



**Politecnico  
di Torino**

**PLANNING FOR ENVIRONMENT**

# DISTRICT 16

Madonna di Campagna

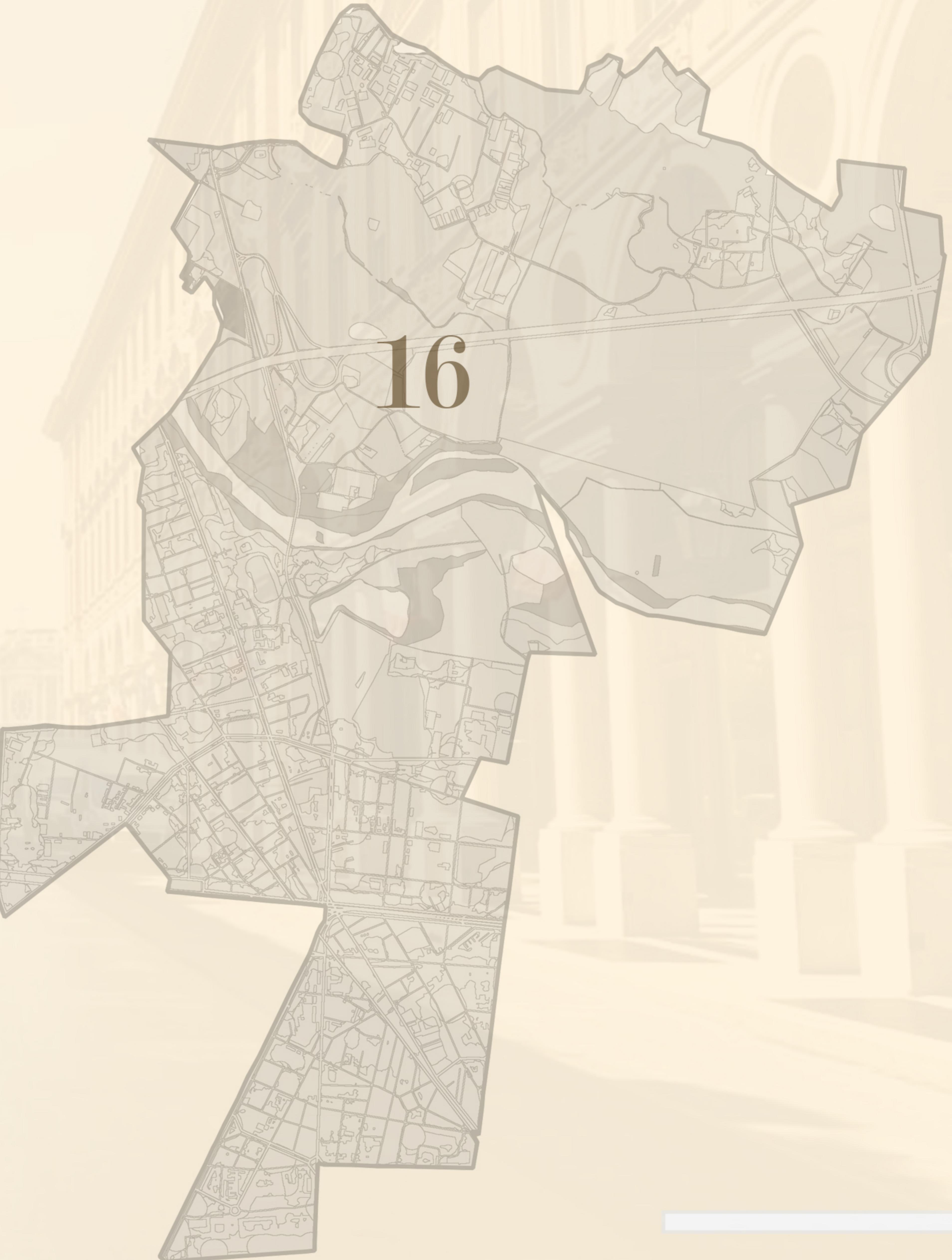
Pouria Navabpour

Dorna Hosseinzadehbonabi

Gunel Mustafayeva

Jose Luis Echeverry

Mahshad Gorji Nejad



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# District 16\_ Madonna di Campagna

## PART I

### Land Cover (LC) And Imperviousness Degree (IMD) Calculations

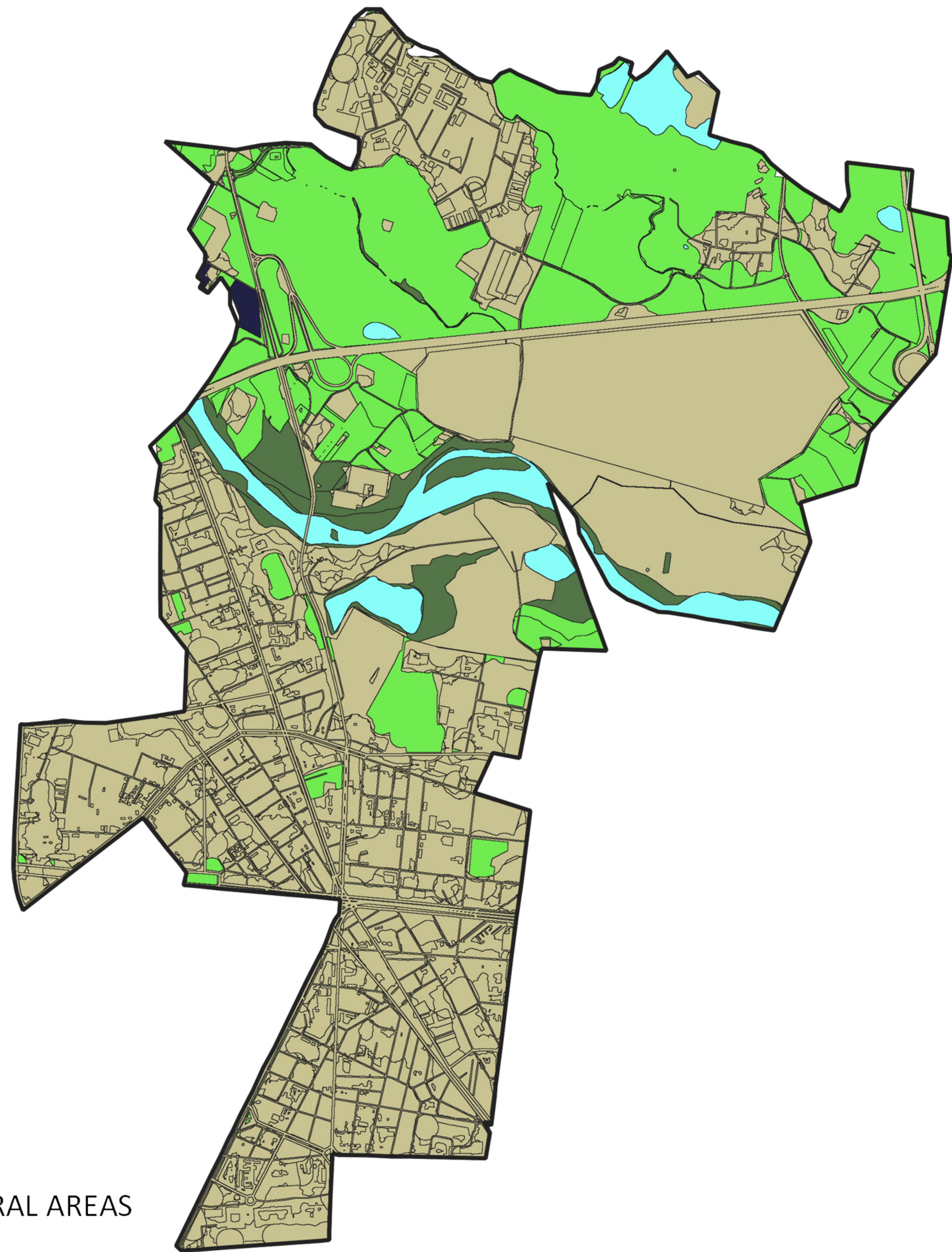


District 16  
Madonna di Campagna

#### Land Use Level I

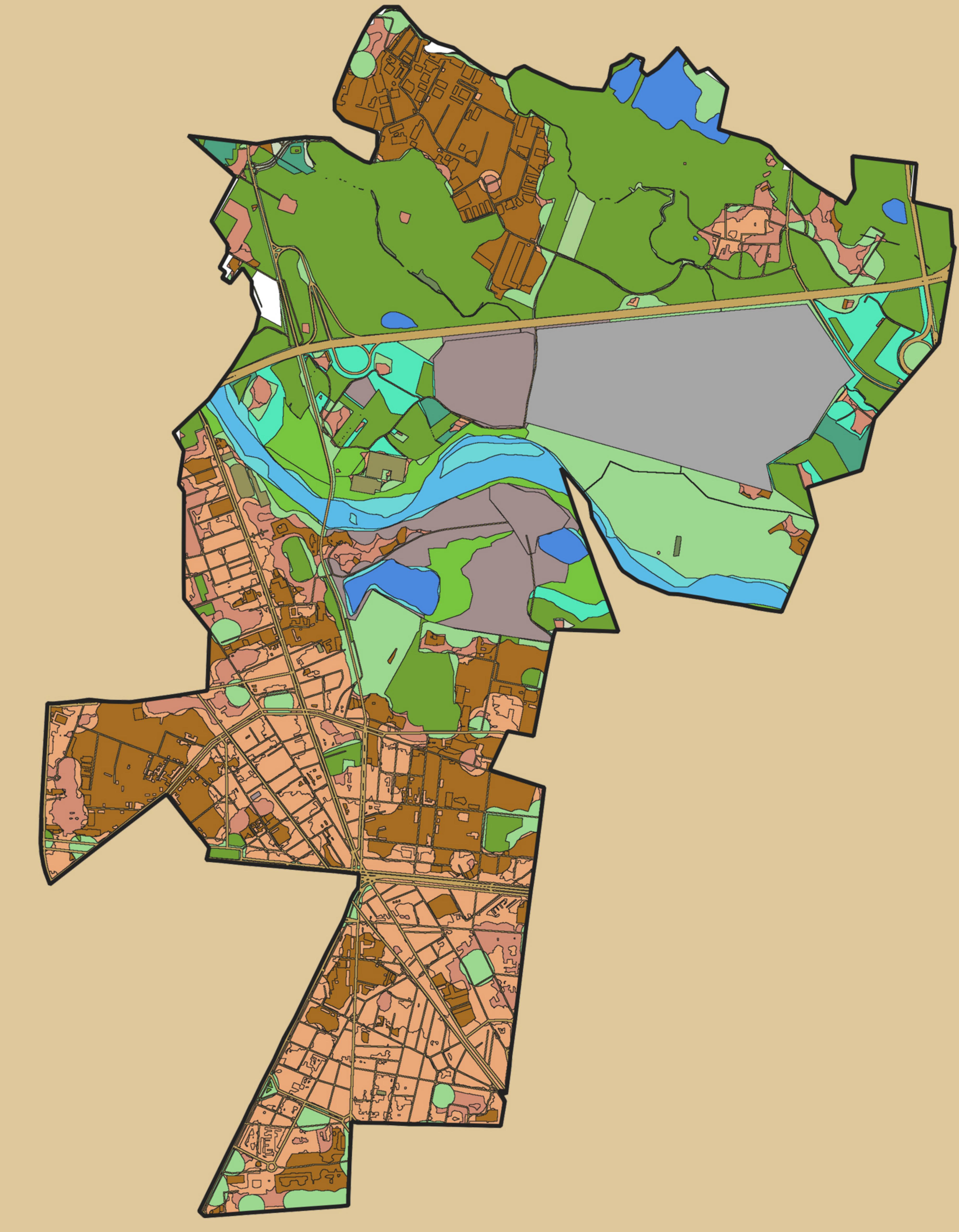
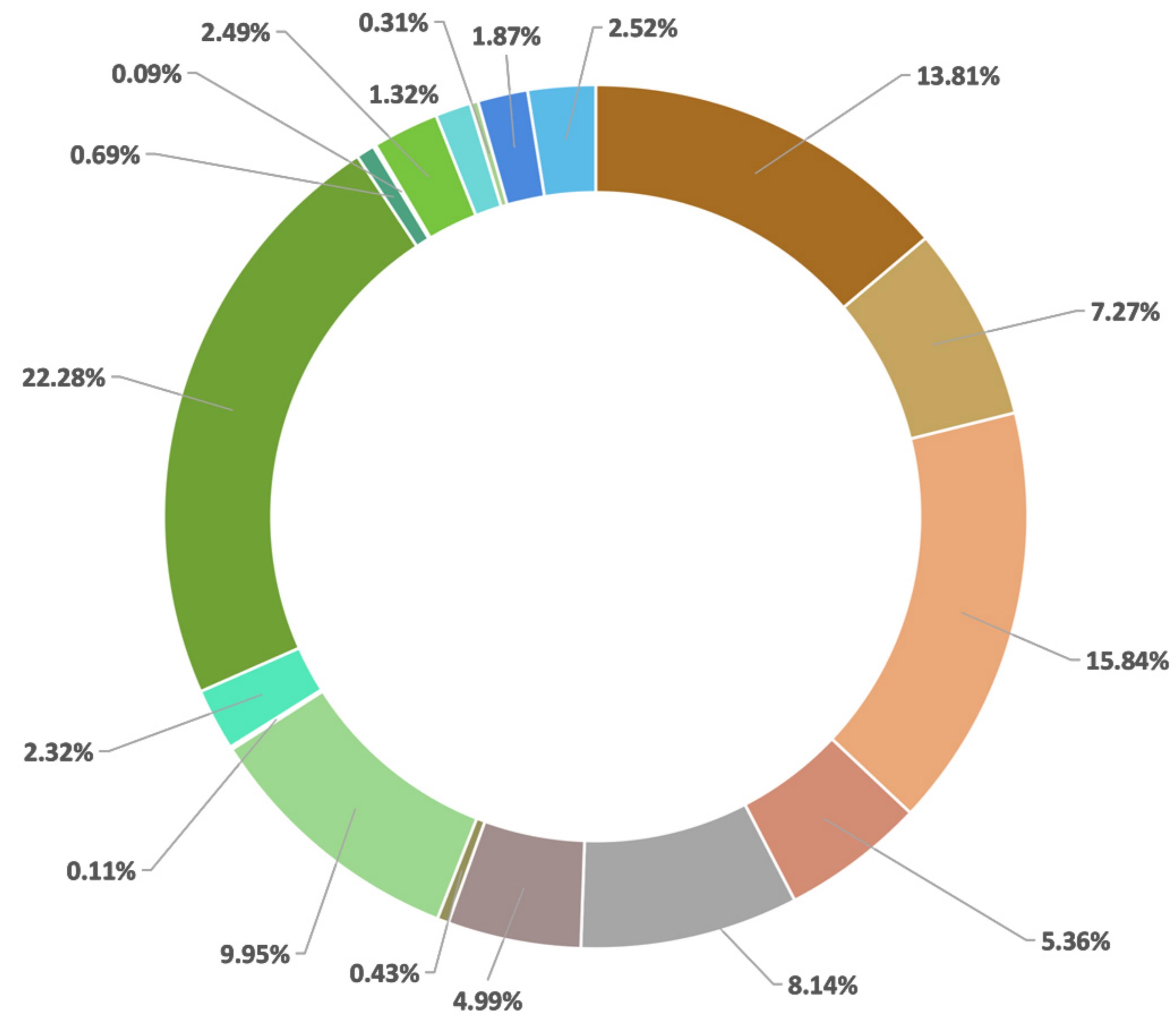
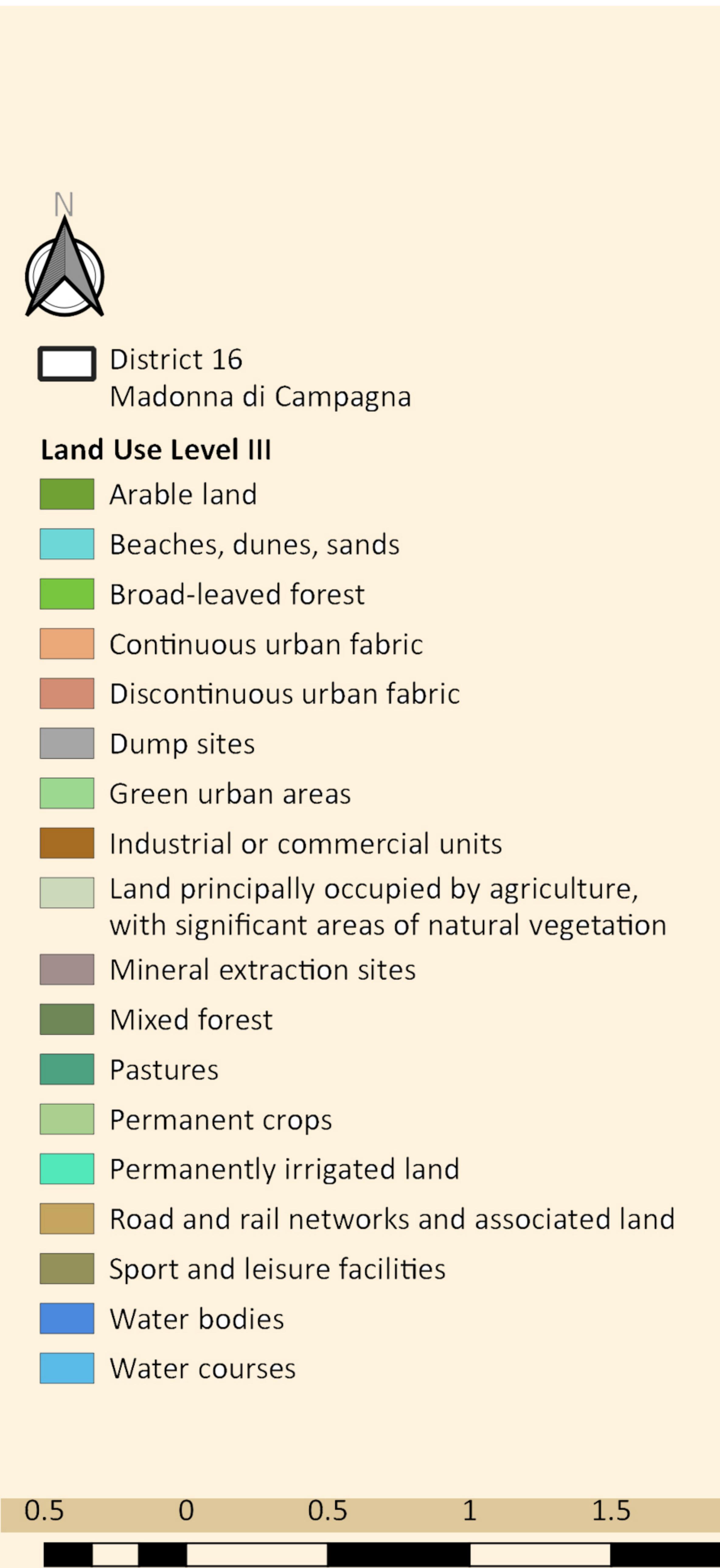
- AGRICULTURAL AREAS
- ARTIFICIAL SURFACES
- FOREST AND SEMI NATURAL AREAS
- WATER BODIES
- NULL

0.5 0 0.5 1 1.5 2 km



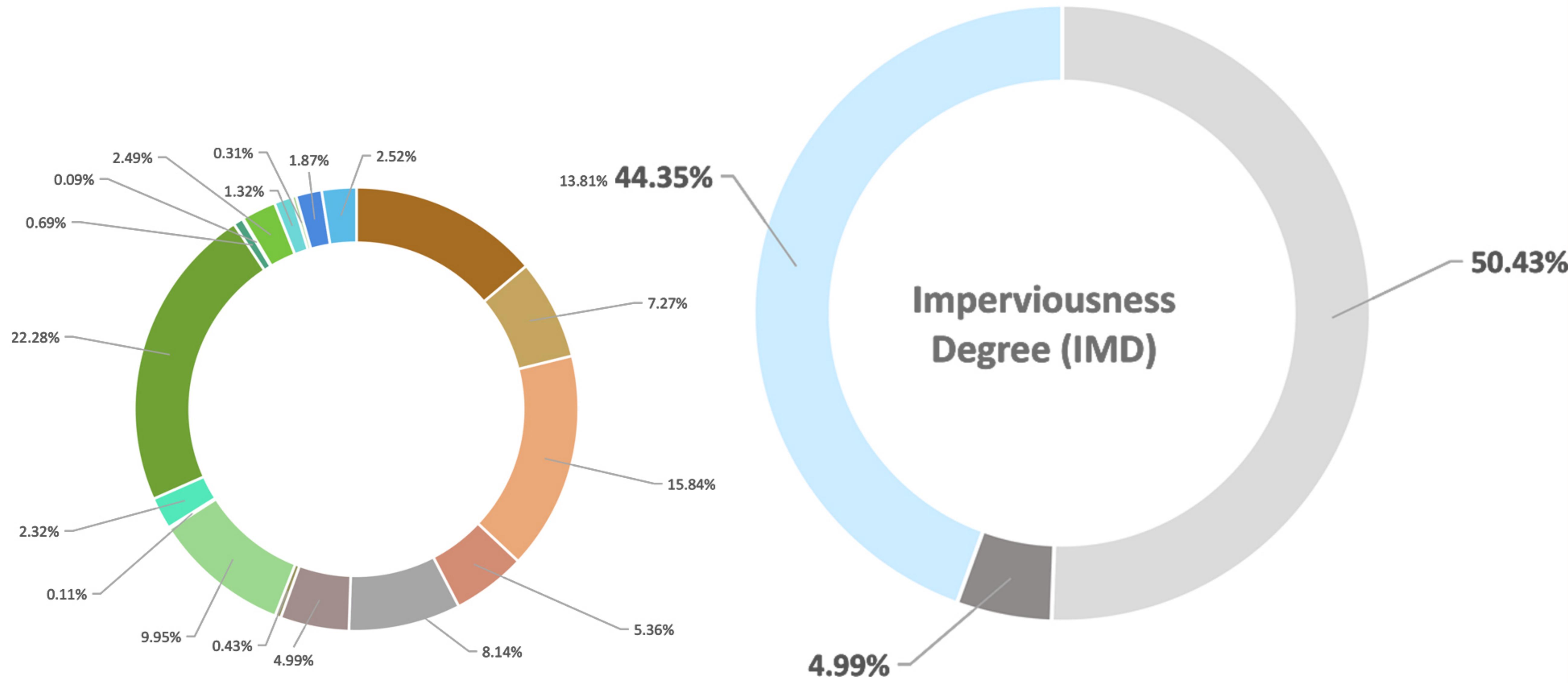
# District 16\_ Madonna di Campagna

## LEVEL III\_LAND COVER

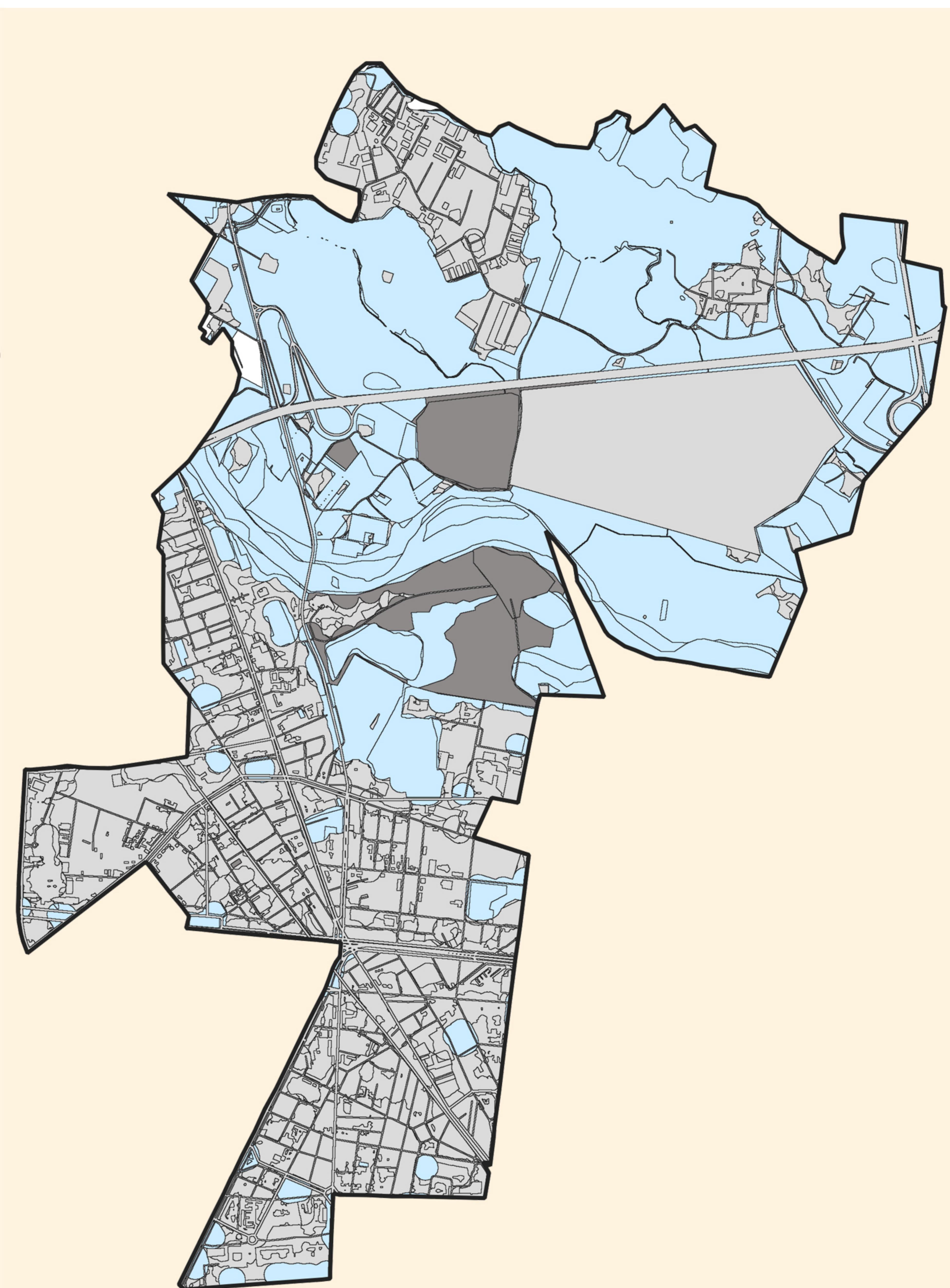


## District 16\_ Madonna di Campagna

### Imperviousness Degree (IMD)



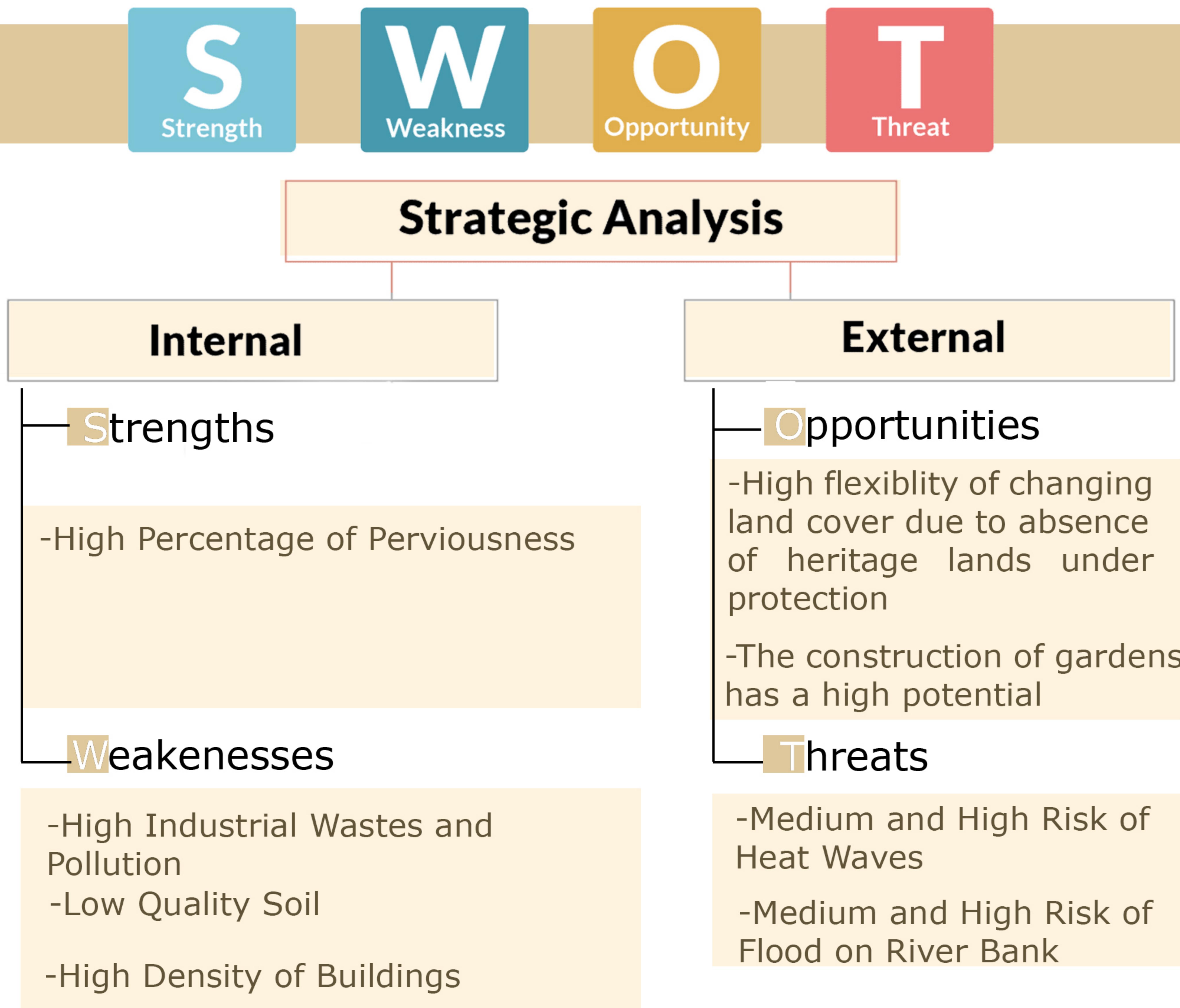
LEVEL 3	AREA	PERCENT	Imperviousness degree (IMD)
Industrial or commercial units	1,413,243.48	13.81%	
Road and rail networks and associated land	744,321.87	7.27%	
Continuous urban fabric	1,621,081.52	15.84%	Sealed 50.43%
Discontinuous urban fabric	548,414.23	5.36%	
Dump sites	833,098.19	8.14%	
Mineral extraction sites	510,358.89	4.99%	Untouchable 4.99 %
Sport and leisure facilities	43,743.06	0.43%	
Green urban areas	1,017,778.38	9.95%	
Land principally occupied by agriculture, with significant areas of natural vegetation	10,927.76	0.11%	
Permanently irrigated land	236,400.97	2.32%	
Arable land	2,279,496.36	22.28%	
Pastures	70,421.42	0.69%	
Mixed forest	9,635.62	0.09%	
Broad-leaved forest	254,497.58	2.49%	Permeable 44.35%
Beaches, dunes, sands	135,049.21	1.32%	
Permanent crops	31,248.66	0.31%	
Water bodies	191,082.06	1.87%	
Water courses	257,402.56	2.52%	



0.5    0    0.5    1    1.5    2 km



## PART II SWOT Analysis



### Policy Coherence

- Sustainable and Resilient Turin in 2030
- Policy for the Protection of EU waters
- The SMILE Master Plan

## Policies and Goals

### Sustainable and Resilient Turin in 2030

#### PARTICIPATORY

Actively engaged residents and neighborhoods



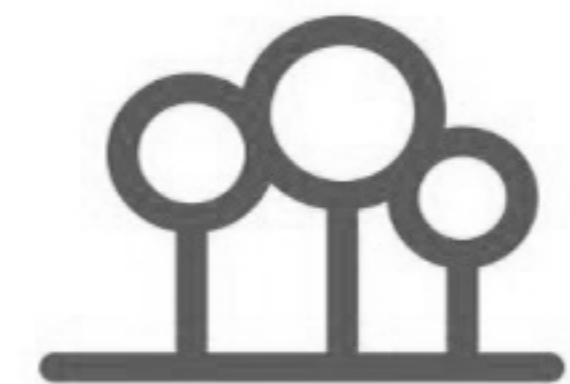
#### DYNAMIC

Rich with **culture, innovation, opportunities and talent**



#### LIVEABLE

Connected, clean, healthy and green



#### JUST

Respectful of each person's rights



Ombretta.C,2022-2023,Introducing Turin,page 31-32

## The SMILE Master Plan



**SMART**  
MOBILITY  
INCLUSION  
LIFE & HEALTH  
ENERGY

<https://piemonteinnova.it/portfolio-articoli/smile/>

### Policy for the Protection of EU waters

The Management Plan of the river basin district is the operational tool envisaged by Directive 2000/60/EC, transposed at national level by Legislative Decree 152/06 and subsequent amendments and additions, to implement a coherent and sustainable policy for the protection of EU waters , through an integrated approach of the various management and ecological aspects at the hydrographic district scale.

<https://pianoacque.adbpo.it/>



## Goals

### Macro Goals

- Green Infrastructure
- Improve the quality of green space
- Enhance the resident's quality of life and public space

### Micro Goals

- Increase Green Spaces
- Improve the quality of public space and improve the living quality of residents
- Surface Water and Flood Management


## PART III

### Proposal of environmental solutions

PROBLEMS	SOLUTIONS	POLICIES
Medium and High Risk of Heat Waves	1 Recreation of Green and Socialized Neighborhood Parks	● Torino 2030
Medium and High Risk of Flood on River Bank	2 Transforming Parking Lots	● The Water Protection Plan (PTA)
High Industrial Wastes and Pollution	3 Sustainable Green Buildings (Roof Gardens)	● The "SMILE" Master Plan
Low Quality Soil	4 Walk Streets	
High density of building	5 Full Depth Permeable Pavement Shoulder Design	

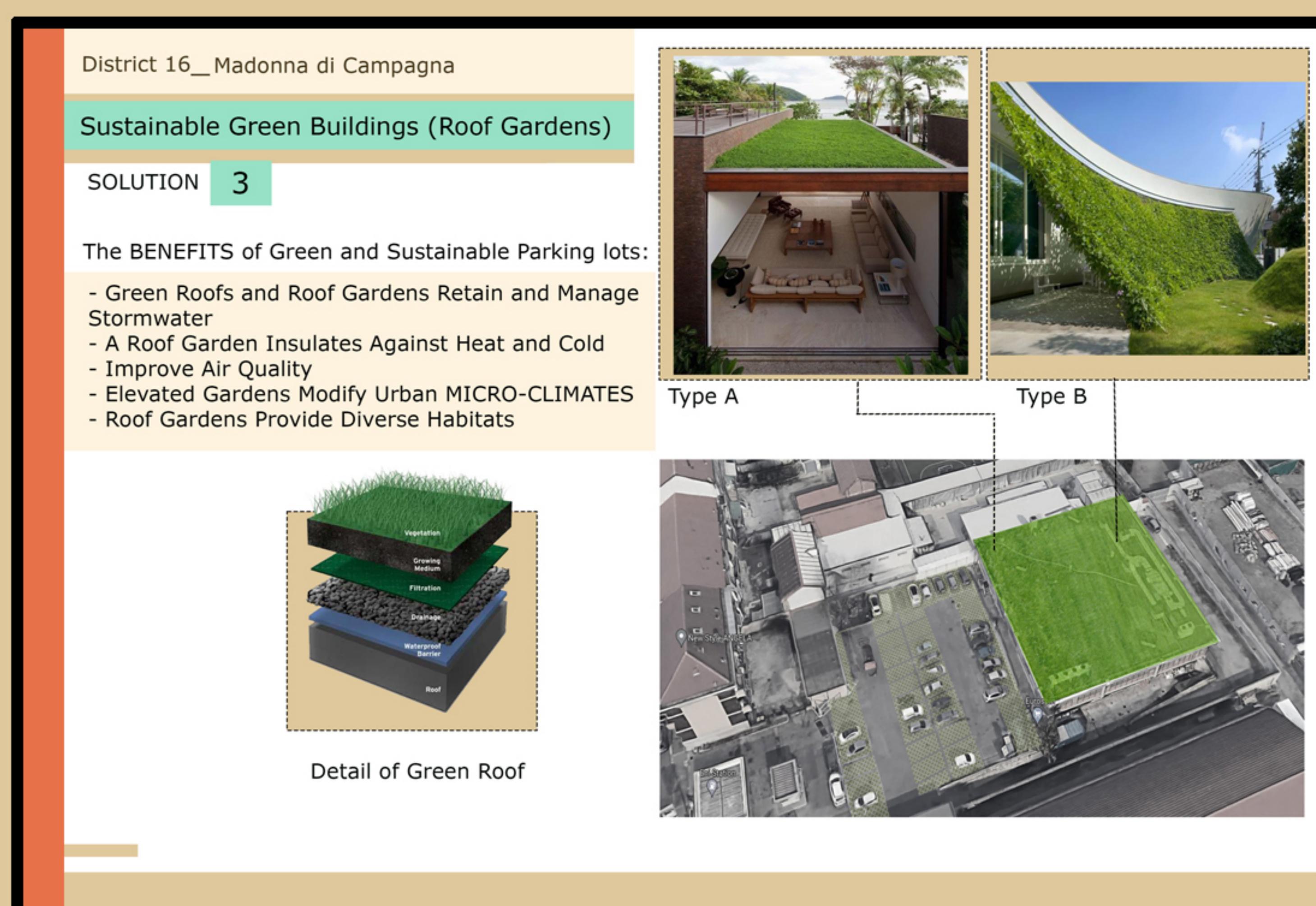
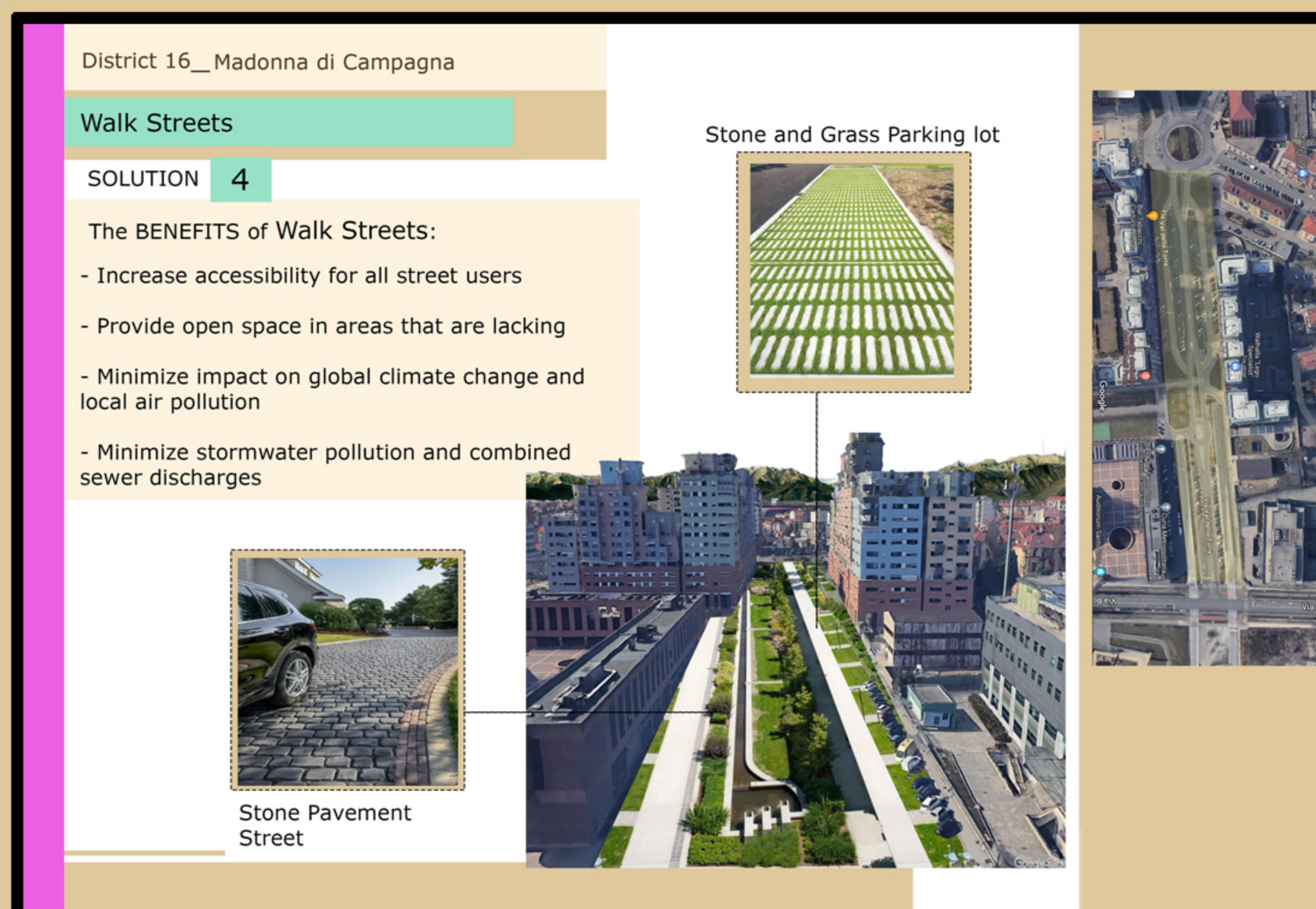
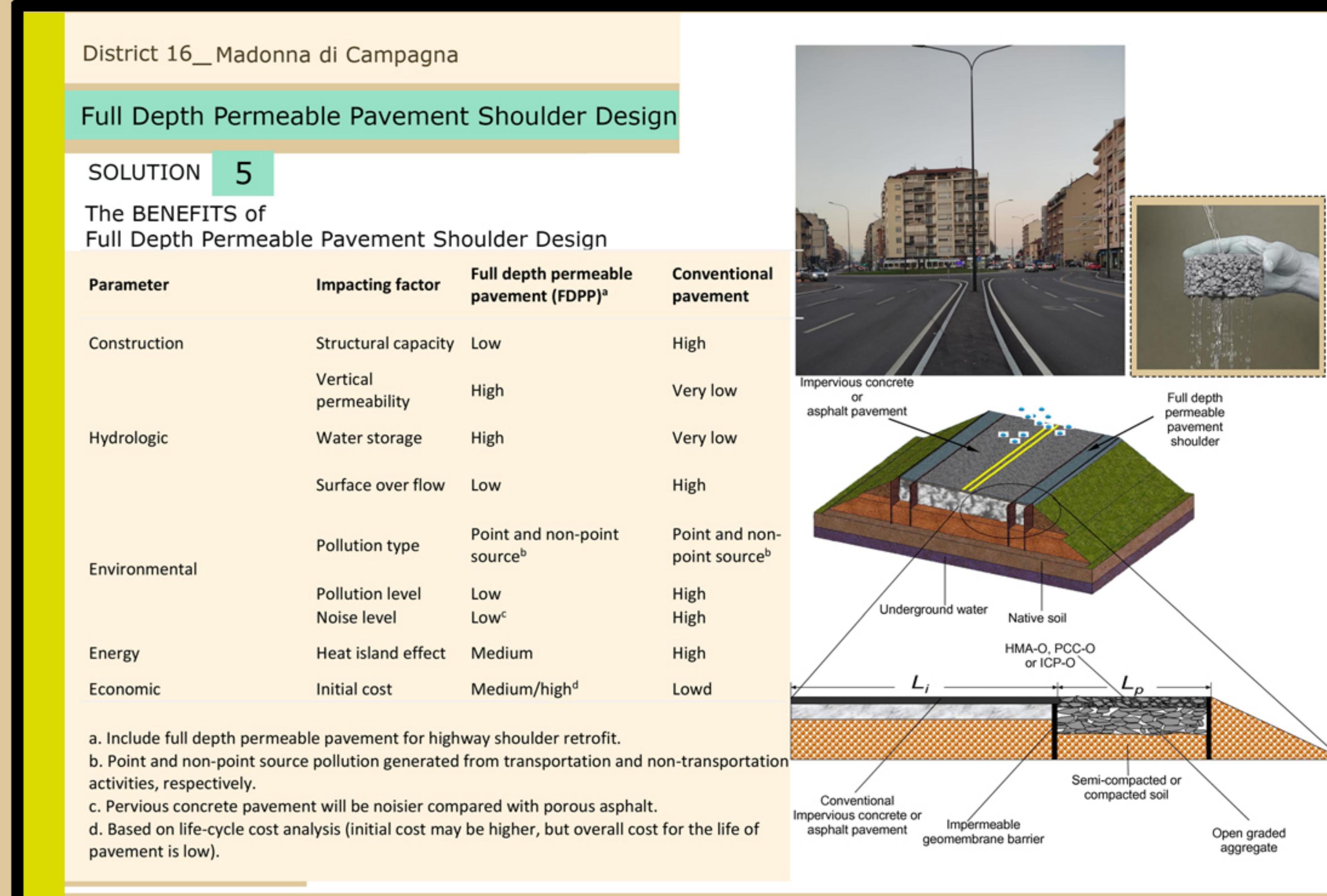
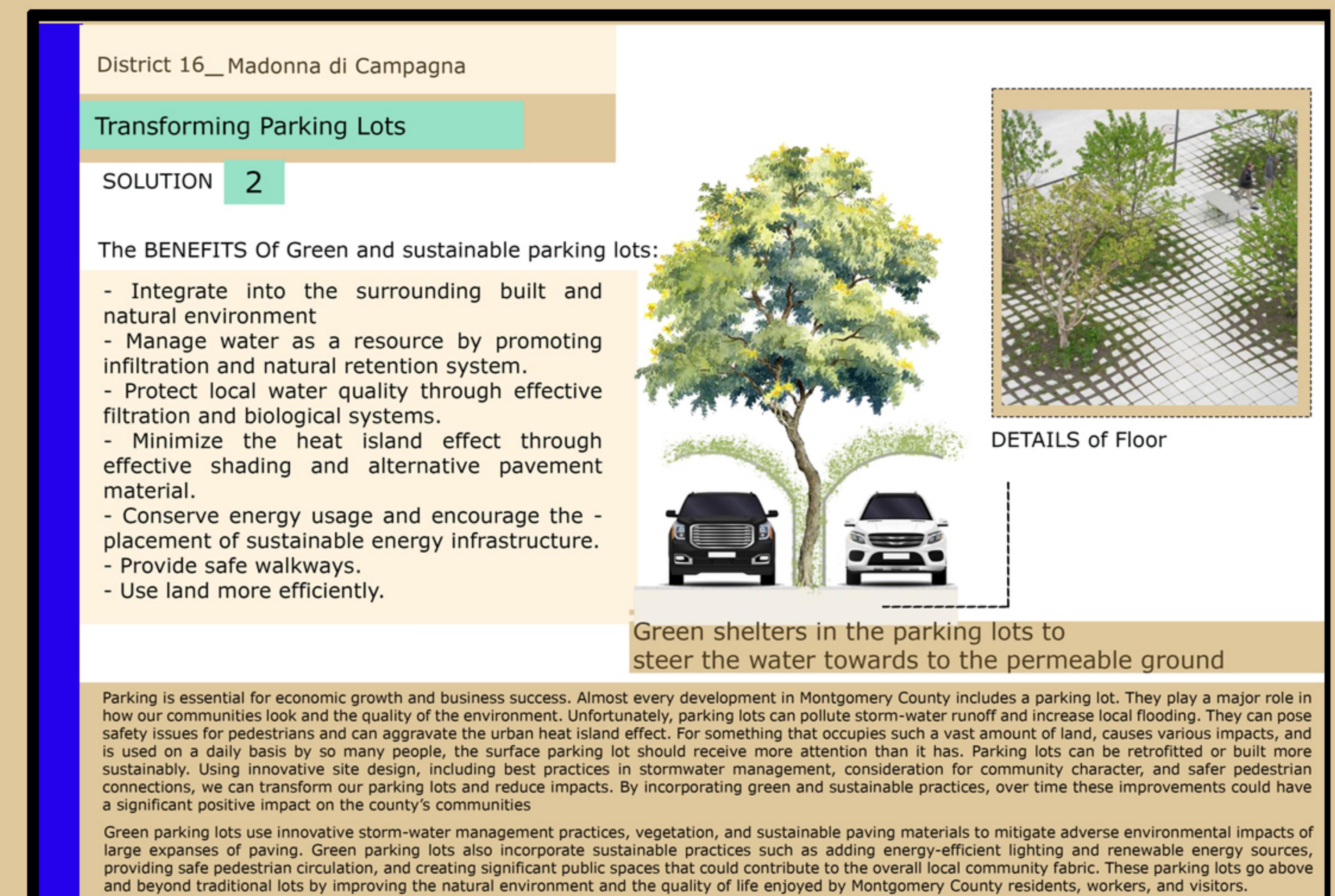
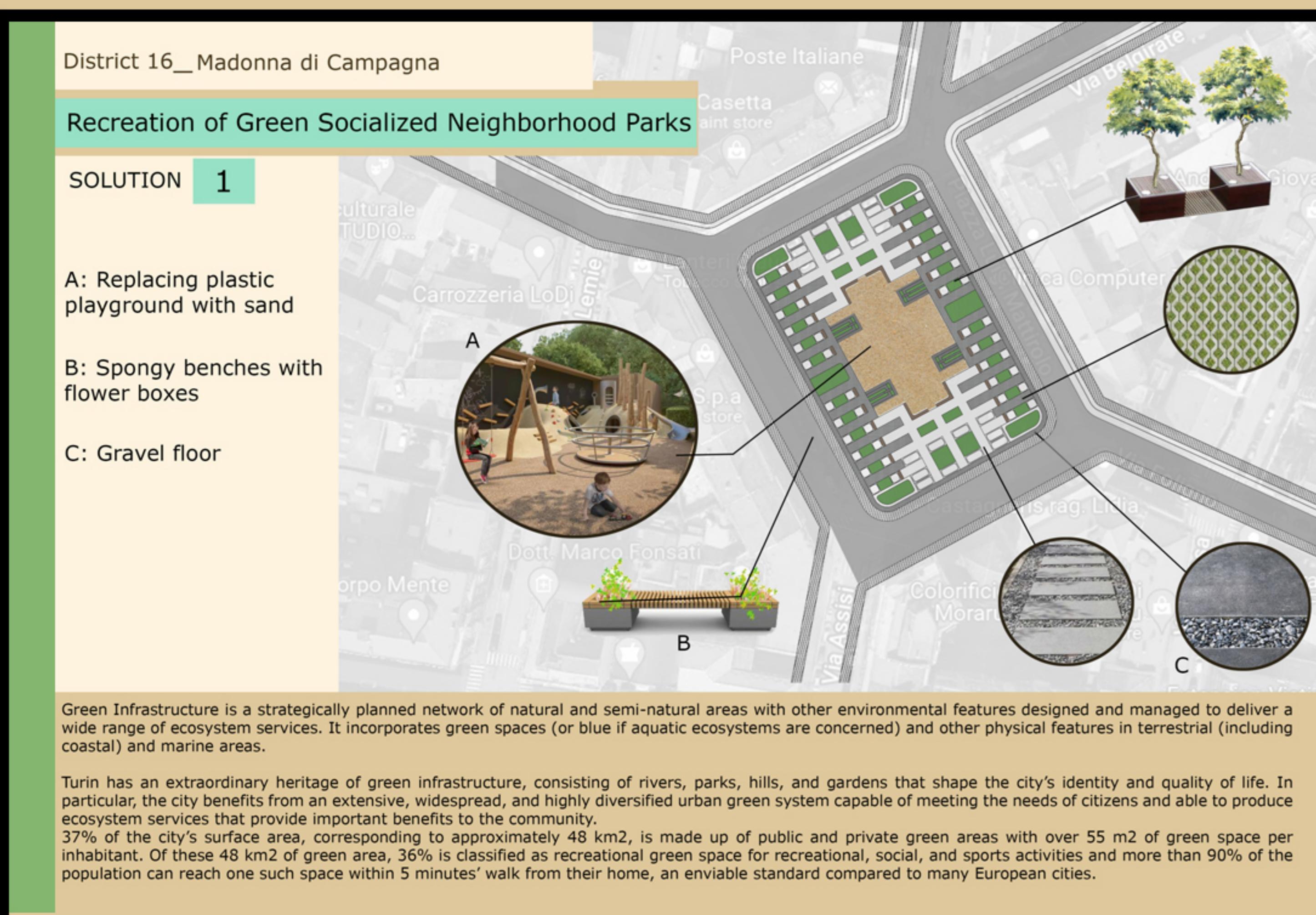
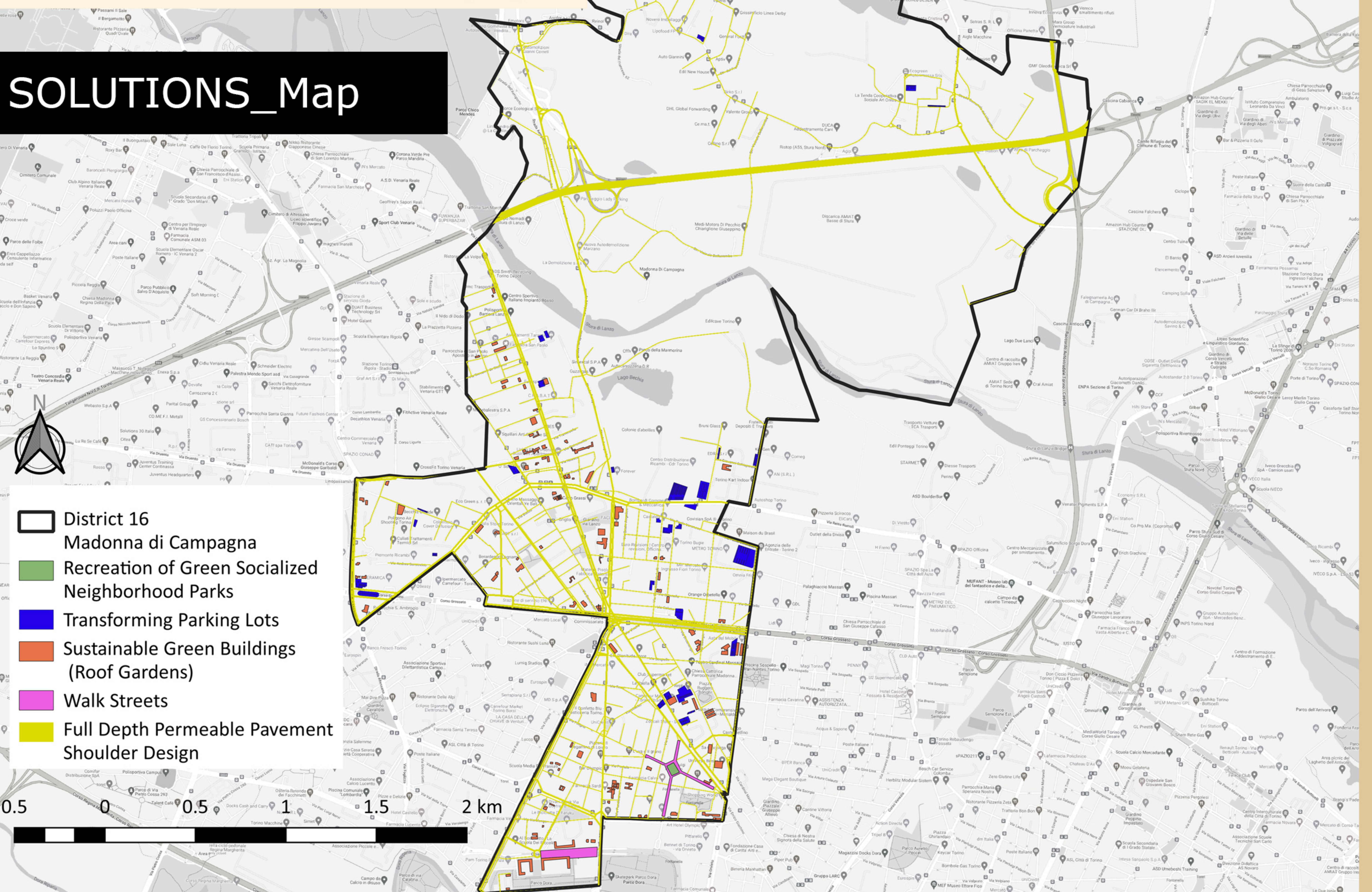
# District 16\_ Madonna di Campagna

## PROBLEMS



# District 16\_ Madonna di Campagna

## SOLUTIONS\_Map

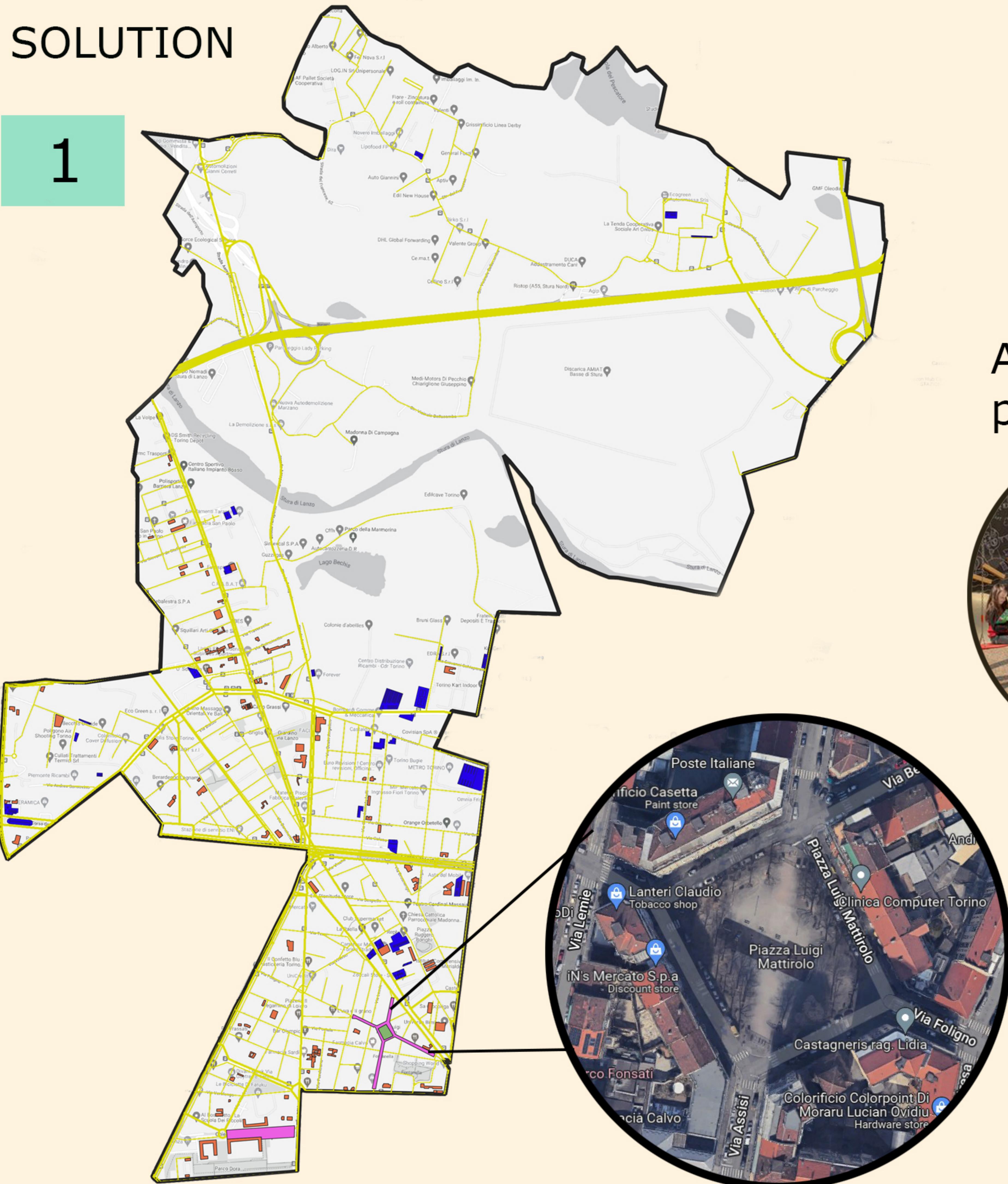


# District 16\_ Madonna di Campagna

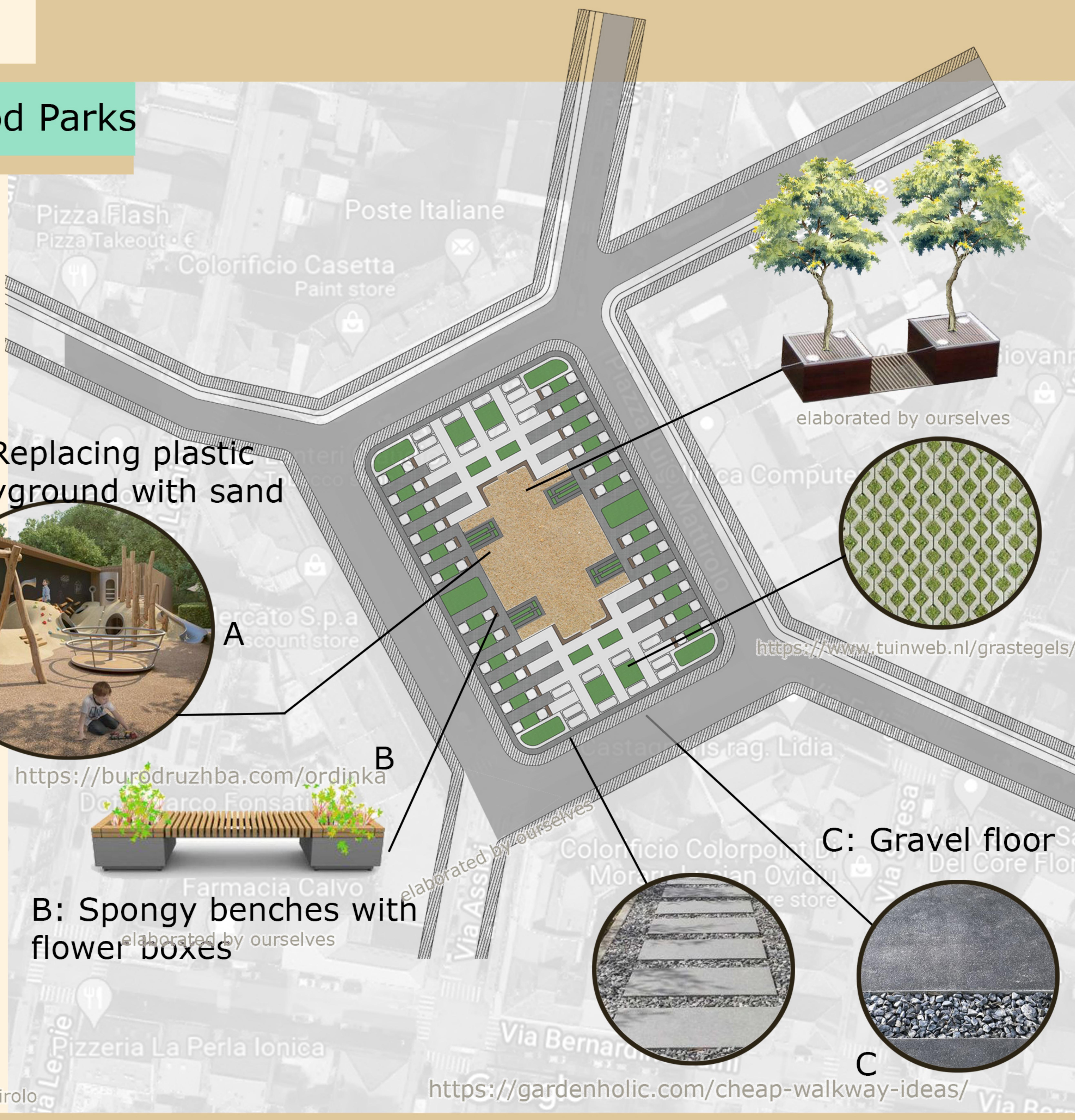
## Recreation of Green Socialized Neighborhood Parks

### SOLUTION

1



<https://www.google.com/maps/place/Giardino+di+Piazza+Mattiolo>



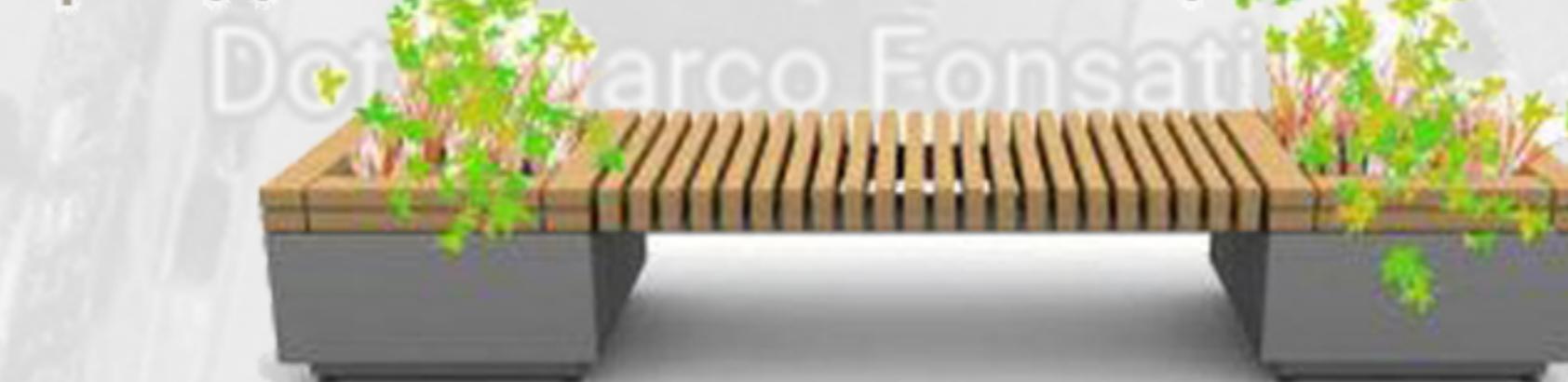
A: Replacing plastic playground with sand



A

<https://burodruzhba.com/ordinka>

elaborated by ourselves



B

B: Spongy benches with flower boxes

elaborated by ourselves



C

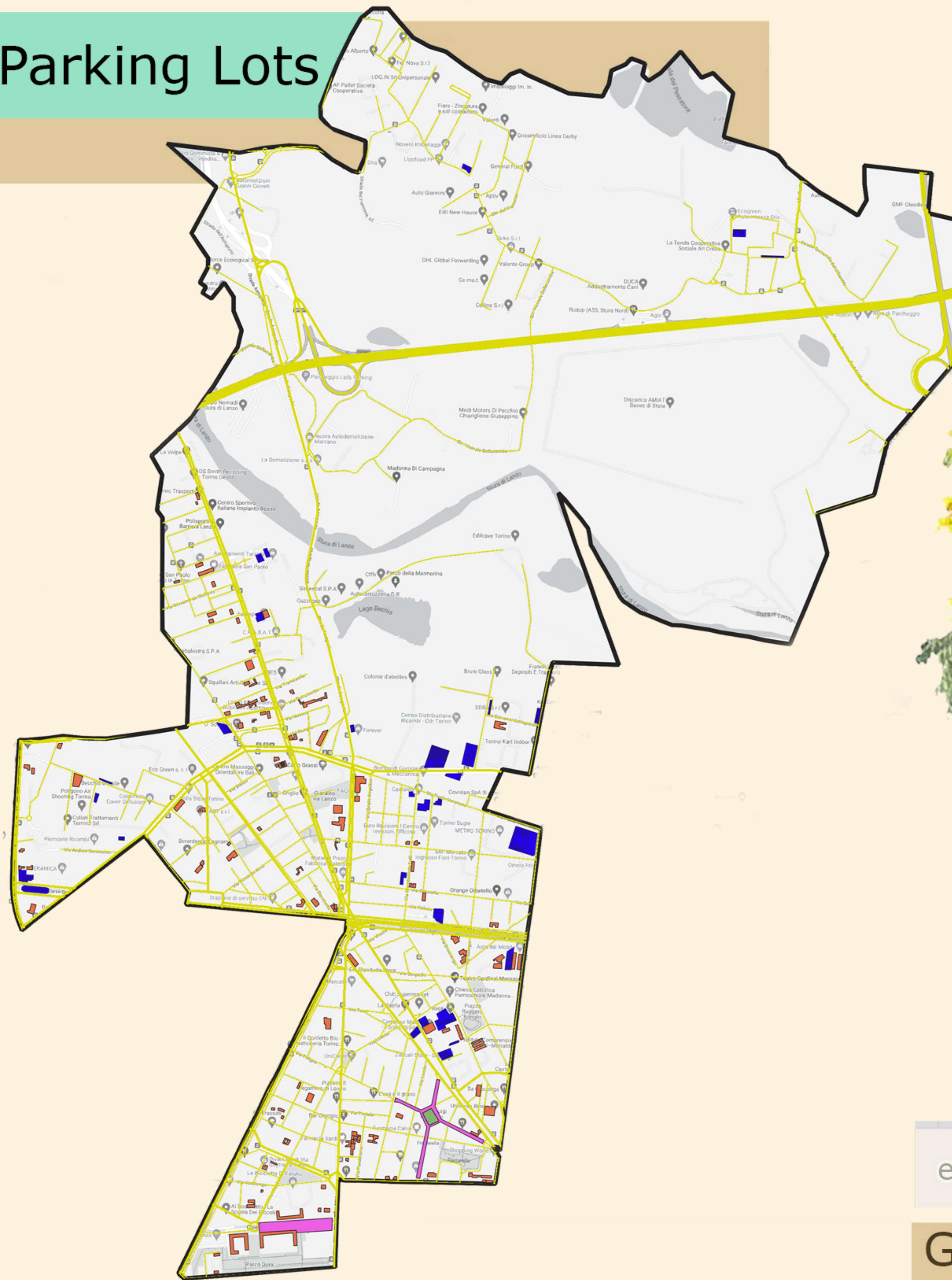
<https://gardenholic.com/cheap-walkway-ideas/>

# District 16\_Madonna di Campagna

## Transforming Parking Lots

### SOLUTION

2



### DETAILS of Floor

<https://landezine-award.com/roche-campus-kaiseraugst/>



elaborated by ourselves

Green shelters in the parking lots to steer the water towards to the permeable ground

### The BENEFITS Of Green and sustainable parking lots:

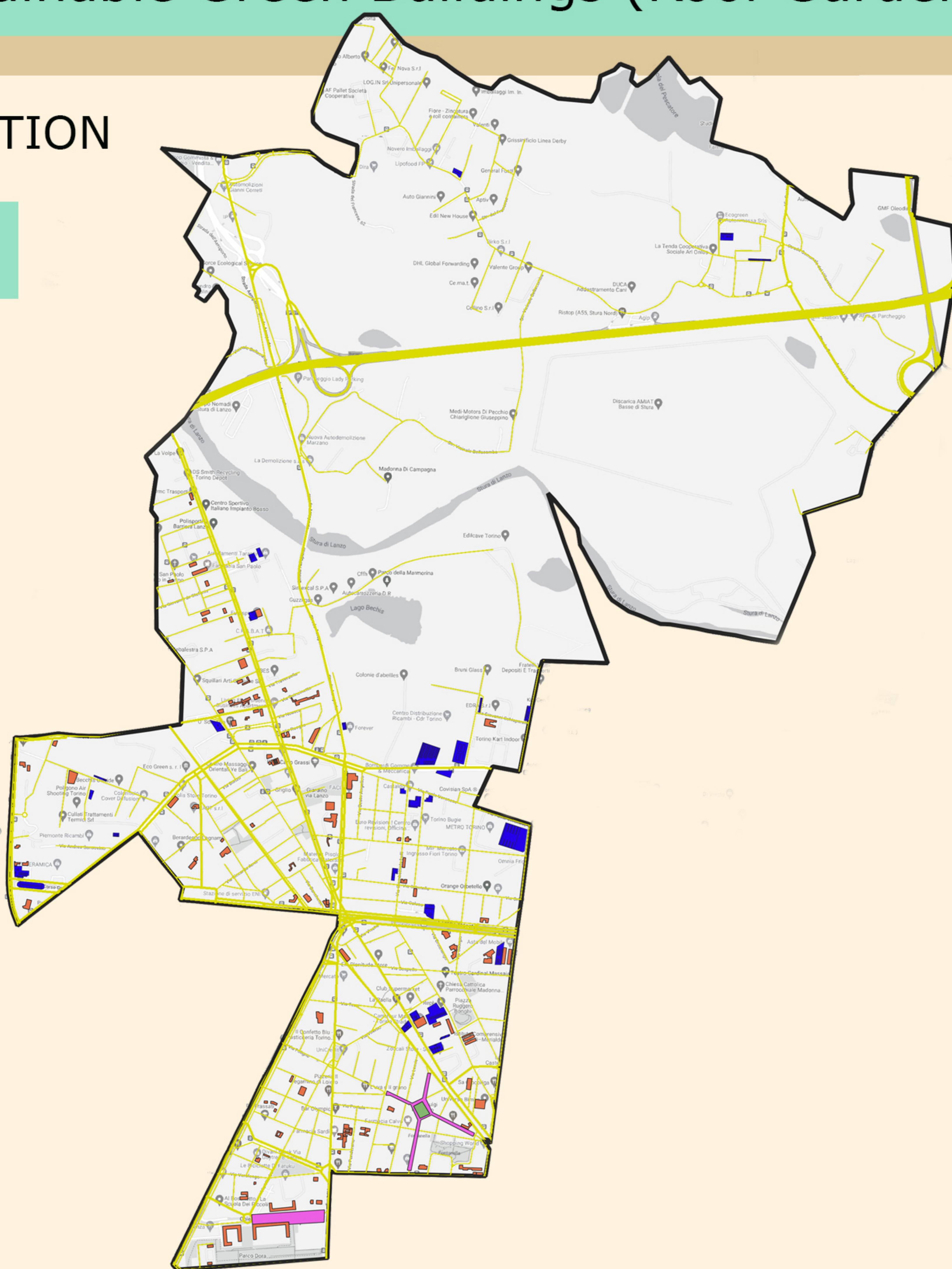
- Integrate into the surrounding built and natural environment
- Manage water as a resource by promoting infiltration and natural retention system.
- Protect local water quality through effective filtration and biological systems.
- Minimize the heat island effect through effective shading and alternative pavement material.
- Conserve energy usage and encourage the placement of sustainable energy infrastructure.
- Provide safe walkways.
- Use land more efficiently.

# District 16\_ Madonna di Campagna

## Sustainable Green Buildings (Roof Gardens)

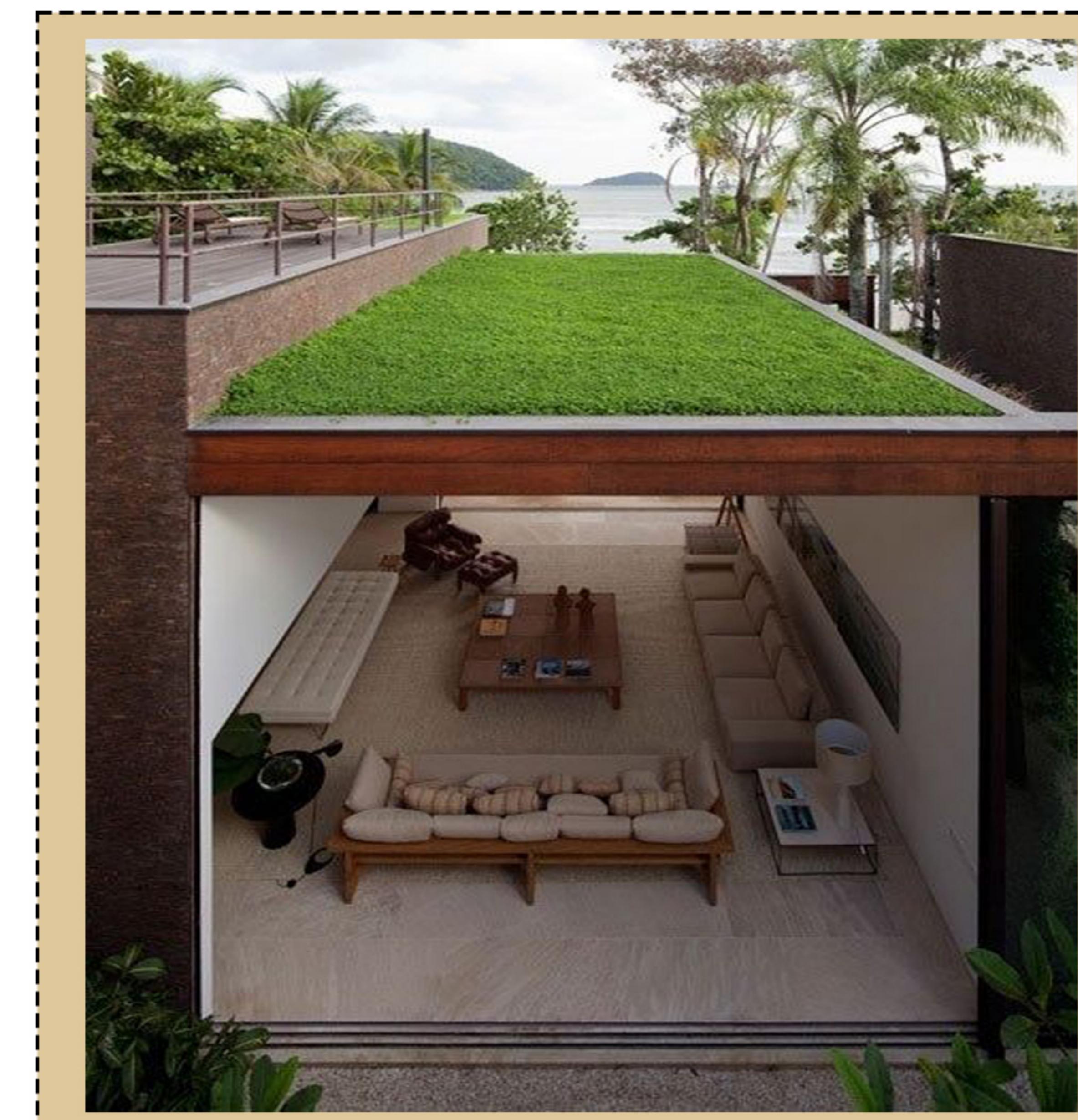
### SOLUTION

3



### The BENEFITS of Green and Sustainable Parking lots:

- Green Roofs and Roof Gardens Retain and Manage Stormwater
- A Roof Garden Insulates Against Heat and Cold
- Improve Air Quality
- Elevated Gardens Modify Urban MICRO-CLIMATES
- Roof Gardens Provide Diverse Habitats



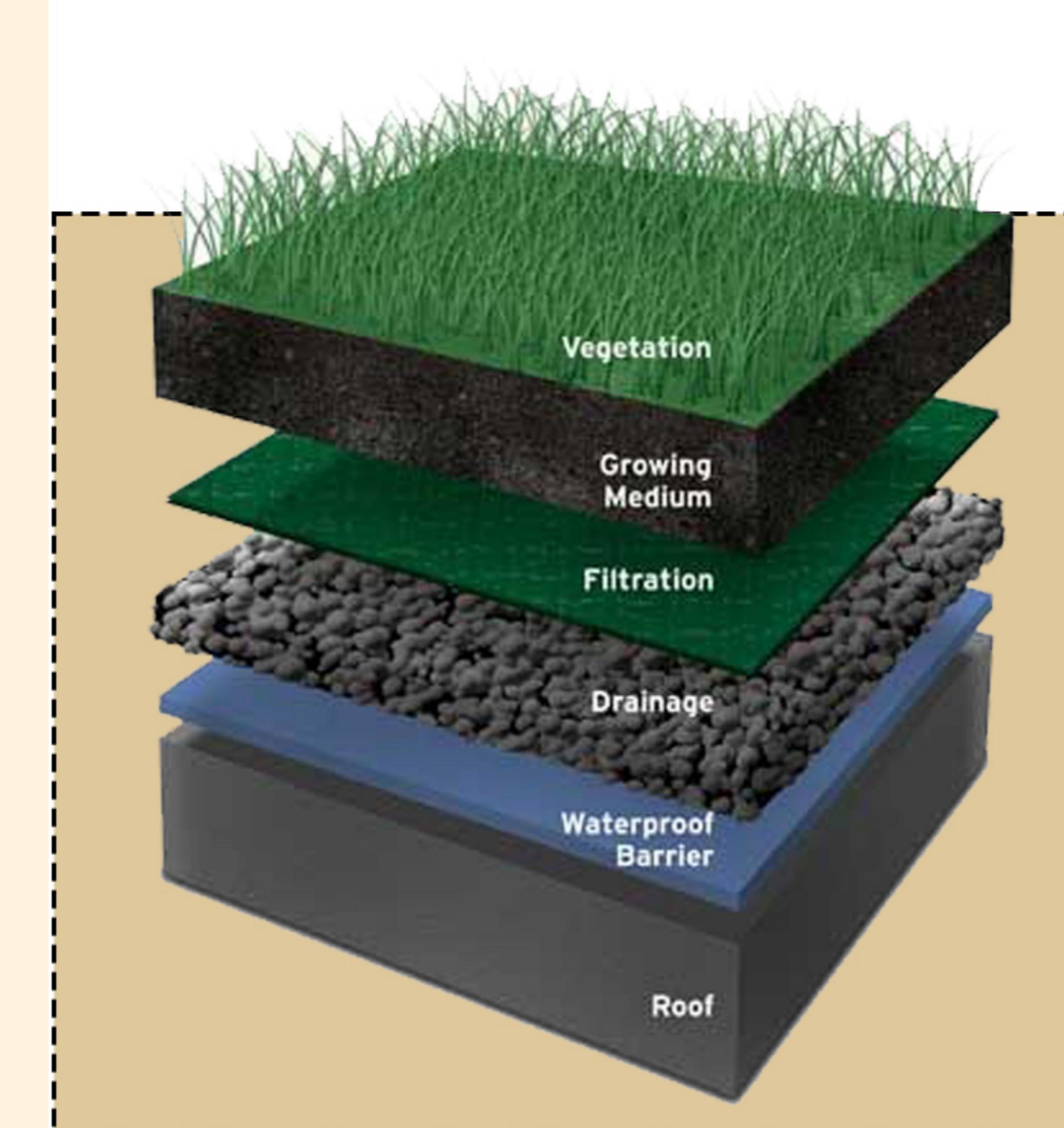
Type A

<https://www.architectureartdesigns.com/30-incredible-green-roof-designs/>



Type B

<https://www.archdaily.com/421607/green-screen-house-hideo-kumaki-architect-office>



Detail of Green Roof



elaborated by ourselves

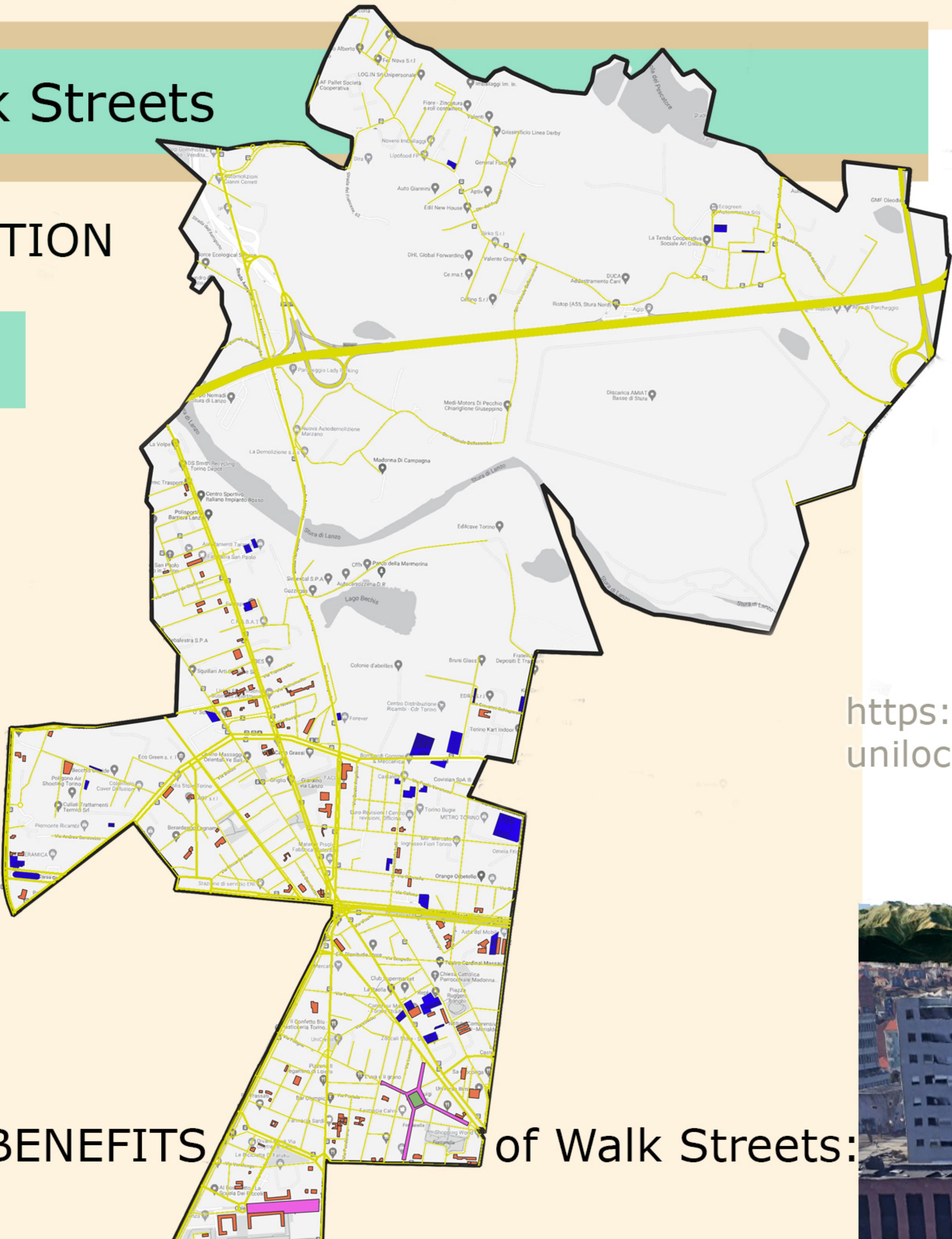
<https://www.birlaa1.com/urban-rooftop-garden.html>

# District 16\_ Madonna di Campagna

# Walk Streets

# SOLUTION

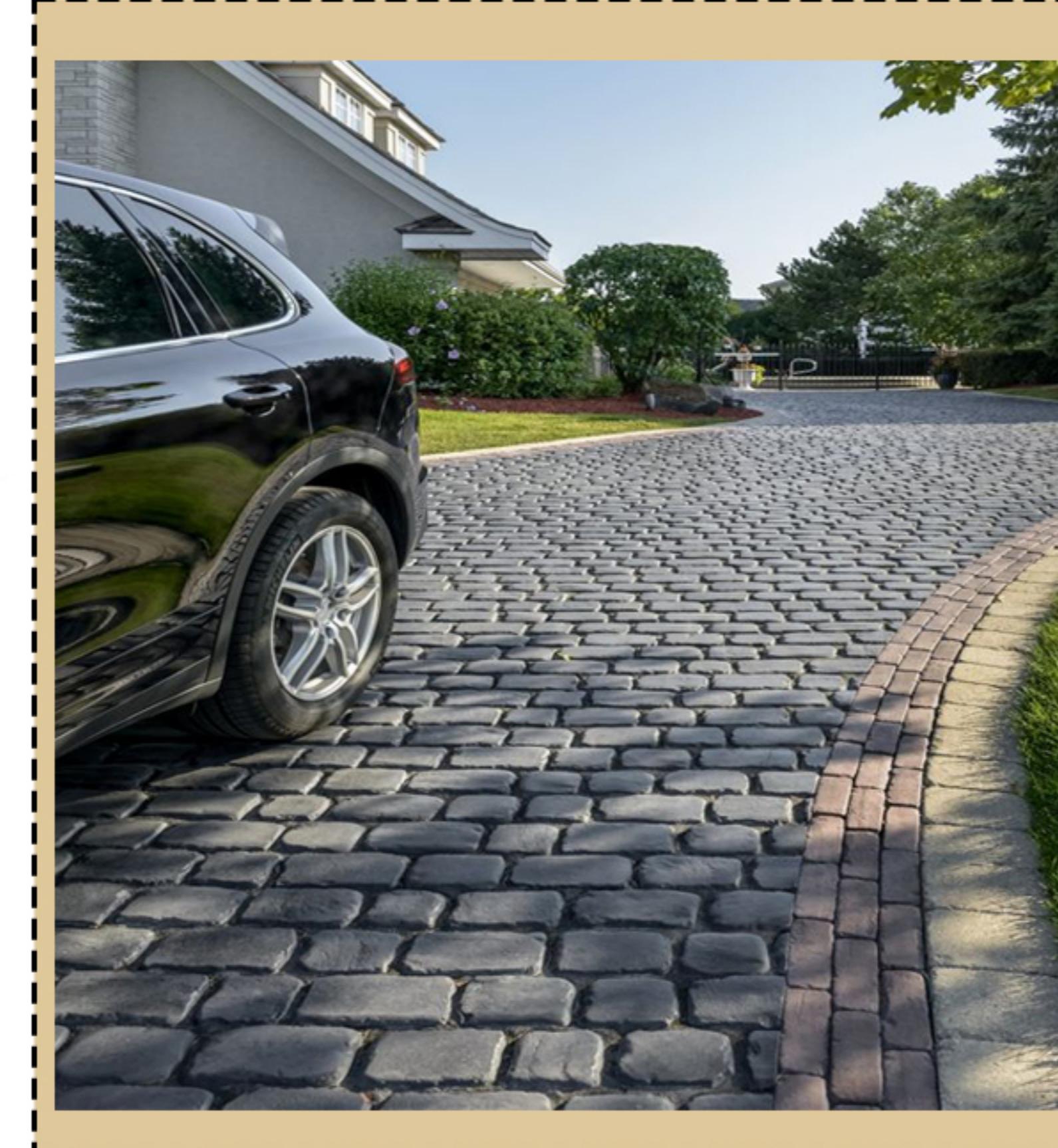
4



# The BENEFITS of Walk Streets:

- Increase accessibility for all street users
  - Provide open space in areas that are lacking
  - Minimize impact on global climate change and local air pollution
  - Minimize stormwater pollution and combined sewer discharges

# Stone Pavement Street



<https://www.houzz.com.au/photos/unilock-driveway>

# Stone and Grass Parking lot



<https://www.gardenista.com>



elaborated by ourselves



<https://www.google.com/maps/place/Walhalla+Lego+specialist>

# District 16\_ Madonna di Campagna

## Full Depth Permeable Pavement Shoulder Design

### SOLUTION

5

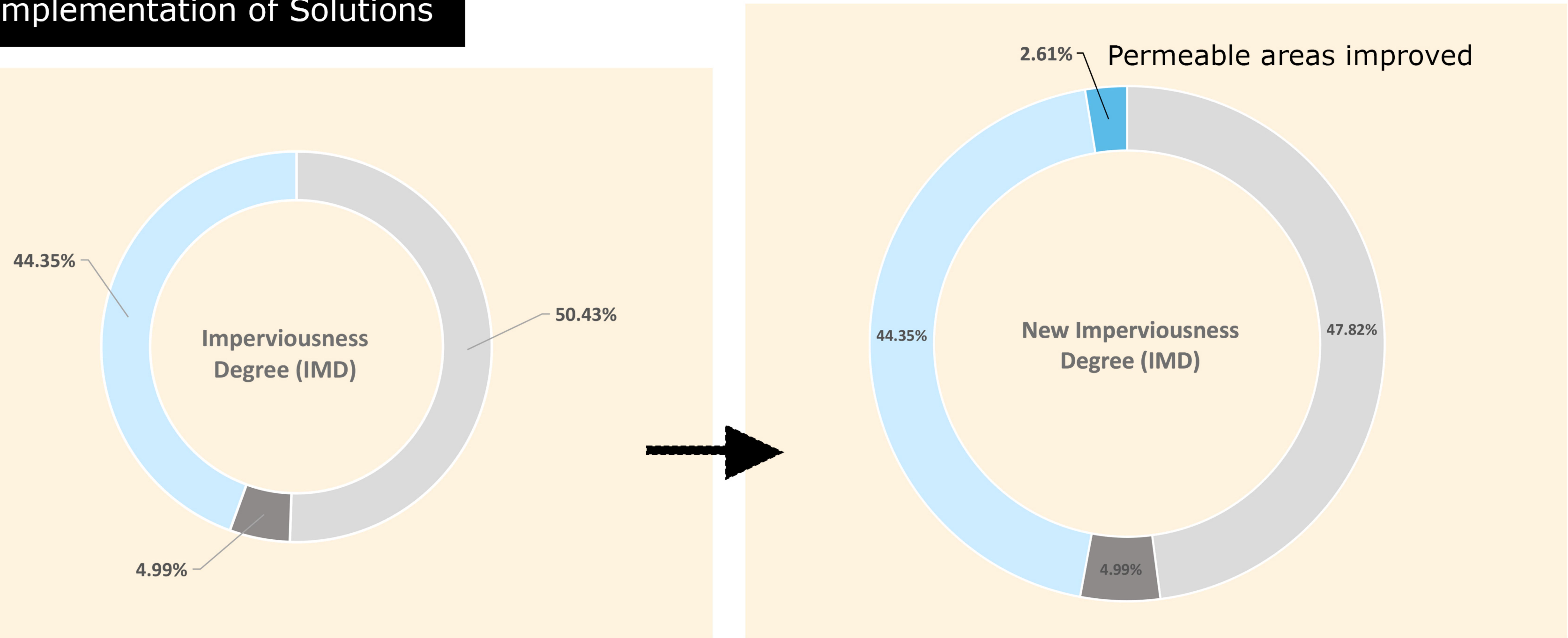


elaborated by ourselves

### The BENEFITS of Full Depth Permeable Pavement Shoulder Design

Parameter	Impacting factor	Full depth permeable pavement (FDPP) <sup>a</sup>	Conventional pavement
Construction	Structural capacity	Low	High
	Vertical permeability	High	Very low
Hydrologic	Water storage	High	Very low
	Surface over flow	Low	High
Environmental	Pollution type	Point and non-point source <sup>b</sup>	Point and non-point source <sup>b</sup>
	Pollution level	Low	High
Energy	Noise level	Low	High
	Heat island effect	Medium	High
Economic	Initial cost	Medium/high <sup>d</sup>	Low <sup>d</sup>

## Implementation of Solutions



## Implementation of Solutions Calculation

Solutions Ordered by Possibility		Area (sqm)	Intervention Ratio (%)	Final Intervention Area (sqm)	Relative to Total Area (%)
Solution 1	Recreation of Green Socialized Neighborhood Parks	2,653.76	100	2,653.76	0.03%
Solution 2	Transforming Parking Lots	58,032.26	Variable	17,672.93	0.17%
Solution 3	Sustainable Green Buildings (Roof Gardens)	68,630.86	100	68,630.86	0.67%
Solution 4	Walk Streets	29,412.23	100	29,412.23	0.29%
Solution 5	Full Depth Permeable Pavement Shoulder Design	744,321.87	20	148,864.37	1.46%
Total New Permeable Areas				267,234.15	2.62%