



Co-creation of Nature-Based Solutions for Managing Snowmelt Runoff in Urban Environments

A Pilot Study within the URBREATH Project

In the face of climate change, managing snowmelt runoff in urban areas is becoming increasingly critical due to the potential for widespread environmental contamination. Urban snow dump sites, where contaminated plowed snow is collected, play a pivotal role in stormwater quality management as pollutants adhere to soil, sediments and watercourses.

ADVANCED DIGITAL TOOLS

Kajaani University of Applied Sciences and the City of Kajaani are piloting co-creation tools and processes developed within the URBREATH project. Virtual City Maps and urban Digital Twins enable detailed simulation and monitoring of climate adaptation measures. These digital tools help visualize potential impacts, optimize the placement of nature-based solutions (NBS), and assess their effectiveness in real time. They are also developed and used to support stakeholder engagement.

In Kajaani, these tools are applied in the planning and siting of a nature-based solution for managing snowmelt water. They are also used to engage citizens—for example, when evaluating suitable locations for snow piling sites within the urban area



STAKEHOLDER ENGAGEMENT

By involving local communities and stakeholders in the planning and implementation of NBS, the solutions can be tailored to local needs and conditions, increasing their effectiveness and acceptance.

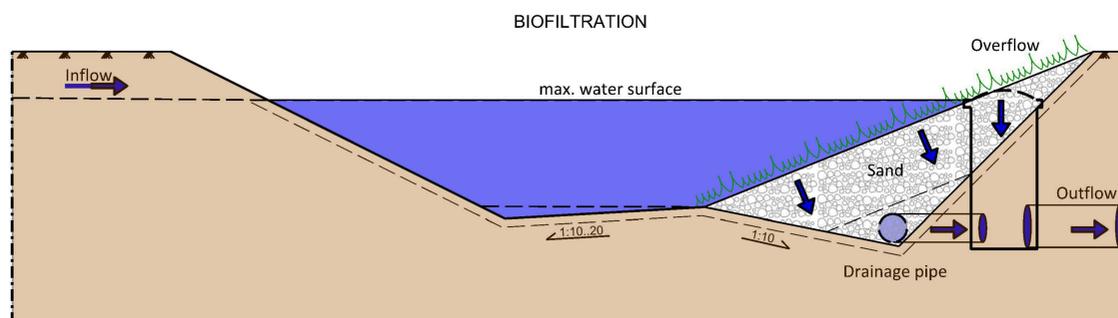
The technical nature of the NBS implemented in Kajaani makes stakeholder engagement more complicated compared to solutions that are more directly connected to citizens' daily lives. Still, citizens' opinions and ideas can be taken into account, for example, when selecting locations for snow piling sites. Moreover, citizen engagement in reducing littering has a direct impact on the success of the snowmelt water NBS, as less litter leads to cleaner water.

NATURE-BASED SOLUTIONS

Cost-efficient nature-based solutions (NBS), like bioretention, detention basins, and wetlands, can efficiently treat cold stormwater from snowmelt.

In Kajaani, the Pyykönpuro pilot site serves as key snow dumping area, which currently discharges meltwater and litter into a natural stream. Implementing NbS is expected to reduce heavy metals and nutrients by 50 % for 30,000–50,000 m³ of snow treated per season.

Raising awareness and engaging citizens can also reduce litter in plowed snow.



Picture: Watec Ltd



City of Kajaani



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