



Photo: Manu Eloaho

Vesikko

Demonstration Environment

Vesikko Demonstration Environment

South-Eastern Finland University of Applied Sciences has developed the "Vesikko Demonstration Environment" for the development and testing of landfill leachate, stormwater treatment and filter materials.

In Vesikko, water is pumped through biochar and woodchip, the changes in water quality are monitored using meters and sampling.

Keyfacts

- Commissioned in 2023
- Mobile demonstration environment for landfill leachate and storm water treatment based in EcoSairila area
- Total volume of the treatment system 20 m³
- Treatment capacity adjustable according to demonstration set up, up to 27 m³/day
- Two separate process lines allow monitoring of water treatment with two different combinations of filtration materials
- Owner and operator of the demonstration environment: South-Eastern Finland University of Applied Sciences Xamk

Caption at the top: Two independent process lines enable the monitoring of water treatment using two distinct combinations of filtration materials.

Caption below: Vesikko has been tested with the leachate waters from the Metsäsairila waste management centre.

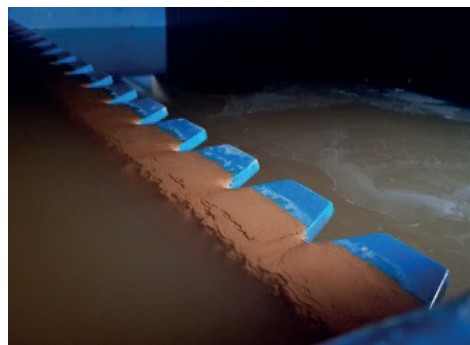


Typical properties of leachate and storm waters

The formation and quality of leachate depends on the quality, quantity, stage of decomposition and age of the landfill. Leachates can contain high concentrations of nutrients and pollutants that contaminate water bodies.

Key characteristics of leachate water:

- High ammonium nitrogen content
- Heavy metals
- Harmful substances
- Lack of oxygen or low oxygen content
- Low acidity

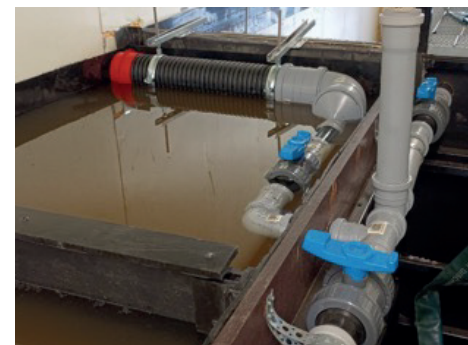
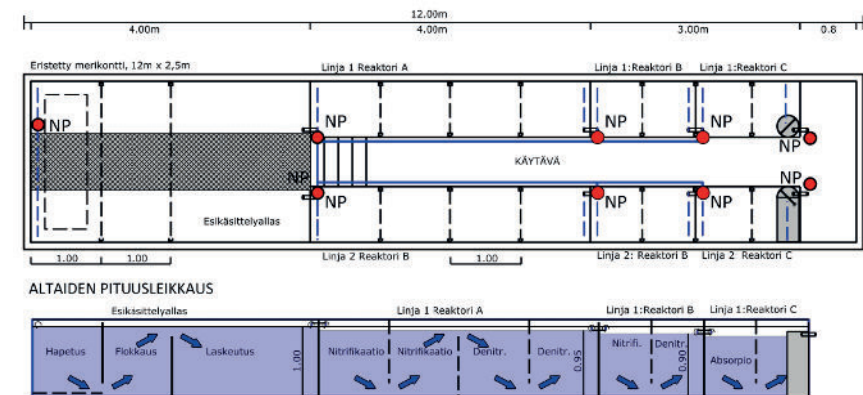


Photos: Salla Pulliainen

Process Description

- Aerated pretreatment pool (10,0 m³) for settling iron and solids
- Two separate process lines allow monitoring of water treatment with two different combinations of filtration materials

One process line consists of reactor (3,4 m³) for biological nitrogen removal and two reactors (1,0 m³) for selective absorption of pollutants. The reactors can be used together or bypassed according to the test arrangements.



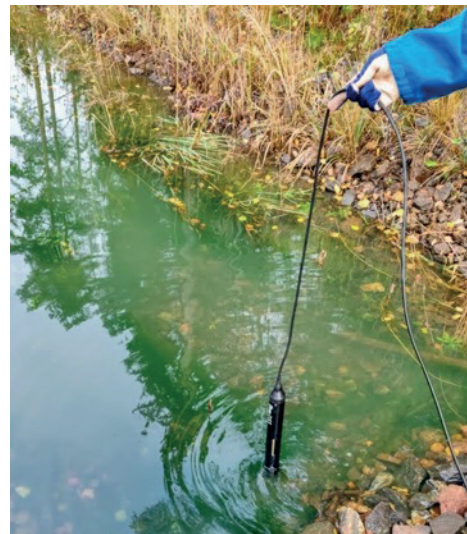
Commissioning of the system and experiences 2023

- During the commissioning phase, biochar and wood chips were used as filtration materials in the bioreactors to remove nitrogen and heavy metals from landfill leachate.
- Oxidation of treated leachate was tested and adjusted to optimise biological nitrogen removal.

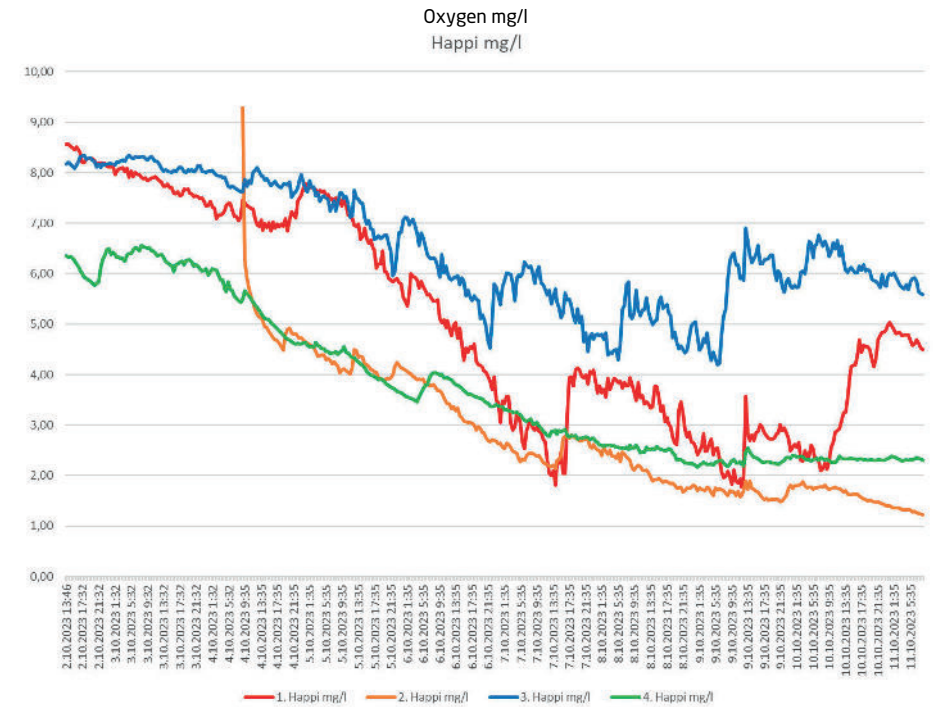
Partner for R&D: sampling and online monitoring available

South-Eastern Finland University of Applied Sciences Xamk provides on-site R&D services including sampling, measuring and online monitoring.

The Vesikko demonstration environment is available for companies and R&D organisations for testing filtration materials. The mobile demonstration environment can be relocated to the desired location.



Photos: Salla Pulliainen





Vesikko demonstration environment is part of the Blue Economy Mikkeli (BEM) Center of Excellence.

BEM focuses on water circularity and brings together experts from Mikkeli Waterworks, LUT University, South-Eastern Finland University of Applied Sciences Xamk, Mikkeli Development Miksei and a strong network of companies excelling in water circularity.

BEM offers research and development, testing and piloting environments and services in the laboratory, demonstration and for R&D organisations and companies.

BEM offers innovation and business acceleration services and helps start-ups and SMEs to get started with new ideas.



Vesikko mobile demonstration unit for leachate treatment

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