Reconstruction of the Lepiku channel in Tallinn's Botanic Garden, Estonia

Year of issue

2025

Summary

Reconstruction of the Lepiku channel that is a part of the drainage system, which starts from the new residential area next to the Tallinn Botanic Garden and includes wetlands, detention ponds, ditches and channels and debouches into Pirita river. The aim was to improve the quality of the storm water that flows into the Pirita river. The river Pirita is a part of Natura 2000 site and flows into the Baltic Sea. The length of the reconstructed channel part is ca 195 m and the works included: widening of channel bottom in different segments, creating artificial dykes and rapids and creating suitable conditions to the aquatic plants exhibits in Botanic Garden.

Photo Gallery



Location

59.4822, 24.8764

Project

NWRM

National ID

Estonia_03

Sector

Urban

Installation Date

2015

Implementation status

Completed

Overview

Location of the project

Near Kloostrimetsa Road, Tallinn, Estonia. Near Palmhouse of Tallinn Botanic Garden.

Country

Estonia

NUTS2 Code

Eesti

Sponge measures implemented in the case study

Channels and rills

Wetland restoration and management

Ponds and scrapes

Objectives

1. The aim was to improve the quality of the stormwater that flows into the Pirita river
2. Pollutants Removal – to create a natural purification process in order to decrease the quantities of particles in the water
3. To show citizens privileges of a watercourse – water elements diversify nature and bring recreational values

Involved partners

Authority type	Authority name	Authority role	Comments
Other	1. Tallinn Environment Department	Initiation of the measure	Tallinn city Environment department
—	2. Tallinn University	Other	Carried out a survey in coastal parishes (in Baltic countries) with the aim to find out the attitude of people towards environmental protection measures and their practice

Authority type	Authority name	Authority role	Comments
—	3. Construction company	Implementation	Construction works ordered by Tallinn Environment Department
—	4. Tallinn Botanic Garden	Other	Getting reconstructed channel in their territory
—	5. Citizens of Tallinn	Other	Getting new information
—	6. 4People OÜ	Determination of design details of the measure	Innovative approach, all design was made by Gen Mandre from 4people OÜ (www.4people.ee). He is also involved in the project “(D)rain for Life” which is concentrated on Sustainable Urban Drainage Systems (SUDS) - http://drainforlife.eu/index.php/en/).

Site Information

Climate Zone

Cool temperate moist

Precipitation

695.00 mm

Temperature (°C)

6.50 °C

Elevation range

30

Vegetation class

Cultural landscape (botanic garden area where near the channel are different plants)

WFD Ecological status

Good

WFD Chemical status

Failing to achieve good

Water quality status

Pollution from surrounding housing area

Design and Implementation

Project scale

Micro

Project scale specifications

Regional, metropolitan and urban level

Project area

200 m

Size

195.00

Size unit

m

Principles

Local plants cleaning the water

Constraints

Ensuring the slopes of the channel; to create a natural purification process in order to decrease the quantities of particles in the water.

Favourable preconditions

The aim for Tallinn Botancal Garden was reorganisation of the channel section. And not just cleaning the channel and ensuring banks but while doing it to keep in mind water purification, water regime regulation and aesthetic appearance. Aim was to design a modern, eco-friendly and not very costly solution, which would set a good example for the other channels and trenches in Tallinn. Maybe to change the the way of thinking to solve the problem through hiding water into the pipe underground instead bringing it visuable in the channel on the ground.

Financing

Total cost

114595.00 €

Total cost information

Usaually LIFE+ cofinancing is 50% but in agreement the share was raised based on the co-financing of Finnish MoE to 84,91% which left to City of Tallinn co-financing share of 15,09 %

Costs investment

35000.00 €

Costs investment information

Reconstruction works including materials and designn

Financing authorities

Authority name	Type of funding	Comments	Financing share
European Union	EU-funds: LIFE+	LIFE+ project “Benchmarking water protection in cities – CITYWATER” (LIFE 11 ENV/FI/000909)	84,91 %
City of Tallinn	Local funds	—	15,09 %

Compensations

No

Policy and Governance

Policy description

There are in total 9 ponds in the territory of Tallinn Botanic Garden, some of them feed on springs and the water collected in the Botanic Garden´s territory but most of the water is coming from Lepiku channel (catchment 150,4 ha). Most of the ponds were built in 1963-1965 on channels that existed before. The Lepiku channel that is feeding the ponds of Botanic Garden has not been cleaned for years. Additionally the channel is partly closed to pipes which hinder water runoff and self-cleaning of water. The ponds have been cleaned and the banks been fixed depending on financial possibilities.
In last ten years it was noticed that in the years that were warmer and had less precipitation the water started to “bloom” – satiated with different algae and aquatic plants were proliferating which refers to nitrogen and phosphorus compounds’ inflow from Lepiku channel catchment where a lot of new buildings have been built. It is also possible that the bottom of one pond is polluted by fuel oil that that was flowing in there from a boiler house that was situated in the bank of the pond in 1980s.
That meant that excessive amount of suspended solids, nitrogen and phosphorus compounds and possibly oil products end up in the gulf of Finland that is 2,5 km away via Pirita river.

Land ownership

Tallinn city

Policy targets

Pollutants Removal

Target remarks

Reduce nutrition flow to the salmon river Pirita

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name	Comments
Local	Water	Development plan of Tallinn 2009-2027	5th main objective: citizen of Tallinn connecting sustainably home, work and rest – Tallinn with cosy, inspiring and environmentally sustainable urban space, 5.4 Technical infrastructure services are of high quality, available for residents of the city and meet the safety and environmental protection requirements Measure 2: guaranteeing channelling of storm and surface water
Local	Water	Tallinn Environmental Strategy 2030	Point 2.3.1.3.(Coastal waters) states that the aim is to restore the ecological balance in marine environment and guaranteediversity of nature and achieve in necessary water quality in the recreational areas. Point 2.3.2 (rain water) emphasizes the need to work out concept for rain/storm water removal.
Local	Water	Tallinn public water supply and sewerage development plan 2010-2021	Point 10 (storm water systems) maps the bottlenecks related to storm water removal, including the degrading impact of water flowing in from the urban region to the status of Tallinn Botanic Garden ponds both in quantitative and qualitative way, which in turn degrades the quality of storm water flowing in Pirita river

Wider plan type	Wider plan focus	Name	Comments
Local	Water	Tallinn stormwater strategy to 2030	Point 3.2.11 (new catchments) foresees the development of Lepiku-Laiaküla catchment as the area needs researches and development of holistic solution in order to guarantee storm water removal and good status of Tallinn Botanic Garden ponds. Point 6.1 sets the strategic aim to achieve ecological status of storm water recipients (coastal sea and inland water bodies of Tallinn) and continuous improving of the storm water quality that flows in the recipient water bodies.

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring parameters

Monitored will be in future water quality (N, P etc)

Maintenance

Maintenance requirements

Tallinn Botanic Garden, annually : plantation of the channel and removal of extra plants when they hinder the water flow. Mowing in autumns.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Socio-economic Impacts

Direct benefits

Increased appreciation for natural spaces, Increased knowledge of locals about local nature, Increased awareness of NBS and their benefits.

Direct benefits information

Reconstruction and cleaning of the Lepiku channel means that cleaner water will flow in to the Botanic Garden’s ponds and later in Pirita river and in the Gulf of Finland – this way improving the ecological status of water. The project has reduced the maintenance necessity to clean nearby pond of the rose garden.

Ancillary benefits information

The reconstruction of the Lepiku channel on the territory of Tallinn Botanic Garden may be handled as a pilot project, the objective of which is to raise awareness of the residents of the area. In the lower course of the reconstructed ditch the self-cleaning system should be more effective than in the straight, piped upper course, as is the case at the moment in the upper course. The innovation, by most part, lies in the fact that with very simple means and relatively low cost it is possible to build a self-cleaning, aesthetically enjoyable rainwater handling solution. The solution will help the residents of the drainage area to understand the need the importance of water conservation and offers inspiration to land owners whose land the ditch passes through, and hopefully helps them to understand that an attractively and effectively built ditch will increase the value of their land, rather than be a possible area for problems.

Biophysical impacts: Biodiversity

Improved biodiversity

No

Information on improved biodiversity

Spreading of slugs (Arion vulgaris)

Biophysical impacts: Water & Soil Quality

Information on water quality overall

In last ten years it was noticed that in the years that were warmer and had less precipitation the water started to “bloom” – satiated with different algae and aquatic plants were proliferating which refers to nitrogen and phosphorus inflow from Lepiku channel catchment where a lot of new buildings have been built. It is also possible that the bottom of one pond is polluted by fuel oil that that was flowing in there from a boiler house that was situated in the bank of the pond in 1980s.
That meant that excessive amount of suspended solids, nitrogen and phosphorus compounds and possibly oil products end up in the gulf of Finland that is 2,5 km away via Pirita river. Reconstruction and cleaning of the Lepiku channel means that cleaner water will flow in to the Botanic Garden’ s ponds and later in Pirita river and in the Gulf of Finland – this way improving the ecological status of water. As works are not yet finalised then chane cannot be estimated.

Biophysical impacts: Others

Ecosystem impact climate regulation

No information available

Lessons Learned

Key lessons

Limestone walls worked well as also the selected plants, except Typha latifolia, which was too big for this small channel

Barriers

Barrier type	Barrier role	Comments
Other	Main barrier	The biggest drawback was caused by weather. Because of the long and heavy raining period, movement for mechanisms was hindered; on both sides of the watercourse different collections of trees were planted and the area for mechanisms to move was quite narrow.
Other	Secondary barrier	Electrical cable, which was mentioned in the project, but the location (depth) was different. The problem was solved by adding one extra culvert under the cable and rebuilding one small section to ensure the right slope.
Other	Secondary barrier	Soil erosion, which was caused by heavy rain again, was solved by placing natural grass carpet instead of waiting grass to grow from seeds.

Drivers

Driver type	Driver role	Comments
Legal obligations	Main driver	Achieving good ecological quality of waters by 2015 (WFD)
—	Main driver	Availability of funds - measeure was implemented in frame of the LIFE+ project “Benchmarking water protection in cities – CITYWATER” (LIFE 11 ENV/FI/000909)

Success factors

Success factor type	Success factor role	Comments
Financing possibilities	Main factor	measeure was implemented in frame of the LIFE+ project “Benchmarking water protection in cities – CITYWATER” (LIFE 11 ENV/FI/000909)
Legal obligations	Secondary factor	Achieving good ecological quality of waters by 2015 (WFD)
Other	Main factor	The success of the project can be evaluated on two levels. The first is the population, land owners and the government's awareness. The project has justified itself when in the Lepiku channel upper course rainwater is handled by using local solutions rather than just leading the water into a sewerage. The second positive aspect of the project is the quality of water that runs from the Lepingu water course into Pirita river. It is assumed that in the reconstructed area of the ditch, the self-cleaning system is quite effective. However, to prove this, it will be necessary to monitor the area. Monitoring will commence right after the ending of reconstruction.

Transferability

Easily transferable, in large extent in urban areas.

Sources

Sources

Lepiku ditch in Tallinn botanic garden

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