

## Circular water management in a built environment

Watch the webinar video at: <https://platformwow.nl/terugblikken/2022/11/terugblik-circular-water-in-a-built-environment-perspectives-from-several-european-cities>

### Questions for Henk-Jan van Alphen from KWR

1. Which private partners are involved?

Here you can find an overview of Brainport Smart District and those involved:

<https://brainportsmartdistrict.nl/en/>

2. Are there any project developers participating in Brainport Smart District, like BPD?

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3. Will the treated grey water also be used for infiltration to the groundwater for water conservation in the region?

Yes, this is an option.

4. Has underground storage of rainwater been taken into account, better strategic reserves/supply and better quality?

This is not part of the current concept. The communal pond is the main reservoir.

5. I think that this kind of systems can only be used in a new environment. But the largest risk is that there must be commitment for maybe combined BV for this kind of system where municipality, waterboard and province take part and deliver knowledge

It is indeed less difficult to implement these systems in new developments, but not impossible to use elements in existing neighborhoods. A combined BV is not necessary, we think, but there needs to be a clear division of roles and responsibilities.

6. The research of KWR is focusing on a possible new system. Is it possible to implement these techniques in current systems or is that complicated?

It can be used in existing neighborhoods, but it needs large scale infrastructural work in houses and neighborhoods.

## Questions for Ellen Edefell from NVSA

7. How high is the m<sup>2</sup> price for development off the harbor-area? Because the three pipe-system (specially in the houses) drives up the prices for the houses. Is this all affordable?

The initial estimation in Oceanhamnen is that the installation of the three pipes instead of one wastewater pipe increased the cost about 70% for plumbing including planning and installation. In the scope of the total cost for the buildings the increased cost for the three pipes does not increase the price significantly.

8. What about microplastic?

In Oceanhamnen the greywater is treated with nanofiltration and the water available for reuse is therefore free of microplastics.

9. Do you have a market or application for the recovered resources (water, struvite and ammonium sulphate) already? Is it being used by stakeholders now? If not what do you do with it now?

The recovered struvite and ammonium sulfate will be used to produce fertilizer pellets. We have not yet reached production enough for producing the pellets from Oceanhamnen. Fertilizer pellets will be tested locally on farmland for the third time next year. If the market for the pellets will be large scale farmers or home growers is not yet decided. The reuse of water has so far not have any specific application. It has been mostly to show that it is possible and raise the question of social acceptance.

10. How you use the Lessons learned for the project ?

NSVA is participating in national and international networks to share our experiences. There are also many study visits to RecoLab where we share our lessons learnt.

11. How do you make sure there are no medicine in the water with the black water?

Most pharmaceutical residues used in households will end up in the blackwater (personal care products are more likely in the greywater). By source separating the wastewater there is a possibility to remove a majority of the pharmaceuticals by treating the blackwater only, which is only about 5% of the total wastewater volume. The treatment is therefore not as expensive as if you would need to treat the entire wastewater volume as in conventional wastewater systems. In RecoLab we have nanofiltration and ozonation of the retentate of the greywater (and the blackwater will later on be treated there as well). Next year we will also test granular activated carbon filtration of the blackwater.

12. Do you both think more decentralized waste water systems will be implemented?

Source separated systems as implemented in Oceanhamnen and RecoLab will require what we today consider decentralized systems.

13. A swimming pool needs drinking water quality. How do they recover the grey water into drinking water? What about medicine residues, plastics, bacteria, substances of high concern like cariogene substances, heavy metals, pesticides etc?

Yes, drinking water quality will be required. The current treatment with biological phosphorus removal and nanofiltration produces a treated greywater which meets drinking water standards for most parameters but additional treatment steps before the water can be considered as drinking water quality.

14. Do you know of any studies with data on energy use, resource recovery, removal efficiency etc. of these relatively small-scale circular systems that have already been realized?

Not that I know of. Demo-sites to keep track of can be found at <https://run4life-project.eu/> In Oceanhamnen we have some time before we will have the data to do the evaluation.