HYDROROCK®
the green label in water management

BluWater
Solutions

Hydrorock's Capability for Filtering Particle Deposits from Rainwater Runoff

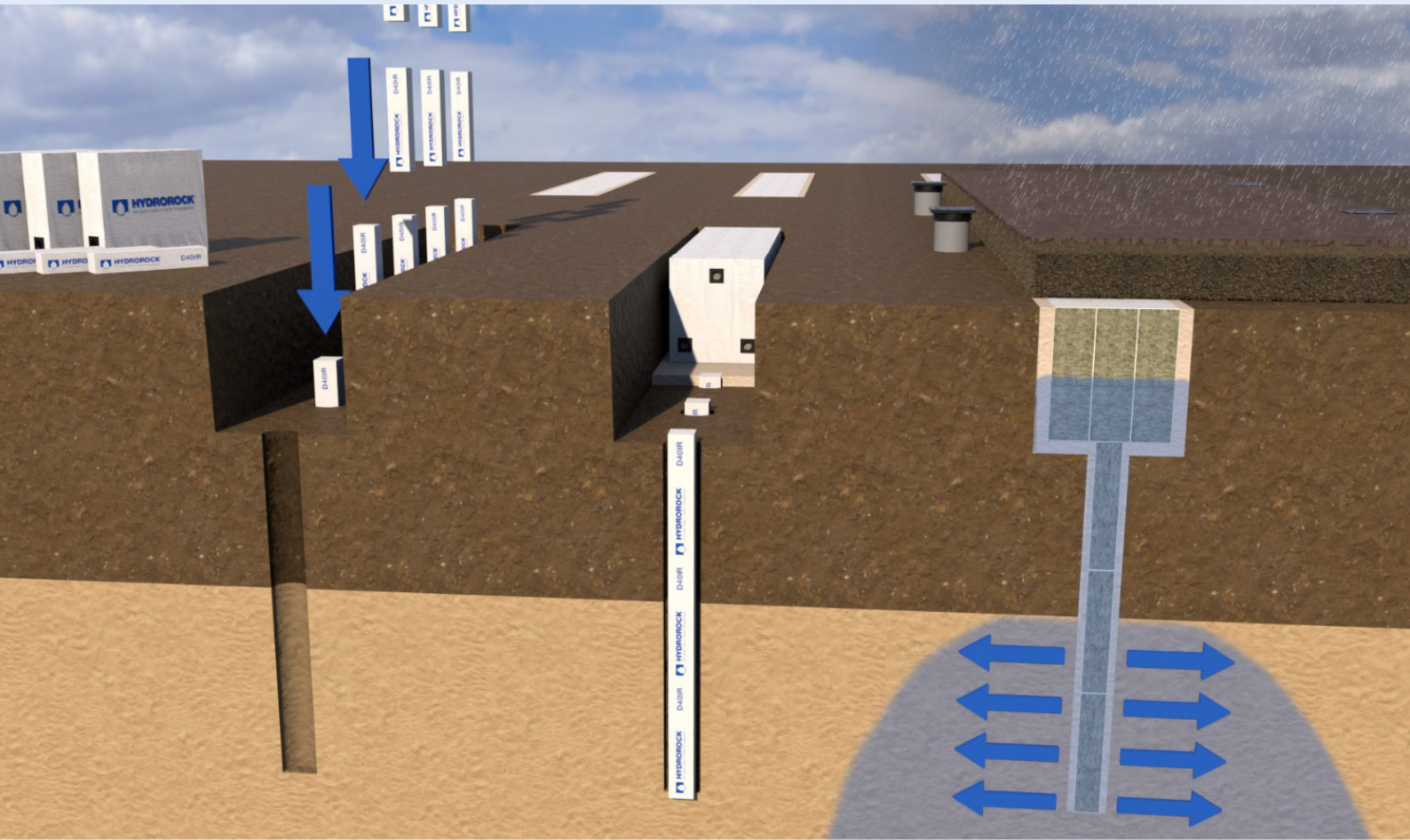
Wageningen University & Research (Wageningen Environmental Research)

Heavy rain showers and stronger drying out of the soil have a major impact on the condition of the surface water and groundwater. Rainwater that flows along roads contains concentrations of pollutants from vehicles.

The stone wool core in the Hydrorock blocks proves to be an excellent material for filtering these kinds of substances from rainwater, in order to prevent them from ending up in the environment. Wageningen University & Research (WUR) tested the water-absorbing stone wool in their laboratory, with the result that more than 50% of these substances are collected by the stone wool.

Hydrorock is used, among other things, to buffer water with the aim of preventing flooding during heavy rain showers, the excess water is quickly and efficiently collected and infiltrated slowly into the soil and groundwater.

The stone wool also appears to be very suitable for filtering this water. stone wool even appears to be able to remove dissolved contaminants from water, such as PAHs and heavy metals such as zinc and copper. PAHs (Polycyclic Aromatic Hydrocarbons) are molecules that result from thermal decomposition caused by vehicle exhaust, tires and brakes and are very harmful to health and our environment. If Hydrorock is applied along roads, the rinsing rainwater can excellently filter. In addition to capturing solid particles with a physical size > 50 microns, dissolved molecules of PAHs, copper and zinc, can be adsorbed by the matrix stone cloud core (sorption). This prevents these environmentally harmful particles from ending up directly in the environment. Hydrorock is a sustainable solution that can absorb pollution of many years in this way.



Wageningen University & Research (WUR) started in 2018 with research into filtering rainwater and retaining polluting materials with stone wool. Wim Beltman is a scientific chemistry researcher at Wageningen Environmental Research at WUR. Together with his research team, he studies organic contaminants such as medicines and pesticides in the environment and what the risks are for ecosystems. “The focus of this research has been on the adsorption of PAHs, copper and zinc on stone wool. Hydrorock is used to absorb showers. "We investigated whether PAHs, zinc and copper stick to the stone wool." The tests with artificial waste water in a laboratory set up show that the substances acenaphthene, phenanthrene (both PAHs), zinc and copper adsorb to the stone wool. The stone wool was found to effectively retain substances in the test: 62% acenaphthene, 91% phenanthrene, 88% copper and 51% zinc.

"We have tested rainwater under optimum conditions," says Beltman. "A next step can be to translate our tests into the dynamics of rainwater, for example how fast it flows, and to better approach the practice water, which has a different composition than the test water (particles and dissolved organic material)." Beltman explains that the condition of the rainwater strongly depends on the dynamics of the rain showers.

It is best to regularly test the rainwater at locations outside. “Metals such as copper and zinc can occur in various forms, depending on the acidity and presence of dissolved substances in the water. That has consequences for how many of the PAHs, copper and zinc adsorb substances to the stone wool, "says Beltman.

Ronald Wentink is senior water and climate consultant at Syntraal, part of Tauw consultancy and engineering firm. He explains how important a good condition of rainwater, surface water and groundwater is for the Netherlands. "If pollution enters the groundwater via rainwater, it can then also end up in the surface water," says Wentink. Groundwater flows through to the sea. Pollution moves with the groundwater. "This affects the ecosystem and may end up in our drinking water and food." According to Wentink, filtering polluted rainwater has far-reaching positive effects for the water balance. For years, the trend has been to infiltrate rainwater into the soil instead of draining it to the treatment plants. A point for attention here is contaminated rainwater that often still goes to the treatment via the sewer system. "Rinsing rainwater can sometimes contain high concentrations of PAHs and heavy metals, and you don't want that directly in the soil." If this can be filtered effectively, it means that more water can be introduced into the soil. With this we relieve the sewerage and build a water buffer in the soil for drier periods.

A topical subject, given the periods of drought and the heavy rain showers that we are increasingly confronted with. “In the Netherlands, regulations are limited regarding the filtering of rainwater. Denmark now has a law prohibiting infiltration of raw water from roads. Drinking water is extracted from groundwater and must therefore remain pure. “In the Netherlands, there is no general law that prohibits the removal of untreated rainwater contaminated with PAHs and heavy metals in the soil. There are, however, requirements for groundwater protection areas, "says Wentink. Not only the government, but also road authorities and infrastructure companies have an important role to play in preventing the infiltration of polluted rainwater into the soil. "Relevant points of attention that we should not deal with without obligation", concludes Wentink.

Researcher
Water and food team
Environmental Sciences Group

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Wageningen University & Research

Postbus 47, 6700 AA, Wageningen
Wageningen Campus, Gebouw Lumen
Droevendaalsesteeg 3, 6708 PB, Wageningen
Tel. 0317 480000 www.wur.nl/environmental-research

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BioScapes Limited, The Airfield, Seaton Ross, York, YO24 4NF
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For more information please email
info@bluwatersolutions.co.uk or visit

www.bluwatersolutions.co.uk