

Case study

Nievenheim-Ost A57 filling and service area



Stormwater treatment with subsequent infiltration

Products

- 14 systems
SediSubstrator XL 600/12
- 1,500 modules Rigofill inspect

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The DIBt-approved systems SediSubstrator and Rigofill inspect will now treat, store and subsequently infiltrate the surface water of the Nievenheim-Ost filling and service area in a controlled way. The underground infiltration system with sedimentation path by FRÄNKISCHE thus protects the groundwater along the A57 motorway, one of the arterial roads along the Lower Rhine, with high treatment performance and little space requirements.

In North Rhine-Westphalia (NRW), traffic is routed via one of the densest motorway networks in Germany. At the same time, the densely populated federal state has the highest traffic volume in Germany with the highest number of daily congestion kilometres. The motorways, mostly built in the 1970s and 1980s, are in need of modernisation and cannot cope with the traffic anymore. For example, with a traffic volume of up to 120,000 vehicles per day, the A57 motorway that connects the commercial centres on the left bank of the Rhine river is among the motorways with the highest number of traffic jams in North Rhine-Westphalia. According to Landesbetrieb Straßenbau NRW, experts expect the traffic volume to further increase and that there will be up to 130,000 vehicles a day in some sections by 2030. Because the motorway, which currently has four lanes, had actually reached its capacity limit with 80,000 vehicles per day, it will be expanded to six lanes along the 63-km-long route between Cologne and Kamp-Lintfort in 12 construction phases.

Expanded filling and service area

The extension of the motorway and the increasing car and truck traffic also require an expansion of the filling and service areas along the route so that travellers can eat and drink, and truck drivers can observe their rest periods and use sanitation facilities. Near Dormagen-Nievenheim in the Rhine district of Neuss, Landesbetrieb Straßenbau NRW has expanded the Nievenheim-Ost filling and service area and therefore provides more capacities. With additional 14,000 square metres, the area will almost be doubled to 31,000 square metres so that 75 trucks, 86 cars, three car trailers and five buses will be able to park in the service area. A 250-metres-long area will provide space for drivers to safely park their hazmat and heavy haulage vehicles.

Groundwater protection requirement

The increasing number of vehicles goes along with a rising groundwater hazard: If brake dust, brake fluid and dirt, but also leaking petrol, diesel or oil enter the soil, they can pollute the underground water supplies. Therefore, the Nievenheim-Ost filling and service area was required to clean the surface water from coarse dirt as well as fine particles and subsequently infiltrate the clean water nearby. The responsible Lower Rhine regional branch of Landesbetrieb Straßenbau NRW also had to consider the fact that the filling and service area is located within a



groundwater protection area class III B, i.e., another protection area. Within a radius of more than two kilometres around the wells, any measures that could pollute the groundwater in the long run or compromise its quality are prohibited. Besides persistent chemical substances and radioactive contaminations, this also includes the discharge of stormwater.

Space-saving system instead of open design

The limited space capacities of the filling and service area presented the planners with another challenge: A stormwater treatment system with an open design would have meant less usable area and thus significantly less parking spaces. A DIBt-approved system with high treatment performance and little space requirements was necessary - in cooperation with Untere Wasserbehörde Rhein-Kreis Neuss, the builder decided to use the SediSubstrator systems by FRÄNKISCHE in combination with a Rigofill inspect storage/infiltration system to infiltrate the water. In the autumn of 2016, Dr. Fink-Stauf GmbH & Co. KG from Much installed 14 SediSubstrator sedimentation paths and the infiltration system below the recreation area within two months. The cooperation ran smoothly: The products were delivered as agreed, all deadlines were adhered to and construction site maintenance was optimal.

SediSubstrator® XL: treatment in two stages

The 12-metre-long SediSubstrator XL systems DN 600 by FRÄNKISCHE treat heavily polluted stormwater runoff according to the two-stage principle: In a first step, the sedimentation retains coarse dirt and fine particles and mud and thus already fulfils 98 per cent of the required sediment retention. In the second treatment stage, two substrate cartridges absorb dissolved pollutants such as heavy metals and retain light liquids, for example, oil. If the high binding capacity of the substrate cartridge is exhausted, only the adsorption substrate is exchanged and the cartridge does not have to be removed. The DIBt-approved SediSubstrator systems are safe to operate and reliable, can be cleaned easily using conventional sewer cleaning equipment and their maintenance is cost-effective.

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Controlled infiltration with Rigofill® inspect

Thanks to the high treatment performance of the two-stage SediSubstrator system, the treated surface water can later infiltrate without worries. At the Nievenheim-Ost filling and service area, this function will now be undertaken by the Rigofill inspect modular system by FRÄNKISCHE Rohrwerke. A total of 1,500 block-shaped full blocks were assembled by the building company Dr. Fink-Stauf to form a high load-bearing underground storage/infiltration system with a length of 23.20 metres and a width of 21.60 metres. Handling of the products, both of the SediSubstrator systems and Rigofill inspect, was easy for the installers. On the one hand, due to the low weight, on the other hand, because there was no need for special tools or specially trained personnel. A continuous inspection tunnel for modern inspection technology is routed through the 2-layer Rigofill inspect storage/infiltration system. The system that stores water and discharges it later into the subsoil is accessible for cleaning and maintenance via QuadroControl shafts. Advantage of 3D underground systems: The void ratio is up to three times larger than in gravel swales - this makes excavation works almost superfluous, saves space and allows for an overground usage as recreation area.

For the expansion of the Nievenheim-Ost filling and service area, DIBt-approved systems for top-class stormwater treatment and space-saving, underground storage and infiltration were required - a classic case for SediSubstrator systems by FRÄNKISCHE in combination with a Rigofill inspect storage/infiltration system.

Facts & figures

- Reconstruction of the Nievenheim-Ost A57 filling and service area
- Stormwater treatment using SediSubstrator systems with subsequent infiltration via a Rigofill inspect storage/infiltration system
- Year of construction: 2016

Organisation & execution

Customer/builder:

Landesbetrieb Straßenbau NRW,
Lower Rhine regional branch

Planning:

BAB project group of the
Lower Rhine regional branch

Building company:

Dr. Fink-Stauf GmbH & Co. KG,
Much

