

Rumble Pond Adaptive Stormwater Infrastructure Project

Project: Rumble Pond

Location: Richmond Hill, Ontario

Owner: Town of Richmond Hill

Engineer: RJ Burnside; Schollen & Company Inc. (architect)

Contractor: Gateman Milloy

Approving Agency: Ontario Ministry of the Environment (MOE)

Products: 2 Stormceptor® Units, 2 Jellyfish® Filter Units, and Sorbtive® Media



Rumble Pond was built in the 1980s to manage runoff from the adjacent 44 hectare (109 acres) residential area in Richmond Hill, Ontario. It was designed as an online pond with Patterson Creek flowing through it.

Over time, there were several major issues with the state of Rumble Pond that indicated the need to upgrade its infrastructure. Over the past few decades the pond had filled with sediment, which reduced water quality and quantity control. The compromised function of Rumble Pond was negatively impacting the local environment. Online ponds are known for increasing water temperatures to levels that some fish cannot tolerate. In addition, the pond's outfall weir was a major barrier to fish passage. The weir fragmented Patterson Creek and impeded fish, including the endangered Redside Dace, from moving upstream to find other sources of food.



In 2012, The Ontario Ministry of the Environment awarded a \$1 million grant through the Showcasing Water Innovation program to the Town of Richmond Hill to assist in the implementation of the project. This program funded projects to explore leading edge, innovative and cost effective solutions for managing and protecting water resources. Richmond Hill partnered with stormwater industry leaders, including Imbrium Systems, Hanson Pipe & Precast, and the Toronto and Region Conservation Authority (TRCA), to showcase their technologies and practices within the stormwater facility. The project goal was to meet or exceed current standards for water quality, quantity and erosion control, apply innovative treatment technologies, help reduce the risk of community flooding and downstream environmental impacts, and provide a recreational space for local residents to enjoy.

Restoring the pond to its original design would not provide the desired improved water quality enhancements, and was deemed too costly. Instead, engineers decided to take the pond "offline", separating the pond and Patterson Creek in effort to address various water quality impacts, including thermal pollution. It was also decided that the pond's forebay would be removed and replaced with a treatment train thereby providing more space for quantity control, as well as a higher level of treatment.

The treatment train approach consisted of the Stormceptor and Jellyfish Filter, both Imbrium Systems technologies licensed and manufactured by Hanson Pipe & Precast. Two Series Stormceptor units were installed to accept runoff from the pre-existing neighborhood storm drainage network. Each Stormceptor was followed by a Jellyfish, which uses membrane-filtration to deliver 80%+ TSS removal, plus nutrient and metals removal, and low turbidity effluent discharged into the pond. The treatment train approach was designed to capturing a much higher volume of sediment and pollutants before stormwater entered the pond to improve water quality, and prevent sediment load from building up within the pond too quickly. In addition, it was recognized that the Stormceptor and Jellyfish treatment train would also provide a lower life-cycle cost.

Stormceptor is a stormwater treatment device, commonly referred to as an oil grit separator (OGS) designed to remove total suspended solids (TSS) as well as free oils, and other pollutants that attach to fine sediment, and store them for safe and easy removal. Advantages of using Stormceptor in place of a pond forebay are; Stormceptor has tested and proven hydrocarbon spill capture eliminating costly clean-up, the design offers a much smaller footprint, and a single point for easy curb-side inspection and maintenance.

The Jellyfish filter is a stormwater quality treatment technology featuring membrane filtration. Jellyfish has been verified to capture very fine particles, even down to two microns, with effluent turbidity of less than 25 NTUs, and Total Nitrogen removal of 50% and Total Phosphorus removal of 59%, which far exceeds the capabilities of a forebay. In addition, the value of the Jellyfish Filter's ability to reduce the turbidity has been of interest as it relates to ability to positively impact the environment on the endangered Redside Dace fish.

As part of the normal inspection and maintenance procedure for Stormceptor and the Jellyfish Filter, sediment and other pollutants are extracted from the units, which are located road-side. This keeps the maintenance process quick and easy, and once completed the treatment units are functionally restored as designed within minimal impact on the neighboring residential area, and aesthetics of the site. The treatment train approach of using a Stormceptor to pretreat the Jellyfish Filter also further extends the life cycle between maintenance cycles and needed maintenance for the pond, keeping the projects long-term life-cycle costs to a minimum.

The completed park has incorporated multiple innovative water quality design aspects and technologies, while looking and functioning like a natural recreational space with walkways, benches, native vegetation, a pavilion, an island and interpretive signage for the community to learn from, and enjoy for years to come.

