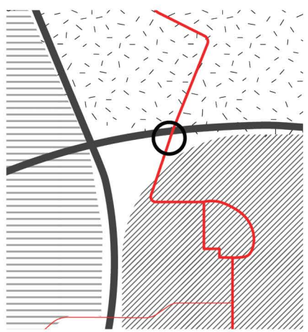
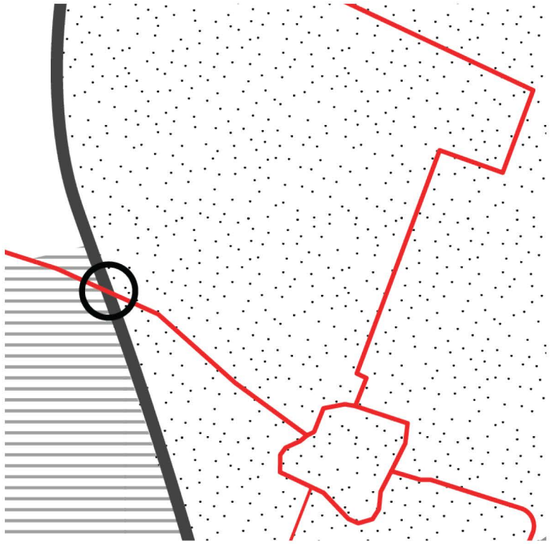


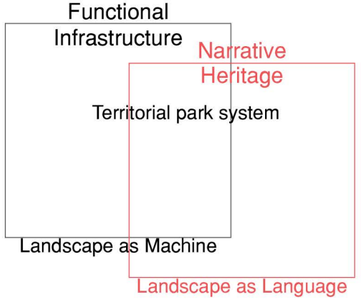
Transition node 3
from agriculture field to
university campus

agriculture field (clay)

transition node: the tunnel from agriculture field to university campus

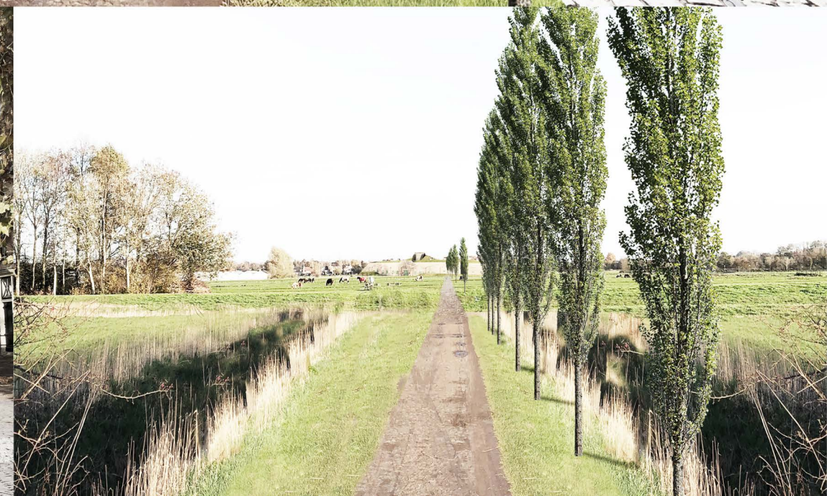
university campus

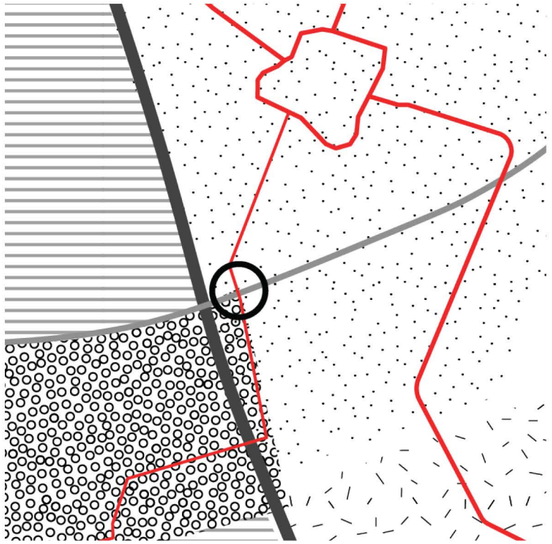


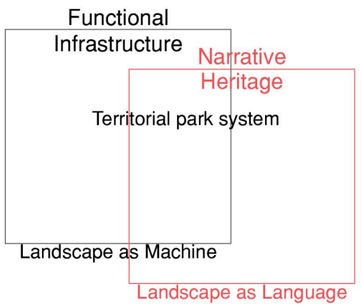



## Transition nodes

Design I Narrative Infrastructure and Functional Heritage
53 I 76

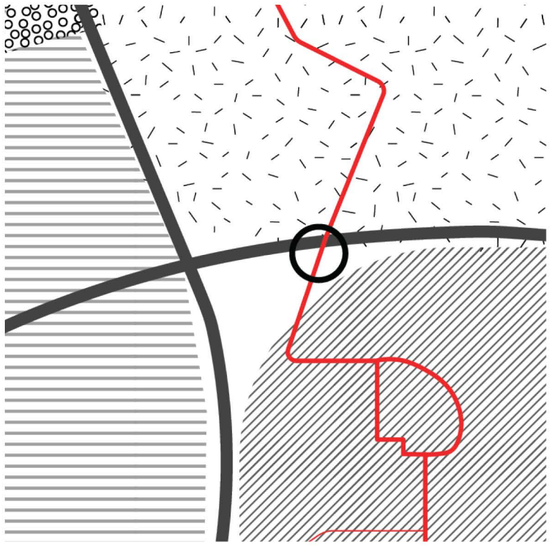


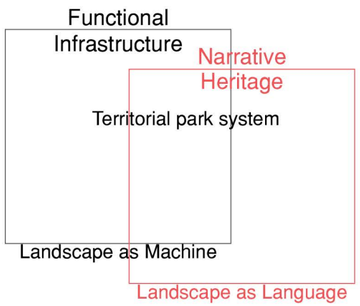





## Transition nodes

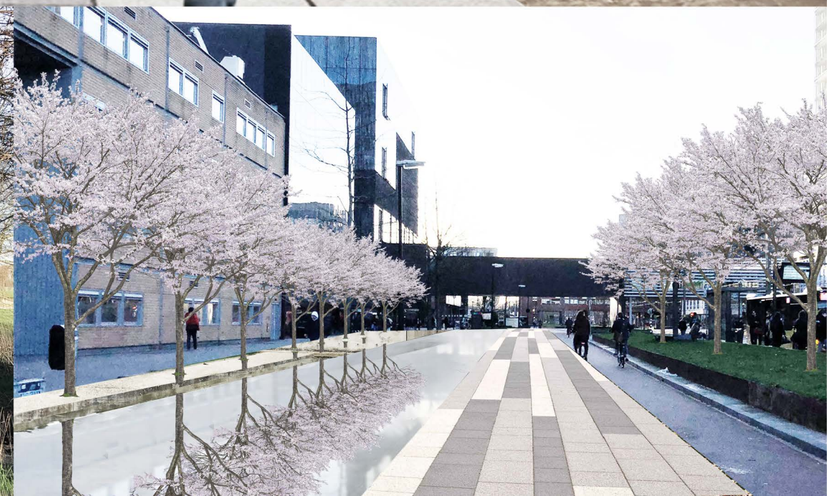
Design I Narrative Infrastructure and Functional Heritage
54 I 76

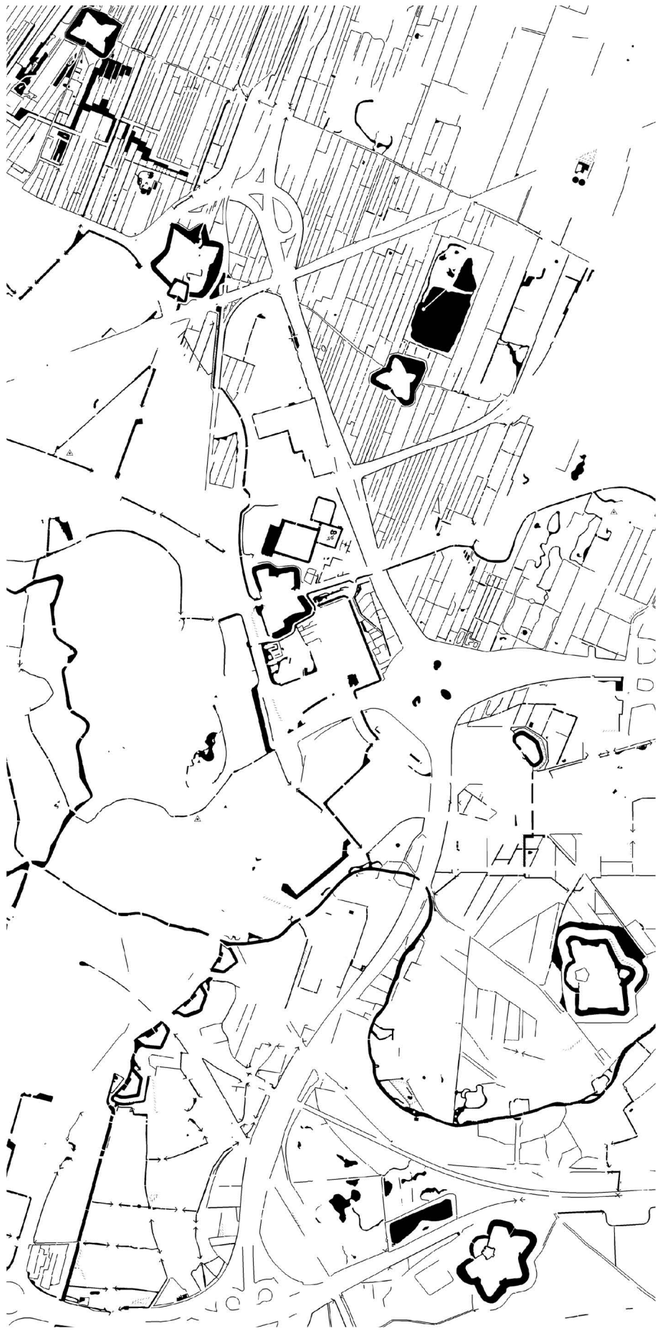





## Transition nodes

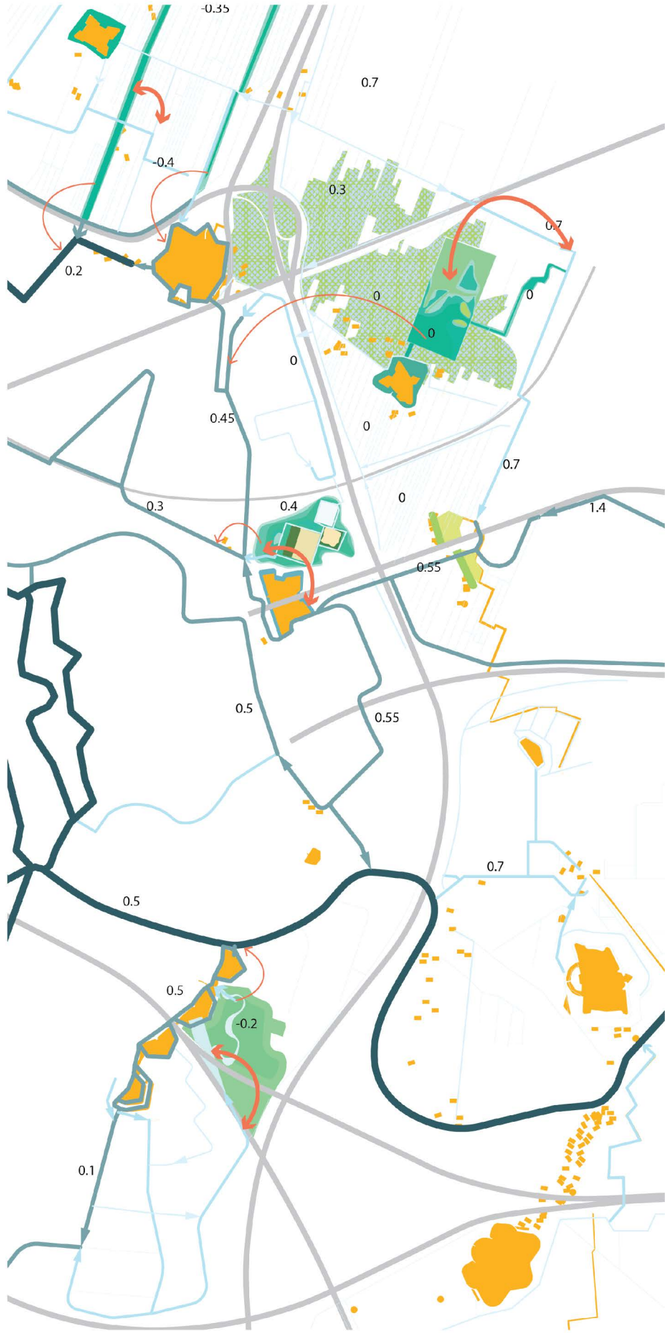
Design I Narrative Infrastructure and Functional Heritage
55 I 76





Original water pattern

Original water system




proposed water system

## Water Strategy

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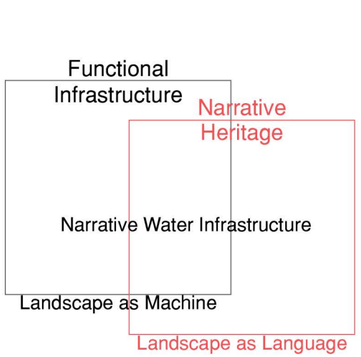
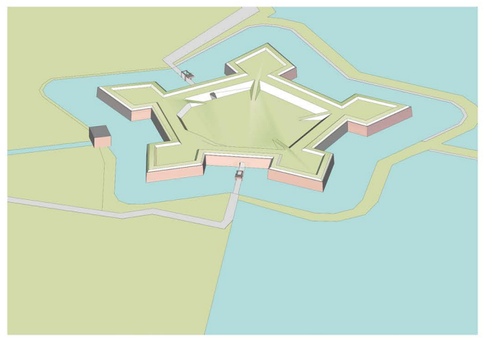


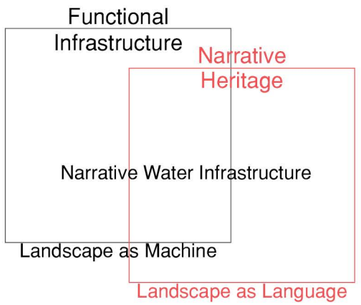
Tool A: Seasonal wetland

seasonal wetland for cultural narrative and resilient water management.

Vegetation absorbs the nitrogen and phosphate among the water from agriculture area. These substances act as nutrients and help the vegetation to grow. The purified water is discharged to the water system. Vegetation can be harvested as biomass.

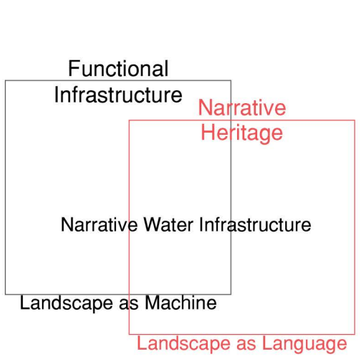
## Tool Kit for Flooding Representation

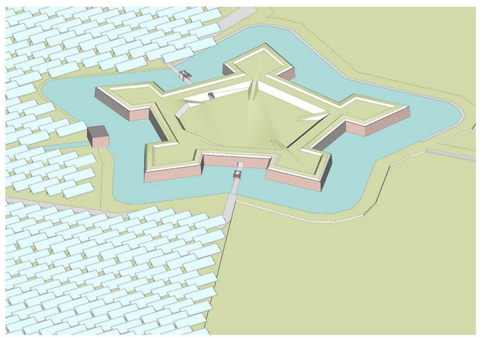
Design I Narrative Infrastructure and Functional Heritage




## Tool Kit for Flooding Representation

Design I Narrative Infrastructure and Functional Heritage
58 I 76

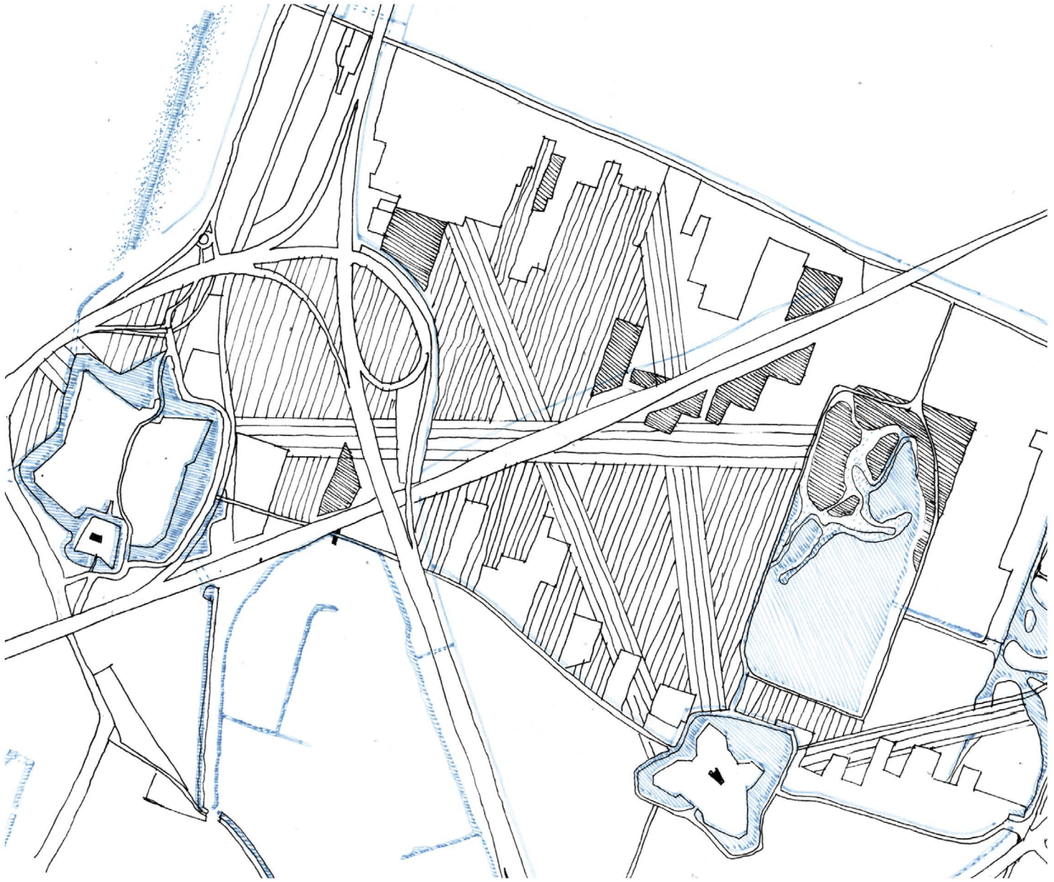


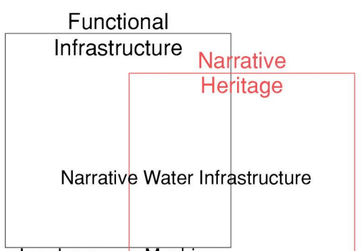



Tool B: Solar panel field

In some area which can not be seasonally flooded can be transformed into solar panel field, sometimes combining with farm. The shining image of solar panel field remind people of the water easily. Therefore, it is also used as a tool to represent the inundation.

## Tool Kit for Flooding Representation






## Tool Kit for Flooding Representation

Design I Narrative Infrastructure and Functional Heritage
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Heritage
flooding wetland
forest
farmland
paved area
lawn
plaza
sport field
trees
nursery
old building
new building
green house
seasonal flooding
river
tram
road
path

# Site Plan

Fort Lunet Park in the New Dutch Waterline Park System in Utrecht

0 80 160 m N

**Fort Lunet Park**

Design I Narrative Infrastructure and Functional Heritage
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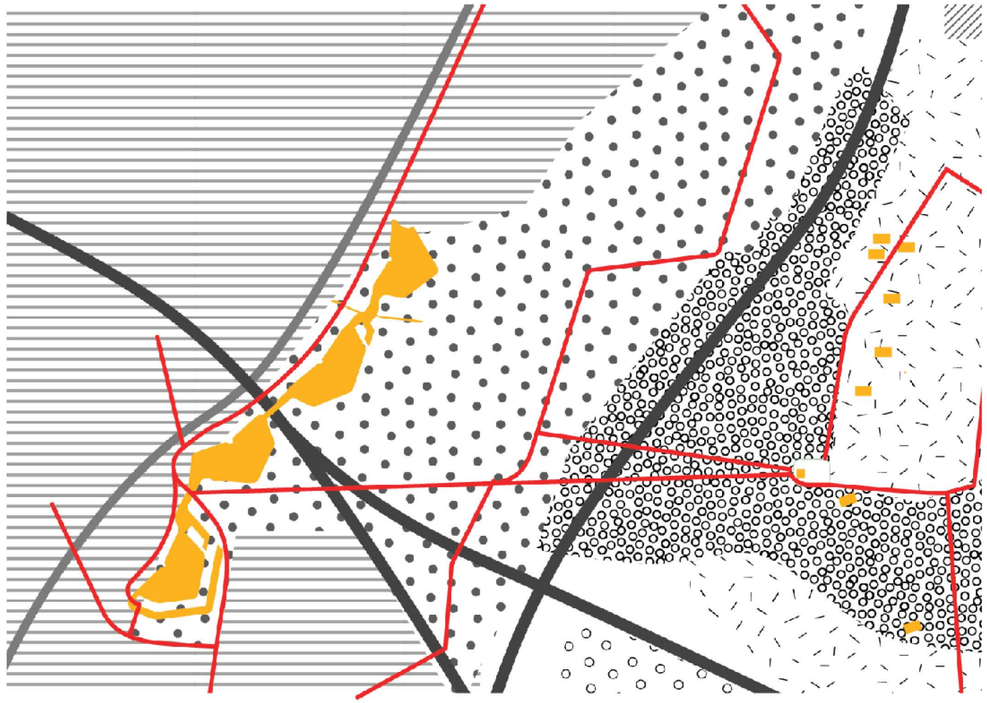
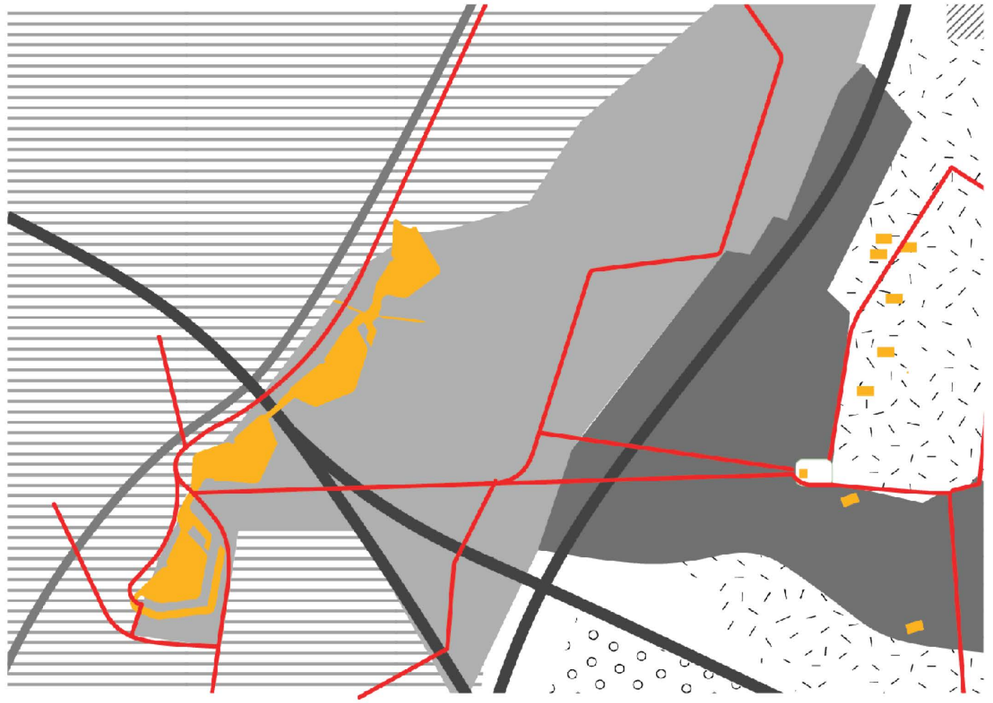
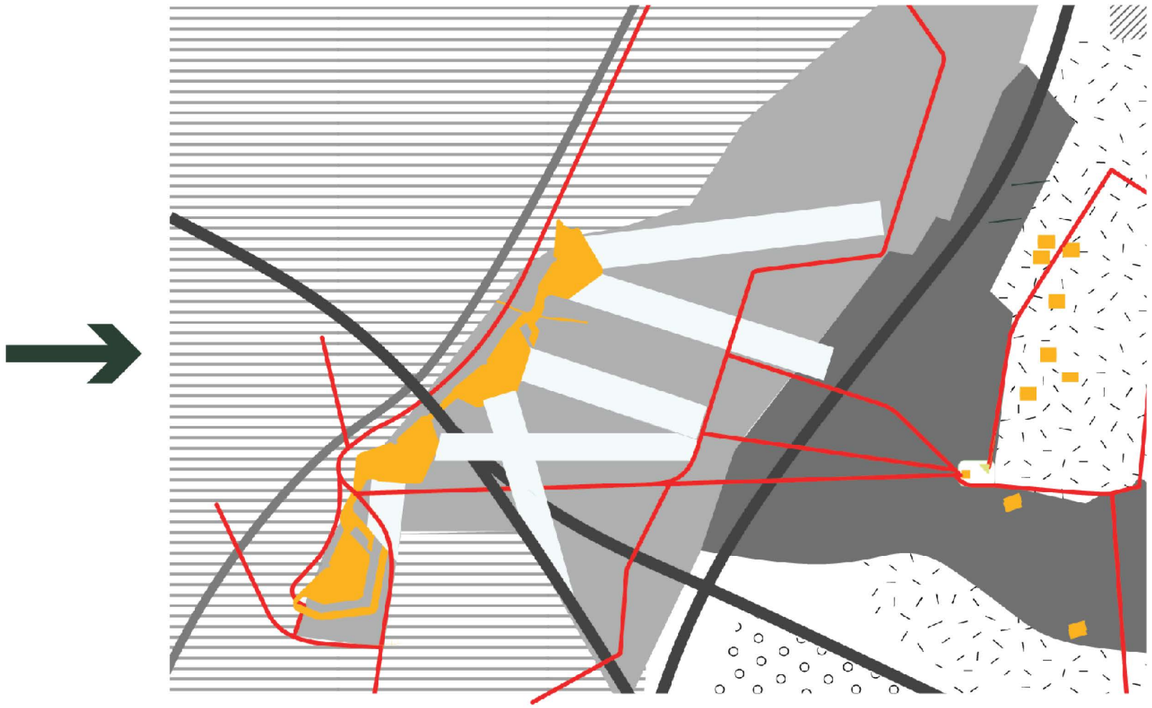


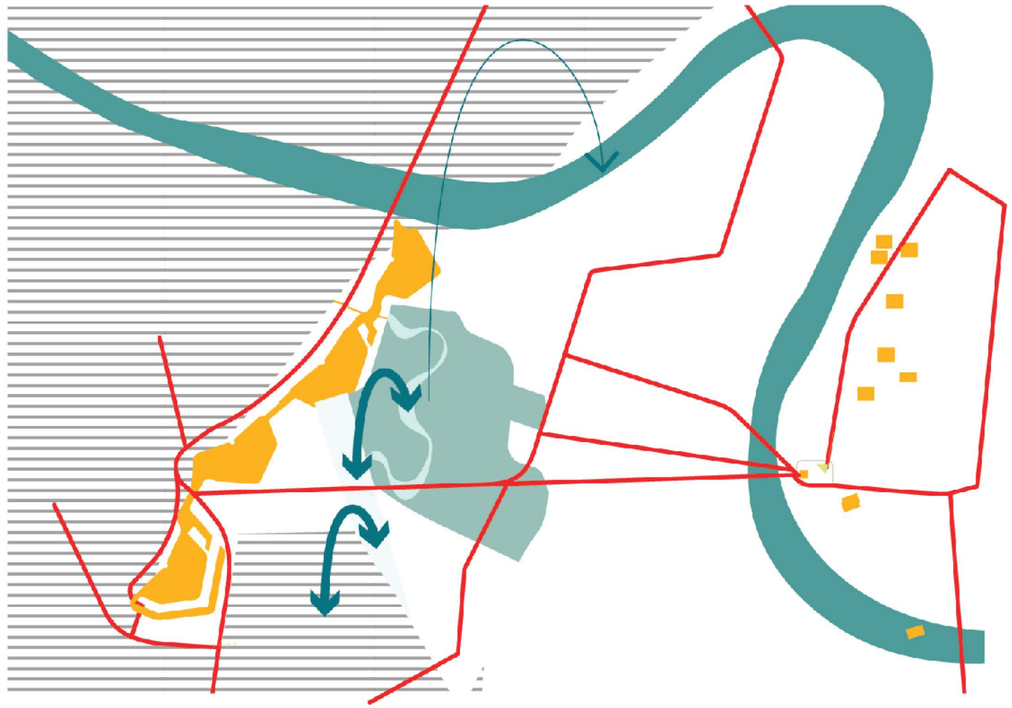
Path as basic framework connecting different forts in complex environments



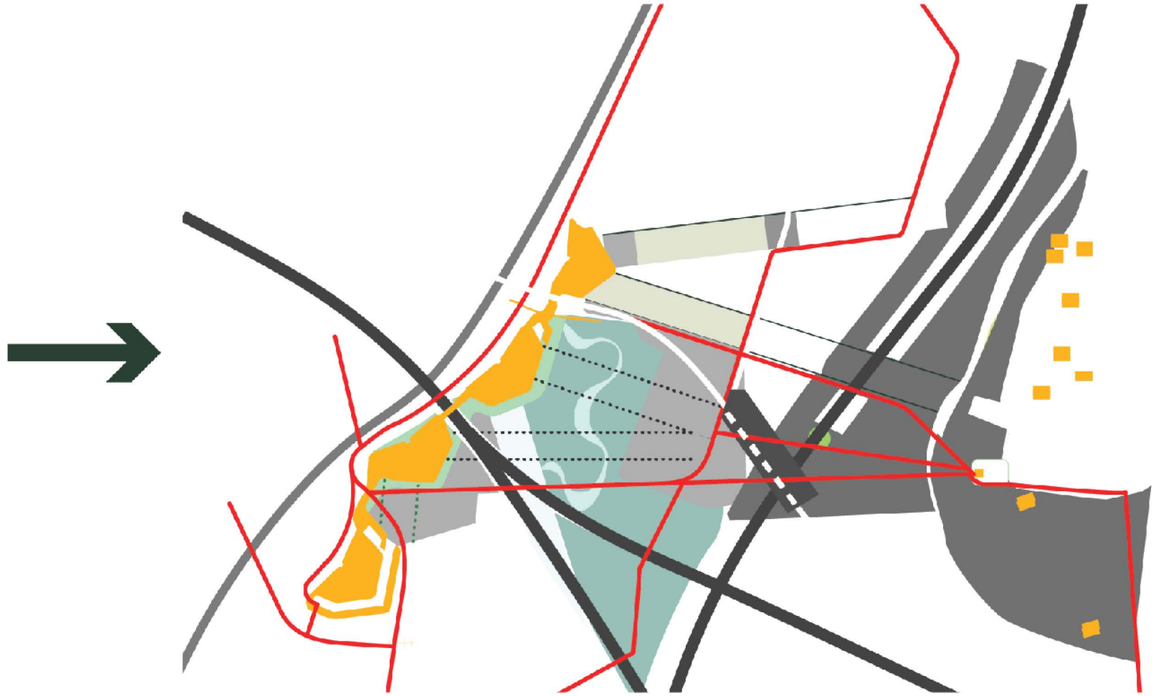
Expand the path as a park



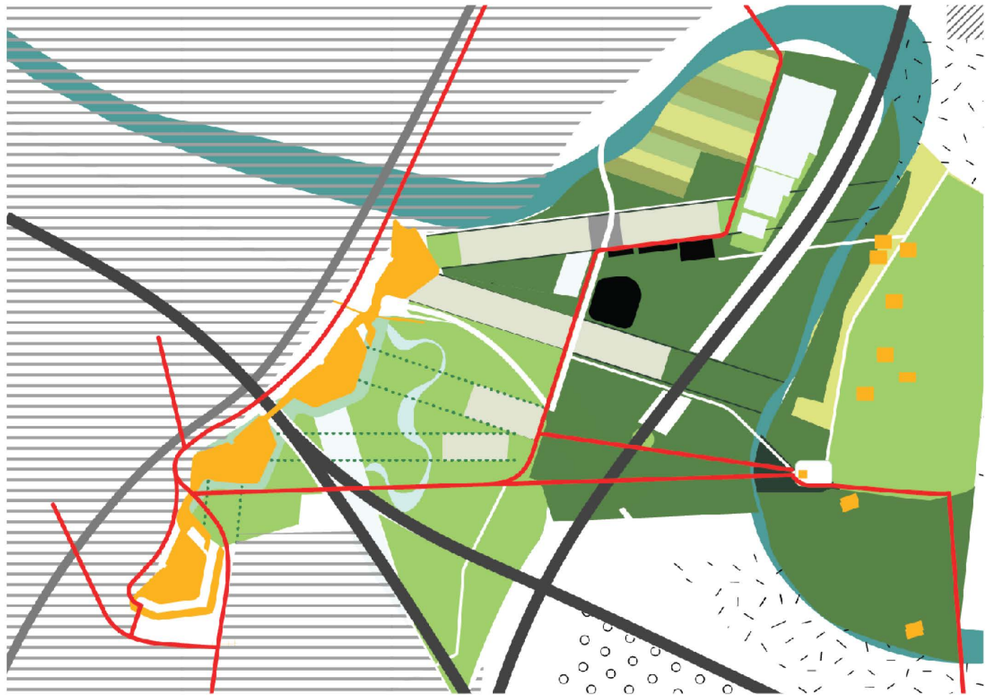
shooting range as a program framework



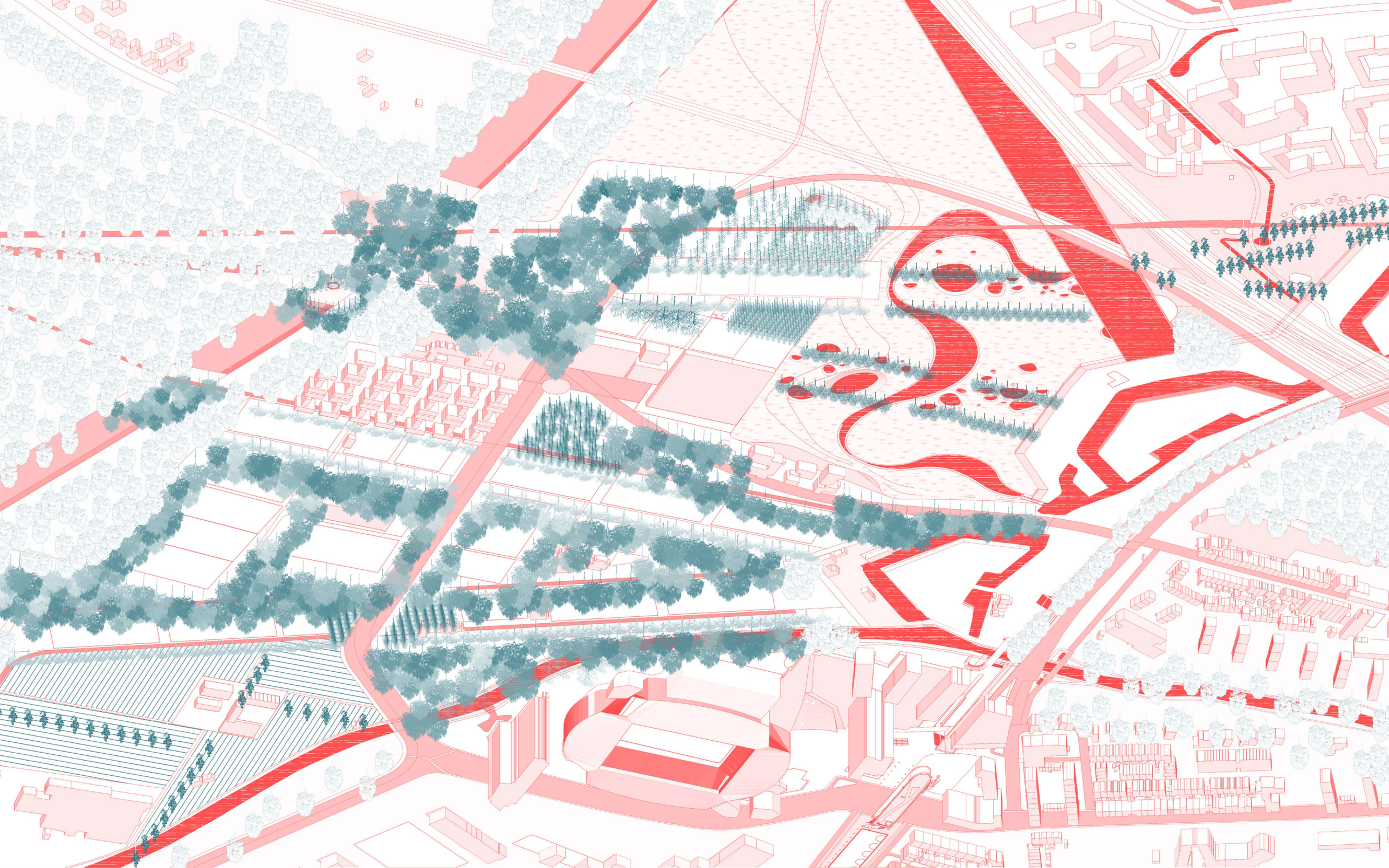
seasonal wetland for cultural narrative and resilient water management

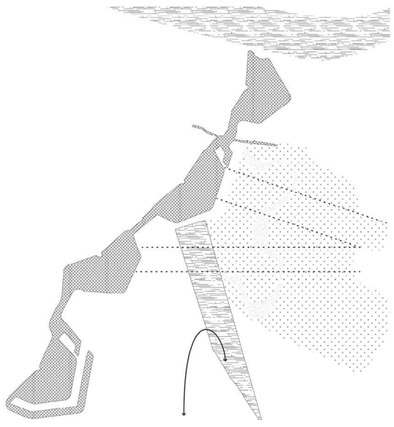


combine the two strategy as the basic framework

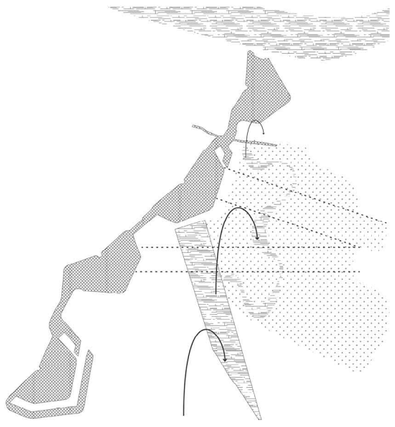


one scenario of the park

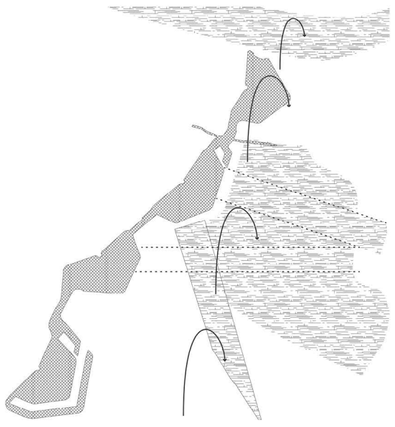




During Dry Conditions



During Average Rainfall Event



During Flood Event

**Narrative water infrastructure**

Design I Narrative Infrastructure and Functional Heritage
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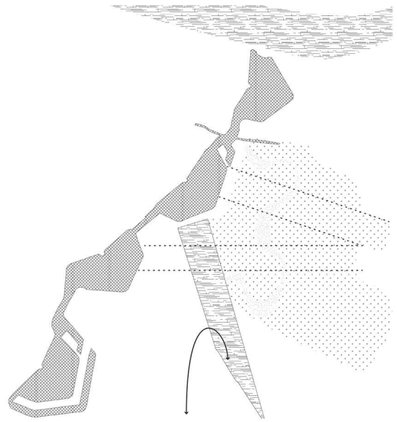
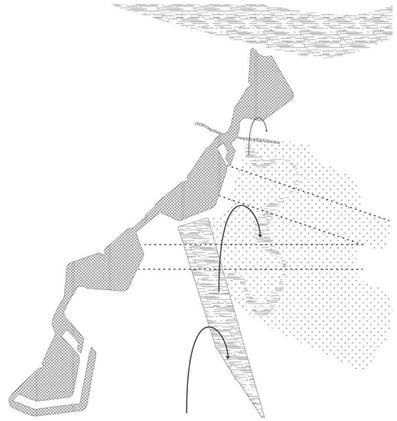
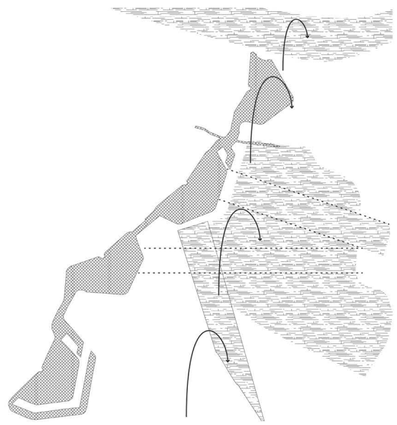
Steep slope and walls shape the clear land form and represent the inundation basin. Tree rows start from the fort and point to the distance, just like shooting. The pits along the trees look like craters.

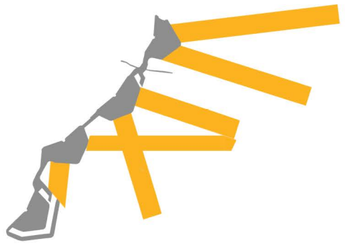


The water flows into the seasonal wetland in the rainy days. Water is shaped as a curve, which showing the water flow direction. The “craters” collect the rainwater and turn into scattered mirrors.

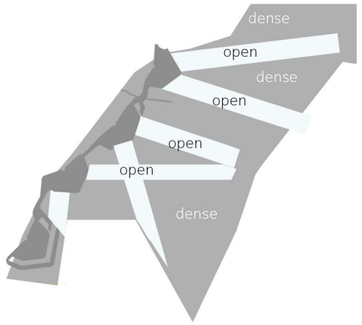


In stormy weather, the basin is full of water like during the war. The tree rows and sky are mirrored. The peaceful view inspires people to reflect war and peace.

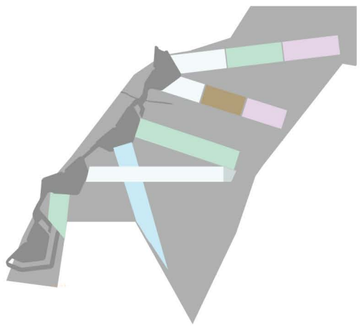




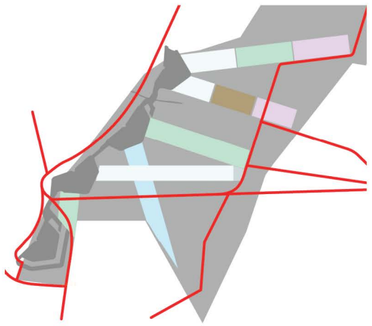
invisible shooting range




urban forest and other elements represent the invisible shooting range



open areas in the shooting range provide flexible functions, like football field, farm, lawn and plaza. Similarly, dense areas also provide flexible functions, like housing, forest and green house.



flexible framework combines with experience path which connecting different forts and other urban fabrics.

Phase 1:narrative urban structure

Phase 2

Phase 3

Scenario 1:
neighborhood

Scenario 2:
sport park

Scenario 3:
urban farm

Phase 2

Phase 3

# Scenario 1: neighborhood

Phase 2

Phase 3

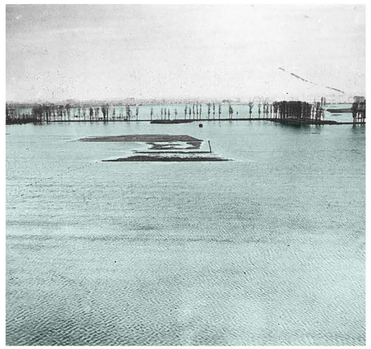
# Scenario 2: sport park

Phase 2

Phase 3

# Scenario 3: urban farm

Narrative



Functional

The New Dutch Waterline

Landscape as Language and Machine

Narrative

Illegible Heritage

Illegible Heritage

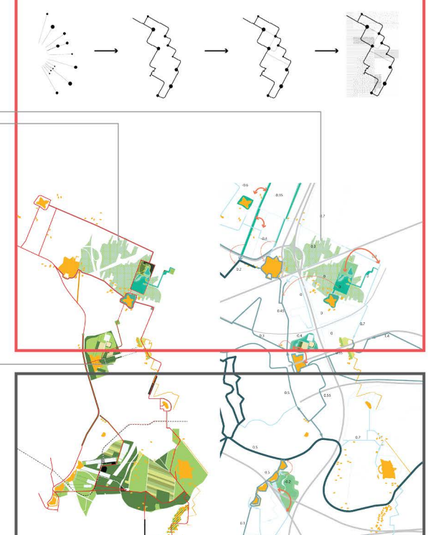
Water Management Challenge

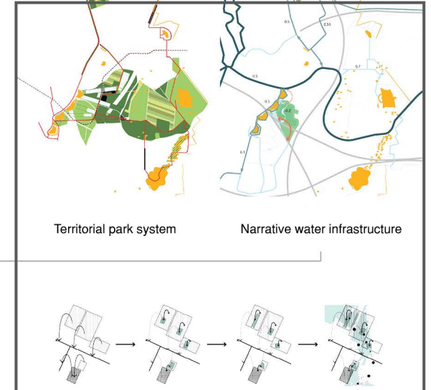
Functional

Urbanization and Critical Heritage Studies

Issues

Narrative

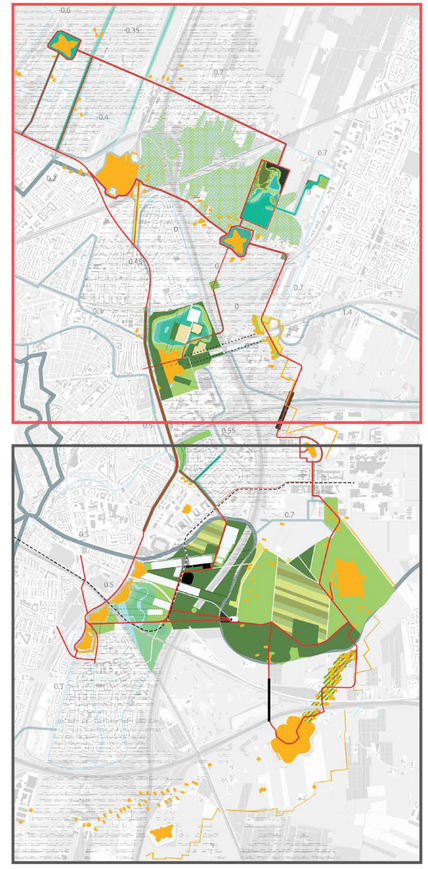





Functional

Strategy for Narratuve Infrastructure and Functional Heritage

Narrative



Functional

Framework and Scenario

Landscape narrative in Italian garden

Functional Landscape

# Renaissance of Landscape Architecture

# Renaissance of Landscape Architecture

Landscape narrative in Italian garden

Functional Landscape