Phosphorus reduction using cloth filtration
Unconventional industrial water sources
Drinking water desalination
The new McLaughlin Place retail centre in Moncton, New Brunswick, is meeting the city’s mandate of eliminating any increase in stormwater runoff while maximizing the number of parking spaces. Instead of using a detention pond or sump, the designers decided to use a system of chambers under the parking lot that would collect and hold stormwater runoff from the lot and rooftops.

The one-hectare commercial development with five buildings is located near the Université de Moncton. Plans call for apartment buildings to be added in the future.

“Based on the city’s design criteria, there could not be any increase in stormwater runoff into Moncton’s storm sewer system from McLaughlin Place,” stated Denis LeBlanc, P.Eng., of WSP Canada Inc. “This is in an older, fully developed part of the city with roads, storm sewers, etc., already in place. The city has a zero net increase stormwater policy, which means that, when you develop a site, post-development flows have to equal pre-development flows.

“In our case, some old houses and an old skating rink on the property had been demolished a few years before, but the downstream storm sewer was still limited by capacity. This meant we had to go above and beyond the zero increase requirements. In our design, we actually had to reduce pre-development flow conditions due to the undersized storm sewer that was downstream of our site.”

“Moncton uses a lot of open, dry detention ponds,” LeBlanc explained. “The reason for that is because land value is not that high and developers can usually afford to lose a bit of land to put in a pond. In this case, we didn’t have any available land and our site was fully covered by buildings or parking lots. So, underground storage was our choice for detention.”

To satisfy the city’s Zero Net Increase for Stormwater Runoff Law P#215 and meet the site’s storage capacity requirement of 485 cubic metres, the underground system used 87 StormTech® MC-3500 chambers in a 26.8 m x 17.9 m area.

Each StormTech MC-3500 chamber is 2.28 m long x 1.95 m wide x 1.14 m high, with minimum installed storage capacity of 5.06 cubic metres. The open graded stone around and under the chambers provides a significant conveyance capacity, ranging from approximately 23 l/s – 368 l/s. Actual conveyance capacity is dependent upon stone size, depth of foundation stone and head of water.

The excavation was 3.3 m deep, which allowed for 2.13 m of cover above the chambers. The gravel bed was made up of 18 mm – 50 mm washed rock. A rock slinger was used in order to place the stone faster.

A non-woven geotextile separates native soil from the washed rock. To convey the water from the catch basins, ADS N-12® corrugated high-density polyethylene (HDPE) pipe was used to create a 600 mm x 450 mm manifold, connected to the first four chamber rows.

“We’re not calling it retention but detention,” LeBlanc continued. “Water is not infiltrating into the ground. Our soils are all clay here so there’s little to no infiltration. This means you still need to outlet water to a pipe or a sewer. Our chambers are on the bed of gravel with the geotextile under it to prevent the clay from interacting with the gravel. From there, the water flows into a control structure downstream of the chambers. It is basically just a manhole with an orifice in it. From there, it goes into the municipal storm sewer.”

To convey water from the underground detention system to the municipal storm sewer, a 250 mm diameter solid wall DR17 HDPE pipe was horizontally directionally drilled nearly 16 m under Morton Avenue, a major road. This was needed because the city could not shut down any lanes.

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