

## EXECUTIVE SUMMARY

### Introduction and Background

Over the past two decades the City of Toronto (the City) has experienced a number of severe storm events that has resulted in both surface and basement flooding of many residents' homes as well as damage to City's infrastructure including roads, bridges, culverts and sewers. The severe storms that the City has experienced include events that are in excess of the 100-year storm. On August 19, 2005 various locations within the City received over 150mm of rainfall in 3 hours and more than 4,200 basement flooding complaints were received by the City consequently.

The City retained Aquafor Beech Limited (Aquafor) and its sub-consultants Civica Infrastructure Inc. (Civica), Parsons, Thompson Flow Investigation (TFI) and Archaeological Services Inc. to undertake the Basement Flooding Protection Program (BFPP) Capacity Assessment Studies – Bundle C, Study Areas 55, 58, 65 and 66 (the Capacity Assessment Study). Each study area has a separate report which provides a summary of the study approach and findings. This report is prepared for Study Area 58.

### Study Purpose, Objectives and Scope

The purpose of the Capacity Assessment Study was to assess the existing storm drainage system and sanitary sewer system capacities and provide infrastructure upgrade recommendations that meet the City's basement and surface flooding criteria (the study component), and prepare preliminary designs for selected assignments (the preliminary design component). The primary focus is on the identification and development of Municipal Class Environmental Assessment (MCEA) Schedule A / A+ assignments and alignment of efforts and resources to best accelerate the implementation of assignments. Should any assignments be identified as Schedule B or Schedule C projects, then additional reports will be required to address Phase 2, 3, and / or 4 of the Municipal Class EA Process.

To accomplish these objectives the Capacity Assessment Study includes the following scope:

- Background reviews and desktop analyses including review of as-built records, CCTV, foundation drain records, etc.
- Review and analyses of the flow and rainfall data provided by the City.
- Characterization of dry weather and wet weather flow events (including I/I assessment) in order to determine the response of the system to the extent required for modelling and design.
- Preparation and evaluation of a basement flooding questionnaire.
- Field investigation program, including property survey to verify downspout connections, reverse slope driveways, low points on the road, location and type of maintenance hole/catchbasin covers and overland flow paths, as well as inspection of storm outlets.
- Development and refinement of the InfoWorks storm (dual drainage) and sanitary models and assessment of the interaction between storm, sanitary and overland flow systems, as well as groundwater.

- Detailed engineering assessment of the system performance including flooding mechanism and sequence.
- Development and evaluation of remedial measures to address the flooding issues including constructability and feasibility review.
- Preparation of estimated costs, cost per benefiting property for each Assignment.

Four technical memorandums (TM) and a Final Study Report have been prepared for each study area for the Capacity Assessment Study in accordance with Phase 1 of the Municipal Engineers Association's (MEA) Municipal Class EA Process (October 2000, as amended in 2007, 2011, 2015 and 2023).

As a result of the Capacity Assessment Study, a total of 85 Assignments have been identified for the four study areas (44 Assignments for study area 58), of which a majority of them fall under the MCEA Schedule A/A+ category as per the project objectives. The total estimated construction cost is \$993 million. The total Maximum Construction Cost for the Assignments to move forward into the PD Phase as part of the project is \$47.25 million. As a result, thirteen Assignments have been selected to move into the Preliminary Design phase.

There are also five Assignments that have been identified as Schedule B projects as part of the Capacity Assessment Study. These Assignments were identified as Schedule B due to easement requirements. Since additional studies are required to satisfy the Schedule B requirements as per the Municipal Class EA process, this study report has been prepared for the five Schedule B projects following Master Plan Approach #2. This report presents an overview of the study approach and findings from the Capacity Assessment Study and the A58 Master Plan Study which has a focus on fulfilling the requirements for the Schedule B projects.

### Study Area

Study Area 58, the largest study area within Bundle C, traverses across the City from Steeles Avenue at Keele Street to the Don Valley Parkway at Don Mills Road following the Don River West Branch. Area 58 falls within North York District, forming part of Ward 6 (York Centre), 8 (Eglinton-Lawrence), 14 (Toronto-Danforth), 15 (Don Valley West), 16 (Don Valley East), and 18 (Willowdale). The area consists of distributed residential land uses, valley lands with a mix of commercial, institutional and light-industrial land uses. The study area is comprised largely of smaller, independent sewersheds surrounding the watercourses and has a completely separated sewer system, with the sanitary sewers outletting into the Don River Sanitary Trunk Sewer (STS) System.

The five Schedule B projects identified include the following, which are illustrated in **Figure ES.1** together with the overall study area.

- A58-07: Robert Hicks Finch/Bathurst Area
- A58-28: Old Yonge Street
- A58-29: York Mills Road Area
- A58-39: Belgrave / Highway 401 Area
- A58-41: Eglinton Avenue East Area

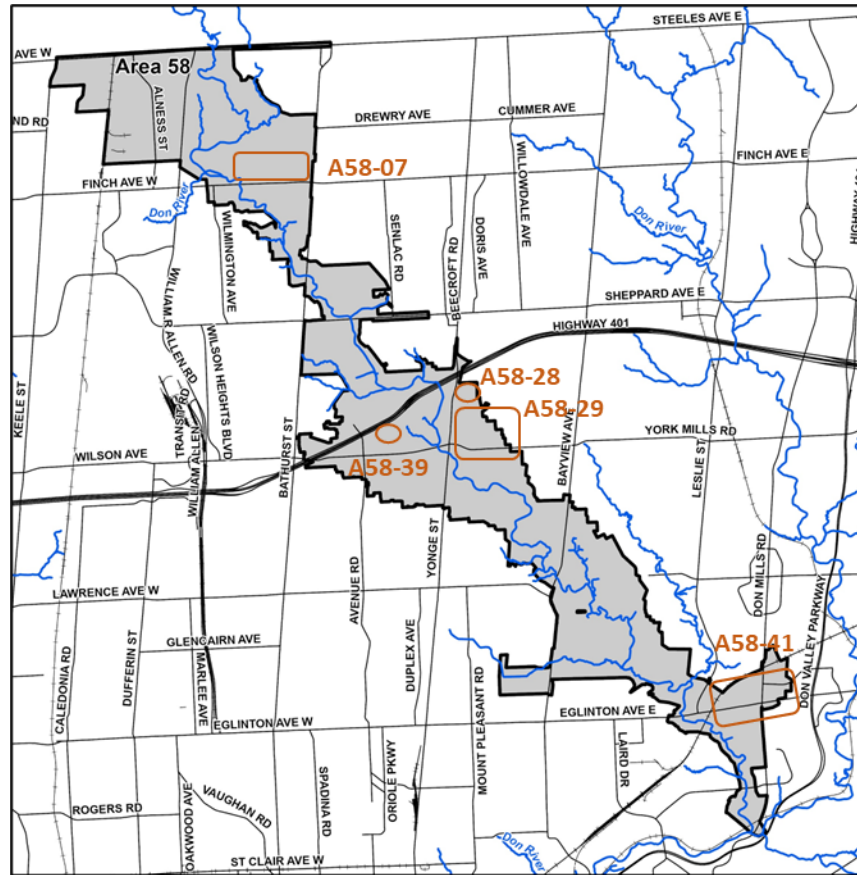


Figure ES.1: Study Area

### Communication and Consultation

The City’s approach to consultation in undertaking this MCEA Master Plan included communication with appropriate government agencies, indigenous communities, the local community and the general public throughout the course of the study. All comments received during the study were responded to by the City’s Public Consultation Unit with support from the study team. The following consultation tools were employed during Phase 1 and 2 of the MCEA process to obtain feedback for this study:

- A mailing list of persons/groups interested and/or affected by the study was set up and contact information was collected through the City’s Public Consultation Co-ordinator, Notice of Commencement and online survey responses, and the Public Drop-in Events’ sign-in sheets.
- Newspaper advertising was prepared in order to notify the community regarding the Municipal Class EA opportunities to participate in the planning process.
- Notices were sent out to help inform stakeholders about Area 58, provide details about the project website, Public Information Centre and online questionnaire.
- An online survey was created in order to obtain additional information about the study area (i.e., history of flooding, level of source control measures implemented).
- A webpage on the City’s website was created to provide useful information about the study, including invitations to consultation opportunities and the Executive Summary for the Master Plan Report.

- Key stakeholders were identified for individual meetings to advise and provide feedback.
- Public Information Centre materials were posted online at the City’s webpage to present an overview of the study including the purpose of the study, types of solutions that have been considered and the preferred solution(s), and impact management, as well as to provide opportunities for public comments and inputs.
- Consultation with Indigenous communities, review agencies and private property owners where easement may be required was undertaken.

TRCA was consulted during both the Capacity Assessment Study and this study. A preliminary consultation meeting was held with TRCA and the City on September 28, 2021 to introduce the Capacity Assessment Study, present the proposed works that are within the TRCA regulated area and / or on TRCA properties and works that are within the municipal right-of-way (ROW) but may have an impact on TRCA regulated lands. A series of comments were received from TRCA on January 25, 2022. TRCA was also notified of the online Public Consultation materials for Area 58 Class EA posted on the City’s Website and provided comments on February 6, 2023. Please refer to **Section 2.5** for further details regarding TRCA consultation process.

### **Phase 1 – Problem and Opportunity**

Flooding incidents were reported following the storm events that occurred on May 12, 2000, August 19, 2005, July 8, 2008, July 8, 2013, October 16 & 24, 2014 and August 7, 2018. A total of 72 properties, approximately 2.5% of all properties in Study Area 58, reported flooding incidents. A majority of the incidents were attributed to the May 12, 2000 storm. Engineering assessments using the hydraulic modelling undertaken during the study identified various locations at risk of basement flooding during extreme events which overload the existing storm and sanitary sewer systems. The frequency and specific causes of basement flooding vary between the different sewer systems which service the study area.

Five Schedule B projects have been identified as part of the base scope of the study. These projects are classified as Schedule B because deficiencies were identified in the existing infrastructure within private properties where improvement works are required but lack of easements. The five projects include:

1. A58-07: Robert Hicks Finch/Bathurst Area (Storm Sewer Upgrades)
2. A58-28: Old Yonge Street (Storm Sewer System Upgrades)
3. A58-29: York Mills Road Area (Sanitary Sewer System Upgrades)
4. A58-39: Belgrave / Highway 401 Area (Storm Sewer System Upgrades)
5. A58-41: Eglinton Avenue East Area (Storm Sewer System Upgrades)

A total of 15 flooding incidents were reported within the five Schedule B project areas. With increasingly severe weather events and continued population growth, the risk of basement and surface flooding needs to be reduced to protect against damage to private property within the study area. The opportunities in this study include the development of a comprehensive storm drainage system and sanitary sewer system improvement plan that meets the current level of service.

## Phase 2 – Alternative Solutions

To minimize basement flooding occurrences and to control wet weather flows, several remedial measures were considered and evaluated. The measures are divided into four categories:

1. Source control measures;
2. Local measures;
3. Remedial measures applicable to the sanitary sewer system; and
4. Remedial measures applicable to the storm drainage system.

It should be noted that the storm and sanitary models were not calibrated to any existing flow monitoring information. As the existing flow monitoring data are limited, a rainfall and flow monitoring program was conducted on the storm and sanitary systems between 2020 and 2022. No significant events (> 40mm/hr) were captured during the flow monitoring period. The storm model was therefore validated using the Hansen records and online questionnaire results. In the absence of sanitary flow monitoring data, the sanitary model used the RTK unit hydrograph approach to generate an I/I rate of 3 L/s/ha during the May 12, 2000 storm, as per Section 2.3.11.e of the RFP.

The hydrologic and hydraulic computer models were used to simulate and size each alternative to meet the City’s targeted level of service. Various remedial alternatives were attempted, where possible, to avoid conflicts with existing storm and sanitary sewers as well as other utilities within the municipal right-of-way.

Three types of solutions, which incorporate the four categories of measures, were developed:

1. Alternative 1: Do nothing;
2. Alternative 2: Works within Easements; and
3. Alternative 3: Works within Municipal Right-of-Way.

These alternatives were evaluated against a range of evaluation criteria from the natural environment, social-cultural, technical and economic categories. Each alternative was scored numerically for each criterion within the four categories based on the level of impact (score of 4 with the most positive impacts and score of 1 with the least benefits). Based on the evaluation, the following alternatives have been selected as the preferred alternative solutions for each of the Schedule B projects. The table below also summarizes the associated estimated cost and cost per benefitting property.

**Table ES.1: List of Preferred Alternatives and Associated Costs**

Problem Area	Preferred Alternative	Estimated Costs	Cost per Benefitting Property
A58-07: Robert Hicks Area	Alternative 2: Works within Easement	\$9,007,000	\$31,603
A58-28: Old Yonge Street	Alternative 2: Works within Easement	\$679,000	\$61,743
A58-29: York Mills Road	Alternative 2: Works within Easement	\$7,745,000	\$0

Problem Area	Preferred Alternative	Estimated Costs	Cost per Benefitting Property
Area			
A58-39: Belgrave Avenue / Highway 401 Area	Alternative 2: Works within Easement	\$627,000	\$38,186
A58-41a: Eglinton Avenue East Area at Gervais Drive	Alternative 3: Works within Municipal Right-of-Way	\$37,774,000	\$1,180,438
A58-41b: Eglinton Avenue East Area at Don Mills Road	Alternative 2: Works within Easement		
<b>Sub-Total</b>		<b>\$55,832,000</b>	-
Contingency (30%)		\$16,749,600	-
Engineering Costs (10%)		\$22,332,800	-
<b>Total</b>		<b>\$94,914,400</b>	-

### Implementation and Potential Impacts

Due to the City’s capital budgeting limitations, basement flooding projects are typically prioritized based on a number of factors to be included in the capital budget for implementation in the near future or placed on hold. One of the key factors is the Cost Per Benefitting Properties (CPBP). Projects that meet the City’s CPBP threshold (\$68,000) will be put forward for consideration to move into the next phase. Projects that exceed the threshold will be placed on hold. Sanitary system improvement projects are not subject to the CPBP threshold evaluation.

As part of the Capacity Assessment Study, thirteen Schedule A/A+ Assignments with a total estimated construction cost of \$47.25 million have been selected to move into the preliminary design phase. These projects, which have a final CPBP less than the threshold, will be brought forward and budgeted in the City’s capital budget within the next decade or so.

Amongst the five Schedule B projects, projects A58-07 (Robert Hicks Area), A58-28 (Old Yonge Street) and A58-39 (Belgrave Avenue / Highway 401 Area) are below the CPBP threshold. A58-29 (York Mills Road Area) is a sanitary project which is not subject to the CPBP threshold evaluation. These four projects are likely to be considered to be incorporated into the City’s capital budget for the upcoming years. The other two projects will likely be placed on hold for a considerable period. Nevertheless, the actual implementation of the Schedule B projects may range from a few years to a few decades. Moreover, an EA document typically needs to be revisited and updated every 10 years. Considering the unknown timeframe at this point, supporting information for the Schedule B projects may need to be updated prior to implementation.

Relevant environmental approvals and permits are also required for these projects. Amongst the five projects, two (A58-28 and A58-41) are subject to TRCA approval since a portion of the proposed works are within TRCA properties / regulated lands. Additional studies, such as natural heritage studies, fluvial geomorphic studies, and/or water resources studies, may be required at the design stage to satisfy TRCA requirements.

Based on the types of preferred solutions, construction is expected to have varying environmental effects depending on the type and location of projects (e.g., additional inlet capacity, sanitary sewer

replacement/upsizing) being implemented. By incorporating proper best management practices and construction techniques, adverse construction related impacts can be minimized. These measures will be further confirmed and refined during the preliminary and detailed design phases for the projects implemented under the BFPP.