

# INNOLET G

## Pilot project Vollhöfner Weiden in the Hamburg harbour area, managed by HPA (Hamburg Port Authority)

### Development

INNOLET G is a retrofit measure for existing road inlets with sedimentation volume. It treats storm water from roads and was developed for Hamburg type inlet systems.

With INNOLET G the existing inlet can be retrofitted under use of the existing inlet and its sludge containment and without any additional construction work.



Abb. 1: Parts of INNOLET G, implanted on site

This is realised with a tight connection of stain steel parts directly connected to the outflow pipe. In this construction the filter filled with special filter material will be inserted. Storm water from the road flowing into the inlet will flow through this filter. A coverage overlapping the lower part of the filter system prevents direct inflow of floating particles. Main part of the particles will settle into the sludge containment.

Leaves and oil in low amount will also be retained by the coverage with integrated emergency overflow. This overflow works like a skimming wall and prevents the further flow to the sewer. All parts, coverage and filter can be removed for maintenance purposes and regular filter exchange with a simple hook for sewers.

## Pilot project Hamburg Vollhöfner Weiden

The road Vollhöfner Weiden is located in the area of Hamburg port. It serves as development of the southeast part of the docklands. The vehicle frequency is approx. 25,000 cars/d with a high portion of heavy transport with can be estimated to 50%.



Abb. 2: Location of Vollhöfner Weiden within Hamburg harbour area

The road drainage is combined with the drainage of the properties. In the section of the road in NO-SW-direction approx. 70 inlets were constructed according to the regulation standard of Hamburg Sewage company. Together with property drainage all storm water is drained into a deep ditch and afterwards into the reach of the former Süderelbe. For a separate treatment of road runoff inlet filter systems are suitable solution. These systems are located directly at the road inlet (Trumme). One of these systems is INNOLET G.

Within the project, funded by the DBU (German Environmental Foundation) newly developed INNOLET G filter cartridges were adapted to the existing Hamburg inlets and tested in situ. Therefore, 20 inlets in the stock of the HPA were equipped with these filters.

## Results

With the filter, developed in the project, preliminary tests for handling and maintenance were made. This happened with good success both in hydraulic matter. Also pollution removal tests were successful in the predicted ranges.

After the promising preliminary tests the systems was implemented in the project area of Vollhöfner Weiden in Hamburg harbor area. Therefore, 20 filters were retrofitted in existing inlets,

Within a in situ test period of 1 year maintaince purposes as well as hydraulic and pollution removal capabilites were examined. On site survey and sampling was undertaken to secure the observations and results.

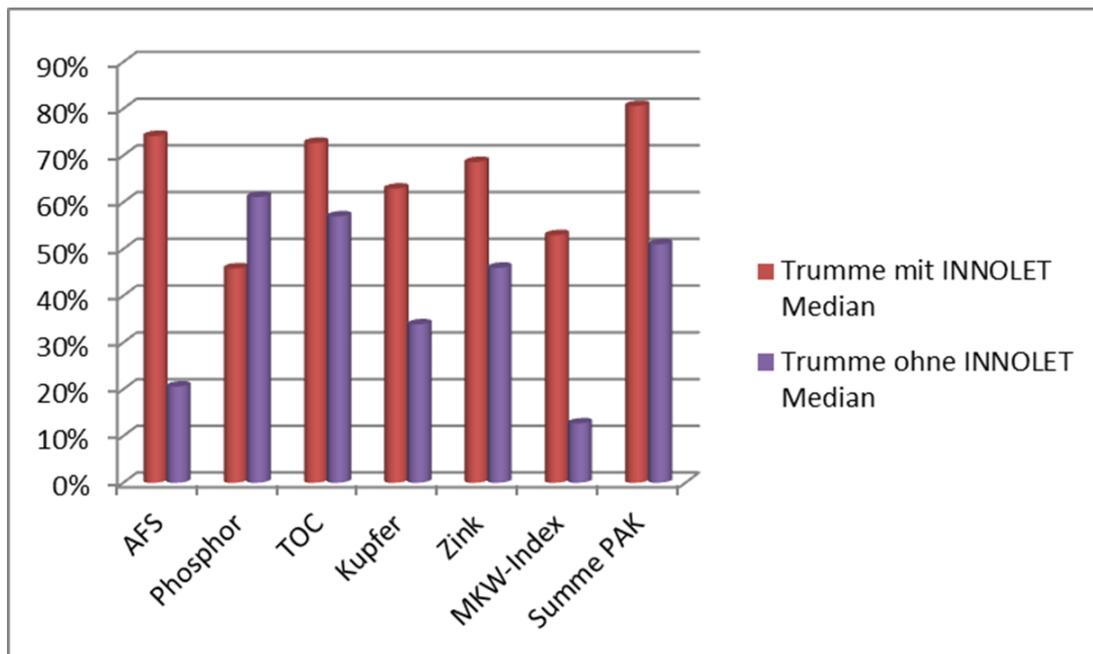


Abb. 3 Pollution removal capacity, manual sampling, median values, corrected with attached area, factor 0,6, inlets without (blue) and with (red) INNOLET G

Before installation of the filters constructional adjustments were made, in order to ensure the flexible retrofit into almost all existing inlets. The area connected to each inlets differs partially more than 200%. For this reason a divergent hydraulic and pollution load results.



Abb. 4: Comparison of inflow/outflow, left side: inlet without INNOLET G, right side: inlet with INNOLET G

The INNOLET G system shows a removal of app. 50-55 % in situ compared to measured inflow values. The inlets without filters have a significant lower retention taking the divergent areas into account.

In the sediments of inlets with INNOLET G significantly more fine particles were registered. For the grain size fraction of less than 100  $\mu\text{m}$  50% more was found in the inlets without INNOLET G. This leads to the conclusion that the retention of the filters for fine particles is significant, which correlates with the results from the test with collected storm water.

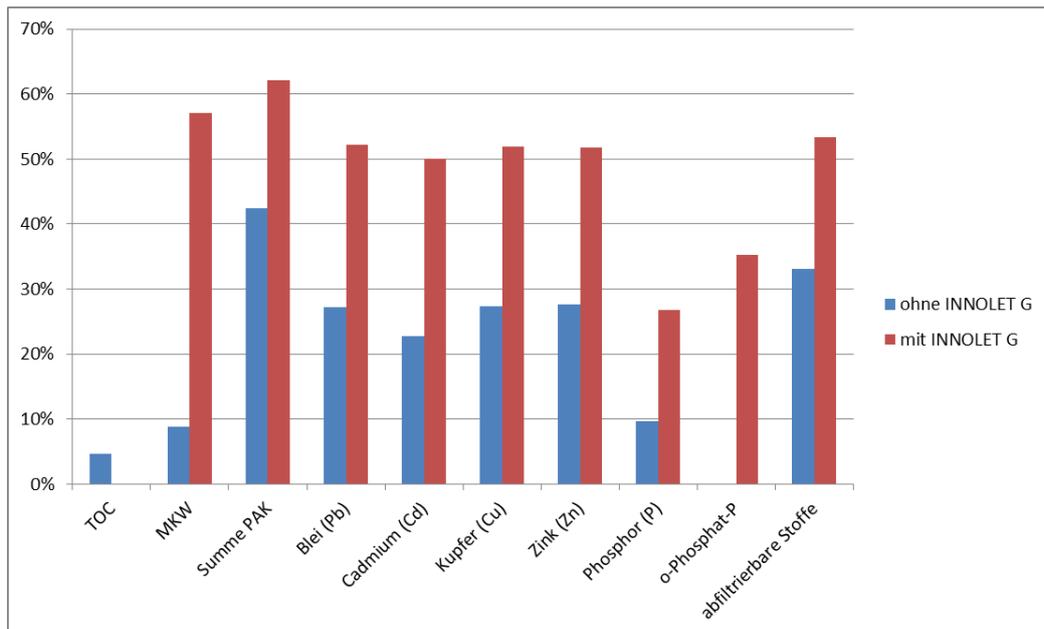


Abb. 5: Results from sampling (April 2011) , inlets without (blue) and with (red) INNOLET G

An examination according to the present test method of the DIBt for decentralized storm water treatment measures with the inspection medium Millisil W4 showed a retention of approx. 68%. In the comparison also the inlet without INNOLET G was checked. This showed a retention for Millisil W4 of 55%. With an additional test, not defined in the DIBt testing method set, floating and/or slowly sinking materials, in contrary to the Trumme with INNOLET G, were hardly retained in the conventional inlet without any filter system. This is similar to the observations on the test stand and in situ.

In the comparison with other alternatives to the cleaning of the street runoff in the catchment area (central ground filter, qualified separation system) the variant with INNOLET G is the most favorite solution due to the retrofit possibility. This study is supported by the variant test accomplished by Hamburg Port Authority before the pilot project with INNOLET G was started.

Meanwhile the street is completely equipped with the system and in regular service and maintenance cycle. The practical experiences from the first year of the regular maintenance show that the system, can be handled according to the experiences from the pilot project. The vehicles and equipment necessary for it is available. Maintenance and cleaning is done after on site briefing of staff. The supply of new filters takes place on the operating yard.

*With support of:*

