City of Peterborough Sanitary Master Plan

VOLUME 1*:* EXECUTIVE SUMMARY – *DRAFT R1*

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GEI Consultants Canada

April 2025

Sanitary Master Plan for City of Peterborough Class Environmental Assessment (EA) Study Report Outline

The City of Peterborough's Sanitary Master Plan is a comprehensive document that describes the planning, evaluation, and decision-making process for developing the preferred long-term wastewater strategy to service growth in the City of Peterborough to 2051. The master plan documentation is compliant with the requirements of the EA Act and was placed on public record for the prescribed review period. The Sanitary Master Plan Report is organized into 5 volumes:

Volume 1 – Executive Summary

The executive summary provides a brief overview of the master plan, and summarizes information contained in the subsequent volumes. This includes the problem and opportunity statement, the study objectives, background and planning context, and a description of the preferred servicing strategy and associated capital program.

Volume 2 – Background and Planning Context

Volume 2 describes the master planning process, the legislative and policy planning context, related studies and background information, wastewater servicing principles and policies, population and employment growth forecasts and existing Study Area conditions.

Volume 3 – Sanitary Master Plan

Volume 3 documents the approach to developing the preferred sanitary servicing strategy, including review of the existing system constraints, impacts of growth on system performance, development of servicing concepts and strategies to service growth, evaluation methodologies and criteria, and the results of the evaluation. It also provides a detailed list of proposed projects associated with the preferred strategy, along with an implementation plan that describes phasing and additional studies that may be required.

Volume 4 – Indigenous Engagement

Volume 4 provides a record of all engagement activities with First Nations and indigenous communities. This includes a log of all email and phone correspondence, along with meetings, both in-person and virtual. Finally, a summary of comments provide by Indigenous Communities is provided, that helped to inform the implementation plan and additional required studies described in Volume 3.

Volume 5 – Public and Agency Consultation

Volume 5 contains all relevant documentation of the public and agency consultation process including notices, comments and responses, and distribution information. Presentation materials from both Public Information Centres (PICs) held during the study are included. Additional presentation materials and discussion information from workshops held with relevant agencies, approval bodies and other stakeholders are also included.

This document contains **Volume 1**, which is one of five volumes that make up the complete Sanitary Master Plan Report and should be read in conjunction with the other volumes.

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1. Introduction

1.1. Background and MCEA Process

The City of Peterborough (the City) has completed a Sanitary Master Plan (SMP) to guide future improvements to all elements of the sanitary system including collection, conveyance, and treatment to meet future capacity needs in alignment with the City's 2023 Official Plan (OP). The City strives to achieve financially responsible and environmentally sustainable growth. This SMP will provide a framework to manage sanitary infrastructure needs to accommodate urban growth and intensification that maximizes use of existing servicing capacity.

This study has been undertaken in accordance with the Modified Approach #2 of the Master Planning process as set out in the Municipal Class Environmental Assessment (MCEA) process developed by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011, 2015, 2023 and 2024), which is approved under the Ontario Environmental Assessment Act.

The scope of work involves satisfying the Master Plan requirements, which will complete Phases 1 and 2 of the MEA Class EA Process:

Phase 1: Define the problem/opportunity statement, and,

Phase 2: Identify, assess, and select servicing concepts for the City, and meet requirements of any identified Schedule B projects required within the next 10 years.

1.2. Problem and Opportunity Statement

At the onset of the study, a problem and opportunity statement was defined as the basis for completing the SMP, as follows:

> *The City of Peterborough's 2023 Official Plan Update anticipates the City's population will grow from 83,000 people in 2016 to a projected population of 125,000 people by 2051.*
>
> *The City's Sanitary Master Plan will provide a framework for servicing urban growth and intensification that is transparent, sustainable, reliable, environmentally friendly, cost effective, flexible and maximizes use of existing sanitary infrastructure.*

The SMP achieves the following objectives:

- Assesses the capacity of the existing sanitary system, including collection, conveyance, and treatment, and identifies the requirements to continue servicing the existing population while allowing for future development;
- Provides recommendations for short and long-term capital planning to forecast funding requirements and inform any updates to the Development Charges (DC) Background Study and DC By-Law;
- Creates a framework for development within the identified Strategic Growth Areas;

- Provides recommendations within an Implementation Plan on how to proceed with the SMP, including a Capital Plan to 2051 and recommendations related to policy, guidance, and operation of the City's Consolidated Linear Infrastructure (CLI) Environmental Compliance Approval (ECA);
- Identifies existing system redundancies, vulnerabilities and risk, and develop a mitigation approach; and,
- Engages the public, agencies and First Nations communities throughout the Master Plan process.

Innovative approaches were considered to address the City's need to adapt its infrastructure and operations under a changing climate and plan for infrastructure expansion that is cost-efficient and financially sustainable for the community.

2. Consultation and Engagement

Public, agency, and stakeholder engagement and consultation are important components to the success of this study and is mandated as part of the Class EA process. Effective consultation is used to obtain valuable comments and feedback on the overall study process, and better understand potential sensitivities and issues related to the SMP.

A summary of consultation included under this Master Plan is summarized below:

Notice of Commencement – July 31, 2023

Level of Service Public Survey – March 8, 2024 (survey open until April 17, 2024)

Notice of Public Information Centre (PIC) #1 – May 15, 2024

Pre-PIC #1 Stakeholder Meeting – May 23, 2024

PIC #1 (Live Virtual Meeting) – May 29, 2024 (comments open until June 21, 2024)

Pre-PIC #2 Stakeholder Meetings – December 9 and December 12, 2024

Notice of PIC #2 – January 22, 2025

PIC #2 (Live Virtual Meeting) – February 11, 2025 (comments open until March 5, 2025)

Presentation to City's Committee of the Whole – June 2, 2025

Notice of Completion and issue of Master Plan Report for Public Review – June 28, 2025

Another key element of communications for this SMP was engagement with Indigenous communities including First Nations. A summary of First Nations engagement is below:

Letters Requesting to Consult – Aug – Sept, 2023

Meeting 1 with Four Directions (representing Hiawatha and Curve Lake First Nations) – Aug 18, 2023

Meeting 1 with Alderville First Nation – October 31, 2023

Draft background reports for Stage 1 Archaeological Assessment, Cultural Heritage Screening Report and Natural Heritage background review shared with Hiawatha, Huron-Wendat, Alderville First Nations and Four Directions – November 2023

Letters Informing of PIC #2 and requesting meeting – November 2024

Meeting 2 with Alderville First Nation – December 5, 2024

Meeting 1 with Curve Lake First Nation (no longer represented by Four Directions) – February 25, 2025

Meeting 1 with Hiawatha First Nation (no longer represented by Four Directions) – March 4, 2025

3. Study Area and Existing Sanitary System

The Study Area encompasses the entirety of the City of Peterborough, as well as Peterborough Airport lands, and the Peterborough Waste Management Facility. **Figure 3-1** shows the study area boundaries as well as the existing municipal sanitary infrastructure including sewers, sewage pumping stations (SPSs) and the Peterborough Wastewater Treatment Plant (WWTP). The City's municipal boundary encompasses approximately 6,000 hectares of land. The Airport and Waste Management Facility lands are located south of the City limits within the Township of Cavan Monaghan and Township of Otonabee-South Monaghan, respectively. Sanitary sewage produced within these lands are received by the City's sanitary system and treated at the Peterborough WWTP.

The City's sanitary system consists of 385 km of gravity sewers, 10 SPS, one by-pass pumping station, 13 forcemains, three siphons, and the Peterborough WWTP. The City also operates the Airport SPS which is included in the Master Plan analysis. Refer to **Figure 3-1.**

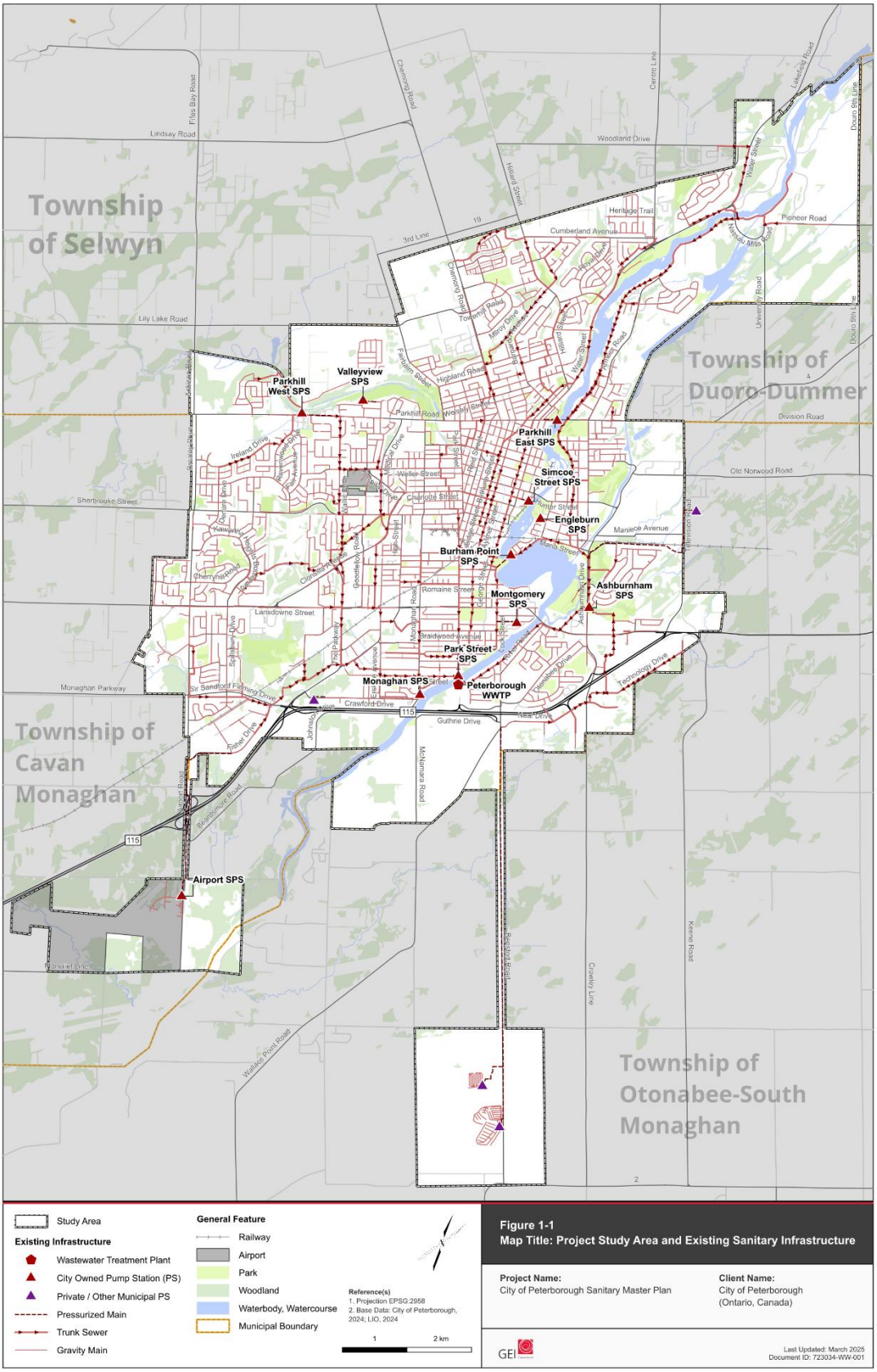

Figure 3-1: Sanitary Master Plan Study Area

4. Level of Service and Performance Targets

Hydraulic performance requirements are used to size future infrastructure and allow the City to continue meeting level of service objectives. To assess the performance of a proposed sewer system and identify capacity constraints on the existing infrastructure from future proposed developments, it is critical that the City maintain a standardized and defendable set of hydraulic performance criteria, determined from a review of applicable design storms and industry standards.

The process logic used to evaluate the system's existing and future hydraulic performance and potential need for system upsizing is shown in **Figure 4-1.** As noted in the figure, a Climate change risk assessment was also completed by 'stress testing' the future sanitary system in order to assess system vulnerability to extreme wet weather events and associated surcharging and flooding associated with climate change.

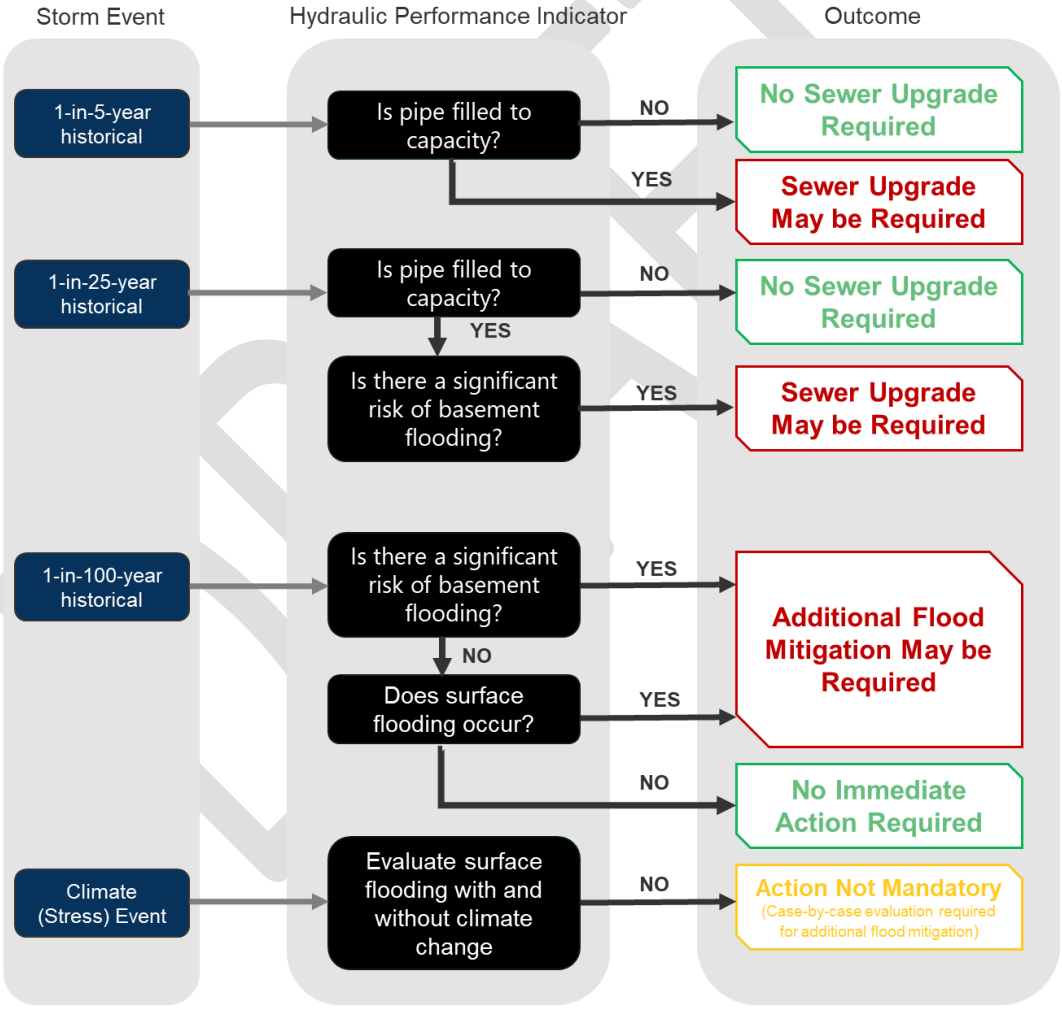

Figure 4-1: Hydraulic Performance Process

Notes:

1. Pipes over 80% capacity (d/D > 0.8) are considered filled to capacity;
2. When the Hydraulic Grade Line (HGL) is 1.8m or more below ground level, basement flooding risk is increased; and,
3. SPS rated capacity to be equivalent to the 10-year-storm peak flow, based on the Ministry of the Environment, Conservation and Parks (MECP) Guidelines.

5. Growth Projections and Future Needs

The 2023 OP anticipates that the City will grow from a population of 83,000 people in 2016 to a population of 125,000 people by 2051. The City also anticipates growth in employment, aiming to achieve at least 2 residents for every 1 job through 2051. It is anticipated that the employment sector will grow from 45,000 jobs in 2016 to 63,000 by 2051. Per the OP, "*growth to 2051 will occur through a combination of intensification within the Delineated Built-Up Area and development within the Designated Greenfield Area*". The OP targets a minimum of 50% of new housing units approved by the City each year to be identified as intensification, with a focus on areas that have existing capacity or can be readily improved, particularly within Strategic Growth Areas. Designated Greenfield Areas, which lie outside the Delineated Built Boundary, but within the City limits, are expected to accommodate a maximum of 50% of the City's residential growth to 2051.

The SMP uses growth projections based on development applications and growth projection data allocated to Traffic Assessment Zone (TAZ) spatial areas. Future flow projections are thereby based on total expected population growth and a flow rate per capita using current City design standards. The growth areas shown in **Figure 5-1** indicate property parcels that have some planned growth somewhere within that parcel. Growth may not be evenly distributed across the site, and any development would need to comply with restrictions associated with applicable land use designations within the property.

The SMP reviews the impacts of growth on the existing sanitary system and identifies constraints in the system that may reduce performance. The performance of the existing system under a 1-in-5-year storm event is shown in **Figure 5-2** below. This assessment is used to identify vulnerable areas in the system to establish opportunities for capital upgrades to allow servicing of growth.

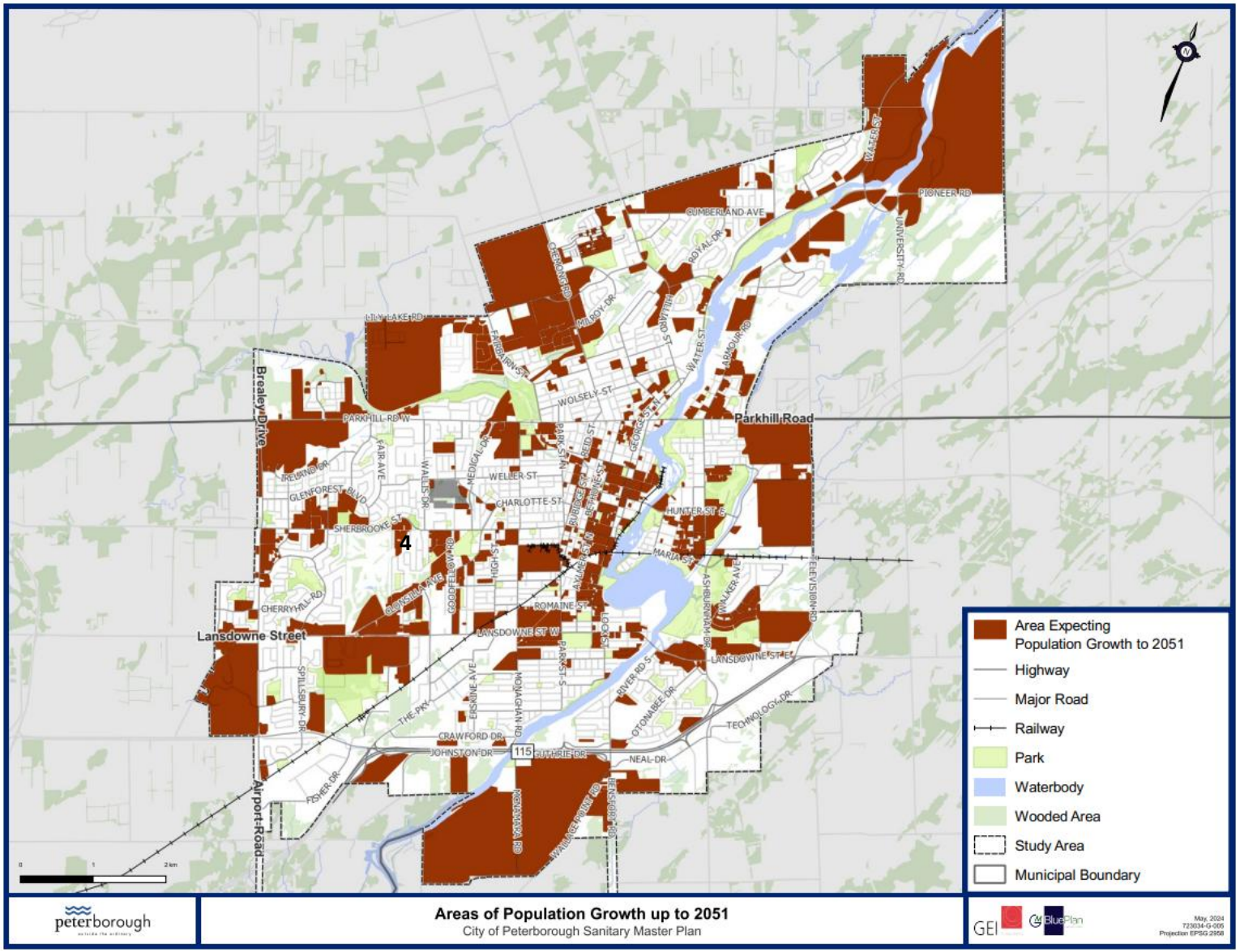

Figure 5-1: Areas of Population Growth up to 2051

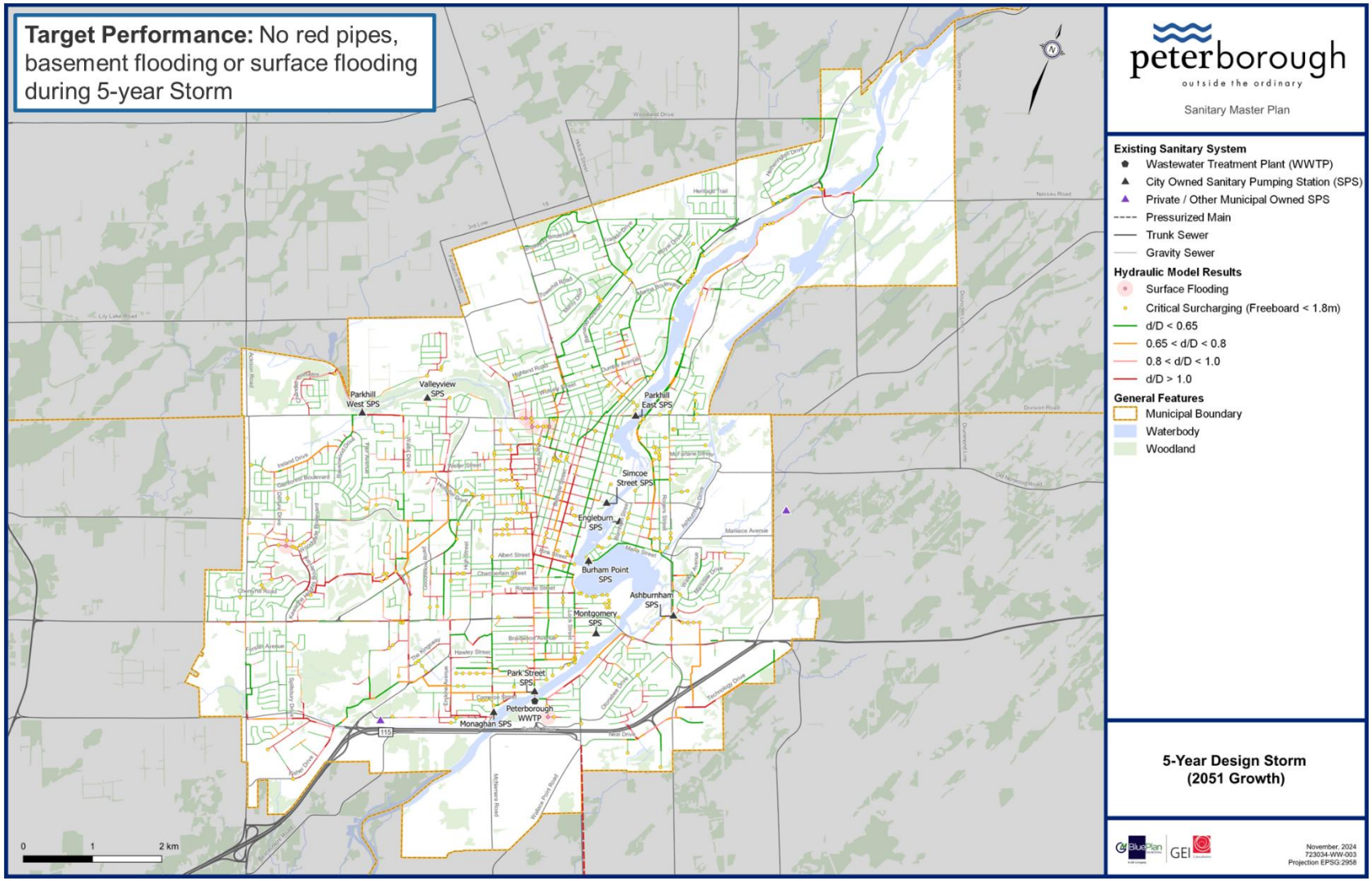

Figure 5-2: System Performance with 2051 Growth During a 1-in-5-Year Storm Event

6. Development and Evaluation of Servicing Strategy Alternatives

6.1. Approach to Development and Evaluation of Alternatives

Following a performance assessment of the existing sanitary system with both the current population and with projected growth to 2051, different approaches for servicing this growth were developed and evaluated. A multi-step evaluation process, as part of Phase 2 of the MCEA Master Plan for Alternative Solutions, was used to select the preferred strategy and develop a list of capital projects. A schematic overview is shown in **Figure 6-1**.

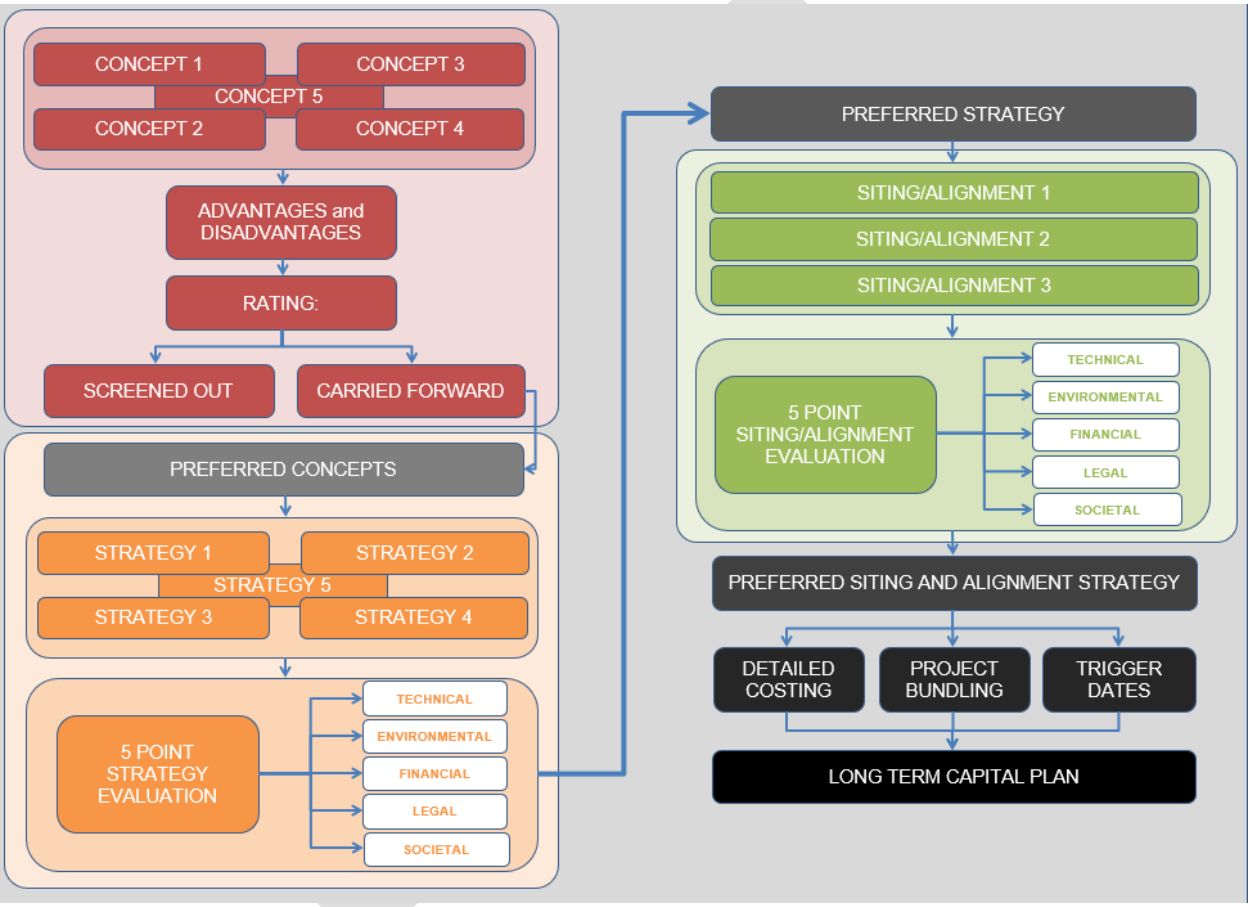

Figure 6-1: Schematic Overview of Evaluation Approach

6.2. Alternative Servicing Concepts and Screening

A total of 14 servicing concepts were identified, under six main categories: do nothing, I/I reduction, demand reduction, conveyance, storage, and WWTP. Two broad screening criteria were used to screen the long list of alternative servicing concepts as ‘pass’ or ‘fail’ based on their ability to meet the objectives of the SMP and the City’s OP, and that it must not be covered under other programs. From this assessment, three servicing concepts were screened out as shown in **Figure 6-2**.

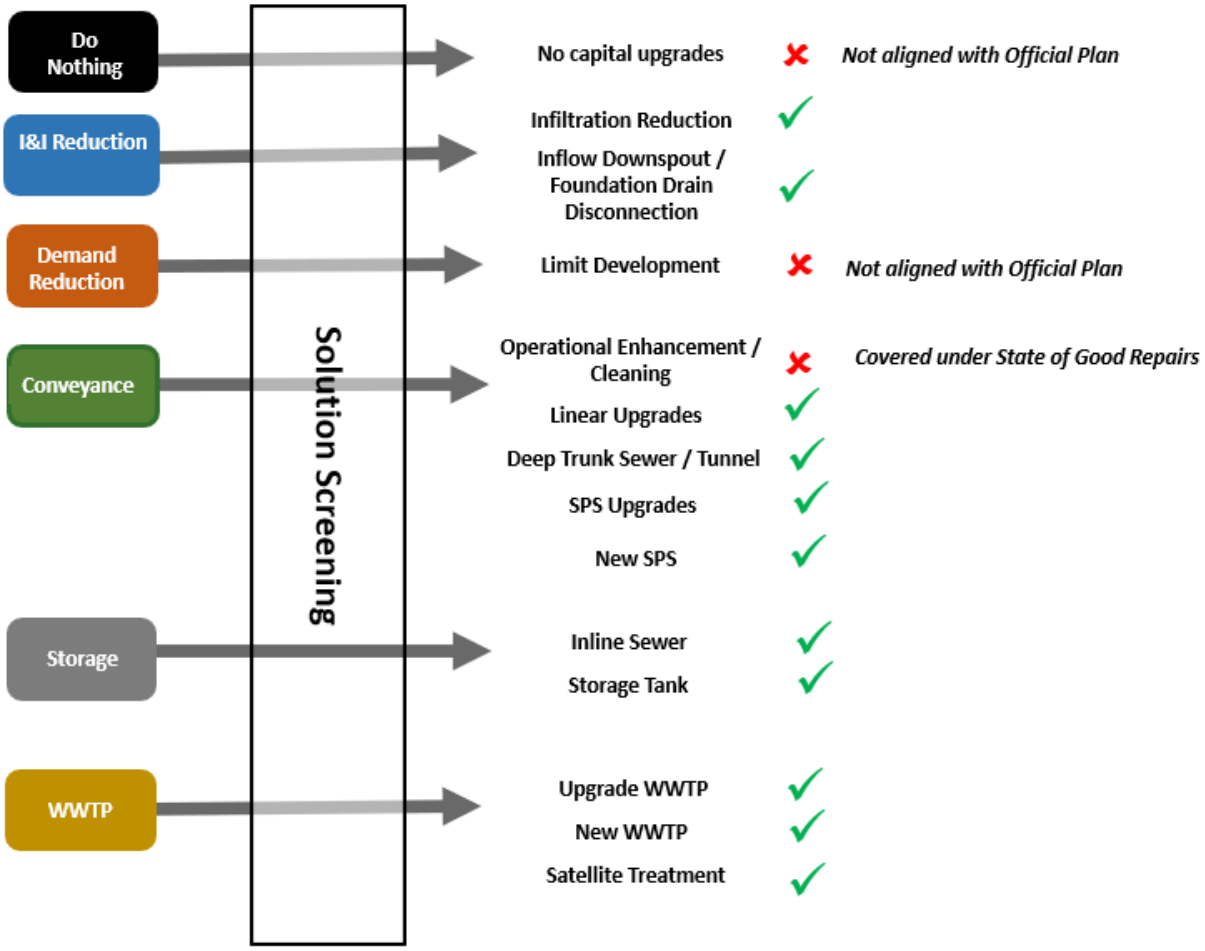

Figure 6-2: Screening of Servicing Concepts

6.3. Development of Servicing Strategies

Using the concepts that passed the screening level evaluation in the previous section, a short list of servicing strategies was developed consisting of different combinations of the screened concepts and associated capital projects. The strategies are summarized as follows:

- Strategy 1: Upsize Existing Sewers. Conveyance capacity increases to service growth
- Strategy 2: System Storage. Incorporate Storage to optimize system upsizing needs
- Strategy 3: Flow Diversion. Identify opportunities to move flows to utilize available capacity
- Strategy 4: New WWTP. New treatment facility location service growth

For purposes of strategy evaluation and comparison, only larger scale projects were considered, and once a preferred strategy was selected, the capital program was refined and optimized and smaller projects were also identified. An overview of the concepts that have been incorporated into each strategy is provided in **Table 6-1**: Development of Servicing Strategies**.**

Table 6-1: Development of Servicing Strategies

Screened Concept	Strategy 1 Upsize Existing Sewer	Strategy 2 Increase System Storage	Strategy 3 Flow Diversion	Strategy 4 New WWTP
I/I Reduction	x	x	x	x
Linear Upgrades	x	x	x	x
Deep Trunk Sewer			x	
SPS Upgrades	x	x	x	x
New SPS(s)			x	x
Storage		x		
Upgrade WWTP	x	x	x	
New WWTP				x
Satellite Treatment				x

6.4. Detailed Evaluation of Servicing Strategies

Following the development of the four short-listed servicing strategies, a detailed evaluation was completed using five criteria categories of technical, societal, environmental, legal/regulatory, and financial.

For each strategy, the sub-criteria were given a score between 1 (colour coded red) to 5 (colour coded green) based on their expected impact. The highest total score, as shown in **Table 6-2**Error! Reference source not found., which provides the most benefit and least impact, was selected as the preliminary preferred strategy. Overall, Strategy 2 was determined to be the preferred alternative.

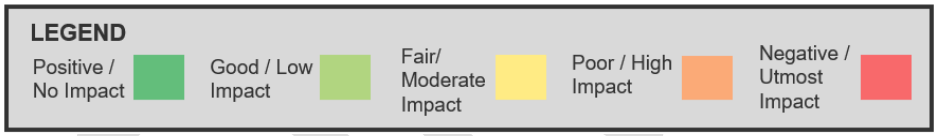

Table 6-2: Summary of Detailed Evaluation with Rankings

Criteria Category	Strategy 1 Upsize	Strategy 2 Storage	Strategy 3 Diversion	Strategy 4 New WWTP
Technical	4.33	4.00	2.67	2.67
Environmental	4.33	4.33	4.00	2.67
Social	3.29	3.43	3.14	2.71
Regulation/ Compliance	3.50	3.50	3.75	2.25
Financial	4.33	4.67	3.00	1.67
Total Score	**79%**	**80%**	**66%**	**48%**
Ranking	**2**	**1 (preferred)**	**3**	**4**

6.5. Preferred Sanitary Servicing Strategy

The servicing strategy providing the greatest benefit and least impact, based on the highest total score, was Strategy 2 to add system storage along with capacity upgrades to ensure system performance for 2051 growth. This strategy provides increased flood resilience, lower impacts on the natural environment due to work within existing disturbed areas, reasonable constructability and lowest overall cost.

Out of the four evaluated strategies, only Strategy 2 included the addition of system storage to reduce peak flows in the downstream sewer. Although there are a range of locations within the collection system where storage could be incorporated, it is generally most practical to locate storage further upstream in the catchment to reduce peak flows in a potentially larger portion of the downstream sewer. As such, in-line storage in the form of an oversized sewer, is proposed in the northeast corner of the City, south of the Nassau Mill Road bridge on Armour Road.

7. Capital Program and Implementation

Based on the preferred sanitary servicing strategy, a detailed capital program was established to support the servicing needs of existing and future growth of the City to 2051. The capital program map for the preferred servicing strategy is shown in **Figure 7-1** (I/I reduction areas) and **Figure 7-2** (capital projects) and presents the general location of recommended capital projects. This capital program will become part of the foundation for the City's capital budget. **Table 7-1** provides project descriptions, project type, proposed sizing, proposed timing, and estimated total project cost for the capital project list.

The SMP was undertaken to satisfy the MCEA Modified Approach #2 requirements according to the MEA Class EA document. This approach satisfies the requirements of Schedule B projects required within the next 10 years so they may move forward to design and construction unless otherwise noted.

Table 7-1 outlines the Class EA requirements, including those that are exempt. Note that exempted projects may move forward directly to implementation. The SMP was prepared as a broad level assessment and recognizes that further detailed assessment will be required through separate studies to satisfy project specific fulfillment of the MEA Class EA requirements for Schedule B projects required beyond the 10-year horizon and all Schedule C projects. The only projects that require a Schedule B within the next 10 years are upgrades to two SPSs: Monaghan SPS and Airport SPS. These Schedule B Class EAs are documented Volume 3 of this SMP report.

During the next steps of project implementation, further studies, permits and approvals are required to support design and construction, including but not limited to:

- Refinement of infrastructure locations and alignments within proposed Right-of-Way (ROW);
- Review and confirmation of property requirements;
- Identification of preferred construction methodologies, and review and mitigation of potential construction-related impacts;
- Completion of additional supporting investigations as identified in **Table 7-1**;
- Geotechnical, and hydrogeological investigations and subsurface utility engineering (SUE);
- Fulfillment of all government agency approval requirements; and,
- Additional engagement with First Nations and Indigenous communities where treaty rights may be impacted by projects.

In 2024, Hemson Consulting completed a Development Charges Background Study (DC Study) as part of a process to update the City's City-Wide Development Charges by-law. The updated by-law (*24-081*) was passed on December 2, 2024, and came into effect on January 1, 2025. The capital program will be primarily funded by City-Wide Development Charges in accordance with the DC By-Law. Final costs and timing of projects will be further refined during subsequent phases of project implementation.

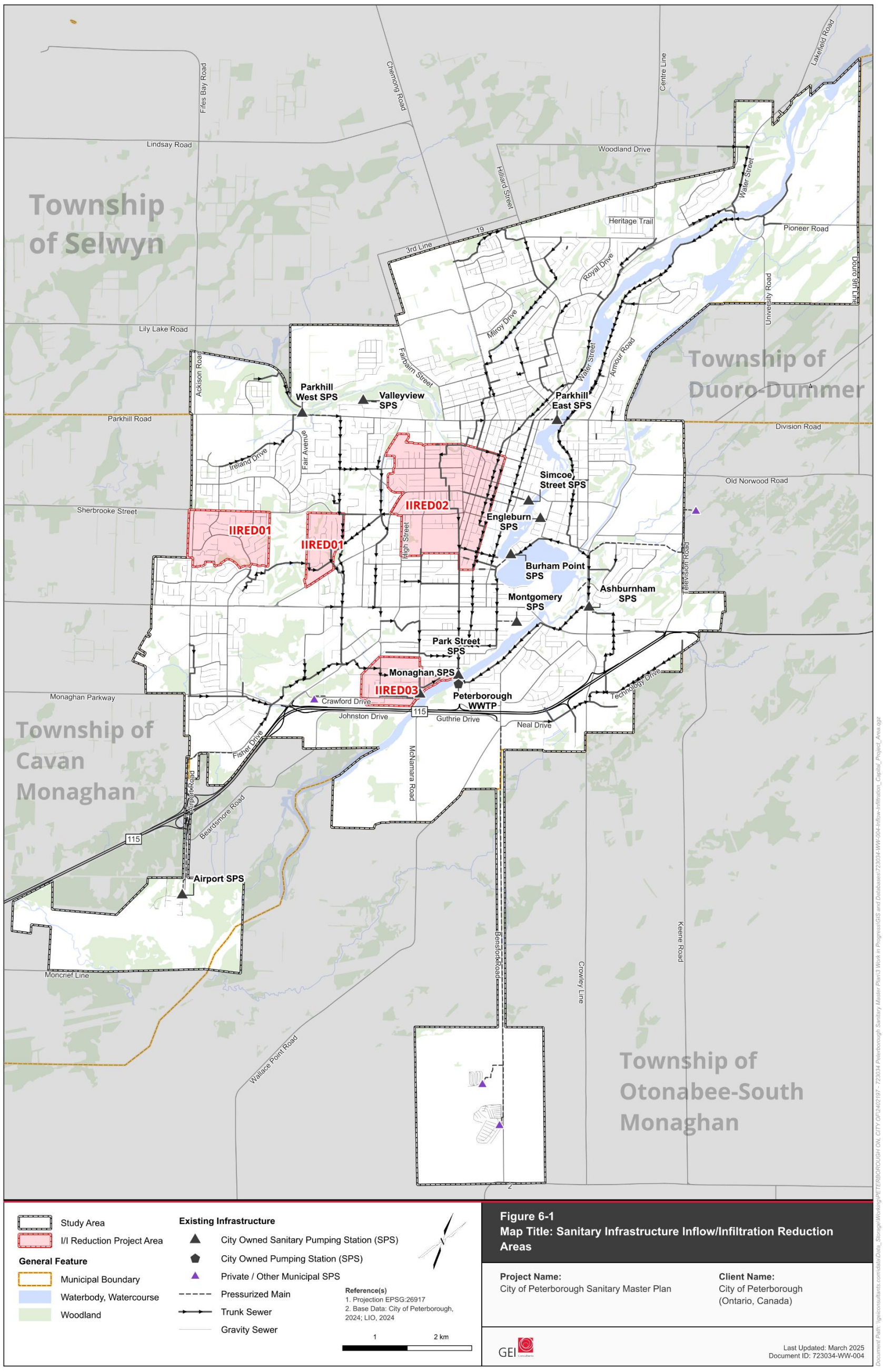

Figure 7-1: Capital Projects Map - I/I Reduction Areas

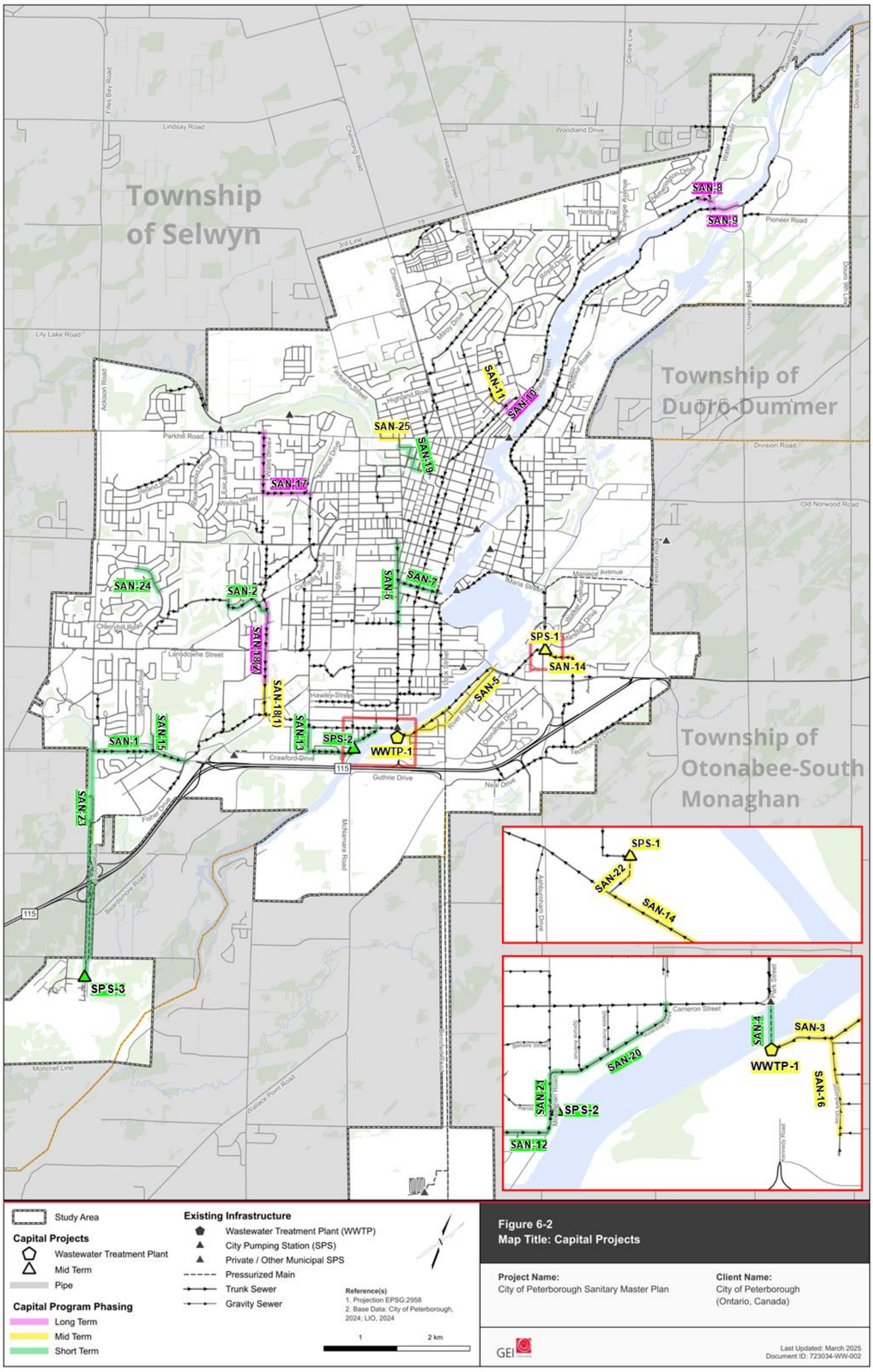

Figure 7-2: Capital Projects Map

Table 7-1: Proposed Capital Project List to Support Growth to 2051 and Implementation Plan

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
Hydraulic Model					
HM01	Hydraulic Model Update and Recalibration with Flow Monitoring Program	$ 850,000	2030	N/A	• n/a
IIRED01	I/I Reduction East and West of Kawartha Golf & Country Club	$ 3,355,000	2030	Exempt (Table B, 19)	• Coordination with City's pipe relining and CCTV programs • Targeted promotion of City's Flood Reduction Subsidy program
IIRED02	I/I Reduction Downtown Peterborough	$ 8,016,000	2030	Exempt (Table B, 19)	• Coordination with City's pipe relining and CCTV programs • Targeted promotion of City's Flood Reduction Subsidy program
IIRED03	I/I Reduction Crawfords Grove	$ 2,014,000	2030	Exempt (Table B, 19)	• Coordination with City's pipe relining and CCTV programs • Targeted promotion of City's Flood Reduction Subsidy program
Collection System Upgrades					
SAN-1	Whittington Trunk Sewer	$11,794,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • SAR screening to determine if suitable habitat is present within the adjacent wetland or woodland • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-2	Whitefield Trunk Sewer	$ 6,280,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Recommend avoidance of aquatic features through the golf course property • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-3	Sherin Ave Sewer	$ 9,659,000	2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • SAR screening to determine if suitable habitat is present along the Otonabee River • Erosion and Sediment Control Plan to protect the Otonabee River • Section 28 permit for development from ORCA • DFO consultation for near water works • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-4	Twin Trunk Under Otonabee River	$ 4,820,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • CHER followed by HIA if required for area within WWTP property • Fish Community Assessment to determine suitable setback from Otonabee River for work area • SAR Screening to determine if suitable habitat is present • Sediment and Erosion Control Plan to protect Otonabee River • DFO consultation and request for review due to potential impacts to Otonabee River • Section 28 permit for development from ORCA • Topographical survey • Subsurface utility investigation • Excess Soils Management Plan

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• Geotechnical and hydrogeological investigation • Road Access Permit • Fluvial Geomorphology Study to confirm cover depth over pipe under river
SAN-5	River Rd Sewer	$ 32,608,000	2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-6	Park St Trunk Sewer	$ 9,157,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-7	Rink Street Sewer	$ 4,278,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-8	Water St Sewer	$ 1,128,000	2051	Exempt (Table B, 22b)	• Targeted flow monitoring upstream of siphon to track capacity and verify timing of upgrade • Stage 2 AA, with First Nations monitors • CHER followed by HIA if required for portions within Trent University • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present along the Otonabee River • Erosion and Sediment Control Plan to protect the Otonabee River • DFO consultation for near water works • Section 28 permit for development from ORCA • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-9	NE Trunk Sewer Storage	$ 5,796,000	2051	**Sch. B (Table B, 22c), Completed in Future**	• Stage 2 AA with First Nations monitors • CHER followed by HIA if required for portions within Trent University • Fish Community Assessment to determine a suitable setback from Otonabee River for work area • SAR Screening to determine if suitable habitat is present • Sediment and Erosion Control Plan to protect Otonabee River • DFO Consultation for near water works • Permit from Parks Canada for development adjacent to Trent-Severn Waterway

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• Section 28 permit for development from ORCA • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-10	Rotary Green Trail	$ 670,000	2051	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • HIA for Pioneer Memorial Park once construction techniques are determined to evaluate impacts • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the woodlands • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit • Park Access Permit
SAN-11	Conger St Sewer	$ 477,000	2040 - 2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-12	Crawford Place Sewer	$ 5,744,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • SAR screening to determine if suitable habitat is present along the Otonabee River • Erosion and Sediment Control Plan to protect the Otonabee River • DFO consultation for near water works • Section 28 permit for development from ORCA • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-13	Erskine Ave Sewer	$ 2,554,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-14	Farmcrest Park Sewer	$ 3,602,200	2040 - 2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • SAR Screening to determine if suitable habitat is present • Sediment and Erosion Control Plan to protect Meade Creek • Avoidance of natural heritage features (watercourse and woodlands) recommended

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-15	Green Blvd Sewer	$ 1,128,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the wetlands or woodlands • Avoidance of natural heritage features (wetlands and woodlands) recommended • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-16	Southpark St Sewer	$ 1,449,000	2040 - 2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-17	Wallis Drive & Weller St	$ 9,741,000	2051	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the woodlands • Avoidance of natural heritage features (woodlands) • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-18 (1)	The Parkway Sewer Phase 1	$ 4,496,000	2040 - 2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the wetlands or woodlands • Avoidance of natural heritage features (wetlands and woodlands) recommended • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-18 (2)	The Parkway Sewer Phase 2	$ 9,771,000	2051	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the wetlands or woodlands • Avoidance of natural heritage features (wetlands and woodlands) recommended
SAN-19	Dublin St/ Gilchrist St/ London St/Donegal St/McDonnel St Sewer	$ 3,798,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-20	Riverside Dr	$ 2,809,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-21	Monaghan FM Upgrade	$ 667,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • SAR screening to determine if suitable habitat is present along the Otonabee River • Erosion and Sediment Control Plan to protect the Otonabee River • DFO consultation for near water works • Section 28 permit for development from ORCA • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-22	Ashburnham FM Upgrade	$ 56,000	2040-2045	Exempt (Table B, 22b)	• Targeted flow monitoring to verify future sizing • Stage 2 AA with First Nations monitors • SAR screening to determine if suitable habitat is present • Avoidance of natural heritage features (wetlands, woodlands, watercourses) recommended • Sediment and Erosion Control plan to protect Meade Creek • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-23	Airport FM Upgrade	$ 11,451,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • CHER followed by HIA if required for area on Airport lands • Aquatic Habitat Assessment and Fish Community Assessment to determine a suitable setback from the watercourses • Ecological Land Classification to determine vegetation community types present and whether SAR habitat or SWH is present • Tree Inventory and Arborist Report • Sediment and Erosion Control Plan to protect Otonabee River • Delineation of wetlands and woodlands along the right-of-way • DFO consultation and request for review due to potential impacts to Otonabee River • Section 28 Permit for Development from ORCA • Topographical survey • Subsurface utility investigation

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-24	Kawartha Heights Sewer	$2,056,000	2035	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present within the wetlands or woodlands • Avoidance of natural heritage features (wetlands and woodlands) recommended • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SAN-25	Parkhill West Sewer	$ 1,156,000	2040-2045	Exempt (Table B, 22b)	• Stage 2 AA with First Nations monitors • No nearby natural heritage features • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan • Road Access Permit
SPS / WWTP Upgrades					
SPS-1	Ashburnham SPS Replacement (Increase capacity from 300 L/s to 752 L/s)	$ 51,660,000	2035-2040	**Sch. B (Table B, 23b), Completed in advance of design**	• Additional flow monitoring upstream to verify existing peak flows to this SPS (part of HM-01) • Stage 2 AA with First Nations monitors • SAR Screening to determine if suitable habitat is present Sediment and Erosion Control Plan to protect Meade Creek • CLI-ECA Update • Building/Demolition Permit • Site Plan Approval • Designated Substances Survey • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan
SPS-2	Monaghan SPS Replacement (Increase capacity from 80 L/s to 300 L/s)	$ 23,800,000	2035	**Sch. B (Table B, 23b), Completed under SMP, Section 7**	• Stage 2 AA with First Nations monitors • Fish Community Assessment to determine a suitable setback from Otonabee River for work area • SAR Screening to determine if suitable habitat is present • Sediment and Erosion Control Plan to protect Otonabee River • Section 28 Permit for Development from ORCA for floodplain and valleylands • MECP consultation to determine whether registration or payment of conservation charges is appropriate for potential Blandings turtle habitat • MECP consultation to determine whether acoustic surveys and/or an overall benefit permit is required for potential bat habitat • CLI-ECA Update • Building/Demolition Permit • Site Plan Approval • Designated Substances Survey

Project ID	Project Description	Estimated. Cost	In-Service Date:	Class EA Requirements[1]	Additional Studies / Permitting Identified[2]
					• Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan
SPS-3	Airport SPS Replacement (Increase capacity from 3 L/s to 50 L/s)	$ 12,578,000	2035	**Sch. B (Table B, 23b), Completed under SMP, Section 7**	• Stage 2 AA with First Nations monitors • CHER followed by HIA if required • Sediment and Erosion Control Plan to protect adjacent swale and stormwater management pond • Section 28 Permit for Development from ORCA for floodplain • CLI-ECA Update • Building Permit • Site Plan Approval • Designated Substances Survey • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan
WWTP-1	Peterborough WWTP Capacity Upgrades (Increase capacity from 68.2 MLD to 75 MLD)	$ 28,482,000	2040 (expect to reach 80% of current rated capacity by 2035)	**Sch. C (Table B, 29c), Completed in advance of design**	• Stage 2 AA with First Nations monitors • CHER followed by HIA for area within WWTP property • Assimilative Capacity Assessment to determine required effluent quality to mitigate impacts to river and downstream communities with First Nation participation • Engagement with First Nations throughout future Schedule C Class EA and associated studies to ensure Treaty Rights are protected in advance of design. • Fish Community Assessment to determine a suitable setback from Otonabee River for work area • Ecological Land Classification to determine vegetation community types present • SAR screening to determine if suitable habitat is present • Sediment and Erosion Control Plan to protect Otonabee River • Environmental Impact Study may be required if encroaching on natural features • DFO consultation and request for review due to potential impacts to Otonabee River • Section 28 Permit for Development from ORCA • ECA Amendment, with inclusion of Air and Noise • Building Permit • Site Plan Approval • Designated Substances Survey • Topographical survey • Subsurface utility investigation • Geotechnical and hydrogeological investigation • Excess Soils Management Plan
TOTAL CAPITAL PROGRAM COST		**$277,900,000**			

Notes:
1. Schedule based on the MCEA (Feb 2024 Amendment), with applicable Project Table from Appendix 1 referenced in brackets;
2. Abbreviations are defined as follows: DFO – Department of Fisheries and Oceans; CHER – Cultural Heritage Evaluation Report, HIA – Heritage Impact Assessment, SAR – Species at Risk, ORCA – Otonabee Region Conservation Authority, CLI-ECA – Consolidated Linear Infrastructure Environmental Compliance Approval

8. Summary of Master Plan Recommendations

A summary of recommendations under this Sanitary Master Plan is provided below:

1. **Strategically Increase System Capacity to Accommodate Growth**: Implement the capital program described in this report to strategically increase system capacity to support population and employment growth projections to 2051. An update to this SMP should be completed by 2030 to re-evaluate needs based on any changes to growth projections and system flows. Recommended to review the City's sanitary design criteria as part of the next Sanitary Master Plan update.
2. **Increase Wet Weather Resilience**: Targeted inflow and infiltration reduction measures are recommended through the proposed capital program (IIRED01, IIRED02, and IIRED03), in areas that have the highest I/I response and the greatest potential for reduction. By removing extraneous flow from the sanitary system, the existing system capacity can be used to at least partially accommodate future flows related to growth. These reductions have been integrated into the Master Plan servicing strategy and the successful reduction is inherent to the other hard infrastructure pipe, pumping station upgrade and sizing needs. Ongoing I/I reduction efforts, in addition to the specific areas identified in the Master Plan is important to manage and moderate the sanitary system's response to wet weather events, increasing resilience to large storm events.
3. **Increase System Redundancy:** This can be achieved through twinning of critical pipes and ensuring all SPS upgrades incorporate sufficient equipment redundancy to allow for continued servicing under different failure scenarios. Specific recommended projects under the proposed capital program that will increase system redundancy are:

   SAN-4 Twin Trunk under Otonabee River: This project adds redundancy to a large trunk that carries the majority of the City's wastewater to the WWTP, and significantly reduces consequences of failure to the upstream collection system. This project is also required for additional capacity to service growth.

   SAN-5 River Road Sewer: This project reduces reliance on the existing sewer that runs along the Otonabee River, partially through residential easements that would be difficult to access for maintenance, including inspections, clean-outs and repairs. By allowing a portion of flow to be redirected through a new sewer along the right-of-way (ROW), the risk of surcharge is reduced, particularly for lower lying properties along the river. This project is also required for additional capacity to service growth.
4. **Plan for Increased Resiliency to Climate Change**: This SMP has identified areas in the sanitary system that have a higher vulnerability to climate change impacts, and specific opportunities within the current identified project list where additional upsizing could be incorporated. The City should review capacity needs ahead of initiating design work to consider opportunities for oversizing. Upgrades to SPSs and the WWTP should also consider opportunities in design to reduce greenhouse gas emissions, increase building resiliency to extreme heat and changes to

the freeze-thaw cycle, and provision for emergency power supply. Further details are provided in **Volume 3, Appendix D**.

5. **Regular Monitoring and Maintenance**: Incorporate enhanced monitoring and maintenance practices to allow for early problem detection and preventive maintenance, ensuring system longevity and reliability. Specifically, an enhanced flow monitoring program is recommended under project HM01, which will inform capacity allocation as developments come online, and support recalibration of the hydraulic model. Further, the City should continue its CCTV inspection program to monitor the condition of sewers that will support resource allocation for state-of-good repair upgrades. There is opportunity to implement a prioritization process for sewer CCTV inspection
6. **Infrastructure Modernization**: Design of the proposed capital projects, particularly facility upgrades at SPSs and the WWTP, should consider opportunities to incorporate newer, more advanced technologies and design practices, improving overall system efficiency. Building in monitoring and automated data collection into facility design and upgrade projects is recommended.
7. **Continue Engagement with First Nations**: The City should continue building relationships with First Nations that will potentially be impacted by the City's sanitary system, particularly in relation to discharge of WWTP effluent to the Otonabee River, and potential impacts of construction to archaeological resources of value to First Nations. It is recommended that the City continue to undertake quarterly meetings with Williams Treaties First Nations to provide them with project updates and opportunities for review and input with support from capacity funding.
8. **Continue Collaboration with Key Stakeholders**: A collaborative strategy involving various stakeholders, including governmental bodies, environmental organizations, and the community, is imperative to address the multifaceted challenges of sanitary flow management. Continued communication with stakeholders as projects move forward will be critical to maintaining buy-in.