

The “CITYWATER – Benchmarking water protection in cities” project (2012-2015) was co-funded by the European Commission Life+ funding instrument, the Finnish Ministry of the Environment and its partners, the City of Helsinki, City of Turku, Tallinn City and

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[www.citywater.fi](http://www.citywater.fi)  
[www.balticseachallenge.net](http://www.balticseachallenge.net)



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LIFE11 ENV/FI/  
000909 CITYWATER



citywater  
Benchmarking water  
protection in cities

Urban rain  
– wasted in drain

Sustainable storm water  
solutions for greener cities



# Storm water – what is it?

Storm water is rain and meltwater collected in urban areas from hard surfaces such as asphalt and roofs where it cannot permeate the ground. Also water from other sources such as firefighting or tunnel or street rinsing etc. may end up in the storm water management system.

## Is there a problem?

Climate change predictions indicate that rainfall is increasing. As urban construction becomes denser, green surfaces permeable to rainwater are decreasing in size and number.

Traditional storm water management based on leading water through pipes is therefore not sufficient and urban flooding has become a common problem, causing extensive damage with high repair costs. Furthermore, storm water is often con-

taminated by solids and harmful substances originating from e.g. erosion, traffic and various coatings and is therefore polluting local water systems.

## How to handle increasing rainfall?

Rainwater and meltwater can be turned into a resource by allowing the water to become a visible feature of urban environments instead of directly leading it away.

Through sustainable storm water management, water can be used for creating green and blue urban areas. Ponds, creeks, parks and green roofs are just a few examples of sustainable ways of handling water while enhancing the comfort of inhabitants and the value of urban areas.

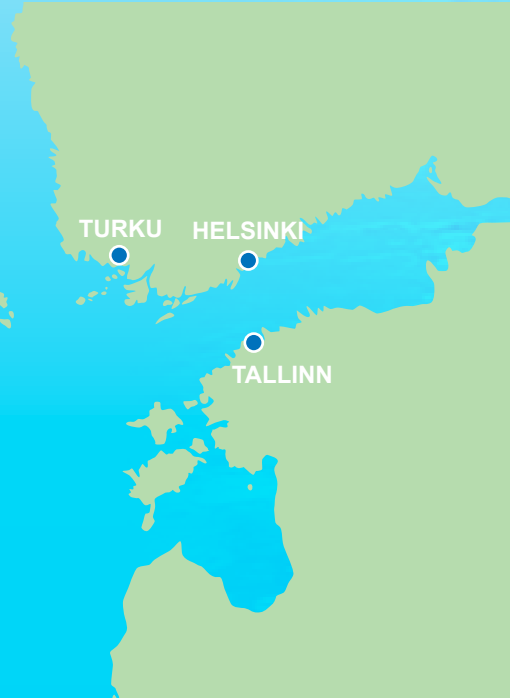


# CITYWATER – Benchmarking water protection in cities project

The aim of the “**CITYWATER – Benchmarking water protection in cities**” project was to promote water protection measures in municipalities in order to protect local water bodies and the Baltic Sea. One of the measures in question involved building sustainable storm water solutions in three cities.

In 2014-2015 a storm water course was reconstructed in Tallinn Botanic Garden and a biofiltration area was built in Helsinki central park. The City of Turku planned a wetland, which will be connected to a future adjacent residential area in Hirvensalo.

These solutions are described in more detail in this brochure. As the overall aim of the project was to increase water quality, the solutions have been primarily planned on the basis of quality management and secondarily based on quantity management.



The renewal of the current storm water management is a topical issue in the Baltic region, where several cities aim to shift from pipe solutions to sustainable management. However, general information on and experiences of alternative management

solutions are scarce and examples of best practices are needed in support of decision-making, implementation and resource allocation. The CITYWATER project was designed to meet these needs.



*A residential wetland brings general wellbeing, recreational possibilities and biodiversity to an urban area. Photo Eliisa Punttila.*



# Reconstruction of water course in Tallinn, Estonia

## What?

The Lepiku water course in the Tallinn Botanic Garden was reconstructed to improve the quality of rainwater and meltwater and to protect the River Pirita.

The objective was to create a natural purification process in order to decrease the quantities of particles in the water. Meandering of the creek, shallow thresholds on the bed of the water course and extended flooding areas were used to retain the water flow and increase settlement of solids. Fur-

thermore, solids are filtered out of the water by the wetland vegetation on the sides and bottom of the course. To prevent erosion, the walls of the water course have been lined with limestone.

## Why?

Recent residential development in the Lepiku area have increased the amount of water entering the local water course. This development has had a negative impact on water quality. In addition, the original limestone walls in the water course had collapsed and the

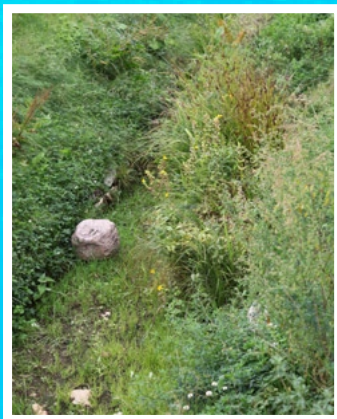
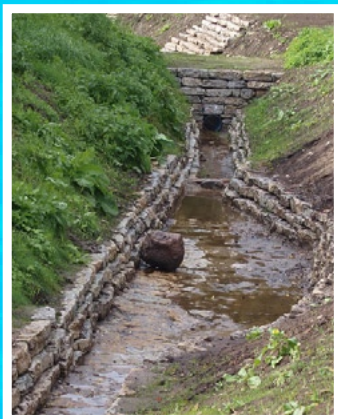
riverbed and culverts were blocked by sediment. The solids in the water were of particular concern, since they contain nutrients, heavy metals and other harmful substances.



The Lepiku water course (bright blue line) runs through the Botanic Garden, collecting rainwater and meltwater from the drainage area (dotted line). A 200 m section (dark blue line) of the course was reconstructed. The Lepiku water course feeds the River Pirita (light blue marking), which is a Natura 2000 site.



← Pictures from the location before construction, after construction without vegetation, and once the vegetation was in place. The water in the Lepiku water course is red in colour, due to naturally occurring iron. Photo Karolin Kairo-Gasman.



*Meandering decreases erosion and increases diversity*

# Biofiltration in Helsinki, Finland

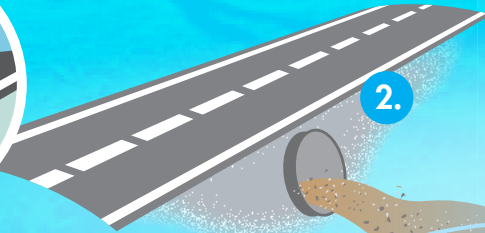
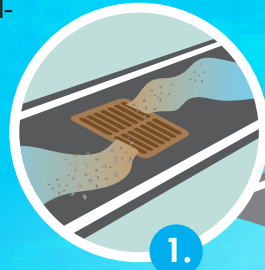
## What?

A sustainable storm water management solution based on biofiltration was realised in Maunulanpuisto Park in Helsinki, in order to purify rainwater and meltwater and improve water quality in the Haaganpuro brook.

Rainwater and meltwater collected in drains from the drainage area **1.** are channelled under the Metsäläntie road **2.** before entering a sedimentation basin **3.**, in which a large part of the solids sinks to the bottom. The water then continues its journey to the biofiltration area **4.** where it is allowed to pool, giving the vegetation time to bind nutrients and heavy metals. After this, the water slowly permeates the filtrating sandy layers under the vegetation, during which harmful substances are absorbed by microbiological activity. Finally, the purified water is fed into the ditch via a drainpipe and onwards into the Haaganpuro brook. **5.**

into a ditch feeding into the Haaganpuro brook. As the drainage area is heavily trafficked and paved with asphalt, high solids, nutrient and oil levels have occasionally been measured in the rainwater and meltwater entering the Haaganpuro brook. Such contamination is harmful to the fish stocks (e.g. trout) and other organisms in the brook. The biofiltration solution is the first of its kind in Helsinki.

*The drainage area is 15 ha in size and 75 % of it consists of paved surfacing. The area of the sedimentation and biofiltration basins is approximately 700 m<sup>2</sup>.*



*Biofiltration binds nutrients and heavy metals*

## Why?

Rain and meltwater from the Metsäläntie road and the adjacent southern area are collected in storm water pipes and were previously led directly



# Planning of a residential storm water wetland in Turku, Finland

## What?

A construction plan has been created for a residential storm water wetland called Häppilännotko in Hirvensalo in Turku. The wetland will purify rainwater and meltwater collected from a future residential area and protect the water quality of the nearby Lake Illoistenjärvi. The wetland will be implemented in the forthcoming years, alongside the construction of local infrastructure.

## Why?

Lake Illoistenjärvi is small and eutrophicated and its catchment area is subject to major changes as nearby fields and forest become residential areas. This is increasing the amount of storm water being formed in the area, as well as the quantities of solids, nutrients and harmful substances which end up in the lake, particularly during phases of residential construction. Because the water from Lake Illoistenjärvi eventually runs into the Baltic Sea, the wetland will also have a positive impact on nearby coastal areas.



*A wetland with vegetation binds nutrients from the water, slows down currents and captures particles.*

The wetland **x** will collect storm water from the drainage area (dotted line), where residential construction (blue lined areas), will increase substantially. From the wetland, the water will be fed into Lake Illoistenjärvi and further on to the Baltic Sea. The drainage area is approximately  $1.7 \text{ km}^2$  and the planned wetland will be  $2700 \text{ m}^2$  in size.



The wetland will be constructed in the Peippolanoja ditch (left) based on the drawn construction plan (right). Photo Anna Räisänen.

