



Schedule 'C' Municipal Class EA Environmental Assessment

Wastewater Capacity Improvements in Central Mississauga

Environmental Study Report

For Public Review

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LIST OF ABBREVIATIONS

Term of Acronym	Definition
ANSI	Areas of Natural and Scientific Interest
CCME	Canadian Council of Ministers of the Environment
CEPA	Canadian Environmental Protection Act
COSSARO	Committee on the Status of Species at Risk in Ontario
CVC	Credit Valley Conservation
DFO	Department of Fisheries and Oceans Canada
EA(A)	Environmental Assessment (Act)
ESA	Environmental Site Assessment
ESR	Environmental Study Report
GGH	Greater Golden Horseshoe
LRT	Light Rail Transit
MEA	Municipal Engineers Association
MH	Maintenance Hole (also known as Manhole)
MNDMNR	Ministry of Northern Development, Mines and Natural Resources
MECP	Ministry of the Environment, Conservation and Parks
MTCS	Ministry of Tourism, Conservation and Parks
MTO	Ministry of Transportation
NEP	Niagara Escarpment Plan
NHIC	Natural Heritage Information Centre
OHA	Ontario Heritage Act
OMB	Ontario Municipal Board
ORMCP	Oak Ridges Moraine Conservation Plan
OWES	Ontario Wetland Evaluation System
PIC	Public Information Centre
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetlands
PTTW	Permit to Take Water
ROP(A)	Regional Official Plan (Amendment)
ROW	Right-Of-Way
RTC	Real Time Control
SAR	Species at Risk
SPS	Sewage Pumping Station
SWP	Source Water Protection
TBM	Tunnel Boring Machine
TRCA	Toronto and Region Conservation Authority
V/C Ratio	Volume to Capacity Ratio
WWTP	Wastewater Treatment Plant

1.0 Introduction and Background

1.1 Study Introduction

The Region of Peel (Region) initiated the Wastewater Capacity Improvements for the Central Mississauga Class Environmental Assessment (EA) Study in March 2019 to identify, develop and implement a strategy to service growth and relieve capacity constraints in the Central Mississauga area. This Class EA study was completed as a Schedule 'C' undertaking in accordance with the requirements of the Municipal Class Environmental Assessment process, prepared by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011 and 2015).

The City of Mississauga is bounded by the City of Brampton to the north, City of Toronto to the east, Region of Halton to the west and Lake Ontario to the south. The Region is responsible for the installation, maintenance and operation of all public water and wastewater infrastructure located within its lower tiers: City of Mississauga, City of Brampton and Town of Caledon.

The primary purpose of this project was to complete a Class EA Study to increase the conveyance capacity of key trunk sewers within Central Mississauga that will meet growth needs to 2041 and beyond as well as to:

- Provide operational flexibility for sewer maintenance, inspection and emergency operations.
- Meet level of service across different areas.
- Address wet weather issues.

Hydraulic restrictions along sections of the Cooksville Creek Trunk Sewer, Canadian Pacific Railway ("CPR") Trunk Sewer and Little Etobicoke Creek Trunk Sewers, as well as other limitations that challenge further upgrades to existing trunk sewers (particularly along the CPR), support the need to consider alternative alignments for conveyance of flow to the G.E. Booth Wastewater Treatment Plant (WWTP). The Region is also undertaking replacement, rehabilitation, and installation of additional sewers on Burnhamthorpe Road, Wilcox Road and Cawthra Road. This Class EA study integrated these system improvements and reviewed these projects with a broader approach to ensure alignment with long-term wastewater servicing objectives.

1.2 Study Background

In the Central Mississauga area, the Region has a long history of undertaking wastewater system studies, strategies and upgrades due to the continuous and extensive growth within the area.

During the 2014 Region of Peel Water and Wastewater Master Plan, a list of preliminary upgrades was identified in the Central Mississauga area. These upgrades consisted mainly of upsizing individual pipe sections within the CPR and Cooksville Creek Trunk Sewers to address peak wet weather capacity issues. These recommended projects did not provide the additional benefit of operational flexibility or opportunity for flow splits and/or diversions between the trunk sewers (see **Figure 1**, W WW MP – 2013/2014).

The 2014 Region of Peel Mississauga City Centre (MCC) Master Plan then analyzed the potential for high density growth beyond 2031 projections which lead to a number of new recommendations for the MCC area (see **Figure 1**, MCC MP 2014):

- Diverting flow west from MCC along Confederation Parkway to a new sanitary pumping station (SPS) and forcemain on The Queensway which then would be pumped west to Clarkson Wastewater Treatment Plant (WWTP) catchment.
- Split flows between Cooksville Trunk Sewer and CPR Trunk Sewer, connection at Burnhamthorpe, to avoid Cooksville Trunk Sewer upgrades.
- New SPS on The Queensway to pump flow west to Clarkson WWTP which aligned with the East to West Diversion Class EA Strategy ESR completed in 2017.

The East to West Diversion strategy when implemented will enable East to West flow diversions to support WWTP flow balancing needs as well as help avoid the need for downstream trunk sewer conveyance upgrades.

In 2016, the East to West Diversion Schedule 'C' Class EA resulted in a solution that eliminated the need for The Queensway East to West diversion. As a result, the focus for a servicing strategy within the CPR and Cooksville sewer catchments would be on growth directly within the catchments themselves, rather than a Region-wide diversion strategy.

Finally, the 2019 Region of Peel Water and Wastewater Master Plan focused on growth projections to 2041. The Master Plan has reconfirmed the East to West wastewater diversion strategy as well as introduced several capital plan projects within the Central Mississauga area to service the growth in the Cooksville and CPR trunk sewer drainage areas. The following recommended projects within the study area will be validated through the completion of the Central Mississauga Class EA study (see **Figure 1**, WW MP – 2015-2018):

- 1,500 mm tunnelled trunk sewer on Cawthra between Burnhamthorpe Road and Dundas Street.
- 1,500 mm trunk sewer from Central Parkway to the new Cawthra Road sewer.
- 1,500 mm tunnelled trunk sewer from Little Etobicoke Creek Trunk Sewer to the new Cawthra Road sewer.
- 1,500 mm tunnelled sewer on The Queensway from Hurontario Street to the East Trunk Sewer.
- 1,500 mm sewer connecting the CPR Trunk Sewer to the new Queensway Trunk Sewer.

This Class EA advances the 2019 Master Plan's servicing concept to a detailed servicing strategy and defines specific projects, sites and alignments.

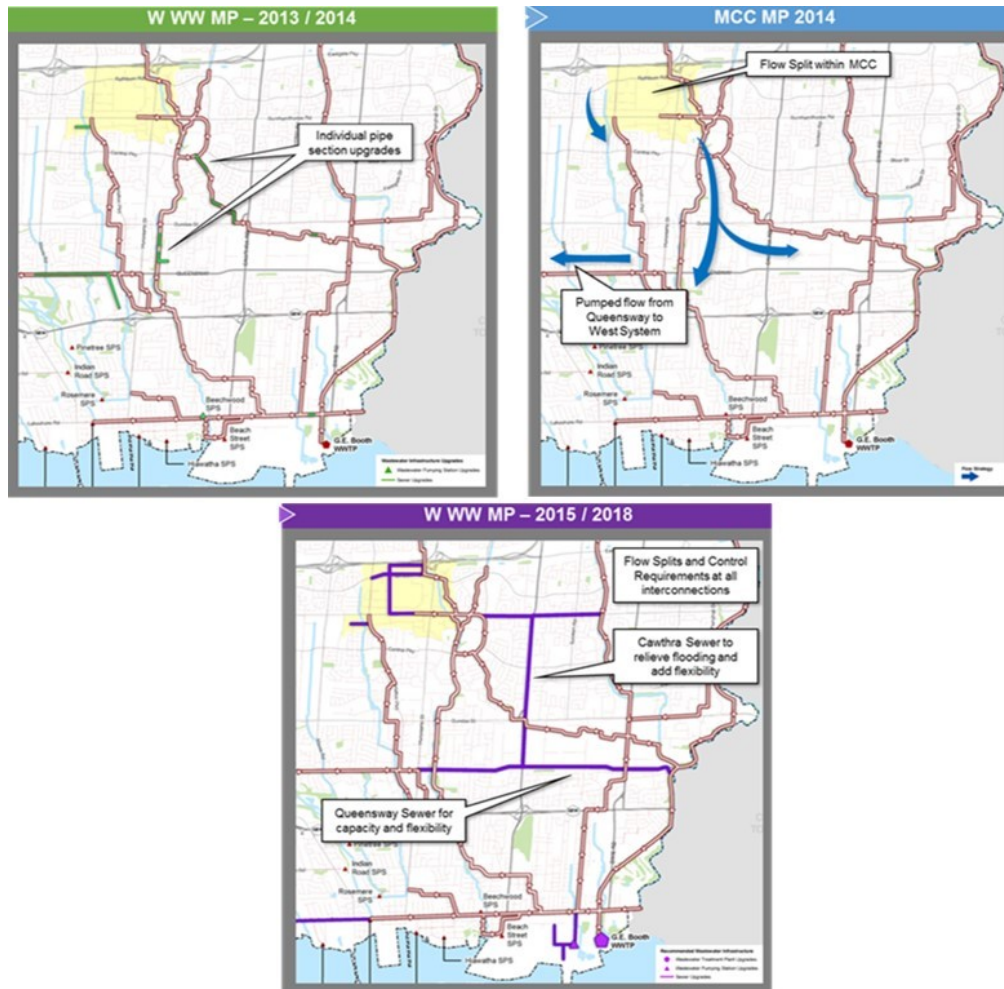


Figure 1: Study Background

1.3 Study Purpose and Objectives

The Region of Peel initiated this Municipal Class EA Study to investigate alternative wastewater strategies for the area with the goal to address a system-wide Problem/Opportunity Statement. The EA confirms the preferred solution including routes, sites, design and construction timing. Based on current growth projections to 2041, the current capacity to convey future flow from the MCC, Hurontario and Dundas corridors within the study area will not be sufficient to maintain level of service. The objectives of the study were to:

- Develop a comprehensive list of alternative solutions.
- Confirm the overall Central Mississauga servicing objectives and perform first principal engineering analysis of the servicing alternatives.
- Satisfy the Municipal Class EA requirements for the servicing solution.
- Consider the unique opportunities and challenges associated with utility and infrastructure services, environment and natural features, and socio-economic impacts.
- Provide effective communication and consultation with stakeholders, agencies, Indigenous communities and the public throughout the entire Class EA study process.

- Analyze and develop the preferred solution to ensure successful implementation of the infrastructure components.
- Identify all potential impacts and associated mitigation measures.
- Provide sufficient level of preliminary design to demonstrate the extents of the infrastructure, improve project lifecycle cost estimating, provide detailed phasing and implementation requirements, identify overall operational concepts, and identify permit and approval requirements.
- Deliver comprehensive documentation of the strategy, evaluation and recommendations in line with Class EA requirements.

1.4 Study Area

The conceptual study area provides a broad view of servicing opportunities and alternatives to ensure the strategy considers a solution for the entire Central Mississauga catchment.

The study area is located in the City of Mississauga within the Region of Peel and is bounded by Etobicoke Creek to the east, Confederation Parkway to the west, Highway 403 to the north, and QEW to the south shown in **Figure 2**. It includes Mississauga City Centre, the Hurontario Corridor and the Dundas Corridor growth areas. The study falls within four Municipal Wards: 1 (east), 3 (north), 4 (west) and 7 (south).

1.5 Document Purpose and Aim

This document focuses on the Municipal Class EA process, Phase 1 to 5. The purpose of this document is to identify the problem/opportunity statement, expand on the inventory of features and analysis of the existing conditions of the area, identify and evaluate the alternative solutions and select the preliminary preferred solution and design concept to address the study's Problem/ Opportunity Statement.

The Environmental Study Report (ESR) for the Central Mississauga EA study documents the comprehensive process and is organized into the following sections:

- **Section 1 – Introduction and Background**
An introduction of the wastewater system, the history of the Central Mississauga study area strategy, the study purpose and objectives, and the report outline.
- **Section 2 – Municipal Class EA Process and Objectives**
Overview of the Municipal Class EA process, principles of environmental planning, a summary of the public and agency consultation process undertaken, and the public review process.
- **Section 3 – Baseline Features and Servicing Conditions**
A baseline description of the Study Area is provided, highlighting its natural features including terrestrial environment, geotechnical conditions, hydrogeological resources, and aquatic resources. It also provides a baseline of the existing land use, wastewater infrastructure, utilities, transportation network, socio-economic and socio-cultural features.
- **Section 4 – Phase 1 - Problem / Opportunity Statement**

Identifies and describes the problems and opportunities addressed by this Class EA study. It gives an overview of the baseline opportunities and constraints which demonstrate and justify the need for the study.

- **Section 5 – Phase 2 - Alternative Solutions**

Describes the process undertaken to identify the alternative ideas, concepts, and routes that were considered as part of the study process. It provides the evaluation criteria and an overview of the evaluation of the alternatives, including high level consideration of construction methodology, potential impacts and associated mitigation measures. The section concludes with the identification of the preferred solution.

- **Section 6 – Phase 3 - Design Concepts Alternatives**

Based on the preferred diversion concept, alternatives for the sewer route and the shaft sites are identified, including construction methodology, construction of the access shafts, the sewer route as well as the impacts and associated mitigation measures. Following evaluation of the alternative routes and sites, a refined sewer route and specific shaft sites are recommended.

- **Section 7 – Preferred Design Concept Solution**

Provides an overview of the recommended sewer route and shaft sites and preliminary design details on the construction of the diversion sewer and the tunnel shaft compound sites.

- **Section 8 – Built and Natural Environment Impacts and Mitigation Measures**

Provides an overview of the sewer route and shaft site construction impacts on the built and environment including natural features, wildlife habitat, groundwater, watercourses, contamination, geotechnical, archaeology, cultural heritage, traffic and climate change. A detailed summary of the potential impacts and associated mitigation measures associated with the construction of the proposed works is provided.

- **Section 9 – Design Commitments**

A summary of the design commitments for the next phase of this project including detailed design and construction.

- **Section 10 – Implementation**

Outlines the various permits and approvals required by the relevant review agencies as part of the design, construction, and implementation process.

- **Section 11 – Conclusion**

This section summarizes the conclusions of the study process and lists the recommendations and commitments following approval of the Class EA study.

1.6 Public Review Period and Next Steps








This ESR meets the requirements of a Schedule C Municipal Class EA study. Filing of this ESR initiates the 30-day public review period starting February 16, 2022 and ending March 18, 2022. To facilitate public review of this document, an electronic copy is posted on the Region of Peel project website:

<https://www.peelregion.ca/pw/water/environ-assess/scheduled-c-class-environmental-assessment.asp>



For review of a hard copy version of the ESR, please contact the Project Manager at the Region of Peel (contact information available on the Region of Peel project website above).

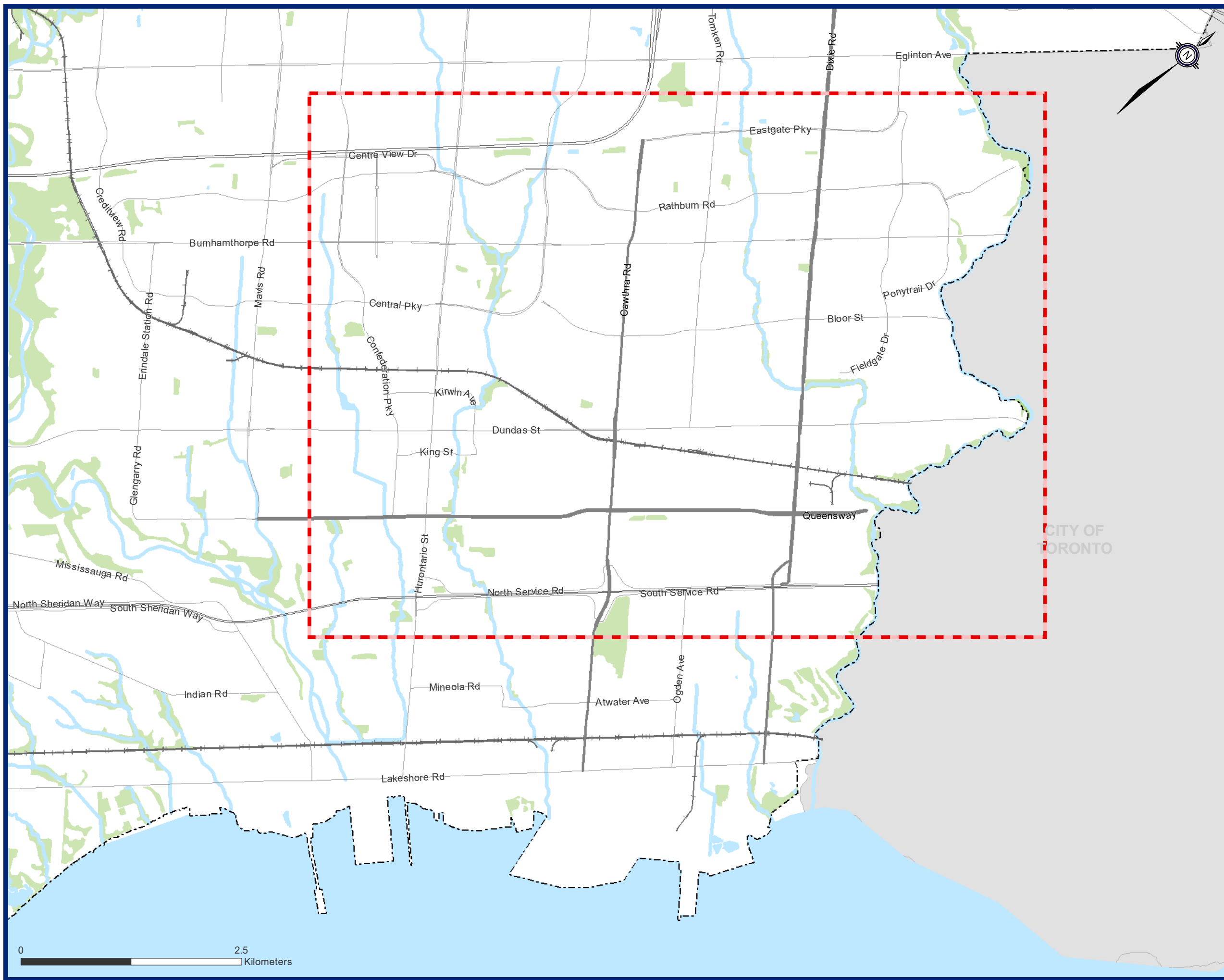
**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

General Features

-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeways
-  Regional Roads
-  Major Roads

Environmental Features

-  Wooded Areas
-  Creeks, Rivers, and Waterbody



CITY OF TORONTO

**Figure 2
Study Area**

2.0 Municipal Class EA Process and Objectives

This Class EA study was completed as a Schedule 'C' undertaking in accordance with the requirements of the Municipal Class Environmental Assessment process (October 2000, as amended in 2007, 2011 and 2015). The Class EA process includes public and review agency consultation, identification and evaluation of servicing strategy alternatives, an assessment of the preferred alternative, identification and evaluation of design alternatives and a comprehensive identification of measures to mitigate potential adverse effects.

2.1 Class Environmental Assessment Act

Ontario's *Environmental Assessment Act* (EAA) was passed in 1975 and was proclaimed in 1976. The EAA requires proponents to examine and document the environmental effects that could result from major projects or activities and their alternatives. Municipal undertakings became subject to the EAA in 1981.

The EAA's comprehensive definition of the environment is:

- Air, land or water.
- Plant and animal life, including human life.
- The social, economic and cultural conditions that influence the life of humans or a community
- Any building, structure, machine or other device or thing made by humans.
- Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities.
- Any part of combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of the EAA is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in Ontario (RSO1990, c.18, s.2). An EAA must also ensure that decisions result from a rational, objective, transparent, replicable, and impartial planning process.

As set out in Section 5(3) of the EAA, an EA document must include the following:

- A description of the purpose of the undertaking.
- The undertaking.
- The alternative methods of carrying out the undertaking.
- Alternatives to the undertaking.

The EA document must also include a description of:

- The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking.
- The effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking or alternatives to the undertaking.

- The actions necessary or that may reasonable be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking or alternatives to the undertaking.
- An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking (RSO1990, c.18, s.2).

2.2 Principles of Environmental Planning

The EAA sets a framework for a rational, objective, transparent, replicable and impartial planning process based on the following five key principles:

- **Consultation with affected parties.** Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address any concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- **Consideration of a reasonable range of alternatives.** Alternatives include functionally different solutions, “alternatives to” the proposed undertaking and “alternative methods” of implementing the preferred solution. The “do nothing” alternative must also be considered.
- Identification and consideration of the effects of each alternative on all aspects of the environment. These aspects include the natural, social, cultural, technical and economic environments.
- Systematic evaluation of alternatives in terms of their advantages and disadvantages to determine their net environmental effects. The evaluation shall increase in the level of detail as the study moves from the evaluation of “alternatives to” to the evaluation of “alternative methods”.
- Provision of clean and complete documentation of the planning process followed to allow “traceability” of decision-making with respect to the project. The planning process must be documented in such a way that it may be repeated with similar results.

THE CLASS EA – A FRAMEWORK FOR ENVIRONMENTAL PLANNING

The Class EA provides the framework for environmental assessment planning of municipal infrastructure projects to fulfill the requirement of the EA Act.

2.3 Class Environmental Assessment Process

“Class” Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigable impacts. The Municipal Class EA process was revised and updated in 1993, 2000, 2007, 2011 and 2015. The Class EA approach streamlines the planning and approvals process for municipal projects that are:

- Recurring.
- Similar in nature.
- Usually limited in scale.
- Predictable in the range of environmental impacts.
- Responsive to mitigation.

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007, 2011 and 2015) outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater, stormwater management and road projects. The process includes five phases:

- **Phase 1:** Problem or Opportunity Definition.
- **Phase 2:** Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution while taking input from the public and other stakeholders into consideration.
- **Phase 3:** Examination of Alternative Methods of Implementation of the Preferred Solution while taking input from the public and other stakeholders into consideration.
- **Phase 4:** Documentation of the Class EA process in the form of an Environmental Study Report (ESR) for public review.
- **Phase 5:** Implementation and Monitoring.

Public and agency consultation are integral to the Class EA planning process. Projects subject to the Class EA process are classified into the following four “schedules” depending on the extent of the expected impacts. **Figure 3** illustrates the Municipal Class EA planning and design process with the phases required for each schedule.

Schedule A projects are minor or emergency operational and maintenance activities and are approved without the need for further assessment. These projects are typically smaller in scale and do not have a significant environmental effect.

Schedule A+ projects are also pre-approved; however, the public is to be advised prior to the project implementation. Although projects of this class do not usually have the potential for adverse environmental impacts, they tend to be broader in scale in comparison to Schedule A projects.

Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed (refer to **Figure 3**). The proponent is required to consult with the affected public and relevant review agencies. If there are still outstanding issues after the public review period, requests may be made to the Minister of the Environment for a Section 16 Order (formerly known as a Part II Order). A Section 16 Order is also known as bumping-up the project to a Schedule C Class EA or an Individual EA. Provided that no significant impacts are identified and no requests for a Section 16 Order are received, once a Schedule B project is approved, work may proceed directly to implementation.

Schedule C projects must satisfy all five phases of the Class EA process. These projects have the potential for greater environmental impacts. Phase 3 involves the assessment of alternative methods of carrying out the project, as well as public consultation on the preferred conceptual design. Phase 4 normally includes the preparation of an Environmental Study Report (ESR) that is filed for public review. Provided no significant impacts are identified, and no requests for Section 16 Orders are received, once a Schedule C project is approved, work can proceed directly to implementation.

Given the nature of this project, the Municipal Class EA for the Wastewater Capacity Improvements for Central Mississauga is classified as a Schedule 'C' undertaking and is required to satisfy Phases 1 through 5 of the Class EA process.

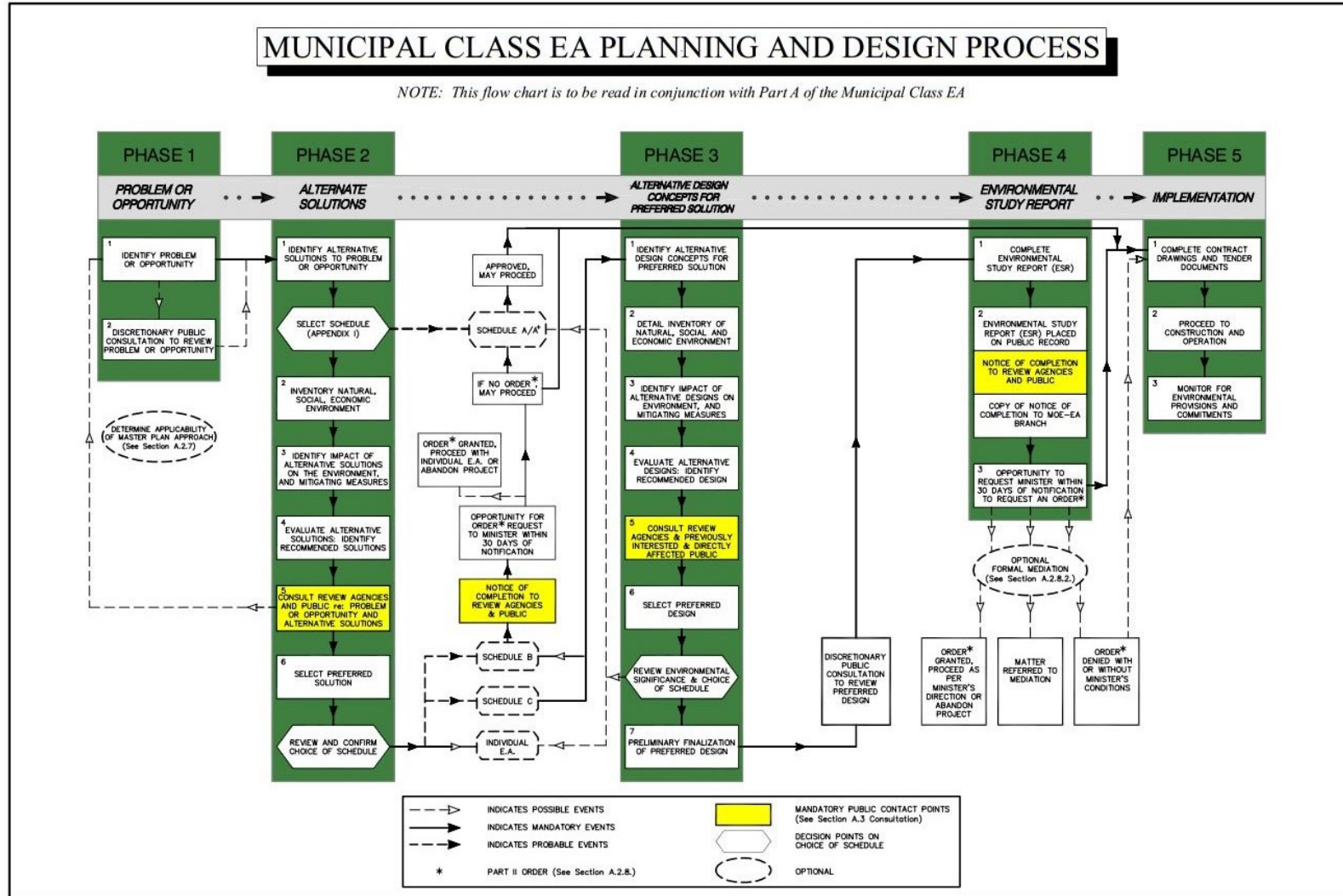


Figure 3: Municipal Class EA Planning and Design Process

2.4 Public Consultation

Public consultation is an important component of the Class EA process and includes informing members of the community and stakeholders to provide balanced and objective information as well as to obtain valuable feedback on the study process, alternatives, and preliminary preferred solution. The Region of Peel continues to coordinate with the City of Mississauga, Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC) regarding coordination of various EA and road widening projects within the study area.

The primary goals and objectives of the public consultation process are to:

- Present clear and concise information at key stages of the study process.
- Solicit community, regulatory, Regional and Local staff input.
- Identify concerns that might arise from the undertaking.
- Undertake a comprehensive Indigenous consultation to fulfill the Region's Duty to Consult with Indigenous communities.
- Consider stakeholder comments when developing the preferred solution.
- Meet Municipal Class EA Consultation requirements.

2.4.1 Public and Agency Consultation Plan

An important component at the outset of the public consultation process was to develop a Public and Agency Consultation Plan. The primary objective of the Plan was to encourage two-way communication with the community, regulatory agencies, Regional and Local staff. The Plan was designed to:

- Build on past communication protocols and consultation plans from previous Class EA and municipal planning initiatives, to ensure consistency and continuity.
- Ensure the general public, Councillors, stakeholders, external agencies (including federal and provincial) and special interest groups have an opportunity to participate in the study process.
- Ensure that accurate information is provided to interested and affected stakeholders in a timely manner.
- Make contact with external agencies to obtain legislative or regulatory approvals, or to collect pertinent technical information.

The Public and Agency Consultation Plan outlines the consultation process throughout the Class EA study with Regional staff and select external stakeholders in order to solicit input and to explore feasibility/viability of alternative servicing strategies. Key stakeholders include Credit Valley Conservation (CVC), Toronto and Region Conservation Authority (TRCA), City of Mississauga, and the Ministry of the Environment, Conservation and Parks (MECP).

The Study Contact List was initially developed based on the project team's knowledge of the study area and baseline information provided by Region staff. The Study Contact List has been continuously updated throughout the process to include any and all relevant agencies, stakeholders and interested parties including Indigenous communities, government agencies, utilities and other special interest groups. Property owners were contacted early in the decision-making process once potential property and easement requirements were identified.

The Public and Agency Consultation Plan outlined the public notifications completed for this study such as study commencement, the two rounds of Public Information Centres (PICs), and study completion. Notifications were issued via the local newspaper (*Mississauga News*), direct mailing/emailing to local residents, businesses and stakeholders in the Study Contact List, and via the Region's project website (<https://www.peelregion.ca/pw/water/environ-assess/scheduled-c-class-environmental-assessment.asp>).

For internal project updates, the Consultation Plan included Councillor project briefings to be prepared and issued to Councillors to ensure they are kept aware of the study and address any concerns raised by their constituents. Opportunities to meet one-on-one was also made available to Councillors whose wards fall within the Study Area.

The Public and Agency Consultation Plan is provided in **Appendix Volume 1, Appendix A**.

2.4.2 Communication and Consultation Summary

2.4.2.1 Contact List

A Study Contact List was compiled of key stakeholders including government review agencies, local municipalities, conservation authorities and interested members of the community. This list was developed at the outset of the study and was updated throughout the course of the study as comments were received. The contact list was also used for mail and e-mail correspondence, where applicable. Agency stakeholders included:

- Indigenous Communities
- Conservation Authorities
- Emergency and Health Services
- Federal, Regional and Municipal Agencies
- Rail and Transit
- Resident/Community Associations
- School Boards
- Utilities

The full Study Contact List is provided in **Appendix Volume 1, Appendix B**.

2.4.3 Study Commencement

The formal Notice of Commencement was first published and distributed in May 2019 to public and agency stakeholders as follows:

- Mailed to stakeholders included in the Study Contact List on May 30, 2019.
- Advertised in the Mississauga News on May 30, 2019 and June 6, 2019.
- Posted on the Region of Peel’s project website.

2.4.4 Phase 1 Consultation

Following the distribution of the Notice of Commencement (**Appendix Volume 1, Appendix C**), the project team consulted with the City of Mississauga. The intent of the consultation was to introduce the project, discuss the EA process and announce key contacts of the project.

Table 1: Phase 1 Stakeholder Meetings

Review Agency	Date	Meeting Summary/Outcomes
All Stakeholders	May 30, 2019	<ul style="list-style-type: none"> • Notice of Commencement sent to all stakeholders on the study contact list
City of Mississauga	June 27, 2019	<ul style="list-style-type: none"> • Discussion focused on the introduction of the study and key study objectives • Project team provided project history, preliminary visioning and overview of the EA process • City provided key contact information and information on the City’s EA communications protocol

2.4.5 Phase 2 Consultation

Prior to PIC No. 1, the project team consulted with the conservation authorities, City of Mississauga, Indigenous Communities, and utilities. The intent of the consultation was to provide an overview of the Phase 2 EA process including evaluation and selection of the preliminary preferred solution.

Table 2: Phase 2 Stakeholder Meetings

Review Agency	Date	Meeting Summary/Outcomes
Indigenous Communities	December 2, 2019	<ul style="list-style-type: none"> • Project team provided a project update letter to all Indigenous Communities identified through the consultation process • Notification that Draft Technical Studies (Natural Environment, Archaeological and Cultural Heritage) are available upon request
Ministry of Transportation	December 9, 2019 & December 23, 2019	<ul style="list-style-type: none"> • Project team provided the short list of alternatives for review • MTO provided information on the planned QEW projects that conflict with the short list of alternatives along North and South Service Roads
Trans-Northern Pipelines Inc.	December 16, 2019	<ul style="list-style-type: none"> • Project team provided the short list of alternatives for review • TNPI provided infrastructure mapping and commentary for each short list alternative

Review Agency	Date	Meeting Summary/Outcomes
TC Energy	December 18, 2019	<ul style="list-style-type: none"> Project team provided the short list of alternatives for review TC Energy confirmed that they do not have any infrastructure within the study area
Ontario Power Generation	December 19, 2019	<ul style="list-style-type: none"> Project team provided the short list of alternatives for review OPG confirmed that they do not have any infrastructure within the study area
Enbridge	January 6, 2020	<ul style="list-style-type: none"> Project team provided the short list of alternatives for review Enbridge provided infrastructure mapping surrounding each of the short list of alternatives
Credit Valley Conservation Authority	January 28, 2020	<ul style="list-style-type: none"> Project team provided a project update Project team presented the evaluation process including alternatives and criteria Project team identified the preliminary preferred solution and conceptual shaft locations within CVC regulated lands CVC confirmed the preliminary preferred route and conceptual shaft site are acceptable at this time
Toronto and Region Conservation Authority	January 28, 2020	<ul style="list-style-type: none"> Project team provided a project update Project team presented the evaluation process including alternatives and criteria Project team identified the preliminary preferred solution and conceptual shaft locations within TRCA regulated lands TRCA requested that the project team review the shaft site at Etobicoke Creek to ensure it is the most viable option
City of Mississauga	February 10, 2020	<ul style="list-style-type: none"> Project team provided a project update Project team presented the evaluation process including alternatives and criteria Project team identified the preliminary preferred solution and conceptual shaft locations City confirmed the preliminary preferred route and conceptual shaft site are acceptable at this time and provided commentary to be considered during the design phase of the study
All Stakeholders	February 27, 2020	<ul style="list-style-type: none"> Notice of Public Information Centre 2 sent to all stakeholders on the study contact list
Hydro One	March 26, 2020	<ul style="list-style-type: none"> Hydro One provided updated contact list Project team provided a project update Project team presented the preliminary preferred solution and conceptual shaft locations

Review Agency	Date	Meeting Summary/Outcomes
		<ul style="list-style-type: none"> Hydro One advised on ownership and minimum clearances along Queensway alignment

2.4.5.1 Public Information Centre No. 1

The first Public Information Centre (PIC) introduced the study, described the Class EA process, identified the problems and opportunities, provided baseline information on the Conceptual Study Limit, presented the shortlisted servicing alternatives, and identified the preliminary preferred solution. Contacts for providing input and comments were also provided.

Public and agency stakeholders were informed of PIC No. 1 by newspaper advertisements, mail/email and the Region's project website as described above. PIC No. 1 was an in-person event. **Table 1** identifies the dates, times, and locations for PIC No. 1

Table 3: PIC No. 1 Date, Time and Location

Date	Time	Location
Tuesday, March 10, 2020	5:00 pm – 7:30 pm	Mississauga Valley Community Centre, 1275 Mississauga Valley Blvd, Mississauga, ON L5A 3R8

Representatives from the Region of Peel and its Consultant, GM BluePlan Engineering, were present at the PIC to provide information and answer questions. The PIC No. 1 Summary Report, which includes a summary of PIC materials, attendance and comments is provided in **Appendix Volume 1, Appendix D**.

2.4.6 Phase 3 Consultation

Prior to PIC No. 2, the project team consulted with the conservation authorities, City of Mississauga, Indigenous Communities, and utilities. The intent of the consultation was to provide an overview of the Phase 3 EA process including evaluation and selection of the preliminary preferred design concepts for the alignment and shaft sites.

Table 4: Phase 3 Stakeholder Meetings

Review Agency	Date	Meeting Summary/Outcomes
Indigenous Communities	May 6, 2020	<ul style="list-style-type: none"> Communication with Indigenous Communities to confirm contact email information as a result of COVID-19 pandemic.
Indigenous Communities	November 2020	<ul style="list-style-type: none"> Stage 2 Archaeological Assessment Notification via the Ministry of Heritage, Sport, Tourism and Culture Industries.
Hydro One	January 18, 2021	<ul style="list-style-type: none"> Project team provided the preliminary preferred design concept for review Hydro One provided commentary to be considered in Environment Study Report

Review Agency	Date	Meeting Summary/Outcomes
City of Toronto	February 17, 2021	<ul style="list-style-type: none"> Project team confirmed City road access at Etobicoke Creek and Sherway Drive
City of Mississauga	February 18, 2021 May 26, 2021	<ul style="list-style-type: none"> Project team presented the preliminary preferred design concept for all shaft locations City confirmed the preliminary preferred design concept are acceptable at this time and provided commentary to be considered in Environmental Study Report
Credit Valley Conservation Authority (CVC)	February 24, 2021 March 16, 2021	<ul style="list-style-type: none"> Project team presented the preliminary preferred design concept for locations within CVC regulated lands CVC requested a scour assessment be completed at Queensway East and Cooksville Creek to inform preferred construction methodology
Toronto and Region Conservation Authority (TRCA)	March 1, 2021 June 1, 2021	<ul style="list-style-type: none"> Project team presented the preliminary preferred design concept for locations within TRCA regulated lands TRCA confirmed the preliminary preferred design concept are acceptable at this time
All Stakeholders	June 4, 2021	<ul style="list-style-type: none"> Notice of Public Information Centre 2 and project update Notification that Draft Technical Studies (Natural Environment, Archaeological and Cultural Heritage) are available upon request
Indigenous Communities	May 13, 2021	<ul style="list-style-type: none"> Project team provided a project update letter to present the preliminary preferred solution. Provided each group the opportunity to receive a copy of the discipline studies for review

2.4.6.1 Public Information Centre No. 2

The second Public Information Centre (PIC) presented the Class EA process, preferred solution presented at PIC No. 1, studies completed to support the project, design concept alternatives and identified the preliminary preferred design concept. Contacts for providing input and comments were also provided.

Public and agency stakeholders were informed of PIC No. 2 by newspaper advertisements, mail/email and the Region's project website as described above. **Table 5** identifies the dates, times, and locations for PIC No. 2.

Table 5: PIC No. 2 Date, Time and Location

Date	Location
June 22, 2021 to July 6, 2021	Virtual – Materials were posted on the Region of Peel project website

The Wastewater Capacity Improvements in Central Mississauga Class EA is a key component of wastewater service planning and therefore the project continued to move forward through the Province of Ontario’s Emergency Orders and restrictions caused by the COVID-19 pandemic. However, it should be noted that due to the Province of Ontario’s Emergency Orders and restrictions, beginning March 17, 2020 the following protocols were taken to ensure that Class EA communication and consultation with key stakeholders were not affected:

- Study Notices were available on the Region of Peel website and sent to stakeholders by email.
- Communication with stakeholders was completed through email or virtual meetings.
- Indigenous Communities were contacted to determine the best communication approach.
- Public Information Centres were held virtually.

The PIC No. 2 Summary Report, which includes a summary of PIC materials, attendance and comments is provided in **Appendix Volume 1, Appendix E**.

2.4.7 Phase 4 Consultation

Prior to the 30-Day Public Review Period, the project team consulted with key review agencies. The intent of the consultation was to provide an opportunity to review the Environmental Study Report prior to filing for public review.

Table 6: Phase 4 Stakeholder Meetings

Review Agency	Date	Meeting Summary/Outcomes
Mississaugas of the Credit First Nation (MCFN)	October 1, 2021 & November 29, 2021	<ul style="list-style-type: none"> • Provided comments regarding the Archaeological and Natural Environment studies completed. • Project team provided project update and copies of the requested Natural Environment and Archaeological Assessment reports. • MCFN confirmed no additional actions were required.
Credit Valley Conservation Authority (CVC)	December 3, 2021 & January 11, 2022	<ul style="list-style-type: none"> • Provided a copy of the draft Environmental Study Report for review prior to public review period • CVC provided comments that were incorporated prior to filing.
Toronto and Region Conservation Authority (TRCA)	December 3, 2021 & January 11, 2022	<ul style="list-style-type: none"> • Provided a copy of the draft Environmental Study Report for review prior to public review period • TRCA provided comments that were incorporated prior to filing.

Review Agency	Date	Meeting Summary/Outcomes
Ministry of Environment, Conservation and Parks (MECP)	December 3, 2021 & January 12, 2022	<ul style="list-style-type: none"> • Provided a copy of the draft Environmental Study Report for review prior to public review period • MECP provided comments that were incorporated prior to filing.

2.4.8 Study Completion

At the end of the Class EA study, a Notice of Completion (**Appendix Volume 1, Appendix F**) was published and sent to all stakeholders with information on the Public Review Period including schedule and locations.

A summary of all communications and responses with public and agency stakeholders including copies of associated correspondence is provided in **Appendix Volume 1, Appendix G**.

3.0 Baseline Features and Servicing Conditions

This section presents the baseline natural features and infrastructure servicing conditions within the Class EA study area.

3.1 Existing and Future Land Use

The study area encompasses various land uses including commercial, industrial, institutional and residential. The primary land use within the study area is residential, with pockets of commercial and industrial. **Figure 4** shows the land use designation within the study area.

As per the Places to Grow Act, Ontario municipalities have assigned areas of growth. Some areas will undergo intensification, where there will be an increase of the people per area, while other regions will experience greenfield growth. Most sites within the study area that will undergo intensification will likely require redevelopment. **Figure 5** provides a map showing the study’s wastewater catchment area. **Table 7** provides the 2016-2041 growth projections provided by the Region (Scenario 16, October 2018) for each sub-catchment within the study area.

Table 7: Growth Projections 2016-2041

Wastewater Catchment Area	Total Growth 2016-2041
CPR Trunk Sewer only	25,480
Cooksville Queensway Trunk Sewer only	33,850
Catchment encompassing both CPR Trunk Sewer and Cooksville Queensway Trunk Sewer	41,180
Total	100,510

Figure 4 shows the three intensification areas within the study area: Mississauga City Centre, Hurontario Corridor and Dundas Corridor.

There are three cemeteries located within the study area:

- Mt Peace Cemetery – 3204 Cawthra Road
- St. John’s Dixie Cemetery – 737 Dundas Street E
- Dixie Union Cemetery – 770 Dundas Street E

There are numerous schools within the study area including but not limited to:

- St. Basil Elementary School – 4235 Golden Orchard Drive
- ISNA Elementary School – 1525 Sherway Drive
- Father Michael Goetz Secondary School – 330 Central Parkway W
- TLC Kennedy Secondary School – 3100 Hurontario Street
- Mississauga Secondary Academy – 33 City Centre Drive #240
- Innocent Hearts Secondary School – 350 Burnhamthorpe Road E #7
- Tomken Road Middle School – 3200 Tomken Road








- Dufferin-Peel Roman Catholic Separate School Board – 377 Burnhamthorpe Road East
- Silverthorn Public School – 3535 Cedar Creek Drive
- St. Vincent De Paul Separate School – 665 Willwbank Trail
- John Cabot Catholic Secondary School – 635 Willowbank Trail
- Applewood Heights Secondary School – 945 Bloor Street
- St. Edmund Separate School – 1250 Melton Drive
- Saints Martha & Mary Separate School – 1760 Bough Beeches Blvd
- Glenforest Secondary School – 3575 Fieldgate Drive
- Forest Glen Public School – 3400 Ponytail Drive

There are also a number of churches within the study area including but not limited to:

- The Free Methodist Church in Canada – 4315 Centre Court Village
- West End Buddhist Temple and Meditation Centre – 3133 Cawthra Road
- Logos Christian Family Church – 3535 Dixie Road
- Church of the Nazarene Canada – 3657 Ponytail Drive
- Kingdom Hall of Jehovah’s Witness – 4351 Dixie Road
- Saints Martha and Mary Parish – 1870 Burnhamthorpe Road East
- Mississauga Muslim Community Centre – 2505 Dixie Road
- Community of Christ – 84 Burnhamthorpe Road

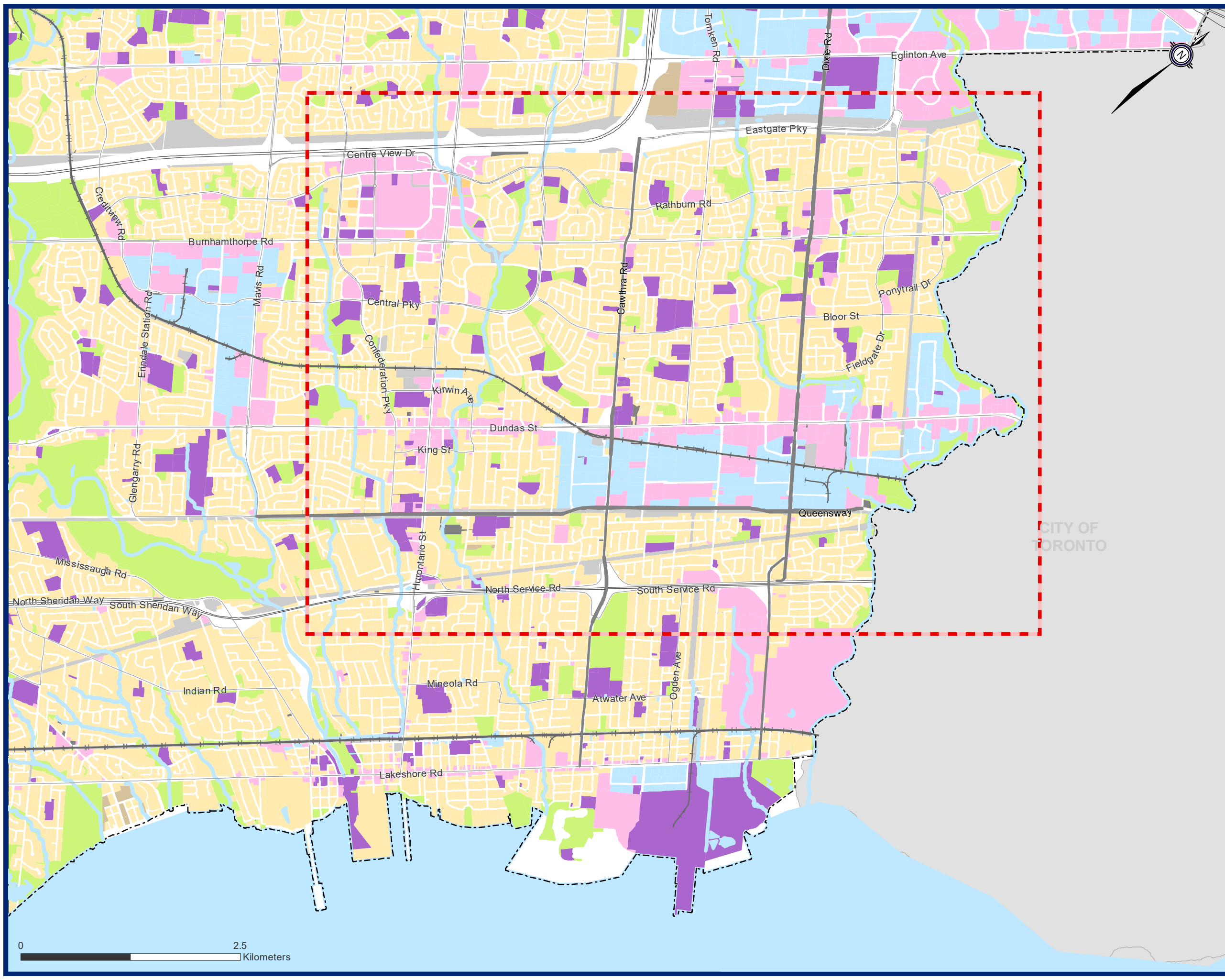
**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

General Features

-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeways
-  Regional Roads
-  Major Roads

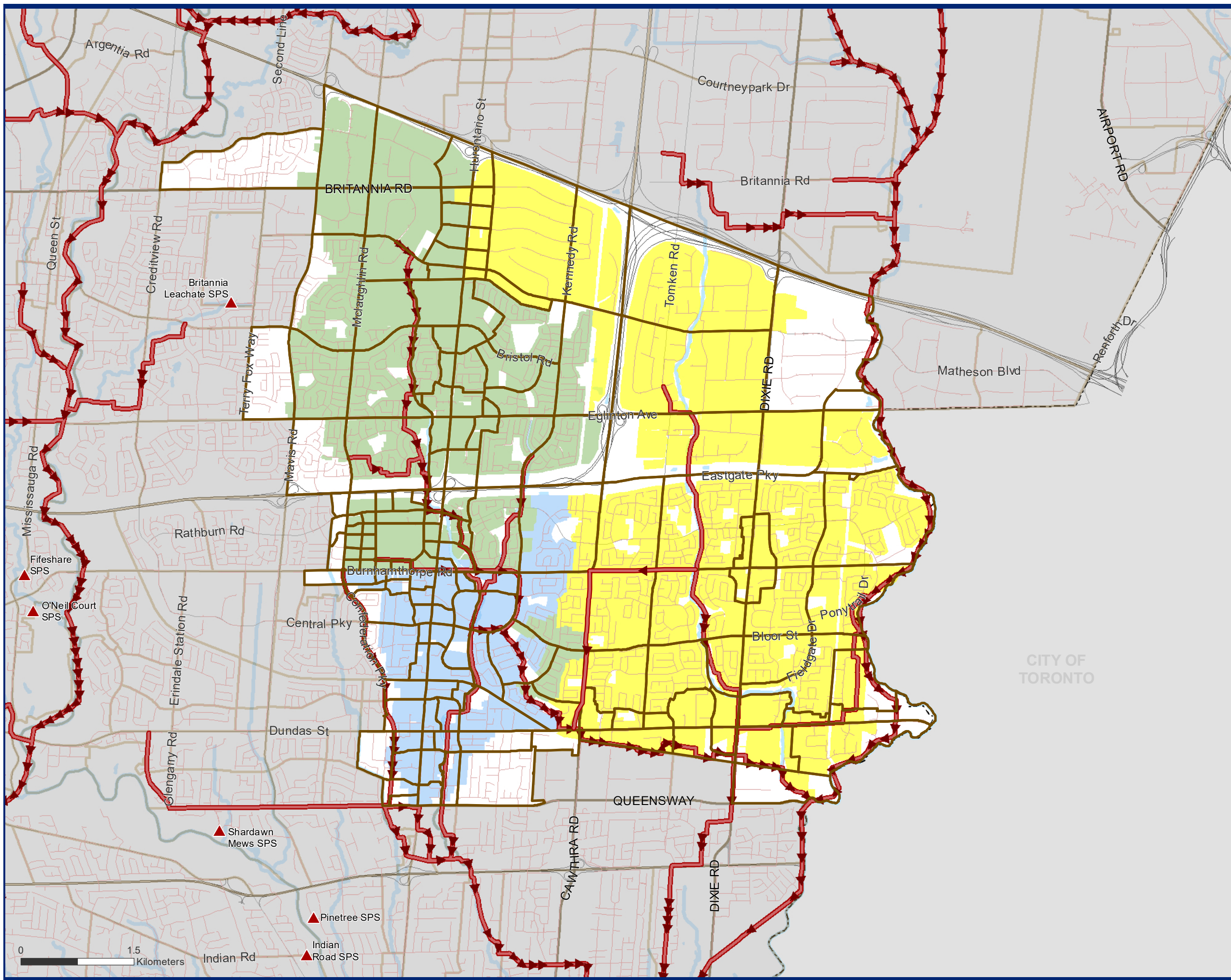
Land Use Features

-  Residential
-  Commercial
-  Industrial
-  Institution
-  Utility / Transportation
-  Agriculture
-  Greenspace
-  Mixed Use
-  Vacant Area



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**Figure 4
Central Mississauga
Land Use Designations**

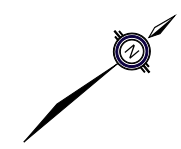


Existing Infrastructure

- ▬ Wastewater Treatment Plant (WWTP)
- ▲ Sanitary Pumping Station (SPS)
- ▬ Trunk Sewers (>600 mm)

Catchment Area

- CPR
- Cooksville Queensway
- Both



**Figure 5
Trunk Sewer Catchment Areas
within Study Area**

0 1.5 Kilometers

3.2 Existing Infrastructure

3.2.1 Existing Wastewater System

3.2.1.1 Regional System

The Region of Peel operates and maintains a lake-based wastewater system comprising of approximately 3,510 km of sanitary sewers which service the City of Mississauga, the City of Brampton and parts of the Town of Caledon. The system consists of two separate gravity trunk sewer systems – the east trunk and west trunk – that end at the G.E. Booth (Lakeview) Wastewater Treatment Plant (WWTP) and the Clarkson WWTP on Lake Ontario. Key Regional wastewater infrastructure is shown in **Figure 6**.

3.2.1.2 Central Mississauga System – GE Booth WWTP

There are three trunk sewers within the Central Mississauga area – Canadian Pacific Railway (CPR) Trunk Sewer, Cooksville Creek Trunk Sewer, and Little Etobicoke Creek Trunk Sewer. Together, the trunk sewers convey wastewater flow from several drainage areas in Central Mississauga to the G.E. Booth WWTP. The existing wastewater system within the study area is provided in **Figure 7**.

The wastewater catchment area extends beyond the study area and is provided in **Figure 5**. The entire drainage area is bounded by Highway 401 to the north, The Queensway to the south, Mavis Road to the west and Etobicoke Creek to the east.

There is a sewer upgrade along Cawthra Road and along adjacent local streets that is currently in the initial phases of design/construction. The Cawthra Road Sewer project is being completed in three phases:

- Phase 1: Construction of the trunk sewer on Cawthra Road from Bloor Street to Dundas Street East. Completed in Summer 2021.
- Phase 2: Construction of the trunk sewer on Cawthra Road from Burnhamthorpe Road to Bloor Street. Currently in construction and is expected to be completed by Spring 2022.
- Phase 3: Construction of the trunk sewer on Burnhamthorpe from Cawthra Road and Tomken Road. Currently out for tender and is expected to be in construction by 2023/2024.

For the purposes of this Class EA, the Cawthra Road Trunk sewer project was considered part of the existing wastewater system.

3.2.1.3 Existing Issues

The Central Mississauga wastewater system services areas within Mississauga that are experiencing rapid intensification growth. Several intensification locations will experience growth that will flow to these sewers including:

- Dundas St Corridor (Dundas Connects)
- Hurontario Corridor (Hurontario LRT)
- Mississauga City Centre (MCC)
- Hurontario / Eglinton

- Britannia Farm

The following existing capacity, condition and operational issues of the study area's wastewater system will be considered as part of this Class EA study:

Capacity

Growth is the key driver for the capacity upgrades, with over 100,000 people and jobs added to the area. Minor capacity constraints exist within the existing trunk and local network, with capacity constraints further exacerbated by growth and increased impact of wet weather events. The Region of Peel has seen a wide range of high intensity storms in recent years which have further strained the capacity of the wastewater conveyance systems. Although the Region has separated sewers and is proactively addressing Inflow and Infiltration (I/I) issues, there are still major impacts to the conveyance during wet weather events. A secondary driver for project upgrades is the ability to handle large wet weather events while maintain levels of service and minimizing the risk of flooding in the trunk and local sewers. The Class EA will consider:

- Observed wet weather capacity constraint issues based on flow monitoring data
- Existing and future hydraulic performance issues based on the Region's calibrated hydraulic model
- Flooding issues based on observed data
- Flat pipe locations causing issues with gravity flow of wastewater

Condition, Operation and Flow Flexibility

The trunk infrastructure within Central Mississauga was predominantly constructed in the 1960s and 1970s. As growth flows increase over the next decades, there will be a greater need for maintenance and rehabilitation measures to ensure the sewers operate as designed and do not experience failures. The ability to divert flow to new trunk sewers on an extended basis with minimal bypass pumping required will facilitate inspection of the sewers and ensure the ability to maintain and rehab large portions of these aging trunk sewers. Although rehabilitation plans are not part of the scope of this EA, flow controls were considered in this project to divert flows and isolate sections of sewers to facilitate any works. The Class EA will consider:

- Sewer condition issues based on structural CCTV information (e.g., cracks)
- Sewer constraints based on operational CCTV (e.g., accumulation of debris causing backups and blockages)
- Need for maintenance, inspection and rehabilitation works

3.2.2 Existing Water System

The existing water transmission and distribution mains are owned, operated and maintained by the Region of Peel. **Figure 8** provides a map of the Regional water infrastructure located within the study area.

3.2.3 Existing Stormwater System

The existing storm sewers within Regional road right of ways are owned, operated and maintained by the Region. Storm sewers located within local municipal boundaries (e.g., along local roads) are owned, operated and maintained by the City of Mississauga. **Figure 8** provides a map of the Regional storm infrastructure.

3.2.4 Existing Utilities

A number of utilities are present within the study area. The following utility companies have been included as part of stakeholder consultation process:

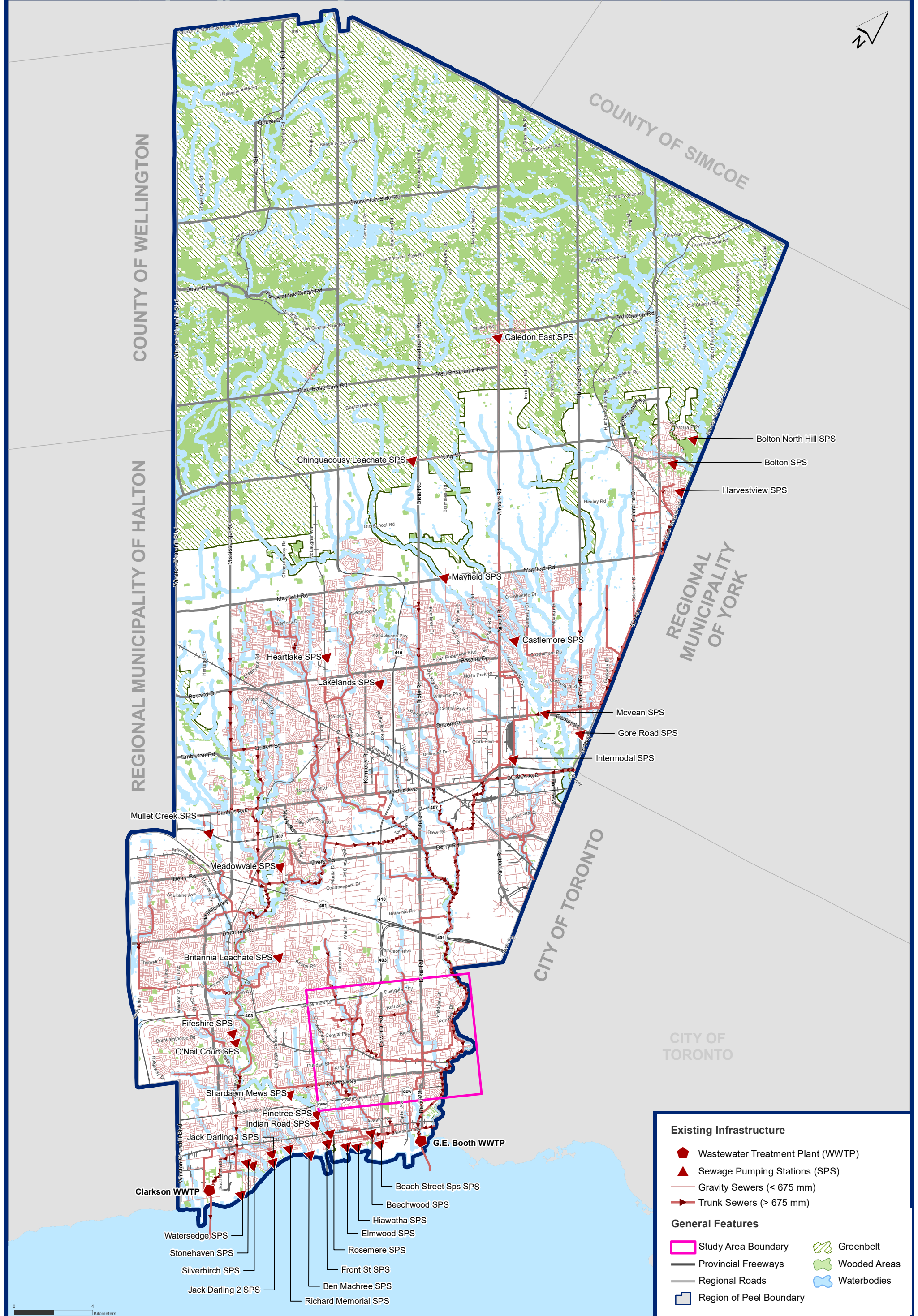
- Gas: Enbridge Gas Distribution, Enbridge Pipelines Inc, Union Gas
- Hydro: Hydro One Networks, Alectra Utilities (formerly known as Enersource)
- Cable, Telecommunications: Rogers Cable, Bell Canada, GT Fiber 360 Networks
- Other Pipelines: Trans-Northern Pipelines Inc., TransCanada Pipeline

Through the preliminary review and consultation with utilities, the following utility infrastructure has been identified within the study area:

- One railway line (freight and passenger) owned by the Canadian Pacific Railway and passing through the study area from northwest to southeast. The rail line is operated by Metrolinx GO Transit.
- Two hydro stations, owned by Hydro One:
 - Northwest side of Cawthra Road and North Service Road intersection
 - Northwest side of Tomken Road and Eastgate Parkway intersection
- Five hydro line alignments, owned by Hydro One:
 - Alignment along Highway 403
 - Northwest to southeast alignment, east of Dixie Road, from Eastgate Parkway to approximately QEW
 - Alignment along the northern side of Queensway East to west of Cawthra Road and along the southern side of Queensway to Etobicoke Creek.
 - Alignment crossing QEW at west of Hurontario Street
- Pipelines owned by Enbridge are located throughout the study area. These pipelines are located along the following major roads:
 - Burnhamthorpe Road
 - Cawthra Road
 - Sections of Queensway East
 - Sections of North and South Service Road
 - Dixie Road
 - Hurontario Street

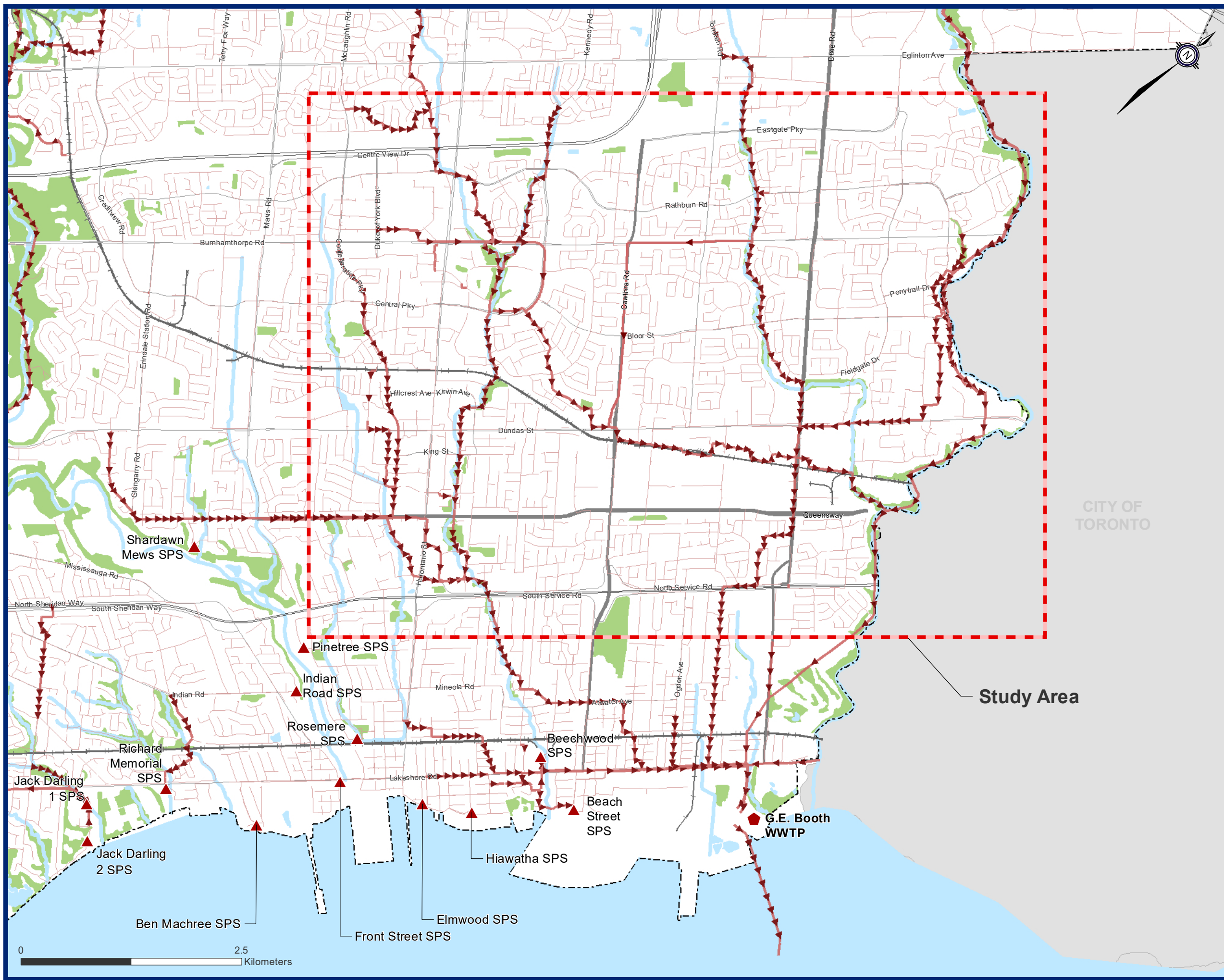
- Pipelines owned by Trans-Northern Pipelines Inc. (TNPI) crosses the following major roads:
 - Queensway East close to Cawthra Road
 - Cawthra Road near the Service Road ramps

Coordination and consultation with utility companies was completed throughout the study process and in optioneering alignment selection and design alternatives. Utility locations identified during the review and consultation are provided in **Figure 14**.



Existing Infrastructure

- ◆ Wastewater Treatment Plant (WWTP)
- ▲ Sanitary Pumping Station (SPS)
- Local Sewers (<600 mm)
- ➔ Trunk Sewers (>=600 mm)



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Study Area

**Figure 7
Central Mississauga
Wastewater Infrastructure**








0 2.5 Kilometers

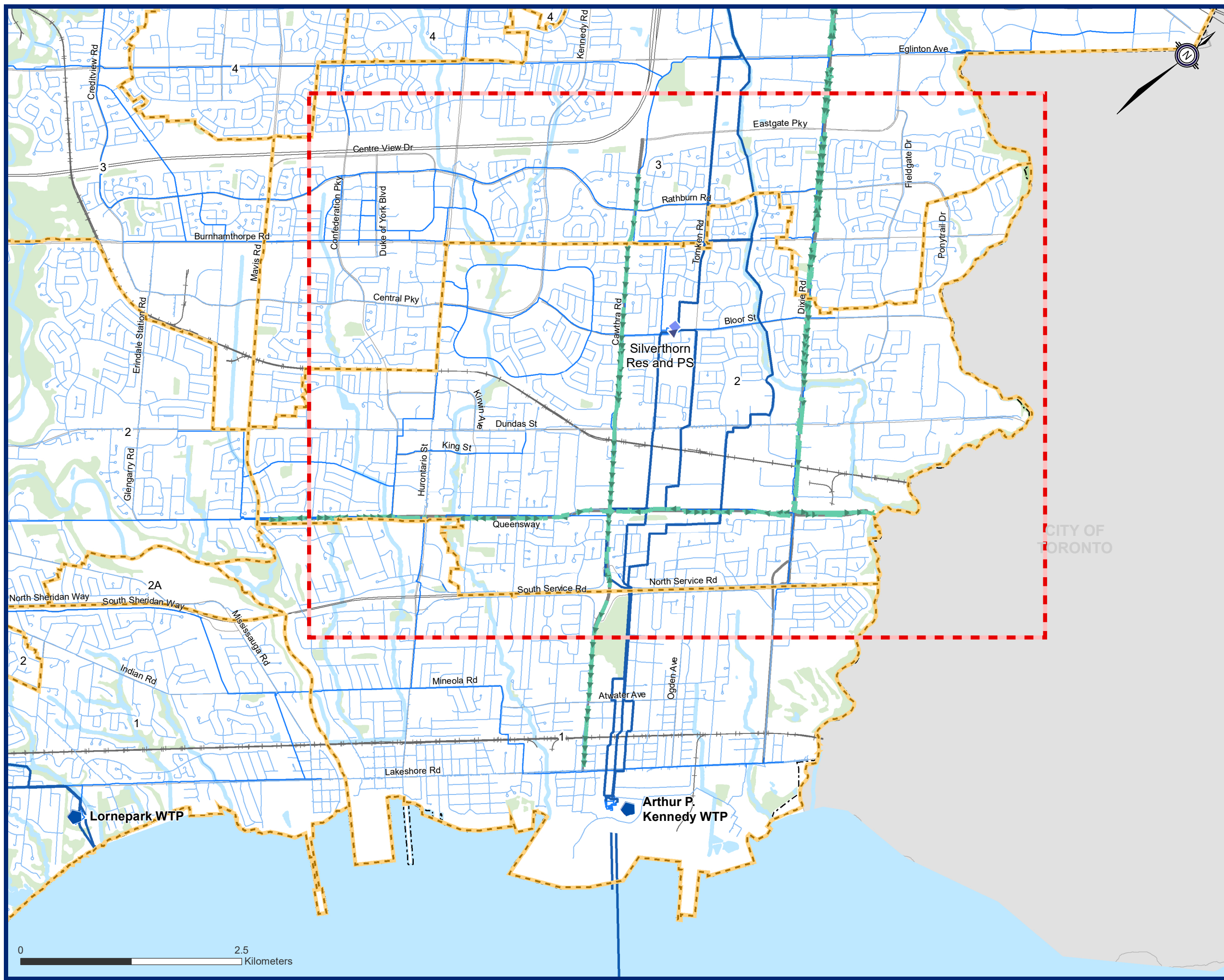
**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

Additional Infrastructure

-  Water Treatment Plant (WTP)
-  Pumping Station (PS)
-  Reservoir (Res)
-  Water Transmission Main
-  Water Sub-Transmission Main
-  Water Distribution System
-  Water Pressure Zone
-  Regional Storm Mains

General Features

-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeway
-  Regional Roads
-  Local Road - Major



CITY OF TORONTO



Figure 8
Regional Water & Storm Infrastructure

3.2.5 Existing Transportation Network

3.2.5.1 Road Network

The study area is located in an urban area where there is heavy vehicle traffic. Construction of the preferred design concept will have an impact on the flow of traffic within the area. **Table 8** provides a list of the regional, provincial and major local roads situated within the study area for consideration.

Table 8: Major Road Network within Study Area

Ownership	Road Classification	Road
Province of Ontario	Provincial Freeway	Highway 403
		Queen Elizabeth Way (QEW)
Region of Peel	Regional Road	Queensway East
		Dixie Road
City of Mississauga	Major Local Road	Cawthra Road
		Dundas Street East
		Central Parkway East
		Burnhamthorpe Road East
		Rathburn Road West
		Tomken Road
		Bloor Street
		Hurontario Street
		Confederation Parkway
		Duke of York Boulevard
		Eastgate Parkway
		Fieldgate Drive
		Hill Crest Avenue
		King Street West
		Kirwin Avenue
Ponytail Drive		
North Service Road		
South Service Road		

3.2.5.2 Public Transit

MiWay is the local City of Mississauga transit service provider. **Table 9** provides a list of the transit routes servicing Regional, provincial and major local roads situated within the study area for consideration.

Table 9: Central Mississauga Public Transit Routes

Main Corridor	Transit Route No.
Burnhamthorpe Road	Route 20 Rathburn
	Route 26 Burnhamthorpe
	Route 76 City Centre-Subway
Bloor Street	Route 3 Bloor
Dundas Street	Route 1 Dundas

Main Corridor	Transit Route No.
QEW	Route 101 Dundas Express
	Route 101A Dundas Express
Rathburn Road	Route 4 Sherway Gardens
	Route 9 Rathburn-Thomas
	Route 20 Rathburn
	Route 61 Mavis
Eastgate Parkway	Route 61A Mavis-Sheridan
	Route 100 Airport Express
	Route 109 Meadowvale Express
Confederation Parkway	Route 110 University Express
	Route 28 Confederation
Hurontario Street	Route 19 Hurontario
	Route 19A Hurontario-Britannia
	Route 19B Hurontario-Cantay
	Route 19C Hurontario-Heartland
Central Parkway	Route 10 Bristol-Britannia
	Route 53 Kennedy
Cawthra Road	Route 8 Cawthra
Tomken Road	Route 51 Tomken
Dixie Road	Route 5 Dixie

There is one GO Transit train line, Milton train line, along Dundas Road and one GO bus route along Eastgate Parkway/Rathburn Road within the study area. There are four GO Transit stations /terminals located within the study area:

- Cooksville GO Station – located near Hurontario Street and Dundas Street East
- Dixie GO Station – located near Dixie Road and Dundas Street East
- Square One Bus Terminal – located near Rathburn Road W and Hurontario Street
- Dixie Transitway Station – located near Eastgate Parkway and Dixie Road

3.2.5.3 Cycling Routes

There are 6 cycling routes along the following major roads within the study area:

- Burnhamthorpe (multi-use trail)
- Queensway East (multi-use trail)
- Rathburn Road West
- Hill Crest Avenue/Kirwin Avenue
- Confederation Parkway
- Dixie Road (multi-use trail)

3.3 Ongoing and Future Infrastructure Projects

The following projects fall within the study area and have been considered during the EA process in order to flag any potential conflict and need to coordinate mitigation measures.

3.3.1 Region of Peel Cawthra Road Transportation Improvements

An EA is being completed to examine the needs and opportunities for transportation improvement within the Cawthra Road corridor, between QEW and Eastgate Parkway.

3.3.2 Region of Peel Sanitary Sewer and Watermain Improvements near Mattawa Avenue

An EA is being completed to examine the needed improvements at several locations in the sanitary sewer and watermain systems located near Dundas Street East and Mattawa Avenue. Improvements include rehabilitation, and replacement of sanitary and watermain infrastructure.

3.3.3 City of Mississauga Hurontario Light Rail Transit (LRT)

Metrolinx is working with the Cities of Mississauga and Brampton to bring 18 km of light rail transit (LRT) along the Hurontario corridor, from north to south. Funded through a \$1.4 billion commitment from the Province of Ontario, the Hurontario LRT is a signature project of the Moving Forward plan. Construction is scheduled to begin in early 2020. The construction is expected to be completed in Fall 2024.

The Hurontario LRT features 19 stops with connections to local transit lines, including eight stops within the Study Area – City Centre, Robert Speck, Burnhamthorpe, Fairview, Cooksville GO Station, Dundas, Queensway and North Service (QEW).

3.3.4 City of Mississauga Burnhamthorpe Road East Reconstruction

This study involved the reconstruction of Burnhamthorpe Road East approximately 200 m east of Dixie to Etobicoke Creek. This project includes road reconstruction, extension of a multi-use trail, storm infrastructure upgrades and intersection improvements.

3.3.5 City of Mississauga Living Arts Drive Extension EA

An EA was completed for the proposed extension of Living Arts Drive between Rathburn Road West and Centre View Drive. The preferred solution included new sidewalks and bike lanes, a new signalized intersection at Living Arts Drive and Centre View Drive, and a new mid-block intersection.

3.3.6 City of Mississauga EAs for Redmond Rd, Webb Dr, The Exchange, and Kariya Dr

An EA is being completed for the existing and future transportation needs in downtown Mississauga.

3.3.7 City of Mississauga Square One Drive EA

An EA was completed for the proposed extension of Square One Drive, from Rathburn Road West to Confederation Parkway. The preferred design for the extension includes a sidewalk and multi-use trail, on-street parking and a roundabout.

3.3.8 Ministry of Transportation QEW Improvement Works

The Ministry of Transportation (MTO) is undertaking QEW Improvement Works. The project is divided into Contract 1 and Contract 2. Contract 1 (2018-2021) improvements are located along Queen Elizabeth Way (QEW) from east of Dixie Road to The East Mall and include bridge rehabilitation, localized QEW widening, drainage improvements, watermain and sanitary sewer works, retaining wall works and pavement rehabilitation. Contract 2 (2022-2025) improvements are located along the QEW from east of Cawthra Road to east of Dixie Road and include underpass and interchange replacement and modifications, bridge replacement, local service road realignment, localized QEW widening, drainage improvements, watermain and sanitary sewer works, retaining wall works, and traffic signals works.

3.3.9 TRCA Strategy Initiatives

Trail Strategy for the Greater Toronto Region TRCA prepared a Trail Strategy which includes City of Mississauga and City of Toronto to complete, expand and manage the trail system within the TRCA Trail network. Existing and conceptual trails are located along Etobicoke Creek will be considered in this study.

Sherway Trail Community Plantings and Community Restoration Plantings This initiative is associated with community based invasive species management in the Etobicoke Creek area.

3.4 Planning and Servicing Considerations

3.4.1 Region of Peel Official Plan

The Regional Official Plan (ROP) is Regional Council's long-term policy framework to assist the Region in decision making. It sets the Regional context for detailed planning by protecting the environment, managing resources, directing growth, and setting the basis for providing Regional services in an efficient and effective manner. The ROP provides direction for future planning activities and for public and private initiatives aimed at improving the existing physical environment.

The ROP was adopted by Council on July 11, 1996 and approved with modifications by the Minister of Municipal Affairs and Housing on October 22, 1996. Appeals of the Plan were forwarded to the Ontario Municipal Board (OMB). Sections of the Plan deemed not under appeal became effective on October 1, 1997. The latest ROP Office Consolidation is September 2021 which includes amendments to growth management, greenbelt, agricultural and natural heritage. The Peel 2051 ROPA is currently under review to bring policies in step with more recent provincial policy updates and requirements including A Place to Grow: Growth Plan for the GGH and updates to the planning horizon to 2051.

The purpose of the ROP is to:

- Provide Regional Council with the long-term Regional strategic policy framework for guiding growth and development in Peel while having regard to protecting the environment, managing the renewable and non-renewable resources, and outlining a regional structure that manages this growth within Peel in the most effective and efficient manner.
- Interpret and apply the intent of Provincial legislation and policies within a Regional context using the authority delegated or assigned to the Region by the Province.

- Provide a long-term Regional strategic policy framework for the more specific objectives and land use policies contained in the area municipality official plans which must conform to this Plan.
- Recognize the duality in the Region of Peel between the urban nature of the Cities of Brampton and Mississauga and the primarily rural nature of the Town of Caledon.
- Recognize the need for effective environmental protection and management measures to ensure environmental sustainability.
- Recognize the importance of protecting and enriching the natural and cultural heritage of the Region of Peel.
- Provide for the health and safety of those living and working in Peel.
- Maintain and enhance the fiscal sustainability of the Region of Peel.

The ROP includes objectives and policies around the natural environment, water resources, and cultural heritage. These will be considered when assessing wastewater servicing alternatives under this Class EA study.

Section 6.4 of the Official Plan discusses water and wastewater services. Key policies of relevance to municipal wastewater servicing include:

It is the policy of Regional Council to:

Policy 6.4.2.1

Require and provide full municipal sewage and water services to accommodate growth in the Urban System to the year 2031, and the three Rural Service Centres to 2021. The provision of full municipal sewage and water services in the Urban System and the three Rural Service Centres will be subject to the Regional financial and physical capabilities.

Policy 6.4.2.2

Ensure that no development requiring additional or new water supply and/or sanitary sewer services proceeds prior to the finalization of a Servicing Agreement with the Region, confirming the responsibility for, and ability to provide, appropriate facilities for water supply and sewage disposal. In the case of plans of subdivision, confirmation will be required prior to draft approval, that servicing is or will be available.

Policy 6.4.2.7

Ensure that the planning, construction, expansion, extension, operation and maintenance of water and sanitary sewer services protects the environmental systems and natural resources of Peel in a manner consistent with the objectives and policies in this Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Greenbelt Plan.

3.4.2 Region of Peel Climate Change Master Plan

The Region of Peel Climate Change Master Plan (CCMP) was recently issued (2020) and in effect until 2030. The CCMP outlines strategies to manage Regional assets, infrastructure, and services in a changing climate. Two primary outcomes of the CCMP are:

- Reduce corporate emissions by 45% by 2030 relative to 2010 levels
- Be prepared for changing climates and extreme weather events by ensuring Regional services and assets are resilient

Supporting outcomes will enable success by providing direction to “Build Capacity,” “Invest,” and “Monitor and Report”. The pursuit of these outcomes is guided by four principles: balance, transparency, collaboration and innovation. Progress on these outcomes will be measured by the Region’s Climate Change Resiliency scorecard which assesses key factors of a climate resilient community.

These principles and objectives have been considered in the development and evaluation of solution alternatives for the Central Mississauga Class EA through opportunities to address Climate Change. Sections below discuss the CCMP’s approach to energy management and greenhouse gas reduction, specifically.

3.4.2.1 Energy Management

The CCMP recommends undertaking deep retrofits for existing buildings to reduce inefficient energy use related to heat transfer through walls, windows, and roof. Improved efficiency in these areas would minimize energy loss associated with heating and cooling.

In conjunction with deep retrofits, the CCMP prescribes leveraging the Reduce, Improve, Switch and Generate framework:

- Reduce the amount of energy needed to maintain comfort and deliver services
- Improve efficiencies of energy consuming equipment
- Switch from GHG intensive to low-carbon fuels (natural gas to electricity)
- Generate energy through renewable resources (e.g., solar photovoltaic cells and renewable natural gas from wastewater)

Further to the above, the CCMP also recommends ensuring that new buildings have high energy performance and aim for net-zero emissions.

This Class EA will integrate the above recommendations where appropriate, including minimizing or avoiding the need for energy consuming equipment (e.g., sewage pumping stations) and increasing flow flexibility to ensure maintenance and rehabilitation can be completed thereby reducing the volume of extraneous flows being treated (e.g., energy used) at the WWTPs.

3.4.2.2 Greenhouse Gas Reduction

A primary outcome of the Region of Peel CCMP is to reduce corporate greenhouse gas (GHG) emissions by 45% by 2031 relative to 2010 levels. The Region achieved 29% reduction in 2016 and will need to reduce emissions by a further 16% to meet the 2031 goal, bringing emissions down to 75 ktCO₂e per year. The CCMP describes a “Low-Carbon Pathway”, which considers seven Regional sectors, including Water and Wastewater. In order to meet the Region’s 2031 goals, Water and Wastewater-related GHG emissions must be reduced by approximately 20 ktCO₂e per year.

3.4.3 City of Mississauga Official Plan

The official consolidation of the Mississauga Official Plan has been updated to include Local Planning Appeal Tribunal (LPAT), formerly known as the Ontario Municipal Board, decisions and City Council approved Official Plan Amendments as of March 13, 2019¹. Appeals to the Plan have been identified and until all original appeals are resolved, both Mississauga Plan (2003) and Mississauga Official Plan will need to be referred to since they are both partially in effect.

The City's Official Plan includes general land use designations, intensification areas and environmental features within the study area.

Within the study area, the following areas have been identified:

- Dixie Employment Area (bounded by The Queensway West to the south, Dundas Street to the north, Cawthra Road to the west and Etobicoke Creek to the east).

3.4.4 Provincial Policy Statement

The Provincial Policy Statement set the policy foundation for land use planning and development in Ontario. The Provincial Policy Statement provides guidance and support for appropriate land use planning and development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment.

The Provincial Policy Statement applies to land use planning decisions made under the *Planning Act* by provincial ministers, municipal councils, local boards and planning boards, among other approval authorities. All municipal decisions affecting planning matters shall be consistent with the policies outlined in the Provincial Policy Statement.

The Provincial Policy Statement contains policies relevant to wastewater infrastructure planning including, but not limited to:

- Requirement that infrastructure be provided in a coordinated, efficient and cost-effective manner with considerations to climate change.
- Planning for infrastructure should be financially viable over their lifecycle and available to meet current and projected needs.
- Optimization of the use of existing infrastructure and public service facilities before developing new infrastructure.

More specifically, the Provincial Policy Statement recommended that wastewater services should:

- Direct and accommodate expected growth in a manner that promotes the efficient use and optimization of existing municipal wastewater services.
- Ensure that these systems are provided in a manner that:
 - can be sustained by the water resources upon which such services rely.

¹ City of Mississauga. 2019. *Mississauga Official Plan*. <http://www.mississauga.ca/portal/residents/mississaugaofficialplan>. Accessed July 12, 2019

- is feasible, financially viable and complies with all regulatory requirements.
- protects human health and the natural environment.
- Promote water conservation and water use efficiency.
- Integrate servicing and land use considerations at all stages of the planning process.

The Greenbelt Plan, the Niagara Escarpment Plan, and the Oak Ridges Moraine Conservation Plan work within the framework set out by the Growth Plan for the Greater Golden Horseshoe for where and how future population and employment growth should be accommodated.

Together, all four provincial plans build on the Provincial Policy Statement to establish a land use planning framework for the Greater Golden Horseshoe and the Greenbelt Plan Area that supports a thriving economy, a clean and healthy environment and social equity.

3.4.5 Growth Plan for the Greater Golden Horseshoe

A Place to Grow is the provincial initiative to plan for growth in Ontario. The most recent growth plan, *A Place to Grow - The Growth Plan for the Greater Golden Horseshoe* (the *Growth Plan*), was first introduced in July 2017 replacing the 2006 Growth Plan, and later amended in May 2019 and August 2020.

The Growth Plan is a long-term plan that works together with the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan and the Niagara Escarpment Plan to manage growth and development in a way that supports economic prosperity, protects the natural environment, and helps build complete communities that achieve a high quality of life.

To support these goals, the Growth Plan for the Greater Golden Horseshoe works to:

- Support the achievement of complete communities that offer more options for living, working, learning, shopping and playing.
- Reduce traffic gridlock by improving access to a greater range of transportation options.
- Provide housing options to meet the needs of people at any age.
- Revitalize downtowns to become more vibrant and to provide convenient access to an appropriate mix of jobs, local services, public service facilities and a full range of housing.
- Curb sprawl and protect farmland and green spaces.
- Promote long-term economic growth.

Like other provincial plans, the Growth Plan builds upon the policy foundation provided by the Provincial Policy Statement and provides additional and more specific land use planning policies to address issues facing specific geographic areas in Ontario. While the Provincial Policy Statement provides for a time horizon of up to 20 years to make enough land available to meet projected needs, the Provincial Policy also suggests that a provincial plan may provide an alternate time horizon for specific areas of the province. The 2019 Growth Plan provides that the applicable time horizon for land use planning is 2041 while the more recent 2020 Growth Plan provides the 2051 time horizon.

Schedule 3 outlines the Region’s 2041 and 2051 population and employment growth forecasts, as summarized in **Table 10** below.

Table 10: Peel Region Population and Employment Forecasts

Peel Region	2031	2036	2041	2051
Population	1,770,000	1,870,000	1,970,000	2,280,000
Employment	880,000	920,000	970,000	1,070,000

Source: 2019 & 2020 Growth Plan for the Greater Golden Horseshoe

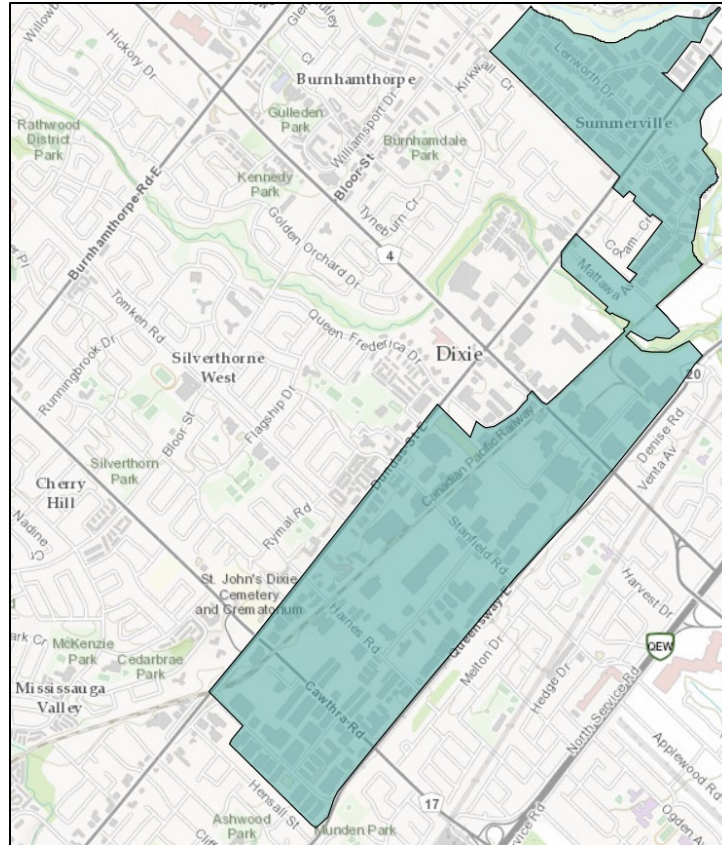
The Growth Plan includes the following specific density targets:

- A minimum of 50 per cent of all residential development occurring annually within the Region of Peel will be within the delineated built-up area.
- 200 residents and jobs combined per hectare for each of the Downtown Brampton and Downtown Mississauga urban growth centres.
- A minimum density target that is not less than 50 residents and jobs combined per hectare for designated greenfield areas within the Region of Peel.

The Growth Plan also provides for minimum density targets for *Major Transit Station Areas* and *Priority Transit Corridors*, as follows:

- 160 residents and jobs combined per hectare for those that are served by light rail transit or bus rapid transit.
- 150 residents and jobs combined per hectare for those that are served by the GO Transit rail network.

There is one Provincially Significant Employment Zone located within the study area – Zone 13, between Dundas Street and The Queensway, from west of Cawthra Road to the Etobicoke Creek, as shown in **Figure 9**.



Source: Provincially Significant Employment Zone Online Map²
Figure 9: Provincially Significant Employment Zone

3.4.6 Greenbelt Plan

The Greenbelt Plan (2017) builds upon the existing policy framework established in the Provincial Policy Statement. The purpose of the plan is to inform the decision-making process to protect agricultural lands, natural heritage and water resource systems, and to provide for a diverse range of economic and social activities related to rural communities, agriculture, tourism, recreation and resource uses.

The Greenbelt Plan includes lands within and builds upon the ecological protections provided by the Niagara Escarpment Plan (NEP) and the Oak Ridges Moraine Conservation Plan (ORMCP). The Protected Countryside lands identified in the Greenbelt Plan are intended to enhance the spatial extent of agriculturally and environmentally protected lands covered by the NEP and the ORMCP while improving linkages between these areas and the surrounding major lake systems and watersheds.

² Provincially Significant Employment Zone. Province of Ontario. Retrieved from <https://www.placestogrow.ca/AGOL/AccessibleViewer/>

Under the latest Parkway Belt West Plan (2008), a small area of designated Parkway Belt West lands were designated around the Highway 410/Derry Road interchange. In 2017, the Ministry proposed amendments affecting lands located within the Parkway Belt West Plan (PBWP) and Minister's Zoning Orders (MZO) in the regional municipalities of Halton, Peel and York and the Cities of Hamilton and Toronto. Feedback is currently under review.

A portion of the study area is located within the Parkway Belt West (southern link) including the corridor along Highway 403 and Eastgate Parkway and the corridor along Cawthra Road (north of Eastgate Parkway).

3.4.7 The Planning Act

The Planning Act establishes the rules for land use planning in Ontario. It describes how land uses may be controlled in communities. Changes to the planning system were introduced in 2006 by the *Planning and Conservation Land Statute Law Amendment Act*. Key changes are as follows:

- Municipalities must now update their official plan every five years, followed by an update of the accompanying zoning by-law within three years after the new official plan is in effect.
- There are more opportunities for public input before local decisions are made.
- Municipalities have enhanced ability to plan for a range and mix of housing types and densities.
- Municipalities have additional ability to have the final say on whether designated employment lands can be changed to other uses.

3.4.8 Sustainable Water & Sewage Systems Improvement & Maintenance Act

Bill 13 enacts the Sustainable Water and Wastewater Systems Improvement and Maintenance Act, 2010 and repeals the Sustainable Water and Sewage Systems Act, 2002. The Bill had its first reading on March 23rd, 2010. Key points of the Bill are as follows:

- Sets out the purposes of the Act, which include ensuring that public ownership of water services and wastewater services is maintained.
- Establishes the Ontario Water Board as an agent of the Crown and sets out the Board's objectives, powers and duties which relate to the regulation of water services and wastewater services.
- Sets out the responsibilities of municipalities or groups of municipalities that are designated as regulated entities by regulation.
- Regulated entities must prepare business plans for the provision of water services or wastewater services. The plan must contain, among other things, an assessment of the full cost of providing water services or wastewater services to the public and a description of how the regulated entity intends to pay this full cost.

3.4.9 Water Opportunities and Conservation Act

The Ontario Government passed the Water Opportunities and Conservation Act in 2010. The purposes of the Act are as follows:

- To foster innovative water, wastewater and storm water technologies, services and practices;

- To create opportunities for economic development and clean-technology jobs in Ontario; and
- To conserve and sustain water resources for present and future generations.

To further the purposes of the Act, the MECP may establish aspirational targets in respect of the conservation of water and other matters.

The Act requires certain municipalities, persons and entities to prepare, approve and submit to the MECP municipal water sustainability plans for municipal water services, municipal wastewater services and municipal storm water services under their jurisdiction. The Minister may establish performance indicators and targets for these services. The Act also authorizes the making of regulations requiring public agencies to prepare water conservation plans, achieve water conservation targets, and consider technologies, services and practices that promote the efficient use of water and reduce negative impacts on Ontario's water resources.

3.4.10 Safe Drinking Water Act

The *Safe Drinking Water Act* was adopted in 2002. The *Act* provides for the protection of human health and the prevention of drinking water hazards through the control and regulation of drinking water systems and drinking water testing. Key features of the *Act* include the following:

- Legally binding standards for contaminants in drinking water.
- Requirement to use licensed laboratories for drinking water testing.
- Requirement to report any results that do not meet the standards to the Ministry of the Environment and the local Medical Officer of Health and to undertake corrective action.
- All operators of municipal drinking water systems must be trained and certified.
- Establishment of a licensing regime for drinking water systems.
- Inspections and enforcement to determine compliance with the Act.

3.4.11 Clean Water Act

The Clean Water Act was adopted in 2006 with the objective to protect existing and future sources of drinking water including rivers, lakes, and underground aquifers. The Act requires the following:

- That local communities assess existing and potential threats to their water, and that they set out and implement the actions needed to reduce or eliminate these threats.
- Empowers communities to take action to prevent threats from becoming significant.
- Public participation on every local source protection plan – the planning process for source protection is open to anyone in the community.
- That all plans and actions be based on sound science.

3.4.11.1 Drinking Water Source Water Protection Policies

Under the Clean Water Act, O. Reg. 287/07, on-site sewage systems and sewage works may be considered a threat to drinking water. These activities may be deemed significant under certain conditions.

The Region falls within two source protection areas:

- Toronto Source Protection Area (east of Dixie Road and Etobicoke Creek)
- Credit Valley Source Protection Area (west of Dixie Road and Etobicoke Creek)

Source Water Protection (SWP) Plans were prepared for the 19 watershed-based Source Protection Regions (SPR) across Ontario to protect existing and future sources and to identify areas of significant drinking water threats. The Region of Peel falls within one Source Water Protection Region:

- Credit Valley, Toronto and Region and Central Lake Ontario (CTC)

Therefore, the applicable source protection plan policies, provided in **Table 11**, have been considered throughout this Class EA study.

Table 11: Applicable Drinking Water Source Protection Policies

Policy Subject	Policy No.	Policy Statement
Sanitary Sewers and Related Pipes	SWG-13	<p>Where sanitary sewers and related pipes are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas:</p> <ul style="list-style-type: none"> • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • The remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future). <p>Not limiting any other conditions to be included in the Environmental Compliance Approval, the Issuing Director should include the following conditions, where possible:</p> <ul style="list-style-type: none"> • Requiring higher construction standard • Inspections by the owner for leaks
	SWG-14	<p>New development dependent on sanitary sewers and related pipes, in an area where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the sanitary sewer and related pipes is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas:</p> <ul style="list-style-type: none"> • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or

Policy	Policy No.	Policy Statement
		<ul style="list-style-type: none"> The remainder of an Issue Contributing Area for Nitrates or Pathogens (future).

Source: MECP (formerly MOECC). (2015). *Approved Source Protection Plan: CTC Source Protection Region*

The Source Water Protection Plans identify vulnerable areas that have been delineated under the Clean Water Act. According to the Source Protection Plan³;

- Wellhead Protection Areas (WHPA) are areas on the land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years.
- Intake Protection Zones (IPZ) are the areas on the water and land surrounding a municipal surface water intake.
- Significant Groundwater Recharge Areas (SGRA) are areas characterized by porous soils that allow the water to seep easily into the ground and flow to an aquifer.
- Highly Vulnerable Aquifers (HVA) are aquifers that can be easily changed or affected by contamination from both human activities and natural processes as a result of (a) its intrinsic susceptibility, as a function of the thickness and permeability of overlaying layers, or (b) by preferential pathways to the aquifer.
- Event Based Areas (EBA) are areas where spills from a specific activity within an EBA would cause a significant risk to the drinking water source and hence the activity would be identified as a significant threat.
- Vulnerable Scoring Areas (VSA) identifies how fast a contaminant can travel to a ground or surface water without being diluted or rendered less harmful and assigns a high, medium or low score.
- Water Quantity Vulnerable Areas identifies any areas with water quantity stress, determine the stress level in WHPA-Q, and where the level is deemed significant or moderate and also identify the type and location of the activities that pose a drinking water quantity threat.

3.4.12 CCME Strategic Vision for Water

The proposed Canadian Council of Ministers of the Environment (CCME) Wastewater System Effluent Regulations were published in March 2010, with the final Regulations published on June 29, 2012 and was amended January 2015. These Regulations are the primary instrument that Environment Canada is using to implement the CCME Canada-wide Strategy for the Management of Municipal Wastewater Effluent.

CCME developed the Canada-wide strategy for the management of municipal wastewater which provides an approach for municipalities to manage their wastewater including National Performance Standards for wastewater discharges, pollution prevention measures, regular monitoring of facilities and risk management activities to be implemented for sanitary and combined overflows.

³ *Drinking Water Source Protection. Approved Source Protection Plan: CTC Source Protection Region. 2015.* <https://ctcswp.ca/protecting-our-water/the-ctc-source-protection-plan/>. Accessed on March 19, 2019

This 2009 Strategy requires that all facilities achieve minimum National Performance Standards and develop and manage site-specific Effluent Discharge Objectives. The Strategy requires that overflow frequencies for sanitary sewers not increase due to development or redevelopment. The same applies for combined sewers, unless occurring as part of an approved combined sewer overflow management plan. Neither should occur during dry weather, except during spring thaw and emergencies. Source control of pollutants is recommended and monitoring and reporting on effluent quality is required. The 2014 Progress Report outlined the progress made by signatory federal, provincial and territorial jurisdictions on the commitments made in the 2009 Strategy.

The Regulations apply to any wastewater system that has a capacity to deposit a daily volume of effluent of 100 cubic metres⁴ or more from its final discharge point. The effluent from the applicable wastewater systems would be compared against “national effluent quality standards”.

In 2009, the CCME provided a framework for future actions and activities related to water through the development of a vision and action plan, such that Canadians have access to clean, safe and sufficient water to meet their needs in ways that also maintain the integrity of ecosystems. The goals and rationale developed as part of the vision includes the following:

- **Goal 1:** Aquatic ecosystems are protected on a sustainable watershed basis.
Rationale: Enhance understanding and application of Integrated Water Resource Management to improve ecosystem health.
- **Goal 2:** The conservation and wise use of water is promoted.
Rationale: Improve understanding of the full value of water to achieve behavioral change.
- **Goal 3:** Water quality and water quantity management is improved, benefitting human and ecosystem health.
Rationale: Promote nationally consistent approaches to water quality and quantity monitoring, guidelines and multi-jurisdictional public reporting. Encourage research and networks to enhance knowledge and understanding of ground and surface waters.
- **Goal 4:** Climate change impacts are reduced through adaptive strategies.
Rationale: Enhance water quality and quantity monitoring networks to support water and adaptation needs.
- **Goal 5:** Knowledge about Canada’s water is developed and shared.
Rationale: Help to spearhead value added information on water quality and quantity by supporting jurisdictional reporting efforts to Canadians in a systematic and consistent fashion.

⁴ <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-139/FullText.html>, Application 2(1)

3.4.13 CEPA – Inorganic Chloramines and Chlorinated Wastewater Effluents

The Canadian Environmental Protection Act (CEPA) required the elimination of toxic chlorine residuals from municipal wastewater effluent. All owners and operators of wastewater systems with daily volumes greater than or equal to 5,000 cubic metres of effluent were required to lower their total residual chlorine (TRC) levels to less than 0.02 mg/L or lower by December 15, 2009⁵.

3.4.14 Conservation Authorities

The legislative mandate of the Conservation Authority, as set out in Section 20 of the Conservation Authorities Act, is to establish and undertake programs designed to further the conservation, restoration, development and management of natural resources.

Conservation Authorities are local agencies that protect and manage water and other natural resources at the watershed level. These agencies have a number of responsibilities and functions in the land use planning and development process.

The study area falls within the Toronto and Region Conservation Authority (TRCA) east of Dixie Road and the Credit Valley Conservation Authority (CVC) to the west. A map indicating the areas within the Region under the TRCA and CVC jurisdictions is provided in Baseline Natural Features report in **Figure 12**.

TRCA and CVC are commenting agencies on the development applications under the Planning Act based on regulations approved by their Board of Directors and the province. These Conservation Authorities have agreements with partnering municipalities to provide technical services regarding matters associated with natural heritage protection, hazardous land management and water resources (e.g., stormwater management).

In addition, Conservation Authorities have the delegated responsibility from the Ministry of Northern Development, Mines and Natural Resources and Municipal Affairs and Housing to implement Section 3.1 (Natural Hazards) of the Provincial Policy Statement (2014), consistent with the Provincial one-window planning initiative.

TRCA and CVC also administer Ontario Regulation (O. Reg) 166/06 and O. Reg 160/06 respectively, under Section 28 of the Conservation Authorities Act. In general, these regulations prohibit altering a watercourse, wetland or shoreline and prohibit development in areas adjacent to river and stream valleys, hazardous lands and wetlands, without the prior written approval from the Conservation Authority (i.e., issuance of a permit).

3.5 Environmental Baseline Review

3.5.1 Physical Environment

The following subsections summarize the existing physical environment in and around the study area. Detailed reports on natural features and hydrogeological conditions are provided in **Appendix Volume 2**.

⁵ <http://ec.gc.ca/lcpe-cepa/default.asp?lang=En&xml=8EE8F3F3-DE8E-41CD-BC74-BAB1B4F52171>, (2); 4.3.3 – Dec 2009

Additional information on site specific natural environment investigations is provided in **Section 8.1.1**.

3.5.1.1 Subwatersheds

The study area is within the jurisdiction of two separate conservation authorities: CVC and TRCA. CVC jurisdiction comprises the western limit to near Hurontario Street. TRCA includes near Hurontario Street to the eastern limit. The Conservation Authorities have jurisdiction over the following subwatersheds listed in **Table 12** below.

Table 12: Study Area Subwatersheds

CVC (West)	TRCA (East)
<p><i>Credit River Watershed</i></p> <ul style="list-style-type: none"> • Norval to Port Credit (Subwatershed 9) • Lake Ontario Shoreline East Tributaries (Subwatershed 22) 	<p><i>Etobicoke Creek Watershed</i></p> <ul style="list-style-type: none"> • Lower Etobicoke Creek Subwatershed • Little Etobicoke Creek Subwatershed • Etobicoke Main Branch Subwatershed

3.5.1.2 Topography, Physiology and Geology

The study area is located within two physiographic regions, the South Slope (northwestern part of the study area) and Iroquois Plain (southeastern part of the study area). The surficial geology of the area consists of four types of deposits:

- Halton Till – northwestern part
- Deltaic and Lacustrine/glaciolacustrine material – southeastern part
- Recent alluvium lies adjacent to present day watercourses
- Shale bedrock

Fine-textured soils including clay with gravel, clay with sand, and silt are in the northwestern part (South Slope physiographic region) of the study area, while the southeastern part, the soils consist of sand, sand and gravel and some silt and clay, with a thicker overburden when compared to the northeastern portion.

3.5.1.3 Groundwater Conditions

According to the MECP well records in the study area, the shallow water wells (depth less than 7.6 metres below ground surface (mbgs)) show that the groundwater table may be as shallow as 1.6 mbgs, however, the water well record search did not return static water level data for a large portion of the study area.

No water wells were identified as “flowing” or with a static water level above ground surface, which indicates artesian conditions. Artesian conditions occur when the water level is above the actual level of the aquifer and the water table is shown to be above the actual location of the aquifer at and around the well in the centre⁶. It should be noted that, through past experience within the study area, it has been found that there are some artesian wells in the vicinity of Eglinton Avenue and Highway 403, installed within the Oak Ridges Moraine aquifer.

Bedrock within the study area is of Georgian Bay Formation which is composed of shale, limestone, dolostone and siltstone. The surface of the bedrock lies at a depth ranging from 0.4 to 16.8 mbgs.

3.5.1.4 Source Water Protection

Based on the assessment completed on the MECP’s Source Protection Information Atlas web page, the study area includes the following:

- Within Intake Protection Zone 2 and 3
- Multiple Significant Groundwater Recharge Areas
- Event based areas including Cooksville Creek and Etobicoke Creek
- Highly Vulnerable Aquifer (majority of the study area)
- Vulnerable Scoring Area (Surface Water) between 4 and 7.9
- Low Tier 2 Ground and Surface Water Subwatersheds








The study area does not include any WHPAs. Source Protection Area maps can be found in **Figure 10** and **Figure 11**.

With respect to sewage collection and transmission activities, no “significant” drinking water threats have been identified within the IPZ, SGRA or HVA located in the study area.

There may be potential for a sanitary trunk sewer break within an Event Based Area to constitute a drinking water threat. If the EA process proposes a sanitary trunk sewer to cross through an Event Based Area, modeling may be required to determine the level or risk to drinking water intakes on Lake Ontario and/or the applicability of policies to that trunk sewer.





⁶ Ministry of the Environment, Conservation and Parks. Retrieved from <https://www.ontario.ca/page/wells-regulation-flowing-wells-technical-bulletin>

General Features

-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeways
-  Regional Roads
-  Major Roads

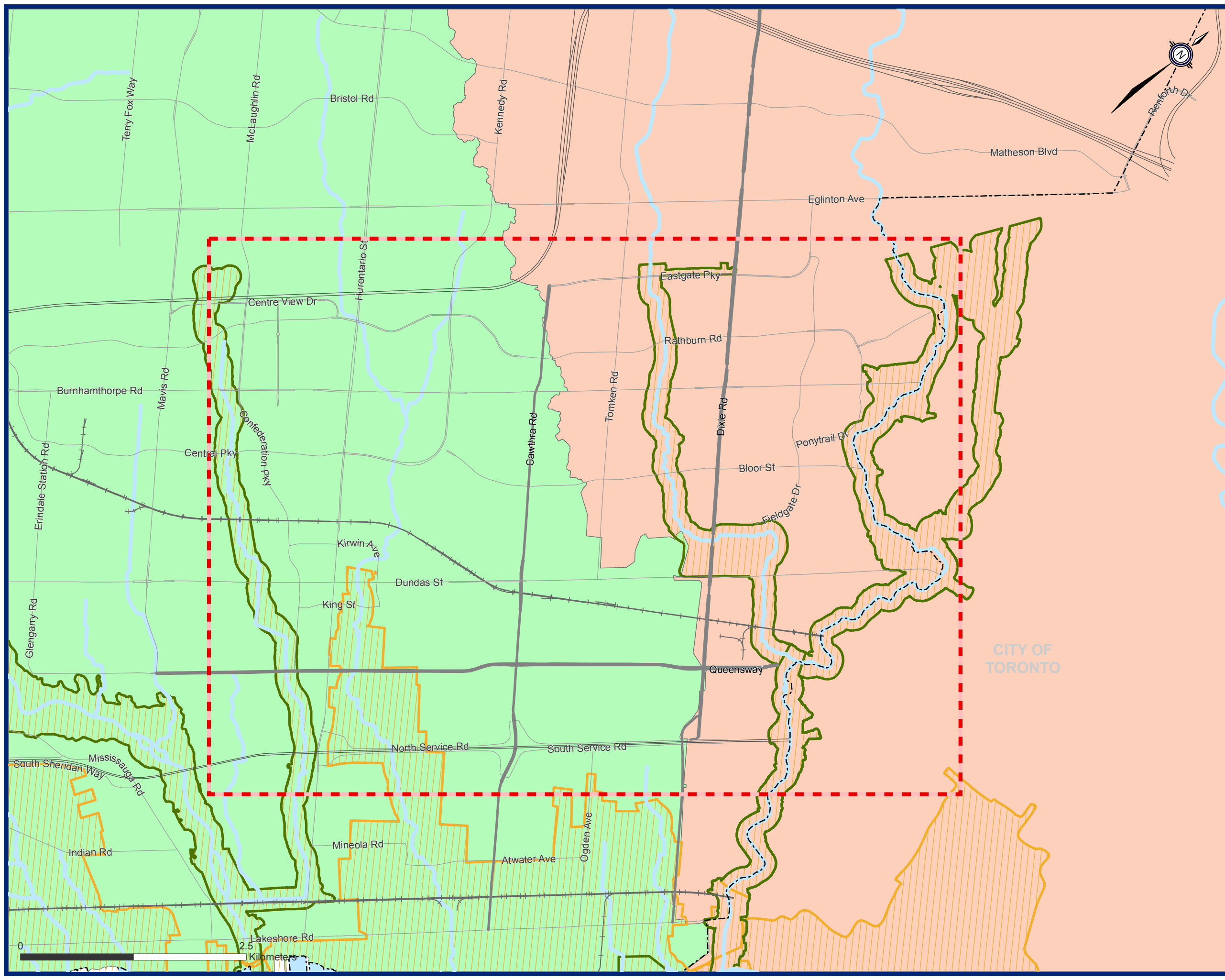
Environmental Features

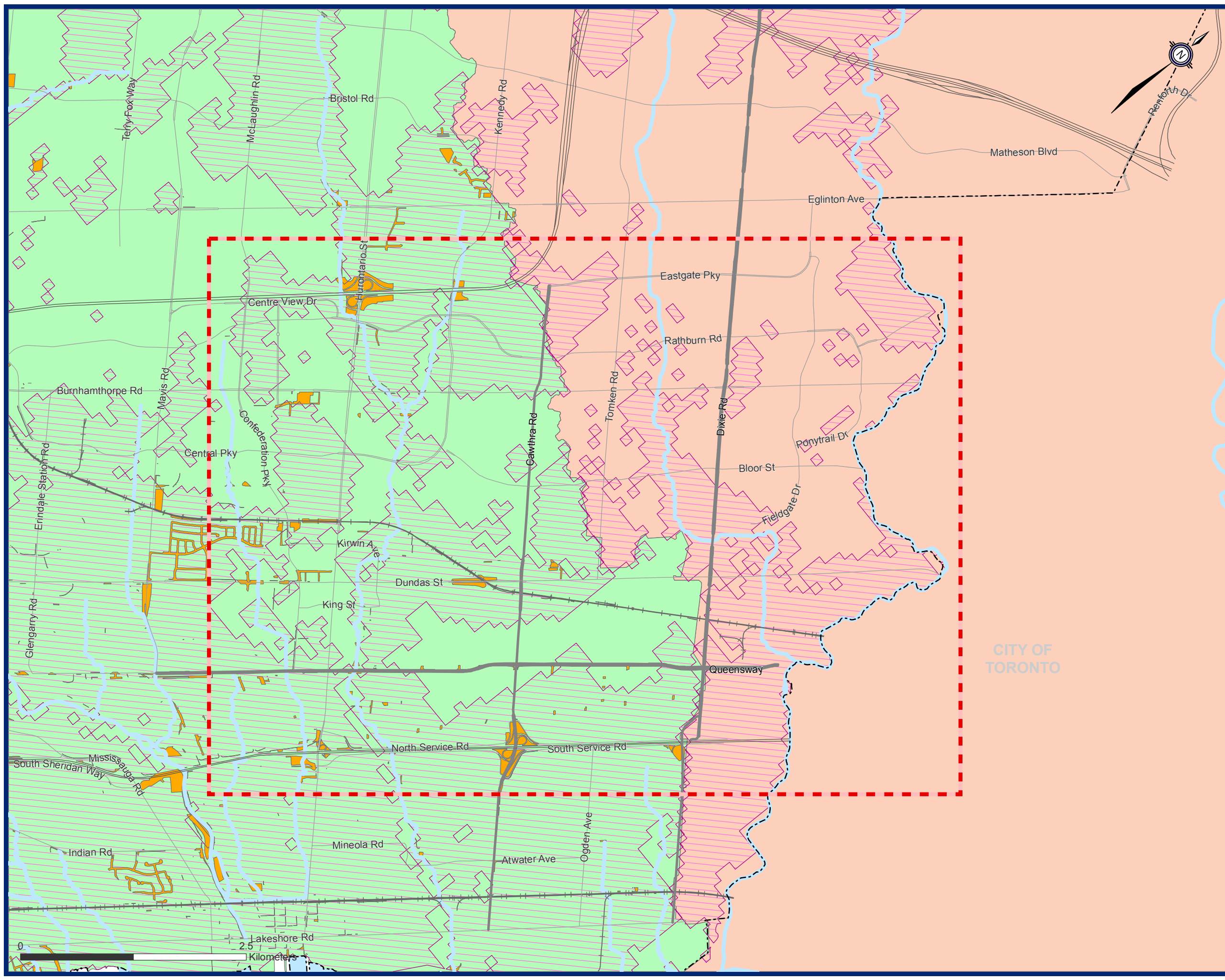
Source Protection Area

-  Credit Valley Source Protection Area
-  Toronto and Region Source Protection Area
-  Event-Based Areas
-  Intake Protection Zones








Map includes data from:
Toronto and Region Conservation Authority,
Credit Valley Conservation Authority

**Figure 10: Source Protection:
EBAs and IPZs
Hydrogeological Study**









General Features

-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeways
-  Regional Roads
-  Major Roads

Environmental Features

Source Protection Area

-  Credit Valley Source Protection Area
-  Toronto and Region Source Protection Area
-  Highly Vulnerable Aquifers
-  Significant Groundwater Recharge Areas

Map includes data from:
Toronto and Region Conservation Authority,
Credit Valley Conservation Authority

**Figure 11: Source Protection:
SGRAs and HVAs
Hydrogeological Study**

3.5.1.5 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI) are designated by the province according to standardized evaluation procedures. ANSIs are ranked by the Ministry of Northern Development, Mines and Natural Resources as being either provincially or regionally significant.

There is one provincially significant ANSI located within the study area – Cawthra Woods, east of Cawthra and south of the QEW, at the southern extent of the study area. **Figure 12** provides a map showing the ANSIs within the study area.

3.5.1.6 Significant Wetlands

Provincially Significant Wetlands (PSW) are determined by the MNRF based on a scientific point-based ranking system known as the Ontario Wetland Evaluation System (OWES). Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features.

There is one PSW within the study area – Cawthra Woods Wetland Complex PSW (associated with the Cawthra Woods ANSI). There are several unevaluated wetlands in the study area as well. **Figure 12** provides a map showing the significant wetlands within the study area.

3.5.1.7 Significant Woodlands

Significant woodlands are areas which are:

- Ecologically important in terms of features such as species composition, age of trees and stand history
- Functionally important due to their contribution to the broader landscape because of their location, size or due to the amount of forest cover in the planning area
- Economically important due to the site quality, species composition or past management history

Any development or site alteration is prohibited within the Core Areas of the Greenland System, except for minor development and essential infrastructure that is authorized under the EA process. In the event that portions of the Core Area are damaged or destroyed, the natural features in the area must be rehabilitated to restore ecological function.

The significant woodlands align with the Core Areas of the Greenlands System and are provided in **Figure 12**.

3.5.1.8 Significant Valleylands

According to the City of Mississauga, significant valleylands are associated with the main branches, major tributaries and other tributaries and watercourse corridors draining directly to Lake Ontario including the Credit River, Etobicoke Creek, and Mimico Creek. General guidelines for determining significance of valleylands is available in the Natural Heritage Reference Manual (NHRM).

An assessment is required if development is proposed within or adjacent to a significant valleyland. This assessment will demonstrate that the development will not adversely affect the feature or its ecological function, to the satisfaction CVC/TRCA. A permit would be required for any proposed work within or adjacent to woodlands in accordance with O. Reg 160/06 and O. Reg 166/06. **Figure 12** provides a map showing the significant valleylands within the study area.

3.5.1.9 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) is evaluated and designated based on the criteria and guidelines in the NHRM, Significant Wildlife Habitat Technical Guide (SWHTG) and Significant Wildlife Habitat Mitigation Support Tool (SWHMiST). There are four general types of SWH: seasonal concentration areas, migration corridors, rare or specialized habitats and habitat for species of conservation concern.

SWH in the City is generally encompassed within the Significant Natural Areas in the City's Official Plan (Schedule 3 – Natural System). Potential habitat for 16 species of conservation concern may be present in the study area. Field investigations will be conducted later in this study to identify any additional SWHs.









An assessment is required if development is proposed within or adjacent to (within 120 m) a SWH. This assessment will demonstrate that the development will not adversely affect the feature or its ecological function. **Figure 12** and **Figure 13** (The City of Mississauga Official Plan Schedule 3 Natural System Map) provides a map showing the significant natural features within the study area.

3.5.1.10 Other Natural Heritage Features








The City's Official Plan also designates other categories of Natural Heritage Features including:

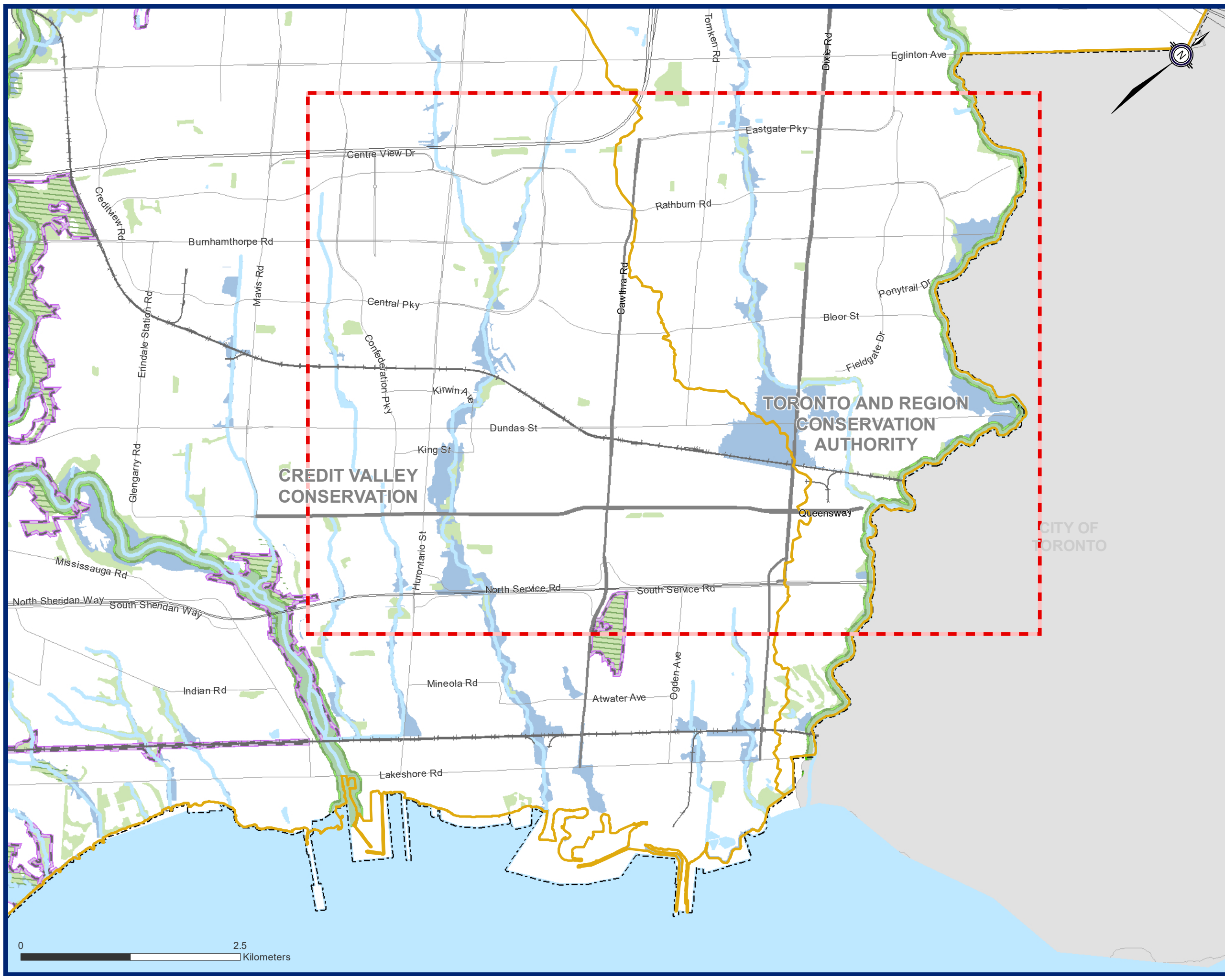
- Residential Woodlands
- Natural Green Spaces
- Significant Natural Area
- Special Management Areas
- Development or site alteration is not permitted within or adjacent to Natural Green Spaces, Linkages and Special Management Areas unless it is demonstrated that the development will not adversely affect the feature or its ecological function and opportunities for their protection, restoration, enhancement and expansion have been identified. These features are provided in **Figure 13**.

General Features

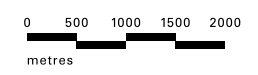
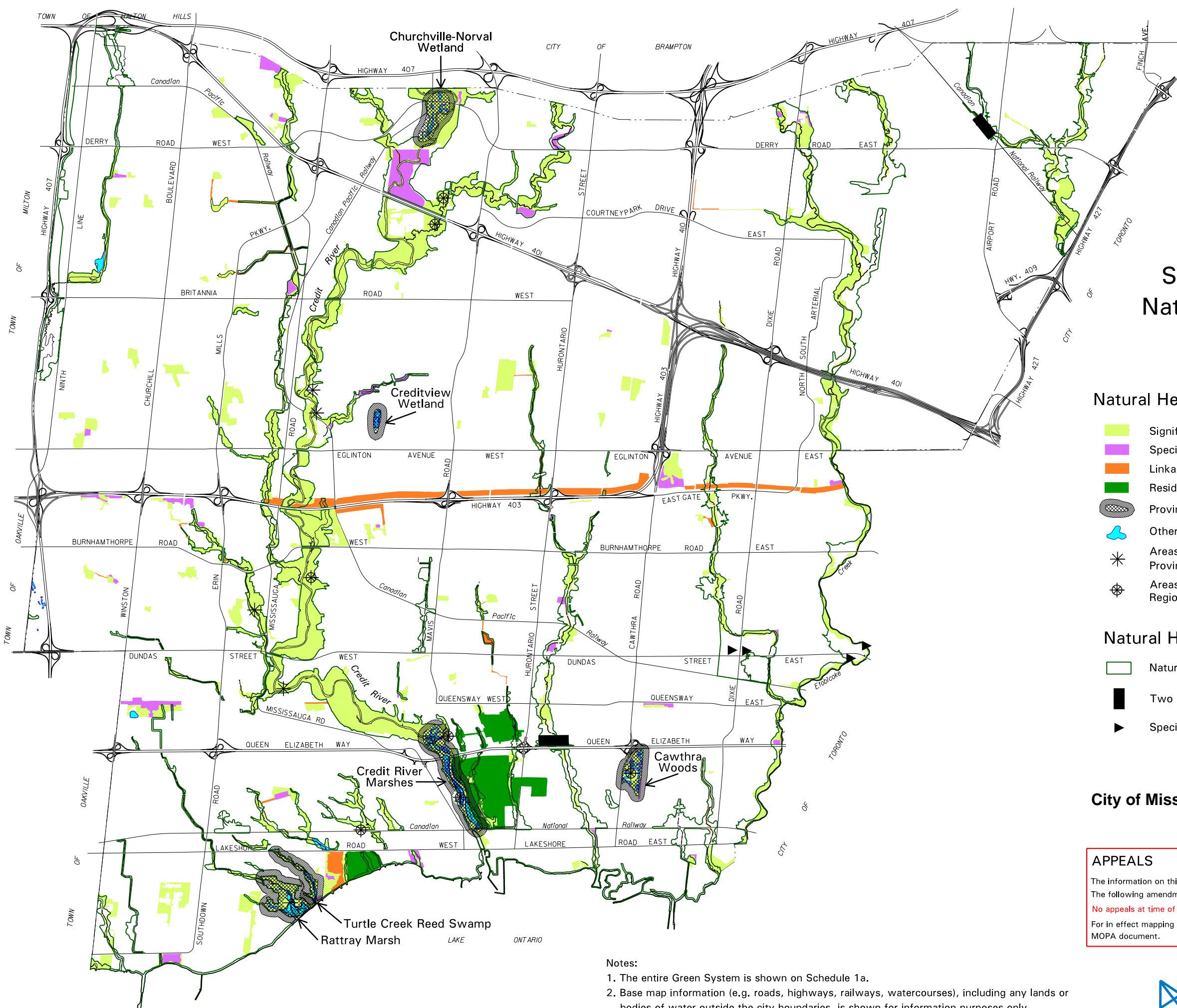
-  Conservation Authority Boundary
-  Study Area
-  Municipal Boundary
-  Other Municipal
-  Railway
-  Provincial Freeways
-  Regional Roads
-  Major Roads

Environmental Features

-  Greenbelt Plan
-  Environmentally Sensitive Area
-  Area of Natural and Scientific Interest
-  Floodplain
-  Watershed
-  Wooded Areas
-  Creeks, Rivers, and Waterbody



**Figure 12
Significant Environmental Area
Designation**



Schedule 3 Natural System

Natural Heritage System:

- Significant Natural Areas and Natural Green Spaces
- Special Management Areas
- Linkages
- Residential Woodlands
- Provincially Significant Wetlands
- Other Wetlands
- Areas of Natural and Scientific Interest - Provincial Significance
- Areas of Natural and Scientific Interest - Regional Significance

Natural Hazards:

- Natural Hazards
- Two Zone Floodplain Regulations
- Special Policy Area Floodplain

Figure 13
City of Mississauga Official Plan Natural Features

APPEALS

The information on this schedule reflects Council adopted amendments. The following amendments are under appeal and affect this schedule:

No appeals at time of consolidation.

For in effect mapping information refer to the Consolidation Tables and MOPA document.

- Notes:**
1. The entire Green System is shown on Schedule 1a.
 2. Base map information (e.g. roads, highways, railways, watercourses), including any lands or bodies of water outside the city boundaries, is shown for information purposes only.
 3. The limits of the Natural Hazards shown on this Schedule are for illustrative purposes only. The appropriate Conservation Authority should be consulted to determine their actual location.

3.5.1.11 Species at Risk

Species at risk (SAR) designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial MNRF, species are added to the provincial list of endangered and threatened species in compliance with the Endangered Species Act, which came into effect June 30, 2008. The Endangered Species Act provides habitat protection to all species listed as threatened or endangered. The Species at Risk in Ontario (SARO) List is contained in O. Reg. 230/08.

The natural features report (**Appendix Volume 2, Appendix A**) includes those SAR listed under federal Species at Risk Act and the provincial Endangered Species Act, as well as species ranked S1-S3 (NHIC) and regionally rare species. An assessment was conducted to determine which SAR occurred and/or had potential habitat within the study area. A screening of all SAR which have the potential to be found in the study area was conducted as a desktop exercise. The screening included the following sources of information:

- Natural Heritage Information Centre (NHIC) Biodiversity Explorer geographic query for information on SAR, S1-S3, and natural areas database maintained by the Ontario Ministry of Northern Development, Mines and Natural Resources
- MNRF mapping and existing studies
- SAR mapping
- SAR Public Registry (ECCC 2019)
- Species at Risk in Ontario (SARO) List (MNRF 2019)
- Breeding Birds Atlas of Ontario (OBBA) (Cadman, et al. 2007)
- Atlas of Mammals of Ontario (Dobbyn 1994)
- Bat Conservation International (BCI) range maps (BCI 2019)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019)
- Land Information Ontario (MNRF 2019)
- Ontario Butterfly Atlas (Jones et al. 2019)
- eBirds species maps (eBird 2019) MNRF LIO Aquatic Resources Area Layer (MNRF 2019)
- Aquatic Species at Risk Maps (DFO 2019)
- MNRF LIO Aquatic Resources Area Layer (MNRF 2019)
- Mississauga Plan and Mississauga Official Plan (City of Mississauga 2003, 2016)
- Region of Peel Official Plan (Region of Peel 2016)
- Parkway Belt West Plan (1978)
- York, Peel, Durham, Toronto and The Conservation Authorities Moraine Coalition (YPDT-CAMC) Groundwater Program database (YPDT-CAMC 2019)
- Toronto and Region Conservation Authority and Credit Valley Conservation Authority
- Existing aerial imagery

Based on the desktop assessment, 40 species designated as special concern, threatened or endangered under the Endangered Species Act and SARA were assessed to have potential to occur within the Study Area. **Table 13** identifies the Species at Risk that have regulatory protection under the Endangered Species Act (threatened or endangered) and were assessed to have moderate potential to occur within the Study Area.

Table 13: Potential Species at Risk Summary within Study Area

Taxon	Species
Amphibian	Jefferson Salamander, Jefferson X Blue-spotted Salamander
Bird	Bank Swallow, Barn Swallow, Chimney Swift
Fish	American Eel, Lake Sturgeon, Redside Dace
Mammal	Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-coloured Bat
Reptile	Blanding's Turtle
Vascular Plant	Butternut

The majority of potential suitable habitat for these SAR in the study area is concentrated in provincially significant wetlands (PSW), watercourses and associated riparian habitat and woodlands. There are also two species, Chimney Swift and Little Brown Myotis, which may also use anthropogenic structures for habitat.

3.5.1.12 Water Courses

There are two major surface water features found within the study area, Etobicoke Creek and Cooksville Creek. Additionally, there are several tributaries to these watercourses that cross through the study area.

Etobicoke Creek is approximately 59 km long, has a drainage area of about 211 km² and drains to Lake Ontario. Cooksville Creek is approximately 16 km long, has a drainage area of about 34 km² and drains to Lake Ontario.

3.5.1.13 Fish and Fish Habitat

All major watercourses and waterbodies within the study area are considered warmwater features. Warmwater aquatic features are generally considered to be more robust and tolerant to external effects. Cooksville Creek and Etobicoke Creek have more of a coldwater/coolwater thermal regime as they flow into Lake Ontario.

There are numerous native and non-native fish species present in the watercourses and waterbodies of the Credit River and Etobicoke Creek watersheds. Fish caught in the Cooksville Creek, downstream of the QEW highway, include top predator cold water species including migratory Rainbow Trout and Brown Trout and warmwater species including White Sucker and Baitfish.

Most fish in the Etobicoke Creek watershed are warmwater species such as Largemouth Bass, White Bass and Common Carp (an invasive species). A few coldwater species are found in Cooksville creek, near the mouth in Etobicoke Creek including Chinook Salmon. Historically, Redside Dace, a SAR classified as endangered, have been recorded as well as American Eel and Lake Sturgeon.

3.5.1.14 Hydrogeological Analysis

In general, an Environmental Activity and Sector Registry (EASR) approval is recommended to ensure regulatory compliance for construction dewatering. However, some areas within the study area that have been identified as having generally higher risk of requiring construction dewatering beyond EASR eligibility (i.e., more than 400,000 L/d):

- Gravelly Beach Deposits near Dundas Street: most likely require a Permit to Take Water (PTTW) where excavation is below the groundwater table.
- Fluvial Deposits/Alluvium: may require a PTTW due to variability of soils and proximity to surface water, except where impermeable shoring and/or pressure-balanced trenchless method (e.g., MTBM) are employed.
- Deep excavations in the northern part of the study area: may require a PTTW to provide for depressurization of deep Oak Ridges Moraine deposits to facilitate excavation stability.
- Excavations into Bedrock: excavation in fractured bedrock may require considerable dewatering and possible PTTW, therefore packer testing is recommended as part of the geotechnical investigations in areas where excavation into bedrock is proposed.

To provide confidence in construction dewatering discharge estimates, hydrogeological/ geotechnical investigations are recommended to include, at minimum, a combination of single-well response tests and grain size distribution tests to characterize the hydraulic conductivity of subsurface materials below the groundwater table.

Where dewatering must occur in the vicinity of impacted groundwater, significant costs may be incurred due to either treating the dewatering discharge or in providing cut-offs or seepage barriers to minimize handling of impacted groundwater.

3.5.2 Climate Change

The Region of Peel has experienced significant weather-related events over the last decade including extreme rainfall and ice storm events. The variability, frequency, and intensity of these type of events are forecasted to increase within the Region which can lead to negative impacts on the Region's water and wastewater infrastructure operations and maintenance. In 2016, the Region completed a study to characterize climate trends and future climate projections within the Region of Peel across an array of climate indicators of interest in the Region⁷.

The Region's climate in 2020's is projected to be the following, assuming business as usual emissions:

⁷ Auld, H., Switzman, H., Comer, N., Eng, S., Hazen, S., and Milner, G. 2016. *Climate Trends and Future Projections in the Region of Peel*. Ontario Climate Consortium: Toronto, ON: pp.103

- Increase in temperature across all seasons (mean annual temperature increases expected to rise 1.4°C). An increase in both the intensity and frequency in temperature extremes is also projected.
- Increase in total precipitation. An increase in both the intensity and frequency of precipitation events is also projected.
- Longer growing seasons (14 days longer).

The Region's climate in 2050's is projected to be the following, assuming business as usual emissions:

- Increase in temperature across all seasons (mean annual temperature increases expected to rise 2°C). An increase in both the intensity and frequency in temperature extremes is also projected.
- Increase in annual total precipitation (99 mm more per year is expected). An increase in both the intensity and frequency of precipitation events is also projected.
- Much longer growing seasons (up to 54 days longer).

The Region's climate in 2080's is projected to be the following, assuming business as usual emissions:

- Increase in temperature across all seasons (mean annual temperature increases expected to rise 4.9°C). An increase in both the intensity and frequency in temperature extremes is also projected.
- Increase in annual total precipitation (74 mm more per year is expected). An increase in both the intensity and frequency of precipitation events is also projected.
- Much longer growing seasons (34 days longer).

3.5.3 Built Environment

3.5.3.1 Areas of Potential Environmental Concern

A Phase One Environmental Site Assessment (ESA) is undertaken to identify areas where there may be potential soil or groundwater contamination. The Phase One ESA involved the review of numerous sources of information available from public sources and from the Region of Peel related to the sites, including a 250 m buffer around each site. Sources including:

- Topographic, surficial geological, water well record mapping and database information
- Environmental database reports from ERIS
- Limited City Directory search
- Aerial photographs
- Fire Insurance Plans
- Site reconnaissance

The Phase One ESA identified a total of 49 potentially contaminating activities (PCAs) within the study area with the majority related to historical or current existence of fuel tanks or automotive service stations and historical occurrence of spills of potential contaminants of concern (PCOCs). These PCAs were each subject to an individual assessment to determine whether the environmental risk associated with it was sufficient to be considered an Area of Potential Environmental Concern (APEC). Several of the APECs are due to PCAs that occurred at off-site locations. Where a PCA was identified to have occurred on a given site, it was immediately considered to be an APEC.

Based on the APECs identified, it has been recommended that additional investigation (i.e., in the form of a Phase Two ESA or soil quality sampling for the purposes of Excess Soil Management Plan in accordance with O. Reg. 406/19) be conducted. The Phase Two ESA is planned during the detailed design phase. It will involve in-field investigations including borehole and monitoring wells to collect and analyze soil and groundwater samples to identify any levels of contaminants. A Phase 2 ESA will achieve the following objectives:

- determine with greater certainty whether the potential impacts are present and
- assess how the impacts may affect construction activities such as dewatering and/or
- provide soil quality assessment for the purposes of developing an Excess Soil Management Plan.

3.5.3.2 Archaeological Assessment

A Stage 1 Archaeological Assessment is undertaken to determine the potential to encounter archaeological resources within a study area. It involved the compilation of available information about the known and potential cultural heritage resources within the study area and provided direction for the protection, management, and recovery of these resources. Distance to water, soil texture and proximity to resource -specific features conducive for past settlements are all important determinants into archaeological potential

A Stage 1 Archaeological Assessment was completed for the study area. Most of the study area was considered to have low archaeological potential; however, a Stage 2 Survey was recommended for multiple pockets which were identified as having archaeological potential.

3.5.3.3 Built/Cultural Heritage Resources

A desktop analysis for Cultural Heritage Screening Report (CHSR) was conducted for the study area to identify known or potential cultural heritage resources in the study area and determine if further cultural heritage studies will be required for the project. Through this analysis, 53 known or potential cultural heritage resources were identified within the study area.

The CHSR is provided in **Appendix Volume 2, Appendix D**. The completed Ministry of Heritage, Sport, Tourism and Culture (MHSTC) Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes Checklist is also included in **Appendix Volume 2, Appendix D**.

3.5.3.4 Socio-Economic Environment and Land Use

The primary land use within the study area is residential with pockets of commercial and industrial. The high growth areas are located within the Hurontario Corridor, Dundas Corridor and MCC. A land use map of the study area is provided in **Figure 4**.

Hurontario/ Main Street Corridor Master Plan

The Hurontario/Main Street Corridor Master Plan, completed in October 2010, integrates transit, intensification areas and urban design.

The guiding principles of this Master Plan are the following:

1. Maintain the focus on the “big picture”
2. Make it sustainable and integrated
3. Support transit through built form and densities
4. Put pedestrians first
5. Plan for development that is compact and complete
6. Facilitate multimodalism
7. Create connectivity
8. Focus on place-making
9. Ensure that the plan is both visionary and attainable
10. Protect stable neighbourhoods

Dundas Connects Master Plan

The Dundas Connects Master Plan, completed in May 2018, integrates both transportation and land use planning to create a strategy for current and future servicing demands. The Master Plan identified seven focus areas along Dundas Street, three of which are within the study area – Cooksville, Cawthra and Dixie. These areas have been identified in the Mississauga Official Plan as intensification areas – the land located within 200 to 300 m of the corridor centre line have potential for higher density and mixed-use development.

The Dundas Connects Master Plan recommended the following strategies:

- Mixed-use, transit-supportive intensification across Dundas Street and seven broader Focus Areas
- Implementing Bus Rapid Transit (BRT) along Dundas Street
- Creating a complete street for all users

Downtown21 Master Plan/Downtown Strategy




The Downtown21 Master Plan, completed in April 2010, has set out guiding principles to drive future policy and strategy decisions including:

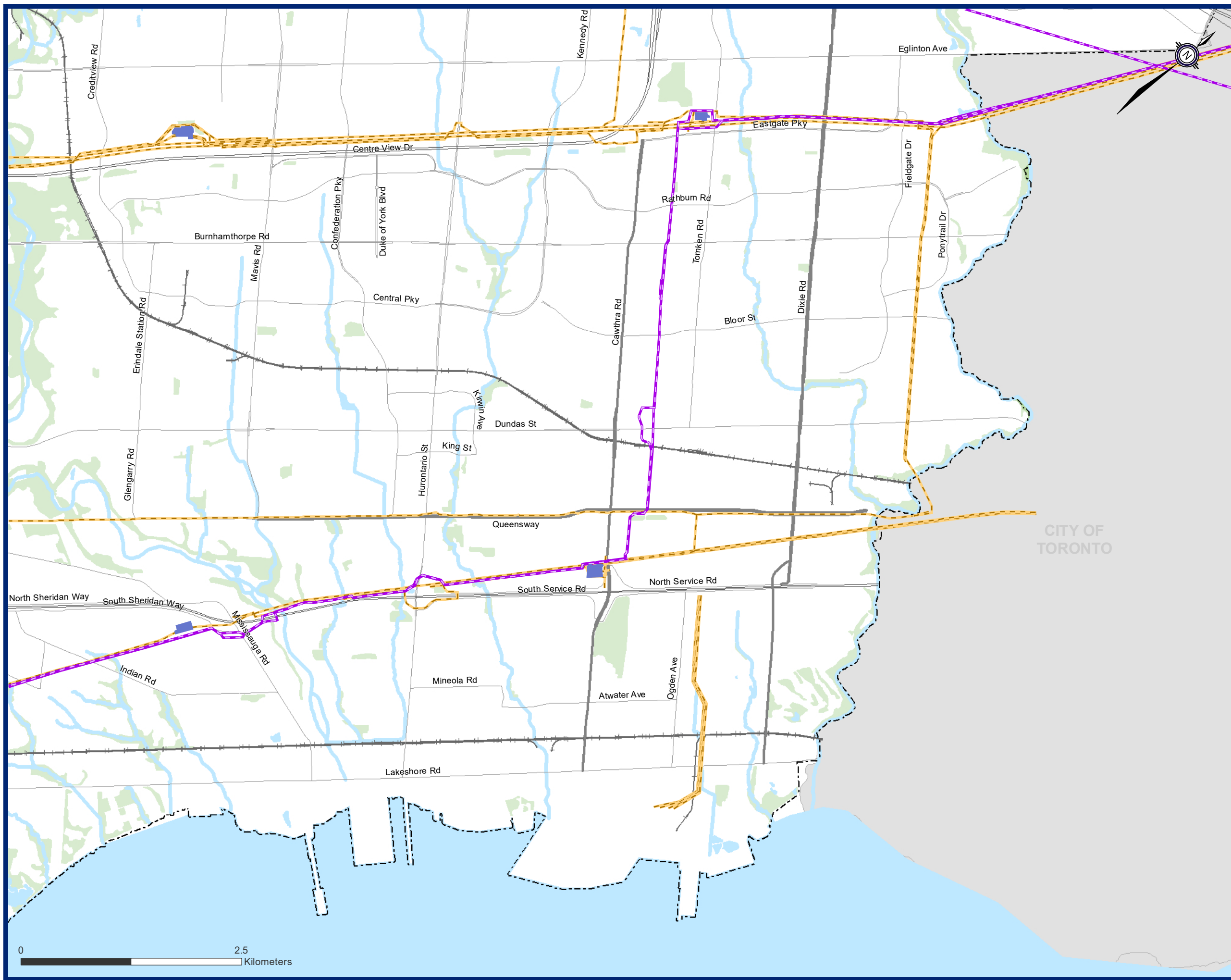
- Increase Employment.

- Build the area to accommodate a range of transportation modes including walking, cycling, transit and car.
- Develop a walkable and urban downtown.
- Ensure sustainability is at the core of economic development and resource consumption strategy.
- Focus on a small intense location.
- Create a development framework with predictability.

The City is developing the *Downtown Strategy* which will set out a new vision and plan for the Downtown Mississauga area and will build off the Downtown21 Master Plan. This strategy will include downtown needs and aspirations, opportunities for improvement, a vision for the future and steps in implementing the strategy.

Additional Infrastructure

-  Hydroline
-  Pipelines (National Energy Board)
-  Hydro Station



CITY OF TORONTO



**Figure 14
Central Mississauga Utility
Infrastructure**

4.0 Phase 1 - Problem/Opportunity Statement

4.1 Problem/Opportunity Statement

As part of Phase 1 of the Municipal Class EA process, a Problem/Opportunity Statement provides a clear identification of the opportunities and challenges that are being addressed through the study. The Problem/Opportunity Statement for this Class EA is summarized as follows:

“Increase the conveyance capacity of key trunk sewers to service future growth and ensure alignment with the Region’s long-term plan for providing wastewater services within the Mississauga City Centre, Hurontario Corridor and Dundas Corridor areas.”

The Problem/Opportunity Statement for the Wastewater Capacity Improvements for Central Mississauga Class EA aims to achieve the following strategy goals:

- Optimize the existing and future capacity of the Cooksville, CPR, and Little Etobicoke Creek trunk sewers within the study area to meet growth needs to 2041 and beyond.
- Divert sufficient flows from the Cooksville, CPR, and Little Etobicoke Creek trunk sewers to provide operational flexibility for sewer maintenance, inspection and emergency operations.
- Provide an appropriate level of servicing security while considering growth within the intensification areas of Hurontario, Dundas and Mississauga City Centre.
- Provide infrastructure capacity and flexibility to adapt to increasingly extreme wet weather events.
- Provide flow diversion strategy and operational flexibility to service 2041 peak flows as well as the potential post 2041 flows.
- Minimize total capital, operation and maintenance, and lifecycle costs.
- Minimize environmental impacts including natural and socio-economic.

4.2 Opportunities and Constraints

Several opportunities and constraint considerations will guide the wastewater servicing solution for the Central Mississauga area:

- G.E. Booth WWTP has sufficient capacity to receive current and future flows from the study area therefore there is no need to divert flows within the study area to the Clarkson WWTP.
- Address conveyance upgrade requirements to convey flows based on the needs of the existing and future service area
 - **Figure 15** identifies capacity constraints identified in the 2041 growth scenario based on a 25yr SCSII design storm. Trunk sewer capacity constraints were identified on the Upper and Lower Cooksville Creek Trunk Sewers, Upper and Lower CPR Trunk Sewers. Additional details modelling analyses are provided in the Hydraulic Analysis Report in **Appendix Volume 2, Appendix E**.

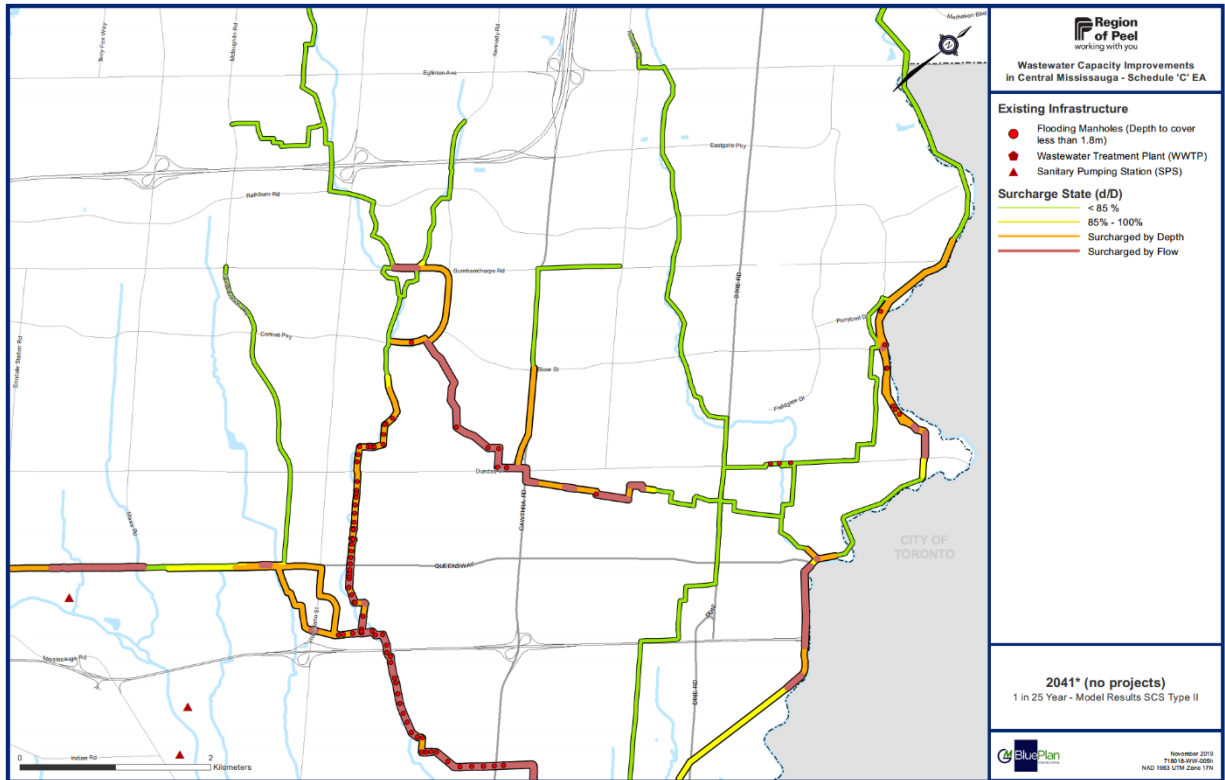


Figure 15: 2041* Growth Scenario

- Improve the ability to divert flows between trunk sewers to address operation, maintenance and emergency operation needs.
- Offset other major infrastructure projects.
- Consider real time control integration to ensure diversion flexibility during peak wet weather flow and maintenance.

Through the study, special technical considerations were given to the following:

- Environmental crossings (e.g., creeks)
- Utility corridors (e.g., MTO, Hydro One, Enbridge)
- Sewer connection points
- Natural, built, and social features

Figure 16 provides a map showing the three growth corridors and the direction of flow from these areas to the G.E. Booth WWTP.

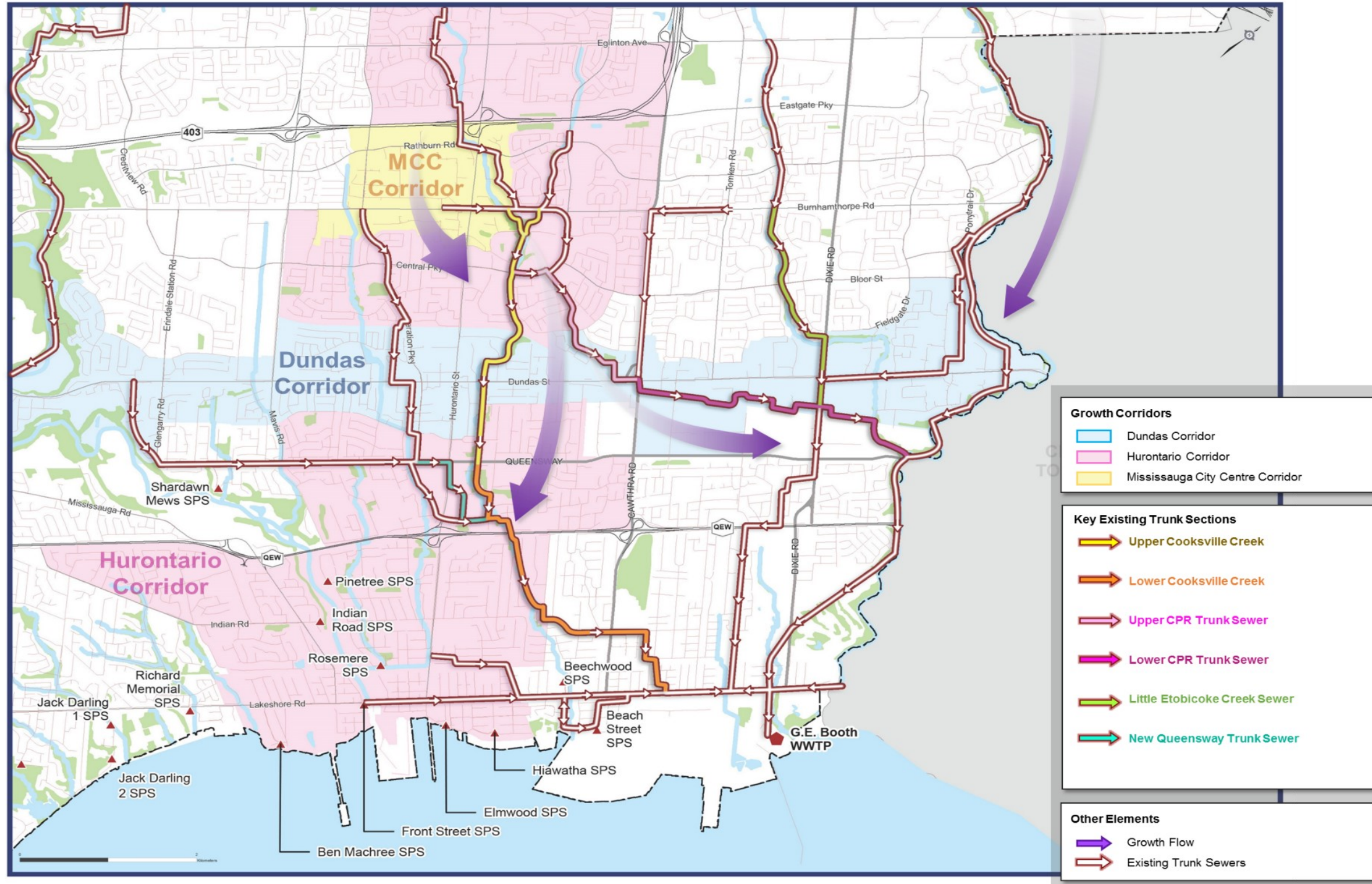


Figure 16: Problem/Opportunity

5.0 Phase 2 – Alternative Solutions

This section describes the Phase 2 Class EA process undertaken to identify, develop and evaluate alternative solutions to address the problem/opportunity statement identified in Phase 1 of the Class EA. Following the baseline inventory of natural, social, economic, legal/jurisdictional and environmental factors described in **Section 3.0**, a long list of alternative solutions was identified, evaluated, and shortlisted through an extensive process to ultimately identify the preferred solution. This section describes this process.

This Class EA Study followed a comprehensive step by step approach in developing an overall solution to meet the problem statement – increase the conveyance capacity of key trunk sewers to service future growth. The evaluation methodology in this Class EA Study required a tailored process to analyze and evaluate broad strategy ideas, conceptual servicing strategies and ultimately specific alternative solutions with various alignments and conceptual shaft site locations. Each step in this process provided an enhanced level of detail starting from a high-level approach to more detailed infrastructure locations.

This section describes the evaluation criteria, process, and results from each step. **Figure 17** provides an overview of the Phase 2 Class EA process.

Table 14: Phase 2 Evaluation Framework

Step	Description
Step 1 Strategy Ideas	All possible high-level strategy ideas to address the problem/opportunity statement within the study area were proposed including do nothing, limit growth, reduce I/I and divert flows/infrastructure upgrades.
Step 2 Conceptual Servicing Strategies	The diversion of flows/infrastructure upgrades strategy idea was carried forward and further refined to the following two concepts: individual sewer section solutions (resolving each individual capacity issue separately) and an integrated solution (examining all capacity issues in parallel to develop one holistic solution).
Step 3 Long List of subsections	An integrated solution servicing strategy was carried forward and a long list of 43 alternative sub-section alignments was created. Pre-screening criteria was used in the evaluation of these sub section alternatives.
Step 4 Short List of alignments	8 alignments were carried forward and underwent a detailed review to evaluate each alternative against the evaluation criteria (environmental, technical, socio-economic, legal/jurisdictional) and input from key agencies.
Step 5 Preferred Solution	Following the comprehensive evaluation of the short list of alternatives, the preliminary preferred solution was selected.

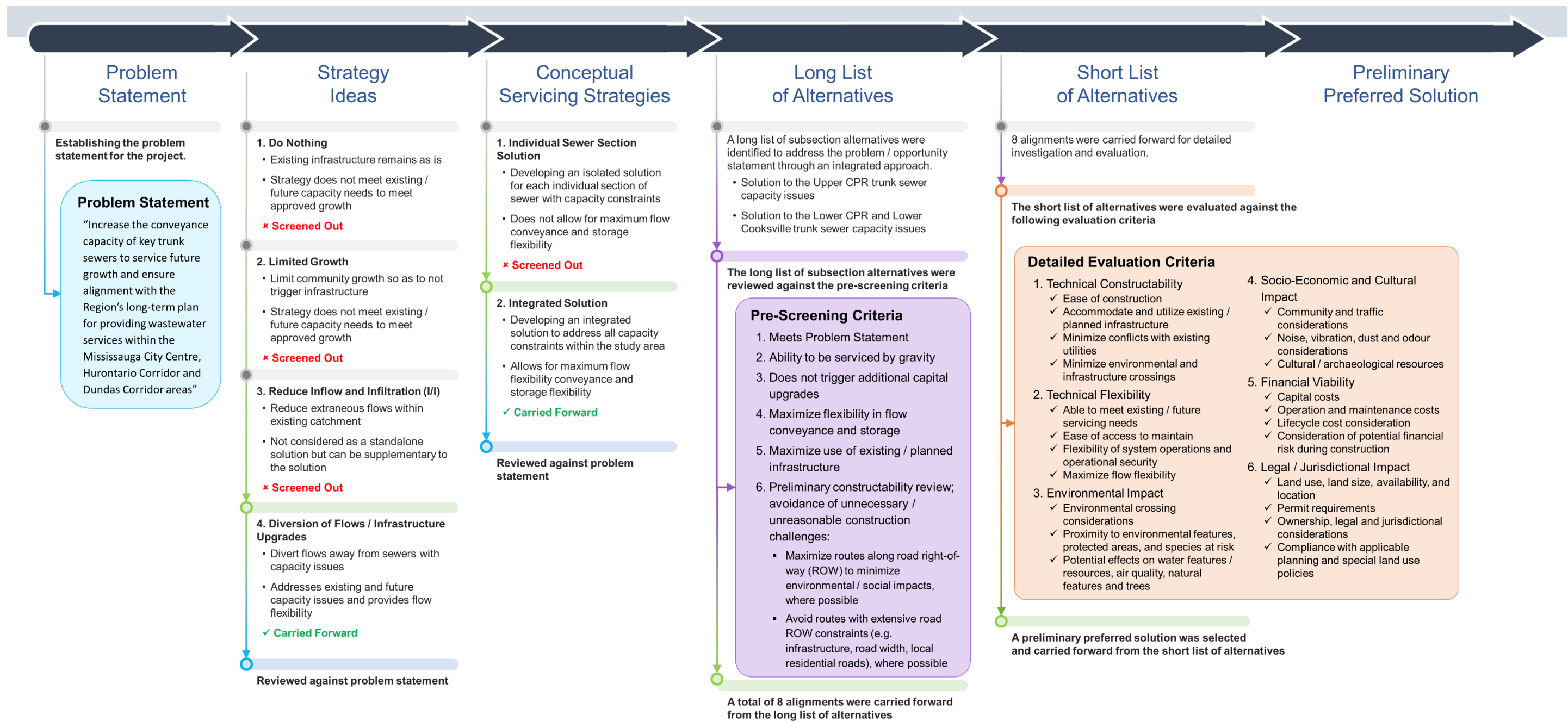


Figure 17: Phase 2 Class EA Evaluation Process

5.1 Servicing Ideas

Servicing ideas were developed to address the problem/opportunity identified in Phase 1 of the Class EA process. In keeping with the principles of environmental planning, the servicing ideas to the proposed undertaking and “alternative methods” of implementing the preferred solution included “Do Nothing” and “Limit Growth”.

Servicing ideas to address the problem/opportunity statement were identified based on a high-level technical analysis that considered a baseline infrastructure review as well as recommendations from past studies completed within the study area. The following servicing ideas were identified at the outset of the study and applied within the conceptual study limits.

Table 15: Servicing Ideas Screening Results

Strategy Idea	Pass/Fail	Screening Results
Do Nothing	Existing infrastructure remains as is – strategy does not meet existing/future capacity needs to meet approved growth.	Does not address the Problem/Opportunity Statement Screened out ✖
Limited Growth	Limit community growth so as to not trigger infrastructure – strategy does not meet existing/future capacity needs to meet approved growth.	Does not address the Problem/Opportunity Statement Screened out ✖
Reduce I/I	Reduce extraneous flows within existing catchment – not considered standalone solution but supplementary to solution.	Does not address the full Problem/Opportunity Statement Screened out ✖
Diversion of Flows/Infrastructure Upgrades	Divert flows away from sewers with capacity issues - addresses existing and future capacity issues and provides flow flexibility.	Addresses the Problem/Opportunity Statement Carried Forward ✔

5.2 Conceptual Servicing Strategies

The shortlisted servicing idea of “Diversion of Flows /Infrastructure Upgrades” was further refined as conceptual servicing strategies. The evaluation of the servicing concepts included which concept best met the Problem/Opportunity Statement.

Table 16: Conceptual Servicing Strategies Screening Results

Servicing Strategy	Pass/Fail	Screening Results
Concept 1	Individual sewer section solution including Upper CPR Diversion, Lower Cooksville Diversion and Lower CPR Diversion. <i>Resolving each individual capacity issue separately.</i>	Does not allow for maximum flow conveyance and storage flexibility Screened out ✖
Concept 2	Integrated solution including Upper CPR Diversion and an Integrated Lower Cooksville and Lower CPR Diversion. <i>Examining all capacity issues in parallel to develop one holistic solution.</i>	Allows for maximum flow conveyance and storage flexibility Carried Forward ✔

Concept 2 led to an integrated approach solution and included two areas for evaluation:

- Area 1: Upper CPR Diversion Solution
- Area 2: Integrated Lower Cooksville and Lower CPR Diversion Solution

5.3 Long List of Routes

A long list of wastewater sewer sub-sections was developed within the integrated solution concept. A key aspect to the development of the long list of alternatives was the need to connect to key trunk sewers in the existing system to address the problem/opportunity statement and relieve capacity constraints in the constrained trunk sewers described in **Section 4.2**.





A total of 43 different wastewater sewer sub-sections were developed to address area 1 and 2. **Figure 18** provides a map with the wastewater sewer route sub-sections.

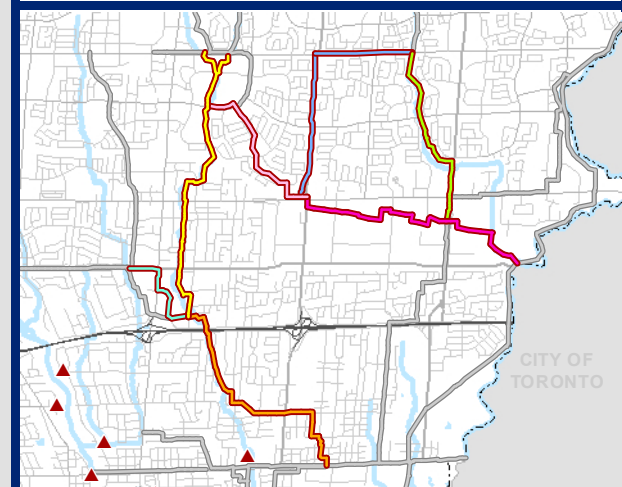
**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

**Screening of Sewer Route
Sub-Sections (Long List to Short List)**








← Long List Alternatives

Existing Infrastructure

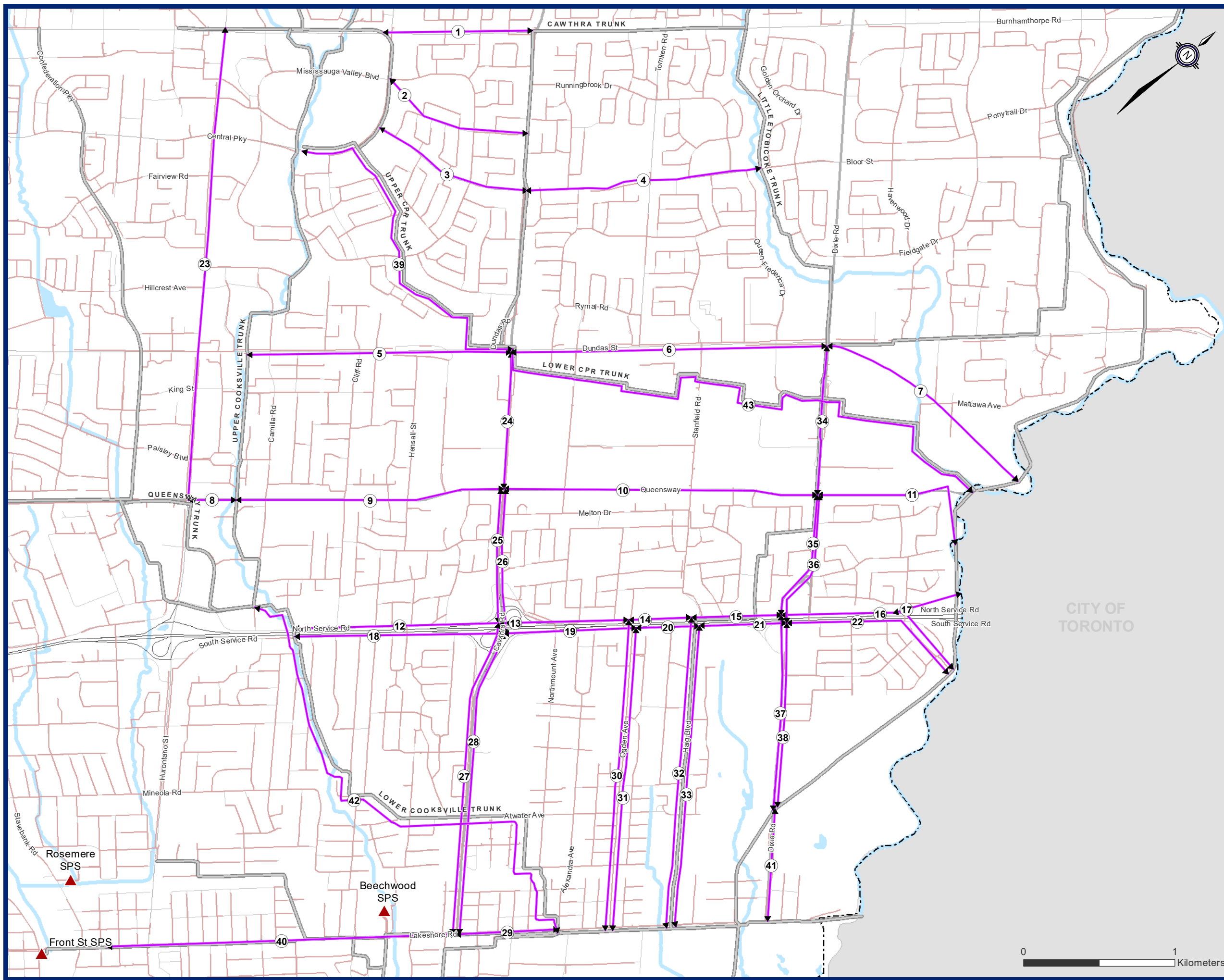
-  Wastewater Treatment Plant (WWTP)
-  Sanitary Pumping Station (SPS)
-  Trunk Sewers (>600 mm)
-  Local Sewers (<600 mm)



Key Trunk Sewers

-  Upper Cooksville Creek
-  Lower CPR Trunk Sewer
-  Little Etobicoke Creek Sewer
-  Lower Cooksville Creek
-  Queensway Trunk Sewer
-  Upper CPR Trunk Sewer
-  Cawthra Road Trunk

**Figure 18
Long List Sub-Sections
Sewer Route Overview**



0 1 Kilometers

5.4 Pre-Screening Evaluation of Long List

A set of high-level pre-screening criteria was developed to evaluate the long list of alternatives. The following pre-screening criteria was used:

- Meets the Problem/Opportunity Statement.
- Ability to service by gravity.
- Does not trigger additional capital upgrades.
- Maximizes flexibility in flow conveyance and storage.
- Maximizes use of existing/planned infrastructure.
- Preliminary constructability review; avoidance of unnecessary/unreasonable construction challenges:
 - Maximizes routes along road right-of-way (ROW) to minimize environmental/social impacts, where possible.
 - Avoidance of routes with extensive road ROW constraints (e.g., infrastructure, road width, local residential roads), where possible.

Details on the evaluation of the long list is provided below in **Table 17**.

Table 17: Screening of Sewer Route Sub-sections (Long List to Short List)

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
1	Burnhamthorpe between Central Parkway and Cawthra Road	<ul style="list-style-type: none"> • Meets criteria 	✓	<ul style="list-style-type: none"> • Utilizes the Cawthra sewer which is designed and currently in the construction phase
2	Along local roads between Central Parkway and Cawthra Road	<ul style="list-style-type: none"> • Residential route • Road ROW constraints 	✗	<ul style="list-style-type: none"> • Alternative alignment available with less impact to residents (avoids local roads)
3	Bloor Street between Central Parkway and Cawthra Road	<ul style="list-style-type: none"> • Meets criteria 	✓	<ul style="list-style-type: none"> • Utilizes road ROW
4	Bloor Street between Cawthra Road and Little Etobicoke Creek Trunk Sewer	<ul style="list-style-type: none"> • Does not maximize existing/planned infrastructure 	✗	<ul style="list-style-type: none"> • Alternative alignment available that utilizes the Cawthra sewer currently under construction

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
5	Dundas Street between Upper Cooksville Trunk Sewer and Cawthra Road	<ul style="list-style-type: none"> Cannot be serviced by gravity Does not maximize existing/planned infrastructure Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Gradient does now allow for gravity sewer
6	Dundas Street between Cawthra Road and Dixie Road	<ul style="list-style-type: none"> Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Alternative alignment available which maximizes flow from Upper Cooksville
7	Along local roads from Dundas Street and Dixie Road and Etobicoke Creek	<ul style="list-style-type: none"> Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Alternative alignment available with less impact to residents (avoids local roads)
8	Queensway between Hurontario and Upper Cooksville	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
9	Queensway between Upper Cooksville and Cawthra Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
10	Queensway between Cawthra Road and Dixie Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
11	Queensway between Dixie Road and Etobicoke Creek	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
12	North Service Road between Lower Cooksville Creek Trunk Sewer and Cawthra Rd	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
13	North Service Road between Cawthra Road and Ogden Avenue	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
14	North Service Road between Ogden Avenue and Haig Boulevard	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
15	North Service Road between Haig Boulevard and Dixie Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizes flow flexibility, with the ability to receive flows from both Upper Cooksville and new Queensway Trunk Sewer
16	North Service Road between Dixie Road and Etobicoke Creek	<ul style="list-style-type: none"> Unnecessary/unreasonable construction challenges 	✗	<ul style="list-style-type: none"> No road access for construction/maintenance purposes Requires construction on local roads
17	North Service Road between Winterhaven Road and East Trunk	<ul style="list-style-type: none"> Cannot be serviced by gravity 	✗	<ul style="list-style-type: none"> Gradient does not allow for gravity sewer
18	South Service Road between Lower Cooksville Creek Trunk Sewer and Cawthra Rd	<ul style="list-style-type: none"> Unnecessary/unreasonable construction challenges 	✗	<ul style="list-style-type: none"> Limited land availability for shafts

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
19	South Service Road between Cawthra Road and Ogden Avenue	<ul style="list-style-type: none"> Unnecessary/unreasonable construction challenges 	x	<ul style="list-style-type: none"> Limited land availability for shafts
20	South Service Road between Ogden Avenue and Haig Boulevard	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Increased potential for available land for shafts
21	South Service Road between Haig Boulevard and Dixie Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Increased potential for available land for shafts
22	South Service Road between Dixie Road and Etobicoke Creek	<ul style="list-style-type: none"> Unnecessary/unreasonable construction challenges 	x	<ul style="list-style-type: none"> No road access for construction/maintenance purposes Limited land availability for shafts
23	Hurontario Street between Burnhamthorpe Road and Queensway	<ul style="list-style-type: none"> Does not maximize existing/planned infrastructure 	x	<ul style="list-style-type: none"> Alternative alignment available that utilizes the Cawthra sewer currently under construction
24	Cawthra Road between Dundas Street and Queensway	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizing the use of the Cawthra sewer, currently in construction phase Maximizes flow diversion from the Lower CPR Trunk sewer
25	Cawthra Road between Queensway and North Service Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizing the use of the Cawthra sewer, currently in construction phase Maximizes flow diversion from the Lower CPR Trunk sewer

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
26	Cawthra Road between Queensway and South Service Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Maximizing the use of the Cawthra sewer, currently in construction phase Maximizes flow diversion from the Lower CPR Trunk sewer
27	Cawthra Road between North Service Road and Lakeshore	<ul style="list-style-type: none"> Road ROW constraints (e.g., infrastructure) Capacity constraints on Lakeshore, triggers additional capital upgrades 	✗	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
28	Cawthra Road between South Service Road and Lakeshore	<ul style="list-style-type: none"> Road ROW constraints (e.g., infrastructure) Capacity constraints on Lakeshore, triggers additional capital upgrades 	✗	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
29	Lakeshore between Cawthra Road and Alexandria Avenue	<ul style="list-style-type: none"> Capacity constraints on Lakeshore, triggers additional capital upgrades 	✗	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
30	Ogden Avenue between North Service Road and Lakeshore	<ul style="list-style-type: none"> Capacity constraints on Lakeshore, triggers additional capital upgrades 	✗	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
31	Ogden Avenue between South Service Road and Lakeshore	<ul style="list-style-type: none"> Residential route Capacity constraints on Lakeshore, triggers additional capital upgrades 	✗	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
32	Haig Boulevard between North Service Road and Lakeshore	<ul style="list-style-type: none"> Residential route Capacity constraints on Lakeshore, triggers additional capital upgrades 	x	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
33	Haig Boulevard between South Service Road and Lakeshore	<ul style="list-style-type: none"> Residential route Capacity constraints on Lakeshore, triggers additional capital upgrades 	x	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
34	Dixie Road between Dundas Street and Queensway	<ul style="list-style-type: none"> Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Alternative alignment available which maximizes flow flexibility
35	Dixie Road between Queensway and North Service Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Alignment avoids difficult connection to East Trunk at Etobicoke Creek
36	Dixie Road between Queensway and South Service Road	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Alignment avoids difficult connection to East Trunk at Etobicoke Creek
37	Dixie Road between North Service Road and East Trunk	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Alignment avoids difficult connection to East Trunk at Etobicoke Creek
38	Dixie Road between South Service Road and East Trunk	<ul style="list-style-type: none"> Meets criteria 	✓	<ul style="list-style-type: none"> Alignment avoids difficult connection to East Trunk at Etobicoke Creek

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
39	Dixie Road between East Trunk and Lakeshore	<ul style="list-style-type: none"> Capacity constraints on Lakeshore, triggers additional capital upgrades Unnecessary/unreasonable construction challenges Extensive road ROW constraints along Lake Shore (e.g., infrastructure) 	x	<ul style="list-style-type: none"> Capacity constraints along Lake Shore Existing infrastructure within Lakeshore ROW
40	Lakeshore from Cawthra Road and Port Credit	<ul style="list-style-type: none"> Does not maximize existing/planned infrastructure Cannot be serviced by gravity 	x	<ul style="list-style-type: none"> Alignment would require a pumping station due to gradients. Alternative alignments available that maximize existing infrastructure
41	Twinning Upper CPR Creek Trunk Sewer	<ul style="list-style-type: none"> Alignment along Cooksville Creek; major impacts to environmental features Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Alternative alignment available which maximizes flow flexibility
42	Twinning Lower Cooksville Creek Trunk Sewer	<ul style="list-style-type: none"> Portion of alignment along Little Etobicoke Creek; major impacts to environmental features Does not maximize flow flexibility 	x	<ul style="list-style-type: none"> Capacity constraints along Lake Shore sewer limiting available flow diversion to twinned Lower Cooksville Trunk Sewer
43	Twinning Lower CPR Trunk Sewer	<ul style="list-style-type: none"> Alignment along Cooksville Creek; major impacts to environmental features 	x	<ul style="list-style-type: none"> Alternative alignment available which maximizes flow flexibility from Upper CPR

Sub-section	Description	Relevant Screening Criteria	Screening Result	Commentary
		<ul style="list-style-type: none"> Does not maximize flow flexibility 		

The pre-screening criteria was applied using the baseline opportunities and constraints gathered through the desktop environmental reviews, technical analysis and public consultation. Based on the criteria, alternative sewer sub-sections were evaluated and either eliminated or carried forward for more detailed evaluation, as shown in **Figure 19**.

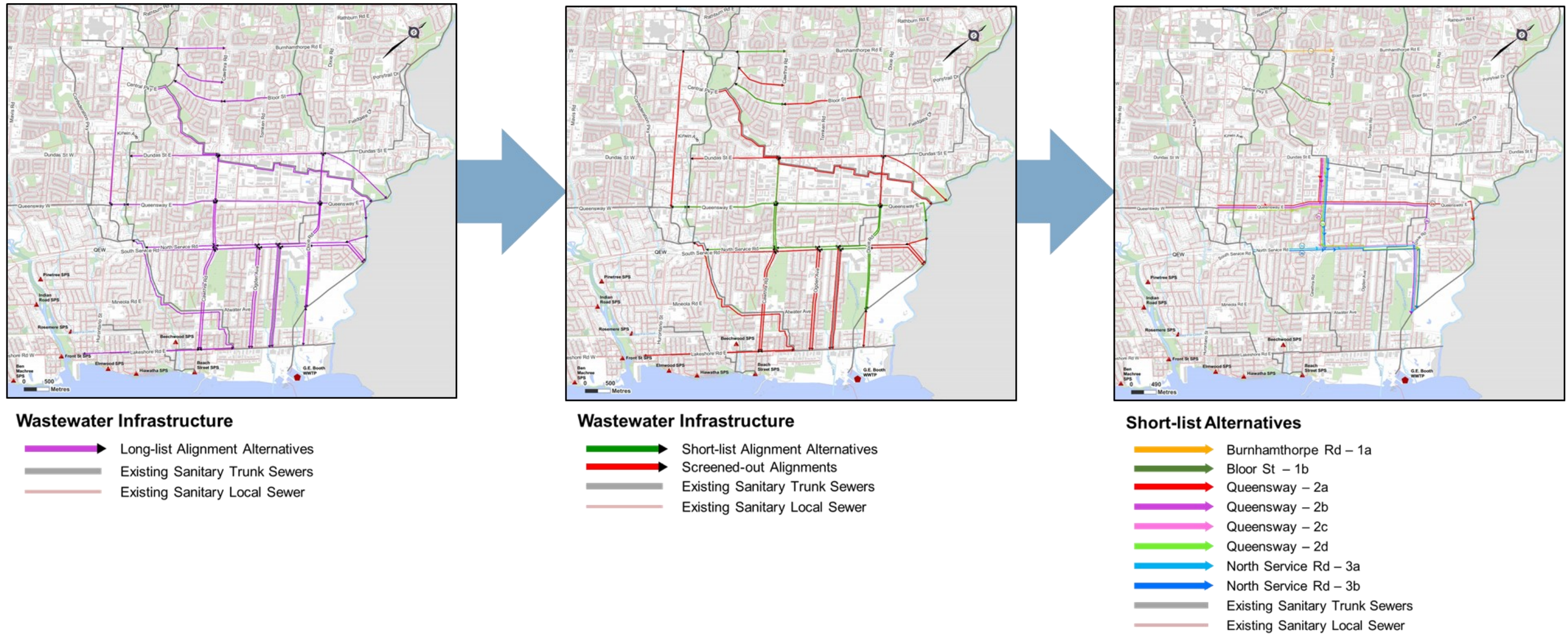


Figure 19: Screening of Sewer Route Sub-sections (Long List to Short List)

5.5 Short List of Alternatives

The evaluation of the long list screening resulted in the development of a short list of alternative alignments.

Area 1: Upper Cooksville Diversion Solution includes two primary routes:

1. Burnhamthorpe Road from Central Parkway to Cawthra Road
2. Bloor Street from Central Parkway to Cawthra Road

Area 2: Lower Cooksville and Lower CPR Diversion Solution including two primary routes (Queensway and North Service Road) with six sub-routes:

1. Queensway East from Hurontario Street to East Trunk – Etobicoke Creek
2. Queensway East from Hurontario Street to East Trunk – through Dixie Road
3. Queensway East from Hurontario Street to East Trunk - through North Service Road and Dixie Road
4. Queensway East from Hurontario Street to East Trunk – through North/South Service Road and Dixie Road
5. North Service Road from Lower Cooksville Creek Trunk to East Trunk – through Dixie Rd
6. North Service Road from Lower Cooksville Creek Trunk to East Trunk – through South Service Road and Dixie Road

Figure 20 provides a map of the short list of alternatives.

5.6 Servicing Strategy Assumptions








Following selection of the Preferred Concept - Diversion of Flows/Infrastructure Upgrades a key construction methodology criterion was selected to guide the development and evaluation of servicing strategy alternatives.

The key criterion was that the new trunk sewer alignments were to be mainly constructed using trenchless technology. This decision was driven by the following:





- Required large diameter for new sewer alignments.
- Existing upstream and downstream connecting sewer points.
- Gravity diversion sewer was at depth.
- Existing built environment would not support extensive open cut construction as the impacts were not considered reasonable.

**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

Short List Alternatives

-  Burhamthorpe (1a and 1b)
-  Queensway - 2a
-  Queensway - 2b
-  Queensway - 2c
-  Queensway - 2d
-  North Service - 3a
-  North Service - 3b

Existing Infrastructure

-  Wastewater Treatment Plant (WWTP)
-  Sanitary Pumping Station (SPS)
-  Trunk Sewers (>600 mm)
-  Local Sewers (<600 mm)

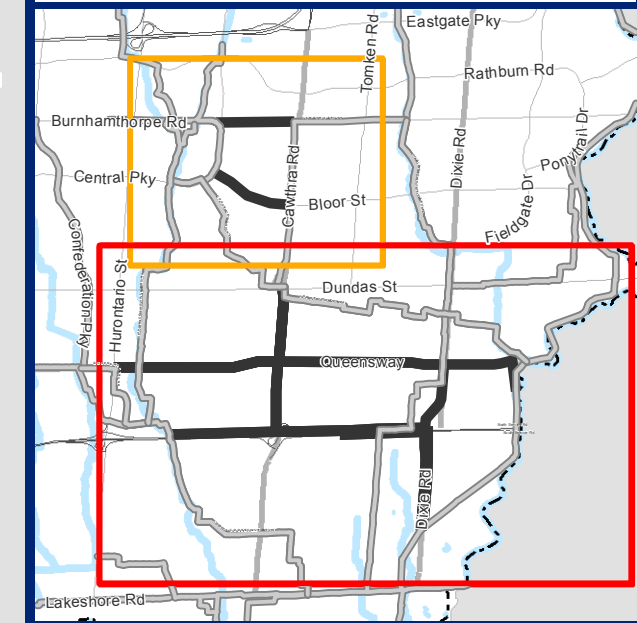
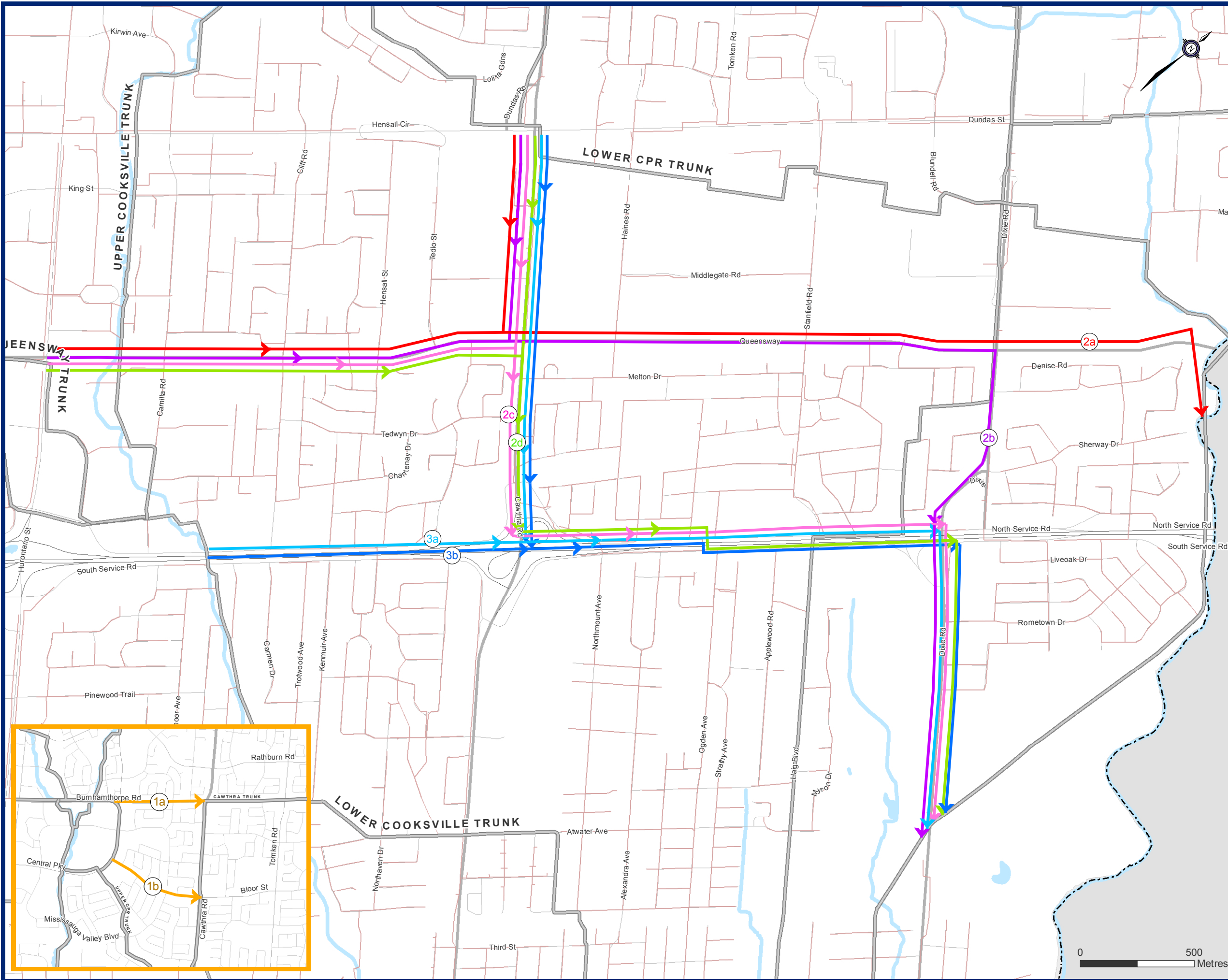


Figure 20

Short List Sub-Sections

Sewer Route Overview



The following is a summary of each of the alternative routes:

Area 1 Alternatives

(1a) Burnhamthorpe Road from Central Parkway to Cawthra Road

A gravity sewer along Burnhamthorpe Road to convey flow from the Mississauga City Centre (MCC) area to the Cawthra Road Trunk sewer currently in phased construction. This alignment allows for flow flexibility at Burnhamthorpe Road and Central Parkway to send flows to either Upper Cooksville Creek Trunk Sewer or to the Cawthra Road Trunk Sewer.

(1b) Bloor Street from Central Parkway to Cawthra Road

A gravity sewer along Bloor Street to convey flows from the Mississauga City Centre (MCC) area to the Cawthra Road Trunk Sewer currently in phased construction. This alignment allows for flow flexibility at Bloor Street and Central Parkway to send flows either downstream or to the Cawthra Road Trunk Sewer.

Area 2 Alternatives

(2a) Queensway East from Hurontario Street to East Trunk – at Etobicoke Creek

A gravity sewer along Queensway East to convey flows from Hurontario Street to the East Trunk at Etobicoke Creek. This alignment allows for flow flexibility at multiple locations including Queensway Trunk Sewer, Upper Cooksville Trunk Sewer and Dixie Road local sewer. This alignment includes the Cawthra alignment from Dundas Street to Queensway East to allow flow flexibility from Area 1. This alternative is the only alignment that connects at Etobicoke Creek.

(2b) Queensway East from Hurontario Street to East Trunk – through Dixie Road

A gravity sewer along Queensway East and Dixie Road to convey flows from Hurontario Street to East Trunk. This alignment allows for flow flexibility at multiple locations including Queensway Trunk Sewer, Upper Cooksville Trunk Sewer and Dixie Road local sewer. This alignment includes the Cawthra alignment from Dundas Street to Queensway East to allow flow flexibility from Area 1.

(2c) Queensway East from Hurontario Street to East Trunk – through North Service Road and Dixie Road

A gravity sewer along Queensway, North Service Road and Dixie Road to convey flows from Hurontario Street to East Trunk. This alignment allows for flow flexibility at multiple locations including Queensway Trunk Sewer, Upper Cooksville Trunk Sewer and Dixie Road local sewer. This alignment includes the Cawthra alignment from Dundas Street to North Service Road to allow flow flexibility from Area 1.

(2d) Queensway East from Hurontario Street to East Trunk – through North/South Service Road and Dixie Road

A gravity sewer along Queensway, North and South Service Road and Dixie Road to convey flows from Hurontario Street to East Trunk. This alignment allows for flow flexibility at multiple locations including Queensway Trunk Sewer, Upper Cooksville Trunk Sewer and Dixie Road local sewer. This alignment includes the Cawthra alignment from Dundas Street to North Service Road to allow flow flexibility from Area 1.

(3a) North Service Road from Lower Cooksville Creek Trunk to East Trunk – through Dixie Road

A gravity sewer along North and South Service Road and Dixie Road to convey flows from Lower Cooksville Trunk Sewer to the East Trunk Sewer. This alignment allows for flow flexibility at multiple locations including Lower Cooksville Trunk and Dixie Road local sewer. This alignment includes the Cawthra alignment from Dundas Street to North Service Road to allow flow flexibility from Area 1.

(3b) North Service Road from Lower Cooksville Creek Trunk to East Trunk – through South Service Road & Dixie Road

A gravity sewer along North and South Service Road and Dixie Road to convey flows from Lower Cooksville Trunk Sewer to the East Trunk Sewer. This alignment allows for flow flexibility at multiple locations including Lower Cooksville Trunk and Dixie Road. This alignment includes the Cawthra alignment from Dundas Street to North Service Road to allow flow flexibility from Area 1.

5.7 Alternative Shaft Locations

Conceptual shaft location alternatives for each of the short list alignment alternatives were developed to supplement the detailed evaluation process. These conceptual shaft locations were selected based on the need for:

- Key Connection: Connections to existing trunk sewers to relieve capacity constraints downstream and address the problem/opportunity statement.
- Constructability: Shafts support the construction of the alignment.
- Minor Connections: Connections to local sewers to relieve capacity constraints.

As in the alignment alternatives, the following studies were used to support the identification of the conceptual shaft location alternatives:

- Cultural heritage
- Stage 1 Archaeological Assessment
- Baseline Natural Environment
- Hydrogeological Study
- Land use

The number, availability, size, and location of each of the conceptual shaft locations fed into the overall score of each alternative. These conceptual shaft locations were further refined through Phase 3 of the Class EA process.

5.8 Summary of the Evaluation of the Short List of Alternatives

Area 1 alignment alternatives 1a and 1b were evaluated against one another to identify the preferred alignment to solve the Upper CPR trunk sewer capacity issues. The key factors in the evaluation which resulted in the preferred solution being selected are provided in **Table 18**. The detailed evaluation matrix is provided in **Appendix Volume 3, Appendix A**.

Table 18: Key Factors in Evaluation (Area 1)

Alternative	Opportunities	Constraints
(1a) Burnhamthorpe Road from Central Parkway to Cawthra Road	<ul style="list-style-type: none"> • Larger road ROW, good opportunity for shaft locations • Potential opportunity to integrate with Wilcox sewer upgrade • Existing land use further from road right of way, higher potential to buffer surrounding land use during construction 	<ul style="list-style-type: none"> • More traffic along Burnhamthorpe (major arterial road) • Dependent on timing, potential perceived construction fatigue
(1b) Bloor Street from Central Parkway to Cawthra Road	<ul style="list-style-type: none"> • Less traffic along Bloor Street (collector road) 	<ul style="list-style-type: none"> • Narrower road ROW, shaft size options more constrained • Does not maximize planned infrastructure upgrades on Bloor Street • Existing land use closer to road right of way, higher potential for impact to surrounding land use during construction

Area 2 alignment alternatives 2a, 2b, 2c, 2d, 3a, and 3b were evaluated against one another to identify the preferred alignment to solve the Lower CPR and Lower Cooksville Creek Trunk Sewer. The key factors in the evaluation which resulted in the preferred solution being selected are provided in **Table 19**.

The detailed evaluation matrix is provided in **Appendix Volume 3, Appendix A**.

Table 19: Key Factors in Evaluation (Area 2)

Alternative	Opportunities	Constraints
<p>(2a) Queensway East from Hurontario Street to East Trunk – at Etobicoke Creek</p>	<ul style="list-style-type: none"> • Fewer construction accessibility constraints due to more/larger potential shaft locations on Queensway road ROW. • Wider road ROW / utility corridor on Queensway with increased separation from residents/businesses. • Hydraulic benefit of straight alignment vs alignment with turns/curves. • Straight alignment provides benefit to tunnel construction methodology with potential to minimize construction shaft locations and the need to remove and turn boring machine. • Ability to avoid major utility conflicts including MTO. • Minimizes potential legal/jurisdictional conflicts with private landowners compared to options connecting on Dixie Road. 	<ul style="list-style-type: none"> • Increased complexity to connect to east trunk at Etobicoke Creek. • Higher potential for environmental impacts during construction, will require mitigation and remediation (at Etobicoke Creek). • Connection point at Etobicoke Creek transects multiple jurisdictions, increased coordination will be required.
<p>(2b) Queensway East from Hurontario Street to East Trunk – through Dixie Road</p>	<ul style="list-style-type: none"> • For Queensway alignment section up to Dixie, similar opportunities as alternative 2A including wide road ROW, straight alignment, and good construction access. • Option avoids need for connection at Etobicoke Creek, minimizing potential impact to natural environment during construction. 	<ul style="list-style-type: none"> • Hydraulic disadvantage of alignment with turns/curves. • Provincial road crossing (QEW crossing required). • Conflicts with existing and future MTO improvements along North and South Service Road and Dixie. • Turns/curves along alignment resulting in challenges to tunnel construction methodology with potential to increase construction shaft locations (increase in surface disturbance and land acquisition) and the need to remove and turn boring machine. • Increased jurisdictional needs at the Lakeview or City of Toronto Golf Clubs for connection to East Trunk sewer along Dixie. • Narrower road ROW along Dixie with reduced separation from residents/businesses. • Potential impact to mature trees along Dixie.

Alternative	Opportunities	Constraints
<p>(2c) Queensway East from Hurontario Street to East Trunk – through North Service Road and Dixie Road</p>	<ul style="list-style-type: none"> For Queensway alignment section up to Cawthra, similar opportunities as alternative 2A and 2B including wide road ROW, straight alignment and good construction access. Option avoids need for connection at Etobicoke Creek, minimizing potential impact to natural environment during construction 	<ul style="list-style-type: none"> For North Service Road and Dixie alignment sections, similar constraints as alternative 2B including hydraulic disadvantage, QEW crossing, conflicts with MTO improvements, challenges to tunnel construction methodology, increased jurisdictional needs, constrained constructability and accessibility, reduced separation from residents/businesses and potential impact to trees. Greater construction accessibility constraints due to limited shaft locations on North/South Service Rd road ROW
<p>(2d) Queensway East from Hurontario Street to East Trunk – through North/South Service Road and Dixie Road</p>	<ul style="list-style-type: none"> For Queensway alignment section up to Cawthra, same pros as alternative 2A, 2B and 2C including wide road ROW, straight alignment and good construction access. Option avoids need for connection at Etobicoke Creek, minimizing potential impact to natural environment during construction. 	<ul style="list-style-type: none"> For North Service Road and Dixie alignment sections, similar constraints as alternative 2C, including hydraulic disadvantage, QEW crossing, conflicts with MTO improvements, challenges to tunnel construction methodology, increased jurisdictional needs, constrained constructability and accessibility, reduced separation from residents/businesses and potential impact to trees.
<p>(3a) North Service Road from Lower Cooksville Creek Trunk to East Trunk – through Dixie Road</p>	<ul style="list-style-type: none"> Option avoids need for connection at Etobicoke Creek, minimizing potential impact to natural environment during construction Slightly greater flow flexibility due to further south connection to Queensway Trunk connection 	<ul style="list-style-type: none"> Full alignment within North Service Road and Dixie road ROW. For North Service Road and Dixie, similar constraints as alternative 2C and 2D including hydraulic disadvantage, QEW crossing, conflicts with MTO improvements, challenges to tunnel construction methodology, increased jurisdictional needs, constrained constructability and accessibility, reduced separation from residents/businesses and potential impact to trees.

Alternative	Opportunities	Constraints
(3b) North Service Road from Lower Cooksville Creek Trunk to East Trunk – through South Service Road & Dixie Road	<ul style="list-style-type: none"> • Option avoids need for connection at Etobicoke Creek, minimizing potential impact to natural environment during construction • Slightly greater flow flexibility due to further south connection to Queensway Trunk connection 	<ul style="list-style-type: none"> • Full alignment within North/South Service Road and Dixie road ROW. • For North/South Service Road and Dixie, similar constraints as alternative 2C, 2D and 3A including hydraulic disadvantage, QEW crossing, conflicts with MTO improvements, challenges to tunnel construction methodology, increased jurisdictional needs, constrained constructability and accessibility, reduced separation from residents/businesses and potential impact to trees.

5.9 Evaluation of Short List of Alternatives

The set of criteria, also known as the five-point evaluation criteria, considered five key factors for evaluation with each short list alternative including:

1. Technical (technical constructability and flexibility)
2. Environmental
3. Socio-economic
4. Financial
5. Legal/Jurisdictional

The conceptual shaft locations were also considered in the evaluation of the short list of alternative solutions. Alignments which have larger availability in land and better connection points to the key existing trunk sewers were preferred to ensure constructability.

The evaluation process developed to assess the shortlisted alternatives and identify the preferred solution reflected the enhanced multiple “bottom line” evaluation aligned with Region-wide strategy goals. Additional details on the five-point evaluation criteria are provided in **Appendix Volume 3, Appendix A**.

5.10 Preferred Solution

Alignment alternatives along Burnhamthorpe Rd (Area 1), Cawthra Rd and Queensway E (Area 2) were selected as the preferred strategy for the Wastewater Capacity Improvements in Central Mississauga. This solution provides the Region with maximized flow flexibility to meet servicing needs to 2041 and beyond. This solution also minimizes the overall constructability risk with fewer shaft locations and greater shaft accessibility.

This preferred solution will provide the following key benefits:

- Alignment within large road right of way, with supporting sites for construction shaft compounds and permanent manhole locations.
- Increased buffer available to surrounding existing land use that will minimize potential impact and need for mitigation measures during construction.
- Minimized number of tunnel shaft sites required to facilitate construction minimizing surface disturbance during construction.
- Alignment with the least number of turns and curves reducing construction complexity and improving long term operations.
- On overall merit avoidance of most constrained alignments and areas.

The preferred alignment is depicted in **Figure 21**.

**Wastewater Capacity Improvements
in Central Mississauga - Schedule 'C' EA**

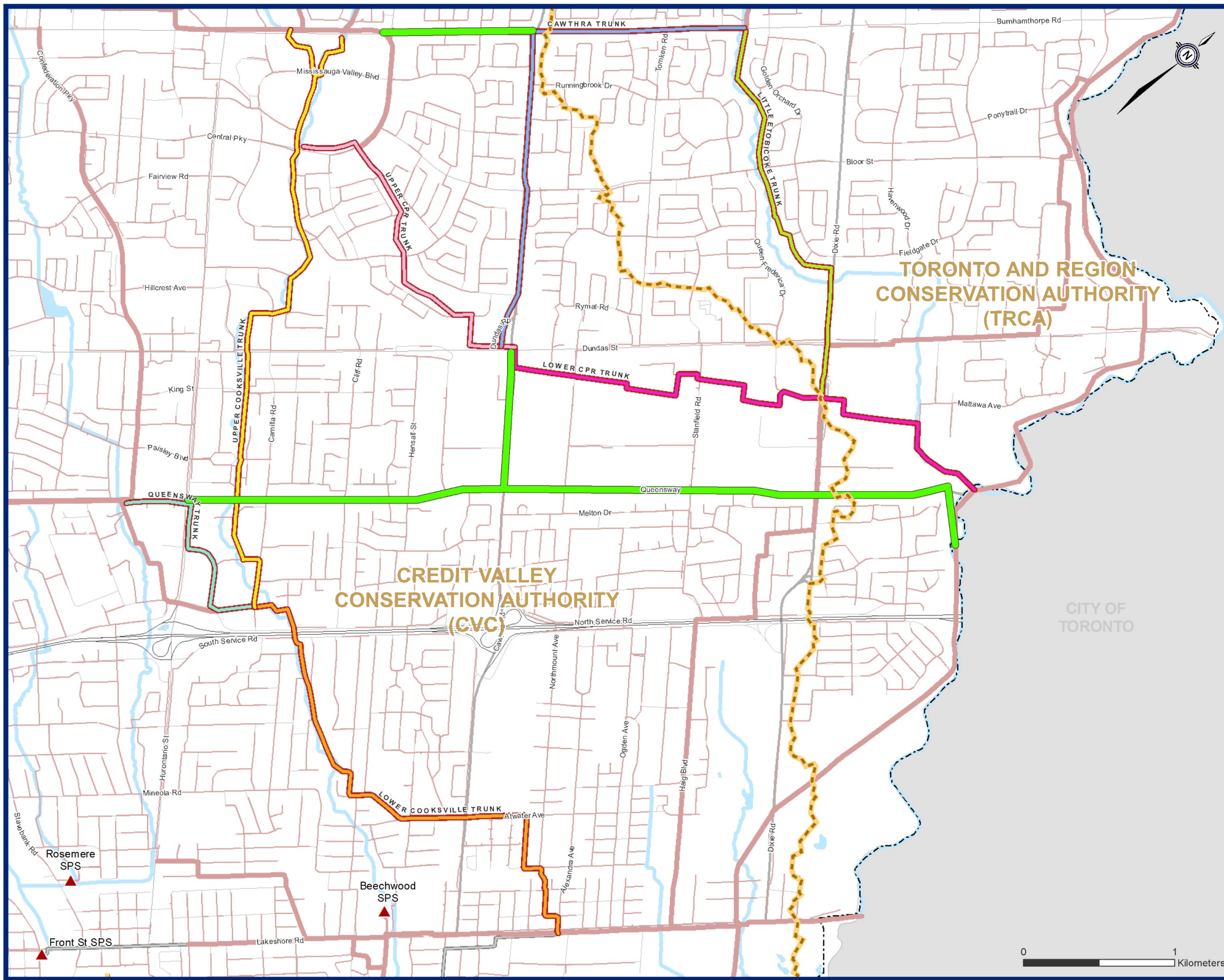
- ▬ Preliminary Preferred
- - - Conservation Areas

Existing Infrastructure

- ◆ Wastewater Treatment Plant (WWTP)
- ▲ Sanitary Pumping Station (SPS)
- ▬ Trunk Sewers (>600 mm)
- ▬ Local Sewers (<600 mm)

Key Trunk Sewers

- | | |
|--|--|
| ▬ Upper Cooksville Creek | ▬ Lower CPR Trunk Sewer |
| ▬ Lower Cooksville Creek | ▬ Little Etobicoke Creek Sewer |
| ▬ Upper CPR Trunk Sewer | ▬ Queensway Trunk Sewer |
| | ▬ Cawthra Road Trunk |



**Figure 21
Preliminary Preferred Strategy
Alternatives**

6.0 Phase 3 – Design Concept Alternatives

Phase 3 of the Class EA process examines the various ways of designing and implementing the preferred solution. Phase 3 generally answers the questions:

What will the solution look like? What are the potential impacts?

The alternative design concepts for the Central Mississauga Class EA consist of three major components of the proposed solution including construction methodology, shaft site location and layout and sewer alignment location.

The methodology used to evaluate the alternatives of each of the three components was founded on the key decision-making principles of the Class EA process, considering technical, social/cultural, environmental, legal/jurisdictional, and financial criteria.

The evaluation was carried out as a coordinated assessment whereby detailed shaft site requirements were considered in conjunction with the tunnelling requirements for the sewer route.

6.1 Construction Methodology

6.1.1 Sewer Construction

There were a number of alternative construction methodologies identified for the preferred design concept. The project team considered a range of technical variables such as sewer length, depth, crossings, trunk sewer connection points, opportunity to connect to local sewer catchments and flow diversion potential. The project team considered three construction methodologies to construct the gravity sewer:

Trenchless Technology (Tunnelling)

- Tunnel Boring Machine (TBM) uses specialized boring equipment to excavate beneath the surface to install the sewer pipe. In contrast to micro-tunnelling, use of a TBM produces a larger tunnel diameter, operates at greater depths, and can accommodate longer tunnel driving lengths (that result in fewer shafts required). A TBM is suited for boring in various soil and rock strata, favouring straight alignments which minimize turns.
- Micro-tunnelling uses drilling technology to install underground sewer pipes. In comparison to tunnel boring machines, micro-tunnelling accommodates smaller diameter tunnels, operates at shallower depths, and requires an increased number of access shafts.

Trenching Technology

- Open Cut Construction requires a trench to be dug and the sewer pipe installed in the trench. Unlike tunnel boring machines and micro-tunnelling which operate underground, open cut construction can potentially result in significant community and traffic impacts as it causes increased surface disruption.

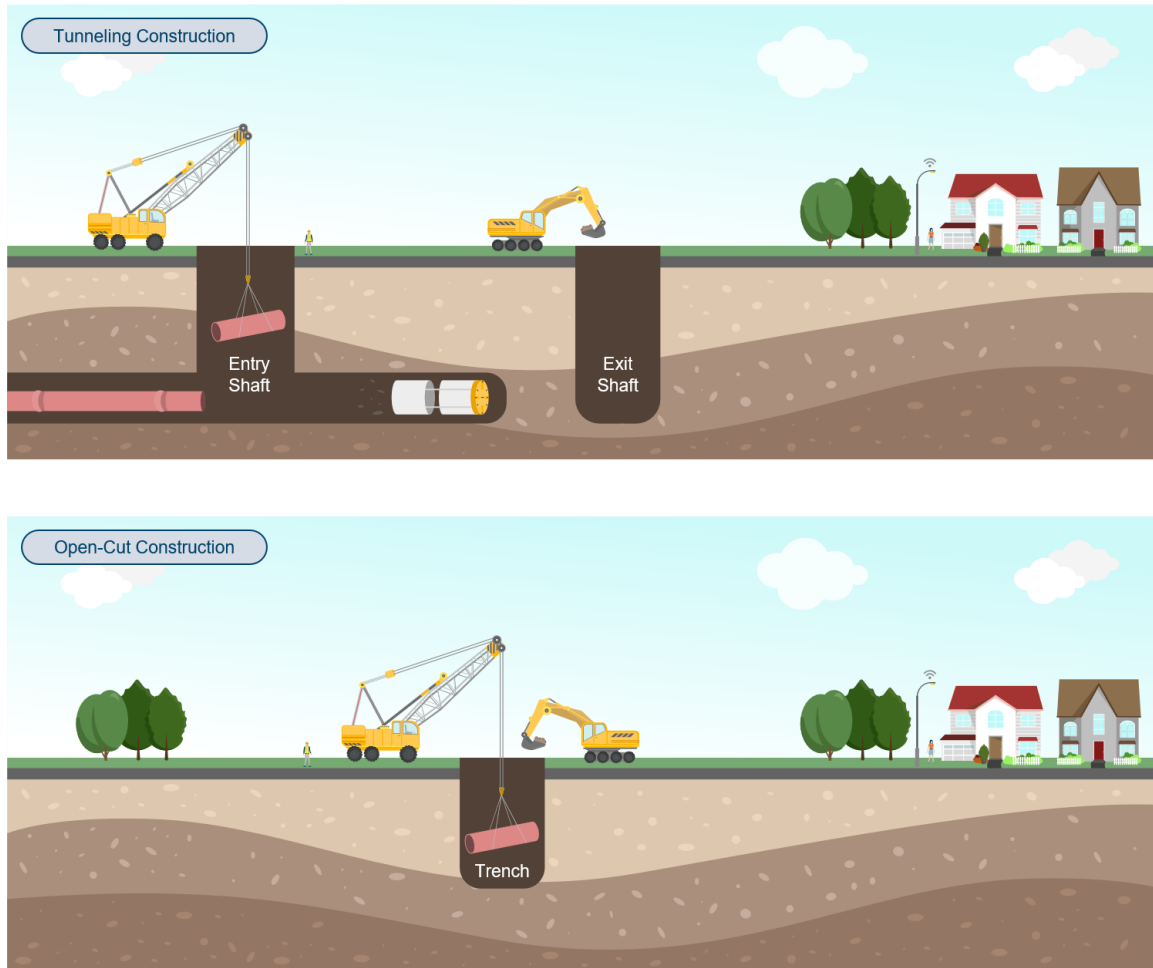


Figure 22: Construction Methodology – Tunnelled vs. Open Cut

The depth of the proposed sewer is driven by the need to achieve a gravity sewer between the required upstream and downstream connection points in the existing wastewater system. The depth of the preferred solution ranges from approximately 4 m to 22 m from ground surface to sewer invert.

The construction methodologies were evaluated with consideration to sewer length, depth, crossings, existing sanitary connection points, and required diameter of the sewer. It was determined that **trenchless technology was the preferred option for the majority of the sewer alignment**, meeting all the technical requirements, depth, size, and flow requirements and minimizes potential conflicts at surface including impacts to environmental crossings, heritage sites, utility and servicing infrastructure.

Benefits of tunnelling at depth include:

- The greater depth required reduces the risk of conflict with critical utilities and existing municipal infrastructure located along the road corridors; the proposed depth (15m+) for the majority of the proposed alignment is generally considered not feasible or practical to be constructed via open cut.
- The majority of the sewer route at Etobicoke Creek will be tunnelled within the valley to avoid impacts to the natural environment.
- The crossing at Cooksville Creek will be tunnelled to avoid impacts to the creek.

- The crossings of several major intersections will be tunnelled to minimize traffic impacts.
- Minimized surface disturbance and the extent of ecological and socio-economic impact to the community.
- Tunnelling can accommodate the installation of large pipe sizes.

Open cut construction was also considered and selected for smaller diameter local sewer connections to the new trunk sewer and also recommended when adequate ground cover was not achievable to facilitate trenchless crossing of environmental features.

Open cut construction was the preferred option for the connection to existing sewers at Cooksville Creek Cliff Road, Hensall Street, Hensall Street West and Tedlo Street due to the shallower depth.

Due to the construction complexity at Etobicoke Creek sewer crossings, a combination of tunnel (valley) and open cut (creek crossing) construction is required to accommodate the shallow burial depth, reduce the impact to the natural features and support the connection to existing trunk sewers.

In theory the proposed new trunk sewer strategies can accommodate both TBM and microtunnelling technology. Additional geotechnical and hydrogeological studies will be required during Detailed Design to confirm the preferred tunnelling technology (micro-tunnelling versus tunnel boring machine) for the proposed tunnelled sections of sewer alignment based on local conditions.

Further details are outlined in the following sections.

6.1.2 Shaft Construction

The main surface works required with tunnel construction are the entrance and exit shafts located between tunnel drive lengths (distance between shafts). Each of the access shafts will require a staging area where construction equipment can be stored, and excavated material can be brought to the surface to be hauled from the site in trucks. Staging areas will vary in configuration and will be fenced off. The staging, stockpile and storage areas will avoid location within the floodplain where possible and will be identified and isolated at the detailed design stage. Once tunnelling is completed, the staging area will be restored to its original condition or enhanced. A typical shaft staging area layout is provided in **Figure 23**.

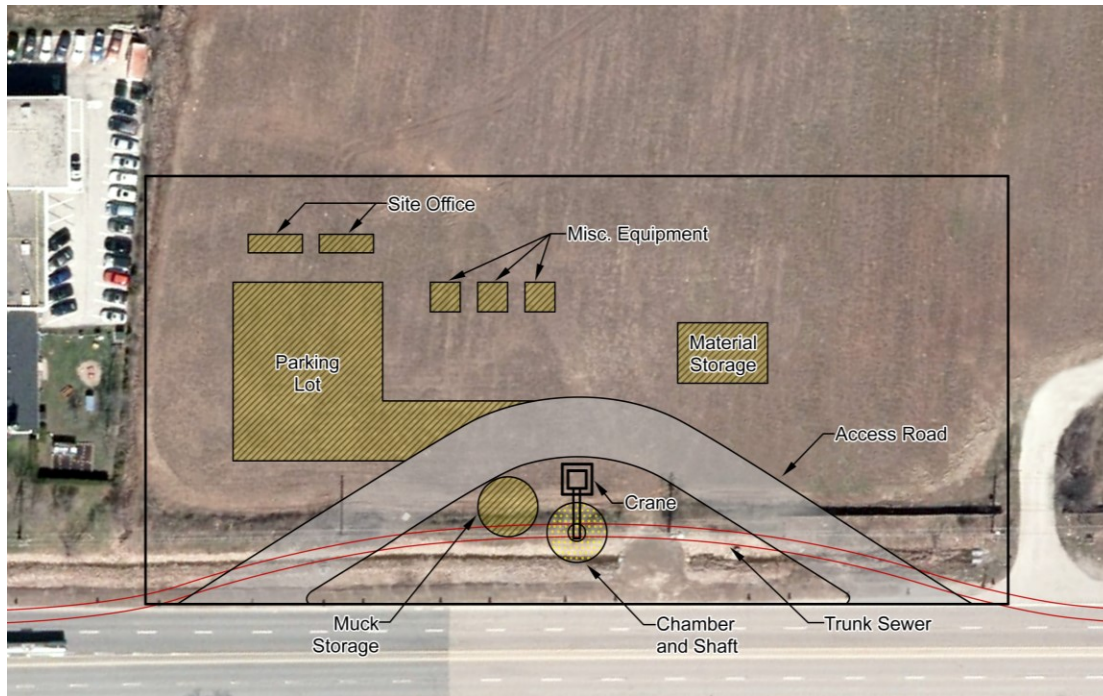


Figure 23: Typical Shaft and Construction Compound Layout

6.2 Evaluation of Tunnel Shaft Alternatives

The process to evaluate the shaft sites required a two-tiered approach. In Phase 2 of the Class EA process, conceptual shaft locations were selected based on high level criteria including availability of land and proximity to key existing trunk sewers to facilitate connection. A long list of conceptual shaft locations was then identified and screened to ensure the site supported the problem/opportunity statement. A short list of shaft alternatives for each location was then evaluated using the detailed criteria to identify the preferred sites.

Conceptual shaft site locations were categorized based on their study objective:

- **Key Connection Point:** critical connections to existing trunk sewers to address the problem / opportunity statement.
- **Minor Connection Point:** minor connection to existing local sewers and / or provide an interim shaft location for constructability.

A total of 17 long list conceptual shaft locations were considered, each with a set of alternative sites. These alternatives were evaluated to select the required shaft locations. The screening criteria was initially based on meeting technical requirements to aid constructability and address the problem and opportunity statement.

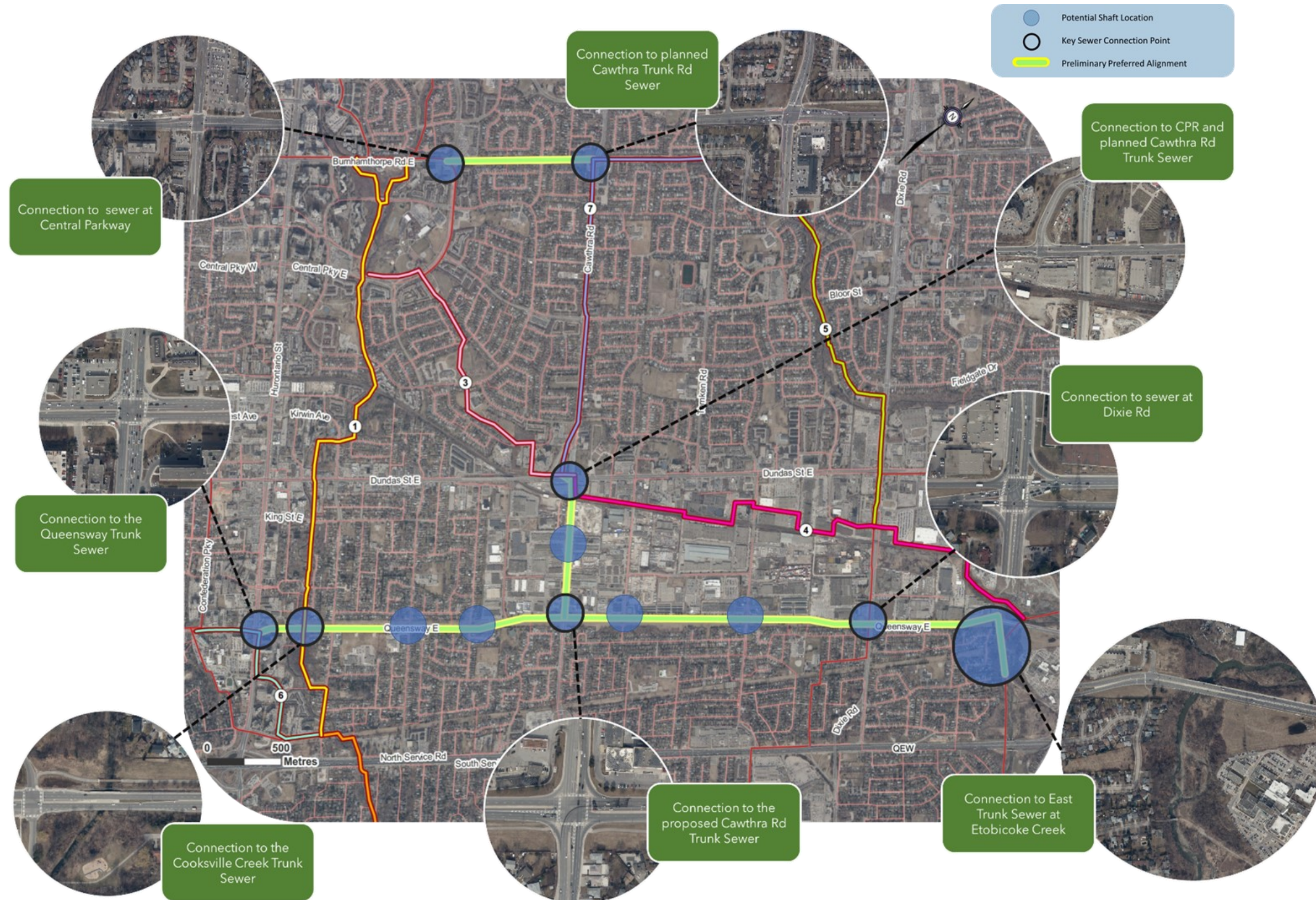


Figure 24: Conceptual Shaft Locations for Preferred Alignment

Table 20: Screening Results of Long List Shaft Locations

Alignment	Intersection	Screening	Comment
Queensway East	1. Sherway Drive	✓	Required for key connection to East Trunk Sewer
	2. Etobicoke Creek	✓	Required for constructability
	3. Dixie Road	✓	Required for key connection to Dixie Trunk Sewer to relieve downstream capacity constraints
	4. Stanfield Road	✗	Not required for constructability. No downstream capacity constraints
	5. Haines Road	✗	Not required for constructability. No downstream capacity constraints
	6. Cawthra Road	✓	Required for key connection to proposed Cawthra Road sewer
	7. Tedlo Street	✓	Required for minor connection to local sewer to relieve downstream capacity constraints
	8. Hensall Street	✓	Required for minor connection to local sewer to relieve downstream capacity constraints
	9. Cliff Road	✓	Required for minor connection to local sewer to relieve downstream capacity constraints
	10. Camilla	✗	Not required for constructability. No downstream capacity constraints
Cawthra Road	11. Cooksville Creek	✓	Required for key connection to Cooksville Creek Trunk Sewer to relieve downstream capacity constraints
	12. Hurontario Street	✓	Required for key connection to Hurontario Trunk Sewer to relieve downstream capacity constraints
	13. Needham Lane	✗	Not required for constructability
Burnhamthorpe Road	14. Dundas Street	✓	Required for key connection to Upper and Lower CPR Trunk Sewer to relieve downstream capacity constraints
	15. Cawthra Road	✓	Required for key connection to new Cawthra Road Trunk Sewer
	16. Wilcox Road	✗	Connection to local sewer will be accommodating through a separate Regional project

Alignment	Intersection	Screening	Comment
	17. Central Parkway	✓	Required for key connection to Central Parkway Trunk Sewer to relieve downstream capacity constraints

A total of 12 shaft locations were carried forward to access the tunnel along the preferred alignment. Each shaft location had a set of alternatives which went through a detailed evaluation to determine the preferred shaft sites. A summary of the evaluation results, highlighting the key determining factors for the selection of the preferred sites is provided below. The complete five-point criteria and the detailed evaluations of the shaft site alternatives are provided in **Appendix Volume 3, Appendix B**.

Shaft 1 – Etobicoke Creek and Sherway Drive

Shaft 1 is located at the downstream end of the proposed Queensway sewer, within the Etobicoke Creek valley between Queensway East and QEW. This location is a key shaft site and is required to connect to the existing 2100 mm Etobicoke Creek trunk sewer.

Five conceptual alternative sites were identified in this area. Alternative 1A and 1C are located on the south and north side of Queensway at Etobicoke Creek. These alternatives were screened out since they did not meet the minimum slope criteria to achieve gravity flow. Alternative 1B is located at Etobicoke Creek and Sherway Drive, Alternative 1D is located at Etobicoke Creek and Sunnycove Drive and Alternative 1E is located at Etobicoke Creek and QEW. All locations are within TRCA lands and within the floodplain. These alternatives underwent a comprehensive evaluation and consultation with TRCA.

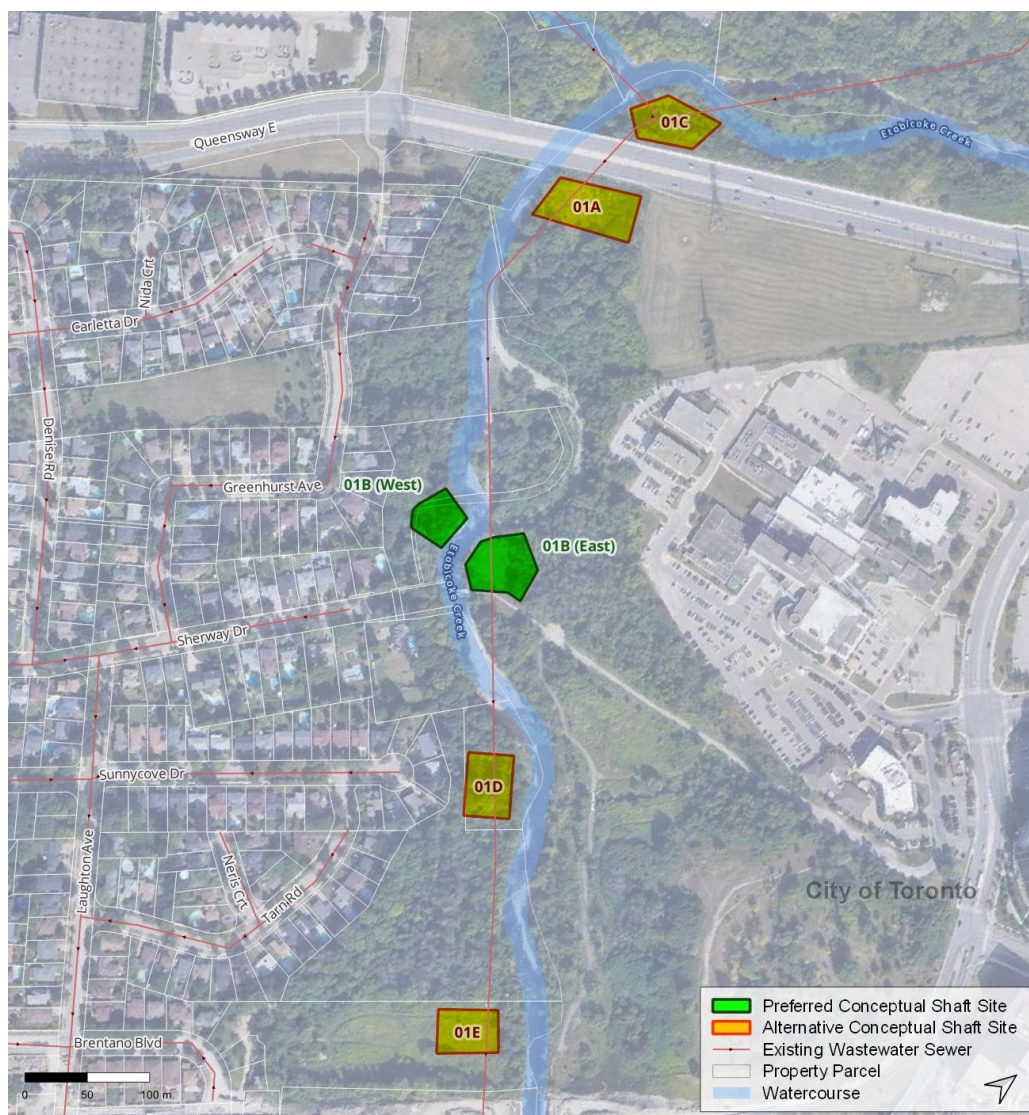


Figure 25: Conceptual Shaft 1 Alternatives

Alternative 1B is considered the preferred site because:

- It enables tunnelled sewer construction to Queensway from the West side of the creek minimizing potential impact to the natural environment in the valley.
- It supports the open cut construction required to connect to the Etobicoke Creek trunk sewer.
- It provides an open accessible connection point to the East Trunk sewer which runs parallel to the creek.
- It provides an opportunity to mitigate and remediate the existing and future sewer against erosion.
- It reduces construction risk to creek due to minimized new sewer length in the valley.
- It has an existing access route for construction, maintenance, and operation on the east side of creek.
- It enables restoration to natural area on the west side of Creek.

A step-by-step shaft alternative evaluation approach was conducted at this location due to the existing site conditions and required creek crossing including supporting field investigations and a scour impact analysis to determine a preferred construction methodology. The Etobicoke Creek Evaluation Process Tech Memo is provided in **Appendix Volume 3, Appendix C**.

Shaft 2 – Queensway East and Etobicoke Creek

Shaft 2 is located at Queensway East and Etobicoke Creek. This location is a minor shaft required for constructability to support the construction of the tunnel bend toward Etobicoke Creek valley.

Two conceptual alternative sites were identified in this area. Alternative 2A is located on the north side of Queensway East and Alternative 2B is location on the south side of Queensway East.



Figure 26: Conceptual Shaft 2 Alternatives

Alternative 2A is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer alignment on the northside of the road.
- It supports the tunnelled construction of the sewer alignment from Queensway to existing sewer in the Etobicoke Creek Valley.
- It provides a good buffer between residential properties.
- It avoids conflicts with hydro corridor on the southside of the road.
- It provides the best accessibility.

Shaft 3 – Queensway East and Dixie Road

Shaft 3 is located at Queensway East and Dixie Road. This location is a key shaft site and is required to connect to the existing 900 mm Dixie trunk sewer to improve capacity issues downstream and flow flexibility.

Four conceptual alternatives were identified in this area. Alternative 3A is located on the northeast corner, alternative 3B is located on the southwest corner, alternative 3C is located on the northwest corner and alternative 3D is located on the southeast corner.

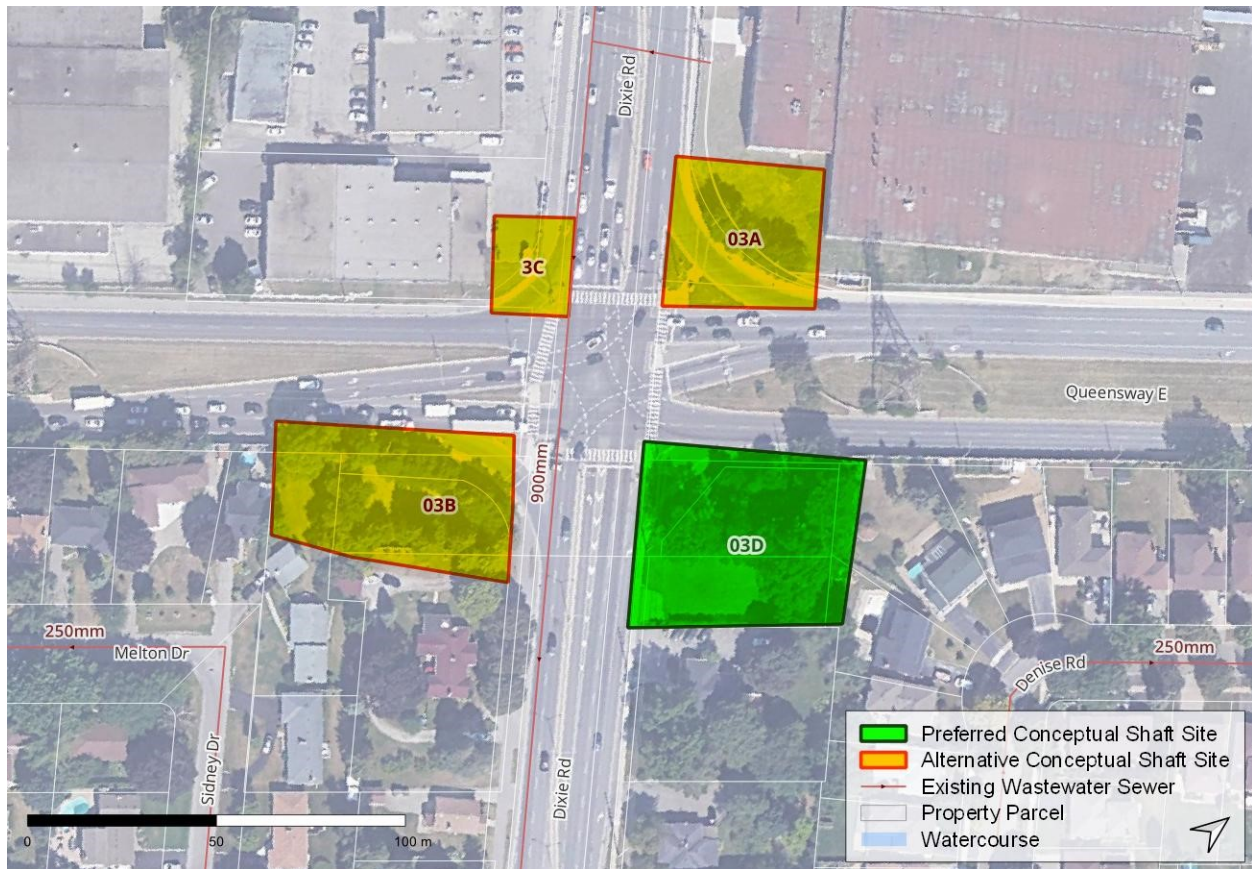


Figure 27: Conceptual Shaft 3 Alternatives

Alternative 3D is considered the preferred site because:

- It provides the best availability of land.
- It is located on Region of Peel owned lands.
- It minimizes conflicts with existing infrastructure.
- It minimizes potential of site contamination and remediation requirements (Site 3A is area of known site contamination).

It minimizes traffic and pedestrian impacts, not requiring any lane or sidewalk/multi-use trail closures.

Shaft 6 – Queensway East and Cawthra Road

Shaft 6 is located at Queensway East and Cawthra Road. This location is a key shaft site and is required to connect to the proposed 1500 mm trunk along Cawthra Road to improve flow flexibility.

Three conceptual alternatives were identified in this area. Alternative 6A is located on the northeast corner, alternative 6B is located on the southwest corner and alternative 6C is located on the southeast corner.



Figure 28: Conceptual Shaft 6 Alternatives

Alternative 6A is considered the preferred site because:

- It supports the tunnelled construction of the Queensway and Cawthra sewer alignments.
- It allows for a north side sewer alignment along Queensway, avoiding road crossings.
- It avoids conflicts with existing utilities.
- It provides a good buffer between residential properties.

Shaft 7 - Queensway East and Tedlo Street

Shaft 7 is located at Queensway East and Tedlo Street. This location is a minor shaft site and will provide a connection to the existing local sewer along Tedlo Street to improve downstream capacity, flow flexibility and wet weather issues.

Two conceptual alternatives were identified in this area, Alternative 7A is located on the northwest corner and alternative 7B is located on the southeast corner.



Figure 29: Conceptual Shaft 7 Alternatives

Alternative 7A is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer alignment on the northside of the road.
- It supports the open cut construction required to connect to the local sewer at Tedlo.
- It allows for a north side sewer alignment, avoiding road crossings.
- It avoids conflicts with existing utilities.

Shaft 8 - Queensway East and Hensall Street

Shaft 8 is located at Queensway East and Hensall Street. This location is a minor shaft site and will provide a connection to the existing local sewer along Hensall Street and a local sewer west of Hensall Street to improve downstream capacity, flow flexibility and wet weather issues.

Two conceptual alternatives were identified in this area, Alternative 8A is located on the northeast corner and alternative 8B is located on the northwest corner.



Figure 30: Conceptual Shaft 8 Alternatives

Alternative 8B is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer alignment on the northside of the road.
- It supports the open cut construction required to connect to the local sewers at Hensall and Hensall West.
- It allows for a north side sewer alignment, avoiding road crossings.

Shaft 9 - Queensway East and Cliff Road

Shaft 9 is located at Queensway East and Cliff Road. This location is a minor shaft site and will provide a connection to the existing local sewer along Cliff Road to improve downstream capacity, flow flexibility and wet weather issues.

Three conceptual alternatives were identified in this area. Alternative 9A is located on the northeast corner, alternative 9B is located on the northwest corner and alternative 9C is located on the southwest corner.



Figure 31: Conceptual Shaft 9 Alternatives

Alternative 9C is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer alignment on the northside of the road.
- It supports the open cut construction required to connect to the local sewer at Cliff.
- It allows for a north side sewer alignment, avoiding road crossings.
- It provides good accessibility.
- It increases the buffer between the school (south side).

Shaft 11 - Queensway East and Cooksville Creek

Shaft 11 is located at Queensway East and Cooksville Creek. This location is a key shaft site and will provide a connection to the existing Cooksville Creek trunk sewer to improve capacity issues downstream and flow flexibility.

Two conceptual alternatives were identified in this area. Alternative 11A is located on the northeast side and alternative 11B is located on the southeast side. All locations are within CVC lands and partially within the floodplain. These alternatives underwent a comprehensive evaluation and consultation with CVC.



Figure 32: Conceptual Shaft 11 Alternatives

Alternative 11A is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer alignment on the northside of the road.
- It provides a connection point to the Cooksville Creek trunk sewer.
- It allows for a north side sewer alignment, avoiding road crossings.
- It provides best availability in land.
- It minimizes impacts to trees.
- It is outside of City park lands.

A step-by-step shaft alternative evaluation approach was conducted at this location due to the existing site conditions and required creek crossing including supporting field investigations and a scour impact analysis to determine a preferred construction methodology. The Cooksville Creek Evaluation Process Tech Memo is provided in **Appendix Volume 3, Appendix D**.

Shaft 12 - Queensway East and Hurontario Street

Shaft 12 is located at Queensway East and Hurontario Street. This location is a key shaft site and will provide a connection to the existing Queensway trunk sewer to improve capacity issues downstream and flow flexibility.

Two conceptual alternatives were identified in this area. Alternative 12A is located on the southwest corner and alternative 12B is located on the southeast corner.



Figure 33: Conceptual Shaft 12 Alternatives

Alternative 12B is considered the preferred site because:

- It supports the tunnelled construction of the Queensway sewer.
- It provides the best connection point to the Queensway trunk sewer.
- It avoids conflicts with planned infrastructure.
- It avoids conflicts with utilities.

Shaft 14 – Cawthra Road and Dundas Street East

Shaft 14 is located at Cawthra Road and Dundas Street East. This location is a key shaft site and will provide a connection to the existing Cawthra Road and CPR Trunk sewers to improve flow flexibility.

Three conceptual alternatives were identified in this area. Alternative 14A is located on the southwest corner, alternative 14B is located on the northwest corner and alternative 14C is located on the southeast corner.



Figure 34: Conceptual Shaft 14 Alternatives

Alternative 14B is considered the preferred site because:

- It supports the tunnelled construction of the Cawthra sewer.
- It is the current compound for the in-construction Cawthra Trunk sewer which is a key connection point.
- It provides a connection to the west to east CPR Trunk sewer with the ability to divert flows south to alleviate the eastern section of the CPR.
- It provides a good buffer between commercial and industrial areas.
- It avoids potential lane closures along Dundas Street.

Shaft 15 – Burnhamthorpe Road and Cawthra Road

Shaft 15 is located at Burnhamthorpe Road and Cawthra Road. This location is a key shaft site and will provide a connection to the existing Central Parkway trunk sewer to improve capacity issues downstream and flow flexibility.

Three conceptual alternatives were identified in this area. Alternative 15A is located on the northeast corner, alternative 15B is located in the southwest corner and alternative 15C is located on the northwest corner.



Figure 35: Conceptual Shaft 15 Alternatives

Alternative 15C is considered the preferred site because:

- It supports the tunnelled construction of the Burnhamthorpe sewer alignment on the northside of the road.
- It is the current compound for the in-construction Cawthra trunk sewer which is a key connection point.
- It allows for a north side sewer alignment, avoiding road crossings.
- It minimizes impacts to trees.

Shaft 17 – Burnhamthorpe Road and Central Parkway

Shaft 17 is located at Burnhamthorpe Road and Central Parkway. This location is a key shaft site and will provide a connection to the existing Cawthra Road trunk sewer to improve capacity issues downstream and flow flexibility.

Four conceptual alternatives were identified in this area. Alternative 17A is located on the northeast corner, alternative 17B is located on the southwest corner, alternative 17C is located on the northwest corner and alternative 17D is located on the southeast corner.

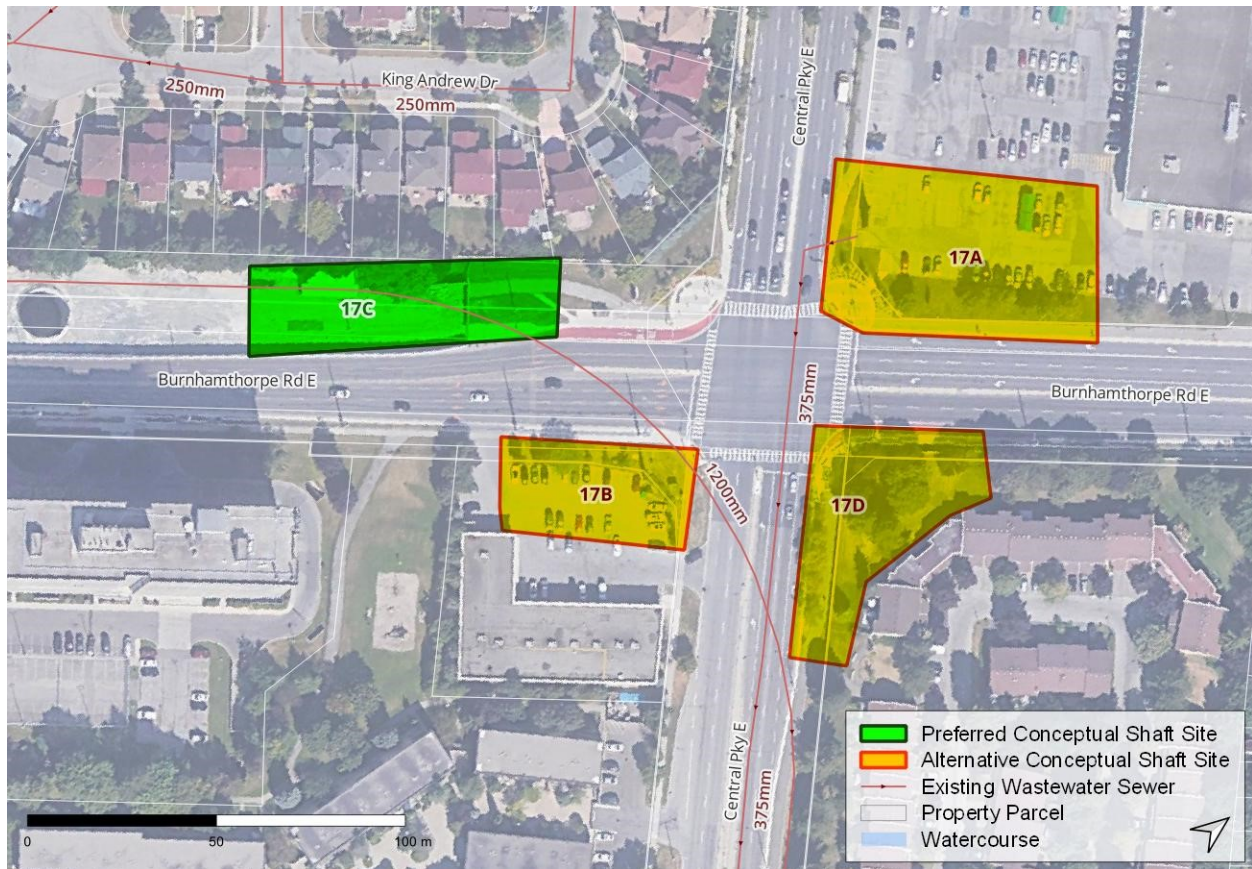


Figure 36: Conceptual Shaft 17 Alternatives

Alternative 17C is considered the preferred site because:

- It supports the tunnelled construction of the Burnhamthorpe sewer alignment on the northside of the road.
- It provides the best connection point to the Central Parkway trunk sewer.
- It allows for a north side sewer alignment, avoiding road crossings.
- It minimizes impacts to trees.

Appendix Volume 3, Appendix B provides the full detailed evaluation for each of the shaft site alternatives.

6.3 Evaluation of Refined Sewer Route Alignment

The evaluation of the refined sewer route involved the identification of the location of the sewer between the shaft/manhole locations.

The decision-making for the alignment of the sewer worked simultaneously with the evaluation of the access shafts, as the selection of one bears a strong influence on the other. Due to the depth of the tunnelled sewer (ranging from approximately 4 to 22 m), there is limited surface disruption anticipated outside of the shaft locations. As such, there is limited detail provided for each route segment relative to the shaft sites.

The preferred alignment routes were selected to:

- Facilitate connection to key shaft sites.
- Allow required curvature for machinery to tunnel in and out of shaft sites.
- Avoid unnecessary road crossings.
- Allow required setbacks from existing infrastructure and utilities.
- Maintain road ROW alignment where possible to minimize permanent easement requirements.

The rationale for pinpointing the alignment of the sewer is summarized by the route segments in the following sections:

Segment A: Shaft 1 to Shaft 2

Segment A is the downstream connection of the proposed Queensway East sewer to connect to the existing East Trunk sewer. Segment A is located within the Etobicoke Creek Valley. It represents the sewer alignment between shaft 1 and shaft 2.

The process to evaluate the route required a two-tiered approach due to the construction complexity within the Etobicoke Creek Valley. First, five alignment alternatives, shown in **Figure 37**, were screened based on the following factors:

- To mitigate risk of bedrock fracture during construction alternatives should not require tunneled crossing of the creek.
- In order to minimize the potential for environmental impact to the valley natural features, alternatives should not require open cut construction of the sewer from the west of the creek to the Queensway shaft compound.

Alignment alternative C and D were carried forward (**Figure 38**). The two remaining alternatives were evaluated using the detailed criteria to identify the preferred alignment.

Alignment Alternative 1: Etobicoke Creek Valley

Alignment from Queensway (shaft 2) to north of Sherway Drive within the Etobicoke Creek Valley. Open cut construction to cross Etobicoke Creek to shaft 1. This alignment measures approximately 0.37 km.

Alignment Alternative 2: Greenhurst Avenue

Alignment from Queensway (shaft 2) to Greenhurst Avenue (within the road ROW), to north of Sherway Drive within the Etobicoke Creek Valley. Open cut construction to cross Etobicoke Creek to shaft 1. This alignment measures approximately 0.4 km.



Figure 37: Long list of Etobicoke Creek Alignment Alternatives

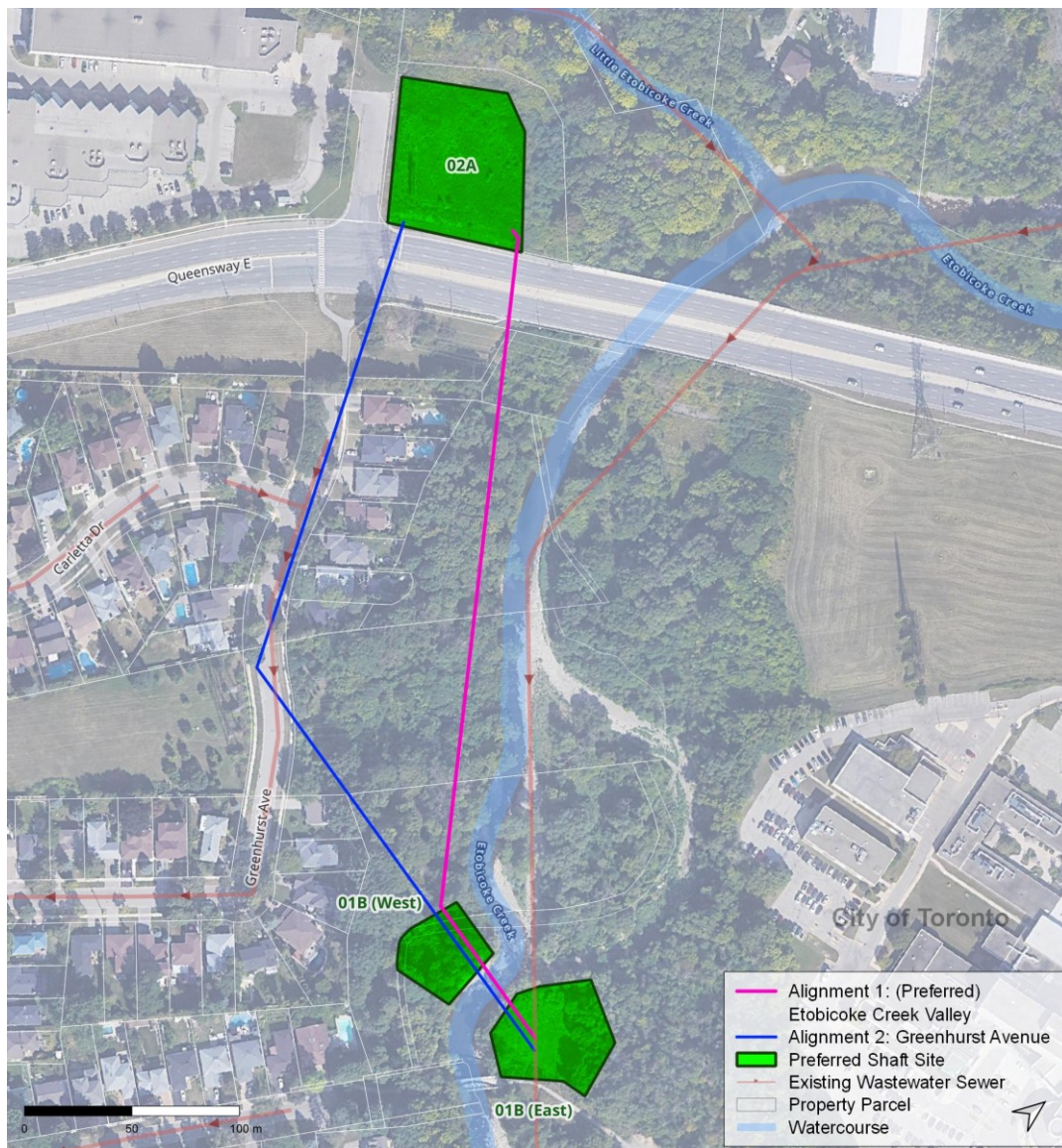


Figure 38: Alignment Alternatives from Shaft 1 to Shaft 2

Alignment 1 was considered the preferred alignment because:

- Minimizes number of required shaft sites.
- Avoids construction within residential neighborhood.
- Avoids construction traffic along residential roads.
- Avoids conflicts with existing utilities.
- Straighter alignment provides improved flow hydraulics.

The Etobicoke Creek Evaluation Process Tech Memo is provided in **Appendix Volume 3, Appendix C**.

Segment B: Shaft 2 to Shaft 6

Segment B is located along Queensway East, from Etobicoke Creek to Cawthra Road. It represents the sewer alignment between shaft 2 and shaft 6 and measures approximately 2.9 km. Only one viable alignment alternative was identified for this segment which is located mainly on the north side of the road ROW.

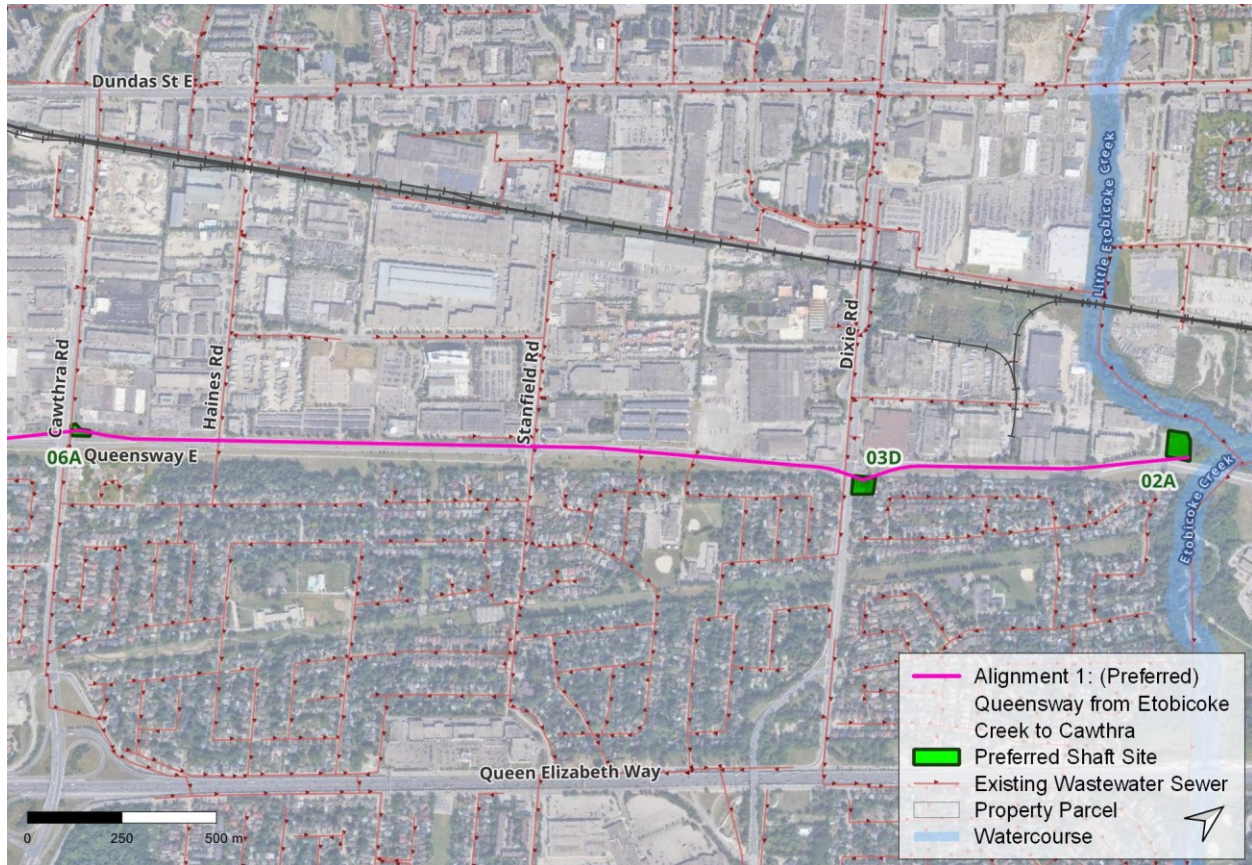


Figure 39: Segment B: Alignment from Shaft 2 to Shaft 6

This alternative accommodates the preferred shaft sites, maintains a mainly north side alignment, and minimizing road ROW and gas main crossings.

Segment C: Shaft 6 to Shaft 12

Segment C is located along Queensway East, from Cawthra Road to Hurontario Street. It represents the sewer alignment between shaft 6 and shaft 12 and measures approximately 2.1 km. Two alignment alternatives were identified for this segment.

Alignment Alternative 1: Road ROW

Alignment from Hurontario to Tedlo within the road ROW. Alignment curves in and out of shaft locations. This alternative avoids permanent sewer easements on Hydro One lands. One sewer road crossing from Hurontario to Cooksville Creek shaft sites.

Alignment Alternative 2: Hydro One Corridor

Alignment from Hurontario to Cooksville Creek within the road ROW. Alignment from Cooksville Creek to Tedlo within the Hydro One Corridor. This alternative requires permanent sewer easements on Hydro One lands. One sewer road crossing from Hurontario to Cooksville Creek shaft sites.

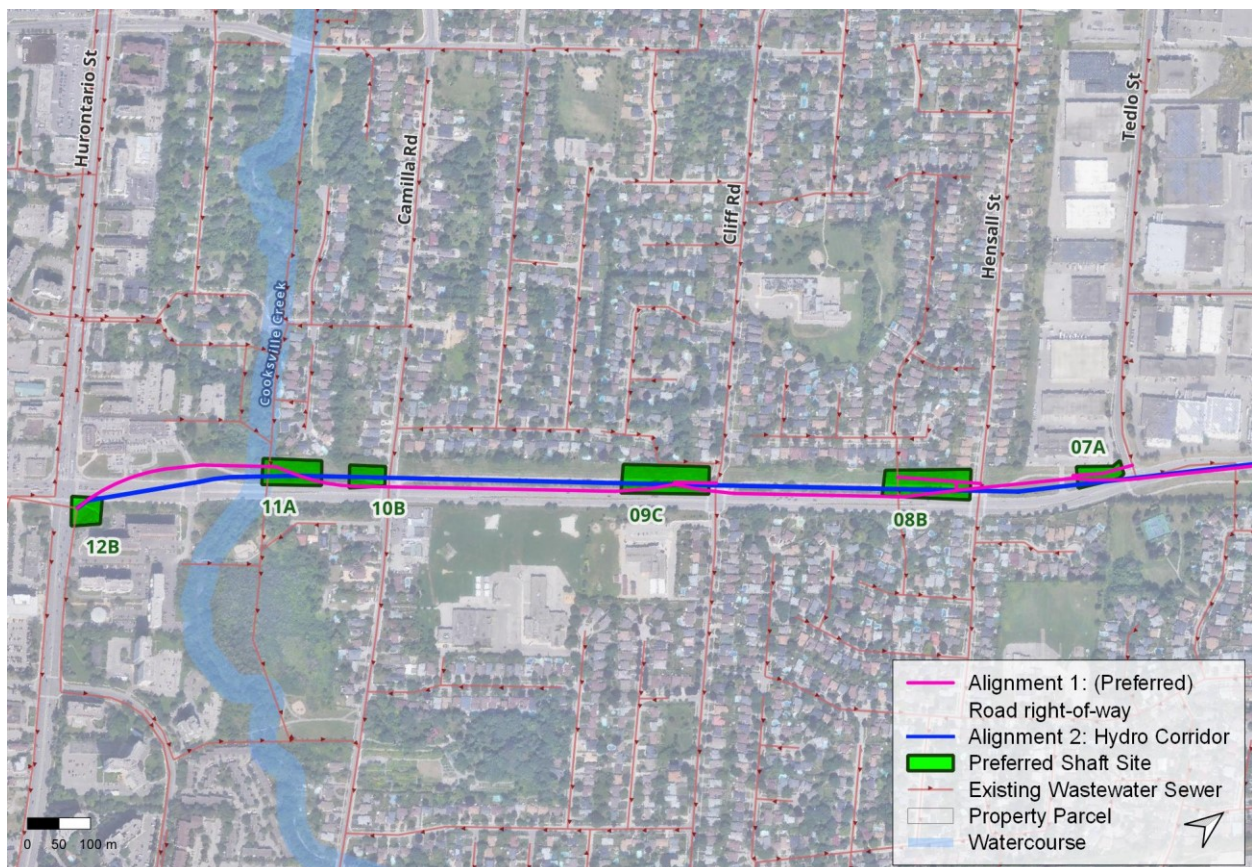


Figure 40: Segment C: Alignment Alternatives from Shaft 6 to Shaft 12

Alignment 1 was considered the preferred alignment because:

- Less potential for conflicts with existing or future utilities.

- Alignment construction within previously disturbed area (road ROW).
- Lower costs for permanent easements.

The detailed evaluation is provided in **Appendix Volume 3, Appendix B**.

Segment D: Shaft 6 to Shaft 14

Segment D is located along Cawthra Road, from Queensway East to Dundas Street East. It represents the sewer alignment between shaft 6 and shaft 14 and measures approximately 1.0 km. Only one viable alignment alternative was identified for this segment. This alignment crosses Cawthra at Dundas and keeps to the east side of Cawthra to Queensway East.

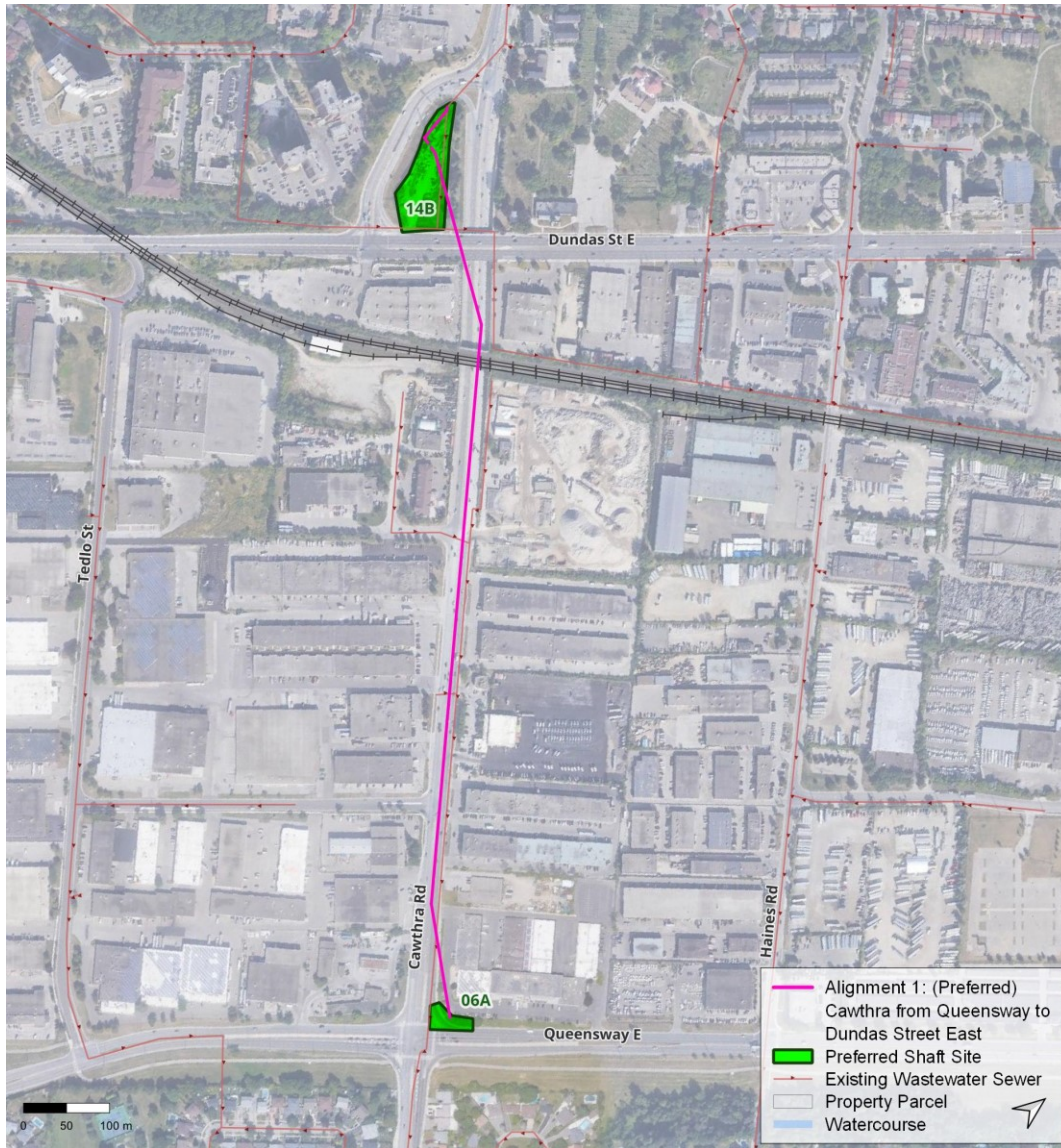


Figure 41: Segment D: MH6 to MH14 Alignment

This alternative accommodates the preferred shaft sites, meets setbacks for existing infrastructure and enables the required curvature for tunneling machinery.

Segment E: Shaft 15 to Shaft 17

Segment E is located along Burnhamthorpe Road, from Central Parkway to Cawthra Road. It represents the sewer alignment between shaft 15 and shaft 17 and measures approximately 1.0 km. Only one viable alignment alternative was identified for this segment.

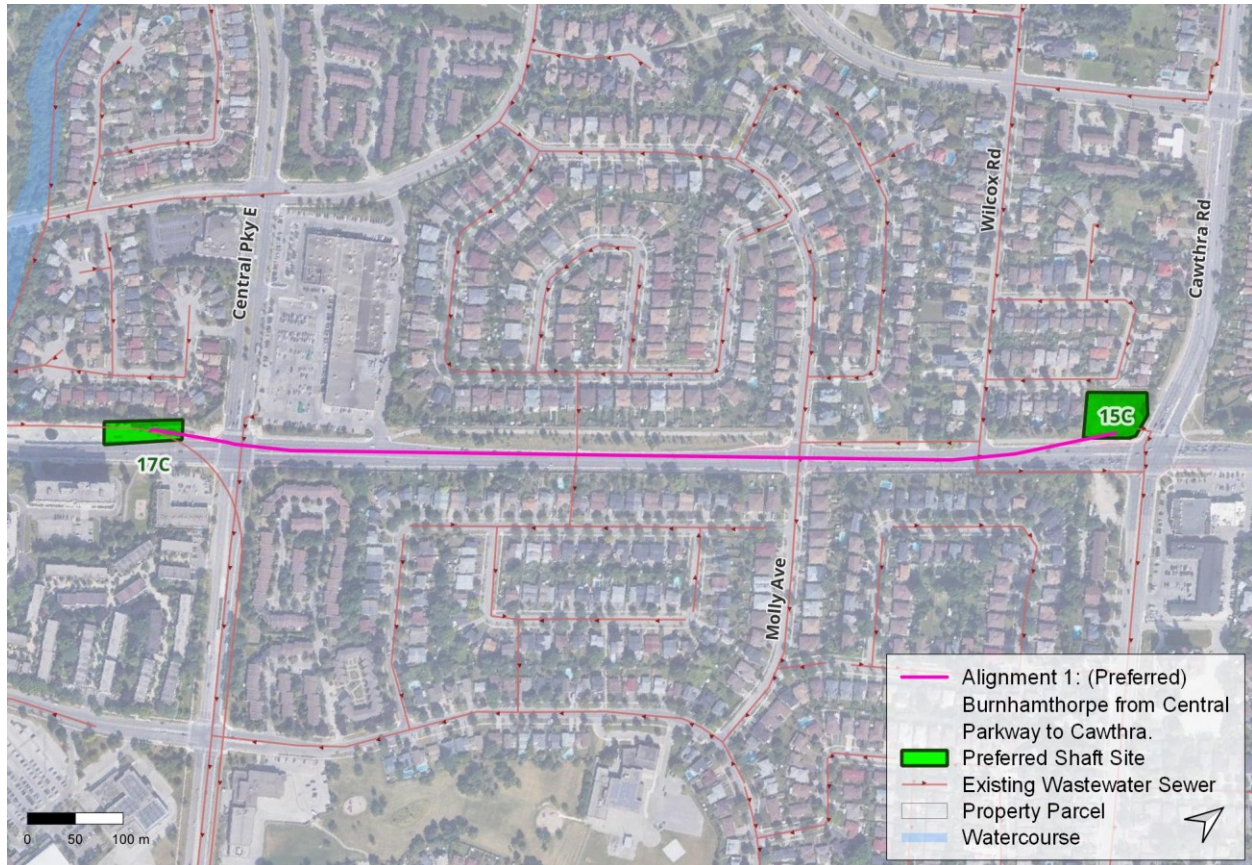


Figure 42: Segment E: MH15 to MH17 Alignment

This alignment accommodates a north side alignment based on the selected preferred shaft site. This alignment keeps to the north side of Burnhamthorpe, accommodates the preferred shaft sites, meets setbacks for existing infrastructure and enables the required curvature for tunneling machinery.

7.0 Preferred Design Concept

The preferred design concept solution consists of four gravity sewer alignments designed to connect to key trunk and local existing sewers to ultimately flow to the East Trunk Sewer along Etobicoke Creek. The solution improves capacity within the Central Mississauga area and increases flow flexibility with the addition of flow control gates at the existing sewer connection points.

Due to the depth and length of the preferred full gravity solution, tunnelling was the preferred construction method for the majority of the sewer alignments. Open cut construction will be required at the Etobicoke Creek crossing and connections to the Cooksville Creek Trunk Sewer, Cliff Street Local Sewer, Hensall Street and Hensall Street West Local Sewers, Tedlo Street Local Sewer and Dixie Road Trunk Sewer. Based on flow requirements and ultimate tunnelling methodology for each of the sewer alignments, it is anticipated that the diameter will be:

- 1500 mm for Burnhamthorpe Road sewer alignment, between Central Parkway and Cawthra Road.
- 1500 mm for Cawthra Road sewer alignment, between Dundas Street and Queensway East.
- 1500 mm for Queensway East sewer alignment, between Hurontario Street and Cawthra Road.
- 1800 mm for Queensway East sewer alignment, between Cawthra Road and Etobicoke Creek.
- 1800 mm for Etobicoke Creek Valley sewer alignment, between Queensway East and Sherway Drive.

7.1 Overview of the Preferred Route

Figure 43 provides an overview of the proposed sewer alignments and shaft sites. **Figure 44** to **Figure 48** provide details on each of the shaft sites. Note that shaft site numbering has been updated to reflect the final design concept. Construction of each sanitary sewer segment below will generally proceed from a downstream to upstream direction.

7.1.1 Segment A: Shaft 1 to Shaft 2

Segment A is the downstream end of the proposed Queensway Trunk Sewer but will be the first to be constructed. This segment is approximately 0.4 km of 1800 mm diameter gravity sewer along Etobicoke Creek between Queensway East and Sherway Drive and ranges from approximately 4 m to 22 m in depth (from ground to sewer invert). Open cut construction will be required to cross the Etobicoke Creek from East to West due to the shallow creek clearance at the crossing location. There will not be a permanent manhole on the west side of Etobicoke Creek at Shaft 1. Tunnelling will be used for the alignment within the Etobicoke Creek Valley between the west side of Shaft 1 and Shaft 2.

There is one connection to the existing wastewater system:

- Shaft 1: direct connection with no control. All flows from the proposed Queensway Trunk Sewer are directed south along the East Trunk sewer.

Shaft 1 and 2 will require temporary easements for the duration of construction and permanent easements for long term maintenance access to the manholes and sewer.

7.1.2 Segment B: Shaft 2 to Shaft 4

Segment B is approximately 2.9 km of 1800 mm diameter gravity sewer along Queensway East between Cawthra Road and Etobicoke Creek and ranges from approximately 15 m to 22 m in depth (from ground to sewer invert). Tunnelled construction will be used for the 1800 mm sewer; however open cut construction will be required to connect to Dixie Road Trunk Sewer.

There is one connection to the existing wastewater system:

- Shaft 3: gate control on the existing Dixie Road Trunk Sewer to fully regulate flow south along Dixie Rd trunk sewer or east along proposed Queensway Trunk sewer.

Shafts 2 and 4 will require temporary easements for the duration of construction and permanent easements for long term maintenance access to the manholes and sewer. Shaft 3 will not require any temporary or permanent easements since it is located on Region of Peel owned lands.

7.1.3 Segment C: Shaft 4 to Shaft 9

Segment C is the upstream end of the proposed Queensway Trunk Sewer. This segment is approximately 2.1 km of 1500 mm diameter gravity sewer along Queensway East between Hurontario Street and Cawthra Road and ranges from approximately 4 m to 15 m in depth (from ground to sewer invert). Tunnelled construction will be used for the 1500 mm sewer, including the Cooksville Creek crossing; however, open cut construction will be required to connect to Cooksville Creek Trunk Sewer, Cliff Road Local Sewer, Hensall Street and Hensall Street West Local Sewers and Tedlo Street Local Sewers.

There are six connections to the existing wastewater system:

- Shaft 5: Gate control on the existing Tedlo St local sewer to fully regulate flow south along Tedlo St local sewer or east along proposed Queensway Trunk sewer.
- Shaft 6: Gate controls on the existing Hensall St and Hensall St West local sewer to fully regulate flows south along local sewer west of Hensall St or east along proposed Queensway Trunk sewer; and, south along Hensall St local sewer or east along proposed Queensway Trunk sewer.
- Shaft 7: Gate control on the existing Cliff Rd local sewer to fully regulate flow south along Cliff Rd local sewer or east along proposed Queensway Trunk sewer.
- Shaft 8: Gate control on the existing Cooksville Creek Trunk sewer to fully regulate flow south along Cooksville Creek trunk or east along proposed Queensway Trunk sewer.
- Shaft 9: Gate control on both the existing Trunk Sewer heading south on Hurontario and the proposed Queensway Trunk Sewer. This will enable full control of flow to either east or south.

Shafts 4, 5, 6, 7 and 8 will require temporary easements for the duration of construction and permanent easement for long term maintenance access to the manholes and sewer. Shaft 9 will only require temporary easements since the manhole and sewer will be located in the road ROW.

7.1.4 Segment D: Shaft 4 to Shaft 10

Segment D connects the existing Cawthra Road Trunk Sewer to the proposed Queensway East Trunk Sewer. This segment is approximately 1 km of 1500 mm diameter gravity sewer along Cawthra Road between Dundas Street East and Queensway East and ranges from approximately 9 m to 17 m in depth (from ground to sewer invert). Tunnelled construction will be used for the full 1500 mm sewer.

There is one connection to the existing wastewater system:

- Shaft 10: Gate control on both the existing Cawthra Rd Trunk Sewer heading south on Cawthra Rd and the proposed Cawthra Rd Trunk Sewer. This will enable full control of flow to either pipe going south.

Shaft 4 will require temporary easements for the duration of construction and permanent easement for long term maintenance access to the manholes and sewer. Shaft 10 will not require any temporary or permanent easements since it is located on Region of Peel owned lands.

7.1.5 Segment E: Shaft 11 to Shaft 12

Segment E is approximately 1 km of 1500 mm diameter gravity sewer along Burnhamthorpe Road between Central Parkway and Cawthra Road and ranges from approximately 16 m to 23 m in depth (from ground to sewer invert). Tunnelled construction will be used for the full 1500 mm sewer.

There are two connections to the existing wastewater system:

- Shaft 11: Direct connection with no control. All flows from proposed Burnhamthorpe Trunk sewer and existing Cawthra Rd Trunk Sewer directed south along the existing Cawthra Rd Trunk Sewer.
- Shaft 12: Gate control on both the existing Trunk Sewer heading south on Central Parkway and the proposed Burnhamthorpe Trunk Sewer. This will enable full control of flow to either east or south.

Shaft 11 will only require temporary easements for the duration of construction since the manhole and sewer will be located in the road ROW. Shaft 12 will only require permanent easements.

Detailed plan and profiles and site plans of the preferred design concept are provided in **Appendix Volume 3, Appendix E**.

It is important to note that further refinements to the shaft sites and property requirements may be identified during the detailed design phase of the project.

Preferred Design

- Proposed Alignment
- Proposed Shaft Compound

Other Features

- Existing Trunk Sewer Mains
- Existing Local Sewer Mains
- Railway
- Property Parcel

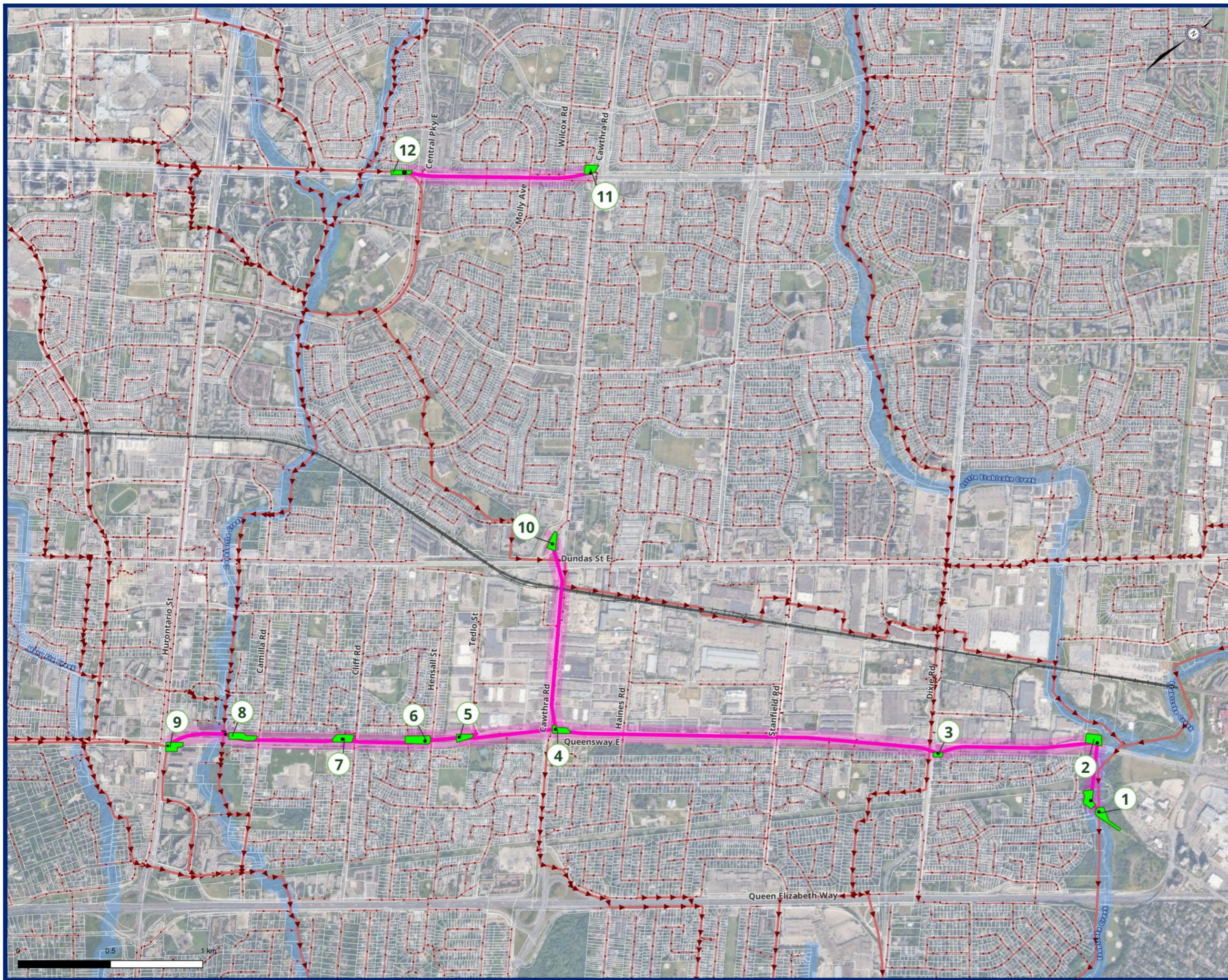
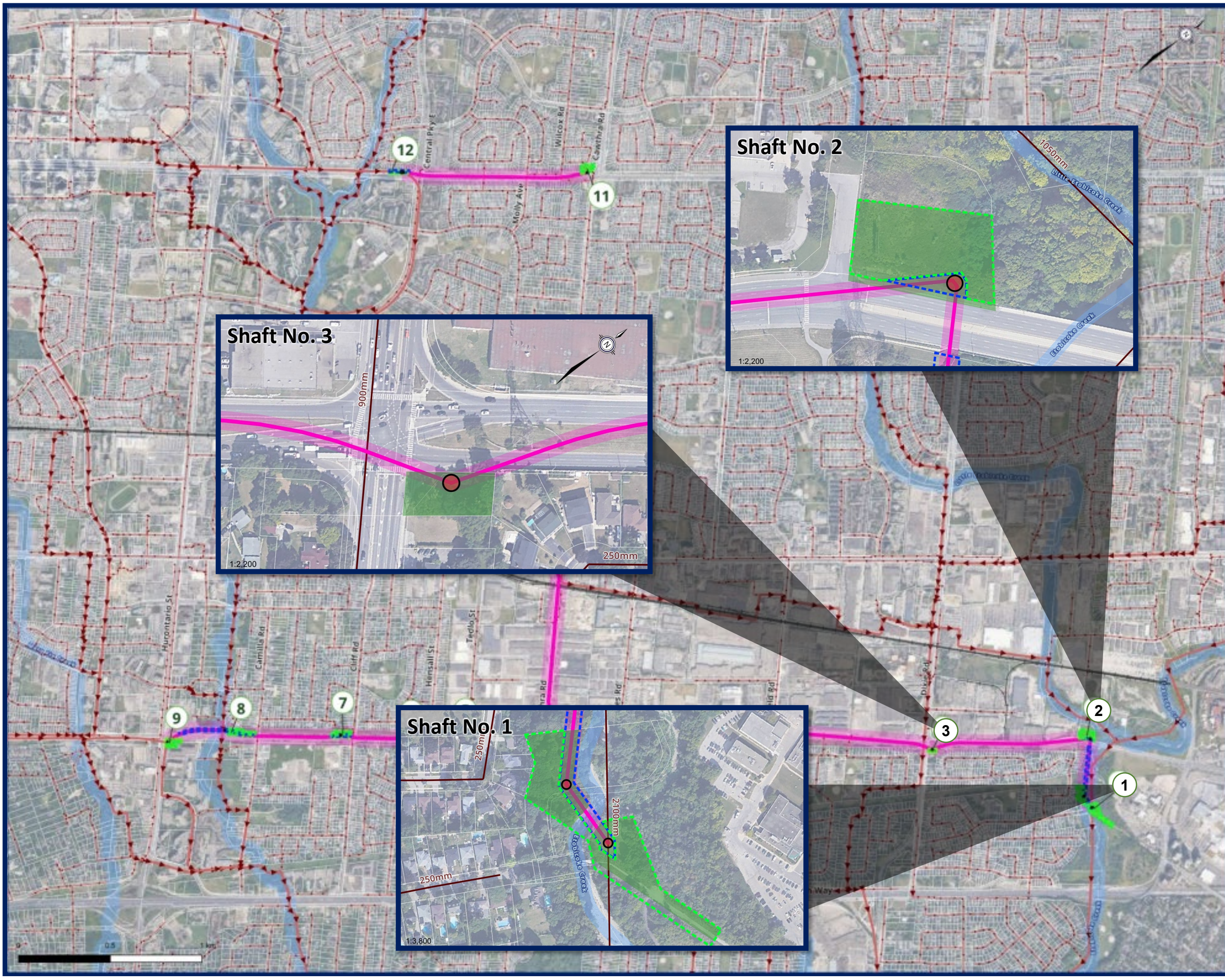


Figure 43

Preferred Alignment

Overview



- Preferred Design**
- Proposed Shaft
 - Proposed Alignment
 - Proposed Compound Easement
 - Proposed Permanent Easement
 - Proposed Temporary Easement
- Other Features**
- Existing Wastewater Mains
 - Railway
 - Property Parcel

Preferred Design Overview

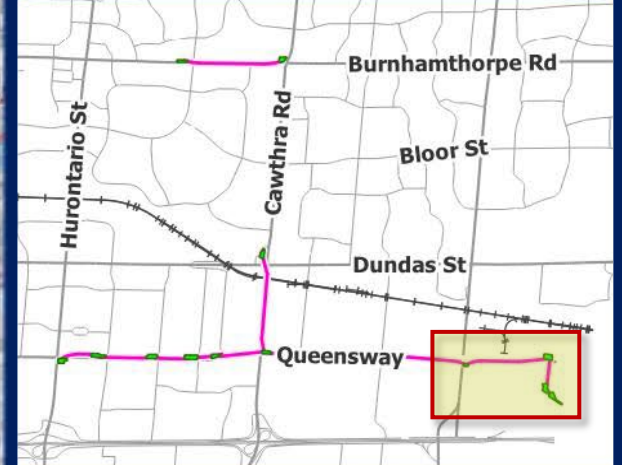
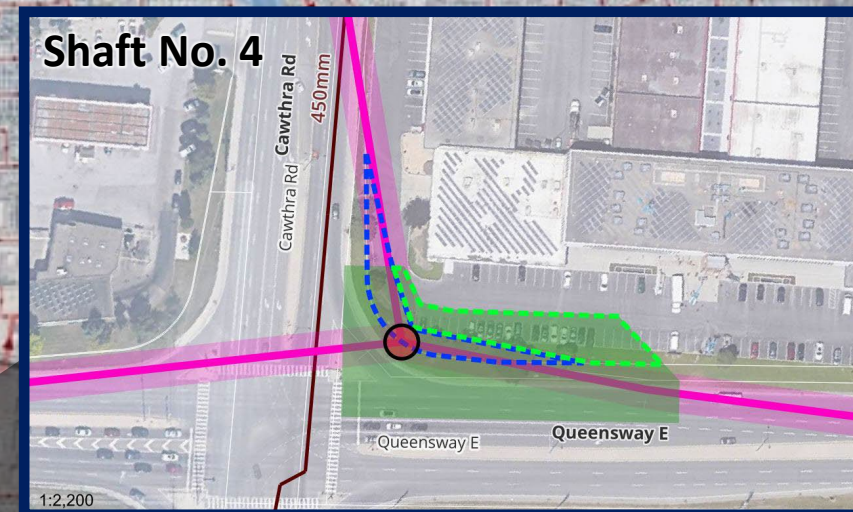
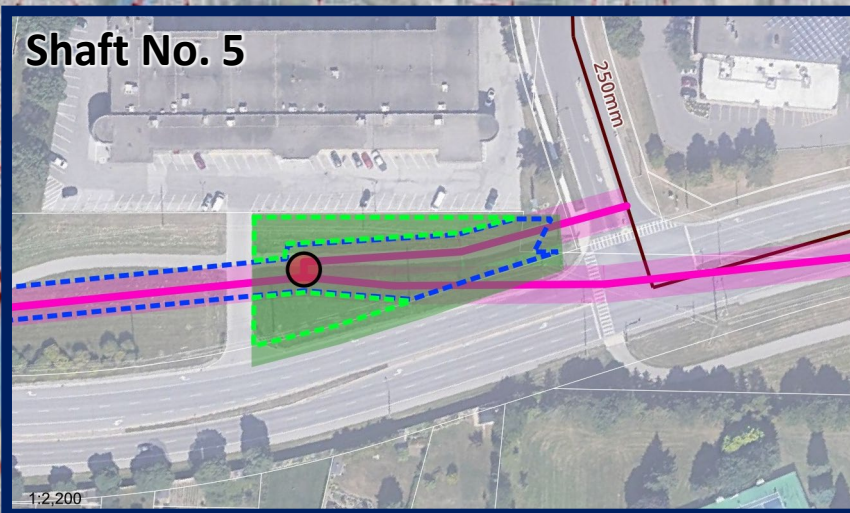


Figure 44
**Dixie and Etobicoke Creek
Route (Shaft 1 - 3)**
Preferred Design

Figure 44



Preferred Design

- Proposed Shaft
- Proposed Alignment
- Proposed Compound Easement
- Proposed Permanent Easement
- Proposed Temporary Easement

Other Features

- Existing Wastewater Mains
- Railway
- Property Parcel

Preferred Design Overview

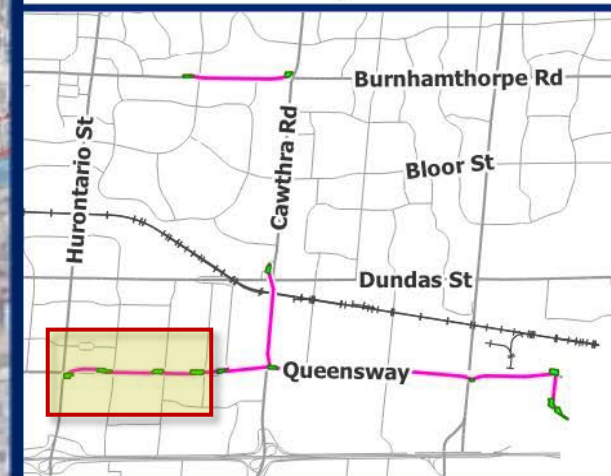
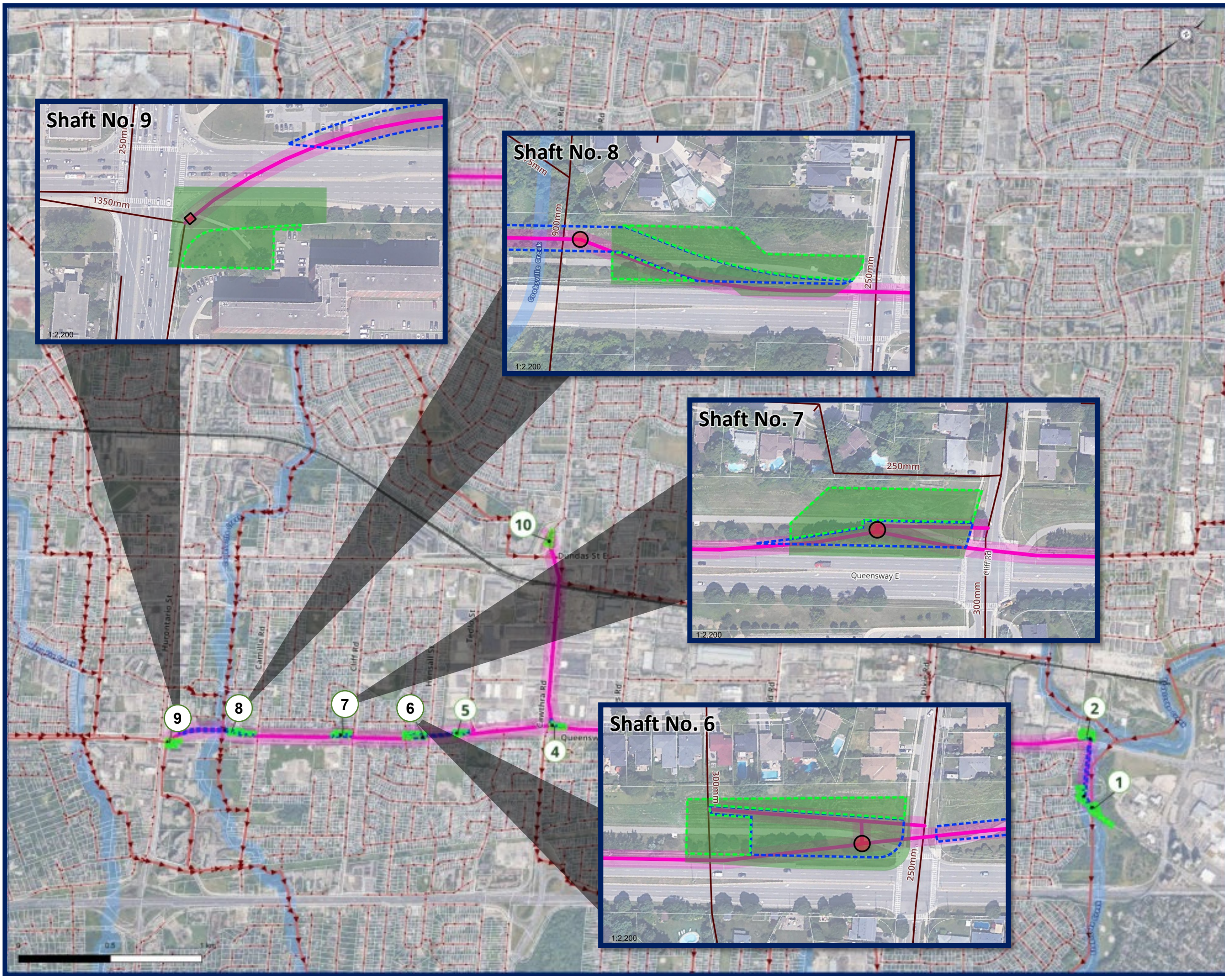
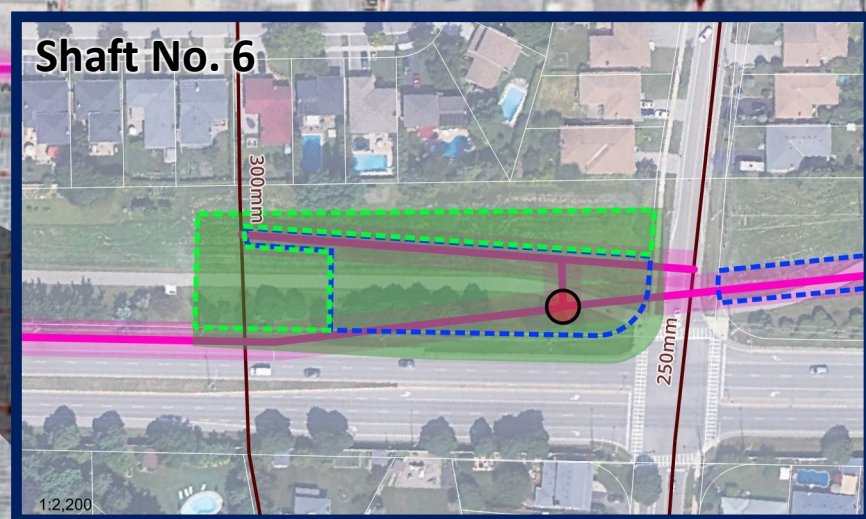
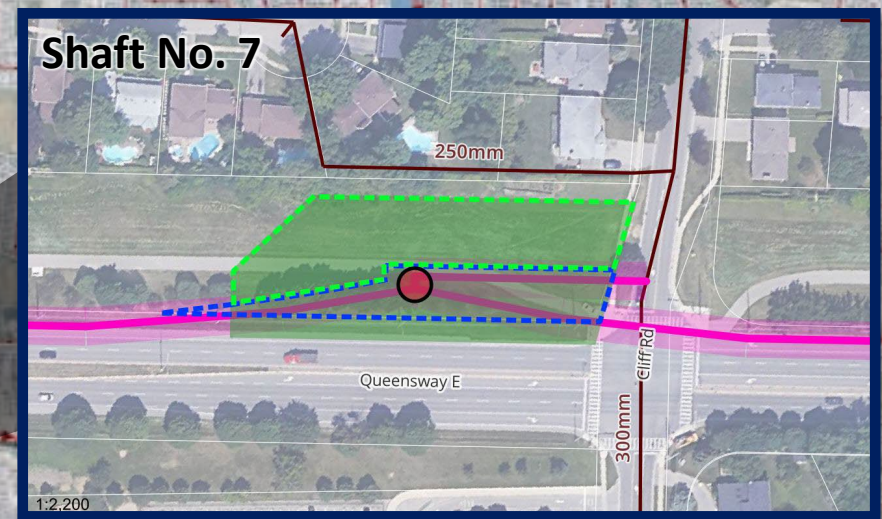
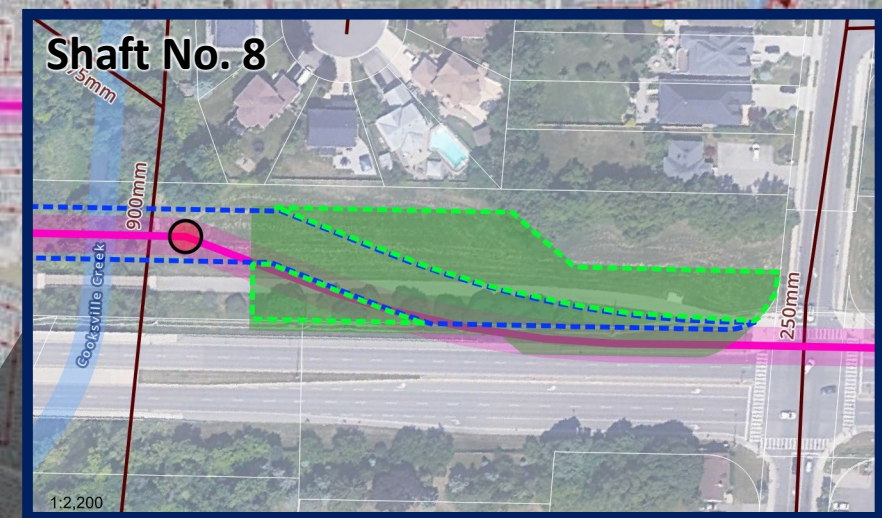
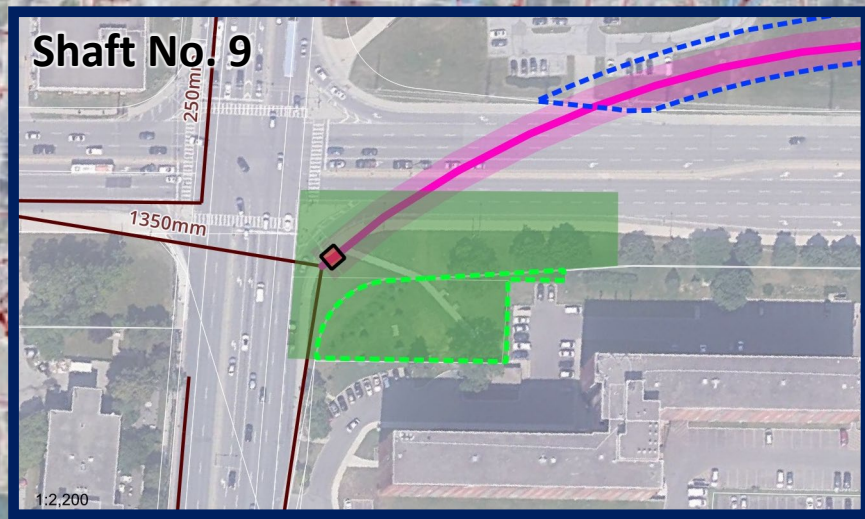


Figure 45
Queensway Route
(Shaft 4 - 5)
Preferred Design



- Preferred Design**
- Proposed Shaft
 - Proposed Alignment
 - Proposed Compound Easement
 - Proposed Permanent Easement
 - Proposed Temporary Easement
- Other Features**
- Existing Wastewater Mains
 - Railway
 - Property Parcel

Preferred Design Overview

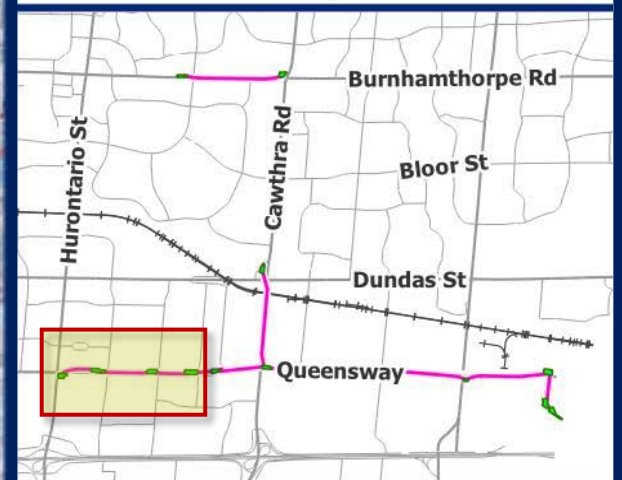


Figure 46
**Queensway Route
(Shaft 6 - 9)
Preferred Design**

Preferred Design

-  Proposed Shaft
-  Proposed Alignment
-  Proposed Compound Easement
-  Proposed Permanent Easement
-  Proposed Temporary Easement

Other Features

-  Existing Wastewater Mains
-  Railway
-  Property Parcel

Preferred Design Overview

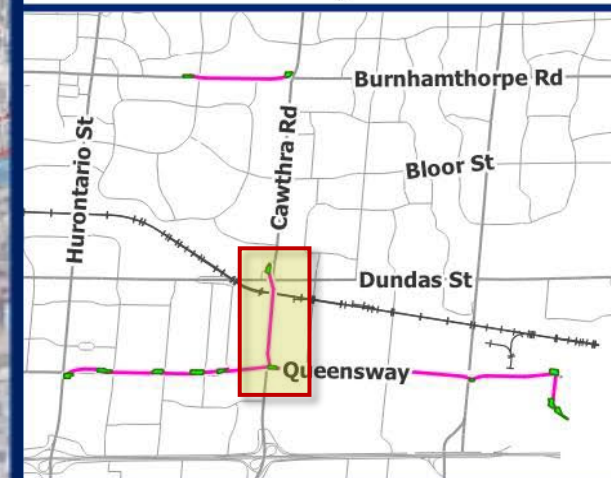
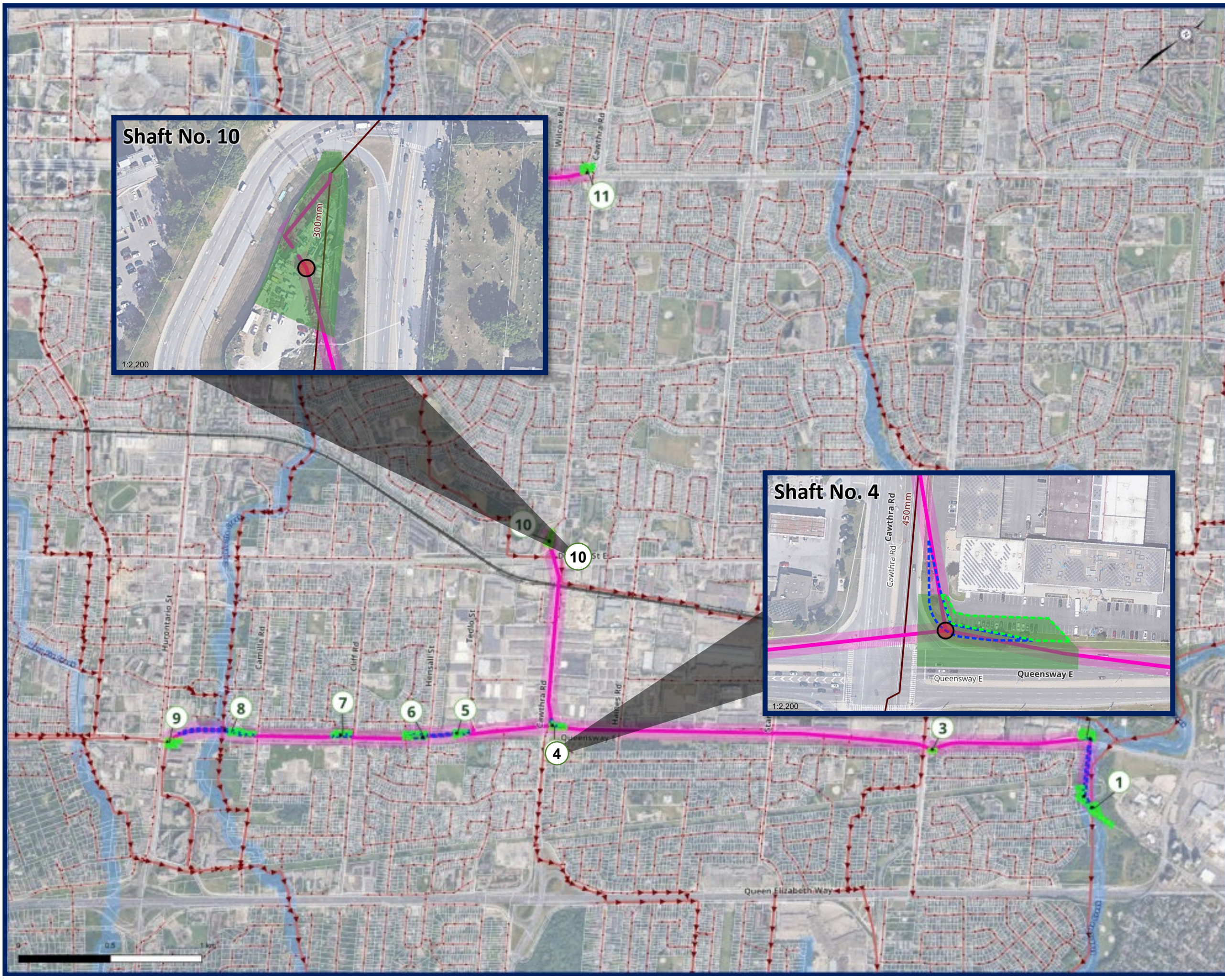
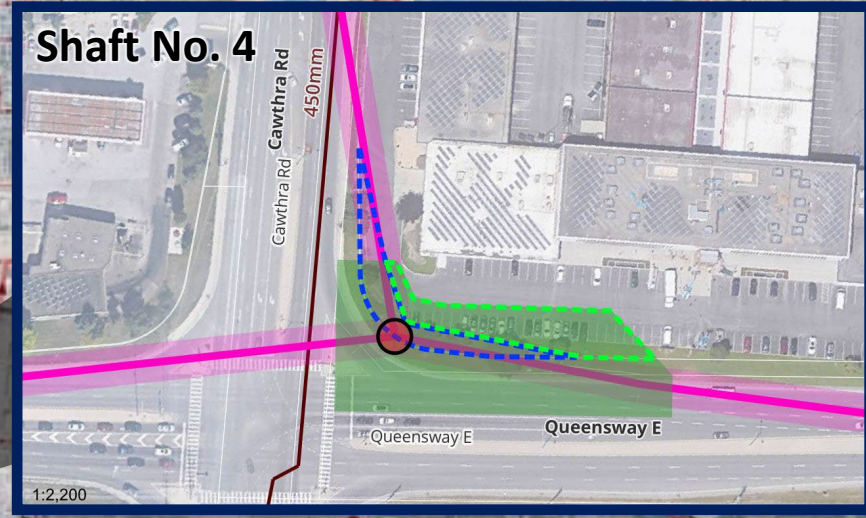
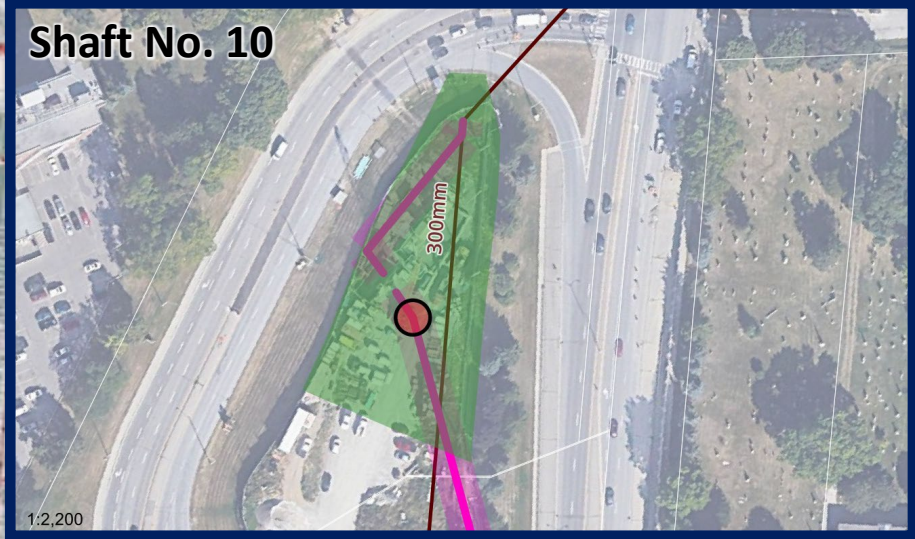


Figure 47
Cawthra Route
(Shaft 4 and 10)
Preferred Design

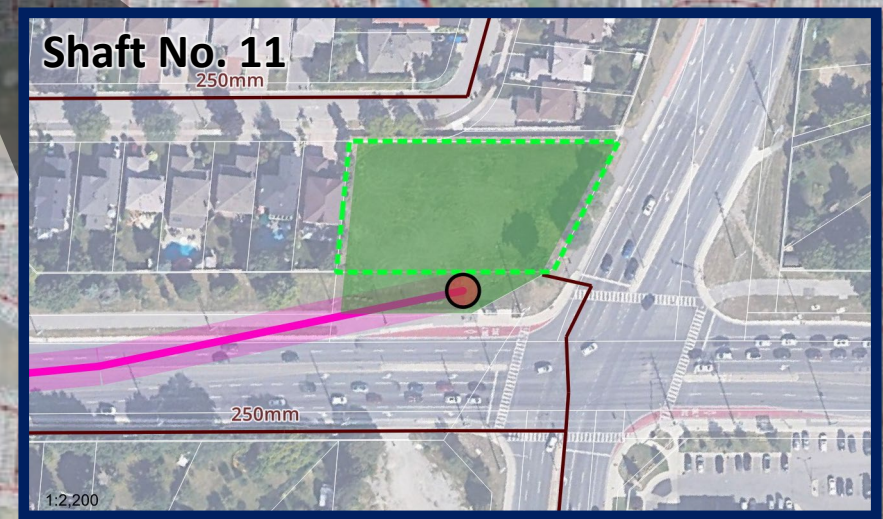
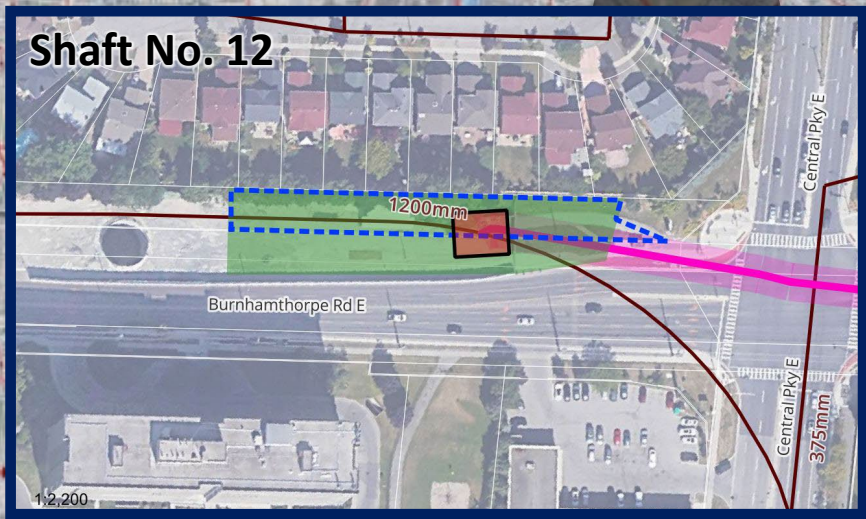


Preferred Design

-  Proposed Shaft
-  Proposed Alignment
-  Proposed Compound Easement
-  Proposed Permanent Easement
-  Proposed Temporary Easement

Other Features

-  Existing Wastewater Mains
-  Railway
-  Property Parcel



Preferred Design Overview

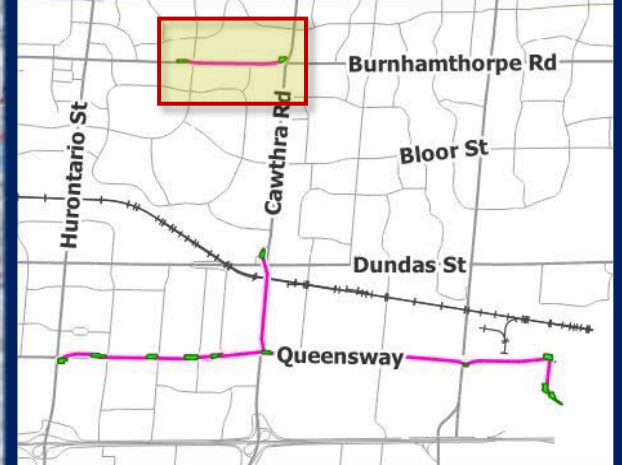


Figure 48
Burnhamthorpe Route
(Shaft 11 - 12)
Preferred Design

7.2 Other Design Considerations

Further to the main decisions related to the trunk sewer alignment, construction methodology and shaft/manhole sites, other key design elements were considered and are outlined below.

7.2.1 Interconnections and Control Structures

Based on the completed hydraulic analyses, existing and future capacity needs and constructability of new infrastructure, flow control locations were selected at key connection points to help relieve capacity constraints during normal and wet weather flow conditions and support maintenance and rehabilitation activities. The key connections are as follows:

- East Trunk Sewer (2,100 mm) – Etobicoke Creek / Sherway Drive
- Dixie Trunk Sewer (900 mm) – Queensway East / Dixie Road
- Cooksville Creek Trunk Sewer (900 mm) – Queensway East / Cooksville Creek
- New Queensway Trunk Sewer (1,350 mm) – Queensway East / Hurontario Street
- CPR Trunk Sewer (900 mm) – Dundas Street / Cawthra Road
- New Cawthra Trunk Sewer (1,500 mm) – currently under construction – Cawthra Road / Burnhamthorpe Road
- Central Parkway Trunk Sewer (1,200 mm) – Central Parkway / Burnhamthorpe Road

In addition to the key connection points, other minor connection points (generally from local sewers) were also reviewed to determine if there was value in connecting these local sewers to the proposed Queensway Trunk Sewer. To help determine the connection benefits, local modeling in the sub-catchments south of Queensway, was completed. This was done in order to assess the potential benefits of intercepting the local sewers that cross Queensway from north to south. The minor connections are as follows:

- Tedlo Local Sewer (250 mm) – Queensway East / Tedlo Street
- Hensall Local Sewer (250 mm) – Queensway East / Hensall Street
- Hensall West Local Sewer (300 mm) – Queensway East / west of Hensall Street
- Cliff Local Sewer (300 mm) – Queensway East / Cliff Road

These interconnection locations were also investigated to determine the benefit for tunneling constructability; an interconnection location could be deemed to be favourable to optimize tunnel drive lengths or be at a location with open space and good access. Overall, this was an iterative process to determine the preferred interconnection locations that would provide a combination of:

- Flow diversion to Queensway to relieve capacity constraints.
- Optimally spaced shaft/compound location.
- Estimated shaft/compound cost.

In general, an additional shaft wasn't recommended if there were no downstream local capacity constraints (diversion of flow not beneficial for capacity relief) and if it was not determined to be necessary to optimize tunnel drive lengths.

Depending on the future function of these connections, they may be connected to the existing network using a variety of configurations of chambers, gates, weirs or other control structures. A description of the connection as well as proposed controls are outlined below.

Connection to East Trunk Sewer – Shaft 1

The downstream connection to the existing Region wastewater system, located at northeast of Etobicoke Creek and Sherway Drive. The upstream catchment will flow into the 2,100 mm East Trunk sewer which eventually leads to the G.E. Booth WWTP.

Connection: Direct connection with no control. All flows from proposed Queensway Trunk sewer directed south along the East Trunk sewer.

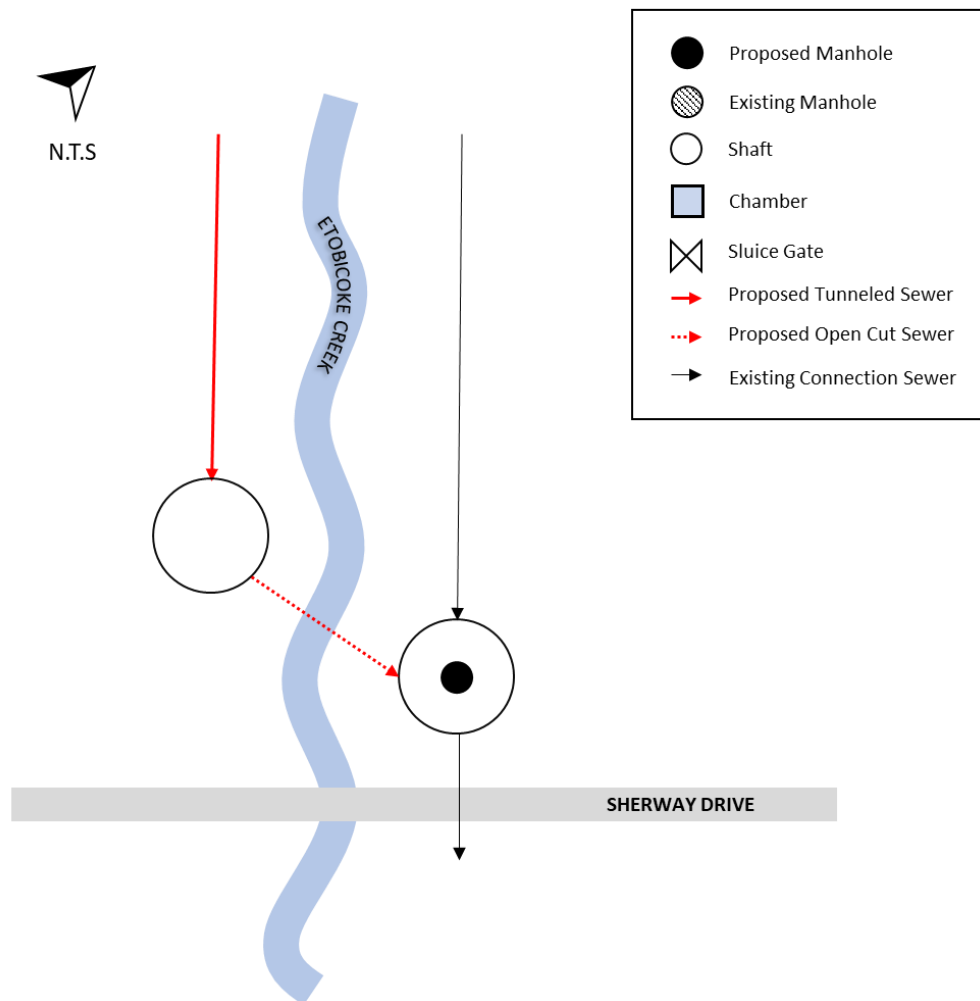


Figure 49: Etobicoke Creek and Sherway Drive Connection Type Schematic

Connection to Dixie Trunk Sewer – Shaft 3

The proposed Queensway Trunk Sewer will connect to the existing system at Queensway East and Dixie Road. This provides connectivity to the 900 mm Dixie Trunk Sewer along Dixie Road.

Connection: Gate control on the existing Dixie Road trunk sewer to fully regulate flow south to along Dixie Road trunk sewer or east along proposed Queensway Trunk sewer.

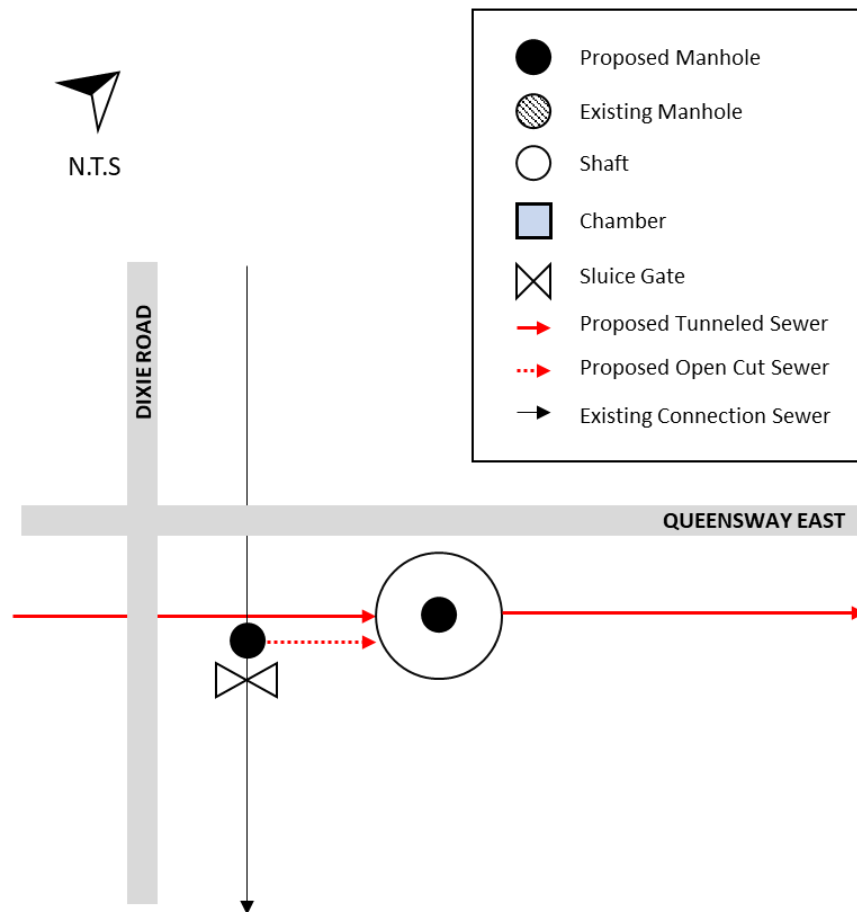


Figure 50: Queensway East and Dixie Road Connection Type Schematic

Connection to Tedlo Local Sewer – Shaft 5

The proposed Queensway Trunk Sewer will connect to the existing system at Queensway East and Tedlo Street. This provides connectivity to the 250 mm local sewer along Tedlo Street. Note that there may be a bend in the sewer connecting to the Tedlo St local sewer, therefore an intermediate manhole has been included.

Connection: Gate control on the existing Tedlo Street local sewer to fully regulate flow south along Tedlo Street local sewer or east along proposed Queensway Trunk sewer.

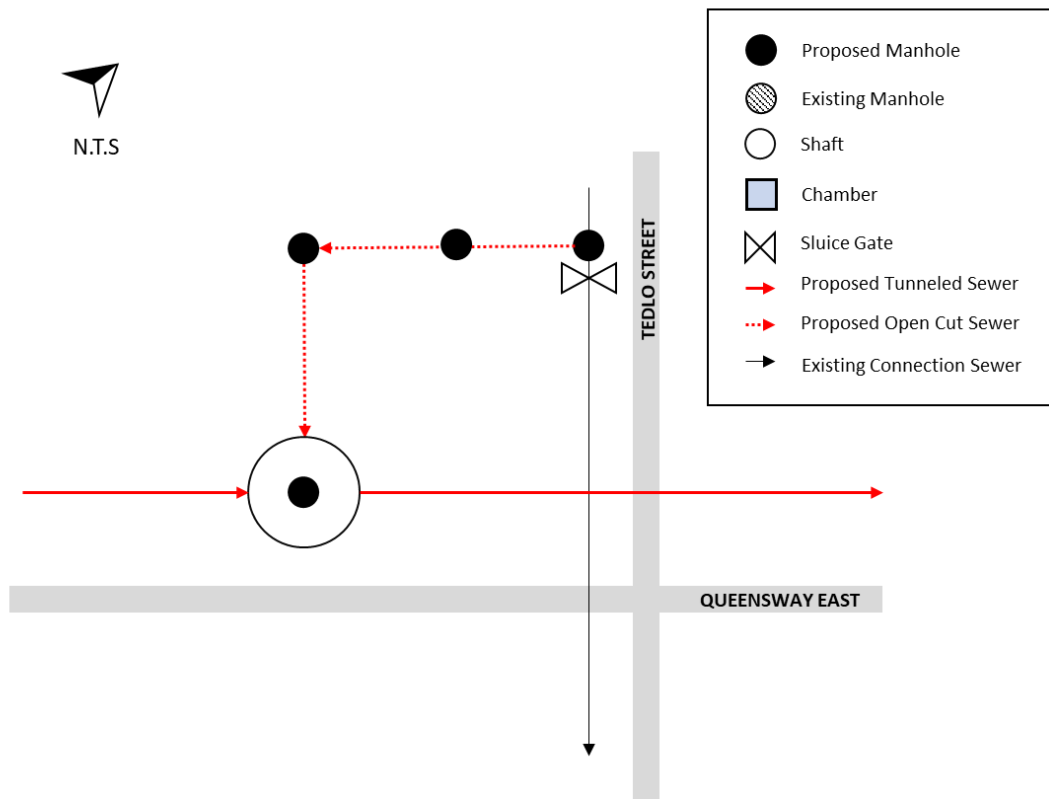


Figure 51: Queensway East and Tedlo Street Connection Type Schematic

Connection to Hensall and Hensall West Local Sewer – Shaft 6

The proposed Queensway Trunk Sewer will connect to the existing system at Queensway East and Hensall Street. This provides connectivity to two local sewers, a 300 mm local sewer west of Hensall Street and a 250 mm local sewer along Hensall Street.

Connection: Gate controls on the existing Hensall Street and Hensall Street West local sewer to fully regulate flows:

- South along local sewer west of Hensall Street or east along proposed Queensway Trunk sewer; and,
- South along Hensall Street local sewer or east along proposed Queensway Trunk sewer.

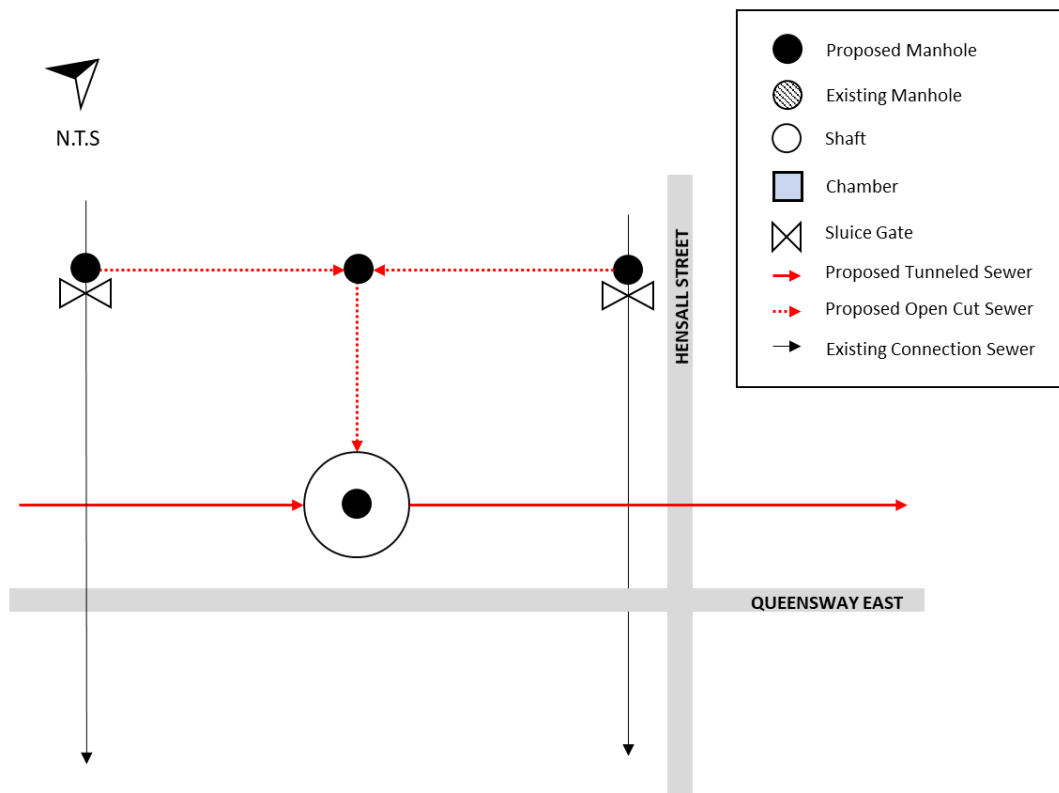


Figure 52: Queensway East and Hensall Street Connection Type Schematic

Connection to Cliff Local Sewer – Shaft 7

The proposed Queensway Trunk Sewer will connect to the existing system at Queensway East and Cliff Road. This provides connectivity to the 300 mm local sewer along Cliff Road.

Connection: Gate control on the existing Cliff Road local sewer to fully regulate flow south along Cliff Road local sewer or east along proposed Queensway Trunk sewer.

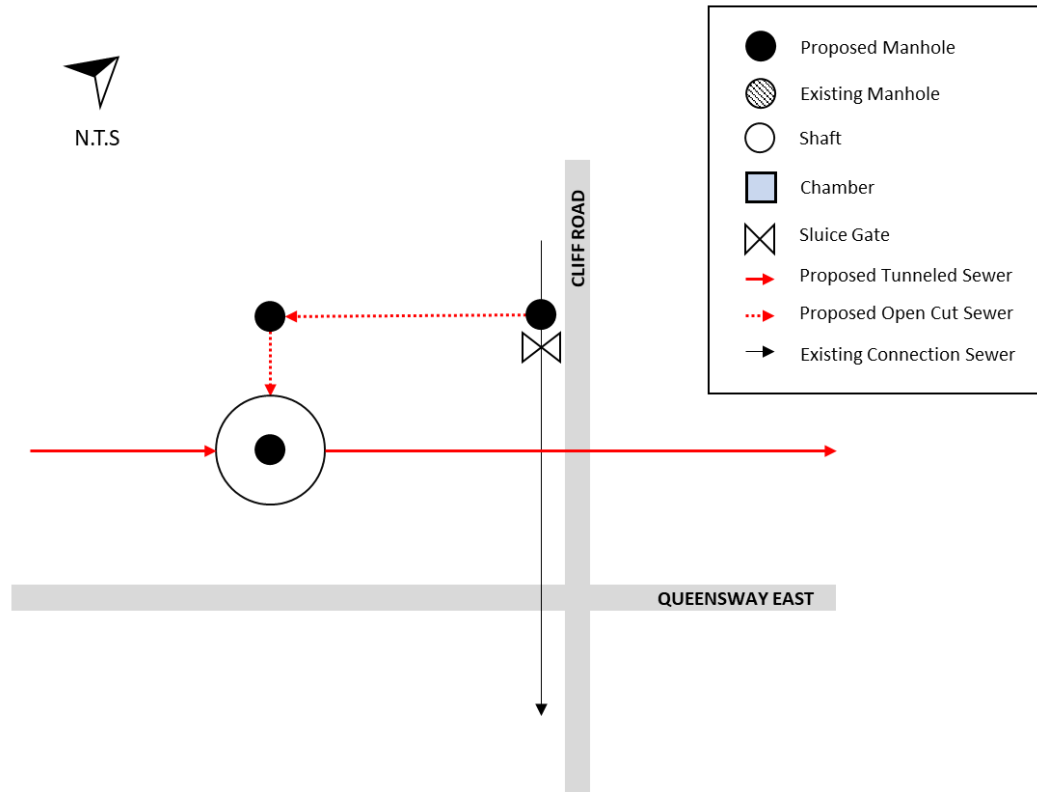


Figure 53: Queensway East and Cliff Road Connection Type Schematic

Connection to Cooksville Creek Trunk Sewer – Shaft 8

The proposed Queensway Trunk Sewer will connect to the existing system at Queensway East and Cooksville Creek. This provides connectivity to the 900 mm Cooksville Creek Trunk Sewer along Cooksville Creek.

Connection: Gate control on the existing Cooksville Creek Trunk sewer to fully regulate flow south along Cooksville Creek trunk or east along proposed Queensway Trunk sewer.

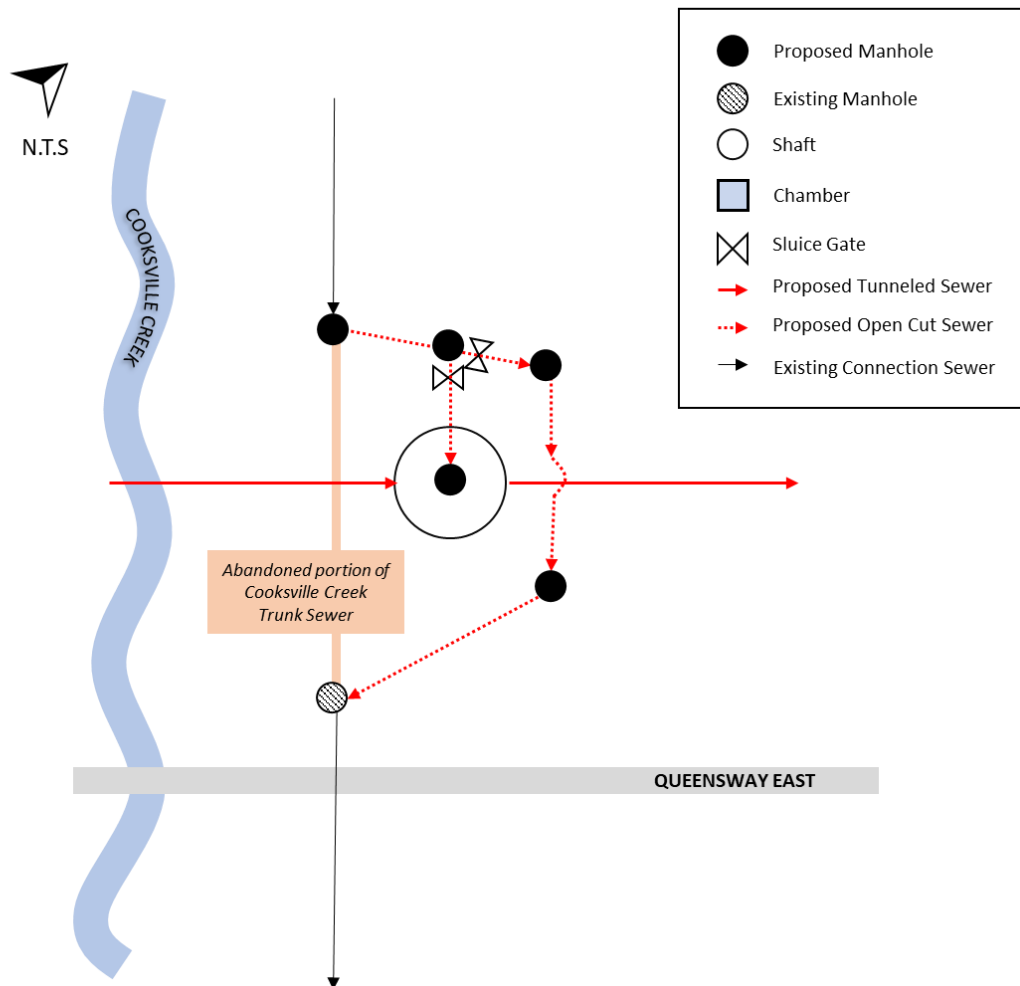


Figure 54: Queensway East and Cooksville Creek Connection Type Schematic

Connection to New Queensway Trunk Sewer – Shaft 9

An existing manhole will be utilized to connect to the existing system at Queensway East and Hurontario. This provides connectivity to the 1,350 mm New Queensway Trunk Sewer along Queensway East.

Connection: Gate control on both the existing Trunk Sewer heading south on Hurontario and the proposed Queensway Trunk Sewer. This will enable full control of flow to either east or south.

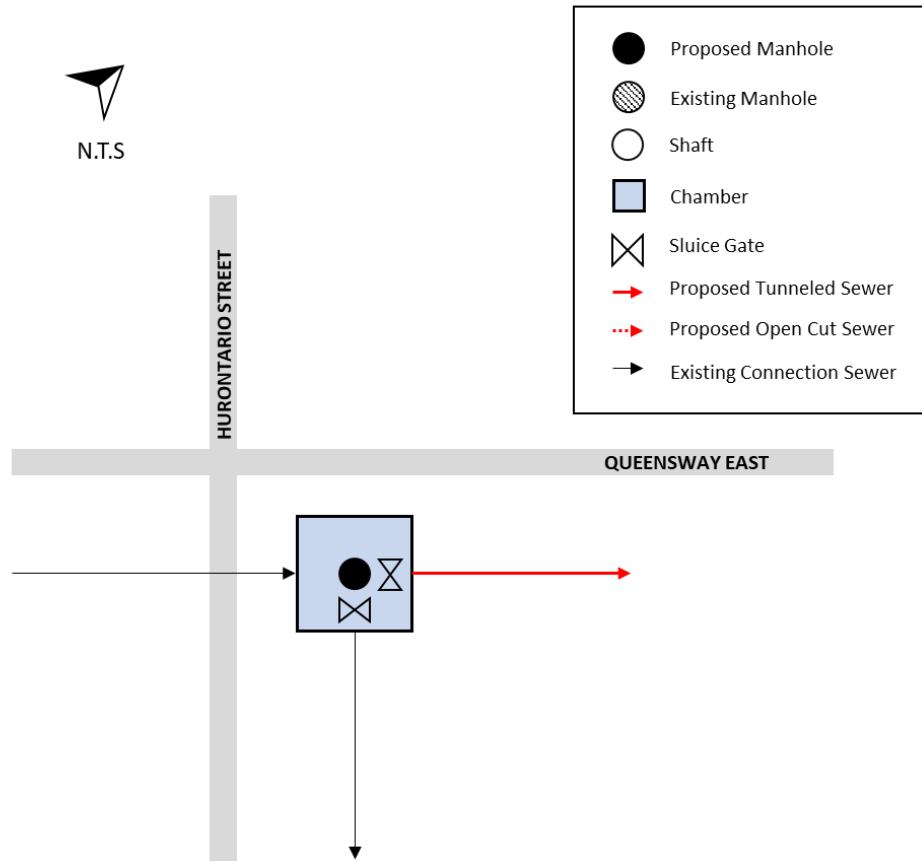


Figure 55: Queensway East and Hurontario Street Connection Type Schematic

Connection to New Cawthra Trunk Sewer and CPR Trunk Sewer – Shaft 10

The proposed Cawthra Road Trunk Sewer will connect to the existing system at Cawthra Road and Dundas Street East. This provides connectivity to the 900 CPR Trunk Sewer along Dundas and the under construction 1,500 mm Cawthra Trunk Sewer along Cawthra Road.

Connection: Gate control on both the existing Cawthra Road Trunk Sewer heading south on Cawthra Road and the proposed Cawthra Road Trunk Sewer. Pipes labeled A and B in the figure below are part of the existing Cawthra Trunk Sewer. These pipes were constructed with a flat gradient (slope of 0%) to allow flows to move north or south depending on the flow control gate settings. This will enable full control of flow to either the proposed pipe or south to pipes A and B to flow to CPR Trunk Sewer (pipe C) going east

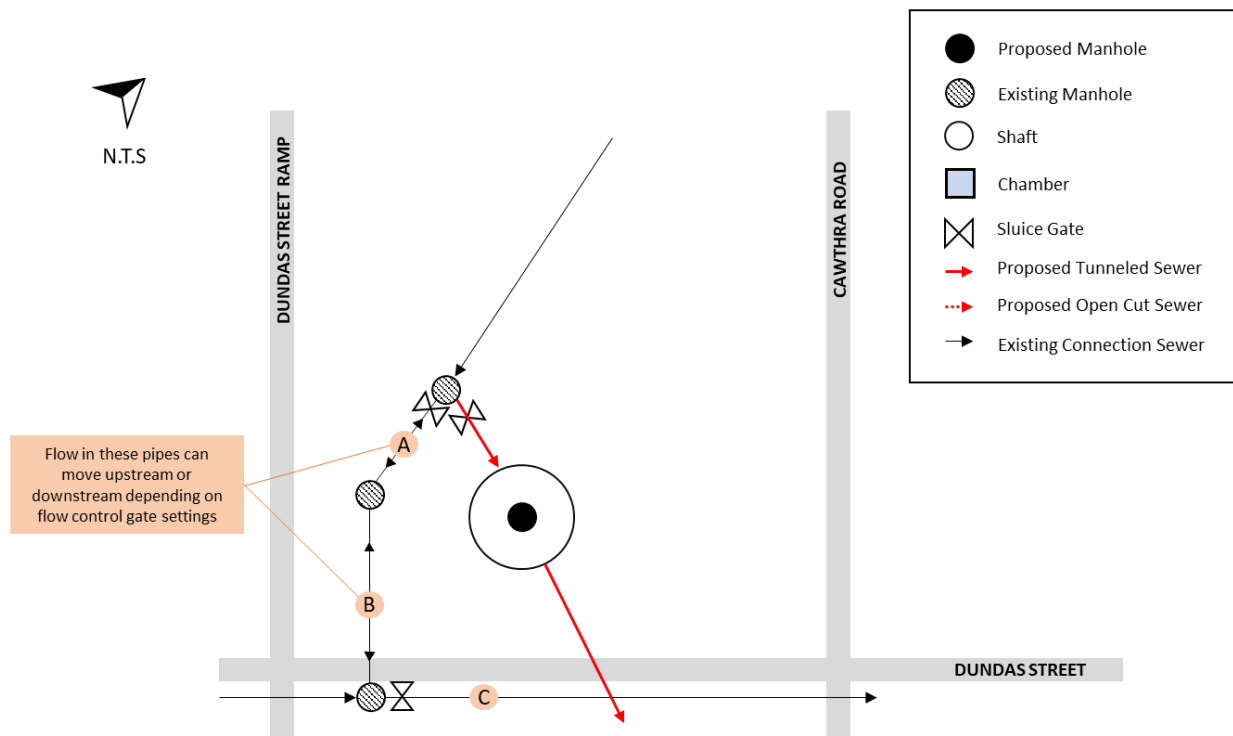


Figure 56: Cawthra Road and Dundas Street East Connection Type Schematic

Connection to New Cawthra Trunk Sewer – Shaft 11

The proposed Burnhamthorpe Trunk Sewer will connect to the existing system at Burnhamthorpe Road and Cawthra Road. This provides connectivity to the under construction 1,500 mm Cawthra Trunk Sewer along Cawthra Road.

Connection: Direct connection with no control. All flows from proposed Queensway Trunk sewer and existing Cawthra Road Trunk Sewer directed south along the existing Cawthra Road Trunk Sewer.

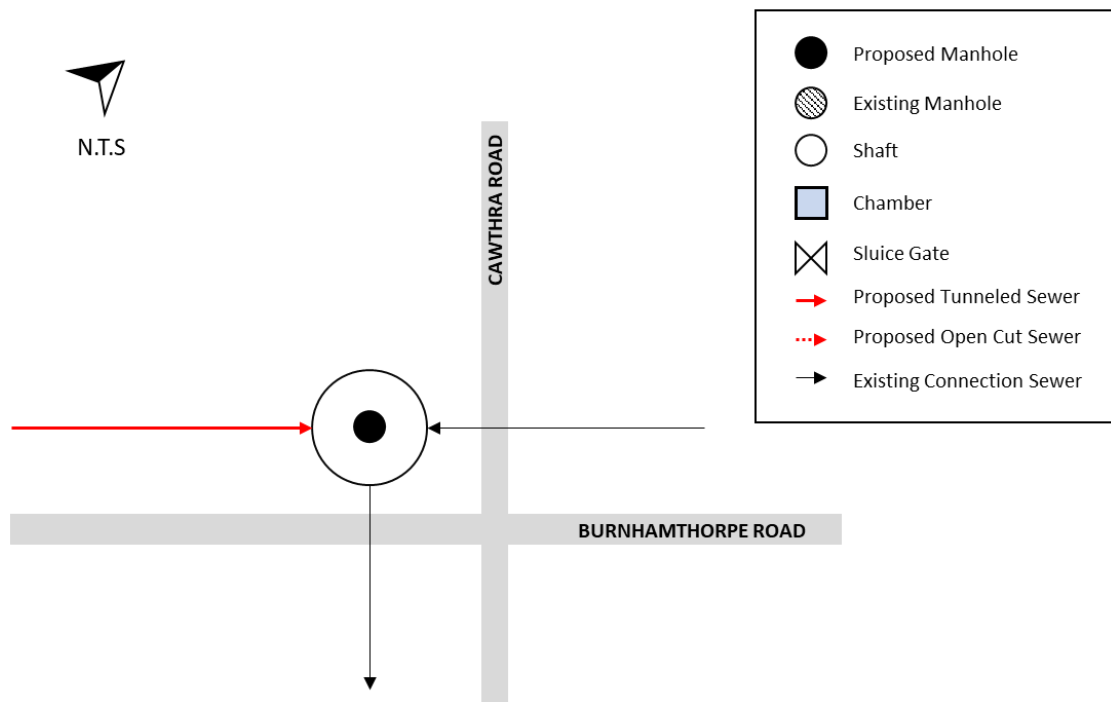


Figure 57: Burnhamthorpe Road and Cawthra Road Connection Type Schematic

Connection to Central Parkway Trunk Sewer – Shaft 12

The proposed Burnhamthorpe Trunk Sewer will connect to the existing system at Burnhamthorpe Road and Central Parkway. This provides connectivity to the Central Parkway Trunk Sewer along Burnhamthorpe Road.

Connection: Gate control on both the existing Trunk Sewer heading south on Central Parkway and the proposed Queensway Trunk Sewer. This will enable full control of flow to either east or south.

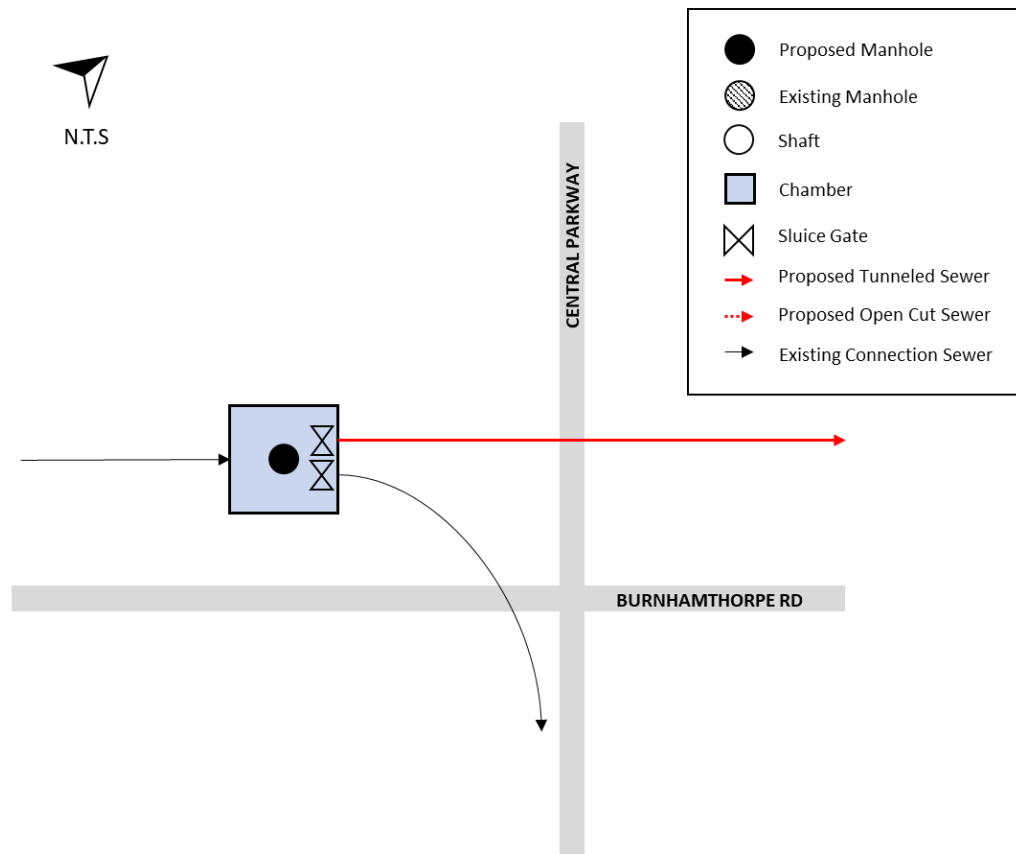


Figure 58: Burnhamthorpe Road and Central Parkway Connection Type Schematic

Connections for Future Consideration

There are additional potential connections for future Region consideration including:

- Wilcox Local Sewer (250 mm) – this connection is being planned through a separate Regional project.
- Camilla Local Sewer (250 mm) – no future downstream capacity issues were identified during the course of the study.

- Haines Local Sewer (300 mm) – no future downstream capacity issues were identified during the course of the study.
- Stanfield Local Sewer (300 mm) – no future downstream capacity issues were identified during the course of the study.

7.2.2 Real Time Controls

In order to moderate the flow and maximize flexibility from the proposed control structures noted above, Real Time Controls (RTC) is proposed throughout the alignment at the connection points. The internal sewers will be controlled via gates and control structures, however, the RTC strategy has also considered key external conditions including:

- Peak wet weather flows at G.E. Booth and Clarkson WWTPs.
- The future East to West diversion (currently under construction) along the East trunk sewer upstream of the proposed Queensway and Etobicoke Creek connection point.

For more details on the operational strategy for the proposed solution, see the Hydraulic Analysis Report provided in **Appendix Volume 2, Appendix E**.

7.2.3 Storage

There is a potential opportunity to utilize the Queensway East Trunk Sewer for in-line storage. In-line storage could provide the system with further flow attenuation to manage peaks within the trunk sewer network as well as at the G.E. Booth Wastewater Treatment Plant. Gates and RTC can be utilized to close flows for in-line storage use. The maximum storage capacity available within the proposed new 1800 mm Queensway Trunk Sewer is estimated to be approximately 10,000 m³. Storage opportunities, control logic and subsequent control structure design to facilitate storage may be revisited during Detailed Design.

7.2.4 Property

The majority of the shaft locations require easements for construction (temporary) and long-term maintenance (permanent) access. Property owners were contacted through the Class EA process to conduct required studies and investigations. Permission to Enter (PTE) agreements were arranged with the property owners to access their lands for these studies. The property owners were notified as per their PTE agreements before accessing their lands. The following table provides an overview of the property requirements for each shaft location. The required permanent and temporary easements for the proposed shafts and routes are provided in **Appendix Volume 3, Appendix E**.

Table 21: Property Considerations

Location	Property Ownership	Temporary Easements	Permanent Easements
Etobicoke Creek & Sherway Drive	TRCA City of Mississauga City of Toronto Infrastructure Ontario (managed by Hydro One)	Required Required Required Not required	Required Required Required Required (for sewer along Etobicoke Creek)
Queensway East & Etobicoke Creek	Private	Required	Required
Queensway East & Dixie Road	Region of Peel	Not required – construction on Region of Peel owned lands	Not required – manhole is located on Region of Peel owned lands
Queensway East & Cawthra Road	Private	Required	Required
Queensway East & Tedlo Street	Infrastructure Ontario (managed by Hydro One)	Required	Required
Queensway East & Hensall Street	Infrastructure Ontario (managed by Hydro One)	Required	Required
Queensway East & Cliff Road	Infrastructure Ontario (managed by Hydro One)	Required	Required

Location	Property Ownership	Temporary Easements	Permanent Easements
Queensway East & Cooksville Creek	Infrastructure Ontario (managed by Hydro One) Private	Required Required	Required Required
Queensway East & Hurontario Street	Private	Required	Not required – manhole located in road ROW
Cawthra Road and Dundas Street	Region of Peel	Not required – construction on Region of Peel owned lands	Not required – manhole is located on Region of Peel owned lands
Burnhamthorpe Road and Cawthra Road	Private	Required	Not required - manhole located in road ROW
Burnhamthorpe Road and Central Parkway	City of Mississauga	N/A	Required

7.2.5 Climate Change

The Region of Peel, at a Council level, have prioritized Climate Resiliency Region-wide across all services. The implications of climate change on infrastructure can be wide-ranging and can encompass numerous aspects of a project. Likewise, infrastructure upgrades, expansions, operations, and maintenance activities may increase Greenhouse Gas (GHG) emissions thereby impacting air quality and climate.

This section provides an overview of the potential impacts of climate change to the wastewater system and the potential implications of the wastewater system on climate change. The information was used to support the development and evaluation of alternative solutions and design concepts, as well as short and long term adaptative management practices.

7.2.5.1 Potential Impacts to the Wastewater System

Climate conditions can have an impact on wastewater systems. The following provides a list of weather events and their potential impacts on the wastewater system.

- High Temperatures: an increase in temperatures can lead to water quantity and quality issues
- Drought: a decrease in wet weather events can lead to water quality issues (higher concentration of wastewater entering the wastewater treatment plants)
- Freeze-Thaw Cycle: freeze-thaw cycles can lead to damaged buried infrastructure
- Precipitation: increased precipitation can lead to capacity issues and an increased potential for overflows and spills.

- Wind: high winds can lead to an increased power outage, impacting the operation of pumping stations and treatment plants
- Water Level: increased water levels can lead to flooding of infrastructure
- Storms: increased storm events can lead to increased power outages, impacting the operation of pumping stations and treatment plants.

In developing and assessing alternatives, the proposed solution will provide flexibility and redundancy for adapting to the potential climate change impacts described above.

7.2.5.2 Impacts of the Project on Climate Change

The following proposed solution strategies aim to minimize the project's impact on climate change.

- The use of gravity sewers to reduce the amount of greenhouse gas emissions compared to the development of pumping stations.
- Connections to existing infrastructure to enhance capacity, thereby reducing the need to build new infrastructure to increase capacity in the system.
- Adding redundancy to the wastewater system by connecting to key trunk and local sewers. This will ensure aging infrastructure can be properly rehabilitated and maintained to reduce volume of extraneous flows entering the wastewater system.
- Implementation of real time control at key connections to adapt to continually changing wet weather and flow conditions within the system.
- Design of wastewater infrastructure for existing and future peak wet weather conditions to ensure future capacity and avoid potential overflows.
- Restoring natural/grassed areas back to original or enhanced natural conditions.
- Carrying out construction activities outside of key ecological periods to minimize damage to the natural environment and wildlife habitat (e.g., construction outside breeding bird season and high runoff periods in spring).
- The Queensway Trunk Sewer can be used for in-line storage (~ 10,000 m³ storage volume) which can support the management of peak flows within the trunk sewer network as well as the G.E. Booth Wastewater Treatment Plant, avoiding or minimizing overflows and peak energy usage at the plant.
- Decreasing the project's carbon footprint by reducing shipment distances of construction resources and materials where possible.
- Using energy efficient technologies during construction where possible.

8.0 Built and Natural Environment Impacts and Mitigation Measures

Additional studies were completed during Phase 3 of the MCEA process to support the selection of the preferred design concept and determine the potential impacts and required mitigation measures during and after construction.

Full reports are provided in **Appendix Volume 2**.

8.1 Impact Assessment Results

8.1.1 Natural Features and Wildlife Habitat Impact

A Natural Environment Impact Assessment was completed for the shaft locations located on or adjacent to natural features (identified in the Natural Environment Desktop Review). Shaft sites at Etobicoke Creek/Sherway Drive (Shaft 1), Queensway/Etobicoke Creek (Shaft 2) and Queensway/Cooksville Creek (Shaft 8) were identified to be on or adjacent to natural features.

Table 22 summarizes the surveys conducted on the preferred design concept.

Table 22: Natural Environment Surveys

Survey Type	Sites
Field Reconnaissance	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
Bat Habitat Assessment	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
Amphibian Call Count (ACC) Survey	Etobicoke Creek (Site 1)
General Wildlife Survey	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
Breeding Bird Survey (BBS)	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
General Wildlife Survey	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
Ecological Land Classification (ELC)	All sites
Botanical Inventory	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)
Fish Habitat Assessment and Community Sampling	Cooksville Creek (Site 8), Etobicoke Creek (Sites 1 & 2)

The following standard best management practices are recommended during site preparation and construction to minimize any damage to the natural features at Shaft 1, 2, and 8:

- Minimize Project footprint and duration to the extent possible.
- Clearly demarcate and maintain site boundaries to prevent encroachment into adjacent natural features.
- To maintain compliance with the MBCA, avoid removal of vegetation during the bird nesting season (April 1– August 31), unless construction disturbance is preceded by a nesting survey conducted by

a qualified biologist. If any active nests are found during the nesting survey, a buffer will be installed around the nest to protect against disturbance. Vegetation within the protection buffer cannot be removed until the young have fledged the nest.

- Ensure all equipment is cleaned prior to transportation and maintained free of fluid leaks, for use on the sites to avoid the spread or introduction of invasive species, or noxious weeds.
- Prepare a grading plan, drainage plan and sediment and erosion control plan for each site.
- Develop and implement a site-specific spill management plan and always have all components on site in event of a spill.
- Remove and properly dispose of all construction-related debris and excess materials following construction.

Based on the survey results, the following site-specific impacts and mitigation measures were identified:

Habitat of Endangered or Threatened Species

No potential habitat for endangered/threatened species was identified on the surveyed lands. However, since a portion of the deciduous forest on Shaft 1 (west side of Etobicoke Creek) was not surveyed, it is recommended that this portion be surveyed to confirm if any butternut and/or tree-roosting SAR bats (little brown myotis, northern myotis and tri-coloured bats) are identified. If habitat for butternut and/or SAR bats is confirmed on the site, and the habitat is expected to be disturbed by the proposed construction activities, authorization (registration or permitting) under the ESA will be required.

The following mitigation measures are recommended to minimize negative direct and indirect impacts to butternut, little brown myotis, northern myotis, and tri-colored bat on Shaft 1:

- Confirm the absence of butternut and potential bat maternity roosts in the unsurveyed portion of the site (i.e., along the west side of Etobicoke Creek). Acoustic monitoring (i.e., a passive 10-day survey in June) may be required to confirm absence of SAR bats if potential bat maternity roosts are identified.
- If habitat for butternut and/or SAR bats is confirmed on the site, and the habitat is expected to be disturbed by the proposed construction activities, authorization (registration or permitting) under the ESA will be required. Additional mitigation requirements will be determined through the ESA authorization process

Significant Woodlands / Significant Wildlife Habitat

Two woodlands along Etobicoke Creek (Shaft 1 and 2) and one woodland along Cooksville Creek (Site 8) was determined to qualify as significant based on the assessment as well as significant wildlife habitat for bat maternity colonies (Site 1), animal movement corridors (Shaft 1, 2, 8) and land bird migratory stopover areas (Shaft 1, 2, 8).

The following mitigation measures are recommended to minimize negative direct and indirect impacts to significant woodlands and wildlife habitat:

- Avoid compacting the soil in the setback area (which can negatively impact tree roots) by limiting the use of heavy machinery within 5 m of the dripline (where potential for root damage is most likely), particularly during wet periods (e.g., spring) when soil may already be saturated.

- Conduct tree removal outside of the core active season for wildlife including roosting bats and migrating land birds (i.e., outside April – October).
- Rehabilitate, re-stabilize and re-vegetate all disturbed areas upon completion of the construction works to restore the proposed development footprint to its pre-construction condition, where possible.
- Use native, non-invasive plant species for rehabilitation plantings, where possible

Significant Valleylands

Etobicoke Creek and Cooksville Creek have been identified as significant valleyland by the City of Mississauga. Since the area of proposed disturbance is limited, the project is not expected to have any negative impacts on the morphology of the valleyland and therefore no mitigation measures are recommended.

Fish and Fish Habitat

The proposed open cut creek crossing and tunnelling along Etobicoke Creek valley and Cooksville Creek crossing have the potential to impact fish and fish habitat from the use of industrial equipment, vegetation clearing/grading/excavation, placement of material/structure in water, changes in flow, impediments to fish passage and removal of organic debris.

The following mitigation measures are recommended to minimize negative direct and indirect impacts to Etobicoke Creek and negative indirect impacts to Cooksville Creek:

- Conduct all in-water work outside of the MNDMNR restricted warmwater fisheries timing window, which restricts near or in-water work from October 1 to July 15 (i.e., in-water work can occur from July 16 to September 30), subject to confirmation with the MNDMNR. No in-water work is expected to occur in Cooksville Creek.
- Conduct instream work during a period of low flow and avoid wet, windy, and rainy periods.
- Install sediment and erosion controls (e.g., silt fencing) along the extent of the construction disturbance footprint prior to commencement of site preparation and construction activities to prevent sediment from entering the watercourse.
- Manage water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the watercourse (e.g., rainfall, water pumped into or from watercourse).
- Regularly inspect and maintain the sediment and erosion controls.
- Undertake all instream activities in isolation of open or flowing water to avoid introducing sediment into the watercourse.
- Monitor turbidity/suspended sediment concentrations to document potential downstream effects of instream work.
- Isolate the in-water work area. A qualified environmental professional will complete a fish rescue to remove and relocate fish.
- Use appropriately screened water intakes to prevent entrainment or impingement of fish following the *DFO Interim Code of Practice: Fish Intake Screens*.

- Develop a response plan that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on the site.
- Limit machinery fording of the watercourse to a one-time event or use temporary crossing structures and use watercourse bank and bed protection measures following the *DFO Interim Code of Practice: temporary Stream Crossings*.
- Wash, refuel, and service equipment away from the watercourse (i.e., >30 m distance).
- Plan activities near water such that chemicals do not enter the watercourse.
- Minimize depth of excavation, where possible.
- Minimize organic debris (e.g., woody debris) clearing and use proper clearing techniques. Salvage and replace organic debris areas to pre-construction condition.
- Restrict dredging to the isolated section of the watercourse.
- Store and stabilize all stockpiled materials, including but not limited to excavated overburden and topsoil, excess materials, construction debris and containers in a manner that will prevent the release of leaching of substances that may be deleterious to fish from entering any watercourse.
- Revegetate cleared and disturbed areas and armour exposed soils on watercourse banks to pre-construction condition to minimize exposed soils and therefore erosion potential. Revegetate cleared areas with native species that were removed. Rehabilitate and re-contour land to pre-construction condition.
- Return aquatic habitat to pre-construction conditions.
- Remove all material or structures (e.g., isolation dams) placed in the watercourse.

Trees Screening

A tree screening was completed at the Etobicoke Creek shaft locations. Trees in the area were assessed to confirm if any were classified as Species at Risk. No Species at Risk were found on site during the site visit. Considering the nature of the site, the following strategies are recommended during the design and construction of the proposed works:

- Implementation of tree protection zones during construction to provide protection to surrounding tree species that may be impacted.
- Ensure tunneled alignment is a minimum of 2.5 m burial depth to reduce the impact to tree roots and maintain root growth viability.
- Minimize soil disturbance, where possible. Where open cut is required, it is recommended to replace the soil with clean material and/or monitor regularly for invasive species regrowth.
- Removal of unhealthy specimens and invasive species for construction purposes should be replaced with native species functioning in a similar habitat niche.
- Further detailed tree inventory study will need to be undertaken to support detailed design.

The Natural features Reports are provided in **Appendix Volume 2, Appendix A**.

8.1.2 Watercourse Impacts

There are two proposed creek crossings: Etobicoke Creek and Cooksville Creek. Hydraulic and geomorphic hazard assessments were completed at both crossings to determine the minimum burial depth and lateral setback limits required to avoid estimated scour. Topographic surveys were conducted at both locations to confirm the creek bed inverts and bank depths.

The proposed pipe depths along the proposed pipe are fixed due to the key upstream and downstream connecting pipes. If the minimum burial depths could not be met, mitigation measures will be required to reinforce the pipe.

Etobicoke Creek (Shaft 1)

The assessment recommended a 4.5 m burial depth (under 100-year flow conditions) below the creek bed with a setback of 12.0 m from top of bank on the west side and 5.0 from meander belt on the east side (**Figure 59**).

The proposed pipe depth of approximately 0.5 m is below the recommended depth therefore, mitigation measures will be required to reinforce the pipe to support construction. Scour mitigation measures alternatives include bank, stream bed and/or floodplain trench armouring and high flow weirs. These will be further assessed and confirmed during detailed design.

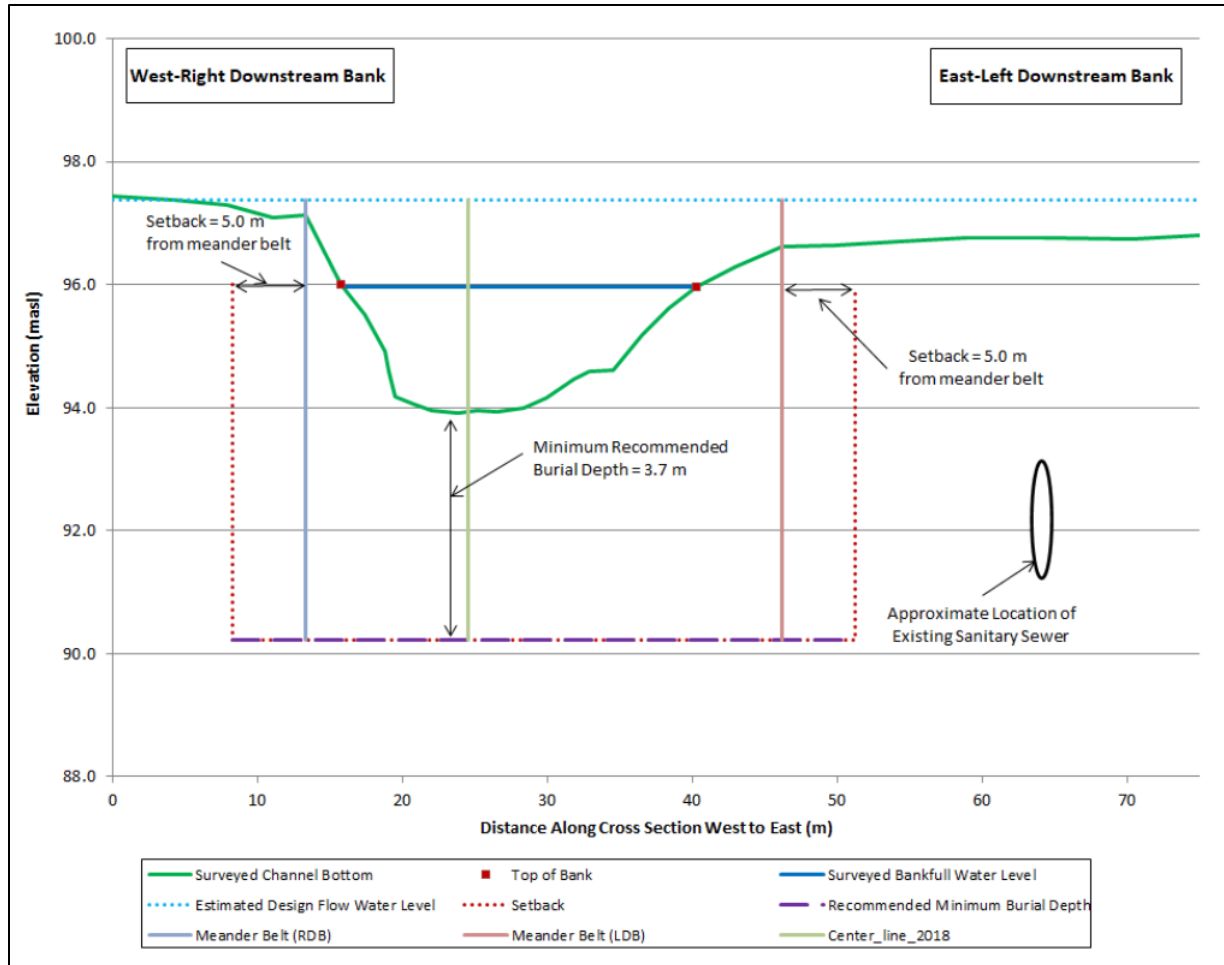


Figure 59: Minimum Pipeline Burial Depth and Setback Recommendations at Proposed Crossing Location

Cooksville Creek (Shaft 8)

The assessment recommended a 2.3 m burial depth (under 100-year flow conditions) below the creek bed with a belt width allowance of approximately 19.2 m (setback of 4.8 m from top of bank on either side of the channel).

The proposed pipe depth is approximately 0.02 to 0.04 m within the required burial depth (**Figure 60**). Mitigation measures may be required to reinforce the pipe to support tunnelled construction. Scour mitigation measure alternatives include:

- placement of rip rap/river stone at the bed and banks of the channel in the immediate vicinity of the crossing location to provide erosion protection and armouring.
- installation of a small rock weir or riffle at a location immediately downstream of the channel crossing to reduce channel velocities and shear stresses in the immediate vicinity of the crossing location.

These mitigation measure alternatives will be further assessed and confirmed during detailed design.

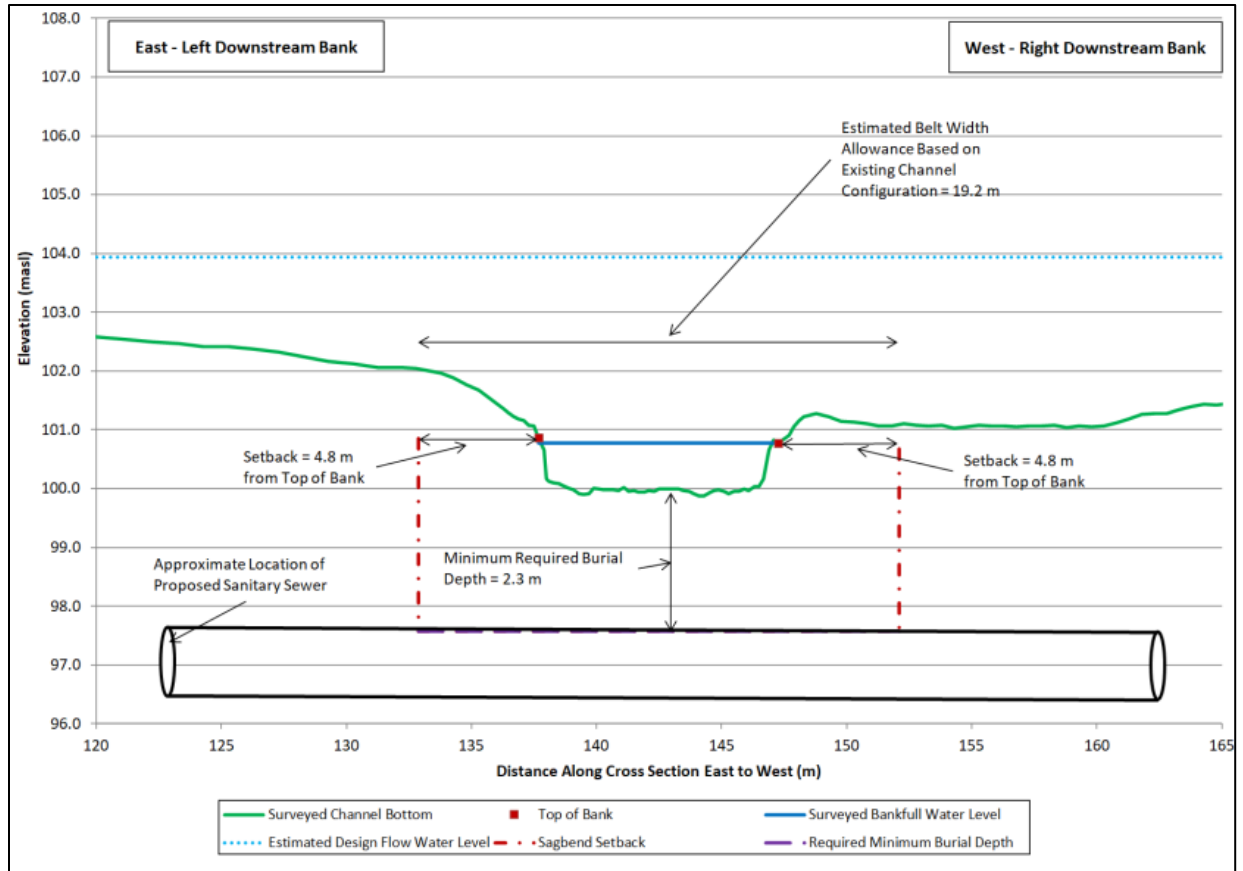


Figure 60: Minimum Pipeline Burial Depth Requirement and Setback Recommendation for the Proposed Crossing Location

The Scour Analysis Reports for Etobicoke Creek and Cooksville Creek are provided in **Appendix Volume 2, Appendix A**.

8.1.3 Groundwater Impacts

An impact assessment was completed to identify potential impacts that groundwater may have on the proposed alignment and shafts and vice versa. The findings include:

- The project is not expected to trigger issues, risk management plans, or “Significant” drinking water threat activities with respect to Source Protection.
- The project is not likely to cause impacts to ecological systems, though it has been recommended that additional protection be provided to the pipe where it crosses Etobicoke Creek.
- The main effect of groundwater on the project is with respect to construction dewatering as it will affect approvals requirements.
- Dewatering rates at a given shaft Site are expected to be greater than 50,000 L/d but less than 400,000 L/d. The construction dewatering approval that is most likely to be required would be registration through the Environmental Activity and Sector Registry (EASR). Exceptions to this would be cases where:

- The bedrock at the shaft location is of exceptionally high transmissivity and watertight shoring is not provided.
- Multiple shafts require construction dewatering simultaneously.
- Management of discharge from dewatering activities will likely require the approval/permission of the operator of the receiving structure (e.g., City of Mississauga for discharge to storm sewers; Region of Peel for discharge to sanitary sewers). Approval from Conservation Authorities may also be required for select sites near watercourses (TRCA for Shafts 1 and 2; CVC for Shaft 8). Treatment of discharge water will likely be required.

Based on the findings above, recommendations include:

- Watertight shoring to be provided, especially where shafts are expected to penetrate aquifers (i.e., Shafts 3, 4, 7, and 12) or where there is elevated potential to intersect contaminated groundwater (i.e., Shafts 4, 11, 12).
- Further study to confirm groundwater quality on-site and to confirm hydraulic properties of subsurface materials (especially if watertight shoring is not to be provided).
- At a minimum, a construction dewatering approval in the form of EASR should be anticipated, though a PTTW may be required if the results of detailed investigation or construction methodology or scheduling requirements indicate otherwise.
- Construction sites should be laid out to ensure that there is capacity to provide sufficient treatment to construction dewatering discharge water before release.

The Hydrogeological Reports are provided in **Appendix Volume 2, Appendix B**.

8.1.4 Archaeological Potential

Stage 2 Archaeological Assessments were undertaken for the preferred shaft sites where the Stage 1 indicated archeological potential. All activities undertaken during the assessment, including the test pit surveys, followed the Ontario Heritage Act and the latest Ministry of Heritage, Sport, Tourism and Culture (MHSTC) Standards and Guidelines for Consultant Archaeologists. The results indicated that all sites had either low or no archaeological potential and therefore, based on the Stage 2 findings, a Stage 3 Archaeological assessment is not required.

Should deeply buried archaeological resources be identified during ground disturbance activity, ground disturbance activities should be immediately halted and the Archaeology Division of the Culture Programs Unit (MHSTCI) and identified Indigenous Communities should be notified.

The Archeological Assessment Reports (Stage 1 and Stage 2) are provided in **Appendix Volume 2, Appendix C**.

8.1.5 Built/Cultural Heritage Impact

A Cultural Heritage Existing Condition and Preliminary Impact Assessment (CHECPIA) was completed on the cultural heritage resources which may be potentially impacted by the preferred shaft sites. Five cultural heritage resources were assessed, and the following mitigation measures are recommended:

- Middle Road Bridge: No direct or indirect impacts that cannot be fully mitigated by:

- Monitoring for vibration during all construction activities
- Erecting temporary fencing
- Avoiding mature trees and limit vegetation clearing. Where unavoidable, incorporate a replacement screening and planting strategy
- Etobicoke Creek Valley: No direct or indirect impacts that cannot be fully mitigated by:
 - Avoiding mature trees and limit vegetation clearing. Where unavoidable, incorporate a replacement screening and planting strategy
- 707 Dundas Street East (Dixie Union Chapel): No potential impacts
- 3065 Cawthra Road (Dixie Presbyterian Church): No potential impacts
- 2240 Dixie Road: No direct or indirect impacts that cannot be fully mitigated by:
 - Monitoring for vibration during all construction activities
 - Avoiding mature trees and limit vegetation clearing. Where unavoidable, incorporate a replacement screening and planting strategy

Based on the findings, no further cultural heritage assessment is required. The Cultural Heritage Reports are provided in **Appendix Volume 2, Appendix D**.

8.1.6 Contamination Impacts

49 potentially contaminating activities (PCAs) were identified within the study area. Each PCA was assessed to determine whether the environmental risk associated with it was sufficient enough to be considered an Area of Potential Environmental Concern (APEC).

Based on the findings, it is recommended that all shaft sites undergo further investigations (either a Phase Two ESA or soil quality sampling for the purposes of Excess Soil Management Plan in accordance with Ontario Regulation 406/19) to:

- Determine with greater certainty whether the potential impacts are present.
- Assess how the impacts may affect construction activities such as dewatering.
- Provide soil quality assessment for the purposes of developing an Excess Soil Management Plan ESA.

After the Phase One ESA report was completed, a historical “Environmental Soil and Groundwater Investigation” report (Coffey, 2010) was recovered from the Region archives. The Coffey Report (2010) describes the results of an intrusive investigation at locations near Shaft 03A (northeast shaft alternative) confirming the presence of contaminants. Due to this discovery, a Phase Two ESA was recommended during the Class EA to support the preferred Shaft 3 selected location and minimize any delays and/or site impacting results during Detailed Design.

The investigation included the advancement of a total of four (4) boreholes. Soil samples were collected from the vicinity of the water table to investigate the potential for impacts from offsite sources, as well as from shallow soils to investigate the quality of shallow soils on-Site. Groundwater samples were collected from all monitoring wells to investigate the potential for impacts from neighbouring upgradient industrial activities. No evidence of PHC impact was identified in the groundwater and no field evidence of impact was detected based on soil screening during drilling at locations of the investigative boreholes. Based on results of laboratory analysis of the select soil samples, exceedances of the Standard were reported at two (2) locations:

- One (1) sample from location BH/MW-1 exceeded the Standard for Sodium Absorption Rate (SAR), which is considered to be potentially related to de-icing activities on nearby roadways.
- One (1) sample from location BH/MW-4 exceeded the Standard for lead.

Based on the nature and occurrence of the elevated levels of lead and SAR in soil, the potential for environmental risk or impact to the subject property is considered to be low. However, these impacts will need to be considered should excess soils from the Site require off-site disposal or re-use as part of future shaft construction at the site. The soil disposal and re-use options will need to be considered based on the receiving site's requirements and in accordance with Ontario Regulation 406/19 for the purpose of excess soil management. Based on consideration of the Site as a future shaft location for the proposed wastewater system upgrades, plans for construction dewatering will need to consider potential containment and treatment options for groundwater or disposal as liquid waste at an appropriate facility depending on the level of dewatering required and the selected disposal alternative.

In consideration of the findings of this Phase Two Environmental Site Assessment, we provide the following recommendations regarding the project:

- The excavation for Shaft 3 be designed and constructed to exclude groundwater seepage into the excavation. This minimizes potential for contaminant migration from the suspected source of contaminants (i.e., the industrial areas to the north) which may occur if intensive dewatering is undertaken.
- Confirmatory groundwater sampling according to the Region of Peel's Sewer Use By-Law Standards be conducted before allowing discharge of groundwater from a construction dewatering system.
- The Region of Peel sanitary sewer be considered the preferred receiver for construction dewatering.
- Assuming a "watertight" excavation methodology, an Environmental Activity and Sector Registry (EASR) registration be obtained for construction dewatering (i.e., for initial purging of water from the excavation) and that the discharge management plan address handling and disposal of impacted groundwater from the excavation.
- The project can proceed with the expectation that the permanent removal of more than 100 m³ of soil from Site 03D will make the project ineligible for exemption from filing notice under O.Reg. 406/19 and therefore will require, at minimum, a Destination Assessment Report as well as the development and implementation of a soil load tracking program.
 - this assumes that this Phase Two Environmental Site Assessment report and the previously completed Phase One Environmental Site Assessment report, both having been completed prior to January 1, 2022, will serve as a Soil Characterization Report and an Assessment of Past Uses report, respectively.

- Any monitoring wells no longer used for two (2) years, or no longer needed to support the proposed shaft construction on the subject property, be decommissioned per the requirements of Ontario Regulation 903 (as amended).

The Phase One and Phase Two ESA Reports are provided in **Appendix Volume 2, Appendix F**.

8.1.7 Geotechnical Considerations

A Geotechnical Desktop Review was completed on the preferred design concept. The soil conditions at the sites are anticipated to consist of varying amounts of fill materials underlain by granular deposits of silt to silty sand to sand, with some interlayers of sand and gravel to gravel, and silty clay based off the limited borehole information available. The granular and cohesive deposits are typically underlain by a glacial till deposit. The till deposit overlies shale bedrock of the Georgian Bay formation along the proposed trunk sewer alignment.

The following table provides the geotechnical challenges, potential impacts from construction and the suggested mitigation measures.

Table 23: Geotechnical Potential Issues and Mitigation Measures

Geotechnical Challenges	Description of Potential Challenge	Mitigation Measures
In Situ Stresses and Swelling of Shale Bedrock	Shale bedrock may experience swelling when stresses are relieved due to excavation or tunnelling. The swelling and in situ stresses in the shale bedrock may impact the temporary and permanent tunnel and shaft liner design.	The Tunnel Designer is to consider in situ stresses and the potential for swelling in the liner design.
Presence of Cobbles and Boulders	The presence of cobbles and/or boulders should be considered in machine selection and adopted method for tunnelling through overburden and excavations at shaft locations. It should be assumed that cobbles/ boulders are comprised of a variety of different lithology's including native bedrock but also glacial erratics from the Canadian Shield with a wide range in strengths.	The Contract Documents should include provisions to manage the excavation and disposal of cobbles and boulders.

Geotechnical Challenges	Description of Potential Challenge	Mitigation Measures
Naturally occurring BTEX and Subsurface Gases	Naturally occurring benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) and other naturally occurring subsurface gases (methane, hydrogen sulphide and carbon dioxide) have been encountered within shale bedrock and/or glacially derived till deposits during recent tunnelling projects in the Greater Toronto Area. Subsurface gases can impact tunnel boring machine selection, ventilation design, tunnel spoil management and disposal options.	Tunnel spoil disposal options and worker health and safety requirements should be developed during the detailed design and incorporated into the Contract Documents.
Water-Bearing Granular Zones/ Groundwater Control	The tunnel is anticipated to be constructed below the groundwater table. Tunnelling and excavations for the construction of all shafts are expected to extend below the groundwater level. Water-bearing granular soil zones are anticipated to be present within the overburden. In addition, the proposed construction shafts and the sewer alignment will be excavated near the Etobicoke Creek and below the Etobicoke Creek level.	Detailed design of the shafts and tunnel should incorporate groundwater control methods to minimize the impact of dewatering on the watercourses, surrounding infrastructure and sensitive features. The design and construction should take into account the requirements for groundwater control (dewatering and unwatering) and the potential need for diverting the Etobicoke Creek stream during the construction. Consideration should be given to studying the seasonal flow of the creek to construct the shafts and install the pipe in the low flow season.
Mixed-Face and Overburden Tunnelling	The tunnel will encounter overburden and mixed-face conditions as such hybrid / dual mode tunnel boring machine (rock TBM with slurry or EPB capability) should be utilized.	Geotechnical Baseline Report to define the overburden/bedrock interface and alert the contractor about the risks associated with the mixed face conditions and tunnelling through soils.

Geotechnical Challenges	Description of Potential Challenge	Mitigation Measures
Limited Soil Cover Thickness (Erosion and Scour Protection)	Available borehole records indicate that the overburden soils at/near the Etobicoke Creek have a total thickness of up to about 3 m and in cases as low as 1 m. The existing sewer has a soil cover of about 2 m. The overburden soils are primarily non-cohesive and as such prone to erosion.	It is understood that a fluvial geomorphology study was carried out to provide further information about the thickness of overburden, the condition of the banks and any exposures of the existing pipe and associated shafts. The design of the new sewer and connection points should ensure that the pipes will have adequate cover against erosion and scours.
Construction of the Sewer across the Etobicoke Creek	Assuming a tunnel diameter of about 2 m, and considering the invert elevations of 91 m to connect to the existing shaft, the pipe is expected to have a cover of less than 2 m.	The installation by means of tunnelling will require additional intervention measures (such as pressurized face tunnel boring machine, grouting etc.) to increase the stability of the excavation and reduce the risk of frac-out. The additional intervention measures should be reviewed by the conservation authorities to ensure they do not pose risks to the Creek and the natural environment. The open cut excavation will require a cofferdam to divert the creek to construct the pipe in conditions suitable to implement the work and to provide for required inspection of the founding soils (or bedrock), placing pipe bedding, etc.

Further borehole investigation is required to confirm the subsurface conditions in the vicinity of the proposed sewer alignment, and to minimize the risk of unforeseen ground conditions during construction (e.g., bedrock valleys etc.). Based on the limited borehole information available, the majority of the tunnel will be advanced through bedrock, and as such, further investigation is required to confirm the bedrock cover above the tunnel invert is sufficient and to define the potential for mixed face (soil and rock) conditions. Where there is potential for the tunnel to be advanced through overburden or mixed face conditions (i.e., near Etobicoke River or Burnhamthorpe Road East and Central Parkway East), further investigation is required to assess the tunneling suitability through the overburden.

Additional geotechnical investigations will be required during detailed design including:

- Confirming subsurface conditions encountered in previous geotechnical investigations and well records, filling in the gaps in the stratigraphic profile where subsurface information is not known, and minimizing the risk of unforeseen ground conditions during construction.
- Advancing boreholes at regularly spaced intervals along the proposed tunnel alignments (e.g., 75 m, 100 m or 150 m spacing) and at every proposed shaft location.
- Identifying presence of fill materials at shaft locations and along open cut portions of the sanitary sewer.
- Delineating bedrock surface and the thickness highly weathered rock by means of additional Standard Penetration Test (SPT) and/or PQ Soil Core) boreholes at all shaft locations and along the Etobicoke Creek alignment.
- Identifying thickness / elevation of highly weathered bedrock in conjunction with borings and geophysical survey.
- Confirming strength of overburden and bedrock within the tunnel horizon.
- Collecting current and representative groundwater levels along the alignment and at shaft locations.
- Identifying potential elevated groundwater levels or pressurized aquifers along the Project alignment (i.e., near Etobicoke Creek).
- Testing and assessing environmental quality of soil and groundwater for handling, re-use and disposal.
- Targeting water bearing soil zones to assess the need for groundwater control and support of excavation options.
- Providing soil and bedrock parameters of the existing subsurface materials for design through in-situ (e.g., pressure meter) and laboratory testing (e.g., swell) and analysis.

The Geotechnical Report is provided in **Appendix Volume 2, Appendix G**.

8.1.8 Traffic Impacts

Based on a review of the proposed shaft locations, construction at two shaft locations will affect traffic operations at their respective intersections:

- Queensway East and Cawthra Road (Shaft 4)
- Queensway East and Hurontario Street (Shaft 9)

Construction at four shaft locations will also affect pedestrian mobility at their respective intersections:

- Queensway East and Cawthra Road (Shaft 4)
- Queensway East and Tedlo Street (Shaft 5)
- Queensway East and Hurontario Street (Shaft 9)
- Burnhamthorpe Road East and Central Parkway (Shaft 12)

The existing traffic operations within the study area are mainly operating at overall acceptable levels of service during peak hours.

- Several movements are operating with poor levels of service and high volume to capacity (v/c) ratios.
- Several movements are currently exceeding available turning lane storage during each respective peak hour.

Without any traffic detour re-assignment during construction, the future traffic operations (2025) will operate at overall poor levels of service and high v/c ratios (> 0.90) during morning and evening peak hours.

- Multiple movements will operate at poor levels of service and with high v/c ratios (> 0.90) during morning and evening peak hours.
- Several movements will exceed available queue length storage during each respective peak hour.

Significant traffic re-assignment (>50%) will be required to provide better levels of service and less congestion at the study area intersections; however, this level of reassignment is likely not achievable due to limited detour routing options. In places where sidewalks or trails are closed, alternative routing options are typically provided; however, they will increase pedestrian walking routes and times.

Based on the findings of this study, it is recommended that for traffic operations:

- Refinement of selected shaft compound locations to minimize road encroachment and lane closures at the study area intersections, where possible.
- Consideration is given to staging works such that both intersections are not under construction at the same time.
- If construction conditions are still in place, intersection operations at Queensway East and Hurontario Street should be observed and recorded to provide a baseline for the 2025 operations.

For pedestrian mobility:

- Provide advance notice of closures on all affected approaches or intersection legs, especially in long blocks where crossing opportunity are widely spaced.
- Provide signage at intersections indicating sidewalk or path is closed and that point to alternate/detour routing.
- Where possible, move or relocate pedestrian facilities to outside work areas, specifically near Tedlo Street.

Traffic mitigation measures and detours during construction will be further assessed during Detailed Design.

The Traffic Impacts Assessment Report is provided in **Appendix Volume 2, Appendix H**.

8.2 Impact Mitigation and Monitoring Measures Overview

Several assessments were completed on the preferred design concept to better understand the potential impacts (**Section 7.2**). The following section provides a summary of the impacts and the associated mitigation and monitoring measures required during construction. This includes mitigation of impacts on:

- Natural Features and Wildlife Habitat (Terrestrial and Aquatic)

- Groundwater
- Watercourse
- Contamination
- Soil / Bedrock
- Archaeology
- Cultural/Built Heritage Resources
- Traffic

Table 24 provides a detailed summary of all of the anticipated impacts and the mitigation measures to be undertaken by the Region of Peel during detailed design and construction.

Table 24: Impacts and Mitigations Measures

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
Sewer and Shafts (All)	Archaeological Potential	<ul style="list-style-type: none"> Based on the Stage 1 & 2 Archaeological Assessments, all shaft locations are free of archaeological concern. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> Should deeply buried archaeological resources be identified during ground disturbance activity, ground disturbance activities should be immediately halted and the Archaeology Division of the Culture Programs Unit of the MHSTCI notified.
	Hydrogeology	<ul style="list-style-type: none"> Construction dewatering may be required at all sites Intake Protection Zones, Event-Based Areas, Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers have been identified. No “significant” drinking water threat activities have been identified that would require the preparation of a Risk Management Plan. 	<ul style="list-style-type: none"> Further hydrogeological field investigations are required during detailed design to confirm groundwater quality on site and confirm hydraulic properties of subsurface materials. 	<ul style="list-style-type: none"> Watertight shoring to the full depth of excavation to minimize dewatering requirements. Minimize length of open cut excavation to minimize potential dewatering requirements. Shaft site to consider dewatering activities and appropriate discharge treatment. Construction sites should be laid out to ensure that there is capacity to provide sufficient treatment to construction dewatering discharge water before release. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design
	Soil / Bedrock	<ul style="list-style-type: none"> Geotechnical challenges were identified in the desktop review. 	<ul style="list-style-type: none"> Further geotechnical field investigations are required during detailed design. 	<ul style="list-style-type: none"> Mitigation measures to be identified during Detailed Design 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design
	Natural Features	<ul style="list-style-type: none"> Potential impacts to natural features at shaft sites and open cut construction of sewer. 	<ul style="list-style-type: none"> Further natural feature field investigations are required during detailed design. Detailed tree inventory required at all shaft locations with trees. 	<ul style="list-style-type: none"> Minimize project footprint and duration to the extent possible. Clearly demarcate and maintain site boundaries to prevent encroachment into adjacent natural features. Ensure all equipment is cleaned prior to transportation and maintained free of fluid leaks, for use on the sites to avoid the spread or introduction of invasive species, or noxious weeds. Remove and properly dispose of all construction-related debris and excess materials following construction. 	<ul style="list-style-type: none"> To maintain compliance with the MBCA, avoid removal of vegetation during the bird nesting season (April 1 – August 31), unless construction disturbance is preceded by a nesting survey conducted by a qualified biologist. If any active nests are found during the nesting survey, a buffer will be installed around the nest to protect against disturbance. Vegetation within the protection buffer cannot be removed until the young have fledged the nest. Prepare a grading plan, drainage plan and sediment and erosion control plan for each site. Develop and implement a site-specific spill management plan and always

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
					<ul style="list-style-type: none"> have all components on site in event of a spill. Additional monitoring requirements to be identified during Detailed Design
Shaft 1: Etobicoke Creek and Sherway Drive	Terrestrial Environment	<ul style="list-style-type: none"> Negative direct and indirect impacts on the deciduous forests that qualify as significant woodlands along Etobicoke Creek and significant wildlife habitat for bat maternity colonies, animal movement corridors and land bird migratory stopover areas. 	<ul style="list-style-type: none"> Survey to be completed on unsurveyed portion of Site 1 (west side) during detailed design to confirm absence of butternut and/or SAR bats habitat Tree inventory to be completed during detailed design Further natural feature field investigations are required during detailed design 	<ul style="list-style-type: none"> Avoid compacting the soil in the setback area (which can negatively impact tree roots) by limiting the use of heavy machinery within 5 m of the dripline (where potential for root damage is most likely), particularly during wet periods (e.g., spring) when soil may already be saturated. Conduct tree removal outside of the core active season for wildlife including roosting bats and migrating land birds (i.e., outside April – October). Rehabilitate, re-stabilize, and re-vegetate all disturbed areas upon completion of the construction works to restore the proposed development footprint to its pre-construction condition, where possible. Use native, non-invasive plant species for rehabilitation plantings, where possible 	<ul style="list-style-type: none"> If habitat for butternut and/or SAR bats is confirmed on site and the habitat is expected to be disturbed by proposed construction activities, authorization under the ESA and associated mitigation measures will be required.
	Aquatic Environment	<ul style="list-style-type: none"> Negative direct and indirect impacts to fish and fish habitat at Etobicoke Creek 	<ul style="list-style-type: none"> Further natural feature field investigations are required during detailed design 	<ul style="list-style-type: none"> Conduct all in-water work outside of the MNDMNR restricted warmwater fisheries timing window, which restricts near or in-water work from October 1 to July 15 (i.e., in-water work can occur from July 16 to September 30), subject to confirmation with the MNDMNR. Conduct instream work during a period of low flow and avoid wet, windy, and rainy periods. Install sediment and erosion controls (e.g., silt fencing) along the extent of the construction disturbance footprint prior to commencement of site preparation and construction activities to prevent sediment from entering the watercourse. Manage water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering 	<ul style="list-style-type: none"> Regularly inspect and maintain the sediment and erosion controls. Monitor turbidity/suspended sediment concentrations to document potential downstream effects of instream work. Develop a response plan that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on the site

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
				<p>the watercourse (e.g., rainfall, water pumped into or from watercourse).</p> <ul style="list-style-type: none"> • Undertake all instream activities in isolation of open or flowing water to avoid introducing sediment into the watercourse. • Isolate the in-water work area. A qualified environmental professional will complete a fish rescue to remove and relocate fish. • Use appropriately screened water intakes to prevent entrainment or impingement of fish following the DFO Interim Code of Practice: Fish Intake Screens. • Limit machinery fording of the watercourse to a one-time event or use temporary crossing structures and use watercourse bank and bed protection measures following the DFO Interim Code of Practice: temporary Stream Crossings. • Wash, refuel, and service equipment away from the watercourse (i.e., >30 m distance). • Plan activities near water such that chemicals do not enter the watercourse. • Minimize depth of excavation, where possible. • Minimize organic debris (e.g., woody debris) clearing and use proper clearing techniques. Salvage and replace organic debris areas to pre-construction condition. • Restrict dredging to the isolated section of the watercourse. • Store and stabilize all stockpiled materials, including but not limited to excavated overburden and topsoil, excess materials, construction debris and containers in a manner that will prevent the release of leaching of substances that may be deleterious to fish from entering any watercourse. 	

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	Watercourse (Etobicoke Creek)	<ul style="list-style-type: none"> Etobicoke Creek crossing with shallow cover (open cut) 	<ul style="list-style-type: none"> Additional assessment required during Detailed Design to determine best mitigation measures to minimize scour during and after construction. 	<ul style="list-style-type: none"> Revegetate cleared and disturbed areas and armour exposed soils on watercourse banks to pre-construction condition to minimize exposed soils and therefore erosion potential. Revegetate cleared areas with native species that were removed. Rehabilitate and re-contour land to pre-construction condition. Return aquatic habitat to pre-construction conditions. Remove all material or structures (e.g., isolation dams) placed in the watercourse. Open cut construction to cross creek Bank armouring to limit erosion threat by preventing channel migration into the area overtop of proposed sewer Stream bed armouring to reduce risk of scour and potential damage to the sewer by including erosion protection above pipe Floodplain trench armouring to protect sewer in the event the Creek were to shift laterally and expose the sewer to potential scour and erosion High Flow Weirs to allow full conveyance during bankfull flow and small events, but partially constrict flows during high flow events Mitigation measure to be identified during Detailed Design 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Cultural & Built Heritage	<ul style="list-style-type: none"> Direct vibration impacts the bridge during construction of the shaft would be moderate and site specific, potentially resulting in permanent damage to the bridge's heritage attributes. Direct vibration impacts as a result of trench excavation on the bridge are considered to be more limited and reflective of the difference in elevation between the Bridge and the riverbed. Any potential impacts from the trench excavation would be minor and site specific (without mitigation). 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Erect temporary fencing to ensure all excavation, installation and associated vehicle traffic will not accidentally impact the bridge. Avoid mature trees and limit vegetation clearing to reduce predicted impacts on the visual context setting and heritage attributes of the bridge. Where vegetation removal is unavoidable, incorporate a strategy for replacement screening into detailed design Avoid mature trees and limit vegetation clearing to reduce predicted impacts on the visual context setting and the 	<ul style="list-style-type: none"> Monitor for vibration during all construction related activities to protect bridge

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
		<ul style="list-style-type: none"> Direct alteration to the watercourse itself is predicted during trench excavation, however, since the trenched location is not directly visible from the bridge (and vice versa) and views between are also partly visually obscured by vegetation, impacts to the visual setting of the Creek and of the Bridge as a result of trench construction are minor, indirect and site specific (without mitigation). Direct impacts to the cultural landscape of Etobicoke Creek as a result of the proposed open cut excavation through the watercourse are limited to a very small proportion of a much larger cultural heritage landscape. Consequently, the impacts to the heritage attributes of the Creek are considered to be minor, site specific, temporary, and reversible. Potential impacts can be fully mitigated 		<p>heritage attributes of the creek. Where vegetation removal is unavoidable, incorporate a strategy for replacement screening into detailed design. Where relocation of the recreational trail is proposed in the vicinity, consider appropriate alternatives to divert visitors away from the construction zone and maintain overall natural and cultural experience.</p>	
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) was identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Impacts to multi-use trail. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of multi-use trail during construction will be indicated on detailed design drawings. Potential opportunity to improve permanent access to multi-use trails through this project 	<ul style="list-style-type: none"> No monitoring measures required.
	Geotechnical	<ul style="list-style-type: none"> Impacts to valley slopes. 	<ul style="list-style-type: none"> Where the valley slopes exist, the slope stability and erosion hazard assessment are required to ensure that the proposed work is not undermined by erosion hazard in long-term or does not destabilize the valleys. The position of the Long-Term Stable Top of Slope needs to be 	<ul style="list-style-type: none"> Geotechnical investigations required during Detailed Design to identify concerns and mitigation measures. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
			delineated with a minimum safety factor of 1.50 to define the setback required from the existing top of bank/slope.		
Shaft 2: Queensway and Etobicoke Creek	Natural Environment	<ul style="list-style-type: none"> Potential impacts to significant wildlife habitat for animal movement corridors and land bird migratory stopover areas. 	<ul style="list-style-type: none"> Further natural feature field investigations are required during detailed design 	<ul style="list-style-type: none"> Avoid compacting the soil in the setback area (which can negatively impact tree roots) by limiting the use of heavy machinery within 5 m of the dripline (where potential for root damage is most likely), particularly during wet periods (e.g., spring) when soil may already be saturated. Conduct tree removal outside of the core active season for wildlife including roosting bats and migrating land birds (i.e., outside April – October). Rehabilitate, re-stabilize and re-vegetate all disturbed areas upon completion of the construction works to restore the proposed development footprint to its pre-construction condition, where possible. Use native, non-invasive plant species for rehabilitation plantings, where possible. Additional mitigation measures to be identified during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No potential impacts to the heritage attributes of Etobicoke Creek. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) was identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design. 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
Shaft 3: Queensway and Dixie	Cultural & Built Heritage	<ul style="list-style-type: none"> Potential indirect vibration impacts to the heritage property 2240 Dixie Road (within 100 m from property). Potential indirect impacts to the visual setting of the heritage property. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Avoid mature trees and limit vegetable cleaning to reduce predicted impacts on visual alternation Where vegetation removal is unavoidable, incorporate a strategy for replacement screening into detailed design. 	<ul style="list-style-type: none"> Monitor for vibration during all construction related activities to protect the heritage attributes of the 2240 Dixie Road
	Environmental Risk	<ul style="list-style-type: none"> Phase Two ESA investigations identified contaminants in two samples. The potential for environmental risk or impact to the subject property is considered to be low. 	<ul style="list-style-type: none"> An Environmental Activity and Sector Registry (EASR) will be required, including a Discharge Management Plan that addresses the handling and disposal of the impacted groundwater. If more than 100m³ of soil is expected to be removed, a Destination Assessment Report and the development and implementation of a Soil Load Tracking Program will be required during Detailed Design. 	<ul style="list-style-type: none"> Plans for construction dewatering will need to consider potential containment and treatment options for groundwater or disposal as liquid waste at an appropriate facility depending on the level of dewatering required and the selected disposal alternative. 	<ul style="list-style-type: none"> The soil disposal and re-use options will need to be considered based on the receiving site's requirements and in accordance with Ontario Regulation 406/19 for the purpose of excess soil management.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
Shaft 4: Queensway and Cawthra	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> Two Potential Environmental Concern (APEC) were identified Potential Chemicals of Concern that may be related to these APECs include polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons F1 (PHC), benzene, toluene, ethylbenzene and xylenes (BTEX) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify any concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Potential lane closure (right turn lane). Intersection will operate at poor levels of service with high levels of congestion during peak hours. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design. 	<ul style="list-style-type: none"> Mitigation measures to be identified during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
Community	<ul style="list-style-type: none"> Potential impact to nearby bus stop. Impacts to sidewalk 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> Potential relocation of bus stop during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required. 	

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
				<ul style="list-style-type: none"> Relocation of sidewalk during construction will be indicated on detailed design drawings. 	
Shaft 5: Queensway and Tedlo	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) were identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals in soil. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Impacts to multi-use trail. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of multi-use trail during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 6: Queensway and Hensall	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> Two Potential Environmental Concern (APEC) were identified. Potential Chemicals of Concern that may be related to these APECs include polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons F1-F4 (PHC), benzene, toluene, ethylbenzene and xylenes (BTEX) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	Community	<ul style="list-style-type: none"> Impacts to multi-use trail. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of multi-use trail during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 7: Queensway and Cliff	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) was identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals in soil. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Impacts to multi-use trail. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of multi-use trail during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 8: Queensway and Cooksville Creek	Terrestrial Environment	<ul style="list-style-type: none"> Negative direct and indirect impacts on the deciduous forests that qualify as significant woodlands along Cooksville Creek and significant wildlife habitat for animal movement corridors and land bird migratory stopover areas. 	<ul style="list-style-type: none"> Further natural feature field investigations are required during detailed design 	<ul style="list-style-type: none"> Avoid compacting the soil in the setback area (which can negatively impact tree roots) by limiting the use of heavy machinery within 5 m of the dripline (where potential for root damage is most likely), particularly during wet periods (e.g., spring) when soil may already be saturated. Conduct tree removal outside of the core active season for wildlife including roosting bats and migrating land birds (i.e., outside April – October). Rehabilitate, re-stabilize, and re-vegetate all disturbed areas upon completion of the construction works to restore the proposed development footprint to its pre-construction condition, where possible. Use native, non-invasive plant species for rehabilitation plantings, where possible 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	<p>Aquatic Environment</p>	<ul style="list-style-type: none"> Negative indirect impacts to fish and fish habitat at Cooksville Creek 	<ul style="list-style-type: none"> Further natural feature field investigations are required during detailed design 	<ul style="list-style-type: none"> Install sediment and erosion controls (e.g., silt fencing) along the extent of the construction disturbance footprint prior to commencement of site preparation and construction activities to prevent sediment from entering the watercourse. Manage water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the watercourse (e.g., rainfall, water pumped into or from watercourse). Use appropriately screened water intakes to prevent entrainment or impingement of fish following the DFO Interim Code of Practice: Fish Intake Screens (DFO 2021b). Wash, refuel, and service equipment away from the watercourse (i.e., >30 m distance). Plan activities near water such that chemicals do not enter the watercourse. Minimize depth of excavation, where possible. Minimize organic debris (e.g., woody debris) clearing and use proper clearing techniques. Salvage and replace organic debris areas to pre-construction condition. Store and stabilize all stockpiled materials, including but not limited to excavated overburden and topsoil, excess materials, construction debris and containers in a manner that will prevent the release of leaching of substances that may be deleterious to fish from entering any watercourse. Revegetate cleared and disturbed areas and armour exposed soils on watercourse banks to pre-construction condition to minimize exposed soils and therefore erosion potential. Revegetate cleared areas with native species that were removed. 	<ul style="list-style-type: none"> Regularly inspect and maintain the sediment and erosion controls. Develop a response plan that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on the site. Additional monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	Watercourse (Cooksville Creek)	<ul style="list-style-type: none"> Shaft site located adjacent to Cooksville Creek and within the floodplain Cooksville Creek crossing with shallow cover (trenchless) 	<ul style="list-style-type: none"> Detailed survey at Cooksville Creek Pebble count at Cooksville Creek Detailed scour depth calculation (to confirm Scour Hazard Assessment findings) 	<ul style="list-style-type: none"> Rehabilitate and re-contour land to pre-construction condition. Additional mitigation measures to be identified during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) was identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals in soil. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Impacts to multi-use trail and pedestrian bridge. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of multi-use trail during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 9: Queensway and Hurontario	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> Two Potential Environmental Concern (APEC) were identified. Potential Chemicals of Concern that may be related to these APECs include polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOC) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Potential lane closure (right turn lane). Intersection will operate at poor levels of service with high levels of congestion during peak hours. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Mitigation measures to be identified during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	Community	<ul style="list-style-type: none"> Potential impact to nearby bus stop. Impact to sidewalk. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> Potential relocation of bus stop during construction will be indicated on detailed design drawings. Relocation of sidewalk during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 10: Cawthra and Dundas	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No potential impacts to identified designated heritage property Dixie Union Chapel (707 Dundas Street East) and Dixie Presbyterian Church (3065 Cawthra Road). 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> Two Potential Environmental Concern (APEC) were identified. Potential Chemicals of Concern that may be related to these APECs include polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons F1-F4 (PHC), benzene, toluene, ethylbenzene and xylenes (BTEX), volatile organic compounds (VOC) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
Shaft 11: Burnhamthorpe and Cawthra	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> Two Potential Environmental Concern (APEC) were identified. Potential Chemicals of Concern that may be related to these APECs include polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons F1-F4 (PHC), benzene, toluene, ethylbenzene and xylenes (BTEX), volatile organic compounds (VOC) and metals. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.

Shaft	Impact	Potential Impacts	Additional Studies during Detailed Design	Mitigation Measures / Net Effects	Monitoring Requirements
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. Intersection will operate at overall acceptable levels of service and congestion. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Mitigation measures to be identified during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Potential impact to nearby bus stop. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> Relocation of bus stop during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.
Shaft 12: Burnhamthorpe and Central Parkway	Natural Environment	<ul style="list-style-type: none"> No natural features identified. 	<ul style="list-style-type: none"> No further assessment is required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Cultural & Built Heritage	<ul style="list-style-type: none"> No adjacent cultural heritage properties identified. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> No mitigation measures required. 	<ul style="list-style-type: none"> No monitoring measures required.
	Environmental Risk	<ul style="list-style-type: none"> One Potential Environmental Concern (APEC) was identified. Potential Chemicals of Concern that may be related to this APEC include polycyclic aromatic hydrocarbons (PAHs) and metals in soil. 	<ul style="list-style-type: none"> Phase 2 ESA required during Detailed Design 	<ul style="list-style-type: none"> Phase 2 ESA is required during Detailed Design to identify concerns and mitigation measures 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Traffic Management	<ul style="list-style-type: none"> Shaft located off road; minimized impacts to traffic. 	<ul style="list-style-type: none"> Traffic Management Plan will be completed during Detailed Design 	<ul style="list-style-type: none"> Traffic mitigation measures and detours during construction will be further assessed during Detailed Design. 	<ul style="list-style-type: none"> Monitoring requirements to be identified during Detailed Design.
	Community	<ul style="list-style-type: none"> Potential impact to nearby bus stop. Impact to sidewalk and multi-use trail. 	<ul style="list-style-type: none"> No further assessment required. 	<ul style="list-style-type: none"> Relocation of bus stop during construction will be indicated on detailed design drawings. 	<ul style="list-style-type: none"> No monitoring measures required.

9.0 Design Commitments

The Region is committed to undertake the following studies and next steps during Detailed Design and prior to construction.

9.1 Overview of Future Studies

The following table provides an overview of the future studies required at each shaft site during Detailed Design.

Table 25: Overview of Future Studies During Detailed Design

Shaft Site	Study Commitments
Shaft 1 Etobicoke Creek and Sherway Drive	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Scour mitigation measures assessment (Etobicoke Creek) • Natural environment investigations • Traffic management plan
Shaft 2 Queensway and Etobicoke Creek	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 3 Queensway and Dixie	<ul style="list-style-type: none"> • Geotechnical field investigations • Hydrogeological field investigations • Settlement analysis (Hydro One transmission towers) • Traffic management plan
Shaft 4 Queensway and Cawthra	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 5 Queensway and Tedlo	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 6 Queensway and Hensall	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 7 Queensway and Cliff	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 8	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations

Shaft Site	Study Commitments
Queensway and Cooksville Creek	<ul style="list-style-type: none"> • Scour mitigation measures assessment (Cooksville Creek) • Detailed survey at Cooksville Creek • Pebble count at Cooksville Creek • Detailed scour depth calculation (to confirm Scour Hazard Assessment findings) • Natural environment investigations • Traffic management plan
Shaft 9 Queensway and Hurontario	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 10 Cawthra and Dundas	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 11 Burnhamthorpe and Cawthra	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan
Shaft 12 Burnhamthorpe and Central Parkway	<ul style="list-style-type: none"> • Phase 2 ESA • Geotechnical field investigations • Hydrogeological field investigations • Traffic management plan

Following approval of this Class EA study, the commitments noted in the following sections will be undertaken during Detailed Design as follows:

9.2 Natural Environment

- Region to consult with TRCA, CVC and City of Mississauga throughout detailed design stage to finalize location of manholes, ensure supporting detailed investigations are completed to support determination of mitigation measures, monitoring requirements, permitting, and approvals and ensure engineering drawings show all necessary details such as:
 - Regional floodlines
 - Appropriate setbacks for permanent infrastructure
 - Stabilization works
- Region to develop a Response Plan that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on the site.
- Region to develop a Contingency Plan that will be implemented immediately in the event of a tunnel collapse during the tunnel boring beneath Cooksville Creek.
- Region to consult with the MECP – Species At Risk Branch during detailed design to confirm potential Species at Risk (SAR) impacts, permitting requirements, and construction timing window for works in and near water (Etobicoke Creek and Cooksville Creek), prior to construction.

- Existing grading elevations must be maintained at the completion of works and must be confirmed during Detailed Design.
- Erosion prevention and sediment control (ESC) measures shall be implemented to mitigate erosion and sediment processes during construction. Region to provide comprehensive ESC plans to TRCA and CVC indicating how runoff from the different sites will be managed. Details, locations and supporting calculations for each ESC measure should be included in the plans. The ESC plans will be consistent with the *Erosion and Sediment Control Guideline for Urban Construction*⁸.
- For work within CVC permit regulation limits, Region to provide erosion and sediment control plans with control measures identified as necessary in accordance with *CVC's Standard Notes for Drawings Submitted for CVC Review*⁹.
- Region to forward detailed design drawings and site investigation reports to TRCA and CVC. Restoration plans will need to be completed based on TRCA and CVC requirements, including compensation for loss of habitat.
- Region to provide CVC and TRCA Construction Staging Plan for work carried out within the floodplain.
- Information on species specific SAR identification, impacts and mitigation during construction will be prepared during detailed design and used to support permitting.
- Further coordination with and approval from the Ministry of Environment, Conservation and Parks (MECP) will be required prior to construction, in particular, to discuss Permit to take Water (PTTW) and Environmental Compliance Approval (ECA) requirements.
- Region to complete natural environment investigations (vegetation, significant wildlife habitat and Species At Risk assessments) on unsurveyed lands on west side of Shaft 1 at Etobicoke Creek during the Detailed Design stage of the project.
- Region to complete a Tree Preservation and Replacement and Comprehensive Offsetting Plan according to *CVC's Ecosystem Offsetting Guidelines*¹⁰ and *TRCA's Guideline for Determining Ecosystem Compensation*¹¹. The mitigation measures will be further refined, as necessary. Region to consult with TRCA, CVC and City of Mississauga.
- Region to complete a Tree Inventory at each shaft location with trees within shaft compound area during the Detailed Design stage to gather detailed tree information to support tree removal and site restoration works.
- Region to limit, if possible, the extents of impacts from the proposed works within the Sherway Trail Community Plantings and Community Restoration Plantings area near Shaft 1 (East side). If impacts are unavoidable, the Region to work with TRCA to determine compensation for impacts to TRCA lands.

⁸ Sustainable Technologies, 'Erosion and Sediment Control Guide for Urban Construction', 2019, [Microsoft Word - ESC Guide for Urban Construction.docx \(sustainabletechnologies.ca\)](#)

⁹ Credit Valley Conservation, 'Standard Notes for Drawings Submitted for CVC Review, 2017, [Standard-Notes-for-Drawings-Submitted-for-CVC-Review.pdf](#)

¹⁰ Credit Valley Conservation, 'Ecosystem Offsetting Guidelines, 2020, [rpt_CVCEcoOffset_FINAL_20200313.pdf](#)

¹¹ Toronto and Region Conservation Authority, 'Guideline for Determining Ecosystem Compensation, 2018, [Ecosystem Compensation Protocol](#)

- Region to consult with TRCA, CVC and City of Mississauga during detailed design to confirm detailed design and mitigation measures for creek crossings at Etobicoke Creek and Cooksville Creek.
- Region to complete a detailed survey, pebble count and confirm scour depths (calculated through the Class EA) for the reach of Cooksville Creek during detailed design in accordance with CVC's *Fluvial Geomorphic Guidelines: Factsheet V Scour Analysis* (CVC, 2019).
- Region to confirm scour mitigation/treatment measures with CVC during Detailed Design. Through consultation with CVC, they recommended the following to be considered:
 - creek bed and banks be fortified with rip rap or river stone within the area of the crossing.
 - all treatments to consider fish passage and replicate natural habitat features to the extent possible in terms of stone sizing, stone placement, and shape.
 - flow appropriate round stone from a reputable quarry is recommended.
 - bioengineering methodologies and technologies are recommended for bank treatment to maximize the incorporation of native vegetation material (shrubs, plugs, and live stakes) to be placed in lifts within the softest methods possible.

Natural Environment consultation and coordination during Detailed Design with the following stakeholder: TRCA (Etobicoke Creek), CVC (Cooksville Creek), MECP, and City of Mississauga.

9.3 Geotechnical Investigations

- Detailed geotechnical investigation programs will be undertaken by the Region as part of a separate assignment to support the detailed design of the proposed sewers. Mitigation measures will be recommended, as necessary.
- Findings related to the detailed geotechnical investigations will be provided to TRCA and CVC for review.
- Where the valley slopes exist, the slope stability and erosion hazard assessment are required to ensure that the proposed work is not undermined by erosion hazard in long-term or does not destabilize the valleys. The position of the Long-Term Stable Top of Slope needs to be delineated with a minimum safety factor of 1.50 to define the setback required from the existing top of bank/slope.
- Consideration for mitigating inflow and infiltration will be further refined during detailed design and confirmed through the construction contract.

Geotechnical consultation and coordination during Detailed Design with the following stakeholders: TRCA and CVC.

9.4 Hydrogeological Investigations

- During detailed design, Stage 2 Hydrogeological Investigations identified will be undertaken. The mitigation measures outlined will be further refined, as necessary.
- Detailed hydrogeological investigation programs to be completed by the Region as part of a separate assignment to support the detailed design of the proposed sewers. The hydrogeological investigations will include but are not limited to:

- Direct investigation of the subsurface media, such as
- Grain-size analyses,
- Hydraulic testing (slug tests and/or pumping tests),
- Bedrock coring and documentation of RQD and fracture occurrence/nature, and
- Water quality testing.
- A door-to-door survey for private wells that may occur within the area of influence, if applicable.
- Phase 2 ESA to confirm water and/or soil quality in areas where environmental impacts may be present and influenced by significant dewatering.
- Review of the project design and planned construction methodologies to assess the potential water taking and potential for impacts.
- Review of the planned dewatering program and development of mitigation measures.
- Hydrogeological investigation program including field investigations and the production of a detailed Hydrogeological Data Report (HDR).
- Hydrogeological Impact Assessment Report (HIAR) with dewatering evaluation for all tunnelling sections and potential impact assessment in support of Permit to Take Water (PTTW) application(s).
 - MECP no longer permits passive/pump around water taking. For the open cut/trenching locations, dewatering assessments should be carried out to determine any potential impacts to adjacent surface water features.
- PTTW application will need to include the Phase 2 ESA and a contamination mitigation plan should the area be impacted by contamination.
- All monitoring and testing required as part of the hydrogeological investigation program.
- Monitoring well decommissioning as per MECP requirements when instructed by the Agency.
- Further coordination with and approval from the MECP will be required during detailed design.
 - MECP recommends that during future investigations, site specific hydrogeological data should be collected to satisfy the requirements for PTTWs or construction dewatering EASRs according to *MECP's Technical Guidance Document for Hydrogeological Studies in Support of Category 3 Applications*¹².
- Region to continue to consult with review agencies through detailed design, including forwarding route alignment and site plans to the following conservation authorities:
 - TRCA regarding construction of Shaft 1 and Shaft 2 - Etobicoke Creek crossing and Etobicoke Creek Valley; and,
 - CVC regarding construction of Shafts 8 – Cooksville Creek crossing.
- Environmental Management Plan (EMP) may be required at the detailed design stage based on the potential groundwater impacts. Permitting requirements will be confirmed at the design stage once

¹² Ministry of Environment, Conservation and Parks, 'Technical Guidance Document for Hydrogeological Studies in Support of Category 3 Applications', 2021, <https://www.ontario.ca/page/technical-guidance-document-hydrogeological-studies-support-category-3-applications>

impacts have been confirmed for all of the TRCA and CVC regulated areas. Groundwater quality testing to be included in the EMP.

- CVC and TRCA will be consulted on any potential need for mitigation / potential for complications with the proposed tunnelling during detailed design. Additional/refined information related to construction dewatering will be provided during detailed design, including proposed volumes and methods for handling the effluent/discharge.
- MECP recommends the Region consult with the Oak Ridges Moraine Groundwater Program during Detailed Design to support groundwater investigations.

Hydrogeological consultation and coordination during Detailed Design with the following stakeholders: TRCA, CVC, MECP

9.5 Environmental Site Assessments

- During detailed design, a Phase 2 ESA will be undertaken for the remaining shaft locations (Phase 2 ESA completed at Shaft 3 during Class EA) to provide greater certainty in identifying the presence of environmental impacts to all shaft sites that may be associated with the identified Areas of Potential Environmental Concern.
 - Region to consider the submission of and Freedom of Information (FOI) Request to MECP to identify all addresses along the sewer alignment to inform the management of excess soils and water removal from excavations as well as any past/current PTTWs in or near the sewer alignments. Note that past/current PTTWs can also be found on *MECP's Source Protection Information Atlas*¹³.
- Development of a Soils Management Plan for the management of contaminated soils, as appropriate, including soil testing documentation.
- Appropriate mitigation measures will include removal or remediation of soils in the shaft sites and the access sites.
- Any monitoring requirements will be identified during the Phase 2 ESAs.
- Further coordination with and approval from the MECP will be required prior to construction.
- MECP, Region of Peel and City of Mississauga engineering and environmental departments will be contacted to obtain information on possible contamination sites along the recommended sewer alignment and within the shaft sites.
- For Shaft 3, where a Phase 2 ESA was completed and found to have traces of contaminants, an Environmental Activity and Sector Registry (EASR) will be required, including a Discharge Management Plan that addresses the handling and disposal of the impacted groundwater. If more than 100m³ of soil is expected to be permanently removed from Shaft 3, then, a Destination Assessment Report and the development and implementation of a Soil Load Tracking Program, at a minimum, will be required during Detailed Design.

¹³ Ministry of Environment, Conservation and Parks, 'Source Protection Information Atlas', 2021, [Ministry of the Environment, Conservation and Parks \(gov.on.ca\)](https://www.gov.on.ca).

Environmental Site Assessment consultation and coordination during Detailed Design with the following stakeholders: TRCA, CVC, MECP

9.6 Cultural Heritage

- Following completion of detailed design, consultation with City of Mississauga will be required to confirm mitigation measures for the work near 1700 Sherway Drive and 2240 Dixie Road.

Cultural Heritage consultation and coordination during Detailed Design with the following stakeholders: City of Mississauga

9.7 Archaeological Assessments

- Based on the findings of the Stage 2 Archaeological Assessment, no further assessments are required at any shaft sites.
- Should deeply buried archaeological resources be identified during ground disturbance activity, ground disturbance activities should be immediately halted and the Archaeology Division of the Culture Programs Unit (MHSTCI) and identified Indigenous Communities should be notified.

Archaeological consultation and coordination during Detailed Design with the following stakeholders: None

9.8 Community and Traffic Impact

- A detailed Traffic Management Plan will be undertaken during detailed design. The mitigation measures will be further refined, as necessary.
- The Region to coordinate with the City of Mississauga, City of Toronto and MTO through detailed design regarding the preparation of the Traffic Management Plan.
 - Coordination with MTO required due to QEW construction detours along Queensway East.
- Additional consultation and coordination will be required with the City of Mississauga during detailed design including:
 - any proposed above ground infrastructure.
 - temporary sidewalk and/or MUTs relocations and/or detours in the event of a closure during construction.
 - temporary MiWay transit stops during construction in the event that a bus stop cannot be maintained during construction. Temporary transit stops should be located as close to the original location as possible.
 - avoiding obstruction to any storm runoff collections points by construction activities. If there are any proposed relocations, adjustments or alternations to the City's storm infrastructure, the Region shall:
 - Demonstrate that there will be no negative hydraulic impacts.
 - Provide detailed designs to City staff for review.

- Complete a pre- and post-construction CCTV inspection of the affected storm infrastructure to the satisfaction of City staff. All inspections and associated reporting shall conform to current NASSCO standards. The Region must provide the condition report and video file to City.
- Provide the City with as-constructed drawings and CAD files detailing any revisions/alterations
- for any proposed utilities adjacent to the City's storm sewers, the Region shall:
 - Ensure that there is a minimum 0.5 m OD-OD vertical clearance for all storm sewer crossings.
 - Ensure that there is a minimum 2.5 m OD-OD horizontal clearance.
- design approval from the City of Mississauga's Traffic Operations, Infrastructure Planning, MiWay Services, Fire Emergency Services and Hurontario LRT Project Office.
- Complete a Construction Noise and Vibration Mitigation Plan during detailed design. The mitigation measures will be further refined, as necessary.
- Complete a Restoration Plan for all disturbed areas which will include the restoration of sites to their original condition or enhanced as determined by the Region.

Community and Traffic consultation and coordination during Detailed Design with the following stakeholders: City of Mississauga, City of Toronto and MTO

9.9 Property Requirements

- Based on the property requirements identified in **Section 7.2.4** of this report, the Region will begin to negotiate required permanent and temporary easements, including the following:
 - Shaft / MH 1: permanent and temporary easements (City of Mississauga, TRCA and City of Toronto, Infrastructure Ontario / Hydro One)
 - Shaft / MH 2: permanent and temporary easements (Private Owner)
 - Shaft / MH 4: temporary and permanent easements (Private Owner)
 - Shaft / MH 5: temporary and permanent easements (Infrastructure Ontario / Hydro One)
 - Shaft / MH 6: temporary and permanent easements (Infrastructure Ontario / Hydro One)
 - Shaft / MH 7: temporary and permanent easements (Infrastructure Ontario / Hydro One)
 - Shaft / MH 8: temporary and permanent easements (Infrastructure Ontario / Hydro One)
 - Shaft / MH 9: temporary easement (Private Owner)
 - Shaft / MH 11: temporary easement (Private Owner)
 - Shaft / MH 12: permanent easements (City of Mississauga)
- No easements are required for the following shafts:
 - Shaft / MH 3: no easements required (Region of Peel)
 - Shaft / MH 10: no easements required (Region of Peel)

- It is important to note that further refinement of property requirements may be identified during the detailed design phase of the project, which would trigger the need for an EA addendum.

Property consultation and coordination during Detailed Design with the following stakeholders:
City of Mississauga, TRCA, City of Toronto, Hydro One and private property owners

9.10 Corporate Communications

- Region's Corporate Communications department to continue to inform the study contact list, residents and public via online notices and website updates, public notifications via email/mail, and via existing social medial channels as the project proceeds to Detailed Design.
- Region to continue to inform local Councillors via briefing notes throughout detailed design.

9.11 Construction

- The recommended sewer and shafts will proceed to detailed design pending outstanding coordination and necessary approvals.
- Region to continue to coordinate with the various utility companies to resolve any potential conflicts that arise during construction.
 - Region to forward route alignment and site plans to Enbridge Gas Distribution, Hydro One Networks, TNPI, Alectra Utilities, Bell and Rogers.
- Region to coordinate with the City of Mississauga on all storm infrastructure that may be impacted.
- A Construction Management Plan will be prepared prior to beginning construction, and will address:
 - Haulage of material
 - Impact to street trees
 - Restoration plans
 - Impact to buildings
 - Impact to street signage, traffic signals
 - Any sidewalk closures
 - Any short-term temporary lane closures required
- Detailed design should consider construction methodologies to mitigate inflow and infiltration, in accordance with Regional policies.
- A Post-Construction Monitoring Plan will be completed during detailed design.
- Further coordination with and approval from the City of Mississauga to obtain all necessary permits and approvals described in **Section 10.1**, prior to construction.

10.0 Implementation

10.1 Construction Costs and Funding

The cost of the tunnelled sewer route is a function of the length of the route, depth of pipe, the number of shafts required, sewer appurtenances and other additional costs such as relocation of utilities, connection to existing pipes, pipe lining and restoration.

Specific tunneling approach, such as TBM or micro-tunneling, and construction methodology, such as cast in place, pre-cast pipe, concrete pressure pipe, or concrete protective lining will be determined during detailed design and tendering phase. Construction methodology will also need to consider mitigation of inflow and infiltration. The total estimated project cost for the Central Mississauga improvements is approximately \$190.2 million.

The total project cost includes the following key elements:

- Cost for pipe and manhole construction of the proposed sewers
- All connection chambers, manholes and RTC gates
- Engineering and contract admin (15% of base construction cost)
- Construction contingency (30% of base construction cost)
- Property (permanent and temporary easements)

The estimated costs are summarized below.

Table 26. Cost Estimate for the Queensway East Trunk Sewer

Element – Queensway East Trunk Sewer	Estimated Cost
Base Construction	\$96,738,344
Property	\$3,141,600
Design/Engineering	\$14,510,752
Contingency	\$29,021,503
Total Project Cost	\$143,412,199

Table 27. Cost Estimate for the Cawthra Road Trunk Sewer

Element – Cawthra Road Trunk Sewer	Estimated Cost
Base Construction	\$15,953,337
Property	\$0
Design/Engineering	\$2,393,000
Contingency (30%)	\$4,786,001
Total Project Cost	\$23,132,338

Table 28. Cost Estimate for the Burnhamthorpe Road Trunk Sewer

Element – Burnhamthorpe Road Trunk Sewer	Estimated Cost
Base Construction	\$16,105,763
Property	\$331,879
Design/Engineering	\$2,415,864
Contingency	\$4,831,729
Total Project Cost	\$23,685,234

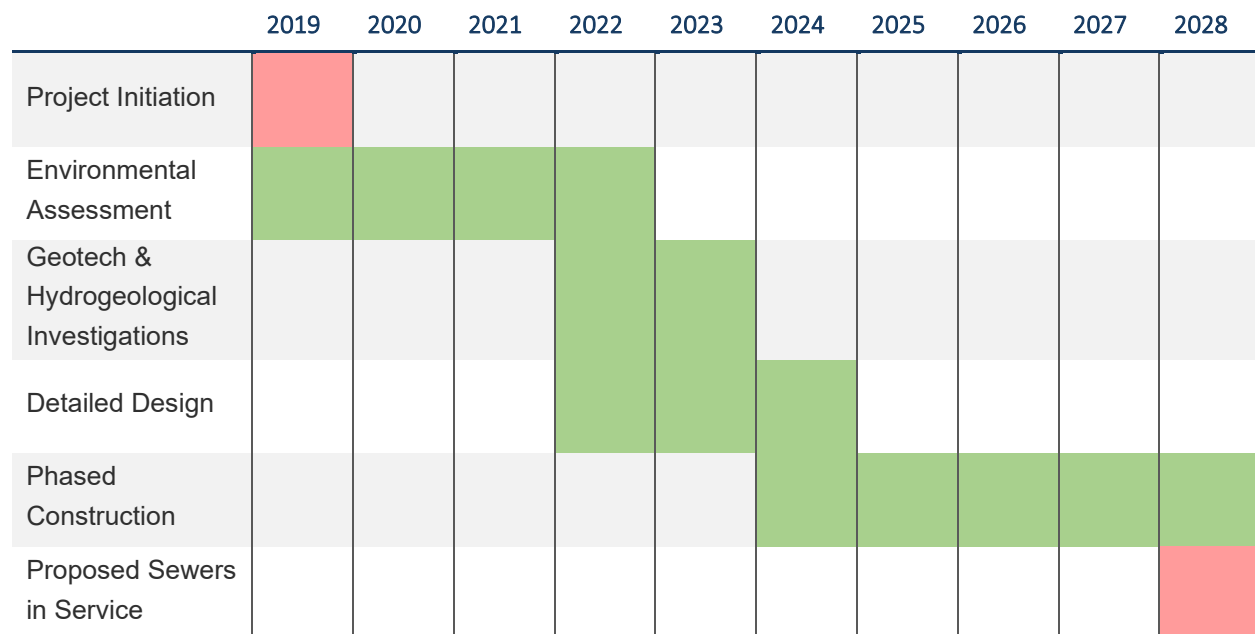
A detailed cost estimate is provided in **Appendix Volume 3, Appendix F**.

The Central Mississauga improvements were recommended as part of the Region of Peel 2020 Water and Wastewater Master Plan predominantly to service growth. The majority of the costs will be funded through development charges (DCs). Due to the long-term Region-wide need for wastewater diversion beyond the next planning horizon and the ultimate capacity of the proposed sewers, it is anticipated that a portion of the construction cost for the Queensway Trunk Sewer and Cawthra Trunk Sewer will be allocated to “Out of By-Law” (OBL) costs. This means that the project is sized and built partially to service areas and provide benefit for growth beyond the 2041 growth forecast. Additionally, both the Queensway and Cawthra Trunk Sewers provide benefit to the existing service area through the ability to provide flow flexibility and facilitate maintenance/rehabilitation activities on existing sewers. Therefore, a portion of the project costs will be allocated to the Region’s Rate Budget through “Benefit to Existing” (BTE).

10.2 Implementation Schedule

The Region’s current anticipated implementation timeline for the Central Mississauga proposed sewers is shown below, with the intent on having the new diversion sewers in service by approximately 2028. At this time, construction is tentatively scheduled to start as early as 2024, as shown in **Figure 61**.

Figure 61: Implementation Schedule



10.2.1 Timing / Phasing

The main capacity constraints that were identified in the modelling runs, in particular for 2041* 5-year SCS, are as follows:

- Lower Cooksville Creek from QEW south – Constraint is relieved by Queensway Trunk
- Upper CPR between Central Pkwy and Cawthra – Constraint is relieved by Burnhamthorpe Trunk
- Lower CPR between Cawthra and Stanfield – Constraint is relieved by Cawthra South Trunk and Queensway Trunk

The pipe sections from the above list that experience constraints sooner, or that are “triggered” first depend on several factors:

- Burnhamthorpe/ Cooksville Creek West. If this control diverts more flow east, to CPR, there is greater risk of capacity constraints in those sewer sections. If flow is left to continue south, constraints may be observed in Lower Cooksville Creek Trunk sooner. Preliminary assumptions and discussions with Peel staff have indicated that the plan is to continue to divert flow east to the 1,500 mm sewer on Burnhamthorpe Rd.
- The rate of growth within the MCC, Hurontario Corridor and Dundas Corridor could be faster or slower in certain areas, resulting in triggering a pipe constraint sooner, i.e., the “2041*” projected growth and flow could theoretically be reached in an earlier (or later year) depending on development pressure.
- The construction of the Cawthra Tunk Sewer between Burnhamthorpe and Dundas will bring some additional flow to the Lower CPR Trunk Sewer in the short term

In addition to capacity constraints, other factors should be considered when determining phasing of the preliminary preferred solution. Final timing will require consideration of the factors below along with collaboration with the Region.

- The Burnhamthorpe Trunk Sewer can be considered to be a stand-alone piece of the overall solution (it is not necessarily dependent on the other projects). This project only requires that the Cawthra Sewer (between Burnhamthorpe Rd and Dundas St) be constructed. Once this occurs, the Burnhamthorpe Trunk Sewer can be implemented, which will effectively twin the Upper CPR. It should be noted that construction is only just being completed on the new MCC Watermain along Burnhamthorpe, in the same alignment as the future sewer. Timing of future construction should consider social impacts and potential “construction fatigue” in the area.
- Cawthra South Trunk Sewer cannot proceed without the Queensway Trunk Sewer; it will need to be part of a later phase or be built concurrently
- Maintenance and/or inspections are important for the Region to maintain Levels of Service and to keep the system in a good state of repair. If a section of sewer is to be prioritized for maintenance or inspection, an earlier trigger of a given project could provide that opportunity.
- Region operations staff can provide additional input into capacity constraints that occur in the field but may not be captured in the hydraulic modelling; this could result in the desire to expedite a solution.

- There are inherent risks of schedule delays for major projects. Design and construction of the Queensway Trunk Sewer could take several years and need to be in place well before 2041. Planning for an earlier in-service date could provide additional buffer for delays.
- The 2020 Water and Wastewater Master Plan “in service dates” are as follows:
 - Queensway East Trunk Sewer: 2027
 - Cawthra Road Trunk Sewer: 2026
 - Burnhamthorpe Road Trunk Sewer: 2027
- These are relatively aggressive timelines for completion of Design and Construction and will continue to be revisited moving forward.
- Potential development delays due to COVID-19 and subsequent budget impacts

Additional details are provided in the Hydraulic Analysis Report found in **Appendix Volume 2, Appendix E**.

10.3 Permits & Approvals

The following section identifies the necessary permits and approvals required from various agencies during detailed design and prior to construction for the preferred alignment and shaft locations. These agencies include the MECP, CVC, TRCA, Ministry of Transportation (MTO), Ministry of Tourism, Culture and Sport (MTCS), DFO, City of Mississauga, and various utility companies.

The first sections describe the overall permits and approvals that apply to the whole preferred solution. **Table 29** summarizes any additional required permits and approvals for site-specific locations.

10.3.1 Department of Fisheries and Oceans Canada (DFO)

A permit may be required for any works that affect aquatic Species at Risk (SAR) identified in the Species at Risk Act. To determine whether a permit may be required during construction of Shaft 1 and Shaft 8, a Request for Review must be submitted to the Fish and Fish Habitat Program during detailed design.

10.3.2 Ministry of the Environment, Conservation and Parks (MECP)

An Environmental Compliance Approval (ECA) will be required as the proposed sewers are considered a “substantial addition to the existing system”. As such, a **comprehensive general plan** of the existing and proposed works will need to be provided to the MECP showing the following:

- All major topographic features including existing and proposed streets, contour lines, drainage areas, watercourses, municipal boundaries, land surveying data used, etc.
- The location and size of existing and proposed sewers.
- Location and nature of all existing and proposed sewage works associated with the proposed sewers, including any existing sewer overflows.
- Stormwater Management Plan, as deemed necessary during detailed design.

Engineering Drawings and Specifications – detailed plan and profile drawings for the proposed and adjacent existing sewer submitted to the MECP shall include the following:

- For the purposes of this ESR, a horizontal scale of not more than 1:1000 and a vertical scale of not more than 1:100.
- Location of streets and sewers.
- Existing and proposed ground surface, size, slope, material and class of pipe, pumping stations, manholes, overflows and other appurtenances.
- Location of all known existing structure that might interfere with, or be affected by, the proposed sewers, especially any watermains and other water works.
- Details of sewer bedding and anchoring, manholes and manhole connections, service connections, bridge crossings, stream crossings, support structures for existing structures in the path of construction, trench bracing, etc.
- Any additional descriptive specifications and information not included in a separate specifications document that would be necessary to inform the contractor of all project requirements regarding the type and quality of construction materials.

The Region will engage the MECP in pre-consultation as part of detailed design to confirm the need and/or requirements for an Environmental Compliance Approval (ECA) associated with the Diversion Sewer and/or the management of the dewatering effluent.

A Permit to Take Water (PTTW) will also be required should there be groundwater taking of more than 50,000 Litres per day (i.e., through dewatering). This will be confirmed as part of the follow on geotechnical and hydrogeological investigations that will be undertaken. The PTTW will need to include the Phase 2 ESA as well as a contamination mitigation plan should the area be impacted by contamination.

The Region will engage the MECP to confirm potential Species At Risk permitting and approval requirements under the ESA. Should habitat for butternut and/or SAR bats be confirmed on Site 1, and the habitat is expected to be disturbed by the proposed construction activities, authorization (registration or permitting) under the ESA will be obtained.

10.3.3 City of Mississauga

When setting up the staging area for the access shaft, City trees may need to be removed to facilitate the placement of machinery and equipment that are necessary as well as to enable the entrance and exit of construction vehicles. In these cases, tree removal permits from the City of Mississauga will be obtained. Impacts to individual trees and restoration measures will be confirmed during detailed design.

Region of Peel to obtain the following permits from the City of Mississauga's Transportation & Works department for construction:

- Erosion and Sediment Control Permit
- Road Occupancy Permit

Region of Peel to obtain the following permits from the City of Mississauga's Parks and Forestry department for construction:

- Application to Permit the Injury or Destruction of Trees on Private Property (Tree Removal Permit).

- Park Access Permit (for construction access to the municipally owned parkland).

Region to consult with the City on any identified multi-use trail and sidewalk closures, relocations and/or detours. Permanent and temporary easement agreements will also be required for all City of Mississauga owned lands (Shaft 1 and Shaft 12).

10.3.4 MiWay

The Region of Peel will consult with MiWay regarding any road/boulevard works (including lane disruptions) impact existing transit infrastructure (stops or shelters) or service (routes) at least two weeks prior to submission of Road Occupancy Permit. Transit related information will be provided in the proposed traffic management plan.

10.3.5 TRCA

A site visit by TRCA to Shaft 1 may be required at the commencement of the detailed design stage to confirm site conditions. In accordance with Ontario Regulation 166/06 *Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*, a Permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses will be required during construction.

10.3.6 CVC

A site visit by CVC to Shaft 8 may be required at the commencement of the detailed design stage to confirm site conditions. In accordance with Ontario Regulation 160/06 *Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*, a Permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses will be required during construction.

10.3.7 Utilities

Some sections of the sewer alignment will require relocation of utilities and/or temporary easements to enable the construction of the proposed sewers. These include existing infrastructure owned by Enbridge Gas Distribution, Hydro One Networks, Alectra Utilities, Bell Canada, Rogers Cable, and others. Detailed plan and profile drawings of the recommended sewers will be circulated to the various utility companies.

Coordination to address any utility conflicts will continue directly with the utility companies and through both the Region of Peel and City of Mississauga Public Utilities Coordinating Committees (PUCCs) as part of detailed design. TRCA and CVC will also need to be contacted for permits / approvals for any utility relocations identified within their regulation limit. Approval from the PUCCs will be required before any construction can be initiated.

The Region will engage the MECP in pre-consultation as part of detailed design to confirm the need and/or requirements for an Environmental Compliance Approval (ECA) associated with the proposed sewer and/or the management of the dewatering effluent.

10.3.7.1 Enbridge Pipelines

Region is required to contact Damage Prevention department of Enbridge Gas Distribution a minimum of three business days prior to commencing any excavation to schedule a site meeting, in accordance with Enbridge Gas requirements for work within 3 m of a vital main pipeline.

A National Energy Board (NEB) permit will also be required for work within 30 m of the NEB regulated gas pipeline right of way.

- Permit Application to Enbridge Gas Distribution Engineering Department
- Detailed plans submitted for Enbridge Gas Distribution review
- Approval from Enbridge Gas Main

10.3.7.2 TNPI

Region is required to contact TNPI a minimum of three business days prior to commencing any excavation to schedule a site meeting, in accordance with TNPI requirements.

10.3.7.3 Hydro One

Region to send detailed drawings to Hydro One for review and approval.

For works near hydro transmission towers, a settlement analysis may be required during detailed design to obtain Hydro One approval.

10.3.8 Property Owners

Temporary and permanent easements will be required on lands not owned by the Region of Peel including City of Mississauga, TRCA, City of Toronto, Hydro One and private property owners.

10.3.9 Site Specific Permits and Approvals

In addition to the permits and approvals listed above, the following table provides site-specific permits and approvals that may be required during detailed design and/or construction.

Table 29: Additional Site-Specific Permits and Approvals

Shaft	Agency	Site-Specific Permits and Approvals
Shaft 1 Etobicoke Creek and Sherway	DFO	Request for Review required to determine whether a permit is required during construction.
	City of Mississauga	Region of Peel to provide notification to City of Mississauga for works within 100m radius of Middle Road Bridge. Temporary and permanent easement agreements are required for City of Mississauga owned lands.
	MECP	Region of Peel to consult with Species At Risk Branch to confirm potential permits associated with Species At Risk.

Shaft	Agency	Site-Specific Permits and Approvals
	TRCA	Region of Peel to obtain permit from TRCA for Shaft 1 construction in accordance with O.Reg. 166/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Temporary and permanent easement agreements are required for TRCA owned lands. TRCA require Board of Director approval for all easement agreements therefore allow a minimum of 6 months for approval process.
	City of Toronto	Temporary and permanent easement agreements are required for City of Toronto owned lands. Permission to Enter required for City of Toronto managed lands (Contact City of Toronto Parks Staff).
Shaft 2 Queensway and Etobicoke Creek	TRCA	Region of Peel to obtain permit from TRCA for Shaft 2 construction in accordance with O.Reg. 166/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.
	Property Owner	Permanent and temporary easement agreements are required for privately owned land.
Shaft 3 Queensway and Dixie	City of Mississauga	Region of Peel to provide notification to City of Mississauga for works within 100m radius of 2240 Dixie Road heritage property.
	MECP	Region of Peel to register activities on the Environmental Activity and Sector Registry (EASR) for construction dewatering.
	Hydro One	For works near hydro transmission towers, a settlement analysis may be required during detailed design to obtain Hydro One approval.
Shaft 4 Queensway and Cawthra	Property Owner	Temporary and permanent easement agreements are required for private property owned lands.
Shaft 5 Queensway and Tedlo	Hydro One	Temporary and permanent easement agreements are required for Hydro One / Infrastructure Ontario owned lands.
Shaft 6 Queensway and Hensall	Hydro One	Temporary and permanent easement agreements are required for Hydro One / Infrastructure Ontario owned lands.

Shaft	Agency	Site-Specific Permits and Approvals
Shaft 7 Queensway and Cliff	Hydro One	Temporary and permanent easement agreements are required for Hydro One / Infrastructure Ontario owned lands.
Shaft 8 Queensway and Cooksville Creek	DFO	Request for Review required to determine whether a permit is required during construction.
	MECP	Region of Peel to consult with MECP to confirm potential permits associated with Species At Risk.
	CVC	Region of Peel to obtain permit from CVC for Shaft 1 construction in accordance with O.Reg. 160/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.
Shaft 9 Queensway and Hurontario	Hydro One	Temporary and permanent easement agreements are required for Hydro One / Infrastructure Ontario owned lands.
	City of Mississauga	Region to coordinate approval with Hurontario LRT works.
Shaft 10 Cawthra and Dundas	Property owner	Temporary easement agreement is required for privately owned lands.
	No site-specific permits or approvals at this location.	
Shaft 11 Burnhamthorpe and Cawthra	Property owner	Temporary easement agreement is required for privately owned lands.
Shaft 12 Burnhamthorpe and Central Parkway	Property owner	Permanent easement agreement is required for City of Mississauga owned lands.

11.0 Conclusion

This Municipal Class EA Environmental Study Report (ESR) has been prepared to confirm that the proposed sewers within the Central Mississauga area meet the requirements of the *EAA*. This Schedule C Class EA Study resulted in the identification of three gravity trunk sewers located along Burnhamthorpe Road (between Central Parkway and Cawthra Road), Cawthra Road (between Dundas Street East and Queensway East), Queensway East (between Hurontario Street and Etobicoke Creek) and Etobicoke Creek (between Queensway East and Sherway Drive).

The recommended solution consists of a 7.4 km long deep gravity sewer that will be constructed via trenchless technology to transfer flows from key trunk sewers within the Central Mississauga wastewater system. The proposed sewers will require the construction of 12 shafts that will contain manholes to access the sewer for future maintenance / repair. The shafts and manholes will generally be located as follows:

- Shaft 1: Etobicoke Creek, northeast of Sherway Drive
- Shaft 2: Queensway East, northwest of Etobicoke Creek
- Shaft 3: Queensway East, southeast of Dixie Road
- Shaft 4: Queensway East, northeast of Cawthra Road
- Shaft 5: Queensway East, northwest of Tedlo Street
- Shaft 6: Queensway East, northwest of Hensall Street
- Shaft 7: Queensway East, northwest of Cliff Road
- Shaft 8: Queensway East, northeast of Cooksville Creek
- Shaft 9: Queensway East, southeast of Hurontario Street
- Shaft 10: Cawthra Road, northwest of Dundas Street East
- Shaft 11: Burnhamthorpe Road, northwest of Cawthra Road
- Shaft 12: Burnhamthorpe Road, northwest of Central Parkway

Consideration of potential impacts was included as part of the evaluation of alternative sewer routes and shaft sites and are isolated to only areas of surface disturbance, primarily shaft locations and creek crossings, which can be addressed by the recommended mitigation measures. Public and agency notifications were provided throughout the course of the Class EA study and to date no comments received cannot be addressed as the project proceeds through detailed design.

Following approval of this Municipal Class EA Study, it is recommended that:

- Based on property requirements identified in **Section 9.9** of this ESR, the Region will begin to negotiate all required permanent and temporary easements, primarily required for the construction of the tunnel shafts.
- The mitigation measures identified in **Section 8.2** of this ESR be confirmed and refined during detailed design and implemented during and post-construction.

- The preferred sewer route proceeds to detailed design with the understanding that further investigations are required during Detailed Design and permits and approvals from various agencies will be needed prior to construction.
- The Region Peel continue to consult and coordinate with key review agencies during Detailed Design including City of Mississauga, City of Toronto, MTO, MECP, TRCA, CVC, and utilities to ensure design, mitigation and monitoring requirements are reviewed and approved.
- The Region of Peel continue to coordinate with the City of Mississauga and City of Toronto regarding coordination of construction timing for any ongoing EA within the study area.