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City of Hamilton 2023 Development Charges By-Law Study

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Hamilton

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1.0 Introduction

This water and wastewater technical report is prepared as a background document for the City of Hamilton's 2023 Development Charges (D.C.) By-law. The 2023 D.C. Background Study is an update to the Development Charges Background Study, dated July 2019, prepared by Watson & Associates Limited. This water and wastewater technical report provides engineering input on growth related costs of water and wastewater infrastructure upgrades and will be used to update the City's D.C. By-Law in 2023 for growth to the servicing target.

The objectives of this study are:

- Identify the demand that will be placed on the community's municipal water and wastewater system as a result of approved population and employment growth within the urban boundary to the service target. It is noted that for the Water service and Wastewater service, the forecast is based on the targeted population and employment numbers which was included in the prior D.C. study. The City is undertaking masterplan studies for each of these services to assess the servicing needs for growth beyond these targets (as per O.P.A. 167). However, as of the time of writing, these studies are not complete. As the servicing information is not available for growth identified in O.P.A. 167, the former growth targets have been continued for this study.
- Recommend water and wastewater infrastructure required to service the expected growth needs in the two planning horizons 0 to 5 year and beyond 6 years to urban boundary build-out (U.B.B.O.).
- Provide growth related project cost estimates for water and wastewater infrastructure eligible for D.C. funding.

Section 5 describes the required works that are development related for each urban area. Figures are organized with the digit and decimal (e.g. 2.2). The digit identifies the type of infrastructure and the decimal identifies the urban area as follows (e.g. 2.2 Wastewater System, Ancaster).

Digit – Infrastructure

- 1 - Water Distribution System
- 2 - Wastewater System

Decimal – Area

- .1 - Waterdown
- .2 - Ancaster
- .3 - Airport Employment Growth District (A.E.G.D.)/Mount Hope
- .4 - Binbrook
- .5 - Hamilton Mountain
- .6 - Stoney Creek Upper
- .7 - Stoney Creek Lower

The time periods for the projects listed on tables are identified as follows:

- a – 0 to 5 year period:** Includes growth from 2023 to 2028, inclusive.
- b – 6 years to Urban Boundary Build-Out (U.B.B.O):** Includes growth from 2029 to service target.

Within the tables and figure, the projects are further identified with unique identifiers as follows:

W	Waterdown
A	Ancaster
B	Binbrook
MH	A.E.G.D./Mount Hope
HM	Hamilton Mountain
SCU	Stoney Creek Upper
SCL	Stoney Creek Lower
W-23	Water Projects
S-23	Wastewater Projects

Example:

W# – W – 23 represents water project # in Waterdown

SCU# – S – 23 represents wastewater project # in Stoney Creek Upper

This report also includes a table for City-wide projects which lists proposed capital projects that affect the City's overall systems and are typically located outside the previously identified urban areas. General projects such as studies are also included; however, the majority of City Wide projects are being driven by and are benefitting growth.

The Woodward Wastewater Treatment Plant has been added to the charge as a separate item and is not listed in the City-Wide projects.

2.0 DEVELOPMENT AREAS

Through the development of the City of Hamilton's Growth Related Integrated Development Study (G.R.I.D.S.) and the ongoing 2024 City of Hamilton Water and Wastewater Master Plan, the City's Planning Department developed expected population and employment targets. This growth was focused in the following areas:

- Waterdown,
- Ancaster,
- Binbrook,
- Airport Employment Growth District (A.E.G.D.) / Mount Hope,
- Hamilton Mountain,
- Stoney Creek Lower, and
- Stoney Creek Upper.

All areas capable of being developed in the urban boundary are assumed to have densities and land uses in accordance with the City's Official Plan.

Additional study was undertaken for the Airport Employment Growth District (A.E.G.D.). A stand-alone servicing master plan for the A.E.G.D. was developed and identified detailed servicing requirements. These recommendations have been incorporated into infrastructure requirements of the D.C. Background Study.

3.0 DEVELOPMENT CHARGES CALCULATIONS & POLICIES

3.1 Local Service Policy

Utilizing the City's development assumptions, the water and wastewater infrastructure required to service these areas was identified. To determine if a project is a Development Charges (D.C.) related project, the following were evaluated:

Category 1 – Projects External to Proposed Development Lands

The following project descriptions fall into Category 1, such as projects on existing road allowance and servicing more than one development, and will be fully or partially allocated to Development Charges:

- New infrastructure or upgrades to existing City infrastructure required to service more than one potential proposed development and/or development property, whether in a Greenfield area or Intensification area. This includes upgrades to infrastructure that is upstream (water) or downstream (wastewater) of multiple developments.
 - If an upgrade is triggered by growth (single or multiple potential development) and that planned growth is less than or equal to the approved Traffic Survey Zone growth, the upgrade will be all or partially allocated to Development Charges.
 - In the case that a development plans to have more growth than is planned for (by approved Traffic Survey Zones and system capacity) and if the infrastructure upgrade is as a result of growth over and above what is approved, that additional oversizing shall be the responsibility of the Developer (Direct Developer).
 - This may include watermains for transmission, distribution and looping.

New projects that physically lie outside of a proposed development, but only service a single development can be considered to be part of Category 2. For example, new sewer on existing road right of way (external to development) to service a new building on land not already serviced, with no additional developments potentially draining to the new sewer.

Local cost recoveries will be made on a site-specific basis based on frontage and/or drainage area.

Category 2 – Projects Within Proposed Development Lands

The following project descriptions fall into Category 2:

- Water and sewer infrastructure that is required to directly service the proposed development lands.
- Water and sewer infrastructure that is required to directly service the proposed development lands and potentially “oversized” in consideration (capacity, looping or fire protection) of additional proposed developable lands that are normally serviced via proposed development property.
- In regard to Category 2 projects, the developer is required to pay for the full cost of the installation of sanitary sewers and watermain up to and including the sizes listed below. This is described as the Direct Developers Contribution. The minimum sizes are provided from the City’s Development Policies:
 - Sanitary Sewer - 450 mm diameter
 - Watermain - 300 mm diameter

Facilities (Water Pumping Station, Water Reservoir or Elevated Tank, Wastewater Pumping Station)

- No minimum size/capacity.
- Facilities to service single proposed development lands will be Direct Developer Contribution.
- Facilities servicing multiple developments/service areas will be allocated to Development Charges Categories only (D.C., Benefit to Existing and Post Period Benefit).

Water Treatment / Wastewater Treatment – Treatment upgrades to be included in Development Charges Categories only (D.C., Benefit to Existing and Post Period Benefit).

Should the size of the local infrastructure be required to be greater than the minimum local servicing sizes (i.e. to support external development), Development Charges contributions shall be made. The City shall contribute, through the Development Charges Fund, towards the cost to install the infrastructure on a “Flat Rate” basis. “Flat Rate” is defined as the cost difference between the size required for external development and the minimum size, noted above in the City’s Development Policies.

Projects identified are sized based on the City’s engineering guidelines for design and to accommodate the future population and employment demand / flow within the proposed drainage/service areas.

The Development Charges Capital Program identified in this document demonstrates the calculated cost splits on a project by project basis.

3.1.1 Areas Developed Outside the Existing Service Target Urban Boundary

For Developments that occur outside of the existing Urban Boundary, developments will be required to directly cover the costs of all internal (local servicing inside the development/subdivision) servicing and external servicing. External servicing will consist of the infrastructure not identified in the current DC and can consist of, but is not limited to:

- Watermain or sewer extensions from the existing network to the development.
- Upstream/downstream watermain/sewer upgrades or pumping station upgrades triggered by the development.
- New or upgraded storage triggered by the development.

In addition, the development will also be required to pay the Treatment portion of the current DC and may also be charged a portion of post period benefit costs identified in the current DC. The City will consider using cost recovery tools such as best efforts agreements, part XII Municipal Act By-Laws, and / or impose fees for future development which accesses the infrastructure.

3.1.2 Funding for Municipal Extensions

In cases where a new watermain or sewer is installed by a developer that benefits and enables a new connection to by an existing, unserviced property, a flat rate contribution is made back to the developer. Additional details of this funding methodology related to Direct Developer (or “Developer Initiated”) projects including projects external to the development lands are found in the 2007 City Report: *TOE02005b/FCS02026b/PED07248 - Funding Methodology for Municipal Infrastructure Extensions Review and Update*.

3.1.3 Capacity Allocation

As growth and re-development progresses over time, the City requires a means to determine the amount of spare capacity within the water distribution and wastewater collection systems that are to be allocated to any potential development application. Additionally, the City must also determine a reasonable period of time during which this allocated capacity is to be made available prior to development.

The capacity will be allocated to projects in the order in which the Construction Plans are approved. In the event that multiple projects are approved at the same time, the identification, selection and prioritization of the project given in the City’s Infrastructure Staging of Development Program will prevail.

This policy is intended to be used as a guide for conveyance only (not treatment) and is subject to review and update by the City moving forward.

3.1.4 Co-ordinated Projects with Transportation Requirements

Water and wastewater projects external to proposed development lands (i.e. on existing road allowances and/or existing roads) that fall into Category 1 and that are initiated as a result of identified transportation requirements and are eligible for inclusion in the D.C. at the same D.C. eligible percentage as the associated road.

Service connections (water and/or wastewater connections – public portion) will be constructed to each land parcel, when an existing dwelling unit exists. Property owners that require more than one service connection will be required to pay for the cost of the additional service connections prior to construction. Benefitting property owners shall contribute towards the cost to install the infrastructure on a “flat rate” basis. The “flat rate” will be established by the City at the beginning of each year.

3.2 Benefit to Existing

The non-growth component has been identified for certain projects which benefit the existing service area. These components are typically associated with upgrades to the existing systems or facilities necessary to continue to provide service to the existing residential and non-residential users. These projects may also involve upgrades or expansions which provide additional capacity to meet growth in the service area. As such, for each of these projects, the growth related and non growth related needs and corresponding capacity and costs have been separately identified.

Given that the servicing program is designed to service growth to the servicing target and the infrastructure is primarily located in new growth areas, there are limited benefit to existing (non-growth) components in the capital program.

For projects that may have a benefit to existing, a methodology was developed to estimate the Benefit to Existing (B.T.E.) split. If reasonable and appropriate data are available to support the accurate calculation of B.T.E., B.T.E.1, a calculation-based approach will be used to arrive at a project-specific B.T.E. percentage. Otherwise, the cost allocation shall reference a structured approximation policy assigning B.T.E. under categories B.T.E.2 through B.T.E.5, as outlined in the table below:

Table 1-Benefit to Existing (B.T.E.) Approach

Category	B.T.E. %	Description
B.T.E.1	Calculated – if possible	<p>Calculated based on best available data. Example calculation basis:</p> <ul style="list-style-type: none"> Cost for existing needs vs cost for growth Existing measurable capacity deficiency that is addressed through new project that supports growth <p>EXAMPLE:</p> <ul style="list-style-type: none"> Existing watermain/sewer is to be replaced within intensification area based on condition and State of Good Repair (S.O.G.R.) needs. Replacement is identified in the City’s ongoing S.O.G.R. program, not based on growth There is potential growth (within D.C. Period and identified in planning estimates) that is serviced by watermain / sewer In order to service existing service area plus growth, increase in diameter is required B.T.E. % is calculated as: Cost for Replacement only Project ÷ Cost for Upsized Project Remaining cost is applicable to D.C.
B.T.E.2	10% B.T.E.	<p>These projects are driven by growth but are likely to address some minor existing deficiencies potentially related to level of service, security of supply, age, operational flexibility, condition or performance.</p> <p>EXAMPLE:</p> <ul style="list-style-type: none"> A watermain replacement and upsizing is required to support growth in a new greenfield area Adjacent existing serviced area is currently serviced by a watermain that is ~25 years old and may have slightly decreased capacity due to condition Replacement watermain provides new service to new users and a replacement of the existing watermain <i>Minor condition/age deficiency is addressed by construction of new watermain, therefore, 10% B.T.E. is applied</i>

Category	B.T.E. %	Description
B.T.E.3	25% B.T.E.	<p>These projects are driven by growth but will address some known existing deficiencies potentially related to operational issues or significant level of service, security of supply, age, operational flexibility, condition or performance.</p> <p>EXAMPLE:</p> <ul style="list-style-type: none"> A new development within an intensification area is to be serviced by an existing sewer which has known capacity deficiencies and modelled surcharging A larger sewer is required to address the existing capacity constraint as well as to service growth <i>Level of service / capacity deficiency is addressed by construction of new watermain, therefore 25% B.T.E. is applied</i>
B.T.E.4	50% B.T.E.	<p>These projects equally provide additional capacity for growth as well as enhanced level of service in existing service areas. These projects address known existing deficiencies but also improve servicing conditions including security of supply/service.</p> <p>EXAMPLE:</p> <ul style="list-style-type: none"> A new development within an intensification area is to be serviced by an existing sewer which has significant known condition issues and significant capacity constraints including <i>modelled</i> surcharging and occasional <i>observed</i> surcharging and capacity constraints A larger, new sewer is required to address the existing deficiencies as well as to service growth <i>Level of service, capacity and condition/age deficiencies are addressed by construction of new sewer, therefore 50% B.T.E. is applied</i>
B.T.E.5	Other	<p>These projects do not fall within B.T.E.1-B.T.E.4 categories and may require a unique split based on project specific factors.</p> <p>EXAMPLE:</p> <ul style="list-style-type: none"> An existing sewage pumping station is deficient in pumping capacity, wet well storage capacity and standby power. Additionally, pumps and other mechanical equipment require replacement due to condition Modifications to the station are recommended to address all issues, including pump replacement The new pumps will be re-sized to accommodate both the increase in required existing flow as well as an additional marginal increase in capacity to accommodate small potential intensification developments <i>Major capacity and level of service and condition constraints trigger the need for S.P.S. upgrade; only marginal increase in capacity is required, therefore an estimated 90% B.T.E. is applied to the project cost</i>

NOTE: The intensification allowance for water and wastewater within the City-Wide category is currently assumed to have a 50% Benefit to Existing 50% D.C. split based on assumed overall age, condition and level of service within intensification areas. The B.T.E. split that is applied will be reviewed and confirmed on a project by project basis as detailed intensification projects are initiated.

3.3 Post Period Oversizing

Project costs are identified for any oversizing of infrastructure to service growth beyond the D.C. by-law planning period; in this case, the servicing target.

Under this D.C. program, most of the local development area servicing is sized to service the specific development areas within the approved urban boundary. There is no post-period oversizing for these projects. There are some service areas that have made allowance for servicing lands outside the current urban boundary. These projects have some post period oversizing costs identified.

The trunk infrastructure is based on the City of Hamilton Master Plan. The Master Plan infrastructure and sizing was based on the growth plan projections and urban boundary established under G.R.I.D.S. This baseline data from G.R.I.D.S. forecasted to the planning horizon. In general, there is no post-period oversizing for the trunk infrastructure.

If reasonable and appropriate data is available to support the calculation of Post Period Benefit, P.P.1, a calculation-based approach will be used to arrive at a project-specific Post Period percentage. Otherwise, the cost allocation shall reference a structured approximation policy assigning Post Period splits under categories P.P.2 through P.P.5, as outlined in the table below:

Table 2- Post Period Oversizing Approach

Category	Post Period %	Description
P.P.1	Calculated – if possible	<p>Calculated based on best available data. Example calculation basis:</p> <ul style="list-style-type: none"> • Cost for service target project vs cost of oversized needs <p>Typical P.P. calculation is for greenfield linear works and consists of: $P.P. = \text{Cost for oversized pipe} - \text{Cost for pipe required for in-period growth only}$</p> <ul style="list-style-type: none"> • Capacity for service target needs vs Capacity for post-period growth <p>EXAMPLE:</p> <ul style="list-style-type: none"> • A new sewer is required to service a greenfield growth area up to the edge of the urban boundary. The urban boundary is anticipated to be built out within the service target (in-period) • Beyond the urban boundary lies a potential growth area that is likely to require servicing after the service target is reached • The sewer is strategically oversized by one pipe size to accommodate the growth area outside of the urban boundary • <i>Post Period Benefit is calculated as: $P.P. = \text{Cost for oversized pipe} - \text{Cost for pipe required for in-period growth only}$</i>
<p>P.P.1 is applicable in most cases of projects with Post Period Benefit. P.P.2, P.P.3, P.P.4 and P.P.5 are intended to be applied to unique projects where the calculations of capacities and costs applicable to in period growth and post period growth are complex and not easily defined.</p>		
P.P.2	10% P.P.	These projects are driven by growth within the By-law planning period but are oversized to provide some marginal additional capacity to support additional growth beyond the By-law planning period.
P.P.3	25% P.P.	These projects are driven by growth within the By-law planning period but are oversized to provide additional capacity to support growth beyond the By-law planning period. These projects are predominantly located in and/or support areas with likely future growth potential.
P.P.4	50% P.P.	These projects are strategically sized for significant additional future capacity. These projects are located in areas with constraints for additional capacity. These projects may also provide cost effective additional capacity.

P.P.5	Other	These projects do not fall within P.P.1-P.P.4 categories and may require a unique split based on project specific factors.
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3.3.1 Provisional Post Period Benefit

Project specific post period benefit has been allocated based on growth triggers and assumptions stated in the table above. However, due to the uncertainty surrounding the post service target to 2041 population and employment growth locations and densities as well as the uncertainty around the subsequent water and wastewater servicing needs, it is anticipated that there will be additional post period benefit within a portion of the program. As such, a \$47M Provisional Post Period Benefit has been allocated proportionally to both the water (\$33M) and wastewater (\$14M) programs.

3.4 City-Wide Projects

The City has identified specific monitoring and programs that must be undertaken to evaluate the existing and future infrastructure requirements to service the City. For the most part, these are required for future development; however, the existing infrastructure will have to be evaluated. An allowance has been made for City-Wide costs for these items.

Development related projects are listed in the tables identified by infrastructure (water and sewage) and by urban area. A City-wide project table is included with projects that do not lie within the listed urban areas or that provide City-wide benefit, such as studies.

3.5 Residential / Non-Residential Cost Share

The general intent of the cost share for water and wastewater infrastructure is based on proportion of growth attributed to residential and non-residential use.

The Residential and Non-Residential growth split is determined based on growth from 2023 to the service target. This split excludes Work from Home and No Fixed Place of Work uses. The cost share based on this growth is 74% Residential and 26% non-residential.

3.6 Costing Criteria

In addition to updating the water and wastewater project scopes and descriptions, the overall project costs have also been revised from the 2019 D.C. Study. A separate report, 2023 City of Hamilton Costing Methodology, dated September 2023, prepared by GM BluePlan Engineering Ltd., provided a comparison to surrounding municipalities costing approaches and recommended a minor modification to the approach taken for the City of Hamilton DC. The costing methodology report recommended utilizing the 2019 Greenfield water and wastewater unit rates as a baseline and adjusting these by a 39% inflation rate to convert the figures from 2019 dollars to 2023 dollars.

Further, depending on the project review, additional costs were applied as follows:

- Additional 75% premium for construction within Urban Areas
- Additional 20% premium for construction of deep sewers
- 15% Soft Costs (Engineering, studies, internal costs, etc)
- 30% Contingency

Where more up to date cost information was available, such as tender prices, detailed Environmental Assessment (E.A.) project cost estimates or from the City's Budget, these costs were used instead of the typical unit cost calculation.

For the Woodward Avenue Wastewater Treatment Plant (W.W.T.P.), the overall project implementation and costing has been reviewed and updated since the 2019 D.C. Study. Costing for the W.W.T.P. is based on either actual incurred costs, actual tender costs received, preliminary design estimates, or conceptual estimates where appropriate. The Woodward Avenue W.W.T.P. information is addressed separately in this report.

3.7 Wastewater Runoff Controls

In order to mitigate the impact of stormwater runoff into the combined sewer network, a policy has been developed that applies to properties that are undergoing re-development within the combined sewer catchment area.

At the development stage, the owner will be required to submit a detailed Storm Water Management Report, to the satisfaction of the Manager of Engineering Design and Construction, addressing the fact that in the absence of an overland flow route, the release rate of a 100 year post development flow will be controlled to the release rate of a 2 year pre development flow.

It has been assumed that the historical 18 year storm criteria are very much equivalent to current 2 year storm using Mount Hope Intensity-Duration-Frequency curves.

4.0 SERVICE STANDARDS

The following standards are the minimum acceptable level of service for each category of service. The City Standards will be used for the design and construction of all roads and municipal services required for all new development. These standards set the level of service for the community, both for new and existing development (i.e. replacement of existing infrastructure).

4.1 Water Distribution System

The water distribution system shall be designed to deliver all required water supply demands and fire flows (protection) based on the Ministry of the Environment, Conservation and Parks (M.E.C.P.) and Regional guidelines with due consideration to the Fire Underwriters Survey. The minimum watermain size for new construction shall be 150 mm diameter for residential areas and 300 mm for Commercial/ Institutional/ Industrial areas.

The City standards require that the minimum distribution system fire flow pressure be not less than 140 kpa (20 psi), distribution system maximum hour pressure does not fall below 275 kpa (40 psi) and distribution system static pressure does not exceed 700 kpa (100 psi). The water system shall be "looped" where possible to minimize water quality problems.

4.2 Sanitary Sewer System

The sewer system shall be designed to carry flows from the drainage area as specified by the City, which may include the Developer's lands, as well as lands beyond the Developer's properties including existing developed lands (external lands) and future developable lands within the urban boundary.

The minimum sewer size for residential development is 250 mm diameter with a minimum velocity of 0.75 m/s. The design shall conform to Ontario Provincial Standards Specifications. For industrial / commercial / institutional development, the minimum sewer size is 375 mm.

The development projections for new developments were provided by the City of Hamilton Planning Department and are the basis for analysis of the sanitary sewer system. The analysis of sewer systems was completed on the basis of the following criteria:

4.2.1 Sanitary Sewers

To determine sewer capacity, the sewers affected by new development were reviewed to determine their capacity. As-recorded information from the City was used to obtain pipe sizes and grades.

The following criteria are from the City's Comprehensive Development Guidelines and Financial Policies Manual (2017) and are used to estimate the sewage flows from a new residential and/or employment development:

Per Capita Flow	=	360 L/capita/day
Peaking Factor (Babbitt Formula)	=	$M = 5/P^{0.2}$ 5 (max.), 2.0 (min.)
Infiltration	=	0.4 L/s/ha – 0.6 L/s/ha (depending on anticipated storm sewer and dwelling weeping tile configuration)

The sewers are designed to flow at a maximum of 75% full.

In addition to using the City of Hamilton's design criteria for sizing sewers in new development areas, the 2006 Water and Wastewater Master Plan Class E.A. Report identified major trunk sewer projects and upgrades using calibrated wastewater modelling software. A skeletonized model of the existing City of Hamilton wastewater system using DHI's Mike Urban software was developed and calibrated by AWS Engineers and Planners Corp. This model was ran under future peak wet weather conditions and a 5 year storm event in order to identify major upgrades to the system under the Master Plan. The model results identified trunk projects that would be required to service new growth to the service target.

Construction of the 2006 Master Plan recommended sewer network has been refined through various detailed studies and analyses over the past 17 years. Constructed projects and modifications to the Master Plan program are reflected in the 2023 D.C. Study.

4.2.2 Sewage Pumping Stations

Existing sewage pumping stations affected by the new development were assessed to determine their available capacities and if upgrades would be required. For lands where gravity flow is not possible, new pumping stations were sized and identified. New pump stations were identified based on topography and availability of grade to connect into an existing or proposed trunk sanitary sewer system. Previous studies as well as the 2006 Water and Wastewater Master Plan Class E.A. Report identified many of the proposed pumping stations and upgrades.

4.2.3 Treatment Facilities

Based on growth projections, the flows draining to the respective treatment facilities were evaluated. The wastewater treatment strategy was based on the Water and Wastewater Master Plan.

The Woodward Avenue W.W.T.P. will require significant upgrades to support the growth related flows and address water quality requirements. The approach, level of capacity of each phase of the upgrade and cost estimates have been further defined through staff reports and project team documents. Additional information on the Woodward Avenue W.W.T.P. upgrade is further detailed in this report.

The Dundas W.W.T.P. will continue to operate. The Waterdown W.W.T.P. has been decommissioned and converted to a sewage pumping station, which pumps flow through a new forcemain, discharging to the existing Borer's Creek Trunk Sewer.

The Woodward Avenue W.T.P. will continue to be the water supply source for all existing and future development areas in Hamilton.

5.0 PROJECT DESCRIPTIONS

Provided in Attachments A, B and C are tables listing the projects for each of the growth areas identified in Section 1. The corresponding figures identify the location of the projects listed in the tables. The tables and figures are located as follows:

- Attachment A: Water Projects
- Attachment B: Water City Wide Projects
- Attachment C: Wastewater Projects
- Attachment D: Wastewater City Wide Projects
- Attachment E: Woodward Avenue W.W.T.P. Projects

The project list was devised through an extensive review of background information, including the previous Development Charges Background Studies (2004, 2009, 2011, 2014 and 2019), the 2006 Water and Wastewater Master Plan Class E.A. Report, the ongoing 2024 Water and Waster Master Plan Study and the City's Capital Works Programs. Meetings with key City staff identified additional projects and refined the project lists.

In this section, we have provided some further input on some of the larger projects and servicing strategy that are expected to occur within the next 5-years (near term) within each development area. The 6+ years projects are shown in Figures in appendices A-D.

5.1 Water Distribution System

5.1.1 Waterdown

The majority of the water projects in Waterdown are required to service the North Waterdown and South Waterdown lands. The majority of the water infrastructure to service North Waterdown has been built. A 400 mm watermain will extend north on Eager Drive and west to east along a new road alignment north of Parkside Drive, connecting the existing local network and supplying new growth in the north. A 600 mm trunk feedermain and HD016 Booster Station upgrades are planned which will support growth and provide security of supply. The Feedermain and Station upgrades have been refined through detailed studies since the previous D.C. Study.

Refer to Table F-1, as well as Figure 1-1 for location, size and cost of the projects for this area.

5.1.2 Ancaster

A new 500 mm to 600 mm trunk watermain is required on Garner Road from Southcote Road to Wilson Street West in order to provide trunk water transmission capacity to the Ancaster Industrial Park area. This area also has several proposed internal watermain projects, most of which are planned to be Direct Developer Contribution sized, and are required to service the development within the Park. A 300 mm crossing of Highway 403 along Shaver Road is planned to provide looping within the system and support the growth in the Ancaster Industrial Park. A study completed in 2019 identified the proposed location for the new PD18 Elevated Tank, north-east of Jerseyville Road.

Refer to Table F-1, as well as Figure 1-2 for location, size and cost of the projects for this area.

5.1.3 Binbrook

A new 400 mm trunk Feedermain, along Fletcher Road and Cemetery Road, will be required to service the development needs of Binbrook. Additionally, new 400 mm watermain projects in west Binbrook on Binbrook Road, Fletcher Road, and Windwood Drive will service the new growth areas. A class EA study is near completion for the upgrade of the Binbrook PS (HD019) and the preferred option cost estimate has been incorporated in the 2023 DC update.

Refer to Table F-1, as well as Figure 1-3 for location, size and cost of the projects for this area.

5.1.4 A.E.G.D./Mount Hope

Modifications to the A.E.G.D. service areas have resulted in minor updates to the proposed water network. However, the majority of the local 300 mm and 400 mm Pressure Districts 6 and 18 watermain network remains unchanged and follows the proposed road network throughout the A.E.G.D. A 400 mm watermain on Southcote Road, south of Garner Road East is also required to service the Industrial Park area.

Refer to Table F-1, as well as Figure 1-4 for location, size and cost of the projects for this area.

5.1.5 Hamilton Mountain

Several 300 mm to 400 mm watermains is required to service the North Glanbrook Industrial Business Park (N.G.I.B.P.) in the southeast corner of the Hamilton Mountain Growth Area. Also required is a 1200mm trunk feedermain delivering water from Greenhill Pumping Station HD05A (see Stoney Creek Upper) through the newly constructed 1200 mm trunk feedermain on First Street. The 1200 mm trunk feedermain is proposed to be constructed on Mud Street and Stone Church Road to Pumping Station HD06B. Other sections of 300 mm to 400 mm watermains will be required in the growth area of Rymal Road East and a new 400 mm watermain will be required along an easement from Twenty Road to Rymal Road. Recent analysis has determined that the Pressure District 7 elevated tank is to be located at the southwest corner of Trinity Church Road and Twenty Road.

Refer to Table F-1, as well as Figure 1-5 for location, size and cost of the projects for this area.

5.1.6 Stoney Creek Upper

This strategy will include capacity upgrades to Pumping Station HD05A and HD04B, and a new 400 mm watermain on First Road West, both of which will also benefit growth.

Refer to Table F-1, as well as Figure 1-5 for location, size and cost of the projects for this area.

5.1.7 Stoney Creek Lower

Existing 150 mm watermain on Lewis Road is required to upsize to 300 mm and another 300 mm watermain is proposed on Glover Road to service new employment growth areas with the Lower Stoney Creek area. The majority of these are employment growth areas that lie adjacent to the railway and Q.E.W.

Refer to Table F-1, as well as Figure 1-6 for location, size and cost of the projects for this area.

5.2 Wastewater System

5.2.1 Waterdown

Servicing of Waterdown North is partially complete and will only require short sewer extensions to complete servicing. A 600 mm diameter sewer is required on Sadielou Boulevard north of McCurdy Avenue. This proposed sewer is required to service future growth in the area.

Refer to Table F-3, as well as Figure 2-1 for location, size and cost of the projects for this area.

5.2.2 Ancaster

Most of the growth related D.C. wastewater projects within Ancaster have been completed. Two remaining wastewater projects to service growth consist of short sections of gravity sewers of 375 mm and 600 mm south of Wilson Street.

Refer to Table F-3, as well as Figure 2-2 for location, size and cost of the projects for this area.

5.2.3 Binbrook

The capacity upgrade for Pump Station HC058 has been successfully finished. There is a planned extension of a 375 mm sewer to the west along Binbrook Road, situated to the east of Fletcher Road. Additionally, to accommodate growth, a 600 mm internal sewer will be extended westward along Windwood Drive. Refer to Table F-3, as well as Figure 2-3 for location, size and cost of the projects for this area.

5.2.4 A.E.G.D./Mount Hope

Modifications to the A.E.G.D. service areas have resulted in minor updates to the proposed sewer network. However, the overall servicing strategy remains unchanged since the 2019 D.C. Study. The first anticipated phase of growth will be in the northeast corner of the A.E.G.D. and will be serviced through connections to existing trunk sewers and the Twenty Road S.P.S. The central portion of the A.E.G.D. will convey flow to the new Dickenson Road sewer within the A.E.G.D. which flows east and will connect with the new Dickenson / Centennial Trunk sewer east of Upper James Street.

In order to support growth in the Mount Hope area, 450 mm – 600 mm diameter sewers are required on Garner Road. Additionally, a 375 mm sewer is proposed extending south on John Frederick Drive in the growth areas.

Refer to Table F-3, as well as Figure 2-4 for location, size and cost of the projects for this area.

5.2.5 Hamilton Mountain

The main projects required for servicing the Hamilton Mountain growth area are the gravity sewers that service the N.G.I.B.P. This area will require gravity sewers ranging from 375 mm to 525 mm, which will flow to the north to the existing network. The Upper Centennial/Dickenson Trunk Sewer Project crosses the southern limit of the Hamilton Mountain service area, however, this infrastructure will service the A.E.G.D. and Upper Stoney Creek. The required projects have been modified since the previous D.C. They now consist of a deep trunk sewer (1,200 mm to 1,350 mm) tunnel from Upper James to Upper Centennial (Regional Road 56).

Refer to Table F-3, as well as Figure 2-5 for location, size and cost of the projects for this area.

5.2.6 Stoney Creek Upper

All wastewater projects in the Upper Stoney Creek area have been constructed, including the recently completed 450 mm sewer on Rymal Road, west of Upper Centennial Parkway to service the Regional Official Plan Amendment (R.O.P.A.) 9 area.

5.2.7 Stoney Creek Lower

A new sewage pumping station, forcemain and gravity sewer will be required to service the areas south of the Q.E.W. surrounding Fifty Road. Furthermore, growth at the north end of Millen Road and South of Barton Street will require gravity sewer upgrades and connection to the Eastern Sanitary Interceptor (E.S.I.). Additionally, the northern section of the Centennial Parkway Trunk Sewer twinning (1,500 mm) is required to service growth on the Hamilton Mountain.

Refer to Table F-3, as well as Figure 2-6 for location, size and cost of the projects for this area.

5.3 City Wide Water and Wastewater Projects

City-Wide water and wastewater projects cover traditional water and wastewater infrastructure capital works (pumping stations, watermains, sewers, etc.) throughout the City, most of which are required to support growth, however, do not lie within the geographical areas of the other systems mentioned above. Also covered in City-Wide projects are items such as studies, flow monitoring and intensification upgrades.

The costs associated with intensification have been reviewed and updated for the 2023 D.C. to reflect an increased level of density and associated cost escalation within the City core. These costs are further described in Section 5.4.

In addition to projects being identified for servicing new developments, several major projects from the 2006 Water and Wastewater Master Plan Class E.A. Report were carried forward into the D.C. By-Law Study. These are large, trunk infrastructure projects and are required to service new growth areas.

Projects in this section relate to City-wide programs identified to increase available capacity in the system. This will allow development to continue in the City while maintaining water quality targets. Without these improvements, development freezes could take effect.

Refer to Table F-2 and F-4 for location, size and cost of the projects.

5.4 Intensification Allowance

Previous Development Charges By-Law studies have included a lump sum dollar amount for both water and wastewater intensification servicing. With the City undertaking detailed studies for specific intensification areas such as the West Harbour Secondary Plan (“Setting Sail”), Light Rapid Transit (L.R.T.) Corridor as well as the requirement by the province for further increases to the minimum levels of intensification growth, there will continue to be a need to further refine the servicing requirements for these areas.

As part of this D.C. By-Law Study, additional intensification allowance costs have been allocated to the D.C. program. The 2023 D.C. has recommended an increase to the water and wastewater allowance to bring the totals to \$42M for water and \$42M for wastewater over the remaining By-Law period.

5.5 Program Changes from 2019 D.C. Study

With respect to the linear program in the 2023 D.C. Study, the key program changes from 2019 include but are not limited to the following:

Area	Water	Wastewater
Waterdown	<ul style="list-style-type: none"> • New alignment for the PD016 Feedermain • South Waterdown tower has been constructed • Revised alignment for growth related watermains 	<ul style="list-style-type: none"> • Several sanitary sewer projects completed/removed
Ancaster	<ul style="list-style-type: none"> • Ancaster PD018 elevated tank relocation to 385 Jerseyville Road in Ancaster Community Park • Several watermain projects completed/removed 	<ul style="list-style-type: none"> • Several sanitary sewer projects completed/removed • Updated alignment for remaining sewer projects
A.E.G.D. / Mount Hope	<ul style="list-style-type: none"> • A.E.G.D. service area boundary has been modified, resulting in removal of certain watermain projects • No major project changes 	<ul style="list-style-type: none"> • A.E.G.D. service area boundary has been modified, resulting in removal of certain sanitary sewer projects
Binbrook	<ul style="list-style-type: none"> • Binbrook pumping station upgrades are complete 	<ul style="list-style-type: none"> • New Forcemain completed
Hamilton Mountain	<ul style="list-style-type: none"> • Realignment of the Stone Church Road Feedermain and distribution main on Dartnall Road 	<ul style="list-style-type: none"> • Dickenson Road trunk sewer updated to reflect new deep tunneled sewer strategy; S.P.S./Forcemain removed from program
Stoney Creek Upper	<ul style="list-style-type: none"> • Several watermain and facility projects completed/removed 	<ul style="list-style-type: none"> • All sanitary sewer projects completed/removed
Stoney Creek Lower	<ul style="list-style-type: none"> • Several watermain and projects completed/removed 	<ul style="list-style-type: none"> • No major changes to strategy • Additional sewer upgrades added
City Wide	<ul style="list-style-type: none"> • Increased intensification upgrades to \$42M Total • Several projects complete/removed 	<ul style="list-style-type: none"> • Increased intensification upgrades to \$42M Total • Several projects complete/removed

5.6 Woodward Avenue W.W.T.P.

5.6.1 Project Scope

As part of the 2023 City of Hamilton Development Charge Study and review of the water and wastewater capital program, it is recognized that the Woodward Avenue W.W.T.P. Upgrade is a significant and major capital project required to meet the future growth to the service target.

The scope of the Woodward Avenue W.W.T.P. expansion has evolved from the project developed under the 2006 Master Plan and carried in previous D.C. updates. The project has undergone review through the original Master Plan, subsequent Class E.A. study, and most significantly through the conceptual / preliminary design phases as part of the project implementation.

Over the last few years, the City of Hamilton proactively and continually reviewed the wastewater treatment capacity trends that were declining. Concurrently, additional discussions were taking place regarding the conditions and expectations for receiving federal and provincial grants and funding for the project. Based on this new information, it was determined that the optimal approach for the Woodward Avenue W.W.T.P. Upgrades would be to complete the water quality upgrades first and defer most of the capacity upgrades out in the future until such time as the current rated capacity of the plant would be constrained.

This approach results in a cost-effective implementation program for the Woodward Avenue W.W.T.P. Upgrades as well as meets the funding/grant requirements with respect to scope and timing in order to secure the funds.

5.6.2 Key Considerations

With respect to the wastewater flow projections, the analysis undertaken by the City team indicated that lower than anticipated flows were observed at the plant and decreasing trends in recent years. It is estimated that due to several factors, including reduced water demands and reduction in large scale employment, the wastewater flows are approximately 34 MLD lower than previously projected. While recent actual flows are below projections, caution should be taken before allocating this capacity to new development. It was determined that there is potential for these uses to return and that the City should safeguard this capacity for the already approved lands. On this basis, it has been determined that 50% of the available capacity will be made available to new development, while 50% will be maintained for the existing serviced areas. As such, 50% of the 34 MLD which equates to 17 MLD, within the current rated capacity of 409 MLD, of the Woodward Avenue W.W.T.P. can be utilized by new development.

Notwithstanding recent trends, it was also determined that the capacity for the future expansion of the Woodward Avenue W.W.T.P. would remain at 500 MLD to satisfy the capacity requirements of the Places To Grow population and employment projections identified in the Places to Grow Act. Updated projections based on recent flow measurement at the W.W.T.P. identified that there would be some Post Period benefit beyond the service target boundary. As such, a 25% Post Period Benefit was applied to the Woodward W.W.T.P. projects.

5.6.3 Project Cost Analysis

Given that the Woodward Avenue W.W.T.P. Upgrades have undergone a significant scope change, a new cost estimate for the total facility upgrades has been completed. Table F-5 provides the overall summary table of the project components that comprise the full upgrades. Attachment D also provides additional detail regarding available cost estimate breakdowns as well as the rationale for the D.C. eligible calculation.

The updated 2023 Cost Estimate for the Woodward Avenue W.W.T.P. Upgrades is summarized in the following table and further detailed in Table F-5.

Table 3 - Woodward Avenue W.W.T.P. Upgrades Summary & Cost Estimate

Project ID	Description	Capital Cost Estimate (\$2023)	Internal Staffing Cost Allocation (Not Eligible for Funding)	Capital Cost w Internal Staffing (\$)
1	Wastewater Pumping Station	\$ 91,033,568	\$ 2,145,501	\$ 93,179,000
2a	Primary Clarifier - Primary Treatment (Phase 1) - Engineering Included	\$ 16,255,669	\$ -	\$ 16,256,000
2b	Primary Clarifier - Primary Treatment (Phase 2 - Tanks) - Engineering Included	\$ 52,246,549	\$ -	\$ 52,247,000
2c	Primary Clarifier - Other Costs (includes New/Expanded Laboratory/Admin Building)	\$ 11,857,782	\$ -	\$ 11,858,000
3	Tertiary Upgrades - North and South Secondary Treatment Plant Upgrades	\$ -	\$ -	\$ -
4a	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 1)	\$ 155,504,975	\$ 3,664,887	\$ 159,170,000
4b-1	Tertiary Upgrades - Tertiary Treatment Plant & 3rd Plant (Phase 2)	\$ 226,312,000	\$ 4,564,986	\$ 230,877,000
4b-2	Tertiary Upgrades - Primary Effluent PS (Phase 2)	\$ 13,470,000	\$ 271,706	\$ 13,742,000
4b-3	Tertiary Upgrades - WUP Office Relocation (Phase 2)	\$ 5,090,000	\$ 102,671	\$ 5,193,000
4b-4	Tertiary Upgrades - Gas Sphere Relocation / Biogas (Phase 2)	\$ 3,861,000	\$ 77,881	\$ 3,939,000
5a	Chlorine Contact Tank and Outfall - Railway Re-Alignment	\$ 11,390,000	\$ 230,000	\$ 11,620,000
5b	Chlorine Contact Tank and Outfall - Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	\$ 49,933,570	\$ 1,176,819	\$ 51,110,000
6	Biogas Digester - New Waste Activated Sludge Thickening Facility (forms part of the Digester Upgrades)	\$ 8,803,000	\$ 177,567	\$ 8,981,000
7	Chlorine Contact Tank and Outfall - New Outfall (included in 5b project)	\$ -	\$ -	\$ -
8a	Clean Harbour Project - Actual Costs of Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	\$ 47,541,754	\$ -	\$ 47,542,000
8b	Clean Harbour Project - O/S Commitments of Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	\$ 6,788,649	\$ -	\$ 6,789,000
8c	Plant Expansion - Future Engineering (Projects 4b, 5a, 6, 11b, 13b) Phase 2	\$ 62,478,006	\$ -	\$ 62,478,000
8d	Plant Expansion - Engineering - Other Costs (includes Modular Office Building)	\$ 10,701,376		\$ 10,701,000
9	Biogas Digester - Additional Dewatering Capacity	\$ -	\$ -	\$ -
10	Biogas Digester - Refurbishment of Digesters to Increase Capacity	\$ -	\$ -	\$ -
11a	Biogas Digester - Biogas Upgrades	\$ 45,005,784	\$ -	\$ 45,006,000
11b	Biogas Digester - Digesters Upgrades	\$ 48,440,000	\$ 977,000	\$ 49,417,000
12	Biosolids Management Facility - Biosolids Thermal Reduction Disposal Facility	\$ 94,790,000	\$ 4,650,000	\$ 99,440,000
13a	Electrical System Upgrades - New Electrical and power systems - Phase 1	\$ 60,033,299	\$ 1,414,948	\$ 61,448,000
13b	Electrical System Upgrades - New Electrical and power systems - Phase 2	\$ 5,190,000	\$ 105,000	\$ 5,295,000
14	Collection System Upgrades	\$ 10,176,000	\$ 239,825	\$ 10,416,000
	Total	\$ 1,036,902,982	\$ 19,798,792	\$ 1,056,702,000

6.0 SUMMARY OF DEVELOPMENT CHARGES PROJECTS

The following tables summarize total project costs for the D.C. projects (not including Woodward W.W.T.P.). The detailed calculations are provided in Attachments A through E.

Table 4 - Summary of Total Project Costs for the D.C. projects (not including Woodward W.W.T.P.)

Total Costs			
Area	Sanitary	Water	Total
Ancaster	\$ 1,351,000	\$ 43,983,000	\$ 45,334,000
Waterdown	\$ 485,000	\$ 46,859,000	\$ 47,344,000
Binbrook	\$ 2,217,000	\$ 21,400,000	\$ 23,617,000
AEGD/Mt. Hope	\$ 48,816,000	\$ 26,207,000	\$ 75,023,000
Hamilton Mountain	\$ 119,952,000	\$ 73,311,000	\$ 193,263,000
Stoney Creek Upper	\$ -	\$ 92,629,000	\$ 92,629,000
Stoney Creek Lower	\$ 86,313,000	\$ 14,801,000	\$ 101,114,000
City Wide Projects	\$ 76,628,000	\$ 66,847,393	\$ 143,475,393
Total (\$2023)	\$ 335,762,000	\$ 386,037,393	\$ 721,799,393
Non-Growth Related Costs (City Costs)			
Area	Sanitary	Water	Total
Ancaster	\$ -	\$ 11,157,750	\$ 11,157,750
Waterdown	\$ -	\$ 9,030,500	\$ 9,030,500
Binbrook	\$ -	\$ 3,480,000	\$ 3,480,000
AEGD/Mt. Hope	\$ -	\$ -	\$ -
Hamilton Mountain	\$ -	\$ -	\$ -
Stoney Creek Upper	\$ -	\$ 7,272,750	\$ 7,272,750
Stoney Creek Lower	\$ 235,700	\$ -	\$ 235,700
City Wide Projects	\$ 23,632,000	\$ 21,325,250	\$ 44,957,250
Total (\$2023)	\$ 23,867,700	\$ 52,266,250	\$ 76,133,950
Growth Related Costs - Development Charges			
Area	Sanitary	Water	Total
Ancaster	\$ 1,351,000	\$ 30,798,000	\$ 32,149,000
Waterdown	\$ 126,000	\$ 34,265,000	\$ 34,391,000
Binbrook	\$ 1,319,000	\$ 17,202,000	\$ 18,521,000
AEGD/Mt. Hope	\$ 41,218,000	\$ 20,706,000	\$ 61,924,000
Hamilton Mountain	\$ 107,501,000	\$ 53,733,000	\$ 161,234,000
Stoney Creek Upper	\$ -	\$ 53,874,000	\$ 53,874,000
Stoney Creek Lower	\$ 77,545,300	\$ 14,801,000	\$ 92,346,300
City Wide Projects	\$ 52,996,000	\$ 45,522,143	\$ 98,518,143
Total (\$2023)	\$ 282,056,300	\$ 270,901,143	\$ 552,957,443
Direct Developer's Costs			
Area	Sanitary	Water	Total
Ancaster	\$ -	\$ -	\$ -
Waterdown	\$ 359,000	\$ 592,000	\$ 951,000
Binbrook	\$ 898,000	\$ 718,000	\$ 1,616,000
AEGD/Mt. Hope	\$ 7,598,000	\$ 5,501,000	\$ 13,099,000
Hamilton Mountain	\$ 771,000	\$ 2,010,000	\$ 2,781,000
Stoney Creek Upper	\$ -	\$ 723,000	\$ 723,000
Stoney Creek Lower	\$ 532,000	\$ -	\$ 532,000
City Wide Projects	\$ -	\$ -	\$ -
Total (\$2023)	\$ 10,158,000	\$ 9,544,000	\$ 19,702,000
Post Period Benefit Costs			
Area	Sanitary	Water	Total
Ancaster	\$ -	\$ 2,027,400	\$ 2,027,400
Waterdown	\$ -	\$ 2,972,000	\$ 2,972,000
Binbrook	\$ -	\$ -	\$ -
AEGD/Mt. Hope	\$ -	\$ -	\$ -
Hamilton Mountain	\$ 11,680,000	\$ 17,568,000	\$ 29,248,000
Stoney Creek Upper	\$ -	\$ 30,759,100	\$ 30,759,100
Stoney Creek Lower	\$ 8,000,000	\$ -	\$ 8,000,000
City Wide Projects	\$ -	\$ -	\$ -
Total (\$2023)	\$ 19,680,000	\$ 53,326,500	\$ 73,006,500



Attachment A – Water Projects

TABLE F-1 - WATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Unit Rate Type (Greenfield/Urban)	Unit Cost (2023\$/m)	Estimated Total Cost (2023\$)	Direct Developer Contribution (2023\$)	Benefit to Existing (%)	Benefit to Existing (\$2023)	Post Period Benefit (%)	Post Period Benefit (2023\$)	Development Charges (2023\$)	Updated Timing	Estimate from Updated Methodology	Estimated Cost from Separate Study/City	Scope Change: Location	Scope Change: Length and/or Size	New Project	2023 Comments
BINBROOK																							
Binbrook	0 to 5 years	B2-W-23	HD019 Pumping Station Expansion and Upgrades to increase Firm Capacity from 75 L/s to 122 L/s	Located at Regional Rd. 56		n/a	122		n/a	\$ 5,800,000		60%	\$ 3,480,000	0%		\$ 2,320,000			x				Updated Estimate based on Binbrook CA&CD Report by GMBP
Binbrook	0 to 5 years	B5-W-23	Fletcher Rd	Binbrook Rd	Pumpkin Pass	330	400	G	\$ 1,084	\$ 535,000		0%	\$ -	0%		\$ 535,000		x			x		updated length
Binbrook	0 to 5 years	B6-W-23	Binbrook Rd	West of Royal Winter Blvd	Fletcher Rd	850	400	G	\$ 1,084	\$ 1,377,000		0%	\$ -	0%		\$ 1,377,000		x					
Binbrook	0 to 5 years	B7-W-23	Binbrook Trunk Feedermain - Fletcher's Rd and Cemetery Rd	Hydro Corridor	HD019	6950	400	G	\$ 1,084	\$ 11,258,000		0%	\$ -	0%		\$ 11,258,000		x					
Binbrook	0 to 5 years	B8-W-23	Fletcher Rd	Binbrook Rd	Binhaven Boulevard Extension	650	400	G	\$ 1,084	\$ 1,053,000		0%	\$ -	0%		\$ 1,053,000		x					
Binbrook	0 to 5 years	B9-W-23	Binhaven Boulevard Extension	Brigham Ave	Fletcher Rd	850	400	G	\$ 1,084	\$ 1,377,000	\$ 718,000	0%	\$ -	0%		\$ 659,000		x					
Sub-Total Binbrook										\$ 21,400,000	\$ 718,000		\$ 3,480,000		\$ -	\$ 17,202,000							
HAMILTON MOUNTAIN																							
Hamilton Mountain	0 to 5 years	HM2-W-23	Terni Blvd extension	140m West of Upper Gage Ave	Miles Rd	430	400	G	\$ 1,084	\$ 697,000	\$ 363,000	0%	\$ -	0%		\$ 334,000		x					
Hamilton Mountain	0 to 5 years	HM3-W-23	Terni Blvd extension	Miles Rd	300m west	300	400	G	\$ 1,084	\$ 486,000	\$ 254,000	0%	\$ -	0%		\$ 232,000							
Hamilton Mountain	0 to 5 years	HM4-W-23	Miles Rd	West extension of Terni Blvd	East extension of Terni Blvd	50	400	U	\$ 1,896	\$ 142,000		0%	\$ -	0%		\$ 142,000		x					
Hamilton Mountain	0 to 5 years	HM5-W-23	Vineberg Dr	140m east of Upper Wentworth St	570m east of Upper Wentworth St	430	400	G	\$ 1,084	\$ 697,000	\$ 363,000	0%	\$ -	0%		\$ 334,000		x					
Hamilton Mountain	0 to 5 years	HM8-W-23	Twenty Rd Extension	Trinity Church Rd	Glover Rd	580	400	G	\$ 1,084	\$ 940,000	\$ 338,000	0%	\$ -	0%		\$ 602,000		x					
Hamilton Mountain	0 to 5 years	HM12-W-23	Nebo Rd	Dickenson Rd	Hydro Corridor	350	300	U	\$ 1,138	\$ 595,000		0%	\$ -	0%		\$ 595,000		x					
Hamilton Mountain	0 to 5 years	HM13-W-23	Dickenson Rd	Nebo Rd	800m east of Nebo Rd.	800	300	U	\$ 1,138	\$ 1,361,000		0%	\$ -	0%		\$ 1,361,000		x					
Hamilton Mountain	0 to 5 years	HM15-W-23	Dartnall Rd and new road alignment	Twenty Rd	Dickenson Rd	1475	300	G	\$ 650	\$ 1,434,000		0%	\$ -	0%		\$ 1,434,000		x					
Hamilton Mountain	0 to 5 years	HM18-W-23	Extension of Terni Blvd	590m east of Upper Wentworth St	300m west of Miles Rd	450	400	G	\$ 1,084	\$ 729,000	\$ 380,000	0%	\$ -	0%		\$ 349,000		x					
Hamilton Mountain	0 to 5 years	HM20-W-23	Stone Church Trunk Feedermain	First Rd W	HD06B	5420	1200	U	\$ 4,659	\$ 45,000,000		0%	\$ -	10%	\$ 4,500,000	\$ 40,500,000			x				Estimated Total Cost (2023\$) provided by City, land cost not specified, project ID 165440243
Hamilton Mountain	0 to 5 years	HM28-W-23	PD7 Elevated Tank	420 Trinity Church Rd		n/a	9.9 ML	G	n/a	\$ 17,424,000		0%	\$ -	75%	\$ 13,068,000	\$ 4,356,000			x				Estimated Total Cost inflated to 2023\$ from 2019 study, land acquisition cost \$0.5M/\$0.6M (2019\$/2023\$)
Hamilton Mountain	6 years to UBBO	HM1-W-23	Crerar Dr	160m North of Stone Church Rd	Stone Church Rd.	160	400	G	\$ 1,084	\$ 259,000	\$ 135,000	0%	\$ -	0%		\$ 124,000		x					
Hamilton Mountain	6 years to UBBO	HM2-W-23	New East-West alignment	Upper Sherman Ave	Acadia Dr	210	400	G	\$ 1,084	\$ 340,000	\$ 177,000	0%	\$ -	0%		\$ 163,000							
Hamilton Mountain	6 years to UBBO	HM27-W-23	Upper Wentworth / Turner Park / Twenty Rd	South Limit at Hydro Corridor	Springside Dr	1980	400	G	\$ 1,084	\$ 3,207,000		0%	\$ -	0%		\$ 3,207,000							
Sub-Total Hamilton Mountain										\$ 73,311,000	\$ 2,010,000		\$ -		\$ 17,568,000	\$ 53,733,000							
STONE CREEK UPPER																							
Stoney Creek Upper	0 to 5 years	SCU6-W-23	First Rd W	Green Mountain Rd	Glover Mountain Rd	855	400	G	\$ 1,084	\$ 1,385,000	\$ 723,000	0%	\$ -	0%		\$ 662,000							
Stoney Creek Upper	0 to 5 years	SCU18-W-23	Greenhill PS W-HD05A Upgrades (W-28)	155 MLD		57	155	U	n/a	\$ 29,091,000		25%	\$ 7,272,750	10%	\$ 2,909,100	\$ 18,909,000		x					Inflated estimate from 2019 DC, land cost not specified
Stoney Creek Upper	0 to 5 years	SCU23-W-23	PD5 Trunk Feedermain - HD05A to Valve Chamber	HD05A	Valve Chamber 3B	240	1200	G	\$ -	\$ 7,903,000		0%	\$ -	0%		\$ 7,903,000			x				Inflated estimate from 2019 DC
Stoney Creek Upper	6 years to UBBO	SCU7-W-23	Highland Reservoir HDR07 (additional storage)			n/a	5.5 ML	U	n/a	\$ 17,424,000		0%	\$ -	25%	\$ 4,356,000	\$ 13,068,000		x					Estimated cost and capacity from Study, Inflated to 2023\$
Stoney Creek Upper	6 years to UBBO	SCU21-W-23	New Zone 7 Booster Pumping Station	Upper Centennial Pkwy and Rymal Rd E			60	G	na	\$ 28,575,000		0%	\$ -	75%	\$ 21,431,250	\$ 7,144,000		x					Estimated cost from Study, Inflated to 2023\$, land acquisition cost \$0.5M/\$0.6M (2019\$/2023\$)
Stoney Creek Upper	6 years to UBBO	SCU22-W-23	Upper Centennial Pkwy	Mud St	New PD 7 Booster Station	1890	600	U	\$ 2,920	\$ 8,251,000		0%	\$ -	25%	\$ 2,062,750	\$ 6,188,000							
Sub-Total Stoney Creek Upper										\$ 92,629,000	\$ 723,000		\$ 7,272,750		\$ 30,759,100	\$ 53,874,000							
STONE CREEK LOWER																							
Stoney Creek Lower	0 to 5 years	SCL4-W-23	Replacement on Lewis Rd	Hwy 8	Barton St	500	300	U	\$ 1,138	\$ 850,000		0%	\$ -	0%		\$ 850,000		x					
Stoney Creek Lower	0 to 5 years	SCL6-W-23	Glover Rd	Barton St	Service Rd Extension	700	300	U	\$ 1,138	\$ 1,191,000		0%	\$ -	0%		\$ 1,191,000		x					
Stoney Creek Lower	6 years to UBBO	SCL7-W-23	Millen Rd	South Service Rd	Arvin Ave	670	400	U	\$ 1,896	\$ 1,899,000		0%	\$ -	0%		\$ 1,899,000		x					
Stoney Creek Lower	6 years to UBBO	SCL8-W-23	South Service Rd	Fruiland Rd	Jones Rd	950	400	U	\$ 1,896	\$ 2,693,000		0%	\$ -	0%		\$ 2,693,000		x					
Stoney Creek Lower	6 years to UBBO	SCL9-W-23	South Service Rd	Millen Rd	Seaman St	1600	400	U	\$ 1,896	\$ 4,536,000		0%	\$ -	0%		\$ 4,536,000		x					
Stoney Creek Lower	6 years to UBBO	SCL10-W-23	CNR Tracks	Barton St	Dewitt Rd	610	300	U	\$ 1,138	\$ 1,038,000		0%	\$ -	0%		\$ 1,038,000		x					
Stoney Creek Lower	6 years to UBBO	SCL11-W-23	Jones Rd	South Service Rd	Barton St	915	400	U	\$ 1,896	\$ 2,594,000		0%	\$ -	0%		\$ 2,594,000		x					
Sub-Total Stoney Creek Lower										\$ 14,801,000	\$ -		\$ -		\$ -	\$ 14,801,000							
Total Water										\$ 319,190,000	\$ 9,544,000		\$ 30,941,000		\$ 53,326,500	\$ 225,379,000							

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- General Features**
- Railways
 - Expanded Urban Boundary
 - Other Municipalities
 - Parking Lot
 - Vacant Non-Residential
 - Vacant Residential
- Existing Infrastructure**
- Water Treatment Plant (WTP)
 - Elevated Tank (ET)
 - Water Main Less than 400mm
 - Water Main 400mm and Greater
 - Pumping Station (PS)
 - Reservoir (RES)
- Future Water Infrastructure**
- WTP 0 - 5 Years
 - PS 0 - 5 Years
 - ET 0 - 5 Years
 - Watermain 0 - 5 Years
 - Watermain 100% Direct Devel Contribution
 - PS 6 Plus Years
 - RES 6 Plus Years
 - Watermain 6 Plus Years

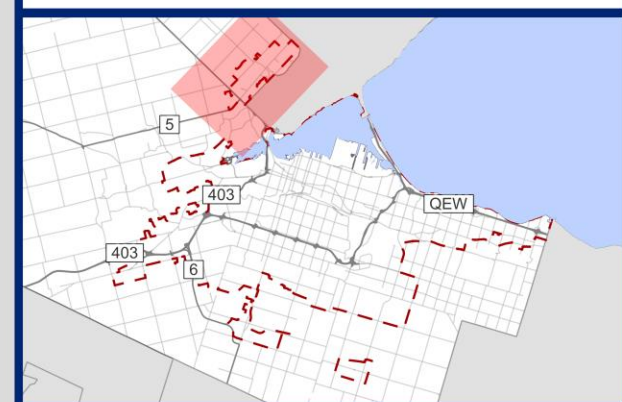
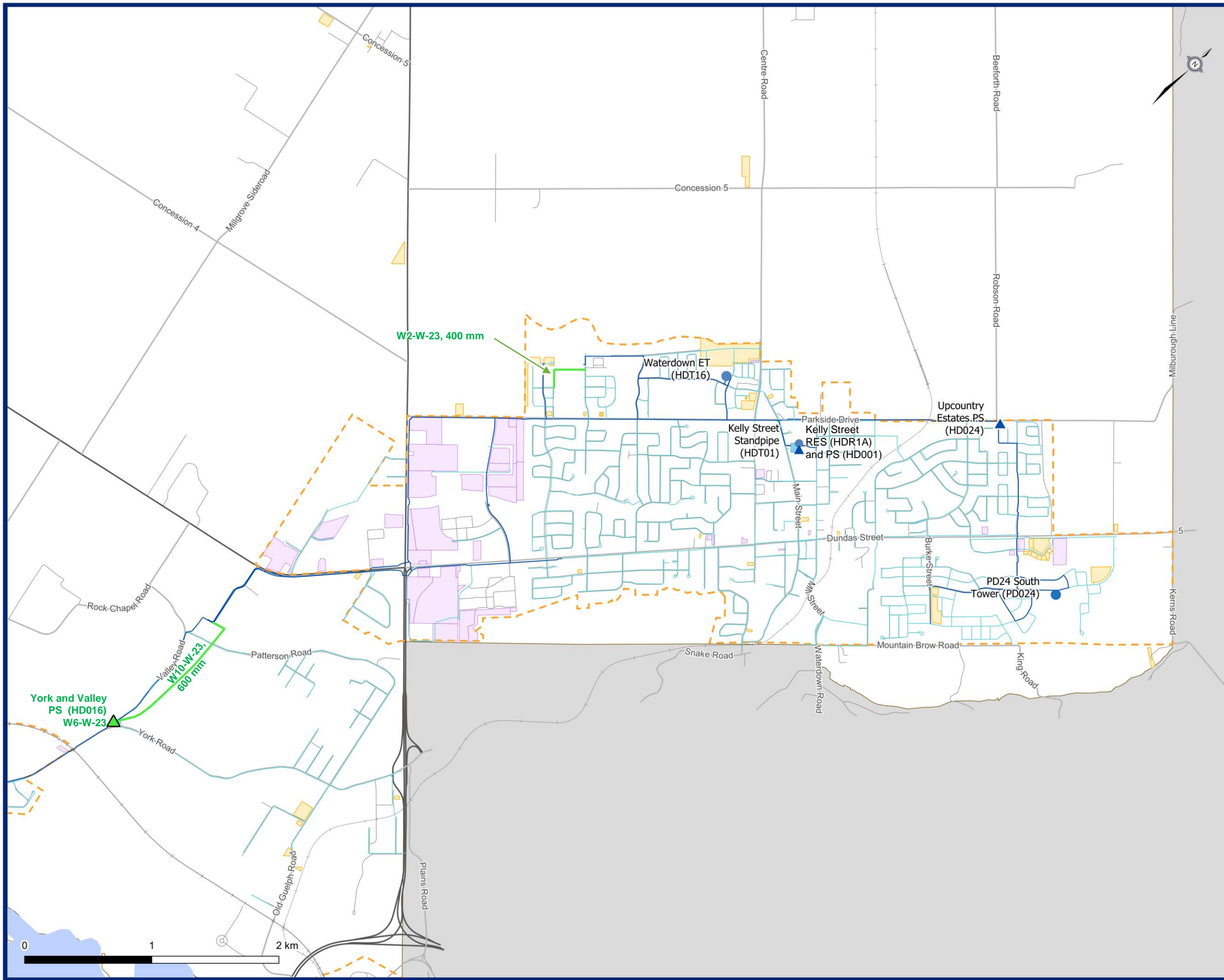


Figure 1-1

Waterdown Water

Development Charges Background Study

- General Features**
- Railways
 - Expanded Urban Boundary
 - Other Municipalities
 - Parking Lot
 - Vacant Non-Residential
 - Vacant Residential
- Existing Infrastructure**
- Water Treatment Plant (WTP)
 - Elevated Tank (ET)
 - Water Main Less than 400mm
 - Water Main 400mm and Greater
 - Pumping Station (PS)
 - Reservoir (RES)
- Future Water Infrastructure**
- WTP 0 - 5 Years
 - PS 0 - 5 Years
 - ET 0 - 5 Years
 - Watermain 0 - 5 Years
 - Watermain 100% Direct Development Contribute
 - PS 6 Plus Years
 - RES 6 Plus Years
 - Watermain 6 Plus Years

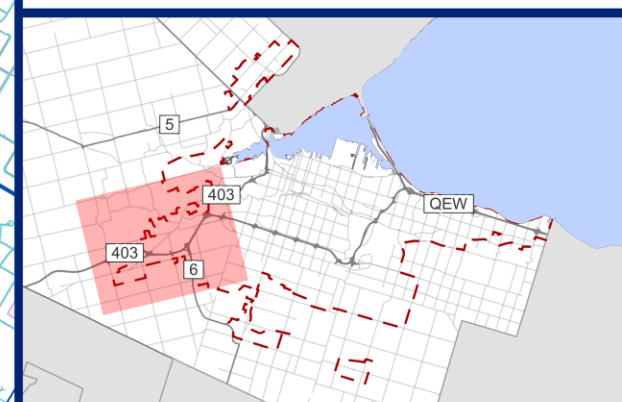
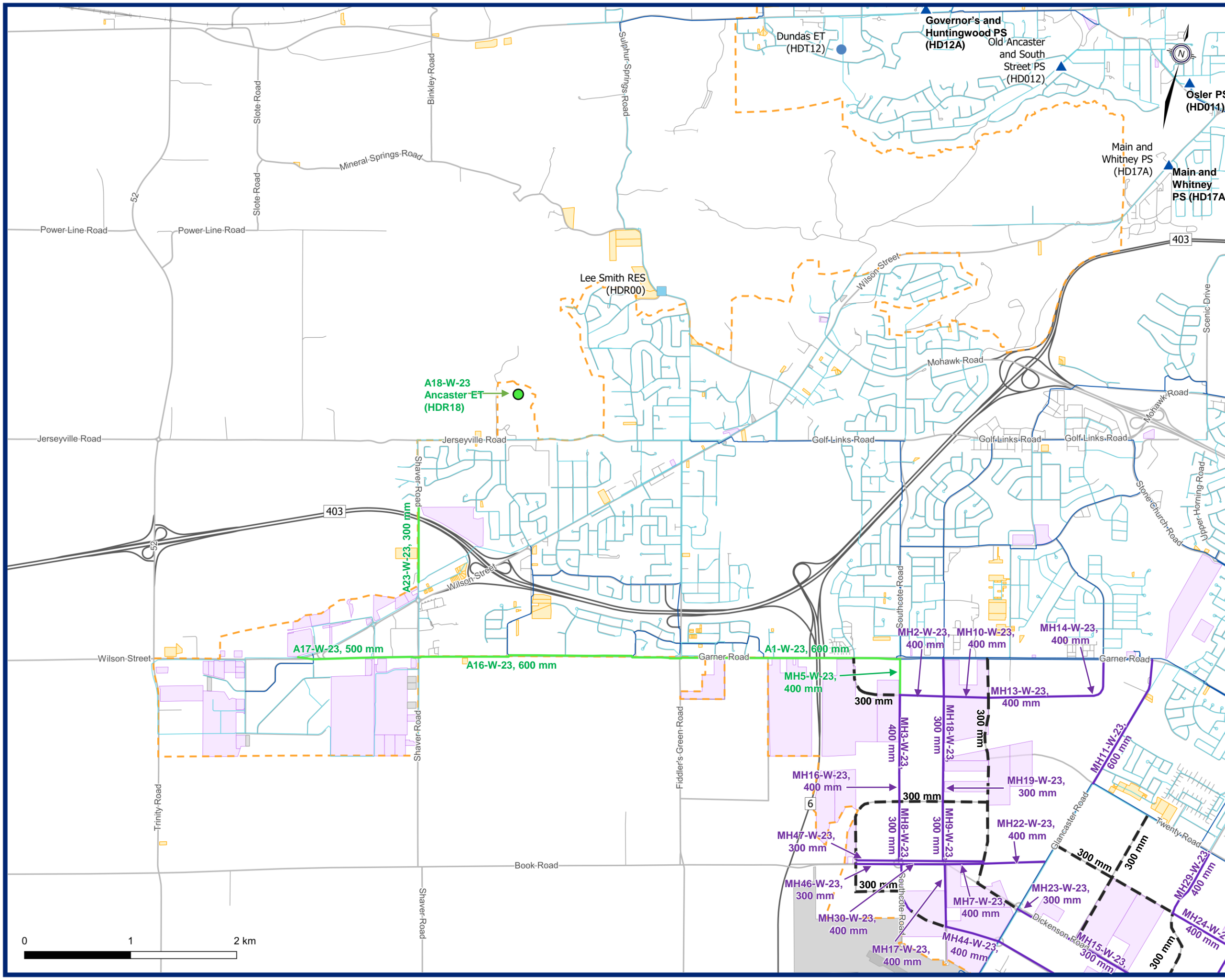
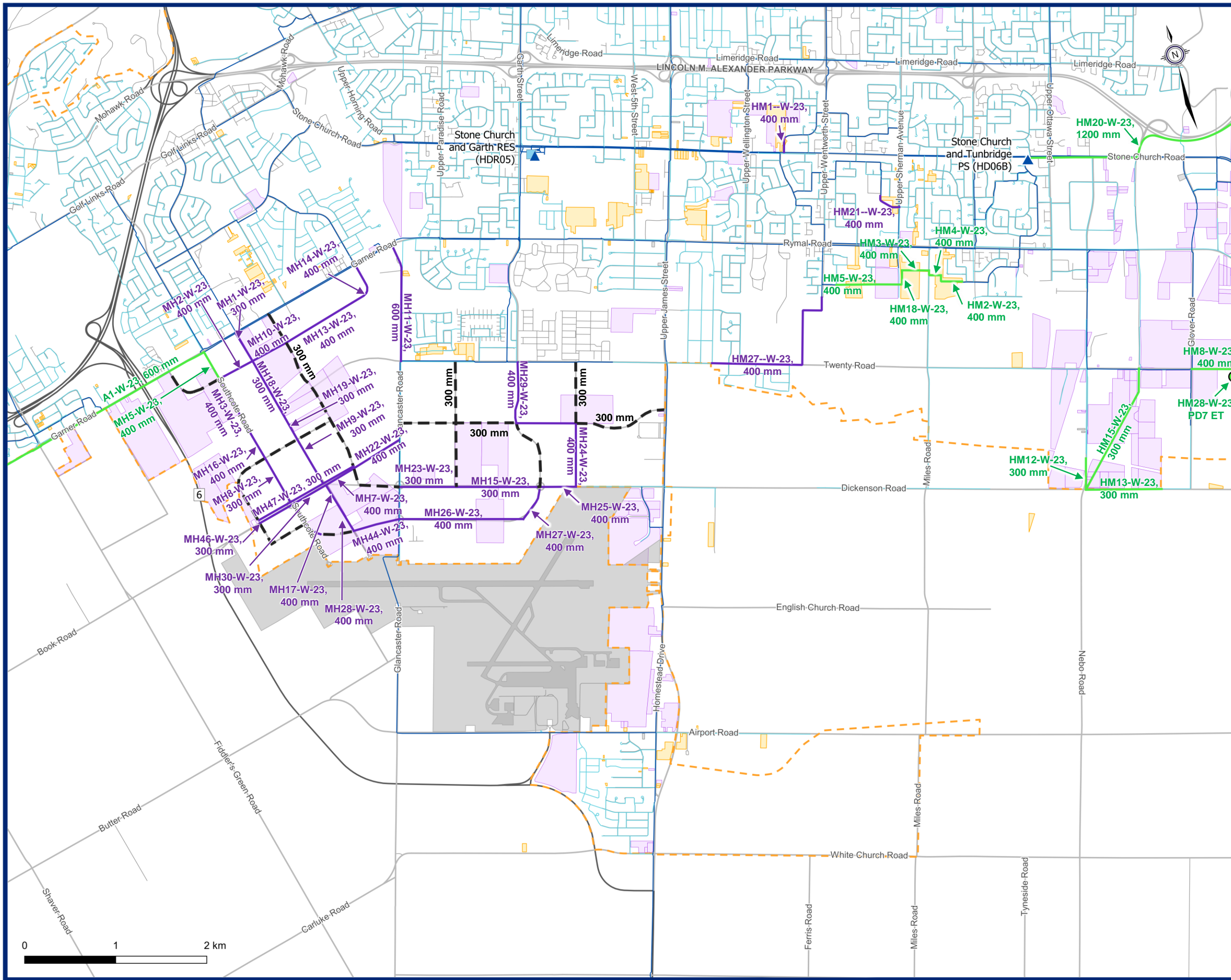


Figure 1-2
Ancaster Water

Development Charges Background Study





General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Water Treatment Plant (WTP)
- Elevated Tank (ET)
- Water Main Less than 400mm
- Water Main 400mm and Greater
- Pumping Station (PS)
- Reservoir (RES)

Future Water Infrastructure

- WTP 0 - 5 Years
- PS 0 - 5 Years
- ET 0 - 5 Years
- Watermain 0 - 5 Years
- Watermain 100% Direct Development Contribute
- PS 6 Plus Years
- RES 6 Plus Years
- Watermain 6 Plus Years

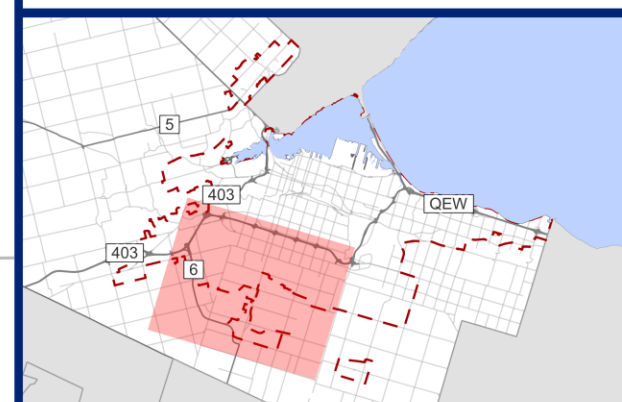
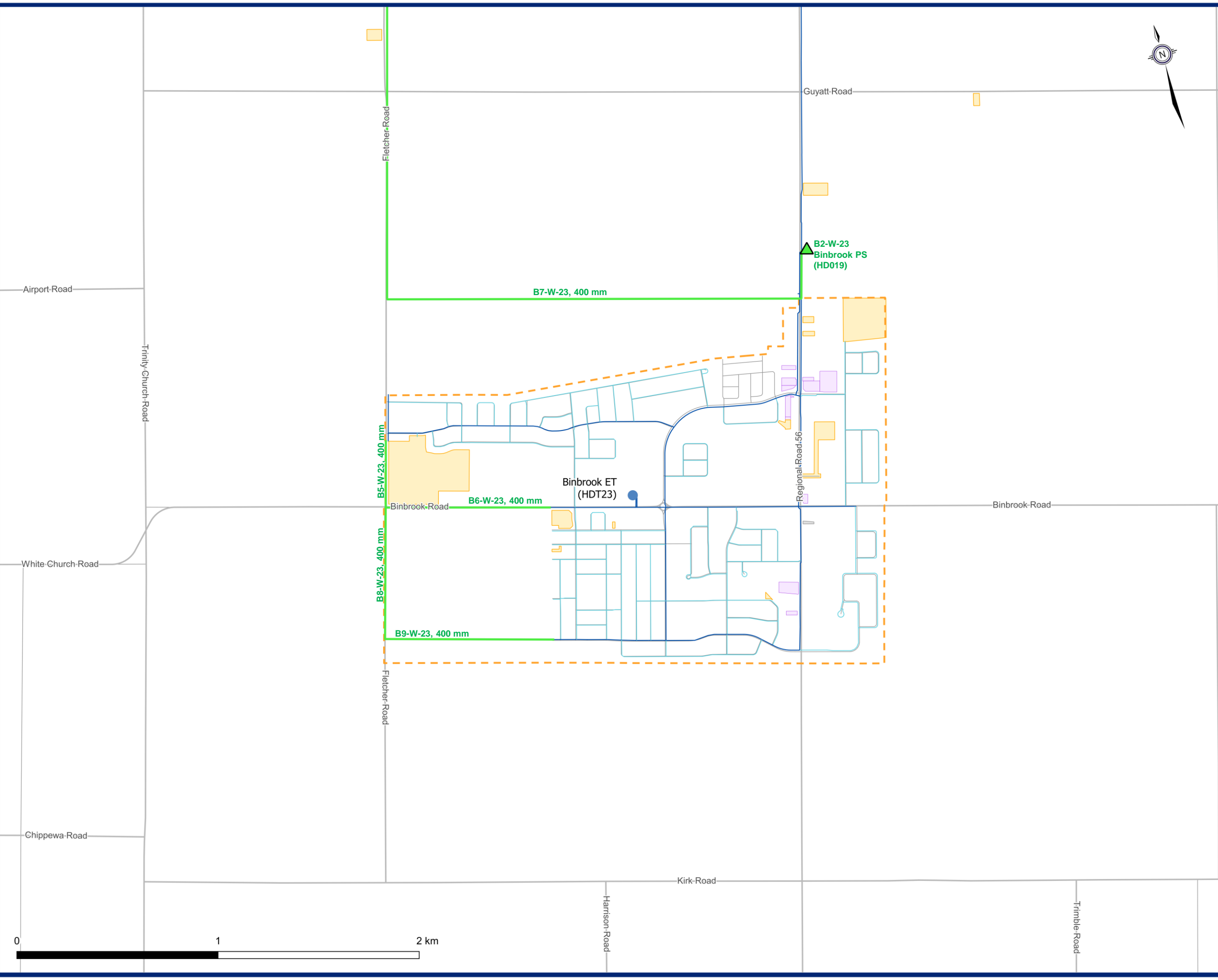
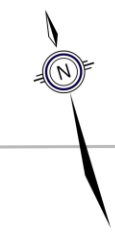


Figure 1-3

AEGD/Mount Hope Water

Development Charges Background Study





General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Water Treatment Plant (WTP)
- Elevated Tank (ET)
- Water Main Less than 400mm
- Water Main 400mm and Greater
- Pumping Station (PS)
- Reservoir (RES)

Future Water Infrastructure

- WTP 0 - 5 Years
- PS 0 - 5 Years
- ET 0 - 5 Years
- Watermain 0 - 5 Years
- Watermain 100% Direct Development Contribute
- PS 6 Plus Years
- RES 6 Plus Years
- Watermain 6 Plus Years

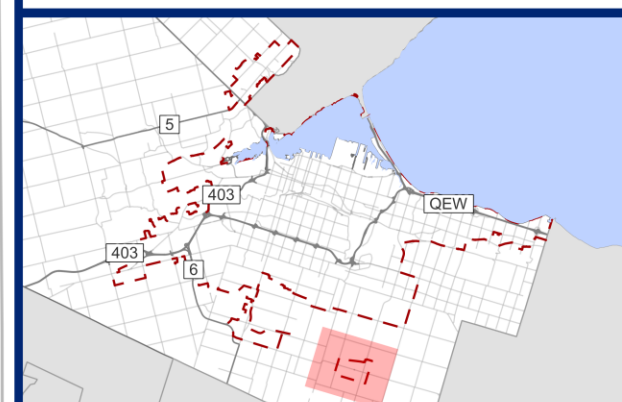
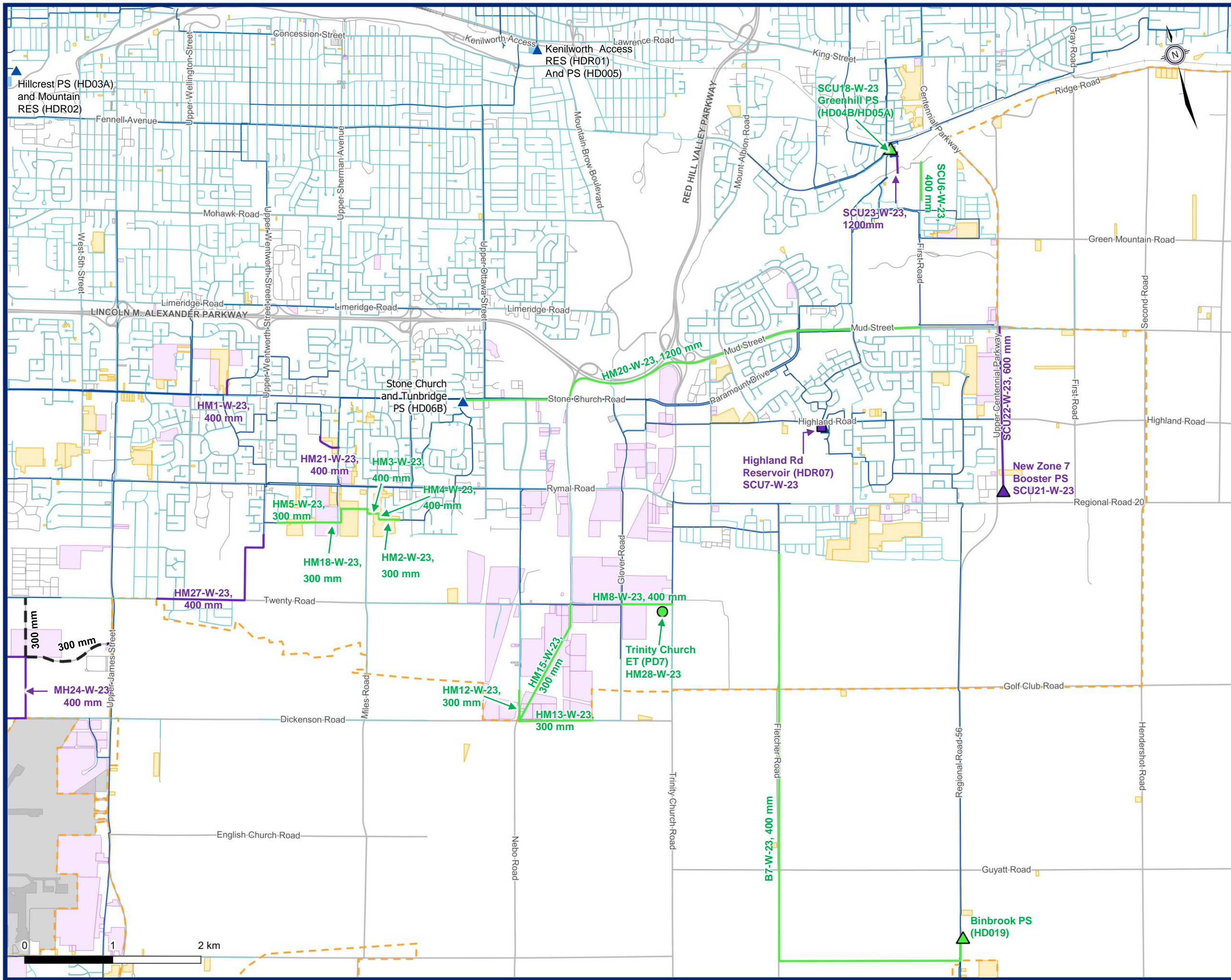


Figure 1-4

Binbrook Water

Development Charges Background Study



General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Water Treatment Plant (WTP)
- Elevated Tank (ET)
- Water Main Less than 400mm
- Water Main 400mm and Greater
- Pumping Station (PS)
- Reservoir (RES)

Future Water Infrastructure

- WTP 0 - 5 Years
- PS 0 - 5 Years
- ET 0 - 5 Years
- Watermain 0 - 5 Years
- Watermain 100% Direct Devel Contribut
- PS 6 Plus Years
- RES 6 Plus Years
- Watermain 6 Plus Years

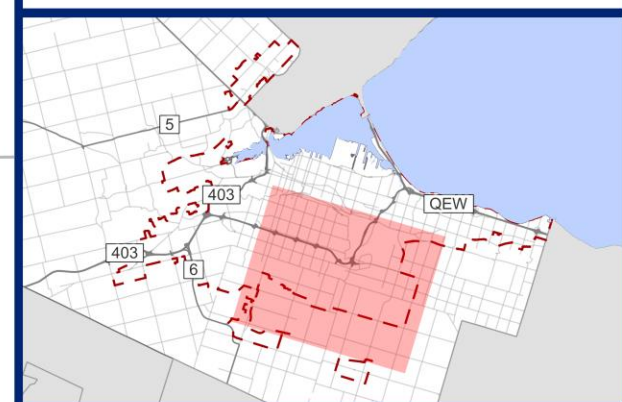
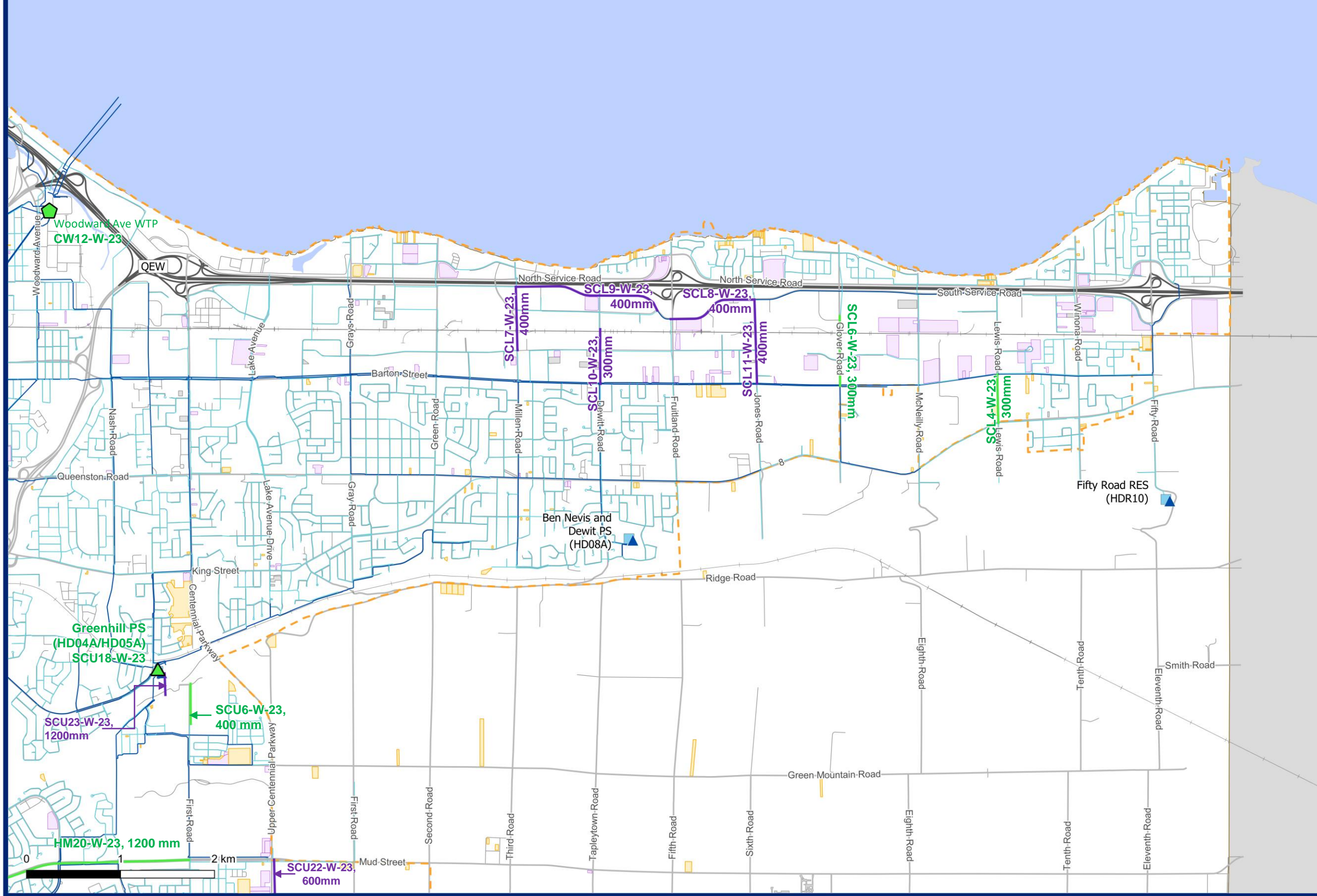


Figure 1-5
Hamilton Mountain / Stoney Creek Water
 Development Charges Background Study



- General Features**
- Railways
 - Expanded Urban Boundary
 - Other Municipalities
 - Parking Lot
 - Vacant Non-Residential
 - Vacant Residential
- Existing Infrastructure**
- Water Treatment Plant (WTP)
 - Elevated Tank (ET)
 - Water Main Less than 400mm
 - Water Main 400mm and Greater
 - Pumping Station (PS)
 - Reservoir (RES)
- Future Water Infrastructure**
- WTP 0 - 5 Years
 - PS 0 - 5 Years
 - ET 0 - 5 Years
 - Watermain 0 - 5 Years
 - Watermain 100% Direct Contribute
 - PS 6 Plus Years
 - RES 6 Plus Years
 - Watermain 6 Plus Years



Figure 1-6

Stoney Creek Lower Water

Development Charges Background Study

- General Features**
- Railways
 - Expanded Urban Boundary
 - Other Municipalities
 - Parking Lot
 - Vacant Non-Residential
 - Vacant Residential
- Existing Infrastructure**
- Water Treatment Plant (WTP)
 - Elevated Tank (ET)
 - Water Main Less than 400mm
 - Water Main 400mm and Greater
 - Pumping Station (PS)
 - Reservoir (RES)
- Future Water Infrastructure**
- WTP 0 - 5 Years
 - PS 0 - 5 Years
 - ET 0 - 5 Years
 - Watermain 0 - 5 Years
 - Watermain 100% Direct Contribute
 - PS 6 Plus Years
 - RES 6 Plus Years
 - Watermain 6 Plus Years

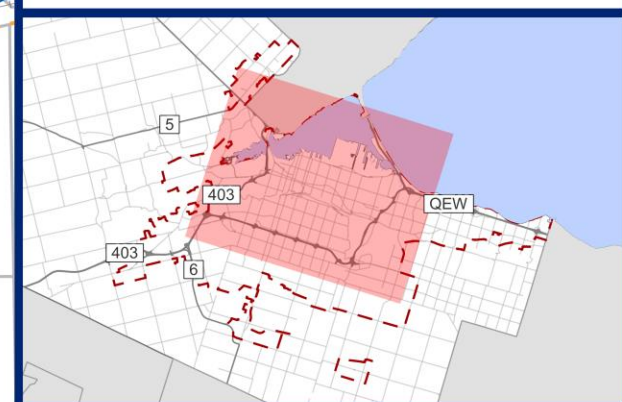
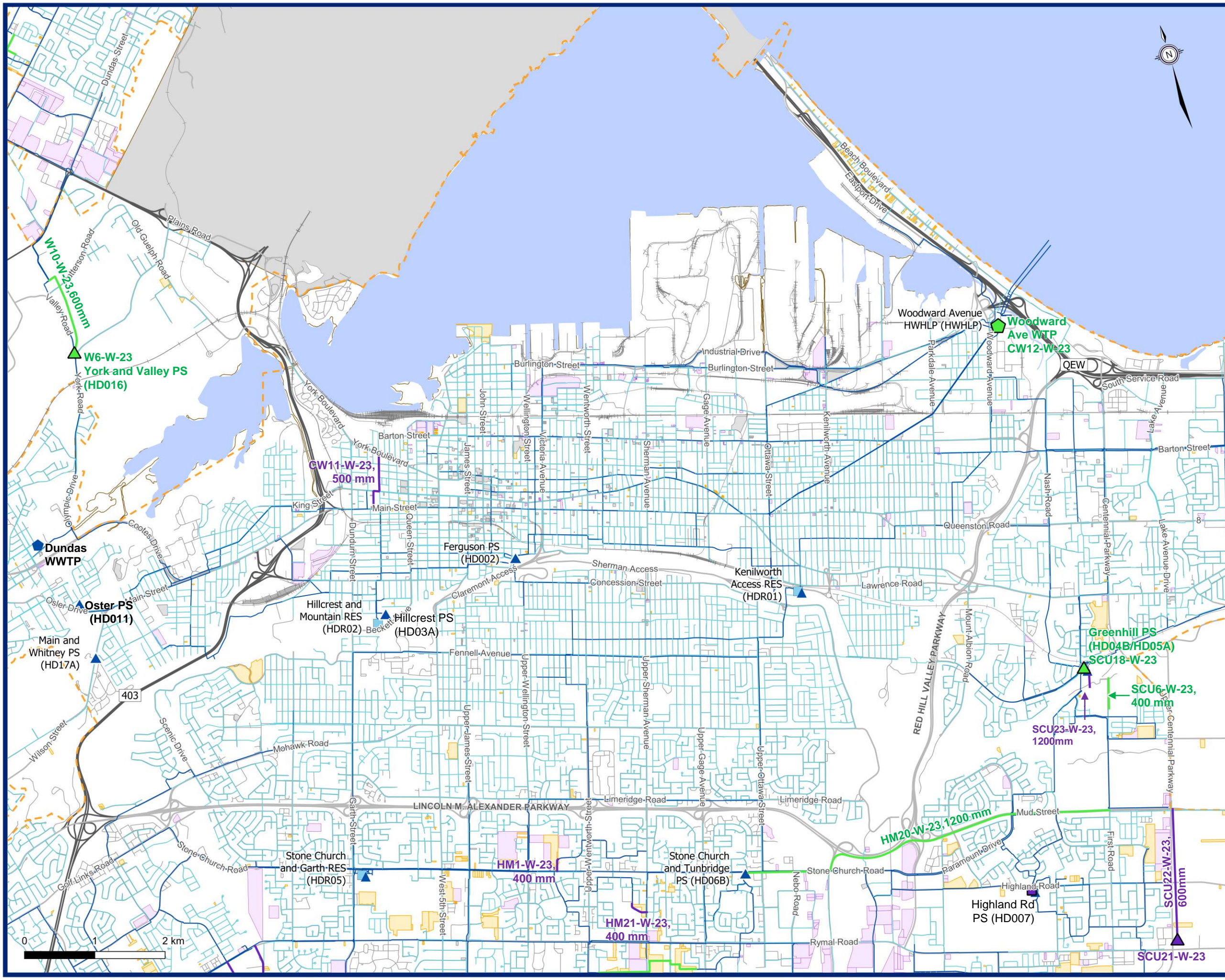


Figure 1-7

Hamilton Downtown Water
Development Charges Background Study



Attachment B – Water City Wide Projects

TABLE F-2 - WATER CAPITAL PROGRAM - CITYWIDE

Area	Planning Period	Project ID	Project	Description	2023 Estimated Total Cost	Direct Developer Contribution	City Cost Share	Post Period Benefit	Development Charges (\$2023)	2019-2023 Change Details
City Wide Projects	0 to 5 years	CW1-W-23	Oversizing of Infrastructure-Watermains	Oversizing of servicing infrastructure within subdivisions	\$ 427,000	\$ -	\$ -	\$ -	\$ 427,000	Updated cost - inflation only
City Wide Projects	0 to 5 years	CW2-W-23	Regional Subdivider's Share for Local Improvements		\$ 1,618,318	\$ -	\$ -	\$ -	\$ 1,618,318	Updated cost - inflation only
City Wide Projects	0 to 5 years	CW3-W-23	Intensification Infrastructure Upgrades - Water (0-5 years)	Upgrades to existing infrastructure to accommodate intensification	\$ 20,909,000	\$ -	\$ 10,454,000	\$ -	\$ 10,455,000	Updated cost - inflation only
City Wide Projects	0 to 5 years	CW14-W-23	Oversizing of Infrastructure-Watermains	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	\$ 10,121,108	\$ -	\$ -	\$ -	\$ 10,121,108	Updated cost - inflation only
City Wide Projects	0 to 5 years	CW15-W-23	Large diameter and cut-in valves on existing watermains		\$ 1,958,000	\$ -	\$ -	\$ -	\$ 1,958,000	Updated cost - inflation only
City Wide Projects	0 to 5 years	CW24-W-23	Freelton Well (FDF01) Capacity Increase	Increase the capacity of the Freelton municipal well in order to meet the ultimate water demand of the Freelton Rural Settlement Area	\$ 4,920,467	\$ -	\$ 417,000	\$ -	\$ 4,503,467	Updated cost - inflation only
City Wide Projects	6 years to UBBO	CW4-W-23	Intensification Infrastructure Upgrades - Water	Upgrades to existing infrastructure to accommodate intensification	\$ 20,908,500	\$ -	\$ 10,454,250	\$ -	\$ 10,454,250	Updated cost - inflation only
City Wide Projects	6 years to UBBO	CW11-W-23	Locke St Watermain	Locke St from Barton St to Main St (1500 m; 500 mm)	\$ 5,985,000	\$ -	\$ -	\$ -	\$ 5,985,000	Updated cost - inflation only
Total Water CityWide					\$ 66,847,393	\$ -	\$ 21,325,250	\$ -	\$ 45,522,143	

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Attachment C – Wastewater Projects

TABLE F-3 - WASTEWATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Unit Rate Type (Greenfield/Urban)	Unit Cost (2023\$/m)	Estimated Total Cost (2023\$)	Direct Developer Contribution (2023\$)	Benefit to Existing (%)	Benefit to Existing (2023\$)	Post Period Benefit (%)	Post Period Benefit (2023\$)	Development Charges (2023\$)	Updated Timing	Estimate from Updated Methodology	Estimated Cost from Separate Study/City	Scope Change: Location	Scope Change: Length and/or Size	New Project	2019-2023 Change Details
WATERDOWN																							
Waterdown	0 to 5 years	W3-S-23	Waterdown North Area	McCurdy Ave	Northerly	340	600	G	\$ 954	\$ 485,000	\$ 359,000	0%		0%		\$ 126,000		x		x	x		Updated alignment and length based on Plan drawing
Sub-Total Waterdown										\$ 485,000	\$ 359,000		\$ -		\$ -	\$ 126,000							
ANCASTER																							
Ancaster	0 to 5 years	A13-S-23	Ancaster Industrial Park Area- Hydro Corridor	Shaver Rd	New road	400	600	G	\$ 954	\$ 571,000		0%		0%		\$ 571,000		x		x	x		No longer extends east through the hydro corridor to Shaver Rd. It will connect to Shaver road through Trustwood (new road).
Ancaster	0 to 5 years	A21-S-23	Shaver Rd	Osprey Dr	Hydro Corridor	660	375	G	\$ 791	\$ 780,000		0%		0%		\$ 780,000		x			x		No longer connects at the hydro corridor, now it will connect to future line at Trustwood (future road).
Sub-Total Ancaster										\$ 1,351,000	\$ -		\$ -		\$ -	\$ 1,351,000							
AEGD/MT. HOPE																							
AEGD/Mt. Hope	0 to 5 years	MH1-S-23	Twenty Rd	Silverbirch Blvd	Upper James St	2000	450	U	\$ 1,422	\$ 4,252,000		0%		0%		\$ 4,252,000		x					
AEGD/Mt. Hope	0 to 5 years	MH3-S-23	John Frederick Dr	Garner Rd	360m South	430	375	U	\$ 1,384	\$ 891,000		0%		0%		\$ 891,000		x		x	x		Extended Length to Garner Rd, per Servicing Report
AEGD/Mt. Hope	0 to 5 years	MH4-S-23	Forcemain - Garner Rd	360m South of Garner Rd	Barley Rd	1000	200	U	\$ -	\$ 1,853,000		0%		0%		\$ 1,853,000		x		x	x		Adjusted length as per Servicing Report, project id 5161180187, estimate from City, no land cost specified
AEGD/Mt. Hope	0 to 5 years	MH6-S-23	Garner Rd	Kitty Murray Lane	Barley Lane	360	375	U	\$ 1,384	\$ 4,415,000		0%		0%		\$ 4,415,000		x			x		Adjusted Size and length to match Servicing Report
AEGD/Mt. Hope	0 to 5 years	MH7-S-23	New SPS	South of Garner on New Street				U		\$ 3,500,000		0%		0%		\$ 3,500,000			x		x		New SPS identified from Servicing Report, Received 2023-07-19, project id 5162280283, estimate from City, no land
AEGD/Mt. Hope	0 to 5 years	MH8-S-23	Garner Rd	200m West of Springbrook Ave	Barley Lane	700	600	U	\$ 1,669	\$ 8,585,000		0%		0%		\$ 8,585,000		x			x		Sewer connecting to MH6, identified in Servicing Report
AEGD/Mt. Hope	0 to 5 years	MH9-S-23	Garner Rd	Kitty Murray Lane	120m West of Southcote Rd	480	300	U	\$ 1,327	\$ 953,000		0%		0%		\$ 953,000		x			x		Sewer connecting to MH3, identified in Servicing Report
AEGD/Mt. Hope	6 years to UBBO	MH10-S-23	Dickenson Rd Trunk Sewer	Glancaster Rd	Garth St extension	1530	525	U	\$ 1,517	\$ 3,470,000		0%		0%		\$ 3,470,000		x			x		Reduced Length, updated size, per City comment
AEGD/Mt. Hope	6 years to UBBO	MH11-S-23	Book Rd Trunk Sewer	400 m west of Southcote	Smith Rd	830	600	G	\$ 954	\$ 1,183,000		0%		0%		\$ 1,183,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH12-S-23	Smith Rd	Hydro Corridor	Book Rd	950	375	G	\$ 791	\$ 1,123,000		0%		0%		\$ 1,123,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH13-S-23	Garth St Extension	Smith Rd	Upper James St	3620	750	U	\$ 2,313	\$ 12,520,000	\$ 7,598,000	0%		0%		\$ 4,922,000		x			x		Increased Length and size, per City comment
AEGD/Mt. Hope	6 years to UBBO	MH14-S-23	Glancaster Rd	Airport	Garth St extension	450	375	G	\$ 791	\$ 532,000		0%		0%		\$ 532,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH15-S-23	Glancaster Rd	Dickenson Rd	Garth St extension	375	375	G	\$ 791	\$ 443,000		0%		0%		\$ 443,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH16-S-23	Glancaster Rd	Book Rd	Dickenson Rd	380	375	G	\$ 791	\$ 450,000		0%		0%		\$ 450,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH17-S-23	Dickenson Rd	Garth St Extension	Smith Rd	825	525	G	\$ 867	\$ 1,069,000		0%		0%		\$ 1,069,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH18-S-23	Book Rd	Glancaster Rd	Smith Rd	950	375	G	\$ 791	\$ 1,123,000		0%		0%		\$ 1,123,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH19-S-23	Southcote Rd	Hydro Corridor	Book Rd	875	375	G	\$ 791	\$ 1,035,000		0%		0%		\$ 1,035,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH20-S-23	Smith Rd	Book Rd	Garth St extension	675	375	G	\$ 791	\$ 798,000		0%		0%		\$ 798,000		x		x			Updated alignment based on AEGD TMP, inflated cost
AEGD/Mt. Hope	6 years to UBBO	MH21-S-23	Southcote Rd	Book Rd	Garth St extension	525	375	G	\$ 791	\$ 621,000		0%		0%		\$ 621,000		x		x			Updated alignment based on AEGD TMP, inflated cost
Sub-Total AEGD/Mt. Hope										\$ 48,816,000	\$ 7,598,000		\$ -		\$ -	\$ 41,218,000							

TABLE F-3 - WASTEWATER CAPITAL PROGRAM																							
Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Unit Rate Type (Greenfield/Urban)	Unit Cost (2023\$/m)	Estimated Total Cost (2023\$)	Direct Developer Contribution (2023\$)	Benefit to Existing (%)	Benefit to Existing (2023\$)	Post Period Benefit (%)	Post Period Benefit (2023\$)	Development Charges (2023\$)	Updated Timing	Estimate from Updated Methodology	Estimated Cost from Separate Study/City	Scope Change: Location	Scope Change: Length and/or Size	New Project	2019-2023 Change Details
BINBROOK																							
Binbrook	0 to 5 years	B10-S-23	Windwood Dr Extension	Fletcher Rd	Brigham Ave	850	600	G	\$ 954	\$ 1,212,000	\$ 898,000	0%		0%		\$ 314,000		x					
Binbrook	0 to 5 years	B11-S-23	Binbrook Rd	Fletcher Rd	Brigham Ave	850	375	G	\$ 791	\$ 1,005,000		0%		0%		\$ 1,005,000		x					
Sub-Total Binbrook										\$ 2,217,000	\$ 898,000		\$ -		\$ -	\$ 1,319,000							
HAMILTON MOUNTAIN																							
Hamilton Mountain	0 to 5 years	HM6-S-23	Dartnall Rd extension	Twenty Rd	730 m south	730	525	G	\$ 867	\$ 946,000	\$ 771,000	0%		0%		\$ 175,000		x					
Hamilton Mountain	0 to 5 years	HM9-S-23	Nebo Rd	250 m north of Twenty Rd East	480 m south of Rymal Rd	630	375	U	\$ 1,384	\$ 1,304,000		0%		0%		\$ 1,304,000		x					
Hamilton Mountain	0 to 5 years	HM10-S-23	Upper Ottawa St	275 m north of Twenty Rd East	350 m south of Rymal Rd	675	375	G	\$ 791	\$ 798,000		0%		0%		\$ 798,000		x					
Hamilton Mountain	0 to 5 years	HM20-S-23	Dickenson Rd Trunk Sewer	Upper James St to Miles Rd	Miles Rd to RR56	9700	1200/1500 mm	G		\$ 116,800,000		0%		10%	\$ 11,680,000	\$ 105,120,000			x				Increased Length and Updated Estimate provided by City; includes Construction Cost, Contingency, plus Design.
Hamilton Mountain	6 years to UBBO	HM3-S-23	Miles Rd	Connection of sewers east and west of Miles Rd		50	375	U	\$ 1,384	\$ 104,000		0%		0%		\$ 104,000		x					
Sub-Total Hamilton Mountain										\$ 119,952,000	\$ 771,000		\$ -		\$ 11,680,000	\$ 107,501,000							
STONE CREEK LOWER																							
Stoney Creek Lower	0 to 5 years	SCL2-S-23	Forcemain- South Service Rd	New SPS	30 m west	30	150	U	\$ -	\$ 36,000		0%		0%		\$ 36,000		x					
Stoney Creek Lower	0 to 5 years	SCL3-S-23	New Sewage Pumping Station at South Service Rd, east of Fifty Rd				Not available	U	n/a	\$ 491,000		0%		0%		\$ 491,000							New SPS, inflated cost from 2019 DC Study, land cost not specified
Stoney Creek Lower	0 to 5 years	SCL11-S-23	Centennial Trunk Sewer	King St	ESI at Kenora Ave	4200	1500	U	n/a	\$ 80,000,000		0%		10%	\$ 8,000,000	\$ 72,000,000		x		x	x		Updated alignment and estimate as provided by City, land cost not specified
Stoney Creek Lower	0 to 5 years	SCL14-S-23	South Service Rd	50 m east of Fifty Road	500 m east	500	450	U	\$ 1,422	\$ 1,063,000	\$ 532,000	0%		0%		\$ 531,000		x					
Stoney Creek Lower	0 to 5 years	SCL18-S-23	Barton St	Jones Rd	470 m east toward Glover	250	450	G	\$ 813	\$ 304,000		0%		0%		\$ 304,000		x					Updated length based on BSS 2 drawing
Stoney Creek Lower	0 to 5 years	SCL19-S-23	Glover Rd	Hwy 8	500 m north, past Watercourse 7	500	450	U	\$ 1,422	\$ 924,000		10%	\$ 92,400	0%		\$ 831,600		x					Updated length based on BSS 2 drawing
Stoney Creek Lower	0 to 5 years	SCL20-S-23	Barton St	McNeilly Rd	200 m east of McNeilly Rd	330	450	U	\$ 1,422	\$ 702,000		0%		0%		\$ 702,000		x					Updated length and size based on BSS 3 drawing
Stoney Creek Lower	0 to 5 years	SCL21-S-23	Barton St	200 m east of McNeilly Rd	Lewis Rd	520	450	U	\$ 1,422	\$ 1,105,000		0%		0%		\$ 1,105,000		x					Updated length based on BSS 3 drawing
Stoney Creek Lower	0 to 5 years	SCL22-S-23	Barton St	Lewis Rd	350 m east of Lewis Rd	370	450	U	\$ 1,422	\$ 787,000		10%	\$ 78,700	0%		\$ 708,300		x					Updated length based on BSS 3 drawing
Stoney Creek Lower	0 to 5 years	SCL24-S-23	Barton St	350 m east of Fruitland Rd	200 m east	74	450	U	\$ 1,422	\$ 157,000		10%	\$ 15,700	0%		\$ 141,300		x					Updated length based on BSS 1 Drawing
Stoney Creek Lower	0 to 5 years	SCL25-S-23	Jones St	350 south of Barton St	200 m south	230	450	U	\$ 1,422	\$ 489,000		10%	\$ 48,900	0%		\$ 440,100		x					Updated length based on BSS 1 Drawing
Stoney Creek Lower	0 to 5 years	SCL16-S-23	Millen Rd and easement (QEW Crossing)	South Service Rd	North Service Rd	120	450	U	\$ 1,422	\$ 255,000		0%		0%		\$ 255,000		x					
Sub-Total Stoney Creek Lower										\$ 86,313,000	\$ 532,000		\$ 235,700		\$ 8,000,000	\$ 77,545,300							
Total WasteWater										\$ 259,134,000	\$ 10,158,000		\$ 235,700		\$ 19,680,000	\$ 229,060,300							

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General Features

-  Railways
-  Expanded Urban Boundary
-  Other Municipalities
-  Parking Lot
-  Vacant Non-Residential
-  Vacant Residential

Existing Infrastructure

-  Wastewater Treatment Plant (WWTP)
-  Sanitary Pumping Station (SPS)
-  Forcemain
-  Sanitary Sewer >= 450mm
-  Sanitary Sewer < 450mm
-  Combined Sewer >= 450mm
-  Combined Sewer < 450mm

Future Water Infrastructure

-  WWTP 0 - 5 Years
-  SPS 0 - 5 Years
-  Forcemain 0-5 Years
-  Sanitary Sewers 0-5 Years
-  Sanitary Sewers - 100% Direct Development Contribution
-  WWTP 6 Plus Years
-  SPS 6 Plus Years
-  Sanitary Sewers 6 Plus Years

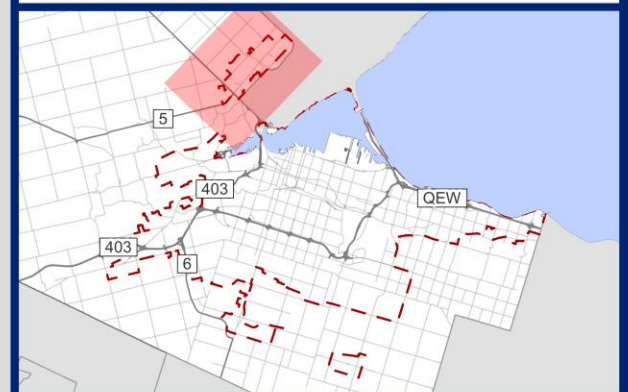
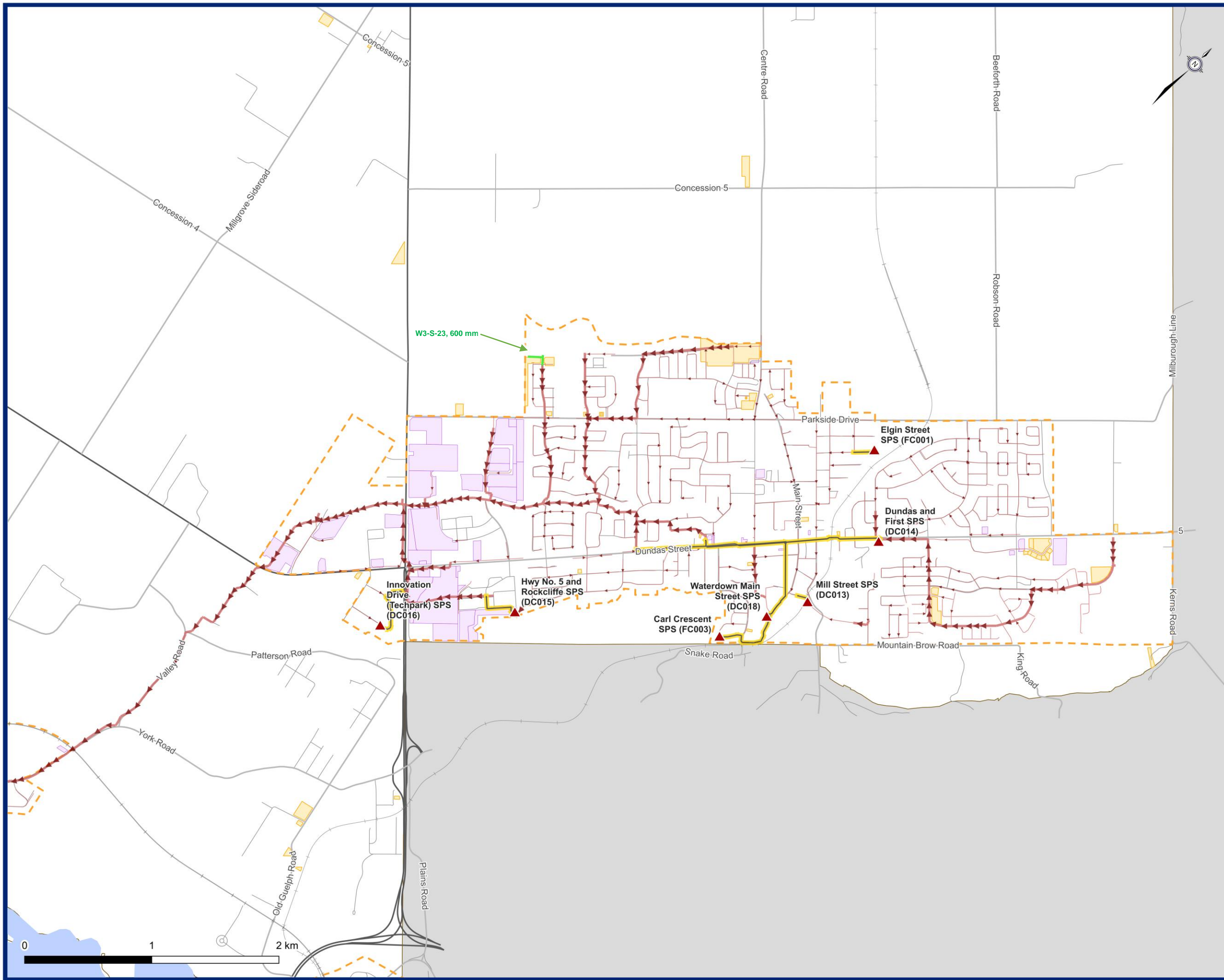
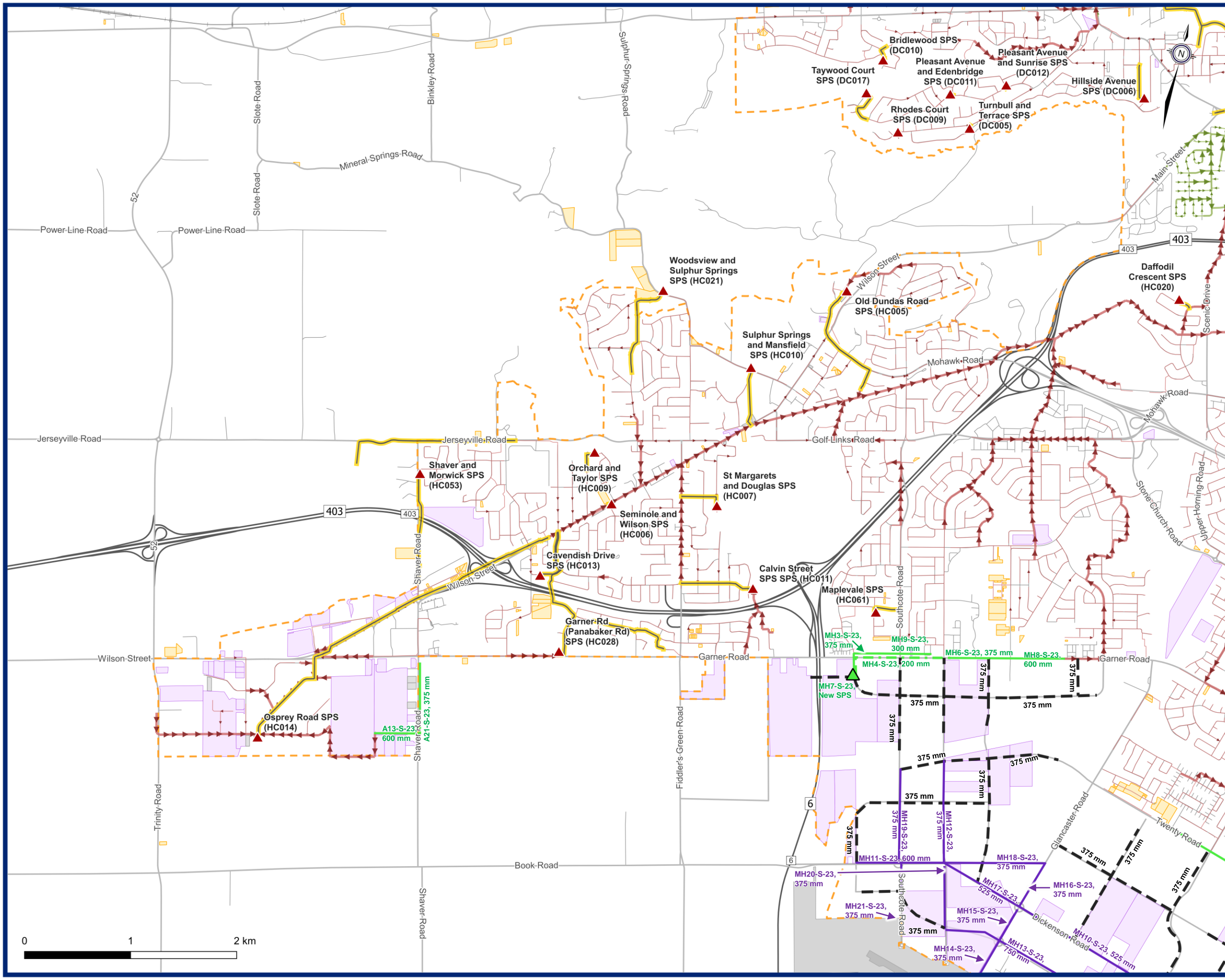


Figure 2-1

Waterdown Wastewater

Development Charges Background Study





General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- Sanitary Pumping Station (SPS)
- Forcemain
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

Future Water Infrastructure

- WWTP 0 - 5 Years
- SPS 0 - 5 Years
- Force mains 0-5 Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers - 100% Direct Development Contribution
- WWTP 6 Plus Years
- SPS 6 Plus Years
- Sanitary Sewers 6 Plus Years

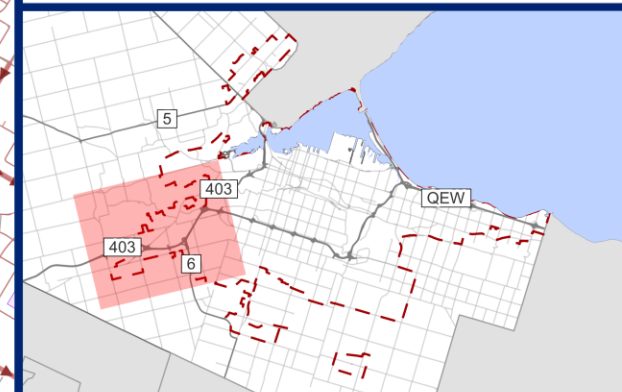
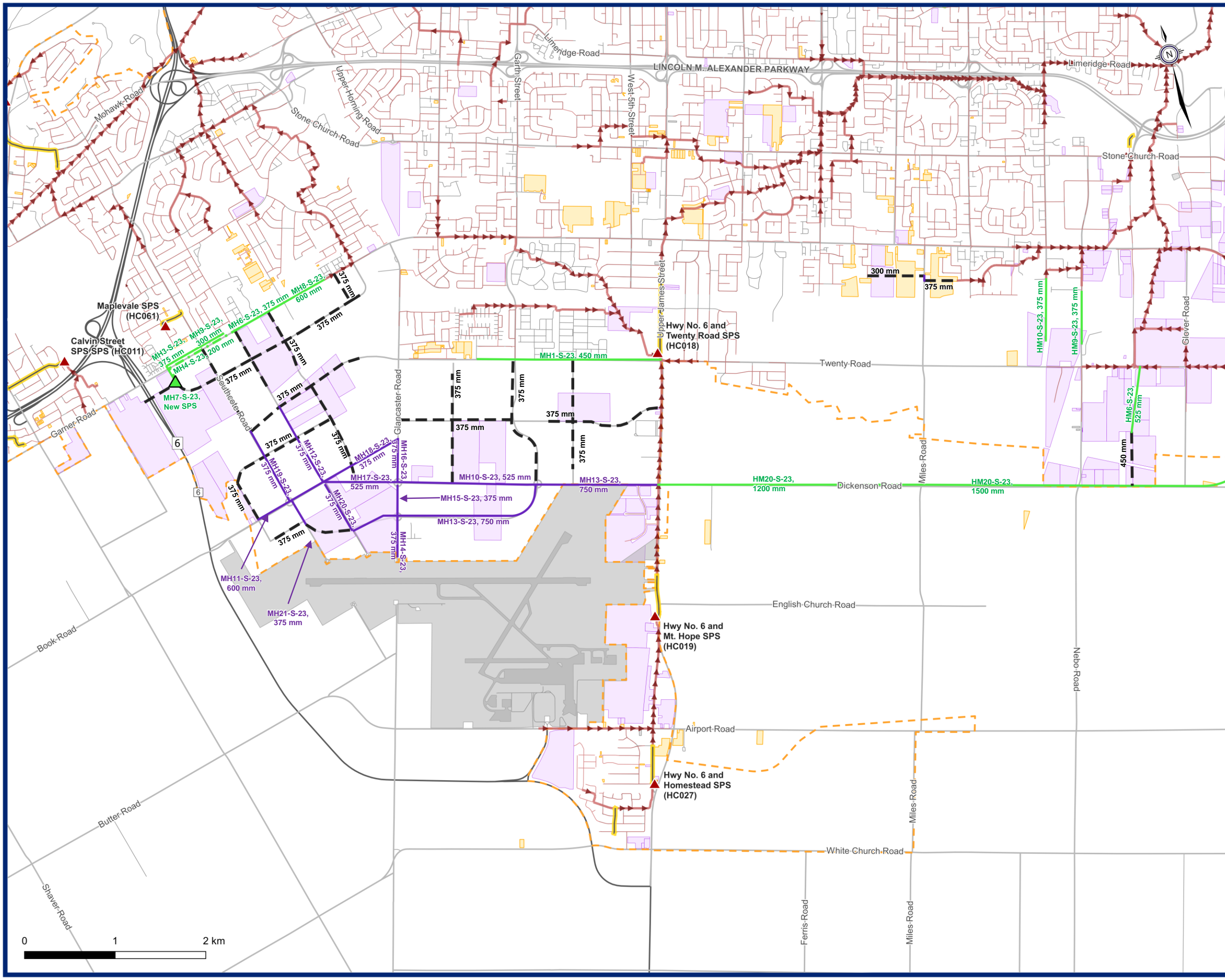


Figure 2-2

Ancaster Wastewater

Development Charges Background Study





General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- Sanitary Pumping Station (SPS)
- Forcemain
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

Future Water Infrastructure

- WWTP 0 - 5 Years
- SPS 0 - 5 Years
- Forcemains 0-5 Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers - 100% Direct Development Contribution
- WWTP 6 Plus Years
- SPS 6 Plus Years
- Sanitary Sewers 6 Plus Years

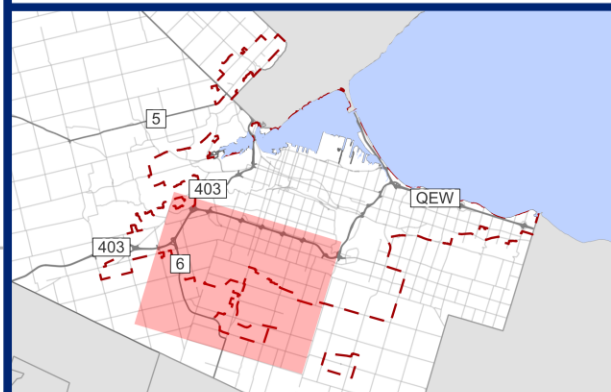
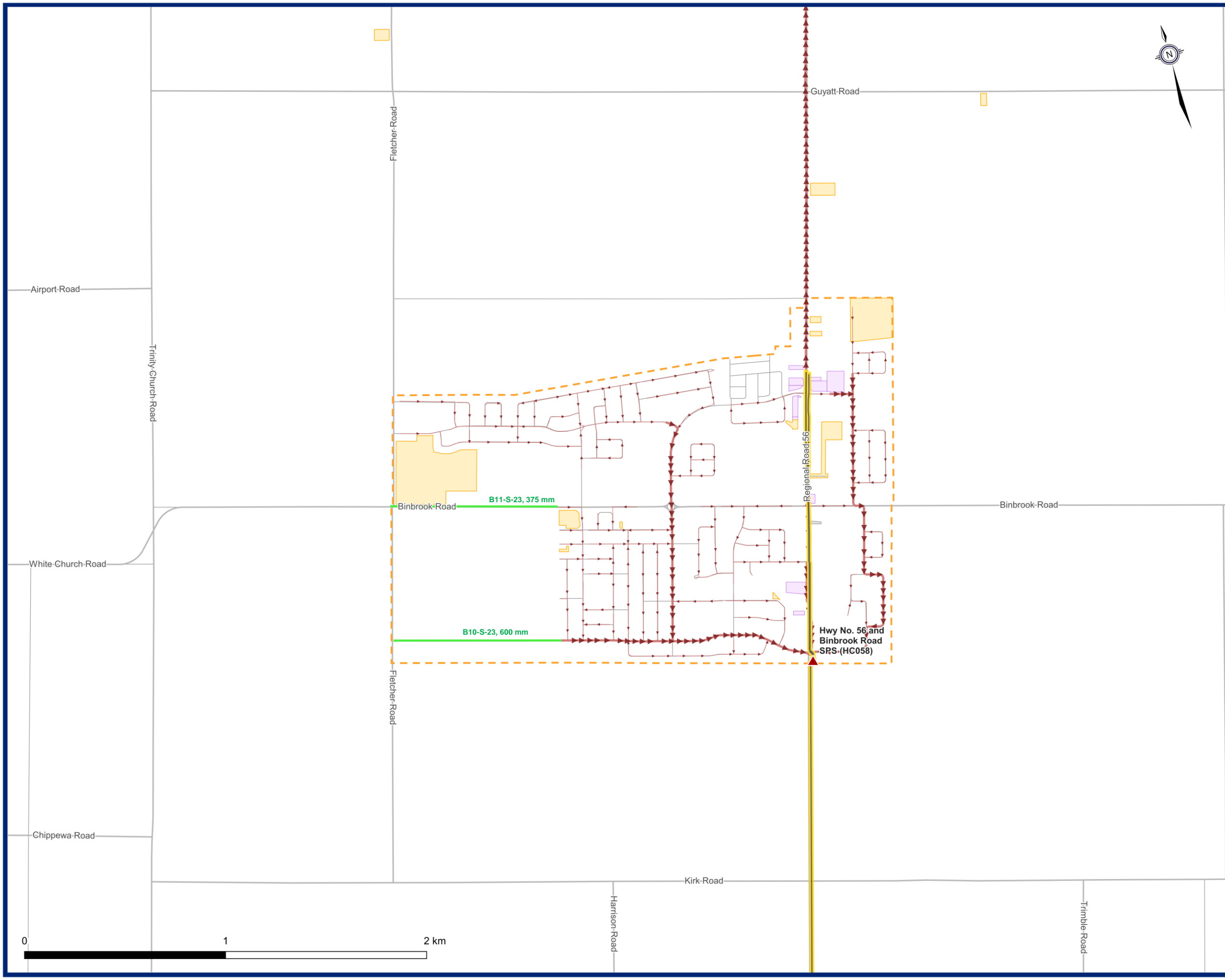


Figure 2-3

AEGD/Mount Hope Wastewater

Development Charges Background Study



General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- Sanitary Pumping Station (SPS)
- Forcemain
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

Future Water Infrastructure

- WWTP 0 - 5 Years
- SPS 0 - 5 Years
- Force mains 0-5 Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers - 100% Direct Development Contribution
- WWTP 6 Plus Years
- SPS 6 Plus Years
- Sanitary Sewers 6 Plus Years

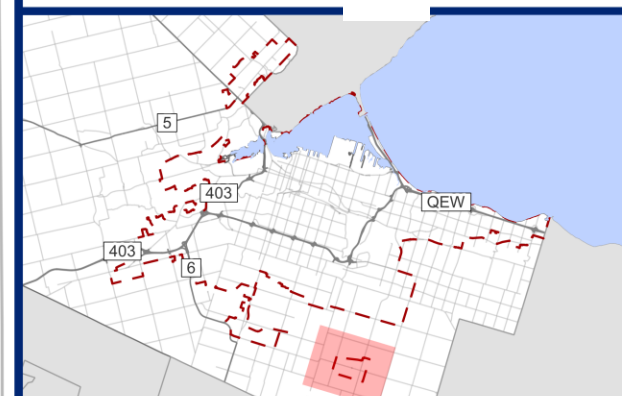
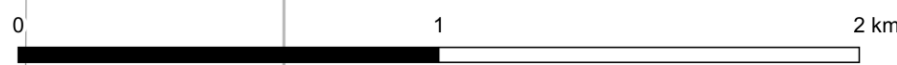
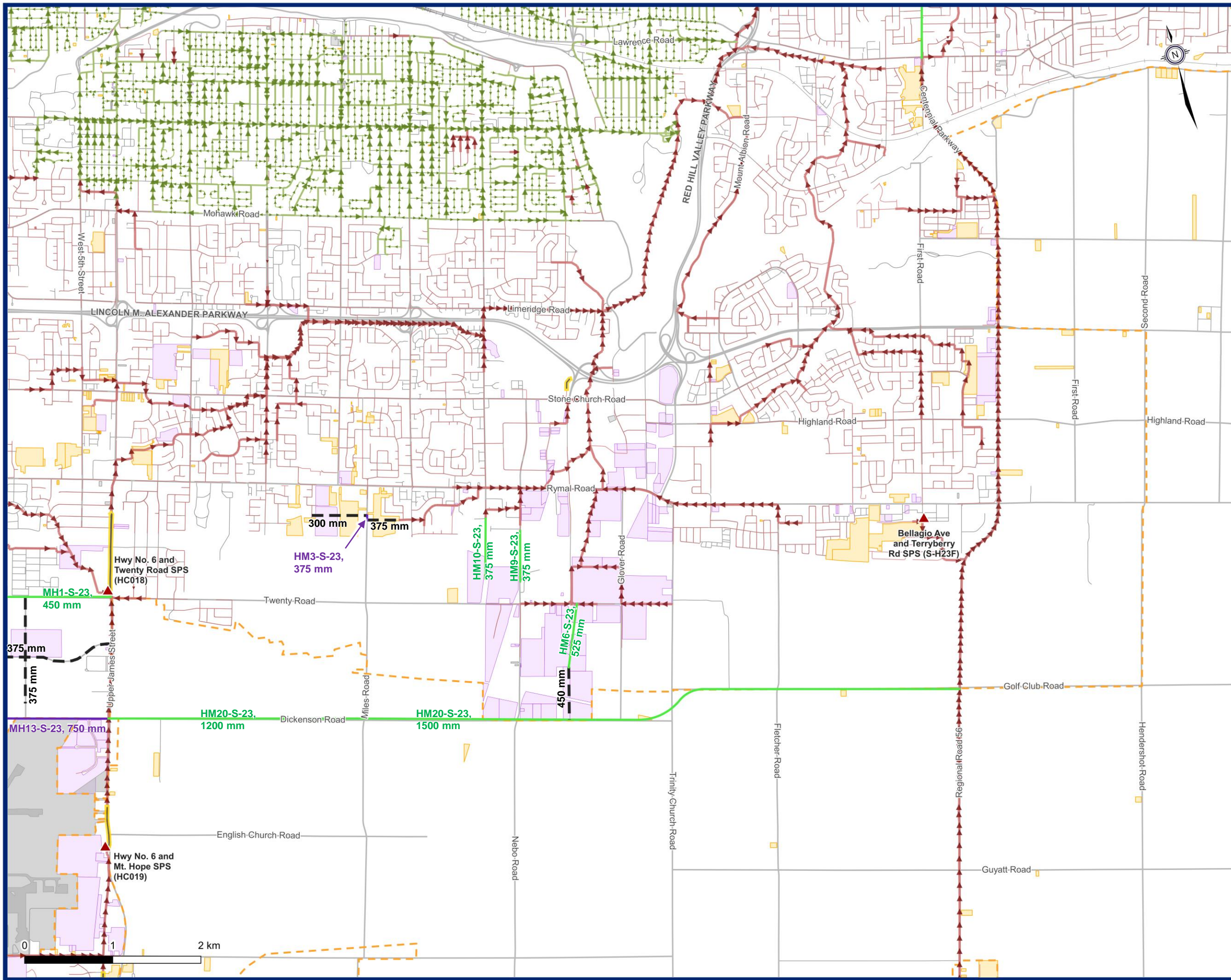


Figure 2-4

Binbrook Wastewater

Development Charges Background Study





General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- ▭ Parking Lot
- ▭ Vacant Non-Residential
- ▭ Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- ▲ Sanitary Pumping Station (SPS)
- ▬ Forcemain
- ▬ Sanitary Sewer >= 450mm
- ▬ Sanitary Sewer < 450mm
- ▬ Combined Sewer >= 450mm
- ▬ Combined Sewer < 450mm

Future Water Infrastructure

- ◆ WWTP 0 - 5 Years
- ◆ WWTP 6 Plus Years
- ▲ SPS 0 - 5 Years
- ▲ SPS 6 Plus Years
- ▬ Force mains 0-5 Years
- ▬ Sanitary Sewers 0-5 Years
- ▬ Sanitary Sewers 6 Plus Years
- ▬ Sanitary Sewers - 100% Direct Development Contribution

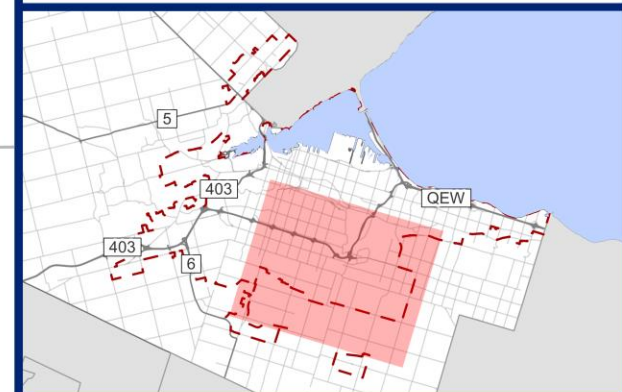
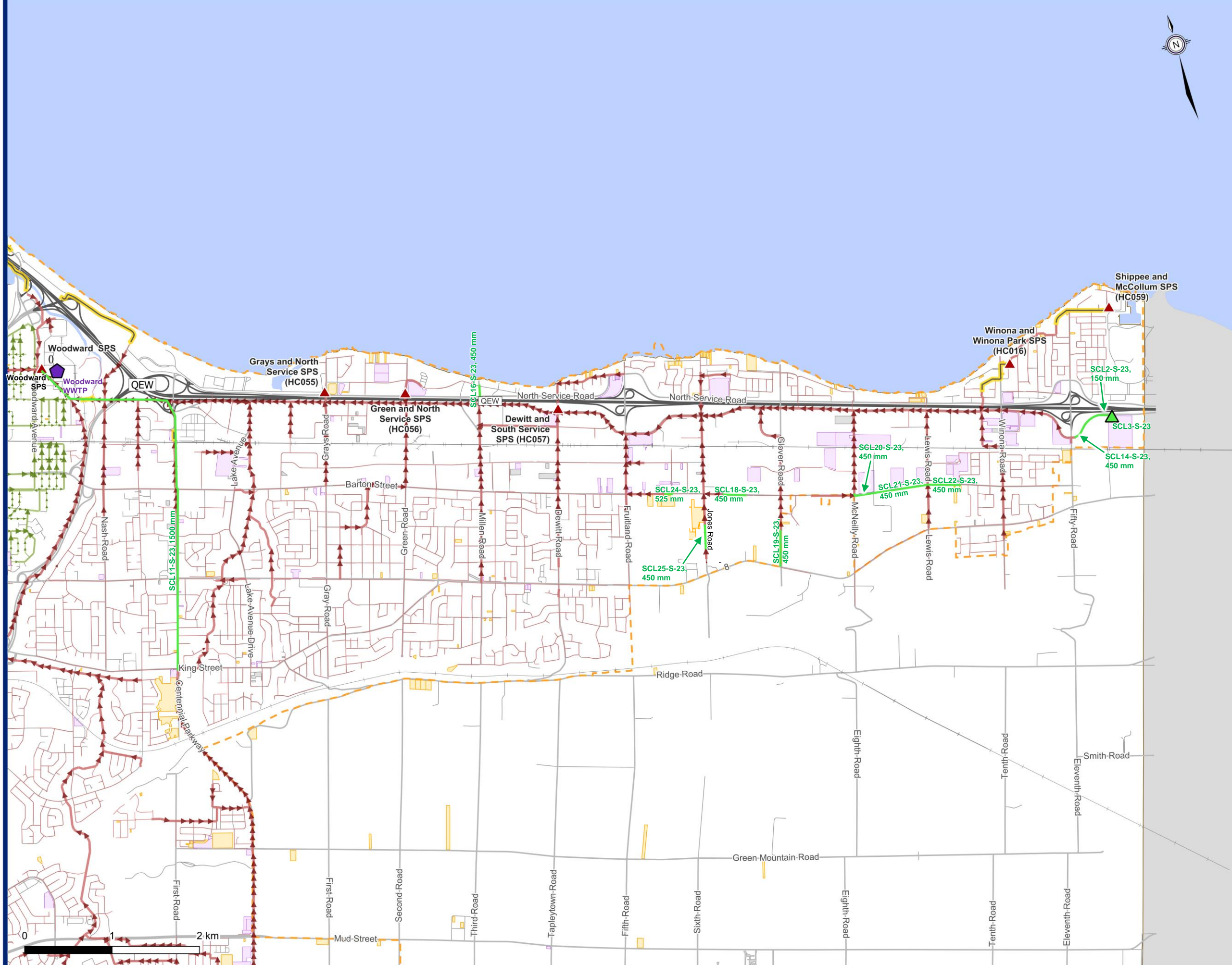


Figure 2-5
Hamilton Mountain / Stoney Creek Wastewater

Development Charges Background Study



General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- Sanitary Pumping Station (SPS)
- Forcemain
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

Future Water Infrastructure

- WWTP 0 - 5 Years
- WWTP 6 Plus Years
- SPS 0 - 5 Years
- SPS 6 Plus Years
- Forcemain 0-5 Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers 6 Plus Years
- Sanitary Sewers - 100% Direct Development Contribution

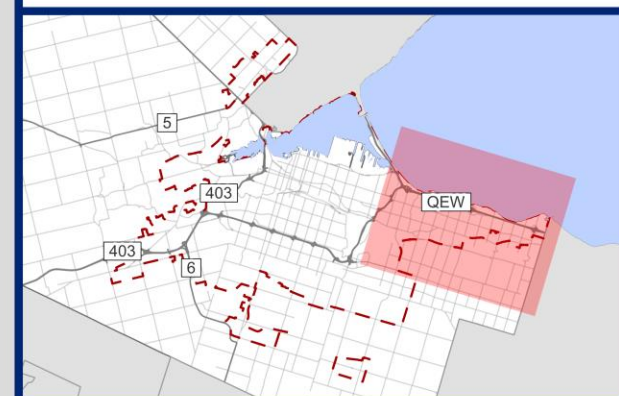
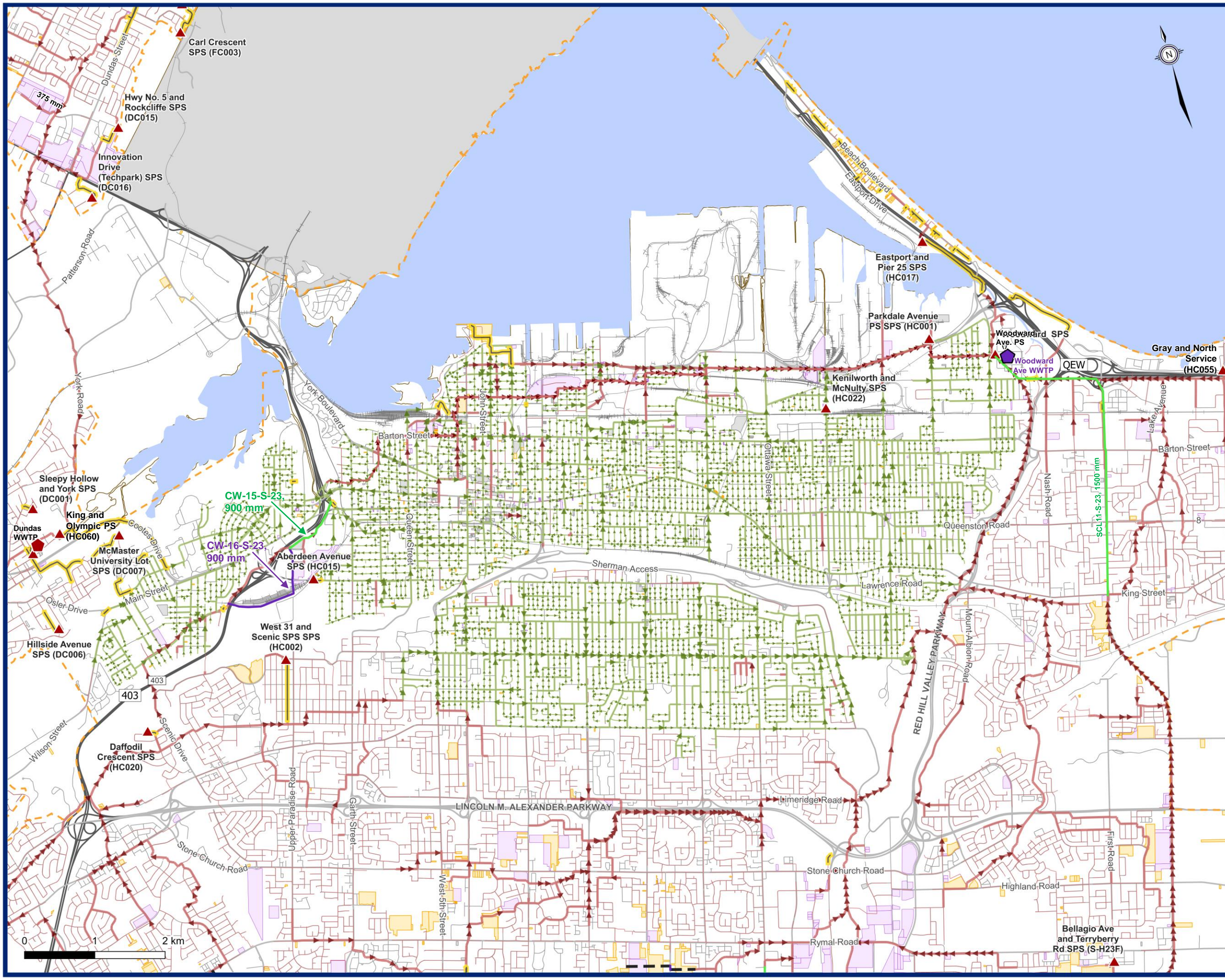


Figure 2-6

Stoney Creek Lower Wastewater

Development Charges Background Study



General Features

- Railways
- Expanded Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Infrastructure

- Wastewater Treatment Plant (WWTP)
- Sanitary Pumping Station (SPS)
- Force main
- Sanitary Sewer >= 450mm
- Sanitary Sewer < 450mm
- Combined Sewer >= 450mm
- Combined Sewer < 450mm

Future Water Infrastructure

- WWTP 0 - 5 Years
- SPS 0 - 5 Years
- Force mains 0-5 Years
- Sanitary Sewers 0-5 Years
- Sanitary Sewers - 100% Direct Development Contribution
- WWTP 6 Plus Years
- SPS 6 Plus Years
- Sanitary Sewers 6 Plus Years

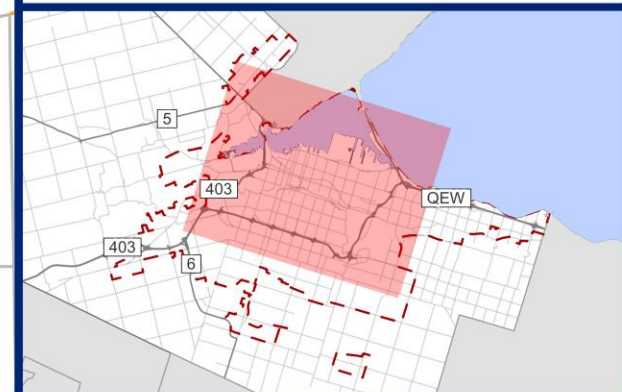


Figure 2-7
Hamilton Downtown Wastewater
 Development Charges Background Study



Attachment D – Wastewater City Wide Projects

TABLE F-4 - WASTEWATER CAPITAL | WASTEWATER CAPITAL PROGRAM-CITYWIDE

Area	Planning Period	Project ID	Project	Description	Estimated Total Cost (\$2023)	Direct Developer Contribution	City Cost Share	Post Period Benefit	Development Charges (\$2023)	Updated Timing	Inflated Cost from 2019 DC	Cost From Seperate Study	Cost from 2024 Unit Rates	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2019-2023 Change Details
City Wide Projects	0 to 5 years	CW1-S-23	Flow Monitoring	Total cost over a period of 2 - 2.5 years. Study being undertaken to know various flow characteristics to calibrate the Sanitary Sewer Model to assist the Master Planning Study	\$ 3,250,000	\$ -	\$ 1,625,000	\$ -	\$ 1,625,000		X						Updated cost based on rate of \$1.3mil/yr, provided by city
City Wide Projects	0 to 5 years	CW2-S-23	VI Reduction Program	Program to free up extra capacity within the existing sewers - costs over five years	\$ 2,194,000	\$ -	\$ 1,097,000	\$ -	\$ 1,097,000		X						Updated cost - inflation only
City Wide Projects	0 to 5 years	CW4-S-23	Oversizing of Infrastructure-Sanitary	Oversizing of servicing infrastructure within subdivisions	\$ 852,000	\$ -	\$ -	\$ -	\$ 852,000		X						Updated cost - inflation only
City Wide Projects	0 to 5 years	CW5-S-23	Land requirement for new sewage pumping stations and easements	Areas for SPS footprints and easements- 5 Ha	\$ 852,000	\$ -	\$ -	\$ -	\$ 852,000		X						Updated cost - inflation only
City Wide Projects	0 to 5 years	CW6-S-23	Intensification Infrastructure Upgrades - Wastewater (0-5 years)	Upgrades to existing infrastructure to accommodate intensification	\$ 20,909,000	\$ -	\$ 10,455,000	\$ -	\$ 10,454,000		X						Updated cost - inflation only
City Wide Projects	0 to 5 years	CW15-S-23	Hwy 403 Trunk sewer twinning - Phase 1	MIP to Main-King	\$ 15,000,000	\$ -	\$ -	\$ -	\$ 15,000,000		X						Updated cost .using estimate provided by city
City Wide Projects	0 to 5 years	CW18-S-23	Oversizing of Infrastructure-Sanitary	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	\$ 1,632,000	\$ -	\$ -	\$ -	\$ 1,632,000		X						Updated cost - inflation only
City Wide Projects	0 to 5 years	CW19-S-23	Regional Subdivider's Share for Local Improvements		\$ 358,000	\$ -	\$ -	\$ -	\$ 358,000		X						
City Wide Projects	6 years to UBBO	CW7-S-23	Intensification Infrastructure Upgrades - Wastewater	Upgrades to existing infrastructure to accommodate intensification	\$ 20,909,000	\$ -	\$ 10,455,000	\$ -	\$ 10,454,000		X				X		Updated cost - inflation only
City Wide Projects	6 years to UBBO	CW16-S-23	Hwy 403 Trunk sewer twinning - Phase 2	Royal CSO to MIP	\$ 10,672,000	\$ -	\$ -	\$ -	\$ 10,672,000		X						awaiting cost, currently inflated from 2019 DC report
Total					\$ 76,628,000	\$ -	\$ 23,632,000	\$ -	\$ 52,996,000								

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Attachment E – Woodward W.W.T.P.

TABLE F-5 - WOODWARD WWTP CAPITAL PROGRAM

Project ID	Description	Capital Cost Estimate (\$2023)	Internal Staffing Cost Allocation (Not Eligible for Funding)	Capital Cost w Internal Staffing (\$)	Grants, Subsidies and Other Contributions Attributable to New Development	Project Cost Less Grants, Subsidies, etc (\$)	Growth (%)	Non-Growth (%)	Benefit to Existing (\$)	Growth Related Cost (\$)	Post Period (%)	Growth - Post Period (\$)	Growth - In Period DC APPLICABLE COST (\$)
1	Wastewater Pumping Station	\$ 91,033,568	\$ 2,145,501	\$ 93,179,000	\$ 62,159,115	\$ 31,020,000	18.84%	81.16%	\$ 25,175,652	\$ 5,844,348	25.00%	\$ 1,461,087	\$ 4,383,261
2a	Primary Clarifier - Primary Treatment (Phase 1) - Engineering Included	\$ 16,255,669	\$ -	\$ 16,256,000	\$ 5,195,046	\$ 11,061,000	18.84%	81.16%	\$ 8,977,043	\$ 2,083,957	25.00%	\$ 520,989	\$ 1,562,967
2b	Primary Clarifier - Primary Treatment (Phase 2 - Tanks) - Engineering Included	\$ 52,246,549	\$ -	\$ 52,247,000	\$ 34,831,033	\$ 17,416,000	18.84%	81.16%	\$ 14,134,725	\$ 3,281,275	25.00%	\$ 820,319	\$ 2,460,957
2c	Primary Clarifier - Other Costs (includes New/Expanded Laboratory/Admin Building)	\$ 11,857,782	\$ -	\$ 11,858,000	\$ -	\$ 11,858,000	52.92%	47.08%	\$ 5,582,746	\$ 6,275,254	25.00%	\$ 1,568,813	\$ 4,706,440
3	Tertiary Upgrades - North and South Secondary Treatment Plant Upgrades	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%	100.00%	\$ -	\$ -	0.00%	\$ -	\$ -
4a	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 1)	\$ 155,504,975	\$ 3,664,887	\$ 159,170,000	\$ 64,732,298	\$ 94,438,000	9.56%	90.44%	\$ 85,410,315	\$ 9,027,685	25.00%	\$ 2,256,921	\$ 6,770,764
4b-1	Tertiary Upgrades - Tertiary Treatment Plant & 3rd Plant (Phase 2)	\$ 226,312,000	\$ 4,564,986	\$ 230,877,000	\$ -	\$ 230,877,000	100.00%	0.00%	\$ -	\$ 230,877,000	25.00%	\$ 57,719,250	\$ 173,157,750
4b-2	Tertiary Upgrades - Primary Effluent PS (Phase 2)	\$ 13,470,000	\$ 271,706	\$ 13,742,000	\$ -	\$ 13,742,000	100.00%	0.00%	\$ -	\$ 13,742,000	25.00%	\$ 3,435,500	\$ 10,306,500
4b-3	Tertiary Upgrades - WUP Office Relocation (Phase 2)	\$ 5,090,000	\$ 102,671	\$ 5,193,000	\$ -	\$ 5,193,000	100.00%	0.00%	\$ -	\$ 5,193,000	25.00%	\$ 1,298,250	\$ 3,894,750
4b-4	Tertiary Upgrades - Gas Sphere Relocation / Biogas (Phase 2)	\$ 3,861,000	\$ 77,881	\$ 3,939,000	\$ -	\$ 3,939,000	100.00%	0.00%	\$ -	\$ 3,939,000	25.00%	\$ 984,750	\$ 2,954,250
5a	Chlorine Contact Tank and Outfall - Railway Re-Alignment	\$ 11,390,000	\$ 230,000	\$ 11,620,000	\$ -	\$ 11,620,000	100.00%	0.00%	\$ -	\$ 11,620,000	25.00%	\$ 2,905,000	\$ 8,715,000
5b	Chlorine Contact Tank and Outfall - Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	\$ 49,933,570	\$ 1,176,819	\$ 51,110,000	\$ 25,727,795	\$ 25,382,000	19.88%	80.12%	\$ 20,335,355	\$ 5,046,645	25.00%	\$ 1,261,661	\$ 3,784,984
6	Biogas Digester - New Waste Activated Sludge Thickening Facility (forms part of the Digester Upgrades)	\$ 8,803,000	\$ 177,567	\$ 8,981,000		\$ 8,981,000	100.00%	0.00%	\$ -	\$ 8,981,000	0.00%	\$ -	\$ 8,981,000
7	Chlorine Contact Tank and Outfall - New Outfall (included in 5b project)	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%	100.00%	\$ -	\$ -	25.00%	\$ -	\$ -
8a	Clean Harbour Project - Actual Costs of Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	\$ 47,541,754	\$ -	\$ 47,542,000	\$ -	\$ 47,542,000	14.73%	85.27%	\$ 40,539,063	\$ 7,002,937	25.00%	\$ 1,750,734	\$ 5,252,202
8b	Clean Harbour Project - O/S Commitments of Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	\$ 6,788,649	\$ -	\$ 6,789,000	\$ -	\$ 6,789,000	14.73%	85.27%	\$ 5,788,980	\$ 1,000,020	25.00%	\$ 250,005	\$ 750,015
8c	Plant Expansion - Future Engineering (Projects 4b, 5a, 6, 11b, 13b) Phase 2	\$ 62,478,006	\$ -	\$ 62,478,000	\$ -	\$ 62,478,000	73.39%	26.61%	\$ 16,626,788	\$ 45,851,212	25.00%	\$ 11,462,803	\$ 34,388,409
8d	Plant Expansion - Engineering - Other Costs (includes Modular Office Building)	\$ 10,701,376		\$ 10,701,000	\$ -	\$ 10,701,000	14.73%	85.27%	\$ 9,124,743	\$ 1,576,257	25.00%	\$ 394,064	\$ 1,182,193
9	Biogas Digester - Additional Dewatering Capacity	\$ -	\$ -	\$ -		\$ -		100.00%	\$ -	\$ -	0.00%	\$ -	\$ -
10	Biogas Digester - Refurbishment of Digesters to Increase Capacity	\$ -	\$ -	\$ -		\$ -		100.00%	\$ -	\$ -	0.00%	\$ -	\$ -
11a	Biogas Digester - Biogas Upgrades	\$ 45,005,784	\$ -	\$ 45,006,000	\$ 20,000,000	\$ 25,006,000	12.89%	87.11%	\$ 21,783,004	\$ 3,222,996	25.00%	\$ 805,749	\$ 2,417,247
11b	Biogas Digester - Digesters Upgrades	\$ 48,440,000	\$ 977,000	\$ 49,417,000	\$ -	\$ 49,417,000	50.00%	50.00%	\$ 24,708,500	\$ 24,708,500	25.00%	\$ 6,177,125	\$ 18,531,375
12	Biosolids Management Facility - Biosolids Thermal Reduction Disposal Facility	\$ 94,790,000	\$ 4,650,000	\$ 99,440,000	\$ 14,300,000	\$ 85,140,000	18.84%	81.16%	\$ 69,099,130	\$ 16,040,870	25.00%	\$ 4,010,217	\$ 12,030,652
13a	Electrical System Upgrades - New Electrical and power systems - Phase 1	\$ 60,033,299	\$ 1,414,948	\$ 61,448,000	\$ 40,596,792	\$ 20,851,000	19.21%	80.79%	\$ 16,846,063	\$ 4,004,937	25.00%	\$ 1,001,234	\$ 3,003,703
13b	Electrical System Upgrades - New Electrical and power systems - Phase 2	\$ 5,190,000	\$ 105,000	\$ 5,295,000	\$ -	\$ 5,295,000	100.00%	0.00%	\$ -	\$ 5,295,000	25.00%	\$ 1,323,750	\$ 3,971,250
14	Collection System Upgrades	\$ 10,176,000	\$ 239,825	\$ 10,416,000	\$ 6,784,000	\$ 3,632,000	0.00%	100.00%	\$ 3,632,000	\$ -	0.00%	\$ -	\$ -
	Total	\$ 1,036,902,982	\$ 19,798,792	\$ 1,056,702,000	\$ 274,326,079	\$ 782,378,000			\$ 367,764,108	\$ 414,613,892		\$ 101,408,223	\$ 313,205,669

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