Prepared By:

Regional Municipality Of Halton

2022 Development Charges Update Water/Wastewater Technical Report

GMBP File: 720084

September 2021

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REVISIONS LOG

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REGIONAL MUNICIPALITY OF HALTON

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EXECUTIVE SUMMARY

Background

In 2011, Halton Region completed the Sustainable Halton Water and Wastewater Master Plan (2011 Master Plan) to support Regional implementation of the Official Plan Amendment (ROPA 38/39) based on Halton Region's Best Planning Estimates (BPEs) (June 2011). The 2011 Master Plan provided a Region-wide water and wastewater servicing strategy to accommodate growth from 2011 to 2031.

The development related capital infrastructure requirements identified in the 2011 Master Plan served as one of several key inputs into the establishment of Halton Region's 2012 and 2017 Development Charges (DC) By-laws. As the 2017 DC By-law expires in August 2022 a number of technical updates to the 2011 Master Plan and its associated capital implementation plan have been undertaken and consolidated into this report entitled "2022 Development Charges Update Water/Wastewater Technical Report".

The 2022 Development Charges Update Water/Wastewater Technical Report (2022 DC Update Technical Report) will serve to support the establishment of the 2022 Development Charges By-law and follows the same overall approach as the previous 2017 DC Update Technical Report for water and wastewater. The objective of the 2022 DC Update Technical Report is to provide the basis for developing costs and capital implementation timing for the water and wastewater projects required to service population and employment growth across Halton Region from 2023 to 2031 according to the 2011 BPEs.

The 2021 and 2031 population and employment projections for Halton Region, based on the BPEs, are summarized in Table ES1.

Table ES1 – BPEs Population and Employment Projections (2021 to 2031)

Municipality	Total 2021 Population	Total 2021 Employment	Total 2031 Population	Total 2031 Employment
Burlington	178,847	102,846	186,169	105,349
Halton Hills	61,672	22,855	91,885	41,962
Milton	161,750	81,187	228,084	114,330
Oakville	221,826	120,795	246,400	128,359
Total	**624,094**	**327,683**	**752,537**	**390,000**

Note: Totals may not add up due to rounding.

Water and Wastewater Technical Review

A technical review of the water and wastewater system and capital projects identified in the 2011 Master Plan, 2012 DC Update Technical Report and 2017 DC Update Technical Report was undertaken which focused on the following key elements:

- Re-assessing existing and future water and wastewater system capacities.
- Comparing actual growth uptake with planned theoretical growth projections.
- Identifying opportunities to further optimize water and wastewater system infrastructure.
- Validating the long range Water and Wastewater Development Capital Implementation Plan to 2031 (i.e. project scope, timing, and cost) as identified in the 2011 Master Plan and refined through the 2017 DC Update Technical Report.

Since the 2011 Master Plan and 2012 DC Update there have been technical reviews, updated operational strategies and system modifications that have resulted in changes to the capital program. Some changes were previously reflected in the 2017 DC Update Technical Report and some are more recent. A summary is below.

i) Updated Water and Wastewater Design Criteria

The water and wastewater per capita design criteria was updated in the 2017 DC Technical Report to reflect decreasing per capita residential water consumption and wastewater generation trends. The design criteria developed for the 2017 DC Update Technical Report have been used for the 2022 DC Update Technical Report as well.

ii) Updated Water and Wastewater Development Capital Implementation Plans

The BPEs and design criteria were used to review and update the water and wastewater development capital implementation plans in both the 2017 DC Update Technical and the 2022 DC Update Technical Report. The projects identified in the water and wastewater development capital implementation plans are those required to provide the projected water demands from the supply sources to the planned growth and to convey the projected wastewater flows from the planned growth to the treatment facilities.

Halton Region's water and wastewater hydraulic models were used to confirm and validate the infrastructure projects outlined in the 2023 to 2031 water and wastewater development capital implementation plans. These models reflect the most recent infrastructure information and have been calibrated based on the best available water demand and wastewater flow data. Some capital project updates and modifications have occurred due to changing system conditions and/or new technical information.

It should be noted that this technical review excludes projects that will be approved in 2022 (as part of the 2022 Budget) as these are subject to an approved financing plan, and any projected funding shortfall will be included in the reserve balances or unfunded capital in the DC study.

iii) Water and Wastewater Servicing Strategy Revisions (previously captured in the 2017 DC Technical Report)

- Wastewater flow diversion from the Milton Wastewater Treatment Plant (WWTP) to the Mid-Halton WWTP. This flow diversion strategy, which included decommissioning of the Milton WWTP and returning 16 Mile Creek to a more natural state and achieves wastewater treatment economies of scale. The Milton WWTP was taken offline in 2020.
- Realignment of water pressure zone boundaries in the Town of Milton and the Town of Oakville (Zones 3, 4 and 5) to optimize customer water pressure in these areas.

iv) Water and Wastewater Servicing Strategy Revisions (new updates in the 2022 DC Update Technical Report)

The technical work completed for the 2022 DC Update Technical Report included an operational review of the 2011 Master Plan, 2012 DC Update and the 2017 DC Update Technical Report. The review outcomes noted

below have been incorporated into the 2023 to 2031 water and wastewater development capital implementation plan:

- Wastewater flow diversion from the Georgetown WWTP to the Mid-Halton WWTP. This flow diversion strategy will convert the Georgetown WWTP into a wastewater pumping station (WWPS) which will allow Halton Region to better utilize existing infrastructure, overcome future operational challenges at the Georgetown WWTP and achieve wastewater treatment economies of scale.
- Upgrading/upsizing wastewater infrastructure projects south of Georgetown to accommodate the diverted flow from Georgetown WWTP, which includes, trunk wastewater mains, Lower Base Line WWPS and North WWPS.

v) Updated Capital Project Cost Estimation

Infrastructure capital projects identified within the 2023 to 2031 timeframe have been updated to reflect best available estimated costs to construct as of January 1, 2022 using a unit costing approach informed by recent tender information compiled over the past several years.

A small number of projects that were not updated using the unit costing approach were inflated using a cost index from 2017 to 2022 dollars in accordance with The Statistics Canada Quarterly Building Construction Price Indexes, Non-Residential Building Construction Price Index.

Where available, cost estimates from Municipal Class Environmental Assessment (MCEA) Studies, scoping studies or preliminary/detailed design have been applied throughout the 2023 to 2031 water and wastewater development capital implementation plan.

The methodology for preparing the cost estimates for this 2022 DC Update Technical Report is similar to that of the 2017 DC Update Technical Report.

Summary of Water and Wastewater Development Capital Implementation Plans

The total cost of the water and wastewater development capital implementation plan is approximately $1,171M from 2023 to 2031. Table 13 and Table 15 of this 2022 DC Update Technical Report present the water and wastewater development capital implementation plans (2023 to 2031) respectively, inclusive of phasing and cost (in 2022 dollars).

Below is a list of significant water projects which have been identified for implementation from 2023 to 2031.

Significant Water Projects

- Design and Construction of Burloak Water Purification Plant (WPP) Phase 2 Expansion
- Expansion of Ashgrove Reservoir
- Expansion of Kitchen Zone O3 Booster Pumping Station (BPS)
- Burloak BPS Phase 1 and Watermains to Upper Middle Road
- Zone 6 Lake Base Storage at 22 Side Road and Watermain

Below is a list of significant wastewater projects which have been identified from 2023 to 2031.

Significant Wastewater Projects

- Design and Construction of Mid-Halton WWTP Expansion
- New Inlet to Skyway WWTP
- Expansion of North WWPS

- Lower Baseline WWPS and Twinned Forcemain
- South Milton Fourth and Fifth Line Trunk Wastewater Mains
- Tremaine Road WWPS and Forcemain

Categorizing the Water and Wastewater Development Capital Implementation Plans According to the DC By-Law

The recommended projects in the water and wastewater development capital implementation plans are categorized according to the DC By-Law structure based on three main categories:

- **Capacity** – project supports Region-wide needs at major treatment facilities or trunk linear infrastructure.
- **Greenfield** – project supports growth outside of the current Urban Built Boundary (2006).
- **Built Boundary** – project supports growth within the current Urban Built Boundary (2006).

The following Table ES3 summarizes the water and wastewater development capital implementation plans by DC Category for 2023 to 2031

Table ES3 – Water and Wastewater Development Capital Implementation Plan Summary by DC Category

Program	Capacity	Greenfield	Built Boundary	Total
Water	$184,187,000	$357,554,000	$20,500,000	$562,241,000
Wastewater	$252,452,000	$320,278,000	$35,848,000	$608,578,000
Total	**$436,639,000**	**$677,832,000**	**$56,348,000**	**$1,170,819,000**

Categorizing the Water and Wastewater Capital Implementation Plans According to the DC Policy Framework

The water and wastewater development capital implementation plans were developed in order to service the planned growth in Halton Region. However, additional categorization is required in order to establish the DC eligible share of the capital implementation plans according to the DC policy framework. This process is consistent with the 2017 DC Update Technical Report.

The DC policy framework accounts for the following elements:

- **Residential & Non Residential** – The portions of the water and wastewater capital implementation plans that are associated with servicing water demand and wastewater flow generated by Residential growth and Employment growth.
- **Benefit to Existing** – The portions of the water and wastewater capital implementation plans that also provide a benefit to existing users of water and wastewater services.
- **Post Period Benefit** – The portion of the water and wastewater capital implementation plans that also provide a benefit to growth that will occur beyond 2031.

Consistent with the 2017 DC Update Technical Report, the total capital cost was categorized in order to establish the DC eligible share of the water and wastewater development capital implementation plan according to the DC policy framework as outlined in Tables ES4 and ES5.

Table ES4 – Water Development Capital Implementation Plan Summary by DC Policy Framework

DC Category	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)
Capacity	$184,187,000	$286,000	$0	$183,901,000	$139,769,000	$44,132,000
Greenfield	$357,554,000	$0	$46,888,000	$310,666,000	$226,789,000	$83,877,000
Built Boundary	$20,500,000	$11,706,000	$0	$8,794,000	$7,299,000	$1,495,000
Total	**$562,241,000**	**$11,992,000**	**$46,888,000**	**$503,361,000**	**$373,857,000**	**$129,504,000**

Table ES5 – Wastewater Development Capital Implementation Plan Summary by DC Policy Framework

DC Category	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)
Capacity	$252,452,000	$142,080,000	$24,549,000	$85,823,000	$65,229,000	$20,594,000
Greenfield	$320,278,000	$23,780,000	$0	$296,498,000	$213,481,000	$83,017,000
Built Boundary	$35,848,000	$9,256,000	$0	$26,592,000	$22,071,000	$4,521,000
Total	**$608,578,000**	**$175,116,000**	**$24,549,000**	**$408,913,000**	**$300,781,000**	**$108,132,000**

The water and wastewater development capital implementation plans by year (2023 to 2031) are represented graphically within Figure ES1 and ES2, respectively.

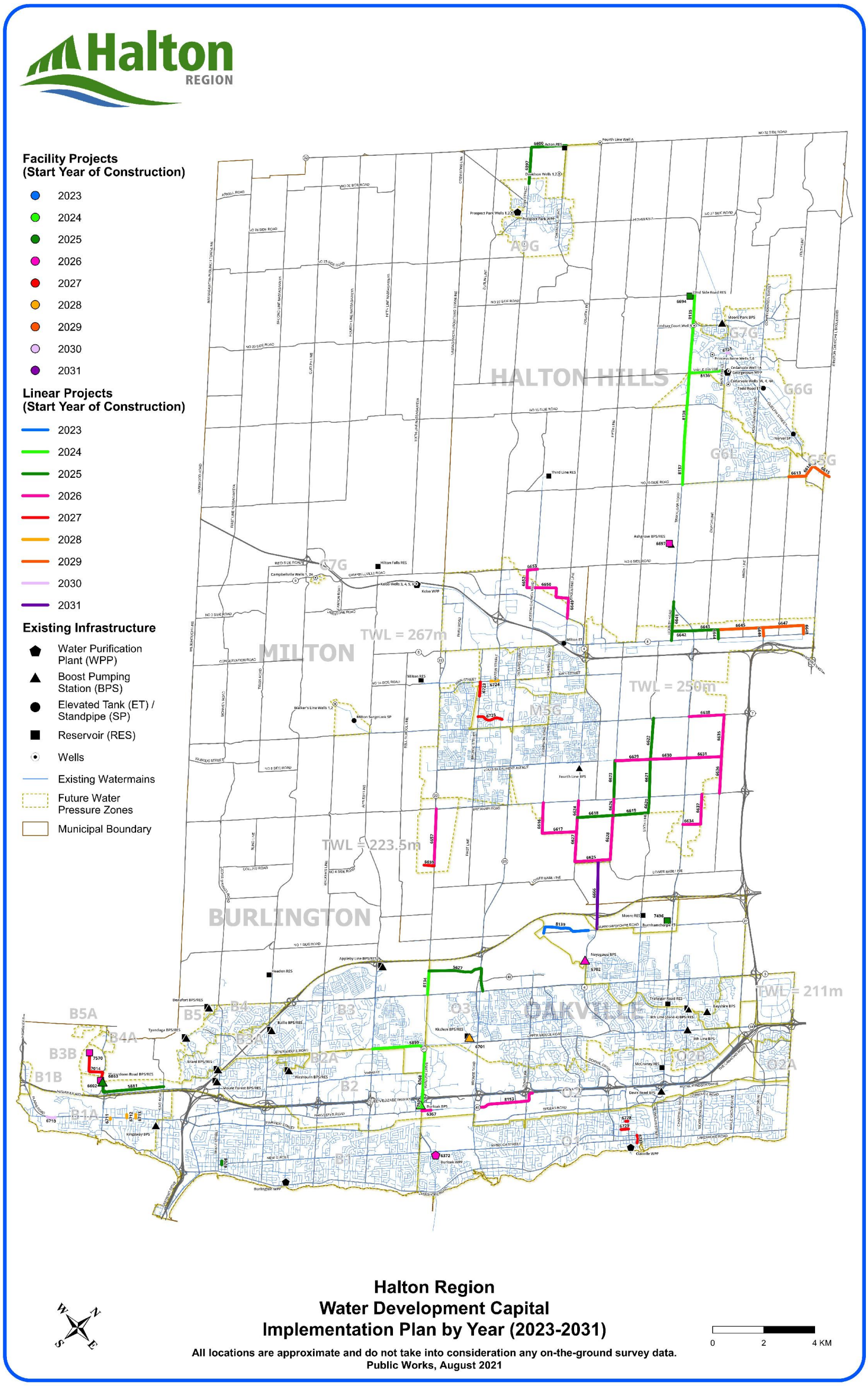


Figure ES1 – Water Development Capital Implementation Plan by Year (2023 to 2031)

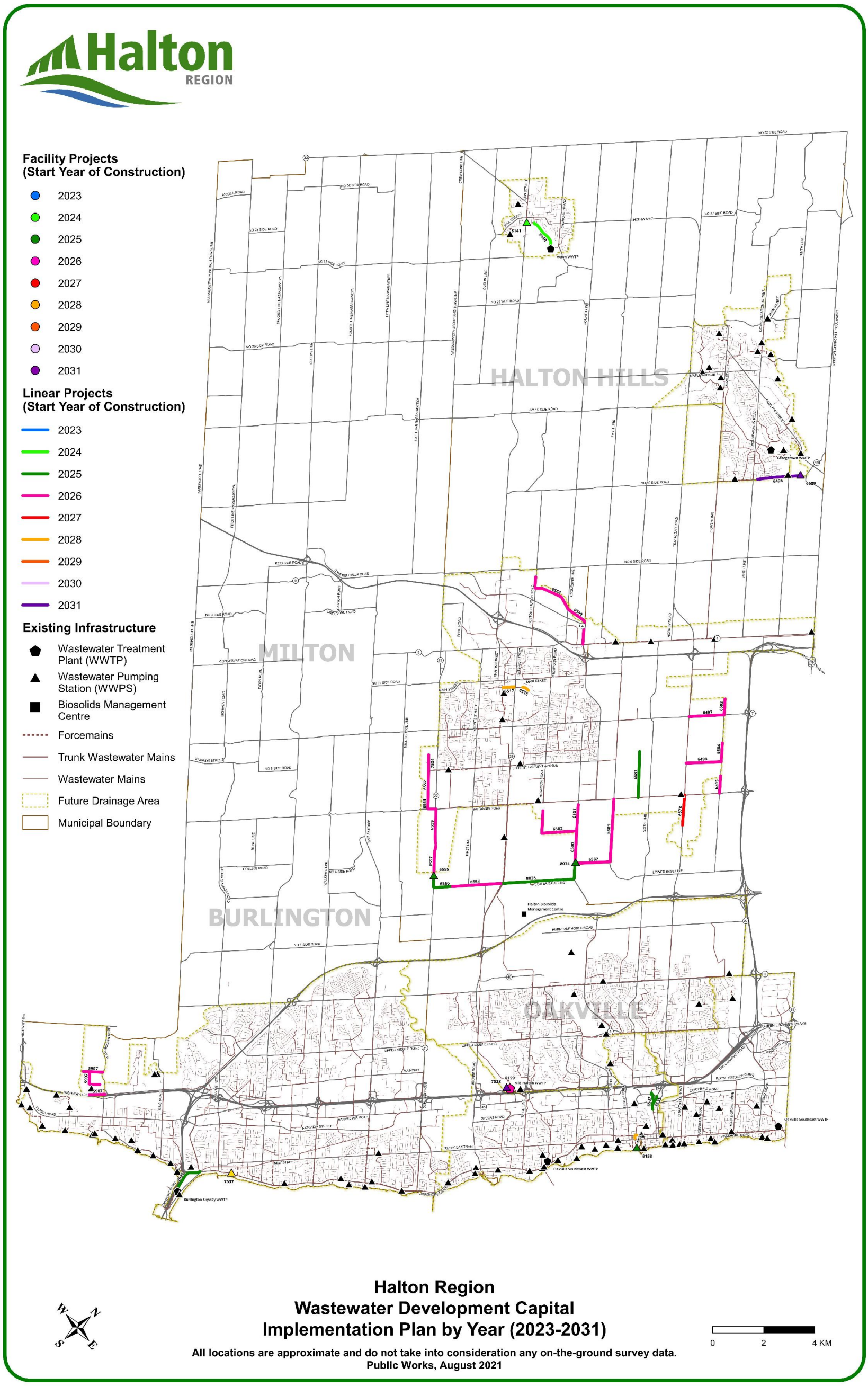


Figure ES2 – Wastewater Development Capital Implementation Plan by Year (2023 to 2031)

1. OVERVIEW

1.1. Background

The 2022 DC Update Technical Report provides the basis for developing costs and capital implementation timing of water and wastewater projects to service Halton Region's growth from 2023 to 2031. This 2022 DC Update Technical Report builds on the findings and direction from the 2017 DC Update Technical Report.

The work completed in the 2011 Master Plan, 2012 DC Update Technical Report and the 2017 DC Update Technical Report created the foundation for the water and wastewater development capital implementation plans to 2031. They helped define the projects' scope, cost and capital implementation timing in this report. This program was further refined using new available information such as:

- Updated information related to the current capacities of water and wastewater facilities
- Updates to the water and wastewater hydraulic models
- Recent construction costs and trends
- Updated studies and technical reviews

1.2. Study Area

The study area for the 2022 DC Update Technical Report remains unchanged from the 2017 DC Update Technical Report. The study area encompasses the existing designated urban areas in the City of Burlington, the Town of Oakville, the Town of Milton, the Town of Halton Hills 401 Corridor and the urban areas of Georgetown and Acton (including the hamlets of Stewarttown, Norval, and Glen Williams) located within the Town of Halton Hills. Intensification development in the existing Urban Built Boundary (2006) and new Greenfield development outside of the existing urban areas in Oakville, Milton and Georgetown are also included in the Study Area. The study area can be seen in Figure 1 below.

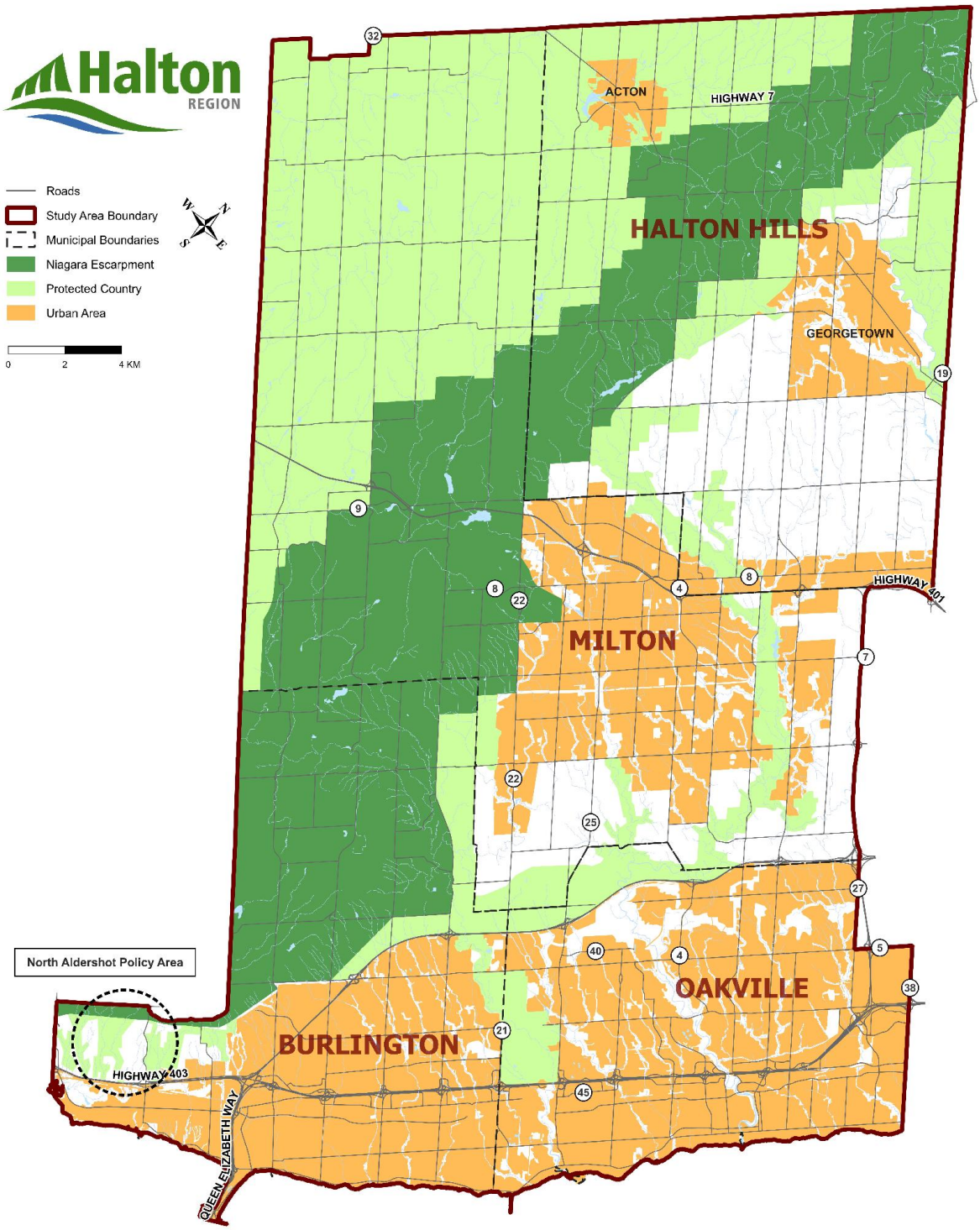


Figure 1 – Study Area

1.3. System Overview

1.3.1. Water Supply and Distribution System

Halton Region's Lake-based System is supplied by Lake Ontario. Three water purification plant (WPP) facilities are used to supply the Lake-based System; Burloak WPP, Burlington WPP and Oakville WPP. Water is distributed through the various system pressure zones with booster pumping stations (BPSs) and storage facilities. The BPSs and storage facilities are connected to the trunk feedermains, which transport water into the smaller local distribution watermains.

There is also a Groundwater Based System in North Halton which is supplied by several municipal well fields. The Walkers Line and Kelso Well Fields continue to be the main source of supply to Milton's downtown core. Fourth Line, Davidson and Prospect Park Well Fields supply groundwater in Acton, while Cedarvale, Princess Anne and Lindsay Court Well Fields supply groundwater in Georgetown. The village of Campbellville is supplied by the Campbellville Well Field; however, no new connections or serviced growth are planned for Campbellville, and it is excluded from the scope of this report002E

Under the 2011 Master Plan, improved groundwater based servicing strategies were established, including new wells, treatment and storage facilities. An expansion of the Lake-based System to Georgetown was endorsed to support increased growth in the area. Major infrastructure projects identified in the 2011 Master Plan to expand the Lake-based System into Georgetown are currently in detailed design/construction, including the Eighth Line Trunk wastewater main (Britannia Road, Milton to No. 10 Side Road in Georgetown), the new Milton Zone 4 Reservoir (Ashgrove Reservoir) and Georgetown Zone 6 BPS (Ashgrove BPS) as well as the new water transmission mains from south Halton to Georgetown.

1.3.2. Wastewater Collection and Treatment System

The wastewater treatment plants (WWTPs) in Halton Region that receive and treat wastewater are used to differentiate and designate the primary wastewater collection systems. The four largest wastewater collection systems within Burlington, Oakville and Milton are respectively the Skyway WWTP, Oakville Southeast WWTP, Oakville Southwest WWTP and Mid-Halton WWTP. Flow in each collection system travels via gravity to the WWTPs; however, flows in lower elevation areas are transported to higher elevations with wastewater pumping stations (WWPSs). WWPS service areas can vary from small, localized subdivisions to large drainage areas. Additionally, WWPS capacities can vary from approximately 3 litres per second (L/s) to over 1,500 L/s. WWPSs, local gravity wastewater mains and forcemains all connect into larger trunk wastewater mains which make up the wastewater collection systems.

With the recent decommissioning of the Milton WWTP in 2020, all of the wastewater from Milton is now part of the Mid-Halton WWTP drainage area. The Acton and Georgetown wastewater collection systems are currently separate from the Burlington and Oakville systems. The Acton WWTP treats wastewater collected in Acton and discharges clean effluent to Black Creek, while the Georgetown WWTP treats wastewater collected in Georgetown and discharges clean effluent to Silver Creek. With increasing growth in Georgetown and limitations at the Georgetown WWTP, future extension of the Lake Ontario based wastewater system to Georgetown was endorsed by Regional Council in 2011 in order to service the projected growth.

2. POPULATION AND EMPLOYMENT PROJECTIONS

2.1. Best Planning Estimates (BPEs)

The current and future water and wastewater servicing needs established in this 2022 DC Update Technical Report were determined based on Halton Region Best Planning Estimates (BPEs) (June 2011). The BPE data was geographically distributed by Traffic Survey Zone (TSZ) and contains approved population and employment projections for Halton Region up to the year 2031, consistent with Halton Region's Official Plan. The BPEs Data is summarized in Table 1 and Table 2 below.

Table 1 – Halton Region Population Projections to 2031

	Total Population		
Municipality	2021	2026	2031
Burlington	178,847	182,034	186,169
Halton Hills	61,672	77,003	91,885
Milton	161,750	195,735	228,084
Oakville	221,826	234,121	246,400
Total	**624,094**	**688,894**	**752,537**

Note: Totals may not add up due to rounding.

Table 2 – Halton Region Employment Projections to 2031

	Total Employees		
Municipality	2021	2026	2031
Burlington	102,846	104,145	105,349
Halton Hills	22,855	32,210	41,962
Milton	81,187	96,777	114,330
Oakville	120,795	122,578	128,359
Total	**327,683**	**355,710**	**390,000**

Note: Totals may not add up due to rounding.

The above tables include rural (un-serviced) population and employees.

2.2. Service Area Projections

It is essential to track the population and employment growth in service areas connected to the municipal systems, to determine the impact it will have on the water and wastewater systems. The total serviced population and employment includes the Built Boundary areas, designated Greenfield growth areas and a small percentage of Rural areas on municipal systems. Rural areas on private systems are not included in the serviced population. A summary of the service area population projections can be seen below in Table 3 and Table 4.

Table 3 – Service Area Population Projections to 2031

	Serviced Population		
	2021	2026	2031
Oakville	221,709	234,007	246,283
Burlington	175,393	178,648	182,834
Milton	155,183	189,235	221,589
Halton Hills 401 Corridor	0	0	0
Sub-Total South Halton	**552,284**	**601,889**	**650,706**
Acton	10,379	12,874	13,981
Georgetown	44,410	57,452	71,332
Sub-Total North Halton	**54,789**	**70,327**	**85,313**
Total Service Area	**607,073**	**672,216**	**736,019**

Note: Totals may not add up due to rounding.

Table 4 – Service Area Employment Projections to 2031

	Serviced Employment		
	2021	2026	2031
Oakville	120,795	122,578	128,359
Burlington	102,033	103,315	104,508
Milton	79,207	94,719	112,406
Halton Hills 401 Corridor	3,682	11,115	19,018
Sub-Total South Halton	**305,717**	**331,727**	**364,291**
Acton	4,354	4,744	5,071
Georgetown	13,056	14,583	15,907
Sub-Total North Halton	**17,410**	**19,327**	**20,978**
Total Service Area	**323,127**	**351,054**	**385,269**

Note: Totals may not add up due to rounding.

Note: Population and Employment Projections are based on the water service area. The wastewater service area is marginally smaller than water.

3. RELATED POLICY AND CRITERIA

3.1. Residential and Employment Servicing

Residential and Employment servicing needs and strategies were developed and reviewed as part of the 2011 Master Plan, 2012 DC Update Technical Report and 2017 DC Update Technical Report. These strategies were created and refined in contrast with water and wastewater policies and guidelines, regional servicing standards and the servicing needs calculated from planning projections and design criteria.

The residential and employment servicing considerations have not changed from the 2017 DC Update Technical Report. They are associated with providing service from the trunk infrastructure, extending servicing from trunk infrastructure to local systems, allowing for system redundancy, addressing security of supply concerns, and maintaining an adequate level of service (e.g., pressures, fire flow) while accounting for future extension of local servicing. Note that employment servicing considerations are similar to residential servicing considerations with some exceptions, such as higher fire flow requirements in employment areas.

3.2. System Security of Supply

The 2011 Master Plan reviewed growth related needs in both the water and wastewater system. A detailed evaluation of each system was completed to determine if an adequate level of service to the existing system could be maintained, while supporting growth with an appropriate level of supply security. The types of projects that were commonly identified by this analysis include: addressing isolated service areas, single feeds across significant features such as highways, support for emergency shut down conditions, and overall capacity redundancy for future water demands and wastewater flows. The strategy and associated capital projects have not been modified through the 2017 DC Update Technical Report or in this 2022 DC Update Technical Report.

3.3. Intensification

A detailed intensification study was completed for the 2011 Master Plan to establish Intensification Projects in the 2012 DC Update. The intensification study analyzed the water and wastewater infrastructure needs within the built boundary areas due to projected intensification growth. The resulting projects in the 2012 DC Update water and wastewater development capital implementation plan were maintained in the 2017 DC Update Technical Report.

The analysis completed for the 2022 DC Update Technical Report leveraged the most recent updated water and wastewater hydraulic models, the 2011 BPE population and employment projections, and Halton Region's current design criteria to validate the previously recommended Intensification Projects. Upon completion of the analysis, the Intensification Projects for the 2022 DC Update Technical Report remain consistent with previous programs.

3.4. Water Demand and Wastewater Flow Projection Approach

For capital infrastructure needs to service new development, future estimates or projections of water demand and wastewater flows for each service area are required. In order to estimate and project future demands/flow, a baseline or "starting point" needs to be established. The "starting point" is calculated from several years of existing measured (actual) demands/flow. The demand and flow projections are calculated by quantifying the expected increase from additional population and employee growth between 2021 and 2031 in line with the BPEs. The approach was consistent with the previous 2011 Master Plan, 2012 DC Update Technical Report and 2017 DC Update Technical Report.

The anticipated increase in demands/flow between 2021 and 2031 for each service area has been determined for the 2022 DC Update Technical Report by applying design criteria to anticipated growth between 2021 and 2031 based on the BPEs as well as consideration for estimated actual population and employment for 2021. The design criteria are developed using actual measured flow rates/demand data and estimated actual population in the existing system, and assumes that the per capita and per employee water demand and wastewater generation flow rate will be the same as the current patterns observed in the existing communities as per Ministry of Environment,

Conservation and Parks (MECP) Procedure D-5-1. Additional wastewater flow resulting from infiltration and inflow (I&I) into new wastewater mains is estimated using Halton Region's I&I design criterion.

In 2015-2016, Halton Region developed updated water and wastewater design criteria to reflect decreasing per capita residential water consumption and wastewater generation trending observed over the last several years. The updated design criteria were used for the 2017 DC Update Technical Report as well as the 2022 DC Update Technical Report.

3.4.1. Water Demand Criteria

The 2022 DC Update Technical Report water demand criteria remains consistent with the criteria developed by Halton Region for the 2017 DC Update Technical Report. The water demand and design criteria for system components are summarized in the tables below. Water demand from existing serviced areas is calculated from measured data.

Table 5 – Water Demand Criteria

Average Day Water Design Criteria			
L/cap/d *	Residential	265	
L/emp/d **	Employment	225	
Max Day and Peak Hour Water Design Criteria		**Max Day Peaking Factor**	**Peak Hour Peaking Factor**
Lake-based	Oakville, Burlington, Milton, Georgetown	1.9	3
Groundwater Based	Milton, Georgetown, Acton	1.6	3

*Litres per capita per day

**Litres per employee per day

For areas with sufficient storage volume, the water supply requirements are based on Maximum Day Demands (MDD), while areas without sufficient storage base their water supply requirements on Peak Hour Demands (PHD).

Water system capacity needs were developed on the considerations summarized in Table 6.

Table 6 – Water Design Criteria for System Components

Water Design Criteria for System Components		
Component	Design Criteria	
Feedermains	Flow capacity	Convey maximum day demand while achieving water velocity guidelines
Local Watermains	Flow capacity	Convey the greater of: • Maximum day demand plus fire flow demand, or • Peak hour demand while achieving water velocity guidelines

Water Design Criteria for System Components		
Booster Pumping Stations	With adequate zone storage available	Supply maximum day demand to zone and all subsequent zones
	Without adequate storage available	Supply peak hour demand to zone and maximum day demand to all subsequent zones
Storage (reservoirs, water towers)	A – Equalization	25% of maximum day demand
	B – Fire	Largest expected fire in zone (Based on land use)
	C – Emergency	Minimum of 25% of (A+B)
	Total volume	= A + B + C
Fire Flow	Minimum flow (Residential)	5,500 L/min for 2 hours @ minimum 140 kPa (20 Psi)
	Minimum Flow (Industrial / Commercial / Institutional)	15,000 L/min for 3 hours @ minimum 140 kPa (20 Psi)
System Pressure	Minimum and maximum operating conditions	280 kPa (40 Psi) to 700 kPa (100 Psi)

3.4.2. Wastewater Flow Criteria

The 2022 DC Update Technical Report wastewater flow criteria remains consistent with the criteria developed by Halton Region for the 2017 DC Update Technical Report. The wastewater flow criteria for WWTPs and for system components are summarized in the tables below. Wastewater generation from existing serviced areas is calculated from measured data.

Table 7 – Wastewater Flow Criteria for Wastewater Treatment Plants

Wastewater Treatment Plant			
L/cap/d *	Residential	Average Day Flow	360
L/emp/d **	Employment	Average Day Flow	310

*Litres per capita per day

**Litres per employee per day

Table 8 – Wastewater Flow Criteria for System Components

System (Booster Pumping Stations and Wastewater Mains)			
L/cap/d*	Residential	Peak Dry Weather Flow	215 x PF
L/emp/d**	Employment	Peak Dry Weather Flow	185 x PF
L/s/ha***	I&I Allowance	Inflow and Infiltration Design Allowance	0.286

*Litres per capita per day

**Litres per employee per day

***Liters per second per hectare

Note: Total peak flows for new development are calculated by multiplying total dry weather flows by the peaking factors (PF) specified in the Halton Linear Design Manual (based on Harmon formula) and adding the Inflow and Infiltration Design Allowance.

The design criteria outlined in Table 7 and Table 8 were used to estimate current and future wastewater flows for each service area. Future flow rates for existing catchments and service areas were calculated by adding the projected increase in flows (calculated with the above criteria) to the measured flow from existing service areas. Wastewater capacity needs were developed on the following basis:

- Wastewater mains and WWPS were sized for peak wet weather flow rate.
- WWTP rated treatment capacity needs were sized based on the average day flow which includes an average level of extraneous flow within the system.

3.5. Costing Methodology

The costing approach used for the 2022 DC Update Technical Report is similar to that developed for the 2017 DC Update Technical Report.

The 2017 DC Update Technical Report costing methodology applied a unit cost approach for Master Plan costed projects, where the total length or capacity needs of the required infrastructure project was multiplied by a base unit cost applicable to the particular construction type (5 m depth wastewater main, 10 m depth wastewater main, watermain, wastewater forcemain, L/s or megalitres per day (ML/D) of pumping, megalitres (ML) of storage, ML/D of treatment). In cases where construction is to take place in built-up areas, such as intensification areas, additional cost escalation factors were applied to the base unit cost. This provides additional project costs to account for utility coordination/relocation, urban reinstatement, and urban construction impacts.

The base cost was made up of the unit cost multiplied by the project length or capacity. Additional costs were added to the base cost to account for creek/road/railway crossings, property acquisition, tunneling requirements, etc. where applicable. The sum of base cost plus additional costs results in the Base Construction Cost. Subsequently, 35% total engineering costs and contingency allowances were added to the Base Construction Cost to arrive at the Total Project Cost. In general, these are conceptual level cost estimates, which have a typical accuracy range of +40%/-20%.

For the purposes of the 2022 DC Update Technical Report, project costs were further updated as follows:

- Where a cost estimate was available through detailed analysis (i.e., Municipal Class Environmental Assessment (MCEA) Study, project scoping study or detailed design), that cost was used as the governing project cost estimate. Provided cost estimates were indexed to January 1, 2022 dollars (indexing percentages are shown in Appendix A).

- The majority of costs in the water and wastewater development capital program were estimated based on the unit costing approach as described above. The unit costs were updated to account for inflation and increase in project costs based on recent tender information compiled over the past several years. These updated unit costs are shown in Appendix A.

- The remaining projects (constituting <2% of total capital program costs) were estimated based on the cost previously identified in the 2017 DC Update Technical Report, indexed to January 1, 2022 dollars (indexing percentages are shown in Appendix A). These are projects where on-going or planned studies will further define scope requirements and costs (for example, the Kitchen Zone O3 BPS Expansion).

4. DEVELOPMENT CHARGES FUNDING APPROACH

4.1. DC By-Law Structure

For the 2022 DC Update Technical Report, the water and wastewater development capital implementation plan has been classified according to the DC By-Law structure into three categories: Capacity, Distribution – Greenfield, and Distribution – Built Boundary.

Capacity

This category includes projects that are related to Region-wide needs of water supply/treatment and wastewater treatment. This category also includes projects that support the transfer/conveyance of capacity and the deferral/elimination of the need for immediate treatment plant or well field expansions. Projects included in this definition are:

- Studies
- Projects related to water purification plants and groundwater well fields, such as:
  - Burloak WPP Expansion from 55 ML/D to 165 ML/D
- Projects related to wastewater treatment plants, such as:
  - Mid-Halton WWTP Expansion from 125 ML/D to 175 ML/D
- Major trunk infrastructure that services broader greenfield and intensification areas such as:
  - Modifications to the Burnhamthorpe Water Tower
  - New Sewer Inlet to Skyway WWTP

Distribution – Greenfield

This category includes projects that support Greenfield growth outside the current Urban Built Boundary (2006) and within the Sustainable Halton Urban Boundary (2031).

Projects within this category include:

- Infrastructure located in Greenfield service areas.
- Infrastructure located within the built boundary that convey flow to or from future growth areas.
- Infrastructure includes, but is not limited to pipes, pumping stations and storage facilities.

Distribution – Built Boundary

This category represents projects that support growth within the current Urban Built Boundary (2006). This includes growth to 2031 associated with infill within the Urban Built Boundary (2006) as well as intensification within specific areas such as the Urban Growth Centres (UGCs) and corridors as identified in the 2011 Master Plan.

Projects within this category include:

- Infrastructure located within the Urban Built Boundary (2006).
- Infrastructure servicing only infill growth and intensification within the Urban Built Boundary (2006).
- Infrastructure identified under the Urban Growth Centres (UGCs) and corridors servicing reviews.

4.2. Existing Capacity

The servicing strategies for Halton Region were developed in line with the servicing policies found in the 2011 Master Plan. Strategies focused on major facilities are generally developed from the following:

- Maximizing existing capacity in facilities.
- Scheduling facility capacity expansion when a threshold of approximately 90% of existing rated capacity has been reached.
- Ensuring operational effectiveness, flexibility and security of supply.
- Maintaining appropriate level of service.

The servicing strategies for facility expansions ensure that existing capacity remains, typically ranging from 5 to 10%. Existing capacity is required to provide and maintain an adequate level of service throughout the systems. Each DC period has benefitted from previous existing capacity remaining, and future expansion will provide the same benefit. Under this program there is no allowance for existing capacity remaining at the existing facilities.

4.3. Benefit to Existing (Non-Growth)

The non-growth components of servicing strategies are usually identified for projects which benefit the existing service area. Examples of these components are upgrades to the existing systems or facilities necessary to maintain service levels to existing residential and non-residential users. These projects can also increase capacity to meet growth in service areas through upgrades and expansions. When evaluating intensification, critical security/redundancy requirements and impacts on critical existing trunk infrastructure needed to be identified, as well as additional projects within the existing service area. Some Benefit to Existing (non-growth) components were identified in a small number of infrastructure capital projects that are primarily required to service growth in new urban areas.

With triggers ranging from growth to security/redundancy requirements, the growth related and non-growth related needs and corresponding capacity and costs for each of these projects have been separately identified. Detailed information regarding the Benefit to Existing (non-growth) cost splits can be found in Appendix B.

4.4. Post Period Benefit

Since most water and wastewater infrastructure has a service life of up to 50+ years, it is good engineering practice to strategically size certain projects to meet potential growth beyond the 2031 planning horizon. The sizing and capacity set for 2031 must also provide a sufficient level of service to new growth areas, ensure efficient integration with existing infrastructure, and not negatively impact current system operations.

Projects in the 2022 DC Update Technical Report that have been assigned a Post Period Benefit value are the same projects as were determined in the 2017 DC Update Technical Report. The oversizing cost is calculated by the difference in cost for the recommended size of infrastructure and the size of infrastructure to meet the 2031 horizon. Identified oversizing is deducted from the 2031 DC recoverable costs and is to be recovered through subsequent DC by-law(s) covering the post 2031 period.

It should be noted that the 2002 Master Plan as well as the 2007 Master Plan Update considered infrastructure sizing to an urban boundary built out scenario (2031) and post 2021 considerations respectively. Some projects previously oversized to meet the 2031 horizon are now integrated into the current program based on the 2011 Master Plan and are not considered oversized based on the current 2031 by-law period.

Detailed Post Period Benefit calculations are available in Appendix B.

4.5. DC Eligible Infrastructure

Watermains, wastewater mains and water and wastewater infrastructure are DC eligible depending on criteria presented in the Local Service Guidelines. The linear infrastructure eligibility is summarized below and provided in more detail in Appendix C of this report.

The minimum size for DC eligible watermains is:

- Greater than 400 mm diameter internal to the development.
- Greater than or equal to 400 mm diameter external to the development.

The minimum size for DC eligible wastewater mains is:

- Greater than 450 mm diameter.

Further information is available in Appendix C: Local Service Guidelines.

4.6. Residential/Non Residential

The DC eligible share of the water and wastewater development capital implementation plan (2023 to 2031) has been split between benefit to residential development and benefit to non-residential development within each DC by-law category. The residential/non-residential split is calculated from the percentage of total anticipated demand/flow that will be generated by each class of development. This is the standard approach used by other municipalities for calculating the split and this approach was used for Halton Region's 2004, 2008, 2012 and 2017 DC Updates.

The Capacity category is based on Region-wide calculated demands/flows. The Distribution-Greenfield category is based on demands/flows calculated from the Greenfield areas only, while the Distribution-Built Boundary category is based on demand/flows calculated for growth within the Urban Built Boundary (2006) only.

The water project splits are based on maximum day demand created from the growth between year 2021 to year 2031. The wastewater project splits are based on average day flows for the growth from 2021 to 2031. The water and wastewater calculation and employment demand forecast does not include employees associated with working at home (WAH) because the impact on water and wastewater services from WAH employees is generated from the home which is already accounted for in the population/unit forecast.

For No Fixed Place of Work (NFPOW) employees, the need for water and wastewater services related to these employees has largely been included in the employment forecast by usual place of work (i.e. employment and gross floor area (G.F.A.) in retail and accommodation sectors generated from NFPOW construction employment). Since these employees have no fixed work address, they cannot be captured in the non-residential G.F.A. calculation. Accordingly, NFPOW employees have been removed from the water and wastewater DC employment forecast and calculation as well as the forecasted water and wastewater demands.

The WAH and NFPOW approach for the calculation of forecasted water demands and wastewater flows is consistent with the methodology in the 2017 DC Update Technical Report.

The residential/non-residential contributions based on water demands and wastewater flows can be seen in Tables 9 and 10 respectively.

Table 9 – Growth Related Water Demands for the DC By-Law Categories

Category	Projected Increase in Water Demand, 2021 to 2031 (ML/D)	Percentage
Capacity (Region-Wide)		
Residential	65.3	76%
Non-Residential	20.8	24%
Total	**86.1**	**100%**
Distribution (Greenfield)		
Residential	43.3	73%
Non-Residential	16.4	27%
Total	**59.6**	**100%**
Distribution (Built Boundary)		
Residential	22.1	83%
Non-Residential	4.4	17%
Total	**26.5**	**100%**

Table 10 – Growth Related Wastewater Flows for the DC By-Law Categories

Category	Projected Increase in Wastewater Generation, 2021 to 2031 (ML/D)	Percentage
Capacity (Region-Wide)		
Residential	46.7	76%
Non-Residential	15.1	24%
Total	**61.8**	**100%**
Distribution (Greenfield)		
Residential	31.0	72%
Non-Residential	11.9	28%
Total	**42.8**	**100%**
Distribution (Built Boundary)		
Residential	15.8	83%
Non-Residential	3.2	17%
Total	**19.0**	**100%**

4.7. Project Timing

The predominant driver for project timing was the need to provide capacity and infrastructure servicing to meet BPE growth.

Analysis has been undertaken through this 2022 DC Update Technical Report to evaluate the timing/phasing of major projects such as new facilities and facility expansions that provide a system-wide benefit as opposed to servicing isolated growth areas. Treatment expansions are scheduled to be in place in order to provide water supply or wastewater treatment capacity to each plant's catchment/service area.

In order to reduce repeated disruption due to infrastructure construction projects and to improve efficiencies in construction, the water and wastewater program timing will be coordinated with other related works. Where possible, project timing should be aligned with the most recent Halton Region State-of-Good Repair capital program for water and wastewater, and local road improvements as well as Halton Region's Road capital program.

5. WATER SERVICING REQUIREMENTS

5.1. Water Service Areas

Water infrastructure needs were identified during the 2022 DC Update Technical Report based on the water demands for each individual service area or pressure zone. In general, Halton Region's pressure zones span an elevation difference of approximately 30 meters and are identified by the local municipality they service, with the exception of the new pressure zones resulting from the Zone Boundary Re-alignment Strategy that are identified by their Top Water Level (TWL).

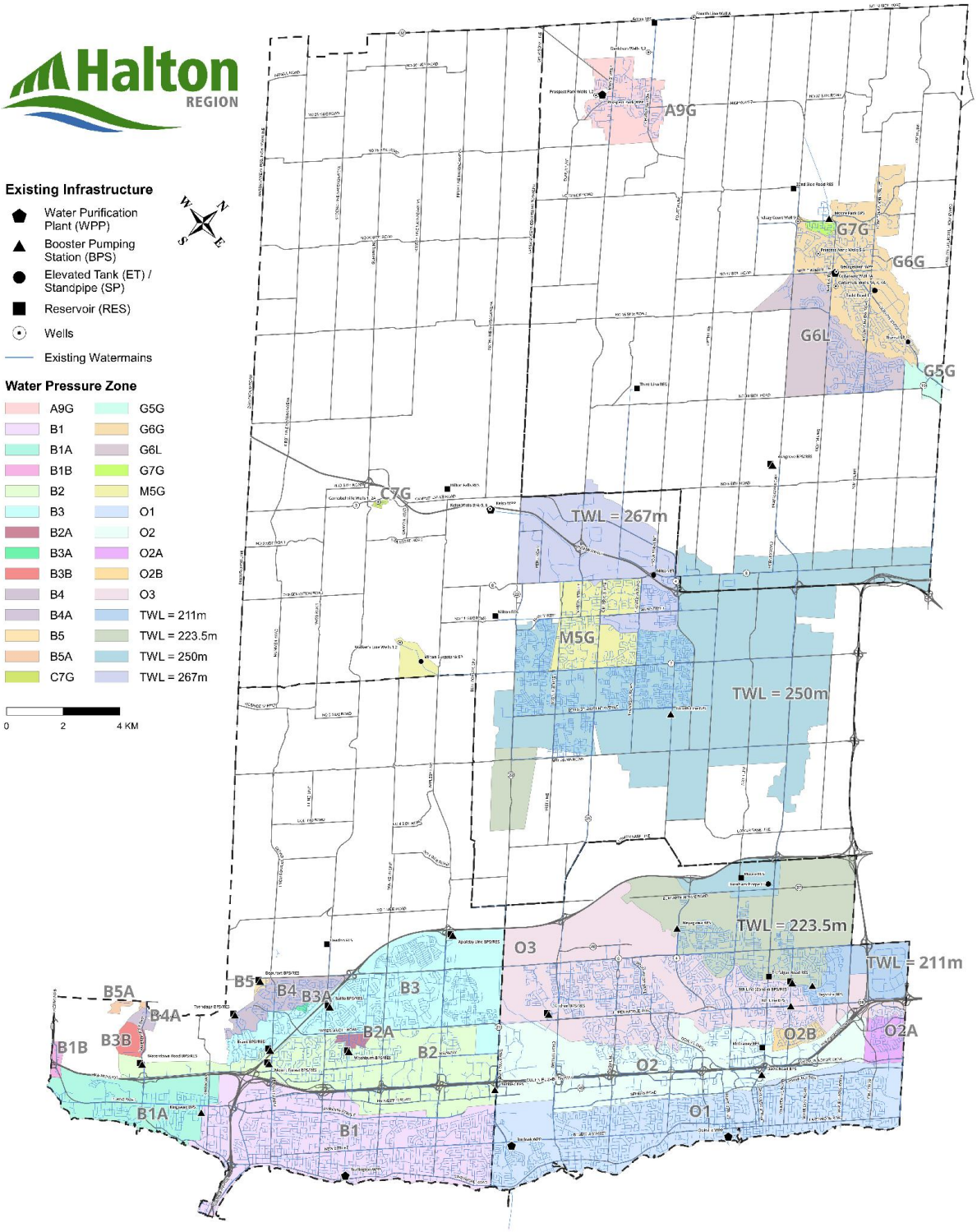
Halton Region's pressure zones (representing the final service areas after the completion of the Zone Boundary Re-alignment) are:

- Burlington is serviced by lake-based Zones B1, B2, B2A, B3, B3A, B4 and B5, with B1A and B1B servicing Aldershot and B3B, B4A, B5A encompassing the North Aldershot Policy Area. Portions of Burlington that are serviced with water from the City of Hamilton supply (Zone B1B) are excluded from the scope of the 2022 DC Update Technical Report.
- Oakville is serviced by lake-based Zones O1, O2, O2A, O2B, O3, TWL=211m (formerly Zone O3B), TWL=223.5 and TWL=250m (formerly Zone O4).
- Milton is serviced by one groundwater based Zone M5G and two lake-based Zones TWL=250m and TWL=267m (formerly Zones M4L and M5L).
- Georgetown is serviced by Zones G5G, G6G and G7G. The Georgetown Southwest Greenfield service area, the existing Georgetown South service area and the existing Stewarttown community will be serviced by extending the south Halton lake-based system and the creation of Zone G6L.
- Acton is serviced by a single groundwater based pressure zone, Zone A9G.
- One portion of Campbellville is serviced by a single groundwater based pressure zone, Zone C7G. No new connections or serviced growth are planned for Campbellville, and it is excluded from the scope of this 2022 DC Update Technical Report.

5.2. Zone Boundary Re-Alignment Update

The Zone Boundary Re-alignment Strategy was introduced in the 2017 DC Update Technical Report. The re-alignment was driven by the construction of the Zone 4 feedermain to Milton and the subsequent creation of a new large pressure zone in north Oakville and Milton. In order to maintain appropriate levels of service to customers, especially customers in new growth areas, modifications to the Zone O3, O4, M4L and M5L boundaries were needed. These changes were endorsed through the 2017 DC Update Technical Report. Since that time, the new Milton Zone 4 Reservoir (i.e., Ashgrove Reservoir) was constructed and commissioned, which has transitioned Milton Zone M4L and a portion of Oakville Zone O4 to a new pressure zone, TWL=250m. There are several other capital projects underway currently that continue to support the re-alignment strategy and will ultimately establish the final water pressure zones outlined in Section 5.1 and shown in Figure 2 and Figure 3

The only capital project in the 2022 DC program related to the Zone Boundary Re-alignment Strategy is ID7496 – Modifications to the Burnhamthorpe Water Tower.



Halton Region
Future Water Pressure Zones

Figure 2 – Future Pressure Zone Map

Figure 3: Region of Halton Lake-based Water System Schematic (to 2031)

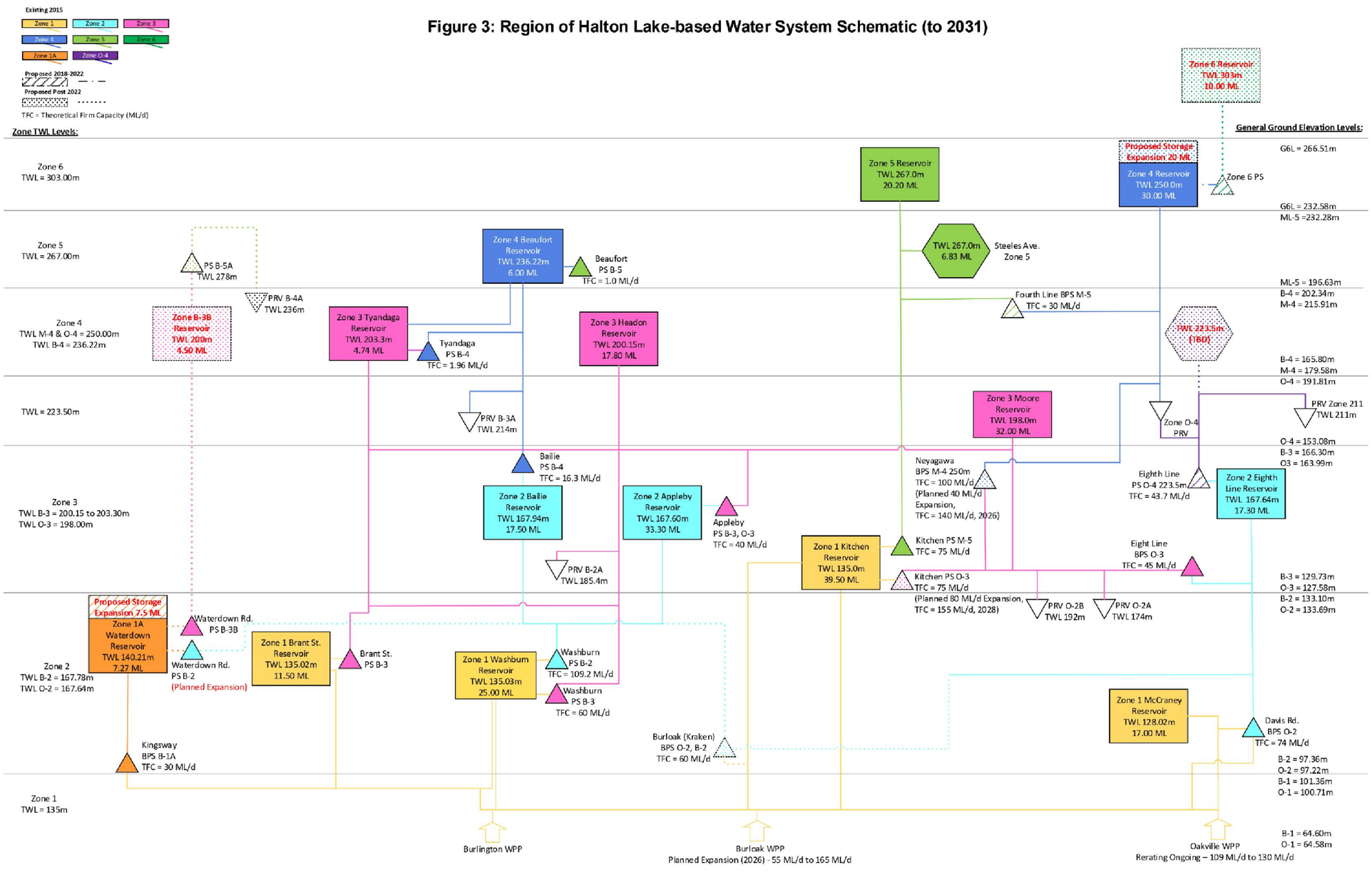


Figure 3 – Future Water Pressure Zones Schematic

5.3. Water Demand Projections

Based on the 2011 BPE data, current design criteria, and Zone Boundary Re-alignment Strategy, the following table identifies the water demand projections for major milestone years to 2031.

Table 11 – Water Demand Projections

Pressure Zone	Average Day Total Residential & Employment Demand (ML/D)			Maximum Day Total Residential & Employment Demand (ML/D)			Peak Hour Total Residential & Employment Demand (ML/D)		
	2021	2026	2031	2021	2026	2031	2021	2026	2031
B1 O1	48.6	50.3	51.9	92.3	95.5	98.7	145.8	150.8	155.8
B1A	4.6	4.6	4.7	8.7	8.7	8.9	13.7	13.8	14.0
B3B B4A B5A	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
B2	14.6	14.6	14.9	27.6	27.8	28.3	43.7	43.8	44.7
B2A	0.5	0.5	0.5	1.0	1.0	1.0	1.5	1.5	1.6
B3	15.0	15.1	15.5	28.6	28.7	29.5	45.1	45.3	46.5
B3A B4	2.5	2.5	2.6	4.8	4.8	4.9	7.6	7.6	7.7
B5	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
TWL=211	3.3	3.3	3.3	6.2	6.2	6.3	9.9	9.8	10.0
TWL=223.5	11.7	13.1	14.0	22.2	24.9	26.6	35.1	39.4	42.0
TWL=250	29.8	42.2	47.0	56.6	80.3	89.3	89.4	126.7	141.0
TWL=267	9.6	11.4	13.1	18.3	21.7	24.9	28.9	34.3	39.2
G5G G6G G7G	10.8	11.4	12.5	17.3	18.3	20.1	32.5	34.2	37.6
G6L	5.1	8.5	11.7	8.1	16.1	22.2	15.2	25.5	35.1
A9G	3.2	3.9	4.3	5.0	6.3	6.9	9.5	11.8	13.0
O2	13.8	15.1	16.6	26.2	28.6	31.6	41.4	45.2	49.9
O2A	1.6	1.5	1.6	3.0	2.9	2.9	4.7	4.6	4.7
O2B	0.8	0.8	0.8	1.5	1.5	1.5	2.4	2.4	2.4
O3	23.4	23.4	24.1	44.4	44.4	45.8	70.1	70.1	72.3
M5G	8.9	9.6	10.1	14.2	15.4	16.1	26.6	28.9	30.2
Total Serviced	**207.7**	**232.1**	**249.4**	**386.4**	**433.5**	**465.8**	**623.3**	**696.2**	**748.2**

Note: Supply to Zone B1B is provided by the City of Hamilton; B1B demands have been excluded from the above table.
Campbellville is excluded from the above table.

5.4. Water Storage Requirements

The water storage requirements by pressure zone is provided in the following table. More detailed information can be found in Appendix D of this Report.

Table 12 – Water Storage Requirements

Pressure Zone Service Area	Total Storage Requirement (ML)		
	2021	2026	2031
B1, O1	33.1	34.0	35.0
B1A	6.9	6.9	7.0
B3B, B4A, B5A	4.3	4.3	4.3
B2	12.8	12.9	13.1
B3, B2A	13.4	13.5	13.7
B4,B3A	5.7	5.7	5.7
TWL=250, TWL=223.5, TWL=211	30.8	39.0	42.4
TWL=267	9.9	11.0	12.0
G5G, G6G, G7G	9.6	9.9	10.5
G6L	6.7	9.2	11.2
A9G	5.0	5.3	5.5
O2	12.4	13.2	14.1
O3, O2A, O2B	19.5	19.5	19.9
M5G	8.6	9.0	9.2

Note: Service Areas for several facilities consist of multiple pressure zones. The total storage requirement for these service areas is calculated based on the combined storage need for all of the zones within the service area.

Note: Zone B5 is a very small service area and does not currently have water storage. There are no current plans to add storage to this zone.

6. WATER DEVELOPMENT CAPITAL IMPLEMENTATION PLAN

The water development capital implementation plan is outlined by the DC by-law structure category in Table 13. This table provides the Halton Region unique IDs (project identification numbers), project descriptions and cost estimates. The total water development capital implementation plan cost for 2023 to 2031 is $562M as presented in Table 13.

The water servicing strategy for each of the main service areas as identified in the 2011 Master Plan and updated through the subsequent DC programs is outlined below, as well as key infrastructure components that remain in the water development capital implementation plan from 2023 to 2031 (shown in Figure 4 and Figure 5).

It should be noted that this technical review excludes projects that will be approved in 2022 (as part of the 2022 Budget) as these are subject to an approved financing plan, and any projected funding shortfall will be included in the reserve balances or unfunded capital in the DC study.

Oakville Water Servicing Strategy

- North Oakville east of Sixteen Mile Creek will ultimately lie within Zone TWL=223.5m (with a small area within Zone TWL=250m) and will be predominantly serviced by the Oakville supply system with supplemental flow from Burloak/Burlington WPPs into the transmission network.
- North Oakville west of Sixteen Mile Creek lies within existing Zone O3 and will be serviced via Zone O3 pumping from Oakville (Kitchen Zone O3 BPS) and Burlington (Washburn and Appleby Zone B3 BPSs) via Dundas Street crossing.
- Oakville (Central Area) is generally located east of Bronte Creek and South of Dundas Street. These lands are serviced by Zones O1, O2 and parts of O3 and will continue to be serviced by the Oakville supply system.

Key infrastructure components of the Oakville Water Servicing Strategy from 2023 to 2031 are:

- Burloak WPP expansion to provide additional treated water supply for growth – common to all lake-based service areas experiencing growth.
- Sub-trunk distribution network within North Oakville Greenfield growth area.
- Modifications to the Burnhamthorpe Water Tower.
- Zone O2 interconnection along Wyecroft Road.
- Kitchen Zone O3 BPS expansion.

Burlington Water Servicing Strategy

- The Burlington Water Servicing Area is within Zones B1 to B5 and B1A generally south of Highway 407 and Dundas Street.
- Water supply is provided mainly from the Burlington WPP through existing transmission watermains, BPSs and reservoirs in the Burlington system.

Key infrastructure components of the Burlington Water Servicing Strategy from 2023 to 2031 are:

- Trunk linear and BPS infrastructure in east Burlington.
- Local infrastructure upgrades to meet demand projections and fire flow needs related to intensification growth.

North Aldershot Policy Area Water Servicing Strategy

- The North Aldershot Policy Area is located in the City of Burlington as identified in Figure 1, and occupies a portion of Zone B2 and Zones B3B, B4A, and B5A. Due to topography this area requires servicing via several pressure zones.

- The North Aldershot water system is currently supplied by the City of Hamilton through an interconnection to their distribution system on Waterdown Road. For emergency servicing, the area can also be supplied by the Waterdown Road BPS which is owned and operated by Halton Region.
- Currently, transmission, pumping and storage upgrades are recommended; however, this area will require a separate study to further refine these infrastructure upgrades.

Milton Water Servicing Strategy

- Milton Lake-based Service Area includes areas outside of the Milton Core groundwater service area. The lake-based service area consists of new Zones TWL=267m, TWL=250m and a portion of new Zone TWL= 223.5 m.
- Water supply to this service area is via the existing lake-based WPPs (Burlington, Oakville, Burloak) and is pumped through the existing BPSs and reservoirs to Milton.
- The existing groundwater service area (Zone M5G) is expected to remain on groundwater through 2031. The next Water and Wastewater Master Plan will establish a long-term water servicing strategy for the Town of Milton.

Key infrastructure components of the Milton Water Servicing Strategy from 2023 to 2031 are:

- Upgrades within Burlington and Oakville to supply water to the north.
- Sub-trunk distribution network within Milton Greenfield growth including areas along Trafalgar corridor, south of Britannia and Tremaine Road.
- Local infrastructure upgrades within the Milton Core to meet demand projections and fire flow needs related to intensification growth.

Georgetown Water Servicing Strategy

- Provide new lake-based water supply to new Greenfield growth area in southwest Georgetown as well as transfer South Georgetown and Stewarttown to lake-based supply. This will enable the groundwater system to remain within sustainable yields.
- New lake-based pressure zone, Zone G6L, to be introduced.
- Lake-based water supply will be from the existing lake-based WPPs and will be pumped through the existing BPSs and reservoirs throughout the distribution system.
- Water treatment capacity provisions for Norval and Glen Williams (currently only parts of these areas are serviced).

Key infrastructure components of the Georgetown Water Servicing Strategy from 2023 to 2031 are:

- Upgrades within Burlington, Oakville and Milton to supply water to the north.
- Trafalgar Road Zone 6 Feedermains and sub-trunk distribution network within south Georgetown.
- New Zone 6 Reservoir at 22nd Side Road.
- Local infrastructure upgrades to meet demand projections and fire flow needs related to intensification growth.

Acton Water Servicing Strategy

- Acton is supplied by local groundwater wells and operates under a single pressure zone, Zone A9G.
- Increase transmission redundancy from the Third Line Reservoir.

Key infrastructure components of the Acton Water Servicing Strategy from 2023 to 2031 are:

- Transmission watermains on No. 32 Side Road and Regional Road 25 to support growth.

Table 13 – Water Development Capital Implementation Plan

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
Capacity																				
5951	Design of Burloak WPP Phase 2 Expansion from 55 to 165ML/d (OAK)	OAK	PLANT	110 ML/d		$14,734,000	$-	$-	$14,734,000	$11,198,000	$3,536,000	$-	$14,734,000	$-	$-	$-	$-	$-	$-	$-
6372	Construction of Burloak WPP Phase 2 Expansion from 55 to 165ML/d (OAK)	OAK	PLANT	110 ML/d		$160,688,000	$-	$-	$160,688,000	$122,123,000	$38,565,000	$-	$-	$-	$160,688,000	$-	$-	$-	$-	$-
7496	Modifications to the Burnhamthorpe Water Tower (OAK)	OAK	RESERVOIR			$5,725,000	$286,000	$-	$5,439,000	$4,134,000	$1,305,000	$1,145,000	$-	$4,580,000	$-	$-	$-	$-	$-	$-
8150	Halton Water Master Plan (2023 and 2028) (REG)	REG	STUDY			$1,600,000	$-	$-	$1,600,000	$1,216,000	$384,000	$800,000	$-	$-	$-	$-	$800,000	$-	$-	$-
8151	Water Distribution System Analysis (2023 to 2031) (REG)	REG	STUDY			$990,000	$-	$-	$990,000	$756,000	$234,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000
8152	Water Supply Capacity Annual Monitoring Report (2023 to 2031) (REG)	REG	STUDY			$450,000	$-	$-	$450,000	$342,000	$108,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Total Capacity						**$184,187,000**	**$286,000**	**$-**	**$183,901,000**	**$139,769,000**	**$44,132,000**	**$2,105,000**	**$14,894,000**	**$4,740,000**	**$160,848,000**	**$160,000**	**$960,000**	**$160,000**	**$160,000**	**$160,000**
Greenfield																				
5627	600mm WM through North Oakville Lands from Tremaine Rd to Bronte Rd (Zone O3) (OAK)	OAK	MAIN	600	3,004	$11,326,000	$-	$-	$11,326,000	$8,268,000	$3,058,000	$2,265,000	$-	$9,061,000	$-	$-	$-	$-	$-	$-
5850	1050mm WM on Upper Middle Rd from Burloak Drive to Appleby Line (Zone B2) (Construction) (BUR)	BUR	MAIN	1050	1,760	$14,546,000	$-	$4,946,000	$9,600,000	$7,008,000	$2,592,000	$-	$14,546,000	$-	$-	$-	$-	$-	$-	$-
5881	400 mm WM from Waterdown booster pumping station along North Service Rd to King Rd (Zone B2) (BUR)	BUR	MAIN	400	2,916	$9,407,000	$-	$-	$9,407,000	$6,867,000	$2,540,000	$1,881,000	$-	$7,526,000	$-	$-	$-	$-	$-	$-
6367	Burloak Booster Pumping Station Phase 1, 60 ML/d (Zone B2) - Construction (BUR)	BUR	PS	60 ML/d		$16,848,000	$-	$10,783,000	$6,065,000	$4,427,000	$1,638,000	$-	$16,848,000	$-	$-	$-	$-	$-	$-	$-
6368	1050mm WM on Burloak Dr from the QEW to Upper Middle Rd (Zone B2) - Construction (OAK)	OAK	MAIN	1050	1,870	$13,975,000	$-	$5,870,000	$8,105,000	$5,917,000	$2,188,000	$-	$13,975,000	$-	$-	$-	$-	$-	$-	$-
6597	300mm WM on RR 25 from No. 32 Side Rd to 640 m north of Wallace St. (Zone A9G) (HHACT)	HHACT	MAIN	300	1,250	$1,952,000	$-	$-	$1,952,000	$1,425,000	$527,000	$390,000	$-	$1,562,000	$-	$-	$-	$-	$-	$-
6600	300 mm WM on No. 32 Side Rd from RR 25 to 3rd Line Reservoir (Zone A9G) (HHACT)	HHACT	MAIN	300	1,360	$2,038,000	$-	$-	$2,038,000	$1,488,000	$550,000	$408,000	$-	$1,630,000	$-	$-	$-	$-	$-	$-
6613	600mm WM on No 10 Side Rd from 10th Line to Adamson St S (Zone G6L) (HHGEO)	HHGEO	MAIN	600	673	$2,539,000	$-	$-	$2,539,000	$1,854,000	$685,000	$-	$-	$-	$-	$508,000	$-	$2,031,000	$-	$-
6614	600 mm WM on Adamson St from 10th Side Rd to Guelph St (Zone G6L) (HHGEO)	HHGEO	MAIN	600	1,241	$3,592,000	$-	$-	$3,592,000	$2,622,000	$970,000	$-	$-	$-	$-	$718,000	$-	$2,874,000	$-	$-
6615	600mm WM on Guelph St from Adamson St to Bovaird Dr (Region of Peel) (Zone G6L) (HHGEO)	HHGEO	MAIN	600	1,280	$6,884,000	$-	$-	$6,884,000	$5,025,000	$1,859,000	$-	$-	$-	$-	$1,377,000	$-	$5,507,000	$-	$-
6616	400mm WM on Thompson Rd South from Britannia Rd to approx. 1,211m south (Zone M4) (MIL)	MIL	MAIN	400	1,211	$2,716,000	$-	$-	$2,716,000	$1,982,000	$734,000	$-	$543,000	$-	$2,173,000	$-	$-	$-	$-	$-
6617	400mm WM on new roadway south of Britannia Rd from Thompson Rd South to 4th Line (Zone M4) (MIL)	MIL	MAIN	400	1,345	$3,360,000	$-	$-	$3,360,000	$2,453,000	$907,000	$-	$672,000	$-	$2,688,000	$-	$-	$-	$-	$-
6618	400mm WM on new roadway south of Britannia Rd from 4th Line to 5th Line (Zone M4) (MIL)	MIL	MAIN	400	1,379	$3,421,000	$-	$-	$3,421,000	$2,497,000	$924,000	$684,000	$-	$2,737,000	$-	$-	$-	$-	$-	$-
6619	400mm WM on new roadway south of Britannia Rd from 5th Line to 6th Line (Zone M4) (MIL)	MIL	MAIN	400	1,405	$2,658,000	$-	$-	$2,658,000	$1,940,000	$718,000	$532,000	$-	$2,126,000	$-	$-	$-	$-	$-	$-
6620	400mm WM on 6th Line from Britannia Rd to 600 m south (Zone M4) (MIL)	MIL	MAIN	400	600	$1,623,000	$-	$-	$1,623,000	$1,185,000	$438,000	$325,000	$-	$1,298,000	$-	$-	$-	$-	$-	$-
6621	400mm WM on 6th Line from Britannia Rd to future Louis St. Laurent Blvd. (Zone M4) (MIL)	MIL	MAIN	400	1,503	$4,163,000	$-	$-	$4,163,000	$3,039,000	$1,124,000	$833,000	$-	$3,330,000	$-	$-	$-	$-	$-	$-
6622	400mm WM on 6th Line from Derry Rd to future Louis St. Laurent Blvd (Zone M4) (MIL)	MIL	MAIN	400	1,600	$4,625,000	$-	$-	$4,625,000	$3,376,000	$1,249,000	$925,000	$-	$3,700,000	$-	$-	$-	$-	$-	$-
6623	400mm WM on 5th Line from Britannia Rd to future Louis St. Laurent Blvd (Zone M4) (MIL)	MIL	MAIN	400	1,484	$3,205,000	$-	$-	$3,205,000	$2,340,000	$865,000	$641,000	$-	$2,564,000	$-	$-	$-	$-	$-	$-
6624	400mm WM on 4th Line from Britannia Rd to 650 m south (Zone M4) (MIL)	MIL	MAIN	400	636	$2,207,000	$-	$-	$2,207,000	$1,611,000	$596,000	$-	$441,000	$-	$1,766,000	$-	$-	$-	$-	$-

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
6625	400mm WM on Lower Base Line (East) from 4th Line to 5th Line (Zone M4) (MIL)	MIL	MAIN	400	1,387	$3,840,000	$-	$-	$3,840,000	$2,804,000	$1,036,000	$-	$768,000	$-	$3,072,000	$-	$-	$-	$-	$-
6626	400mm WM on 5th Line from Britannia Rd to 650 m south (Zone M4) (MIL)	MIL	MAIN	400	648	$1,304,000	$-	$-	$1,304,000	$952,000	$352,000	$-	$261,000	$-	$1,043,000	$-	$-	$-	$-	$-
6627	400mm WM on 4th Line from 650 m south of Britannia Rd to Lower Base Line (West) (Zone M4) (MIL)	MIL	MAIN	400	1,759	$3,697,000	$-	$-	$3,697,000	$2,698,000	$999,000	$-	$739,000	$-	$2,958,000	$-	$-	$-	$-	$-
6628	400mm WM on 5th Line from 650 m south of Britannia Rd to Lower Base Line (West) (Zone M4) (MIL)	MIL	MAIN	400	1,738	$4,469,000	$-	$-	$4,469,000	$3,263,000	$1,206,000	$-	$894,000	$-	$3,575,000	$-	$-	$-	$-	$-
6629	600mm WM on Louis St. Laurent Ave from 5th Line to 6th Line (Zone M4) (MIL)	MIL	MAIN	600	1,363	$4,409,000	$-	$-	$4,409,000	$3,219,000	$1,190,000	$-	$882,000	$-	$3,527,000	$-	$-	$-	$-	$-
6630	600mm WM on Louis St. Laurent Ave from 6th Line to Trafalgar Rd (Zone M4) (MIL)	MIL	MAIN	600	1,386	$5,932,000	$-	$-	$5,932,000	$4,331,000	$1,601,000	$-	$1,186,000	$-	$4,746,000	$-	$-	$-	$-	$-
6631	400mm WM on Louis St. Laurent Ave from Trafalgar Rd to 8th Line (Zone M4) (MIL)	MIL	MAIN	400	1,399	$3,861,000	$-	$-	$3,861,000	$2,819,000	$1,042,000	$-	$772,000	$-	$3,089,000	$-	$-	$-	$-	$-
6634	400mm WM on new Milton Rd from Trafalgar Rd to approximately 700 m east (Zone M4) (MIL)	MIL	MAIN	400	698	$2,203,000	$-	$-	$2,203,000	$1,608,000	$595,000	$-	$441,000	$-	$1,762,000	$-	$-	$-	$-	$-
6635	400mm WM on 8th Line from Derry Rd. to future Louis St. Laurent Blvd (Zone M4) (MIL)	MIL	MAIN	400	1,610	$4,240,000	$-	$-	$4,240,000	$3,095,000	$1,145,000	$-	$848,000	$-	$3,392,000	$-	$-	$-	$-	$-
6636	400mm WM on 8th Line from Britannia Rd to future Louis St. Laurent Blvd (Zone M4) (MIL)	MIL	MAIN	400	1,471	$3,701,000	$-	$-	$3,701,000	$2,702,000	$999,000	$-	$740,000	$-	$2,961,000	$-	$-	$-	$-	$-
6637	400mm WM on new roadway from Britannia Rd to approx. 1,200 m south (Zone M4) (MIL)	MIL	MAIN	400	1,146	$2,600,000	$-	$-	$2,600,000	$1,898,000	$702,000	$-	$520,000	$-	$2,080,000	$-	$-	$-	$-	$-
6638	400mm WM on Derry Rd from Trafalgar Rd to 8th Line (Zone M4) (MIL)	MIL	MAIN	400	1,348	$2,557,000	$-	$-	$2,557,000	$1,867,000	$690,000	$-	$511,000	$-	$2,046,000	$-	$-	$-	$-	$-
6641	400 mm WM on Hornby Rd from Steeles Ave to Trafalgar Rd (Zone 250) (HHS)	HHS	MAIN	400	1,500	$3,754,000	$-	$-	$3,754,000	$2,740,000	$1,014,000	$751,000	$-	$3,003,000	$-	$-	$-	$-	$-	$-
6642	400 mm WM in the 401 growth corridor north of Steeles from Hornby Rd to Trafalgar Rd (Zone 250) (HHS)	HHS	MAIN	400	926	$5,995,000	$-	$-	$5,995,000	$4,376,000	$1,619,000	$1,199,000	$-	$4,796,000	$-	$-	$-	$-	$-	$-
6643	400 mm WM in the 401 growth corridor north of Steeles from Trafalgar Rd to approximately 400m east of 8th Line (Zone 250) (HHS)	HHS	MAIN	400	1,013	$4,979,000	$-	$-	$4,979,000	$3,635,000	$1,344,000	$996,000	$-	$3,983,000	$-	$-	$-	$-	$-	$-
6644	400mm WM in the 401 growth corridor from Steeles Ave to approximately 300 m north (Zone 250) (HHS)	HHS	MAIN	400	357	$1,708,000	$-	$-	$1,708,000	$1,247,000	$461,000	$342,000	$-	$1,366,000	$-	$-	$-	$-	$-	$-
6645	400mm WM in the 401 growth corridor north of Steeles Ave. from 1,000 m west of 9th Line to 900 m east of 9th Line (Zone 250) (HHS)	HHS	MAIN	400	1,759	$3,292,000	$-	$-	$3,292,000	$2,403,000	$889,000	$-	$-	$-	$-	$658,000	$-	$2,634,000	$-	$-
6646	400mm WM in the 401 growth corridor from Steeles Ave to approximately 330 m north (Zone 250) (HHS)	HHS	MAIN	400	327	$1,655,000	$-	$-	$1,655,000	$1,209,000	$446,000	$-	$-	$-	$-	$331,000	$-	$1,324,000	$-	$-
6647	400mm WM in the 401 growth corridor north of Steeles Ave. from 600 m west of 10th Line to 1,000 m east of 10th Line (Zone 250) (HHS)	HHS	MAIN	400	1,582	$3,379,000	$-	$-	$3,379,000	$2,466,000	$913,000	$-	$-	$-	$-	$676,000	$-	$2,703,000	$-	$-
6648	400mm WM in the 401 growth corridor from Steeles Ave to 340 m north (Zone 250) (HHS)	HHS	MAIN	400	338	$2,078,000	$-	$-	$2,078,000	$1,517,000	$561,000	$-	$-	$-	$-	$416,000	$-	$1,662,000	$-	$-
6649	400mm WM on Esquesing Line from James Snow Parkway to approximately 800 m north (Zone 267) (MIL)	MIL	MAIN	400	784	$1,952,000	$-	$-	$1,952,000	$1,425,000	$527,000	$-	$390,000	$-	$1,562,000	$-	$-	$-	$-	$-
6650	400mm WM on new roadway from Esquesing Line to approximately 360 m west of Boston Church Rd (Zone 267) (MIL)	MIL	MAIN	400	2,029	$4,989,000	$-	$-	$4,989,000	$3,642,000	$1,347,000	$-	$998,000	$-	$3,991,000	$-	$-	$-	$-	$-
6652	400mm WM on new roadway from 400 m west of Third Line to No 5 Side Rd (Zone 267) (MIL)	MIL	MAIN	400	695	$1,792,000	$-	$-	$1,792,000	$1,308,000	$484,000	$-	$358,000	$-	$1,434,000	$-	$-	$-	$-	$-
6653	400mm WM on No 5 Side Rd from approximately 400 m west of 3rd Line to 3rd Line (Zone 267) (MIL)	MIL	MAIN	400	390	$842,000	$-	$-	$842,000	$615,000	$227,000	$-	$168,000	$-	$674,000	$-	$-	$-	$-	$-
6657	400mm WM on Tremaine Rd from Britannia Rd to 2,200 m south of Britannia Rd (Zone 223.5) (MIL)	MIL	MAIN	400	2,208	$5,309,000	$-	$-	$5,309,000	$3,875,000	$1,434,000	$-	$1,062,000	$-	$4,247,000	$-	$-	$-	$-	$-
6659	400mm WM on new road alignment from Tremaine Rd to approximately 360 m west (Zone 223.5) (MIL)	MIL	MAIN	400	392	$846,000	$-	$-	$846,000	$617,000	$229,000	$-	$-	$169,000	$-	$677,000	$-	$-	$-	$-
6666	750mm WM on Neyagawa Blvd. from Burnhamthorpe Rd W to Lower Base Line W (MIL)	MIL	MAIN	750	2,667	$12,505,000	$-	$11,255,000	$1,250,000	$913,000	$337,000	$-	$-	$-	$-	$-	$-	$-	$2,501,000	$10,004,000

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
6694	10 ML Zone G6L Storage at 22nd Side Rd (HHGEO)	HHGEO	RESERVOIR	10 ML		$16,783,000	$-	$-	$16,783,000	$12,252,000	$337,000	$3,357,000	$-	$13,426,000	$-	$-	$-	$-	$-	$-
6697	15 ML storage expansion at Zone M4 Reservoir (TWL = 250m) (HHGEO)	HHGEO	RESERVOIR	15 ML		$25,174,000	$-	$-	$25,174,000	$18,377,000	$4,531,000	$-	$5,035,000	$-	$20,139,000	$-	$-	$-	$-	$-
6701	Kitchen Zone O3 Booster Pumping Station Expansion by 80 ML/d (OAK)	OAK	PS	80 ML/d		$15,786,000	$-	$10,577,000	$5,209,000	$3,803,000	$6,797,000	$-	$150,000	$-	$3,007,000	$-	$12,629,000	$-	$-	$-
6702	40 ML/d Expansion at the Neyagawa Booster Pumping Station (OAK)	OAK	PS	40 ML/d		$8,859,000	$-	$-	$8,859,000	$6,468,000	$1,406,000	$-	$1,772,000	$-	$7,087,000	$-	$-	$-	$-	$-
6863	Waterdown Road Booster Pumping Station Expansion (Zones B2, B3A & B5A) (BUR)	BUR	PS			$6,926,000	$-	$-	$6,926,000	$5,056,000	$2,391,000	$1,385,000	$-	$5,541,000	$-	$-	$-	$-	$-	$-
7014	400 mm WM from Waterdown Reservoir Booster Pumping Station to new North Aldershot Reservoir (Zone B3A) (BUR)	BUR	MAIN	400	1,496	$3,631,000	$-	$-	$3,631,000	$2,651,000	$1,870,000	$-	$-	$726,000	$-	$2,905,000	$-	$-	$-	$-
7505	1050mm WM on Burloak Dr from Burloak Booster Pumping Station to the QEW - Construction (OAK)	OAK	MAIN	1050	270	$8,231,000	$-	$3,457,000	$4,774,000	$3,485,000	$980,000	$-	$8,231,000	$-	$-	$-	$-	$-	$-	$-
7570	4.5 ML North Aldershot in ground Reservoir (Zone B3B) (BUR)	BUR	RESERVOIR	4.5 ML		$7,552,000	$-	$-	$7,552,000	$5,513,000	$1,289,000	$200,000	$1,470,000	$-	$5,882,000	$-	$-	$-	$-	$-
8134	600mm WM on Tremaine Rd from Dundas St to approximately 950 m north-Construction (North Oakville Lands) (Zone O3) (OAK)	OAK	MAIN	600	927	$2,540,000	$-	$-	$2,540,000	$1,854,000	$2,039,000	$-	$2,540,000	$-	$-	$-	$-	$-	$-	$-
8135	750mm WM on Trafalgar from 15th Side Rd to 22nd Side Rd Lake Based Reservoir - Construction (Zone G6L) (HHGEO)	HHGEO	MAIN	750	4,300	$16,907,000	$-	$-	$16,907,000	$12,342,000	$686,000	$-	$16,907,000	$-	$-	$-	$-	$-	$-	$-
8136	400mm WM on 17th Side Rd from Trafalgar Rd to Main St - Construction (Zone G6L) (HHGEO)	HHGEO	MAIN	400	1,323	$2,528,000	$-	$-	$2,528,000	$1,845,000	$4,565,000	$-	$2,528,000	$-	$-	$-	$-	$-	$-	$-
8137	750mm WM on Trafalgar Rd from 10th Side Rd to approximately 1,700 m north of 10th Side Rd-Construction (Zone G6L) (HHGEO)	HHGEO	MAIN	750	1,658	$5,486,000	$-	$-	$5,486,000	$4,005,000	$683,000	$-	$5,486,000	$-	$-	$-	$-	$-	$-	$-
8138	750mm WM on Trafalgar from 1,700 m north of 10th Side Rd to 15th Side Rd -Construction (Zone G6L) (HHGEO)	HHGEO	MAIN	750	1,444	$4,881,000	$-	$-	$4,881,000	$3,563,000	$1,481,000	$-	$4,881,000	$-	$-	$-	$-	$-	$-	$-
8139	400mm WM on new North Oakville Rd west of Neyagawa Blvd. -Construction (OAK)	OAK	MAIN	400	2,000	$3,993,000	$-	$-	$3,993,000	$2,915,000	$1,318,000	$3,993,000	$-	$-	$-	$-	$-	$-	$-	$-
8153	600mm WM on Wyecroft Rd from Burloak Dr to the 900mm WM on the SE corner of Third Line and QEW. Phase 2 (OAK)	OAK	MAIN	600	4,740	$19,304,000	$-	$-	$19,304,000	$14,092,000	$1,078,000	$-	$3,861,000	$-	$15,443,000	$-	$-	$-	$-	$-
Total Greenfield						**$357,554,000**	**$-**	**$46,888,000**	**$310,666,000**	**$226,789,000**	**$83,877,000**	**$21,107,000**	**$111,424,000**	**$68,544,000**	**$104,344,000**	**$8,266,000**	**$12,629,000**	**$18,735,000**	**$2,501,000**	**$10,004,000**
Built Boundary																				
6602	7.5 ML storage expansion at Waterdown Reservoir (existing site) (Zone B1A) (BUR)	BUR	RESERVOIR	7.5 ML		$12,587,000	$11,706,000	$-	$881,000	$731,000	$150,000	$-	$2,517,000	$-	$10,070,000	$-	$-	$-	$-	$-
6708	300mm WM on Elizabeth St from James St to approximately 95 m north (BUR)	BUR	MAIN	300	95	$205,000	$-	$-	$205,000	$170,000	$35,000	$41,000	$-	$164,000	$-	$-	$-	$-	$-	$-
6710	300mm WM on Plains Rd East (Twinning adjacent to 6709) (BUR)	BUR	MAIN	300	341	$680,000	$-	$-	$680,000	$565,000	$115,000	$-	$-	$-	$-	$-	$136,000	$-	$544,000	$-
6711	300mm WM on Birchwood Avenue from Plains Rd East southwards towards Fairwood Place East (BUR)	BUR	MAIN	300	53	$125,000	$-	$-	$125,000	$104,000	$21,000	$-	$-	$-	$25,000	$-	$100,000	$-	$-	$-
6712	300mm WM on Gallagher Rd from Plains Rd East to 160 m Northerly (BUR)	BUR	MAIN	300	127	$268,000	$-	$-	$268,000	$223,000	$45,000	$-	$-	$-	$54,000	$-	$214,000	$-	$-	$-
6713	300mm WM on Downsview Rd from Plains Rd East to Dowland Crescent (BUR)	BUR	MAIN	300	144	$300,000	$-	$-	$300,000	$249,000	$51,000	$-	$-	$-	$60,000	$-	$240,000	$-	$-	$-
6723	400mm WM on Bronte St between Main St West and Barton St (MIL)	MIL	MAIN	400	551	$1,426,000	$-	$-	$1,426,000	$1,184,000	$242,000	$-	$-	$285,000	$-	$1,141,000	$-	$-	$-	$-
6724	300mm WM on Main St East between James St and Martin St (MIL)	MIL	MAIN	300	292	$585,000	$-	$-	$585,000	$485,000	$100,000	$-	$-	$-	$117,000	$-	$468,000	$-	$-	$-
6725	300mm WM on Laurier Avenue between Bronte St and Commercial St (MIL)	MIL	MAIN	300	1,003	$2,139,000	$-	$-	$2,139,000	$1,775,000	$364,000	$-	$-	$428,000	$-	$1,711,000	$-	$-	$-	$-
6728	300mm WM on Cowan Ave between Kerr St and Inglewood Drive (OAK)	OAK	MAIN	300	87	$375,000	$-	$-	$375,000	$311,000	$64,000	$-	$-	$75,000	$-	$300,000	$-	$-	$-	$-

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
6729	300mm WM on Deane Ave between Kerr St and Felan Ave (OAK)	OAK	MAIN	300	291	$769,000	$-	$-	$769,000	$638,000	$131,000	$-	$-	$154,000	$-	$615,000	$-	$-	$-	$-
6731	300mm WM on Forsythe St between Rebecca St and Burnet St (OAK)	OAK	MAIN	300	314	$813,000	$-	$-	$813,000	$675,000	$138,000	$-	$-	$163,000	$-	$650,000	$-	$-	$-	$-
6733	300 mm WM Replacement on Cross St from Guelph St to Main St (HHGEO)	HHGEO	MAIN	300	106	$228,000	$-	$-	$228,000	$189,000	$39,000	$-	$-	$-	$-	$-	$46,000	$-	$182,000	$-
Total Built Boundary						**$20,500,000**	**$11,706,000**	**$-**	**$8,794,000**	**$7,299,000**	**$1,495,000**	**$41,000**	**$2,517,000**	**$1,269,000**	**$10,326,000**	**$4,417,000**	**$1,204,000**	**$-**	**$726,000**	**$-**
Total						**$562,241,000**	**$11,992,000**	**$46,888,000**	**$503,361,000**	**$373,857,000**	**$129,504,000**	**$23,253,000**	**$128,835,000**	**$74,553,000**	**$275,518,000**	**$12,843,000**	**$14,793,000**	**$18,895,000**	**$3,387,000**	**$10,164,000**

Note: RR 25 = Regional Road 25, WM = Watermain, WPP = Water Purification Plant

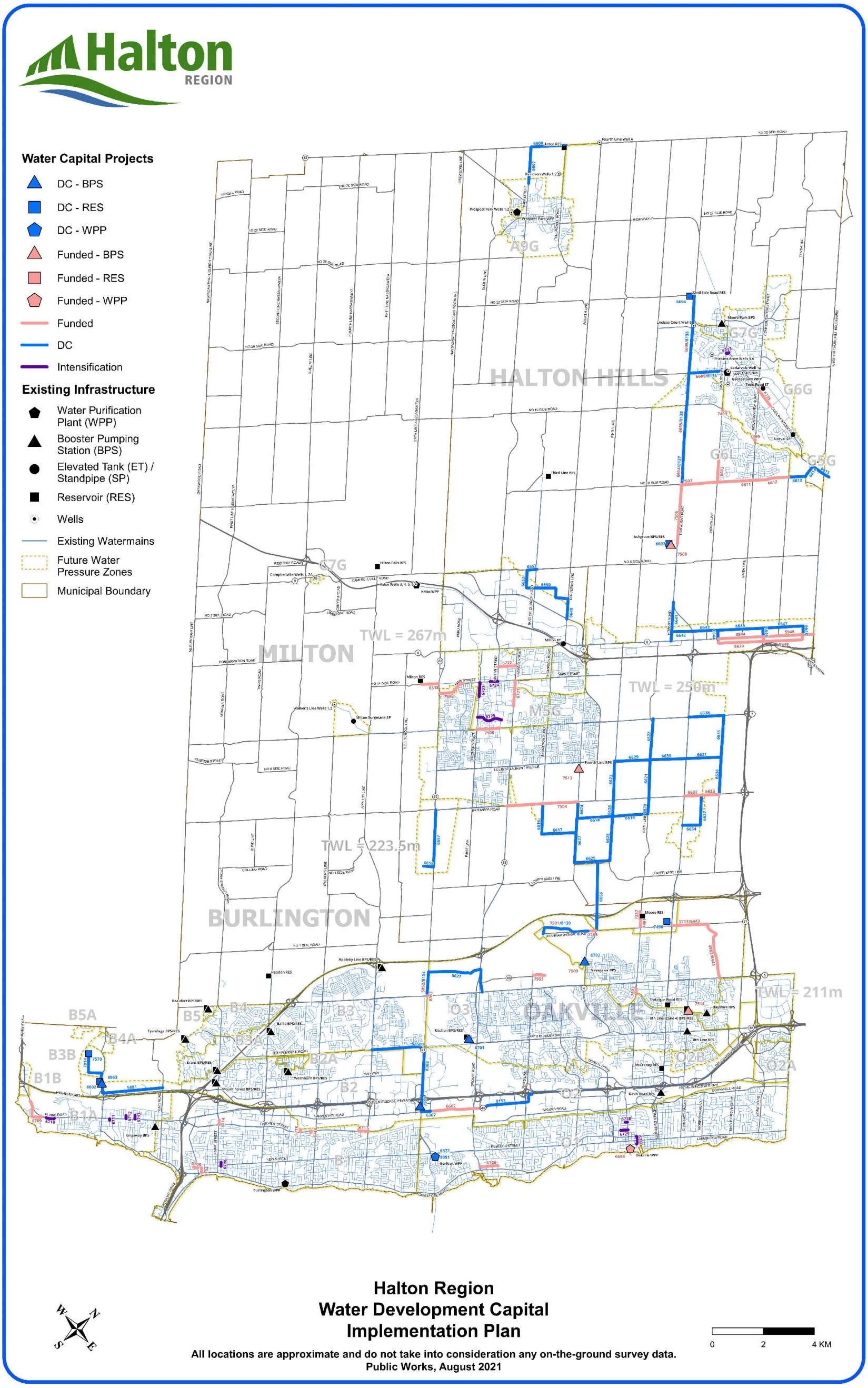


Figure 4 – Water Development Capital Implementation Plan

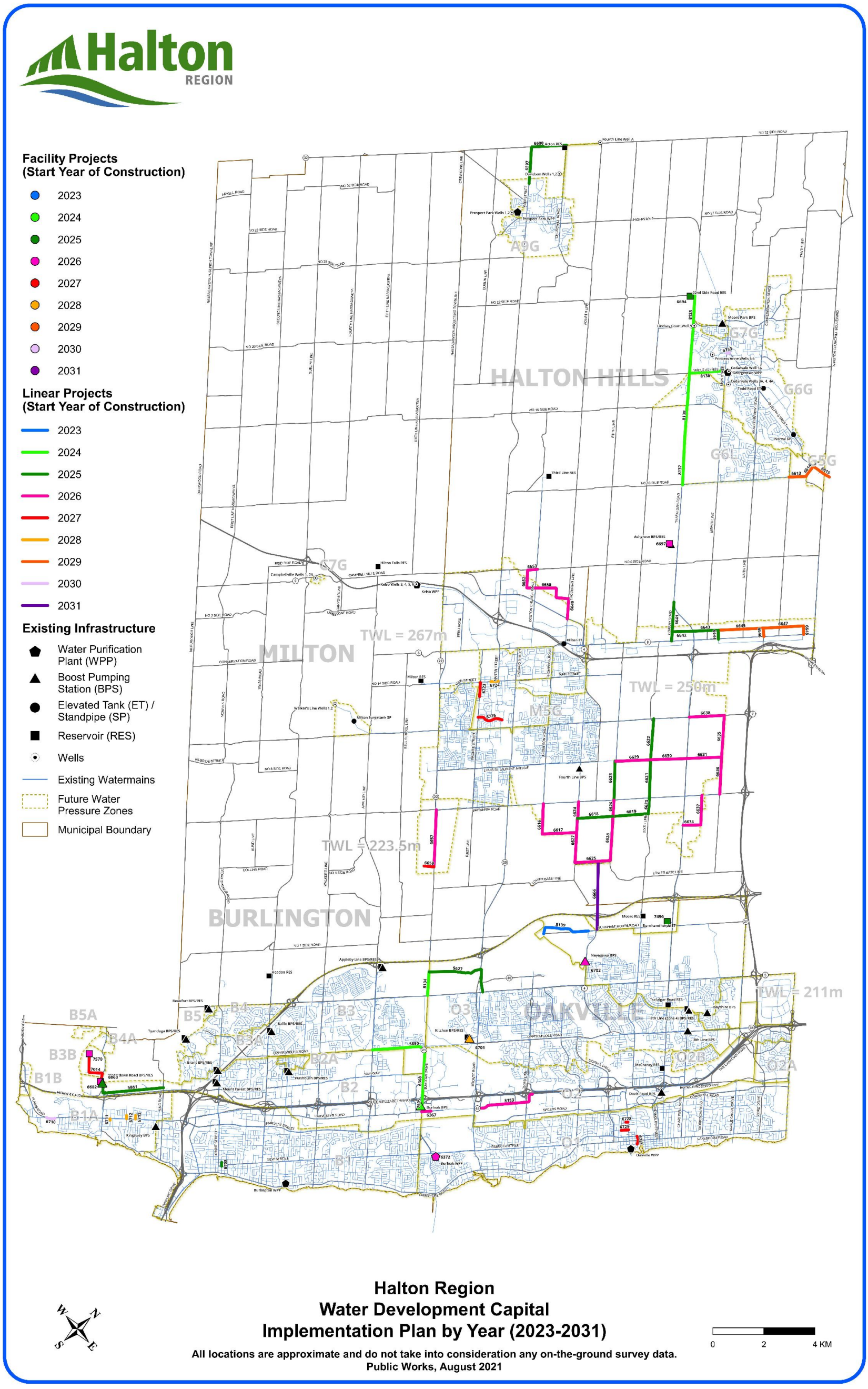


Figure 5 – Water Development Capital Implementation Plan by Year

7. WASTEWATER SERVICING REQUIREMENTS

7.1. Wastewater Service Areas

The wastewater service areas were reviewed and confirmed through this 2022 DC Technical Report. Using Halton Region's wastewater model and various desktop analyses, project requirements were confirmed as well as the downstream impacts to trunk wastewater mains, Wastewater Pumping Stations and Wastewater Treatment Plants. In general, the wastewater development capital implementation plan and general servicing strategy for Halton Region's wastewater system has remained the same as it was in the 2017 DC Update Technical Report, with the exception of changes at the Georgetown WWTP (refer to Section 7.3).

The following sections outline the key modifications to the Halton Region wastewater system. The future wastewater drainage areas are identified by their downstream WWTP and are depicted in Figure 6.

7.2. Milton Wastewater Servicing Review (Update)

The Milton Wastewater Servicing Review was introduced in the 2017 DC Update Technical Report. The study was undertaken to review the long-term servicing strategy for the Milton WWTP. The outcome of the Milton Wastewater Servicing Review determined that the most cost effective and technically viable long-term solution for wastewater servicing in the area was to decommission the Milton WWTP and send all wastewater flows to the Mid-Halton WWTP. This recommendation was endorsed through the 2017 DC Update Technical Report.

Milton WWTP was decommissioned in spring of 2020. All wastewater flow is now directed to the Mid-Halton WWTP.

7.3. Georgetown WWTP Decommissioning Strategy

The 2011 Master Plan endorsed a lake-based transfer of service in Georgetown to facilitate planned growth in the Town of Halton Hills to 2031. The wastewater transfer strategy included a partial diversion of flow from the Georgetown WWTP to the Mid-Halton WWTP. Since the 2011 Master Plan, infrastructure to support the lake-based transfer (both water and wastewater) has progressed to detailed design and construction, per the Region's capital program.

In 2019, a detailed assessment was undertaken to evaluate post-transfer operation of the Georgetown WWTP. The outcome of the study highlighted several potential risks associated with post-transfer operation including consideration of impacts to Silver Creek and increased probability of odour complaints due to a change in flow conditions.

The 2019 study also considered several longer-term alternatives for the Georgetown WWTP and identified the benefits of transferring all flow from the Georgetown WWTP and decommissioning of the facility to coincide with the originally proposed lake-based transfer (2025 timeframe). It is noted that near-term capacity is available at the Mid-Halton WWTP to accommodate the Georgetown WWTP decommissioning due to Regional investment in programs which have reduced per capita average wastewater generation. The benefit to existing percentage of the next Mid-Halton WWTP expansion (planned construction start 2026) has been increased through the 2022 DC Update to account for the capacity utilized by the Georgetown WWTP decommissioning.

The Georgetown WWTP decommissioning strategy will be further validated through the next Water and Wastewater Master Plan. The associated modifications to infrastructure costs have been incorporated into the 2022 DC Update Technical Report for planning purposes.

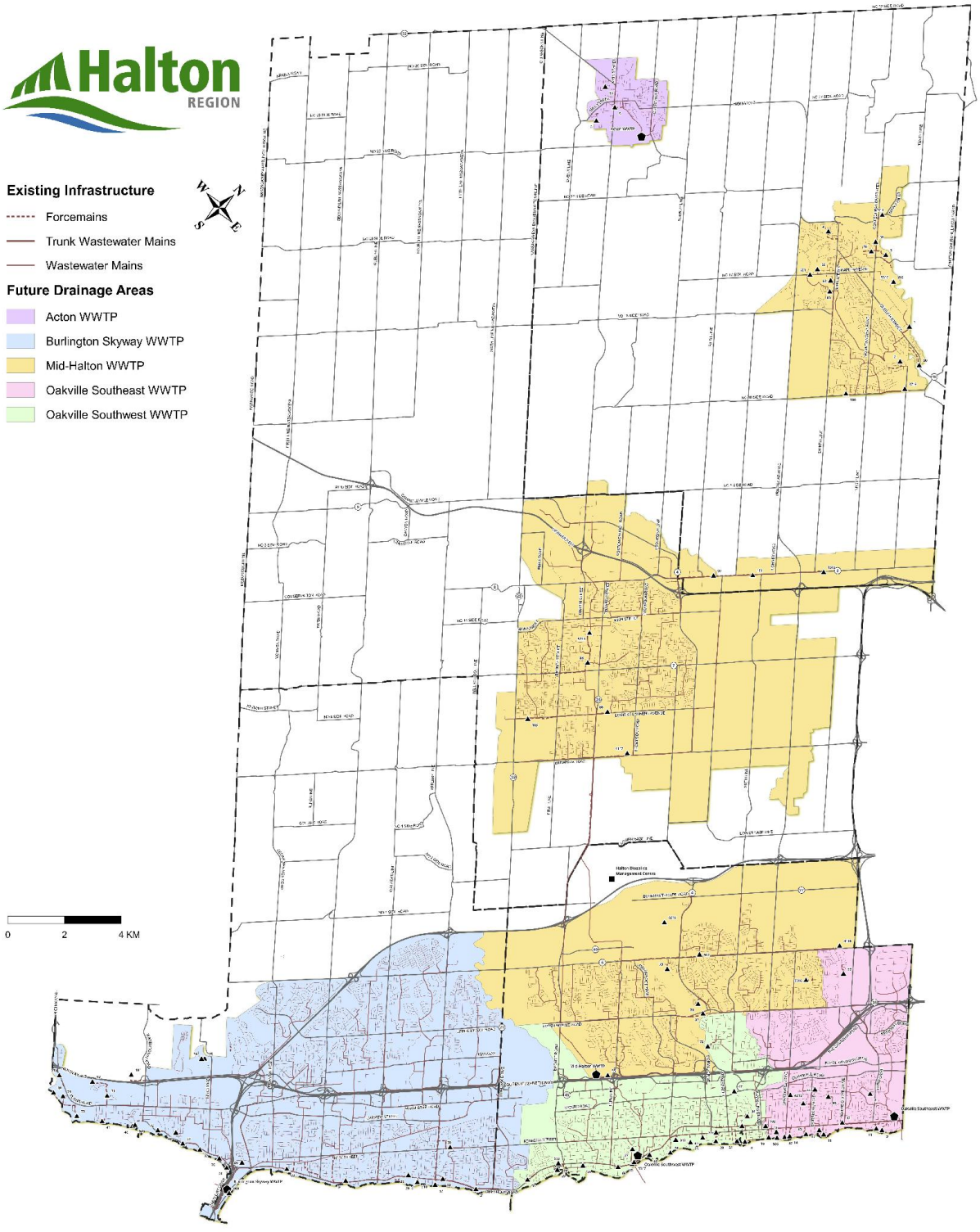


Figure 6 – Future Wastewater Drainage Areas

7.4. Wastewater Flow Projections

The following table outlines the flow projections for each WWTP, including transfer of flow between WWTP catchment areas.

Table 14 – Wastewater Flow Projections

Drainage Area		Average Day Flow Rates (ML/D)		
		2021**	2026	2031
1	**Acton WWTP**	**3.5**	**5.4**	**5.9**
2	**Georgetown WWTP (after transfer)**	**16.0**	**-**	**-**
2.1	Georgetown WWTP (Including Glen Williams and Norval)	16.0	17.1	19.5
2.2	Transfer to Mid-Halton WWTP	-	17.1	19.5
3	**Mid-Halton WWTP (Including transfer from Georgetown WWTP)**	**71.6**	**151.1**	**178.8**
3.1	Mid-Halton WWTP (no transfer)*	71.6	134.0	159.3
3.2	Georgetown WWTP Transfer to Mid-Halton WWTP	-	17.1	19.5
4	**Oakville Southeast WWTP**	**16.1**	**17.2**	**17.8**
5	**Oakville Southwest WWTP**	**28.6**	**37.5**	**40.1**
6	**Skyway WWTP**	**110.2**	**108.2**	**110.3**

*Includes flows from the service area of the decommissioned Milton WWTP.

** For reporting purposes, the average day flow rate (ML/d) for each WWTP (2020 actual plant data) is shown as a representation of current operation.

8. WASTEWATER DEVELOPMENT CAPITAL IMPLEMENTATION PLAN

The wastewater development capital implementation plan is outlined by DC policy category in Table 15. This table provides the Halton Region Unique IDs (project identification numbers), project descriptions and cost estimates. The total wastewater development capital implementation plan cost from 2023 to 2031 is $609M as presented in Table 15.

The wastewater servicing strategy for each of the main service areas as identified in the 2011 Master Plan and updated through the subsequent DC programs is outlined below, as well as key infrastructure components that remain in the wastewater development capital implementation plan from 2023 to 2031 (shown in Figure 7 and Figure 8).

It should be noted that this technical review excludes projects that will be approved in 2022 (as part of the 2022 Budget) as these are subject to an approved financing plan, and any projected funding shortfall will be included in the reserve balances or unfunded capital in the DC study.

Oakville Wastewater Servicing Strategy

- The wastewater strategy for Oakville is to maintain conveyance to the existing WWTPs within the Town.
- Greenfield growth will be directed to the Mid-Halton WWTP.
- Oakville UGC, which is anticipated to experience intensification growth will be serviced by the Rebecca Trunk wastewater main, which ultimately outlets to the Oakville Southwest WWTP.

Key components of the Oakville Wastewater Servicing Strategy from 2023 to 2031 are:

  - Mid-Halton WWTP and North WWPS expansion to provide additional capacity for growth – common to all lake-based service areas in Milton and Georgetown experiencing growth.
  - Local WWPS and linear infrastructure upgrades through intensification program to meet flow projections related to intensification growth.

Burlington Wastewater Servicing Strategy

- The wastewater strategy for Burlington is to maintain conveyance to the Skyway WWTP via existing trunk wastewater mains and WWPSs throughout the City.
- Growth flows within the Skyway WWTP catchment area are predominantly generated by intensification growth.

Key components of the Burlington Wastewater Servicing Strategy from 2023 to 2031 are:

  - Trunk wastewater main upgrades parallel to the QEW just upstream of the Skyway WWTP.
  - Junction Street WWPS Capacity Upgrades.

North Aldershot Policy Area Wastewater Servicing Strategy

- The North Aldershot Policy Area is located in the City of Burlington as identified within Figure 1.
- The North Aldershot wastewater system is located in the service area of the Skyway WWTP in Burlington. The system is currently servicing the Bridgeview Area and lower portions of Waterdown Road and the East sector.
- Currently, new gravity wastewater mains are identified to service the area; however, this area will require a separate study to further refine these infrastructure upgrades.

Milton Wastewater Servicing Strategy

- The wastewater strategy for Milton is to maintain conveyance to the Mid-Halton WWTP via the existing Boyne Trunk wastewater main and various WWPSs.
- Milton Greenfield growth will be serviced by various new trunk wastewater mains and WWPSs to convey flows to the Mid-Halton WWTP.

Key components of the Milton Wastewater Servicing Strategy from 2023 to 2031 are:

- South Tremaine WWPS and Forcemain – servicing areas generally west of Regional Road 25 and south of Britannia Road, including Milton Education Village.
- Trunk wastewater main infrastructure along Fifth Line and Lower Baseline.
- Lower Baseline WWPS and Forcemains – servicing growth areas in Georgetown, Halton Hills 401 Corridor and Milton (Trafalgar Corridor and south of Britannia Road).
- Local infrastructure upgrades to meet flow projections related to intensification growth.

Georgetown Wastewater Servicing Strategy

- Georgetown is currently serviced exclusively by the stream-based Georgetown WWTP.
- Upon completion of the lake-based trunk wastewater main infrastructure, the Georgetown WWTP will be decommissioned, and the service areas can be transferred to the Mid-Halton WWTP catchment area.
- New Greenfield growth areas in southwest Georgetown will be serviced by the lake-based trunk wastewater main infrastructure.

Key components of the Georgetown Wastewater Servicing Strategy from 2023 to 2031 are:

- New WWPS and forcemain to pump flows from Greenfield growth areas in southeast Georgetown.
- Decommissioning of the Georgetown WWTP, and lake-based infrastructure: trunk wastewater mains, WWPSs and forcemains along Fifth Line and Lower Base Line.

Acton Wastewater Servicing Strategy

- The Wastewater strategy for Acton is to maintain conveyance to the Acton WWTP via existing and upgraded trunk wastewater mains and WWPSs.

Key components of the Acton Wastewater Servicing Strategy from 2023 to 2031 are:

- Service updates at the Agnes Street WWPS and Black Creek wastewater mains.

Table 15 – Wastewater Development Capital Implementation Plan

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
Capacity																				
7528	North WWPS expansion of 2,000 L/s at Mid-Halton WWTP (OAK)	OAK	PS	2000 L/s		$69,782,000	$47,139,000	$-	$22,643,000	$17,208,000	$5,435,000	$-	$-	$-	$-	$-	$-	$13,956,000	$-	$55,826,000
7548	Mid-Halton WWTP expansion from 175 ML/d to 225 ML/d (Design)	OAK	PLANT	50 ML/d		$24,549,000	$-	$24,549,000	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-	$24,549,000
7946	New 2400mm WWM inlet to Skyway WWTP parallel to QEW. Design and Construction (BUR)	BUR	MAIN	2400	1,114	$32,137,000	$29,887,000	$-	$2,250,000	$1,710,000	$540,000	$6,427,000	$-	$25,710,000	$-	$-	$-	$-	$-	$-
8154	Halton Wastewater Master Plan (2023 and 2028) (REG)	REG	STUDY			$1,600,000	$-	$-	$1,600,000	$1,216,000	$384,000	$800,000	$-	$-	$-	$-	$800,000	$-	$-	$-
8155	Wastewater Collection System Analysis (2023 to 2031) (REG)	REG	STUDY			$990,000	$-	$-	$990,000	$756,000	$234,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000	$110,000
8156	Wastewater Treatment Capacity Annual Monitoring Report (2023 to 2031) (REG)	REG	STUDY			$450,000	$-	$-	$450,000	$342,000	$108,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
8157	Black Creek Monitoring Program (2023 to 2026) (HHACT)	HHACT	STUDY			$200,000	$-	$-	$200,000	$152,000	$48,000	$50,000	$50,000	$50,000	$50,000	$-	$-	$-	$-	$-
8159	Mid-Halton WWTP expansion from 125 ML/d to 175 ML/d. Design and Construction (OAK)	OAK	PLANT	50 ML/d		$122,744,000	$65,054,000	$-	$57,690,000	$43,845,000	$13,845,000	$-	$24,549,000	$-	$98,195,000	$-	$-	$-	$-	$-
Total Capacity						**$252,452,000**	**$142,080,000**	**$24,549,000**	**$85,823,000**	**$65,229,000**	**$20,594,000**	**$7,437,000**	**$24,759,000**	**$25,920,000**	**$98,405,000**	**$160,000**	**$960,000**	**$14,116,000**	**$160,000**	**$80,535,000**
Greenfield																				
5907	300 mm WWM North Aldershot Servicing (BUR)	BUR	MAIN	300	2,090	$11,800,000	$-	$-	$11,800,000	$8,496,000	$3,304,000	$-	$2,360,000	$-	$9,440,000	$-	$-	$-	$-	$-
6496	Twinned 250mm WWFM from Norval WWPS to new WWM at Mountainview Rd (HHGEO)	HHGEO	FM	250	1,900	$2,503,000	$-	$-	$2,503,000	$1,802,000	$701,000	$-	$-	$-	$-	$-	$-	$501,000	$-	$2,002,000
6497	300 mm WWM on Derry Rd from 8th Line to Trafalgar Rd (MIL)	MIL	MAIN	300	1,361	$1,747,000	$-	$-	$1,747,000	$1,258,000	$489,000	$-	$349,000	$-	$1,398,000	$-	$-	$-	$-	$-
6498	450 mm WWM on new road from 8th Line to Trafalgar Rd (MIL)	MIL	MAIN	450	1,380	$2,854,000	$-	$-	$2,854,000	$2,055,000	$799,000	$-	$571,000	$-	$2,283,000	$-	$-	$-	$-	$-
6500	600 mm WWM on 4th Line from new road to Lower Base Line WWPS (MIL)	MIL	MAIN	600	1,272	$8,253,000	$-	$-	$8,253,000	$5,942,000	$2,311,000	$-	$1,651,000	$-	$6,602,000	$-	$-	$-	$-	$-
6501	450 mm WWM on 4th Line from south of Britannia Rd to new road (MIL)	MIL	MAIN	450	1,021	$6,273,000	$-	$-	$6,273,000	$4,517,000	$1,756,000	$-	$1,255,000	$-	$5,018,000	$-	$-	$-	$-	$-
6502	525 mm WWM on Thompson Rd and new internal road from south of Britannia to 4th Line (MIL)	MIL	MAIN	525	2,241	$4,374,000	$-	$-	$4,374,000	$3,149,000	$1,225,000	$-	$875,000	$-	$3,499,000	$-	$-	$-	$-	$-
6503	300 mm WWM on 8th Line from north of Derry Rd to Derry Rd (MIL)	MIL	MAIN	300	625	$1,046,000	$-	$-	$1,046,000	$753,000	$293,000	$-	$209,000	$-	$837,000	$-	$-	$-	$-	$-
6504	450 mm WWM on 8th Line from north of new road to new road (MIL)	MIL	MAIN	450	738	$1,498,000	$-	$-	$1,498,000	$1,079,000	$419,000	$-	$300,000	$-	$1,198,000	$-	$-	$-	$-	$-
6505	300 mm WWM on 8th Line from north of Britannia Rd to Britannia Rd (MIL)	MIL	MAIN	300	692	$824,000	$-	$-	$824,000	$593,000	$231,000	$-	$165,000	$-	$659,000	$-	$-	$-	$-	$-
6552	450mm WWM on new road alignment in Milton Education Village from Louis St Laurent extension to 1115 m south (MIL)	MIL	MAIN	450	1,115	$1,652,000	$-	$-	$1,652,000	$1,190,000	$462,000	$-	$330,000	$-	$1,322,000	$-	$-	$-	$-	$-
6554	600 mm WWM on Lower Base Line from WWFM discharge approx 650 m west of 1st Line to Regional Rd 25 (MIL)	MIL	MAIN	600	1,911	$15,306,000	$-	$-	$15,306,000	$11,020,000	$4,286,000	$-	$3,061,000	$-	$12,245,000	$-	$-	$-	$-	$-
6555	New 225 L/s WWPS on Tremaine Rd at Lower Base Line (MIL)	MIL	PS	225 L/s		$10,858,000	$-	$-	$10,858,000	$7,818,000	$3,040,000	$2,172,000	$-	$8,686,000	$-	$-	$-	$-	$-	$-
6556	Twin 400 mm WWFM from Tremaine WWPS to Lower Base Line, approx. 650 m west of 1st Line (MIL)	MIL	FM	400	1,135	$5,197,000	$-	$-	$5,197,000	$3,742,000	$1,455,000	$1,039,000	$-	$4,158,000	$-	$-	$-	$-	$-	$-
6557	600 mm WWM on Tremaine Rd from approximately 1500 m north of South Tremaine Rd WWPS to South Tremaine Rd WWPS (MIL)	MIL	MAIN	600	1,539	$12,487,000	$-	$-	$12,487,000	$8,991,000	$3,496,000	$-	$2,497,000	$-	$9,990,000	$-	$-	$-	$-	$-

Halton Region Unique ID	Project Description	Municipality	Project Type	Size / Capacity	Length (m)	Total Estimated Cost (2022$)	Benefit to Existing (2022$)	Post Period Benefit (2022$)	DC (2022$)	Res (2022$)	Non-Res (2022$)	Annualized Funding Requirements								
												2023	2024	2025	2026	2027	2028	2029	2030	2031
6559	525 mm WWM on Tremaine Rd from Britannia Rd to 1050 m south of Britannia Rd (MIL)	MIL	MAIN	525	1,050	$7,554,000	$-	$-	$7,554,000	$5,439,000	$2,115,000	$-	$1,511,000	$-	$6,043,000	$-	$-	$-	$-	$-
6560	525 mm WWM on James Snow Pkwy and new road alignment from Steeles Ave to Esquesing Line (MIL)	MIL	MAIN	525	1,708	$3,525,000	$-	$-	$3,525,000	$2,538,000	$987,000	$-	$705,000	$-	$2,820,000	$-	$-	$-	$-	$-
6561	450 mm WWM on new road and Britannia Rd from Milton Education Village to Tremaine Rd (MIL)	MIL	MAIN	450	710	$1,053,000	$-	$-	$1,053,000	$758,000	$295,000	$-	$211,000	$-	$842,000	$-	$-	$-	$-	$-
6564	525 mm WWM on new alignment from Esquesing Line to 3rd Line (MIL)	MIL	MAIN	525	2,104	$5,197,000	$-	$-	$5,197,000	$3,742,000	$1,455,000	$-	$1,039,000	$-	$4,158,000	$-	$-	$-	$-	$-
6578	525 WWM on Trafalgar Rd from south of Britannia Rd to Britannia Rd/ Trafalgar Rd WWPS (MIL)	MIL	MAIN	525	1,176	$7,376,000	$-	$-	$7,376,000	$5,311,000	$2,065,000	$-	$-	$1,475,000	$-	$5,901,000	$-	$-	$-	$-
6581	1500 mm WWM on 5th Line from Britannia Rd to Lower Base Line (MIL)	MIL	MAIN	1500	2,461	$29,962,000	$1,602,000	$-	$28,360,000	$20,419,000	$7,941,000	$-	$5,992,000	$-	$23,970,000	$-	$-	$-	$-	$-
6582	1500 mm WWM on Lower Base Line from 5th Line to 4th Line (MIL)	MIL	MAIN	1500	1,378	$17,650,000	$849,000	$-	$16,801,000	$12,097,000	$4,704,000	$-	$3,530,000	$-	$14,120,000	$-	$-	$-	$-	$-
6583	525 mm WWM on new road from 1400 m north of Britannia Rd to Britannia Rd (MIL)	MIL	MAIN	525	1,366	$9,428,000	$-	$-	$9,428,000	$6,788,000	$2,640,000	$1,886,000	$-	$7,542,000	$-	$-	$-	$-	$-	$-
6589	35 L/s WWPS on 10th Side Rd in Norval (HHGEO)	HHGEO	PS	35 L/s		$4,550,000	$-	$-	$4,550,000	$3,276,000	$1,274,000	$-	$-	$-	$-	$-	$-	$910,000	$-	$3,640,000
7534	450 mm WWM on new road in Milton Education Village from 800m north of Louis St Laurent extension to Louis St Laurent extension (MIL)	MIL	MAIN	450	800	$1,186,000	$-	$-	$1,186,000	$854,000	$332,000	$-	$237,000	$-	$949,000	$-	$-	$-	$-	$-
8034	2350 L/s WWPS at Lower Base Line and 4th Line (MIL)	MIL	PS	2350 L/s		$81,402,000	$18,093,000	$-	$63,309,000	$45,583,000	$17,726,000	$-	$16,280,000	$65,122,000	$-	$-	$-	$-	$-	$-
8035	Twinned 900 mm WWFM from Lower Base Line to Regional Rd 25 (MIL)	MIL	FM	900	3,532	$64,723,000	$3,236,000	$-	$61,487,000	$44,271,000	$17,216,000	$-	$12,945,000	$51,778,000	$-	$-	$-	$-	$-	$-
Total Greenfield						**$320,278,000**	**$23,780,000**	**$-**	**$296,498,000**	**$213,481,000**	**$83,017,000**	**$5,097,000**	**$56,073,000**	**$138,761,000**	**$107,393,000**	**$5,901,000**	**$-**	**$1,411,000**	**$-**	**$5,642,000**
Built Boundary																				
6515	300 mm WWM on Childs Drive between the south entrance of Satok Crescent and Nipissing Road (MIL)	MIL	MAIN	300	241	$645,000	$-	$-	$645,000	$535,000	$110,000	$-	$-	$-	$129,000	$-	$516,000	$-	$-	$-
6517	450 mm WWM on Oak St between Ontario St South and Fulton St (MIL)	MIL	MAIN	450	387	$1,357,000	$-	$-	$1,357,000	$1,126,000	$231,000	$-	$-	$-	$271,000	$-	$1,086,000	$-	$-	$-
6531	250 mm WWM on Chisholm/Rebecca St between Forsyth St and Chisholm St on Rebecca St and on Chisholm St between Rebecca St and 45 m north of Lakeshore Rd West (OAK)	OAK	MAIN	250	202	$282,000	$-	$-	$282,000	$234,000	$48,000	$-	$-	$-	$56,000	$-	$226,000	$-	$-	$-
6535	450 mm WWM on Trafalgar Rd from 10 m north of Inglehart Street North to Cross Ave (OAK)	OAK	MAIN	450	193	$1,297,000	$-	$-	$1,297,000	$1,077,000	$220,000	$259,000	$-	$1,038,000	$-	$-	$-	$-	$-	$-
6537	675 mm WWM on Trafalgar Rd, through GO lot and on Argus St from Spruce St to 60 m north of Cross Ave (OAK)	OAK	MAIN	675	639	$6,327,000	$-	$-	$6,327,000	$5,251,000	$1,076,000	$1,265,000	$-	$5,062,000	$-	$-	$-	$-	$-	$-
7537	Junction St WWPS Capacity Upgrade to 150 L/s WWPS - Design and Construction (BUR)	BUR	PS	150 L/s		$11,258,000	$-	$-	$11,258,000	$9,344,000	$1,914,000	$-	$-	$-	$2,252,000	$-	$9,006,000	$-	$-	$-
8140	Twinning of 525 - 600 mm WWM from Elgin St South along Black Creek alignment to Acton WWTP -Construction (HHACT)	HHACT	MAIN	525-600	1,252	$3,503,000	$2,137,000	$-	$1,366,000	$1,134,000	$232,000	$-	$3,503,000	$-	$-	$-	$-	$-	$-	$-
8141	Agnes St. WWPS Strategy - Construction (HHACT)	HHACT	PS			$8,577,000	$7,119,000	$-	$1,458,000	$1,210,000	$248,000	$-	$8,577,000	$-	$-	$-	$-	$-	$-	$-
8158	Walker St WWPS - I/I reduction Program to gain capacity at the station. Design and Construction (OAK)	OAK	PS			$2,602,000	$-	$-	$2,602,000	$2,160,000	$442,000	$520,000	$-	$2,082,000	$-	$-	$-	$-	$-	$-
Total Built Boundary						**$35,848,000**	**$9,256,000**	**$-**	**$26,592,000**	**$22,071,000**	**$4,521,000**	**$2,044,000**	**$12,080,000**	**$8,182,000**	**$2,708,000**	**$-**	**$10,834,000**	**$-**	**$-**	**$-**
TOTAL						**$608,578,000**	**$175,116,000**	**$24,549,000**	**$408,913,000**	**$300,781,000**	**$108,132,000**	**$14,578,000**	**$92,912,000**	**$172,863,000**	**$208,506,000**	**$6,061,000**	**$11,794,000**	**$15,527,000**	**$160,000**	**$86,177,000**

Note: RR 25 = Regional Road 25, WWM = Wastewater Main, WWFM = Wastewater Forcemain, WWTP = Wastewater Treatment Plant

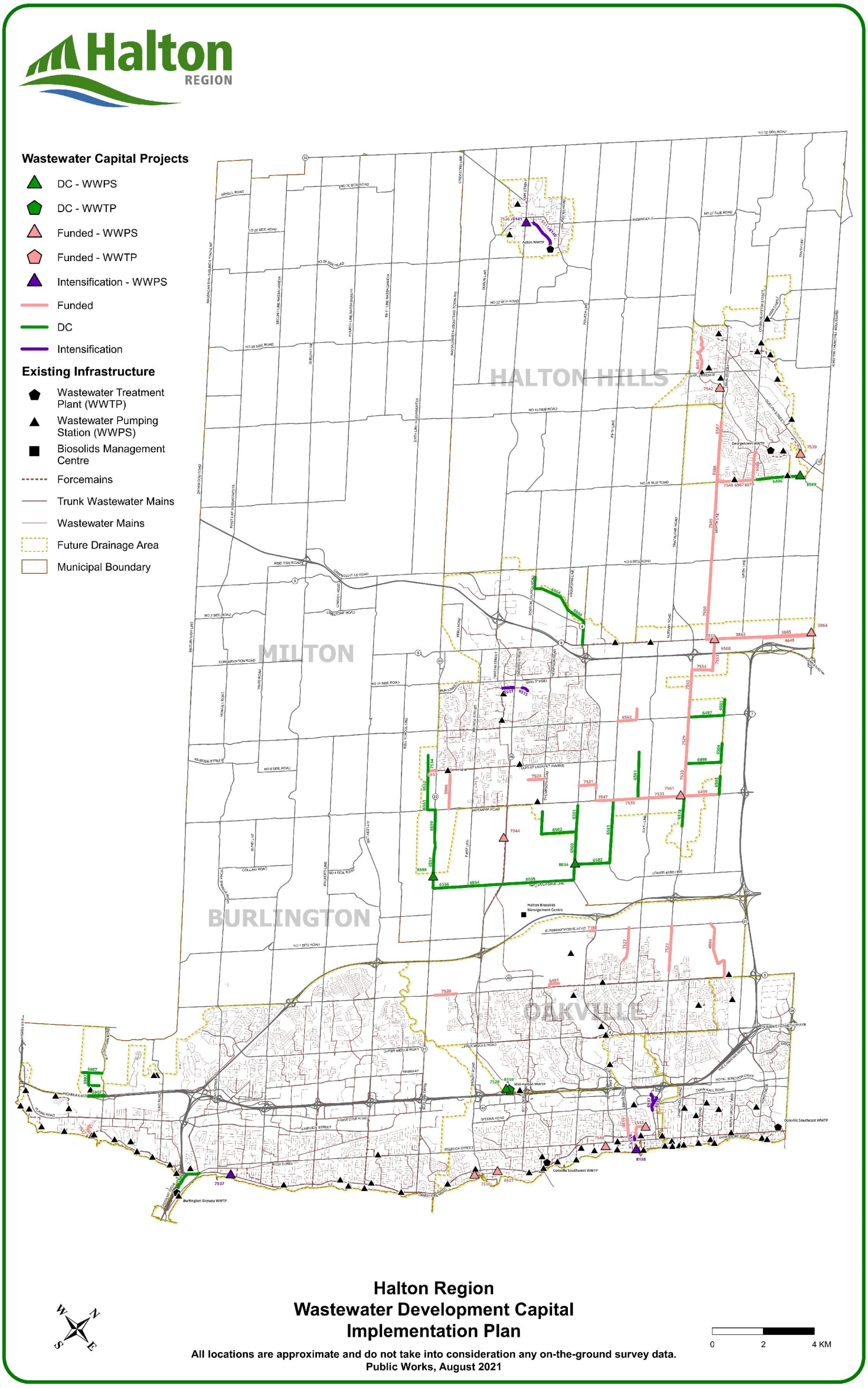


Figure 7 – Wastewater Development Capital Implementation Plan

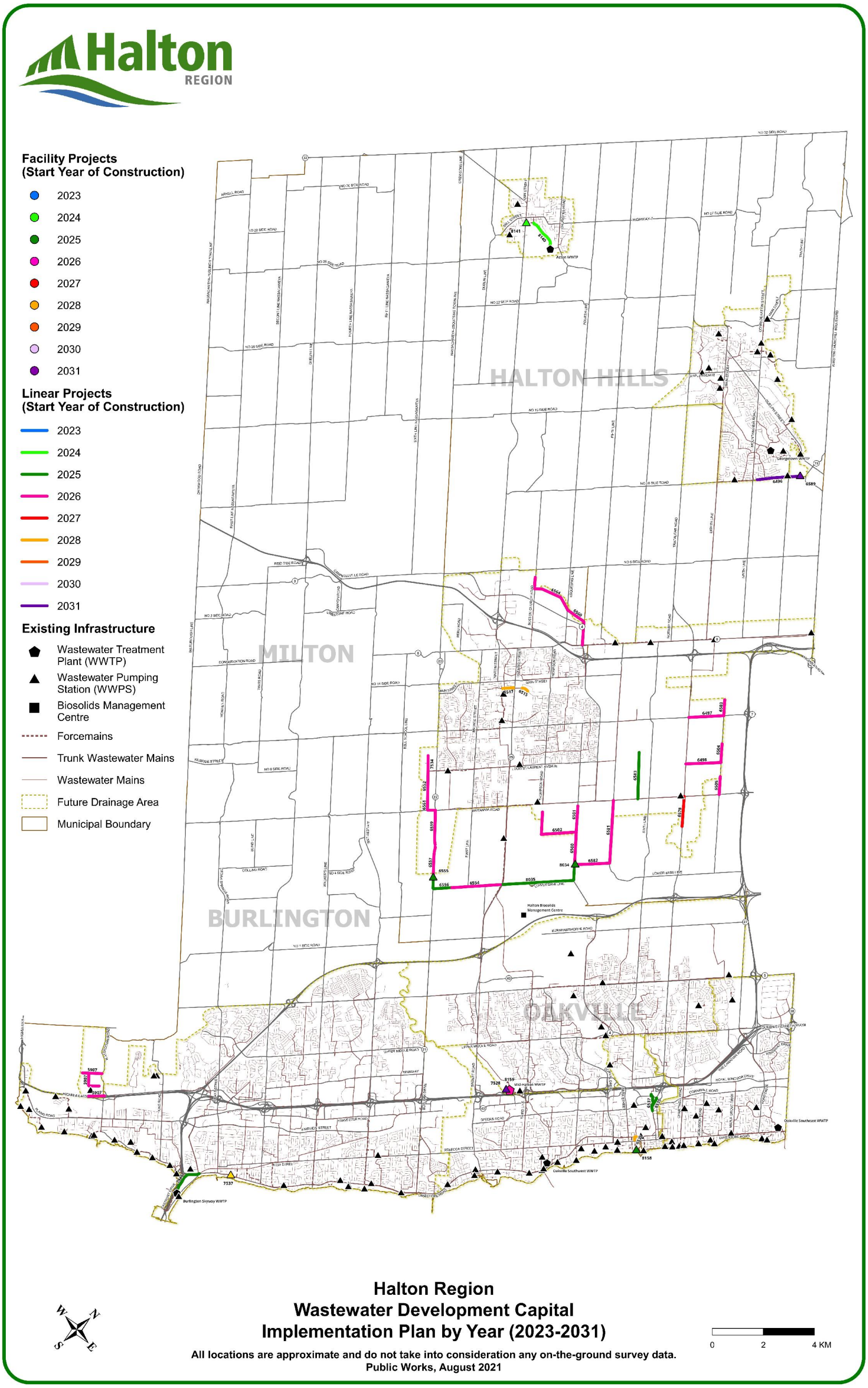


Figure 8 – Wastewater Development Capital Implementation Plan by Year

APPENDIX A:
UPDATED UNIT COSTS AND INDEX

Gravity Wastewater Main Unit Cost
5m Depth

Diameter	Total Unit Cost
(mm)	(2022$/m)
300	$760
375	$810
450	$880
525	$950
600	$1,220
675	$1,490
750	$1,640
825	$1,760
900	$2,070
975	$2,220
1050	$2,460
1200	$2,760
1350	$3,020
1500	$3,380
1800	$4,300
2100	$5,320
2400	$6,550
3000	$9,130

Gravity Wastewater Main Unit Cost
10m Depth

Diameter	Total Unit Cost
(mm)	(2022$/m)
300	$3,210
375	$3,310
450	$3,420
525	$3,530
600	$3,870
675	$4,240
750	$4,450
825	$4,620
900	$5,050
975	$5,230
1050	$5,600
1200	$6,000
1350	$6,390
1500	$6,770
1800	$7,870
2100	$9,150
2400	$10,560
3000	$13,470

Watermain & Forcemain Unit Costs

Diameter	Total Unit Cost
(mm)	(2022$/m)
150	$440
200	$590
250	$740
300	$880
350	$1,030
400	$1,070
450	$1,200
500	$1,360
600	$1,620
750	$1,930
900	$2,390
1050	$2,770
1200	$3,260
1350	$3,960
1500	$4,380
1650	$5,080
1800	$5,660
2100	$6,460

Gravity Wastewater Main Tunnelling Construction Costs

Diameter	Total Unit Cost
(mm)	(2022$/m)
250	$8,530
300	$8,600
375	$8,720
450	$8,830
525	$8,950
600	$9,060
675	$7,870
750	$7,870
825	$7,870
900	$7,870
975	$7,870
1050	$7,870
1200	$7,870
1350	$8,530
1500	$9,190
1650	$9,850
1800	$10,510
2100	$12,490
2400	$13,590

Pressure Pipe Tunnelling Construction Costs

Diameter	Total Unit Cost
(mm)	(2022$/m)
150	$8,370
300	$8,600
400	$8,600
600	$9,840
750	$11,420
900	$13,010
1050	$14,590
1200	$16,170
1350	$17,890
1500	$20,000
1650	$20,930
1800	$22,950

Shaft Tunnelling Construction Costs

Cost = $12,500 x Depth (m) x Inside Shaft Diameter (m)

Facilities

Facility	Total Unit Cost	Unit
Reservoirs - New Construction	$900,000	($/ML)
New Wastewater Pumping Stations	Cost = $19,420 x Capacity (L/s) + 1,983,000	($/L/s)
Notes: Unit rate is intended to provide the base construction cost for a basic facility. These costs are not assumed to account for forcemains (for WWPSs) or overflow storage tanks (for WWPSs) or unique items such as deep wet wells (WWPSs), extensive architectural features or extensive site works.		

Index to January 2022

Index Used	Index	% Incremental Difference (Rounded)	% Cumulative Difference (Rounded)
4Q - 16	98.1	0.0%	0.0%
4Q - 20	112.1	14.6%	14.3%
Estimated 4Q - 21	120.7	7.7%	23.0%

In accordance with the Statistics Canada Quarterly Construction Price Index

APPENDIX B:
BENEFIT TO EXISTING AND POST PERIOD BENEFIT CALCULATIONS

Benefit to Existing and Post Period Benefit Calculations

WATER – Benefit to Existing (BTE)

ID	Description	BTE	DC	Benefit to Existing Rationale
6602	7.5 ML storage expansion at Waterdown Reservoir (existing site) (Zone B1A) (BUR)	93%	7%	There is currently insufficient storage to meet existing demands. This project is required to provide additional storage to support servicing to existing users as well as to support future demands. This facility provides floating storage as well as operational storage for supply to downstream pressure zones. Demand percentage based on Burlington service area. 118.7ML/D existing/127.3ML/D total future = 93%.
7496	Modifications to the Burnhamthorpe Water Tower (OAK)	5%	95%	Due to the scale and location of growth, the Zone 3/4/5 pressure zone boundary modification was required in order to optimize water pressure in growth areas. As a result of this change, some existing users at the upper and lower end of the old zones will experience some improvements to level of service (slight pressure increase in areas of low pressure and slight pressure decrease within areas of high pressure). Growth would not be supported under the existing pressure zones without implementation of this zone switchover. However, the Zone 3/4/5 pressure zone boundary modification will provide some marginal improvements in levels of service to some existing users. The high level assessment of the BTE customers is 5%.

WATER – Post Period Benefit (PPB)

ID	Description	PPB	DC	PPB Rationale
5850	1050mm WM on Upper Middle Rd from Burloak Drive to Appleby Line (Zone B2) (Construction) (BUR)	34%	66%	This feedermain will support water supply to meet the 2031 needs. This is also a critical feedermain for mature state post 2031 servicing. This section of feedermain is being oversized to support the post 2031 strategy. A 750 mm watermain would be required for 2031 servicing only. The feedermain is recommended to be oversized to 1050 mm for post 2031. The PPB has been calculated as the cost difference between a 1050 mm feedermain and a 750 mm feedermain.
6367	Burloak Booster Pumping Station Phase 1, 60 ML/d (Zone B2) - Construction (BUR)	64%	36%	This facility is required to meet servicing needs for the 2031 service areas. This facility is also critical for the long term mature state strategy for post 2031 growth. 60 ML/D will be installed as part of Phase I, an additional 60 ML/D pumping capacity will be installed in Phase II (beyond 2031). The station is being constructed to its ultimate building size in Phase I, and thus Phase II will not require a building expansion. Part of the Phase I building cost is therefore attributed to Phase II (post-period) capacity. 40 ML/D of the total 120 ML/D is required for the 2031 growth demand. • Total cost for full 120 ML/D capacity is $14,965,000 (Phase I + Phase II). • Only 40 ML/D out of the total 120 ML/D is required for 2031: 1/3 x $14,965,000 = $4,988,000 in period DC cost. • In-period (up to 2031) project cost for 2031 = $13,693,000, but $4,988,000 is needed in period, therefore, Phase I PPB = $4,988,000/$13,693,000 = 36% DC, 64% PPB
6368	1050mm WM on Burloak Dr from the QEW to Upper Middle Rd (Zone B2) - Construction (OAK)	42%	58%	This feedermain will support water supply to meet the 2031 needs. This is also a critical feedermain for mature state post 2031 servicing. This section of feedermain is being oversized to support the post 2031 strategy. A 750 mm watermain would be required for 2031 servicing only. The feedermain is recommended to be oversized to 1050 mm for post 2031. The PPB has been calculated as the cost difference between a 1050 mm feedermain and a 750 mm feedermain.
6666	750mm WM on Neyagawa Blvd. from Burnhamthorpe Rd W to Lower Base Line W (MIL)	90%	10%	2031 water supply capacity to the Milton and Halton Hills service areas is primarily provided through the Zone 5 spine and the Zone 4 second spine. This feedermain provides additional security of supply to Zone 4 as well as provides improved level of service to Zone 4. The feedermain capacity will support future growth beyond 2031. It is estimated that the feedermain provides 10% benefit to the 2031 service area.
6701	Kitchen Zone O3 Booster Pumping Station Expansion by 80 ML/d (OAK)	67%	33%	Additional Zone 3 pumping capacity is required to support 2031 needs. The next expansion at the station will require expansion to the building. The additional demand for Zone 3 up to 2031 is approximately 45 ML/D. 80 ML/D of additional pumping capacity will be installed, however the building expansion will be constructed to accommodate the ultimate capacity of 135 ML/D. 45 ML/D of the total 135 ML/D (33%) is required for growth to 2031. The balance of costs is PPB.
7505	1050mm WM on Burloak Dr from Burloak Booster Pumping Station to the QEW - Construction (OAK)	42%	58%	This feedermain will support water supply to meet the 2031 needs. This is also a critical feedermain for mature state post 2031 servicing. This section of feedermain is being oversized to support the post 2031 strategy. A 750 mm watermain would be required for 2031 servicing only. The feedermain is recommended to be oversized to 1050 mm for post 2031. The PPB has been calculated as the cost difference between a 1050 mm feedermain and a 750 mm feedermain.

WASTEWATER – Benefit to Existing (BTE)

ID	Description	BTE	DC	BTE Rationale
6581	1500 mm WWM on 5th Line from Britannia Rd to Lower Base Line (MIL)	5%	95%	Project required to address future growth; however, the project needs to be upsized to accommodate existing flow from the Georgetown WWTP decommissioning. BTE has been calculated as the cost difference between a 1350 mm wastewater main and a 1500 mm wastewater main.
6582	1500 mm WWM on Lower Base Line from 5th Line to 4th Line (MIL)	5%	95%	Project required to address future growth; however, the project needs to be upsized to accommodate existing flow from the Georgetown WWTP decommissioning. BTE has been calculated as the cost difference between a 1350 mm wastewater main and a 1500 mm wastewater main.
7528	North WWPS expansion of 2,000 L/s at Mid-Halton WWTP (OAK)	68%	32%	Project required to address growth flow and support Milton and Georgetown WWTPs decommissioning. BTE share has been calculated as the cost difference between total capacity construction costs and the total capacity required for growth. BTE: [Total Capacity WWPS Construction Cost (2000 L/s) - Growth Capacity WWPS Construction Cost (580 L/s)] / Total Capacity Construction Cost (2000 L/s) = ($69,782,000 – $22,643,000)/ $69,782,000 = 68%.
7946	New 2400 mm sewer inlet to Skyway WWTP parallel to QEW (BUR)	93%	7%	Project required to address existing capacity deficiency as well as growth flow. BTE share has been calculated as the ratio of the existing capacity deficiency, relative to the total increase in capacity required for both existing and growth. BTE: Existing Capacity Deficiency / (Growth Flow + Existing Capacity Deficiency). = 822/((4,998-4,934)+822) = 822/886 = 93%.
8034	2,350 L/s WWPS at Lower Base Line and 4th Line (MIL)	22%	78%	Project required to address future growth; however, the project needs to be upsized to accommodate existing flow from the Georgetown WWTP decommissioning. BTE share has been calculated as the cost difference between total capacity construction costs and the total capacity required for growth. BTE: [Total Capacity WWPS Construction Cost (2350 L/s) - Growth Capacity WWPS Construction Cost (1805 L/s)] / Total Capacity WWPS Construction cost (2350 L/s) = ($81,402,000–$63,309,000)/$81,402,000 = 22%.
8035	Twinned 900 mm WWFM from Lower Base Line to RR 25 (MIL)	5%	95%	Certain projects have been oversized to accommodate flow from the decommission of Georgetown WWTP (Halton Region Unique IDs 6581, 6582, 8034). The Lower Base Line WWPS Forcemains were originally sized as 2 x 900 mm pipes to meet 2031 pumped flow needs (1805 L/s). In order to accommodate the flow from Georgetown WWTP, the WWPS has been resized to 2350 L/s; however, 2 x 900mm forcemains still provide adequate capacity to convey the ultimate pumped flow and sizes have not changed. The Lower Base Line WWPS Forcemains project is a growth driven project; however, it is acknowledged that the forcemains will support the decommissioning and will convey existing flows from Georgetown. As such, a nominal 5% BTE has been applied to this project.
8140	Twinning of 525 - 600 mm WWM from Elgin Street South along Black Creek alignment to Acton WWTP (HHACT)	61%	39%	Project required to address existing capacity deficiency as well as growth flow. BTE share has been calculated as the ratio of the existing capacity deficiency, relative to the total increase in capacity required for both existing and growth. BTE: Existing Capacity Deficiency / (Growth Flow + Existing Capacity Deficiency) = 22/(22+14) = 61%.
8141	Agnes St. WWPS Strategy – Construction (HHACT)	83%	17%	Project required to address existing capacity deficiency as well as growth flow. BTE share is calculated as the ratio of the existing capacity deficiency, relative to the total increase in capacity required for both existing and growth. BTE: Existing Deficiency / (Growth Flow + Existing Deficiency) = 58/(58+12) = 83%.
8159	Mid-Halton WWTP expansion from 125 ML/d to 175 ML/d (OAK)	53%	47%	Project required to address growth flow and support Milton and Georgetown WWTPs decommissioning. BTE share has been calculated as combined flow from decommissioned plants divided by the total capacity expansion. BTE: (Milton WWTP Flows + Georgetown WWTP Flows) / Mid-Halton WWTP Capacity Expansion = (18.5 ML/D + 8.2 ML/D) /50 ML/D = 53%.

WASTEWATER – Post Period Benefit (PPB)

ID	Description	PPB	DC	PPB Rationale
7548	Mid-Halton WWTP expansion from 175 ML/d to 225 ML/d (Design) (OAK)	100%	0%	Upgrade to 225 ML/d is dedicated to post 2031 growth. The design cost will have 100% PPB.

APPENDIX C:
LOCAL SERVICE GUIDELINES

2. LOCAL SERVICE POLICY

2.1 Water and Wastewater

The following guideline sets out in general the size of water and wastewater infrastructure that constitutes a development charge project. Other infrastructure will be treated as a local service, which is the direct responsibility of a landowner under a development agreement.

2.1.1 Watermains

- Internal to the development (servicing of vacant lands)
  - Greater than 400 mm:
    Development charges main
  - 400 mm or less:
    Developer responsibility within subdivision agreement

- External to the development (mains on existing roads but requiring a local connection)
  - 400 mm or greater:
    Development charges main
  - Less than 400 mm:
    Developer responsibility within subdivision agreement

Exception to these policies is feeder mains required to connect from a well or reservoir to the network. All feeder mains are considered to be development charges projects regardless of the size of the main.

External watermains of any size required for a development to be connected to an existing local main are considered to be the developers' responsibility.

2.1.2 Booster Stations and Reservoirs

- All water booster pumping stations and reservoirs projects are considered to be development charges projects.

2.1.3 Wastewater Mains

- Internal or external (i.e., local connection) to the development
  - Greater than 450 mm:

    Development charges main
  - 450 mm or less:

    Developer responsibility within subdivision agreement

2.1.4 Lift Stations

- Lift stations internal to a development and fed by mains which qualify for the development charges project list are considered to be development charges projects. Lift stations fed by mains that do not qualify for the development charges project list are the responsibility of the developer

- Existing lift stations that have to be expanded as part of a new development are the responsibility of the benefiting developer and will be dealt with as part of the subdivision agreement

The above policy guidelines are general principles by which staff will be guided in considering development applications. However, each application will be considered on its own merits having regard to, among other factors, the nature, type and location of the development and any existing and proposed development in the surrounding area, these policy guidelines, the location and type of services required and their relationship to the proposed development and existing and proposed development in the area, and subsection 59(2) of the *Development Charges Act, 1997*.

APPENDIX D:
DETAILED WATER STORAGE TABLES

2021							A: Fire Storage				B: Equalization	C: Emergency	TOTAL REQUIRED STORAGE (A+B+C)
Pressure Zone	Service Area	2021 Total Projection				MDD (2016 modelled plus growth)	Equivalent Population	Fire Flow	Duration	A	25% of Max Day Demand	25% of A + B	
		Population	Industrial	Commercial	Institutional	(ML/D)		(L/s)	(hrs)	(ML)	(ML)	(ML)	(ML)
B1, O1	B1, O1	146,208	14,765	36,740	7,342	92.3	193,002	311	3	3.4	23.1	6.6	33.1
B1A	B1A	11,976	2,375	3,516	717	8.7	17,537	311	3	3.4	2.2	1.4	6.9
B3B,B4A,B5A	B3B, B4A, B5A	1,653	0	0	18	0.2	1,668	311	3	3.4	0.0	0.9	4.3
B2	B2	20,072	22,163	19,767	746	27.6	58,417	311	3	3.4	6.9	2.6	12.8
B3	B3, B2A	51,119	5,061	8,175	515	29.6	62,579	311	3	3.4	7.4	2.7	13.4
B4	B4, B3A	9,656	108	458	134	4.8	10,190	311	3	3.4	1.2	1.1	5.7
TWL=250	TWL=250, TWL=223.5, TWL=211	167,887	19,398	24,681	9,771	85.1	213,892	311	3	3.4	21.3	6.2	30.8
TWL=267	TWL=267	18,008	21,885	16,977	4,863	18.3	57,619	311	3	3.4	4.6	2.0	9.9
G6G	G5G, G6G, G7G	26,909	4,617	5,294	2,342	17.3	37,489	311	3	3.4	4.3	1.9	9.6
G6L	G6L	17,538	319	287	251	8.1	18,291	311	3	3.4	2.0	1.3	6.7
A9G	A9G	10,502	1,644	1,618	1,111	5.0	14,323	250	3	2.7	1.3	1.0	5.0
O2	O2	26,894	26,675	16,784	2,303	26.2	69,585	311	3	3.4	6.5	2.5	12.4
O3	O3, O2A, O2B	73,805	3,998	6,774	6,804	48.9	88,378	311	3	3.4	12.2	3.9	19.5
M5G	M5G	22,956	2,290	6,706	3,108	14.2	32,514	311	3	3.4	3.6	1.7	8.6

Note: Service Areas for several facilities consist of multiple pressure zones. The total storage requirement for these service areas is calculated based on the combined storage need for all of the zones within the service area.
Note: Zone B5 is a very small service area and does not currently have water storage. There are no current plans to add storage to this zone.

2026							A: Fire Storage				B: Equalization	C: Emergency	TOTAL REQUIRED STORAGE (A+B+C)
Pressure Zone	Service Area	2026 Total Projection				MDD (2016 modelled plus growth)	Equivalent Population	Fire Flow	Duration	A	25% of Max Day Demand	25% of A + B	
		Population	Industrial	Commercial	Institutional	(ML/D)		(L/s)	(hrs)	(ML)	(ML)	(ML)	(ML)
B1, O1	B1, O1	151,684	14,956	37,244	7,404	95.5	199,075	311	3	3.4	23.9	6.8	34.0
B1A	B1A	11,941	2,406	3,548	739	8.7	17,576	311	3	3.4	2.2	1.4	6.9
B3B,B4A,B5A	B3B, B4A, B5A	1,641	0	0	18	0.2	1,656	311	3	3.4	0.0	0.9	4.3
B2	B2	20,088	22,305	19,897	754	27.8	58,684	311	3	3.4	6.9	2.6	12.9
B3	B3, B2A	51,110	5,163	8,322	521	29.7	62,786	311	3	3.4	7.4	2.7	13.5
B4	B4, B3A	9,625	118	467	136	4.8	10,178	311	3	3.4	1.2	1.1	5.7
TWL=250	TWL=250, TWL=223.5, TWL=211	202,831	27,539	30,897	14,074	111.4	265,575	311	3	3.4	27.9	7.8	39.0
TWL=267	TWL=267	21,088	24,747	17,625	4,950	21.7	64,385	311	3	3.4	5.4	2.2	11.0
G6G	G5G, G6G, G7G	28,792	4,745	5,454	2,363	18.3	39,638	311	3	3.4	4.6	2.0	9.9
G6L	G6L	28,688	323	1,151	593	16.1	30,300	311	3	3.4	4.0	1.8	9.2
A9G	A9G	12,977	1,867	1,749	1,140	6.3	17,157	250	3	2.7	1.6	1.1	5.3
O2	O2	31,079	26,737	17,279	2,372	28.6	74,223	311	3	3.4	7.2	2.6	13.2
O3	O3, O2A, O2B	74,031	4,006	6,790	6,831	48.8	88,645	311	3	3.4	12.2	3.9	19.5
M5G	M5G	24,720	2,369	7,478	3,893	15.4	35,527	311	3	3.4	3.9	1.8	9.0

Note: Service Areas for several facilities consist of multiple pressure zones. The total storage requirement for these service areas is calculated based on the combined storage need for all of the zones within the service area.
Note: Zone B5 is a very small service area and does not currently have water storage. There are no current plans to add storage to this zone.

2031							A: Fire Storage				B: Equalization	C: Emergency	TOTAL REQUIRED STORAGE (A+B+C)
Pressure Zone	Service Area	2031 Total Projection				MDD (2016 modelled plus growth)	Equivalent Population	Fire Flow	Duration	A	25% of Max Day Demand	25% of A + B	
		Population	Industrial	Commercial	Institutional	(ML/D)		(L/s)	(hrs)	(ML)	(ML)	(ML)	(ML)
B1, O1	B1, O1	156,537	15,745	37,812	7,556	98.7	205,308	311	3	3.4	24.7	7.0	35.0
B1A	B1A	12,169	2,436	3,641	740	8.9	17,900	311	3	3.4	2.2	1.4	7.0
B3B,B4A,B5A	B3B, B4A, B5A	1,643	0	0	18	0.2	1,658	311	3	3.4	0.0	0.9	4.3
B2	B2	20,530	22,394	20,194	754	28.3	59,421	311	3	3.4	7.1	2.6	13.1
B3	B3, B2A	52,140	5,274	8,763	521	30.4	64,230	311	3	3.4	7.6	2.7	13.7
B4	B4, B3A	9,821	119	471	136	4.9	10,377	311	3	3.4	1.2	1.1	5.7
TWL=250	TWL=250, TWL=223.5, TWL=211	233,030	39,776	40,879	15,610	122.3	317,264	311	3	3.4	30.6	8.5	42.4
TWL=267	TWL=267	25,418	26,127	18,135	5,098	24.9	70,711	311	3	3.4	6.2	2.4	12.0
G6G	G5G, G6G, G7G	34,523	4,921	5,859	2,463	20.1	45,915	311	3	3.4	5.0	2.1	10.5
G6L	G6L	36,829	343	1,558	811	22.2	38,913	311	3	3.4	5.6	2.2	11.2
A9G	A9G	14,070	2,007	1,859	1,215	6.9	18,541	250	3	2.7	1.7	1.1	5.5
O2	O2	34,674	27,645	18,821	2,596	31.6	80,033	311	3	3.4	7.9	2.8	14.1
O3	O3, O2A, O2B	76,091	4,133	7,076	7,153	50.3	91,303	311	3	3.4	12.6	4.0	19.9
M5G	M5G	25,693	2,770	7,619	3,953	16.1	37,090	311	3	3.4	4.0	1.8	9.2

Note: Service Areas for several facilities consist of multiple pressure zones. The total storage requirement for these service areas is calculated based on the combined storage need for all of the zones within the service area.
Note: Zone B5 is a very small service area and does not currently have water storage. There are no current plans to add storage to this zone.