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Phosphorus Removal from Storm Water Runoff before Infiltration

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Local infiltration of storm water and direct discharge of storm water into water bodies is a powerful method to reduce waste water flow to sewage plants. Hence, the wastewater has to be cleaned before it is infiltrated into the subsoil or discharged into water courses or lakes. Contents like heavy metals and phosphorus should be reduced or rather eliminated. Especially phosphorus has in the past 20 to 30 years led to a massive eutrophication of lakes. Due to the fact that public communities discharge their storm water into lakes, the content of nutrients increases the abundance of toxine-producing freshwater cyanobacterias like *Mycrocystis*, *Aphanizomenon* and *Anabaena*. In warm late summers their mass appearance causes reduced water quality or even serious health hazards. Studies have shown that often phosphorus is the limiting factor for the growth of those bacterias and must therefore be reduced.

Several origins of phosphorus in storm water are known today. Emissions from traffic and the burn-up of organic material releases phosphorus into the atmosphere. In residential areas, where urban drainage is organized by a sewage system, the phosphorus input derives from animal faeces such as doves or dogs. Recently a pollution control pit has been developed in cooperation between the University of Münster and an engineering company in Münster (HydroCon GmbH) to deal with this issue. It allows the treatment of contaminated storm water with simple technical installations.

Different filter materials were tested under laboratory conditions to assure the best performance. To address the hydro chemical filter processes (sorption, crystallisation, precipitation) the materials were analysed by X-ray powder diffraction, thin section and scanning microprobe analysis. Afterwards the performance of each filter material

was tested in column experiments using water from a local hypertrophic lake.

The first results of our investigations show that filter materials composed of amorphous iron hydroxides and carbonate are capable of detaining phosphorus without significant changes in water chemistry. Current studies with the pollution control pit at a test site should prove the ability to detain phosphorus from storm water before discharging into a lake.

The current work will be done in March, 2006.