



## Water

### Water Resources

#### Client

City of Ottawa

#### Location

Ottawa, Ontario

## Stormwater Facility Retrofit and Operation

### Project Description

The City of Ottawa retained CH2M HILL to conduct environmental assessment, develop pre-design, detailed retrofit design, construction, and operate stormwater management facilities. This description includes two specific and related projects.

### Nepean Creek Facility

The facility was designed as a retrofit to an existing storm sewer system to receive and treat runoff from approximately 1,000 hectares of mainly existing development in Nepean.



The primary design objective was to control pollutant loads released to the Rideau River, the requirement for which was identified in the previously completed Rideau River Stormwater Management Study. The facility design needed to address the constraints of the existing storm sewer system and involved the construction of two diversion structures and sewers to reroute flows from the existing storm sewers to the facility's sediment forebays.

The facility receives flows at three separate locations: the forebay of the Nepean Creek portion of the facility; the forebay of the Merivale Trunk Storm Sewer (MTSS) portion; and the inlet of the expanded Fisher Glen facility - a small existing facility that was retrofitted and enlarged to form one cell of the new system. Retrofit work occurred on the existing MTSS and Coolspring storm sewers to provide diversion chambers to divert storm flow into the new pond system. In addition, a smaller upstream facility, the Merivale Pond, was retrofitted with an oil & floatables skimmer on the outlet structure to improve the quality of effluent discharged to the new facility. The multiple cell design for the facility allows pollutant removal to be maximized while still preserving the highest quality portions of an existing treed ravine, as well as improving water quality and fish habitat in the remaining portions of Nepean Creek itself. Also included in the facility design is a sports field complex, including five soccer fields and one softball diamond, together with a recreational pathway around the entire area. The facility and sports field landscaping is designed to integrate the entire area into the natural ravine, as well as the overall parkland scheme.

CH2M HILL completed all aspects of the project in-house, including the Class Environmental Assessment and public consultation, system layout and site plan, hydraulic and hydrologic modeling, detailed design, landscape planning, and construction administration.

### Saw Mill Creek Facility

Sawmill Creek flows from the Ottawa Airport and Greenbelt lands northward through residential and commercial areas, discharging to the Rideau River near the center of the City. Increasing urbanization of the creek watershed threatens water quality, increases peak flows and flood levels, and impacts bank stability and aquatic habitat central to the urban core, before emptying into the Ottawa River at Rideau Falls. The waterway has high social value to



the citizens of Ottawa for recreational and aesthetic reasons such as fishing, boating, and swimming.



In response to the growing public concern over the state of the watershed, the Rideau Valley Conservation Authority initiated the Sawmill Creek Watershed Study in 1992, undertaken by CH2M HILL. Completed in 1994, the study provided a comprehensive overview of the characteristics of the Sawmill Creek Watershed and produced a watershed management plan and implementation strategy following an extensive public consultation process. The watershed management plan reviewed options for stormwater management on a watershed scale. One of the core components of the plan included the construction of a creek diversion and constructed wetland to improve water quality in the creek, attenuate peak flows, help control downstream creek erosion, and re-establish a more natural continuous north-south corridor in the watershed.

In 1997, an Environmental Study Report (ESR) prepared by CH2M HILL reviewed the proposed constructed wetland facility. The ESR considered alternative designs for the wetland and flow diversion facility and documented the public consultation. Construction of the wetland was not feasible in the period following the original ESR, therefore the City of Ottawa initiated the Sawmill Creek Subwatershed Study Update and ESR Addendum in 2002, also completed by CH2M HILL. The updated strategy confirmed that the constructed wetland and flow diversion project should proceed as a key component of the overall watershed-based water management strategy.

CH2M HILL recently completed the detailed design of the Sawmill Creek Constructed Wetland. Phase I of the project was completed in late 2003. The facility provides benefits such as flood mitigation, stormwater runoff treatment, downstream channel erosion reduction, and enhanced natural features and recreational opportunities.

The facility includes a series of permanent wet ponds and wetland cell that receive and treat diverted storm flow from Sawmill Creek, the Cahill Tributary and the Plante Drive storm sewer. Treated effluent returns to the creek downstream of the facility. Approximately 1,000 meters in length with a maximum volume of 189,000 m<sup>3</sup>, the facility serves a catchment area of 1,420 hectares. Notable design features include:

- A combination of open wet pond and wetland (i.e. marsh-like) cells
- Offline operation: a specially designed diversion structure in Sawmill Creek diverts storm flow to the facility, but also preserves the viability of the bypassed reach of the creek by maintaining creek baseflow and allowing fish passage
- A diversion chamber in the existing Plante Drive sewer to divert storm flow into Cell 3 of the facility
- Extensive landscaping and re-vegetation using native species
- Pathways and bridge crossings to create recreational opportunities for the public

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- Beneficial use of vacant land surrounded by major transportation corridors

### **Design challenges include**

- New storm sewers were required to cross the Ottawa transitway, the Airport Parkway, and two railways
- Utility interferences such as hydro lines, watermains and sewers required careful consideration during design
- Flat terrain posed hydraulic challenges

The Sawmill Creek project represents CH2M HILL's fifth major stormwater facility design since 1996 in the City of Ottawa, and the second such facility "retrofitted" into an already urbanized watershed and stormwater system.