References

Urban runoff under control – quickly and easily



Uponor involvement

- 112 urban runoff tunnels

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Absorption systems, which work alongside the pipe networks, are an efficient solution for handling urban runoff where it first occurs. Nastola's plans initially featured a pipeline but this was replaced with a runoff tunnel. Thanks to the quick and easy installation, the time originally set aside for the project could be halved.

Project Facts:

Location
Nastola, Finland

Completion
2014

Building Type
Municipal

Product systems
Storm water

Project Type
New building

Partners

Contractor:
Lahden Seudun Kuntatekniikka Oy
(LSKT)

Kukkastie, a 1.5-km long connecting road running along the edge of the Salpausselkä ridge area, connects the Kouvolantie road to Nastola village. In addition to through traffic, the road also serves non-motorised traffic as the area is home to the Nastola municipal council, various municipal services and several schools.

"Urban runoff began to cause problems when zebra crossing islands, which had been installed on the road to improve traffic safety, disappeared along with the open ditches. Water built up in one location and the heavy rains that occurred on a few occasions last summer exacerbated the situation," says Hans Forss the manager of infrastructure for the municipality of Nastola. Urban runoff had been directed via a discharge pipe under Kukkastie directly to a steep slope. The Ristola area of detached houses is located at the foot of the slope.

"The slope simply could not cope any more. "Gravel and water spilled out into the residential area – not quite onto the occupied plots of land but not far off. The state – responsible for maintaining roads – took some measures to manage runoff but they were only effective in the short term," Forss says.

According to Forss, when construction began on an urban runoff network for the nearby Hoitokodintie and Aurantie roads, it was clear that runoff needed to be managed differently than discharging the water onto the slope of the ridge. The discharge point of the new urban runoff network would also have been in the same location on Kukkastie. Originally, the intention was to build a pipeline with absorbing drains on Kukkastie. TL-Suunnittelu Oy prepared site plans and took measurements. The company employed a German-born consultant who specialises in managing urban runoff and who proposed a runoff tunnel for the site.

"Similar tunnels have been in use in Germany for some time. We did not have any experience of urban runoff tunnels but the solution appeared good and the costs were also reasonable," Forss states.

An easily expandable system

The project began in the middle of October 2014. It was also the first time that the contractor, Lahden Seudun Kuntatekniikka Oy (LSKT), had installed an urban runoff tunnel.

"The work immediately proved itself to be quick and easy. The tunnel modules and additional accessories were installed rapidly and flexibly thanks to the easy connecting method," says Jarkko Aho, site foreman from LSKT. The Uponor urban runoff tunnel is a storage and absorption solution that is particularly suitable for small sites. The system consists of tunnel modules and end plates, so it can be expanded as required. Each module has a volume of 300 litres.

"Compared with traditional crushed stone absorption, there is three times as much storage capacity," says Teemu Salminen, Offering Manager from Uponor Infra. 112 tunnel modules were installed in a single line of 130 metres in length along Kukkastie. The modules can also be installed in several adjacent lines with no limit to the length. The dimensions of the tunnels take account of the soil type and the surface area from which water is to be taken.

"The required number of tunnels and installation depths are specified in the site plan. Uponor Infra can help with measurements," Salminen says.

Quick installation

"In comparison with a conventional pipe worksite, it was considerably quicker to make the levelling base," says Jarkko Aho.

Before the tunnels were installed, a filter material was placed across the bottom of the drain along with crushed stone with diameters in the range of 16–32 millimetres.

"The tunnel modules were installed at a depth of approximately 1.5 metres and connected to each other using clips at the end of each module."

Connections can be made very quickly – it only takes a few minutes to complete a six-metre section. We installed airing pipes every 20 metres. In addition to discharge drains, four inspection chambers were installed along the line. The modules formed

tunnels with lengths of 44, 50 and 36 metres between the inspection chambers.

"It is also easy to connect the modules to inspection chambers as the modules come with ready-made connections for different pipe sizes," Aho says.

The finished tunnel was covered with filter material. The initial in-fill was done using the same 16–32-millimetre crushed rock that was used for the levelling base and the final in-fill consisted of the excavated earth. The speed of installation was reflected in the duration and cost of the project.

"Six weeks were originally set aside for the work but that was almost halved and the costs were one quarter below the estimated level. The costs were also impacted by traffic arrangements, which were more extensive on the state-maintained road in comparison with those required on the normal street network," Hans Forss says. Work on the site was complete by mid-November. The project took a month in total. Grass seeds will be sown on the site at the beginning of the summer.

"A very positive experience – the quick, trouble-free installation was a surprise," say Aho and Forss.

Urban runoff management is currently an important issue for municipalities

Climate change and accelerating urbanisation are expected to significantly increase the amount of runoff in urban areas. Overhauls that enable urban runoff to be managed are currently important issues in all municipalities as the new Water Services Act entered into force last autumn, changing the responsibilities and regulations governing urban runoff. The clauses related to urban runoff were transferred to the Land Use and Building Act, while the Water Service Act governs arrangements and accounting for sewerage. Nastola is currently planning to transfer urban runoff management from the water supply agency to the municipal infrastructure department. The municipality's new urban runoff plan will also be finished this year.

"Municipalities are probably still using a very wide range of methods to handle urban runoff but the reformed law will clarify things soon," Forss says.

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