

# Roadway Retrofit

Minnesota municipality installs new storm water system as part of major road reconstruction

By Laura Blodgett



Three separate infiltration systems provide the city the storage volume capacity it needs to comply with regulations.

The city of Maplewood, a metropolitan suburb of the Twin Cities in Minnesota, needed to make improvements on a key roadway named Castle Avenue. There were several issues at hand, according to Steve Kummer, Maplewood staff engineer, who designed and engineered the project.

“First, the pavement was in very poor shape,” Kummer said. “Second, we are expecting future development in that area that we had to accommodate by widening the road. Lastly, we had to implement some traffic-calming measures to increase safety along the roadway, such as adding curb and gutter and adjusting the existing roadway profile so folks slow down when they go around the curve and downhill.”

In addition, the city had to meet a watershed district requirement that called for 1 in. of infiltration over all new or disturbed pervious surfaces. Maplewood also has a citywide requirement to improve storm water runoff to 1988 conditions in terms of the amount of pollutants coming off of the street. It was determined that the retrofit of the roadway should include a new storm system.

## Trifold Solution

Through its association with Royal Enterprises, Triton Stormwater Solutions provided the city with an infiltration system, selected for its storage volume capacity. Because of the steep incline of the roadway, one

long, flat infiltration basin would have put too much dependence on one end of the system. Instead, the engineers split the project into three separate infiltration systems.

Triton’s modular design can be fit into almost any footprint, according to Lance Hoff, water resource engineer, Royal Environmental, part of Royal Enterprises. “It reduced the footprint of each system almost by half,” he said.

Another feature that appealed to the city engineers was the easy maintenance obtained through the system’s header row feature. “A system like this is a lot more manageable because you are able to get inside of it with a sewer jetter,” Kummer said. The city originally had a sump manhole, which provided just a bit of extra depth for settling of sediment before its entering the system.

## The Installation

Whereas a storm water system installation generally takes place on a parking lot or other large surface, this installation posed some unique constraints. As a residential road also servicing a nursing home, Castle Avenue needed to remain open during construction. In addition, its narrowness provided limited space in which to store materials and equipment. The storm water system was confined to a 10-ft-deep, 12.5-ft-wide trench.

“The stacking ability of the chambers really came in handy with such a deep and narrow trench,” Hoff said. “The whole system came on just

four pallets that could be set to the side, with the materials pulled off as needed. It was very convenient.”

First, the crew dug to elevation and put down a 6-in. base layer of stone. Next, the chambers were put in and the walls of the trench lined with a Class 2 nonwoven geofabric. The site was backfilled with stone up to 6 in. past the crown of the chambers, and the geofabric was folded back and backfilled with material to the desired elevation, with the chambers needing to be placed under 16 in. of cover.

The largest of the three systems measures 115 ft in length, with 80 chambers laid out in two rows. In total, 190 chambers were used for a volume capacity of 8,500 cu ft. The first installation, including digging the hole, setting up the chamber system, backfilling and getting it back to grade, was completed in one day.

“Even though it was the first of three systems to be installed, it went extremely fast,” said Triton President

Joe Miskovich, who was on site to help manage the installation.

Once the contractor installed the first system, the group did not require any further help to install the additional systems, which are now up and running.

### Project Success

The ability to place this product underneath a major roadway is a testament to its strength. In addition, the system’s modular, stackable design and ease of maintenance played important roles in this storm water redesign.

“I would use the product again, especially from a storm water management standpoint,” Kummer said. “The fact that it can be stored underground and is fairly easy to maintain, unlike a pond where you have to dig it out every 10 years, is appealing.”

Miskovich credits the city with helping streamline the installation process. “I am really impressed that the Maplewood municipality is so proactive

about storm water runoff,” he said. “They are very forward thinking to solve an issue right up front in the most cost-effective and time-effective way possible before there becomes a problem down the road.” **[SWS]**

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