# Water

## Integrated Master Plan – Volume 3

3

Halton REGION

# Integrated Master Plan Report Outline

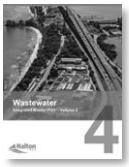
The Integrated Master Plan (IMP) for Water, Wastewater, and Transportation is a comprehensive document that describes the planning, evaluation, and decision-making process to develop long-term infrastructure strategies for water, wastewater, and transportation in Halton Region.

The IMP is organized into six volumes:


**Volume 1 – Executive Summary**
Provides a brief overview of the IMP including the problem and opportunity statement, study purpose, key planning policy and technical considerations, and descriptions of the recommended infrastructure strategies for water, wastewater, and transportation.


**Volume 2 – Planning Overview and Foundations**
Outlines the integrated planning framework and methodology used for the IMP. This volume summarizes the study vision, objectives, Municipal Class EA process, key planning policies, growth forecasts, and existing conditions. It provides the foundation for the subsequent volumes.


**Volume 3 – Water**
Provides documentation for the Region's water system. This volume outlines study objectives, baseline data/performance, methodologies, technical analyses, and evaluation that informed the recommended water servicing strategy and its components.




**Volume 4 – Wastewater**
Provides documentation for the Region's wastewater system. This volume outlines study objectives, baseline data/performance, methodologies, technical analyses, and evaluation that informed the recommended wastewater servicing strategy and its components.


**Volume 5 – Transportation**
Provides documentation for the Region's transportation infrastructure system. This volume outlines study objectives, baseline data/performance, methodologies, and technical analyses informed the recommended transportation strategy and its components that support all road users including transit, active transportation and auto.


**Volume 6 – Consultation and Engagement**
Provides documentation of the consultation and engagement process, including notices, presentation materials from Public Information Centres (PICs), and records from workshops with agencies, local municipalities, and other interested parties.

This report is the complete **Volume 3 – Water Master Plan** which is one of six volumes that together form the complete Integrated Master Plan Report and should be read in conjunction with the other volumes.

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# Acronyms and Abbreviations

| | |
|---|---|
| AACE | Association for the Advancement of Cost Engineering |
| ADD | Average Day Demand |
| ASP | Archaeological Screening Process |
| BPS | Booster Pumping Station |
| DC | Development Charge |
| EAA | Environmental Assessment Act |
| EPS | Extended Period Simulations |
| ESR | Environmental Study Report |
| ET | Elevated Tank |
| FF | Fire Flow |
| GHG | Greenhouse Gas |
| HGL | Hydraulic Grade Line |
| IGMS | Integrated Growth Management Strategy |
| IMP | Integrated Master Plan |
| JBPE | Joint Best Planning Estimate |
| KPA | Kilopascal |
| LOS | Level of Service |
| MCEA | Municipal Class Environmental Assessment |
| MDD | Maximum Day Demand |
| MECP | Ministry of the Environment, Conservation and Parks |
| ML/d | Megalitres Per Day |
| MOU | Memoranda of Understanding |
| MTSA | Major Transit Station Area |
| OP | Official Plan |
| PHD | Peak Hour Demand |
| PPS | Provincial Planning Statement |
| PRV | Pressure Reducing Valve |
| PS | Pumping Station |
| psi | Pounds per Square Inch |
| PTTW | Permit to take Water |
| Region | Regional Municipality of Halton |
| RES | Reservoir |
| ROPA | Regional Official Plan Amendment |
| SCADA | Supervisory Control and Data Acquisition |
| SOGR | State of Good Repair |
| TWL | Top Water Level |
| UV | Ultraviolet |
| WM | Watermain |
| WTP | Water Treatment Plant |

# 1.0 Introduction

# 1.0 Introduction

Halton Region has undertaken an Integrated Master Plan (IMP) to develop the next region-wide Water, Wastewater, and Multi-Modal Transportation Master Plans. The outcome of this work is a long-term integrated servicing strategy for Regional infrastructure to accommodate future growth to 2051. This IMP provides the strategies and tools required to meet future water, wastewater, and transportation infrastructure needs beyond 2031.

The IMP ensures that water and wastewater infrastructure and services are effectively planned and implemented to maintain appropriate levels of service for residents and businesses as the Region continues to grow. In parallel, the development of a robust multi-modal transportation network supports Halton Region's long-term vision by accommodating increasing travel demand and enhancing connectivity. Together, these infrastructure strategies have been developed to align with local growth priorities and remain flexible to adapt to evolving needs through Halton's Enhanced Growth Monitoring process.

The purpose of Volume 3 is to document the Region's water system and outline study objectives, baseline data/performance, methodologies, technical analysis, and evaluation that informed the recommended water servicing strategy and its components.

## 1.1 Master Plan Objectives

The key objectives of the IMP are to:

- guide the management and development of the Region's water, wastewater and transportation (including the active transportation network) systems;
- maximize capacity, system flexibility and life expectancy of Regional water, wastewater and transportation infrastructure;
- identify the need, timing and cost of servicing and infrastructure; and,
- provide the strategies and tools required to meet the water, wastewater and transportation infrastructure needs of the community now and in the future.

## 1.2 Components of the Integrated Master Plan

The IMP is comprised of three (3) key components:

- Water: focuses on the delivery of safe, clean drinking water to homes and businesses within the urban areas.
- Wastewater: addresses the collection and treatment of wastewater from the urban areas before returning the treated water to the environment.
- Transportation: focuses on a Regional transportation network for transit users, active transportation (e.g., pedestrians and cyclists), cars and trucks (including farm vehicles) that accommodates all users and all abilities.

Recognizing that the needs of the communities are changing, the IMP brings together these systems in a coordinated way that allows the Region to evolve and support a dynamic and resilient future.

## 1.3 Vision Statement and Considerations

The vision statement is a compact, high-level statement that guided the master planning process and informed the considerations developed for the plan. The overarching vision statement of the IMP is:

> **"Building a safe, equitable and sustainable future for the Region's Water, Wastewater and Transportation systems through responsible and proactive planning".**

In support of this overarching vision, the IMP also includes two (2) focused vision statements specific to the study components:

The Water and Wastewater vision focuses on:

> "Planning for a future Regional water and wastewater system that is safe, efficient, resilient and prioritizes the environment".

Meanwhile, the Transportation vision focuses on:

> "Planning for a future multi-modal Regional transportation system that is safe, continuous, and connected across Halton Region to support all modes of travel, all users and all abilities".

In addition to the vision statements, key considerations were developed to help guide the IMP decision making process and the development of the infrastructure strategies. The considerations include:

- **Equitable Infrastructure Services** – Provide for water and wastewater services in urban areas and access to multi-modal Regional transportation infrastructure (including active transportation, transit and auto).
- **Safe and Healthy Communities** – Support healthy and active lifestyles and community well-being. For example, the provision of active transportation infrastructure and the provision of safe drinking water.
- **Sustainability** – Balance social, environmental and economic goals to support growth in a sustainable manner.
- **Climate Change** – All phases of Regional water, wastewater and multi-modal transportation infrastructure planning must recognize and incorporate climate change.
- **Communication and Consultation** – Ensure the IMP process and strategies are clearly and openly communicated and consulted with stakeholders.
- **Integration of Planning for Regional Infrastructure** – Ensure a coordinated approach to implementation of Regional water, wastewater, and multi-modal transportation infrastructure.
- **Technical Innovation** – Include innovation in the development of Regional water, wastewater and multi-modal transportation infrastructure strategies.

Together, the vision statements and considerations provide a strategic foundation for shaping priorities, evaluating alternative solutions, and making informed decisions throughout the course of the IMP.

## 1.4 Problem or Opportunity Statement

The problem or opportunity statement serves as a foundation for the Master Plan process in accordance with the Municipal Class Environmental Assessment (MCEA) process and helps establish the overall scope of the project. The IMP problem or opportunity statement is defined as follows:

> **"The Integrated Master Plan has been initiated to update the Region's long-term servicing strategy and capital implementation plan for Water, Wastewater and Transportation to support future growth to 2051."**

## 1.5 Study Area

Halton Region is located in southern Ontario and is bordered by the City of Hamilton to the west, Peel Region to the east, Wellington County to the north and Lake Ontario to the south. The Region is comprised of four Local Municipalities including the City of Burlington, the Town of Halton Hills (including the Communities of Acton and Georgetown), the Town of Milton and the Town of Oakville.

Halton Region covers an area of 966 square kilometres with a population of over 650,000. The Region features a diverse range of urban centres, suburban communities, rural areas, and protected natural landscapes, including parts of the Niagara Escarpment and the Greenbelt, which contribute to its unique environmental and cultural character.

The overall study area can be seen in **Figure 1**.

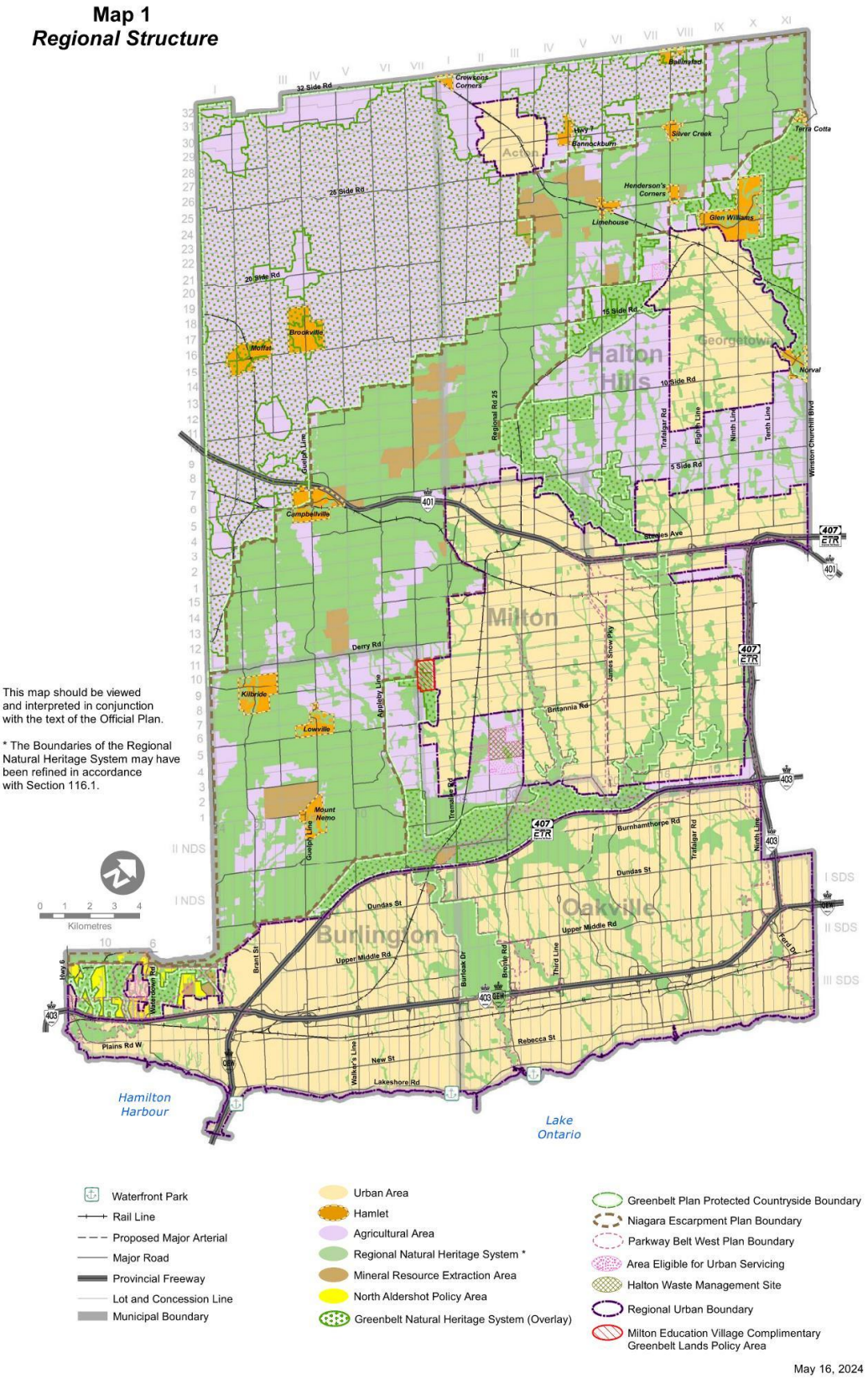


**Figure 1 – Halton Region Study Area**

## 1.6 Population and Employment Planning Forecasts

Following the completion of Halton's Integrated Growth Management Strategy (IGMS) and the Regional Official Plan Amendment 49 (ROPA 49), the Region developed the comprehensive Joint Best Planning Estimates (JBPE) update for population and employment in the fall of 2023 with the Local Municipalities. The JBPEs are essential input for planning and delivering Regional infrastructure, ensuring services like water, wastewater, and transportation can accommodate future growth.

The 2023 JBPEs version 3.032 to the year 2051, align with the new housing targets set out in Bill 23. The updated forecasts consider new direction from the Province of Ontario as well as recently approved growth areas. As a result of the new housing targets, the JBPEs anticipate higher population growth over the next decade across all of the Halton Region's Area Municipalities than the initial IGMS and ROPA 49.

As the Region's population and employment base is forecasted to increase between 2031 and 2051, the IMP builds on the long-term servicing strategies previously outlined in the 2011 water, wastewater, and transportation master plans to reflect the population and employment growth projections to 2051.

**Table 1** highlights the residential population forecasts to the year 2051, and **Table 2** highlights the employment forecasts to the year 2051.

**Table 1 – Residential Population Forecasts**

| Municipality | 2051* |
|---|---|
| Burlington | 324,000 |
| Halton Hills | 167,000 |
| Milton | 455,000 |
| Oakville | 443,000 |
| **Total** | **1,389,000** |

**The 2051 forecasts are based on the Minister's decision on ROPA 49 through Bill 162, Get It Done Act, 2024, which received Royal Assent on May 16, 2024, as well as Bill 23, More Homes Built Faster Act, which received Royal Assent on November 28, 2022.*

**Table 2 – Employment Population Forecasts**

| Municipality | 2051* |
|---|---|
| Burlington | 150,000 |
| Halton Hills | 87,000 |
| Milton | 175,000 |
| Oakville | 212,000 |
| **Total** | **624,000** |

**The 2051 forecasts are based on the Minister's decision on ROPA 49 through Bill 162, Get It Done Act, 2024, which received Royal Assent on May 16, 2024, as well as Bill 23, More Homes Built Faster Act, which received Royal Assent on November 28, 2022.*

# 2.0 Related Studies and Background Information

## 2.0 Related Studies and Background Information

A comprehensive review of existing studies and documentation was undertaken to inform the development of the water component of the IMP. These materials provided critical context regarding the existing system, servicing strategies, and ongoing initiatives across Halton Region.

The water component of the IMP lays out a high-level plan for the Region's future water system to the year 2051. The IMP is an update to the previous 2011 Sustainable Halton Water & Wastewater Master Plan.

The IMP is part of a larger policy framework that guides how water is planned at a Federal, Provincial, Regional, and Local level, which is described in detail in Section 4.0 of Volume 2: Plan Overview and Foundations. In Ontario, the provincial government sets a framework for growth and development that municipalities must follow.

The following section highlights key documents, in addition to those identified in Volume 2, that have been referenced in the development of the water servicing strategy.

Key documents include:

- 2011 Sustainable Halton Water & Wastewater Master Plan (Sustainable Halton Master Plan).
- Development Charges (DC) Technical Reports (2012, 2017, 2022).
- Area Servicing Plans for various communities, including:
    - **Burlington:** Bronte Meadows, Tremaine-Dundas, Burlington Mobility Hubs.
    - **Halton Hills:** Premier Gateway Phase 1B and 2B, Southeast Georgetown.
    - **Milton:** Derry Green Business Park, Royal Park (North & South), Milton Major Transit Station Areas (MTSAs), Agerton and Trafalgar Corridor, Britannia.
    - **Oakville:** North Oakville East, Sixteen Hollow Employment Area, 407 West Employment Area, Midtown Oakville, Bronte GO MTSA.
- Class Environmental Assessments (EA):
    - Oakville Water Treatment Plant EA
    - Burloak Water Treatment Plant Phase 2
    - Fourth Line Well Field Expansion
    - Prospect Park Well Field Re-Rating and Water Treatment Plant Expansion
- Additional Reports and Studies:
    - Zone 3/4/5 Realignment Study
    - Drinking Water Systems Flow Summary Annual Reports

- Burlington and Milton Water Servicing Strategies
- Wildwood Estates Study.

- Council Reports and Related Materials:
  - PW-07-21 – Long-Term Water Servicing Strategy for Milton (February 17, 2021)
  - Council Motion – Declaration of Climate Change Emergency (September 11, 2019)
  - Workshop on Infrastructure Planning and Financing (March 8, 2023)
  - PW-13-23 – Allocation Programs Update (March 10, 2023)

These foundational documents, together with input from interested parties and updated modelling and technical analyses, provided the basis for identifying servicing constraints and opportunities. They supported the development of a comprehensive, forward-looking water servicing strategy that aligns with growth objectives, environmental commitments, and infrastructure investment priorities to 2051.

# 3.0 Existing Water Distribution System

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## 3.1 Water Distribution in Halton Region at a Glance

Halton Region's water distribution systems service the City of Burlington, the Town of Halton Hills including the communities of Acton and Georgetown, the Town of Milton, and the Town of Oakville. The existing water systems are comprised of the lake-based system and groundwater system as shown in **Figure 2**.

To inform the development of the preferred water servicing strategy, the existing water distribution system was assessed and considered. The following sections outline each of the components of the lake-based and groundwater systems including pressure zones, treatment plants, wells, storage facilities, pumping stations, and distribution systems.

## 3.2 Pressure Zones

Halton Region's lake-based and groundwater systems deliver water to users through various pressure zones as summarized in **Table 3** and shown in **Figure 2**. In general, each pressure zone spans an elevation difference of approximately 30 metres and is alphanumerically identified based on the Local Municipality it services, with the exception of the new pressure zones resulting from the Zone Boundary Re-alignment Strategy which are identified by their Top Water Level (TWL) and Hydraulic Grade Line (HGL).

**Table 3 – Summary of Existing Pressure Zones and Key Information**

| Pressure Zone | Zone TWL/HGL (m) | System | Source of Supply (WTP/Wells/ Pump Stations) | Storage Facilities | Other Notes |
|---|---|---|---|---|---|
| B1 | 135.0 m | Lake-based | Burlington WTP<br>Burloak WTP | Brant Street RES<br>Washburn RES | - |
| B1A | 140.2 m | Lake-based | Kingsway BPS | Waterdown RES | - |
| B2 | 167.8 m | Lake-based | Washburn PS | Bailie RES<br>Appleby RES | - |
| B3<br>(& B2A) | 200.1 m (Headon) to 203.3m (Tyandaga) | Lake-based | Washburn PS<br>Brant Street PS<br>Appleby PS | Headon Road RES<br>Tyandaga RES | - |
| B4 | 236.2 m | Lake-based | Bailie PS<br>Tyandaga PS | Beaufort RES | - |
| B5 | 283.0 m | Lake-based | Beaufort PS | - | - |

| Pressure Zone | Zone TWL/HGL (m) | System | Source of Supply (WTP/Wells/ Pump Stations) | Storage Facilities | Other Notes |
|---|---|---|---|---|---|
| O1 | 135.0 m | Lake-based | Oakville WTP<br>Burloak WTP | Kitchen RES<br>McCraney RES | McCraney is storage for Davis Road BPS; not floating storage in O1 |
| O2 | 167.6 m | Lake-based | Davis Road BPS | Glenashton (Eighth Line) RES | - |
| O3 (& O2A, O2B) | 198.0 m<br>174.0 m (O2A)<br>192.0 m (O2B) | Lake-based | Eighth Line BPS<br>Kitchen PS | Moore RES | PRVs from O3 to O2A and O2B |
| O4 (& O3B) | 235.9 m<br>211.0 m (O3B) | Lake-based | Glenashton PS | Burnhamthorpe ET | *Future O4 has 224m TWL.<br>PRVs to O3B |
| 250 (formerly M4L) | 250.0 m | Lake-based | Neyagawa BPS | Ashgrove RES | - |
| 267 (formerly M5L) | 267.0 m | Lake-based | Kitchen PS<br>Fourth Line BPS | Third Line RES<br>Milton (Steeles) ET | - |
| M5G | 257.0 m | Groundwater | Kelso Wells and WTP | Main St. RES | - |
| G6G (& G5G) | 303.0 m (G6G)<br>254.8 m (G5G) | Groundwater | Georgetown WTP/Cedarvale Wells<br>Lindsay Court Wells/Pump House<br>Princess Anne Wells/Pump Houses | 22nd Side Road RES<br>Todd Road Tower<br>Norval Standpipe (G5G) | Valve supply from G6G to G5G |
| G6B (also referred to as G7G) | 326.3 m | Groundwater | Moore Park BPS | - | Backup check valves from G6G |
| A9G | 412.3 m | Groundwater | Prospect Park Well/WTP<br>Davidson Well/Pump House<br>Fourth Line Wells/Pump House | Acton Third Line RES | - |

Halton REGION

GEI Consultants Canada  CIMA+

# Integrated Master Plan

## Water, Wastewater and Transportation

Last updated: July 3, 2025

### Existing Infrastructure

- Water Treatment Plant (WTP)
- Booster Pumping Station (BPS)
- Elevated Tank (ET) / Standpipe (SP)
- Reservoir (RES)
- Wells

### Existing Watermains

- Transmission Mains
- Distribution Mains
- Municipal Boundary
- Major Transit Statiopn Area (MTSA) (ROPA48)

### Lake-Based Pressure Zone

| | | |
|---|---|---|
| B1 | B3 | O2 |
| B1A | B3A | O2A |
| B1B | B4 | O2B |
| B1C | B5 | O3 |
| B2 | M4L | O3B |
| B2C | M5L | O4 |
| B2A | O1 | |

### Groundwater Based

| | |
|---|---|
| A9G | G6B |
| G5G | M5G |
| G6G | |

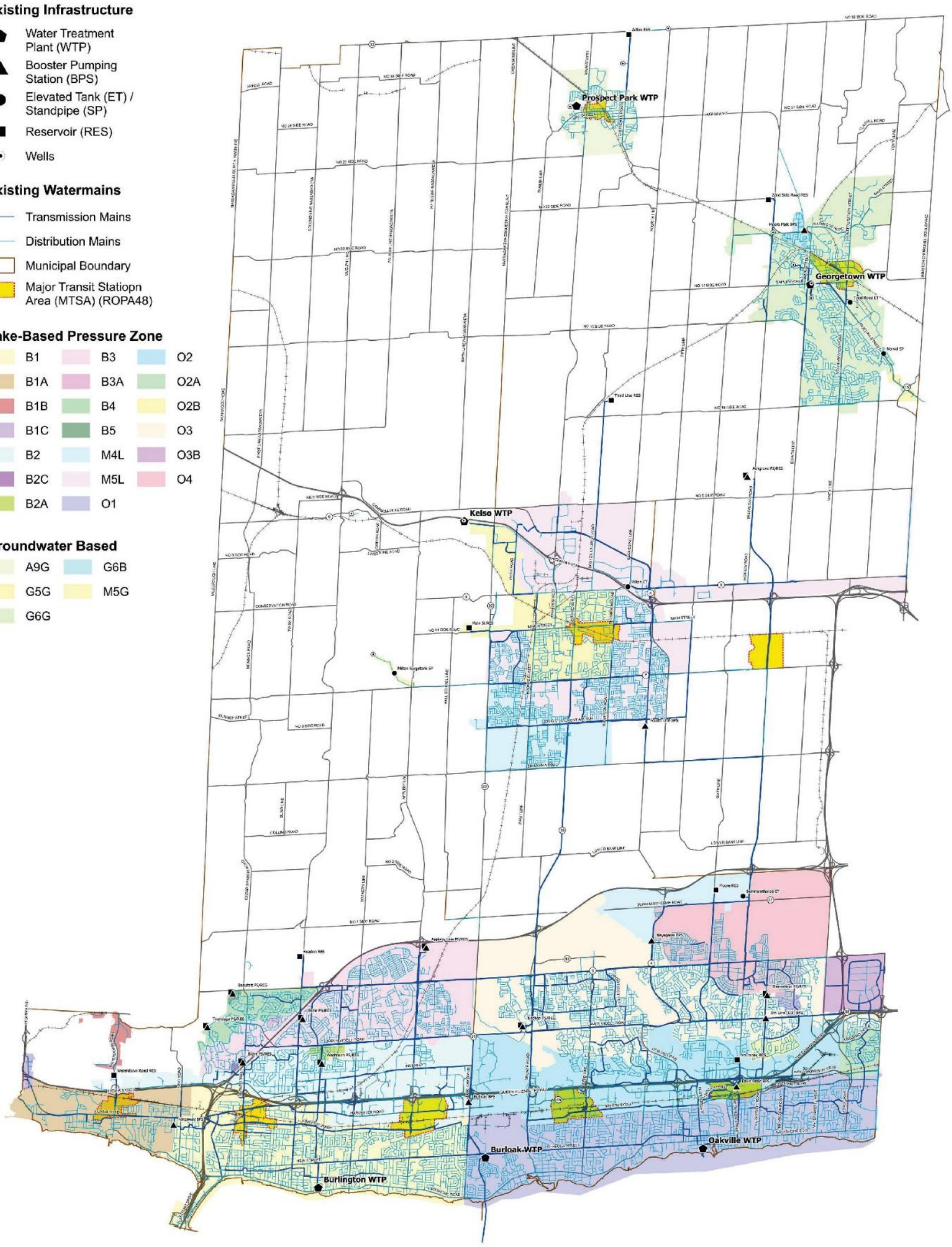



**Figure 2 - Halton Region**
**Water Distribution System**

0 2 4 KM

## 3.3 Lake-Based System

The existing lake-based system distributes drinking water to the City of Burlington, the Town of Oakville, part of the Town of Milton, and a small part of the Town of Halton Hills (401 corridor) and is illustrated in **Figure 2**.

### 3.3.1 South Halton Distribution System

The lake-based system is supplied by three (3) water treatment plants (WTP) that treat water from Lake Ontario. From the treatment plants, water is distributed through the various system pressure zones with pumping stations and storage facilities. The pumping stations and storage facilities are connected to the larger trunk feedermains which transport water into the smaller local distribution watermains that deliver water directly to homes and businesses.

#### 3.3.1.1 Water Treatment Plants

##### Burlington WTP

The Burlington WTP is located at 3249 Lakeshore Road in Burlington. The facility is a conventional filtration treatment plant with a sand ballasted clarification process and mainly services the urban area of Burlington. The treated drinking water is pumped into the South Halton Water Distribution System. Currently, the rated capacity of the Burlington WTP is 263 Megalitres Per Day (ML/d) and is permitted to take up to 291 ML/d.

##### Oakville WTP

The Oakville WTP is located at 21 Kerr Street in Oakville. The treated drinking water is pumped into the South Halton Water Distribution System. The facility is a conventional filtration treatment plant with a sand ballasted clarification process, and primarily services the urban area of Oakville, while also supporting upper pressure zones in Milton and Georgetown as part of the interconnected South Halton system. Currently, the rated capacity of the Oakville WTP is 109 ML/d and is permitted to take up to 155 ML/d. However, the plant is currently undergoing a re-rating which will increase the rated capacity to 130 ML/d. The re-rating will achieve this capacity increase in order to meet the growing demand with minimal impact to the local community by avoiding large scale process changes and optimizing the plant within its existing footprint.

##### Burloak WTP

The Burloak WTP is located at 3380 Rebecca Street, Oakville. The treated drinking water is pumped into the South Halton Water Distribution System. This facility is a membrane filtration plant and primarily services the urban areas of Oakville and Burlington, while also supporting upper pressure zones in Milton and Georgetown as part of the interconnected South Halton system. Currently, the rated capacity of the Burloak WTP is 55 ML/d and is permitted to take up to 64 ML/d.

**Table 4** provides a summary of the Region's lake-based water treatment plants.

Table 4 – Existing Lake-Based South Halton Water Treatment Plants

| Water Treatment Plants | Rated Capacity (ML/d) | Raw Water Source |
|---|---|---|
| Burlington WTP | 263 | Lake Ontario |
| Oakville WTP | 109 | Lake Ontario |
| Burloak WTP | 55 | Lake Ontario |

#### 3.3.1.2 Storage

Storage facilities must be capable of providing fire and emergency storage as well as equalization to the system. Below is a summary of the lake-based South Halton storage facilities along with their respective service zones and existing storage capacities.

Table 5 – Existing Lake-Based South Halton Storage Facilities

| Storage Facility | Service Zone | Existing Storage Capacity (ML) |
|---|---|---|
| Brant Street RES | B1 | 11.50 |
| Washburn RES | B1 | 23.50 |
| Waterdown RES | B1A | 7.30 |
| Bailie RES | B2 | 17.50 |
| Appleby RES | B2 | 33.30 |
| Tyandaga RES | B3 | 4.70 |
| Headon Road RES | B3 | 17.80 |
| Beaufort RES | B4 | 6.00 |
| Kitchen RES | O1 | 39.50 |
| McCraney RES* | O1 | 17.00 |
| Glenashton RES | O2 | 17.40 |
| RJ Moore (6th Line) RES | O3 | 32.00 |
| Burnhamthorpe Elevated Tank | O4 | 5.68 |
| Ashgrove RES | Zone 250 | 30.00 |
| Milton Elevated Tank | Zone 267 | 6.83 |
| Third Line RES | Zone 267 | 20.20 |

**Note: McCraney Road RES acts as a clear well to the Davis Road BPS and does not currently provide floating storage to Zone O1 or any other pressure zones.*

#### 3.3.1.3 Pumping

For each pressure zone, the pumping stations must be capable of meeting the water supply requirement based on maximum day demand for the specific zone, as well as for all higher zones supplied by the

station, assuming sufficient floating storage is available. If no storage is available in a zone, then pumping stations should supply at least the peak hour demand to that zone and the maximum day demand to all subsequent zones that are pumped to. Firm capacity is the capacity available with the largest pump or two pumps out of service, depending on storage within the pressure zone.

**Table 6** provides a summary of the lake-based South Halton water pumping stations with their firm capacities.

**Table 6 – Existing Lake-Based South Halton Pumping Stations**

| Pumping Station (PS) | Service Zone | Existing Firm Capacity (ML/d) |
|---|---|---|
| Kingsway BPS | B1A | 30.00 |
| Waterdown PS | B1B | 2.29 |
| Washburn PS – B2 | B2 | 36.40 |
| Washburn PS – B3 | B3 | 46.00 |
| Brant Street PS | B3 | 6.50 |
| Appleby PS | B3 | 40.00 |
| Bailie PS | B4 | 16.30 |
| Tyandaga PS | B4 | 1.96 |
| Beaufort PS | B5 | 1.00 |
| Davis Road BPS | O2 | 74.00 |
| Eighth Line BPS | O3 | 39.20 |
| Kitchen PS– O3 | O3 | 75.00 |
| Glenashton PS | O4 | 43.70 |
| Neyagawa BPS | Zone 250 | 112.00 |
| Kitchen PS– Zone 267 | Zone 267 | 75.00 |
| Fourth Line BPS | Zone 267 | 30.00 |

## 3.4 Groundwater-Based System

There are three (3) groundwater supply systems currently operating and servicing part of Milton and most of Halton Hills, Georgetown and Acton specifically as shown in **Figure 2**.

### 3.4.1 Milton Groundwater Supply System

The Town of Milton is supplied with both groundwater and lake-based water. Milton's groundwater supply is currently derived from the Kelso aquifer wells. There are four (4) wells in the Kelso aquifer and two (2) wells in the Walkers Line aquifer. Walkers Line wells have been decommissioned in 2025. The current firm capacity of this well-based system is constrained. The treatment includes greensand filters for manganese removal and chlorination for disinfection.

The following tables present a summary of the Milton groundwater system including wells, storage facilities and pumping stations.

**Table 7 – Milton Groundwater System Permit to Take Water (PTTW) and Rated Capacity**

| Well | PTTW Daily Average Taking (ML/d) | Rated Capacity (ML/d) |
|---|---|---|
| Kelso | 13.635 (annual average)<br>22.730 (up to 5 days per year) | 22.670 |

**Table 8 – Milton Groundwater Storage Facilities**

| Storage Facility | Zone Service | Existing Storage Capacity (ML) |
|---|---|---|
| Main St. RES | M5G | 14.70 |

**Table 9 – Milton Groundwater Pumping Stations**

| Pumping Stations | Zone Service | Existing Firm Capacity (ML/d) |
|---|---|---|
| Kelso WTP | M5G | 22.12 |

### 3.4.2 Georgetown Groundwater Supply System

The Georgetown Drinking Water System draws groundwater from three (3) well fields: Cedarvale, Princess Anne, and Lindsay Court. The Georgetown WTP treats water from the four (4) Cedarvale Wells with greensand filtration, ultraviolet light for primary disinfection, fluoridation, and chlorination for secondary disinfection. Water from the three (3) Princess Anne and two (2) Lindsay Court Wells receive treatment at the well sites with chlorination for disinfection and fluoridation.

The following tables present a summary of the Georgetown groundwater system including wells, storage facilities, and pumping stations.

**Table 10 – Georgetown Groundwater System Permit to Take Water (PTTW) and Rated Capacity**

| Well | PTTW Daily Average Taking (ML/d) | Rated Capacity (ML/d) |
|---|---|---|
| Lindsay Court | 6.545 (annual average & maximum daily)<br>7.502 (maximum instantaneous = 5210 L/min) | 6.540 |
| Princess Anne | 6.800 (annual average)<br>13.090 (maximum daily) | 13.090 |
| Cedarvale | 6.972 (annual average)<br>12.500 (maximum daily) | 13.046 |

**Table 11 – Georgetown Groundwater Storage Facilities**

| Storage Facility | Service Zone | Existing Storage Capacity (ML) |
|---|---|---|
| Norval Standpipe | G5G | 0.70 |
| Todd Road Tower | G6G | 5.00 |
| 22nd Side Road RES | G6G | 8.20 |

**Table 12 – Georgetown Groundwater Pumping Stations**

| Pumping Stations | Service Zone | Existing Firm Capacity (ML/d) |
|---|---|---|
| Georgetown WTP | G6L, G5G, G6G, G6B | 8.64 |
| Lindsay Court PS | G6G | 6.54 |
| Moore Park PS | G6B (also referred to as G7G) | 1.38 |
| Princess Anne Pump House | G6G | 4.91 |
| Princess Anne Pump House 2 | G6G | 13.08 |

### 3.4.3 Acton Groundwater Supply System

The Acton Drinking Water System draws water from three (3) well fields. There are two (2) wells in each the Davidson well field, the Fourth Line well field, and the Prospect Park well field. All the wells use ultraviolet (UV) light for primary disinfection with chlorination for secondary disinfection. Fluoride is added to the water from all three sources. Both the Davidson and Fourth Line wells use preliminary and final cartridge filters. The Prospect Park Facility is equipped with greensand filters for removal of manganese and iron from the water.

The following tables present a summary of the Acton groundwater system including wells, storage facilities, and pumping stations.

**Table 13 – Acton Groundwater System Permit to Take Water (PTTW) and Rated Capacity**

| Well | PTTW Daily Average Taking (ML/d) | Rated Capacity (ML/d) |
|---|---|---|
| Prospect Park | 3.40 (annual average & maximum daily) | 3.40 |
| Davidson | 2.50 (annual average & maximum daily) | 2.50 |
| Fourth Line (Combined) | 1.71 (annual average & maximum daily) | 1.71 |

**Table 14 – Acton Groundwater Storage Facilities**

| Storage Facility | Service Zone | Existing Storage Capacity (ML) |
|---|---|---|
| Acton Third Line RES | A9G | 4.55 |

**Table 15 – Acton Groundwater Pumping Stations**

| Pumping Stations | Service Zone | Existing Firm Capacity (ML/d) |
|---|---|---|
| Prospect Park WTP | A9G | 3.40 |
| Davidson Well Pump House | A9G | 2.50 |
| Fourth Line Well Pump House | A9G | 1.31 |

## 3.5 Inter-Municipal Servicing Agreements

### 3.5.1 Halton and Hamilton Water Supply Agreement

Since the early 1990s, the City of Hamilton has supplied municipal water to several properties within Halton Region along the City of Burlington-City of Hamilton border. On November 17, 2011, a formal Agreement was entered into between Halton Region and the City of Hamilton for the City of Hamilton to supply water to the Bridgeview, Snake Road and North Aldershot communities in the City of Burlington as shown in **Figure 3**.

The term of the present Agreement is 10 years with an option for both parties to renew the Agreement for an additional 10-year period. The agreement was renewed in September 2019 for a 10-year term commencing on November 16, 2021, and ending on November 16, 2031, with the same terms and conditions originally agreed upon by the two municipalities.

The agreement sets a prescribed maximum water consumption amount from the Hamilton system. The maximum water takings are summarized as follows:

- For the combined Bridgeview and Snake Road communities, Halton shall not withdraw water that exceeds a maximum daily volume of 1ML (i.e., 1 ML/d maximum daily average), or an instantaneous flow rate that exceeds 92 L/s (7.95 ML/d).
- For the North Aldershot community, Halton shall not withdraw water that exceeds a maximum daily volume of 1ML (i.e., 1ML/d maximum daily average), or an instantaneous flow rate that exceeds 150 L/s (12.96 ML/d).

The North Aldershot and Snake Road communities are serviced via connections to the Hamilton Water Distribution System at Waterdown Road and Snake Road, respectively. The Bridgeview community is serviced via a connection across Highway 6 from Northcliffe Avenue in Hamilton to Plains Road. There are currently no connections from these communities to the South Halton Water Distribution System.

**Figure 3** shows the Bridgeview (1), Snake Road (2) and North Aldershot (3) water distribution systems.

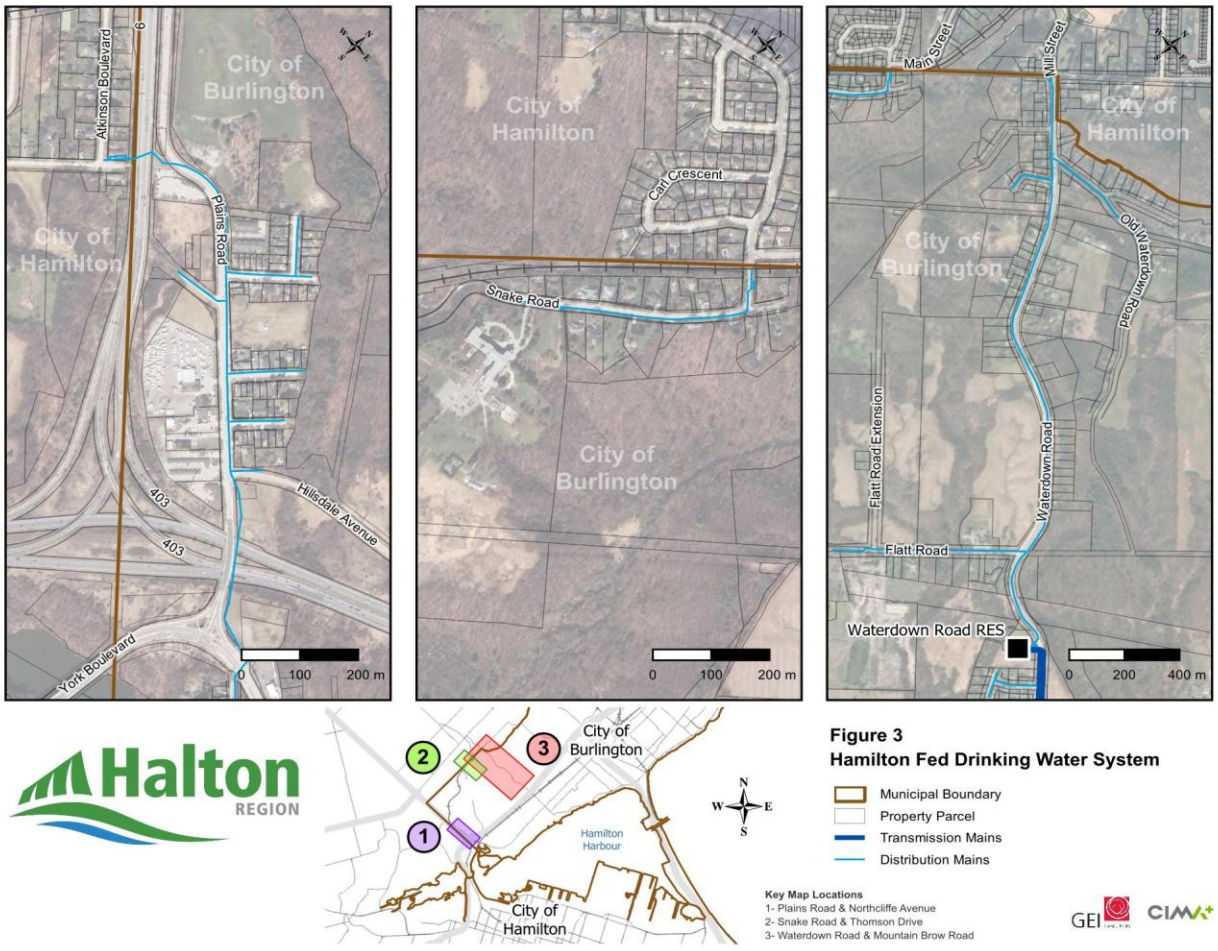



**Figure 3 – City of Hamilton Supplied Areas of Halton**

# 4.0 Assessment of Existing and Future Water Infrastructure

# 4.0 Assessment of Existing and Future Water Infrastructure

Identifying and evaluating strategy alternatives is a core element of the master planning process. The development of strategies allows for a comprehensive review of potential solutions, supporting informed decision-making, and ensuring the recommended strategies are both well-founded and defensible.

The IMP builds on the recommendations of previous Regional Master Plans and utilizes the Joint Best Planning Estimates as a foundation to develop strategies for infrastructure requirements to accommodate future growth from 2031 to 2051. Inputs to the IMP include background studies and plans by the Region, Local Municipalities, adjacent municipalities, and other agencies such as the Ontario Ministry of Transportation and Metrolinx. Along with new/updated analysis tools, including a new water model these inputs formed a comprehensive and integrated base for understanding and planning infrastructure in Halton Region. This was followed by identifying and evaluating strategy alternatives to allow for a comprehensive and transparent review of potential solutions, supporting informed decision-making, and ensuring the recommended strategies are well-founded. As with previous water and wastewater master plans, each system was assessed independently considering the full range of opportunities and considerations.

A critical initial step in the master planning process was the assessment of the existing infrastructure to establish baseline system conditions. These baseline conditions became the foundation of the future recommendations of the IMP and were determined through a comprehensive and detailed analysis of the current system. Once the baseline conditions were established, the impacts of projected future growth on the water supply and distribution systems were evaluated to identify key opportunities and considerations, which informed the development and assessment of the long-term servicing strategies.

The overall process is illustrated in **Figure 4** and includes the inputs described above. The process considered the identification of opportunities and considerations, development of alternative solutions, and the identification of the preferred infrastructure solution and strategy.

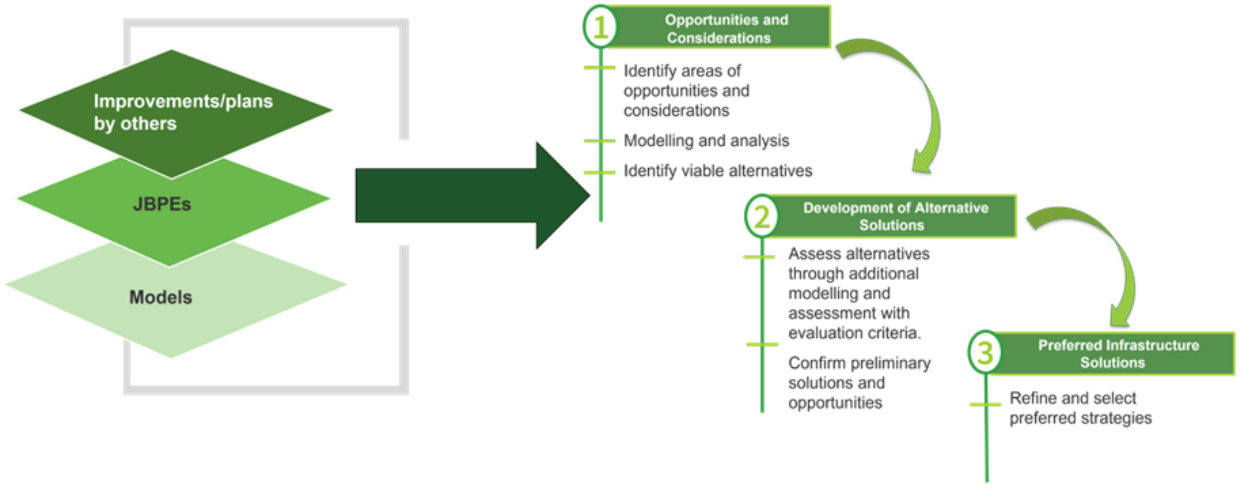



**Figure 4 – Process for Development of the Preferred Strategy**

The preferred water strategy identified through this process will form the foundation of the Region's long-term capital and implementation programs to 2051. These programs provide a coordinated framework to guide infrastructure investments, ensure alignment with growth projections, and support sustainable, resilient, and adaptable systems through to 2051.

Recognizing the importance of monitoring and responding to growth across the Region, the strategies identified through the IMP will be adaptable to support local growth priorities to 2051.

The following sections describe the water system criteria, levels of service, and hydraulic model used in the IMP, and identify potential water system opportunities and expected considerations and limitations in the existing water systems' ability to accommodate future growth to 2051.

## 4.1 Water System Criteria and Levels of Service

As part of the IMP, Halton Region's existing water system design criteria and levels of service (LOS) were reviewed to assess their continued applicability based on available data and current industry best practices. This assessment aimed to validate, confirm, or amend the criteria and assumptions used in the development of the IMP and support future long-term infrastructure planning initiatives.

A summary of the key design criteria and levels of service adopted for the water component of the IMP is provided in the following sections.

### 4.1.1 Design Criteria

Design criteria are a set of technical parameters, standards, and assumptions used to guide the planning, sizing, and timing of infrastructure systems. The guiding principle of design criteria is to ensure that the demand projections are adequately estimated with an appropriate factor of safety and risk management. This overall principle also ensures that future infrastructure would have sufficient capacity to support the approved/planned growth.

The design criteria used for the water component of the IMP are summarized in **Table 16**.

**Table 16 – Water Design Criteria**

| | |
|---|---|
| **Water Future Demand Projection** | |
| Future 2051 Demand =<br>2022 Starting Point + (Growth to 2051 x Design Criteria x Peaking Factor*)<br>**Peaking Factor is only applicable to Max Day Demand (MDD) and Peak Hour Demand (PHD)* | |
| **Water Starting Point Methodology** | |
| 2022 Starting Point = 85$^{th}$ Percentile of Historical MDD in the past 10 years (2013 – 2022) | |
| **Water Design Criteria for Growth** | |
| **Average Day Demand (ADD)** | |
| Residential | 230 L/capita/day |
| Employment | 190 L/employee/day |
| **Max Day Demand (MDD) Peaking Factor** | |
| Lake-based System | 1.9 x ADD |
| Groundwater System | 1.6 x ADD |
| **Peak Hour Demand (PHD) Peaking Factor** | |
| System-wide | 3 x ADD |

### 4.1.2 Levels of Service

Levels of service refer to measurable performance targets or qualitative service expectations that guide the planning, design, operation, and maintenance of water and wastewater infrastructure. Ultimately, the water distribution system should be sized to support Peak Hour Demand (PHD) and Maximum Day Demand (MDD) + Fire Flow (FF) with considerations for water quality during low demand periods. This can be accomplished through a combination of storage, pumping, treatment, and transmission.

**Table 17** summarizes the performance indicators that were used to assess the Region's water supply and distribution systems and their ability to meet the levels of service objectives:

**Table 17 – Summary of Water Levels of Service Performance Indicators**

| **Levels of Service – Availability** | |
|---|---|
| Water Treatment Plant (WTP) | • WTP capacity requirements are based on the MDD.<br>• When MDD reaches 80% of plant capacity, the planning process for plant expansion would be triggered (i.e., Class EA). When MDD reaches 90% of plant capacity, the plant expansion would be implemented (i.e., design and construction). |
| Watermains | • Convey the greater of MDD + FF, or PHD. |
| Pumping Station | • Pumping stations (where adequate zone storage is available) must supply at least the maximum day demand to that zone and all subsequent zones that are pumped to.<br>• If no storage is available in a zone, then pumping stations should supply at least the peak hour demand to that zone and the maximum day demand to all subsequent zones that are pumped to. |
| Storage | • Storage sizing for each pressure zone is to be calculated using the MECP A+B+C Methodology, where:<br>A = Fire Flow volume is established on 311 L/s for 3 hours (with exceptions)<br>B = Equalization = 25% of MDD<br>C = Emergency Volume = 25% of (A + B)<br>• Note that there may be instances where it is not practical to supply the full MECP A+B+C Volume. The available storage may be a combination of reservoirs (RES) from the current zone and upper zone (through Pressure Reducing Valves) in Halton or neighbouring municipalities.<br>• Ample storage is good for resiliency but can come at the expense of water quality challenges. Storage volume will often be balanced among "pumped storage" in lower zones, floating storage in the current zone and floating storage in upper zones. |
| System Pressure | • Acceptable Pressure Range: Pressure should be adequate to ensure that the pressure in the zone to be served is within the range of 275 kilopascal (kPa) (40 pounds per square inch (psi)) and 700 kPa (100 psi) during peak and minimum demand periods. The maximum pressure should not be exceeded for pumps on at top water level to avoid damage to household plumbing and unnecessary water and energy consumption.<br>• Normal operating pressure @ MDD: Maintain water pressure between 350 and 480 kPa (50 and 70 psi).<br>• Preferred Pressure range @ ADD: Maintain water pressure between 379 and 620 kPa (55 and 90 psi).<br>• During Fire Flow: It may be acceptable to allow pressure in the system drop to a level no lower than 140 kPa (20 psi). |

| Levels of Service – Reliability | |
|---|---|
| Water Treatment Plant | • Adequate firm capacity and back-up power should be provided to limit outage impacts.<br>• Where viable, combined WTP capacities should be able to handle a major facility outage (via use of standby power; and other built-in redundancies) to maintain levels of service.<br>• Target is to be able to provide at least the ADD in summer (1.2 x ADD), during these emergency conditions. |
| Pumping Station | • Adequate firm capacity and back-up power should be provided to limit outage impacts at each pump station.<br>• Where viable, pump station capacities to each pressure zone should be able to handle a major facility outage (via use of standby power; and other built-in redundancies) to maintain levels of service.<br>• Target is to be able to provide at least the ADD in summer (1.2 x ADD), during these emergency conditions, when one pump station is out of service. |
| Storage | • Treated water storage volume is targeted based on the previously mentioned MECP A+B+C guideline.<br>• Where viable, it is good practice to design for sufficient storage resiliency in each pressure zone, so that facilities can be taken offline for maintenance without major impact to the system. This can be provided through having multiple cells at a facility that can be repaired in phases; or pumped storage ability (operating as closed zone). |
| General Water System Design (booster pumping stations (BPS) and transmission watermains) | • Where viable, the goal is to maintain at least two (2) feeds (primary and secondary) in each pressure zone. Pressure Reducing Valve (PRV) supplies from other zones could be tertiary supply. This is to ensure security of supply to the zone in the case of planned or unplanned interruptions.<br>• Target is to be able to provide at least the ADD in summer (1.2 x ADD), during these emergency conditions, when the primary feed is out of service. This means that, where viable, any major feed to an area can be taken offline for maintenance during non-peak demand conditions. |

| Levels of Service – Cost Effectiveness | |
|---|---|
| WTP, PS, RES, Water Transmission System | Use a suitable life cycle costing approach to compare the options (including new and existing assets where growth or capacity expansion is required). |

| Levels of Service – Fire Flow | |
|---|---|
| Low Density Residential | 91.7 L/s for 2 hours at a minimum pressure of 140 kPa (20 psi). |
| Medium Density Residential | 150 L/s for 2 hours at a minimum pressure of 140 kPa (20 psi). |
| High Density Residential | 250 L/s for 2 hours at a minimum pressure of 140 kPa (20 psi). |
| Employment | 311 L/s for 3 hours at a minimum pressure of 140 kPa (20 psi). |

## 4.2 Water Hydraulic Model

Halton Region maintains a detailed all-pipes hydraulic model of its water distribution system developed in InfoWater, which includes local distribution mains, transmission mains, reservoirs, pumping stations, and other key water infrastructure. The model is used to support planning, design, and operational decision-making across the Region. It was last comprehensively calibrated in 2021, based on extended period simulations (EPS) and validated against supervisory control and data acquisition (SCADA) data collected during periods of high system demand.

For the purposes of the IMP, the model was reviewed and updated to reflect recent infrastructure changes and system performance data. The following summarizes the key modelling activities completed as part of this study:

- **Model Review and Update:** The existing hydraulic model was reviewed and updated with the latest infrastructure data, design criteria, and levels of service performance indicators.
- **Future Growth and Infrastructure Updates:**
    - Growth projections from the Joint Best Planning Estimates (JBPEs) were incorporated into the model to establish five-year planning horizons through to 2051.
    - Future infrastructure, both committed projects and previously identified needs, were added to support the assessment of servicing strategies to 2051.
- **Scenario Development:** The updated hydraulic model was used to simulate a series of planning scenarios, including existing conditions and future horizons extending to 2051. Scenarios considered average day, maximum day, and fire flow demand conditions, as well as different growth and infrastructure phasing assumptions. The modelled results helped identify the water infrastructure servicing strategies presented in the IMP.

This modelling work forms the basis for identifying future capacity needs and system improvements required to accommodate long-term growth in the Region.

## 4.3 Opportunities and Considerations

The assessment of opportunities and considerations focused on the water service areas within the approved Regional Urban Boundary. The IMP did not assess or propose expanded water servicing in areas outside of the approved Boundary.

Existing and future water opportunities and considerations were identified through discussions with Regional staff, hydraulic analyses, and review of available infrastructure data (e.g., geographic information systems, design reports, as-built information, etc.). The InfoWater hydraulic model was used to assess the performance of the existing and future system under various demand conditions.

Opportunities and considerations for the water system include:

- **Water Treatment Expansion:** expanding the water treatment capacity in Halton to support growth, primarily by the Burloak WTP which has site capacity for expansion and future planned upgrades.
- **Environmental Challenges:** Bronte Creek and Sixteen Mile Creek present challenges for watermain crossings and moving water west to east, then north into the greenfield growth areas of Milton and Georgetown.
- **Balance of Treatment Capacity at Lake and Groundwater Source:** growth in the groundwater service area and subsequent well capacity will need to be considered.
- **Supporting Continued Growth within Urban Areas:** high density growth within several key MTSAs will require continued infrastructure investments.
- **Additional System Resiliency:** enhancing lake-based water transmission from south to north through two primary transmission mains. The objective is to provide multiple pathways for water to flow through the system, increasing operational flexibility and redundancy. As growth continues in Milton and Georgetown, the need for greater south-to-north supply capacity will also increase.
- **Supporting Greenfield Growth with Water System Expansions:** extension of water infrastructure north of Highway 401 will support growth in Halton Hills.
- **Maintaining Levels of Service and Security of Supply:** security of supply for water pumping and transmission will be critical as growth increases further from supply sources.

## 4.4 Assessment of Water Infrastructure

The assessment of water infrastructure (water treatment plants, pumping stations, storage, etc.) was carried out using the most current data available, updated analysis tools, updated design criteria and levels of service, and the JBPEs, as described in previous sections. The results of the assessment are summarized in the following sections.

### 4.4.1 Water Treatment Plants

This section summarizes the analysis of existing and future treatment capacity needs for each water supply system. A treatment capacity assessment was completed using updated design criteria and the JBPEs to evaluate when capacity upgrades may be required to meet the needs of future growth. Maximum day demand (MDD) projections were determined for each water treatment plant service area to identify potential supply constraints. Based on the Region's level of service guidelines, plant expansion planning is typically initiated when MDD reaches 80% of treatment capacity and implementation (i.e., design and construction) is triggered at 90% of treatment capacity.

The water treatment capacity assessment informs timing needs for capacity expansion and are presented in the following sections. Broader, system-wide supply strategies are addressed in Section 5.3.1.

#### 4.4.1.1 Acton Groundwater System

**Figure 5** presents the projected demands for the Acton groundwater system compared to the existing treatment capacity and the PTTW limit. The assessment indicated that growth demands are approaching the Acton Groundwater Capacity by 2051.

The MDD in Acton is projected to approach 90% of available treatment capacity shortly before 2046. While the total current capacity is sufficient to meet projected growth to 2051, this threshold suggests a potential need for continuous monitoring of the annual demand as it increases over time. Recommendation for potential future expansions can be made upon further review of growth uptake and associated demand under future infrastructure planning assignments.

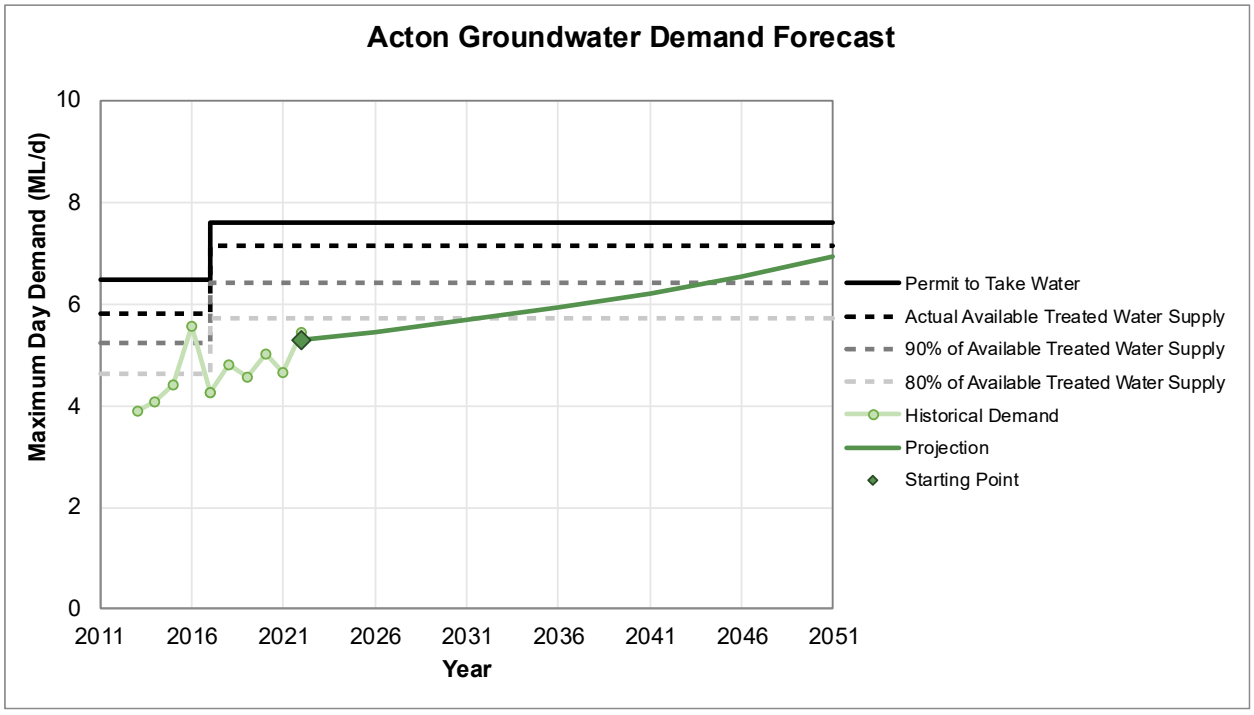



**Figure 5 – Water Supply & Demand Forecast – Acton Groundwater System**

#### 4.4.1.2 Georgetown Groundwater System

**Figure 6** presents the projected demands for the Georgetown groundwater system compared to the existing treatment capacity and the PTTW limit. It is worth noting that a water supply solution for Georgetown was recently implemented. The solution involved a transfer of select areas in south Georgetown from groundwater to lake-based servicing, as recommended in the Sustainable Halton Master Plan. The transfer of some areas of Georgetown from groundwater to lake-based servicing is reflected in **Figure 6** by the sudden drop in the demand forecast.

The assessment indicated that with the transition of select areas of Georgetown to the lake-based system, there is sufficient groundwater capacity within the Georgetown system to maintain water supply to the areas serviced by the groundwater system.

**Figure 6** further accentuates the importance of the transfer to support the projected growth in Georgetown. If the groundwater to lake-based transfer of select areas had not been implemented, then the existing treatment capacity would not be sufficient to support projected growth to 2051. Based on current projections, the 90% treatment capacity threshold would have been reached shortly after 2026. Without any changes to the servicing strategy and pressure zones boundaries, projected demand in Georgetown would have reached over 60 ML/d by 2051. This is essentially double the current treatment capacity, highlighting both the magnitude of the growth and the necessity to transition to lake-based supply in parts of Georgetown.

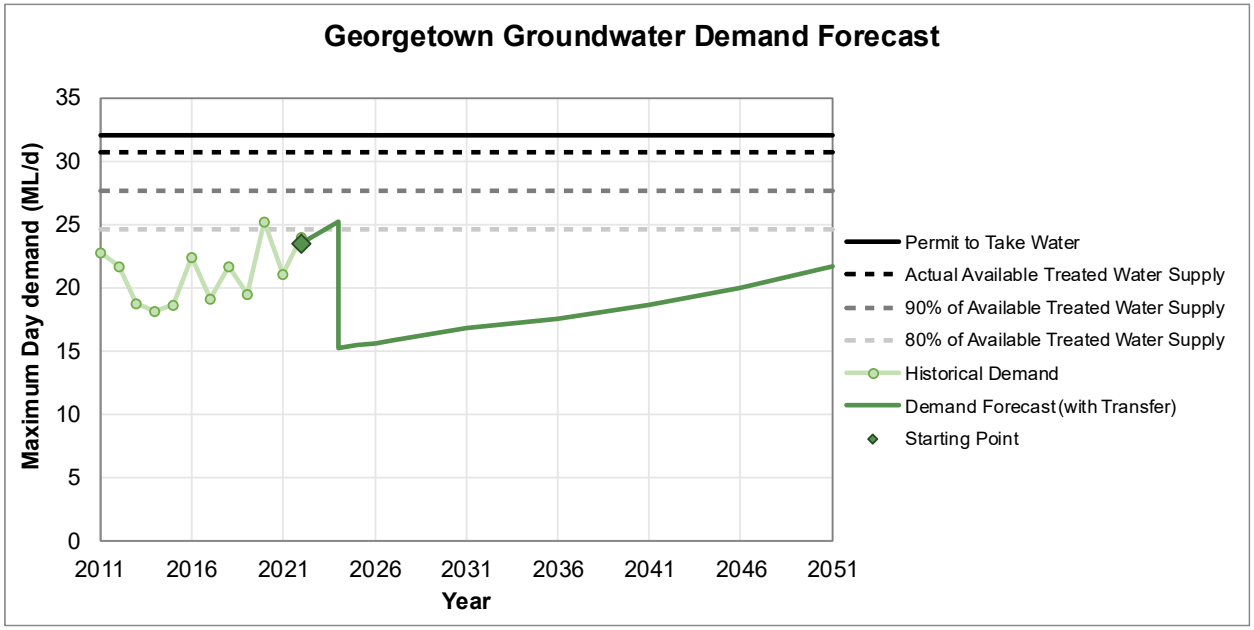



**Figure 6 – Water Supply & Demand Forecast – Georgetown Groundwater System**

#### 4.4.1.3 Milton Groundwater System

**Figure 7** presents the projected demands for the Milton groundwater system compared to the existing treatment capacity and the PTTW limit. The assessment indicated that the existing treatment capacity will not be sufficient to support projected growth to 2051.

Based on current projections, the 90% treatment capacity threshold could be reached shortly after 2026, suggesting that various alternatives for how to address the Milton groundwater system limitations should be considered in the near-term. Potential alternatives include servicing new growth areas with lake-based supply, implementing partial and phased transfers from the groundwater to the lake-based system where feasible, increasing groundwater treatment capacity, and promoting water conservation measures. These options are discussed in more detail in Section 5.3.1.

As shown in **Figure 7**, if the current groundwater service boundary remains unchanged, water demand in 2051 is projected to approach approximately 27 ML/d. This significantly exceeds both the current PTTW and the actual treatment capacity, highlighting the need for a servicing strategy to accommodate long-term growth.

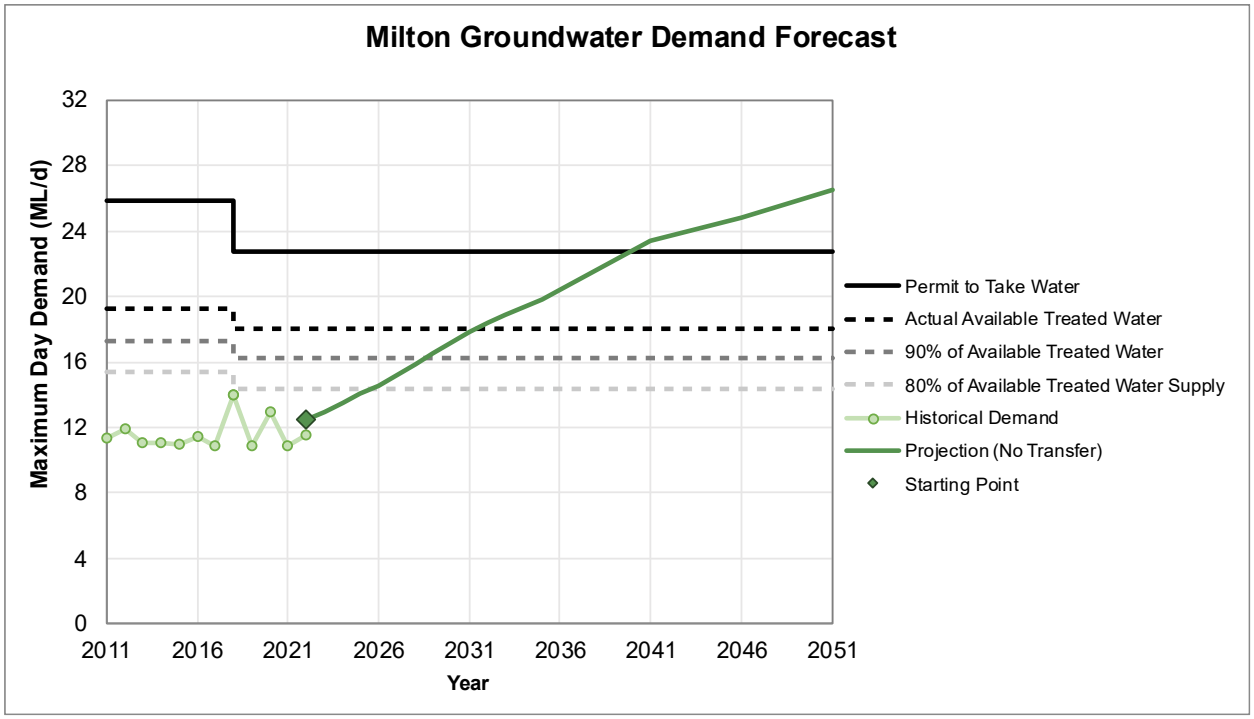



**Figure 7 – Water Supply & Demand Forecast – Milton Groundwater System**

#### 4.4.1.4 Lake-based System

**Figure 8** presents the projected demands for the lake-based water system compared to the existing and currently planned treatment capacity. The assessment indicated that the combined capacity of existing facilities and committed upgrades, including the Oakville WTP increase to 130 ML/d and the Burloak WTP Phase 2 expansion to 165 ML/d, will not be sufficient to meet projected growth to 2051.

Based on current projections, the planned Burloak WTP Phase 2 expansion is critical in the near-term, as 90% of the current treatment capacity is expected to be reached around 2031. With the completion of this expansion, the system can accommodate approximately seven additional years of growth before reaching the 90% threshold again, projected after 2036. This highlights the need to consider a further increase in treatment capacity for the lake-based system within the planning horizon.

Various options to achieve the estimated ultimate treatment capacity requirement of approximately 690 ML/d are explored and evaluated in Section 5.3.1.4. Note that this projection to 690 ML/d does not include any potential supply transfer (from groundwater to lake-based) for the Milton system. If identified as the preferred Milton supply solution, these groundwater to lake-based supply transfers further increase the ultimate demands on the lake-based system.

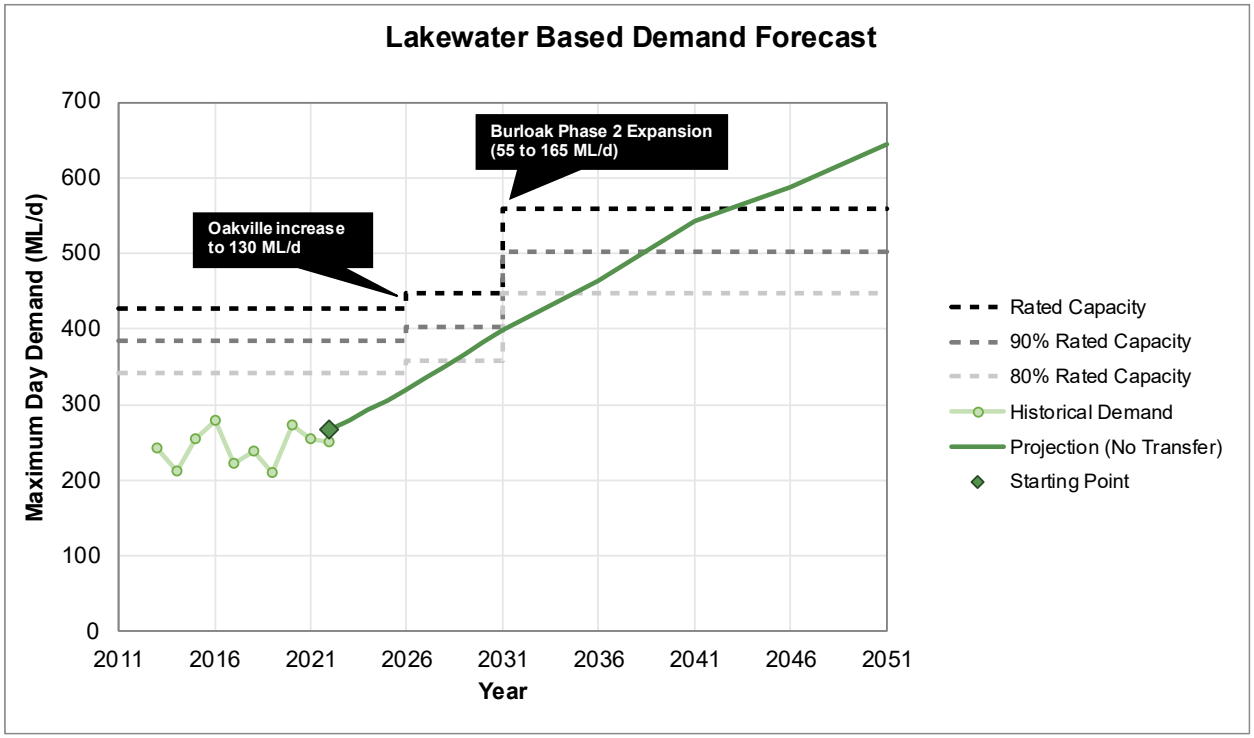



**Figure 8 – Water Supply & Demand Forecast – Lake-based System**

To summarize, the assessments of the Regional water supply systems indicated the lake-based system and Milton groundwater system will require additional supply capacity and/or modifications to their servicing strategies. The following sections provide a more detailed assessment of specific components of the water distribution systems. These include an evaluation of pumping capacity and storage needs within individual pressure zones, followed by a high-level review of the transmission network and its ability to convey treated water from the WTPs.

### 4.4.2 Water Pumping Stations

The initial assessment of pumping capacity for each pressure zone was based on the ability to provide the firm capacity to meet the required demands in the system. This assessment required comprehensive hydraulic analysis using the Region's hydraulic model and water system schematic to determine pumping station requirements.

It is important to note that in a complex water system, decisions regarding one component, such as pumping, are closely interconnected with others, including location of treatment plant expansions, storage types (floating vs. pumped), and transmission strategy. As such, identifying pumping requirements is an iterative process, where later decisions can influence earlier assumptions and change the amount of pumping required at certain sites.

The summary below reflects this interdependency, incorporating certain assumptions about pressure zone boundaries and water supply strategies that are discussed later in Section 0. Based on the analysis, the following pumping capacity requirements and resiliency considerations were identified to support growth to 2051:

**Zone G6L – Pumping Deficiency and Improved Resiliency Opportunity:**
The G6L pressure zone is currently supported by a single pumping station, the Ashgrove PS. Based on a water supply strategy that limits the water demand to the available supply capacity of the Georgetown groundwater system, there is a long-term need for significant pumping requirements in the new lake-based G6L pressure zone. The recently constructed Ashgrove PS will not be sufficient to accommodate the projected 2051 demands in the pressure zone. An opportunity to add a second G6L pumping station is identified to support the increased pumping requirements and improve system resiliency.

**Zone 267 (M5L) – Pumping Deficiency and Improved Resiliency Opportunity:**
The M5L pressure zone is currently supported by the Kitchen PS and the Fourth Line PS. Based on the water supply strategy which limits Milton's groundwater system to its current capacity, significant long-term growth in M5L may require expansion of the pressure zone. The extent of the required pumping increase will also depend on other system decisions, such as whether or not a future second G6L pumping station draws supply from M5L. Considering the increase in supply needs from M5L, as well as operational concerns with the existing M5L pumping stations, a third pumping station in M5L is viewed as a potential opportunity to support the increased pumping requirements and improve system resiliency.

**Zone 250 (M4L) – Pumping Deficiency and Improved Resiliency Opportunity:**
M4L is supported by a single pumping facility, the Neyagawa BPS. Growth within pressure zone M4L and increased transfer needs through M4L towards Georgetown (G6L) and Milton (M5L) exceed pumping capacity at the Neyagawa BPS. A second pumping station is identified as a strong opportunity to meet future demand and enhance system resiliency.

**Zone 224 (O4) – Pumping Deficiency and Improved Resiliency Opportunity:**
The O4 pressure zone is currently supported by a single pumping station, the Glenashton PS. The station does not have capacity to support the projected growth to 2051 within pressure zone O4. Therefore, a second pumping station is identified as a strong opportunity to meet demand and enhance system resiliency.

**Zone O3 – Pumping Deficiency:**
The O3 pressure zone is currently supported by the Eighth Line BPS and Kitchen PS. Anticipated growth in O3 and the potential increased transfer demands to higher zones means that there could be insufficient capacity to support the projected growth, depending on the selected transmission and pumping strategies in other zones.

Currently, the Neyagawa BPS pulls supply from O3 and pumps it north to M4L. As this transfer increases, it puts further needs on the O3 system. Additionally, there is a separate opportunity to utilize the Moore RES (O3) as a future pumping station site to support the O4 pressure zone. This expected increased flow out of O3 and into O4 would also further the need to provide increased pumped supply into Zone O3.

**Zone O2 – Pumping Deficiency:**
The O2 pressure zone is currently supported by the Davis Road BPS and will also be aided in the future by the planned Burloak BPS. Anticipated growth in O2 and increased transfer demands through O2 to support significant growth in the upper zones may require additional pumping capacity depending on the selected transmission and pumping strategies in other zones. Currently, both the Glenashton PS and the Eighth Line BPS pull supply from O2 and pump it north towards O3 and O4. As these transfers increase, there is an increased need for pumping from the O2 pressure zone through expansion of existing facilities and the incorporation of the Burloak BPS for resiliency.

**Zone O1/B1 – Pumping Deficiency:**
Currently, supply to the entire lake-based water distribution system is through pressure zones O1 and B1. The three (3) existing water treatment plants (Burlington, Burloak, and Oakville) supply flow into O1/B1 which is subsequently transferred north to other parts of the system. To support significant growth in the upper zones, additional pumping capacity in O1/B1 may be required, depending on the selected transmission and pumping strategies in other zones. It is noted that there is an opportunity to partially bypass the O1/B1 pressure zones by directing some future flows from the WTP directly to higher zones. This approach could help reduce the pumping and transmission requirements in O1/B1.

**Zone B2 – Pumping Deficiency:**
The B2 pressure zone is currently supported by the Washburn PS and will be aided in the future by the planned Burloak BPS. Due to anticipated growth in B2 and the increased transfer demands to upper zones via B2, the current system is anticipated to be unable to support the projected growth to 2051. The magnitude of the deficiency is largely dependent on how the pumping deficiency is addressed in O1/B1. To support the increased pumping needs and improve resiliency, expansion of existing facilities, including potential direct Zone 2 supply from the WTPs, and the incorporation of the Burloak BPS are anticipated outcomes.

**Table 18** provides a summary of pumping station requirements and opportunities for each pressure zone.

**Table 18 – Water Pumping Station Summary of Capacity Requirements and Opportunities**

| Pressure Zone* | Facilities/Pump Stations | Available Pumping Capacity (ML/d) | Baseline (2022 MDD) Demand** (ML/d) | 2051 Max Day Demand** (ML/d) | Transfer to Other Zones? | Outcome Notes |
|---|---|---|---|---|---|---|
| **A9G** | • Prospect Park Wells<br>• Davidson Well<br>• Fourth Line Wells | 7.1<br>(7.6 PTTW) | 5.3 | 6.9 | No transfers | - No expansion needed based on projection. |
| **G6G** | • Cedarvale Wells<br>• Lindsay Court Wells<br>• Princess Anne Wells | Ave. Annual: 20.3<br>Max: 30.8 | 23.6 | **25.2** | No, except G6B (small, boosted area) | - To limit the need for expansion of the Georgetown groundwater capacity, this considers that new growth (South Georgetown) will become part of the new Georgetown lake-based system (G6L). |
| **M5G** | • Kelso Wells | Ave. Annual: 13.6<br>Max (PTTW): 22.7 | 12.4 | **12.3** | Yes- transfers to M5L | - To limit the need for expansion of the Milton groundwater capacity, this assumes that select parts of M5G will be transferred to M5L. |
| **G6L** | • Ashgrove PS | 20 | N/A | **45.2** | No transfers | - No G6L in 2022 (baseline); Ashgrove PS existing 20 ML/d.<br>- Assumes split between G6L and G6G in the Georgetown system to sustain groundwater source. Existing Ashgrove PS capacity will not be sufficient alone to meet 2051 MDD. |
| **267 (M5L)** | • Kitchen PS<br>• Fourth Line BPS | 105 | 35.1 | **97.3** | -No transfer currently.<br>-Potential future transfer to G6L. | - Baseline MDD identified does not consider potential transferred flows.<br>- MDD in 2051 assumes some M5G will be transferred to M5L to maintain sustainable groundwater takings. If future transfer from M5L to G6L, there is need for increased M5L pumping capacity. |
| **250 (M4L)** | • Neyagawa BPS | 112 | 9.6 | **162.0** | Yes, transfers are existing or planned to M5L & G6L | - Baseline MDD identified does not consider transferred capacity from M4L to M5L (Fourth Line) and to G6L (Ashgrove).<br>- Even without transfers, there is a pumping capacity deficit in M4L by 2051. M4L system requires significant additional capacity and would benefit from a 2nd PS for resiliency. |
| **224 (O4)** | • Glenashton PS | 43.7 | 18.1 | **79.8** | No transfers | - With major growth in O4, Glenashton PS will not be sufficient alone to meet 2051 MDD. Requires significant additional capacity and would benefit from a 2nd PS for resiliency. |
| **O3** | • Eighth Line BPS<br>• Kitchen PS | 114.2 | 44.5 | **61.2** | Yes, transfers are existing to M4L and potentially O4 | - Baseline MDD identified does not consider transferred capacity from O3 to M4L (Neyagawa).<br>- MDD in 2051 assumes some O4 will be supplied by O3 via a new pumping station.<br>- With existing & potential transfers to growth areas (M4L/O4), there is a sizeable pumping need in O3. O3 pumping could also benefit from additional resiliency. |
| **O2** | • Davis Road BPS | 74 | 19.0 | **48.6** | Yes, transfers are existing to O3 & O4 | - Baseline MDD identified does not consider transferred capacity from O2 to O4 (Glenashton).<br>- With existing & potential transfers to growth areas (O3/M4L/O4), there is a sizeable pumping need in O2. Could also benefit from additional resiliency. |
| **O1** | • Oakville WTP<br>• Burloak WTP | 130 | 39.3 | **52.3** | Yes, transfers are existing to many areas | - Previously identified in supply section that WTP capacity expansion in the lake-based system is essential. |
| **B5** | • Beaufort PS | 1 | 0.1 | 0.1 | No transfers | - No expansion needed; sufficient capacity remains. |
| **B4** | • Bailie PS<br>• Tyandaga PS | 18.3 | 5.9 | 6.3 | Yes, transfers are existing to B5 | - No expansion needed; sufficient capacity remains. Benefit in maintaining existing resiliency to B4. |
| **B3** | • Washburn PS<br>• Brant Street PS<br>• Appleby PS | 92.5 | 26.0 | 35.4 | Yes, transfers are existing to B4 & B5 | - No expansion needed; sufficient capacity remains. Benefit in maintaining existing resiliency to B3. |
| **B2** | • Washburn PS | 36.4 | 15.7 | **49.8** | Yes, transfers are existing to B3 & B4 & B5 | - Increase partly driven by B1A zone realignment to B1/B2.<br>- Growth, along with realignment and continued transfers north in Burlington indicates need for the 2nd PS (Planned Burloak BPS) for capacity and resiliency. |
| **B1A** | • Kingsway BPS | 30 | 8.6 | N/A | No transfers | - Servicing strategy (discussed later) removes B1A pressure zone and repurposes it into some areas of B1 and other areas of B2. Kingsway BPS still considered for being maintained/ repurposed for resiliency to B2. |
| **B1** | • Burlington WTP<br>• Burloak WTP | 252 | 44.3 | **82.6** | Yes, transfers are existing to many areas | - Previously identified in supply section that WTP capacity expansion in the lake-based system is essential. |

** Note that in some cases, the Pressure Zone Boundary does change based on the servicing strategies identified in Section 7. Meaning, the baseline demands reflect the existing pressure zone boundaries. Whereas the 2051 demands reflect changes in the pressure zone boundaries.*

*** Demand refers to the maximum day demand, for the respective year, in the pressure zone itself. The value shown in these columns does not include the transfer demands, which can be significant in many areas. These transfers can vary notably depending on the decisions made (i.e., decisions on how to more water supply to northern pressure zones).*

### 4.4.3 Water Storage

Adequate storage is essential to maintain reliable service levels during both normal and emergency conditions. Storage requirements are typically based on the need to provide equalization storage, fire protection, and emergency supply. Based on the analysis, the following storage requirements and opportunities were identified to support growth to 2051:

**Zone G6L/G6G – Storage Volume Deficiency:**
In the 2022 baseline condition, pressure zone G6L did not exist, and has since been established with the Ashgrove PS serving as its source of supply. As a temporary measure, the Region is planning to operate the existing 22nd Side Road RES (normally G6G storage) as a G6L storage facility. While this addresses short-term needs, it is not sufficient to meet the long-term (2051) storage requirements of G6L. Additionally, this arrangement creates a temporary storage deficit in G6G, which will persist until a dedicated G6L storage facility is constructed. Once that facility is in place, the 22nd Side Road RES can revert to serving G6G and is expected to be adequate for its long-term needs. Overall, G6L will require additional storage capacity to meet ultimate demand.

**Zone 267 (M5L) – Storage Volume Deficiency:**
Due to projected growth in pressure zone M5L, and the strategy to transfer select groundwater areas (M5G) to lake-based areas (M5L), there is an increase in the storage needs in M5L. The existing storage capacity will not be sufficient to meet the demands of planned growth. Storage solutions should be explored and could include additional floating storage or pumped storage from adjacent pressure zones, provided there is sufficient pumping and transmission capacity to deliver flows from other storage facilities, as needed.

**Zone 250 (M4L) – Storage Volume Deficiency:**
Due to significant growth in the M4L pressure zone, the existing Ashgrove RES does not have sufficient capacity to meet the ultimate storage needs for the zone. Therefore, storage solutions should be explored and could include additional floating storage or pumped storage from adjacent pressure zones, provided there is sufficient pumping and transmission capacity to deliver flows from other storage facilities, as needed. It is noted that the existing Ashgrove site has expansion potential, making it a viable candidate for future storage upgrades that could also support neighbouring zones such as M5L and G6L.

**Zone 224 (O4) – Storage Volume Deficiency:**
Existing storage capacity in O4 will not be sufficient to support projected growth and additional new storage capacity is needed in this zone. Storage solutions should be explored and could include additional floating storage or pumped storage from adjacent pressure zones, provided there is sufficient pumping and transmission capacity to deliver flows from other storage facilities, as needed.

**Table 19** provides a summary of storage requirements and opportunities by pressure zone.

Table 19 – Water Storage Summary of Capacity Requirements and Opportunities

| Pressure Zone | Storage Facilities | Existing Storage (ML) | Baseline (2022) Storage Need (ML)* | 2051 Storage Need (ML)* | Outcome Notes |
|---|---|---|---|---|---|
| **A9G** | • Acton Third Line RES | 4.5 | 4.6 | **5.1** | - Marginal storage deficit. Does not necessarily warrant an additional storage facility. May be more appropriate to use additional pumping capacity and to monitor long-term demand in this service area. |
| **G6G** | • 22nd Side Road RES<br>• Todd Road Tower<br>• Norval Standpipe (G5G) | 13.2 | 11.6 | 12.1 | - Storage needs are similar to existing based on assumption of some areas of G6G transferring to G6L.<br>- Sufficient storage does exist to support the ultimate need. However, there will be a temporary storage deficit when the 22nd Side Road RES is used for G6L storage, until dedicated G6L storage is added. |
| **M5G** | • Main Street RES | 14.7 | 8.1 | 8.1 | - Storage needs are similar to existing based on assumption of some areas of M5G transferring to M5L. Under these conditions, there is sufficient storage. |
| **G6L** | • N/A | N/A | N/A | **18.3** | - Temporarily, the Region is planning to operate the existing 22nd Side Road RES (normally G6G storage) as a G6L storage facility.<br>- This storage is not sufficient to support the long-term storage needs (2051) of the G6L zone and creates a temporary storage deficit in G6G. New storage solutions are required to support the ultimate need. |
| **250 (M5L)** | • Third Line RES<br>• Milton (Steeles) Elevated Tank | 27 | 15.2 | **34.6** | - Existing storage capacity is insufficient due to the significant amount of growth and due to the partial transfer needs from M5G to M5L.<br>- Future storage solutions need to be explored and assessed, which can involve new floating storage or new pumped storage from other zones. |
| **250 (M4L)** | • Ashgrove RES | 30 | 7.2 | **54.8** | - Due to significant growth in the M4L pressure zone, the existing Ashgrove RES is not sufficient to meet the ultimate storage needs for the zone.<br>- Future storage solutions need to be explored and assessed.<br>- The existing facility has expansion potential which could be considered to address the needs in M4L and support neighbouring pressure zones. |
| **224 (O4)** | • Burnhamthorpe Elevated Tank | 5.6 | 9.9 | **29.1** | - Due to significant growth in O4 and changes to top water levels, the existing storage is insufficient in O4.<br>- Storage solutions need to be explored and assessed. Storage options can consider both increases in floating storage or increases in pumped storage from other pressure zones. |
| **O3** | • Moore RES | 32 | 18.1 | 23.3 | - Sufficient storage exists at the existing Moore RES. No added storage is needed in O3. |
| **O2** | • Glenashton RES | 17.4 | 10.1 | **19.4** | - If there are no changes from existing conditions, then there is a slight storage deficit in O2.<br>- Planned expansion at Glenashton RES (to ~24ML) can support the future storage needs in O2. |
| **O1** | • Kitchen RES<br>• McCraney RES | 39.5 | 16.5 | 20.5 | - Sufficient storage exists at the existing reservoirs. No added storage needed in O1. |
| **B5** | • N/A | N/A | 0.4 | 0.4 | - No storage facility exists in this pressure zone. Acts as a closed zone, with pumped storage from B4. This remains acceptable due to the surplus at Beaufort RES. |
| **B4** | • Beaufort RES | 6 | 4.4 | 4.5 | - Sufficient storage exists at the existing reservoir. No added storage needed in B4. |
| **B3** | • Headon Road RES<br>• Tyandaga RES | 22.5 | 12.3 | 15.3 | - Sufficient storage exists at the existing reservoirs. No added storage needed in B3. |
| **B2** | • Bailie RES<br>• Appleby RES | 50.8 | 9.1 | 19.8 | - Sufficient storage exists at the existing reservoirs. No added storage needed in B2. |
| **B1A** | • Waterdown RES | 7.3 | 5.7 | N/A | - Based on the servicing strategy of a pressure zone realignment of B1A to become B1 & B2, this pressure zone would no longer exist, and storage would not be required. |
| **B1** | • Brant Street RES<br>• Washburn RES | 35 | 18.0 | 30.0 | - Sufficient storage exists at the existing reservoirs. No added storage needed in B1. |

** Note that in some cases, the Pressure Zone Boundary does change based on the servicing strategies identified in Section 7. Meaning, the baseline demands reflect the existing pressure zone boundaries. Whereas the 2051 demands reflect changes in the pressure zone boundaries.*

### 4.4.4 Transmission Mains

The transmission network plays a critical role in conveying treated water from water treatment plants to pumping stations, storage facilities, and the overall distribution network. The assessment of transmission main capacity considered multiple factors, including the location and magnitude of projected growth, the configuration of the existing water network (including transmission and pumping infrastructure), the overall water supply strategy, system reliability, and the ability to meet demands to the 2051 planning horizon. Based on this assessment, several existing and planned transmission routes have been identified for upgrades or servicing strategies to accommodate projected growth to 2051:

**From WTP to growth areas in Milton:**
According to the JBPEs, the majority of the growth is located in the lake-based system in North Oakville and Milton. Currently the only supply route into M4L is via the Neyagawa BPS which is supplied by the Oakville WTP. Additional lake-based treatment capacity in the future is generally only available at the Burloak WTP as it has site capacity for expansion. Therefore, a new transmission main to move water from the Burloak WTP to the north should be considered. The transmission strategy options will be explored and assessed in more detail in Section 5.3.2.

**Zone O2 from Davis BPS to Eighth Line BPS:**
The existing zone O2 transmission from Davis Road BPS to Eighth Line BPS is reaching its conveyance capacity limit. As such, a twinning or upsized replacement of the existing transmission main will need to be considered in order to maximize the pumping capacity from Davis Road BPS.

**Zone B2 from the planned Burloak BPS to Appleby RES:**
The existing zone B2 network does not yet have the dedicated transmission needed to allow for the planned Burloak BPS to supply flows towards B2 and the Appleby RES. A new transmission main along Burloak Drive and Upper Middle Road was previously recommended by the 2011 Sustainable Halton Master Plan and is in the design phase.

**Zone B2/O2 Inter-Zone Transmission:**

The Sustainable Halton Master Plan recommended improved transmission capacity from the Burloak BPS easterly, towards zone O2, to provide emergency supply and to supplement supply from the Davis Road BPS as needed. A new transmission main connecting zones B2 and O2 was recommended along Wyecroft Road and the project is underway.

**Zone B1/O1 Transmission between WTPs:**
To meet projected growth within the 2051 planning horizon, increases in capacity are required from the WTPs. The existing Zone B1/O1 network is reaching its conveyance capacity and inter--zone transfer is limited. A new transmission main could help move water between WTPs, strengthening the system's resiliency to any unplanned limitations at WTPs and maximizing the treatment capacity.

Additional transmission mains may be needed to strengthen the water supply links between future pumping stations and any future storage facilities that are identified as part of the preferred water servicing strategies. Transmission needs are heavily dependent on other servicing strategy decisions (treatment, pumping, and storage).

# 5.0 Preferred Water Servicing Strategy

# 5.0 Preferred Water Servicing Strategy

The process of identifying and assessing servicing alternatives is a critical component of the master planning process. It enables a comprehensive evaluation of various servicing solutions and should be documented to ensure the process has been carried out in a transparent and defensible manner.

This section outlines the process to develop the preferred water servicing strategy, including the identification and evaluation of alternatives, and presents the resulting capital program that supports implementation of the preferred strategy.

This section also identifies the costing and phasing of the proposed capital projects. Cost estimates are comprehensive and account for all stages of project delivery, including preliminary planning, environmental assessment, detailed design, property acquisition, and construction.

## 5.1 Approach

The strategy development approach has been designed to ensure a logical and transparent process that documents the evaluation and decision-making that will ultimately develop a successful capital program. Sustainability principles were considered in the development of the IMP and were integrated within the strategy development, such as:

- Making best use of existing infrastructure.
- Minimizing the cost of new infrastructure.
- Considering operation and maintenance costs to ensure financial sustainability.
- Planning for long-term reliability and security of the water and wastewater systems.
- Increasing system resiliency to climate change.
- Avoiding disruptions to natural and cultural heritage resources.
- Minimizing environmental crossings and other disruptions to the environment.
- Configuring future infrastructure within the existing road right-of-way, where possible.
- Avoiding/reducing production of greenhouse gas (GHG) emissions.
- Developing solutions that are flexible and adaptable to support growth to 2051.

## 5.2 Evaluation Process and Criteria

Opportunities and considerations for the water system were identified at the outset of the study and were used as a starting point for identifying conceptual servicing options. The evaluation process progresses from high-level concepts to more detailed servicing strategies and, where applicable, to further evaluation of specific servicing solutions in certain focus areas. The progression from high-level to more detailed servicing strategies allows for a more efficient process as it screens out servicing concepts that are not feasible and do not achieve the objectives of the servicing strategy before they are carried forward for detailed evaluation.

Servicing concepts, strategies, and specific servicing solutions are subject to a wide range of considerations, including:

- **Equitable Infrastructure Services** – Provide for water and wastewater services in urban areas and access to multi-modal Regional transportation infrastructure.
- **Safe and Healthy Communities** – Support healthy and active lifestyles and community well-being.
- **Sustainability** – Balance social, environmental and economic goals to support growth in a sustainable manner.
- **Climate Change** – All phases of Regional water, wastewater and multi-modal transportation infrastructure planning must recognize and incorporate climate change.
- **Communication and Consultation** – Ensure the IMP process and strategies are clearly and openly communicated and consulted on.
- **Integration of Planning for Regional Infrastructure** – Ensure a coordinated approach to implementation of Regional water, wastewater, and multi-modal transportation infrastructure.
- **Technical Innovation** – Include innovation in the development of Regional water, wastewater and transportation infrastructure strategies.

These considerations are closely aligned with the evaluation criteria used to assess servicing alternatives. The full set of criteria, along with detailed descriptions and the scoring methodology, are presented in **Table 20**. Each criterion includes specific measurable factors (quantitative and qualitative) used to identify the overall preferred servicing strategy.

Table 20 – Evaluation Criteria and Scoring

| Criteria Category | Sub-Criteria | Scoring |
|---|---|---|
| **Equitable Infrastructure Services** | Improves/maintains level of service for existing users | • Reduces LOS<br>• Maintains LOS<br>• Improves LOS |
| **Safe and Healthy Communities** | Minimizes potential short/long-term noise and odour impacts | • Increases impact<br>• Neutral<br>• Decreases impact |
| | Minimizes construction impact on traffic, local businesses, and residents | • Increases impact<br>• Neutral<br>• Decreases impact |
| | Considers long-term visual aesthetics of the proposed infrastructure | • Increases visual impact (e.g. new pump station)<br>• Neutral (no impact) (e.g. maintain pump station)<br>• Decreases visual impact (e.g. remove pump station) |
| | Minimizes impacts on surrounding properties | • Increases road/utility crossings & conflicts<br>• Neutral<br>• Minimizes road/utility crossings & conflicts |
| **Sustainability** | Minimizes environmental crossings, impact on aquatic/terrestrial species at risk, and environmentally sensitive/protected areas, and nearby agricultural lands. | • Increases impact<br>• Neutral<br>• Decreases impact |
| | Incorporates water conservation and reuse practices | • Decreases conservation<br>• Neutral<br>• Increases conservation |
| | Minimizes impact on archaeological/resources, and cultural heritage sites | • Increases impact<br>• Neutral<br>• Decreases impact |
| | Maximizes existing infrastructure | • Requires new, dedicated infrastructure that doesn't improve system resiliency<br>• Neutral<br>• Maximizes capacity of existing infrastructure |
| | Full lifecycle costs | • Higher lifecycle cost<br>• Neutral<br>• Lower lifecycle cost |
| | Staging costs | • Higher staging and throwaway costs<br>• Lower staging and throwaway costs |
| | State of Good Repair (SOGR) integration | • Lower level of coordination with SOGR program<br>• Neutral<br>• Higher level of coordination with SOGR program |

| Criteria Category | Sub-Criteria | Scoring |
|---|---|---|
| **Climate Change** | Considers resiliency and operational flexibility to adapt to Climate Change | • Strategy elements do not provide improved resiliency for Climate Change adaptation<br>• Neutral<br>• Strategy elements provide improved resiliency for Climate Change adaptation |
| | Reduction in emissions | • High carbon footprint<br>• Neutral<br>• Lower carbon footprint |
| **Integration of Planning for Regional Infrastructure** | Minimizes approvals/coordination | • Increases approval/coordination needs<br>• Neutral<br>• Decreases approval/coordination needs |
| | Integrates with road/transportation projects | • Decreased integrated with road/transportation program<br>• Neutral<br>• Increased integration with road/transportation program |
| **Technical Innovation** | Applies innovation and/or new technologies | • Does not consider innovative and/or new technologies<br>• Neutral<br>• Considers/applies innovative and/or new technologies |
| | Provides opportunity for operational flexibility and security | • Reduces operational flexibility and security of supply/capacity<br>• Neutral<br>• Maximizes operational flexibility and security of supply/capacity |
| | Considers performance of the system under emergency conditions (power outages, fire emergencies) or during construction) | • Degrades performance<br>• Maintains performance<br>• Improves performance |
| | Supports phased growth | • Does not support phased growth<br>• Neutral<br>• Supports phased growth |
| | Minimizes roads/utility crossings and existing infrastructure and minimize proximity and/or conflicts with existing infrastructure | • Increases road/utility crossings & conflict<br>• Neutral<br>• Minimizes road/utility crossings & conflicts |
| | Considers constructability and technical feasibility to build and maintain infrastructure | • More constructability challenges and reduced technical feasibility<br>• Neutral<br>• Reduced constructability challenges and improved technical feasibility |

## 5.3 Servicing Strategy Development

The IMP servicing strategies were developed to address the problem or opportunity statement identified in Preliminary Phase 1 of the MCEA process and to address the various constraints identified in Section 4.0.

Water alternative servicing strategies were identified and reviewed in detail for existing and future growth areas. The following sections summarize the water alternative servicing strategies developed and assessed as part of the IMP. These were ultimately subdivided into three (3) distinct sections:

- Supply Concepts – For each system, the overall water treatment/supply strategy is first assessed to identify the most viable ways to achieve the total flow/demand required to 2051.
- Transmission Concepts – For the lake-based system, overarching transmission alternatives were identified and assessed. Generally, these looked to assess the most logical way to transfer bulk supply from the source (WTP) towards the primary growth areas (lake-based Milton and Georgetown, and North Oakville). This is identified as an overarching strategy since it is interrelated with many of the localized challenges in the water systems.
- Focus Area Concepts – Targeted solutions in areas with identified potential capacity constraints or strategic growth priorities.

Collectively, the combination of servicing solutions will form the overall water servicing strategy for the Region. The strategies are generally intended to build on the 2011 Sustainable Halton Master Plan, where appropriate, and develop similar concepts for water supply and transmission.

The following sections provide an overview of the key components of the proposed water servicing solutions, encompassing the system wide and service area supply, transmission, and distribution systems. Comprehensive details of the preferred servicing strategies, including project sizes, locations, and cost estimates, are provided in Section 5.6. followed by detailed evaluation tables (where applicable) in **Appendix 3A**.

### 5.3.1 System Wide Supply Concepts

Halton Region's level of service guidelines for water supply specify expansion planning should begin when MDD reaches 80% of treatment capacity and implementation is triggered at 90% of treatment capacity. The water treatment facilities approaching or exceeding these thresholds were identified, and high-level servicing concepts were developed to address potential existing and future capacity constraints.

A list of servicing concepts to address existing and future servicing challenges was considered at a high level, weighing the advantages and disadvantages of each concept. The concepts considered included: Do Nothing, Limit Growth, Plant Expansion, New Treatment Plants/Wells, and partial or full transfers of groundwater to lake-based supply, with the applicability of each concept assessed in the context of the plant's unique operating conditions and site-specific conditions. Based on the evaluation, concepts were either screened out or carried forward for further evaluation.

For those concepts that required a more detailed evaluation, the detailed evaluation can be found in **Appendix 3A**.

#### 5.3.1.1 Acton Groundwater System Supply

As previously discussed in Section 4.0, existing treatment capacity is sufficient to meet projected growth within the 2051 planning horizon for the Acton groundwater system. As such, it is reasonable to continue utilizing the existing infrastructure for servicing the Acton groundwater service area. Since the demand forecast indicates that water consumption is rising steadily towards the ~90% trigger of available treatment capacity, it is recommended that the Region continue monitoring demand in Acton long term. This will allow the Region to identify if and when the 90% trigger of treatment capacity will be reached, so that they can explore increased or alternate supply options for Acton in a future master plan or separate study.

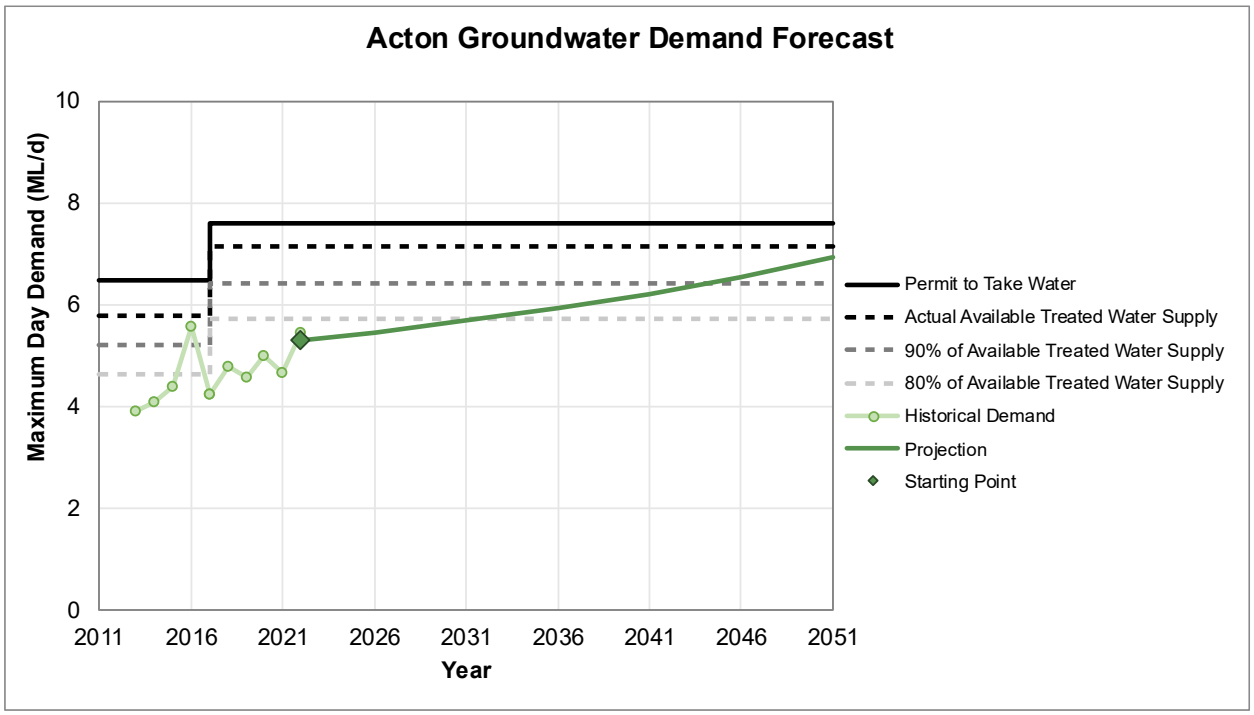



**Figure 9 – Water Supply & Demand Forecast – Acton Groundwater System**

### 5.3.1.2 Georgetown Groundwater System Supply

As discussed in Section 4.0, the Region recently transitioned select areas in Georgetown from the groundwater to the lake-based water system, as previously recommended in the 2011 Sustainable Halton Master Plan. **Figure 10** shows the projected demands to 2051 with the recently implemented transfer of demand away from the groundwater system. The assessment of supply needs and supply availability indicates that with the transfer, there is sufficient groundwater capacity within Georgetown to maintain water supply in the remaining parts of the Georgetown groundwater system to 2051. As such, no further transfer areas (from groundwater to lake-based) have been identified at this time.

The IMP has carried forward the recently implemented partial transfer from the groundwater to the lake-based water, whereby south Georgetown is supported by lake-based supply, and the northern portions of Georgetown remain on groundwater. The pressure zone boundary split between the groundwater and lake-based systems in Georgetown can be seen in **Figure 11**. The boundary has been identified to:

- Maintain system looping/connectivity and minimize closed boundary valves that are required.
- Ensure that the groundwater system's demand remains within the system's capacity and PTTW.

The identified long-term boundary for lake-based vs groundwater-based service is the natural feature of Silver Creek. This helps minimize the amount of additional infrastructure and operational changes required for the transfer. With the implemented transfer, Zone G6G is reduced in size, compared to historically, while still maximizing the utilization of existing infrastructure. The new lake-base Zone G6L will be supplied by the newly constructed Ashgrove PS. G5G and G6B (sometimes also referred to as G7G) will continue to be serviced via G6G, as part of the groundwater system.

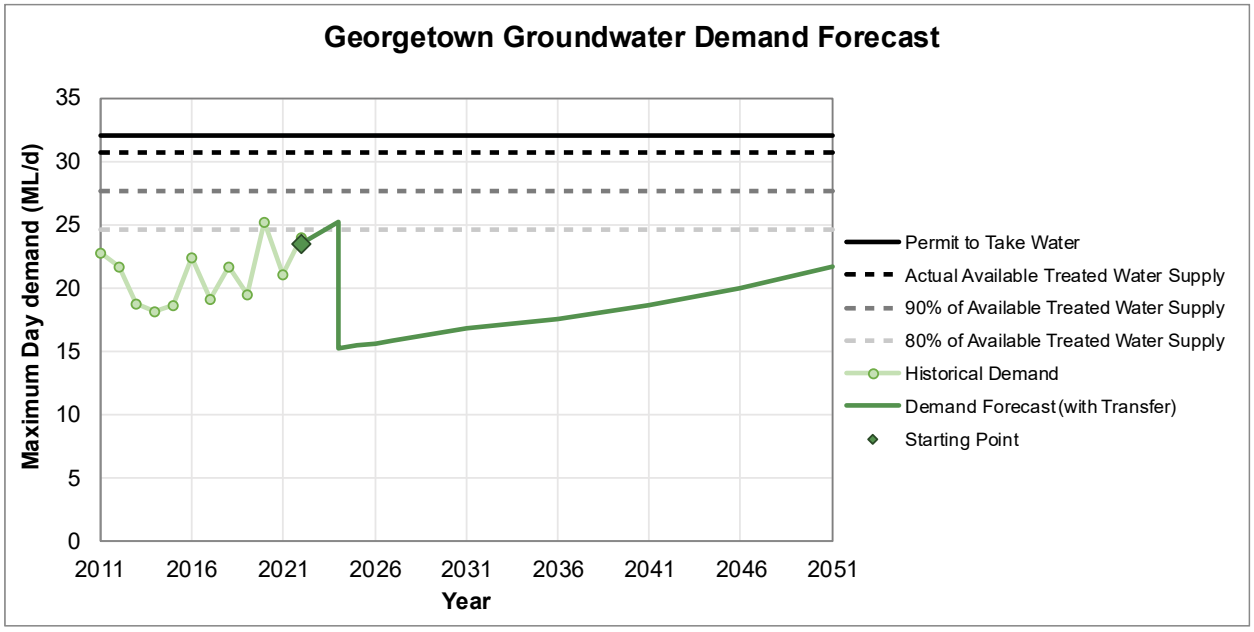



**Figure 10 – Water Supply & Demand Forecast – Georgetown Groundwater System**

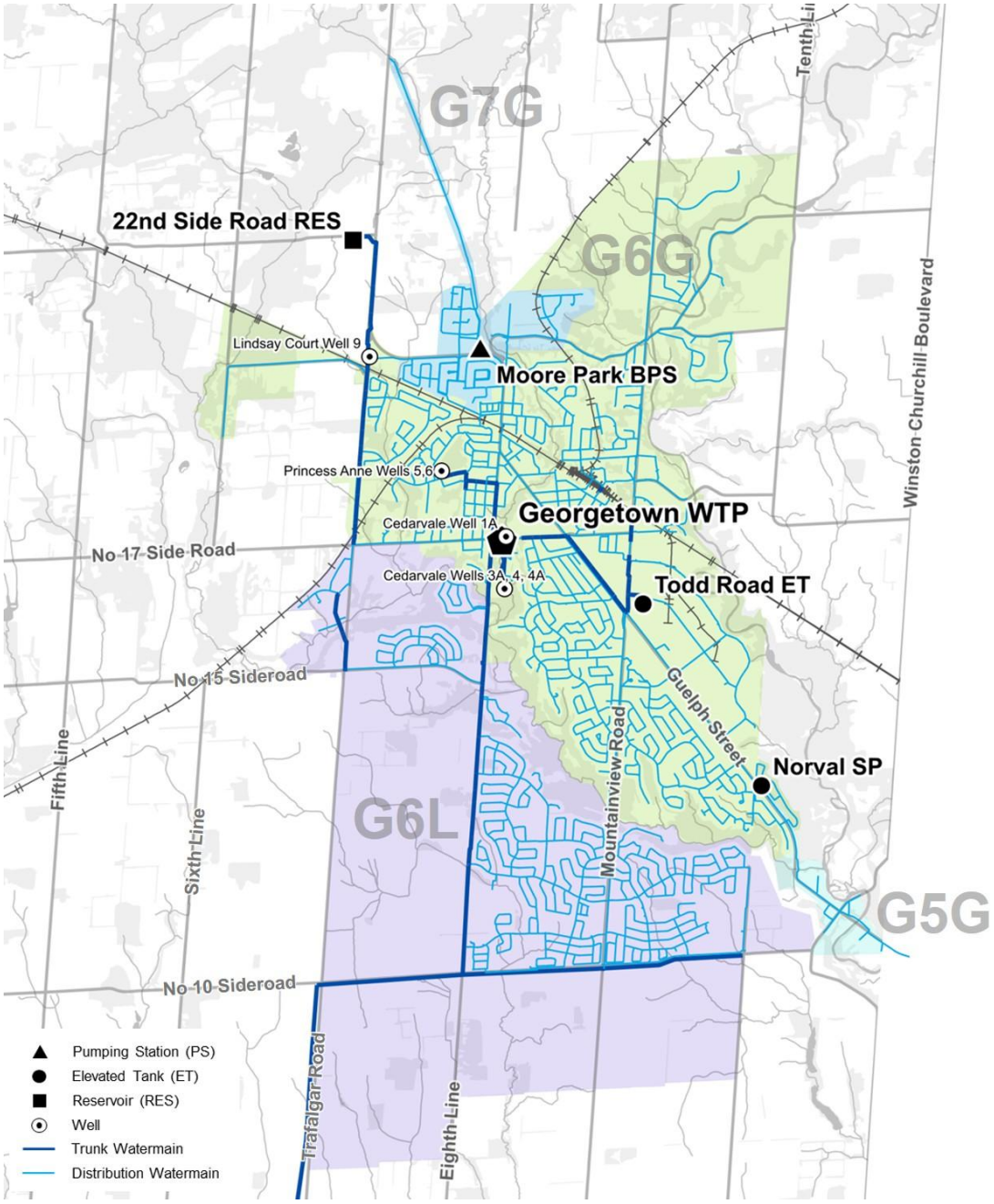



**Figure 11 – Georgetown Water Pressure Zones after Partial Transfer to Lake-based System**

### 5.3.1.3 Milton Groundwater System Supply Concepts

As previously discussed in Section 4.4.1.3, if no changes are made to the Milton groundwater system's boundary or capacity, then the existing groundwater treatment capacity in Milton would be insufficient to meet projected growth to 2051. To resolve this challenge, a range of different system supply concepts were assessed for screening and subsequent evaluation. The initial concepts were evaluated simplistically, with key advantages and disadvantages listed in **Table 21** for the purposes of screening.

**Table 21 – Milton Groundwater System Supply Concepts**

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do nothing | • Does not incur new capital costs, since system demand would remain within the system's current capacity. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ✗<br>Screened Out |
| 2. Limit growth | • Reduces the extent of capital upgrades required in the system. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ✗<br>Screened Out |
| 3. Existing M5G area fully remains on groundwater with new or expanded wells | • Maximizes utilization of the existing groundwater supply infrastructure.<br>• Maintains flexibility in supply with both groundwater supply infrastructure and lake-based infrastructure within Milton. | • High production cost of groundwater in Milton.<br>• Expected high cost for additional well expansion/exploration.<br>• Potential lack of expansion viability.<br>• Unknown environmental/social impacts with the new supply (location of the well field, aquifer impacts, and associated linear upgrades).<br>• Difficult to accomplish in short-term due to supply limits and rate of growth. | ✓<br>Carried Forward |
| 4. Partial and phased transfer of groundwater to lake-based servicing | • With selected transfer areas, the system demands in M5G can be maintained within the limits of Kelso WTP.<br>• Meets adequate levels of service for existing and future growth.<br>• Maximizes existing infrastructure and some additional linear projects.<br>• Lower production cost from the lake-based supply.<br>• Works well with phased approach as growth occurs.<br>• Greater certainty in long-term supply capacity. | • Potential variances in public perceptions of groundwater vs lake-based supply.<br>• Additional infrastructure is required to facilitate select lake-based transfer. | ✓<br>Carried Forward |
| 5. Full transfer of Milton groundwater system to lake-based servicing | • With a full transfer, lake-based system upgrades to 2051 could be planned/sized to support the entirety of Milton.<br>• Meets adequate levels of service for existing and future growth.<br>• Works well with phased approach as growth occurs.<br>• Lower production cost from the lake-based supply.<br>• Greater certainty in long-term supply capacity. | • Does not maximize use of the existing built infrastructure.<br>• Increased capital costs for larger facility upgrades/expansions through the lake-based system.<br>• Unknown long-term viability of wells.<br>• Potential variances in public perceptions of groundwater vs lake-based supply. | ✓<br>Carried Forward |

A more detailed evaluation of the carried forward concepts can be found in **Appendix 3A**.

Based on the detailed evaluation and the summary indicated above, there are three (3) technically viable alternatives for the Milton supply system, but they each come with varying social, financial, and technical challenges. The preferred strategy is identified as alternative 4, the "Partial and Phased Transfer of Groundwater to Lake-based Servicing." To support a phased transfer, guiding principles have been identified for the preferred supply alternative and are further discussed below.

Servicing the area with only groundwater has significant challenges with technical, financial, and environmental viability since groundwater exploration (finding new well field sites) is a long process with high capital and high operating costs. With the rapid speed of projected growth, it would not be possible to identify new well field sites (if any are viable nearby) and to develop them in time to support the growth.

Fully transferring to the lake-based system requires increased facility upgrades and expansions, as well as higher long-term carbon footprint throughout the lake-based system since that supply needs to ultimately be transferred from the lake-based WTPs all the way north to Milton (M5L).

## Guiding Principles for the Milton Partial & Phased Transfer of Groundwater to Lake-based Servicing

With growth/intensification projected within the current service boundary for the Milton groundwater system and with limitations in groundwater supply availability, a set of guiding principles were established to help guide a strategy that provides sustainable water servicing for the groundwater system that enables the projected long-term growth to occur. The principles are intended to help minimize the areas that need to undergo a transfer from groundwater to lake-based servicing, whilst also ensuring that the timing of any transitions occurs when needed. These guiding principles include:

- New "greenfield" growth areas are to be serviced from the lake-based Milton system, where technically and practically feasible. This ensures that the greenfield areas do not unnecessarily advance the need to transfer existing areas from groundwater to lake-based servicing.
- Track and monitor the groundwater system's consumption long term to assess the impacts of:
    a. population growth on demand (ADD and MDD).
    b. peak summer demand (e.g., during droughts and extreme temperatures).
- Prior to the Milton groundwater system demand nearing the capacity of the Kelso wells, select areas of the system will be transferred from groundwater to lake-based servicing based on certain criteria:
    a. Minimize costs of additional infrastructure to facilitate the transfer where feasible.
    b. Level of service as described in Table 4 will be achieved.
- Monitor the viability of maintaining the Kelso well field in good operating condition and re-asses the sustainability of continued maintenance.

**Figure 12** shows the projected demands with and without the phased partial transfer of select areas to the lake-based system in Milton. Following the guiding principles, the greenfield growth areas will be serviced by the lake-based system. These growth areas with minimal existing servicing are bounded by Steeles Avenue to the north, rail corridor to the south, Martin Street to the east, and Bronte to the west; and the area west of Peru Road and north of Steeles.

Subsequently, as intensification growth occurs within the retained area of the Milton groundwater system, demand should be monitored long term. Prior to the system reaching the limits of treatment capacity, the first transfer phase will be triggered. The first envisioned transfer block (bounded by Ontario Street, Main Street, Thompson Road, and Steeles Avenue), which can be seen in **Figure 13** below, is identified since it requires negligible capital costs to transfer. The transfer can be facilitated through operational (valving) changes on existing watermains.

As growth continues in the Milton groundwater system, prior to the treatment capacity limit is being approached again, the second potential transfer area would be triggered. This second envisioned transfer block is generally bounded by Ontario Street, Derry Road, Thompson Road, and Childs Drive, and can be seen below in **Figure 13.** The timing and exact details of the transfer area can continue to be refined over time as further demand forecasting is complete.

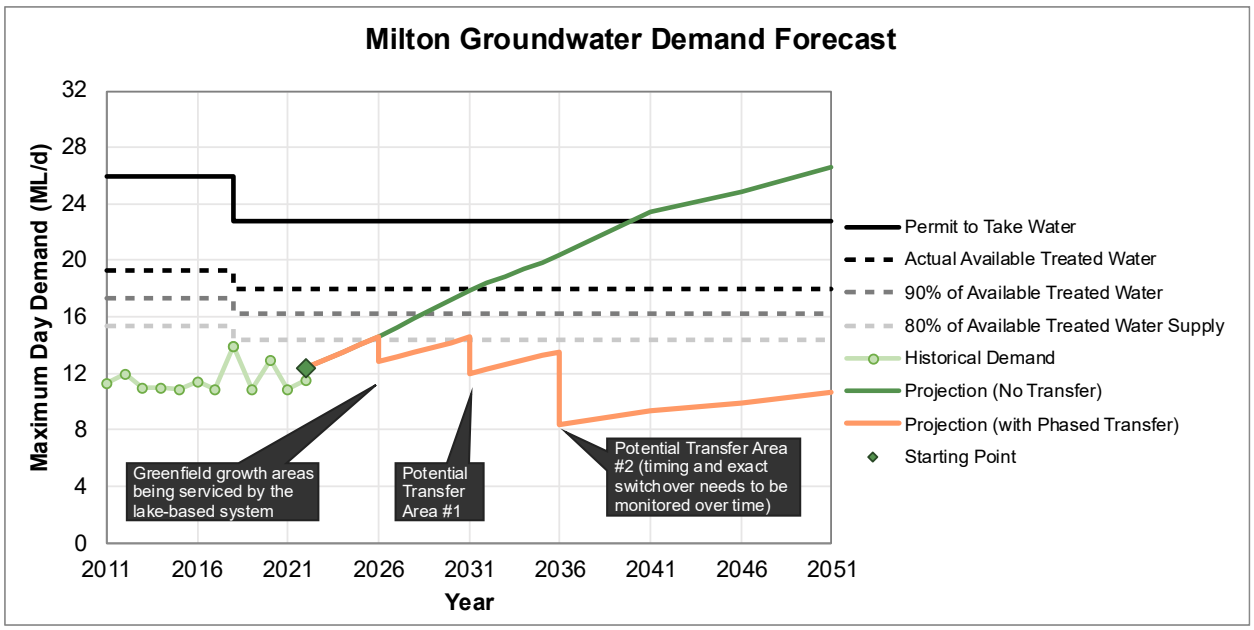



**Figure 12 – Water Supply & Demand Forecast – Milton Groundwater System**

**Figure 13** presents the new pressure zone boundary after partial transfers to the lake-based system have been completed. The theorized ultimate (2051) boundary was developed following the guiding principles of the "Partial and Phased Transfer of Groundwater to Lake-based Servicing".

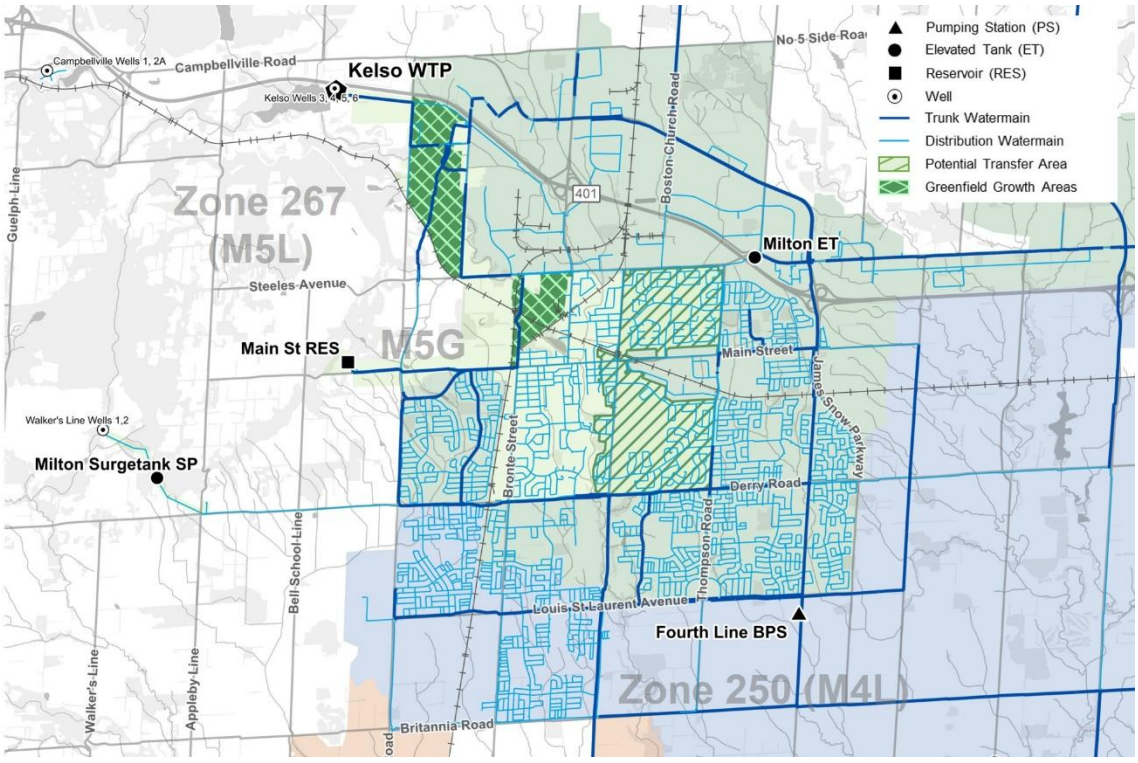



**Figure 13 – Milton Water Pressure Zones upon completion of Partial Transfer to Lake-based System**

#### 5.3.1.4 Lake-based System Supply Concept

As previously discussed in Section 4.0, without system upgrades, the existing treatment capacity of the lake-based water system would be insufficient to meet projected growth to 2051. As such, a range of different system supply concepts were assessed for screening and subsequent evaluation. The initial concepts were evaluated with the key advantages and disadvantages listed in **Table 22** for the purposes of screening. Detailed evaluation of these concepts that passed screening can be found in **Appendix 3A**.

**Table 22 – Lake-based System Supply Concepts**

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do nothing | • Does not incur new capital costs.<br>• No potential impacts due to construction of new infrastructure. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ✗<br>Screened Out |
| 2. Limit growth | • Reduces the extent of capital upgrades required in the system. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ✗<br>Screened Out |
| 3. Expand capacity via existing WTPs (Burloak WTP) | • Meets adequate levels of service for existing and future growth.<br>• Maximizes existing infrastructure (Oakville WTP; Burlington WTP).<br>• Burloak WTP is already planned for expansion (existing intake capable of supporting capacity expansion).<br>• More viable to accomplish in near-term with planned capacity expansion at the Burloak WTP site.<br>• Lower costs of expansion compared to a new WTP. | • Significant expansion will require increased coordination to ensure existing facility maintains service throughout the construction phasing. | ✓<br>Carried Forward |
| 4. Expand capacity with new WTP | • Meets adequate levels of service for existing and future growth. | • Does not maximize the built capacity for existing WTP elements.<br>• More difficult to support rapid near-term growth as the planning, design, and construction phases of a new WTP are long in duration.<br>• Higher capital cost for a new WTP facility. | ✓<br>Carried Forward |

Based on the summary indicated above and the detailed evaluation in **Appendix 3A**, the preferred strategy to increase water supply for the lake-based supply system is to "Expand Capacity via Existing WTPs."

Expansion of existing WTPs is in line with the 2011 Sustainable Halton Master Plan. Although there are limited opportunities to increase capacity at the Oakville WTP and the Burlington WTP, there is significant room for expansion at the Burloak WTP, where the intake was intentionally sized to support future growth.

**Figure 14** shows the projected demands for the lake-based water system. The graph shows the demand forecast both with and without the lake-based transfer areas of Milton and Georgetown. The demand forecast "with transfer" shows that the ultimate capacity need for the entire lake-based system is approaching 700 ML/d. **Figure 14** also indicates the planned timing of the water treatment plant expansions to 2051. The first two capacity expansions (Oakville increase to 130 ML/d and Burloak Phase 2 Expansion) are ongoing projects, which will be completed in the near-term. Two subsequent expansions of the Burloak WTP are identified as "Phase 3" and "Phase 4" to support the gradual increases in overall supply needs. The exact details of the Burloak WTP expansions and phasing will be further refined in their future MCEAs.

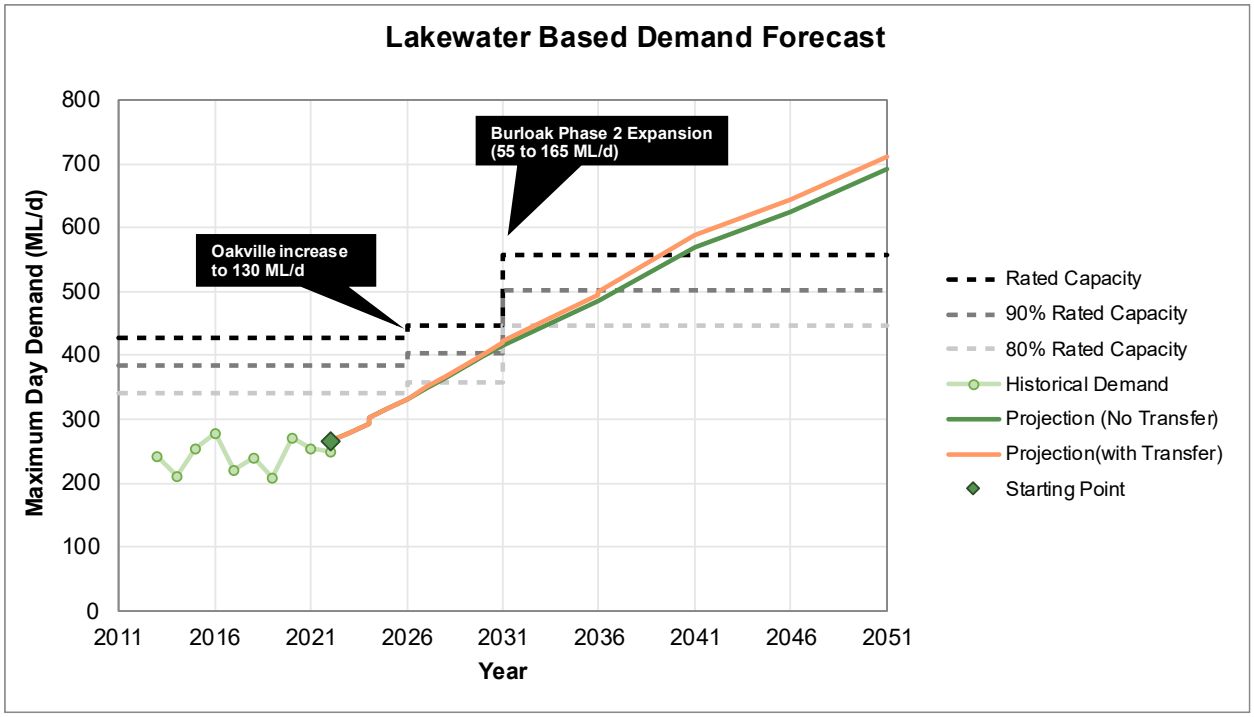



**Figure 14 – Water Supply & Demand Forecast – Lake-based System**

**Figure 15** presents the future (2051) pressure zone boundaries of the lake-based pressure zones after the transfer of select areas of the current groundwater system to lake-based system, whereby the M5G and G6G areas still remain part of the groundwater system as previously discussed.

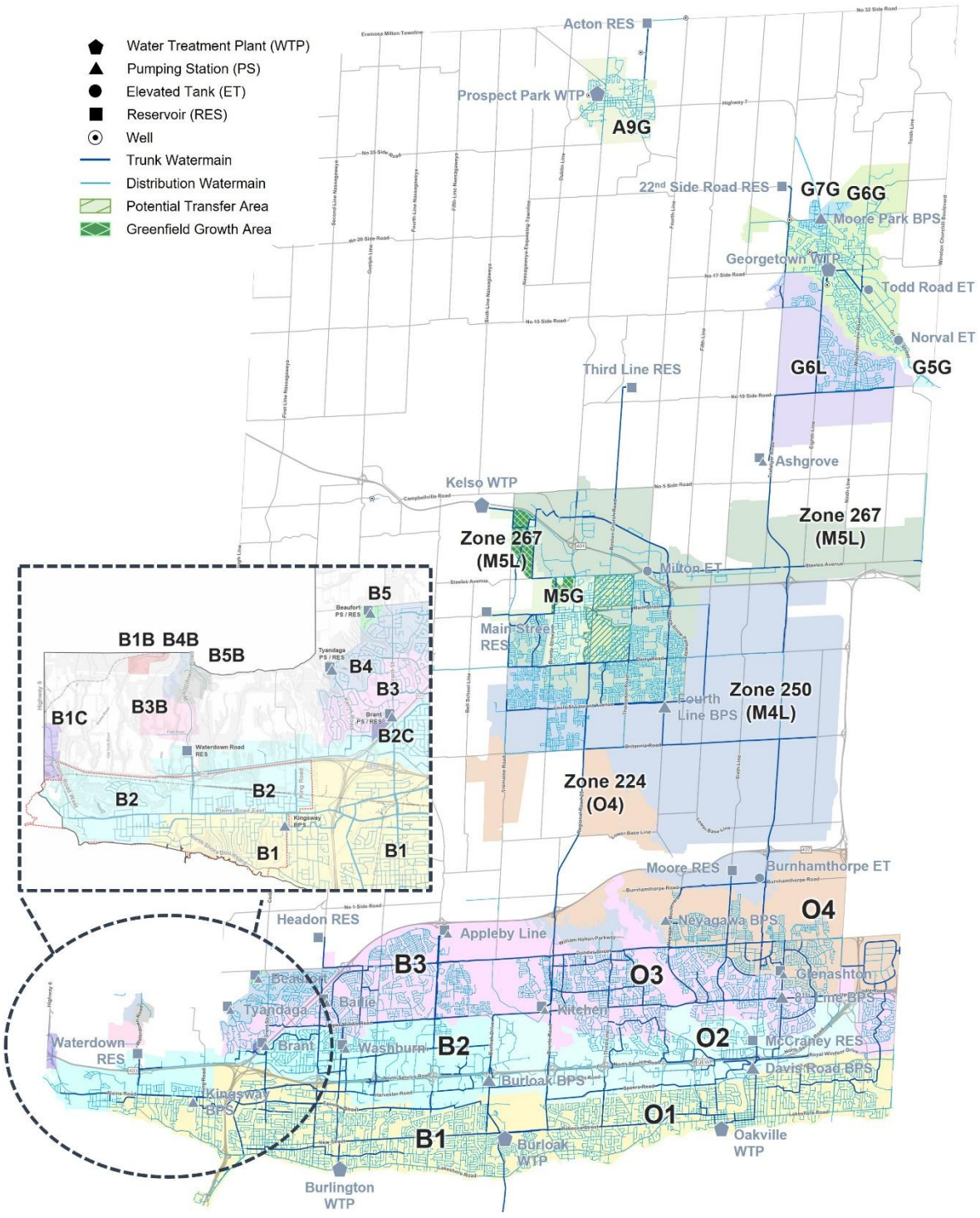



**Figure 15 – Lake-based System Pressure Zones in 2051**

### 5.3.2 Overall Transmission Strategy

Subsequent to the water supply strategies being identified, it was important for the IMP to identify an overarching transmission strategy for the lake-based system. With significant growth in Milton, Georgetown and North Oakville, the existing transmission infrastructure requires upgrades in order to move the water from the WTPs to the north. Generally, the water transmission strategy is focused on identifying the preferred way to transfer bulk supply from the source (WTP) towards the primary growth areas (Lake-based Milton, Georgetown and North Oakville) and improve system resiliency where feasible.

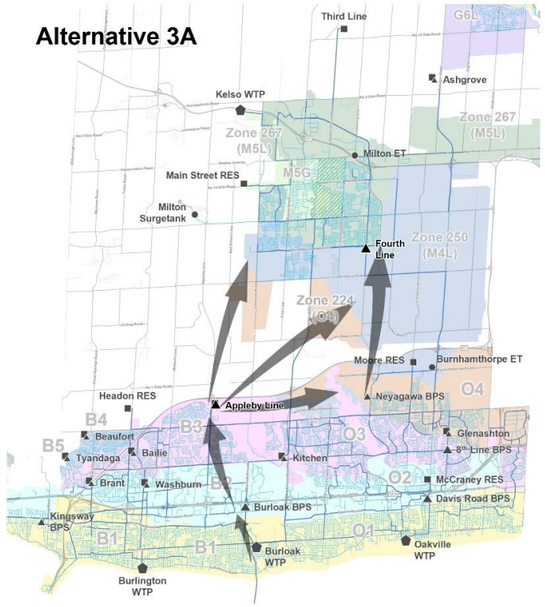
Several different system-wide transmission strategies were explored to bring water from an expanded Burloak WTP to the northern parts of the lake-based water system. Seven (7) overall transmission strategies were developed and evaluated and are shown schematically in **Figure 16**. The overall transmission strategies are described as follows:

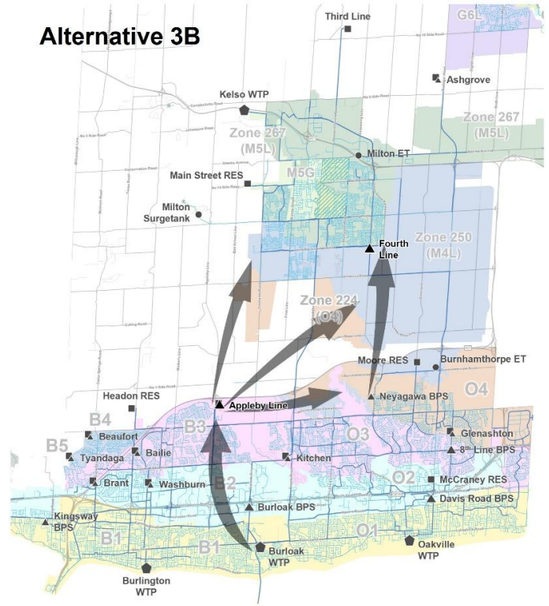
- Alternative 1 – Do nothing
- Alternative 2 – Limit growth
- Alternative 3 – West concept via Appleby RES/PS expansion and Burloak BPS
- Alternative 3B – West concept via Appleby RES/PS expansion and Burloak BPS
- Alternative 4A – Central concept via a new central facility and Burloak BPS
- Alternative 4B – Central concept via a new central facility skipping Burloak BPS
- Alternative 5 – East concept via the existing facilities in Oakville

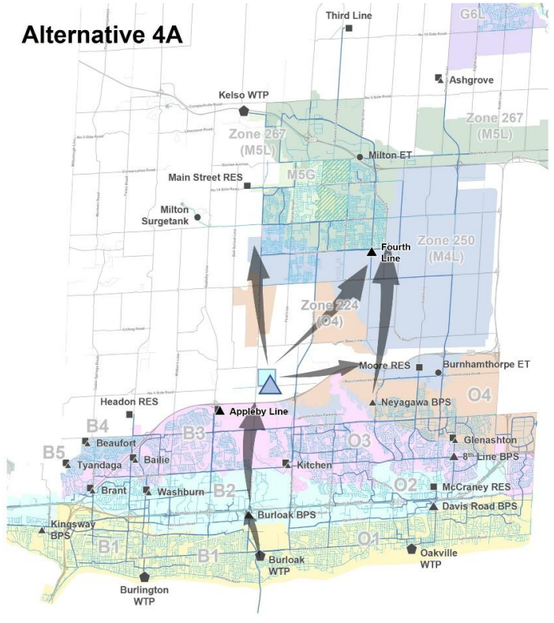
The initial concepts were evaluated with the key advantages and disadvantages listed in **Table 23** for the purposes of screening. A more detailed evaluation of the carried forward concepts can be found in **Appendix 3A**.

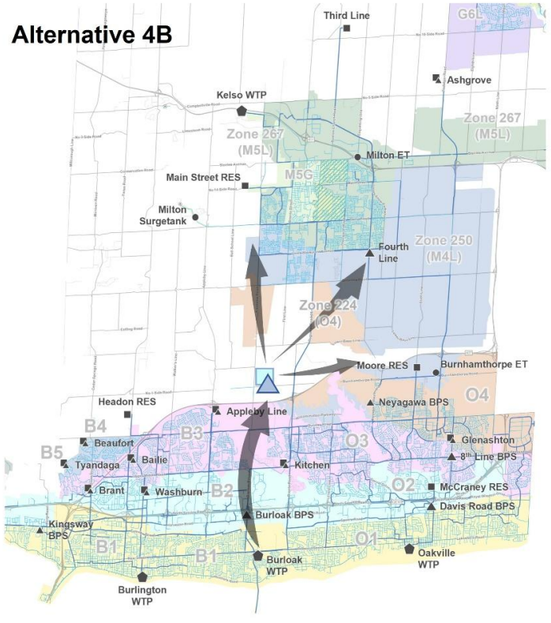
# Overall Transmission Alternatives

- Flow Direction
- Proposed Facilities
- Water Treatment Plant (WTP)
- Pumping Station (PS)
- Elevated Tank (ET)
- Reservoir (RES)
- Well
- Trunk Watermain
- Distribution Watermain
- Potential Transfer Area



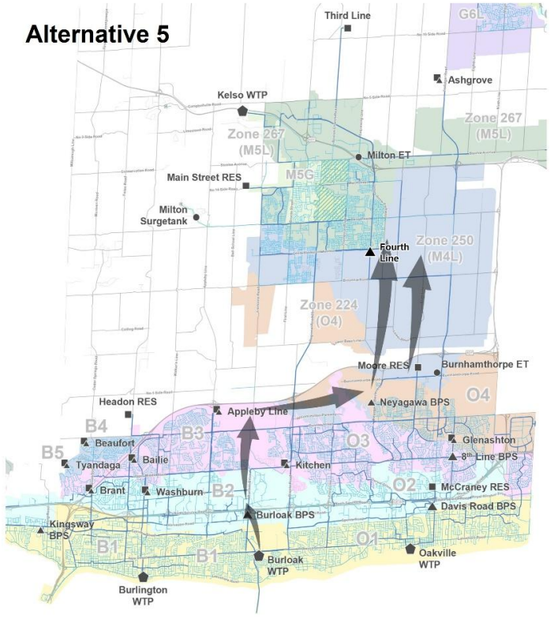




**Figure 16 – Overall Transmission Alternatives**

**Table 23 – Overall Transmission Strategy**

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do Nothing | • Does not incur new capital costs.<br>• No potential impacts due to construction of new infrastructure. | • Does not meet adequate levels of service for existing and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ✗<br>Screened Out |
| 2. Limit Growth | • Reduces extent of upgrades required in system. | • Does not meet adequate levels of service for existing and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ✗<br>Screened Out |
| 3A. West concept via Appleby RES/PS expansion and Burloak BPS | • Meets adequate levels of service for existing and future growth.<br>• Technically feasible. | • Significant upgrades would be needed through the Zone 1 and Zone 2 systems in order to move this supply towards the Appleby RES. | ✗<br>Screened Out |
| 3B. West concept via Appleby RES/PS expansion skipping Burloak BPS | • Meets adequate levels of service for existing and future growth.<br>• Technically feasible.<br>• Skipping Burloak BPS could avoid the pressure variations in the local B1/B2/O1/O2 systems. | • Requires a significant amount of infrastructure upgrades (Appleby PS/RES with associated transmission watermains). | ✓<br>Carried Forward |
| 4A. Central concept via a new central facility and Burloak BPS | • Meets adequate levels of service for existing and future growth.<br>• Technically feasible. | • Significant upgrades would be needed through the Zone 1 and Zone 2 systems in order to move this supply towards the higher zones (M4L/B3/O3). | ✗<br>Screened Out |
| 4B. Central concept via a new central facility skipping Burloak BPS | • Meets adequate levels of service for existing and future growth.<br>• Technically feasible.<br>• Skipping Burloak BPS could avoid the pressure variations in the local B1/B2/O1/O2 systems.<br>• Interconnection between this dedicated Zone 2 feedermain and other B2/O2 transmission mains could improve system resiliency. | • Requires a significant amount of new infrastructure (A new station with a reservoir and two sets of pumps with associated transmission watermains). | ✓<br>Carried Forward |
| 5. East concept via the existing facilities in Oakville | • Meets adequate levels of service for existing and future growth.<br>• Technically feasible. | • Significant upgrades would be needed through fully developed areas in Zone 1, Zone 2 and Zone 3 systems in Oakville.<br>• There are limited suitable crossing opportunities to bring flow from Burloak WTP across Sixteen Mile Creek and towards the existing Oakville facilities. | ✗<br>Screened Out |

The seven (7) alternatives are further described and evaluated for key advantages and disadvantages below:

**Alternative 1 – Do nothing**

This alternative (1) proposes leaving existing infrastructure unchanged. Advantages include avoiding new capital costs and eliminating construction-related impacts. However, this approach does not provide adequate levels of service for existing or future growth, nor does it comply with the official plans of the four Local Municipalities in Halton, JBPE projections, or PPS 2024 growth targets. Alternative 1 conflicts with the vision and considerations set out in the IMP and the inability to maintain levels of service for future growth would adversely impact social, economic, and community well-being.

**Alternative 2 – Limit growth**

Alternative 2 would restrict community growth to avoid triggering new infrastructure or upgrades. This alternative reduces the extent of required system upgrades and minimizes associated costs. Alternative 2 does not align with the official plans of the four Local Municipalities in Halton, JBPE projections, or PPS 2024 growth targets, and is inconsistent with the IMP vision and considerations.

**Alternative 3A – West concept via Appleby RES/PS expansion and Burloak BPS**

This alternative (3A) considers bringing water from the Burloak WTP into Zone 1 and then pumping it from Zone 1 (O1/B1) to Zone 2 (O2/B2) via the planned Burloak BPS towards the Appleby RES. Subsequently, water would be pumped to higher zones (M4L/B3/O3) via an expanded Appleby PS. Ultimately, this option was screened out in favour of other similar concepts (Alternative 3B and Alternative 4B) for the following reasons:

- Significant upgrades would be needed through the Zone 1 and Zone 2 systems in order to move the supply towards the Appleby RES (Zone 1 transmission, Zone 2 Burloak BPS, and Zone 2 transmission). These major upgrades would have limited benefit to the B1 & B2 pressure zones, and a wide range of flows passing through the lower zones was considered to be a significant operational impact due to the variations in pressure that would result in the local B1/B2/O1/O2 systems.

**Alternative 3B – West concept via Appleby RES/PS expansion skipping Burloak BPS**

Alternate 3B is similar to Alternative 3A since it also brings water supply from the Burloak WTP towards the Appleby RES before being transferred north. The main difference is that this option considers transferring water supply directly into Zone 2 from Burloak WTP towards the Appleby RES with a dedicated feedermain. This alternative was carried forward for the detailed evaluation presented in **Appendix 3A**. Ultimately, this option was considered more viable since it supported the overall needs of the growth in the Milton, Georgetown, and North Oakville lake-based systems without adversely impacting the B1/B2/O1/O2 systems.

**Alternative 4A – Central concept via a new central facility and Burloak BPS**

Alternative 4A considers bringing water from the Burloak WTP into Zone 1 and then pumping it from Zone 1 to Zone 2 via the planned Burloak BPS towards a future Central Facility which would consist of a Zone 2 reservoir and PS. From there, water would be pumped to higher zones (M4L/B3/O3) via the Central Facility PS. Ultimately, this alternative was screened out in favour of other similar alternatives (Alternative 3B and 4B). It was screened out for the same reasons Alternative 3A was screened out.

**Alternative 4B – Central concept via a new central facility skipping Burloak BPS**

Alternative 4B is similar to Alternative 4A since it also brings water from the Burloak WTP towards a future Central Facility. The main difference is that this option considers transferring water directly into Zone 2 from Burloak WTP towards the Central Facility Reservoir with a dedicated feedermain. This means that the dedicated feedermain would have minimal impact on the B1/B2/O1/O2 zones. Provisions for an interconnection between this dedicated Zone 2 feedermain and other B2/O2 transmission mains should be considered during future planning since it can provide improved system resiliency in the event of system outages/limitations. This alternative was carried forward for detailed evaluation presented in **Appendix 3A**. Ultimately, this option was selected as the preferred solution since it supported the overall needs of the growth in the Milton, Georgetown, and North Oakville lake-based systems without adversely impacting the B1/B2/O1/O2 systems, and having potential benefit for improved resiliency in these systems.

**Alternative 5 – East concept via the existing facilities in Oakville**

Alternative 5 considers bringing water from the Burloak WTP eastwards into Oakville for transmission north towards North Oakville, Milton, and Georgetown. In this concept, flow travels from the Burloak WTP into Zone 1, and is then pumped from Zone 1 towards the Kitchen RES before being pumped into Zone 3. From Zone 3 (O3), the supply is pumped towards North Oakville and the east side of Milton by the Neyagawa BPS and a future second O4/M4L pumping station. This concept is shown schematically in **Figure 16**. Ultimately, this option was screened out in favour of other concepts (Alternative 3B and 4B) for the following reasons:

- Significant upgrades would be needed through fully developed areas in Zone 1, Zone 2, and Zone 3 systems in Oakville.
- There are limited suitable crossing opportunities to bring flow from Burloak WTP across Sixteen Mile Creek and towards the existing Oakville facilities.

In summary, Alternatives 3A, 4A, and 5 were screened out while Alternative 3B and 4B were carried forward for detailed evaluation. Through the detailed evaluation of the overall transmission strategies, it was determined that Alternative 4B “Central concept via a new central facility, skipping Burloak BPS” is the preferred strategy. The evaluation table is provided in **Appendix 3A**.

### 5.3.3 Focus Area Servicing Solutions

The lake-based water system is a complex system with multiple components. In addition to the Overall Transmission Strategy outlined in the previous section, the IMP outlines servicing solutions in focus areas where key components of the system are reviewed, and the preferred servicing solutions are identified. Collectively, the supply strategy, transmission strategy, and focus area servicing solutions combine to form the overall water servicing strategy for the Region.

The following sections summarize key aspects of the water servicing solutions by focus areas. In select cases, where a full comparative detailed evaluation of alternatives is needed, these are provided in **Appendix 3A**.

#### 5.3.3.1 Acton

As previously discussed in Section 4.4, Acton has sufficient supply, pumping, and storage capacity to support growth to 2051 within its service area. The IMP intends to maintain the current servicing strategy with some improvements to system resiliency/looping.

The servicing strategy and proposed capital projects for the Acton groundwater system have been maintained and carried forward from the Sustainable Halton Master Plan, as shown in **Figure 17**. The watermain projects along Main Street and No.32 Side Road are intended to help support servicing and improve the system resiliency by providing an alternative route to convey water from the Acton Reservoir and wells to the serviced area in Acton.

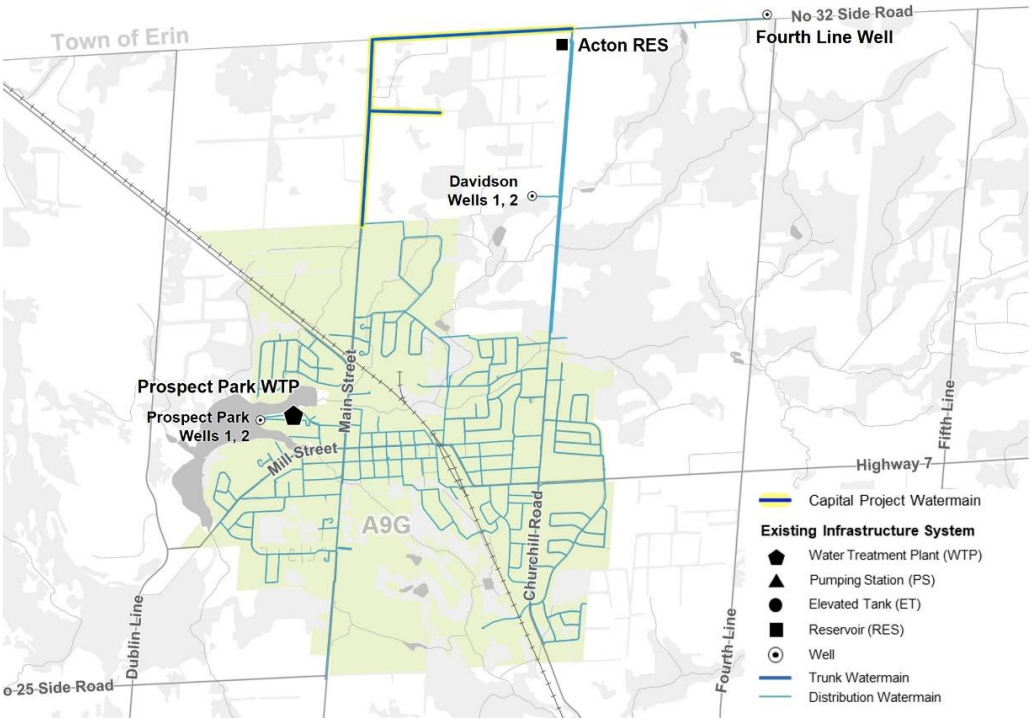



**Figure 17 – Focus Area Servicing Solution – Acton**

#### 5.3.3.2 Georgetown

##### Lake-based Georgetown (G6L) Pumping

Pressure Zone G6L is the new lake-based pressure zone servicing South Georgetown. Part of the existing Georgetown groundwater system south of Silver Creek, along with the growth areas in the south side of the Georgetown future service area are to be serviced by the lake-based system.

To service growth to 2051, Pressure Zone G6L requires additional pumping capacity. The recently completed 20 ML/d Ashgrove PS (a recommendation of the Sustainable Halton Master Plan) will be insufficient to support the ultimate 2051 needs in Zone G6L.

The IMP explored four (4) alternatives while also considering how to improve resiliency in the pressure zone. The following alternatives were considered:

- Alternative 1 – Do nothing
- Alternative 2 – Limit growth
- Alternative 3 – Expansion of the newly constructed Ashgrove PS
- Alternative 4 – Addition of a 2nd G6L pumping station at the Third Line RES site

**Figure 18** presents the water servicing strategy alternatives for Zone G6L. **Table 24** lists the high-level advantages and disadvantages of each alternative. **Figure 19** presents the preferred water servicing strategy for G6L.

Alternatives 1 and 2 were screened out since they do not address the identified capacity constraints or support planned growth within the Region. These options are not consistent with the vision and servicing objectives of the IMP.

Alternatives 3 and 4 provide feasible solutions that could address the future pumping challenge in Zone G6L. Alternative 3 would ultimately lead to increasing reliance on continued operation of the Ashgrove G6L PS. Conversely, Alternative 4 provides more operational flexibility and improves system resiliency while having minimal technical/social/environmental concerns which can be addressed through future planning and design phases. Therefore, Alternative 4 was carried forward as the preferred strategy. The detailed strategy evaluation table for this assessment is presented in **Appendix 3A**.

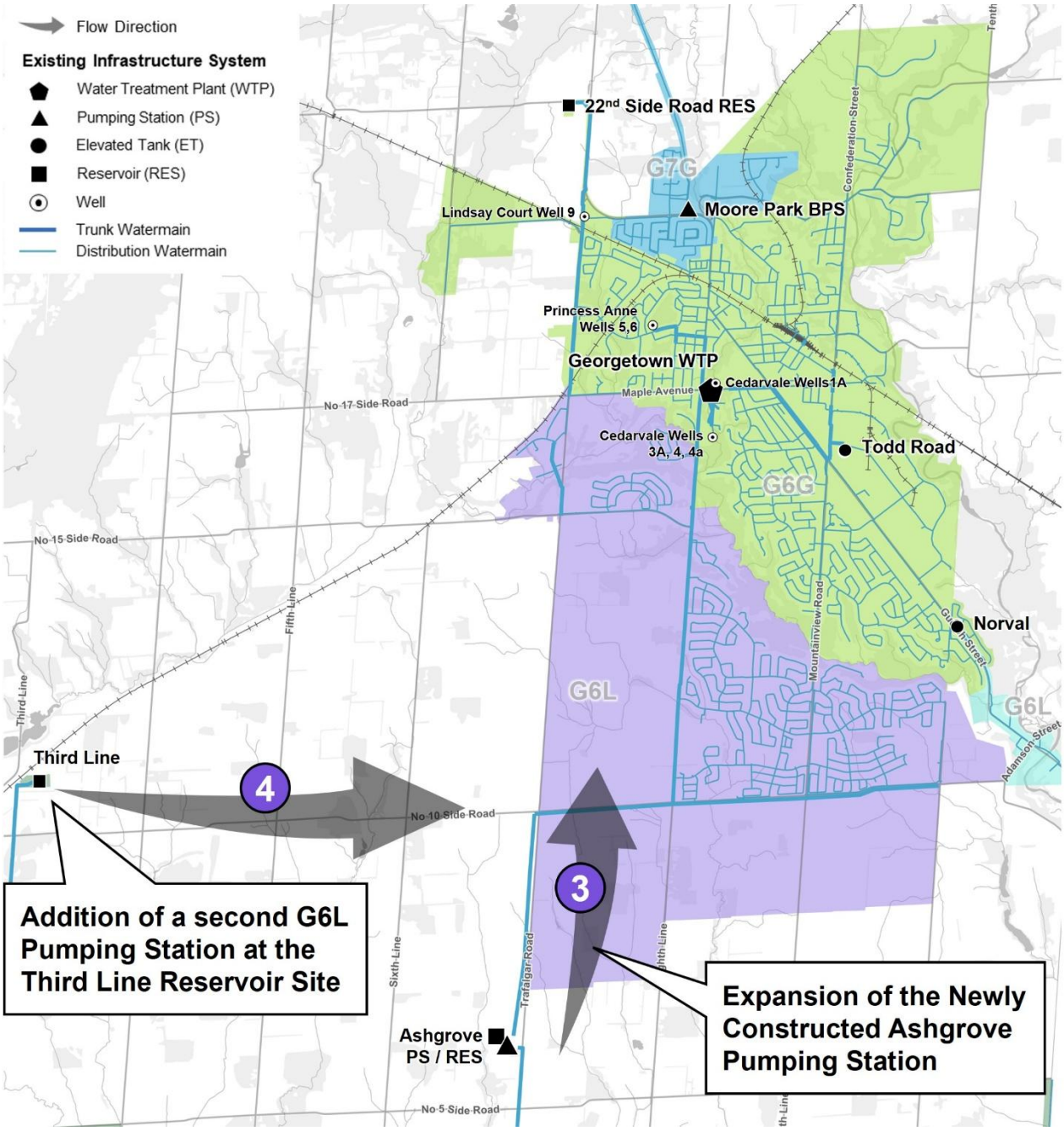



**Figure 18 – Focus Area Servicing Solution – Pressure Zone G6L Alternatives 3 and 4**

Table 24 – Water Servicing Strategy Advantages and Disadvantages for Pressure Zone G6L

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do nothing | • Does not incur new capital costs.<br>• No potential impacts due to construction of new infrastructure. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ✗ Screened Out |
| 2. Limit growth | • Reduces the extent of capital upgrades required in the system. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ✗ Screened Out |
| 3. Expansion of the newly constructed Ashgrove PS | • Technically feasible.<br>• Lower cost to expand existing Ashgrove PS.<br>• Limited impact to local community (noise/construction impacts, etc.) by expanding existing PS. | • Single source of pumping capacity/supply to a pressure zone with significant growth. No improvement to system resiliency during planned/unplanned outages. | ✓ Carried Forward |
| 4. Addition of a 2nd G6L Pumping Station at the Third Line RES site | • Technically feasible.<br>• Improved system resiliency (2nd PS).<br>• Higher operational flexibility during emergency/scheduled shutdowns.<br>• Limited impact to local community (noise/construction impacts; etc.) due to location of Third Line RES site.<br>• Helps water turnover (water quality) at Third Line RES. | • Higher cost for a new facility and linear infrastructure than existing PS expansion.<br>• Higher lifecycle costs with an additional facility to maintain. | ✓ Carried Forward |

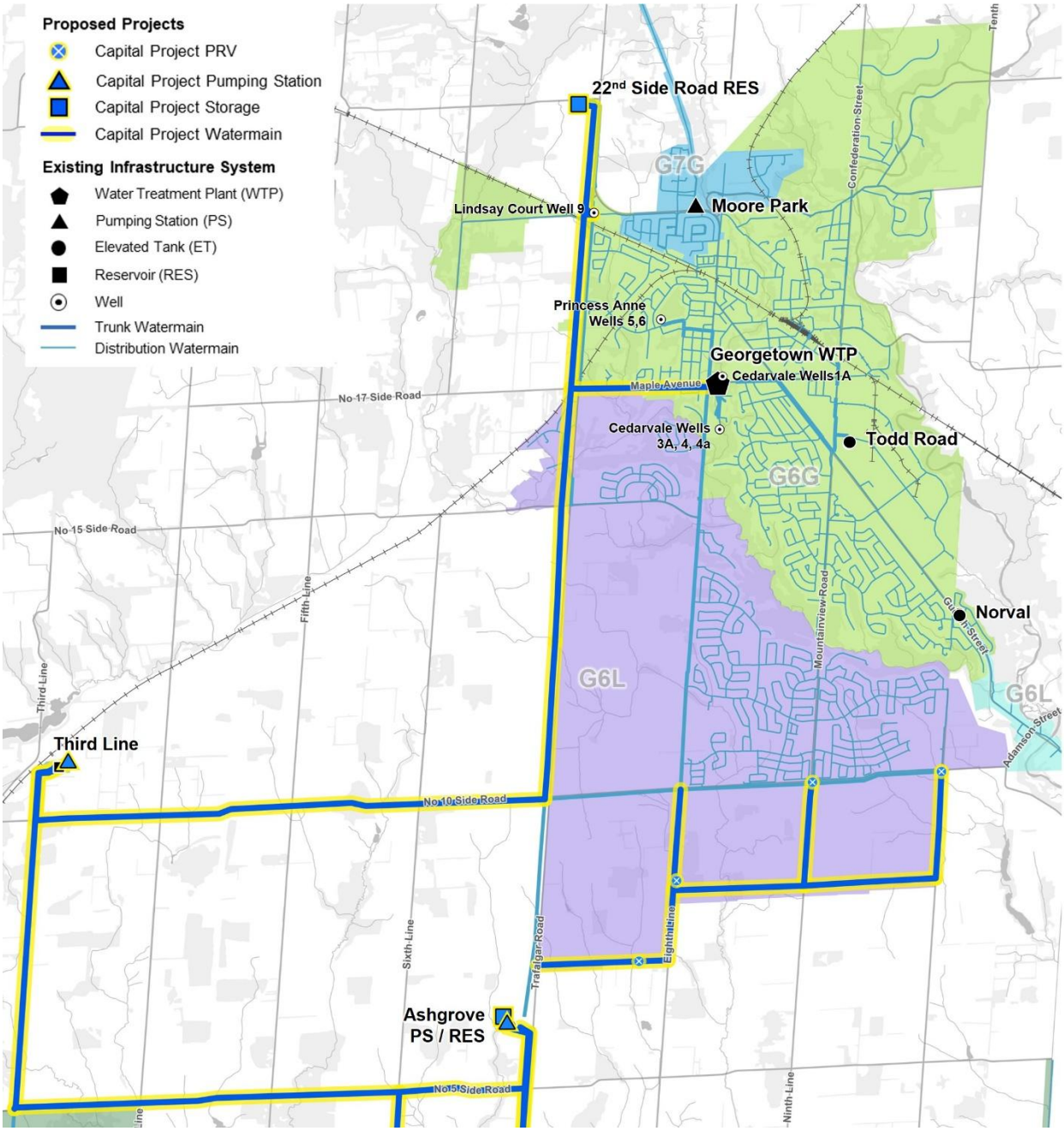



**Figure 19 – Focus Area Servicing Solution – Pressure Zone G6L Preferred Strategy**

## South Georgetown (Pressure Zone Delineation & Storage)

Pressure Zone G6L is the new lake-based pressure zone servicing South Georgetown. Part of the existing Georgetown groundwater system south of Silver Creek and growth areas in the south in the south side of the Georgetown future service will be serviced by the lake-based system, which is consistent with the strategy from the Sustainable Halton Master Plan. The separation of G6L and G6G is critical for maintaining sustainable water taking from the Georgetown groundwater resources.

In addition to the previously discussed long-term pumping capacity limitations in Pressure Zone G6L, there are also challenges of insufficient storage to support growth to 2051. In the 2022 baseline condition, pressure zone G6L did not exist; however, it has since been established with the Ashgrove PS serving as its source of supply. As a temporary measure, the Region is planning to operate the existing 22nd Side Road RES (historically G6G storage) as a G6L storage facility. While this addresses short-term needs, it is not sufficient to meet the long-term (2051) storage requirements of G6L. Additionally, this arrangement creates a temporary storage deficit in G6G which will persist until a dedicated G6L storage facility is constructed. Once that facility is in place, the 22nd Side Road RES can revert to serving G6G and is expected to be adequate for its long-term needs. Overall, G6L will require additional storage capacity to meet ultimate demand.

This additional storage facility is identified as another reservoir near the existing 22nd Side Road RES, meaning that, long-term, there would be both a new Zone G6L 22nd Side Road RES and the existing Zone G6G 22nd Side Road RES near the same location. The exact location of the new 22nd Side Road RES will be determined through an environmental assessment.

Another separate but related challenge for the Zone G6L service area is how to appropriately service the low elevation areas in the southernmost parts of Georgetown. Generally, the areas south of No.10 Side Road are at a lower ground elevation than the rest of Zone G6L. As such, with the planned HGL of the pressure zone, these areas would potentially experience pressures above the Region's Level of Service. To resolve this issue, Pressure Reducing Valves (PRV) would be recommended as the preferred strategy.

It is noted that the current service area that would require the reduced (PRV fed) sub-zone is limited in size and projected population. However, if the future service boundary continues to extend further south in the long-term, then the Region should re-assess whether the PRV solution is still appropriate. An alternate solution could consist of a dedicated set of pumps from the Ashgrove PS to the lower pressure zone or having a dedicated storage at a lower TWL/HGL.

**Figure 19** presents a water servicing strategy for Pressure Zone G6L.

### 5.3.3.3 Burlington

#### North Aldershot

The North Aldershot area is located in West Burlington near the Niagara Escarpment. It is one of the three communities in Halton Region being serviced by the City of Hamilton, as discussed in Section 3.5. The servicing agreement will expire on November 16, 2031. There are ongoing discussions between Halton Region and the City of Hamilton about potential alterations to the agreement to allow for increased supply from Hamilton to support growth in the B3B, B4B and B5B areas. However, since those discussions were ongoing during the development of the IMP, opportunities to bring Halton Region water services to the North Aldershot area were explored through the IMP and are shown in **Figure 20**. Several projects, including the decommissioning of the Waterdown RES and a new North Aldershot RES/PS with associated watermains, are part of the servicing strategy for the North Aldershot area to support growth to 2051. The preferred servicing strategy for this area should be re-evaluated if updates to the Halton & Hamilton Water Supply Agreement are made.

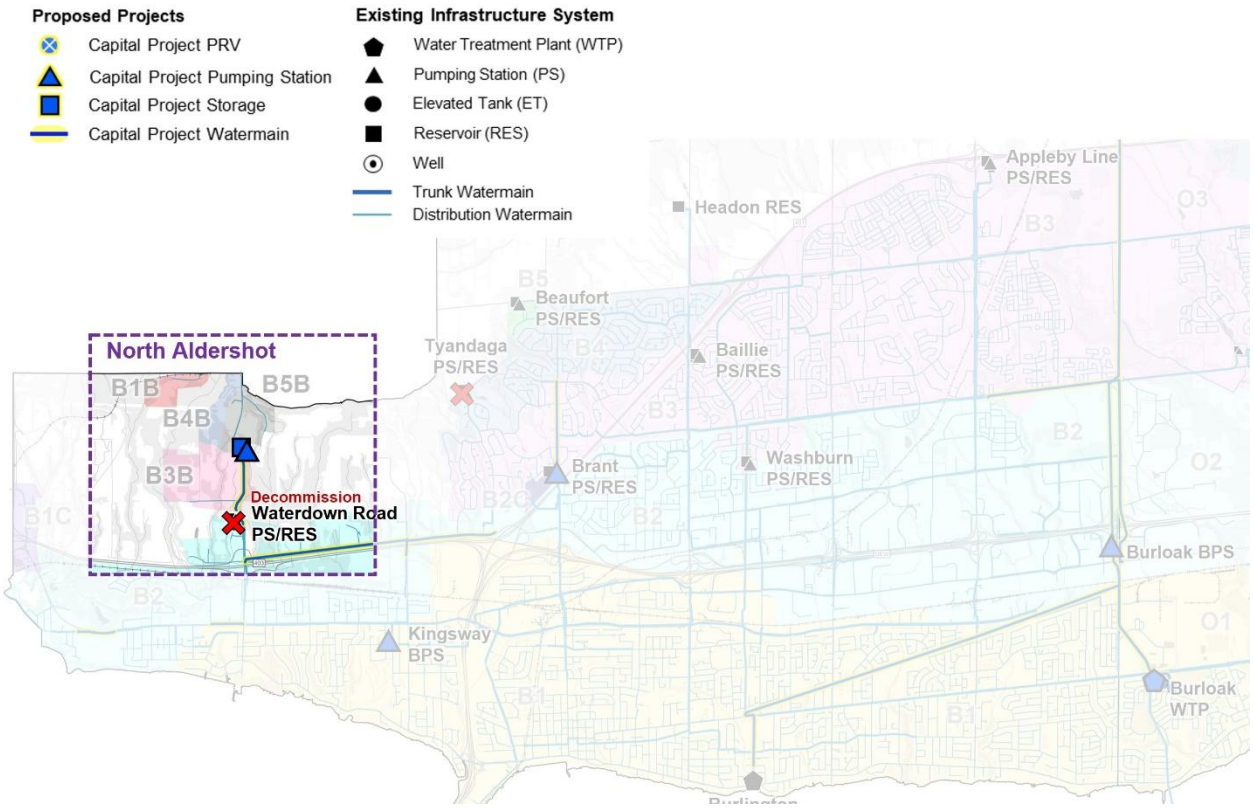



**Figure 20 – Focus Area Servicing Solution – North Aldershot Preferred Strategy**

## Pressure Zone B1A

Pressure Zone B1A is serviced by the Kingsway BPS with storage provided by the Waterdown RES. This zone generally consists of Aldershot lands west of Kingsway Drive and north of Hamilton Harbour.

Pressure Zone B1A has a single source of supply (Kingsway BPS), operational challenges at Kingsway BPS due to pressure fluctuations in the B1 system, insufficient storage to accommodate short-term growth, and aging facilities (Waterdown RES/Kingsway BPS).

The Burlington Water Servicing Strategy (2019) recommended the following:

- Short-term vision – Water distribution network improvements, replacement of existing facilities and elimination of Zone B1A.
- Long-term vision – Dedicated transmission watermains to improve system operability.

The IMP reviewed the preferred servicing approach from the Burlington Water Servicing Strategy (2019) study and explored opportunities to provide adequate service to this area to 2051, while also improving system resiliency. A total of five (5) alternatives were developed:

- Alternative 1 – Do nothing
- Alternative 2 – Limit growth
- Alternative 3 – Primary & secondary feeds are a new watermain (WM) across Hwy 407 to North Service Road and the existing WM across Hwy 407 to Kearns Road, respectively
- Alternative 4 – Kingsway BPS as primary feed with the existing WM across Hwy 407 as the secondary feed
- Alternative 5 – New primary feed watermain across Hwy 407 to North Service Road, with Kingsway BPS as secondary feed

**Figure 21** presents the water servicing strategy alternatives for Zone B1A. **Table 25** lists the key differentiators (advantages and disadvantages) of each considered alternative.

Alternative 3, 4, and 5 are further described below:

- Alternative 3 involves the same pressure zone realignment as Alternatives 4 & 5 and considers the decommissioning of the Kingsway BPS. Without the Kingsway BPS, all flow to the realigned B2 area would originate from the existing B2 pressure zone areas near Brant Street and North Service Road. To have resiliency towards the western side of the realigned B2, the concept considers maintaining the existing 350mm watermain crossing of Hwy 407 towards Kerns Road with the addition of a new watermain crossing of Hwy 407 from Brant Street and along North Service Road. This new watermain (600mm) would become the primary supply to the area and the 350mm watermain would be the secondary supply.

- Alternative 4 involves the same pressure zone realignment as Alternatives 3 & 5 and considers repurposing the existing Pressure Zone B1A Kingsway BPS as a realigned Zone B2 booster pump station. To accomplish this, the existing B1A 600mm watermain along Kingsway Drive and Plains Road will become a realigned B2 watermain. This alternative does not include the addition of a new larger diameter watermain (east to west) along North Service Road. Therefore, the repurposed Kingsway BPS would be the primary supply to the west side of the realigned B2 zone. To have some resiliency towards the western side of the realigned B2, the existing 350mm watermain crossing of Hwy 407 towards Kerns Road would be maintained as the secondary supply.

- Alternative 5 involves the same pressure zone realignment as Alternatives 3 & 4 and considers both the abandonment of the existing 350mm watermain crossing of Hwy 407 towards Kerns Road and the repurposing of the Kingsway BPS as a realigned B2 booster pump station. Similar to Alternative 4, the existing B1A 600mm watermain along Kingsway Drive and Plains Road will become a realigned B2 watermain. A new larger diameter watermain (east to west) along North Service Road is proposed to replace the abandoned 350mm watermain crossing of Hwy 407.This new watermain (600mm) would become the primary supply to the realigned B2 area and the repurposed Kingsway BPS would become the secondary supply.

Common to Alternative 3 to 5, new Zone B2 reservoir is identified in the North Aldershot area which could also include a new pumping station that pulls supply from the B2 reservoir and pumps the flow towards the higher elevation areas (B3B, B4B & B5B) in North Aldershot.

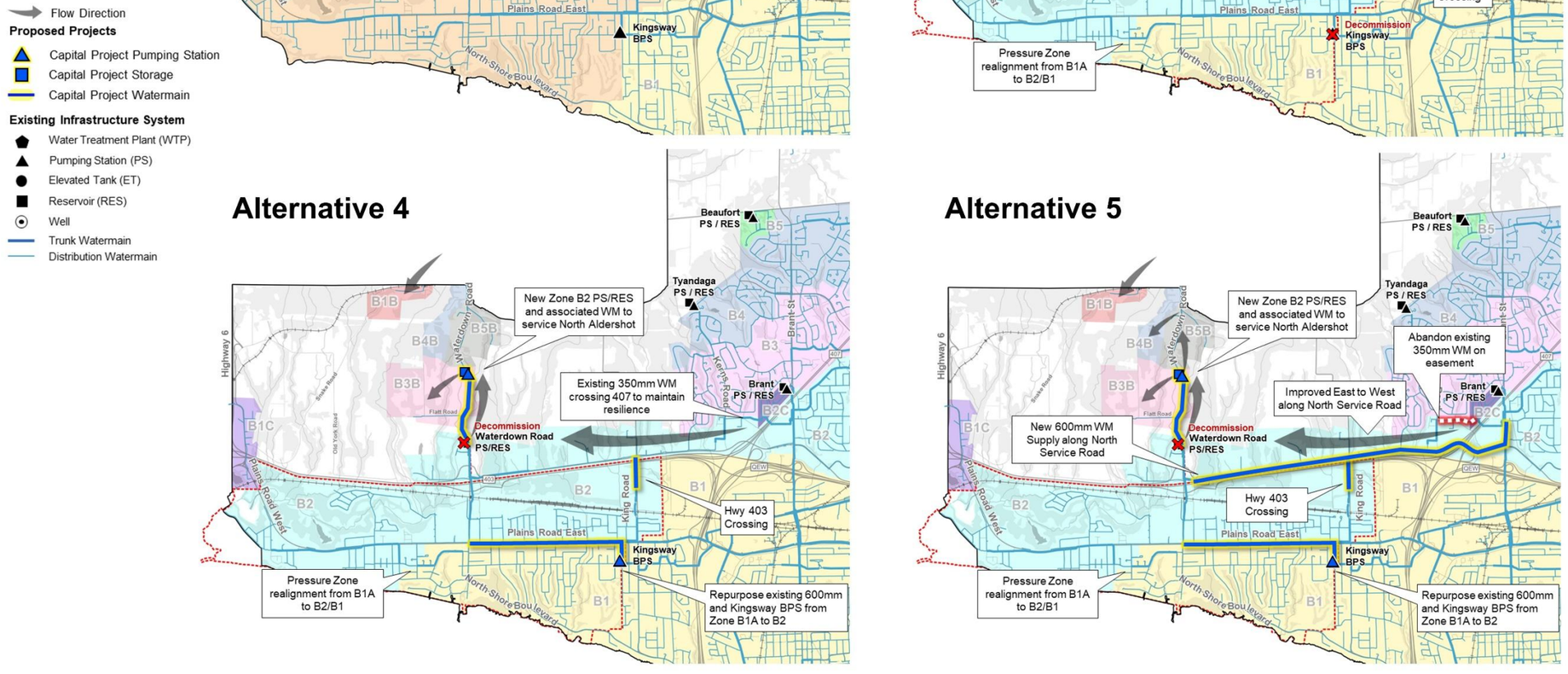



**Figure 21 – Focus Area Servicing Solution – North Aldershot Alternatives**

**Table 25 – Water Servicing Strategy Advantages and Disadvantages for Pressure Zone B1A**

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do nothing | • Does not incur new capital costs.<br>• No potential impacts due to construction of new infrastructure. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ×<br>Screened Out |
| 2. Limit growth | • Reduces the extent of capital upgrades required in the system. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ×<br>Screened Out |
| 3. Primary & secondary feeds are a new watermain (WM) across Hwy 407 to North Service Road and the existing WM across Hwy 407 to Kearns Road, respectively | • Improved levels of service and resiliency by keeping the existing watermain crossing (from Brant Street towards the realigned west side of B2 - Aldershot) and adding a new transmission along a similar route.<br>• Removal of Kingsway BPS seen as beneficial to operations and to pressures experienced in B1. | • The new North Aldershot RES would consistently operate at a lower HGL than the other B2 reservoirs (Bailie; etc.) due to headlosses along the B2 watermains towards the west.<br>• Preferred to remove the existing 407 crossing (350mm WM) from Brant towards Kern Rd due to being within an easement with operational challenges.<br>• High costs for new E-W watermain on North Service Rd.<br>• Lower level of operational flexibility and less system resiliency (all flow from same part of B2 system). | ✓<br>Carried Forward |
| 4. Kingsway BPS as primary feed with the existing WM across Hwy 407 as the secondary feed | • Lower cost due to less new watermain construction.<br>• Potential short-term solution since it is similar to the existing system, but with zone boundary realignment. | • Preferred to remove the existing 407 crossing (350mm WM) from Brant towards Kern Rd due to being within an easement with operational challenges.<br>• Kingsway BPS remains the primary feed but now operates at higher discharge to B2 (instead of B1A). Existing suction challenges for operations in B1 would still exist.<br>• Limited resiliency since system is still very reliant on Kingsway BPS. | ✓<br>Carried Forward |
| 5. New primary feed watermain across Hwy 407 to North Service Road, with Kingsway BPS as secondary feed | • Improved levels of service and resiliency by adding a new transmission (from Brant Street towards the realigned west side of B2 – Aldershot) and keeping Kingsway BPS as secondary/backup supply.<br>• Better turnover of future North Aldershot RES.<br>• Maximizing value (existing site & watermains) of Kingsway BPS.<br>• Higher operational flexibility (ability to supply area via B1 (Kingsway BPS) or B2 supply path.<br>• Able to remove the existing 350mm easement watermain to Kerns Rd. | • High costs for new E-W watermain on North Service Rd.<br>• Kingsway BPS remains in service and requires upgrades to operate as B2 pump station. Continued maintenance of BPS also needed.<br>• During occasional Kingsway BPS use, pressure impacts in B1 would remain. | ✓<br>Carried Forward |

Alternatives 1 and 2 were screened out since they do not address the identified capacity constraints or support planned growth within the Region. These options are not consistent with the vision and servicing objectives of the IMP.

Alternatives 3, 4 and 5 were carried forward for further evaluation. Alternative 3 would eliminate the Kingsway BPS but would not allow for the removal of the existing watermain easement and provides lower system resiliency. Alternative 4 would be less costly but the system remains very reliant on the Kingsway BPS, is challenging operationally, and impacts pressure in the B1 system. Alternative 5 provides the most resilient solution long-term for climate change adaptation; however, the North Service Rd watermain and Kingsway BPS upgrade would be required before the zone realignment can be implemented.

Alternative 5 was carried forward as the preferred long-term solution because it provides the most system resiliency. The detailed strategy evaluation table for this assessment can be found in **Appendix 3A**.

It is noted that the pressure zone realignment will increase pressure in areas in the former B1A/realigned B2 area. Pipe pressure class for the existing system will need to be verified during detailed design to ensure that they are not exceeded. There are also a few localized areas near the waterfront in the realigned B2 area, which have high pressures and would benefit from pressure reducing valves being included during detailed design work.

**Figure 22** presents the preferred water servicing strategy for Zone B1A area.

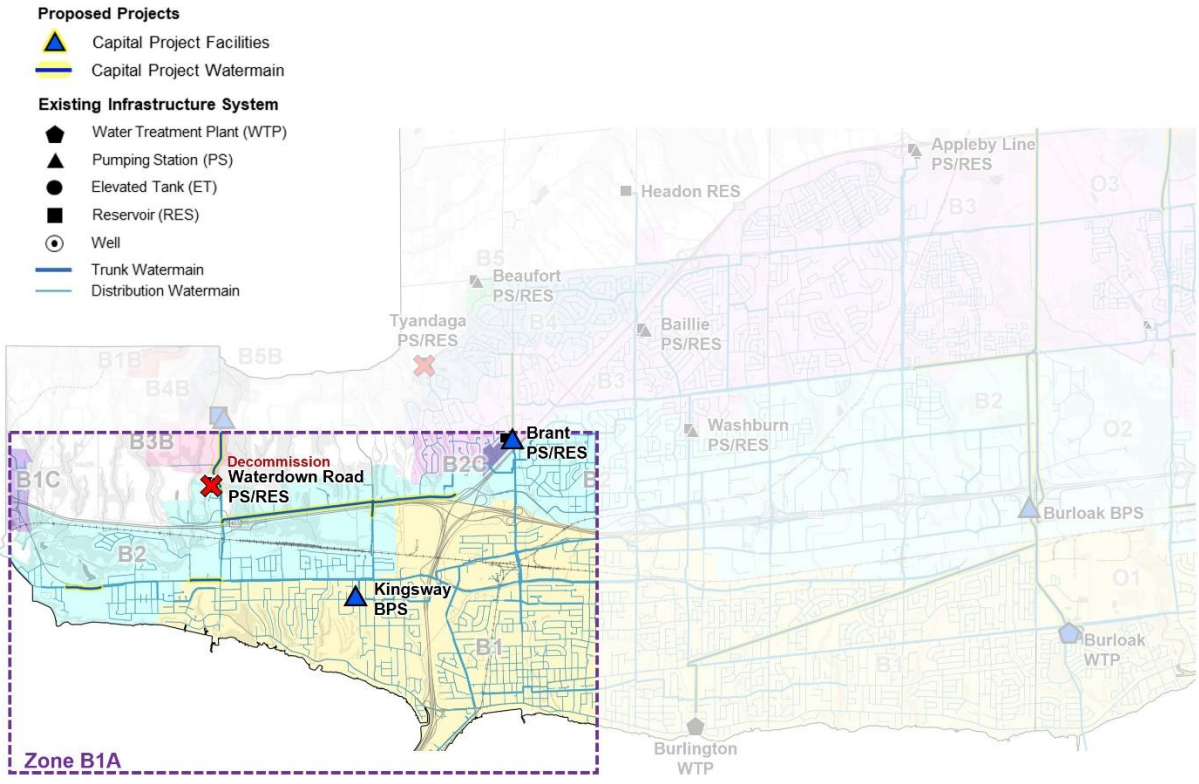



**Figure 22 – Focus Area Servicing Solution – Pressure Zone B1A Area Preferred Strategy**

## Pressure Zone B4

Pressure Zone B4 generally encompasses the area northwest of Highway 407 in Burlington. The area is relatively isolated due to Highway 407.

Pressure Zone B4 is supplied by the Tyandaga PS on the west side of the service area and the Bailie PS on the east side. With the Region's long-term plan of decommissioning the Tyandaga RES and PS due to operational limitations, Zone B4 will be supplied by only the Bailie PS and a single watermain (350mm) that crosses Highway 407 to the service area. As single feeds provide limited resiliency, the IMP has identified that adding Zone B4 pumps to the existing Brant RES/PS site, along with a new watermain along Brant Street from the Brant PS to Upper Middle Rd, is an opportunity to improve system resiliency. While this is shown in **Figure 23**, the IMP recommends completing a feasibility study to assess the feasibility and confirm the viability of expansion at the Brant RES/PS site.

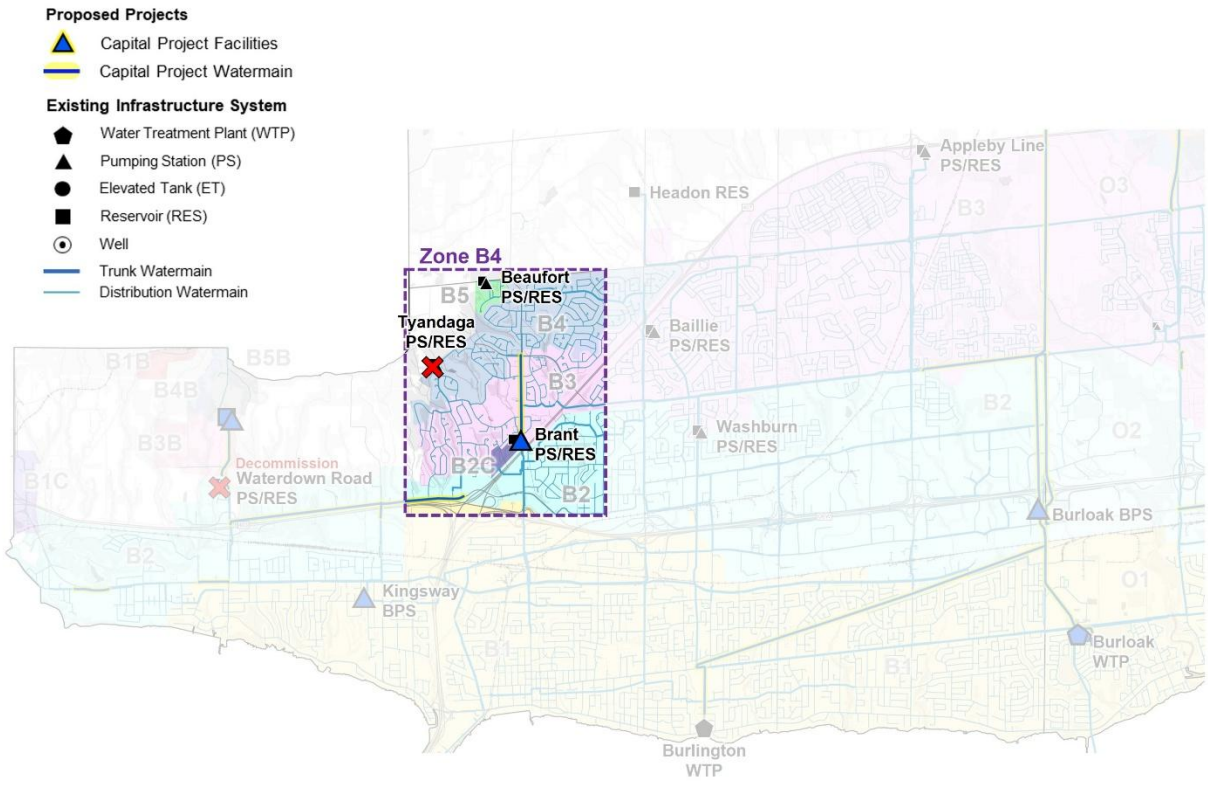



**Figure 23 – Focus Area Servicing Solution – Pressure Zone B4 Strategy**

## Pressure Zone B2 Transmission

Pressure Zone B2 comprises of the central portion of the City of Burlington, generally bounded by Upper Middle Road to the north, the QEW/Fairview Street to the south, Burloak Drive to the east, and Highway 407 to the west. Currently, the Washburn PS is the only source that supplies water to Zone B2. Storage is provided by the Bailie and Appleby Reservoirs.

To meet the growth pumping needs to B2 and to improve overall system resiliency, the Sustainable Halton Master Plan recommended the new Burloak BPS, along with various transmission main upgrades from Burloak BPS towards both Burlington (B2) and Oakville (O2). The transmission upgrades from the Burloak BPS towards Upper Middle Road/Appleby Line are critical to improving long-term supply capacity towards B2 and the Appleby RES.

This servicing strategy for the Zone B2 system has been carried forward from the Sustainable Halton Master Plan to the IMP, as shown in **Figure 24**. The following capital projects are currently in design and being implemented by the Region, improving the ability to bring water from Burloak BPS to Appleby PS/RES so that the capacity of Burloak BPS can be fully utilized:

a. 1200mm WM on Burloak Drive from Burloak Booster Pumping Station to north of QEW
b. 1050mm WM on Burloak Drive from the QEW to Upper Middle Road
c. 1050mm WM on Upper Middle Road from Burloak Drive to Appleby Line

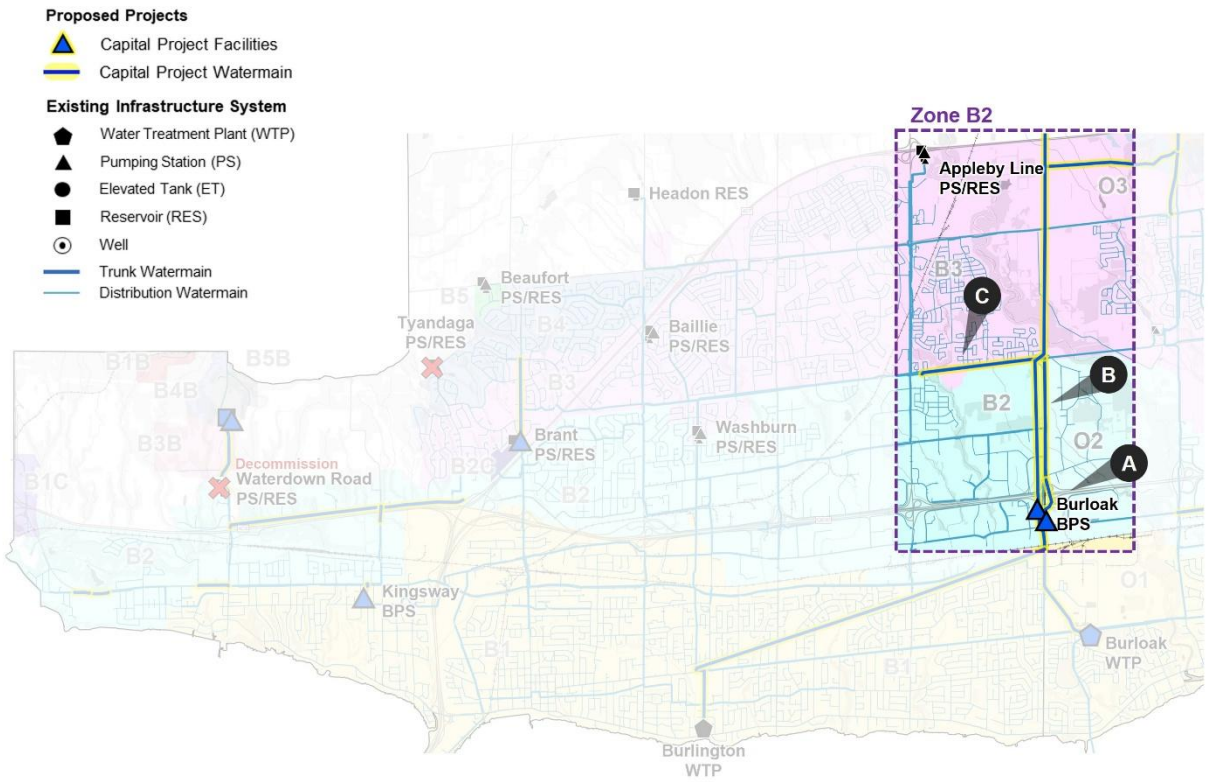



**Figure 24 – Focus Area Servicing Solution – Pressure Zone B2 Transmission Strategy**

## Pressure Zone B1 Transmission (Resiliency and Maximizing Burlington WTP Capacity)

Pressure Zone B1 comprises the southern portion of Burlington. It is supplied by the Burlington WTP and Burloak WTP. As discussed in Sections 4.4.2 and 5.3.1.4, the Burloak WTP will need significant upgrades and expansion to be able to service projected growth within the 2051 planning horizon. While major upgrades are being planned long-term at the Burloak WTP, there is also the need to maximize transmission capacity out of the Burlington WTP, such that the full 263 ML/d PTTW limit can be achieved. To accomplish this, transmission upgrades have been identified to improve hydraulic connectivity between the east and west sides of Zone B1 and increase resiliency in the Burlington and Burloak WTP transmission network. The strategy consists of adding a transmission watermain north from Burlington WTP towards New Street and adding a transmission watermain along the hydro corridor towards Burloak Drive, as shown in **Figure 25**. The alignment of the transmission watermain should be re-evaluated in further detail as part of a separate feasibility or alignment study.

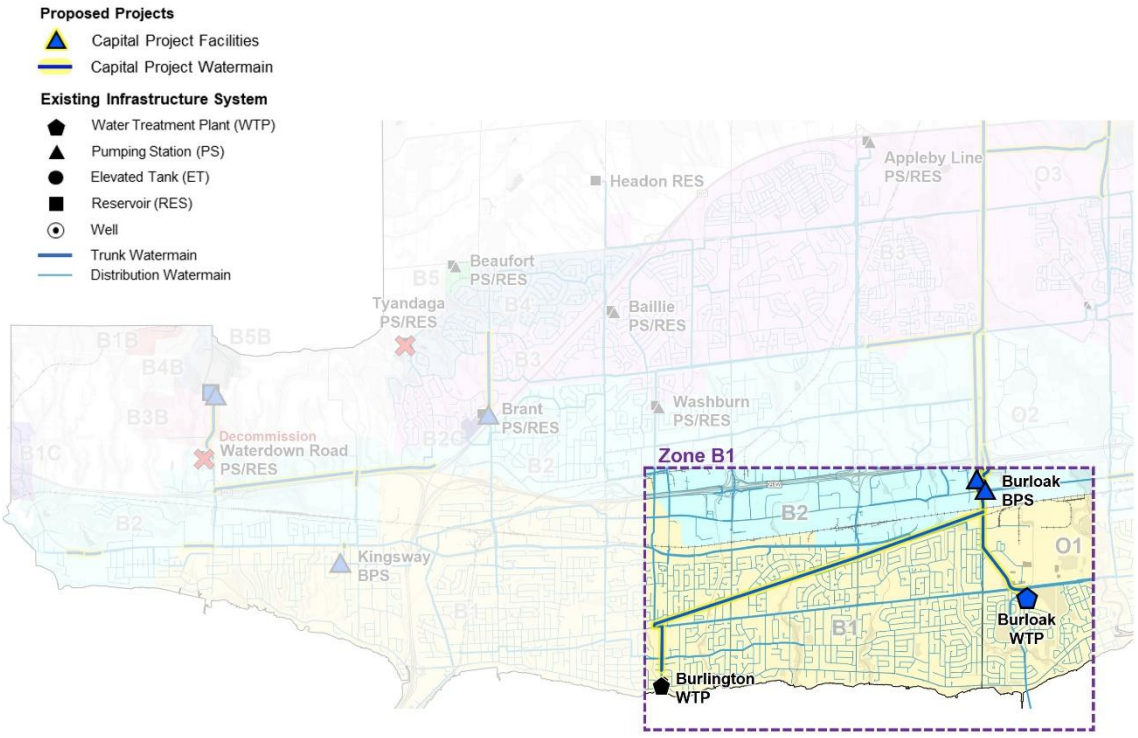



**Figure 25 – Focus Area Servicing Solution – Pressure Zone B1 Transmission Strategy**

#### 5.3.3.4 Oakville

##### Pressure Zone O4 Storage and North Pumping

As discussed in Sections 4.4.2 and 4.4.3, significant growth is projected in Milton and North Oakville within Pressure Zones M5L, M4L, and O4. This growth triggers the need for significant upgrades and expansion in existing facilities (pumping and storage) and transmission in order to provide adequate service to these zones. The challenges include storage deficits in Zones O4 and M5L, pumping deficits in Zones M5L, M4L, O4, and O3, as well as insufficiently sized transmission mains to support the future pumping needs. As indicated in Section 4.4.4, all of these challenges are heavily interrelated since the selected strategy for one pressure zone/facility often impacts the amount of transfer flow required for another pressure zone/facility.

As such, the IMP explored overarching strategies to address the combined pumping, storage, and transmission limitations. The combined challenges are informally referred to as the "North Pumping Strategy". The intent of the strategies is to provide adequate service to the zones, while also improving system resiliency in these areas. A total of five (5) alternatives were developed:

- Alternative 1 – Do nothing
- Alternative 2 – Limit growth
- Alternative 3 – O4 Hornby RES with associated Hornby PS from O4 to M5L
- Alternative 4 – O4 Hornby RES and separate Ashgrove PS from M4L to M5L
- Alternative 5 – O4 elevated tanks and separate Ashgrove PS from M4L to M5L

**Figure 26** presents the water servicing strategy alternatives for Zone O4 Storage and North Pumping. It is noted that many of the system needs are common across one or more of these alternatives. As such, the key differences among Alternatives 3, 4 and 5 are identified in **Table 26**.

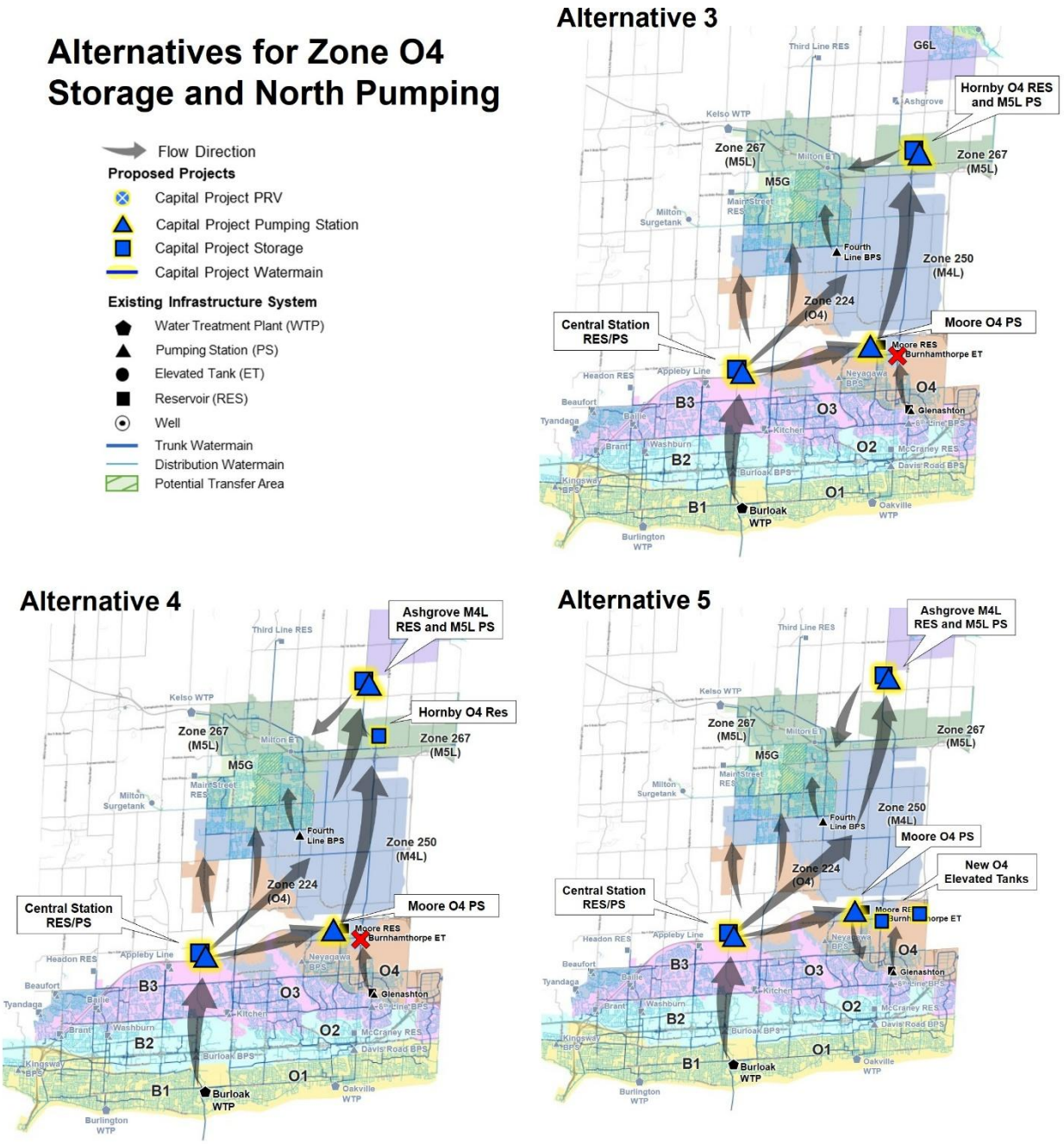



**Figure 26 – Focus Area Servicing Solution – O4 Storage and North Pumping Alternatives**

**Table 26 – Water Servicing Strategy Alternatives for Zone O4 Storage and North Pumping**

| Needs by Area | Alternative 3<br>O4 Hornby RES with Associated Hornby Pump Station from O4 to M5L | Alternative 4<br>O4 Hornby RES and Separate Ashgrove Pump Station from M4L to M5L | Alternative 5<br>O4 Elevated Tanks and Separate Ashgrove Pump Station from M4L to M5L |
|---|---|---|---|
| **Main Differences** | • Hornby RES (O4)<br>• Hornby PS (O4 to M5L) | • Hornby RES (O4)<br>• Ashgrove PS (M4L to M5L) | • Twin ETs in O4<br>• Ashgrove PS (M4L to M5L) |
| **M5L** | • Pumped storage from Hornby RES & PS to M5L (connecting to Steeles and new sub-transmission) | • Pumped storage from Ashgrove PS to M5L with new sub-transmission towards Steeles and towards 3rd Line | • Pumped storage from Ashgrove PS to M5L with new sub-transmission towards Steeles and towards 3rd Line |
| **M4L** | • New "Central Station" PS to M4L with associated transmission | • New "Central Station" PS to M4L with associated transmission<br>• M4L internal transmission upgrades to Ashgrove RES | • New "Central Station" PS to M4L with associated transmission<br>• M4L internal transmission upgrades to Ashgrove RES |
| **O4** | • Moore PS to O4 and associated transmission towards Hornby RES (long-distance) | • Moore PS to O4 and associated transmission towards Hornby RES (long-distance)<br>• Dedicated backfeed from Hornby RES back to O4 | • Twin ETs in O4, with associated transmission, depending on site location<br>• Moore PS to O4 locally and associated transmission |
| **O3** | • New "Central Station" PS to O3 and transmission | • New "Central Station" PS to O3 and transmission | • New "Central Station" PS to O3 and transmission |

**Table 27** lists the key differentiators (advantages and disadvantages) of each alternative. A more detailed evaluation table of these alternatives is presented in **Appendix 3A**.

**Table 27 – Water Servicing Strategy Advantages and Disadvantages for O4 Storage and North Pumping**

| Alternatives | Advantages | Disadvantages | Decision |
|---|---|---|---|
| 1. Do nothing | • Does not incur new capital costs.<br>• No potential impacts due to construction of new infrastructure. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the Provincial Planning Statement (PPS) 2024 growth targets.<br>• Does not align with the IMP's vision and considerations.<br>• Potential social/economic/environmental disruptions due to insufficient supply. | ✗ Screened Out |
| 2. Limit growth | • Reduces the extent of capital upgrades required in the system. | • Does not meet adequate levels of service for existing users and future growth.<br>• Does not comply with the official plans of the four Local Municipalities in Halton and the PPS 2024 growth targets.<br>• Does not align with the IMP's vision and considerations. | ✗ Screened Out |
| **3.** O4 Hornby RES with associated Hornby Pumping Station from O4 to M5L | • The new Hornby RES could work with a single transmission (combined inlet/outlet) from future O4 PS, since the Hornby PS can operate to help storage turnover.<br>• Improved system resiliency in O4 (two PS's), in M4L (two PS's) and M5L (three PS's) to provide supply to each major pressure zone.<br>• Full floating storage could be provided within O4.<br>• Slightly lesser transmission needs for M5L system when pumping from Hornby site, rather than Ashgrove.<br>• Best operational flexibility in terms of ways to get supply into M5L. | • High reliance on continued operation of the long-distance single feed to Hornby RES.<br>• Significant linear (transmission) upgrades still needed across all pressure zones (M4L, M5L, O4, and O3).<br>• Hornby RES site, located near Ashgrove RES site, does not maximize value of the Ashgrove site's expandability.<br>• Phasing of infrastructure needs is difficult. Would need all major linear infrastructure (M4L, O4, M5L, and O3) by ~2036 timeframe. | ✓ Carried Forward |
| 4. O4 Hornby RES and separate Ashgrove Pumping Station from M4L to M5L | • Improved system resiliency in O4 (two PSs), in M4L (two PSs), and M5L (three PS's) to provide supply to each major pressure zone.<br>• Full floating storage could be provided within O4.<br>• Good operational flexibility in terms of ways to get supply into M5L. | • The new Hornby RES would require both a dedicated inlet and a dedicated outlet transmission main, to achieve turnover of the storage when it is a long distance from the O4 service area.<br>• Significant linear (transmission) upgrades still needed across all pressure zones (M4L, M5L, O4, and O3).<br>• Highest amount of construction and disruption.<br>• Highest cost due to the largest amount of major linear transmission upgrades.<br>• Hornby RES site located near Ashgrove RES site, so it does not maximize value of the Ashgrove site's expandability.<br>• Slightly more transmission needs for M5L system when pumping from Ashgrove PS rather than Hornby PS. | ✓ Carried Forward |
| **5.** O4 elevated tanks and separate Ashgrove Pumping Station from M4L to M5L | • Improved system resiliency in O4 (two PS's), in M4L (two PS's) and M5L (three PS's) to provide supply to each major pressure zone.<br>• Phasing of infrastructure needs is most viable. Able to gradually increase O4 storage with first ET; and 2nd ET as growth increases.<br>• Able to defer the third M5L PS until later in planning horizon; spreads out capital costs and infrastructure needs.<br>• Good operational flexibility in terms of ways to get supply into M5L.<br>• RES Maximizes value of the Ashgrove site, by using its expandability (add storage and pumping to M5L). | • Includes elevated storage, which can have negative visual impacts to community.<br>• Significant linear (transmission) upgrades still needed across many pressure zones (M4L, M5L, and O3).<br>• Unable to provide full floating storage within O4. So, partial borrowed storage is needed (PRVs from M4L; pumped from O3).<br>• Reliance on Ashgrove RES, larger transmission upgrades needed towards M4L. | ✓ Carried Forward |

In summary, Alternatives 1 and 2 were screened out since they do not address the identified capacity constraints or support planned growth within the Region. These options are not consistent with the vision and servicing objectives of the IMP.

Alternatives 3, 4, and 5 were carried forward for further evaluation. All three alternatives can provide a viable solution to service this area. Alternative 3 is a strong candidate since it has a high level of operational flexibility and system resiliency and can provide full floating storage in the O4 pressure zone. However, the main drawback of Alternative 3 is the challenge of phased implementation. Almost all linear upgrades would be required earlier to support growth in O4 and M4L, and to support water turnover in the proposed Hornby RES facility. Alternative 4 is the least preferred since it would require the most linear construction with dual transmission (dedicated inlet and outlet) all the way from the O4 pumping stations to the Hornby RES site. Alternative 5 carries a similar magnitude of construction compared to Alternative 3; however, it provides the highest levels of operational flexibility and system resiliency for climate change adaptation. Furthermore, it is the most viable from a phasing perspective since it allows the Region to gradually build out the ultimate needs in O4 (storage gradually added) and it doesn't require the third M5L PS until later in the infrastructure program. Therefore, Alternative 5 was carried forward as the preferred strategy.

**Figure 27** presents the preferred water servicing strategy for this area.

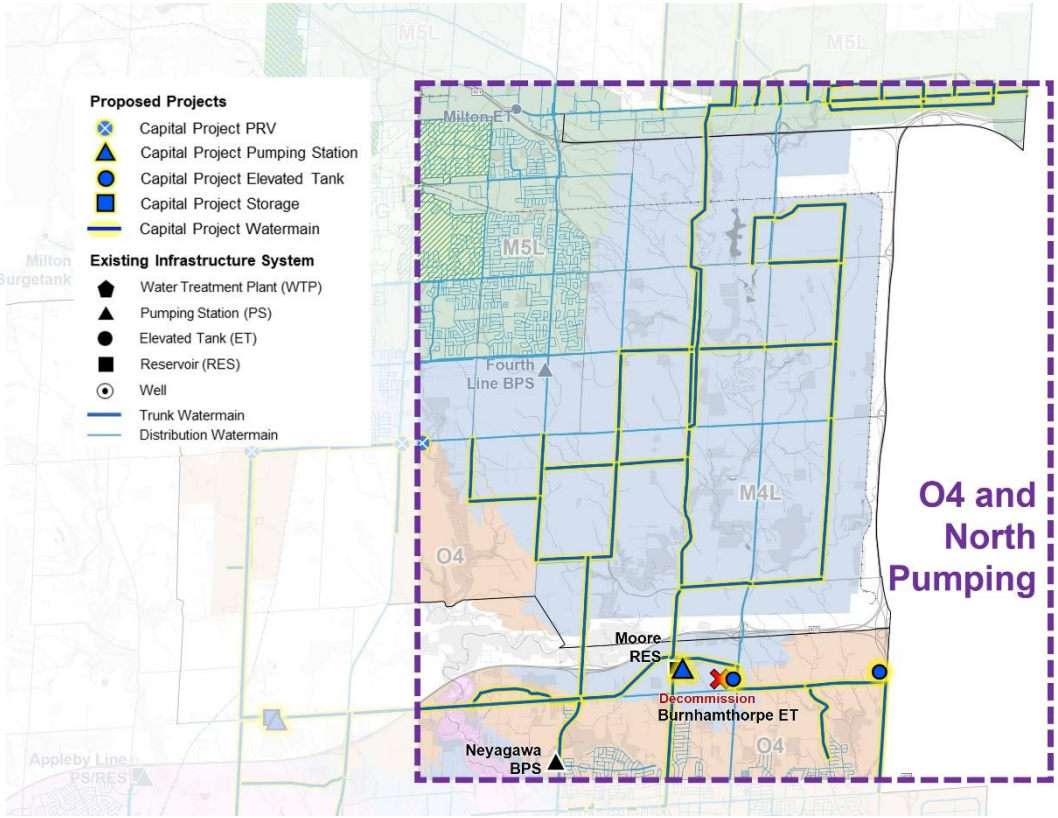



**Figure 27 – Focus Area Servicing Solution – Pressure Zone O4 Storage and North Pumping Preferred Strategy**

## Pressure Zone O2 Transmission – Wyecroft Watermain

Pressure Zone O2 generally covers the areas in Oakville north of Speers Road, south of Upper Middle Road and east of Burloak Drive. Currently, the Davis Road BPS is the primary supply of water to the zone. The zone also acts as a way to transfer additional flows north towards O3 and O4 via the Eighth Line BPS and Glenashton PS.

To meet the growing pumping needs of Zone B2 intensification and North Oakville growth areas, and to help maintain/improve system resiliency, the Sustainable Halton Master Plan recommended the new Burloak BPS at the boundary of Burlington and Oakville. The Burloak BPS would primarily operate as a way to push supply towards B2 (towards Appleby RES), but it would also have the ability to transfer water supply across to O2 via a future Wyecroft sub-transmission main. Without the Wyecroft transmission main, the existing Zone 2 east-west transmission would not have sufficient hydraulic capacity to move water across the O2 system in Oakville.

The servicing strategy for Zone O2 transmission was carried fromward from the Sustainable Halton Master Plan to the IMP, as shown in **Figure 28**. The following projects will improve the east-west conveyance ability to bring water from Burloak BPS towards Zone O2.

a. 900mm WM on Wyecroft Road from Bronte Road to the 900mm WM on the southeast corner of Third Line and QEW and 900mm WM from the Burloak BPS to the constructed watermain on Wycroft Road (Phase 2). Note that this project was upsized compared to the recommendation in the Sustainable Halton Master Plan, to meet projected growth needs to 2051.
b. 600mm WM twinning on North Service Road from Dorval Drive to Kerr Street.

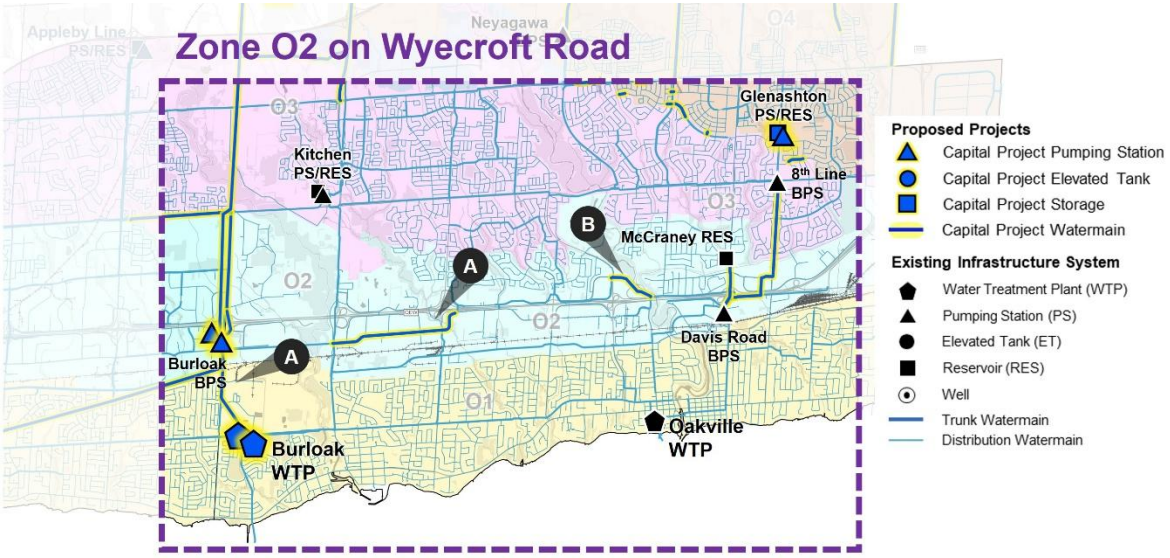



**Figure 28 – Focus Area Servicing Solution – Pressure Zone O2 Transmission on Wyecroft Rd Strategy**

## Pressure Zone O2 Transmission – Davis Road BPS to Eighth Line BPS

The Davis Road BPS supplies water to Zone O2 and pumps water to the Eighth Line BPS and Glenashton RES/PS to feed the upper zones in Oakville. The existing 750mm/900mm watermain from Davis Road BPS to Eighth Line BPS is already nearing capacity (high velocity) under current demand conditions.

As such, the IMP explored opportunities to improve the transmission capacity in Zone O2 to support the growing pumping needs to the upper zones in Oakville. This transmission capacity upgrade was identified as a twinning of the watermain from Davis Road BPS to Eighth Line BPS as shown in **Figure 29**. However, the currently identified alignment of the transmission watermain should be re-evaluated further as part of a separate feasibility or alignment study. Additionally, it is noted that the McCraney RES (which acts as suction to the Davis Road BPS) will require an upsized or twinned watermain back to Davis Road due to high velocity/head loss experienced during peak pumping from Davis Road BPS.

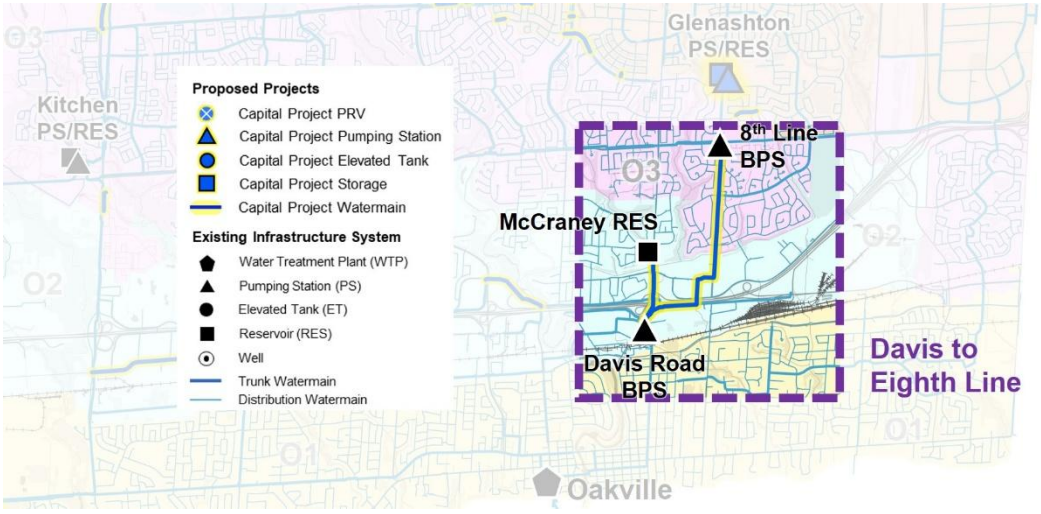



**Figure 29 – Focus Area Servicing Solution – Pressure Zone O2 Transmission from Davis Road BPS to Eighth Line BPS Strategy**

#### 5.3.3.5 Milton

##### M5L Pumping and Transmission (Ashgrove PS)

Pressure Zone 267 (M5L) covers a large area of Milton from Louis Saint Laurent Avenue to Campbellville Road, including the lands of the Highway 401 corridor in the east. Water is pumped from the Kitchen PS and Fourth Line BPS to two (2) storage facilities (Third Line RES and Milton ET).

Long-term, Pressure Zone M5L will experience a storage deficit due to the combination of growth within M5L and the transfer of select parts of M5G to M5L (as needed, based on ongoing monitoring). Furthermore, as the Milton ET ages, the Region has a long-term plan of decommissioning the ET due to challenges of operating both storage facilities in parallel.

To address the storage limitation, the IMP explored opportunities to increase storage capacity in Zone M5L. It was noted that M5L storage expansion is less feasible due to limited expansion capacity at the existing Third Line RES. The IMP looked at building a new storage facility; however, it would require a significant amount of new infrastructure due to the topography of the area. As a result, the preferred option for satisfying the partial storage deficit in M5L was to increase the ability to provide pumped storage into M5L.

This pumped storage concept means taking excess storage capacity from the adjacent Pressure Zone M4L and adding the necessary pumping and transmission capacity to send it to M5L when needed. This pumped storage solution was incorporated and evaluated in detail in Section 5.3.3.4 “Pressure Zone O4 Storage and North Pumping.” It uses increased storage capacity at the Ashgrove RES and a new M5L Pump Station at Ashgrove RES to bring supply from M4L to M5L as needed.

The concept can be seen graphically in **Figure 30** with the addition of the Ashgrove M5L PS, the expansion of the Ashgrove (M4L) Reservoir, future decommissioning of the Milton ET and a series of transmission main upgrades near the new Ashgrove M5L PS and existing Third Line RES that strengthen the hydraulic connectivity between the Ashgrove M5L PS and the rest of the M5L system, including the Third Line Reservoir.

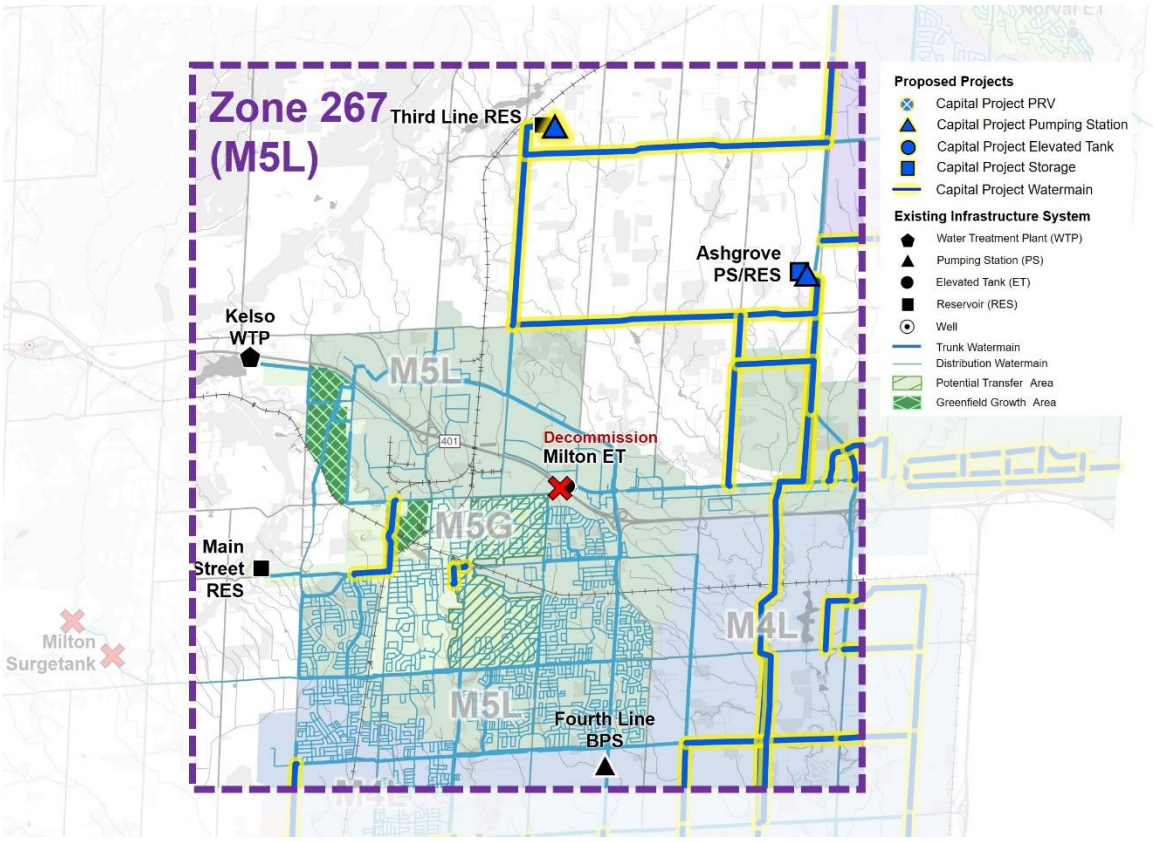



**Figure 30 – Focus Area Servicing Solution – Pressure Zone 267 (M5L) Pumping and Transmission Strategy**

## M4L Transmission Resiliency

Pressure Zone 250 (M4L) currently services a portion of Milton and a small area in Oakville (between Burnhamthorpe Road and Highway 407). A significant part of the future growth (expansion lands) within Milton are located within Pressure Zone M4L. Water is pumped from the Neyagawa BPS to the Ashgrove RES. This zone has the largest projected growth in the Region. Future transmission upgrades are essential to generate the transmission capacity necessary to move water from lower zones to M4L, and to provide resiliency between the existing Neyagawa BPS and the proposed Central PS.

Shown in **Figure 31**, the Sustainable Halton Master Plan recommended the M4L sub-transmission main (watermain on James Snow Parkway from Burnhamthorpe Road West to Lower Base Line West). This capital project will provide the second transmission main from the Neyagawa BPS towards future growth areas in south Milton. In the IMP, even though the overall transmission strategy has changed to also include the "Central PS", this project still proved to be beneficial in enhancing conveyance capacity from Neyagawa BPS and improving the resiliency of supply from the Neyagawa BPS. This additional path for water to flow to the north provides operational flexibility and security of supply by providing the Region with an alternative to the Trafalgar transmission main.

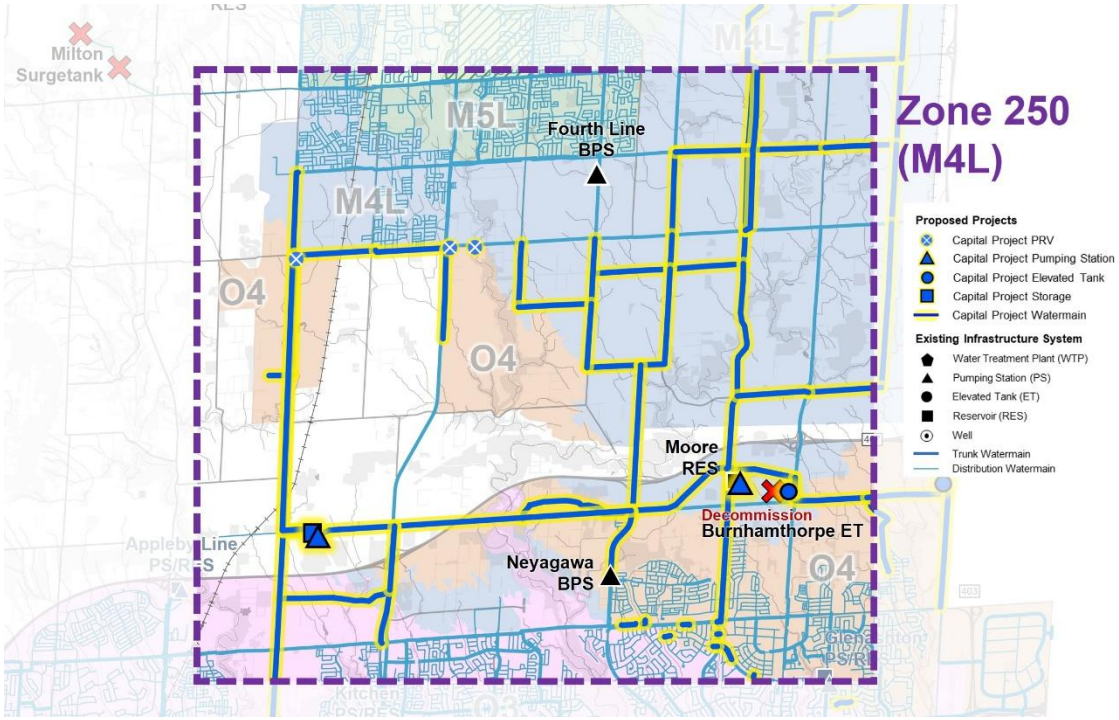



**Figure 31 – Focus Area Servicing Solution – Pressure Zone 250 (M4L) Transmission Strategy**

## Milton Greenfield Growth Areas

Further to the discussed M4L sub-transmission main (watermain on James Snow Parkway from Burnhamthorpe Road West to Lower Base Line West), the Sustainable Halton Master Plan recommended multiple capital projects for distribution across the greenfield growth areas in Milton. The IMP adopted the proposed strategy, which is shown in **Figure 32**; however, it was updated to align with the new distribution of growth and the urban boundary expansion.

A significant part of the future greenfield growth within Milton are located within Pressure Zone 250 (M4L). As discussed previously, M4L sub-transmission mains (watermain on James Snow Parkway and watermain on Trafalgar Road) are necessary to move water from lower zones to M4L. Additional future distribution watermains are also required to move water to future customers. These distribution watermains are along major roads including Eighth Line, Sixth Line, Fifth Line, Fourth Line, Derry Road, Louis St Laurent Avenue, Lower Base Line and other future roads, forming a well looped network to provide resiliency to the local system.

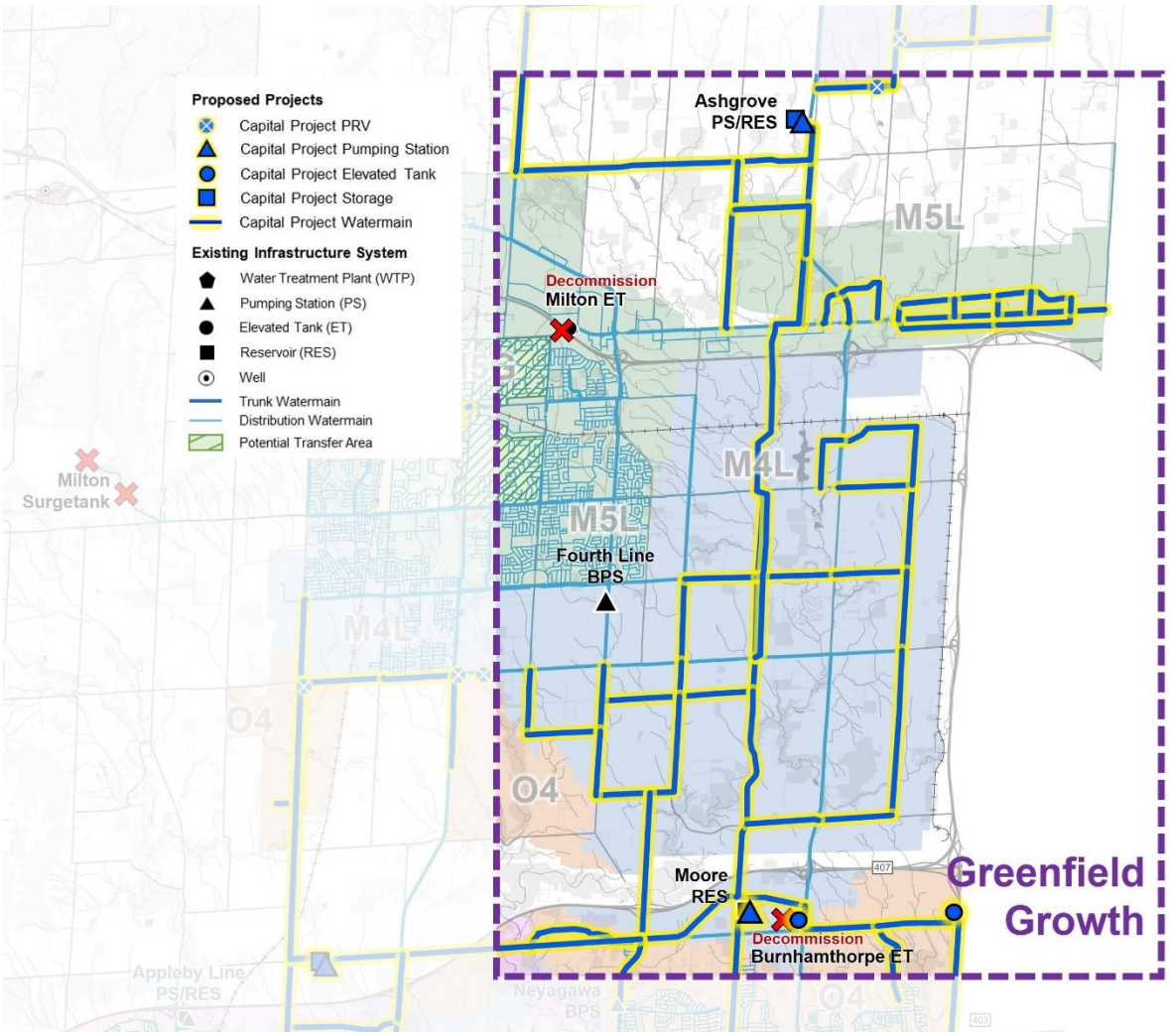



**Figure 32 – Focus Area Servicing Solution – Milton Greenfield Growth Strategy**

## 5.4 Cost Estimation Framework

At the master planning stage, cost estimates are developed to provide a high-level understanding of the capital investment required to implement the preferred servicing strategies. Estimates at this stage are planning-level values suitable for long-range financial forecasting, DC updates, and capital budgeting.

The costing approach for the IMP is based on a unit-rate methodology, using representative cost rates appropriate for master planning. For linear infrastructure, base construction costs were developed using unit rates applied by pipe diameter, while vertical or facility-type projects were estimated through project-specific analysis or cost curves, as appropriate. These unit rates reflect industry-standard planning assumptions and available data sources suitable for the level of project definition at this stage.

Each project cost was adjusted to reflect factors such as construction depth, crossings, tunnelling requirements, and location characteristics (greenfield, suburban, or urban). Following the development of the base construction cost, applicable project components, such as studies, detailed design, property, and other supporting costs, were incorporated in accordance with the costing framework to arrive at a total project cost.

Given the broad level of project definition typical of a Master Plan, cost estimates in the IMP generally correspond to Class 4 (Conceptual) or Class 5 (Order of Magnitude) under the Association for the Advancement of Cost Engineering (AACE) classification system. These estimates typically carry an expected accuracy range of −30% to +50%, reflecting the preliminary nature of project details available at this stage.

Accordingly, these values should be understood as high-level planning estimates that provide a defensible basis for long-range forecasting. As projects advance through subsequent phases, such as MCEA studies (where required), preliminary design, and detailed design, the cost estimates will be refined to reflect the increased level of definition and information available at each stage. Updated estimates will then be incorporated into the Region's capital budgeting process as part of ongoing project development and implementation.

A summary of the unit costs used and the overall costing framework is provided in **Appendix 3B**. Final project costs, presented in Section 5.6, represent the total estimated capital investment to implement the Preferred Water Servicing Strategy and will inform Halton Region's DC By-law and Capital Budget.

## 5.5 Preferred Servicing Strategy Summary

The preferred water servicing strategy combines system-wide recommendations, area-specific solutions, and facility upgrades to collectively address the Region's water needs through to 2051. This strategy was developed to ensure a reliable and efficient water supply system that supports long-term growth across the Region.

Several of the key servicing considerations that informed the preferred strategy are summarized below. The entire capital program is shown in **Table 29**.

**System-Wide Supply Strategy**
To accommodate projected growth to 2051, the Preferred Strategy includes phased expansions, upgrades and transition of select groundwater systems:

- Expansion of the Burloak Water Treatment Plant to 400 ML/d in phased stages to meet long-term lake-based supply demands.
- Upgrades to the Oakville and Burlington WTPs to maximize existing capacity.
- Transition of select groundwater systems (e.g., areas of Milton and Georgetown) to lake-based servicing to maintain the long-term sustainability of Halton's water resources.

**System-Wide Transmission Strategy**
To support the increase in demand, the Preferred Strategy includes system-wide transmission strategies:

- A new south-north water supply spine from the Burloak WTP to a proposed Central Facility (with pumping, storage, and transmission mains) will provide additional capacity to the lake-based growth areas in Milton, North Oakville, and Georgetown, while strengthening overall system resiliency.
- Improved interconnectivity between pressure zones to enhance system flexibility and resiliency.

**Focus Area Servicing Solutions**
In addition to system-wide supply and transmission strategies, the Preferred Strategy includes targeted solutions in areas with identified capacity constraints or strategic growth priorities:

- Milton Groundwater System: Transition areas of M5G to lake-based supply; decommissioning of aging wells.
- Georgetown Groundwater System: Continued use of wells with targeted upgrades; transition to lake-based supply in certain areas.
- Acton Groundwater System: Continued groundwater supply with ongoing capacity monitoring; no major changes recommended at this time.
- Zone O4 and North Pumping Strategy: Implementation of elevated storage solution in O4 and new Ashgrove PS to M5L.

Other Key Initiatives:

- Improvements to pumping stations and storage facilities to address pressure zone deficits.
- Infrastructure Coordination: Integration with the Region's Enhanced Growth Monitoring framework to ensure the strategy remains adaptive to evolving development timelines and priorities.
- Climate Resiliency and Energy: Application of design principles that improve operational flexibility, reduce emissions, and support long-term climate adaptation objectives.

## 5.6 Capital Program for the Preferred Servicing Strategy

The capital program supports the implementation of the Preferred Water Servicing Strategy and outlines the infrastructure investments required to service existing and future growth to 2051.

Project costs were estimated using the methodology described in Section 5.4 and **Appendix 3B**. The capital program includes information on project descriptions, type, location, sizes, timing, estimated costs, and applicable MCEA requirements.

Importantly, the costing approach for all projects is comprehensive and accounts for every phase of development, including preliminary planning, environmental assessment, detailed design, property acquisition, and construction.

The capital program supporting the Preferred Water Servicing Strategy is summarized in **Table 28**. This summary includes only the costs of new projects identified through the IMP and excludes projects already funded through the Allocation Program. The complete list of capital projects is provided in **Table 29**, and their general locations are illustrated in **Figure 33**.

**Table 28 – Summary of Water Capital Program**

| Category | Total ($millions) |
|---|---|
| Water Treatment | $525 |
| Storage and Pumping Station Infrastructure | $388 |
| Linear Infrastructure | $1,400 |
| Other Studies and Programs | $11 |
| **Total** | **$2,325** |

*Notes: Table does not include the cost of projects already funded through the Allocation Program. Total may not add up due to rounding.*

Table 29 – Water Capital Projects

| Master Plan ID | Project Description | Municipality | Construction Type | Project Type | Class EA | Size / Capacity | Length (m) | Year in Service | Total Estimated Cost ($2025) |
|---|---|---|---|---|---|---|---|---|---|
| W01 | 300mm WM twinning on Plains Rd East (between MP-6709 & MP-6710) (BUR) (Future Zone B2) | BUR | Linear | Watermain | - | 300 mm | 235 m | 2031 | $1,169,000 |
| W02 | 300mm WM on Plains Rd connecting Masonry Ct and Howard Rd (BUR) (Zone B2) | BUR | Linear | Watermain | - | 300 mm | 465 m | 2046 | $1,805,000 |
| W03 | Decommission Waterdown Rd Zone B1A Reservoir (BUR) (Zone B1A) | BUR | Vertical | Reservoir | - | N/A | N/A | 2031 | $1,600,000 |
| W04 | New pumping station with a total capacity of 2 ML/d at the new North Aldershot Reservoir site to service future B3B & B5B (BUR) (Zone B3B & B5B) | BUR | Vertical | Water Pumping Station | Schedule B | 2 ML/d | N/A | 2031 | $11,202,000 |
| W05 | Repurpose Kingsway BPS as B2 pumping station (BUR) (Zone B2) | BUR | Vertical | Water Pumping Station | - | 20 ML/d | N/A | 2030 | $7,380,000 |
| W06 | 600mm WM at repurposed Kingsway BPS discharging to Zone B2 (BUR) (Zone B2) | BUR | Linear | Watermain | - | 600 mm | 10 m | 2030 | $68,000 |
| W07 | 300mm WM on Kingsway Dr crossing Plains Rd (BUR) (Zone B2) | BUR | Linear | Watermain | - | 300 mm | 55 m | 2030 | $209,000 |
| W08 | 400mm WM on King Rd crossing QEW (BUR) (Zone B2) | BUR | Linear | Watermain | - | 400 mm | 230 m | 2030 | $7,600,000 |
| W09 | 600mm WM on N Service Rd from Kerns Rd to King Rd (BUR) (Zone B2) | BUR | Linear | Watermain | - | 600 mm | 1285 m | 2028 | $15,777,000 |
| W10 | Decommission Tyandaga Pumping Station/Reservoir (BUR) (Zone B3) | BUR | Vertical | Reservoir | - | N/A | N/A | 2034 | $1,600,000 |
| W11 | Repurpose Brant Pumping Station (BUR) (Zone B3/B4) | BUR | Vertical | Water Pumping Station | - | 6 ML/d | N/A | 2037 | $13,485,000 |
| W12 | 300mm WM on Brant St from the new Brant Pumping Station to Upper Middle Rd (BUR) (Zone B4) | BUR | Linear | Watermain | - | 300 mm | 1320 m | 2037 | $10,803,000 |
| W13 | 900mm WM twinning at Burlington WTP discharge (BUR) (Zone B1) | BUR | Linear | Watermain | - | 900 mm | 130 m | 2033 | $1,626,000 |
| W14 | 1050mm WM twinning on Johnston Dr from Robert St to New St (BUR) (Zone B1) | BUR | Linear | Watermain | - | 1050 mm | 860 m | 2033 | $10,720,000 |
| W15 | 750mm WM on the Centennial Trail from near New St/ Cumberland Ave to Burloak Dr (BUR) (Zone B1) | BUR | Linear | Watermain | - | 750 mm | 5655 m | 2034 | $54,541,000 |
| W16 | Burloak Booster Pumping Station Phase 2 from 60 ML/d to 100 ML/d (BUR) (Zone B2) | BUR | Vertical | Water Pumping Station | - | 40 ML/d | N/A | 2046 | $16,004,000 |
| W17 | Burloak WTP Phase 3 Expansion from 165 to 300 ML/d (OAK) (Zone O1/B1) | OAK | Vertical | Water Treatment Plant | Schedule C | 135 ML/d | N/A | 2036 | $302,000,000 |
| W18 | Burloak WTP Phase 4 Expansion from 300 to 400 ML/d (OAK) (Zone O1/B1) | OAK | Vertical | Water Treatment Plant | Schedule C | 100 ML/d | N/A | 2046 | $223,000,000 |
| W19 | 1650mm WM from Burloak WTP to the new Central Station via Burloak Dr/Tremaine Rd with an emergency valve at UMR/Burloak connect 8280/W22 (OAK) (Zone O2/B2) | OAK | Linear | Watermain | Schedule B | 1650 mm | 9260 m | 2036 | $235,658,000 |
| W20 | New 30 ML Central Station Reservoir at Burnhamthorpe Rd and Tremaine Rd (OAK) (Zone 2) | OAK | Vertical | Reservoir | Schedule B | 30 ML | N/A | 2036 | $57,752,000 |
| W21 | New Central Station at Burnhamthorpe Rd and Tremaine Rd pumping 150 ML/d to Pressure Zone 250 (OAK) (Zone 250) | OAK | Vertical | Water Pumping Station | Schedule B | 150 ML/d | N/A | 2036 | $71,731,000 |
| W22 | New Central Station at Burnhamthorpe Rd and Tremaine Rd pumping 50 ML/d to Pressure Zone O3 (OAK) (Zone O3) | OAK | Vertical | Water Pumping Station | Schedule B | 50 ML/d | N/A | 2036 | $23,910,000 |
| W23 | 1200mm WM on Burnhamthorpe Rd from the new Central Station to RR 25 (Bronte) (OAK) (Zone O3) | OAK | Linear | Watermain | Schedule B | 1200 mm | 1560 m | 2036 | $24,117,000 |

| Master Plan ID | Project Description | Municipality | Construction Type | Project Type | Class EA | Size / Capacity | Length (m) | Year in Service | Total Estimated Cost ($2025) |
|---|---|---|---|---|---|---|---|---|---|
| W24 | 600mm WM on Bronte Rd from Burnhamthorpe Rd to MP-5627 (OAK) (Zone O3) | OAK | Linear | Watermain | Schedule B | 600 mm | 1185 m | 2036 | $10,443,000 |
| W25 | 1200mm WM from the new Central Station via Tremaine Rd (Twinned part 1) (MIL) (Zone 250) | MIL | Linear | Watermain | Schedule B | 1200 mm | 5825 m | 2036 | $83,759,000 |
| W26 | 1200mm WM from the new Central Station via Tremaine Rd (Twinned part 2) (MIL) (Zone 250) | MIL | Linear | Watermain | Schedule B | 1200 mm | 5825 m | 2036 | $83,759,000 |
| W27 | 1050mm WM on Burnhamthorpe Rd from RR25 (Bronte) to Neyagawa Blvd (OAK) (Zone O3) | OAK | Linear | Watermain | - | 1050 mm | 4395 m | 2046 | $56,311,000 |
| W28 | 900mm WM on Neyagawa Blvd from Burnhamthorpe Rd to Neyagawa BPS feedermain (suction side) (OAK) (Zone O3) | OAK | Linear | Watermain | - | 900 mm | 1450 m | 2046 | $17,531,000 |
| W29 | 900mm WM on Burnhamthorpe Rd and William Halton Pkwy from Neyagawa Blvd to Moore Reservoir (OAK) (Zone O3) | OAK | Linear | Watermain | - | 900 mm | 2625 m | 2046 | $27,066,000 |
| W30 | New 50 ML/d pumping station at the existing Moore Reservoir site (OAK) (Zone 224) | OAK | Vertical | Water Pumping Station | Eligible for Screening | 50 ML/d | N/A | 2040 | $33,110,000 |
| W31 | 750mm WM twinning on Sixth Line from Dundas St to Moore Reservoir (OAK) (Zone O3) | OAK | Linear | Watermain | - | 750 mm | 2740 m | 2036 | $25,438,000 |
| W32 | 750mm WM from the new Moore Pumping Station (Zone 224) discharge to Sixth Line then along William Halton Pkwy to Trafalgar Rd (OAK) (Zone 224) | OAK | Linear | Watermain | - | 750 mm | 1420 m | 2041 | $9,766,000 |
| W33 | 750mm WM along Trafalgar from William Halton Pkwy to Trafalgar Rd (OAK) (Zone 224) | OAK | Linear | Watermain | - | 750 mm | 305 m | 2041 | $2,352,000 |
| W34 | Decommission the existing Burnhamthorpe ET for Pressure O4 (OAK) (Future Zone 224) | OAK | Vertical | Elevated Tank | - | N/A | N/A | 2032 | $1,300,000 |
| W35 | 10ML Burnhamthorpe ET at the existing site (OAK) (Zone 224) | OAK | Vertical | Elevated Tank | Schedule B | 10 ML | N/A | 2032 | $35,338,000 |
| W36 | 10ML Burnhamthorpe East ET (OAK) (Zone 224) | OAK | Vertical | Elevated Tank | Schedule B | 10 ML | N/A | 2040 | $42,627,000 |
| W37 | 600mm WM on Burnhamthorpe Rd from the east limit of MP-6443 to Ninth Line (OAK) (Zone 224) | OAK | Linear | Watermain | - | 600 mm | 1515 m | 2040 | $19,917,000 |
| W38 | 400mm WM on Ninth Line from Burnhamthorpe Rd to Dundas St (OAK) (Zone 224) | OAK | Linear | Watermain | - | 400 mm | 2100 m | 2040 | $11,202,000 |
| W39 | Glenashton Pumping Station Capacity Upgrades for Pressure Zone 224 (previously O4) from 43.7 ML/d to 60 ML/d - Construction (OAK) (Zone 224) | OAK | Vertical | Water Pumping Station | - | 60 ML/d | N/A | 2030 | $6,016,000 |
| W40 | Eighth Line (Glenashton) Reservoir expansion from 17.4ML to 24ML (OAK) (Zone 224) | OAK | Vertical | Reservoir | - | 7 ML | N/A | 2030 | $11,801,000 |
| W41 | 150mm WM twinning on Glenbrook Ave from Glenada Cres to Grosvenor St (OAK) (Zone O3) | OAK | Linear | Watermain | - | 150 mm | 290 m | 2031 | $768,000 |
| W42 | 150mm WM on Wildfield Dr from Glenashton Dr to Roxton Rd (OAK) (Zone 224) | OAK | Linear | Watermain | - | 150 mm | 50 m | 2031 | $132,000 |
| W43 | 400mm WM twinning on Glenashton Dr from Sixth Line to Greenfield Dr (OAK) (Zone O3) | OAK | Linear | Watermain | - | 400 mm | 400 m | 2031 | $2,193,000 |
| W44 | 300mm WM twining on Glenashton Dr from 6th Line to Inverhuron Trail (OAK) (Zone O3) | OAK | Linear | Watermain | - | 300 mm | 80 m | 2031 | $304,000 |
| W45 | 300mm WM crossing Sixth Line connecting watermains on Hays Blvd and Westfield Trail (OAK) (Zone 224) | OAK | Linear | Watermain | - | 300 mm | 60 m | 2031 | $228,000 |
| W46 | 200mm WM on easement connecting watermains on Harman Gate and Castle Hill Cres (OAK) (Zone 224) | OAK | Linear | Watermain | - | 200 mm | 135 m | 2031 | $409,000 |
| W47 | 300mm WM twinning on River Glen Blvd from Howell Rd to New Wood Dr (OAK) (Zone O3) | OAK | Linear | Watermain | - | 300 mm | 115 m | 2031 | $437,000 |

| Master Plan ID | Project Description | Municipality | Construction Type | Project Type | Class EA | Size / Capacity | Length (m) | Year in Service | Total Estimated Cost ($2025) |
|---|---|---|---|---|---|---|---|---|---|
| W48 | 300mm WM on easement and George Savage Ave completing the loop (OAK) (Zone 224) | OAK | Linear | Watermain | - | 300 mm | 115 m | 2031 | $437,000 |
| W49 | 300mm WM off Dundas St W from Trailside Dr to Gladeside Ave (OAK) (Zone 224) | OAK | Linear | Watermain | - | 300 mm | 270 m | 2031 | $1,025,000 |
| W50 | 750mm WM twinning from Davis Rd BPS to Eighth Line BPS (O3) - Section 1 (Discharge side of Davis) (OAK) (Zone O2) | OAK | Linear | Watermain | - | 750 mm | 370 m | 2030 | $3,187,000 |
| W51 | 750mm WM twinning from Davis Rd BPS to Eighth Line BPS (O3) - Section 2 (Transmission) (OAK) (Zone O2) | OAK | Linear | Watermain | - | 750 mm | 2785 m | 2040 | $31,913,000 |
| W52 | 600mm EM twinning from Davis Rd BPS to McCraney Reservoir (OAK) (Zone O1) | OAK | Linear | Watermain | - | 600 mm | 1115 m | 2032 | $15,133,000 |
| W53 | 600mm WM twinning on North Service Rd from Dorval Dr to Kerr St (OAK) (Zone O2) | OAK | Linear | Watermain | - | 600 mm | 880 m | 2051 | $5,956,000 |
| W54 | 750mm WM on Tremaine Rd from Britannia Rd to Louis St Laurent Ave (MIL) (Zone 250) | MIL | Linear | Watermain | - | 750 mm | 1550 m | 2036 | $10,660,000 |
| W55 | 1350mm WM on Britannia Rd from Tremaine Rd to First Line (MIL) (Zone 250) | MIL | Linear | Watermain | - | 1350 mm | 1520 m | 2036 | $29,071,000 |
| W56 | 1200mm WM on Britannia Rd from Tremaine Rd to RR25 (MIL) (Zone 250) | MIL | Linear | Watermain | - | 1200 mm | 1405 m | 2036 | $22,337,000 |
| W57 | 400mm WM on RR 25 from Britannia Rd to 2km south (MIL) (Zone 224) | MIL | Linear | Watermain | - | 400 mm | 1775 m | 2034 | $9,905,000 |
| W58 | PRV at Britannia Rd and east of RR25 for future servicing of Zone 224 (MIL) (Zone 224) | MIL | Other | PRV | - | N/A | N/A | 2034 | $1,000,000 |
| W59 | PRV at Britannia Rd and RR25 for future servicing of Zone 224 (MIL) (Zone 224) | MIL | Other | PRV | - | N/A | N/A | 2034 | $1,000,000 |
| W60 | PRV at Britannia Rd and Tremaine Rd for future servicing of Zone 224 (MIL) (Zone 224) | MIL | Other | PRV | - | N/A | N/A | 2036 | $1,000,000 |
| W61 | 600mm WM on Sixth Line from William Halton Pkwy to MP-6620 (MIL) (Zone 250) | MIL | Linear | Watermain | - | 600 mm | 3925 m | 2046 | $32,498,000 |
| W62 | 400mm WM on Lower Base Line from Sixth Line to Trafalgar Rd (MIL) (Zone 250) | MIL | Linear | Watermain | - | 400 mm | 1325 m | 2046 | $11,177,000 |
| W63 | 400mm WM on Lower Base Line from Trafalgar Rd to Eighth Line (MIL) (Zone 250) | MIL | Linear | Watermain | - | 400 mm | 1360 m | 2046 | $8,250,000 |
| W64 | 400mm WM on Eighth Line from Britannia Rd to Lower Base Line (MIL) (Zone 250) | MIL | Linear | Watermain | - | 400 mm | 3045 m | 2046 | $14,972,000 |
| W65 | 400mm WM on future road through the new Milton lands (MIL) (Zone 250) | MIL | Linear | Watermain | - | 400 mm | 2545 m | 2031 | $16,045,000 |
| W66 | 400mm WM on future road through the new Milton lands (MIL) (Zone 250) | MIL | Linear | Watermain | - | 400 mm | 1215 m | 2031 | $10,739,000 |
| W67 | 300mm WM on Main St from Ontario St to Prince St (MIL) (Zone 267) | MIL | Linear | Watermain | - | 300 mm | 230 m | 2037 | $1,283,000 |
| W68 | 300mm WM on Prince St from Main St to Oak St (MIL) (Zone 267) | MIL | Linear | Watermain | - | 300 mm | 315 m | 2037 | $1,565,000 |
| W69 | 400mm WM on Bronte St from Steeles Ave to Main St and on Main St from Bronte St to Scott Blvd (MIL) (Zone 267) | MIL | Linear | Watermain | - | 400 mm | 1980 m | 2031 | $17,649,000 |
| W70 | Decommission of Steeles Ave ET (MIL) (Zone 267) | MIL | Vertical | Elevated Tank | - | N/A | N/A | 2041 | $1,300,000 |
| W71 | 400mm WM on Tenth Line from Steeles Ave to future road (MIL) (Zone 267) | MIL | Linear | Watermain | - | 400 mm | 400 m | 2031 | $1,914,000 |

| Master Plan ID | Project Description | Municipality | Construction Type | Project Type | Class EA | Size / Capacity | Length (m) | Year in Service | Total Estimated Cost ($2025) |
|---|---|---|---|---|---|---|---|---|---|
| W72 | 400mm WM on Ninth Line from Steeles Ave to proposed road (MIL) (Zone 267) | MIL | Linear | Watermain | - | 400 mm | 330 m | 2031 | $1,670,000 |
| W73 | 1200mm WM on Sixth Line from Britannia Rd to Ashgrove Reservoir as the 2nd feedermain (MIL) (Zone 250) | MIL | Linear | Watermain | - | 1200 mm | 10605 m | 2047 | $149,172,000 |
| W74 | Existing Ashgrove Pumping Station expansion of 30 ML/d (HHGEO) (Zone 267) | HHGEO | Vertical | Water Pumping Station | Schedule B | 30 ML/d | N/A | 2046 | $26,492,000 |
| W75 | 900mm WM on No.5 Side Rd from Ashgrove Pumping Station to Sixth Line (MIL) (Zone 267) | MIL | Linear | Watermain | - | 900 mm | 2175 m | 2046 | $26,296,000 |
| W76 | 750mm WM on Sixth Line from No.5 Side Rd to 2200m north of Steeles Ave (MIL) (Zone 267) | MIL | Linear | Watermain | - | 750 mm | 885 m | 2046 | $6,087,000 |
| W77 | 750mm WM on Sixth Line from 2200m north of Steeles Ave to Steeles Ave (MIL) (Zone 267) | MIL | Linear | Watermain | - | 750 mm | 2230 m | 2046 | $22,020,000 |
| W78 | 400mm WM on future Milton Rd from Sixth Line to Trafalgar Rd and on Trafalgar Rd from Hornby Rd to future Milton Rd (MIL) (Zone 267) | MIL | Linear | Watermain | - | 400 mm | 1260 m | 2046 | $10,675,000 |
| W79 | 750mm WM on No.5 Side Rd from Sixth Line to Third Line (MIL) (Zone 267) | MIL | Linear | Watermain | - | 750 mm | 4110 m | 2051 | $46,360,000 |
| W80 | 750mm WM twinning on 3rd Line from No.5 Side Rd to Third Line Reservoir (MIL) (Zone 267) | MIL | Linear | Watermain | - | 750 mm | 3775 m | 2051 | $37,373,000 |
| W81 | New 30 ML/d pumping station at the existing Third Line Reservoir site (MIL) (Zone G6L) | MIL | Vertical | Water Pumping Station | Eligible for Screening | 30 ML/d | N/A | 2040 | $25,729,000 |
| W82 | 600mm WM on No.10 Side Rd from the new Third Line Pumping Station to Trafalgar Rd (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 600 mm | 6275 m | 2040 | $46,763,000 |
| W83 | 400mm WM on Tenth Line from No.10 Side Rd to future road (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1140 m | 2036 | $18,911,000 |
| W84 | 400mm WM on future Georgetown Rd from 10th Line to Ninth Line (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1410 m | 2036 | $8,449,000 |
| W85 | 400mm WM on Ninth Line from No.10 Side Rd to future road (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1090 m | 2036 | $7,416,000 |
| W86 | 400mm WM on future Georgetown Rd from 9th Line to 8th Line (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1395 m | 2036 | $14,281,000 |
| W87 | 400mm WM on Eighth Line from No.10 Side Rd to future road (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1075 m | 2036 | $9,937,000 |
| W88 | 400mm WM on Eighth Line from No.10 Side Rd to future road (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 745 m | 2046 | $8,620,000 |
| W89 | 400mm WM on future Georgetown Rd from 8th Line to 7th Line (HHGEO) (Zone G6L) | HHGEO | Linear | Watermain | - | 400 mm | 1395 m | 2046 | $17,105,000 |
| W90 | PRVs to service a portion of Zone G6L (HHGEO) (Zone G6L) | HHGEO | Other | PRV | - | N/A | N/A | 2036 | $3,000,000 |
| W91 | PRV to service a portion of Zone G6L (HHGEO) (Zone G6L) | HHGEO | Other | PRV | - | N/A | N/A | 2046 | $1,000,000 |
| W92 | Halton Water Master Plan (REG) | Region Wide | Other | Study | Master Plan | N/A | N/A | Various | $4,440,000 |
| W93 | Water Distribution System Analysis (REG) | Region Wide | Other | Study | - | N/A | N/A | Various | $5,400,000 |
| W94 | Water Supply Capacity Annual Monitoring Report (REG) | Region Wide | Other | Study | - | N/A | N/A | Various | $1,512,000 |
| **Total Water Capital Program** | | | | | | | | | **$2,324,688,000** |

Halton REGION

GEI Consultants Canada | CIMA+

# Integrated Master Plan

## Water, Wastewater and Transportation

Last updated: March 18, 2026

**Proposed Capital Projects**

- New / Upgrade
- Decommission
- Pressure Reducing Valve (PRV)

**Proposed Projects (In-Service Years)**

- Allocation Program
- 2028-2031
- 2032-2036
- 2037-2041
- 2042-2046
- 2047-2051

**Existing Infrastructure**

- Water Treatment Plant (WTP)
- Booster Pumping Station (BPS)
- Elevated Tank (ET) / Standpipe (SP)
- Reservoir (RES)
- Transmission Mains
- Distribution Mains
- Municipal Boundary

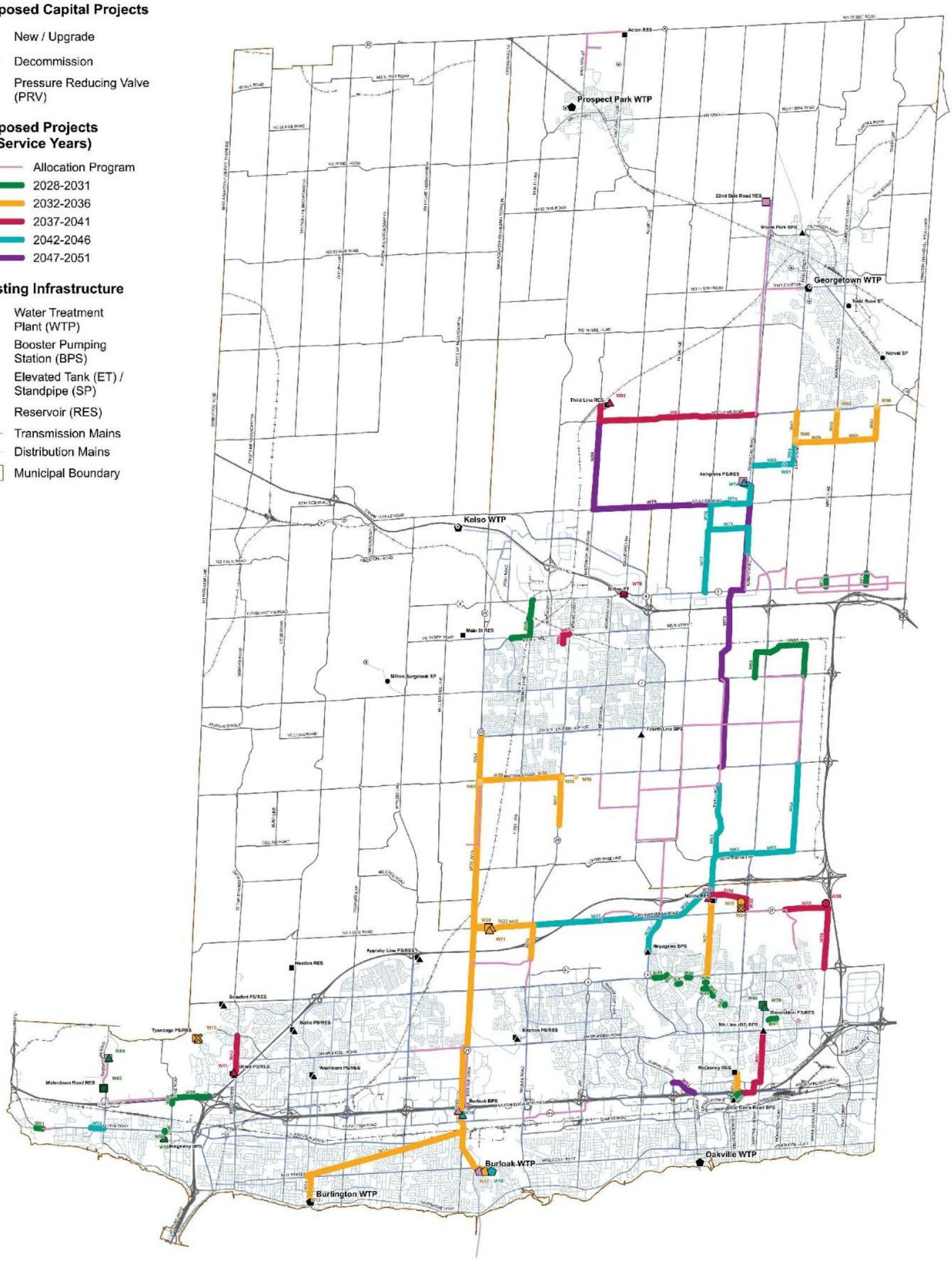



**Figure 33 – Capital Program Map for the Preferred Water Servicing Strategy**

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# 6.0 Implementation – From Plan to Action

# 6.0 Implementation – From Plan to Action

The IMP is a living document that is designed to remain flexible and responsive to Local Municipal growth priorities and changes in the land use context over time. The IMP sets a clear path for implementing the Region's preferred water servicing strategy to support long-term growth and maintain reliable and efficient service delivery to 2051. The IMP translates the recommended water servicing strategy into an actionable, phased capital program with associated timelines and implementation considerations. It also provides a framework for ongoing monitoring and refinement to ensure that infrastructure delivery remains responsive to growth priorities, system conditions, and regulatory requirements.

## 6.1 Phasing and Implementation Strategy

The water infrastructure phasing and implementation strategy has been developed to align the delivery of capital projects with projected growth, system performance needs, and coordination with other Regional infrastructure programs based on the following planning Horizons: 2021, 2026, 2031, 2036, 2041, 2046 and 2051.

At each horizon, servicing needs were analyzed to determine when new infrastructure is required to maintain performance objectives such as pressure, fire flow, redundancy, and capacity. Project timing was then refined to maintain flexibility and allow for adjustments as growth priorities and system conditions evolve.

Key factors considered in developing the phasing plan include:

- **Projected Population and Employment Growth:** Ensure water infrastructure meets future demands across the Region.
- **Servicing Dependencies:** Sequencing of storage, pumping, and transmission projects to maintain reliable system operation.
- **Construction Coordination:** Coordination with other Regional infrastructure programs such as wastewater and transportation. This includes communication with relevant internal departments and divisions and external groups, such as the Region's Local Municipalities.
- **Project Bundling:** Opportunities to group projects geographically or functionally to improve efficiency and minimize disruption.
- **Lead Time Requirements:** Recognition of infrastructure delivery (studies, design and construction), regulatory approvals, property acquisition, MCEA process, and other factors influencing project readiness.

Water projects have been phased on an annual basis out to 2051, as shown in **Figure 34**, with capital costs categorized into five major components: Feasibility Study, MCEA, Design, Property, and Construction. This approach supports integration with Halton's capital planning, budgeting, and Development Charges framework. Cost and schedule estimates represent high-level planning inputs and will be refined as projects progress through subsequent stages of study, design, and implementation.

Halton REGION

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# Integrated Master Plan

## Water, Wastewater and Transportation

Last updated: March 18, 2026

**Capital Program Projects**

- Water Treatment Plant (WTP)
- Booster Pumping Station (BPS)
- Reservoir (RES)
- Pressure Reducing Valves (PRV)
- Decommissioning Projects
- Proposed Watermains

**Allocation Program Projects**

- Water Treatment Plant (WTP)
- Booster Pumping Station (BPS)
- Reservoir (RES)
- Pressure Reducing Valves (PRV)
- Proposed Watermains

**Existing Infrastructure**

- Water Treatment Plant (WTP)
- Booster Pumping Station (BPS)
- Elevated Tank (ET) / Standpipe (SP)
- Reservoir (RES)
- Wells
- Transmission Mains
- Distribution Mains
- Municipal Boundary

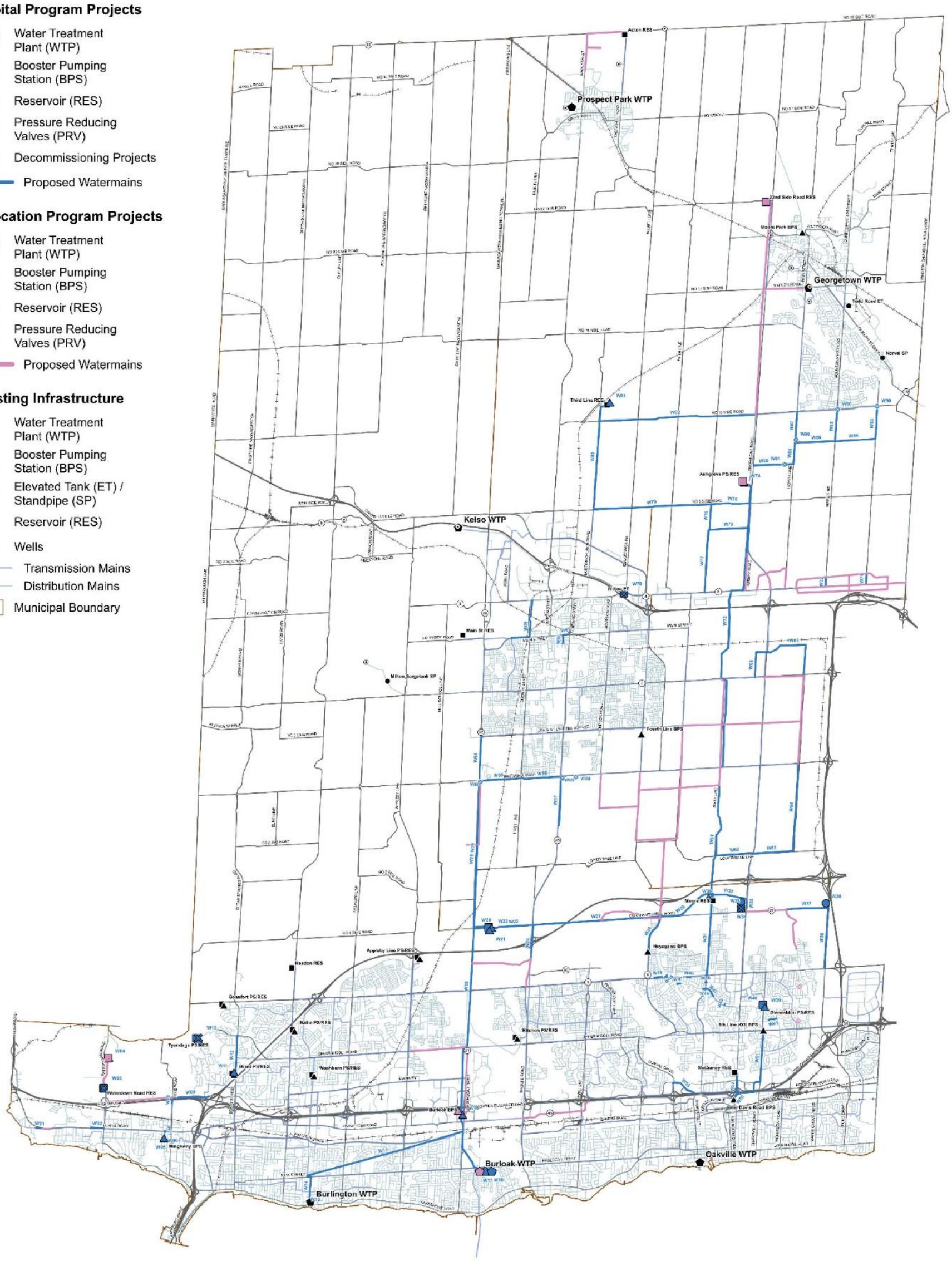


**Figure 34 – Capital Program and Implementation Map for the Preferred Water Servicing Strategy**

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## 6.2 MCEA Process and Project Categorization

The IMP has been prepared in accordance with Approach 1 of the MCEA process. As such, it fulfills Preliminary Phases 1 and 2 of the MCEA process for water servicing needs across the Region and will be used as support for subsequent Schedule B and C project specific studies.

Water infrastructure projects identified through the IMP fall into the following categories:

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

The MCEA requirements for each project have been identified in the capital program. Exempt projects may proceed directly to design and construction, while projects eligible for screening may undergo the screening process to determine if they qualify for exemption from a Schedule B Class EA. The IMP was developed as a broad-level assessment and acknowledges that further detailed studies and targeted consultation and engagement with the public, review agencies and Indigenous Communities will be required to fulfill the specific MCEA requirements for Schedule B and C projects identified within the IMP.

The following summarizes the MCEA requirements applicable to the recommended water capital projects identified through the IMP, including instances where projects have been grouped in accordance with the MCEA principle of planning large or extended project in their entirety. These MCEA requirements are based on the preferred servicing strategies identified at the time of the Master Plan and may be refined or updated as projects advance or as strategies are adjusted in response to evolving growth or system priorities.

**Table 30 – MCEA Requirements for Water Capital Projects**

| Item | Class EA Schedule | Project ID | Project Description |
|---|---|---|---|
| 1 | Schedule B | 6694 | Reservoir at 22nd Side Rd site. (HHGEO) (Zone G6L) |
| 2 | Schedule B | 7570 | North Aldershot in ground Reservoir (BUR) (Zone B2) |
| | | W04 | New pumping station with a total capacity of 2 ML/d at the new North Aldershot Reservoir site to service future B3B & B5B (BUR) |
| 3 | Schedule C | W17 | Burloak WTP Phase 3 Expansion from 165 to 300 ML/d (OAK) (Zone O1/B1) |
| 4 | Schedule C | W18 | Burloak WTP Phase 3 Expansion from 300 to 400 ML/d (OAK) (Zone O1/B1) |
| 5 | Schedule B | W19 | 1650mm WM from Burloak WTP to the new Central Station via Burloak Dr/Tremaine Rd. (OAK) (Zone O2) |
| | | W20 | New Central Station Reservoir at Burnhamthorpe Rd and Tremaine Rd. (OAK) (Zone 2) |
| | | W21 | New Central Station at Burnhamthorpe Rd and Tremaine Rd pumping to Pressure Zone 250. (OAK) (Zone 250) |
| | | W22 | New Central Station at Burnhamthorpe Rd and Tremaine Rd pumping to Pressure Zone O3. (OAK) (Zone O3) |
| | | W23 | 1200mm WM on Burnhamthorpe Rd from the new Central Station to Regional Rd 25 (Bronte) (OAK) (Zone O3) |
| | | W24 | 600mm WM on Bronte Rd from Burnhamthorpe Rd to MP-5627. (OAK) (Zone O3) |
| | | W25 | 1200mm WM from the new Central Station via Tremaine Rd. Twinned part 1. (MIL) (Zone 250) |
| | | W26 | 1200mm WM from the new Central Station via Tremaine Rd. Twinned part 2. (MIL) (Zone 250) |
| 6 | Eligible for Screening | W30 | New pumping station at the existing Moore Reservoir site. (OAK) (Zone 224) |
| 7 | Schedule B | W35* | Burnhamthorpe ET at the existing site. (OAK) (Zone 224) *Potential to be exempt if constructed at the existing site |
| | | W36 | Burnhamthorpe East ET. (OAK) (Zone 224) |
| 8 | Schedule B | W74 | Existing Ashgrove Pumping Station expansion of 30 ML/d (HHGEO) (Zone 267) |
| 9 | Eligible for Screening | W81 | New pumping station at the existing Third Line Reservoir site. (MIL) (Zone G6L) |

*Note: for all IMP projects, the latest version of the MCEA process and the Environmental Act should be referenced at the time of the future studies.*

## 6.3 Implementation Commitments and Next Steps

During the next steps of project implementation, including future studies and detailed design, the following requirements will be considered:

- Continued engagement with Local municipalities, agencies, the public, and First Nations and Indigenous Communities where treaty rights may be impacted by projects.
- Completion of additional site-specific supporting investigations as required (e.g., source water protection, geotechnical, hydrogeological, topographic surveys, floodplain analysis, etc.).
- Consideration of potential impacts to and risks from natural hazards and wetlands (e.g., flooding, erosion, unstable soils/bedrock) to ensure that proposed works avoid or minimize impacts and do not negatively affect hazard or wetland functions, in accordance with conservation authority approval requirements.
- Development of preliminary design.
- Assessment of potential utility relocations, including consideration of potential impacts to natural hazards, wetlands, and other environmental features.
- Refinement of infrastructure locations and alignments.
- Review and confirmation of property requirements.
- Identification of preferred construction methodologies, including review and mitigation of potential construction-related impacts (e.g., traffic, noise and vibration, dust, dewatering requirements, service disruptions, etc.).
- Assessment of installation methods (e.g., trenchless vs. open cut) for water infrastructure near or crossing watercourses and valley lands.
- Fulfillment of all provincial, municipal, and conservation authority permits and approval requirements.
- Continued engagement with Local municipalities, the public, and First Nations and Indigenous Communities where treaty rights may be impacted by projects.

## 6.4 Monitoring and Adaptive Management

The IMP provides a long-range framework for infrastructure delivery that reflects the current understanding of existing and future servicing needs while also recognizing that servicing priorities will evolve over time. As growth progresses and new information becomes available, it is essential that assumptions supporting the plan are periodically reviewed. The Region will implement a monitoring approach to track key technical, regulatory, and planning considerations, ensuring that the timely and responsive delivery of the recommended infrastructure program remains efficient and aligned with evolving conditions and growth priorities.

The monitoring framework will enable refinement of the water infrastructure phasing and implementation plan over time. Monitoring will be carried out by Regional staff in consideration of the following:

- Technical thresholds, such as pressure or fire flow ranges, storage utilization, and supply capacity limits. Certain pressure zones, transmission corridors, and secondary plan areas may require more frequent monitoring based on their sensitivity to growth pressures or system capacity constraints. These areas will continue to be identified/refined and monitored as growth unfolds.
- The Region and the Local Municipalities recognize the importance of monitoring growth across Halton and will collaborate to continue implementation of an Enhanced Growth Monitoring Framework that supports the delivery of Regional infrastructure to support Local Municipal growth strategies, while still ensuring growth is managed effectively and sustainably across the Region.
- The Region will continue to coordinate with Local Municipalities regarding the timing and implementation of Regional infrastructure projects, particularly where works occur within municipal rights-of-way or in areas of intensified growth. This coordination may include ongoing communication related to the status and timing of growth-related capital projects to support alignment with municipal capital programs and planning initiatives.
- Completion of planning studies, Schedule B or C MCEA studies, and detailed design, which may refine scope and/or timing of projects.
- Monitoring will consider the status and duration of permitting and approval processes required under applicable legislation, including approvals from the MECP, Conservation Authorities (e.g., under O.Reg. 41/24), and other regulatory bodies. Early identification of permitting risks or extended review periods will help the Region adjust project timelines and sequencing.
- The Region will monitor the status of related projects and adjust phasing as needed to maintain service continuity, align timelines, and support coordinated infrastructure delivery.
- Status of funding sources and programs to assess financial readiness for project implementation.
- Internal and external resourcing to enable project delivery on schedule, particularly where multiple high-priority projects converge.
- The Region will continue to monitor updates to federal, provincial and local policies, legislation, and technical guidelines that may influence the planning, design, or delivery of water infrastructure. Where applicable, the Region will adapt implementation strategies to maintain compliance and minimize delays associated with new or evolving regulatory requirements.

The phasing, implementation and monitoring plan for the water system provides a framework to guide infrastructure delivery through to 2051. It balances technical requirements and growth priorities, while providing the flexibility needed to adapt to future uncertainties. This plan will continue to evolve through ongoing monitoring and coordination across planning, engineering, and financial functions.

# 7.0 Conclusion

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This volume of the IMP presents a comprehensive strategy for addressing the Region's long-term water servicing needs to 2051. This Water volume is part of a broader strategy that integrates water, wastewater, and transportation planning to ensure Halton's infrastructure remains resilient, adaptable, and sustainable. Grounded in technical assessments, population and employment forecasts, and updated design criteria and levels of service, the IMP Water volume identifies existing infrastructure constraints, evaluates system-wide and localized servicing concepts, and outlines a preferred servicing strategy to support anticipated growth and local priorities across Halton Region.

This volume documents a detailed analysis of the Region's existing lake-based and groundwater systems, supported by hydraulic modeling and infrastructure assessments for treatment plants, pumping stations, storage facilities, and transmission mains. A structured evaluation framework was applied to assess a range of servicing alternatives, leading to the selection of a preferred strategy that supports planned growth to 2051 while balancing system resiliency, operational flexibility, cost efficiency, and alignment with environmental planning requirements.

This volume supports Halton's growth priorities and increasing water treatment and demands through:

- Treatment plant expansion and overall transmission strategies that maintain levels of service while expanding capacity.
- Focus area servicing solutions designed to adjust to shifting population and growth areas, leveraging the existing infrastructure network.
- Balance of the groundwater and lake-based systems while monitoring all sources of water to ensure sustainable use.

The capital program associated with the preferred servicing strategy identifies key infrastructure investments needed to meet long-term demands and is supported by an implementation approach based on servicing dependencies, growth forecasts, and the timing of required approvals and subsequent studies. The plan also identifies MCEA requirements for proposed projects and outlines next steps related to monitoring, adaptive management, and future project-specific studies including further consultation and engagement with Indigenous communities and interested parties.

The strategy presented in this volume provides the foundation for delivering safe, sustainable, and coordinated water services that supports local growth priorities and planned growth in Halton and community well-being. The outcomes of this volume will guide future water infrastructure planning and investment decisions in the Region.

This document is the third of six (6) volumes, with the previous volume focusing on planning foundations and subsequent volumes focusing on wastewater, transportation, and consultation.