

(D)rain for Life project

SUDS in existing urban context: case study Võru, Estonia

Jekaterina Balicka, Gen Mandre, Ottar Tamm
Estonian University of Life Sciences



Vihmapeenar /
raingarden



Linking Estonia and Latvia
Part-financed by the European Regional Development Fund



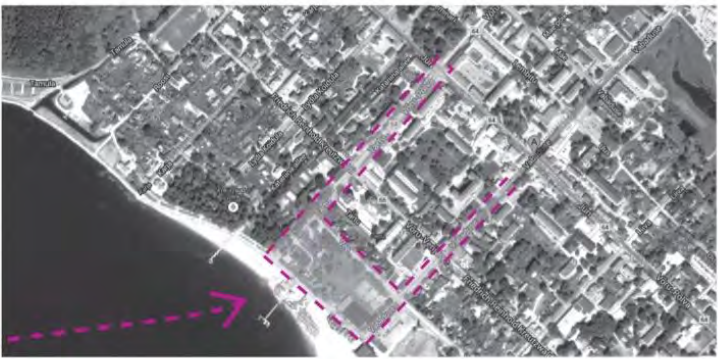
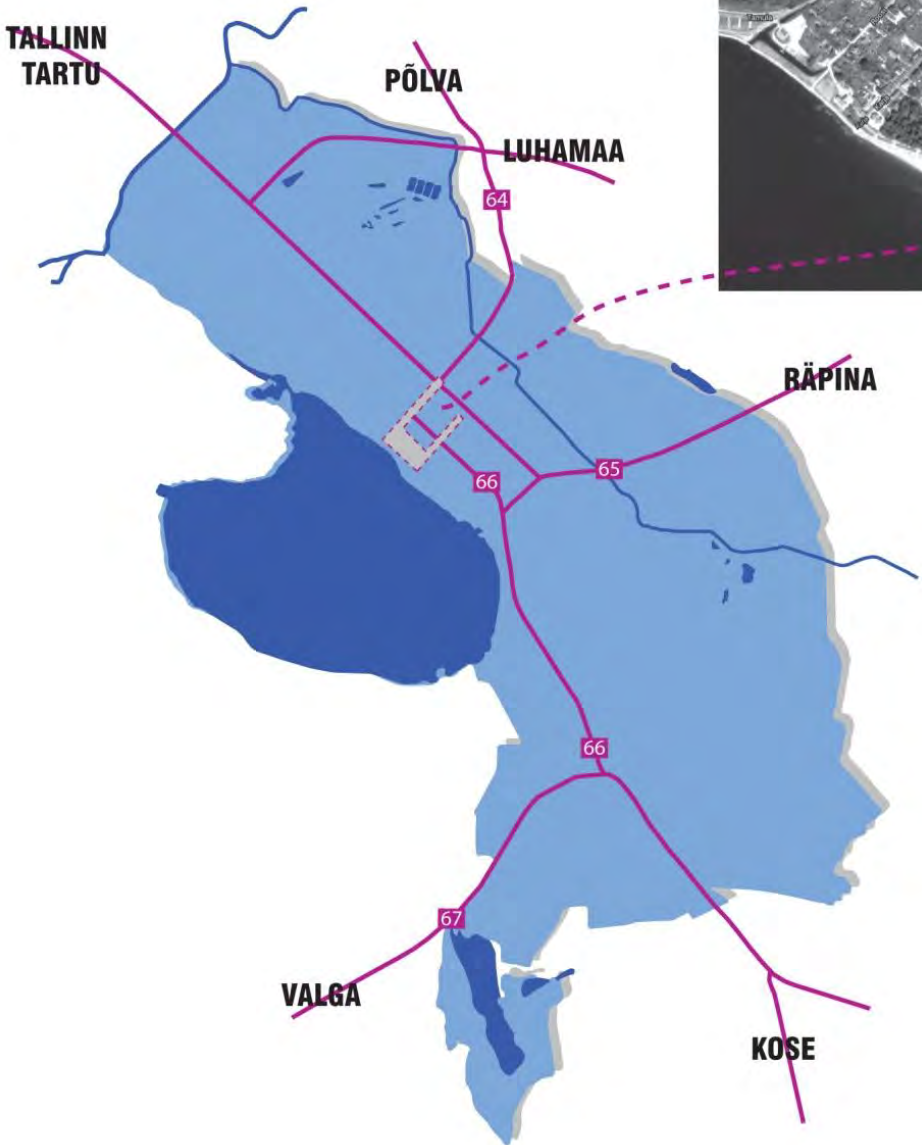
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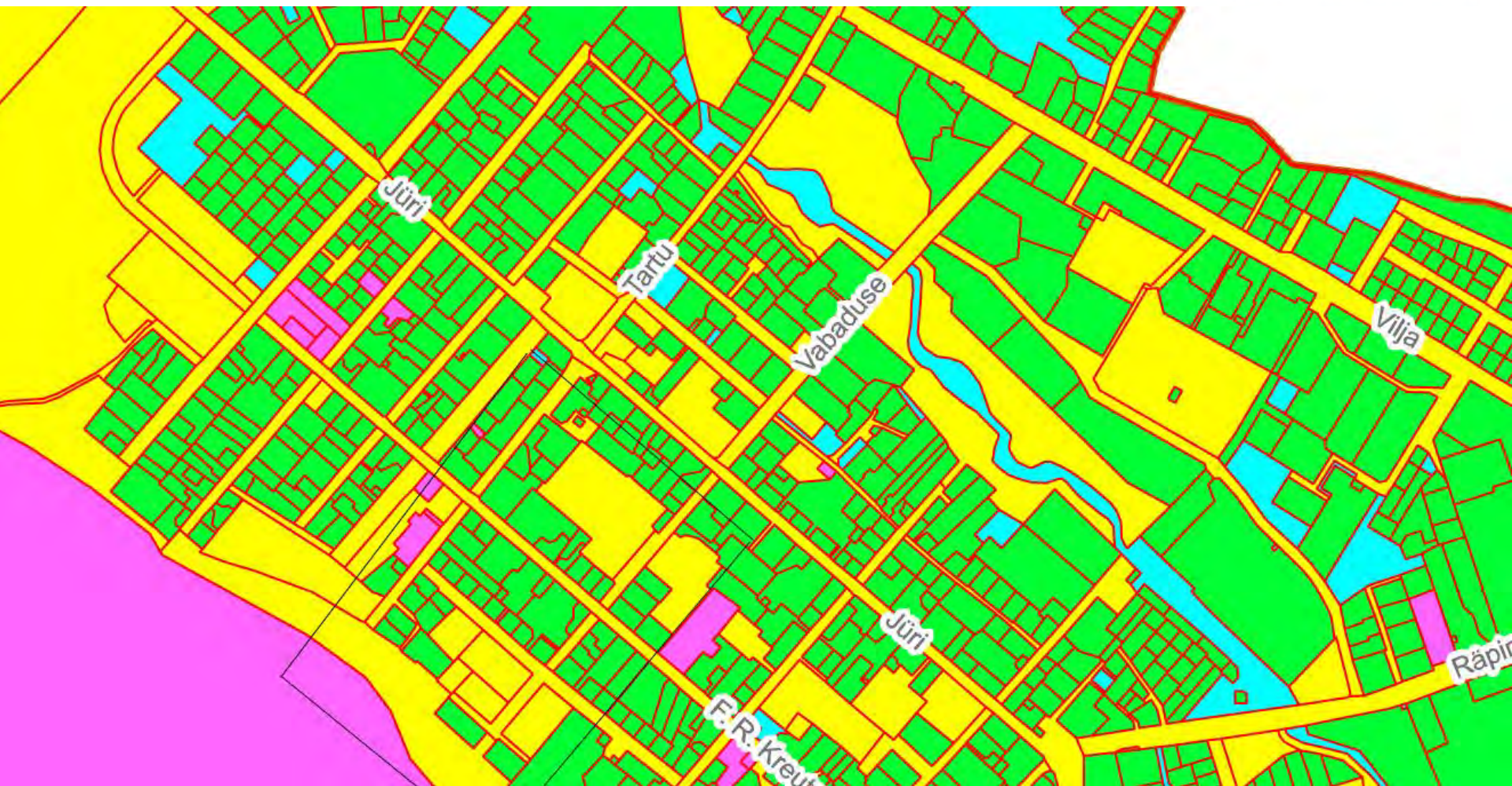
Location in the context of Estonia







Location of case study area

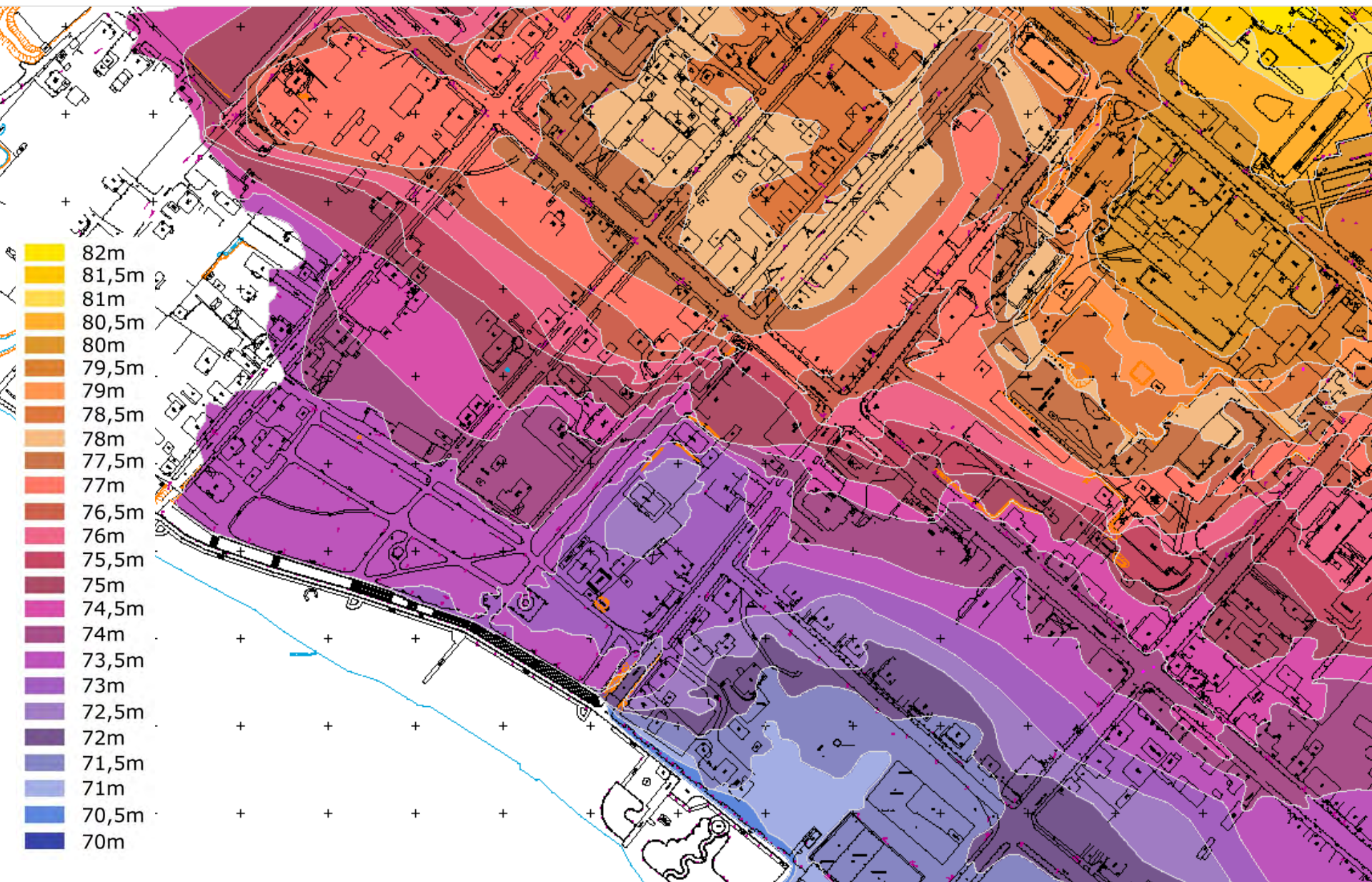


Land ownership



-  Private land
-  Municipal land
-  Public land
-  Unreformed public land

Terrain



Tartu street



Problem with stormwater and melting water caused streets and beach erosion

In case of extreme rain event rainwater causes the flooding of the street and enters the lake unpurified



Vabaduse street



In case of extreme rain event rainwater causes the flooding of the street and area between Tartu and Vabaduse streets in the lower part of the area



Challenges

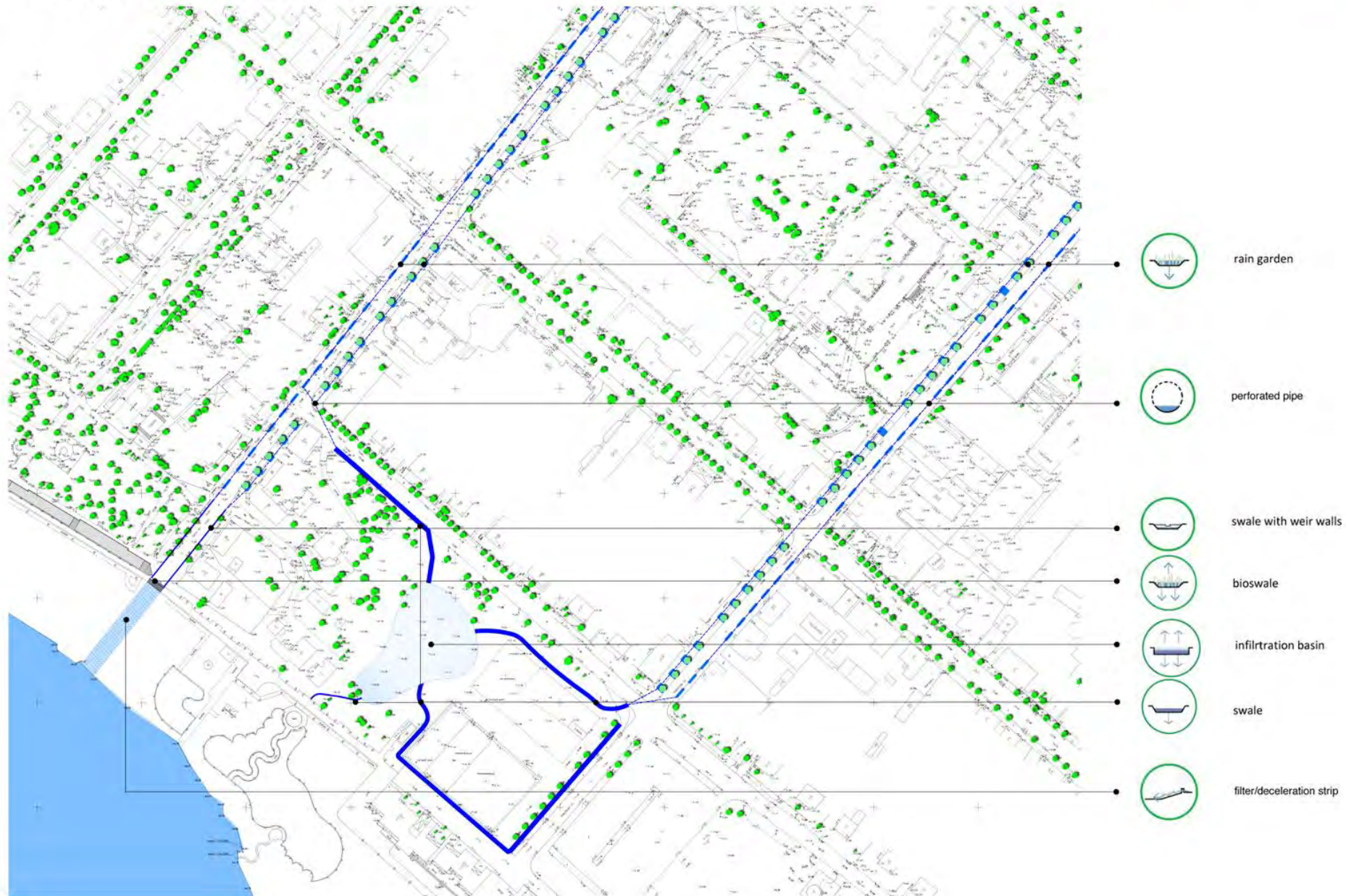
- Varying groundwater level
- Low infiltration capacity due to the high number of surfaced area
- Polluted runoff (salt, traffic pollution) enters the lake unfiltered
- Erosion

Needs

- Runoff delay to increase evaporation and infiltration
- Runoff water purification
- Instruments to stop erosion
- Instruments to stop flooding

IMPLEMENTING SUDS SOLUTIONS IN VORU

GENERAL PLAN. scale 1:2000



1. Raingardens

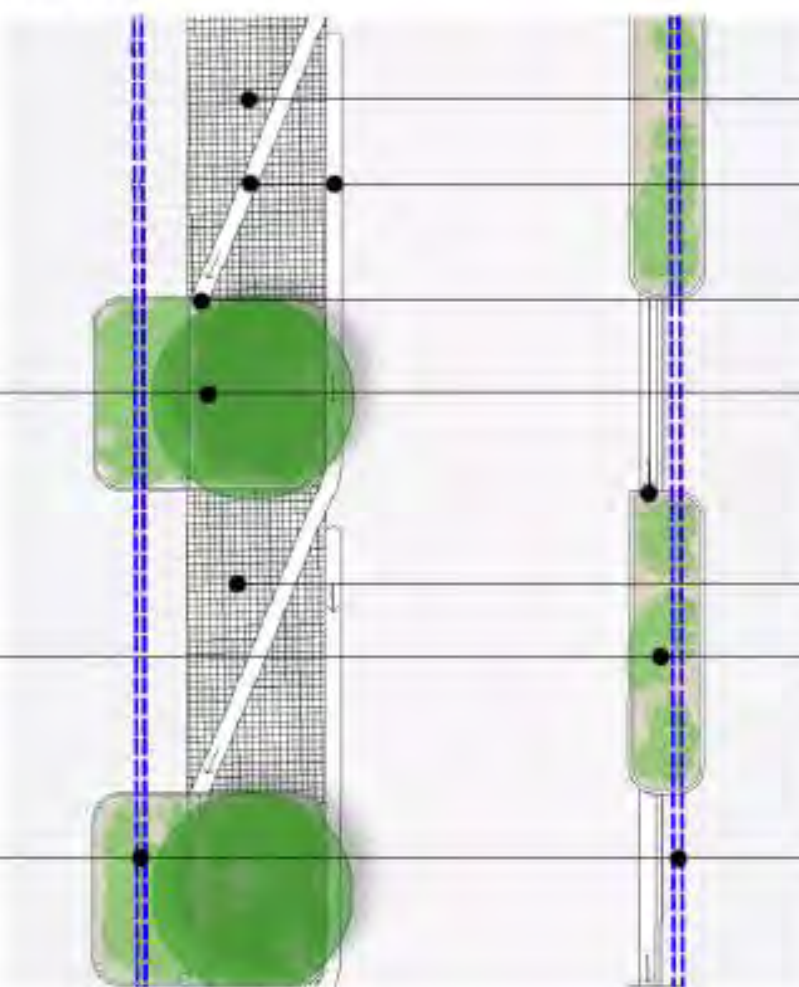


1. Raingardens

TARTU ST. PLAN
Scale 1:1000



PRINCIPLE DETAIL OF RAINGARDEN SYSTEM
Plan view



pervious
pavement

pavement
stone
channel

raingarden
inlet

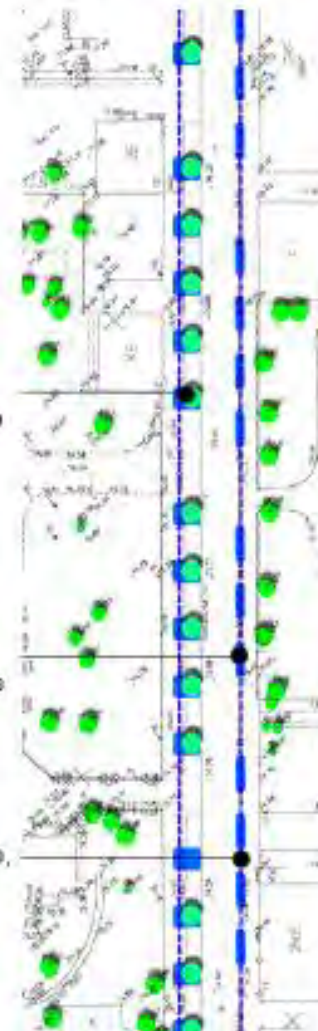
raingarden
type1, with two
sections

parking

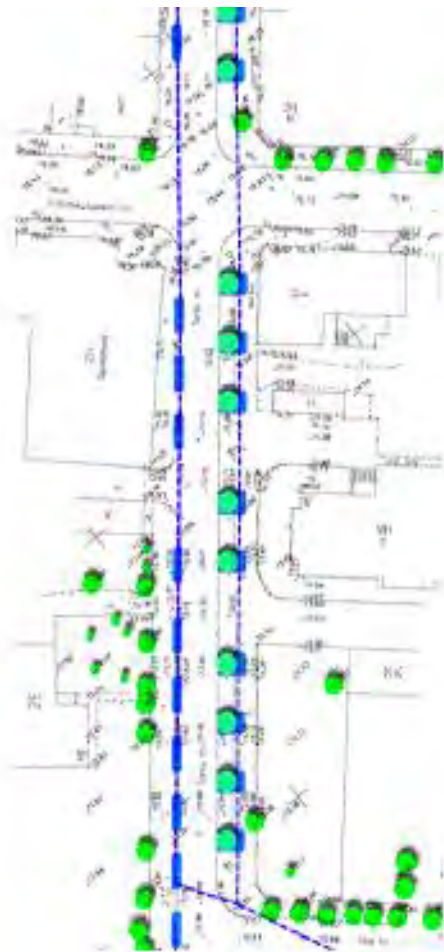
raingarden
type2, with one
section

perforated pipe,
100mm

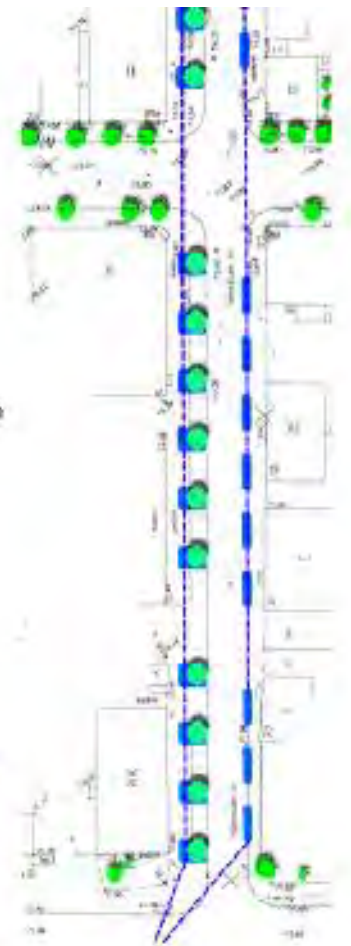
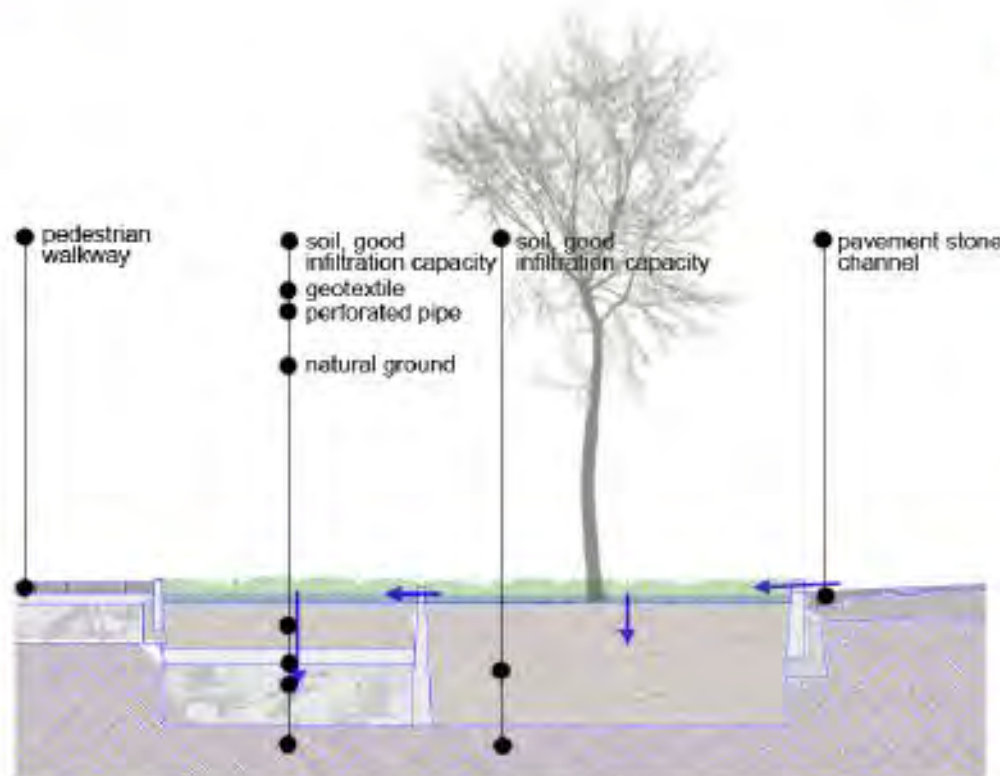
VABADUSE ST. PLAN
Scale 1:1000



1. Raingardens



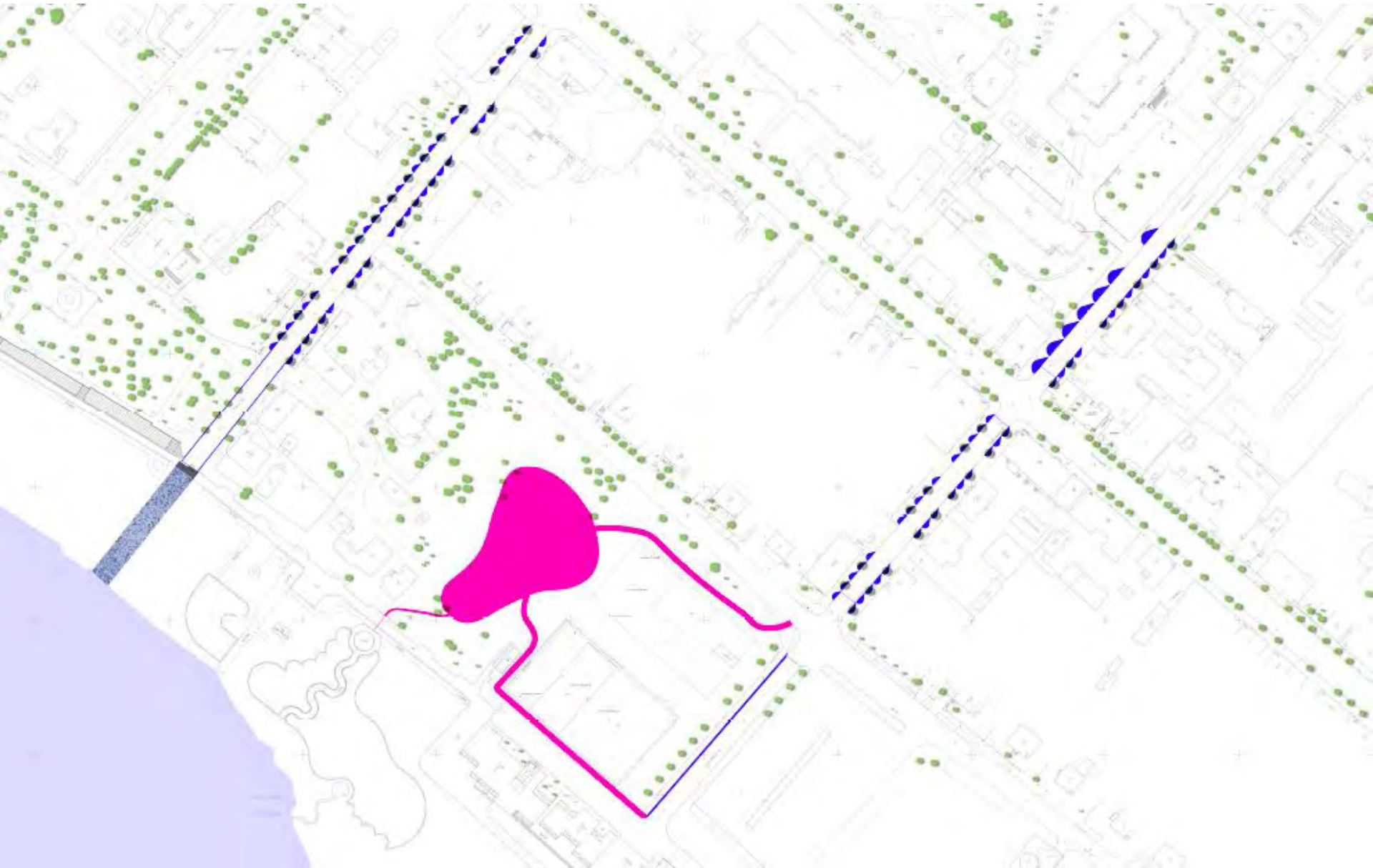
PRINCIPLE DETAIL OF RAINGARDEN SYSTEM Section



2. Open vegetated drains



3. Dry infiltration basin and system of ditches



4. Cobblestone stripe





(D)rain for Life project

SUDS in context of planned urban development: case study Pärnu, Estonia

Jekaterina Balicka, Gen Mandre, Ottar Tamm
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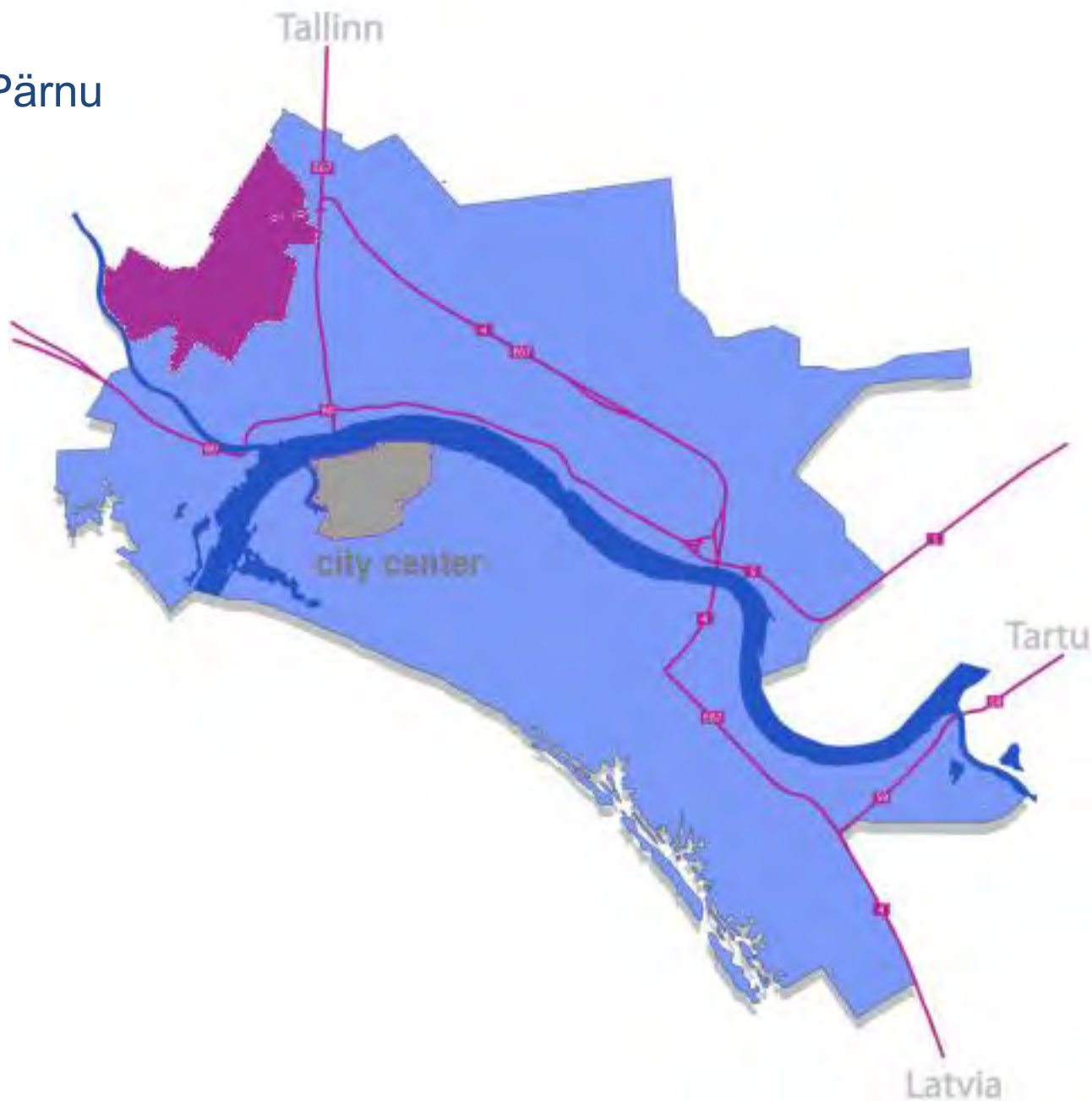
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Location in the Estonia context



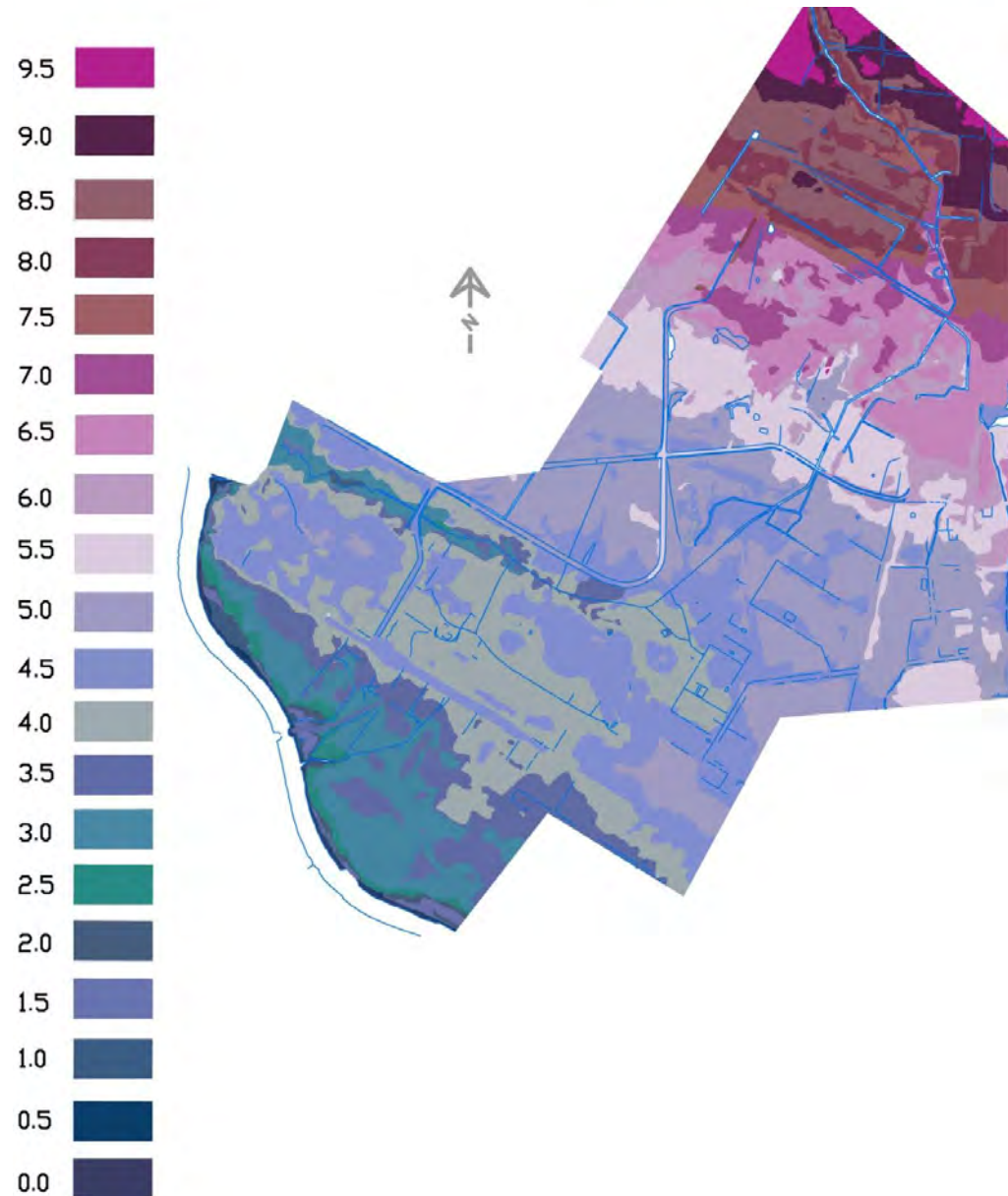
Main directions and characteristics of Pärnu

- ‘Summer Capital’ of Estonia
- Area 32,2 km²
- Population 42 435 (2012)
- Distances :
 - Riga – 182 km
 - Tartu – 170 km
 - Tallinn – 129 km



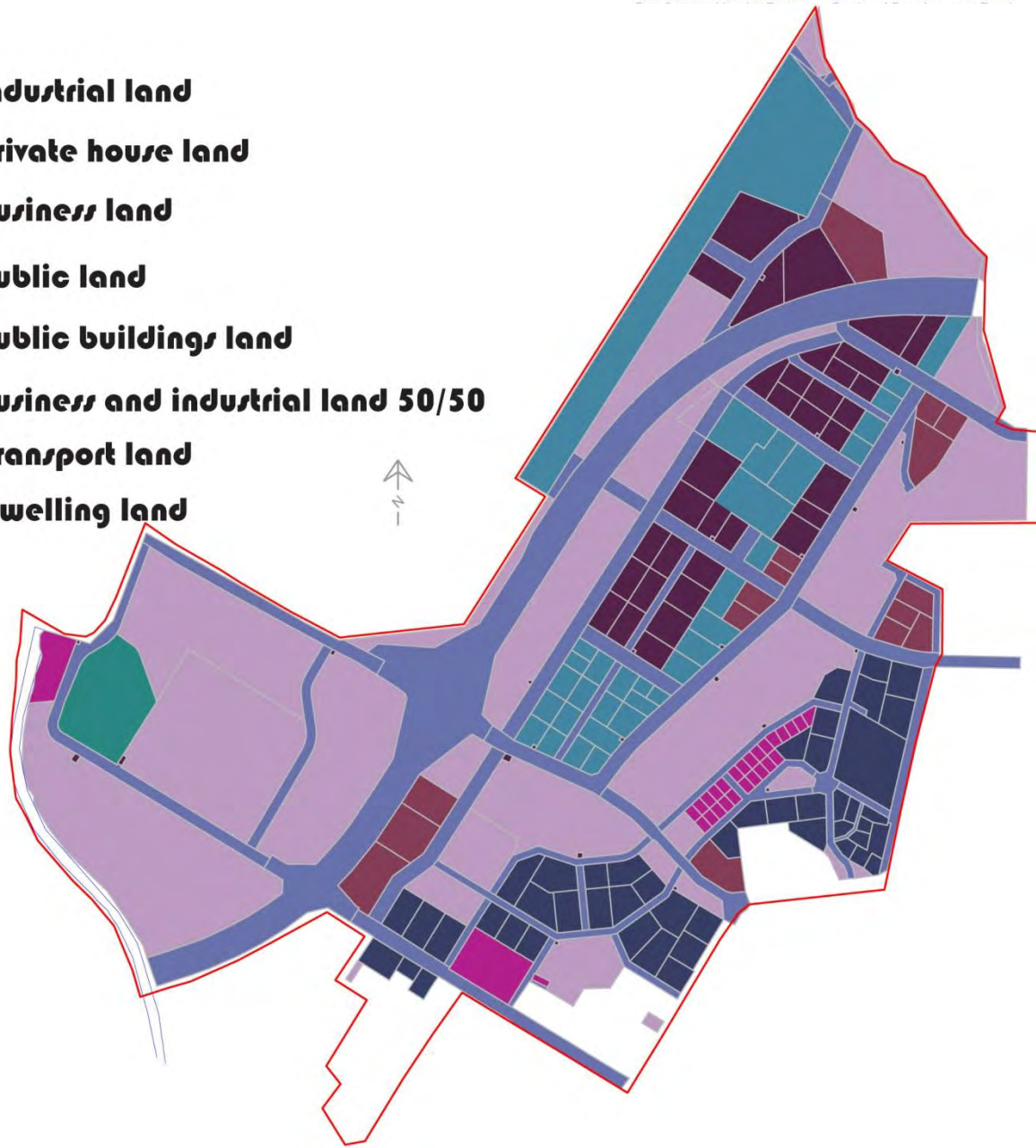
Surface and ground water

Top layers of a natural surface are mainly sandy soils. The investigated area is located at the coastal lowland, where natural ground is relatively flat sloping towards the south-west. Ground water level at the case study area is relatively high through the year, because of the flat terrain and specifics of the soil layers. According to the field study conducted in March 2005 the ground water level was measured as an average of 0.6 - 0.8 m. During rain period ground water level may rise to the ground at most of the area.



PLANNING SITUATION

The Master plan for the North-West Pärnu development area was ordered by Pärnu city municipality and developed by the company OÜ Tinter-Projekt in 2008. The study and project proposal of the Estonian University of Life Sciences for the (D)rain for Life project is based on this master plan.



The area development concept as a case study for the (D)rain for Life project



Since the Master plan detail level wasn't sufficient for the cost-benefit analysis implication, the project aim was to concentrate on the two development blocks with different land-use functions

The area development concept as a case study for the (D)rain for Life project



IMPLEMENTING SUDS SOLUTIONS IN LOODE PÄRNU

DWELLING AREA

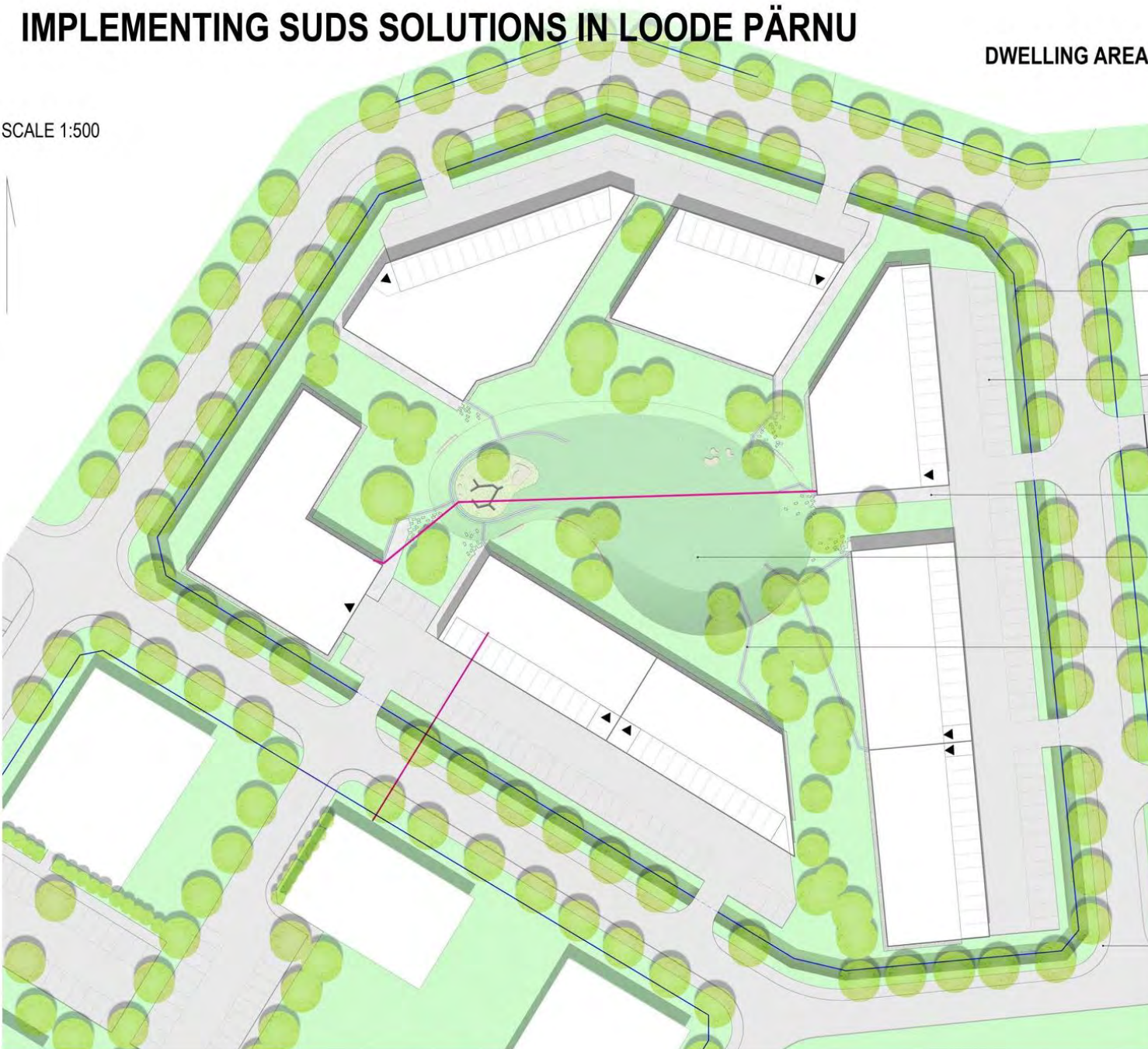
SCALE 1:500

LEGEND

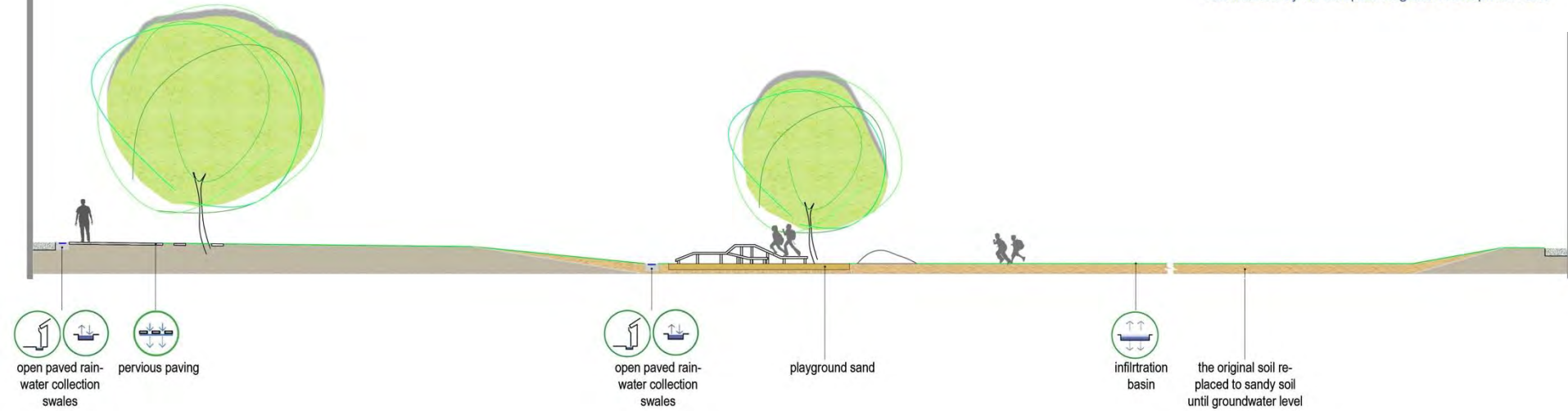
- 

 infiltration trench/ bioswale
- 
 pervious paving
- 
 pervious paving
- 
 infiltration basin
- 

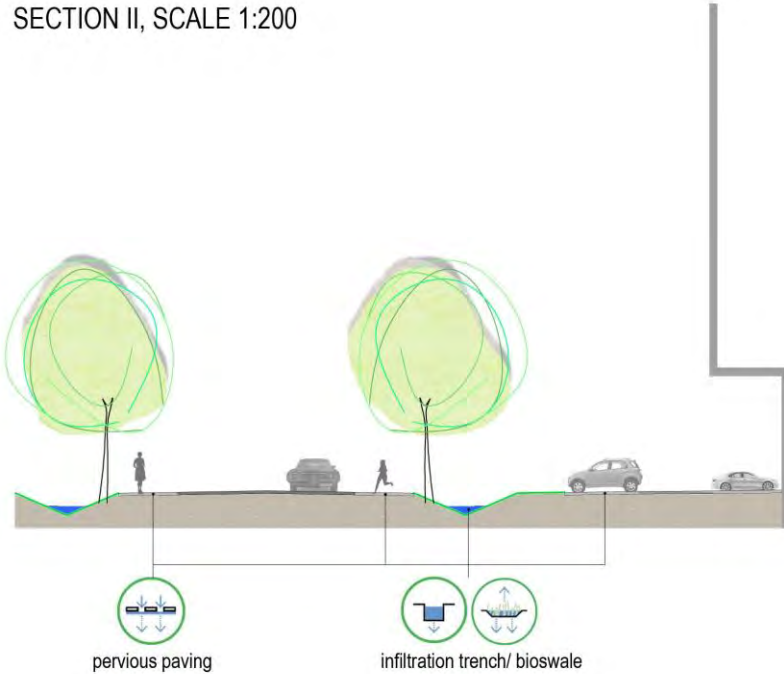
 open paved rainwater collection swales
- 
 pervious paving



SECTION I, SCALE 1:200



SECTION II, SCALE 1:200



infiltration basin



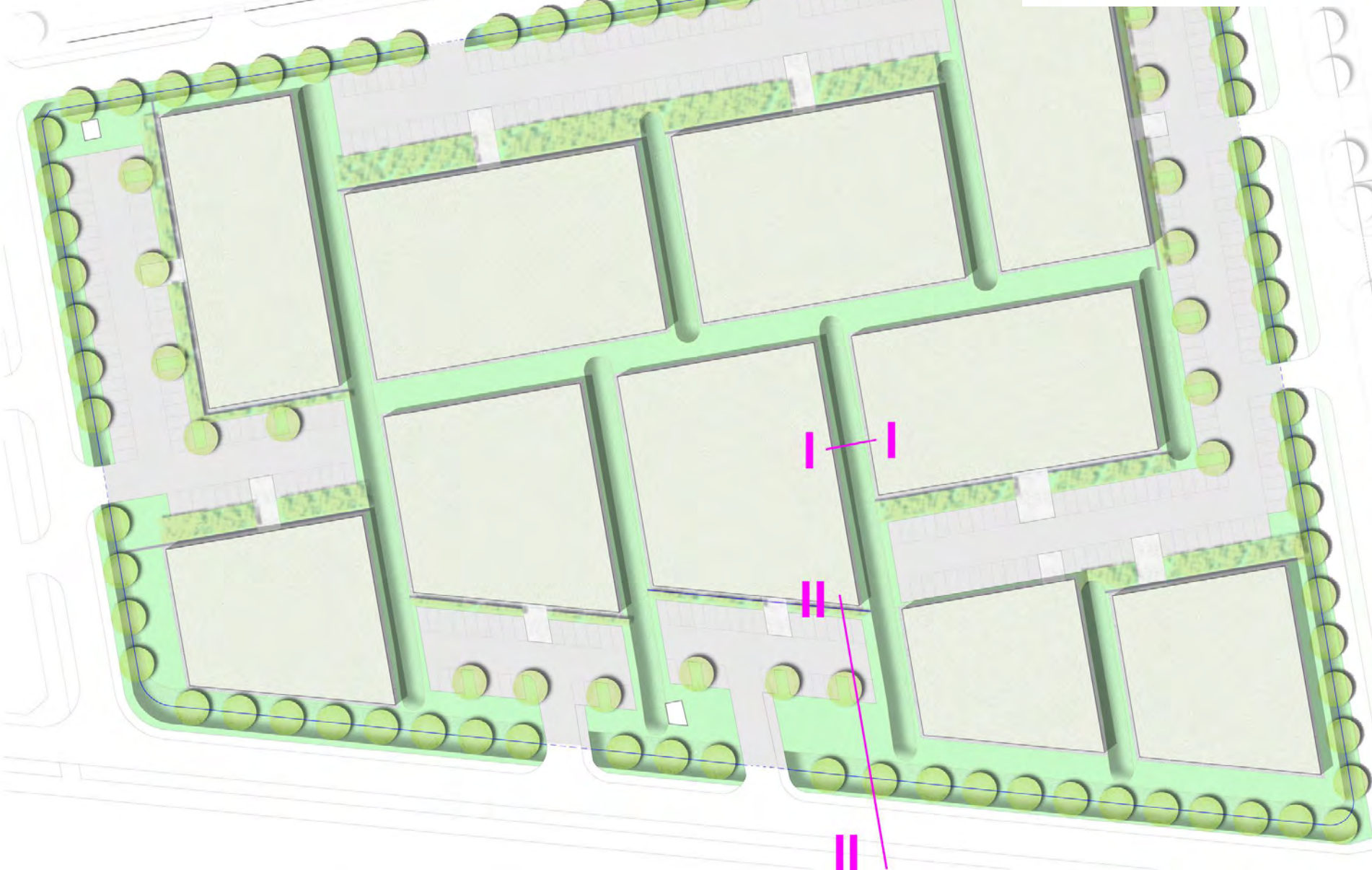
open paved rainwater collection swales



IMPLEMENTING SUDS SOLUTIONS IN LOODE PÄRNU BUSINESS/INDUSTRY PARK AREA



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SECTION I 1:200



rain garden

SECTION II 1:200



open paved rain-
water collection
swales



pervious paving



bioswale



pervious paving

The maximum of the area in this design proposal is dedicated to the SUDS purposes:

- The area between the buildings is occupied by vegetated raingardens, which should collect the stormwater from the roofs;
- The area of the parking is covered with the pervious pavement, which is angled to the side of the street;
- The raingardens are connected through the overflow with the swale, which is embracing the development block and collecting both, the water from the car traffic areas and the overflow water from the raingardens. The swale is connected with the pipe to the main pond.

(D)rain for Life project

Project team of Estonian University of Life Sciences:

Valdo Kuusemets, project leader valdo.kuusemets@emu.ee

Gen Mandre, project manager gen.mandre@emu.ee

Jekaterina Balicka, landscape architect jekaterina.balicka@emu.ee

Ottar Tamm, researcher ottar.tamm@emu.ee

Lauri Lokko, researcher lauri.lokko@emu.ee



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