GEI Consultants Canada

CITY OF BRANTFORD

Water and Wastewater Master Servicing Plan – Development Charges Update
2025 Amendment

Volume IV – Wastewater

Submitted to:
City of Brantford
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Table of Contents

1. Introduction and Background

1.1. City of Brantford Context

The City of Brantford is located in southwest Ontario along the banks of the Grand River and is within proximity of the City of Hamilton and the County of Brant. The City of Brantford is a single tier municipality, which owns and is responsible for the planning, construction, and management of the municipal water, wastewater, and stormwater infrastructure.

The City owns and operates its water system, which includes water treatment, storage facilities, pumping stations, and trunk and distribution watermains. The City's water is supplied by a single surface water treatment plant (WTP) that draws water from the Grand River and distributes treated water to its residents, businesses, and other water users.

The City owns and operates its wastewater system, which includes wastewater treatment, pumping stations, and collection and trunk sewers. The City's wastewater is collected and conveyed to a single wastewater treatment plant (WWTP) that treats the City's wastewater before discharging into the Grand River.

The City owns, maintains, and operates the majority of the stormwater collection and management infrastructure, which includes catch basins, storm sewers, ditches, culverts, stormwater management facilities, and other stormwater infrastructure. The entirety of the City is located within the Grand River watershed. The majority of the City's existing stormwater sewers and managed ditches drain directly to the Grand River or the following Grand River tributaries: Phelps Creek, Mohawk Lake and D'Aubigny Creek; however, a significant portion of the City's northeast discharges to local creeks along the City's north and east before discharging into Fairchild Creek.

Readily available and accessible public infrastructure is essential to the viability of existing and growing communities. Infrastructure planning, land use planning, and infrastructure investment require close integration to ensure efficient, safe, and economically achievable solutions to provide the required water, wastewater, and stormwater infrastructure.

To balance the needs of growth with the protection and preservation of natural, environmental, and heritage resources, the City of Brantford completed the 2021 Master Servicing Plan Update – 2051 Amendment (2021 MSP Update) for water, wastewater, and stormwater services under the Municipal Engineers Association (MEA) Master Plan Class Environmental Assessment process. This update amended the 2020 MSP to extend the planning horizon to 2051 and was completed in 2021. Since then, comprehensive block plans have identified higher densities than originally assumed, creating a need to reassess servicing capacities. The 2025 MSP Amendment builds upon the 2020 and 2021 plans by incorporating updated growth forecasts, revised density targets, and provincial policy changes. It evaluates the impacts of increased density and additional growth through sensitivity analysis, updates hydraulic modeling, and identifies

associated capital programs and cost implications to inform the City's Development Charges By-law and long-term infrastructure planning.

1.2. Municipal Comprehensive Review

The City of Brantford started its Official Plan Review in 2013. Between 2013 and 2016, completed work included the hosting of visioning sessions, the preparation of technical background papers and the creation of a new Draft Official Plan (Version 1, issued in July 2016). The Official Plan Review was put on hold while the Municipal Boundary Adjustment Agreement, between the City of Brantford and the County of Brant, was finalized and approved by the Province, and pending updates to the Growth Plan for the Greater Golden Horseshoe to which the new Official Plan must conform.

In 2016, the municipal boundary, between the City of Brantford and the County of Brant, was adjusted to secure additional lands for the City's future growth, effective January 1, 2017. These lands are referred to as the Boundary Adjustment Lands.

The municipal boundary adjustment brought new lands into Brantford's municipal boundary; however, this did not automatically include the lands in the City's urban area boundary, also referred to as a Settlement Area boundary. To expand the City's Settlement Area boundary, the Province requires municipalities to conduct a Municipal Comprehensive Review (MCR) as input into their new or amended Official Plan. The MCR is necessary as it determines the extent to which the Settlement Area boundary is to be expanded. Following the completion of the MCR, the new or amended Official Plan can designate urban land uses within the expanded Settlement Area boundary.

The City undertook the MCR and revisions to the 2016 Draft Official Plan to include the Boundary Adjustment Lands. The City of Brantford established an eight-stage study process to complete the Municipal Comprehensive Review and finalize the new Official Plan – entitled **Envisioning Our City**, and a new draft Official Plan was released to the public for review and comment in June 2020. To assist the City in completing a new Official Plan, the City retained a team of consultants led by SGL Planning & Design Inc., and includes The Planning Partnership, Cushman Wakefield, Hemson Consulting, AgPlan Limited, ASI (Archaeological Services Inc.), Ecosystem Recovery Inc., GM BluePlan Engineering, Plan B Natural Heritage, and Dillon Consulting.

The new Official Plan was adopted by City Council in March 2021 , approved by the Ministry of Municipal Affairs in August 2021, coming into effect August 5, 2021. The Official Plan has since been amended from time to time, and the current office consolidation is dated August 2025.

GM BluePlan Engineering was retained to support the MCR Study with respect to the determination of the appropriate water, wastewater, and stormwater servicing plan for the lands to be included within the Settlement Area boundary in the North Brantford and Tutela Heights Boundary Adjustment Lands.

1.3. Master Servicing Plan

In support of the Official Plan Review, and to ensure that infrastructure servicing recommendations to support the new urban land uses are made in a cohesive and integrated manner with the City's long-term servicing needs of the existing system, the City undertook an update to its MSP. In 2021, the MSP was amended to extend the planning horizon to 2051. This update incorporated minimal additional growth beyond 2041 and refined servicing assumptions based on updated population and employment forecasts.

The 2021 MSP Update – 2051 Amendment provided a review, evaluation, and development of water, wastewater, and stormwater servicing strategies to support existing needs and projected growth forecasts based to 2051; including the servicing of new urban land uses within the City's new Official Plan, adopted by Council in March 2021 and came into effect August 5, 2021.

The 2021 MSP Update was completed concurrently with the City's new Official Plan and the Transportation Master Plan Update to enable, where advantageous, alignment of recommended work or capital projects, minimizing potential impacts and disruptions to the public. Following the completion of the 2021 MSP Update to the 2041 growth horizon, updated growth numbers were provided by the Province's Growth Plan to the 2051 growth horizon.

The 2021 MSP Update – 2051 Amendment was a critical component of the City's planning for growth and will provide the framework and vision for the management, expansion and funding of the water, wastewater, and stormwater systems for the entire City to 2051 and beyond.

The 2025 MSP Amendment builds upon these previous MSPs, subsequent monitoring and data collection, studies since 2021, hydraulic modelling calibrations based on system update, and additional evaluations. It considers the impacts of increased density and potential additional growth through the assessment of alternate density targets. The amendment also identifies the associated capital program and cost implications to inform updates to the City's Development Charges By-law.

1.4. Master Servicing Plan Objectives

The MSP Update for water, wastewater and stormwater services comprehensively documents the development, evaluation, and selection of the preferred water, wastewater, and stormwater servicing strategies to meet the servicing needs of existing and future development to 2051 and beyond.

The 2021 MSP Update evaluated the ability of existing and planned water, wastewater, and stormwater infrastructure in the City of Brantford to efficiently and effectively service the City's existing and anticipated growth, including servicing of the new urban land uses within the City's new Settlement Area boundary in accordance with the draft Official Plan, and to evaluate and develop recommended servicing strategies.

The 2025 MSP Amendment builds upon the 2020 and 2021 updates by incorporating revised density targets, updated growth forecasts, and provincial policy changes. It evaluates alternate growth scenarios and selects the High Growth Scenario as the preferred planning basis to ensure resiliency and adaptability. The amendment updates hydraulic modeling, confirms servicing capacity for intensification and greenfield development, and identifies associated capital programs and cost implications to inform the City's Development Charges By-law and long-term financial planning.

The key objectives of the 2025 MSP Amendment are as follows:

- Review and confirm servicing capacity under revised growth scenarios, selecting the High Growth Scenario as the preferred planning basis;
- Update and refine water and wastewater servicing strategies to reflect higher density targets and provincial policy direction.
- Consider and incorporate proposed water, wastewater, and stormwater infrastructure needs to support the full buildout lands within the new municipal boundary beyond 2051;
- Maintain level of service objectives while optimizing infrastructure and minimizing under-sizing risks;
- Complete the MSP in accordance with the MEA Class EA process (further described in Volume II);
- Address key servicing considerations as part of the development and evaluation of servicing strategies including:
    - Level of service to existing users and approved growth
    - Operational flexibility and security of supply
    - Mitigation of impacts to natural, social, and economic environments
    - Opportunity to meet policy, policy statements, regulations and technical criteria
    - Opportunity to optimize existing infrastructure and servicing strategies
    - Ensuring the strategies are cost effective
- Consider and develop sustainable servicing solutions;
- Utilize updated industry trends and more detailed information from relevant City studies and projects to provide better capital cost estimates;
- Identify and prioritize capital projects with updated Class 4 cost estimates and escalation factors to ensure financial accuracy;
- Utilize recently completed and on-going projects to update infrastructure status, capacity and cost estimates;
- Provide a framework for implementation and integration with other master plans, including the Transportation Master Plan;
- Incorporate updated hydraulic modelling and system calibrations based on recent monitoring and data collection; Align the capital program with the upcoming Development Charges Background Study (2026) and the City's 10-year capital forecast; and
- Continue to support sustainable servicing solutions and resiliency in response to climate growth pressures.

1.5. Master Servicing Plan Documentation Layout

The 2025 MSP Amendment, including all supporting volumes, is the documentation placed on public record for the prescribed review period. This documentation, in its entirety, describes all required phases of the planning process and incorporates the procedure considered essential for compliance with the **Environmental Assessment Act** and fulfill the municipal master servicing plan requirement.

The 2025 MSP Amendment is organized into six volumes as described below.

Volume I – Executive Summary

Volume I provides a brief overview of the 2025 MSP Amendment. It summarizes the information contained in **Volume II**, **III**, **IV**, **V** and **VI**, including problem statement, purpose of the study, significant planning, environmental and technical considerations, description of the analysis performed and final solution and recommendations.

Volume II – Plan & Policy

Volume II details the master planning process; including the Master Plan Class EA process, related studies, legislative, and policy planning context, water, wastewater, and stormwater servicing principles and policies, population and employment growth forecasts, existing environmental and servicing conditions, evaluation methodology, and future considerations.

The appendices in this volume contain relevant baseline and planning information including:

- Appendix A – Traffic Zone Population and Employment Projections
- Appendix B – Principles, Policies, and Level of Service
- Appendix C – Unit Rates

Volume III – Water Master Plan

Volume III consists of the principal document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred water servicing strategy. This volume outlines the water policies, design criteria and level of service needed to be achieved by the water network. In addition, **Volume III** identifies the existing water network and describes the hydraulic modelling tool used for the analysis. Further **Volume III** outlines the detailed evaluation and decision-making process as well as the preferred servicing strategy and associated capital program and implementation plan.

A significant amount of technical background information has been compiled, which is critical to the development of the Water Master Servicing Plan. This information is included as appendices in **Volume III**. The technical appendices contain relevant project, implementation, and technical analysis information including:

- Appendix A – Water System Schematic
- Appendix B – Existing and Future Planning Details
- Appendix C – Expansion Lands Concepts
- Appendix D – Water Treatment Plant Concepts

- Appendix E – Evaluation Tables
- Appendix F – Capital Program Project Sheets
- Appendix G – Treatment Capacity Technical Memorandum

Volume IV – Wastewater Master Plan

Volume IV consists of the principal document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred wastewater servicing strategy. This volume outlines the wastewater policies, design criteria and level of service needed to be achieved by the wastewater network. In addition, **Volume IV** identifies the existing wastewater network and describes the hydraulic modelling tool used for the analysis. Further in **Volume IV** is the detailed evaluation and decision-making as well as the preferred servicing strategy and associated capital program and implementation plan.

A significant amount of technical background information has been compiled, which is critical to the development of the Wastewater Master Servicing Plan. This information is included as appendices in **Volume IV**.

The technical appendices contain relevant project, implementation, and technical analysis information including:

- Appendix A – Wastewater System Schematic
- Appendix B – Existing and Future Planning Details
- Appendix C – Expansion Lands Concepts
- Appendix D – Wastewater Treatment Plant Concepts
- Appendix E – Evaluation Tables
- Appendix F – Capital Program Project Sheets

Volume V and **Volume VI** were part of the 2020 MSP. The 2025 MSP Amendment did not complete any Stormwater updates or additional Public Consultation; therefore these volumes are not part of this 2025 Amendment Document package. The content of the Volumes as they appeared in the 2020 MSP is outlined below.

Volume V – Stormwater Master Plan

Volume V consists of the principal document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred stormwater servicing strategy. This volume outlines the stormwater policies, design criteria and level of service needed to be achieved by the stormwater network. In addition, **Volume V** identifies the existing stormwater network and describes the hydraulic modelling tool used for the analysis. Further, **Volume V** outlines the detailed evaluation and decision-making as well as the preferred servicing strategy and associated capital program and implementation plan. The Stormwater Master Plan will be updated during the 2030 MSP update. Therefore, this volume was not updated as part of the 2025 MSP Amendment.

A significant amount of technical background information has been compiled, which is critical to the development of the Stormwater Master Servicing Plan. This information is included as

appendices in **Volume V**. The technical appendices contain relevant project, implementation, and technical analysis information including:

- Appendix A – Key Existing Stormwater Infrastructure Facility Details
- Appendix B – Expansion Lands Subwatershed Study
- Appendix C – Evaluation Tables
- Appendix D – Implementation Plan Detailed Study Overview Sheets
- Appendix E – Capital Program Project Sheets

Volume VI – Public and Agency Consultation

No additional consultation activities were undertaken for the 2025 Amendment; refer to **Volume VI** of the 2021 MSP Update for consultation documentation.

2. Wastewater System Policy and Criteria

Execution of reasonable Policies and Level of Service (LOS) objectives are essential in ensuring that the proper planning and design principles are followed in the development of detailed servicing strategies, implementation of system capital program, and operations and maintenance practices.

In the context of the 2025 MSP Amendment, these Policies and LOS objectives provide guidelines and direction to the master planning process, in addition to ensuring that wastewater flows are adequately representative to support the decision making for sizing and timing of future infrastructure.

Through the MSP Amendment, draft Policies and LOS objectives were established and used to guide future investment in the water, wastewater, and stormwater systems. This section summarizes the key Policy and LOS objectives as they relate to the wastewater system. A fulsome summary of the objectives of the MSP Policies and Level of Service (LOS) review and recommendations are included in **Appendix B** of **Volume II**.

2.1. Wastewater Servicing Principles and Policies

Specific servicing principles and policies have been developed to guide the development of wastewater servicing strategies. In general:

> "**The City of Brantford is looking to provide an efficient, sustainable, and reliable wastewater system that minimizes environmental impacts and is capable of accommodating growth.**"

The servicing policies which impact the wastewater servicing are summarized in **Appendix B** of **Volume II**.

2.2. Wastewater Design Criteria and Hydraulic Performance Criteria

A guiding principle of design criteria is to ensure that the flow projections are adequately predicted with an appropriate factor of safety and risk management. This overall principle also ensures that infrastructure has sufficient capacity to meet the growing needs of the City and does not impede the approved/planned growth.

The design criteria were reviewed as part of this MSP Amendment to ensure wastewater flows are accurate and will support sizing and timing of future infrastructure such as pipes and facilities.

2.2.1. Wastewater Design Criteria and Level of Service Summary

The development of design criteria utilized historical flow data in combination with Ontario Ministry of Environment, Conservation, and Parks (MECP) Design Standards and Guidelines. Level of Service and wastewater policies were discussed and established at the outset of the project.

The wastewater design criteria updated as part of the 2025 MSP Amendment are summarized in **Table 1**.

Table 1: Wastewater Design Criteria and Level of Service

Criteria		Draft Targets
Wastewater Flows	Per Capita Rate	245 Liters/capita/day (residential) 270 Liters/capita/day (employment)
	Peaking Factor	Harmon's Peaking Factor (min 2.0, max 4.0)
	Inflow/Infiltration Allowance	0.3 Liters/second/hectare
Facility Capacity	Facility Triggers	80% Planning and Design 90% Construction
	Pumping	Firm capacity = Largest pump out of service (pump capacity); and, Largest forcemain out of service (when multiple forcemains are present) Wastewater Pumping Station (WWPS) to convey peak 100-year flows New WWPS or upgraded WWPS, which support growth, to also provide storage to detain 10-year flows for 1 hour
System Performance	Peak Wet Weather Design Flows	10 Year Design Storm
	Existing Infrastructure [(1)]	Hydraulic Grade Line Target 2.1 meters below ground level or depth/Diameter (d/D) <= 1.0
	New/Upgraded Infrastructure [(2)]	depth/Diameter of pipe (d/D) ≤ 0.7
Extraneous Flow Program		Requirement of the flow monitoring of new developments to ensure development is achieving design flows

[(1)] Existing sewers with surcharge states will only be flagged for upgrades if the diameter is greater or equal to 250 mm.

[(2)] Please note that for the greenfield growth areas, this study only assesses new trunk infrastructure. Local infrastructure (linear and vertical) are not assessed and documented.

Development of the wastewater flow criteria for the 2025 MSP Amendment is detailed further in **Appendix B** in **Volume II**.

2.2.2. Wastewater Use Design Criteria

Wastewater flows are assessed by means of dry weather flows and peak wet weather flow with growth design flows calculated using the following formula:

Peak Design Flow = Dry Weather Flow × Peaking Factor + Infiltration Allowance

To estimate the growth flow per capita rates, extraneous flow allowance, and peaking factors must be defined.

2.2.2.1. Per Capita Flow Rate

Per capita average dry weather flows, as detailed in **Table 2**, were assessed on a system scale with further analysis using 2018-2022 flow monitoring data. The per capita rates indicate that typical residential and employment per capita rates are generally lower than the existing design criteria on a catchment scale and a system wide scale.

Table 2: Historic Wastewater Per Capita Rates

Year	Residential Per Capita Rate (L/c/d)	Employment Per Capita Rate (L/c/d)	Combined Per Capita Rate (L/c/d)
2016	214	303	238
2017	239	295	268
2018	217	296	254
2019	216	331	247
2020	216	279	233
2021	206	300	231
2022	272	204	255
2023	333	175	292
Average	**239**	**273**	**252**
Current Design Criteria	**270**	**300**	**-**

The recommended design criteria utilized for per capita dry weather flows is as follows:

- Growth related residential per capita rate of 245 L/c/d and employment per capita rate of 270 L/c/d
    - This represents a decrease in the existing design criteria per capita rates of 10% and is in line with the recommended water per capita rate decrease.
    - The recommended per capita rate remains above the observed historic per capita rate; providing reasonable flexibility in the criteria to accommodate potential changes in future usage rates.

- While there is an observed decreasing trend in per capita rates, a stepped approach to lowering per capita rates is recommended with the next MSP to ensure water conservation measures are maintained as wastewater flows are directly correlated with water consumption.

2.2.2.2. Peaking Factor

The City presently utilizes the Harmon's peaking factor approach in their current design criteria, and it is recommended that this approach be maintained. The use of Harmon's peaking factor was validated in the 2021 Master Plan Update. During the previous model calibration (using 2017 flow monitoring data), the observed peaking factors at critical flow monitoring locations were compared with design guideline peaking factors as shown in **Table 3**. The results indicated that the observed peaking factors were lower than the peaking factors calculated using design guideline methodology, which provides an additional safety factor in the evaluation of the local system. Harmon's peaking factor will be used continuously in this 2025 MSP Amendment to estimate growth related peak dry weather flows.

Table 3: Observed and Harmon's Peaking Factors

Flow Monitor	Observed Peaking Factor	Design Guidelines Peaking Factor (Residential)	Design Guidelines Peaking Factor (Employment)
SA03	1.95	2.86	2.97
SA04	1.85	2.63	2.82
SA10	1.67	3.72	3.43
SA11	2.19	3.65	3.59
SA12	1.83	2.83	3.24
SA13	1.63	2.82	2.71
SA14	1.83	2.85	3.15
SA15	1.81	3.03	3.16
SA16	1.93	3.80	3.58

2.2.2.3. Extraneous Flow Allowance

Observed wet weather flows, by means of extraneous flows entering the wastewater system, were evaluated based on the 2018-2022 flow monitoring data. This process extrapolated observed extraneous flows to design storms, as detailed in **Table 4**, such that the performance of the existing wastewater system could be assessed.

Table 4: Observed Extraneous Flows

Design Storm	Average I/I (L/s/ha)	Min I/I (L/s/ha)	Max I/I (L/s/ha)
2-Year	0.67	0.04	1.89
5-Year	0.89	0.05	2.49
10-Year	1.08	0.07	3.04
25-Year	1.25	0.08	3.50
50-Year	1.42	0.09	3.96
100-Year	1.58	0.09	4.40
Current Design Criteria	**0.30**		

The recommended design criteria utilized for extraneous flow allowance are as follows:

- Recommend extraneous flow allowance for new greenfield and infill development be increased to 0.3 L/s/ha.
- Capacity assessment for existing infrastructure to utilize actual existing peak wet weather flow based on the hydraulic model results.

2.2.2.4. Starting Point Methodology

The five-year rolling average of average day flows will be used to establish baseline system average daily flows.

2.2.2.5. Growth Flow Projections

Future system flows were developed using a starting point methodology, the standard approach within Southern Ontario for projecting future growth flows. Expected flows due to growth were added to the starting point flow to establish future flows. For example:

2051 Average Dry Weather Flow = Baseline Average Dry Weather Flow + (2051 residential population – 2021 residential population) * 245 L/c/d + (2051 employment population – 2021 employment population) * 270 L/c/d

2.2.3. Wastewater Facilities

Evaluation of facility capacities and future needs were assessed first utilizing peak wet weather flows under historic conditions and further growth flows utilizing the per capita rate, peaking factor, and extraneous flow allowance outlined in **Section 2.2.1**.

2.2.3.1. Facility Upgrade Triggers

Industry best practice, and recommended methodology, for treatment and wastewater pumping stations facility upgrade triggers are as follows:

- At 80% utilization of a facility's capacity the planning and design process will begin to assess upgrade capacity needs.

- At 90% utilization of a facility's capacity the construction process begins through either an upgrade to an existing facility or construction of a new facility.

2.2.3.2. Wastewater Pumping Station Capacity

The evaluation of pumping needs considered the inflow to each pumping station for each design storm using the hydraulic wastewater model. The recommended approach in determination of pumping capacities is as follows:

- Firm capacity is defined as the largest pump out of service, utilizing pump performance data, where available and largest forcemain out of service where there are dual forcemains.
- 100-year level of service for existing and new wastewater pumping facilities – capable of conveying peak 100-year design storm flows.
- 10-year level of service for new facilities and upgraded facilities – capable of providing 1 hour of onsite storage for the 10-year design storm flows.

2.2.4. Hydraulic Performance Criteria

An updated and calibrated hydraulic wastewater model (2023) was utilized in the analysis of existing wastewater system performance. This process detailed existing system performance without the application of growth flows and could be used as a guideline for potential system upgrades.

2.2.4.1. Gravity Sewer System Capacity

Sewer surcharging conditions was defined and assessed when peak system hydraulic grade line (HGL) within a pipe satisfies the following conditions under the 10-year design storm:

- Existing Infrastructure
  - The Hydraulic Grade Line (HGL) in the pipe if the pipe obvert is higher than 2.1 meters below grade; or
  - The depth of flow in pipe is equal to or more than the obvert elevation ($1 \leq d/D$)[1];
- New/Upgraded Infrastructure
  - Gravity sewers will achieve a d/D target of 0.7

Please note that existing sewers with surcharge states will only be flagged for upgrades if the diameter is greater or equal to 250 mm. For the greenfield growth areas, this study only assesses new trunk infrastructure. Local infrastructure (linear and vertical) are not assessed.

Table 5 presents a summary of the level of service targets that were used to evaluate the performance of the existing system.

Table 5: Wastewater Level of Service Targets

Wastewater Criteria	
Design Rainfall Derived Inflow and Infiltration (RDII)	Existing – 10 Year Design Storm Growth - 0.30 (L/s/ha)
Peaking Factor	Harmon's Peaking Factor
Hydraulic Grade Line (HGL) Target	2.1 m below ground under 10-year storm
depth/Diameter (d/D) Target	Existing 1.0 under design RDII
d/D Target	New 0.7 under design RDII

2.3. Capital Cost Projections

A capital cost is provided for all projects proposed as part of this MSP Amendment. For the majority of the wastewater system projects, a base construction cost was obtained using either a unit rate construction cost, based on pipe diameter, or unique project analysis. The base construction cost considers several factors specific to each project such as creek crossings, railway and highway crossings, tunneling requirements, and location of construction (Greenfield, urban, suburban). Design, administration, contingency, and non-recoverable HST costs were added to arrive at a final project cost. Detailed costing sheets were developed to support the financial evaluation for each capital project.

3. Planning & Growth Projections

Ontario's A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020) provides a framework for implementing the Province's vision for managing growth and provides context on where and how to grow. The Growth Plan for the Greater Golden Horseshoe was repealed under O. Reg. 328/24 and integrated into the Provincial Planning Statement (2024).
While this Plan has since been repealed, several of the core principles have been integrated into the Provincial Planning Statement (2024), such as the concept of strategic growth areas.
The Growth Plan provides population and employment forecasts for all upper- and single-tier municipalities in the GGH. The Provincial growth forecasts are a foundational component of the Growth Plan and must be reviewed in consultation with municipalities at least every five years. The City is forecasted to have a population of 165,000 and a corresponding local employment base of 80,000 jobs by 2051. The City's new OP (2023) has been prepared to appropriately plan where and how this growth will be accommodated and the supporting infrastructure that is required.

The basis of the Master Servicing Plan is to identify the long-term servicing requirements to support the City's growth needs in line with the Provincial Planning Statement (2024) to 2051, with appropriate strategic servicing decisions to support post 2051 growth.

3.1. Growth Lands

In 2016, the municipal boundary between the City of Brantford and the County of Brant was adjusted in order to secure additional lands in the City for future growth, effective January 1, 2017. These lands are referred to as the Boundary Adjustment Lands.

The municipal boundary adjustment brought new lands into Brantford's municipal boundary; however, this did not automatically include the lands in the City's urban area boundary, also referred to as the Settlement Area boundary. To expand the City's Settlement Area boundary, the Province requires municipalities to conduct an MCR as input into their new or amended Official Plan. The MCR is necessary as it determines the extent to which the Settlement Area boundary is to be expanded. Following the completion of the MCR the new or amended Official Plan can designate urban land uses within the expanded Settlement Area boundary.

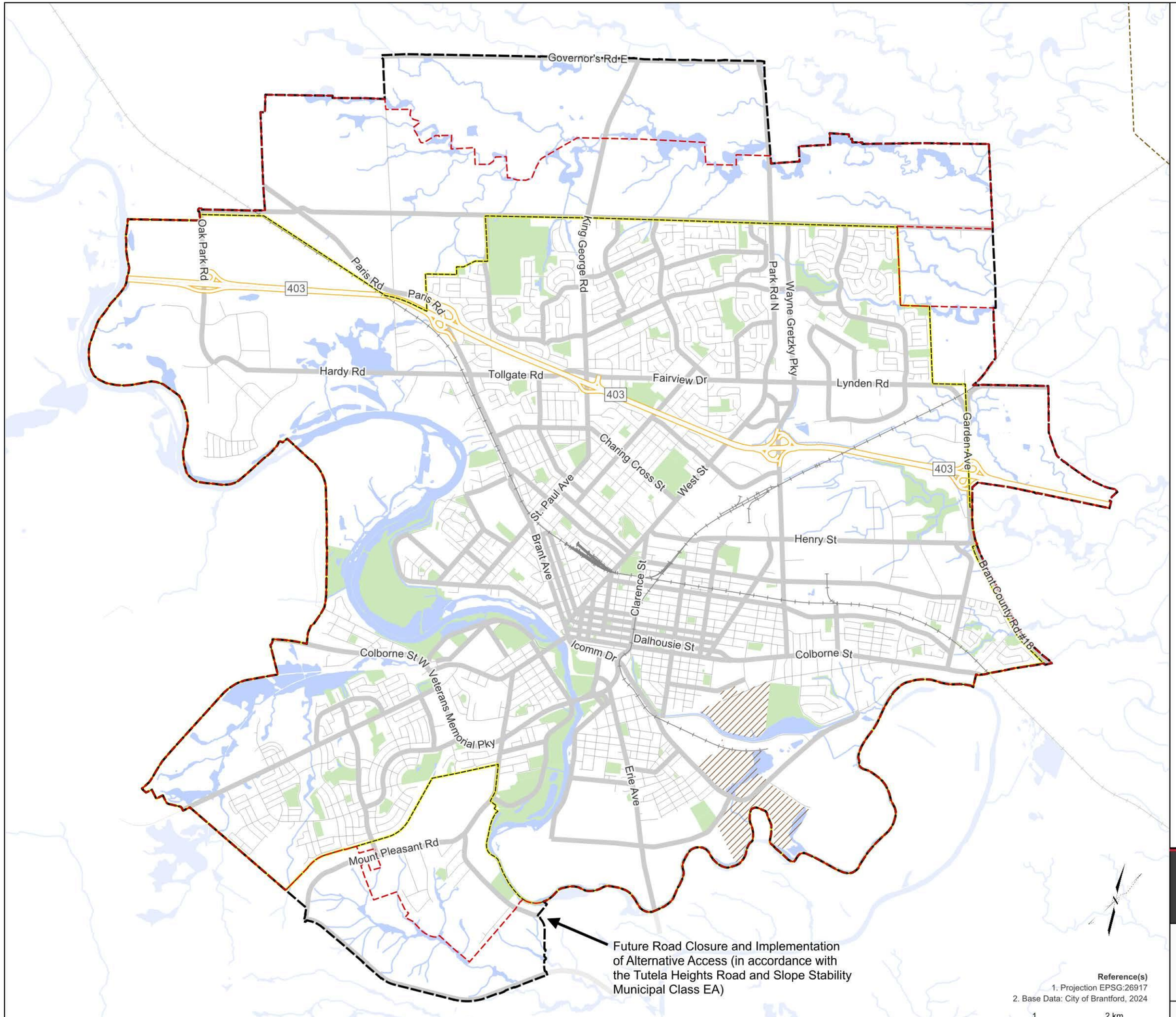
The MCR identified both growth and intensification targets as well as Settlement Area boundary expansion needs. **Figure 1** presents the Settlement Area Boundary Expansion Lands which are further subdivided into the following sub-areas:

- North Expansion Lands;
- East Expansion Lands; and,
- Tutela Heights.

Both the East Expansion Lands and Tutela Heights include lands previously within the Settlement Area boundary of the County of Brant and through the boundary adjustment

became part of the City's Settlement Area. However, as these areas require municipal servicing infrastructure, they are included as part of the three expansion sub-areas listed above.

The proposed land use designations for the Settlement Area boundary expansion areas are presented in Schedule 3 of the Official Plan and include a variation of residential, intensification, and employment areas. Portions of the Settlement Area Boundary Expansion are within the GRCA floodplain and Natural Heritage System; as such, urban development is not permitted in these areas of the new urban land uses due to their environmental sensitivity and the importance of maintaining the existing land uses. Additionally, beyond the Settlement Area Boundary Expansion are Lands Outside Settlement Boundary (LOSB), which are lands held for future Settlement Area expansion following substantial development of the current proposed Settlement Area Boundary Expansion areas.



Proposed Preferred Road Options

- Collector Roads
- Major Arterial Roads
- Controlled Access Major Arterial

Proposed Preferred Land Use Options

- Agricultural Designation
- Core Natural Areas Designation
- Downtown Urban Growth Centre Designation
- General Employment Designation
- Intensification Corridor Designation
- Major Commercial Centre Designation
- Major Institutional Designation
- Parks and Open Space Designation
- Prestige Employment Designation
- Residential Designation

General Features

- Expressway / Highway
- Arterial and Collector Roads
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Parks
- Waterbody and Watercourses

Reference(s)
1. Projection EPSG:26917
2. Base Data: City of Brantford, 2024

1 2 km

Figure 1
Preferred Land Uses

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI Consultants Canada

Last Updated: June 2026
Document ID: 2404322-G-001

Document Path: B:\Working\BRANTFORD ON_CITY OF\2404322 Master Servicing Plan - 2025 Development Charges Update\05_GIS\6_Final Report\2404322-G-001.mxd

The population projections for the Expansion Lands within the Settlement Area Boundary are provided in **Table 6.** The population projection was estimated by applying a high-density scenario to these expansion areas, excluding Natural Heritage Areas. The densities include:

- 30 jobs per hectare for North and East Expansion Employment Lands; and
- 90 residents and jobs combined per hectare for North and East Expansion Residential Lands; and,
- 75 residents and jobs combined per hectare for Tutela Heights.

Table 6: Expansion Lands Within Settlement Area Population Projections

Settlement Area Boundary Expansion Lands	Area (ha)	Population		
		Residential[(1)]	Employment[(2)]	Total
North Expansion Lands	1,883	52,816	26,794	79,613
East Expansion Lands	240	4,421	3,496	7,916
Tutela Heights	581	25,461	834	26,294

(1) Inclusion of 3% undercount and secondary suite residential population growth distributed within the expansion lands

(2) Inclusion of employment no fixed place of work and work from home employment growth distributed within the expansion lands

3.1.1. Settlement Area Boundary Expansion Wastewater Servicing

The wastewater servicing concepts and strategies presented in the following sections consider upgrades within the City's existing infrastructure system, as well as new infrastructure and upgrades needed to service the expansion areas.

3.1.2. Tutela Heights Wastewater System

Existing residents within the Tutela Heights area are serviced by private on lot septic systems. New growth in Tutela Heights will need to be serviced by the municipal wastewater system via an extension of the City's existing wastewater system. The existing septic areas can continue to remain as such; however, the sizing of any existing wastewater infrastructure should consider the future servicing of these septic areas by the City's wastewater system.

3.2. Population and Employment Growth Analysis

Growth projections for the City of Brantford were provided by SGL and subsequently updated by long-range planning at the City based on the City's Official Plan. SGL has refined the population

and employment forecasts set out in the Official Plan and allocated the projections based on Traffic Survey Zone distribution, factoring projected detailed planning information within Greenfield growth areas, intensification corridors and the Settlement Area Boundary Expansion Lands. **Table 8** presents the population and employment breakdowns. **Appendix A** of **Volume II** provides a detailed breakdown of existing (2021) and 2051 population and employment projections by Traffic Survey Zone.

Since the completion of the 2020 MSP Update and the 2021 Amendment, comprehensive block planning and provincial policy changes have resulted in higher density targets and revised growth assumptions shown in **Table 7**. The 2025 MSP Amendment incorporates these changes through a sensitivity analysis of three growth scenarios - Low, Medium, and High - to evaluate infrastructure needs under varying conditions. The High Growth Scenario was selected as the preferred planning basis to ensure resiliency and minimize under-sizing risks.

Table 7: New Density Targets

Area	Density (people or jobs/ha)		
	Low	Medium	High
Expansion Lands, Greenfield - Res	60	75	90
Expansion Lands, Greenfield - Emp	25	25	30
Tutela Heights	50	65	75
Intensification Corridors	60	80	100
Downtown Core	150	200	250

Table 8: Growth Population Estimates

Total MSP Growth	Population [(1)]	Employment [(1)]	Total [(1)]	Growth from 2021[(1)]	Additional Growth in LOSB
2021	103,596	36,993	140,589	-	-
2051 (2021 MSP)	164,736	83,365	248,098	107,509	-
2051 - Low	166,684	83,585	250,268	109,679	35,623
2051 – Med	181,651	88,350	270,001	129,413	35,623
2051 – High	196,044	96,792	292,836	152,247	35,623

[(1)] Not including LOSB

This analysis confirmed that higher density development accelerates infrastructure triggers and increases capital program requirements. Updated hydraulic modeling and servicing strategies were developed to accommodate these projections.

3.3. Projected System Populations

Table 9 details growth by major Wastewater Pumping Station (WWPS) and WWTP catchments from Traffic Zone data.

Table 9: Wastewater Catchment Population and Employment Growth

Wastewater Catchment[1]	Population		Employment	
	2021	2051	2021	2051
Brantford WWTP	48,785	74,835	11,195	35,426
Johnson Road WWPS	1,762	1,858	0	76
Empey Street WWPS	29,827	47,926	19,830	33,787
Somerset Road WWPS	5,245	6,019	931	1,946
Woodlawn Road WWPS	1,940	1,838	0	168
St. Andrews Drive WWPS	149	1,101	19	190
Lawren S. Harris Drive WWPS	1,041	911	4	287
Greenwich Street WWPS	9,665	17,775	4,280	7,413
Alexander Drive WWPS	519	598	298	577
Fifth Avenue WWPS	3,788	6,455	340	814
Stauffer Road WWPS	2	0	0	102
New WWPSs [2]	870	36,726	68	15,814
Total	**103,596**	**196,044**	**36,993**	**96,792**

[1] Catchment totals do not include populations and employment of their upstream catchments.

[2] Multiple New Wastewater Pumping Stations to be constructed, these catchment areas are not serviced currently, but will be serviced in 2051.

3.3.1. County Agreements

As part of the 2016 Boundary Adjustment Agreement, the City committed to allowing the County to connect to the City's servicing infrastructure for areas referred to as the Airport Lands and the Cainsville Lands. The services to be connected were wastewater for the Airport Lands and water and wastewater for the Cainsville Lands. This was subject to a number of terms and conditions including that the City would provide adequate capacity to service the areas based on the City's design criteria and subject to both parties entering into a Servicing Agreement.

The County of Brant undertook a review to evaluate the infrastructure required to service the Airport and Cainsville Lands inline with the 2016 Boundary Adjustment Agreement. The results of the study were presented at the August 14, 2018 County of Brant Public Works Committee meeting (PW-18-69 – Airport and Cainsville Servicing Strategy). The study recommendations for wastewater were as follows:

- Connecting the Airport Lands to the City's wastewater system will be costly and is not recommended over the next 5-10 years.
- To connect the Cainsville wastewater system to the City's existing 675mm trunk sewer on Colborne Street.

Additionally, Cainsville's 2024 Water, Wastewater, and Stormwater Servicing MSP identified an increase in water acquisition from the City as their preferred alternative for increasing municipal water supply. This would require an updated servicing agreement with the City of Brantford.

As per the County report Phase 1 of the Cainsville Service Area was identified as the first priority for the County. This involves connecting Cainsville wastewater to the City's collection and treatment system and ensuring that the existing water connection to the City's distribution system is adequate. The Airport connection phases were identified as a lower priority.

The Existing and 2051 populations are provided in **Table 10** to provide context; if the County and City enter into an agreement in the future.

Table 10: Cainsville and Airport Population Growth

County of Brant Servicing	Population	
	Existing	2051
Airport [1]	903	9,269
Cainsville	7,500[2]	12,070
Total	**8,168**	**20,007**

[1] Airport existing population as in 2016 from 2021 Master Plan Update, which is the most recent available data for the City.

[2] Cainsville existing population as in 2021 based on Cainsville's 2024 Water, Wastewater, and Stormwater Servicing MSP, which includes the total population from both serviced and not serviced properties

3.3.2. Post Period Considerations

The servicing analysis focuses on servicing the buildout of the internal growth and Settlement Area Boundary Expansion Areas to 2051; however, in the development of the recommended servicing strategy and infrastructure sizing, consideration for the full buildout of the City's municipal boundary, including the LOSB was considered, assuming similar population and employment densities. Where applicable, identification of future facility expansion needs and/or strategic upsizing of linear infrastructure was identified and incorporated into the final servicing plan.

The growth projection, detailed in **Table 11**, for the remainder of the municipal boundary area was estimated by applying a high density scenario to these remaining areas, excluding Natural Heritage Areas. These densities include:

- 60 residents and jobs combined per hectare for North and East Expansion Lands; and,
- 75 residents and jobs combined per hectare for Tutela Heights.

This approach typically aligns with the residential densities for proposed growth to 2051.

Table 11: Municipal Boundary Full Buildout Population & Employment

LOSB	Area (ha)	Population & Employment
North Expansion Lands	360	21,571
Tutela Heights	187	14,052
Total LOSB	**547**	**35,623**

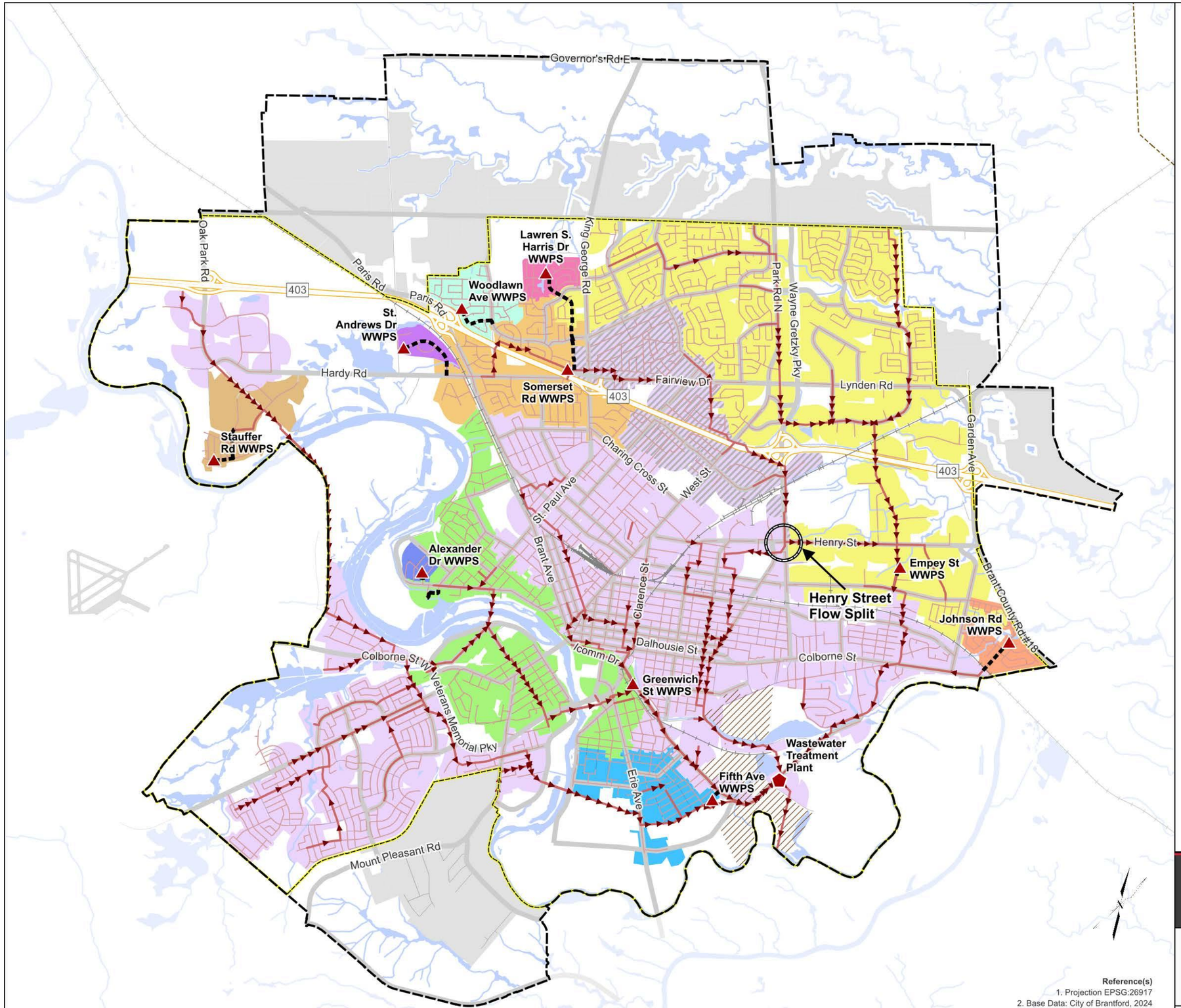
4. Existing Wastewater System

4.1. Existing Wastewater Infrastructure

The City employs a gravity-based wastewater collection and treatment system that collects wastewater from the east and west sides of the Grand River, highlighted in **Figure 2** with detailed wastewater system schematics provided in **Appendix A**. The collection system generally drains from the north to the south and from west of the Grand River to the east. The existing network also includes siphons which convey flow under the Grand River in four locations. Wastewater flows are sent to the Brantford Wastewater Treatment Plant (WWTP), located in southeast Brantford near the Grand River.

4.1.1. Wastewater Treatment Plant

The Brantford WWTP is located at 385 Mohawk Street adjacent to the Grand River in southeast Brantford. The WWTP is a Class IV conventional activated sludge (CAS) facility. The WWTP consists of a single influent pump station consisting of four pumps and preliminary treatment, including screening and grit removal. Wastewater is distributed to two Process Modules (PMs) for primary and secondary (aeration and secondary clarification) treatment and is then combined again for common chlorination and de-chlorination. Treated effluent is discharged from west to east to the Grand River. Sludge is digested anaerobically on site with sludge loading facilities and biosolids storage tanks. **Table 12** includes the WWTP processes and corresponding capacities and an overview of the processes is provided in **Figure 3**.



Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Expressway / Highway
- Arterial and Collector
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Parks
- Waterbody and Watercourses
- North Expansion Lands

Reference(s)
1. Projection EPSG:26917
2. Base Data: City of Brantford, 2024

1 2 km

Figure 2
Existing Wastewater System

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI

Last Updated: June 2026
Document ID: 2404322-WW-002 v2

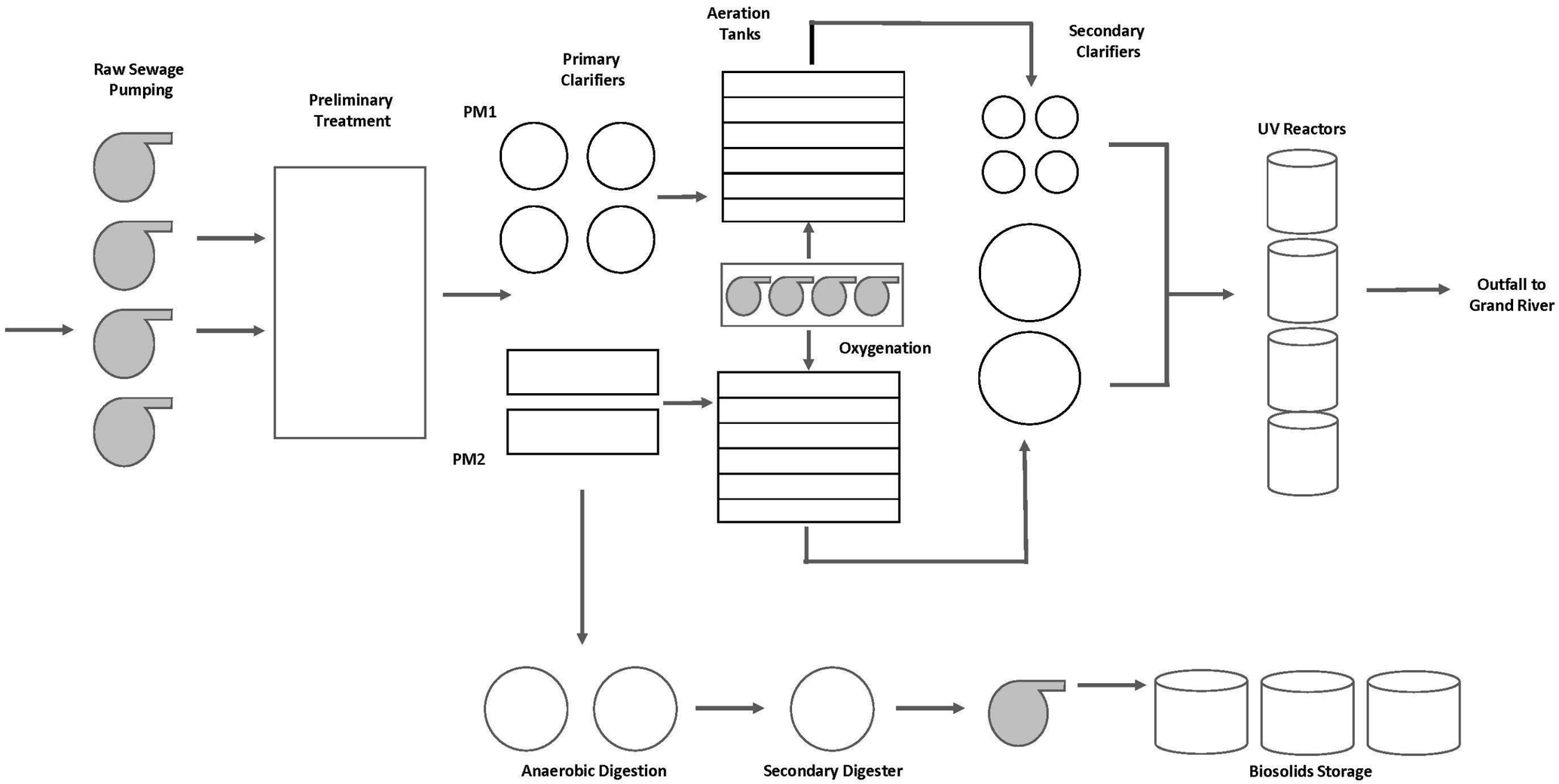


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Figure 3
Wastewater Treatment Plant Process Diagram

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford (Ontario, Canada)

GEI Consultants Canada

Last Updated: December 2025
Document ID: 2404322-WW-004

Table 12: Wastewater Treatment Plant Capacity Process Overview

Process	Elements	Installed Capacity [1]		Operating/Rated Capacity [2] (MLD)
		PM1 Capacity (MLD)	PM2 Capacity (MLD)	
Raw Sewage Pumping	(4) pumps rated @ 60 MLD	240		180
Forcemain	(2) 900 mm forcemains	220		110
Preliminary Treatment – Screening	(2) trains at 116 MLD	232		116
Preliminary Treatment – Grit Chambers	(2) trains at 116 MLD	232		116
Primary Clarifiers	(4) clarifiers for PM1, (2) clarifiers for PM2	85.9	67.6	119
Aeration Tanks				
BOD5 Loading	(2) tanks for PM1, (2) tanks for PM2	61.5	19.8	50.5
O_2 Availability	(2) new 300 HP and (1) 200 HP turbo blowers and (1) 300 HP centrifugal blower	65.5		49.1
Secondary Clarifiers	(2) clarifiers in service and (4) clarifiers out of service at PM1 and (2) clarifiers at PM2	59.4	59.4	89.0 (141)[3]
Chlorine Contact Chamber[4]	(1) Tank and pipe based on 30 min CT	75.8		--
Dechlorination Facilities[4]	(4) 3,100 L Chemical Tanks and (2) pumps at 50 L/hour	58.7		29.3
Sludge Digesters	(2) primary digesters and (1) secondary digester with (2) pumps at 15 day HRT	74.4		37.2
Biosolids Storage	(3) tanks at 150 days HRT	50.7		33.8

[1] The installed capacity is the total installed capacity of all units in the process based on facility specifications

[2] The observed/rated capacity is the actual operating capacity of the process based on current facility operations with 1 unit offline

[3] Anticipated capacity with all clarifiers back in service

(4) City plans to decommission chlorine disinfection and de-chlorination and replace with UV disinfection

4.1.2. Wastewater Pumping Stations

There are currently nine (9) WWPS of varying capacity that are owned by the City. **Table 13** summarizes the wastewater pumping facilities flow capacities. Performance testing was completed in 2018 to confirm the observed capacity of the City's WWPS. For the purposes of the MSP Amendment's analysis, the WWPS's observed firm capacity was used.

Table 13: Wastewater Pumping Station Capacities

Facility	Pumps	Installed Capacity (1) (MLD)	Design Firm Capacity (2) (MLD)	Observed Firm Capacity (3) (MLD)
Johnson Road WWPS	3	6.0	5.5	4.7
Empey Street WWPS	4	145.2	138.2	96.8
Somerset Road WWPS	4	26.8	23.3	22.5
Woodlawn Road WWPS	3	5.5	4.9	4.1
St. Andrews Drive WWPS	2	2.8	2.4	2.1
Lawren S. Harris Drive WWPS	3	7.8	6.7	6.3
Greenwich Street WWPS	4	37.6	32.0	29.5
Alexander Drive WWPS	2	2.8	1.8	0.9
Fifth Avenue WWPS	3	8.5	7.2	6.1
Stauffer Road WWPS	2	5.2	2.6	2.6

(1) The installed capacity is the total installed capacity of all pumps at the facility based on pump specifications

(2) The design firm capacity is the capacity with the largest pump out of service based on pump specifications

(3) Observed firm capacity is the actual operating capacity of the station based on pump station performance testing completed in 2018

4.2. Wastewater Trunk Sewers

A larger trunk sewer network and catchment area collects most areas northeast of the Grand River. A 975 mm to 1200 mm trunk sewer extends along the east side of Brantford, generally along Mohawk Street, Empey Street, Roy Boulevard, and Wayne Gretzky Parkway, a 675 mm to 750 mm sewer extends north through the center of Brantford generally along Stanley Street, and a 900 mm sewer services the majority of the downtown core following Greenwich Street.

A small collection system drains the area southwest of the Grand River towards Colborne Street. The trunk sewer network crosses the Grand River via siphons from west to east at two locations;

south of Veteran's Memorial Parkway and south of Baldwin Avenue along the Dike Trail. Flow from smaller catchments crosses the Grand River west to east from Grand River Avenue to Spalding Drive and along the Oak Hill Trail south of Hardy Road.

4.3. Existing and Future Projected System Flows

The existing wastewater system flows as well as the future projected flows are outlined in the following sections.

4.3.1. Existing System Flows

The existing system observed average daily flows were reviewed from 2019 to 2023 and are included in **Table 14**.

Table 14: Existing Observed System Flows

Year	Observed Average Daily Flow (MLD)
2019	34.5
2020	missing data
2021	missing data
2022	32.3
2023	36.2
2024	**39.3**
3 Year Average	**35.9 (2022-2024)** **35.6 (2019-2024)**

4.3.1.1. Starting Point Methodology

The three year rolling average of average day flows was used to establish baseline system average daily flows.

4.3.2. Projected System Flows

The population and employment projections presented in **Table 9** and Level of Service criteria presented in **Table 1** were utilized to calculate the average dry weather flow (ADWF) presented in **Table 15** and further detailed in **Appendix B**. Future system flows were developed using a starting point methodology, the standard approach within Southern Ontario for projecting future growth flows. Expected flows due to growth were added to the starting point flow to establish future flows.

Table 15: Wastewater System Flows

Wastewater Catchment	Average Dry Weather Flow (MLD)[1]	
	2021	2051
Brantford WWTP	37.8	123.2
Johnson Road WWPS	0.4	0.5
Empey Street WWPS	8.0	43.8
Somerset Road WWPS	2.0	3.2
Woodlawn Road WWPS	0.6	1.0
St. Andrew's Drive WWPS	0.1	0.3
Lawren S. Harris Drive WWPS	0.2	0.3
Greenwich Street WWPS	5.3	10.5
Alexander Drive WWPS	0.5	0.6
Fifth Avenue WWPS	1.2	2.0
Stauffer Road WWPS	0.1	0.2

[1] ADWF includes the WWPS catchment, and all upstream catchments established from the City's Wastewater model

4.3.2.1. County Wastewater Agreements

In the 2016 Boundary Adjustment Agreement, signed by the City and the County, the City committed to entering into a Servicing Agreement based on various principles including that the wastewater system capacity will be provided based on the City's design criteria.

As per County Council report PW-18-69 (August 2018) future flows from Cainsville are likely to be conveyed to the City of Brantford; however, the Airport connection is not anticipated within the next 5 to 10 years and feasibility will be revisited at a later date.

The flows for Cainsville and Airport in the County of Brant are provided in **Table 16** to provide context for the possible flows; if the County and City enter into a wastewater agreement in the future.

Table 16: Cainsville and Airport Flows

County of Brant Servicing	Average Dry Weather Flow (MLD) [1]	
	2021	2051
Airport	0.2	1.6
Cainsville	0.7	1.8
Total	**0.9**	**3.4**

[1] ADWF is estimated based on most recent available data from 2021 Master Servicing Plan Update.

4.3.2.2. Post Period Considerations

The servicing analysis focuses on servicing the buildout of the internal growth and Settlement Area Boundary Expansion Areas to 2051; however, in the development of the recommended servicing strategy and infrastructure sizing, consideration for the full buildout of the City's municipal boundary including the LOSB was considered, assuming similar population and employment densities. Where applicable, identification of future facility expansion needs and/or strategic upsizing of linear infrastructure was identified and incorporated into the final servicing plan.

The growth projection for the remainder of the municipal boundary area was estimated by applying a density to these remaining areas, excluding Natural Heritage Areas. These densities include:

- 60 residents and jobs combined per hectare for North and East Expansion Lands
- 75 residents and jobs combined per hectare for Tutela Heights

This approach typically aligns with the residential densities for proposed growth to 2051. The projected ADWF for the municipal boundary full buildout and their corresponding downstream trunk sewers are shown in **Table 17**. The Mount Pleasant trunk sewer is in the WWTP catchment and the Coulbeck trunk sewer is in the Empey St. WWPS catchment (which is also located within the WWTP catchment).

Table 17: Municipal Boundary Full Buildout Population and Flows

Trunk Sewer	Area (ha)	Population & Employment	ADWF (MLD)
Coulbeck Trunk Sewer	359	31,571	8.0
Mount Pleasant Trunk Sewer	187	14,052	3.5
Total	**546**	**45,623**	**11.5**

4.4. Hydraulic Wastewater Model

The City's existing hydraulic model was updated using InfoWorks ICM, a wastewater system modelling and management software package by Innovyze.

The model was updated through the following procedure:

- System review through facilities drawings, SCADA and GIS data.
- Direct GIS to model link for pipes, manholes and facilities.
- Dry Weather Flow (DWF) and allocation estimated based on billing data versus treated wastewater flow at the WWTP
- Two – Wet Weather Flow (WWF) scenarios comprising of:

- Dynamic RTK unit hydrograph approach, calibrated against historic flow monitoring records. Design storms with various return periods (2-year,5-year, 10-year, 25-year, 50-year, and 100-year) were applied to the model.
- Static Rainfall Derived Inflow and Infiltration (RDII) flow rated scenario based on the City's design standard of 0.30 L/s/ha.

4.4.1. Network Development

Updates to the system and sewers were imported directly into the City's existing GIS wastewater system infrastructure data. Before importing the network information into the model, GIS and existing model pipes were analyzed for any discrepancies with respect to diameter, slope, and upstream and downstream manholes. A small number of discrepancies were found, and the correct source of information was identified for each case (GIS or existing model). The system network elevation for each model junction was based on the City's ground surface contours.

4.4.2. Facility Development

Each system facility was manually reviewed and updated in the model based on available facility site plan drawings, and process flow diagrams, pump curves, and other available information. The scope of the facility development included:

- Reviewing and updating the network configuration around each facility
- Updating the system pumps and pump curves
- Reviewing system storage elements and defining the storage geometry

4.4.3. System Dry Weather Flow

The system's DWFs were evaluated based on SCADA information and flow monitoring data provided. This process supports determination of:

- Average dry weather flows (ADWF), including determination of base sanitary flows and groundwater inflows.
- Spatial allocation of system flows.
- Temporal variation of system flows and peaking factors.

4.4.4. System Wet Weather Flow

The system's wet weather flows were evaluated based on SCADA information and flow monitoring data provided. This process supports determination of:

- System response to a wet weather event (rainfall/snowmelt).
- RDII based on catchment area.

4.4.5. Model Validation

The model was validated for accuracy using the flow monitoring data and average daily flows at the WWTP and WWPS's supplied by the City. DWF in the model was measured against the average daily flows to ensure that flow was realistic.

5. Assessment of Existing Wastewater Infrastructure

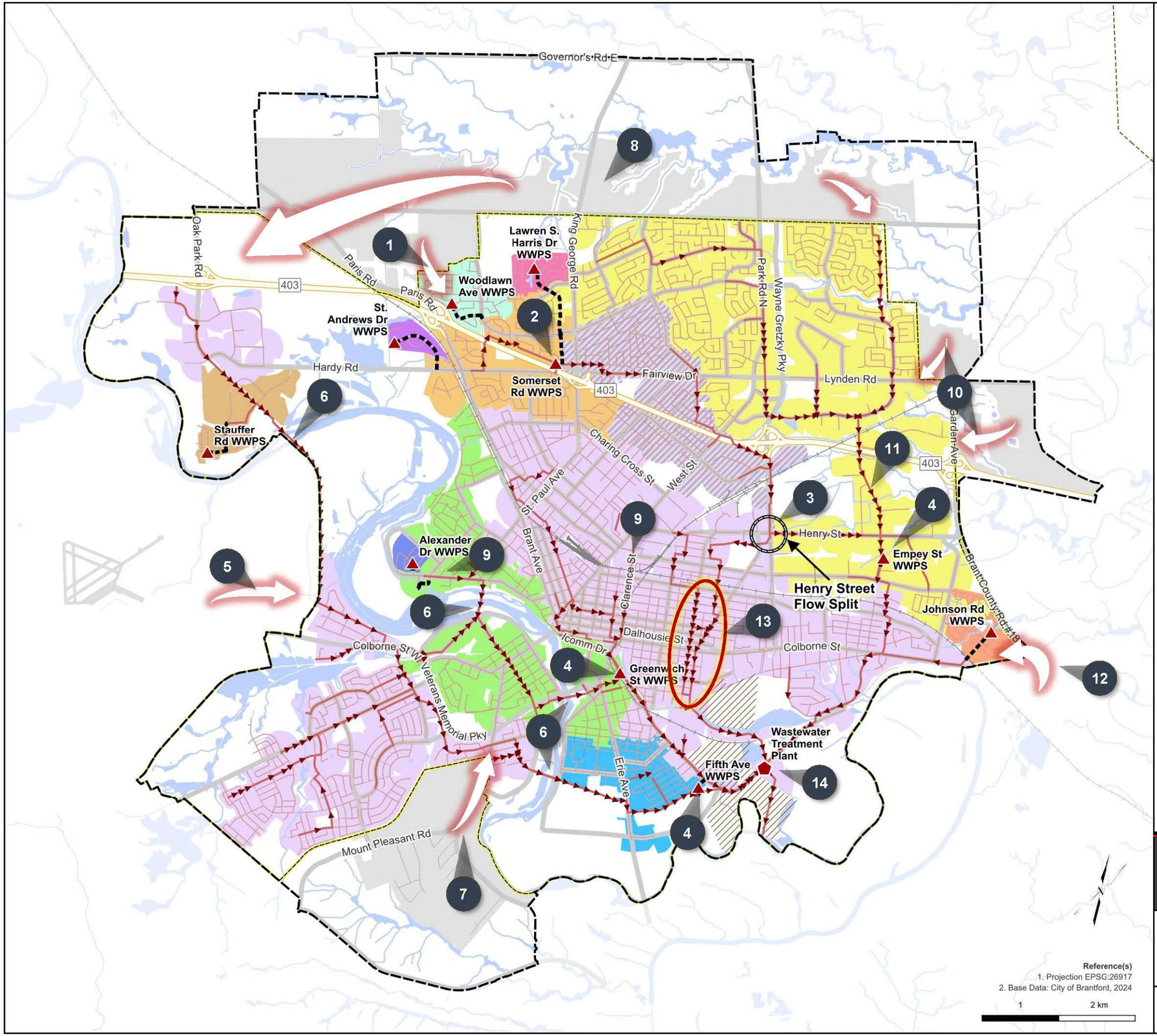
A critical step in the master planning process is the assessment of the existing infrastructure to establish the wastewater system baseline conditions. These baseline conditions will become the basis of the future recommendations of the MSP Amendment, therefore it was important to ensure that they were determined through a comprehensive detailed analysis of the system. Once the existing system conditions were established, the potential impacts of the future growth flows on the wastewater system were analyzed to develop and recommend future servicing strategies.

The following sections describe the current infrastructure constraints, as well as opportunities for developing and expanding the wastewater system to meet growing flows to the 2051 planning horizon and beyond. The capacities and performance outlined in this section are based on the preferred expansion lands servicing concepts outlined in **Section 6**.

5.1. Opportunities and Constraints

Existing and future wastewater opportunities and constraints were identified through discussions with City staff, as well as through hydraulic analyses and review of infrastructure data (e.g. GIS, design reports, as-built information, etc.). The InfoWorks ICM hydraulic model was used to analyze the performance of the existing and future system under dry weather and wet weather flow conditions.

In general, the wastewater collection system has sufficient capacity to convey existing peak wet weather flows with upgrades throughout the system required to convey future peak wet weather flows. **Figure 4** highlights some of the key opportunities and constraints within the City's existing wastewater system.



Reference(s)
1. Projection EPSG:26917
2. Base Data: City of Brantford, 2024

1 2 km

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Expressway / Highway
- Arterial and Collector
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Parks
- Waterbody and Watercourses
- North Expansion Lands

Opportunities & Constraints

1. Partial servicing of northwest lands through Woodlawn WWPS.
2. Optimization of local sewers to support growth areas.
3. Optimization of Henry St flow split.
4. Short and long term strategies to manage pump station capacity (Fifth, Empey, and Greenwich).
5. Provide capacity to Airport employment land (may be subject to potential servicing agreement)
6. Capacity, maintenance, and security of existing river crossings.
7. Extend City's wastewater system to service new development in the Tutela Heights area.
8. Future servicing of expansion lands including multiple new pumping stations and trunk sewers.
9. Management of wet weather flow and system resiliency to climate change.
10. Trunk capacity to support growth areas along eastern boundary.
11. Trunk capacity needs to support intensification corridors and northern growth areas.
12. Provide capacity to Cainsville (may be subject to potential servicing agreements).
13. Existing trunk sewers at capacity.
14. Treatment capacity to support existing and future users.

Figure 4
Existing Wastewater System
Opportunities and Constraints

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI Consultants Canada

Last Updated: June 2026
Document ID: 2404322-WW-002

Treatment

- Existing WWTP upgrades are needed to support existing and future users
- Opportunity for short term optimization and upgrades

Pumping

- Short- and long-term strategies are needed to manage pumping station capacity (Fifth Avenue WWPS, Empey Street WWPS, Greenwich Street WWPS, Woodlawn Road WWPS, and Johnson Road WWPS)

Sanitary Sewer

- Trunk capacity needs to support intensification corridors and northern/eastern growth areas
- A number of existing sewers are at capacity or will be at capacity with 2051 growth flow and upgrades necessary
- Optimization of local wastewater system and flow splits is required to maximize available sewer and pumping capacities to support 2051 growth

Inflow and Infiltration

- Wet weather management is needed throughout the entire wastewater system

5.2. Facility Capacity

Future facility capacity utilization for treatment, pumping and conveyance is presented in the following section.

5.2.1. Wastewater Treatment Plant

The 2021 MSP analyzed the projected growth flows at the Brantford WWTP to ensure that the facility has adequate capacity to service the 2051 growth horizon.

The starting point methodology identified in **Appendix B** of **Volume II** was used to calculate the projected flows for the Brantford WWTP.

Figure 5 presents the Brantford WWTP's existing treatment capacity versus the long-term treatment need. With the full buildout to 2051, the WWTP will reach over 90% capacity.

Although the WWTP has a rated capacity of 81.8 MLD, based on discussions with City staff, not all processes within the treatment plant can accommodate this capacity and thus the WWTP processes were further reviewed to determine limiting capacities and potential opportunities at the existing facility.

The 2025 Technical Memorandum: Water and Wastewater Treatment Plant Capacity Review and Expansion Alternative Evaluation presents the limitations and opportunities of the processes at the WWTP. This report further evaluated the alternatives to determine solutions for system upgrades.

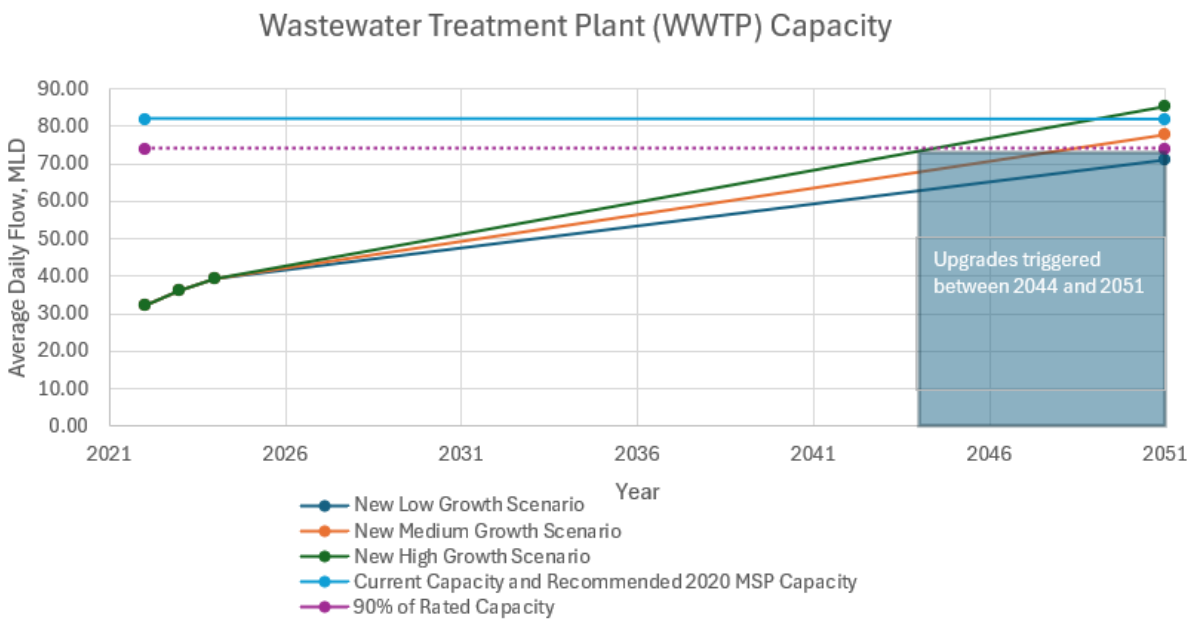


Figure 5: Brantford WWTP Capacity

5.2.2. Wastewater Pumping Station Capacity

Assessment of pumping capacity was based on the ability of the WWPS to provide firm capacity to meet the projected PWWF for the corresponding WWPS catchments. **Table 18** highlights the WWPS projected capacity utilization and the 10-year storm 1-hour wet well storage requirements under the existing and 2051 flows. The existing and 2051 capacity surplus and deficits were based on the operational firm capacity of the WWPS.

Table 18: WWPS Capacity and Peak Wet Weather Flow

Station	Facility Capacity			Existing					2051			
	ECA Firm Capacity (MLD)	2018 Observed Firm Capacity (MLD)	Available Storage (ML)	PWWF – RDII 0.3 (MLD)	100-Year PWWF (MLD)	Surplus / Deficit (MLD)	10-year PWWF 1-hour Storage Requirement (ML)	Storage Surplus / Deficit (ML)	Growth PWWF (MLD)	Surplus / Deficit (MLD)	10-year PWWF 1-hour Storage Requirement (ML)	Storage Surplus / Deficit (ML)
Johnson Road WWPS	5.5	4.7	0.069	1.3	8.7	**-4.0**	0.269	**-0.200**	9.1	**-4.5**	0.274	**-0.205**
Empey Street WWPS	138.2	96.8	2.262	40.2	87.9	**8.9**	2.425	**-0.825**	153.3	**-56.5**	5.283	**-3.683**
Somerset Road WWPS	23.3	22.5	0.497	6.3	23.4	**-0.1**	0.766	**-0.269**	23.2	**-0.7**	0.741	**-0.244**
Woodlawn Road WWPS	4.9	4.1	0.107	1.6	5.2	**-1.1**	0.154	**-0.047**	5.8	**-1.8**	0.182	**-0.075**
St. Andrews Drive WWPS	2.4	2.1	0.032	0.6	1.8	**0.3**	0.050	**0.002**	2.2	**-0.1**	0.067	**-0.015**
Lawren S. Harris Drive WWPS	6.7	6.3	0.069	0.9	4.8	**1.5**	0.132	**-0.063**	5.0	**1.3**	0.141	**-0.072**
Greenwich Street WWPS	32.0	29.5	1.007	11.7	24.8	**4.8**	0.825	**0.182**	51.7	**-22.1**	1.696	**-0.689**
Alexander Drive WWPS	1.8	0.9	0.165	0.4	5.2	**-4.3**	0.150	**0.015**	5.3	**-4.4**	0.157	**0.008**
Fifth Avenue WWPS	7.2	6.1	0.192	3.4	6.8	**-0.7**	0.260	**-0.058**	11.3	**-5.2**	0.381	**-0.189**
Stauffer Road WWPS	2.6	-	0.045	0.5	3.2	**-0.6**	0.087	**-0.042**	3.3	**-0.7**	0.090	**-0.045**

(1) Wastewater Pumping Station capacity utilization colour based on observed firm capacity (<80% capacity, 80-100% capacity, **>100% capacity**)

- **Johnson Road WWPS:** Due to existing high wet weather flows within the Johnson Road WWPS catchment, the station's operating capacity is exceeded during the design 100-year storm. Limited growth is anticipated within the catchment. Further, the station's available storage capacity, under the design 10-year storm, is insufficient to meeting the desired emergency storage capacity.
- **Empey Street WWPS:** A substantial portion of the North Expansion Lands, east of King George Road, as well as the East Expansion Lands will flow to the Empey WWPS, as further detailed in **Section 6**. As a result of the projected growth within the Empey Street WWPS catchment, capacity upgrades to the station are needed to support projected 2051 growth. Further, the station's available storage capacity, under the design 10-year storm, is insufficient to meeting the desired emergency storage capacity.
- **Somerset Road WWPS:** Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing pumping and storage deficit in existing and future condition. Part of the WWPS catchment belongs to a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. The potential high level of I & I requires field verification.
- **Woodlawn Road WWPS:** The Woodlawn Road WWPS currently has sufficient pumping and storage capacity to meet the City's performance criteria. However, the station's existing operational capacity is only 82% of the station's original design capacity. Provisional development servicing plans for the Expansion Lands south of Powerline Road and east of Balmoral Drive propose, through regrading of existing lands, to maximize the lands that can drain to the Woodlawn WWPS, up to the station's original design capacity. It also has insufficient storage to meet the existing and desired 2051 emergency storage capacity.
- **St. Andrews Drive WWPS:** The St. Andrews Drive WWPS's available storage capacity, under the design 10-year storm, is marginally insufficient to meet the desired emergency storage capacity in 2051. The pumping capacity is also marginally insufficient in 2051.
- **Lawren S. Harris Drive WWPS**: Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing storage deficit in existing and future condition. The WWPS is part of a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. The potential high level of I & I requires field verification.
- **Greenwich Street WWPS:** Due to existing high wet weather flows within the Greenwich Street WWPS catchment, the station is reaching its operating capacity during the design 100-year storm. Growth pressures within the catchment are anticipated to create a capacity deficit in 2051. Further, the station's available storage capacity, under the design 10-year storm, is insufficient to meet the desired emergency storage capacity in 2051.

- **Alexander Drive WWPS:** Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing pumping deficit in existing and future condition. The WWPS is part of a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. The potential high level of I & I requires field verification.
-
- **Fifth Avenue WWPS:** Due to existing high wet weather flows within the Fifth Avenue WWPS catchment, the station's operating capacity is exceeded during the design 100-year storm. Growth pressures within the catchment are anticipated to further increase this capacity deficit. Further, the station's available storage capacity, under the design 10-year storm, is insufficient to meet the desired emergency storage capacity.
- **Stauffer Road WWPS**: As a newly constructed WWPS, the existing condition is showing pumping and storage deficit. The WWPS may contain areas with high inflow and infiltration to the system, causing the elevated flow. The potential high level of I & I requires field verification.

Servicing strategies and concepts related to pumping needs are further described in **Section 7** and **8**.

5.3. Collection System

The City's hydraulic wastewater model was used to support the assessment of the wastewater system's sewer capacity. **Table 19** details the existing gravity sewer performance in terms of depth/Diameter (d/D) which indicates the fullness of a pipe as the proportional depth of the pipe. A d/D less than 0.5 indicates that the pipe is half full; however, a d/D greater than 1 indicates that the pipe is surcharging.

Table 19: Gravity Sewer Performance

Design Storm	depth/Diameter (d/D)				
	<0.5	0.5-0.8	0.8-1	>1	Surcharging <2.1 m
Dry Weather Flow	99%	0.8%	0.1%	0.3%	0%
2-Year	90%	8.2%	0.6%	1%	0%
5-Year	84%	12.0%	1.5%	2%	0%
10-Year	81%	13.0%	2.2%	4%	0%
25-Year	78%	12.4%	2.9%	7%	1%
50-Year	74%	12.5%	3.1%	10%	2%
100-Year	72%	12.1%	3.3%	13%	3%

Based on the hydraulic modelling results as shown in **Table 19** and **Figure 6**, the system generally has sufficient capacity under the existing 10-year design storm; however, there are

existing areas of concern. Similarly, the system was assessed under the 2051 10-year design storm, as showcased in **Figure 7** and the same concerns were presented including:

North Brantford

- Trunk sewer constraints on Memorial Drive from Kensington Avenue to Ashgrove Avenue and on Ashgrove Avenue from Memorial Drive to Greenfield Road due to existing and growth flows

Empey Street Pumping Station Catchment

- Constraints in the Coulbeck Trunk sewer in the section 270 m east of Bodine Road from Roy Boulevard to Henry Street as it crosses Highway 403
- Opportunity to optimize Henry Street flow split

Fifth Avenue Pumping Station Catchment

- High rates of inflow and infiltration which limits existing pumping station and sewer capacity
- Opportunity to divert some flows to limit pumping station upgrade costs

Greenwich Pumping Station Catchment

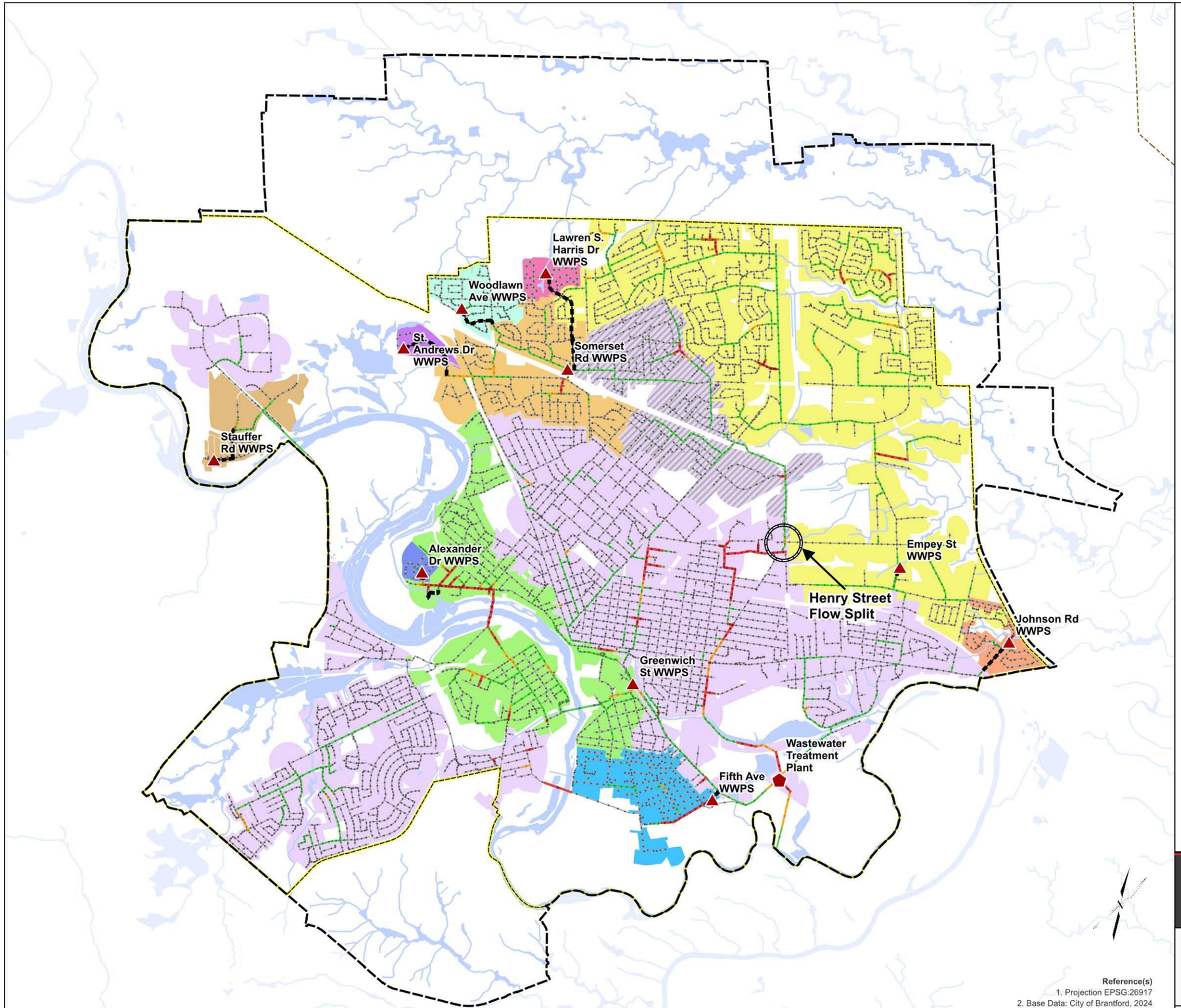
- Local sewer and trunk sewer capacity constraints as a result of current and growth flows
- Opportunity to re-configure flows at the Grand River Siphon and focus sewer upgrade needs along a single alignment
- According to the Greenwich Street WWPS Upgrades design report (TYLin, March 2026), the pumping station currently has a firm capacity of 380 L/s, with higher pump rates planned to accommodate growth in its catchment. The ultimate pumping rate of 695 L/s, as identified in the design report, could result in a higher HGL and surcharging in the immediate upstream and downstream pipes. Additional flow added in the upstream trunk sewer could trigger the overflow structure to recycle some flows back to the wet well at Greenwich WWPS.
- The City plans to increase the firm capacity at Greenwich WWPS from 380 L/s to 437 L/s. The capacity increase at Greenwich WWPS will cause a higher amount of flow discharging into the Greenwich Street Trunk Sewer, resulting in a higher HGL and surcharging in the immediate upstream and downstream pipes. Additional flow added in the upstream trunk sewer could trigger the overflow structure to recycle some flows back to the wet well at Greenwich WWPS.

Oak Park Trunk Sewer

- Existing 675/750 mm trunk sewer on Oakhill Drive represents an existing restriction, with 1050 mm upstream sewer and 1200 mm downstream sewer. Existing sewer presents an existing operational issues and is at capacity under 2051 growth flows

Brantford Wastewater Treatment Plant Catchment

- Constraints in the Mohawk Street trunk sewer from the Mohawk Street siphon to the entrance of the WWTP under 2051 growth flows



Sewer Capacity (legend)

- d/D <0.5
- 0.5 >=d/D <0.8
- 0.8 >=d/D <1.0
- d/D >=1.0

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Current City Municipal Boundary
- 2016 Municipal Boundary
- Outside Municipalities
- Waterbody and Watercourses

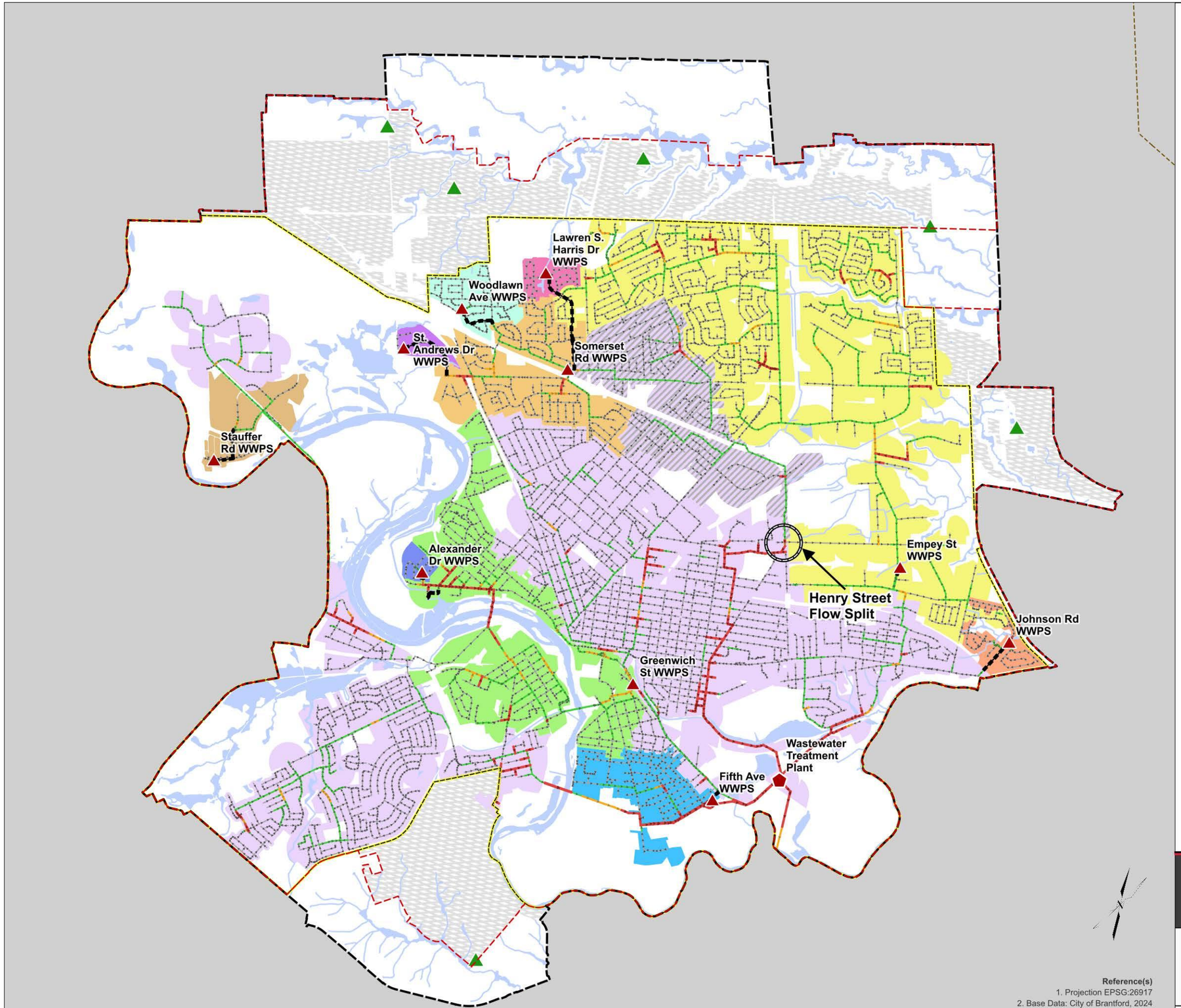
Figure 6
Existing - 10 Year Storm

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI

Last Updated: June 2026
Document ID: 2404322-WW-003 v2



Sewer Capacity (legend)

- d/D <0.5
- 0.5 >=d/D <0.8
- 0.8 >=d/D <1.0
- d/D >=1.0

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

General Features

- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Waterbody and Watercourses

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

Reference(s)
1. Projection EPSG:26917
2. Base Data: City of Brantford, 2024

1 2 km

Figure 7
2051 - 10 Year Storm

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI

Last Updated: June 2026
Document ID: 2404322-WW-003 v2

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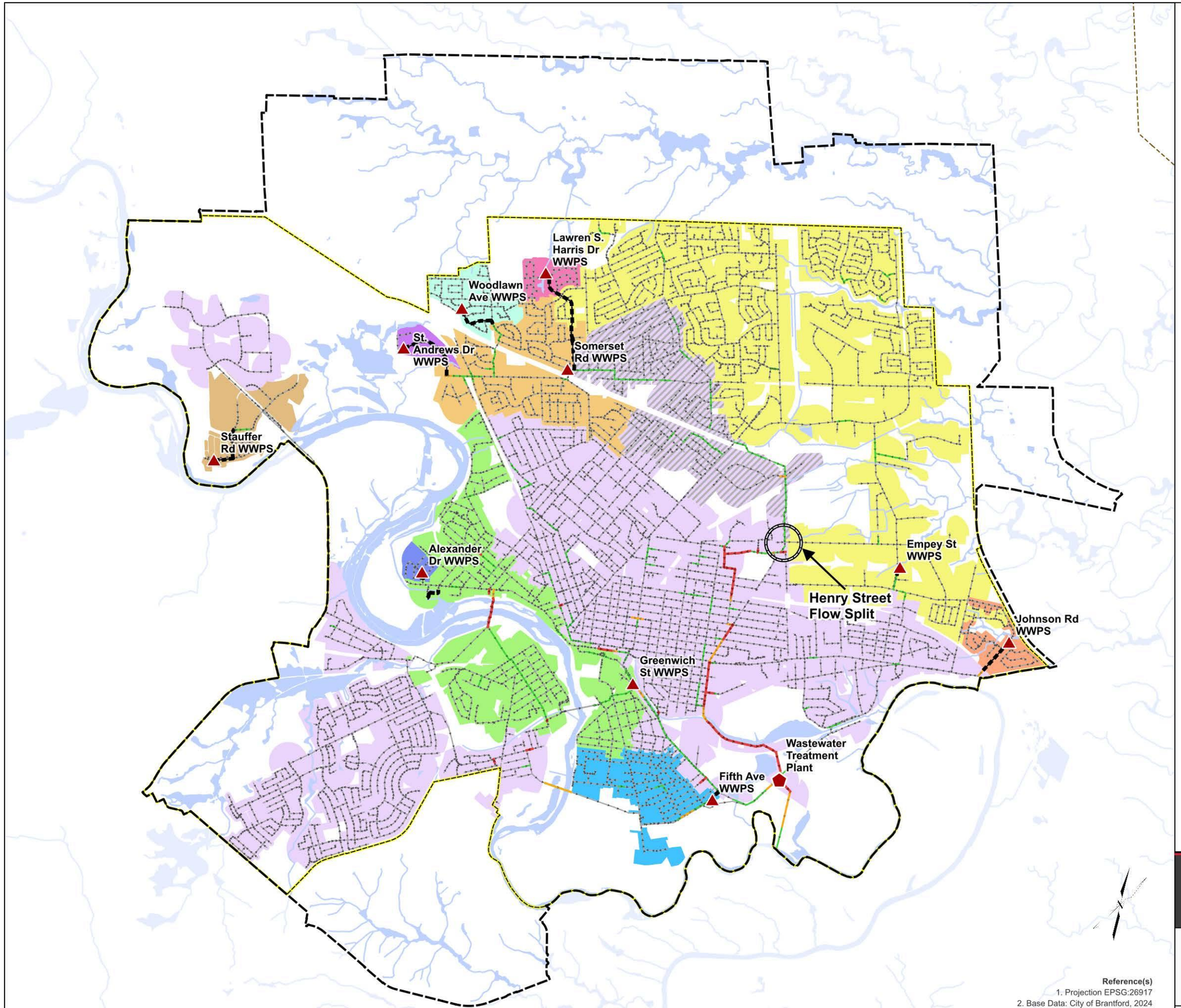
5.3.1. Downtown Sewers

The growth projection identifies substantial potential for intensification and redevelopment with the City's downtown area. The existing downtown sewer network has sufficient capacity to meet existing flows with some surplus capacity to accommodate growth. The scope of sewer capacity needs will be highly dependent on the ultimate location and density of growth; which are unknown at this time.

5.4. Wet Weather Flows

Many of the areas within the City's wastewater system are subject to extraneous wet weather flow rates exceeding the City's design allowance, as shown in **Figure 8** and **Figure 9** for existing conditions and 2051 conditions respectively. These higher than designed wet weather flows are resulting in reduced sewer and pumping station capacity, and increased pumping station storage and wastewater treatment needs. City wide and targeted wet weather flow strategies will be key to minimizing the scope of future system upgrades.



Sewer Capacity (legend)

- d/D <0.5
- 0.5 >=d/D <0.8
- 0.8 >=d/D <1.0
- d/D >=1.0

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Expressway / Highway
- Arterial and Collector
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Outside Municipalities
- Waterbody and Watercourses

Figure 8
Existing - Wet Weather Flow

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI

Last Updated: June 2026
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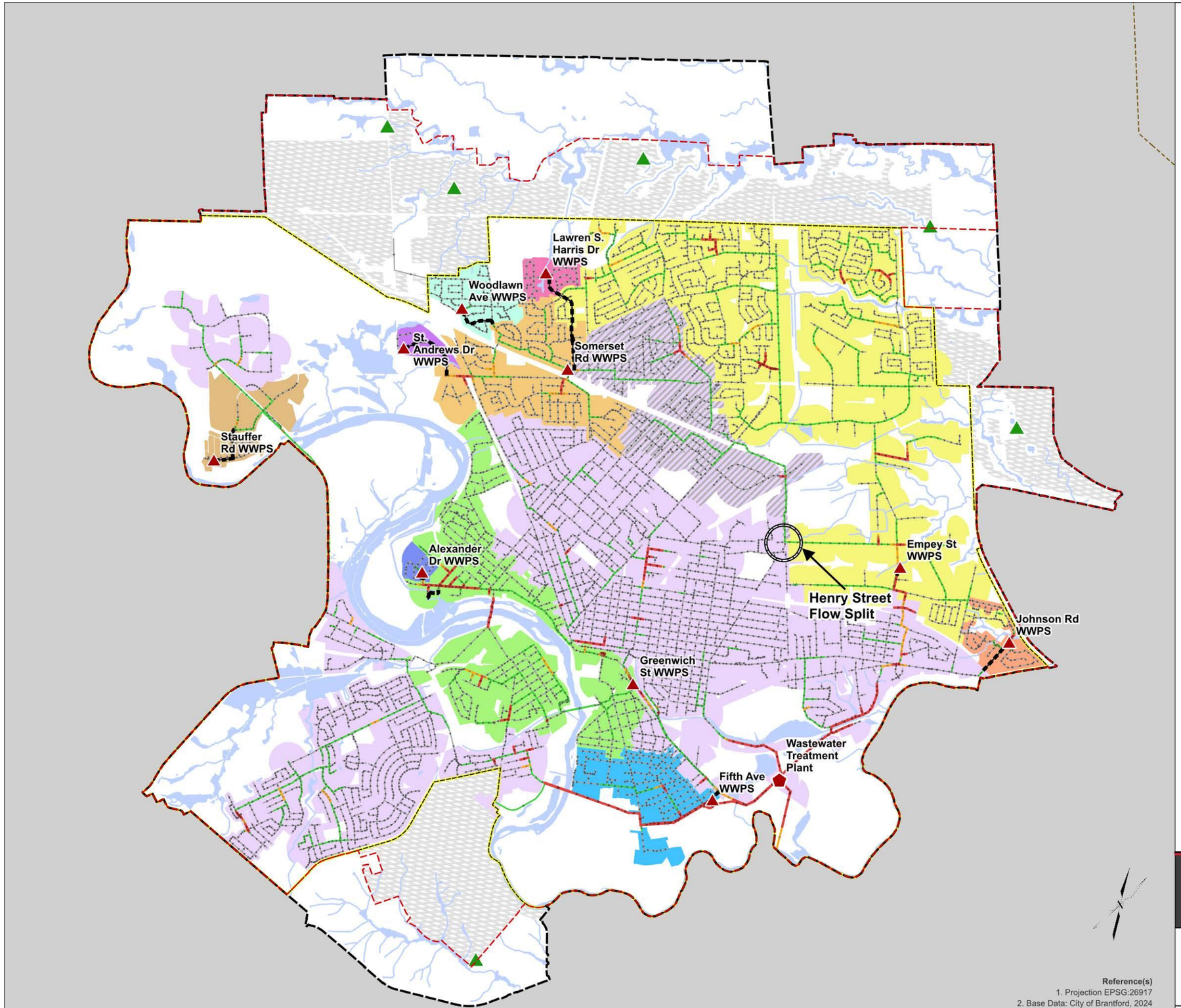


Sewer Capacity (legend)

- d/D <0.5
- 0.5 >=d/D <0.8
- 0.8 >=d/D <1.0
- d/D >=1.0

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Expressway / Highway
- Arterial and Collector
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Waterbody and Watercourses

Figure 9
2051 - Wet Weather Flow

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

GEI

Last Updated: June 2026
Document ID: 2404322-WW-003 v2

6. Servicing of Expansion Lands

The Settlement Area Boundary Expansion Lands will require municipal wastewater servicing via an extension of the City's existing wastewater system. A broad range of wastewater servicing concepts were established and evaluated based on a high-level feasibility assessment to meet the servicing requirements for the North and East Expansion Lands and Tutela Heights.

Concepts are based on the City's existing wastewater system configuration and capacity, existing ground elevations within the expansion lands, and the identified natural heritage system. Figures for the servicing concepts for the expansion lands are included in **Appendix C**.

6.1. Assessment of Expansion Lands Servicing

The expansion lands servicing concepts were evaluated as part of the Secondary Plan in support of the MCR using the following criteria:

1. Configure wastewater service to integrate with existing trunk network
    i. Ability to integrate with existing wastewater trunk network
    ii. Upgrades to existing wastewater network needed to support growth areas
2. To limit impacts on infrastructure implementation, phasing, and servicing flexibility
    iii. Impacts on the trunk infrastructure requirements, including infrastructure sizing, configuration, and requirements for new facilities
    iv. Impacts on infrastructure phasing
    v. Impacts on servicing flexibility
3. Cost to provide additional infrastructure
    vi. Capital Cost
    vii. Lifecycle Cost

6.2. North Expansion Lands

Wastewater servicing for the expansion lands along the northern boundary is characterized by challenging topography with a general downward slope west to east and south to north (away from the existing wastewater network). Further, the expansion lands are bisected by several south to north watercourses.

Generally, the existing northern limit of the wastewater network was not designed with consideration for future expansion beyond the pre-existing municipal boundary. As such, there are only two trunk sewers along the northern boundary which have sufficient depth and capacity to support servicing off the expansion lands without triggering substantial downstream capacity upgrades. These consist of the existing Colbeck trunk sewer at the far east of the City

and the Oak Park trunk sewer at the far west of the City. The North Expansion Lands will be serviced by connecting to these two sewers.

Three general servicing concepts were considered and are outlined below including:

- All Flows to Coulbeck Road
- Flow Split with all Residential Lands to Coulbeck Road
- Flow Split at King George Road

6.2.1. Concept 1: All Flows to Coulbeck Road

The residential and employment lands will be serviced by an extension of the Coulbeck Road trunk sewer on the east side of the City's existing system. Due to a shallow invert in the existing Coulbeck Road trunk sewer and several south to north watercourse crossings, multiple WWPS are required to convey flows from west to east. Wastewater servicing within the Residential Expansion Lands will require three (3) new WWPS; including one WWPS east of Coulbeck Road, one west of Park Road North and south of Jones creek, and one west of King George Road. The employment lands will require an additional two (2) new WWPS; one west of Balmoral Drive and one east of Golf road, north of the collector road. A small section of residential lands, southeast of Golf Road and Powerline Road, can convey flows via gravity to the new WWPS west of Balmoral Drive. New trunk sewers will generally follow the east-west collector road system in the North Expansion Lands. Forcemains from each WWPS will outlet to the new east-west trunk sewers.

Under this concept, the North Expansion Lands wastewater collection will be consolidated to the City's existing infrastructure on the east side of the City. This includes the trunk sewer on Coulbeck Road and Empey WWPS. The Empey WWPS and downstream sewers will require upgrades to accommodate the North Expansion Lands.

6.2.2. Concept 2: Flow Split with all Residential Lands to Coulbeck Road

The residential lands and employment lands east of Golf Road will be serviced by an extension of the Coulbeck Road trunk sewer on the east side of the City's existing system. Due to a shallow invert in the existing Coulbeck Road trunk sewer and several south to north watercourse crossings, three (3) new WWPS will be required to convey flows east of Golf Road. One WWPS will be located east of Coulbeck Road, one WWPS will be located along the collector road, south of Jones Creek and the third WWPS will be located along the collector road, along King George Road. New trunk sewers will generally follow the east-west collector road system in the North Expansion Lands. The forcemain from the WWPS east of Coulbeck Road will outlet to the Coulbeck Road trunk sewer and the other two WWPSs will outlet to the collector road trunk sewer, which will convey flows via gravity to the Coulbeck Road trunk sewer.

The employment lands west of Golf Road will be serviced by an extension of the Oak Park Road trunk sewer on the west side of the City's existing system. The extension of the Oak Park Road

sewer will require a Highway 403 and railway crossing. One WWPS will be required to convey flows from east to west, located in the most northern employment lands, east of Golf Road. A small section of residential lands southeast of Golf Road and Powerline Road can convey flows via gravity to the new WWPS near Golf Road and Powerline Road. A new deep trunk sewer will generally follow east-west along the Powerline Road right of way and north-south along the collector road. The new WWPS will outlet to the trunk sewer which will travel by gravity to Oak Park Road.

Under this concept, the North Expansion Lands will be split between the City's east and west existing infrastructure, including Coulbeck Road and Oak Park Road trunk sewers.

6.2.3. Concept 3: Flow Split at King George Road

The residential lands east of King George Road will be serviced by an extension of the Coulbeck Road trunk sewer on the east side of the City's existing system. Due to a shallow invert in the existing Coulbeck Road trunk sewer and several south to north watercourse crossings, two (2) new WWPS will be required to convey flows east of King George Road. One WWPS will be located east of Coulbeck Road and the other WWPS will be located along the collector road, south of Jones Creek. New trunk sewers will generally follow the east-west collector road system in the North Expansion Lands. The forcemain from the WWPS east of Coulbeck Road will outlet to the Coulbeck Road trunk sewer and the other WWPS will outlet to the collector road trunk sewer, which will convey flows via gravity to the Coulbeck Road trunk sewer.

The employment lands and residential lands west of King George will be serviced by an extension of the Oak Park Road trunk sewer on the west side of the City's existing system. The extension of the Oak Park Road sewer will require a Highway 403 and railway crossing. Two (2) new WWPS will be required to convey flows from east to west. One WWPS will be located west of Balmoral Drive and the other WWPS will be located in the most northern employment lands, east of Golf Road. A small section of residential lands southeast of Golf Road and Powerline Road can convey flows via gravity to new WWPS west of Balmoral Drive. New trunk sewers will generally follow east-west along the new east-west collector road and north-south along the new collector road. Both WWPSs will outlet to the Powerline Road sewer .

Under this concept, the North Expansion Lands will be split between the City's east and west existing infrastructure, including the Coulbeck Road and Oak Park Road trunk sewers. This strategy allows for higher flexibility for northwest employment and residential phasing as infrastructure can be built out from the east or west depending on development needs.

6.2.4. North Expansion Lands Preferred Servicing Concept

Through the Master Plan Review process the Flow Split at King George Road servicing concept was identified as the preferred servicing approach, as it provided the greatest amount of servicing flexibility allowing for the simultaneous development of the west employment lands

and east residential lands. Further, this servicing concept presented the lowest overall cost as it minimized the sizing of trunk infrastructure requirements within the North Expansion Lands and minimized the scope of upgrades to the existing Colbeck and Oak Park trunk sewers.

The Flow Split at King George Road servicing concept for the North Lands was carried forward when completing the assessment of overall wastewater system servicing needs.

6.3. East Expansion Lands Servicing

Wastewater servicing for the expansion lands along the eastern boundary is characterized by challenging topography with a general downward slope southwest to the northeast, away from the existing wastewater network.

All opportunities are dependent on the overall servicing concept and ultimate strategy as outlined in **Sections 7** and **8**. Two servicing concepts were considered and are outlined below including:

- Sinclair Boulevard Tie In
- Lynden Road Tie In

6.3.1. Concept 1: Sinclair Boulevard Tie In

The residential lands north of Lynden Road will be serviced by an extension of the Lynden Road sewer. Wastewater servicing within the residential lands will consist of new sewers following the new collector road system that outlet to the Lynden Road sewer.

The employment lands south of Lynden Road will be serviced by a connection to the Sinclair Boulevard sewer. New sewers, following the collector road system, will convey flow via gravity to a consolidated WWPS in the southeast. Wastewater flows will be pumped by a WWPS to the Sinclair Boulevard sewer.

For this concept, upgrades will be required in the Sinclair Boulevard trunk sewer within the downstream system including Empey Street WWPS. This strategy allows for higher flexibility for residential and employment phasing as the residential lands can connect to the existing infrastructure and do not require any additional facilities.

6.3.2. Concept 2: Lynden Road Tie In

Wastewater servicing within the residential lands north of Lynden Road will consist of new sewers following the new collector road system, draining to the east employment lands. The employment lands will consist of new sewers, following the collector road system, that flow by gravity to a consolidated WWPS in the southeast. A WWPS and forcemain will pump all residential and employment flows to the Lynden Road sewer.

For this option, flows will be consolidated to the Lynden Road trunk sewer, which will require upsizing to accommodate the East Expansion Lands.

6.3.3. East Expansion Lands Preferred Servicing Concept

Through the Secondary Plan Review process the Lynden Road Tie-in servicing concept was identified as the preferred servicing approach, as it presented the lowest overall cost as it limited the scope of sewer upgrades to the Lynden Road sewer.

The Lynden Road Tie-in servicing concept for the East Lands was carried forward when completing the assessment of overall wastewater system servicing needs.

6.4. Tutela Heights

The wastewater servicing for Tutela Heights can be separated into two service areas: lands north of Mount Pleasant Road and lands south of Mount Pleasant Road. The lands north of Mount Pleasant Road slope to the northeast, toward the City's existing wastewater network; allowing for a direct gravity connection to the system. The lands south of Mount Pleasant Road generally slope to the southwest, away from the City and its existing wastewater network. Flows from these lands will be collected via a centralized WWPS and conveyed to the new trunk sewer on Mount Pleasant Road.

Servicing concepts were considered and are outlined below including:

- Tie into Mount Pleasant Road
- Tie into Gilkison Street

6.4.1. Concept 1: Tie into Mount Pleasant Road

The existing and expansion lands north of Mount Pleasant Road slope to the north and east, toward the City's existing wastewater network. These lands can be serviced by extending the City's Mount Pleasant Road trunk sewer to Conklin Road. These lands can be serviced via gravity once a new trunk sewer along Mount Pleasant Road is constructed.

The existing and expansion lands south of Mount Pleasant Road slope to the south and west, away from the City and its' existing wastewater network. Flows from these lands will be collected via a centralized WWPS in the south. A new trunk sewer will extend southeast along the collector road to the WWPS. Flows will be conveyed from the new WWPS to a new trunk sewer extending north along Tutela Heights Road, outletting to the new trunk sewer on Mount Pleasant Road.

This concept will require upgrades to the City's existing Mount Pleasant Road trunk sewer.

6.4.2. Concept 2: Tie into Gilkison Street

The existing and expansion lands north of Mount Pleasant Road slope to the north and east, toward the City's existing wastewater network. These lands can be serviced by a new trunk sewer along Gilkison Street connecting to the City's network. These lands can be serviced via gravity once the trunk sewer along Gilkison Street is constructed.

The existing and expansion lands south of Mount Pleasant Road slope to the south and west, away from the City and its' existing wastewater network. Flows from these lands will be collected via a centralized WWPS in the south. A new trunk sewer will extend southeast along the collector road to the WWPS. Flows will be conveyed from the new WWPS to a new trunk sewer extending north along Tutela Heights Road, outletting to the new trunk sewer on Mount Pleasant Road.

This concept presents risk due to presence of flood plain along Gilkison Street.

6.4.3. Tutela Height Preferred Servicing Concept

Through the Secondary Plan Review process, the Tie into Mount Pleasant Road servicing concept was identified as the preferred servicing approach due to minimized disruptions to the residents and reduced underground utilities despite the seasonal flooding issues along Gilkison Street. However, both concepts as well as other concepts were reviewed by the Mount Pleasant Master Servicing Plan to confirm the preferred sewer alignment.

The Tie into Gilkison Street servicing concept for the Tutela Heights area was carried forward when completing the assessment of overall wastewater system servicing needs.

7. Wastewater Servicing Concepts

Wastewater servicing concepts were developed under the context of identifying high level servicing solutions or concepts to address both system wide and local opportunities and constraints. This long list of servicing concepts was developed based on existing elevations, system conveyance, and pumping capacity, to evaluate the feasibility to either be carried forward for further analysis and consideration or being screened out completely.

The following sections summarize the wastewater servicing concepts, based on specific wastewater catchment areas, with their advantages and disadvantages, such that only desired concepts are carried forward as servicing strategies for further evaluation and costing. These concepts focus on the existing wastewater system while accommodating growth within the North Expansion Lands, East Expansion Lands and Tutela Heights.

The wastewater servicing concepts for the Settlement Area Boundary Expansion Lands, previously discussed in **Section 6**, were carried forward and incorporated into the downstream concept areas where relevant, including the following strategies:

- The North Expansion Lands will be serviced via connections to the existing wastewater system's trunk sewers along the northern boundary including the Coulbeck Road trunk sewer at the east of the City and Oak Park Road trunk sewer at the west of the City.
- The East Expansion Lands will be serviced by connections to the existing wastewater system at Lynden Road.
- Tutela Heights will be serviced by extending the City's Mount Pleasant Road trunk sewer to Conklin Road with a new WWPS outletting to the new sewer on Gilkison Street.

7.1. Servicing Concept Development

As part of the 2025 MSP Amendment, wastewater concepts were reviewed for existing and future growth areas in order to select the servicing strategies that:

- Make best use of existing infrastructure to avoid new infrastructure where possible;
- Minimize cost of new infrastructure;
- Consider operation and maintenance costs to ensure financial sustainability;
- Ensure a long term reliability and security of the wastewater system;
- Increase system resilience to climate change;
- Avoid/minimize environmental crossings and other disruptions to the environment where possible;
- Avoid disruptions to cultural heritage resources;
- Plan for future infrastructure within the existing road right-of-way where possible;
- Avoid/reduce production of Green House Gas Emissions; and,
- Avoid/minimize impact to areas that could represent a significant drinking water threat.

Wastewater servicing concepts were identified and reviewed for existing and future growth areas within the City of Brantford in order to select the best servicing strategies for the system.

7.2. Brantford Wastewater Treatment Plant

The capacity of all processes within the existing WWTP is not sufficient to accommodate all projected growth. As such, upgrades are required to facilitate development. The Technical Memorandum: Water and Wastewater Treatment Plant Capacity Review and Expansion Alternative Evaluation outlines four alternatives to address the additional growth flows.

- **Alternative 1:** Increase capacity of the WWTP using the same technologies as existing
- **Alternative 2:** Implement sludge thickening to the WWTP solids processing
- **Alternative 3:** Convert the secondary treatment from conventional activated sludge to an advanced treatment technology
- **Alternative 4:** Combine technologies of Alternative 2 and 3.

7.3. Fifth Avenue WWPS Catchment

Within the Fifth Avenue WWPS Catchment, two concepts were developed to address the existing capacity constraints at the WWPS due to high inflow and infiltration rates as well as future growth within the catchment area**.** The two concepts, detailed in **Table 20**, are outlined as follows:

- **Fifth Avenue WWPS Catchment Concept 1: Diversion**
  - Flows to the Fifth Avenue WWPS will be diverted to the WWTP trunk sewer; however, upgrades to the Fifth Avenue WWPS are still required
- **Fifth Avenue WWPS Catchment Concept 2: Pumping**
  - Fifth Avenue WWPS will be upgraded to accommodate future peak flows to 2051

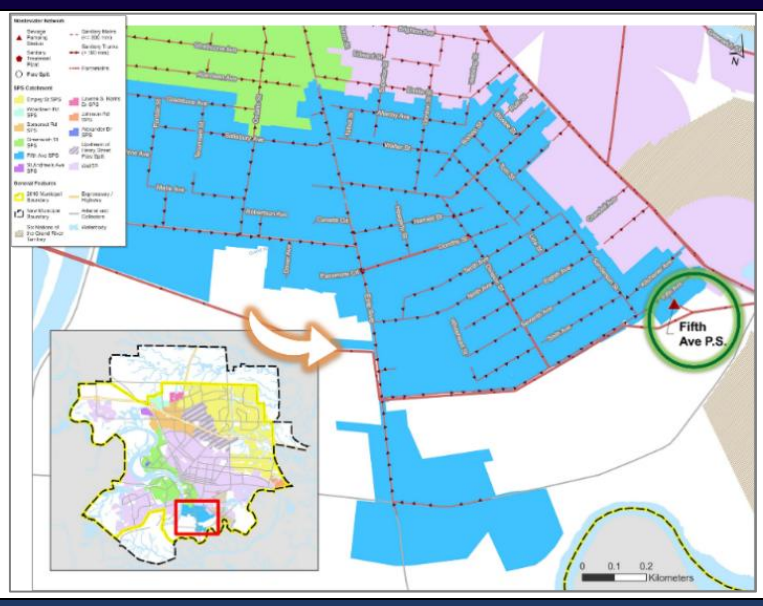
Further, inflow and infiltration reduction strategies are needed in addition to the concepts presented to optimize the Fifth Avenue WWPS and local sewer capacity.

Table 20: Fifth Avenue Pumping Station Catchment Concepts

Fifth Avenue Pumping Station Catchment - Concepts

Overview

- Fifth Avenue WWPS catchment has high rates of inflow and infiltration limiting existing pumping station and sewer capacity
- Intensification occurring along Erie Avenue will contribute additional flows to the pumping station and sewers

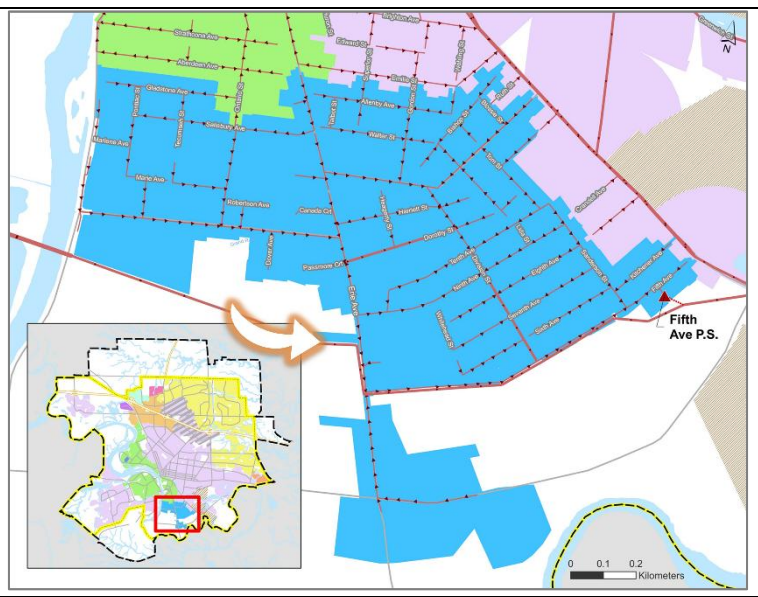


Concept 1: Diversion

Wastewater flows, which would normally be conveyed to the Fifth Avenue WWPS, would be diverted to the 1,200 mm trunk sewer to the WWTP. Diverted flows will primarily be conveyed via gravity, primarily from greenfield growth areas adjacent to the trunk sewer.

Advantages	Disadvantages
• Opportunity to divert flow away from Fifth Avenue WWPS to reduce upgrades at Fifth Avenue WWPS	• Diversion opportunities are limited and unlikely to eliminate the need for pumping station upgrades

Screened Out

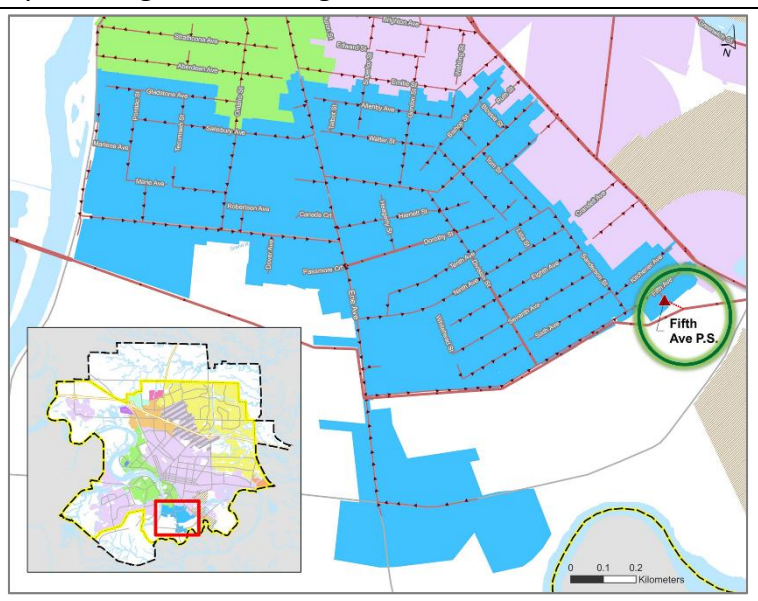


Concept 2: Pumping

Pump upgrades to the existing Fifth Street WWPS to meet the 10-year design storm and growth flows to 2051.

Advantages	Disadvantages
• Services existing users and growth	• Upgrades required at the Fifth Avenue WWPS including pump upgrades and new forcemain; further noting that they are currently underway

Carried Forward



7.4. Greenwich Street WWPS Catchment

Within the Greenwich Street WWPS Catchment, two concepts were developed to address the existing and future capacity constraints within the local sewers within the catchment area. The two concepts, detailed in **Table 21**, are outlined as follows:

- **Concept 1: Divert More Flows to Grand River Avenue**
  - Flows will be conveyed to the flow split at Grand River Avenue and Jubilee Avenue will be primarily diverted along the upsized Grand River Avenue trunk sewer to the Greenwich Street WWPS
- **Concept 2: Maintain Existing Flow Split**
  - Flows will be conveyed normally at the Grand River Avenue and Jubilee Avenue flow split with upgrades to the existing trunk sewers

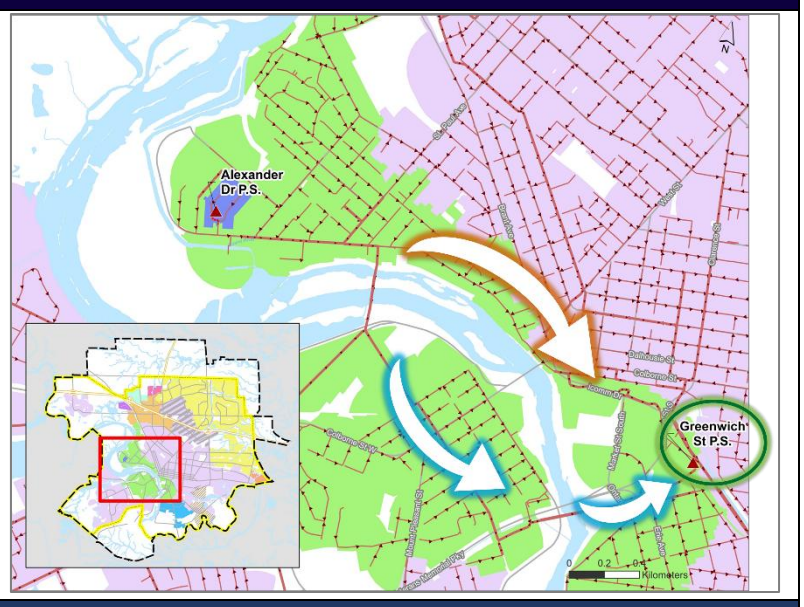
Further, upgrades to the Greenwich Street WWPS and inflow and infiltration reduction strategies are needed in addition to the concepts presented to address existing deficiencies and support growth.

Table 21: Greenwich Pumping Station Catchment - Concepts

Greenwich Pumping Station Catchment - Concepts

Overview

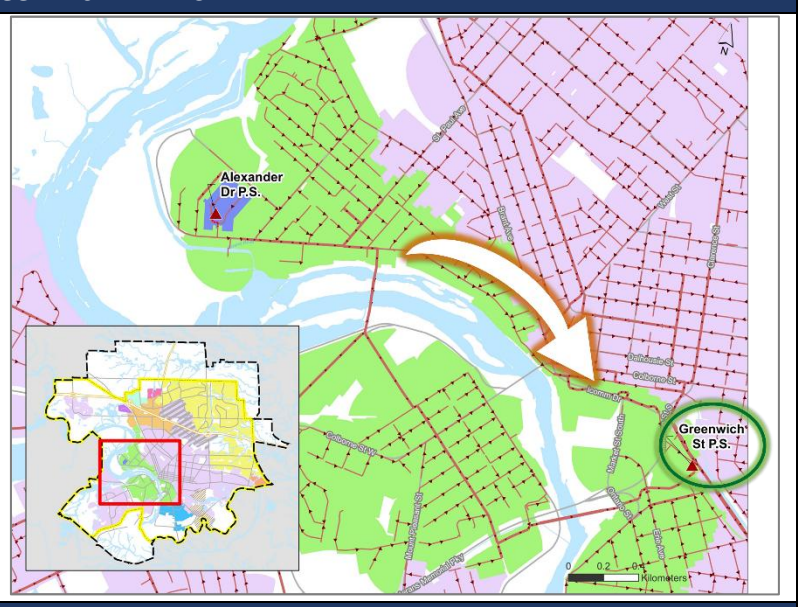
- Greenwich WWPS Catchment has high rates of inflow and infiltration, limiting existing pumping station and sewer capacity
- Intensification occurring in downtown, along Icomm Drive



Concept 1: Divert More Flows to Grand River Avenue and Upgrade Greenwich WWPS

Advantages	Disadvantages
• Diverted flows do not cross Grand River • Eliminates surcharging along Catherine Avenue • Reduces sewer impacts West of Greenwich WWPS • Utilizes new trunk sewer on Icomm Drive	• Sewer upgrades along Grand River Avenue (minor collector road)

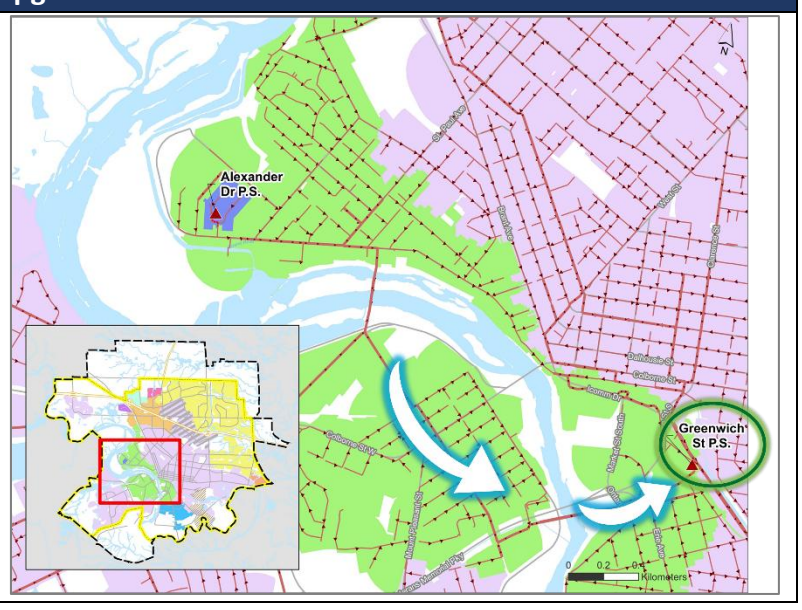
Carried Forward



Concept 2: Maintain Existing Flow Split by Upsizing Trunk Sewer and Upgrade Greenwich WWPS

Advantages	Disadvantages
• Existing split optimizes Grand River Avenue and Catherine Avenue sewer • Potential to reduce local surcharging and sewer upgrades with I&I reduction	• Grand River Avenue and Catherine Avenue sewer remains surcharged • Increased siphon flows • Sewer upgrades west of Greenwich WWPS >10m deep

Carried Forward



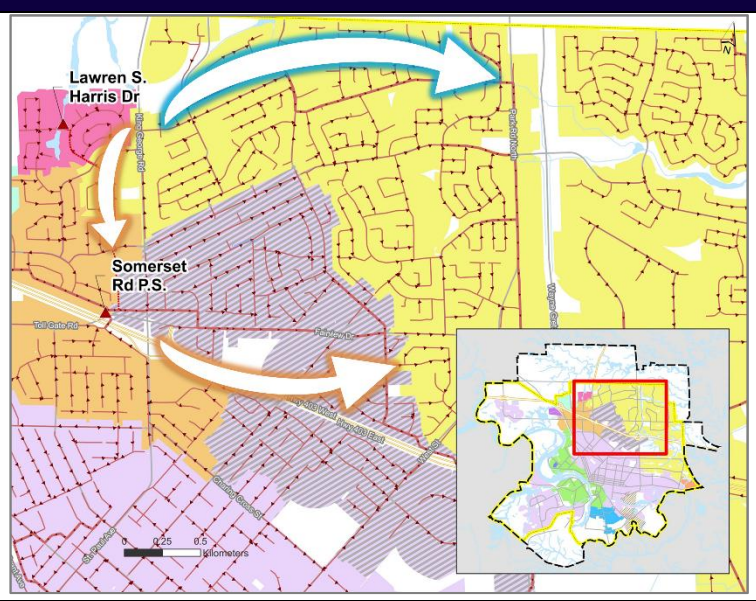
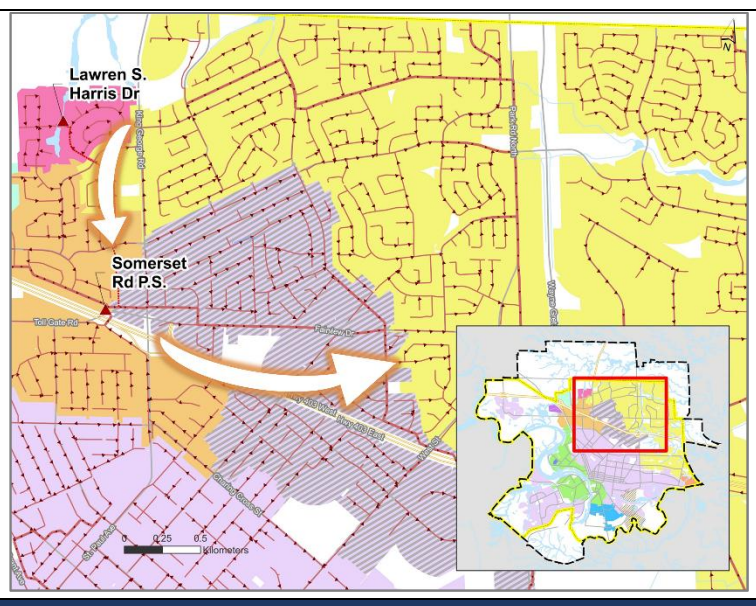
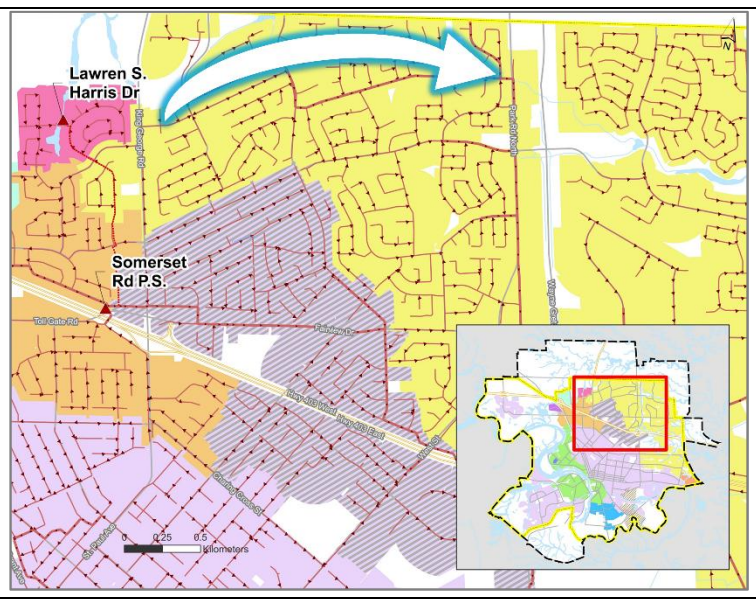
7.5. North Brantford Catchment Concepts

Within the North Brantford Catchment, two concepts were developed to address the existing capacity constraints due to high inflow and infiltration rates as well as future growth within the catchment area**.** The two concepts, detailed in **Table 22**, are outlined as follows:

- **Concept 1: New sewer to Baxter Street trunk sewer**
  - New sewer interceptor to be constructed south along King George Road and upsizing the trunk sewer west along Fairview Drive to the WWTP catchment to accommodate both existing and growth flows along the intensification corridor
  - Redirecting Somerset WWPS flows was reviewed to reduce the flows going to Henry Street flow split but was screened out prior to further review due to the additional costs related to new infrastructure required
- **Concept 2: Upgrade sewers going to Park Road North**
  - Upgrades existing trunk sewer east from King George Road to Park Road North to accommodate existing and growth flows

Further, inflow and infiltration reduction strategies are needed in addition to the concepts presented to optimize the local sewer capacity.

Table 22: North Brantford Catchment Concepts

North Brantford Catchment Concepts	
Overview	
• Limited sewer capacity along King George Road and Powerline Road • Limited capacity restricts sewer servicing options for North Expansion Lands • Sewer upgrades are needed to support intensification corridors	
Concept 1: New sewer to Baxter Street trunk sewer	
New sewer interceptor south along King George Road to Somerset WWPS and upsizing existing trunk sewer west along Fairview Drive.	
Advantages	**Disadvantages**
• Optimizes downstream trunk sewer capacities • Capacity to accommodate north lands King George Road septic systems (neighbourhood of Summerhayes Crescent and Lakeside Drive)	• Major construction disruptions • Complex implementation • Does not address existing constraints
Carried Forward	
Concept 2: Upgrade sewers going to Park Road North	
Upgrade existing trunk sewers east from King George Road to Park Road North.	
Advantages	**Disadvantages**
• Minimizes sewer upgrades and construction • Lower capital cost	• Minimal opportunity to service north lands or King George Road septic systems
Carried Forward	

7.6. Empey Street WWPS Catchment

Within the Empey Street WWPS Catchment, four concepts were developed to address the existing capacity constraints due to high inflow and infiltration rates as well as future growth within the catchment area**.** The four concepts, detailed in **Table 23**, are outlined as follows:

- **Concept 1: Existing flow split with sewer upgrades downtown and at Empey WWPS**
  - Existing Henry Street flow split is maintained with trunk sewer upgrades downtown, in the WWTP catchment, and pump capacity upgrades at the Empey Street WWPS
- **Concept 2: Existing flow split with new downtown trunk sewer to WWTP**
  - Optimization of Henry Street flow split to convey majority of the flows south along a new downtown trunk sewer, in the WWTP catchment, to the WWTP
- **Concept 3: Redirect flows to Empey WWPS and new deep tunnel to replace Empey WWPS**
  - Optimization of Henry Street flow split to convey majority of the flows east to the Empey Street WWPS catchment, with a new deep trunk sewer to bypass the Empey Street WWPS
- **Concept 4: Redirect flows to Empey WWPS and upgrade Empey WWPS**
  - Optimization of Henry Street flow split to convey majority of the flows east to the Empey Street WWPS catchment, with pump capacity upgrades at Empey WWPS

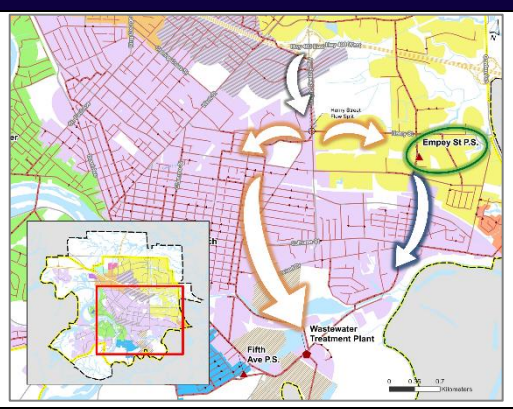
Further, inflow and infiltration reduction strategies are needed in addition to the concepts presented to optimize the local sewer capacity.

Table 23: Empey Street Pumping Station Catchment - Concepts

Empey Street Pumping Station Catchment Concepts

Overview

- Significant growth and intensification expected upstream of the Empey Street WWPS, which has existing capacity restrictions
- Existing trunk sewer downstream of the Henry Street flow split is constrained

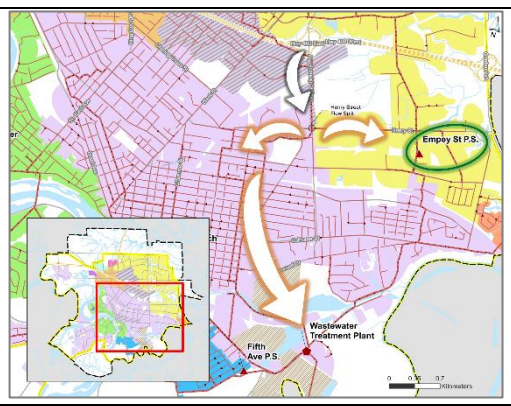


Concept 1: Existing flow split with sewer upgrades downtown and at Empey pumping station

Existing Henry Street flow split is maintained with trunk sewer upgrades downtown, in the WWTP catchment, and pump capacity upgrades at the Empey Street WWPS.

Advantages	Disadvantages
• Minimizes upgrades and pump needs at Empey Street WWPS • Short term capacity is available at Empey Street WWPS	• High costs and construction to upgrade downtown sewers

Carried Forward

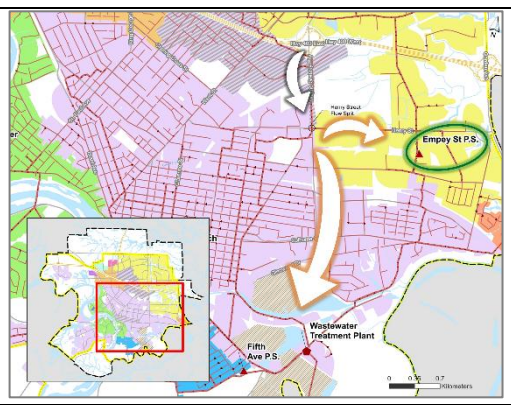


Concept 2: Existing flow split with new downtown trunk sewer to WWTP

Optimization of Henry Street flow split to convey majority of the flows south along a new downtown trunk sewer, in the WWTP catchment, to the WWTP.

Advantages	Disadvantages
• Minimizes upgrades and pump needs at Empey Street WWPS • Short term capacity is available at Empey Street WWPS • Provides additional system capacity	• High costs and construction to new downtown sewers

Carried Forward

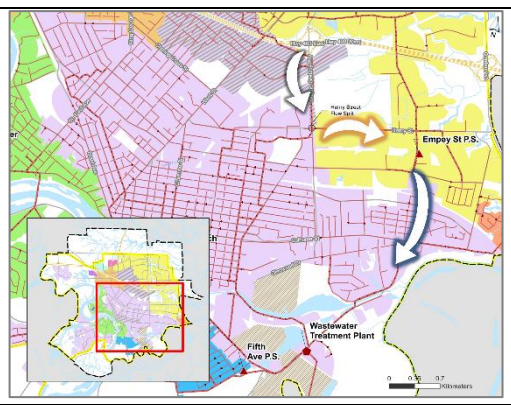


Concept 3: Redirect flows to Empey pumping station and new deep tunnel to replace Empey pumping station

Optimization of Henry Street flow split to convey majority of the flows east to the Empey Street WWPS catchment, with a new deep trunk sewer to bypass the Empey Street WWPS.

Advantages	Disadvantages
• Optimizes flow split to relieve sewer constraints in downtown • Minimizes upgrades and pump needs at Empey Street WWPS	• High costs and complex construction • Higher peak flows to the wastewater treatment plant

Carried Forward

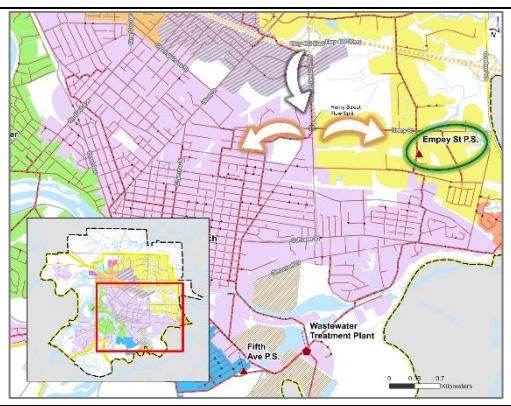


Concept 4: Redirect flows to Empey WWPS and upgrade Empey WWPS

Optimization of Henry Street flow split to convey majority of the flows east to the Empey Street WWPS catchment, with pump capacity upgrades at Empey WWPS.

Advantages	Disadvantages
• Optimizes flow split to relieve sewer constraints in downtown • Short term capacity is available at Empey Street WWPS	• Upgrades are necessary at Empey Street WWPS

Carried Forward



8. Wastewater Servicing Evaluation and Strategies

8.1. Objectives

Wastewater servicing strategies were carried forward based on the servicing concepts presented in **Section 7** and reviewed for existing and future growth in the City in order to select the best servicing solutions. The following sections summarize the alternative servicing strategies and evaluation of the strategies. The evaluation process is outlined in **Appendix C** of **Volume II**. The detailed evaluation of the wastewater alternatives is outlined in **Appendix E** of this Volume.

8.2. Brantford Wastewater Treatment Plant

An overview of the wastewater treatment plant concepts is provided in **Section 7.2**. All concepts, reviewed in **Section 7.2**, were carried forward as follows:

- **Alternative 1:** Increase capacity of the WWTP using the same technologies as existing
- **Alternative 2:** Implement sludge thickening to the WWTP solids processing
- **Alternative 3:** Convert the secondary treatment from conventional activated sludge to an advanced treatment technology

Alternative 4: Combine technologies of Alternative 2 and 3. The evaluation process is summarized in **Table 24**. Alternative 2 provides a greater operational benefit as compared to Alternatives 1, 3 and 34; while maintaining a lower capital cost. On an assessment of system benefit vs. cost, Alternative 2 was selected as the preferred servicing alternative.

Table 24: Brantford WWTP Alternatives & Evaluation

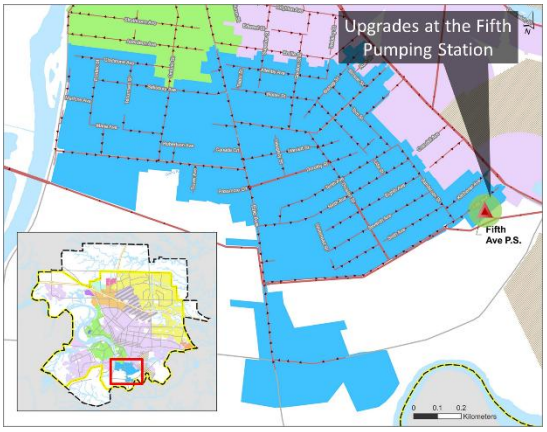
WWTP Upgrade Alternatives																	
	Alternative 1				**Alternative 2**				**Alternative 3**				**Alternative 4**				
Overview	• Increase plant capacity by upsizing existing equipment to meet future capacity needs				• Increase plant capacity with addition of sludge thickening				• Increase plant capacity and convert to Advanced Secondary Treatment				• Combination of Alt 2 and 3: Add sludge thickening and advanced secondary treatment				
Advantages	• Processes are familiar to operations staff • Level of treatment is maintained and consistent between trains				• Reduced cost and construction time compared to Alternative 1 • Reduced volume of sludge to be handled in digesters, storage and hauling				• Reduced cost and construction time compared to Alternative 1 • Reduced footprint for secondary treatment and clarification				• Most cost-effective alternative • Least construction time • Reduced volume of sludge to be handled in digesters, storage and hauling • Reduced footprint for secondary treatment and clarification				
Disadvantages	• Marginally higher costly option which will require the most additional infrastructure • Space restrictions could be encountered on the site				• Increased operation complexity due to WAS thickening process; less biosolids to be managing				• Increased design and operational complexity due to new secondary treatment process				• Increased operation complexity due to thickening process and new secondary treatment process • Increased design complexity				
Upgrades, Cost	~ $101 – 118 M				$88 - 104 M				~ $93 – 109 M				~ $80 - 95 M				
Four-Point Criteria Evaluation	Technical	Enviro	Social & Cultural	Financial	Technical	Enviro	Social & Cultural	Financial	Technical	Enviro	Social & Cultural	Financial	Technical	Enviro	Social & Cultural	Financial	
Recommended Alternative	• **Not Recommended**: as it is not the most effective way to service the growth.				• **Recommended**: as sludge thickening can reduce the need for digester and sludge storage upgrades and improve digester and primary clarify performance.				• **Not Recommended**: at this time due to its increased design and operational complexity, although may be considered post 2051.				• **Not Recommended**: as Alternative 3 is not recommended, but Alternative 2 is not.				

Evaluation Scoring Legend: **High** **Medium** **Low**

8.3. Fifth Avenue Pumping Station Alternatives

For the Fifth Avenue WWPS, only Concept 2: Pumping was carried forward as a viable alternative. The overview and planned upgrades for the Fifth Avenue WWPS are presented in **Table 25**.

Table 25: Fifth Avenue WWPS Planned Upgrades

Fifth Avenue Pumping Station	
Overview • Fifth Avenue Pumping Station catchment has high rates of inflow and infiltration limiting existing pumping station and sewer capacity • Intensification occurring along Erie	
Planned Upgrades • Pumping station capacity upgrades are needed to meet 2051 flow targets further noting that construction is currently underway • Construct emergency 1-hour peak flow storage • New forcemain (twinned) further noting that this is currently under construction	

8.4. Greenwich Street WWPS Catchment Alternatives

Within the Greenwich Street WWPS catchment, existing and future capacity constraints exist within the local sewers in the catchment area. Both concepts, reviewed in **Section 7.4**, were carried forward as follows:

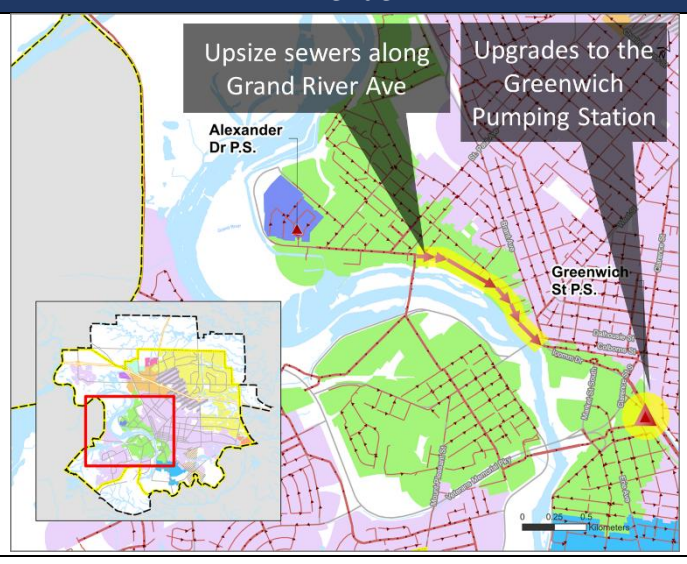
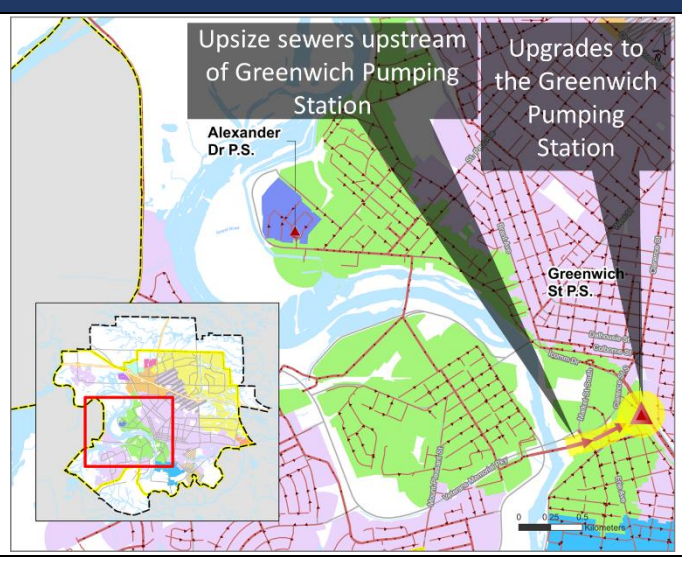
- **Alternative 1:** Divert More Flows to Grand River Avenue
- **Alternative 2:** Maintain Existing Flow Split

Under Alternative 1, the trunk sewer will be upsized to 525 mm along Grand River Avenue from Jubilee Avenue to Icomm Drive as well as upgrading the existing pumping capacity at the Greenwich Street WWPS. This is achieved through the optimization of flows at the Grand River Avenue and Jubilee Avenue flow split to convey the majority of flows along Grand River Avenue.

Under Alternative 2, the trunk sewer to Greenwich Street WWPS from Market Street South would be upsized to 750 mm as well as upgrading the existing pumping capacity at the Greenwich Street WWPS.

The overview, advantages, disadvantages and evaluation are summarized in **Table 26**.

Table 26: Greenwich Pumping Station Alternatives

Greenwich Pumping Station Alternatives		
	Alternative 1: Divert More Flows to Grand River Avenue	**Alternative 3:** Maintain Existing Flow Split
		
Overview	• Optimize flow split and divert flows to Grand River Avenue • Upgrades to Grand River Avenue Sewer	• Maintain existing flow split • Upgrades to Trunk sewer west of Greenwich WWPS
Sewers	• 1370 m of new 525 mm sewer along Grand River Avenue from Jubilee siphon to Icomm Drive	• 540 m of new 750 mm sewer upstream of Greenwich WWPS
Pumping	• Capacity upgrades required at Greenwich WWPS within existing facility footprint	• Capacity upgrades required at Greenwich WWPS within existing facility footprint
Inflow and Infiltration	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment
Costing	• Sewers: $4 M • Greenwich WWPS: $3 M	• Sewers: $7M • Greenwich WWPS: $3 M
Advantages	• Flows are not diverted across the Grand River • Reduces existing local and trunk sewer constraints • Upgrades to Grand River Avenue sewer upstream of recently upgraded sewers will utilize existing sewer capacity in the new Grand River Avenue sewers	• Optimizes current flow split along Grand River Avenue and Catherine Avenue trunk sewers • Potential to reduce local surcharging and sewer upgrades with I&I reduction
Disadvantages	• Sewer upgrades along Grand River Avenue (minor collector road)	• Increases flow across Grand River • Grand River Avenue and Catherine Avenue sewer remains surcharged • Increased flows through two siphons • Sewer upgrades west of Greenwich WWPS >10m deep
Four-Point Criteria Evaluation	Technical: 🟢 | Environ-mental: 🟢 | Social & Cultural: 🟡 | Financial: 🟢	Technical: 🟡 | Environ-mental: 🟢 | Social & Cultural: 🟡 | Financial: 🟡
Recommended Alternative	• **Recommended**: Sewer upgrades resolve constraints while minimizing flows crossing the Grand River	• **Not Recommended**: Sewer constraints remain and has complex construction

Evaluation Scoring Legend: 🟢 **High** 🟡 **Medium** 🔴 **Low**

The full evaluation is included in **Appendix E**. Alternative 1 (Divert More Flows to Grand River Avenue) is the preferred alternative as it resolves local capacity constraints as well as minimizes the flow across the Grand River at two locations.

8.5. North Brantford Catchment Alternatives

Within the North Branford Catchment, existing capacity constraints due to high inflow and infiltration rates as well as future growth within the catchment area are present. Both concepts, reviewed in **Section 7.5**, were carried forward as follows:

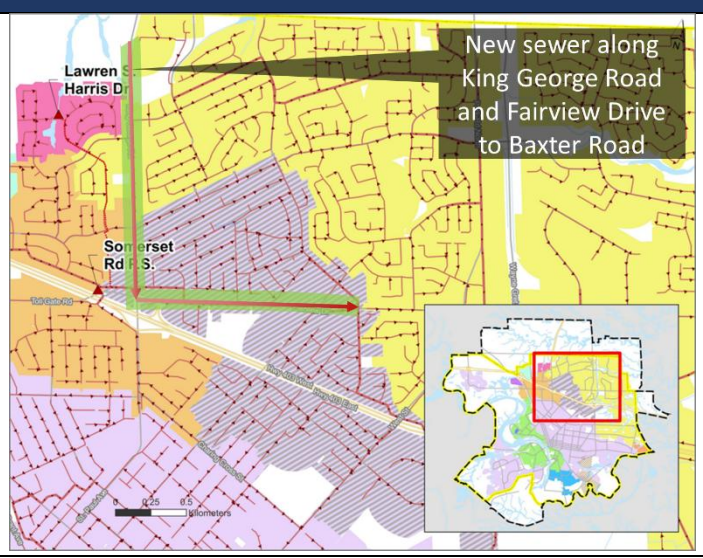
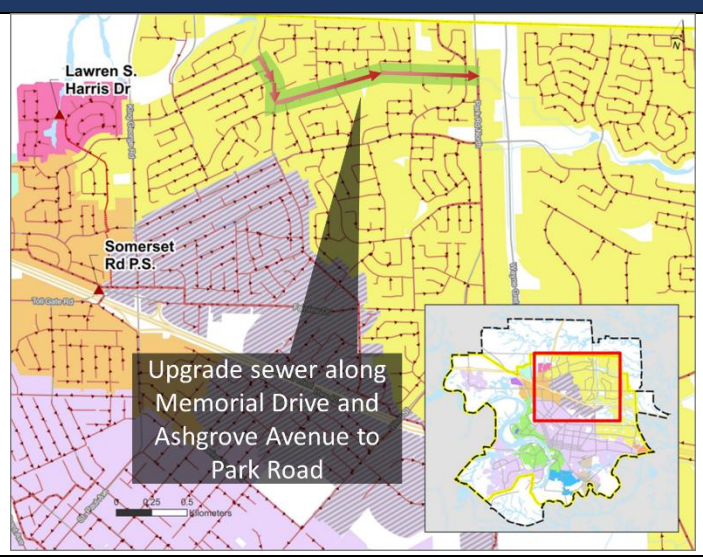
- **Alternative 1:** New sewer to Baxter Street trunk sewer
- **Alternative 2:** Upgrade sewers going to Park Road North

Under Alternative 1, a new 300 mm sewer interceptor would be constructed south along King George Road to Fairview Drive and east along Fairview Drive to Baxter Street. Flow would be conveyed to the WWTP catchment, bypassing the Henry Street flow split.

Under Alternative 2, local sewers would be upsized to 300 mm south along Memorial Drive and east along Ashgrove Avenue to Park Road North.

The overview, advantages, disadvantages and evaluation are summarized in **Table 27**.

Table 27: North Brantford Catchment Alternatives

North Brantford Catchment Alternatives		
	Alternative 1: New Trunk Sewer to Baxter Road	**Alternative 2:** Upgrade Existing Sewers to Park Road N
		
Overview	• New gravity sewer along King George Road and Fairview Drive to existing Baxter Street trunk sewer • Potential oversizing to support north expansion lands • Local Sewer deficiencies addressed through I&I reduction – No new growth flows	• King George growth flows directed to Existing Park Road North and Fairview Drive Sewers • Upgrade North Ashgrove Ave sewers • Additional local sewer upgrades may be needed dependent on Intensification areas • Local sewer (Dunsdon Street) deficiencies addressed through I&I reduction – No new growth flows
Sewers	• 3,400 m of new 300 mm sewer (upsize to 600 mm to incorporate expansion lands)	• 1,560 m of sewer upsized to 600 mm
Inflow and Infiltration	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment
Costing	• Sewers: $28M	• Sewers: $5 M
Advantages	• Optimizes downstream trunk sewer capacities • Opportunity to service North Expansion Lands • Aligns with water strengthening/construction along King George Road • Capacity to incorporate septic systems area along King George Road (neighbourhood of Summerhayes Crescent and Lakeside Drive)	• Minimizes sewer upgrades • Minimizes construction impacts along King George Road • Lower capital costs
Disadvantages	• Major disruptions to King George Road traffic & businesses • Complex construction required with >10 m deep sewers • Complex implementation • Does not address existing constraints in sewers upstream of Park Road	• No opportunity to service North Expansion Lands • Servicing of septic areas (neighbourhood of Summerhayes Crescent and Lakeside Drive) not feasible with WWPS and additional sewer upgrades required
Four-Point Criteria Evaluation	Technical | Environ-mental | Social & Cultural | Financial	Technical | Environ-mental | Social & Cultural | Financial
Recommended Alternative	• **Not Recommended**: High construction disruptions and high costs	• **Recommended**: Lower construction complexity, construction disruptions, and costs

Evaluation Scoring Legend: **High** **Medium** **Low**

The full evaluation is included in **Appendix E**. Alternative 2 (Upgrade Existing Sewers to Park Road) is the preferred alternative as it has lower impacts due to construction as well as lower cost to construct.

8.6. Empey Street WWPS Catchment

Within the Empey Street WWPS Catchment, existing capacity constraints due to high inflow and infiltration rates as well as future growth within the catchment area are present. All four concepts, reviewed in **Section 7.5**, were carried forward as follows:

- **Alternative 1A:** Existing flow split with sewer upgrades downtown and at Empey WWPS
- **Alternative 1B:** Existing flow split with new downtown trunk sewer to WWTP
- **Alternative 2A:** Redirect flows to Empey WWPS and new deep tunnel to replace Empey WWPS
- **Alternative 2B:** Redirect flows to Empey WWPS and upgrade Empey WWPS

Under Alternative 1A, the existing Henry Street flow split will be maintained, conveying similar flows to Empey Street WWPS and to the downtown trunk sewer. The existing downtown trunk sewer will be upsized to 675 mm and 750 mm from the Henry Street flow split to Greenwich Street.

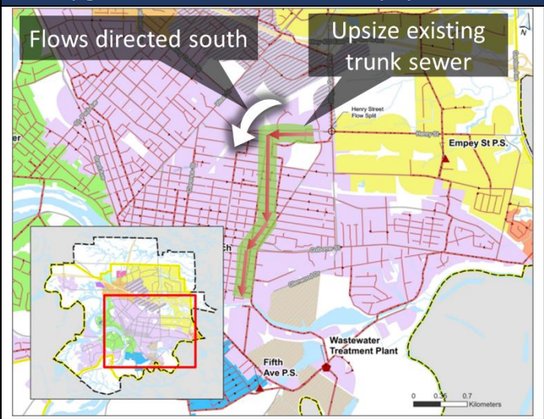
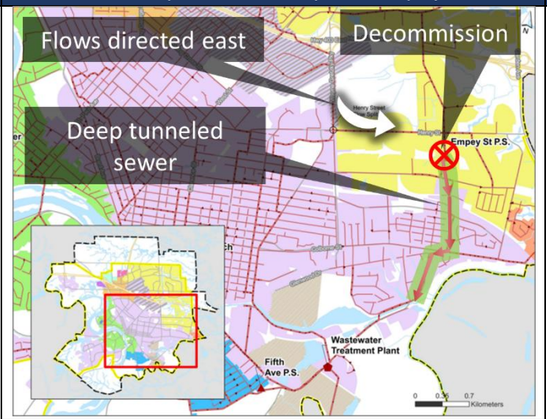
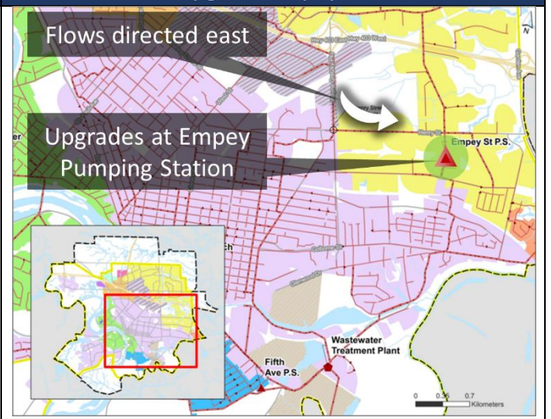
Under Alternative 1B, the Henry Street flow split will be optimized to convey the majority of flows south through a new 750 mm downtown trunk sewer, generally south along Wayne Gretzky Parkway to the Mohawk Street trunk sewer.

Under Alternative 2A, the Henry street flow split will be optimized to convey the majority of flow east to a new deep tunneled trunk sewer. The purpose of this tunneled trunk sewer is to bypass the Empey Street WWPS to eliminate the need for upgrades.

Under Alternative 2B, the Henry street flow split will be optimized to convey the majority of flow east to Empey Street WWPS which requires upgrades to Empey Street WWPS pump capacity to accommodate increased flows.

The overview, advantages, disadvantages and evaluation are summarized in **Table 28**.

Table 28: Empey Street WWPS Catchment Alternatives

Empey Street WWPS Catchment Alternatives				
	Alternative 1A: Existing Flow Split with Sewer Upgrades Downtown and at Empey WWPS	**Alternative 1B:** Existing Flow Split with New Downtown Trunk Sewer to WWTP	**Alternative 2A:** Redirect Flows to Empey WWPS and New Deep Tunnel to Replace Empey WWPS	**Alternative 2B:** Redirect Flows to Empey WWPS and Upgrade Empey WWPS
				
Overview	• Maintain existing flow split upgrade downstream deficiencies • Upgrade trunk sewer downstream of flow split • Upgrade to Empey WWPS	• New trunk alignment to WWTP	• Redirect flows to Empey WWPS to relieved downstream constraints and replacement of Empey WWPS with Deep Tunnel • Flow Split Reconfiguration • New Deep Tunnel	• Redirect flows to Empey WWPS to relieve downstream constraints & WWPS upgrades • Flow Split Reconfiguration • Ongoing upgrade to Empey WWPS including Empey WWPS forcemain replacement from the WWPS to Elgin Street and forcemain extension on Elgin Street and Hachborn Road on Manhole IA166
Sewers	• 2,625 m of 675 mm to 750 mm sewer	• +3,000 m of 750 mm sewer	• 2000 m of 1,050 mm sewer	• Reconfigure existing Henry Street flow split
Inflow and Infiltration	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment	• Initiate Inflow and Infiltration program to reduce wet weather flows in catchment
Costing	• Sewer: $10 M • Empey WWPS: $3 - $9 M	• Sewer: $18 M • Empey WWPS: $3 - $9 M	• Sewer: $48 M • Flow Split Reconfiguration: $0.7 M • Empey WWPS Decommissioning: $1.5M	• Empey WWPS: $14 M • Flow Split Reconfiguration: $0.7 M
Advantages	• Minimizes upgrades and pump needs at Empey WWPS • Existing short term capacity available at Empey WWPS • Potential to eliminate WWPS upgrades through I&I Reduction	• Minimize upgrades and pump needs at Empey WWPS • Existing short term capacity at Empey WWPS • Provides additional system capacity • Potential to eliminate WWPS upgrades through I&I Reduction	• Optimization of the flow split to direct flows to Empey WWPS to relieve flows through downtown trunk • Elimination of WWPS – Improves system efficiency and long-term O&M • Potential to minimize WWPS upgrades through I&I Reduction	• Optimization of the flow split to direct flows to Empey WWPS to relieve flows through downtown trunk • Existing short term capacity at Empey WWPS • Potential to minimize WWPS upgrades through I&I Reduction

Disadvantages	• Limited ability to redirect flows away from Empey WWPS • High costs and construction to upgrade downtown trunk sewers				• Limited ability to redirect flows away from Empey WWPS • High costs and construction for new downtown sewers				• High capital cost • Sewers upstream of WWTP are at capacity with minor surcharging during PWWF • Higher peak flows may be realized at WWTP as Empey WWPS acts as storage • Implementation and Cost risk associated with tunnel construction				• Upgrades required at Empey WWPS • Sewers upstream of WWTP are at capacity with minor surcharging during PWWF			
Four-Point Criteria Evaluation	Technical	Environ-mental	Social & Cultural	Financial	Technical	Environ-mental	Social & Cultural	Financial	Technical	Environ-mental	Social & Cultural	Financial	Technical	Environ-mental	Social & Cultural	Financial
Recommended Alternative	• **Not Recommended**: Substantial sewer upgrades and high construction needs.				• **Not Recommended**: High construction needs and costs associated with new sewer.				• **Not Recommended**: High costs and complex construction associated with tunneled sewer				• **Recommended**: Easiest to implement with the lowest upgrade costs.			

Evaluation Scoring Legend: **High** **Medium** **Low**

The full evaluation is included in **Appendix E**. Alternative 2B (Redirect Flows to Empey WWPS and Upgrade Empey WWPS) is the preferred alternative as it has the easiest implementation process and the lowest upgrade costs.

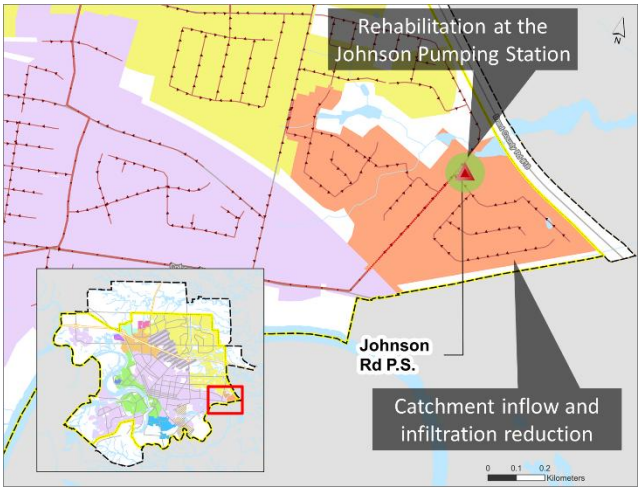
8.7. Local System Servicing Concepts

In addition to the larger catchment concepts that were reviewed, the following planned and proposed local system servicing concepts were presented.

8.7.1. Johnson Road WWPS Catchment

The existing Johnson Road WWPS catchment experiences high rates of inflow and infiltration resulting in capacity constraints at the WWPS; as such, upgrades are proposed to both reduce inflow and infiltration as well as rehabilitate the existing pumps. **Table 29** details the planned upgrades.

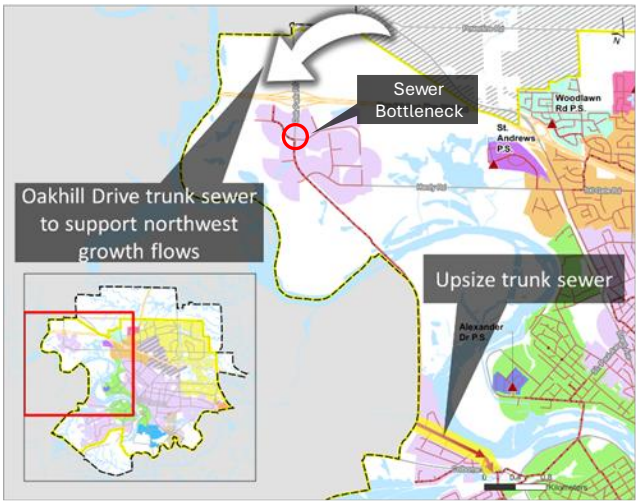
Table 29: Johnson Road WWPS Catchment

Johnson Road Pumping Station Catchment	
Overview	
• Johnson Road Pumping Station catchment has high rates of inflow and infiltration and existing Pumping Station is operating below firm capacity • Growth occurring in northwest area of catchment	
Planned Upgrades	
• Implement inflow and infiltration reduction in catchment to reduce flows to Pumping Station • Pump rehabilitation at Pumping Station to re-establish installed capacity to meet 2051 flow targets	

8.7.2. Oakhill Drive

The Oakhill Drive trunk sewer will support the north expansion lands; however, an existing bottleneck exists between Jennings Road and Colborne Street West. As such, the trunk sewer will be upsized to accommodate increased growth flows. **Table 30** details the planned upgrades.

Table 30: Oakhill Drive

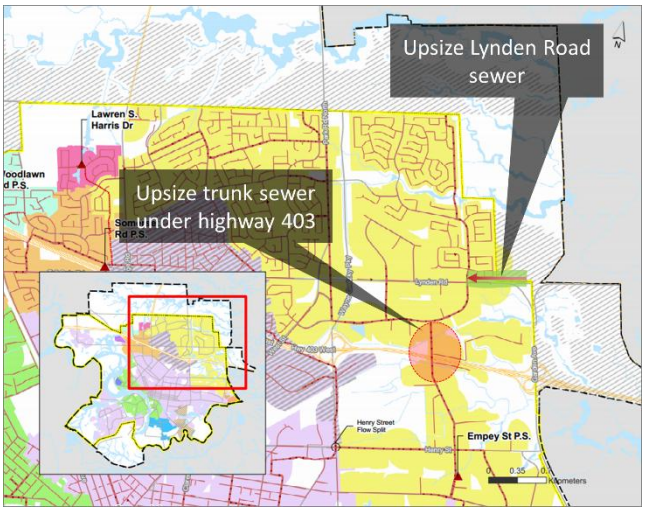
Oakhill Drive	
Overview • Oakhill Drive trunk sewer will support northwest growth flows from Oak Park Road • Existing bottleneck of 600mm sewer between 825/750mm on Fen Ridge Court near Oak Park Road • Existing Oakhill Drive sewer between Jennings Road and Colborne Street West downsizes from 1,050 mm to 675/750 mm	
Planned Upgrades • Upsize sewer between Jennings Road and Colborne Street West to accommodate 2051 growth flows and mitigate potential operational issues • Sewer on Fen Ridge Court near Oak Park Road to be upsized to resolve the sewer capacity bottleneck	

8.7.3. Coulbeck Road Trunk Sewer

The Coulbeck Road trunk sewer will support the north and east expansion lands; however, a capacity constraint exists south of Roy Boulevard crossing Highway 403 to Adams Boulevard. The trunk sewer will be upsized to accommodate increased growth flows and will include ongoing inflow and infiltration such that the project is not triggered at an earlier date than anticipated with an upgrade timeline of 20+ years.

Further, to service the east expansion lands, the existing sewer on Lynden Road will be upsized from the east expansion lands to Roy Boulevard to accommodate increased flows from the new east lands WWPS and forcemain. **Table 31** details the proposed upgrades.

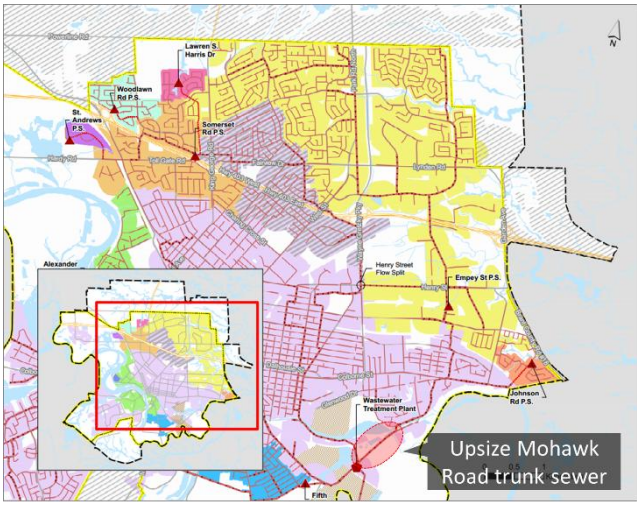
Table 31: Coulbeck Road Trunk Sewer

Coulbeck Trunk Sewer	
Overview	
• North Expansion Lands east of King George Road directed to Coulbeck Road Trunk Sewer • East Expansion Lands along eastern boundary directed to Lynden Road and Coulbeck Road Trunk Sewer	
Proposed Upgrades	
• Coulbeck Road trunk sewer under Highway 403 crossing to be upsized to support growth • Ongoing flow monitoring in sewer to ensure inflow and infiltration doesn't trigger project earlier • Lynden Road sewer upgrade from proposed East Expansion Lands forcemain to Coulbeck Road	

8.7.4. Mohawk Road Trunk Sewer

The Mohawk Road trunk sewer will support the north and east expansion lands; however, a capacity constraint exists upstream of the WWTP. The trunk sewer will be upsized to accommodate increased growth flows and will include ongoing inflow and infiltration monitoring such that the project is not triggered at an earlier date than anticipated with an upgrade timeline of 20+ years. **Table 32** details the proposed upgrades.

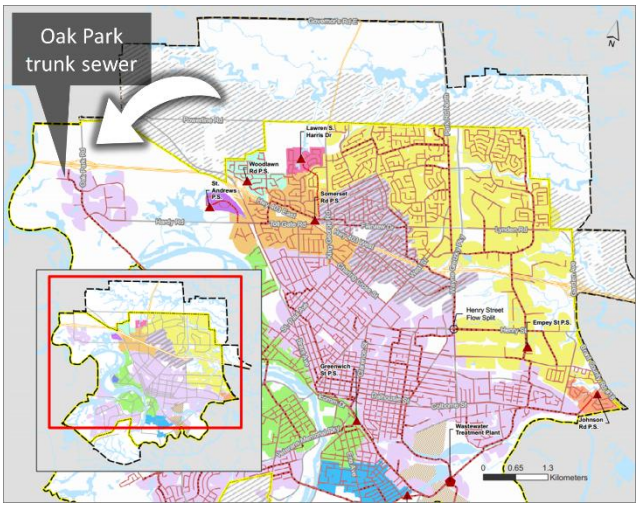
Table 32: Mohawk Road Trunk Sewer

Mohawk Road Trunk Sewer	
Overview	
• North Expansion Lands east of King George Road and East Expansion Lands along eastern boundary flow through Mohawk Road trunk sewer	
Proposed Upgrades	
• Mohawk Sewer from Mohawk Street siphon (south of Forest Road) to WWTP entrance to be upsized to support growth • Ongoing flow monitoring in sewer to ensure inflow and infiltration doesn't trigger project earlier	

8.7.5. Northwest Area Trunk Alignment

The new trunk sewer, within the north expansion lands, west of King George Road will connect to the existing wastewater system at Oak Park Road. Due to existing environmental and construction constraints within the corridor, a separate Schedule 'B' EA will be needed to determine the full extents of the impacts. **Table 33** details the proposed upgrades.

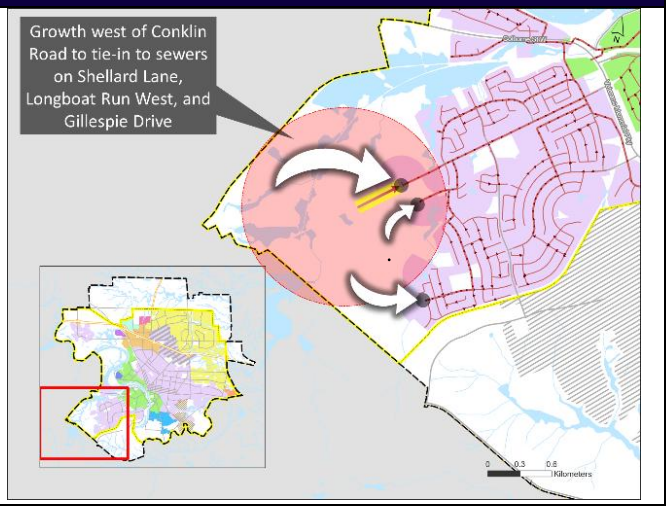
Table 33: Northwest Area Trunk Alignment

Northwest Area Trunk Alignment	
Overview	
• North Expansion Lands west of King George directed to Oak Park Road Trunk sewer • Oak Park Road and Powerline Road alignment constrained due to overhead powerlines and railway crossing • Potential alignment through future employment lands	
Proposed Upgrades	
• Oak Park Road and Powerline Road sewer alignment will be determined through subsequent Schedule 'B' EA • Opportunity to optimize alignment with development draft plans	

8.7.6. West of Conklin Road

Greenfield development within West Conklin, generally north and south of Shellard Lane and west of Conklin Road, will be serviced through various connections conveying flows to the WWTP including the existing 675 mm trunk sewer on Shellard Lane which has sufficient capacity. **Table 34** details the planned upgrades.

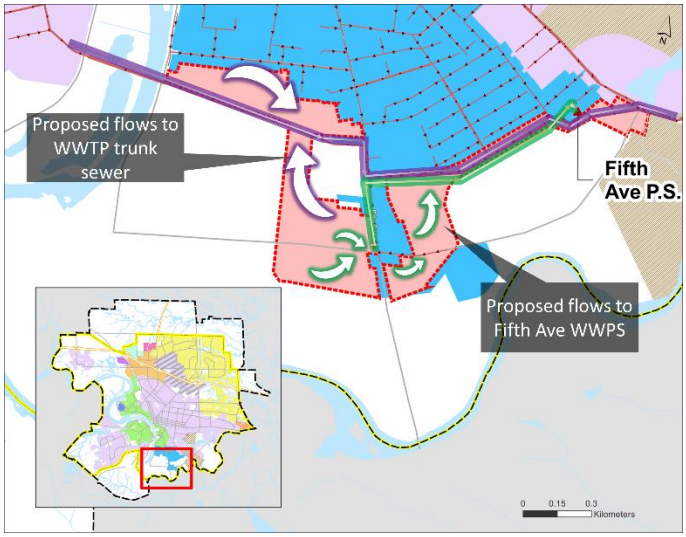
Table 34: West of Conklin Road

West of Conklin Road	
Overview	
• Greenfield development will occur west of Conklin Road, north and south of Shellard Lane	
Planned Upgrades	
• Flows will be conveyed to the existing sewers on Shellard Lane, Longboat Run West, and Gillespie Drive and conveyed by gravity to the WTTP • Existing Shellard Lane trunk sewer has sufficient capacity to accommodate all greenfield development flows	

8.7.7. Fifth Avenue Development

Greenfield development occurring within the Fifth Avenue WWPS catchment will occur generally south of Baldwin Avenue and east of Erie Avenue. Due to its location, the majority of the greenfield growth flows can be diverted to the WWTP trunk gravity sewer which traverses the development area. **Table 35** details the planned upgrades.

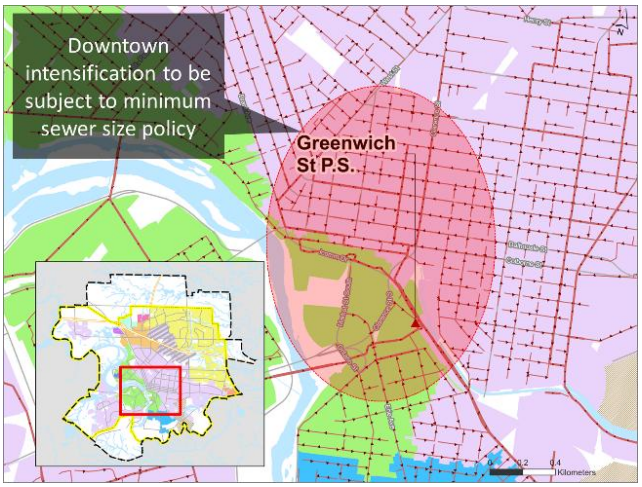
Table 35: Fifth Avenue Development

Fifth Avenue Development	
Overview	
• Greenfield development will occur south of Baldwin Avenue and east of Erie Avenue	
Planned Upgrades	
• Due to the proximity of the development to the existing WWTP trunk sewer, a connection to the existing WWTP trunk sewer can be made to accommodate a majority of the flows by gravity	

8.7.8. Downtown Growth

The growth projection identifies substantial potential for intensification and redevelopment within the City's downtown area. Sewer capacity upgrades may be required to support the increased density. Sewer upgrades will be coordinated with other planned rehabilitation works and/or as required to support individual developments. **Table 36** details the planned upgrades.

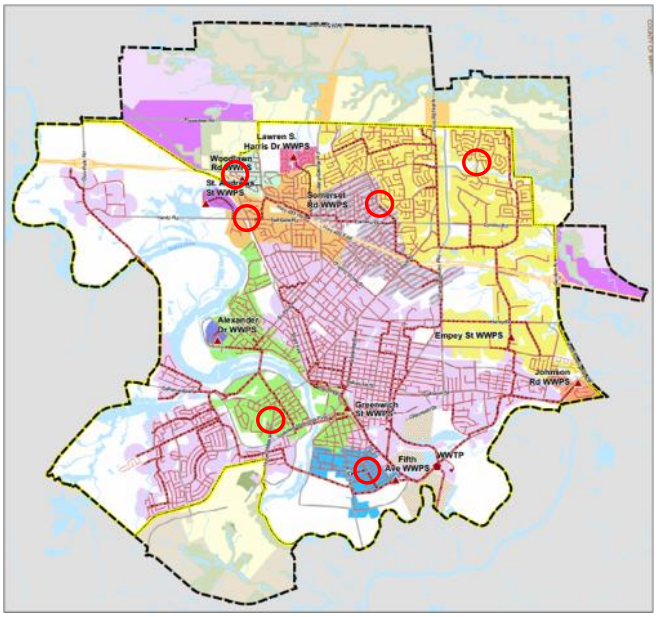
Table 36: Downtown Growth

Downtown Growth	
Overview	
• Substantial growth identified in downtown core • Impacts to existing sewers are dependent on location and density of growth	
Planned Upgrades	
• Establish a policy for minimum sewer capacity requirement to accommodate future intensifications based on L/s/ha of upstream catchment • Upgrade costs to be divided between City and growth	

8.7.9. Localized System Upgrades

Due to the substantial amount of growth and intensification within the City's urban boundary, localized surcharging was identified through hydraulic modelling, indicating sewer capacity upgrades may be required in these localized areas. Sewer upgrades will be coordinated with other planned rehabilitation works and/or as required to support individual developments. **Table 37** details the planned upgrades.

Table 37: Localized System Upgrades

Localized System Upgrades	
Overview • Substantial growth within the City's urban boundary • Impacts to existing sewers are dependent on location and density of growth	

Planned Upgrades
• Upsize existing sewers to accommodate 2051 growth flows:
  • Upsize sewer on Division Street between Dorothy Street and Tenth Avenue
  • Upsize sewer on Brantwood Park Road between Viscount Road and Banbury Road
  • Upsize sewer on Memorial Drive between Buckingham St and Hayhurst Road
  • Upsize sewer on Hardy Road between St Andrews Drive and Paris Road
  • Upsize sewer on Mt Pleasant Road between Helen Avenue and Walnut Street
  • Sewer upgrades on Myrtleville Dr and Sandlewood Ave
• Upgrade costs to be divided between City and growth	

8.8. Wastewater Pumping Station Capacity and Storage Upgrades

Based on the pumping review, there is an existing and long-term pumping deficit and storage needs at some of the existing pumping stations. In addition, based on reviews with City staff, a number of the pumping stations are operating at a lower capacity than the ECA rated firm capacity and require upgrades.

Table 38 presents the facility capacities including design firm capacity, observed firm capacity, available storage and the existing and 2051 flow and storage requirements.

Table 38: WWPS Capacity and Storage Requirements

WWPS	Facility Capacity			Existing		2051	
	Design Firm Capacity (MLD)	Observed Firm Capacity (MLD)	Available Storage (ML)	100-Year PWWF (MLD)	10-year PWWF 1-hour Storage Requirement (ML)	Growth PWWF (MLD)	10-year PWWF 1-hour Storage Requirement (ML)
Johnson Rd. WWPS	5.5	4.7	0.069	8.7	0.270	9.1	0.274
Empey St. WWPS	138.2	96.8	2.262	87.9	2.371	153.3	5.283
Somerset Rd. WWPS	23.3	22.5	0.497	23.4	0.702	23.2	0.741
Woodlawn Rd. WWPS	4.9	4.1	0.107	5.2	0.156	5.8	0.182
St. Andrews WWPS	2.4	2.1	0.032	1.8	0.052	2.2	0.067
Lawren S. Harris Dr. WWPS	6.7	6.3	0.069	4.8	0.137	5.0	0.141
Greenwich St. WWPS	37.8	29.5	1.007	24.8	0.973	51.7	1.696
Alexander Dr. WWPS	1.8	0.9	0.165	5.2	0.152	5.3	0.157
Fifth Ave. WWPS	11.5	6.1	0.192	6.8	0.261	11.3	0.381
Stauffer Rd. WWPS	2.6	2.6	0.045	3.2	0.087	3.3	0.090

(1) Flow and storage requirements colour based on observed firm capacity (<80% capacity, 80-100% capacity, >100% capacity)

The following WWPS require pump upgrades, storage upgrades or both:

- **Johnson Road WWPS**: Rehabilitation to re-establish station firm capacity, and additional storage to address existing and future peak wet weather flow storage deficit. Additionally, implement wet weather flow reduction in the catchment to address peak flows in excess of the rehabilitated firm capacity.
- **Empey Street WWPS**: Pump station upgrades in line with **Section 8.6**. Recent upgrades include 2,185 m3 of storage in new storage tank, 1,100 m3 of storage in collection system, and 500 m3 of storage in wet well for a total of 3,785 m3 of storage. Additionally, implement wet weather flow reduction in the catchment to manage long-term storage requirements.
- **Somerset Road WWPS:** Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing pumping and storage deficit in existing and future condition. Part of the WWPS catchment belongs to a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. Wet weather flow reduction to address future peak wet weather flow storage deficit.
- **Woodlawn Road WWPS**: Rehabilitation to re-establish station firm capacity.
- **St. Andrews WWPS**: Additional storage to address existing and future peak wet weather flow storage deficit.
- **Lawren S. Harris Dr. WWPS**: Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing storage deficit in existing and future condition. The WWPS is part of a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. It is recommended to monitor the flow at the WWPS before implementing any upgrades.
- **Greenwich Street WWPS**: Renewal and improvements to increase station capacity as per **Section 8.4**.
- **Alexander Drive WWPS**: Existing peak wet weather flow has increased significantly in the model after the 2023 calibration. As a result, the WWPS is showing pumping deficit in existing and future condition. The WWPS is part of a larger calibration zone, which may contain areas with high inflow and infiltration to the system, which may cause the increase in existing flow. It is recommended to monitor the flow at the WWPS before implementing any upgrades.
- **Fifth Avenue WWPS**: Implement wet weather flow reduction in the catchment to address peak flows in excess of the rehabilitated firm capacity and peak wet weather flow storage deficit.
- **Stauffer Road WWPS**: As a newly constructed WWPS, the existing condition is showing pumping and storage deficit. The WWPS is part of a larger calibration zone, which may contain areas with high inflow and infiltration to the system, causing the elevated flow. It is recommended to monitor the flow at the WWPS before implementing any upgrades.

8.9. Wet Weather Management

The wet weather management program has been recommended to address existing areas with high inflow and infiltration that result in system capacity restrictions or basement flooding risk. The program is intended to deal with existing capacity constraints, and to provide growth-related capacity without expanding/upgrading existing infrastructure, or by minimizing the required expansion/upgrade. This program provides for a proactive and targeted approach to addressing wet weather impacts.

The wet weather management program should focus on the following priority areas:

- Johnson Road WWPS catchment
- Fifth Avenue WWPS catchment
- Greenwich WWPS catchment
- North Brantford catchment

8.9.1. Johnson Road WWPS

The Johnson Road WWPS catchment is subject to very high RDII (1.28 L/s/ha) that is resulting in peak flows exceeding the capacity of the Johnson Road WWPS. I&I reduction is needed to avoid upgrades to the station beyond the planned rehabilitation. If I&I reduction efforts are unsuccessful, additional upgrades and potential forcemain twinning may be required.

8.9.2. Fifth Avenue WWPS

The Fifth Avenue WWPS catchment area is subject to seasonal high groundwater infiltration, resulting in spring base flow being 5 times the typical baseflows. These seasonally high baseflows combined by the moderately high RDII, results in peak flows exceeding the capacity of the Fifth Avenue WWPS and upstream sewer surcharging. The planned upgrades to the Fifth Avenue WWPS will be sufficient to accommodate the existing and projected peak flows without I&I reduction; however, I&I reduction is still recommended to provide additional resilience to the local system and to reduce total system baseflows helping to manage available growth capacity at the WWTP.

8.9.3. Greenwich Street WWPS

The Greenwich Street WWPS catchment area is subject to moderately high RDII that is resulting in peak flows exceeding the capacity of the Greenwich WWPS. The area is also suspected to be subject to seasonally high groundwater infiltration. The planned upgrades to the Greenwich WWPS will be sufficient to accommodate the existing and projected peak flows without I&I reduction; however, I&I reduction is still recommended to provide additional resilience to the local system and to reduce total system baseflows helping to manage available growth capacity at the WWTP. I&I reduction is needed to avoid additional upgrades to the station beyond the planned rehabilitation.

8.9.4. North Brantford

The North Brantford catchment area is subject to moderately high RDII that is resulting in higher-than-expected flows to the Empey Street WWPS and increased risk of basement flooding in the local sewer network. Upgrades to the Empey Street WWPS are triggered by growth, and I&I reduction alone would not eliminate the need for pump station upgrades; however, I&I reduction is required to minimize the required storage upgrades to support the 10-year design storm flows. I&I reduction will also provide additional resilience to the local system.

8.9.5. Flow Monitoring

To support the wet weather management program, it is recommended that the City maintain and expand the existing flow monitoring program.

8.10. Post Period Servicing

The servicing analysis presented focuses on servicing the buildout of the internal growth and Settlement Area Boundary Expansion Areas to 2051; however, consideration of the City's municipal boundary including the LOSB was considered and will be serviced by the following extensions:

North Expansion Lands

- Lands between Golf Road and Park Road North, north of Jones Creek are considered as post period growth. Servicing this area will require a new WWPS that will pump to the proposed Powerline Road trunk sewer east of Wayne Gretzky Parkway. Capacity upgrades to the Coulbeck Road trunk sewer and further downstream trunk sewers will be required to accommodate the additional full buildout flows.
- Local WWPS might be necessary to service certain development LOSB areas, which will not be considered during this study.
- **Figure 10** presents the planned post period servicing strategy in North Expansion Lands.

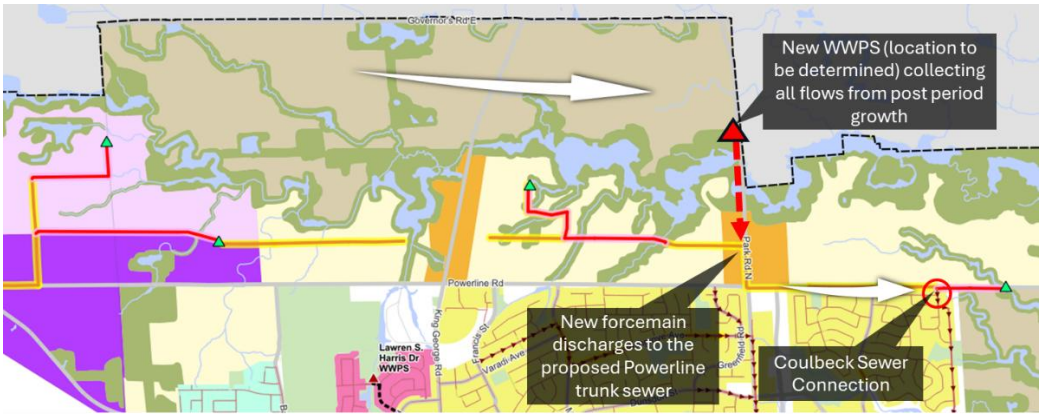


Figure 10: Planned Post Period Servicing Strategy in North Expansion Lands

Tutela Heights Lands

- Full buildout of Tutela Heights will either be serviced by a direct connection to the gravity sewer along Mount Pleasant Road or by a new WWPS. The new WWPS could discharge to the proposed gravity sewer along Mount Pleasant Road or to the proposed Tutela Heights WWPS.
- Full buildout of lands south of Mount Pleasant Road will be serviced by a new WWPS. The new WWPS could pump to the gravity sewers going to the Tutela Heights WWPS and outlet to Mount Pleasant Road. It could also pump to the future gravity sewer along Mount Pleasant Road.
- Full buildout of lands north of Mount Pleasant Road will have the option to tie in directly to the future gravity sewer along Mount Pleasant Road or discharge to the new WWPS.
- Full buildout of lands east of Davern Rd will be serviced by future gravity sewers that flow to the Tutela Heights WWPS and outlet to Mount Pleasant Road.
- **Figure 11** details the planned post period servicing strategy for the Tutela Heights Lands.

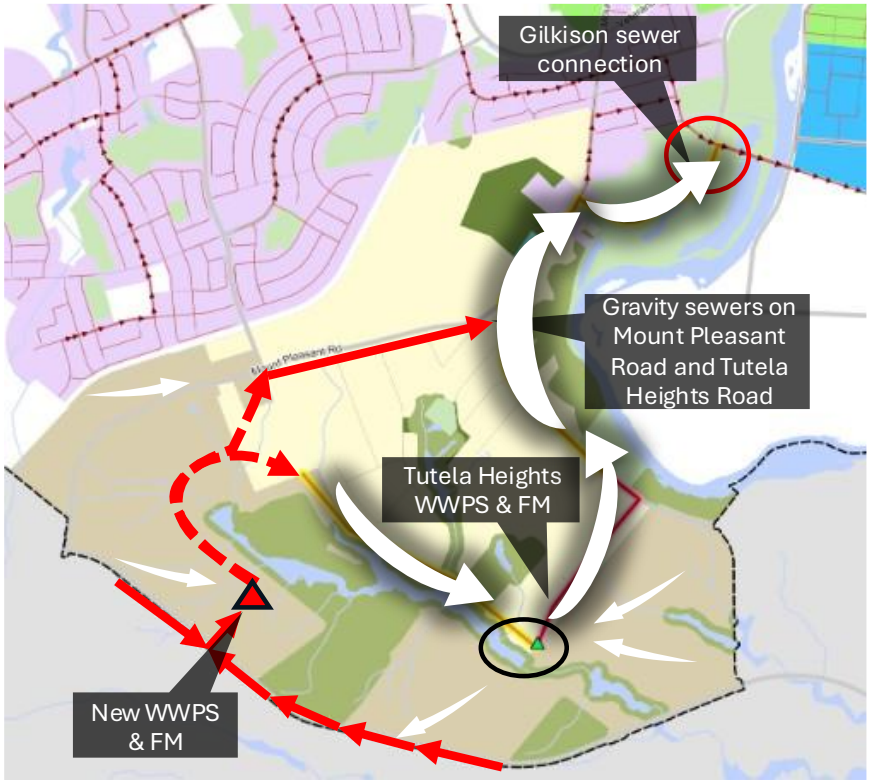


Figure 11: Planned Post Period Servicing Strategy in Tutela Heights Lands

9. Preferred Wastewater Servicing Strategy

The recommended wastewater servicing strategy can be broken down into various components that have different aims but each contributing to the overall improvement of the existing system and service of the projected buildout due to growth.

The preferred servicing strategy was developed to ensure that extension of the wastewater collection system to the expansion lands is supportive of the existing servicing strategy and follows an integrated approach with the City's development plans.

9.1. Preferred Wastewater Servicing Strategy Overview

The preferred wastewater strategy consists of directing growth flows to existing trunk sewers and upgrading downstream WWPSs where needed with the objective of maximizing the total area serviced by gravity.

The North Expansion lands flows will be split between two trunk sewers, Coulbeck Road and Oak Park Road with four (4) new WWPS required to service the expansion lands. The East Expansion lands will be serviced by a connection to the existing system along Lynden Road with a new WWPS in the east employment lands outletting to the Lynden Road sewer.

Tutela Heights will be serviced by a trunk sewer along Mount Pleasant Road connecting to the City's existing system. The lands south of Mount Pleasant Road will be collected via a centralized WWPS and conveyed to the trunk sewer on Mount Pleasant Road and the lands north of Mount Pleasant Road can be serviced by a direct gravity connection along Mount Pleasant Road.

Each wastewater project is further depicted in **Sections 9.1.1** to **9.1.7**.

9.1.1. Brantford Wastewater Treatment Plant

Process maintenance and optimization at the Brantford Wastewater Treatment Plan will allow for a rated capacity of 81.8 MLD to be maintained when completed within the next 0-10 years. Upgrades at the WWTP are needed to accommodate 2051 growth flows. All proposed upgrades will be completed within the next 20 years and include the following upgrades:

- **Raw Sewage Pumping:** Increase pumping capacity with an additional pumping station and a twinned forcemain.
- **Preliminary Treatment:** Additional bar screen and grit chamber.
- **Primary Clarifiers:** Increase clarifier capacity.
- **Aeration Tanks:** Optimize process flow rates to Process Module 1 (PM1) and PM2. Increase capacity of PM2 aeration tanks, and additional aeration capacity.
- **Secondary Clarification:** Bring all existing tanks back into service and add additional.
- **Waste Activated Sludge (WAS) Thickening:** New WAS thickening facility to support primary clarifiers and anaerobic digester.
- **Biosolids Storage Tank:** Increase biosolids storage volume.

9.1.2. Pumping Stations

9.1.2.1. Upgrades to Existing Wastewater Pumping Stations

The following details the recommended upgrades at existing pumping stations

- **Empey Street WWPS Storage Upgrades**: 2021 MSP Update recommended a twinned Wet Well (Duplicate of existing ~0.5 ML of storage), and 2.0 ML Storage Chamber, includes 4 new pumps and a new control building. Recent upgrades include 2.2 ML of storage in new storage tank, 1.1 ML of storage in collection system, and 0.5 ML of storage in wet well for a total of 3.8 ML of storage.
- **Empey Street Wastewater Pumping Station Rehabilitation and Improvements**: Renewal to meet current flow needs including maintenance and repair and rehabilitation.
- **Fifth Avenue Wastewater Pumping Station Upgrades**: Recent upgrades at existing WWPS include upgrading capacity to 11.2 MLD, and a new forcemain (twinned) which is currently under construction.
- **Fifth Avenue Wastewater Pumping Station Storage Upgrades:** Upgrades at the existing WWPS to accommodate 1 hour of storage, 0.468 ML, at peak flows of 11.2 MLD.
- **Greenwich Wastewater Pumping Station Rehabilitation and Improvements**: Renewal to meet current flow needs including maintenance and repair, rehabilitation, and replacing existing pumps with new pumps and non-clog impellers to reduce plugging. Pumps selected are to match current firm capacity to preservice the existing station capacity.
- **St. Andrews Wastewater Pumping Station Storage Upgrades**: 2021 MSP Update recommended an additional 0.02 ML of storage to address existing and future peak weather flow storage deficit. Recent upgrades include 25 m^3 of storage, 7 m^3 of storage in collection system, and 20 m^3 of storage in wet well for a total of 52 m^3 of storage.
- **Johnson Wastewater Pumping Station Storage Upgrades**: An additional 0.12 ML of storage to address existing and future peak weather flow storage deficit.
- **Johnson Wastewater Pumping Station Rehabilitation**: Rehabilitation, maintenance, and repair to address operational concerns related to WWPS.
- **Woodlawn Wastewater Pumping Station Rehabilitation**: Rehabilitation, maintenance, and repair to address operational concerns related to WWPS.

9.1.2.2. New Wastewater Pumping Stations

The following details the recommended new pumping stations to service the Expansion Lands:

- **Northwest-1 Wastewater Pumping Station**: New 2.6 MLD WWPS located northeast of Golf Road or Powerline Road Trunk Sewer. Flows will be pumped to the trunk sewer along the north-south collector road, draining to Oak Park Road. WWPS to be sized for North Expansion Lands while securing site capacity to allow for upgrades for full buildout flows post 2051.

- **Northwest-2 Wastewater Pumping Station**: New 17.4 MLD WWPS located east of Golf Road on east-west collector road. Flows will be pumped to the trunk sewer along the Powerline Road trunk sewer, draining to Oak Park Road. WWPS to be sized for North Expansion Lands while securing site capacity to allow for upgrades for full buildout flows post 2051.
- **North Wastewater Pumping Station:** New 8.4 MLD WWPS located along the east-west collector road between King George Road and Park Road North, south of Jones Creek. WWPS to be sized for North Expansion Lands while securing site capacity to allow for upgrades for full buildout flows post 2051.
- **Northeast Wastewater Pumping Station**: New 6.5 MLD WWPS located along Powerline Road, east of Coulbeck Road. Flows will be pumped to Coulbeck Road trunk sewer.
- **East Wastewater Pumping Station**: New 9.1 MLD WWPS located in southeast East Expansion Lands along collector road. Flows will be pumped to trunk sewer on Lynden Road.
- **Tutela Heights Wastewater Pumping Station**: New 6.9 MLD WWPS located in south Tutela Heights along collector road. Flows to be pumped to trunk sewer on Tutela Heights Road, extending to Mount Pleasant Road trunk sewer.

9.1.2.3. New Forcemains

The following details the recommended new forcemains to service the Expansion Lands:

- **Northwest-1 Wastewater Pumping Station Forcemain**: New 250 mm forcemain extending from Northwest-1 WWPS to north-south collector road trunk sewer. Forcemain sized to accommodate North Expansion Lands with allowance for potential twinning for full buildout flows.
- **Northwest-2 Wastewater Pumping Station Forcemain**: New 500 mm forcemain extending from Northwest-2 WWPS to Powerline Road trunk sewer. Forcemain sized to accommodate existing flows and full buildout flows.
- **North Wastewater Pumping Station Forcemain**: New 350 mm forcemain from North WWPS to east-west collector road trunk sewer. Forcemain sized to accommodate existing flows and full buildout flows.
- **Northeast Wastewater Pumping Station Forcemain**: New 300 mm forcemain from Northeast WWPS to Coulbeck Road trunk sewer. Forcemain sized to accommodate existing flows and full buildout.
- **East Wastewater Pumping Station Forcemain**: New 350 mm forcemain extending from East WWPS to Lynden Road trunk sewer.
- **Tutela Heights Wastewater Pumping Station Forcemain**: New 350 mm forcemain extending from Tutela Heights WWPS to Tutela Heights Road trunk sewer.

9.1.3. Existing System Upgrades

Projects to service the existing system include the following:

- **Bodine Road Easement Sewer Upgrades**: Upsize existing 975 mm sewer to 1,350 mm on alignment 270 m east of Bodine Road from Roy Boulevard to Henry Street crossing under Highway 403 to address future capacity issues; sewer sized to accommodate full buildout. Project costs include ongoing flow monitoring in existing trunk sewer to ensure Inflow and Infiltration (I&I) does not trigger project earlier than anticipated.
- **North Ashgrove Avenue Sewer Upgrades**: Upgrade existing 375-500 mm sewers to 600 mm on Memorial Drive from Kensington Drive to Ashgrove Avenue and on Ashgrove Avenue from Memorial Drive to the Homestead Place to address capacity issues in North Brantford.
- **Summerhayes Crescent Servicing Study**: Feasibility study to assess the connection of the existing septic service lands to the existing King George Road sewer or pumping the services to east-west collector road trunk sewer (east of King George Road) and North WWPS. The feasibility study will determine sewer upsizing needs.
- **Henry Street Flow Split Reconfiguration**: Reconfigure sewer flow split to redirect flows to Empey Street WWPS to relieve downstream sewer capacity constraints.
- **Grand River Avenue Sewer Upgrades**: Optimize Grand River Avenue and Jubilee Avenue flow split by diverting more flows to Grand River Avenue. Upsize existing 300 mm sanitary sewers to 525 mm along Grand River Avenue to accommodate increased flows.
- **Oakhill Sewer Upgrades**: Upsize Oakhill Drive sewer between Jennings Road and Colborne Street West from 675 and 750 mm to 1,050 mm to accommodate growth flows from the North Expansion Lands as well as address any potential operational issues due to the smaller sewer diameter.
- **Downtown Sewers**: The growth projection identifies substantial potential for intensification and redevelopment, as per the Downtown Brantford Revitalization EA, within the City's downtown area. Sewer capacity upgrades may be required to support the increased density. Sewer upgrades will be coordinated with other planned rehabilitation works and/or as required to support individual developments.
- **Mohawk Trunk Sewer Upgrades**: Upgrade existing 1,200 mm sewer on Mohawk Street from Mohawk Street siphon (south of Forest Road) to WWTP entrance to address future capacity issues; sewer sized to accommodate full buildout. Project costs includes ongoing flow monitoring in existing trunk sewer to ensure I&I does not trigger project earlier than anticipated.
- **Localized System Upgrades**: Due to the substantial amount of growth and intensification within the City's urban boundary, localized surcharges were identified through hydraulic modelling, indicating sewer capacity upgrades may be required in these localized areas. The upgrades will be coordinated with other planned rehabilitation works and/or as required to support individual developments.

9.1.4. North Expansion Lands

Projects to service the North Expansion Lands include the following:

- **Oak Park Road Trunk Sewer:** New 750 mm trunk sewer extending from north-south collector road to Oak Park Road to service North Expansion lands west of King George Road.
- **North-South Collector's Road Trunk Sewer**: New 825 mm trunk sewer extending along north-south collector road from east-west collector road to Powerline Road to service North Expansion lands west of King George Road.
- **North-South Collector's Road Trunk Sewer**: New 525 mm trunk sewer extending along north-south collector's road from northern east-west collector road to north-south collector road to service lands north of east-west collector road.
- **East-West Collector's Road Trunk Sewer (West of King George)**: New 600 mm trunk sewer extending along east-west collector road east of Northwest-2 WWPS and west of King George Road.
- **East-West Collector's Road Trunk Sewer (East of King George Road)**: New 525 mm trunk sewer extending along east-west collector road east of King George Road to North WWPS.
- **East-West Collector's Road Trunk Sewer (East of North WWPS)**: New 525 mm trunk sewer extending from North WWPS forcemain to Park Road North.
- **Powerline Road Trunk Sewer (East of North WWPS)**: New 825 mm trunk sewer along Park Road North then on Powerline extending from East-West Collector's Road to Coulbeck Road trunk sewer. Sewer sized to accommodate full buildout.

9.1.5. East Expansion Lands

Projects required to service the East Expansion Lands include the following:

- **East Expansion Lands Trunk Sewer**: New 525 mm trunk sewer from Lynden Road to East WWPS along the east collector road.
- **Lynden Road Trunk Sewer Upgrades**: Upsize existing 250 mm sewer to 525 mm along Lynden Road from East WWPS forcemain to Brantwood Park Road.

9.1.6. Tutela Heights

Watermain upgrades that will be required to accommodate growth include the following:

- **Mount Pleasant Road Trunk Sewer Upgrades**: New 825 mm along Gilkison Street from Mount Pleasant Road to the trunk sewer connection at Delamere Street.
- **Mount Pleasant Road Trunk Sewer**: New 600 mm trunk sewers along Mount Pleasant Road from Tutela Heights Road to existing trunk sewer on Mount Pleasant Road.
- **Tutela Heights Road Trunk Sewer**: New 600 mm trunk sewers along Tutela Heights Road from Tutela Heights WWPS forcemain to Mount Pleasant Road.

9.1.7. Additional Studies

- **Flow Monitoring**: City wide flow monitoring program to address existing issues and provide guidance for wet weather flow management practices.
- **City Wide Inflow and Infiltration Program**: City wide I&I reduction program based on flow monitoring results to address existing areas of high I&I.
- **Greenwich Street WWPS Inflow and Infiltration Reduction**: Greenwich WWPS catchment is subject to high I&I which will be addressed through the initiation of an I&I program to manage peak flows allowing for additional capacity to be realized at the existing Greenwich Street WWPS.
- **Johnson Road WWPS Inflow and Infiltration Reduction**: Johnson Road WWPS catchment subject to very high I&I which will be addressed through the initiation of an I&I program to manage peak flows allowing for additional capacity to be realized at the existing Johnson Road WWPS.

9.2. Capital Program

The preferred wastewater servicing strategy has been developed to support the servicing needs of the existing and future growth areas within the City of Brantford to 2051 and beyond. The capital costs for each project of the Preferred Strategy were estimated according to the costing methodology within **Section 10** of **Volume II**. These projects are listed according to their project number and are shown in **Table 41**. The capital program table contains project descriptions, dimensions, proposed timing, and estimate total project cost. Detailed project sheets are included in **Appendix F**.

9.2.1. Project Costing

The wastewater Capital Program project costs were developed using a unit cost approach. A breakdown of the unit cost methodology is included in **Volume II**.

9.2.2. Development Charge Contributions

For each identified wastewater project, the project's estimated growth/benefit to existing related contribution was identified. **Table 39** summarizes the Development Charge Benefit To Existing (BTE) classifications.

Table 39: Development Charges Benefit to Existing Classifications

Development Charges Benefit to Existing Class	Description	BTE (%)
A	Solely supporting new development area	0%
B	Triggered by growth but also services existing users	20%
C	Triggered by growth but also provides some operational improvement	40%
D	Supports both growth and existing users equally	50%
E	Primarily to address existing operational issues but also supports growth	Custom
F	Sole benefit to existing users	100%

9.2.3. Project Timing and Triggers

To support the City's long-term budgeting and wastewater rates, a preliminary project timeline for each wastewater Capital Program project has been identified. Project timing has been identified in the following increments.

- 0-5 Years
- 5-10 Years
- 10-20 Years

The estimated project timeline was based on individual triggers for each project. These triggers are based on either the growth within the system which can be accommodated before the identified project is required or requirements to service the expansion lands. The triggers that correlate to the project timing are included in **Table 40**.

Table 40: Project Triggers

Project Timeline	Triggers
0 – 5 Years	• Operational improvements (Station rehab and storage) • Primary Trunks to Growth Areas • System Wide Growth Areas
5 – 10 Years	• System Wide Growth • System Trunks & WWPS Upgrades – Depends on Capacity Trigger • Primary Trunk within Growth Areas
10 – 20 Years	• Remaining Growth Projects • System Trunks & WWPS Upgrades – Depends on Capacity Trigger
Unknown/Ongoing	• Downtown Sewers • I&I Reduction • Flow Monitoring

9.3. Operational and Maintenance Impacts

The proposed wastewater system upgrades represents a 12% increase in value of the City sewer trunk network and includes a 21% increase in pump stations. It is anticipated that operational and maintenance requirements will increase for the treatment plant to accommodate new process equipment associated with the proposed capacity upgrades.

It is anticipated that the above system expansions will increase the network operational and maintenance costs by an equivalent amount. As such, these additional operational costs, and supporting staff increase, will need to be factored into the City's long-term wastewater system financial planning and operational needs

9.4. Summary – Capital Program Projects

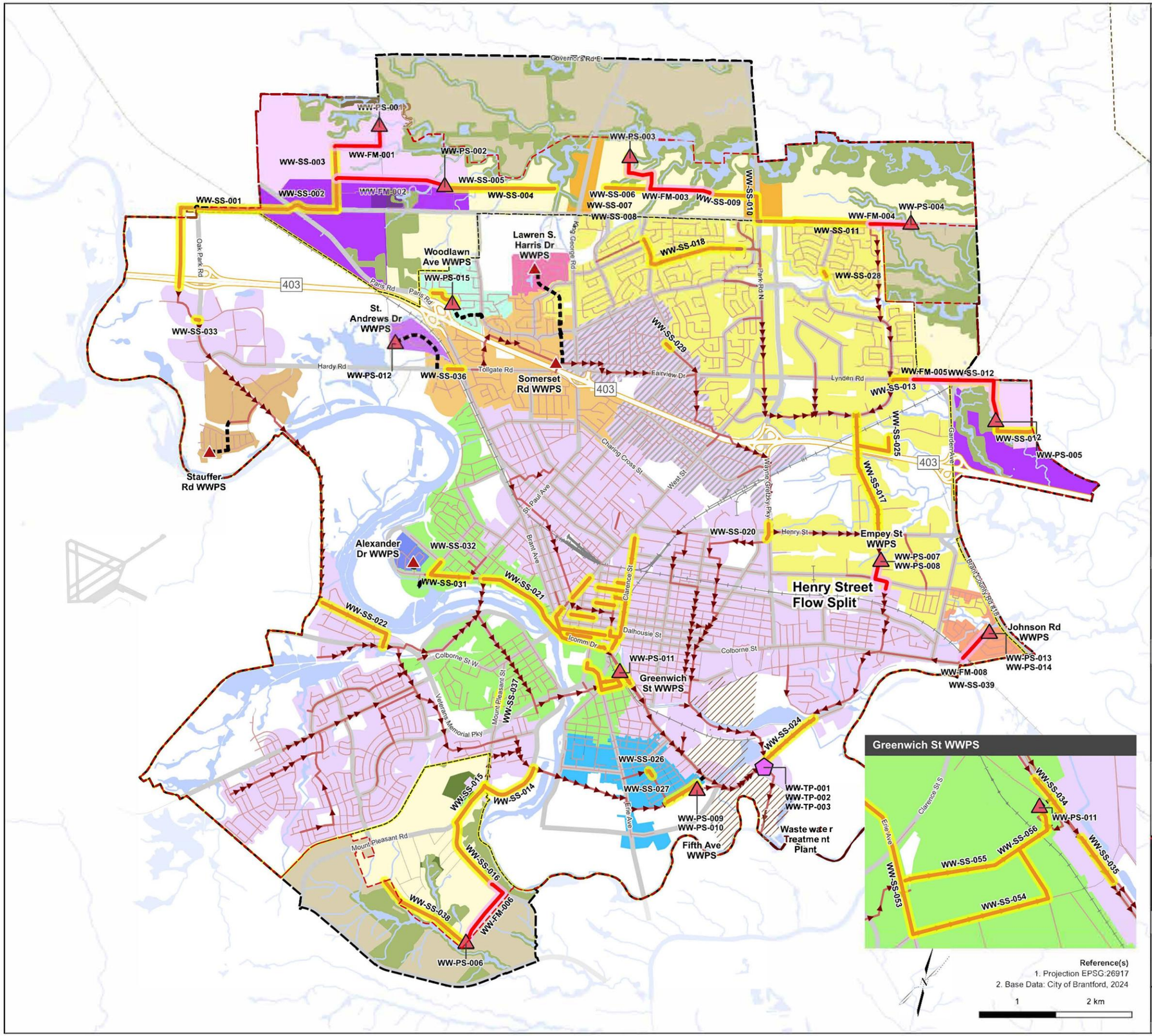
Summary maps and tables of the recommended upgrades for the capital program are included in Table 41 and Figure 12.

Table 41: Wastewater Capital Program Summary

Capital Program ID	Name	Required Studies	Class EA Schedule	Project Type	Size/ Capacity	Total Estimated Cost (2025$)	Timeline	DC Benefit to Existing Class
WW-SS-001	Oak Park Road Trunk Sewer	Municipal Class EA	Schedule B	Sewer 5m	825 mm	$32,885,000	0-5 Years	A
WW-SS-002	North-South Collector's Road Trunk Sewer	-	Exempt	Sewer 5m	825 mm	$1,532,000	0-5 Years	A
WW-SS-003	North-South Collector's Road Trunk Sewer	-	Exempt	Sewer 5m	525 mm	$869,000	10-20 Years	A
WW-SS-004	East-West Collector's Road Trunk Sewer (West of King George Road)	-	Exempt	Sewer 5m	525 mm	$2,054,000	10-20 Years	A
WW-SS-005	East-West Collector's Road Trunk Sewer (West of King George Road)	-	Exempt	Sewer 5m	600 mm	$1,041,000	5-10 Years	A
WW-SS-006	East-West Collector's Road Trunk Sewer (East of King George Road)	-	Exempt	Sewer 5m	300 mm	$219,000	10-20 Years	A
WW-SS-007	East-West Collector's Road Trunk Sewer (East of King George Road)	-	Exempt	Sewer 5m	300 mm	$720,000	10-20 Years	A
WW-SS-008	East-West Collector's Road Trunk Sewer (East of King George Road)	-	Exempt	Sewer 5m	525 mm	$1,547,000	10-20 Years	A
WW-SS-009	East-West Collector's Road Trunk Sewer (East of North WWPS)	-	Exempt	Sewer 5m	525 mm	$1,739,000	5-10 Years	A
WW-SS-010	Powerline Road Trunk Sewer (East of North WWPS)	-	Exempt	Sewer 5m	825 mm	$3,122,000	5-10 Years	A
WW-SS-011	Powerline Road Trunk Sewer (East of North WWPS)	-	Exempt	Sewer 5m	825 mm	$5,511,000	0-5 Years	A
WW-SS-012	East Expansion Lands Trunk Sewer	-	Exempt	Sewer 5m	525 mm	$5,145,000	5-10 Years	A
WW-SS-013	Lynden Road Trunk Sewer Upgrades	-	Exempt	Sewer 5m	525 mm	$657,000	0-5 Years	A
WW-SS-014	Gilkinson Street Trunk Sewer	-	Exempt	Sewer 5m	825 mm	$3,686,000	0-5 Years	B
WW-SS-015	Mount Pleasant Road Trunk Sewer	-	Exempt	Sewer 5m	825 mm	$1,833,000	0-5 Years	A
WW-SS-016	Tutela Heights Road Trunk Sewer	-	Exempt	Sewer 5m	750 mm	$4,192,000	5-10 Years	A
WW-SS-017	Bodine Road Easement Sewer Upgrades	Municipal Class EA	Schedule B	Sewer 5m	1350 mm	$30,832,000	20+ Years	B
WW-SS-018	North Ashgrove Avenue Sewer Upgrades	-	Exempt	Sewer 5m	600 mm	$4,455,000	0-5 Years	B
WW-SS-019	Summerhayes Crescent Servicing Study	Feasibility Study	Exempt	Sewer 5m	0 mm	$200,000	0-5 Years	B
WW-SS-020	Henry Street Flow Split Reconfiguration	-	Exempt	Sewer 10m	825 mm	$670,000	0-5 Years	D
WW-SS-021	Grand River Avenue Sewer Upgrades	-	Exempt	Sewer 5m	525 mm	$4,752,000	5-10 Years	E
WW-SS-022	Oakhill Sewer Upgrades	-	Exempt	Sewer 5m	1050 mm	$6,893,000	10-20 Years	B
WW-SS-023	Downtown Sewers - Chatham St	Feasibility Study	Exempt	Sewer 5m	450 mm	$322,000	0-20 Years	C
WW-SS-024	Mohawk Street Sewer Upgrades	-	Exempt	Sewer 5m	1350 mm	$7,951,000	20+ Years	B
WW-SS-025	Sewer Upgrades for TZ801	Municipal Class EA	Schedule B	Sewer 5m	450 mm	$1,553,000	0-5 Years	B
WW-SS-026	Division St Sewer Upgrades	-	Exempt	Sewer 5m	450 mm	$190,000	0-5 Years	B
WW-SS-027	Fifth Ave Sewer Upgrades	-	Exempt	Sewer 5m	450 mm	$990,000	0-5 Years	E
WW-SS-028	Brantwood Park Rd Sewer Upgrades	-	Exempt	Sewer 5m	300 mm	$1,123,000	10-20 Years	E
WW-SS-029	Memorial Dr Sewer Upgrades	-	Exempt	Sewer 5m	375 mm	$1,521,000	10-20 Years	E
WW-SS-030	Clarence St Sewer Upgrades	-	Exempt	Sewer 5m	450 mm	$11,162,000	10-20 Years	D
WW-SS-031	Grand River Ave Sewer Upgrades (West Section)	-	Exempt	Sewer 5m	525 mm	$9,066,000	5-10 Years	E
WW-SS-032	Morrell St Sewer Upgrades	-	Exempt	Sewer 5m	375 mm	$3,305,000	5-10 Years	E
WW-SS-033	Fen Ridge Court Sewer to Resolve Oak Park Road Bottleneck	-	Exempt	Sewer 5m	600 mm	$142,000	5-10 Years	A

Capital Program ID	Name	Required Studies	Class EA Schedule	Project Type	Size/ Capacity	Total Estimated Cost (2025$)	Timeline	DC Benefit to Existing Class
WW-SS-034	Greenwich St Sewer Upgrades (US of WWPS)	Feasibility Study	Exempt	Sewer 5m	900 mm	$578,000	0-5 Years	B
WW-SS-035	Greenwich St Sewer Upgrades (DS of WWPS)	Feasibility Study	Exempt	Sewer 5m	900 mm	$715,000	0-5 Years	B
WW-SS-036	Hardy Road Sewer Upgrades	-	Exempt	Sewer 5m	300 mm	$1,077,000	10-20 Years	B
WW-SS-037	Mount Pleasant Street Sewer Upgrades	-	Exempt	Sewer 5m	300 mm	$673,000	10-20 Years	E
WW-SS-038	Tutela Heights Sewer Upstream of Tutela Heights WWPS	Municipal Class EA	Schedule B	Sewer 5m	300 mm	$4,613,000	0-5 Years	A
WW-SS-039	Johnson WWPS Inlet Sewer Upgrades	-	Exempt	Sewer 5m	375 mm	$832,000	5-10 Years	E
WW-SS-040	Downtown Sewers - Darling St	Feasibility Study	Exempt	Sewer 5m	250 mm	$453,000	0-20 Years	A
WW-SS-041	Downtown Sewers - Icomm Dr	Feasibility Study	Exempt	Sewer 5m	750 mm	$2,698,000	0-20 Years	A
WW-SS-042	Downtown Sewers - West St	Feasibility Study	Exempt	Sewer 5m	375 mm	$704,000	0-20 Years	A
WW-SS-043	Downtown Sewers - Marlborough St	Feasibility Study	Exempt	Sewer 5m	300 mm	$273,000	0-20 Years	A
WW-SS-044	Downtown Sewers - Sheridan St	Feasibility Study	Exempt	Sewer 5m	450 mm	$842,000	0-20 Years	A
WW-SS-045	Downtown Sewers - Nelson St	Feasibility Study	Exempt	Sewer 5m	375 mm	$494,000	0-20 Years	A
WW-SS-046	Downtown Sewers - Colborne St	Feasibility Study	Exempt	Sewer 5m	250 mm	$981,000	0-20 Years	A
WW-SS-047	Downtown Sewers - Brant Ave	Feasibility Study	Exempt	Sewer 5m	525 mm	$807,000	0-20 Years	B
WW-SS-048	Downtown Sewers - Colborne St E	Feasibility Study	Exempt	Sewer 5m	525 mm	$393,000	0-20 Years	B
WW-SS-049	Downtown Sewers - Clarence St	Feasibility Study	Exempt	Sewer 5m	675 mm	$2,733,000	0-20 Years	B
WW-SS-050	Downtown Sewers - Clarence St S	Feasibility Study	Exempt	Sewer 5m	900 mm	$900,000	0-20 Years	A
WW-SS-051	Downtown Sewers - Water St	Feasibility Study	Exempt	Sewer 5m	250 mm	$496,000	0-20 Years	B
WW-SS-052	Downtown Sewers - Easement	Feasibility Study	Exempt	Sewer 5m	375 mm	$159,000	0-20 Years	B
WW-SS-053	Downtown Sewers - Market St Erie Ave	Feasibility Study	Exempt	Sewer 5m	375 mm	$938,000	0-20 Years	A
WW-SS-054	Downtown Sewers - Eagle Ave	Feasibility Study	Exempt	Sewer 5m	525 mm	$867,000	0-20 Years	A
WW-SS-055	Downtown Sewers - Veterans Memorial Pkwy	Municipal Class EA	Schedule B	Sewer 5m	675 mm	$977,000	0-20 Years	B
WW-SS-056	Downtown Sewers - Greenwich WWPS Inlet	Municipal Class EA	Schedule B	Sewer 5m	900 mm	$714,000	0-20 Years	B
WW-SS-057	Myrtleville Sewer	-	Exempt	Sewer 5m	300 mm	$829,000	5-10 Years	C
WW-FM-001	Northwest-1 WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	250 mm	$1,534,000	10-20 Years	A
WW-FM-002	Northwest-2 WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	500 mm	$5,393,000	5-10 Years	A
WW-FM-003	North WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	350 mm	$3,279,000	10-20 Years	A
WW-FM-004	Northeast WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	300 mm	$1,012,000	0-5 Years	A
WW-FM-005	East WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	350 mm	$4,221,000	5-10 Years	A
WW-FM-006	Tutela Heights WWPS Forcemain	Municipal Class EA	Schedule B	Forcemain	350 mm	$1,175,000	10-20 Years	A
WW-FM-007	Empey WWPS Forcemain Extension	-	Eligible for Screening	Forcemain	900 mm	$6,897,000	10-20 Years	C
WW-FM-008	Johnson WWPS Forcemain Upgrades	-	Exempt	Forcemain	300 mm	$1,372,000	5-10 Years	E
WW-FM-009	Empey WWPS Forcemain Replacement	-	Eligible for Screening	Forcemain	900 mm	$6,979,000	5-10 Years	B
WW-PS-001	Northwest-1 Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	30 L/s	$12,298,000	10-20 Years	A

Capital Program ID	Name	Required Studies	Class EA Schedule	Project Type	Size/ Capacity	Total Estimated Cost (2025$)	Timeline	DC Benefit to Existing Class
WW-PS-002	Northwest-2 Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	190 L/s	$20,800,000	5-10 Years	A
WW-PS-003	North Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	97 L/s	$15,578,000	10-20 Years	A
WW-PS-004	Northeast Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	75 L/s	$14,344,000	0-5 Years	A
WW-PS-005	East Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	105 L/s	$16,028,000	5-10 Years	A
WW-PS-006	Tutela Heights Wastewater Pumping Station	Municipal Class EA	Schedule B	Pumping	80 L/s	$16,772,000	10-20 Years	A
WW-PS-007	Empey Street WWPS Storage Upgrades	Municipal Class EA	Schedule B	Pumping	1000 m^3	$9,568,000	0-5 Years	D
WW-PS-008	Empey Street WWPS Rehabilitation and Improvements	Feasibility Study	Exempt	Pumping	1600 L/s	$7,800,000	0-5 Years	E
WW-PS-009	Fifth Avenue Wastewater Pumping Station Upgrades	-	Exempt	Pumping	72 L/s	$5,057,000	Completion 2021	D
WW-PS-010	Fifth Avenue WWPS Storage Upgrades	Feasibility Study	Exempt	Pumping	468 m^3	$3,327,000	0-5 Years	E
WW-PS-011	Greenwich Wastewater Pumping Station Rehabilitation and Improvements	Feasibility Study	Eligible for Screening	Pumping	141 L/s	$1,296,000	10-20 Years	E
WW-PS-012	St. Andrews WWPS Storage Upgrades	Feasibility Study	Exempt	Pumping	25 m^3	$503,000	0-5 Years	D
WW-PS-013	Johnson WWPS Storage Upgrades	Feasibility Study	Eligible for Screening	Pumping	115 m^3	$897,000	0-5 Years	E
WW-PS-014	Johnson WWPS Rehabilitation	Feasibility Study	Exempt	Pumping	70 m^3	$576,000	0-5 Years	E
WW-PS-015	Woodlawn WWPS Rehabilitation	Feasibility Study	Exempt	Pumping	-	$576,000	0-5 Years	E
WW-II-001	Flow Monitoring	-	Exempt	Wet Weather Reduction	-	$12,129,000	0-5 Years	D
WW-II-002	City Wide I&I Program	-	Exempt	Wet Weather Reduction	-	$38,502,000	0-5 Years	D
WW-II-003	Greenwich WWPS I&I Reduction	-	Exempt	Wet Weather Reduction	-	$8,019,000	0-5 Years	D
WW-II-004	Johnson WWPS I&I Reduction	-	Exempt	Wet Weather Reduction	-	$8,019,000	0-5 Years	D
WW-TP-001	Wastewater Treatment Plant Upgrades - 0 - 5 Years	Municipal Class EA	Schedule C	Treatment	-	$19,500,000	0-5 Years	D
WW-TP-002	Wastewater Treatment Plant Upgrades - 5-10 Years	Municipal Class EA	Schedule C	Treatment	-	$9,750,000	5-10 Years	D
WW-TP-003	Wastewater Treatment Plant Upgrades - 10-20 Years	Municipal Class EA	Schedule C	Treatment	-	$74,700,000	10-20 Years	D
TOTAL						**$505,226,000**		



Capital Program Projects

- Pumping Stations
- Wastewater Treatment Plant
- Sewer Mains
- Forcemains

Wastewater Network

- Wastewater Treatment Plant (WWTP)
- Wastewater Pumping Station (WWPS)
- Forcemains
- Trunk Mains (>300 mm)
- Gravity Mains (≤300 mm)

WWPS Catchment

- Alexander Dr WWPS
- Empey St WWPS
- Fifth Ave WWPS
- Greenwich St WWPS
- Johnson Rd WWPS
- Lawren S. Harris Dr WWPS
- Somerset Rd WWPS
- St.Andrew's Ave WWPS
- Woodlawn Rd WWPS
- Upstream of Henry Street Flow Split
- WWTP
- Stauffer Rd WWPS

General Features

- Expressway / Highway
- Arterial and Collector
- Local Roads
- Railway
- Six Nations of the Grand River Territory
- Current City Municipal Boundary
- 2016 Municipal Boundary
- Settlement Area Boundary
- Outside Municipalities
- Waterbody and Watercourses

Proposed Preferred Land Use Options

- Agricultural Designation
- Core Natural Areas
- Downtown Urban Growth Centre
- General Employment
- Intensification Corridor
- Major Commercial Centre
- Major Institutional
- Parks and Open Space
- Prestige Employment
- Residential

Figure 12
Wastewater - Capital Program

Project Name:
Water and Wastewater Master Servicing Plan – Development Charges Update 2025 Amendment

Client Name:
City of Brantford
(Ontario, Canada)

Last Updated: June 2026
Document ID: 2404322-WW-005-WW
Capital Program v2

10. Implementation Plan

As outlined in **Section 2** of **Volume II**, the 2025 MSP Amendment sets out to satisfy the Class EA Master Plan Approach 1 requirements according to the MEA Class EA document. The Preferred Wastewater Servicing Strategy will support the servicing needs of the City of Brantford's future growth to 2051 and beyond. This strategy will be implemented in accordance with each project Class EA schedule.

Wastewater infrastructure projects identified through the Master Plan fall into the following categories:

- **Exempt Projects (Formerly Schedule A and A+)**: Projects that are generally limited in scale and have minimal adverse effects on the environment. These include routine, maintenance, or low-impact work that are small in scale, with predictable and easily manageable impacts.
- **Eligible for Screening to Exempt**: Certain projects may be eligible for exemption from further MCEA requirements if they meet specific criteria and successfully complete the appropriate screening processes. These processes assess factors such as proximity to environmentally sensitive natural areas, cultural heritage or archaeological potential, and adjacent sensitive land uses. Screening may include, but is not limited to, the Archaeological Screening Process (ASP) and other evaluations outlined in the MCEA manual. If the screening confirms minimal environmental impact, the project may proceed without a full Schedule B or C Class EA. Otherwise, the applicable MCEA process must be followed. Proponents may also choose to bypass screening entirely and undertake a full Schedule B or C MCEA process and must still obtain any other required permits or approvals.
- **Schedule B Projects**: Projects with moderate potential for environmental effects. These must undergo Phases 1 and 2 of the MCEA process and will require project-specific investigations, consultation with the pubic, review agencies as well as First Nations and Indigenous Communities, and documentation before proceeding to implementation.
- **Schedule C Projects**: Projects with potential for significant environmental impacts. These require completion of all phases of the MCEA process, including project-specific investigations, consultation with the public, review agencies as well as First Nations and Indigenous Communities, and the preparation and filing of an Environmental Study Report (ESR).

The Preferred Wastewater Servicing Strategy will support the servicing needs of the City of Brantford's future growth to 2051 and beyond.

The Preferred Wastewater Strategy identifies the following Schedule B and Schedule C projects:

Table 42: MCEA Requirements for Wastewater Capital Projects

Project ID	Project Description	Class EA Schedule
WW-SS-001	Oak Park Road Trunk Sewer	Schedule B
WW-SS-017	Bodine Road Easement Sewer Upgrades	Schedule B
WW-SS-025	Sewer Upgrades for TZ801	Schedule B
WW-SS-038	Tutela Heights Sewer Upstream of Tutela Heights WWPS	Schedule B
WW-SS-055	Downtown Sewers - Veterans Memorial Pkwy	Schedule B
WW-SS-056	Downtown Sewers - Greenwich WWPS Inlet	Schedule B
WW-FM-001	Northwest-1 WWPS Forcemain	Schedule B
WW-FM-002	Northwest-2 WWPS Forcemain	Schedule B
WW-FM-003	North WWPS Forcemain	Schedule B
WW-FM-004	Northeast WWPS Forcemain	Schedule B
WW-FM-005	East WWPS Forcemain	Schedule B
WW-FM-006	Tutela Heights WWPS Forcemain	Schedule B
WW-PS-001	Northwest-1 Wastewater Pumping Station	Schedule B
WW-PS-002	Northwest-2 Wastewater Pumping Station	Schedule B
WW-PS-003	North Wastewater Pumping Station	Schedule B
WW-PS-004	Northeast Wastewater Pumping Station	Schedule B
WW-PS-005	East Wastewater Pumping Station	Schedule B
WW-PS-006	Tutela Heights Wastewater Pumping Station	Schedule B
WW-PS-007	Empey Street WWPS Storage Upgrades	Schedule B
WW-TP-001	Wastewater Treatment Plant Upgrades - 0 - 5 Years	Schedule C
WW-TP-002	Wastewater Treatment Plant Upgrades - 5-10 Years	Schedule C
WW-TP-003	Wastewater Treatment Plant Upgrades - 10-20 Years	Schedule C

All necessary studies (environmental impact, cultural heritage resource, and archeological resource, etc.) should be undertaken by an appropriate professional as early as possible during the planning process for all Schedule B and Schedule C projects identified within the Preferred Servicing Strategy.

As part of the detailed design of the projects, the following requirements should be considered:

- Finalization of property requirements;
- Refinement of infrastructure alignment;
- Identification of preferred construction methodologies;
- Completion of additional supporting investigations as required (e.g. geotechnical, hydrogeological, fluvial geomorphology, etc.);

- Review and mitigation of potential construction related impacts; and,
- Satisfy all federal, provincial, municipal, and conservation authority approval requirements.

With respect to the City's planning and budgeting, this program will be utilized as a high-level baseline estimate for the City's capital budget. These costs will be further developed and refined during the implementation phases as detailed information becomes available.

The anticipated timing of each project within the Preferred Strategy has been established based on the projected population and employment growth within the City. The wastewater program's project scheduling has also been cross-referenced with the water and stormwater programs to ensure project coordination along common alignments.

Given the growth-related nature of the servicing strategies, the wastewater capital program forms the foundation for the wastewater component of the City of Brantford's Development Charges (DC) By-Law.

The following subsections outline the proposed implementation for wastewater infrastructure.

10.1. Brantford Wastewater Treatment Plant

Upgrade requirement triggers at the Brantford WWTP are outlined in **Table 43** and shown in **Figure 13**. Based on the existing ADWF firm capacity of 81.8 MLD and existing ADWF of 37.1 MLD, there is approximately 44.7 MLD of available treatment capacity to support growth; corresponding to an equivalent population of approximately 160,000 people and jobs. Although the WWTP has a rated capacity of 81.8 MLD, based on discussions with City staff, not all processes within the treatment plant can accommodate this capacity. Different processes are also designed to different flow conditions based on MECP guidelines. Some upgrades are required to re-establish the rated capacity of 81.8 MLD. The timeline for the necessary upgrades is on an expediated schedule which was discussed and preferred by the City.

Table 43: Brantford WWTP Upgrade Triggers

	ADWF Rated Capacity (MLD)	Existing ADWF (MLD)	Upgrade Trigger	
			Additional Capacity before Trigger (MLD)	People & Jobs
80% Capacity	65.4	37.1	28.3	100,000
90% Capacity	73.6		36.5	130,000
100% Capacity	81.8		44.7	160,000

Upgrades are classified into three sets of upgrades, based on an expediated timeline and are as follows:

- 0-5 Year Upgrades
  - Chlorine contact chambers are being replaced with UV disinfection (this project has already been planned and thus costing is not included in future planning values.
  - Construct new raw sewage pumping stations with capacity to match the current preliminary treatment capacity.
- 5-10 Year Upgrades
  -
  - Bring existing secondary clarifiers back into service
  - Secondary Treatment PM1 & PM2 cross connection piping upgrades
  - Install thickening for biosolids management.
- 10-20 Year Upgrades
  - Increase preliminary treatment capacity including raw sewage pumping, screening, grit removal and primary clarifier capacity to 2051 flows.
  - Increased aeration tank capacity
  - Increase secondary clarification capacity
  - Increase UV disinfection capacity
  - Any additional digesters and biosolids storage required after system capacity has been assessed with new thickening system

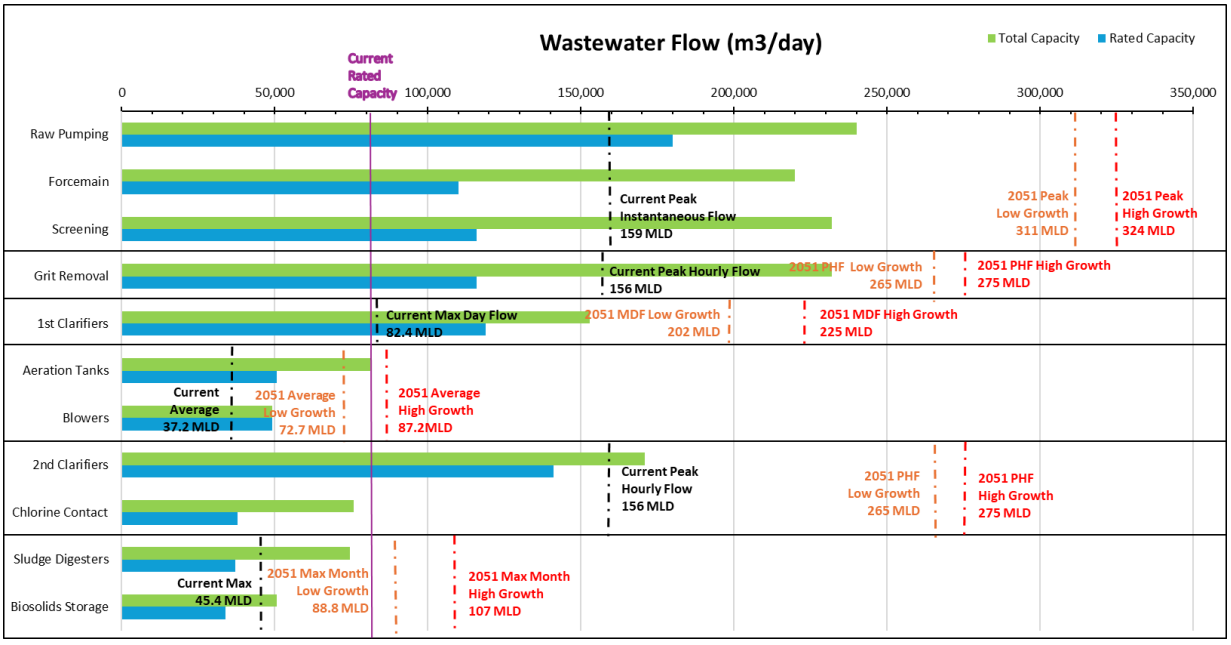


Figure 13: Brantford Wastewater Treatment Plant Capacity Requirements

10.2. Area Servicing Plans

The following sections outline the trunk servicing needs, triggers, and overall servicing requirements for each "development area" with the objective of providing direction on the project timing and triggers in terms of municipal servicing. The following subsections also summarize the magnitude of growth that can be accommodated before any upgrades are triggered.

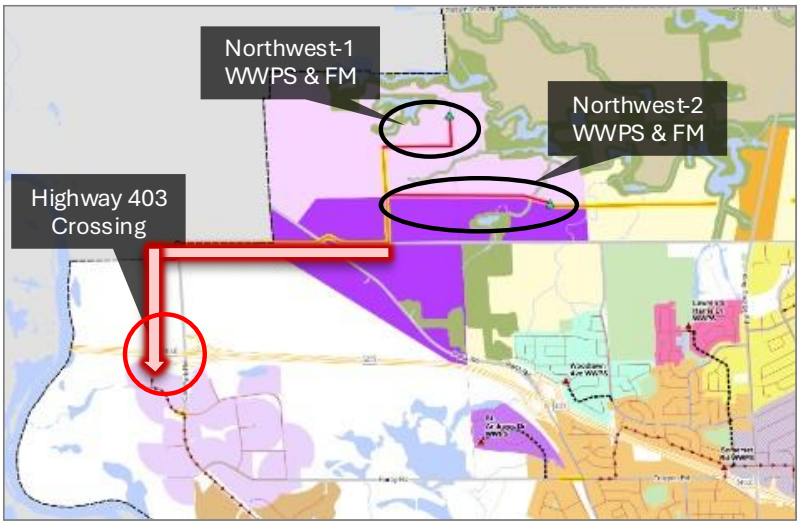
10.2.1. North Expansion Lands (West of King George)

Within the North Expansion Lands, the project timing was broken into two categories: West of King George and East of King George. For the lands West of King George Road, the Oak Park Road trunk sewer will need to be extended north to Powerline Road, crossing Highway 403 before any growth can be serviced, with the trigger being any growth north of Highway 403.

Unlike the Oak Park Road trunk sewer, the trigger for new Wastewater Pumping Stations and forcemains to service the North Expansion Lands will be by local development growth and dependent on the timing of this growth.

The Oakhill Drive sewer will also require upsizing to support growth in the North Expansion Lands, which will be triggered by an additional PWWF of 15.5MLD. An overview of the projects required to service the North Expansion Lands West of King George, including timing and triggers are presented in **Table 44**.

Table 44: North Expansion Lands (West of King George) Implementation

North Expansion Lands (West of King George)	
Overview • Triggered by growth north of Highway 403	
Key Projects • Highway 403 sanitary sewer crossing: **Immediate** (to service any growth) • New WWPS and FM, and wastewater trunk sewers: **Later**; triggered by local development • Oakhill Drive Sewer: **Later**; triggered by growth	

	WW-SS-001: Oak Park Trunk Sewer	WW-SS-022: Oakhill Drive Sewer
Why	• Trunk wastewater sewer crossing Highway 403 • Railway crossing and overhead powerlines • Optimize through local development • Coordinate with watermain	• Upsize wastewater sewer to accommodate growth • Existing bottleneck
Study	Schedule 'B' EA	No further study required
Trigger	Any growth north of Highway 403	Additional PWWF of 15.5MLD
Timing	0-5 Years **Class EA underway**	10 – 20 Years

10.2.2. North Expansion Lands (East of King George)

For the North Expansion Lands east of King George, the Coulbeck Road trunk sewer extension, new Wastewater Pumping Stations and forcemains will all be triggered by local development growth and dependent on the timing of this growth.

To support growth in the North Expansion Lands, the Empey WWPS, Coulbeck Road trunk sewer and Mohawk Street trunk sewer require upgrades. The Empey WWPS requires additional wet well storage and pump upgrades, with upgrades required immediately, before any growth can occur. The Coulbeck Road trunk sewer will require upsizing, which will be triggered by an additional PWWF of 18.2 MLD. Similarly, the Mohawk Street trunk sewer will require upsizing, which will be triggered by an additional PWWF of 43.2 MLD. Flow monitoring should be initiated now for both trunk sewers to ensure I&I does not trigger upgrades sooner than anticipated.

An overview of the projects required to service the North Expansion Lands West of King George, including timing and triggers are presented in **Table 45**.

Table 45: North Expansion Lands (East of King George) Implementation

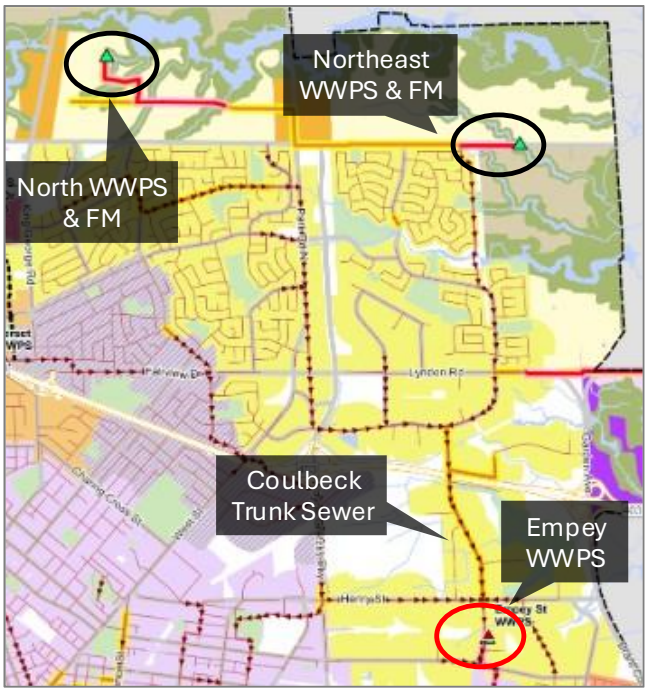
North Expansion Lands (East of King George)

Overview

- No studies required for initial trunk sewer connection
- Studies required for downstream catchments
- Triggered by growth north of Highway 403

Key Projects

- Empey WWPS: **EA completed, Detailed Design underway**
- Coulbeck Road Trunk Sewer: **Later**; Initiate flow monitoring now
- Mohawk Street Sewer: **Later**; Initiate flow monitoring now
- New WWPS & FM, and wastewater sewers: **Later**; triggered by development



	WW-PS-008: Empey Street WWPS	**WW-SS-017:** Coulbeck Road Trunk Sewer Upgrades	**WW-SS-024:** Mohawk Street Sewer Upgrades
Why	• More wet well storage • Pump upgrades needed for increased flows • Forcemain replacement and extension	• Future capacity issues • I&I may trigger project earlier than anticipated	• Future capacity issues • I&I may trigger project earlier than anticipated
Study	Schedule 'B' EA	Ongoing flow monitoring	Ongoing flow monitoring
Trigger	Immediately; Storage at capacity now	Additional PWWF of 18.2 MLD	Additional PWWF of 43.2 MLD
Timing	0-5 Years **EA completed, Detailed Design underway**	20+ Years **Initiate Flow Monitoring Now**	20+ Years **Initiate Flow Monitoring Now**

10.2.3. East Expansion Lands

Servicing for the East Expansion Lands is triggered by growth east of Garden Avenue. To support growth in the East Expansion Lands, the Empey WWPS, Coulbeck Road trunk sewer and Lynden Road trunk sewer require upgrades. The Empey WWPS requires additional wet well storage and pump upgrades, with upgrades required immediately, before any growth can occur. The Lynden Road trunk sewer will require upsizing, which will be triggered by an additional PWWF of 1.3 MLD. The Coulbeck Road trunk sewer will require upsizing, which will be triggered by an additional PWWF of 18.2 MLD. New Wastewater Pumping Stations and forcemains to service the east expansion lands will be triggered by local development growth and dependent on the timing of this growth. An overview of the projects required to service the East expansion lands, including timing and triggers are presented in **Table 46**.

Table 46: East Expansion Lands Implementation

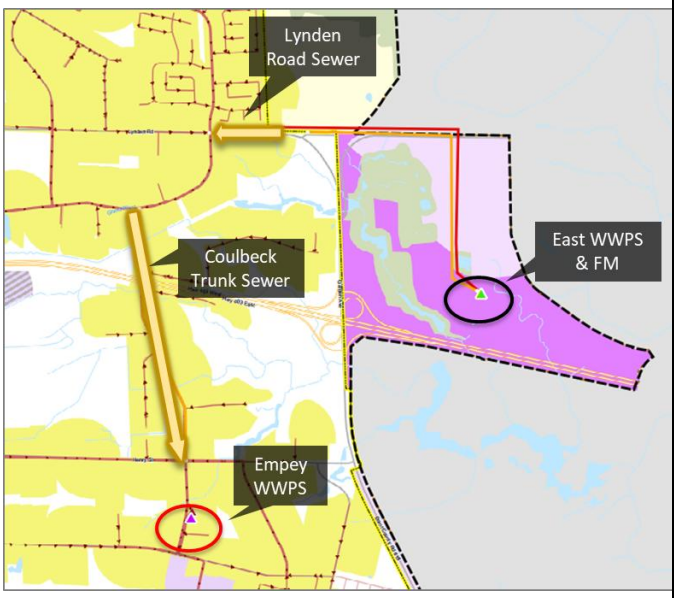
East Expansion Lands

Overview

- No initial studies required
- Triggered by growth east of Garden Avenue

Key Projects

- Empey WWPS: **EA completed, Detailed Design underway**
- Coulbeck Road Trunk Sewer: **Later;** Initiate flow monitoring now
- Lynden Road Trunk Sewer Upgrades: **Later;** triggered by growth
- New WWPS & FM, and Sanitary Sewers: **Later;** triggered by development



	WW-PS-008: Empey Street WWPS	**WW-SS-017:** Coulbeck Road Trunk Sewer Upgrades	**WW-SS-013:** Lynden Road Sewer Upgrades
Why	• More wet well storage • Pump upgrades needed for increased flows • Forcemain replacement and extension	• Future capacity issues • I&I may trigger project earlier than anticipated	• Future capacity issues
Study	Schedule 'B' EA	Ongoing flow monitoring	No further study required
Trigger	Immediately; Storage at capacity now	Additional PWWF of 18.2 MLD	Additional PWWF of 1.3 MLD
Timing	0-5 Years **EA completed, Detailed Design underway**	20+ Years **Initiate Flow Monitoring Now**	0-5 Years

10.2.4. Tutela Heights

To integrate Tutela Heights into the City's existing wastewater system, a Gilkison Street gravity sewer connection is required. The lands that can be serviced by gravity can be developed as soon as the trunk sewer connection to the existing wastewater system is constructed. Gravity trunk sewers on Tutela Heights Road and Mount Pleasant Road are also necessary to convey flows from the developments to the City's existing wastewater system. The new Wastewater Pumping Station and forcemain to service south Tutela Heights will be triggered by local development growth and dependent on the timing of this growth. An overview of the projects required to service Tutela Heights, including timing and triggers are presented in **Table** 47.

Table 47: Tutela Heights Implementation

Tutela Heights	
Overview • No initial studies required • Triggered by growth • Gravity sewer connection to existing City system **Key Projects** • Gilkison Street connection: to integrate into City's system • Gravity Sewers on Tutela Heights Road and Mount Pleasant Road • New WWPS & FM, and wastewater sewers: **Later;** triggered by development and will require studies to determine best location	

	WW-SS-014 & **WW-SS-015:** Mount Pleasant Road Trunk Sewer
Why	• Extend sewer to Tutela Heights • Upgrade portion of existing sewer for future capacity issues
Study	No further study required
Trigger	Needed to support growth
Timing	0 – 5 Years

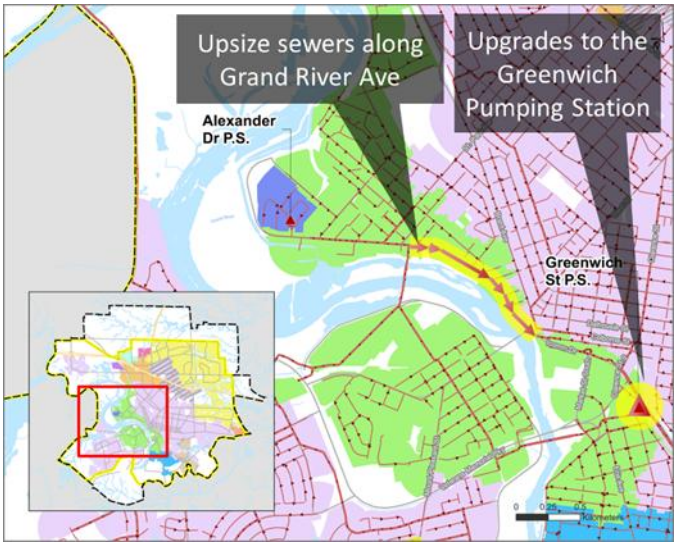
10.3. Local Servicing Needs

The following sections outline the local servicing needs, triggers and overall servicing requirements for each "local development area" with the objective of providing direction on the project timing and triggers in terms of municipal servicing.

10.3.1. Grand River Avenue Sewer Upgrades

Sewer upgrades are required along Grand River Avenue from Jubilee Siphon to Icomm Drive, upstream of the recently upgraded sewers along Grand River Avenue. Sewer upgrades are required to address existing capacity issues as there are existing local and trunk sewer constraints that will limit growth capacity in the catchment. The timing is dependent on additional growth within the catchment. An overview of the sewer upgrade project is identified in **Table 48**.

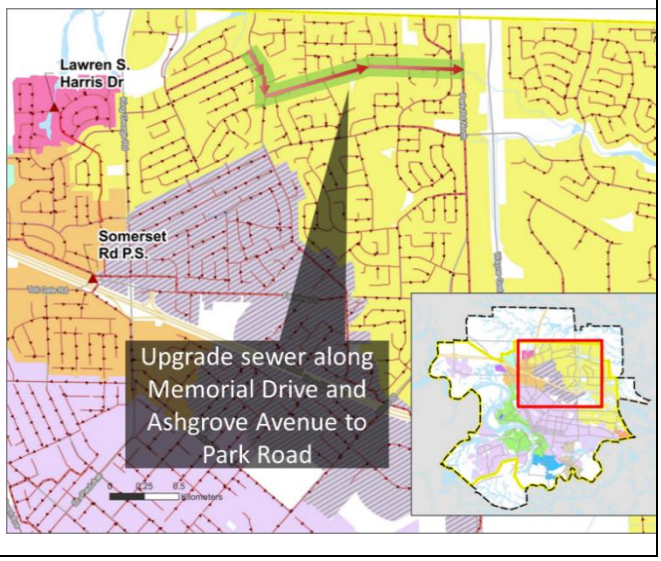
Table 48: Grand River Avenue Sewer Upgrades Implementation

WW-SS-021: Grand River Avenue Sewer Upgrades		
Why	• Address existing capacity issues • I&I reduction strategies needed to address existing deficiencies and support growth	
Study	No further study required	
Trigger	Existing capacity (limited growth in catchment)	
Timing	5-10 Years Partial upgrades completed, further upgrades needed to support growth	

10.3.2. North Ashgrove Sewer Upgrades

Sewer upgrades are required along north Ashgrove Avenue to address existing capacity issues prior to accommodating growth flows. The timing is dependent on growth in the catchment, upstream of the existing sewer. An overview of the sewer upgrade project is identified in **Table 49**.

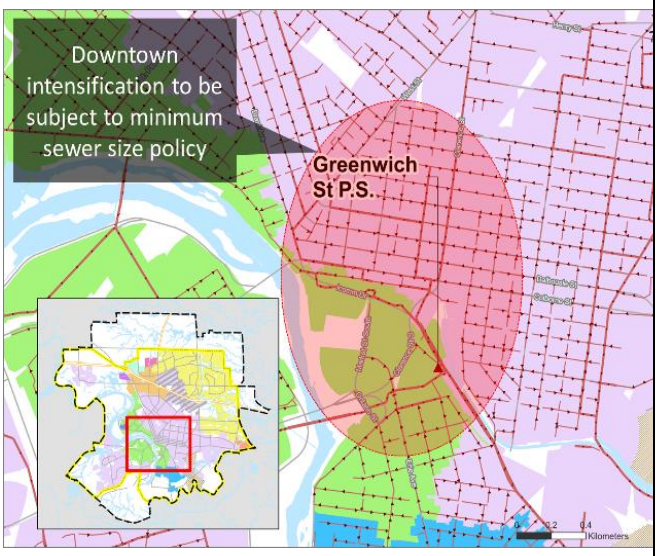
Table 49: North Ashgrove Sewer Upgrades Implementation

WW-SS-018: North Ashgrove Sewer Upgrades		
Why	• Address existing capacity issues in North Brantford • Potential to accommodate Summerhayes Crescent dependent on study outcome	
Study	No further study required	
Trigger	Intensification	
Timing	5-10 Years (Dependent on Growth Pressures)	

10.3.3. Downtown Sewers

Sewer upgrades may be required in the downtown to accommodate future intensification. The sewer upgrades timing will be triggered by local development or planned rehabilitation works based on a minimum sewer capacity requirement of the upstream catchment. An overview of the sewer upgrade project is identified in **Table 50.**

Table 50: Downtown Sewers Implementation

Downtown Sewers		
Why	• Substantial potential for intensification and redevelopment in downtown • Address existing capacity issues	
Study	Policy for minimum sewer capacity requirement (L/s/ha of upstream catchment)	
Trigger	• Planned rehabilitation works, and/or • Local development	
Timing	Ongoing	

10.3.4. Summerhayes Crescent Servicing Study

A feasibility study is required to assess the connection of the Summerhayes neighbourhood into the City's system, which is currently serviced by on lot septic. The study is triggered by local growth and will be required prior to servicing this area. An overview of the project is presented in **Table 51**.

Table 51: Summerhayes Crescent Servicing Study Implementation

WW-SS-018: Summerhayes Crescent Servicing Study		
Why	• Servicing of septic area	
Study	Feasibility Study	
Trigger	No existing City servicing – Local growth pressures	
Timing	0 – 5 Years	

10.4. Flow Monitoring

The City's flow monitoring program is ongoing and proposed to continue for the next 20 years. As the City moves forward with the program, the goal is to be more operational by using flow monitors to track capacity within existing sewers. Flow monitoring should be completed in newly installed systems, development areas prior to the City's acquisition of the sewer assets, to ensure growth lands are not contributing to wet weather flows. An overview of the flow monitoring program is outlined in **Table 52**.

Table 52: Flow Monitoring Implementation

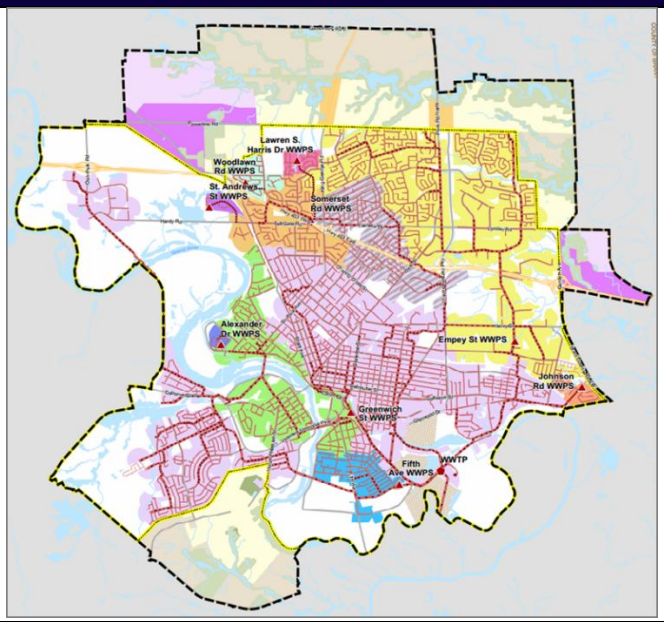
WW-II-001:
Flow Monitoring

Overview

- **Ongoing**; proposed for next 20 years
- Transition from data collection to active management

Why

- System understanding
- Capacity tracking and performance
- Provide guidance for wet weather flow management practices
- Development capacity management



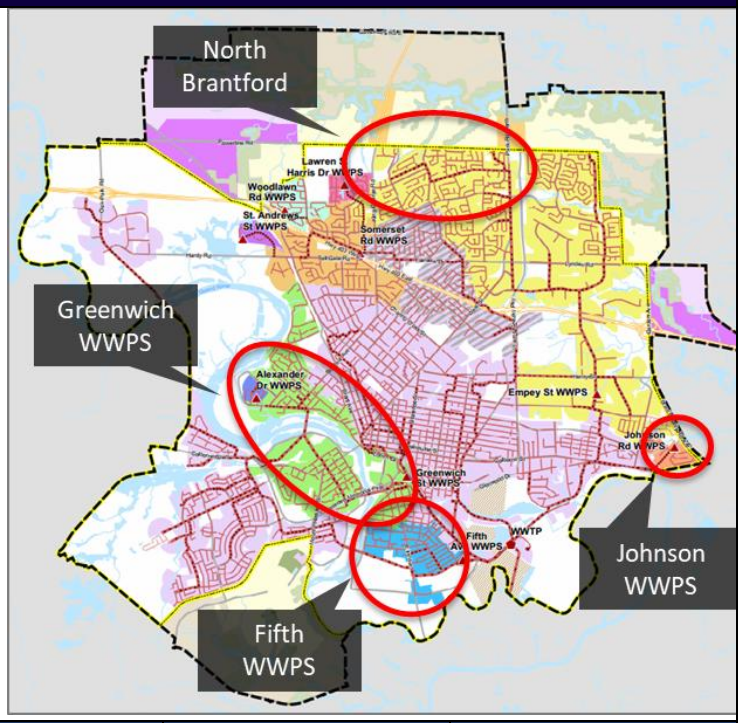
Proposed Monitoring Strategies

- Anchor monitors
  - Track capacity at key locations
  - Measure impacts of I&I program
  - Support system understanding and model calibration
- Development monitors
  - Track capacity and allocation
  - Measure impacts of I&I program
  - Support system understanding and model calibration
- Tactual I&I Program
  - Find I&I sources to support remediation plan

10.5. Inflow & Infiltration Reduction

Inflow and infiltration (I&I) reduction is required in multiple catchments to address existing areas with high I&I. This I&I reduction is required immediately to provide growth capacity and reduce upgrades at existing WWPS. An overview of the I&I target areas is provided in **Table 53**.

Table 53: Inflow and Infiltration Implementation

Inflow and Infiltration	
Trigger • High wet weather flows • Existing and long-term capacity restrictions **Why** • Remove or reduce I&I to avoid upgrades **Where** • Johnson Road WWPS catchment • Fifth Avenue WWPS catchment • Greenwich WWPS catchment • North Brantford catchment **Timing** • Start now • Focus on one area at a time	

	WW-II-004: Johnson Road WWPS	**WW-II-002:** Fifth Avenue WWPS	**WW-II-003:** Greenwich Street WWPS	**WW-II-002:** North Brantford
Why	• Very high RDII (1.28 L/s/ha) • Peak flows exceeding WWPS capacity • I&I reduction needed to avoid WWPS upgrades	• High seasonal groundwater infiltration • Peak flows exceeding Fifth WWPS capacity causing upstream surcharging • I&I reduction needed to provide growth capacity	• Moderately high RDII • Seasonally high groundwater infiltration • I&I reduction needed to avoid additional WWPS upgrades • Will provide growth capacity	• Moderately high RDII • Increased flows to Empey WWPS • Required to minimize upgrades required at Empey WWPS