

ATTACHMENT 1

WET WEATHER FLOW MASTER PLAN – SUPPLEMENTARY INFORMATION

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Figure 1: Map of WWFMP End-Of-Pipe Projects (2023)

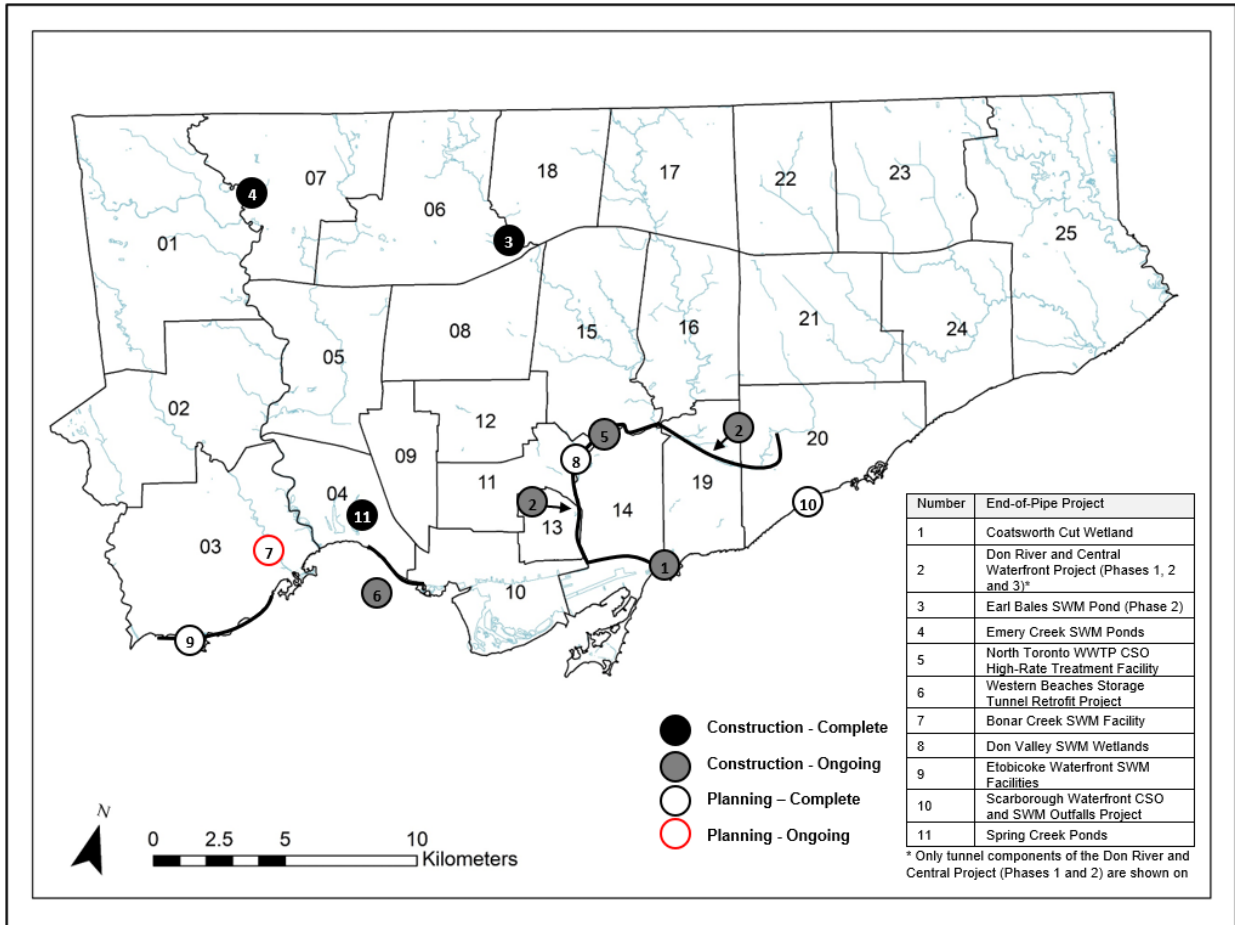


Table A1: Description and Status of WWFMP End-of-Pipe Projects (2023)

End-of-Pipe Project	Project Description	2023 Implementation Status
Coatsworth Cut CSO and Storm Outfalls Control Project	Conveyance control improvements including weir adjustments and adding storage in the Coatsworth Cut sewershed to reduce the volume of stormwater and combined sewer overflows discharged from outfalls to Coatsworth Cut. A wetland facility south of the Ashbridges Bay Treatment Plant was also recommended.	<p>The EA study was completed in 2008.</p> <p>The conveyance controls and the CSO storage tank at Kingston Road and Dundas Street East were completed in 2012. An assessment of lake elevations and variations concluded that the implementation of the wetland at Coatsworth Cut was too complex to be hydraulically feasible. Instead, four outfalls discharging to the Coatsworth Cut will be connected to the Don River and Central Waterfront tunnel system. Modifications have been made the Don River and Central Waterfront tunnel system to accept the Coatsworth Cut flows. In addition, the design of the Integrated Pumping Station at the Ashbridges Bay Treatment Plant site has been modified to accommodate the changed approach.</p>

End-of-Pipe Project	Project Description	2023 Implementation Status
Don River and Central Waterfront (DR&CW) Project	<p>The system will be comprised of three integrated tunnels, underground storage shafts, off-line storage tanks, A pumping station (referred to as the Integrated Pumping Station – IPS), and a new wet weather flow high-rate treatment facility to be located on a Landform constructed on the Ashbridges Bay Treatment Plant water lot. The system will capture and treat stormwater discharges and combined sewer overflows. This combination of projects under the DR&CW program will greatly improve the water quality in the Lower Don River, Taylor-Massey Creek and Toronto's Inner Harbour. The project also includes upgrades to the Don Sanitary Trunk Sewer system to help service future growth and improve operations by providing redundancy for the Coxwell Sanitary Trunk Sewer.</p>	<p>The EA study was completed in 2012 and preliminary design of the entire tunnel system was completed in 2015. The first phase of tunnel construction, the Coxwell Bypass Tunnel (CBT), began in 2018. As of the end of 2022, the CBT tunnel was completed with the breakthrough at Coxwell Ravine Park. Other components of the CBT construction are underway, including the five storage shafts along the tunnel alignment, its connections between the main tunnel and the 11 drop shafts, and sewer connections at two of the storage shafts. The Sheppard / Leslie storage tank, originally planned for phase 3, has been constructed with the phase 1 work.</p> <p>The Inner Harbour West (IHW) Tunnel and sewer connections were scheduled for Stages 4 and 5 respectively in the EA. Due to rapid growth in this area, TW advanced the IHW tunnel implementation with detailed design anticipated to be completed in 2024. Further adjustments to the implementation stages (2, 3, 4 and 5) associated with budget prioritization are anticipated.</p> <p>Two large complex facilities are need to make the system operational. These include the Integrated Pumping Station at the north end of the Ashbridges Bay Treatment Plant (ABTP) that will pump stormwater and combined sewage overflows captured by the tunnel system. Two of three IPS contracts are near complete and the design of the third IPS contract is near complete. Tender of the third contract will be in mid 2024 and construction is expected to last some 10 to 12 years.</p> <p>The IPS will covey the captured combined sewer and stormwater flows to a dedicated treatment facility (referred to as a High Rate Treatment (HRT)) Facility to be constructed on new property created by lakefilling the water lot adjacent to the ABTP. Construction of the landform will be completed in 2025. Design of the HRT is expected to commence in 2024 and the facility is expected to be constructed by 2034.</p>

End-of-Pipe Project	Project Description	2023 Implementation Status
Earl Bales Stormwater Management Pond	<p>One of the largest facilities of its kind in Canada, this stormwater pond in Earl Bales Park provides stormwater treatment for a 400-hectare drainage area.</p> <p>Key innovations of the project include using the pond water for golf course irrigation in the summer and for snowmaking at the Earl Bales ski hill in the winter. The project's benefits include improving water quality and reducing fish habitat stress in the West Don River.</p>	<p>The EA study was completed in 2006 and construction of the pond was completed in 2011.</p> <p>In 2015, the second phase of the project began, which included the construction of two new sewer diversion pipes to capture stormwater from an additional 150 hectares. Phase 2 Civil works were substantially completed in 2018 with site restoration in 2019.</p> <p>With the facility now online, implementation of the monitoring plan has begun utilizing three real time water quality sondes, three portable autosamplers, and three sets of flow through water quality instruments. The complexity of the sampling and data management system caused a three-year pause before it could be turned over to the City for operation in late 2022.</p>
Emery Creek Stormwater Management Ponds	<p>A series of three stormwater ponds in the valley lands southwest of Finch Avenue West and Weston Road. The ponds will intercept and treat stormwater flows from the Emery Creek catchment area, which historically has had some of the worst water quality contributions to the Humber River.</p> <p>This project will contribute significantly to improved water quality in the Humber River and contributes to a healthier environment and improved habitat for aquatic and terrestrial wildlife in the Humber River watershed.</p>	<p>The EA Addendum was completed in 2012.</p> <p>Construction of the project started in 2016 and was completed in 2017.</p>
North Toronto Wastewater Treatment Plant CSO High-Rate Treatment Facility	<p>Retrofits to CSO and stormwater storage tanks at the North Toronto Treatment Plant to provide enhanced chemical treatment of CSOs and increased treatment capacity. This project contributes to improved water quality in the Lower Don River by decreasing CSO volumes and enhancing CSO treatment.</p>	<p>Construction was substantially completed in 2016. The facility was initially commissioned in 2017 but was overwhelmed by stormwater flows experienced at this location. After examining the potential cause of the problem, additional design work was initiated resulting in certain modification that need to be implemented. The current additional design started in 2021 and expected to be completed by end of 2023; and construction is expected to commence in 2025.</p>

End-of-Pipe Project	Project Description	2023 Implementation Status
Western Beaches Storage Tunnel Retrofit Project	<p>The Western Beaches Storage Tunnel was constructed in 2002. The four-kilometre-long tunnel, with three storage tanks, intercepts wet weather flows from eight CSO outfalls and two stormwater outfalls to improve water quality in the City's western beaches.</p> <p>The Western Beaches Storage Tunnel Retrofit Project involves the replacement of the pumping station and other existing equipment for the facility to improve its operation.</p>	<p>In 2017-2018, the detailed design work was split into two phases. The first phase, which involved upgrading chambers at 10 outfalls to replace flap-gates with weirs to isolate the system was completed in 2021-2022.</p> <p>The second phase, including a redesign of the pump system, commenced in 2022 prior to tendering the associated system.</p>
Bonar Creek Stormwater Management Facility	<p>A future project that will include new stormwater management pond adjacent to Mimico Creek and sewer interceptor to collect stormwater discharges from a 365 ha drainage area that is currently untreated. The stormwater pond will treat stormwater discharges to improve water quality in Bonar Creek and Mimico Creek.</p>	<p>The EA study was completed in 2010.</p> <p>Due to cost escalation, Toronto Water is undertaking a study to evaluate the benefit of the proposed Bonar Creek stormwater management facility in relation to alternatives. The study is scheduled to be completed by the end of 2023.</p> <p>The City completed a Park Lawn Lake Shore Transportation Master Plan and Legion Road study in 2022, which included a recommendation to prepare an EA Addendum for the 2010 Legion Road Extension EA (to confirm the validity of the 2010 EA). The EA addendum will be initiated following the outcome of TW's study to determine the preferred SWM alternative for the subwatershed.</p>
Don Valley Stormwater Management Wetlands	<p>A project for future implementation. The EA recommended three stormwater management wetlands and other improvements (e.g., slope stabilization, tree planting, and erosion control) along the Don Valley Parkway (DVP) from the Gardiner Expressway to Taylor-Massey Creek to reduce the impact of stormwater runoff from the DVP and help improve water quality in the Don River.</p>	<p>The EA study was completed in 2009.</p> <p>Improvements on these corridors will be considered for future implementation as part of the City's Green Streets Program.</p>

End-of-Pipe Project	Project Description	2023 Implementation Status
Etobicoke Waterfront Stormwater Management Facilities	<p>A future project to improve quality of stormwater discharges to the Etobicoke waterfront.</p> <p>The EA study recommended the construction of a stormwater interceptor pipe that will direct flows from 27 of 30 outfalls along the Etobicoke waterfront to an underground treatment shaft to be in Samuel Smith Park. Oil/grit separators are recommended for three outfalls.</p>	<p>The EA study was completed in 2013.</p> <p>As the EA study is approaching ten years old, verification of the EA solution may be required. This project will be evaluated prior to advancement, scheduled accordingly, and sequenced with other major projects.</p>
Scarborough Waterfront CSO and Stormwater Outfalls Control Project	<p>A future project to improve water quality along the western Scarborough Waterfront.</p> <p>The EA study recommended source controls, conveyance controls and seven end-of-pipe underground storage facilities to store and treat stormwater and CSOs that are discharged from outfalls along the western Scarborough waterfront.</p> <p>The EA study also recommended flood protection projects to reduce basement flooding and surface flooding at five locations within the study area.</p>	<p>The EA study was completed in 2011. An EA addendum was completed in 2021.</p> <p>Implementation of the water quality improvement recommendations are currently beyond the capital plan, for future consideration upon further advancement of the DRCW project.</p>

End-of-Pipe Project	Project Description	2023 Implementation Status
Cherry Street Stormwater Management Facility (CSWF)	<p>The Cherry Street Stormwater Facility is designed to attenuate and treat stormwater from three different waterfront precincts east of Toronto's downtown core, namely: West Don Lands (32 ha), East Bayfront (22 ha) and North Keating (24 ha).</p> <p>It uses a three-step process to treat stormwater: (1) a hydrodynamic oil grit separator (2) ballasted flocculation (a binder is added so that the weighted material sinks to the bottom of the chamber where it is isolated from the clarified water) and (3) treatment with ultraviolet (UV) disinfection, prior to discharge to the Keating Channel (and Toronto Inner Harbour).</p>	<p>The Environmental Assessment (EA) was completed in 2013. All phases of the EA study and design and construction were led by Waterfront Toronto with input from TW from 2013 -2018.</p> <p>Construction started in August 2018 and was completed in March 2022. Commissioning has occurred from March 2022 to 2023. The facility has been operated by Waterfront Toronto from 2022 to 2023</p> <p>Due to capacity issues, equipment issues and programming issues the facility has not passed the site acceptance testing yet. Until the facility operates properly, Waterfront Toronto will continue to operate the facility. All deficiencies are likely to be corrected sometime this fall (2023) at which time TW will undertake the operations and maintenance responsibilities.</p>
Spring Creek Ponds	<p>Two cells of Spring Creek Ponds were reconstructed and enlarged in 2003 to improve the water quality performance of each cell. Due to the development of a large subsurface cavity caused by artesian pressures, a groundwater well was installed to depressurize the aquifer and to seal up the cavity.</p> <p>Accumulated sediment from the pond cells were cleaned out in 2015 to 2016 and improvements to erosion control measures were constructed for when the outflow from the Upper Pond overtops its spillway into the Lower Pond cell.</p> <p>Since operation of the rebuilt cells commenced in 2003, gray to black colours and occasion smells have been observed in the two cells, which are typical of anaerobic conditions. Accordingly, a study was commissioned in 2018 to investigate the causes of the problems and to investigate solutions.</p>	<p>The Study was initiated in 2019 and completed as three separate field years. In 2019, the study focus was to sample influent water quality, to characterize potential odour sources, and to test out two Solar Bees (i.e., solar powered devices that vertically mix the pond water). In 2020, the study focused on refurbishment and installation of mixers, and further characterization of pond limnology. In 2021, the study focused on obtaining a better understanding of dissolved oxygen balance in the two pond cells.</p> <p>As there is no one cause that can be attributed to the loss of oxygen, a proposal has been developed in 2022 to develop a new phase of work which will involve an Engineering Assessment to scope the equipment needed to install a demonstration system to oxygenate the pond waters, given the large oxygen demand observed in the pond waters.</p>

Figure 2: Map of Don River and Central Waterfront Project (April 2023)

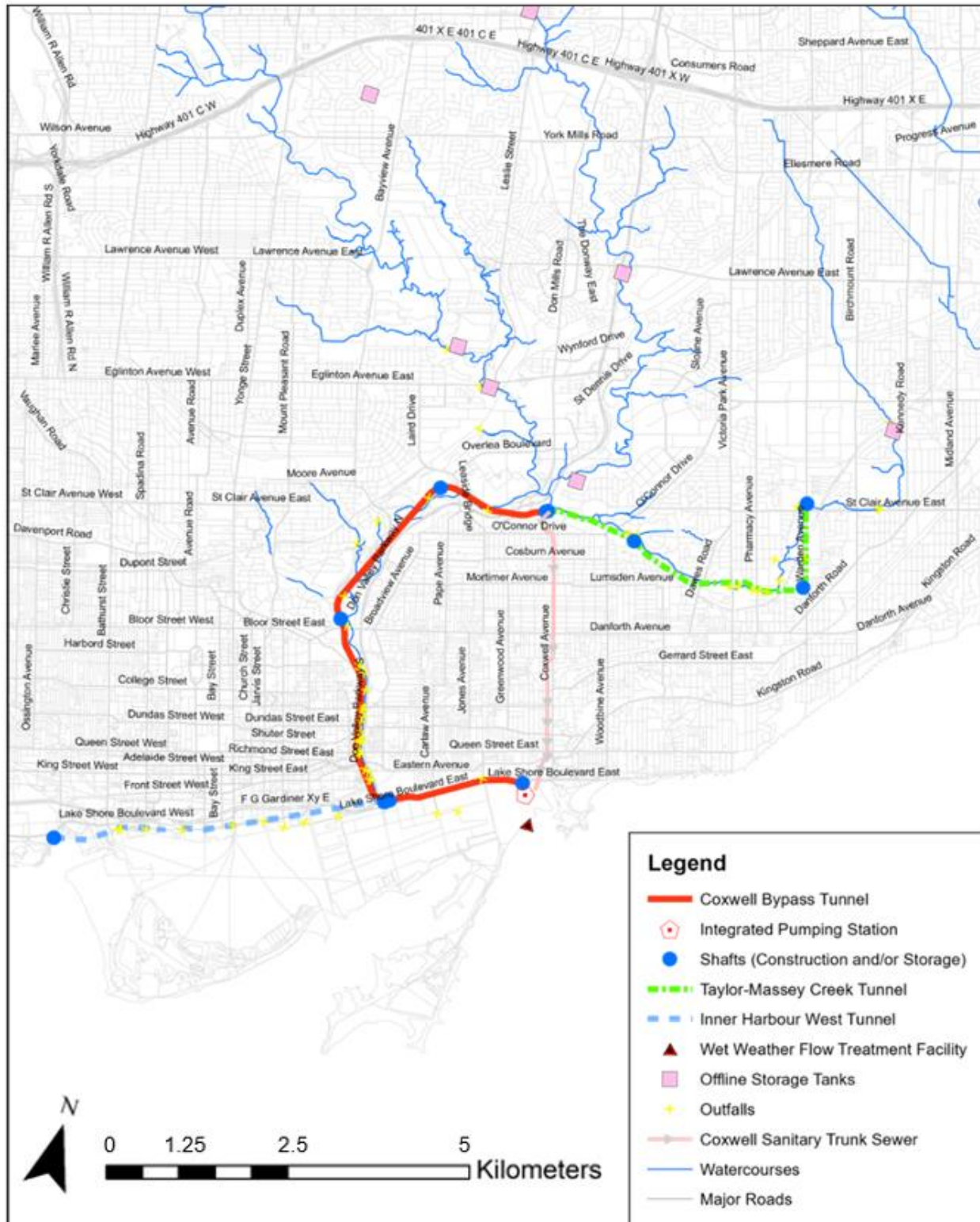


Figure 3: Status of Basement Flooding Protection Program Studies (April 2023)

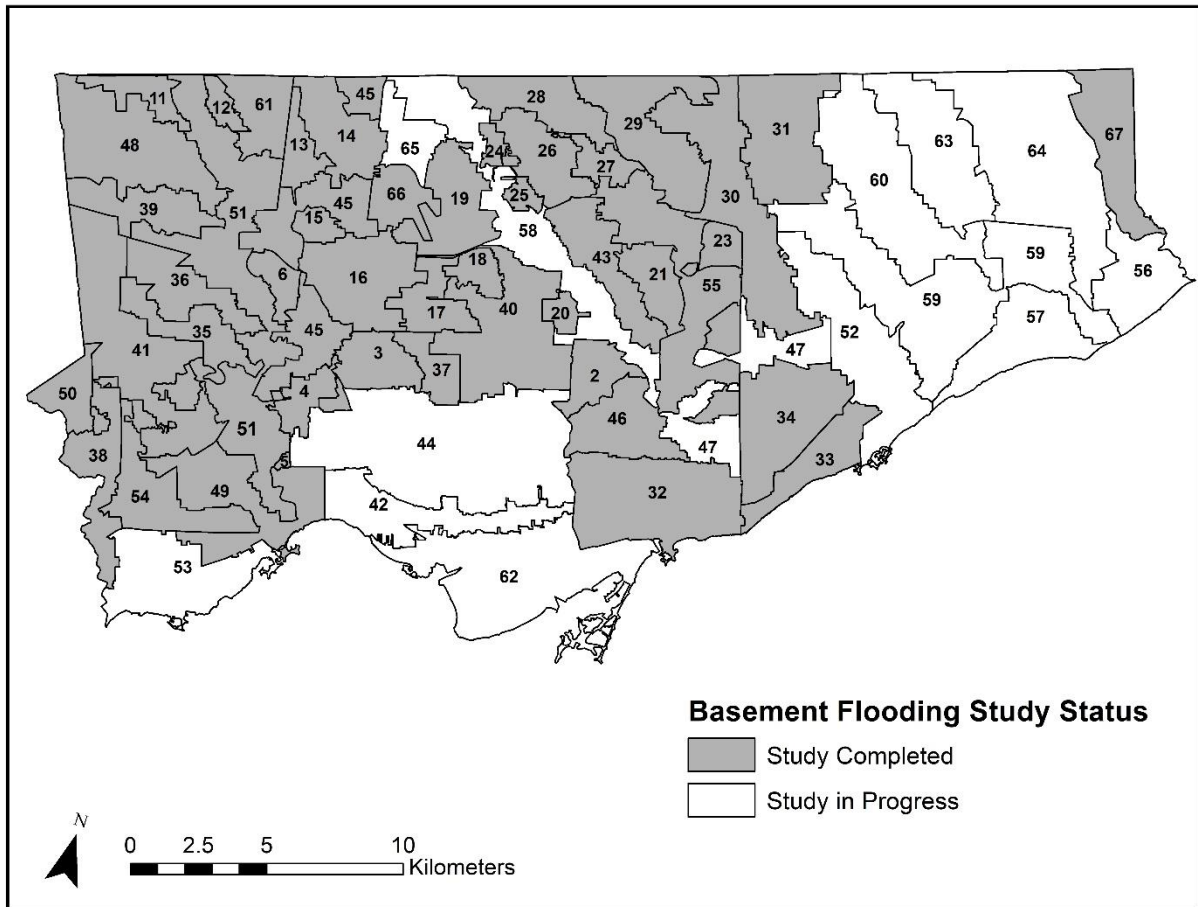


Figure 4: Mandatory Downspout Disconnection – Disconnection Rates by Ward (2021)

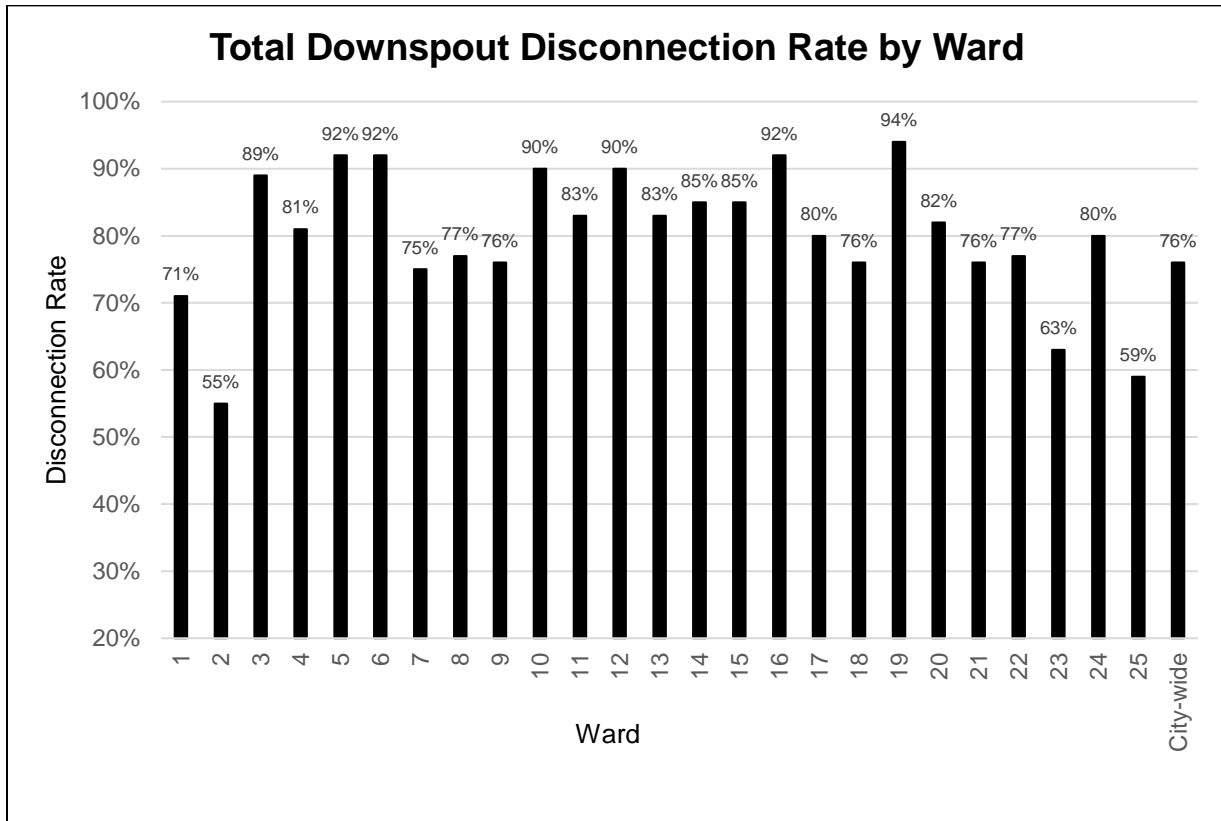


Figure 5: Number of Properties Receiving a Subsidy for Installation of Flood Protection Devices by Ward (up to end of March 2023)

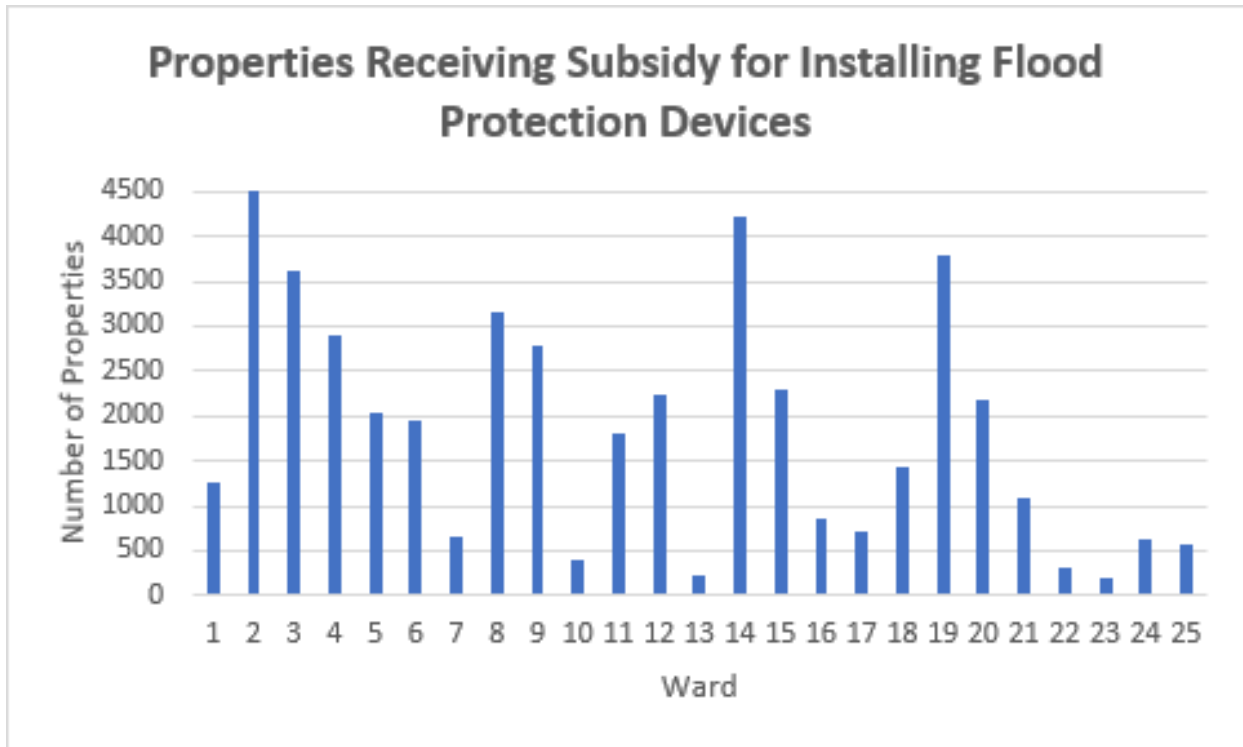


Figure 6: Wet Weather Flow Tributary Monitoring Program (2018-2022)

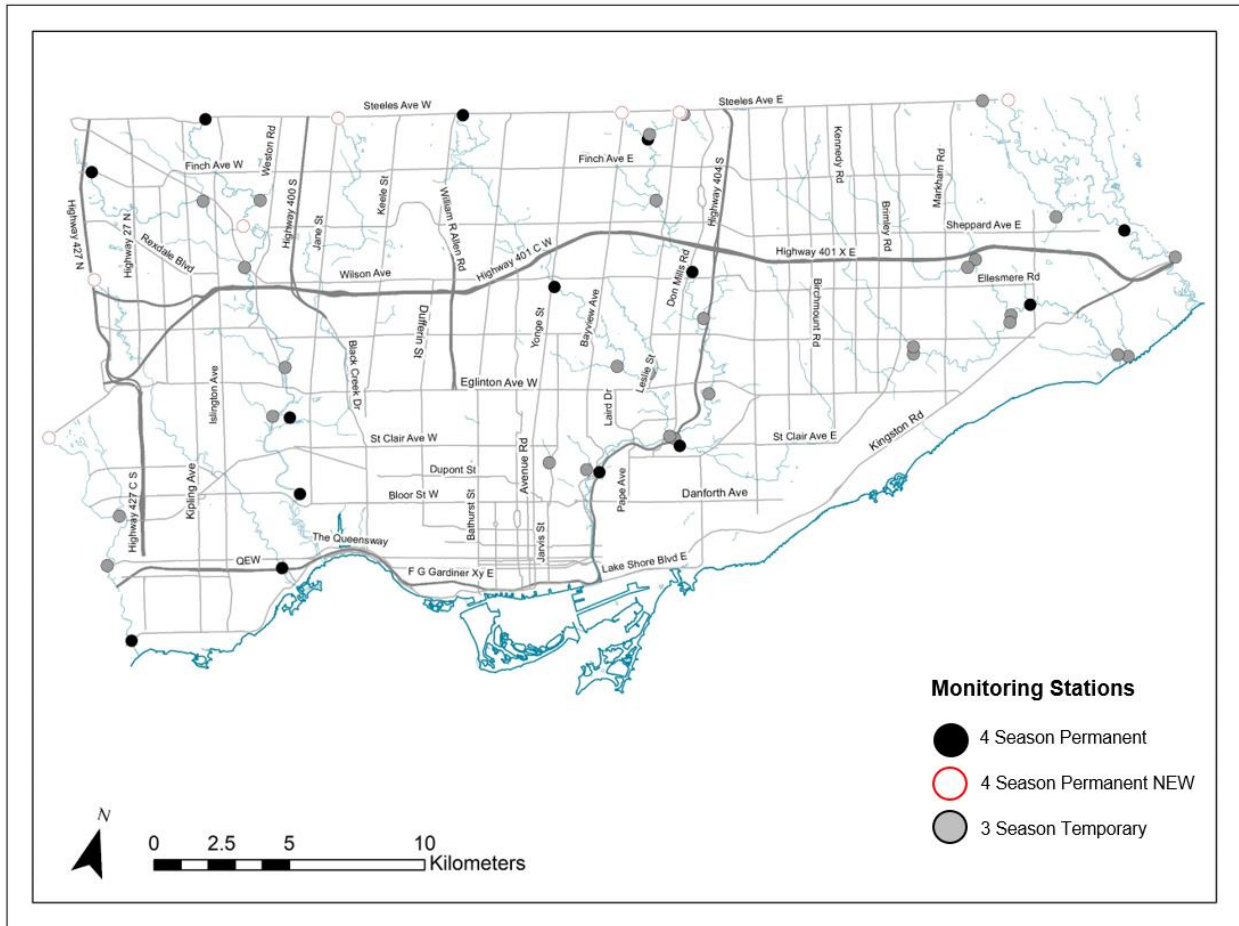
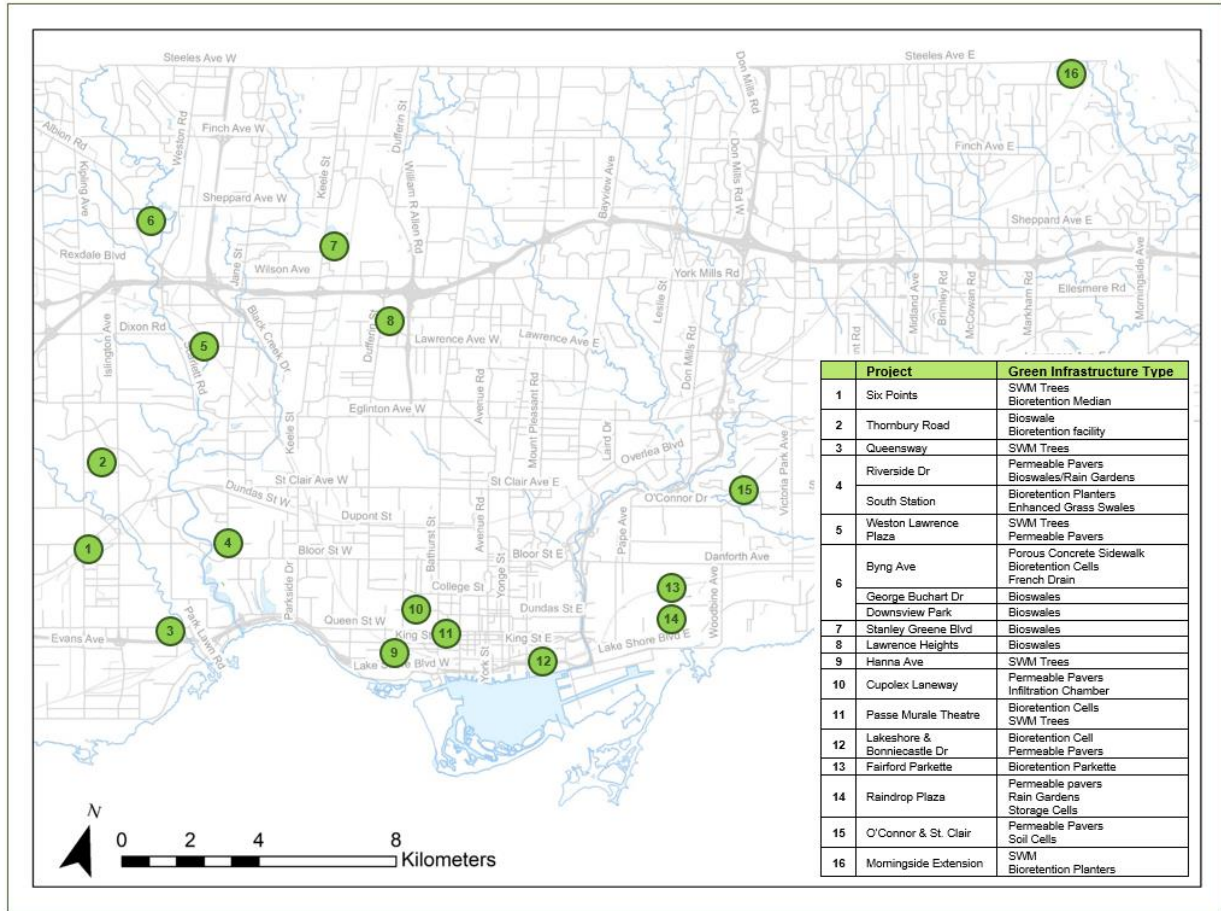


Figure 7: Green Infrastructure Works (January 2023)



Summary of Toronto's Street Sweeping Program

In 2021, the Transportation Services Division (TSD) engaged Ernst & Young LPP ("EY") to undertake a review of the City's Street sweeping and separated bicycle lane operations. EY's report entitled "Review of Street Sweeping Operations - Final Report of all Workstreams" was finalized in December 2022 and documents how the landscape and responsibilities of the street sweeping operations performed by TSD have changed over the years, and how it continues to change. Changes have been observed in the composition of the maintenance vehicle 'fleet', in the amount of cycling infrastructure across the City, and in the population and density of Toronto all with implications for sweeping operations. EY's assessment of the current state and jurisdictional scan developed a concept for the desired (future) state of the sweeping program.

Currently, the TSD has 65 operators, 8 supervisors, 2 superintendents and 2 managers that are responsible for sweeping approximately 12,000 km of curb within the City and an additional ~250 km of expressway. This is completed using 34 regenerative air sweepers (Tymco 600). The operations are split between the four seasons, with an additional spring clean-up in the spring season, leaf program and additional leaf cleaning in the fall, and operations in the winter only when weather is permitting.

Solid Waste Management Services (SWMS) currently has about 10 individuals who operate 6 compact vacuum units to sweep approximately 180 curb kms (2-ways) of separated bicycle lanes. The fleet consists of 5 Mathieu MC-210 units which are designed specifically for separated bicycle lanes. In addition, SWMS has 1 Ravo unit that can only fit wider separated bicycle lanes. SMWS attempts to sweep each bicycle lane every other day. In 2021, SMWS accomplished approximately 1,000 sweeping hours.