



REVEALING ROME'S WATER-BASED CULTURE

A RESILIENT, DYNAMIC AND INTERACTIVE LAYER

Tu Delft Master of Landscape Architecture

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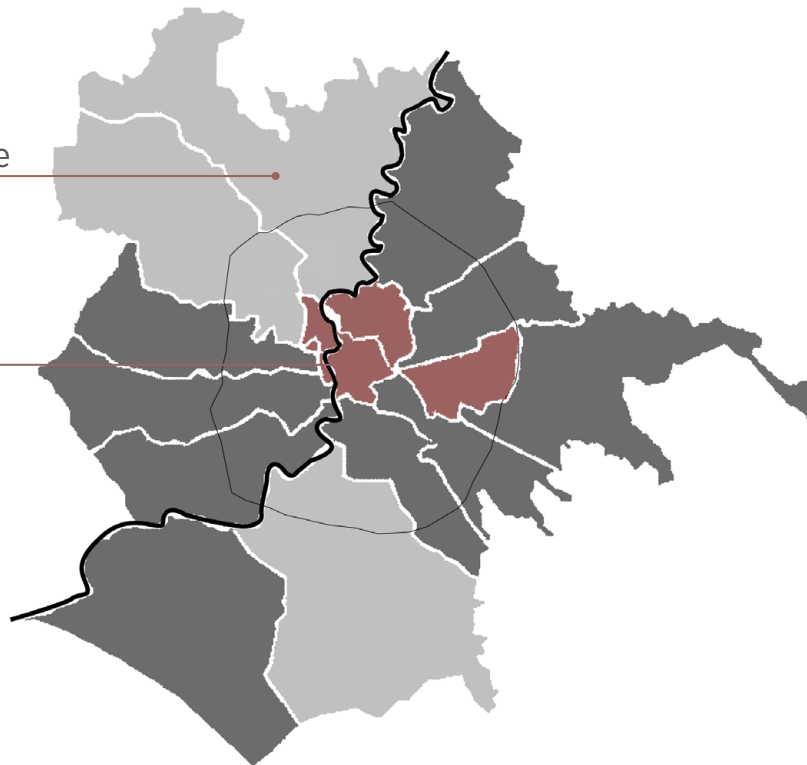
P5 - 02.06.2020

2.9 M

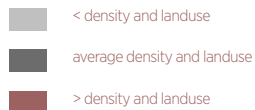
POPULATION OF THE MUNI-
CIPALITY1,285 km²SURFACE AREA OF THE
MUNICIPALITY

14% land use

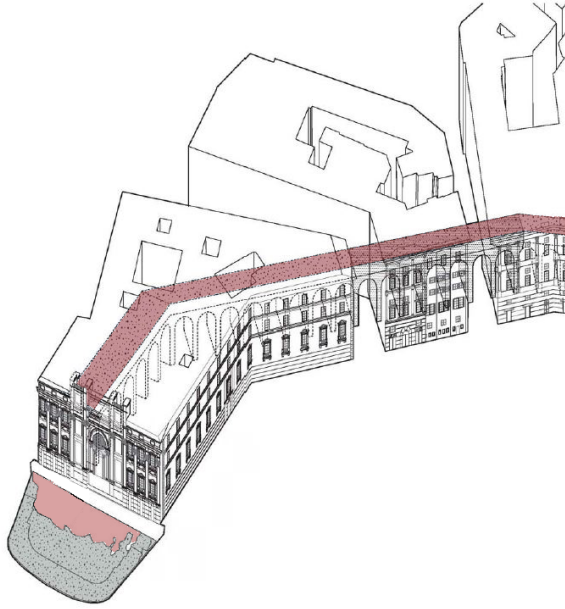
75% land use



ROME IS SUBDIVIDED INTO 15 MUNICIPAL
DISTRICTS.
66% OF THE ROMAN POPULATION
RESIDES IN THE CAPITAL.





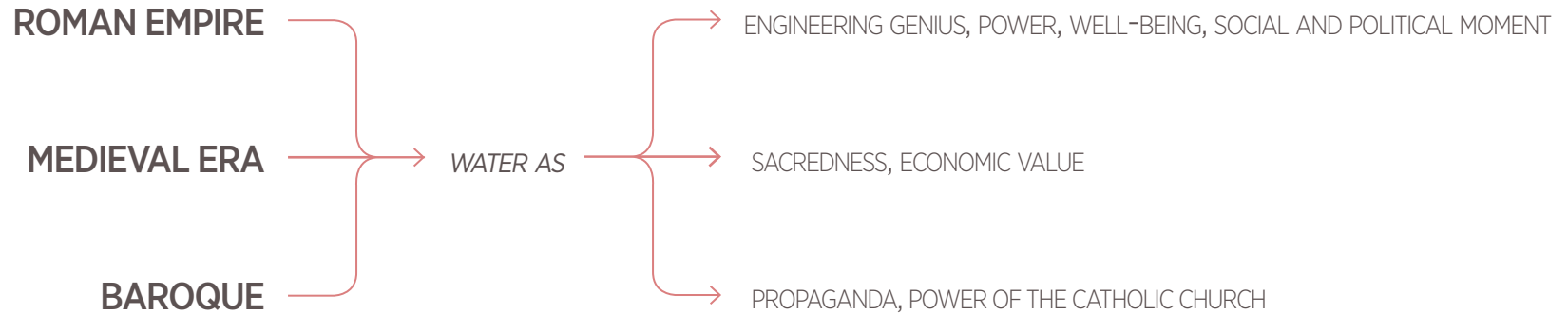


MOSTRA D'ACQUA

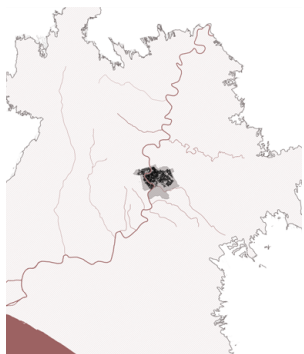
WATER SHOW

FROM LATIN: MOSTRARE
to show, to reveal, to exhibit

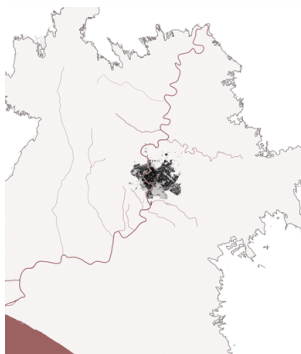




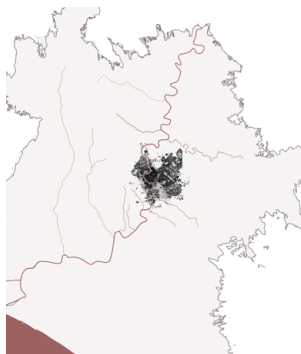
BUT TODAY?



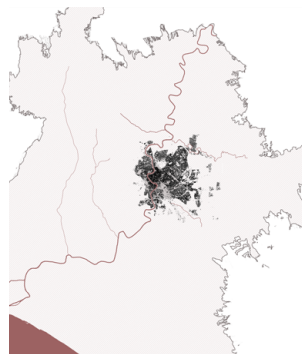
1873



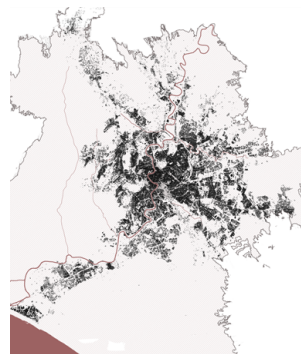
1910



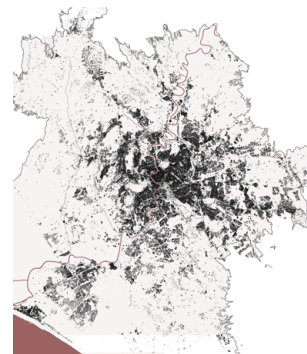
1930



1950



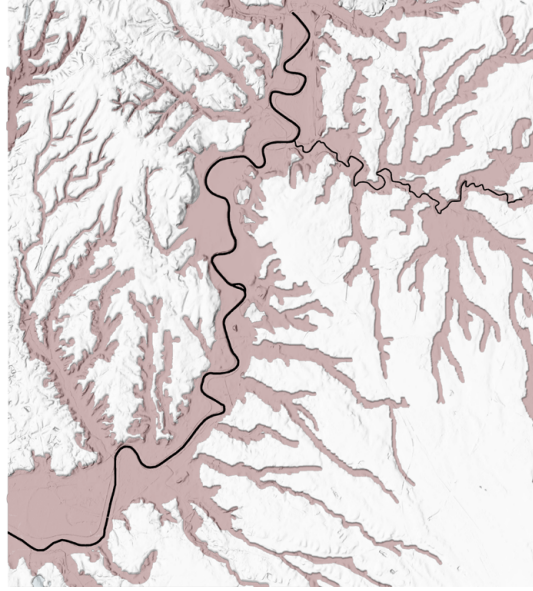
1980



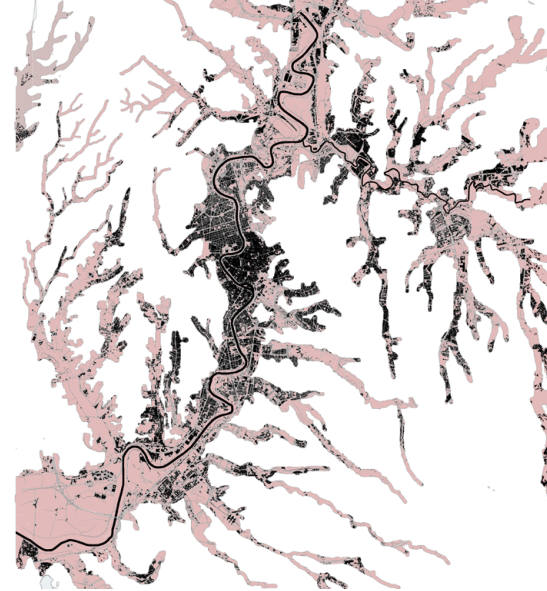
2010



Map of the built city in 2010



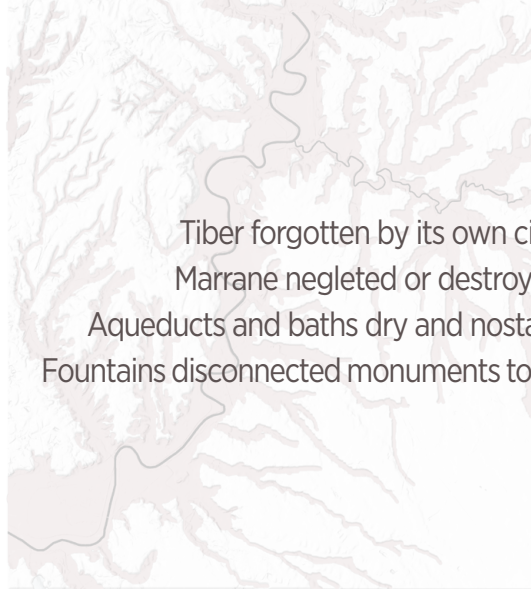
Hydrography Map



Combination of previous map: the city is built on water



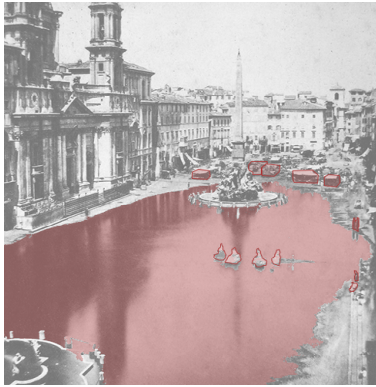
Map of the built city in 2010



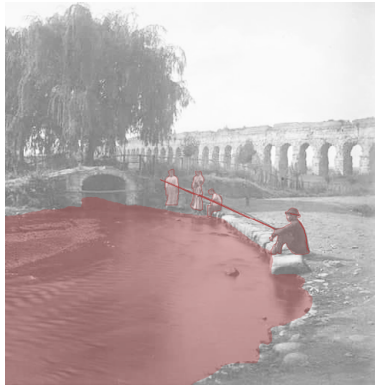
Hydrography Map



Combination of previous map: the city is built on water



Naumachia in the city center (1870)



Fishing on the Marrana (1920)



Swimmable Tiber (1953)



No trace of the old water battle



Disappeared Marrana



Desolated Tiber

The objective of this research is to *mostrare*, reveal, once again all the water elements that have characterized the city of Rome

green and blue system

water-based tourist routes

flood resilient interventions

adaptive and resilient city

How can both natural water and water management elements of ancient Rome be revealed and integrated in a resilient green and blue strategy, which enriches the ecological and experiential qualities of the public space?



LANDSCAPE AS PALIMPSEST

A very old text or document in which writing has been removed and covered or replaced by new writing.

Cambridge Advanced Learner's Dictionary & Thesaurus

LANDSCAPE BIOGRAPHY

Landscape biography focuses on the multidimensional (cultural, social and economic) aspect of landscape changes within a certain period or the “layeredness” of landscape at specific moments in time.

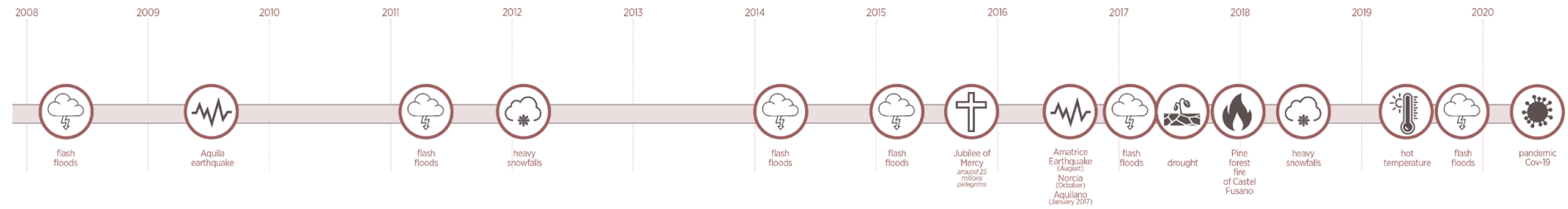
Renes, 2015

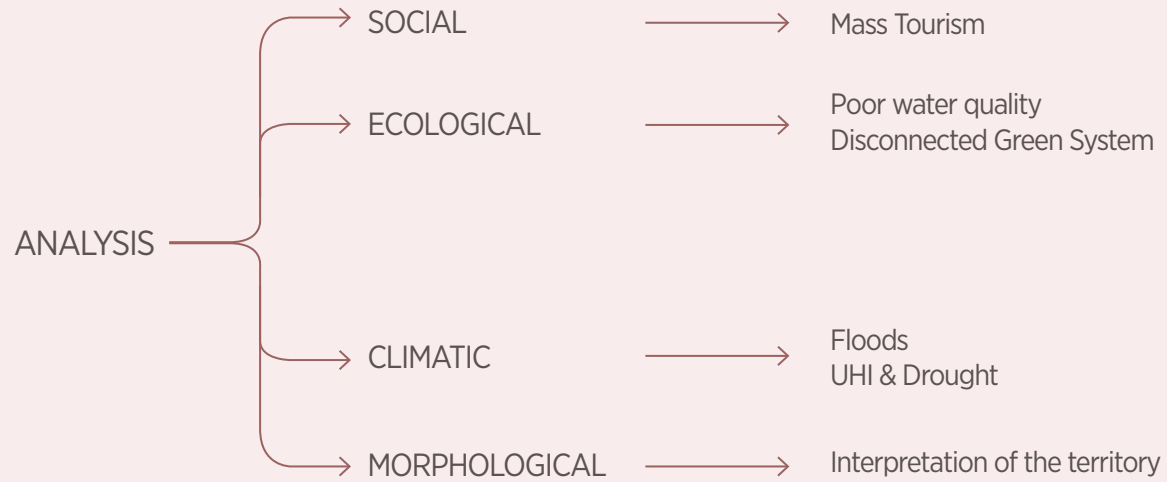
URBAN RESILIENCE

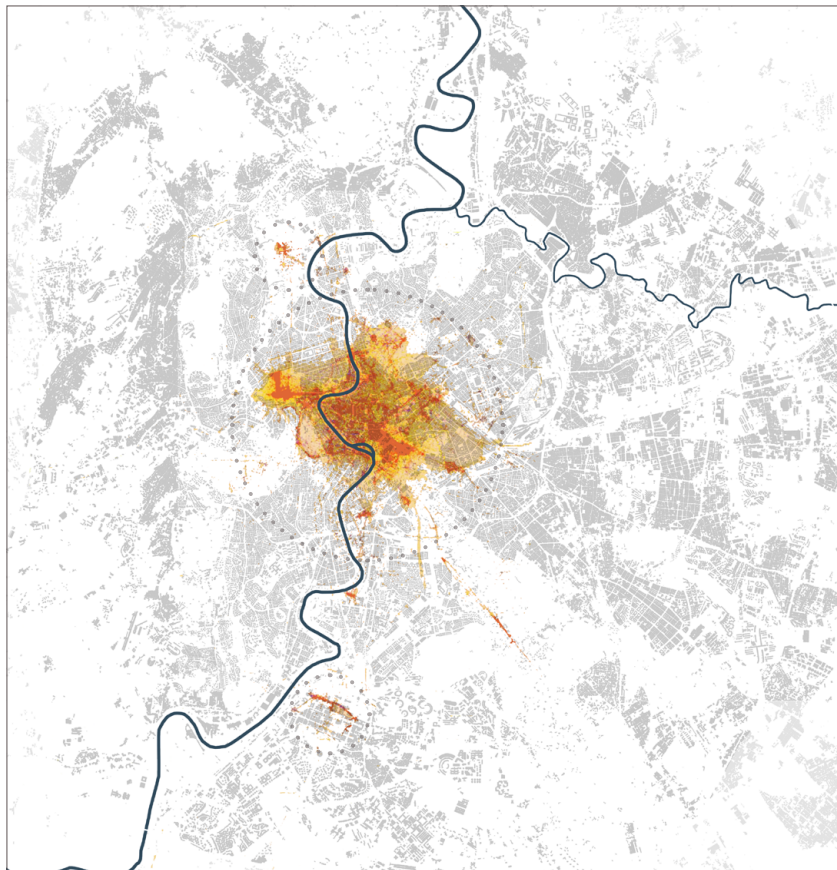
The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

100 Resilient city, 2017

SHOCKS & STRESS







- Area with a high concentration of tourist
- Area with a medium concentration of tourist
- Area with a low concentration of tourist

MASS TOURISM

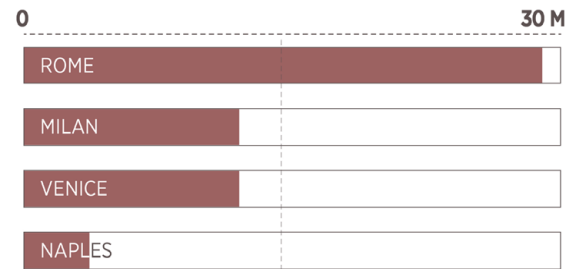
> 25,000 MONUMENTS

In Rome there are more than 25,000 points of historical, artistic and archaeological interest, undoubtedly an unequalled record.

32 km² HISTORIC CENTER

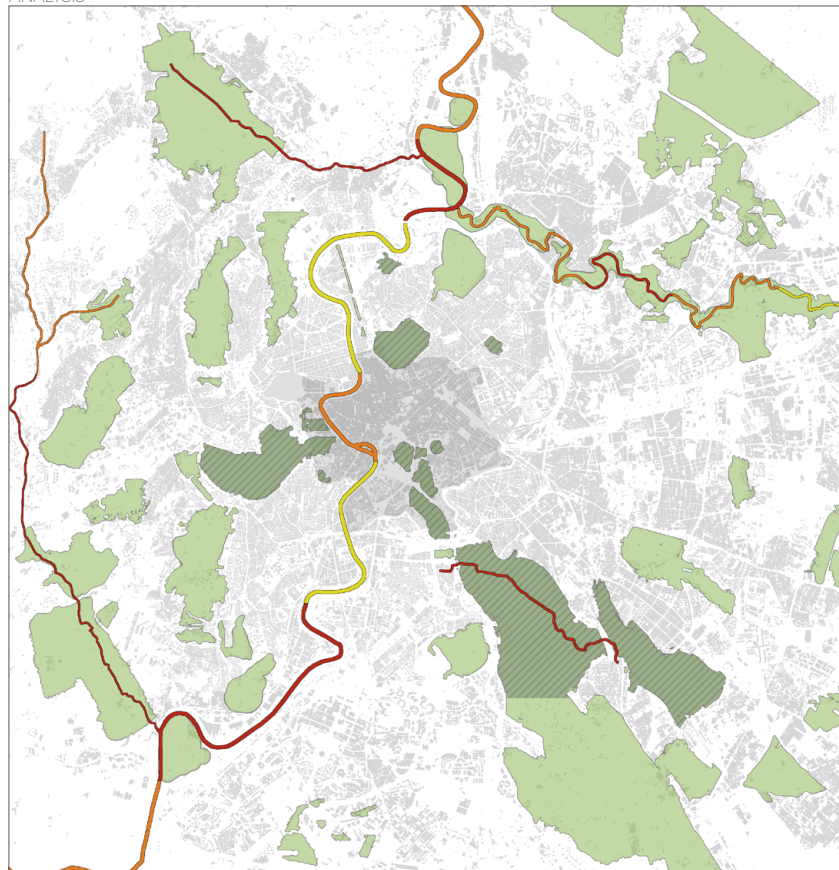
The historic center of Rome has been in the Unesco list of World Heritage Sites since 1980.

TOURISM IN ITALY (million)



Istat 2018





GREEN AND BLUE STRUCTURE

827 km² Surface area of natural capital

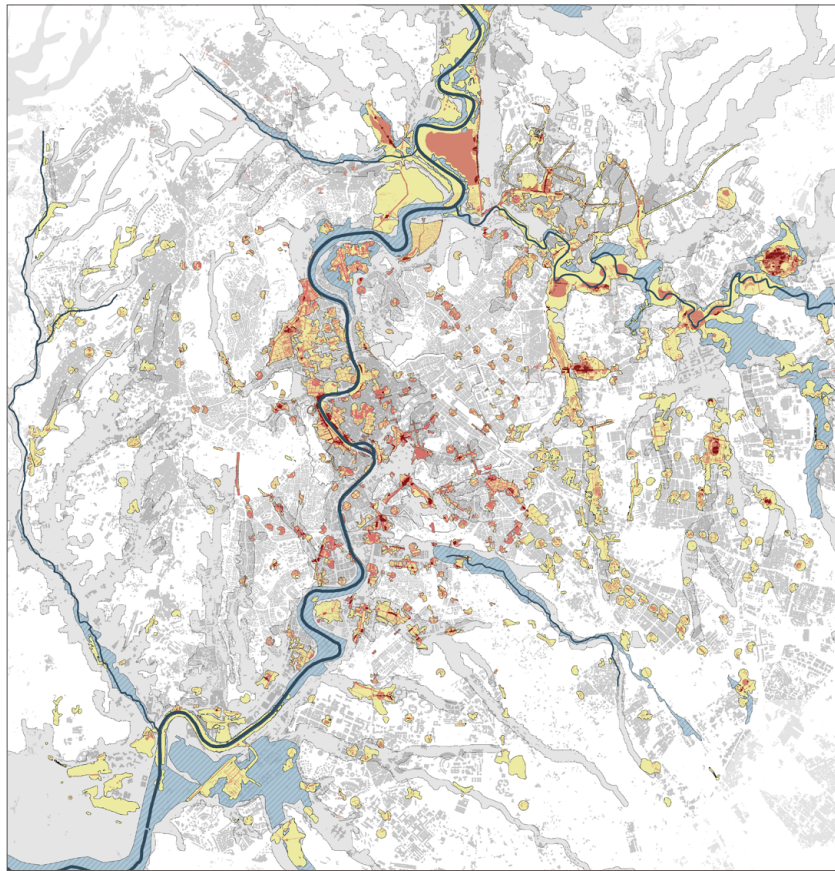
URBAN GREEN SPACES OF HISTORICAL, ARTISTIC AND CULTURAL VALUE (SQ M)



istat 2014

- Protected areas 87,800 ha
- Parks and natural reserves 41,000 ha
- Agricultural areas 53,000 ha
- Archaeological parks 11,000 ha
- Public green under management 3,900 ha





Pluvial Flood Hazard

- High
- Medium
- Low
- River flooding hazard

FLOODS

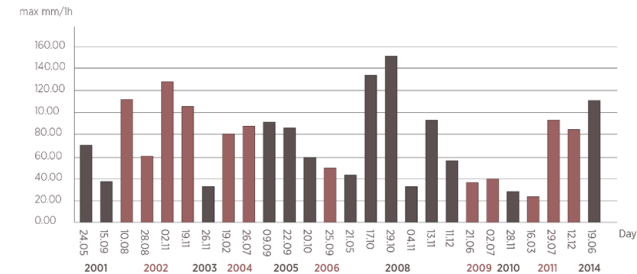
> 250,000 PEOPLE AT RISK OF FLOODS

More than 250,000 citizens live in areas where there is a high risk of flooding, one of the highest in Europe.



DOCUMENTED PLUVIAL FLOODS BETWEEN 2001-2014

The number of observed floods considerably rose from 2008



istat 2017



UHI & DROUGHT

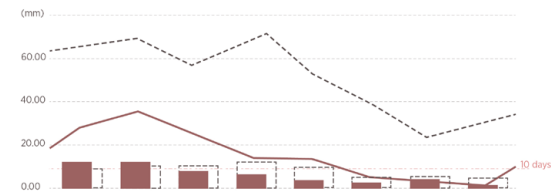
31 °C HEAT ISLAND

A study carried out by the Institute of Biometeorology of the National Research Council established the risky situation created by heat islands amongst vulnerable people. In Rome the highest risk is recorded in the summer months when the ground temperatures reaches 31°C.

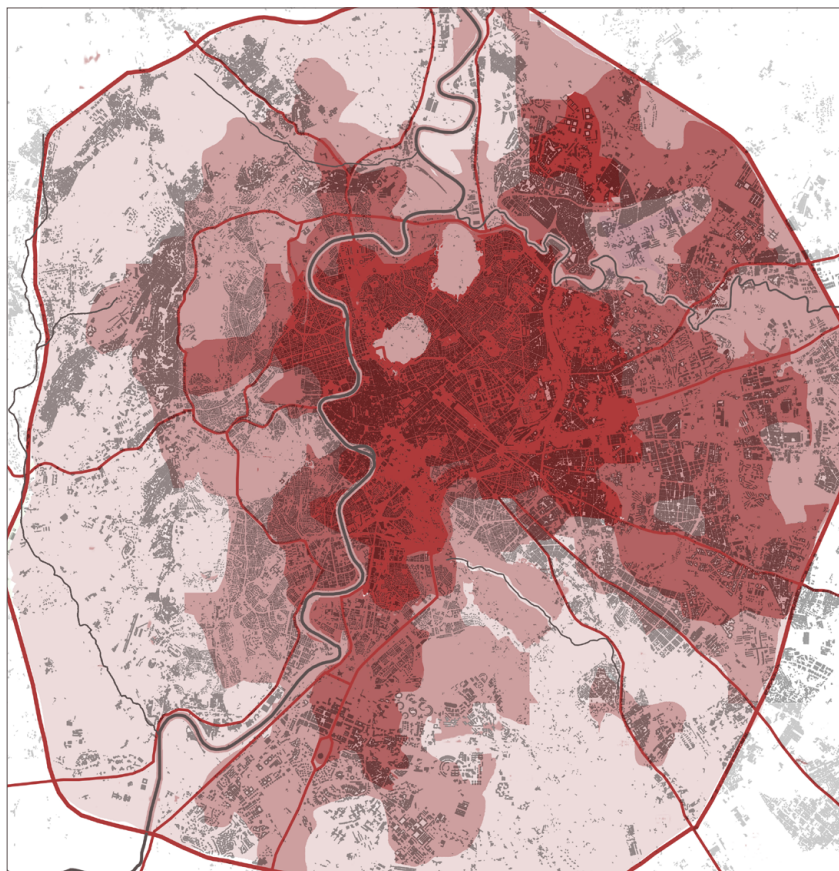
CNR, 2015

-52 % RAINFALL AVERAGE

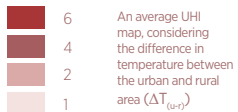
In 2017 rainfalls decreased with respect to the historical averages.

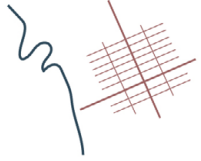


Coldiretti, 2017

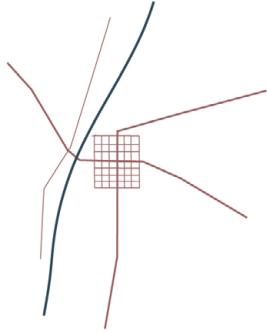


$\Delta T(u-r)$ [K]

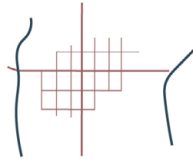




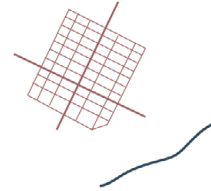
Naples



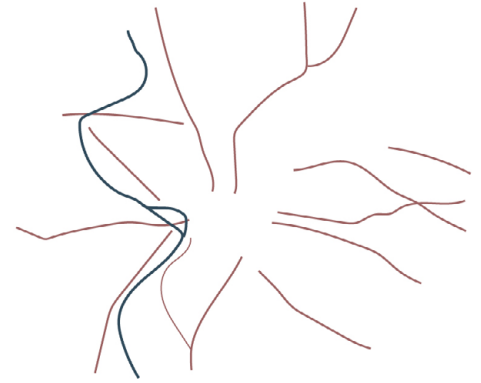
Florence



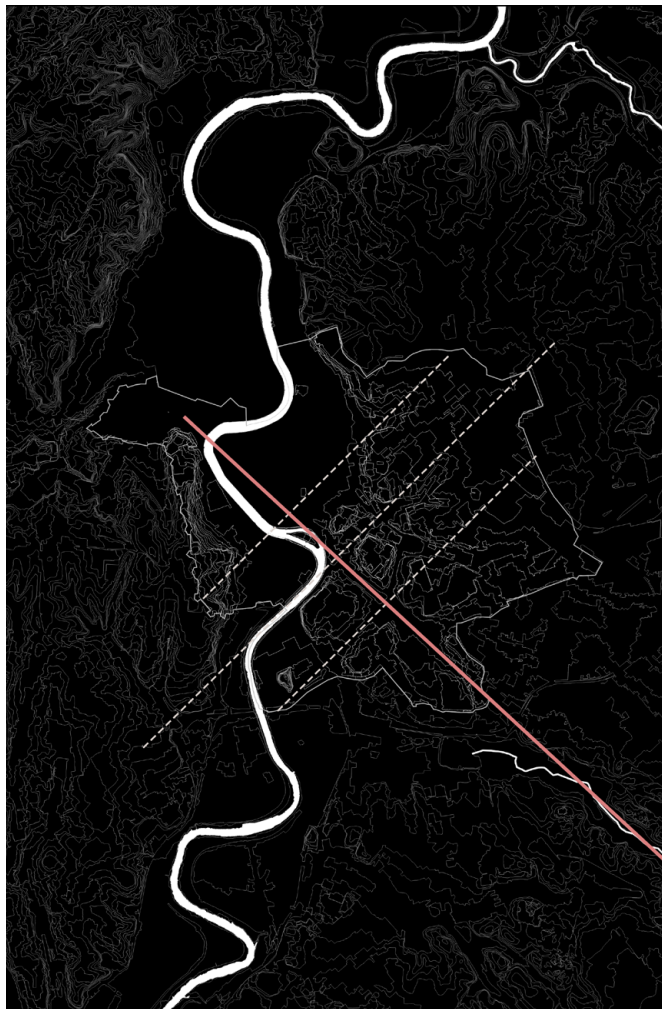
Rimini



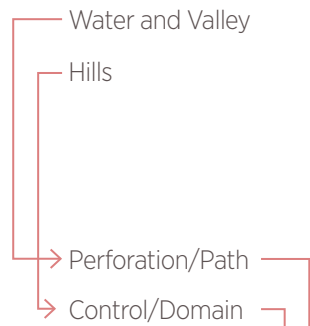
Turin



ROME



GEOGRAPHICAL MEANING



GEOMETRICAL MEANING

Horizontality

Verticality

DUALISM



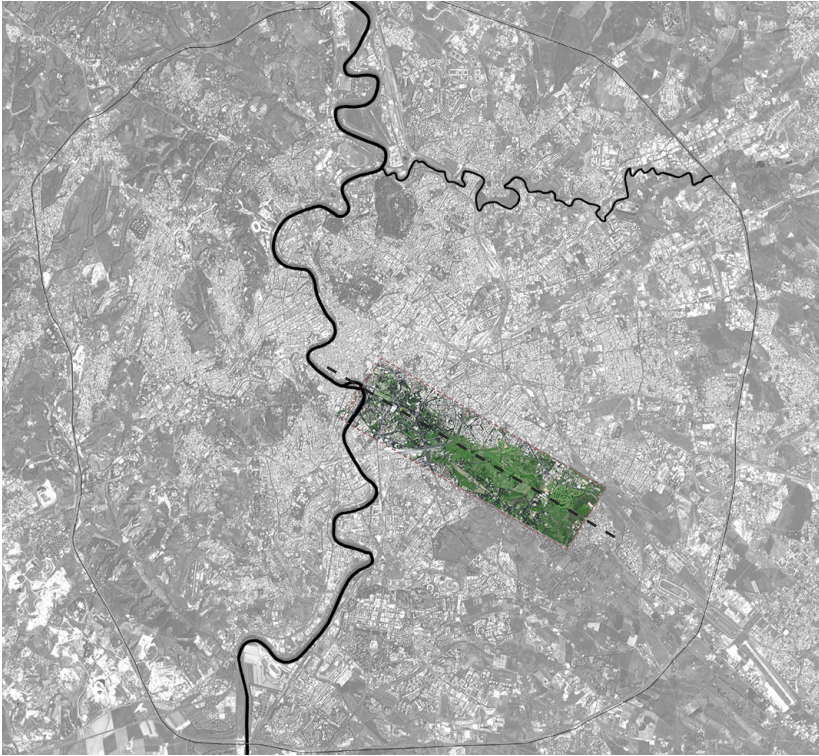
*“First of all man aims to specify the natural structure.
Where nature [...] indicates a direction, he opens a path”.*

(Norberg-Schulz, 1981)

DUALISM \longrightarrow AXIALITY \equiv *synthesis of the place*

The geographic interpretation of the place
led to the identification of axes capable of
tracing a synthesis of the place itself

Territory determines the city's structure,
which is only apparently chaotic



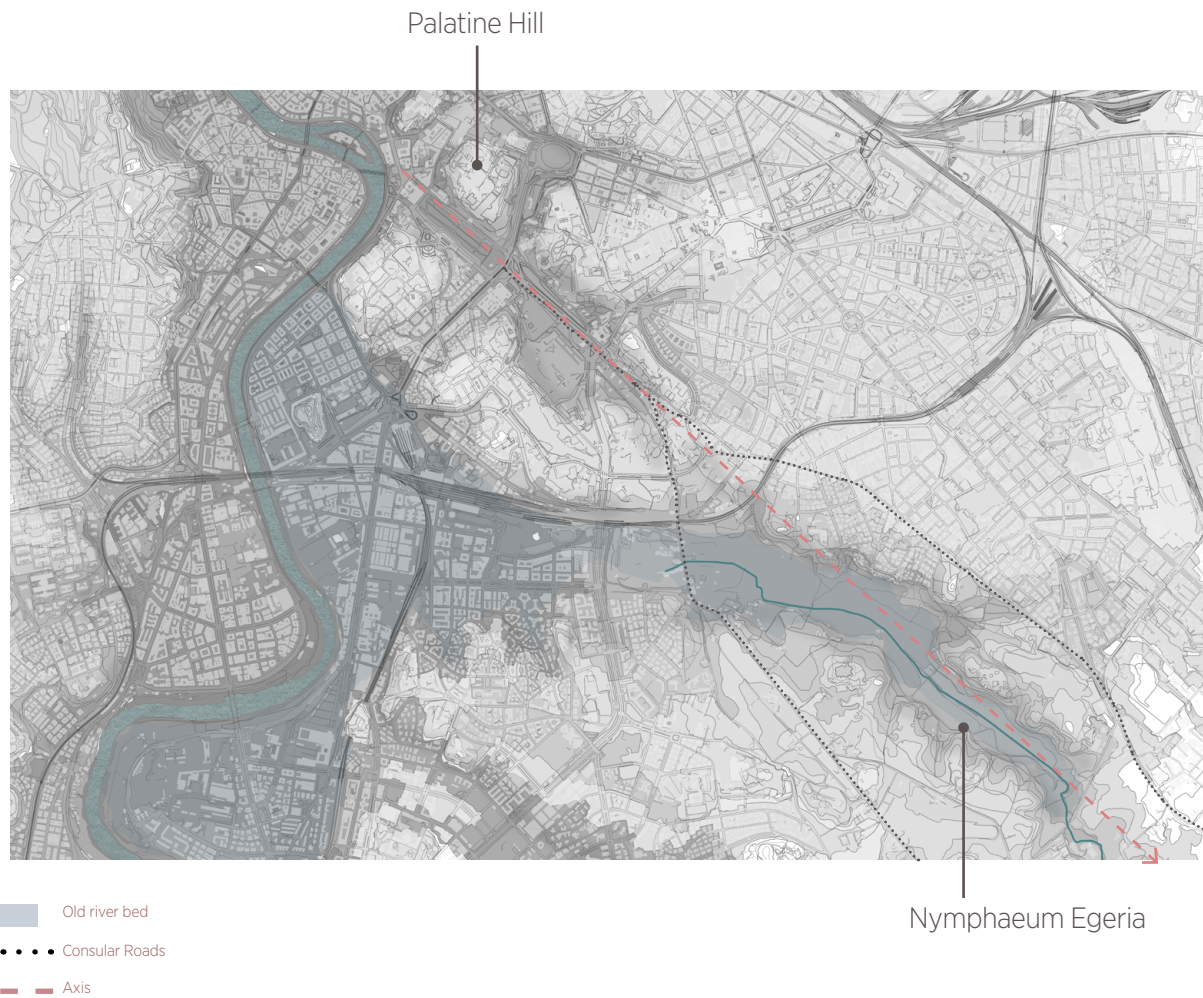
ANALYSIS OF THE
TERRITORY



ACTIVE COMPONENT OF
THE CITY



Chosen area is along the
axis north-west/south-east orientation



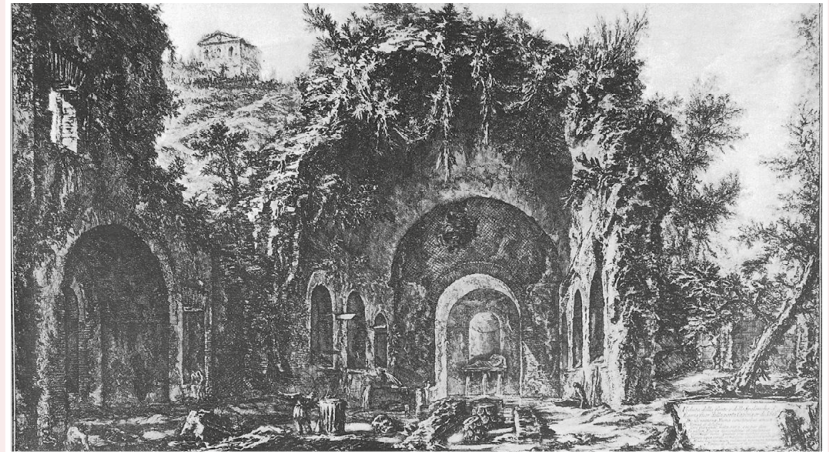


Ulpiano Checa, The Nymph Egeria Dictating to Numa Pompilius the Laws of Rome, 1896, Madrid, Spain



*The grief of others could not ease the woe
of sad Egeria, and she laid herself
down at a mountain's foot, dissolved in tears,
till moved by pity for her faithful sorrow,
Diana changed her body to a spring,
her limbs into a clear continual stream.*

Ov. Met. 15.479



Giovanni Battista Piranesi, The So-called Grotto of Egeria, 1772, Harvard Art Museums/Fogg Museum



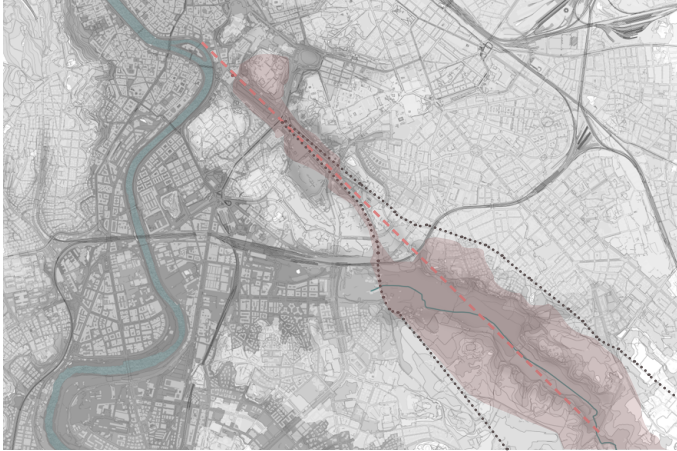
Archaeological and Historical Relevance

rapid connection

fertility of the soils of volcanic origin

abundance of water





Ecological Relevance

green corridor

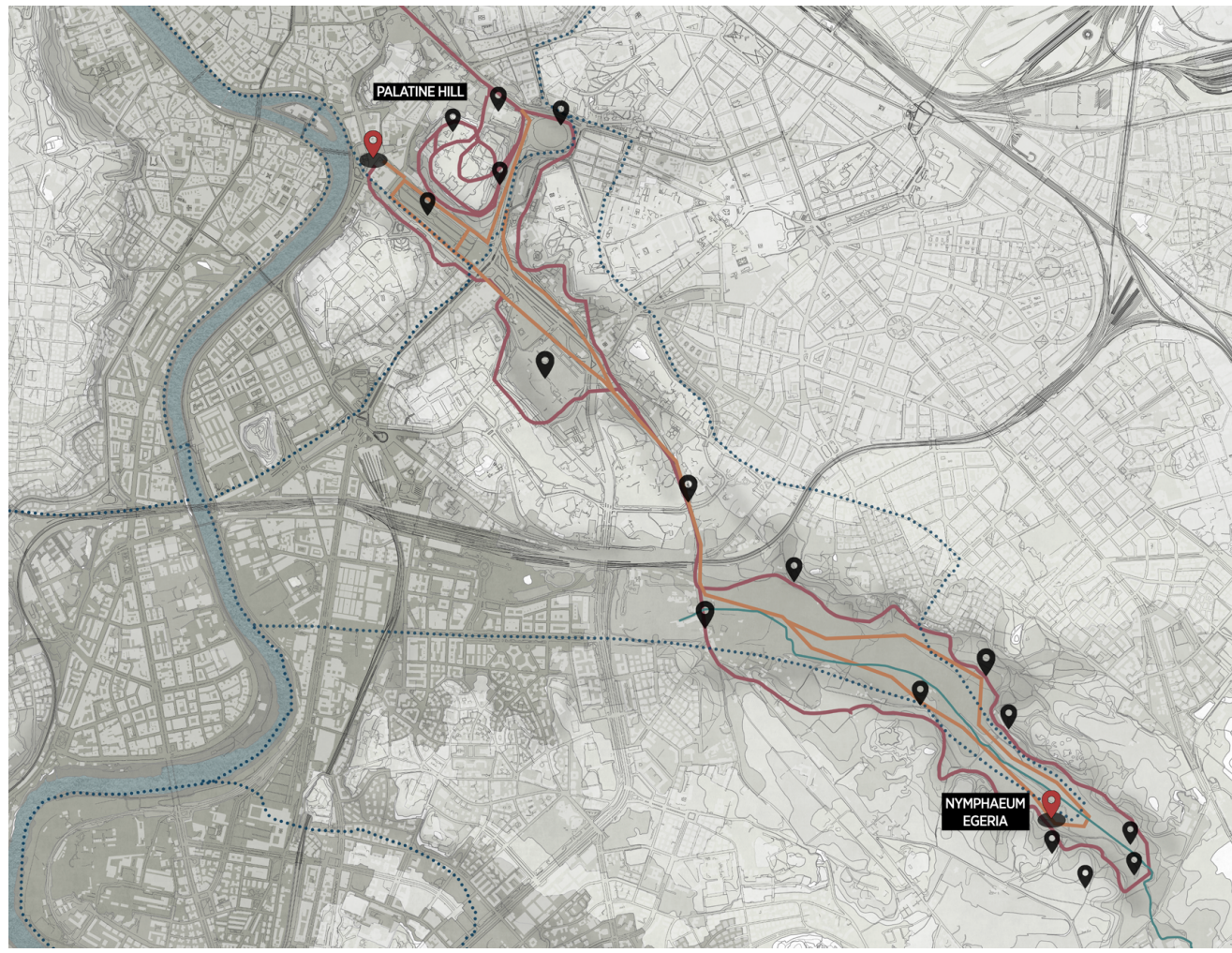
entry of natural elements into the urban core

extremely fragmented eco-mosaic

CITY CENTRE	→	SUBURBAN
GREY	→	GREEN
URBAN	→	RURAL
HISTORY	→	MYTH

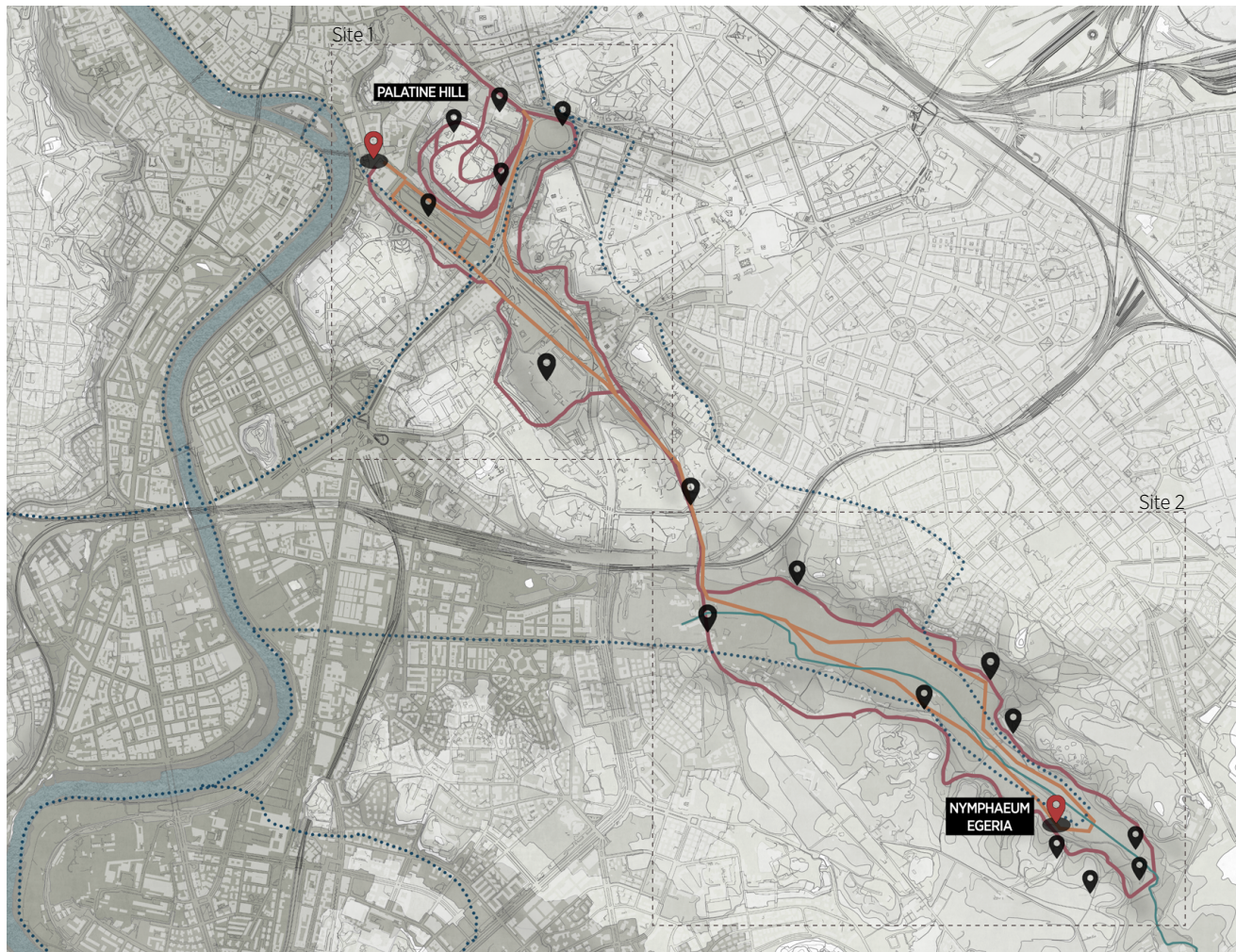


WATER-BASED ROUTES



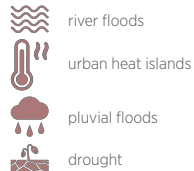
The aim is to enhance the valley from a naturalist and archaeological point of view, promoting the culture of water both for understanding and respecting the water and for emphasizing the value of historical testimonies related to its use.

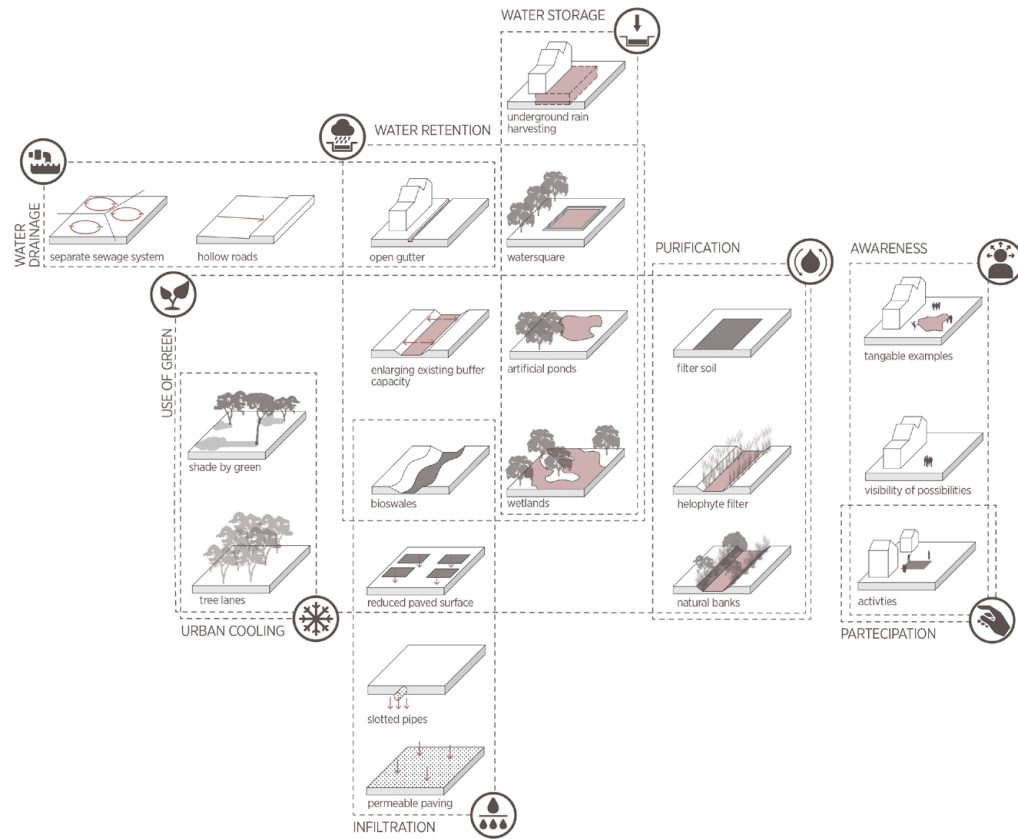
-  Interesting Point
-  Route A
-  Route B

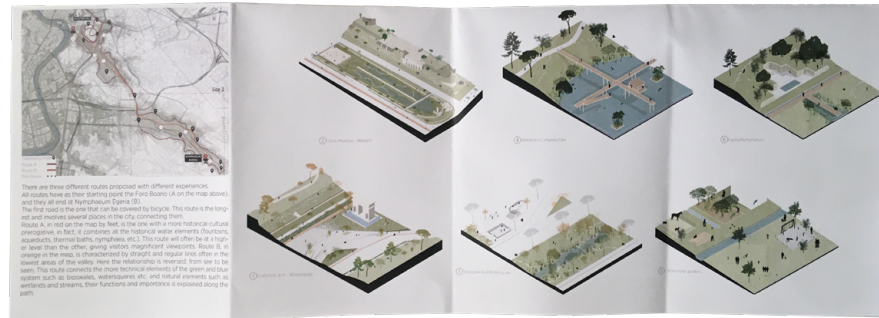
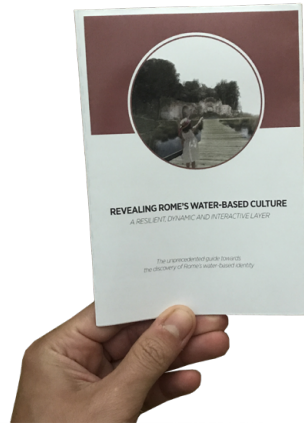


GENERIC TOOLBOX

The following toolbox includes climate adaptation solutions that address issues as cloudburst flooding, heat stress, drought and river and pluvial floods, subdivided in 9 categories.







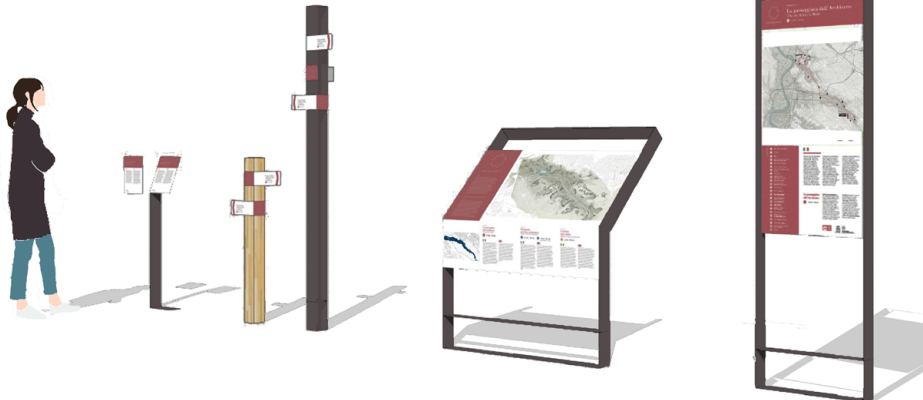
BROCHURE - INFO POINT - TOURIST SIGNS - WORKSHOPS

involving the local community

educate people

collaborative participation

eco tourism





SITE 1 - Historical City Centre



OPPORTUNITIES



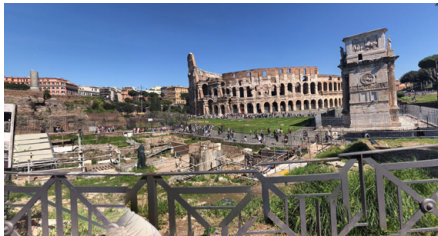
The Circus Maximus with its wide green areas



Domus Severiane: here the enclosed space give a different perception of the area



Colosseum plaza with the Arch of Constantine: the space is suitable for a design intervention



View of the Colosseum from the Palatine Hill



View of the Roman Forum from the Palatine hill



View of the Circus Maximus from the Palatine hill

CRITICAL ISSUES



Large unused spaces



Traffic



High presence of cars and parking lots, little green



Low maintenance of green areas

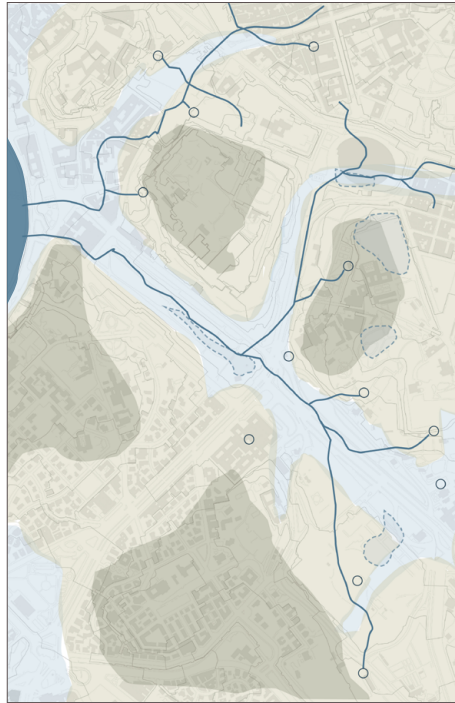


The fences physically separate the visitors from the site



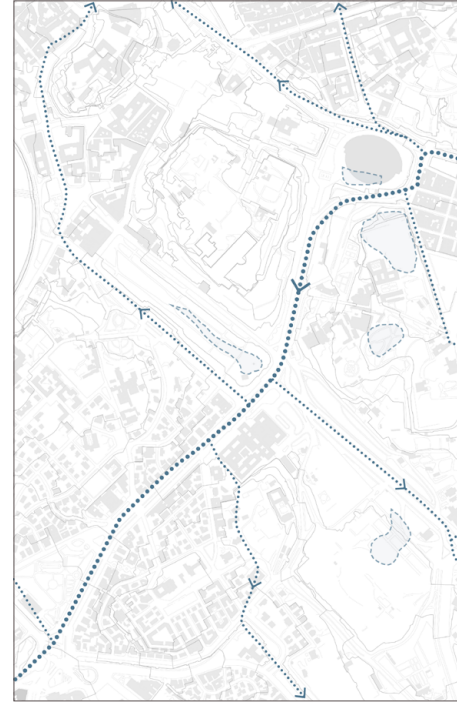
Large bare spaces of trees increase the perception of emptiness and warmth

Soil Map



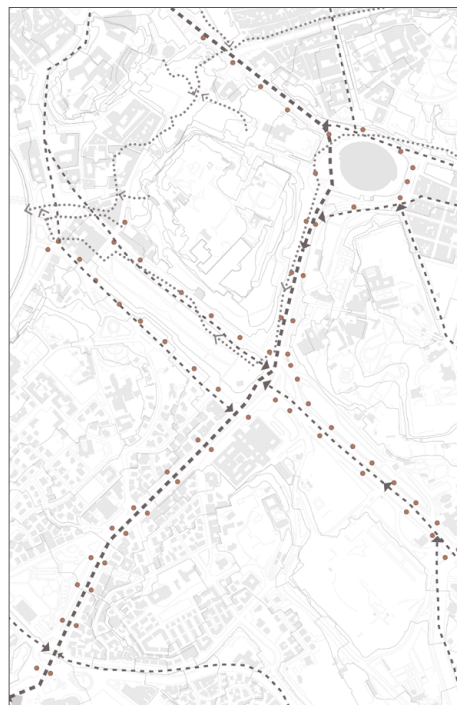
- alluvial deposit - high permeability
- silt, clay and gravel - medium high permeability
- tuff - low permeability
- old streams
- old springs
- old aquifers




Modern aqueduct



- aquifers
- modern aqueducts

Sewage system



-  stormwater inlet /manholes
-  cloache - old sewers
-  modern sewers

Pluvial flood hazard

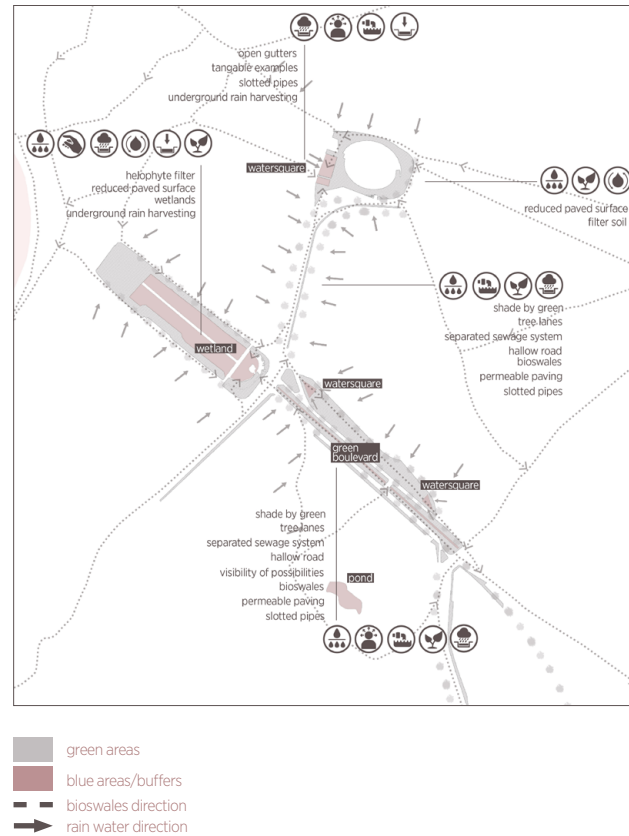


-  high pluvial flood hazard
-  medium pluvial flood hazard
-  low pluvial flood hazard

confluences areas of several
drainage axes

roads that insist on old river
beds

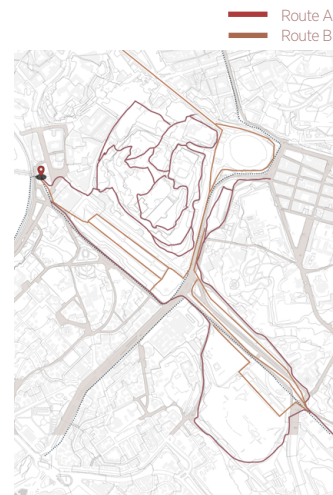
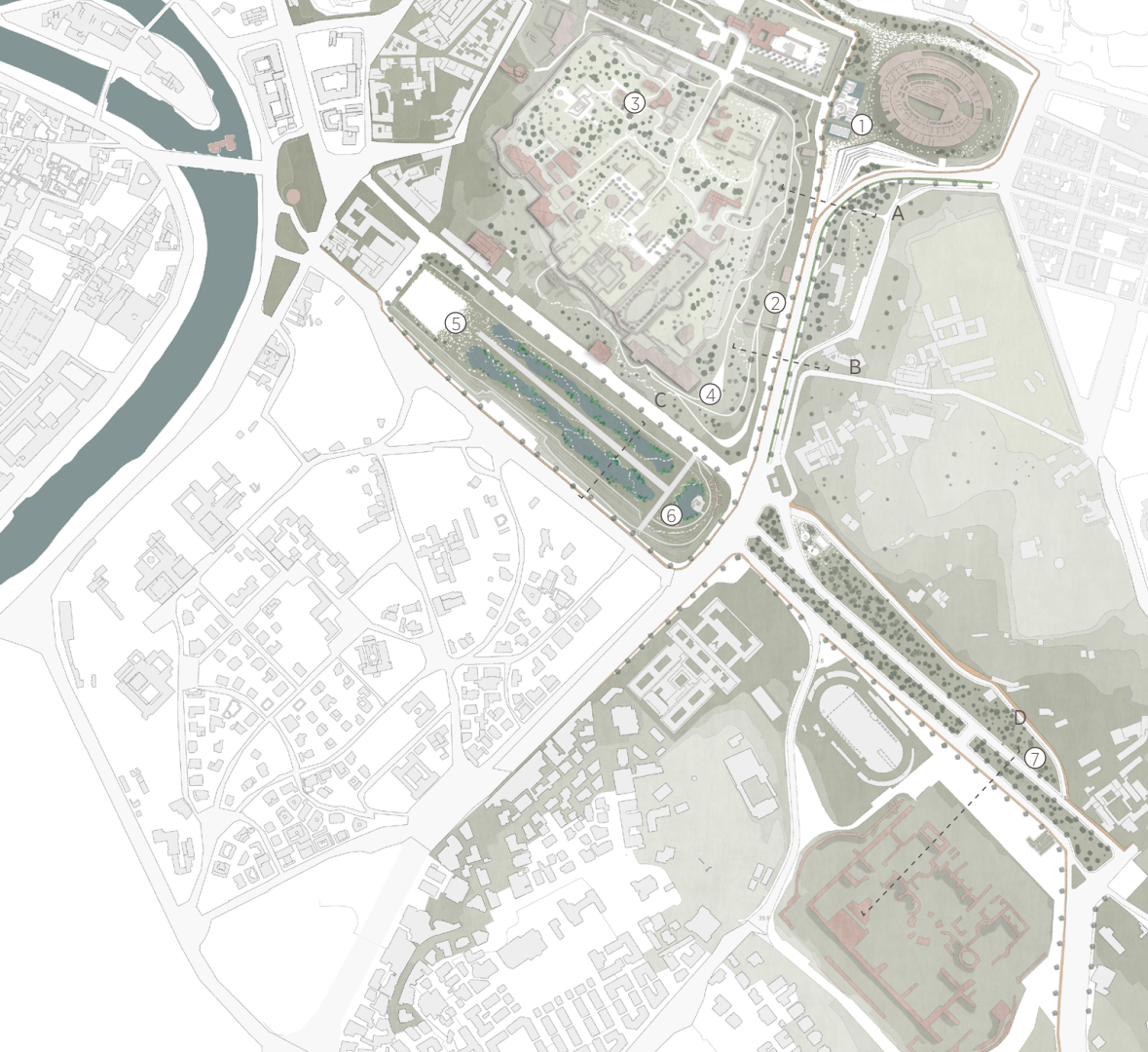
Proposed green and blue system



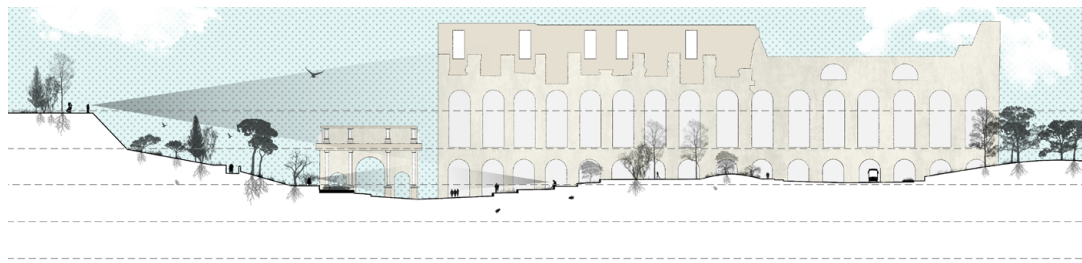
MASTERPLAN

1. Water Square
2. Aqueduct
3. Nymphaeum
4. Terraces
5. Stage
6. Urban Wetland
7. Skate Park/Watersquare

Routes Map

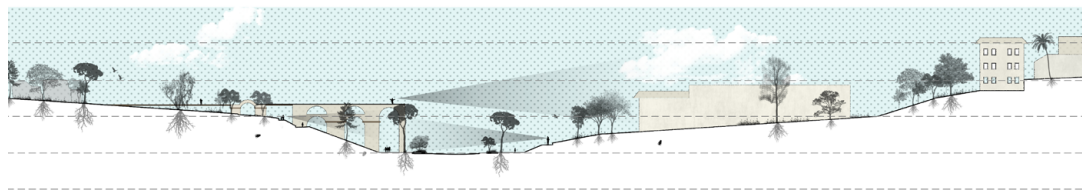


50 m
40 m
30 m
20 m
10 m



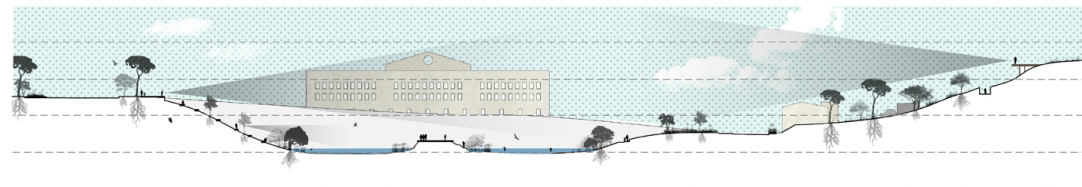
Section A

50 m
40 m
30 m
20 m
10 m



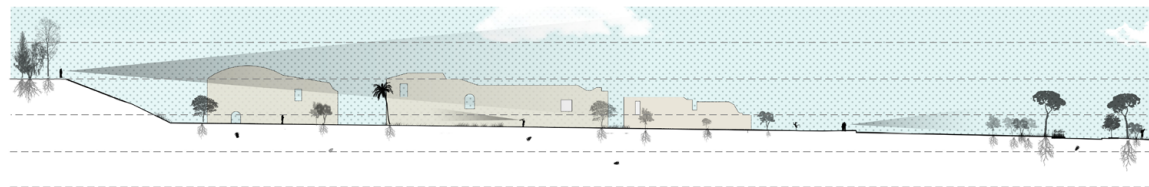
Section B

50 m
40 m
30 m
20 m
10 m

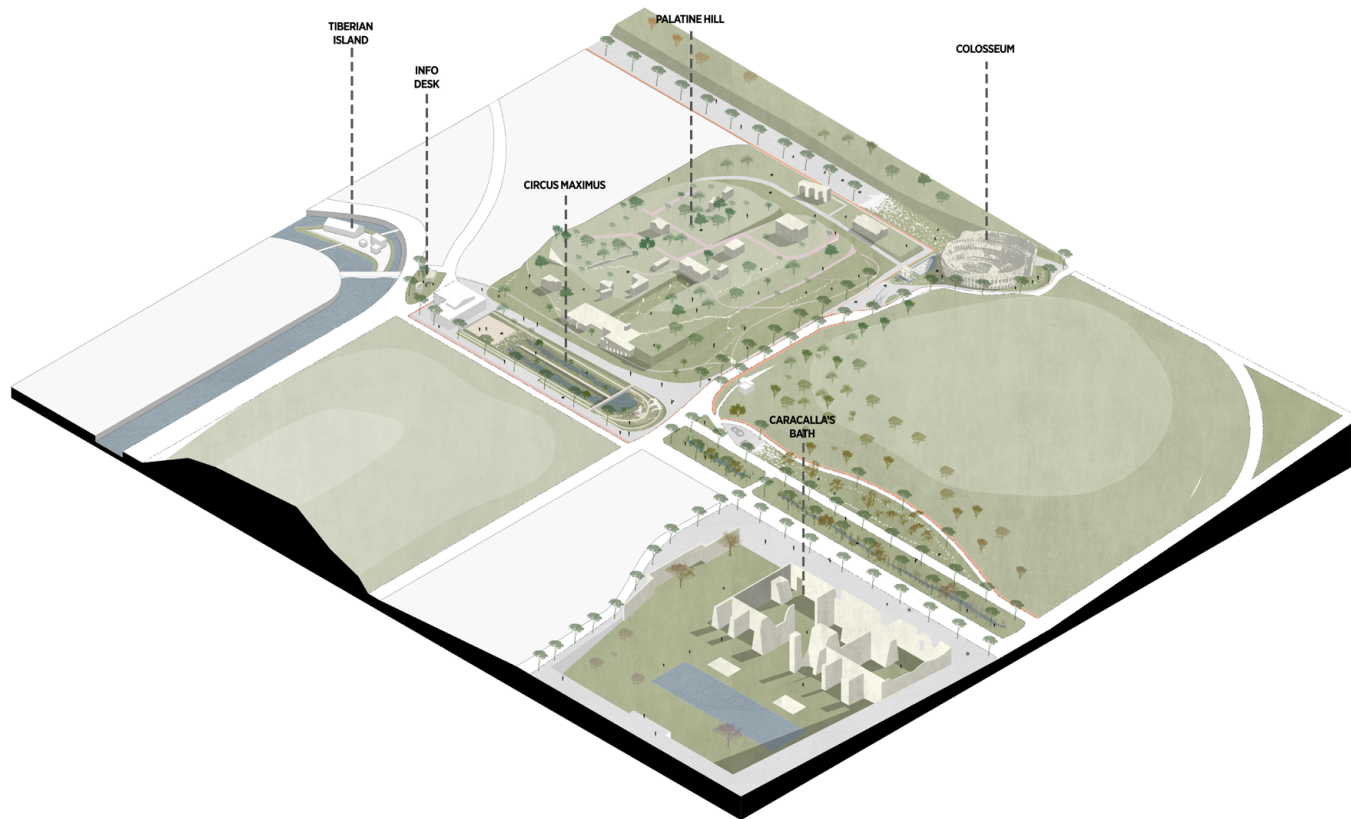


Section C

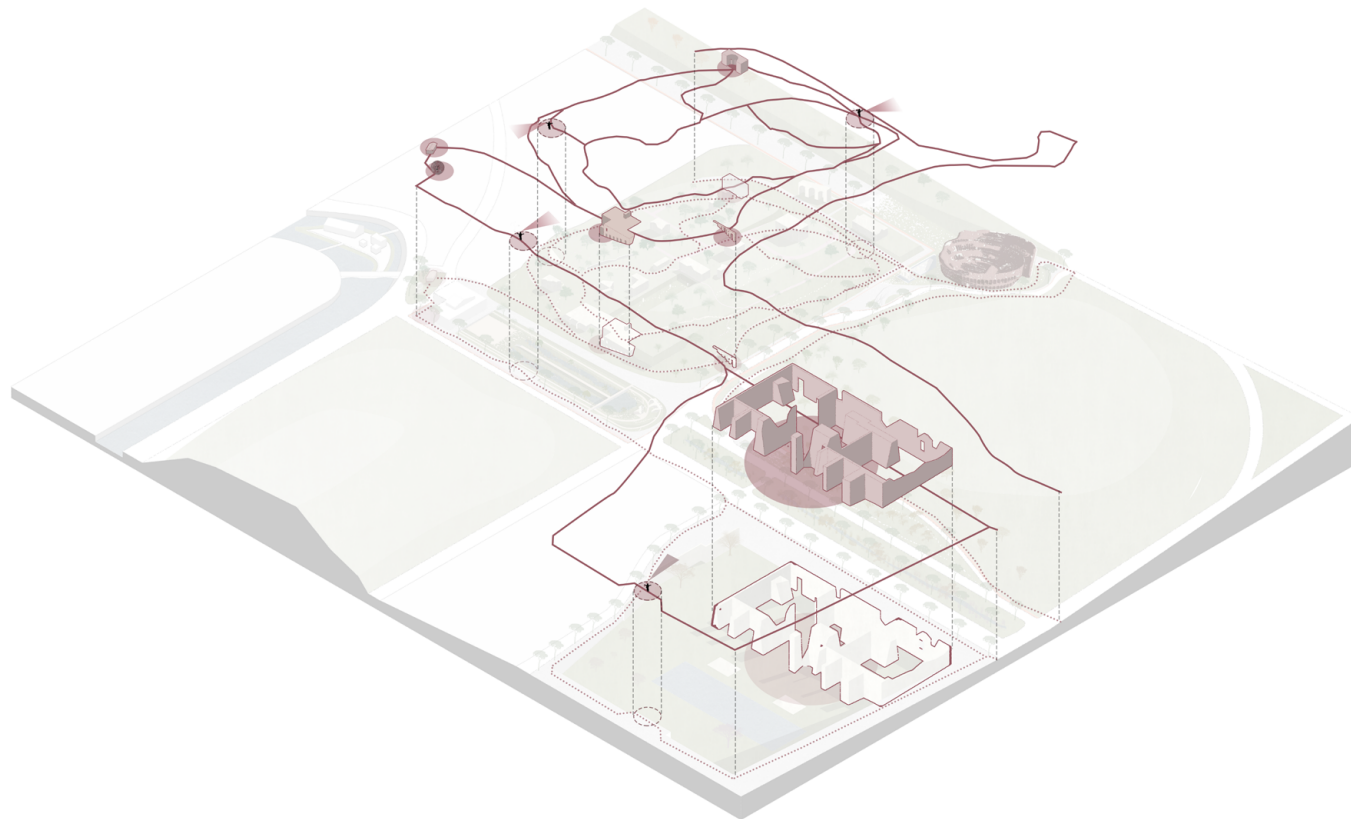
50 m
40 m
30 m
20 m
10 m



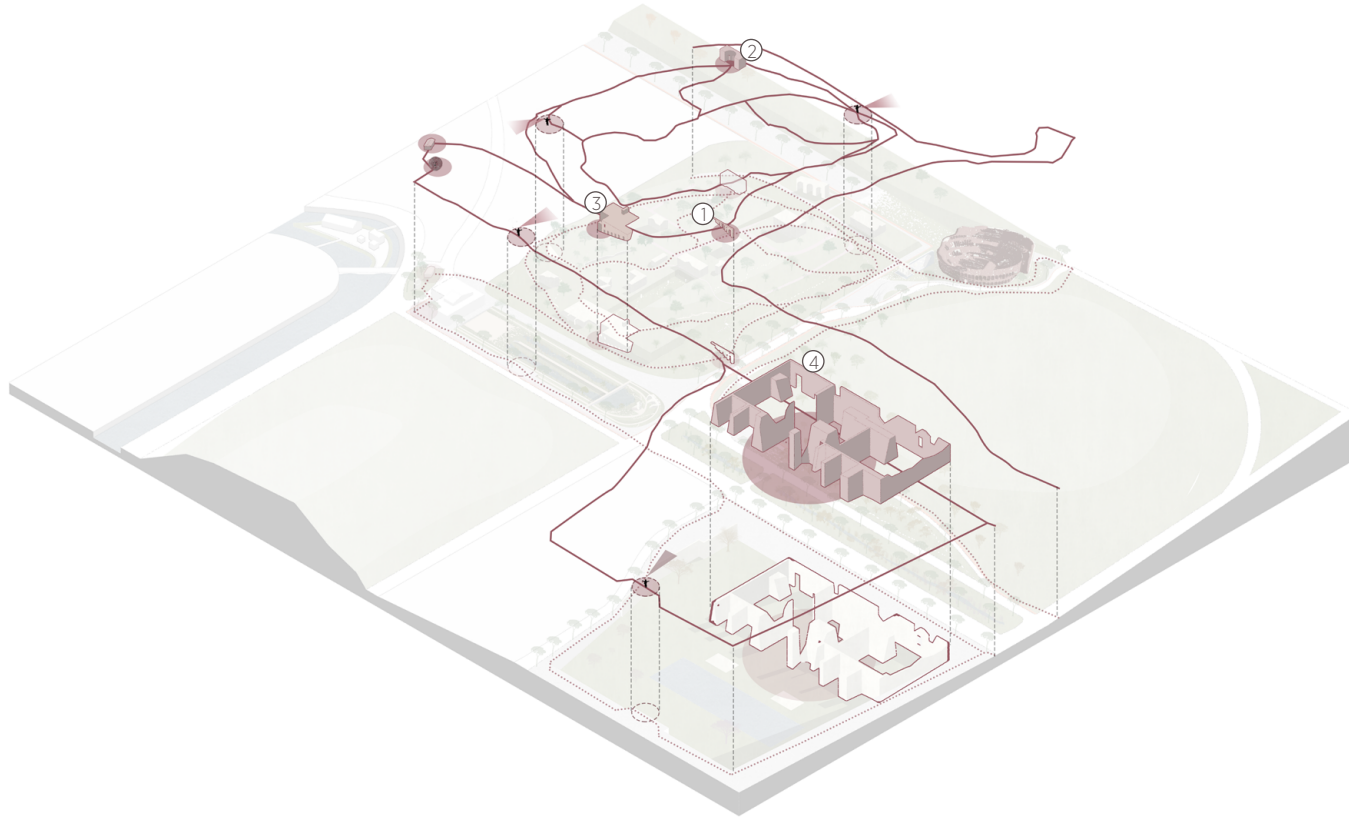
Section D



ROUTE A



ROUTE A



1. Aqueduct Claudio



2. Ninfteo degli Specchi

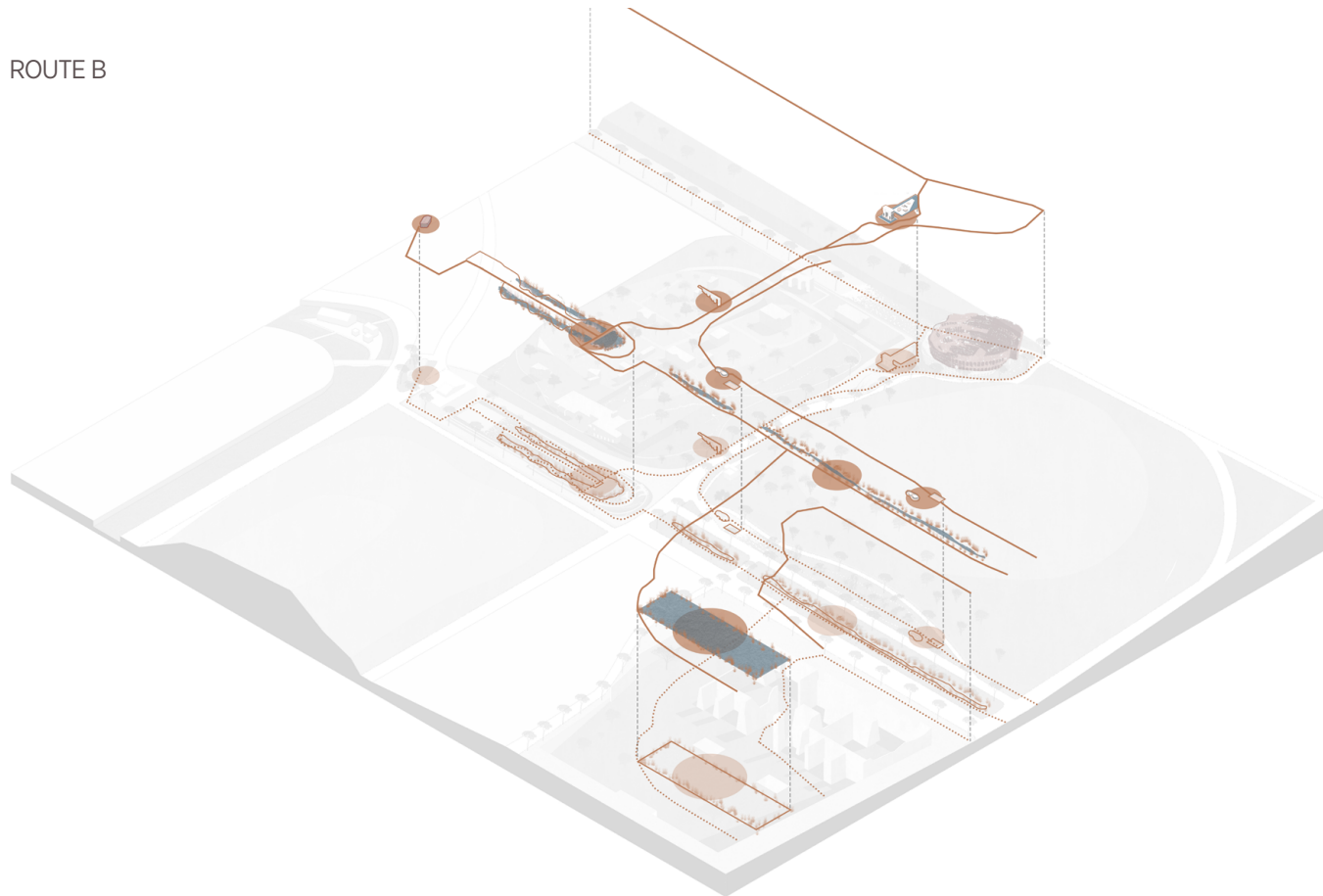


3. Settimio Severio's Bath

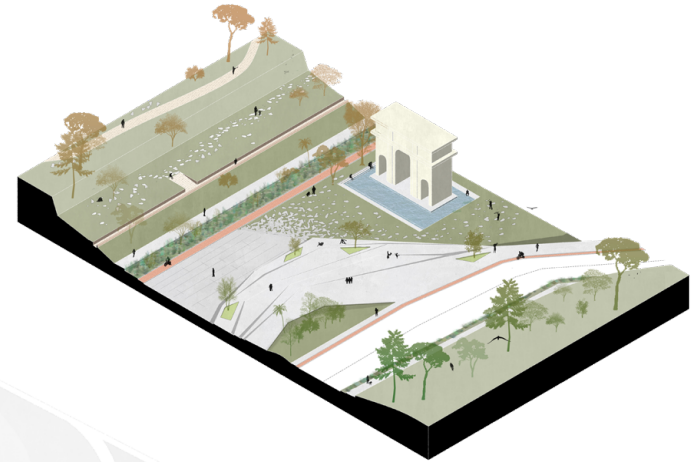
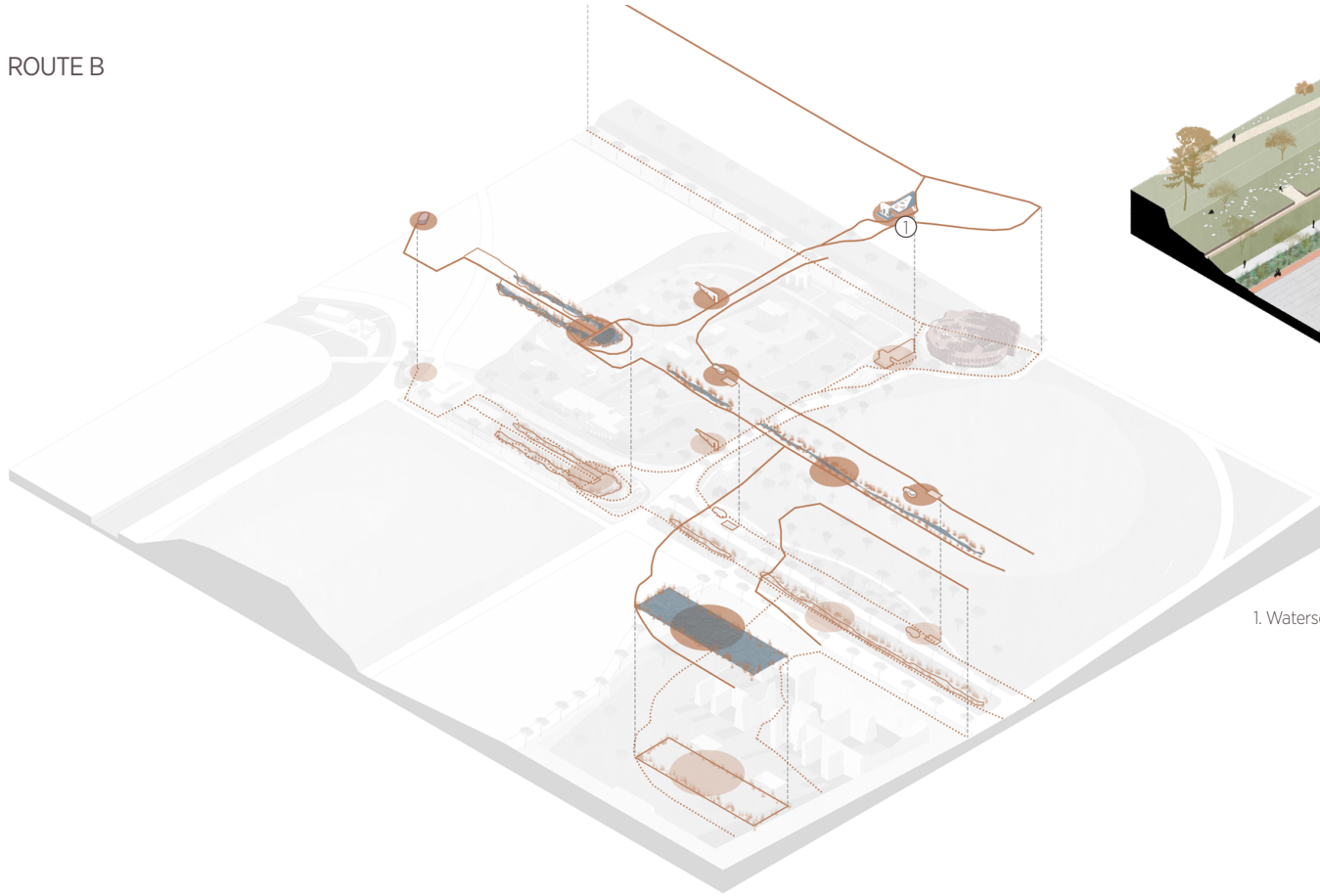


4. Caracalla's Bath

ROUTE B

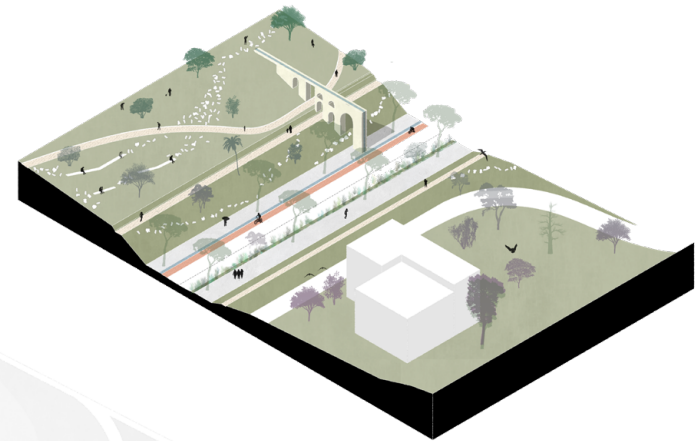
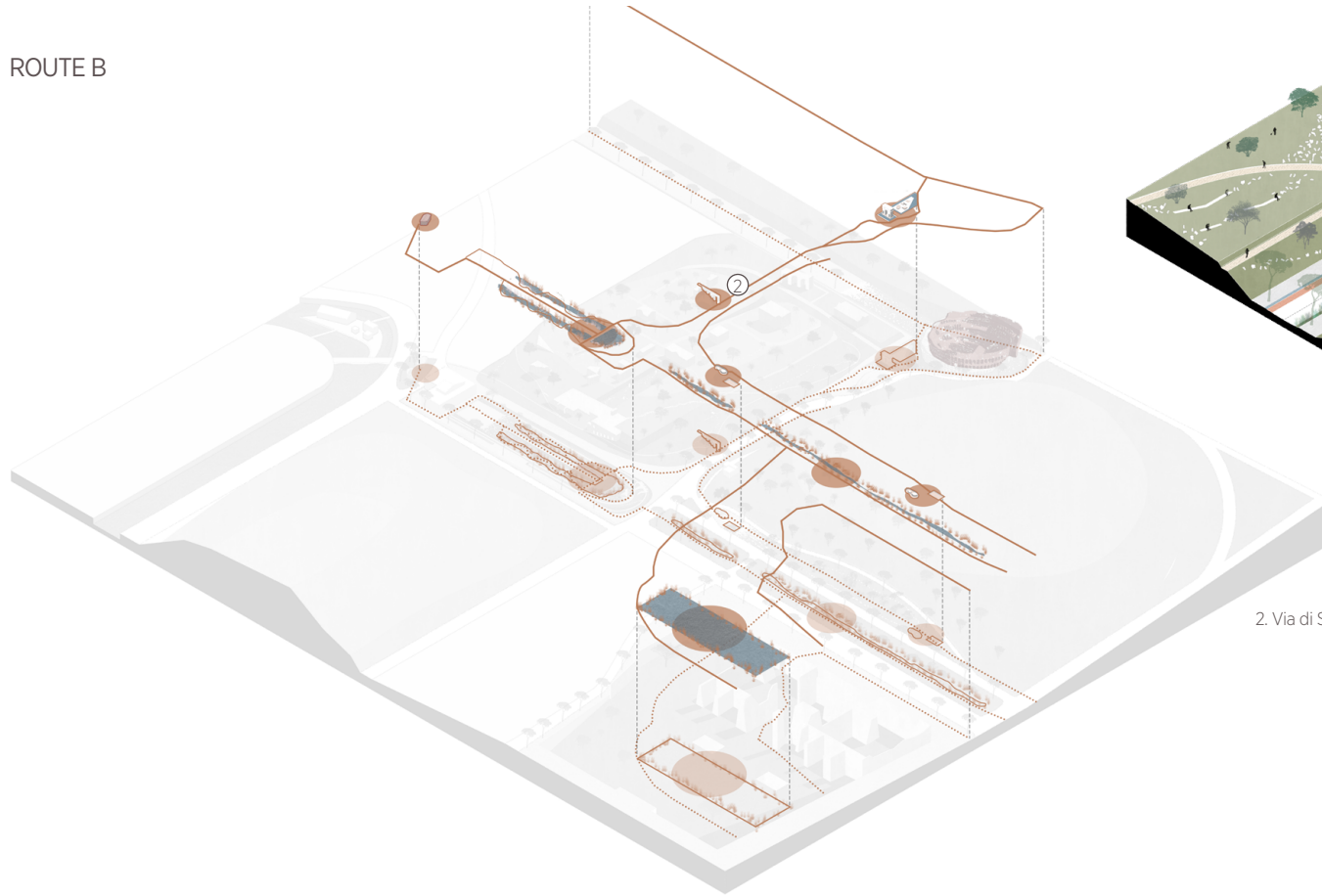


ROUTE B



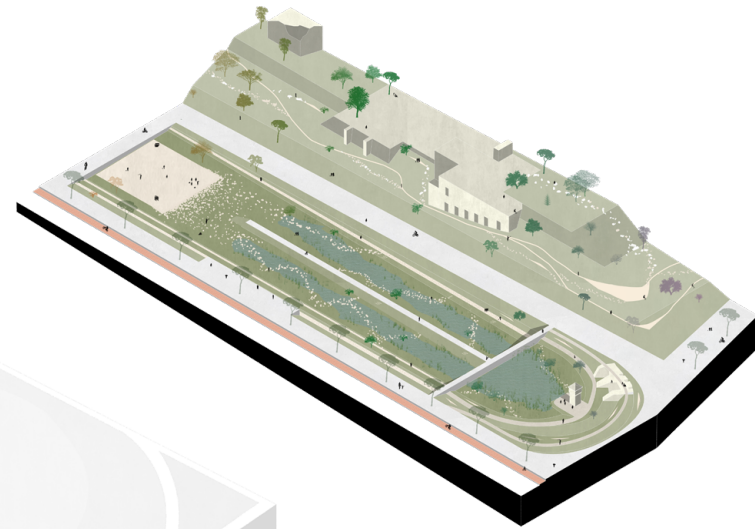
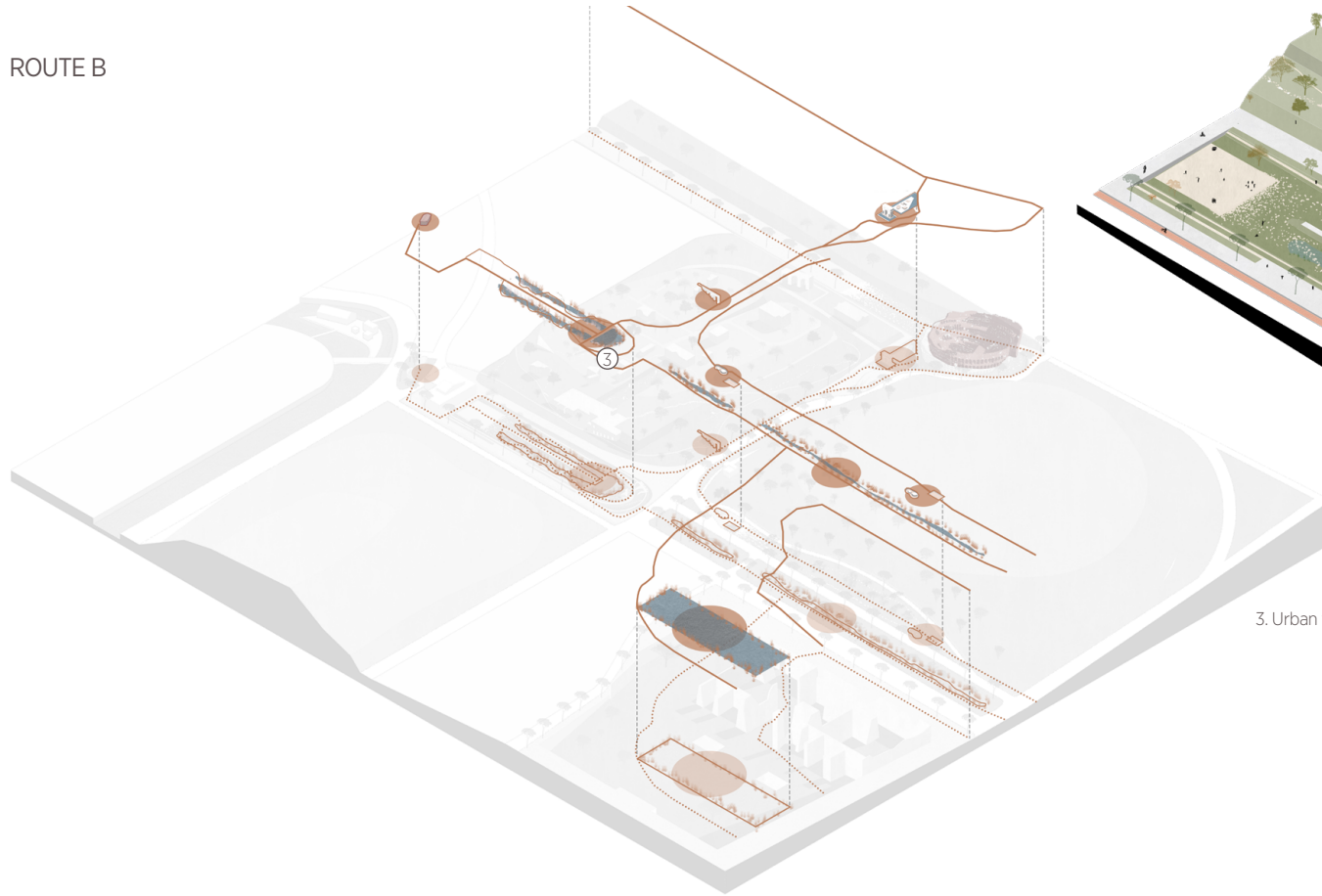
1. Watersquare around the Arch of Costantine in the Colosseum square

ROUTE B



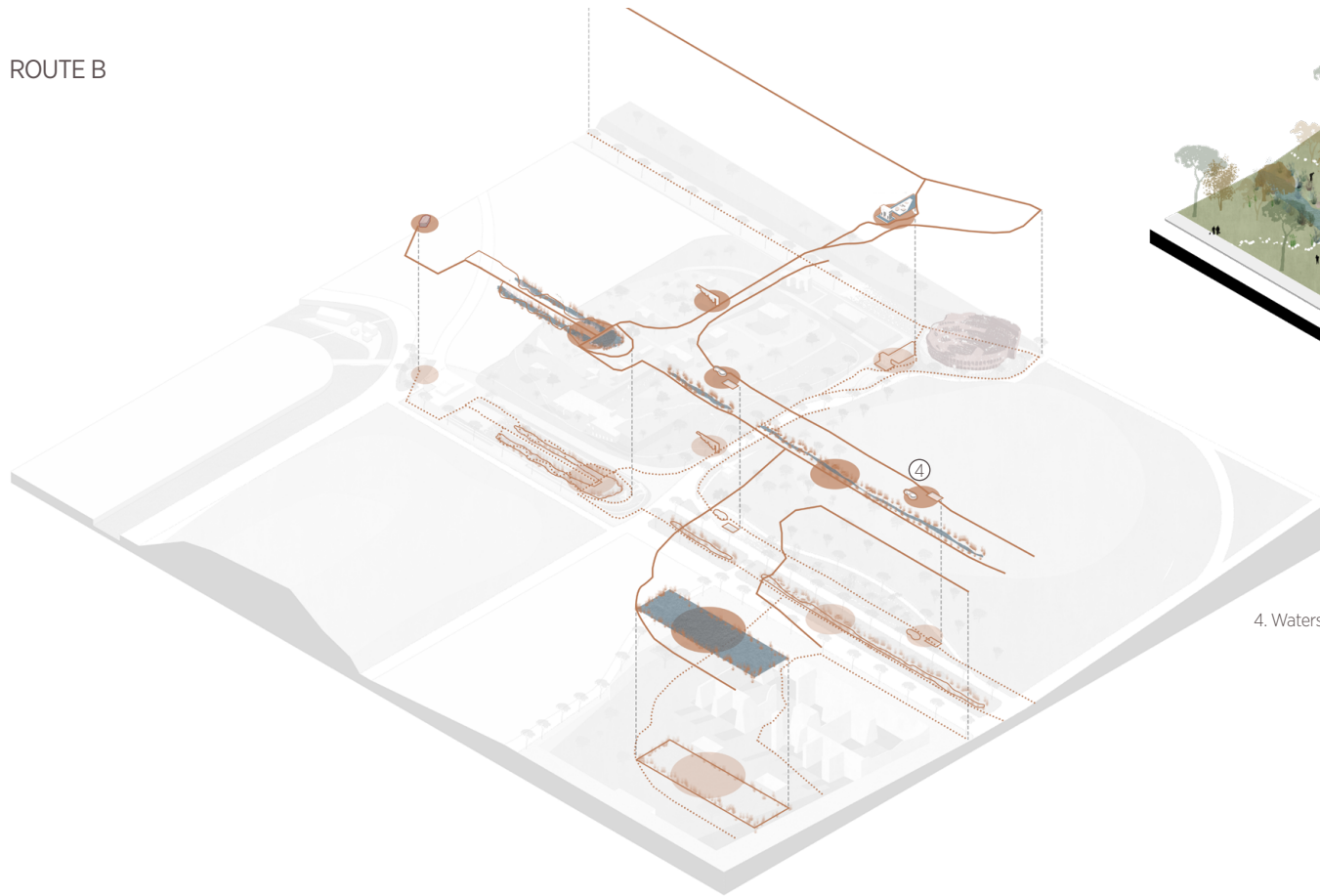
2. Via di San Gregorio and Claudio aqueduct

ROUTE B



3. Urban wetland in the Circus Maximus

ROUTE B

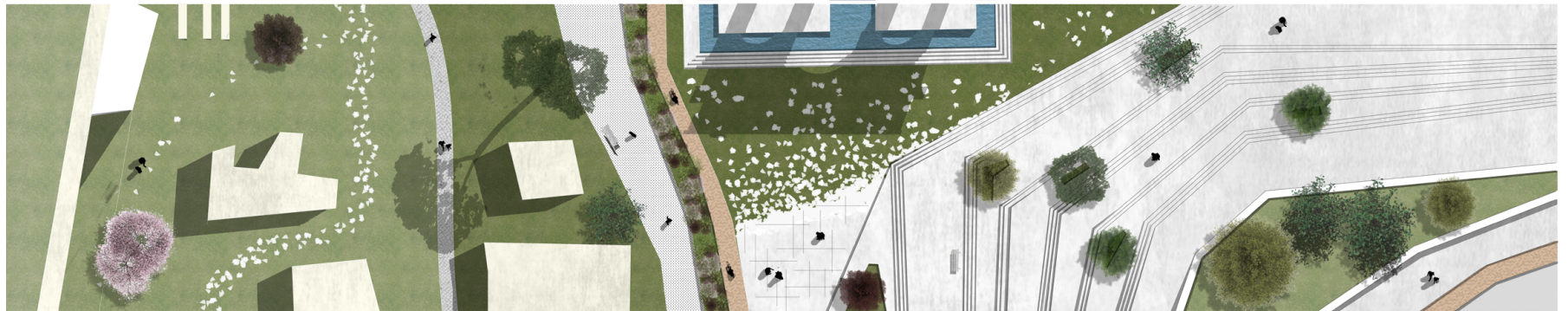


4. Watersquares and the green boulevard in Via delle Terme di Caracalla

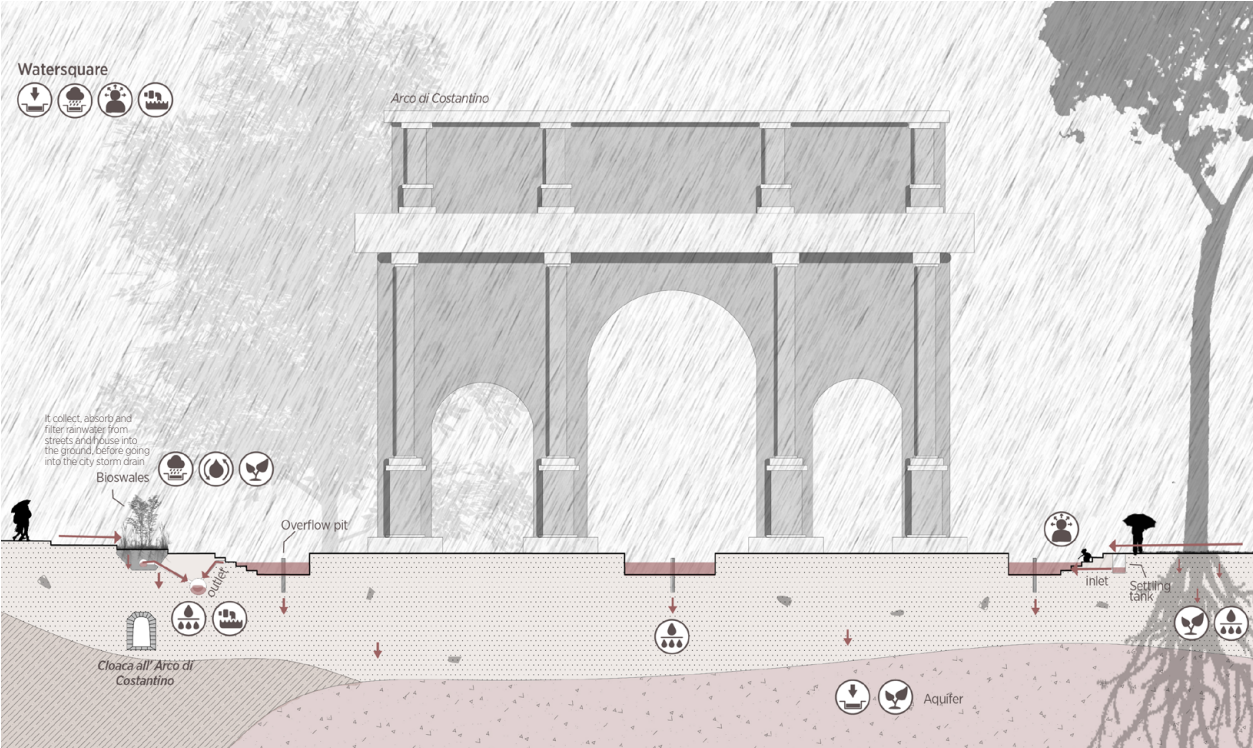
1. Arch of Costantine and Piazza del Colosseo

TODAY



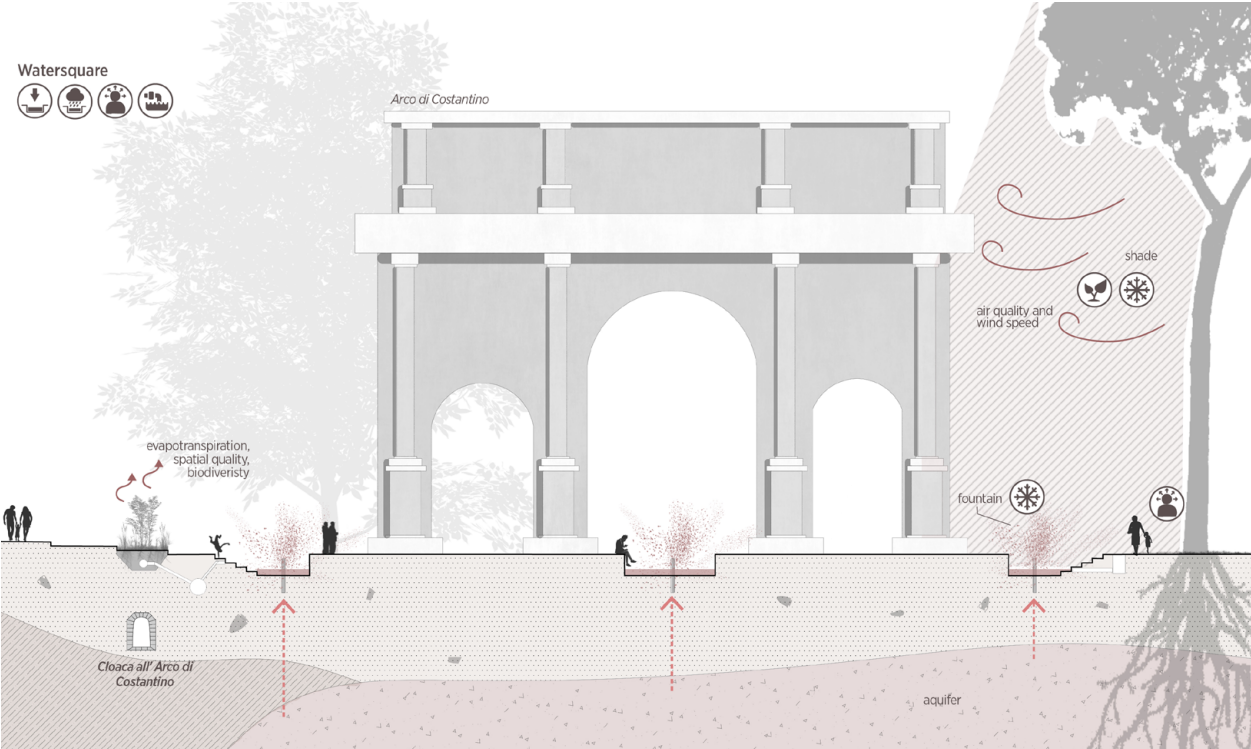


rainy day



-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability

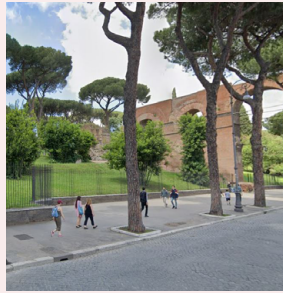
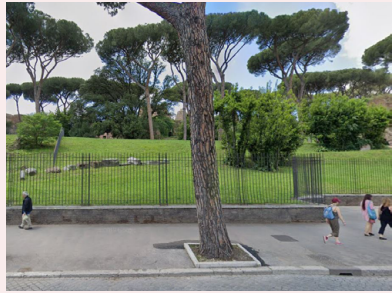
sunny day



- alluvial deposit - high permeability
- aquifer
- tuff - low permeability

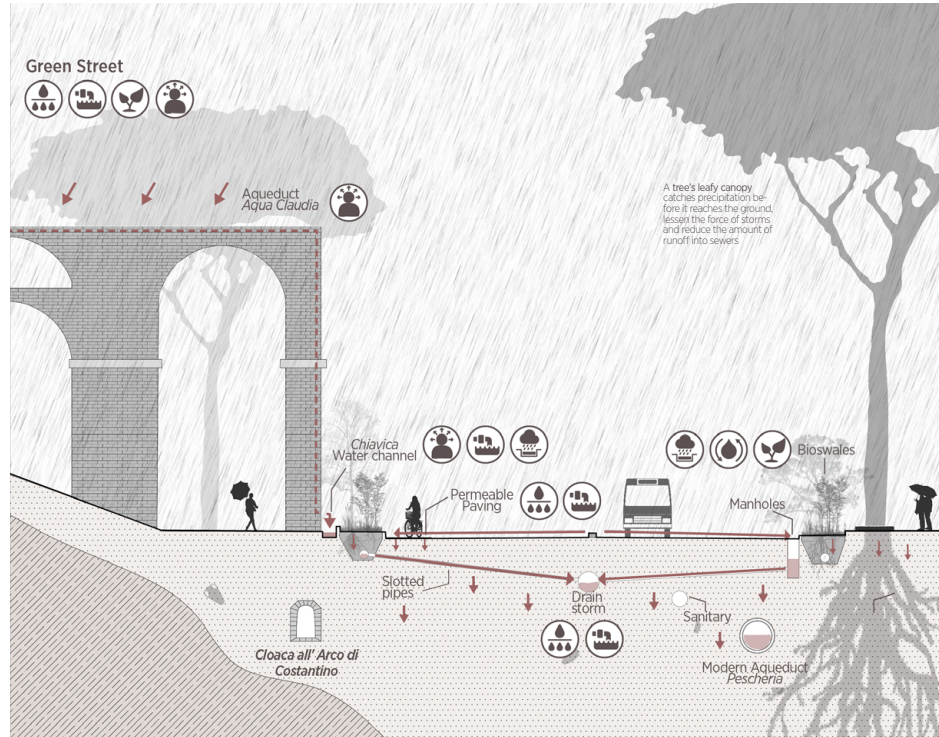
2. Via di San Gregorio and Claudio aqueduct




TODAY



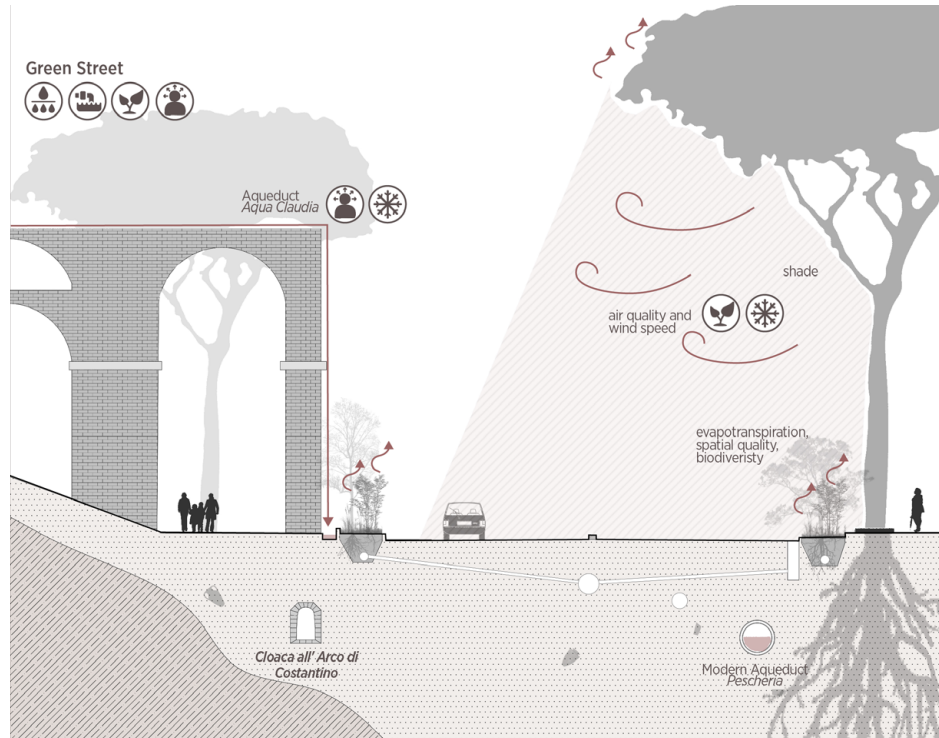





rainy day



-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability

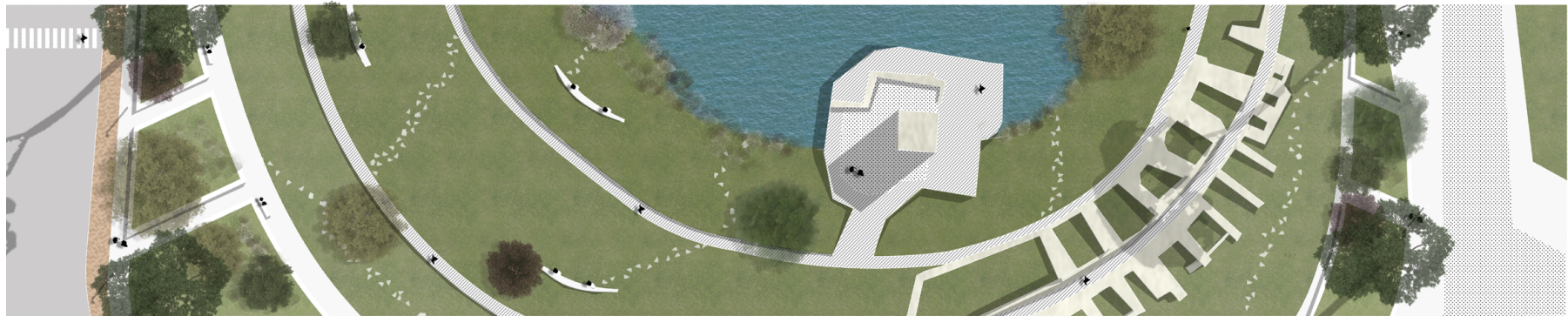
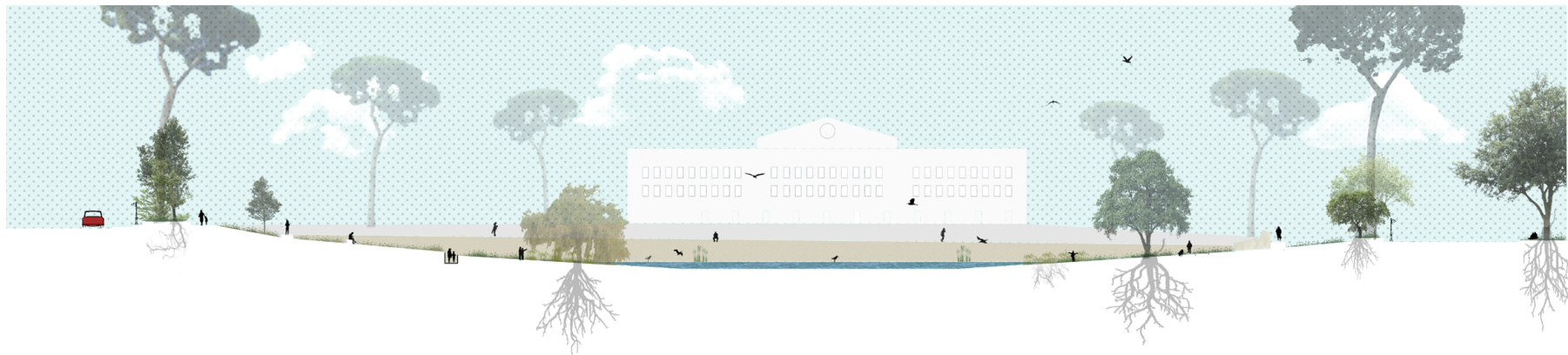
sunny day



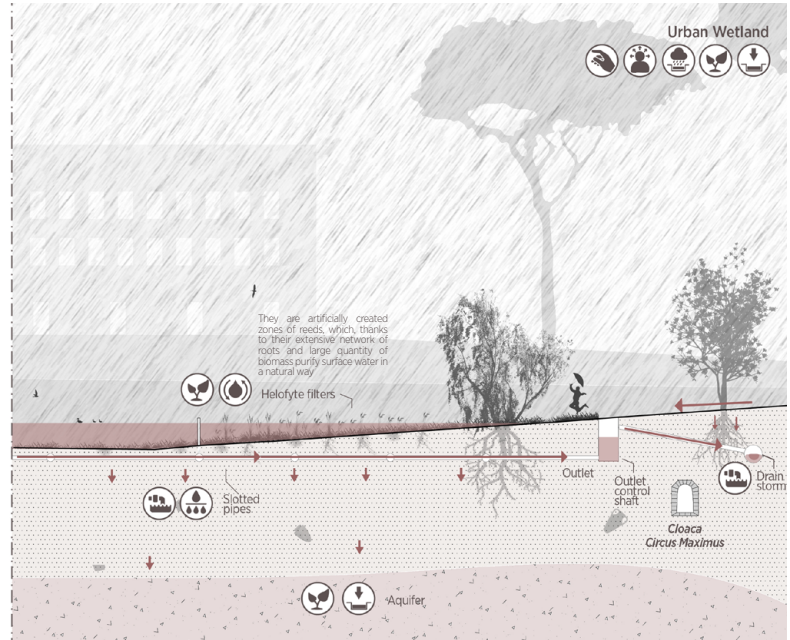
-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability




3. Urban wetland in Circus Maximus *TODAY*



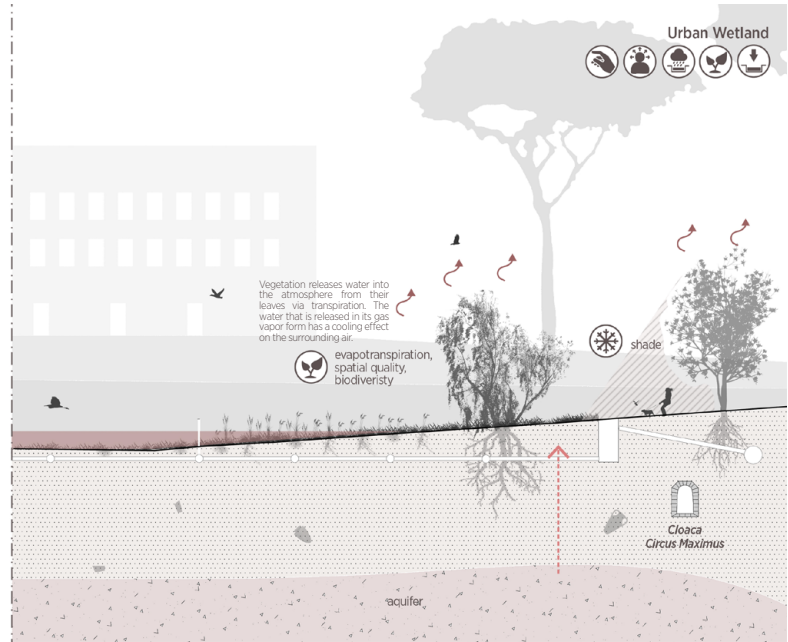
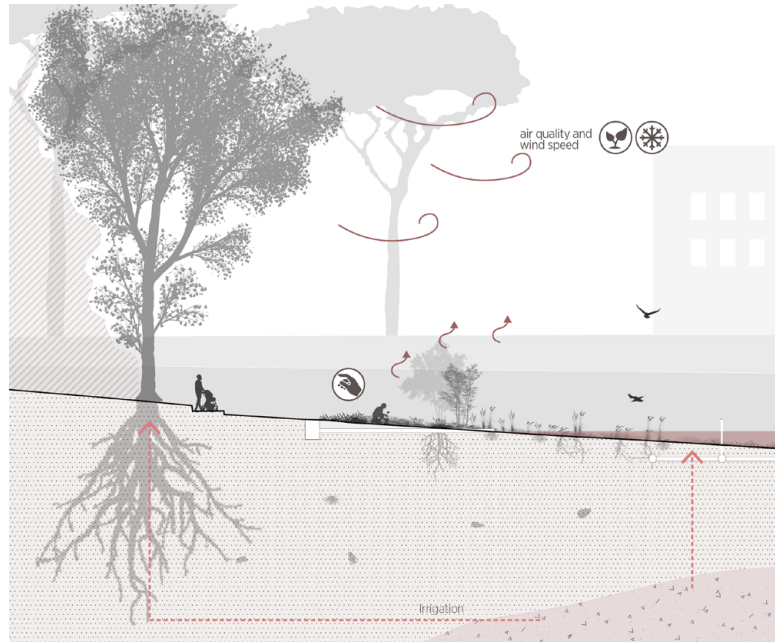



rainy day



-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability

sunny day

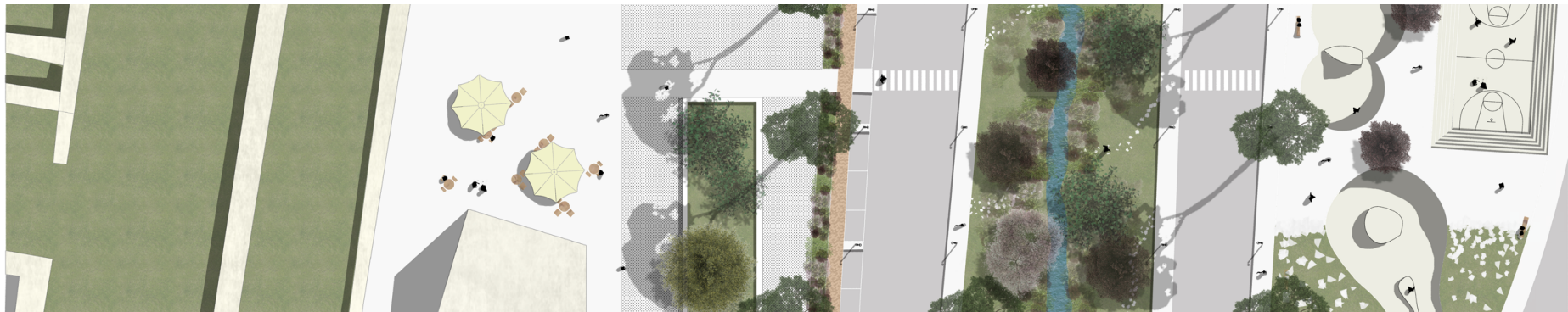


-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability

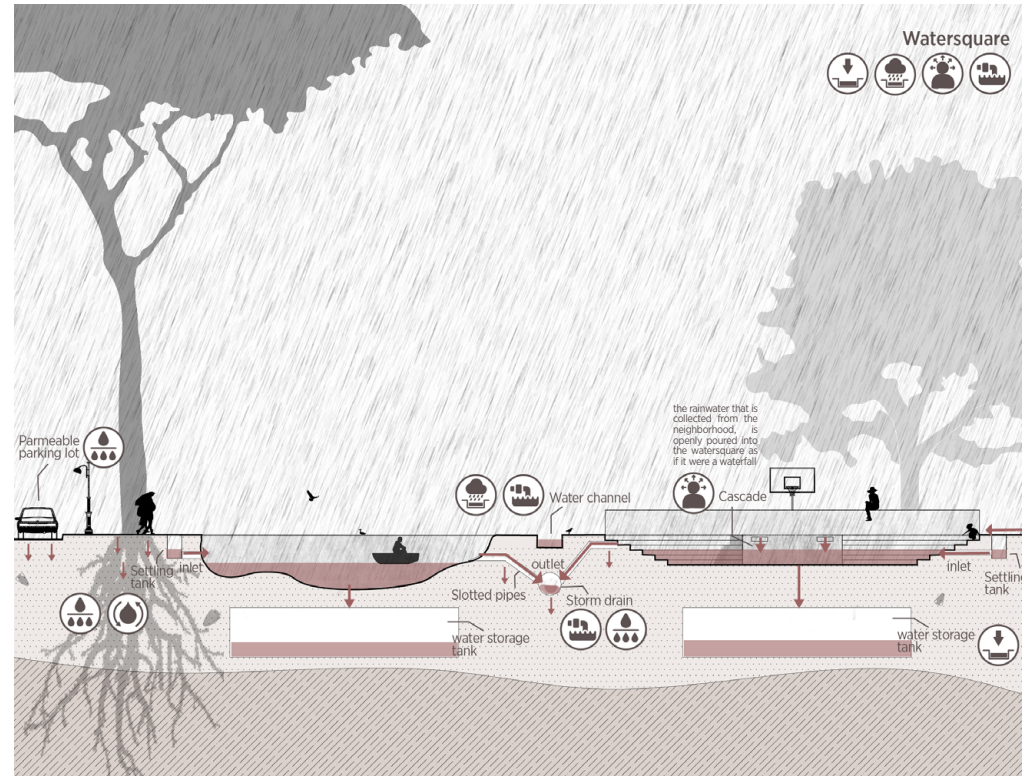
4. Watersquares and the green boulevard in Via delle Terme di Caracalla




TODAY



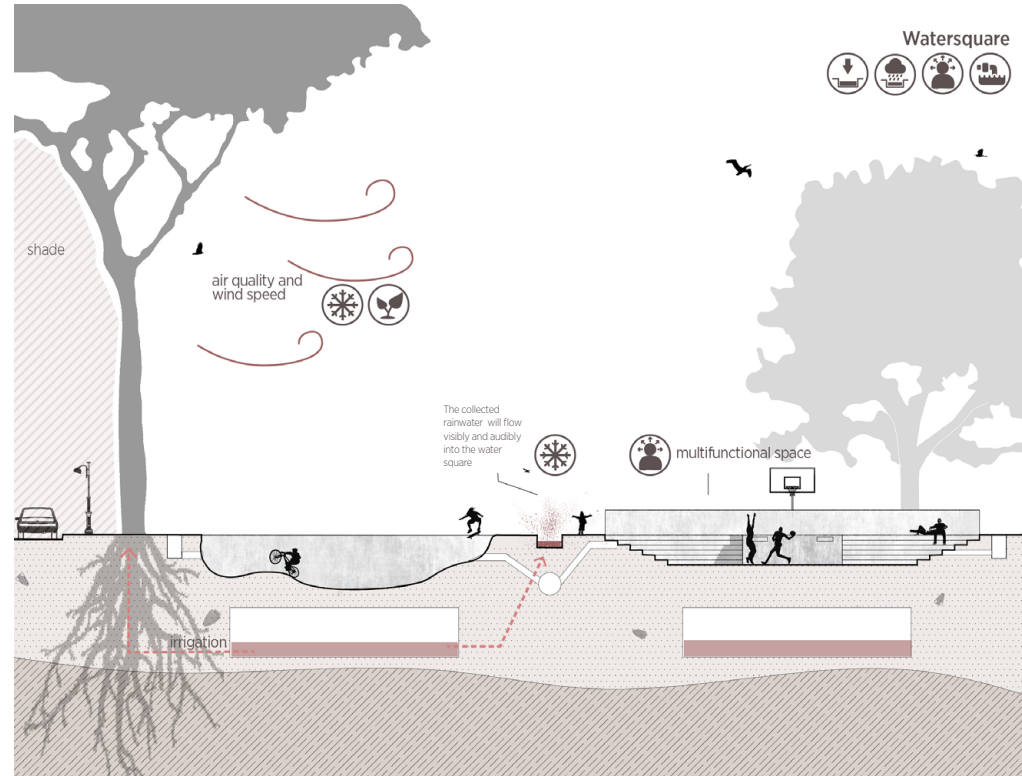


rainy day



-  alluvial deposit - high permeability
-  aquifer
-  tuff - low permeability

sunny day

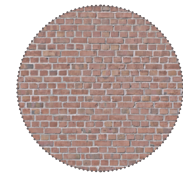


- alluvial deposit - high permeability
- aquifer
- tuff - low permeability

Materialization - Route A

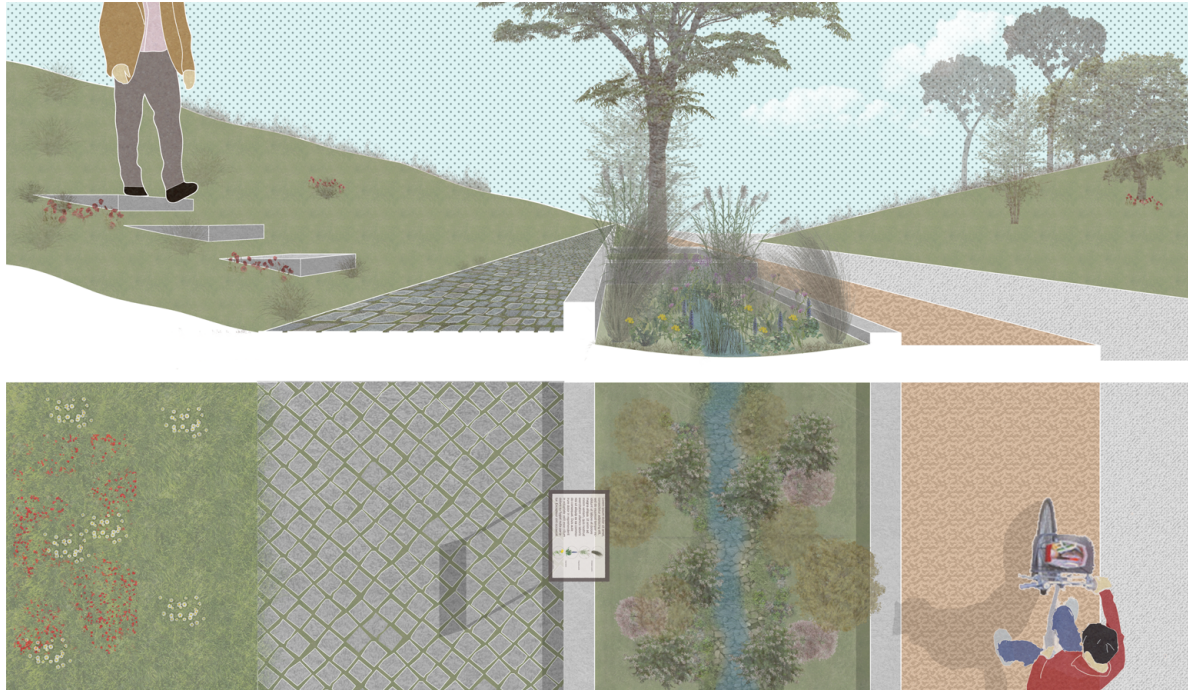


Travertine



Red Bricks

Materialization - Route B



Andropogon scoparius



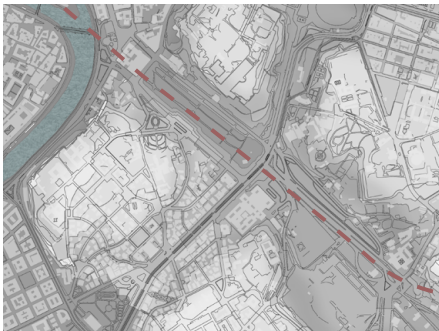
Phragmites australis



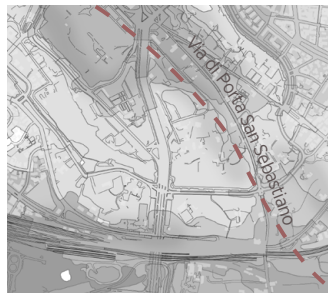
Ajuga reptans



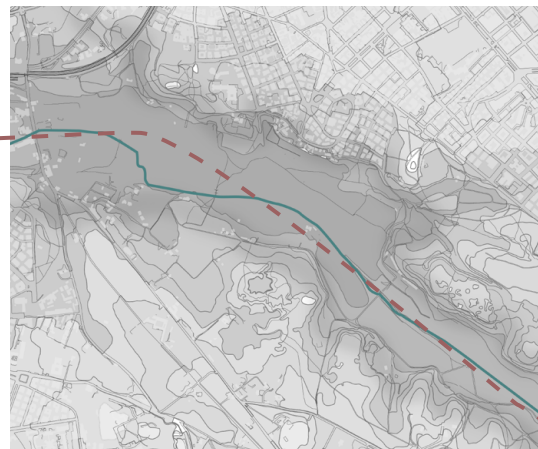
Lathyrus pratensis



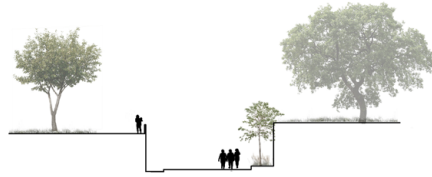
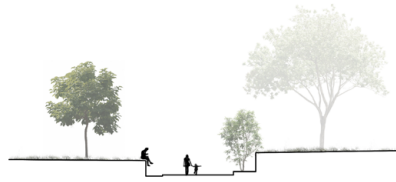
Site 1



Site 2









SITE 2 - Caffarella Park



VIEWS AND PANORAMAS



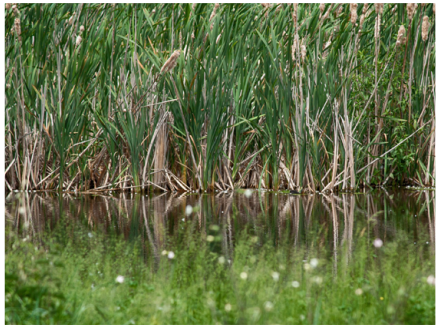
NATURE AND HISTORY

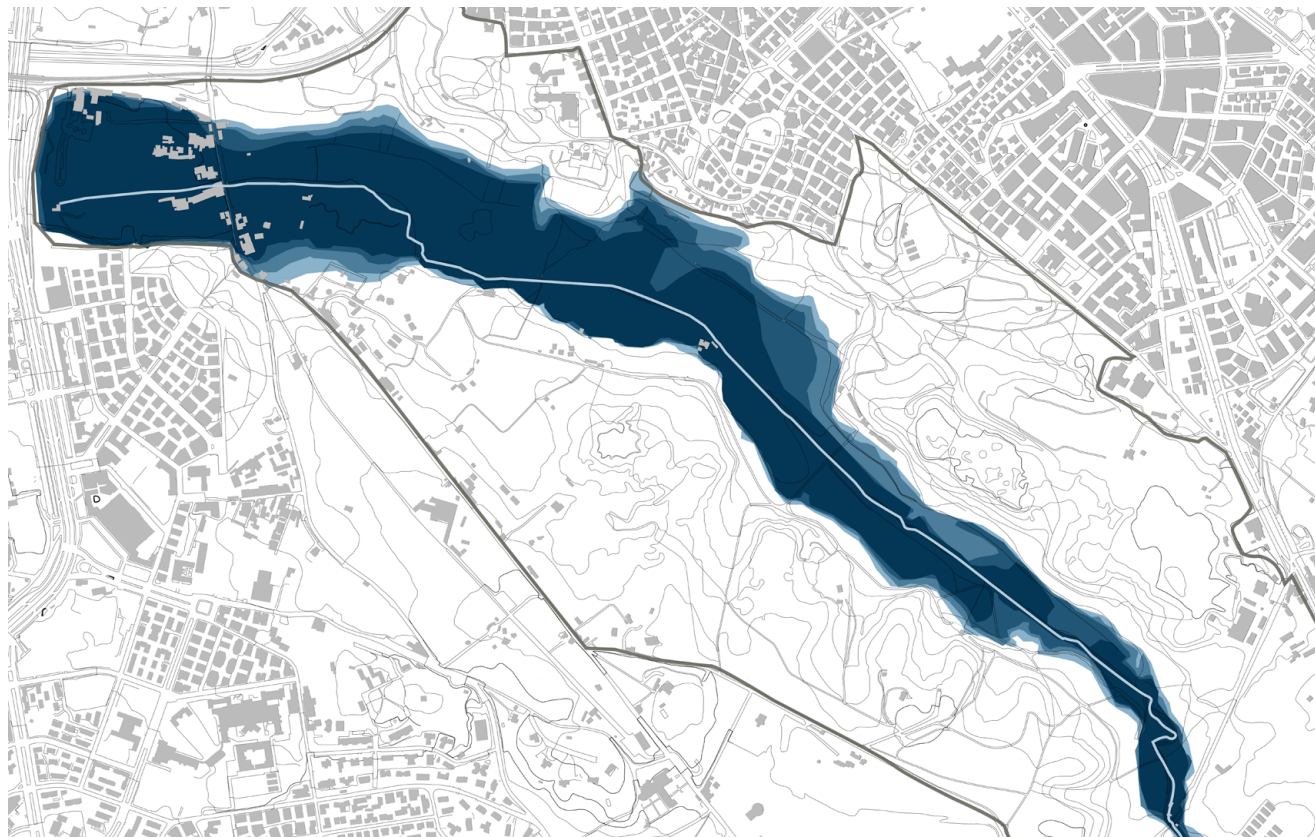


FAUNA



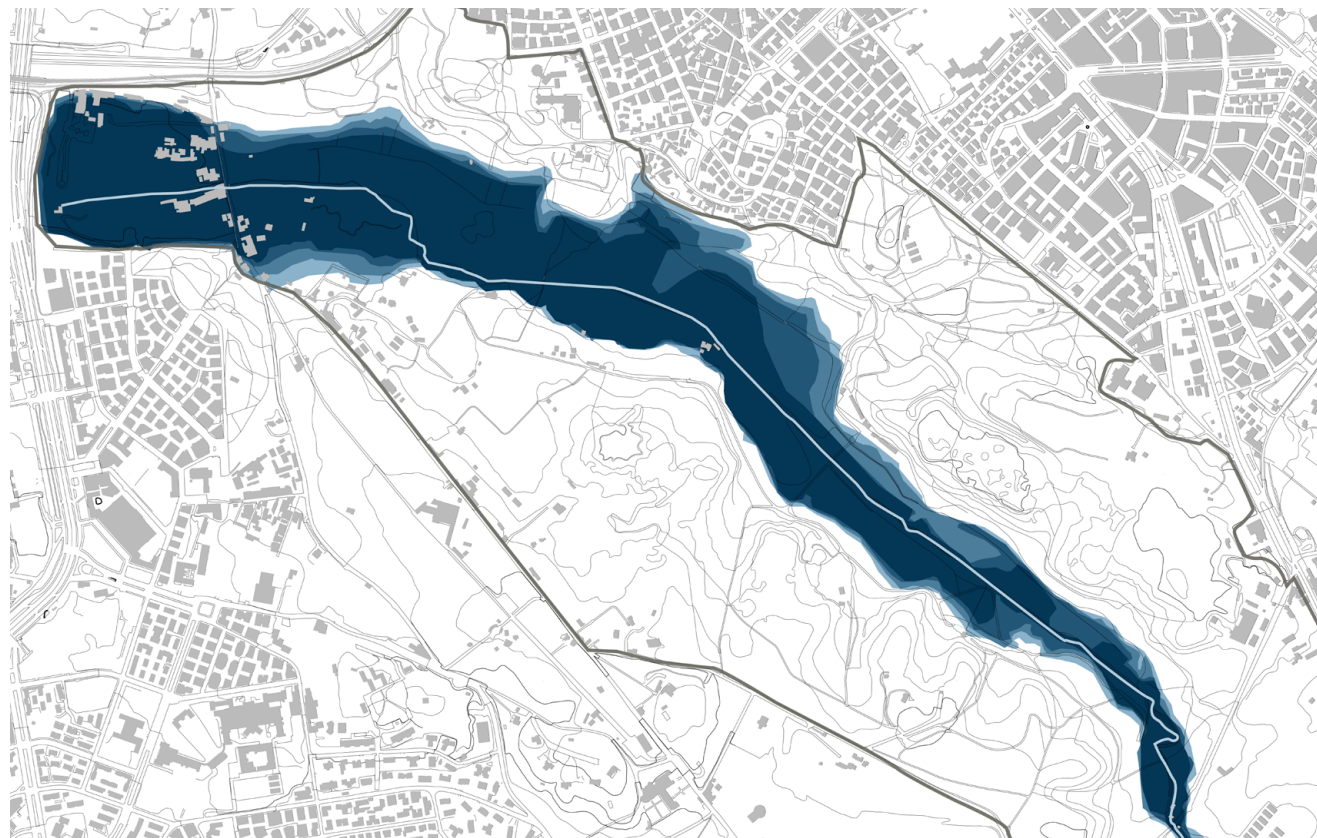
FLORA





Rp= Return Period:
is an average time
between events
such floods to
occur







Actual Situation - Phase 1

River small section
 River covered with riparian vegetation
 Few crossings
 Few entrances on the south west side
 Park not equipped



Phase 2

Widen the river section (room for the river)
 Clean up the banks
 Create wetland
 Enlarge the existing lake
 Retrace the ancient waterways

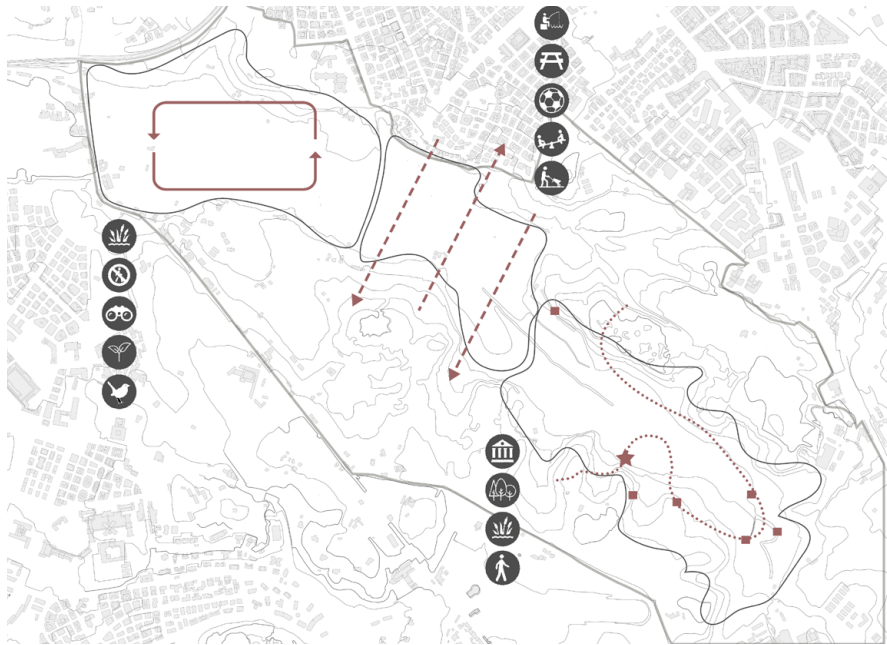


1. Elevated Path
2. Wetland
3. Floating Gardens
4. Artificial lake
5. Fishing pond
6. Community Garden
7. Pic Nic Areas
8. Lawn
9. Wetland
10. Nymphaeum Egeria

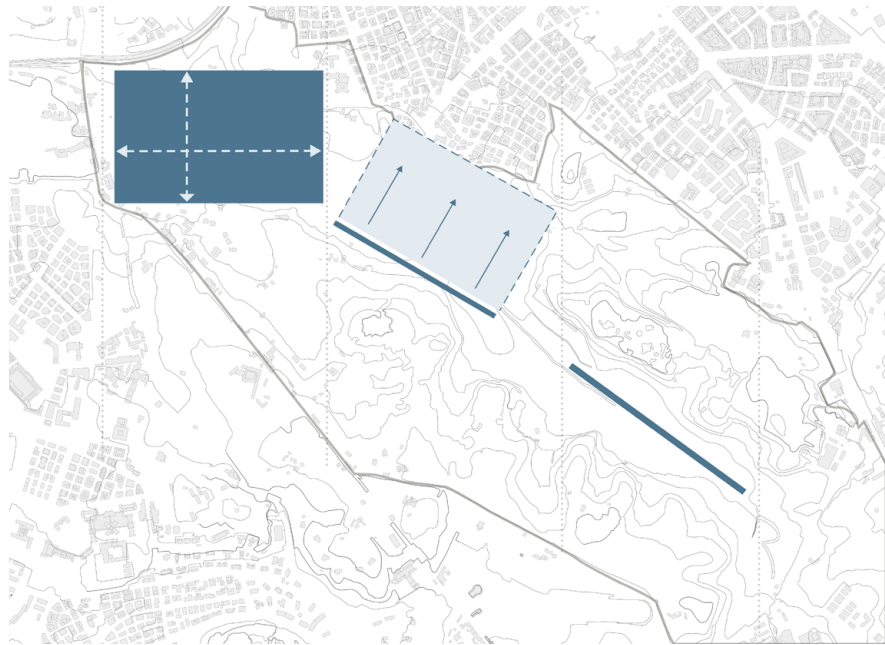
— Route A
— Route B

Phase 3

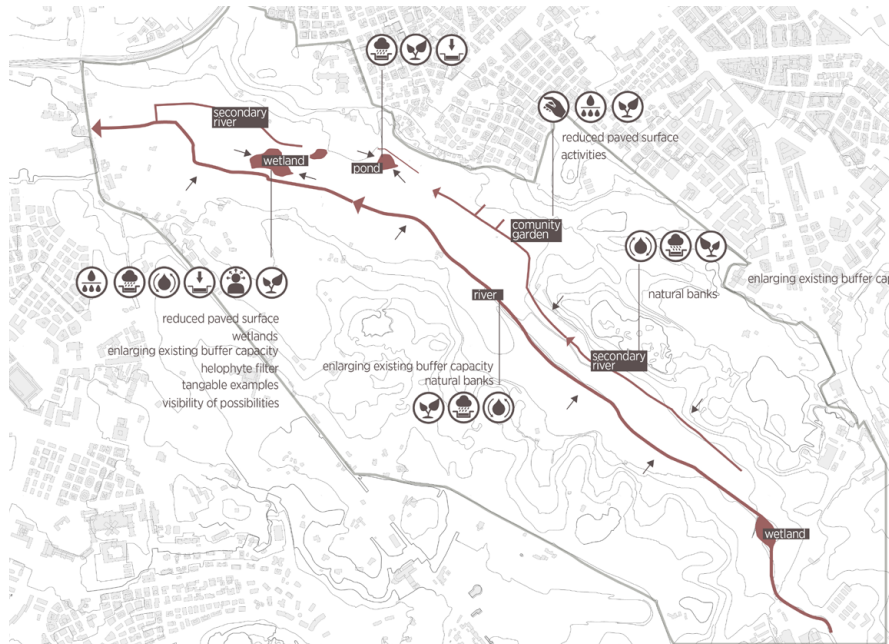
River protagonist of the park
Create crossings
Create revenue
Create equipped areas for visitors



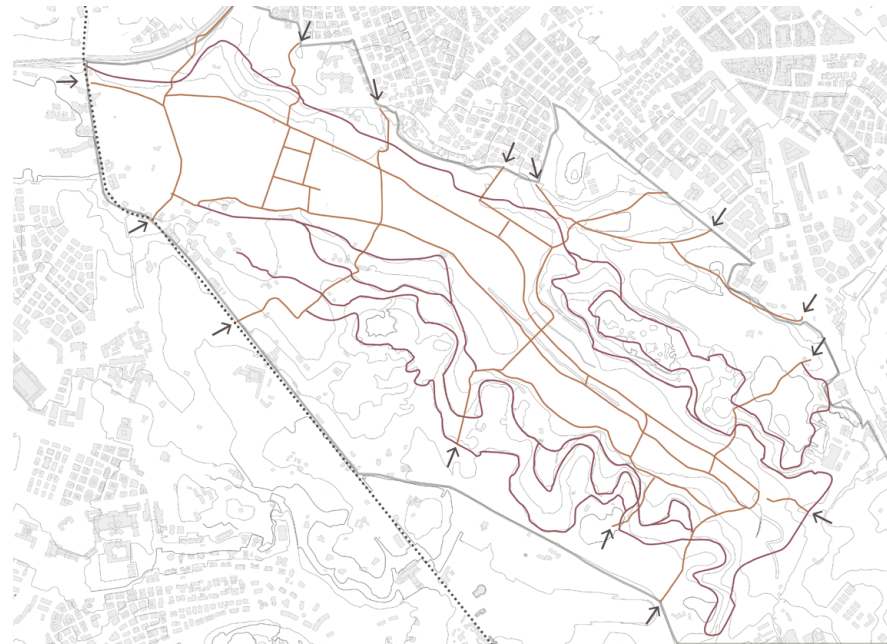
Functions-Accessibility



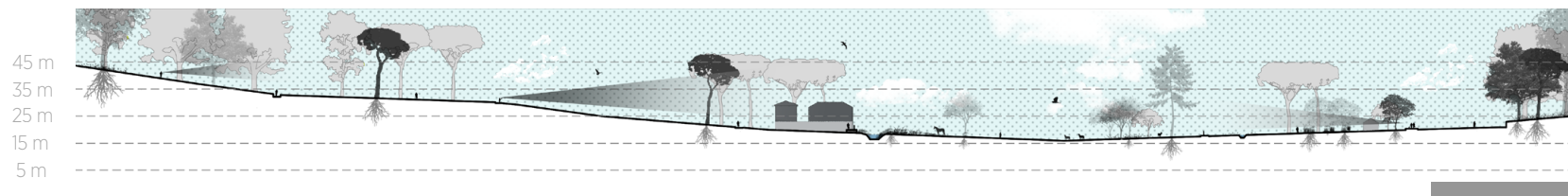
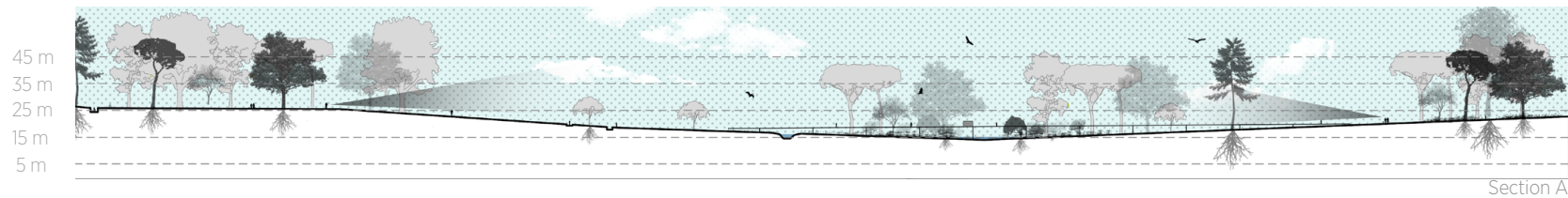
Water behaviour

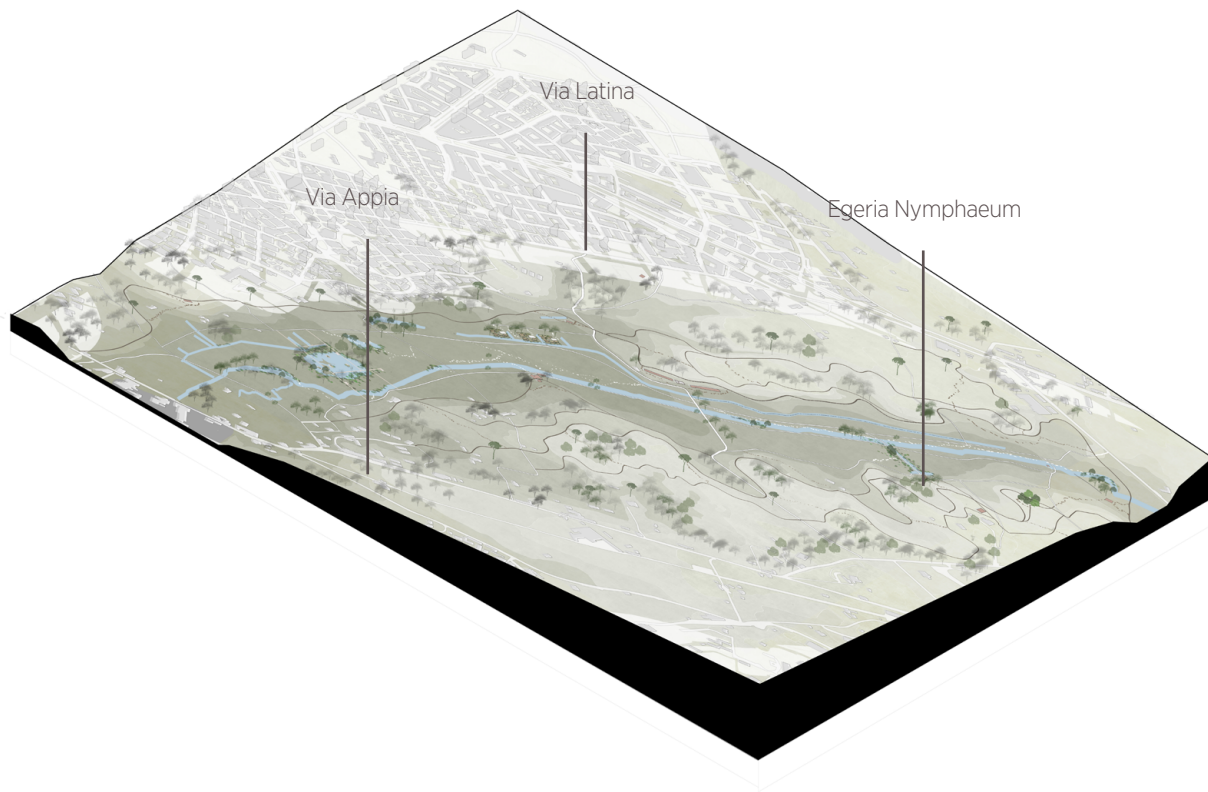


Green & and blue system

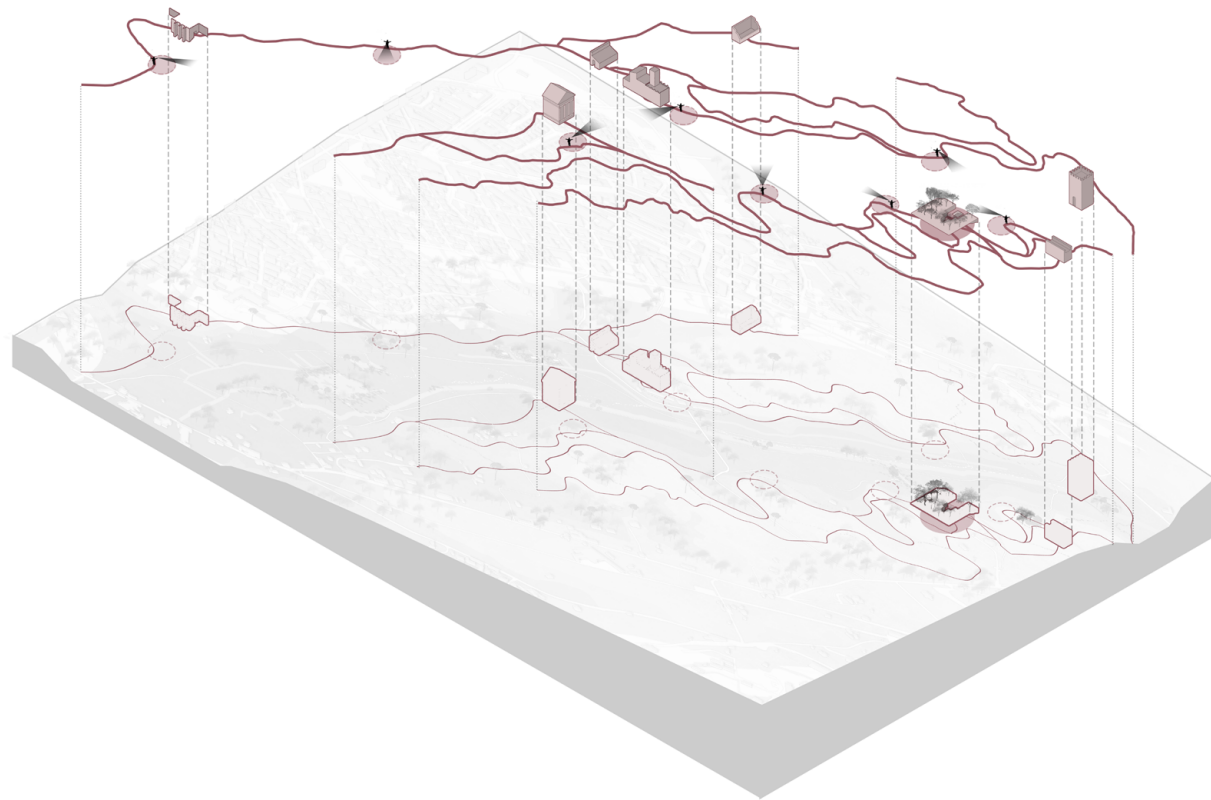


Routes map

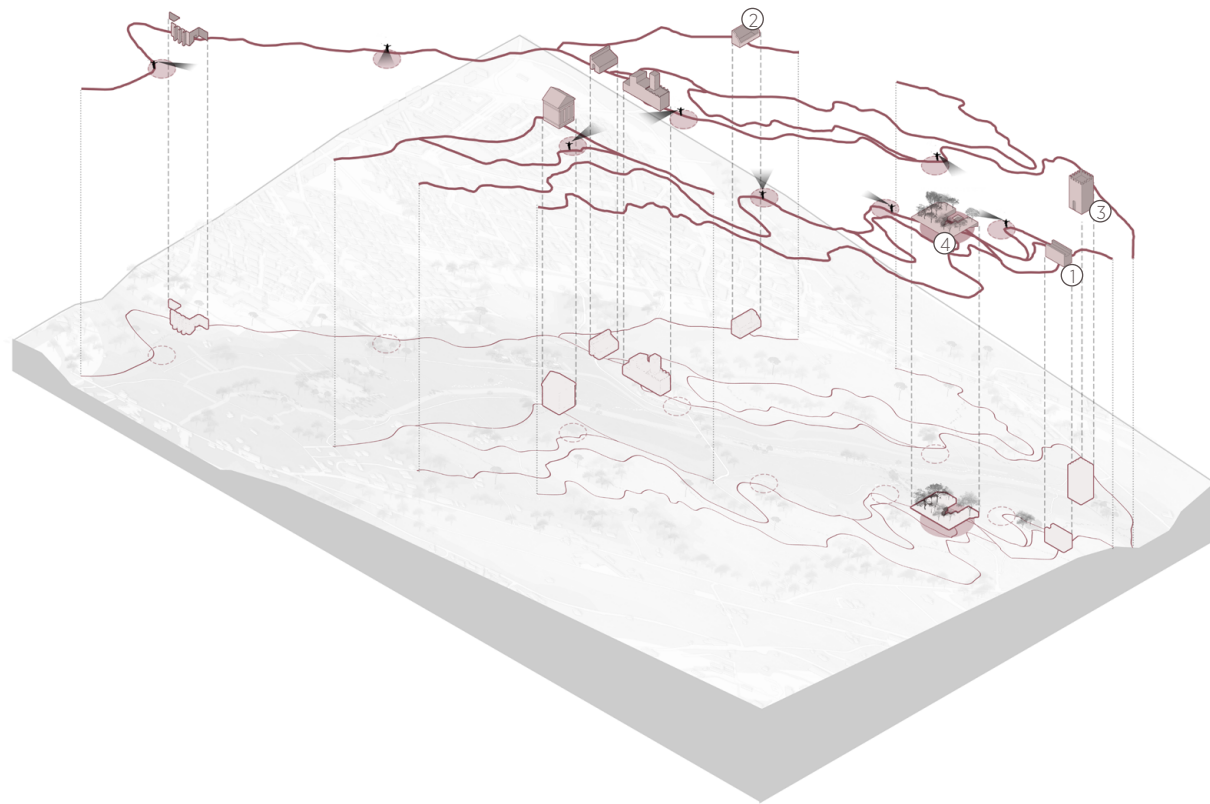




ROUTE A



ROUTE A



1. Roman water tank



2. Roman water tank

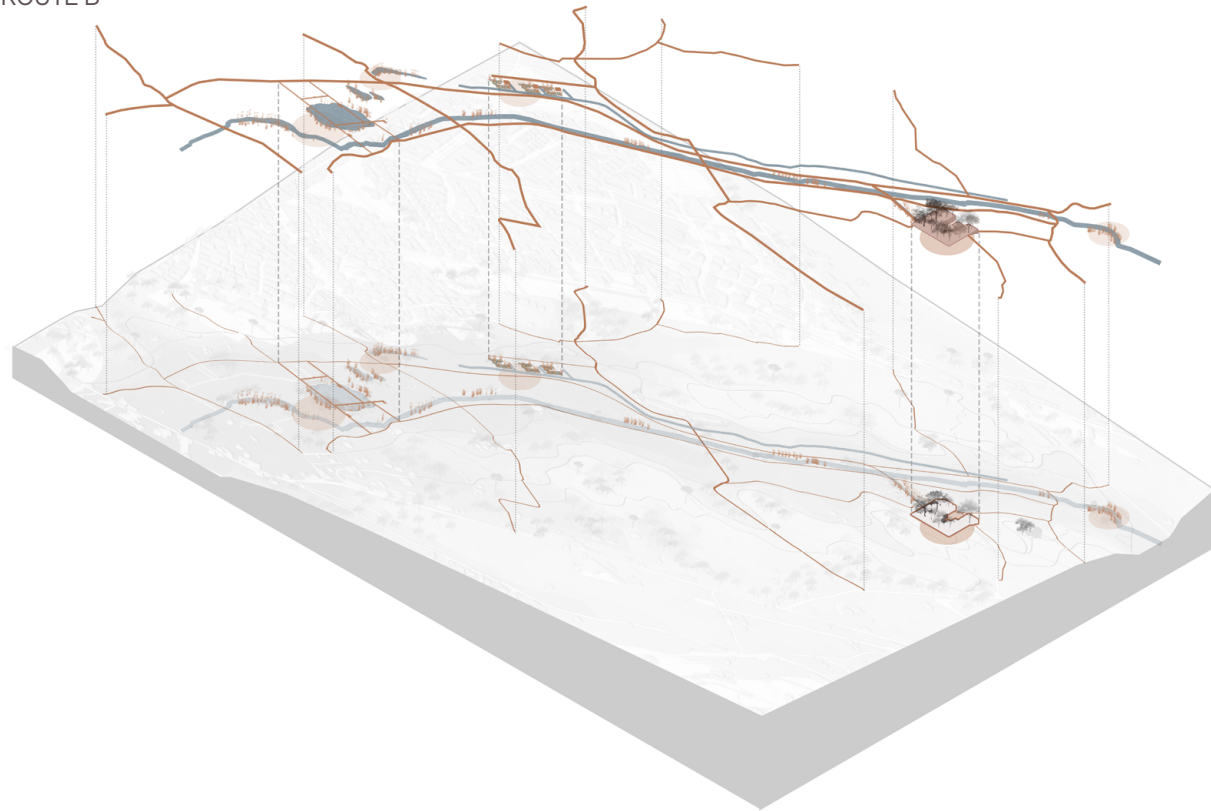


3. Torre Valca

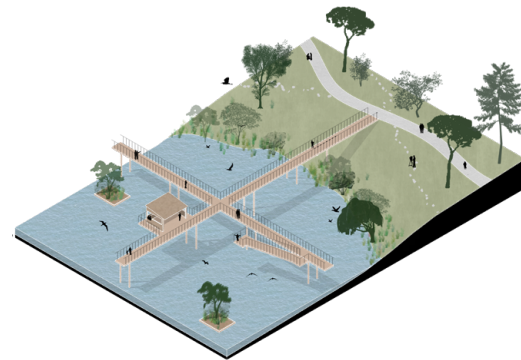
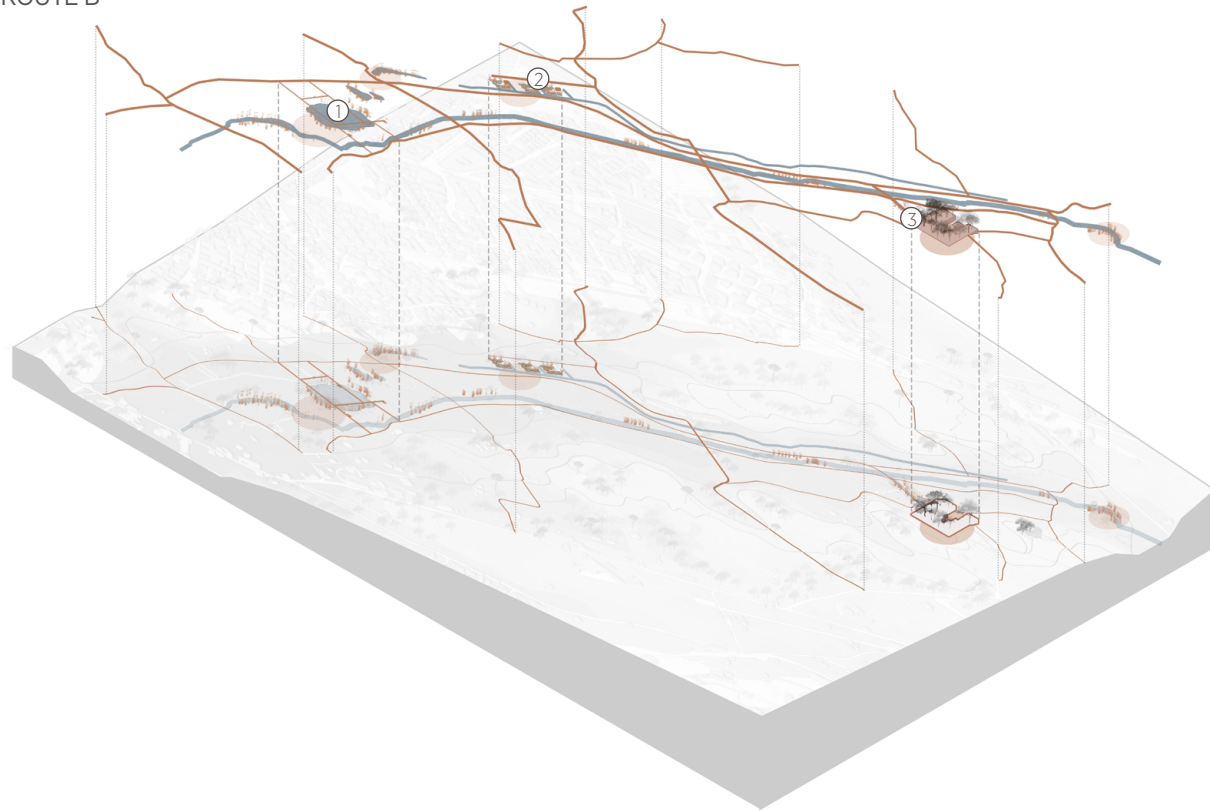


4. Nymphaeum Egeria

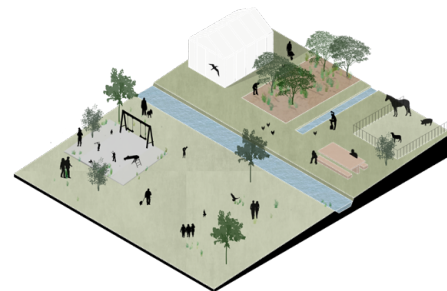
ROUTE B



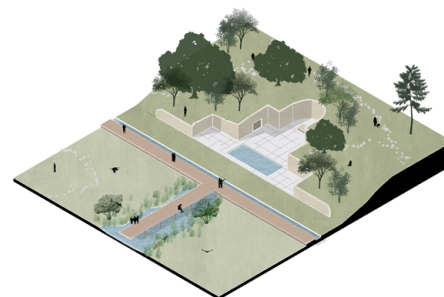
ROUTE B



1. Wetland and the elevated path

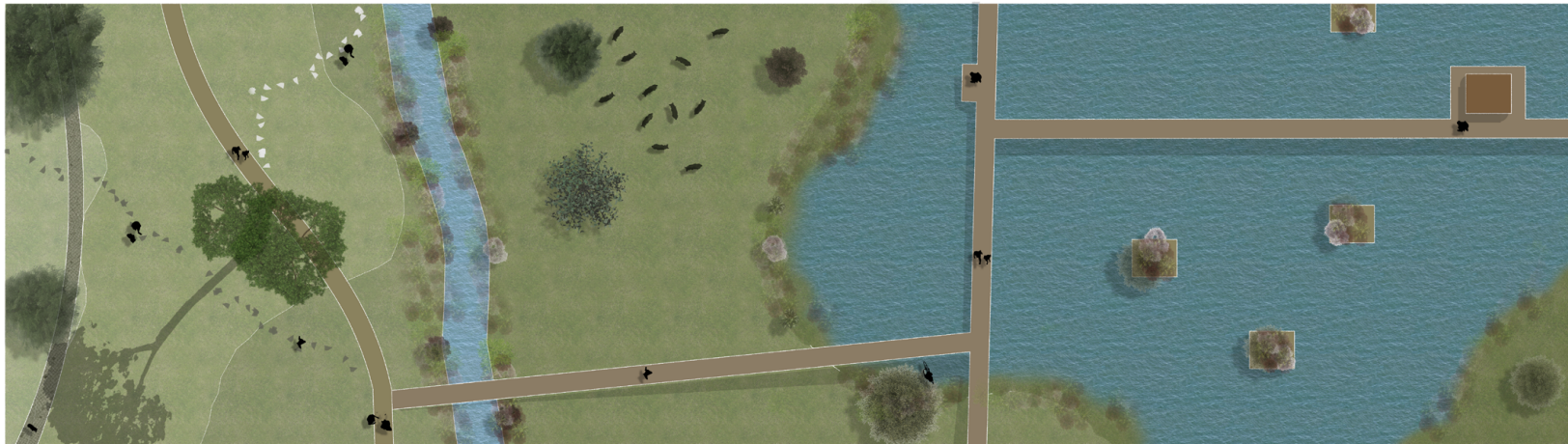


2. Community Gardens



3. Final destination: Nymphaeum Egeria

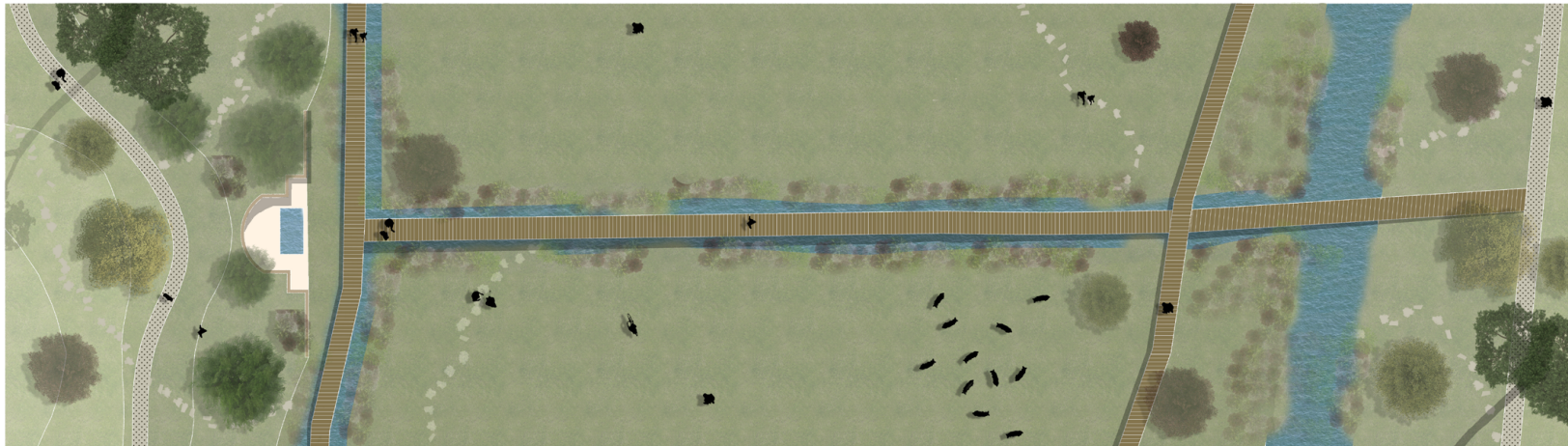
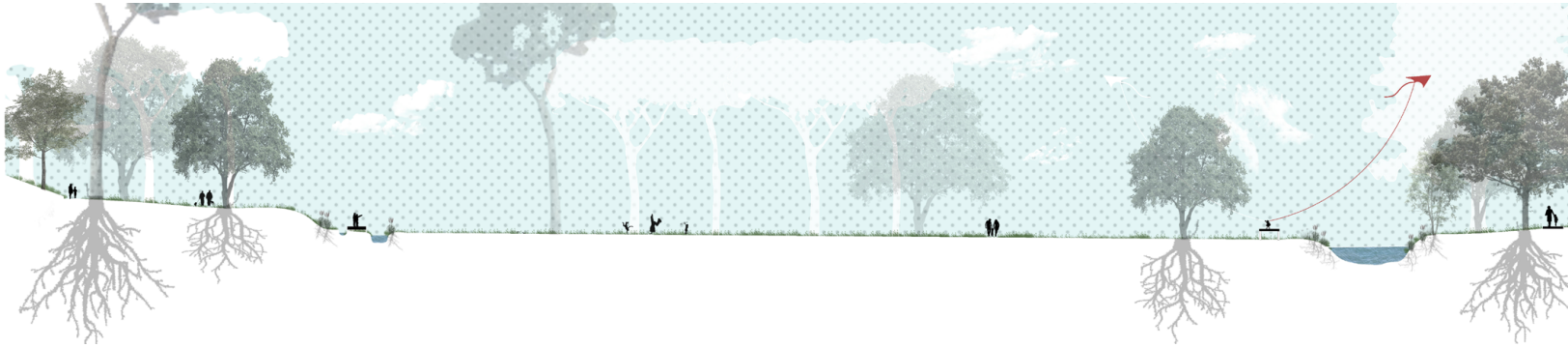
1. Wetland and the elevated path



2. Community Gardens



3. Final destination: Nymphaeum Egeria



Materialization - Route A - Tuff Platform



Roman Tuff

Materialization - Route B - Wooden Path



Acorus calamus



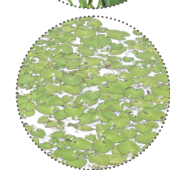
Sagittaria latifolia



Lythrum salicaria



Iris versicolor



Nymphaeodes aquatica

A day in Rome ...

*with the guide in
your hands, let's go!*

























GRAZIE
THANK YOU

