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# Water and Wastewater Servicing AECOM

April 7, 2009

Phase 3  
Sustainable Halton Report 3.13





## 1.0 Introduction

Halton Region is developing a plan for building sustainable and healthy communities - Sustainable Halton.

Over the next 25 years, the Greater Golden Horseshoe is expected to grow significantly. By 2031, the Province of Ontario forecasts that Halton Region will have a population of approximately 780,000 people and 390,000 jobs.

The Sustainable Halton plan will help the Region meet the provincial requirements of the Greenbelt Plan and the Places to Grow Plan, and will help develop Halton's next Official Plan.

*Purpose of Report* The purpose of this report is to present the strategic level assessment undertaken of the water and wastewater infrastructure required of each of the three Concepts prepared for urban intensification and new urban land required for the period 2021 to 2031. The assessed Concepts are:

- Concept 1 – “Milton Centred” – all of the new mixed-use/residential development area is located in Milton.
- Concept 2 – “Milton and Georgetown Growth to 20,000 People” – a population of approximately 20,000 people is allocated around Georgetown at the south-west limits, with the remaining mixed-use/residential lands in Milton.
- Concept 3 – “Milton and Georgetown Growth to 40,000 People” – a population of 40,000 people is accommodated around Georgetown at the south-west limits with the remaining mixed-use/residential land in Milton.

The same employment lands (1100 ha) were used for all three Concepts. The employment lands were focused around the Highway 401 corridor in Milton and Halton Hills, Highway 407 in Milton, around the CN intermodal at Tremaine Road and north of James Snow Parkway in north Milton.

## 2.0 Analysis Methodology

*Methodology* The 2031 population and employment projections for each Concept were provided by the Region's Long Range Planning Section at the traffic survey zone level. The traffic survey zone data for the three Concepts were analysed based on Halton lake-based water pressure zones and wastewater drainage areas.

Review of the greenfield growth areas was undertaken with respect to existing pressure zones and drainage areas and to determine the need for any new pressure zones or drainage areas. A high level review of the impact to capacity for each pressure zone and drainage area was undertaken.

The approach for developing the servicing strategies was based on leveraging the approved 2021 lake-based program. For each Growth Concept, the level of new infrastructure and ability to extend from the existing and currently proposed infrastructure was determined. Concept 2 Preliminary Water and Wastewater Servicing Strategy Maps are attached as an example of the methodology used for each Concept.

The calculated flow and demand projections for each traffic survey zone were loaded into the Region's extended skeletonized hydraulic models to provide preliminary sizing of new infrastructure and to confirm impact on existing and currently proposed infrastructure. Additional constraints and deficiencies in the existing and currently proposed infrastructure due to the new growth were noted.

A total infrastructure program was developed for key greenfield growth areas in Milton and Halton Hills as well as estimated common infrastructure requirements for intensification and common capacity upgrades for treatment, pumping and storage. The total program was developed for each Growth Concept.

Order of magnitude cost estimates were developed for each Growth Concept.

*Assumptions* The analysis focused on Halton only lake-based solutions. Further alternatives including interregional solutions will be reviewed through the Water and Wastewater Master Plan Class Environmental Assessment process.

The servicing strategies were developed for the 2031 built out scenario only.

The analysis leveraged the lake-based servicing strategy for growth to 2021 which was developed and approved through the previous Water and Wastewater Master Plan process. The intention is to develop a strategy at this time based on minimizing the need for new infrastructure.

The approach at this time, provides a desktop level review of the infrastructure requirements. It does not provide a detailed, site specific evaluation of projects to determine the full scope and construction requirements. However, a cursory review of costing implications for the program has been considered.

At this stage of analysis, the previous basis for costing and design criteria has been utilized. It is recognized that the criteria will be further reviewed under the subsequent steps of the Sustainable Halton and Water and Wastewater Master Plan process.

It is recognized that these conceptual plans represented a high level analysis for the costing evaluation process. A further more exhaustive review of alternative servicing strategies will be required of the Preferred Growth Option and undertaken during the Water and Wastewater Master Plan Class Environmental Assessment process.

The groundwater and stream-based systems in Milton, Georgetown and Acton will remain in-service.

### 3.0 Assessment of Growth Concepts

*Assessment of Concept 1* Under Concept 1, all growth areas are generally located in Milton. For water servicing, this results in all growth areas within pressure Zones 4 or 5. For wastewater servicing, all growth area flows would be ultimately conveyed to the Mid-Halton Wastewater Treatment Plant.

#### Water

Through leveraging the approved 2021 program for Concept 1, the growth areas can be serviced with extensions from the currently proposed trunk feeder mains. It is anticipated that similar grid networks would be established to provide adequate pressures and flows in the future service areas. The Zone 4 areas would be extended from the Zone 4 "2<sup>nd</sup> spine" feeder main and Milton Phase 3 feeder mains. The Zone 5 areas would require extensions through Business Park 2 as well as supply from a new Zone 5 pumping station located at the Zone 4 reservoir.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment, pumping and storage capacity required to meet the additional water demands from 2021 to 2031. This capacity would be provided at the Burloak water purification plant, upgrades at existing Oakville pumping stations as well as the new Zone 4 pumping station in North Park, and proposed Zone 4 and Zone 5 reservoirs. Based on the preliminary modelling, the strategic oversizing of the 2<sup>nd</sup> spine feeder main is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements. It should be noted that under Concept 1, intensification is proposed in the existing groundwater service areas of Milton and Georgetown. It is anticipated that intensification in the groundwater based areas on the existing systems is not a sustainable solution.

Based on leveraging the current 2021 water servicing program, Concept 1 has a viable lake-based water servicing solution.

### Wastewater

While there is some opportunity to leverage the approved 2021 program for Concept 1, it is anticipated that new trunk infrastructure will be required within the new growth areas. It is anticipated that the new trunk and sub-trunk sewers would ultimately convey flows to the currently proposed Milton-to-Third Line trunk sewer which will convey flows to the Mid-Halton Wastewater Treatment Plant. It is anticipated that much of the growth areas will be capable of conveying flows to the trunk sewers by gravity. However, based on the natural features and topography in the service area, there will be some trunk sewage pumping stations required to convey flows southerly and westerly to the trunk sewer on the west side of Sixteen Mile Creek and to the Third Line trunk sewer.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment capacity required to meet the additional wastewater flows from 2021 to 2031. This capacity would be provided at the Mid-Halton Wastewater Treatment Plant. Based on the preliminary modelling, the strategic oversizing of the Milton-to-Third Line trunk sewer is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements. It should be noted that under Concept 1, intensification is proposed in the existing stream-based service areas of Milton and Georgetown. It is anticipated that intensification in the stream-based areas on the existing systems is not a sustainable solution. Diversion of the Milton Wastewater Treatment Plant flows will still be required.

Based on leveraging the current 2021 wastewater servicing program where available, Concept 1 has a viable lake-based wastewater servicing solution.

*Assessment of Concept 2* Under Concept 2, the growth areas are located in Milton as well as the south-west limit of Georgetown. For water servicing, this results in growth areas within pressure Zones 4 and 5 as well as the need for a new lake-based pressure Zone 6. For wastewater servicing, all growth area flows would be ultimately conveyed to the Mid-Halton Wastewater Treatment Plant.

### Water

Similar to Concept 1, the growth areas can be serviced with extensions from the currently proposed trunk feeder mains which would leverage the approved 2021 program. The feeder main extensions in Milton would be less extensive for Concept 2 than for Concept 1. The Zone 4 areas would be extended from the Zone 4 "2<sup>nd</sup> spine" feeder main and Milton Phase 3 feeder mains. The Zone 5 areas would require extensions through Business Park 2 as well as supply from a new Zone 5 pumping station located at the Zone 4 reservoir. It is anticipated that a new Zone 6 pumping station would be located at the proposed Zone 4 reservoir which would provide the supply point for a new Zone 6 feeder main north to Georgetown. Servicing in Georgetown would also require new lake-based Zone 6 storage.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment, pumping and storage capacity required to meet the additional water demands from 2021 to 2031. This capacity would be provided at the Burloak water purification plant, upgrades at existing Oakville pumping stations as well as the new Zone 4 pumping station in North Park, and proposed Zone 4 and Zone 5 reservoirs. Based on the preliminary modelling, the strategic oversizing of the 2<sup>nd</sup> spine feeder main is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements.

As noted previously, intensification is proposed in the existing groundwater service areas of Milton and Georgetown. It is anticipated that intensification in the groundwater based areas



on the existing systems is not a sustainable solution. Concept 2 provides lake-based servicing to the Georgetown area which would provide system security and reliability to the Georgetown water system as well as flexibility to determine the required lake-based service area.

Based on leveraging the current 2021 water servicing program, Concept 2 has a viable lake-based water servicing solution.

### Wastewater

While there is some opportunity to leverage the approved 2021 program for Concept 2, it is anticipated that new trunk infrastructure will be required within the new growth areas. It is anticipated that the new trunk and sub-trunk sewers would ultimately convey flows to the currently proposed Milton-to-Third Line trunk sewer which will convey flows to the Mid-Halton Wastewater Treatment Plant. The Georgetown wastewater servicing would be conveyed by a new trunk sewer which would be connected and integrated with the proposed new trunk infrastructure in east Milton. It is anticipated that much of the growth areas will be capable of conveying flows to the trunk sewers by gravity. However, based on the natural features and topography in the service area in Milton, there will be some trunk sewage pumping stations required to convey flows southerly and westerly to the trunk sewer on the west side of Sixteen Mile Creek and to the Third Line trunk sewer.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment capacity required to meet the additional wastewater flows from 2021 to 2031. This capacity would be provided at the Mid-Halton Wastewater Treatment Plant. Based on the preliminary modelling, the strategic oversizing of the Milton-to-Third Line trunk sewer is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements. It should be noted that under Concept 2, intensification is proposed in the existing stream-based service areas of Milton and Georgetown. It is anticipated that

intensification in the stream-based areas on the existing systems is not a sustainable solution. Diversion of the Milton Wastewater Treatment Plant flows will still be required.

Based on leveraging the current 2021 wastewater servicing program where available, Concept 2 has a viable lake-based wastewater servicing solution.

*Assessment of Concept 3* The servicing strategies developed for Concept 3 are similar to the strategies for Concept 2. Under Concept 3, the growth areas are located in Milton as well as the south-west limit of Georgetown. For water servicing, this results in growth areas within pressure Zones 4 and 5 as well as the need for a new lake-based pressure Zone 6. For wastewater servicing, all growth area flows would be ultimately conveyed to the Mid-Halton Wastewater Treatment Plant.

### Water

The water strategy for Concept 3 is similar to Concept 2. The principal difference is slightly less infrastructure in the Milton service area and slightly more capacity for the Zone 6 infrastructure to service Georgetown.

The growth areas can be serviced with extensions from the currently proposed trunk feeder mains which would leverage the approved 2021 program. The feeder main extensions in Milton would be less extensive for Concept 3 than for Concepts 1 and 2. The Zone 4 areas would be extended from the Zone 4 "2<sup>nd</sup> spine" feeder main and Milton Phase 3 feeder mains. The Zone 5 areas would require extensions through Business Park 2 as well as supply from a new Zone 5 pumping station located at the Zone 4 reservoir. It is anticipated that a new Zone 6 pumping station would be located at the proposed Zone 4 reservoir which would provide the supply point for a new Zone 6 feeder main north to Georgetown. Servicing in Georgetown would also require new lake-based Zone 6 storage.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment, pumping and storage capacity required to meet the additional water demands from 2021 to 2031. This capacity would be provided at the Burloak water purification plant, upgrades at existing Oakville pumping stations as well as the new Zone 4 pumping station in North Park, and proposed Zone 4 and Zone 5 reservoirs. Based on the preliminary modelling, the strategic oversizing of the 2<sup>nd</sup> spine feeder main is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the

proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements.

As noted previously, intensification is proposed in the existing groundwater service areas of Milton and Georgetown. It is anticipated that intensification in the groundwater based areas on the existing systems is not a sustainable solution. Concept 3 provides lake-based servicing to the Georgetown area which would provide system security and reliability to the Georgetown water system as well as flexibility to determine the required lake-based service area.

Based on leveraging the current 2021 water servicing program, Concept 3 has a viable lake-based water servicing solution.

### Wastewater

The wastewater strategy for Concept 3 is similar to Concept 2. The principal difference is slightly less infrastructure in the Milton service area and slightly more capacity for the trunk infrastructure to service Georgetown.

While there is some opportunity to leverage the approved 2021 program for Concept 3, it is anticipated that new trunk infrastructure will be required within the new growth areas. It is anticipated that the new trunk and sub-trunk sewers would ultimately convey flows to the currently proposed Milton-to-Third Line trunk sewer which will convey flows to the Mid-Halton Wastewater Treatment Plant. The Georgetown wastewater servicing would be conveyed by a new trunk sewer which would be connected and integrated with the proposed new trunk infrastructure in east Milton. It is anticipated that much of the growth areas will be capable of conveying flows to the trunk sewers by gravity. However, based on the natural features and topography in the service area in Milton, there will be some trunk sewage pumping stations required to convey flows southerly and westerly to the trunk sewer on the west side of Sixteen Mile Creek and to the Third Line trunk sewer.

Common to all Concepts, in addition to the new growth area infrastructure, there would be additional treatment capacity required to meet the additional wastewater flows from 2021 to

2031. This capacity would be provided at the Mid-Halton Wastewater Treatment Plant. Based on the preliminary modelling, the strategic oversizing of the Milton-to-Third Line trunk sewer is capable of servicing the 2031 flows.

Also common to all Concepts, it is anticipated that additional local servicing improvements would be required to support the proposed intensification. Additional full pipe modelling will be required to confirm the extents of the additional system requirements. It should be noted that under Concept 3, intensification is proposed in the existing stream-based service areas of Milton and Georgetown. It is anticipated that intensification in the stream-based areas on the existing systems is not a sustainable solution. Diversion of the Milton Wastewater Treatment Plant flows will still be required.

Based on leveraging the current 2021 wastewater servicing program where available, Concept 3 has a viable lake-based wastewater servicing solution.

*Summary of  
Technical  
Analysis*

The following conclusions can be made from the technical analysis:

- For all Growth Concepts, the following common infrastructure are required:
  - o Additional water treatment plant capacity
  - o Additional water pumping and storage capacity
  - o Additional wastewater treatment capacity
  - o New trunk feeder mains in the Zone 4 and Zone 5 water service areas
  - o New trunk sewer infrastructure in the Milton east and south service areas
- For Concepts 2 and 3, the following infrastructure is required:
  - o New Zone 6 water feeder main, pumping and storage capacity
  - o New Georgetown trunk sewer infrastructure conveying flows to the new Milton east service area
- All Growth Concepts have viable Halton lake-based servicing strategies

## 4.0 Costing Analysis

An order of magnitude cost estimate of the Region’s Capital Water and Wastewater Projects program for each Concept was developed for the period 2021 to 2031. These costs are presented for comparison purposes among each Concept and should not be taken as “absolutes”.

The order of magnitude cost estimates are based on the estimated infrastructure requirements for servicing the growth areas, servicing intensification, and includes common elements such as treatment, pumping and storage capacity costs.

It is important to note these costs are based on best-estimated strategies that have not been assessed under the Class Environmental Assessment process. As such, upon the undertaking of the Water and Wastewater Master Plan for the Preferred Growth Option, a refinement and detailed evaluation of a full spectrum of servicing options will be completed.

Table 1 – Concept Costs

|  | Concept 1<br>(Milton Only) | Concept 2 *<br>(20k HH) | Concept 3 *<br>(40k HH) |
|--|----------------------------|-------------------------|-------------------------|
| Water Program<br>(\$ million)                      | \$384M                     | \$426M                  | \$431M                  |
| Wastewater Program<br>(\$ million)                 | \$232M                     | \$260M                  | \$266M                  |
| Total Program Cost<br>(\$ million)                 | \$616M                     | \$686M                  | \$697M                  |
| Cost per Pop/Empl<br>Growth 2021-2031<br>(approx.) | \$3,400 – \$3,600          | \$3,800 – \$4,000       | \$3,900 - \$4,100       |

\* It should be noted that the option of providing servicing from Peel is currently being reviewed. Depending on the viability of servicing from Peel, this option would be integrated into the servicing strategy and could moderate costs.

From review of the overall program costs for each Growth Concept, it is

noted that Concept 1 provides the lowest cost with Concepts 2 and 3 having increases in the range of 10% to 15% over Concept 1. The reasons for only marginal cost increases between the three Concepts can be attributed to:

- A large percentage of costs are allocated to treatment, pumping and storage capacity and are common to all Concepts
- Concepts 2 and 3 require new Zone 6 water infrastructure
- Concepts 2 and 3 require new trunk sewer infrastructure to Georgetown
- There is only a marginal capacity increase and a corresponding cost increase from Concepts 2 to Concept 3

This cost analysis provides a preliminary cost comparison between the three Growth Concepts. A detailed fiscal impact analysis will be carried out on the Preferred Growth Option to further determine the impact of costs. It should also be noted that the majority of the capital costs identified for the water and wastewater servicing program will be recovered from Development Charges.



## 5.0 Summary of Results



























New water and wastewater servicing strategies to 2031 can be developed for each Growth Concept which can leverage the currently approved servicing strategies to 2021.

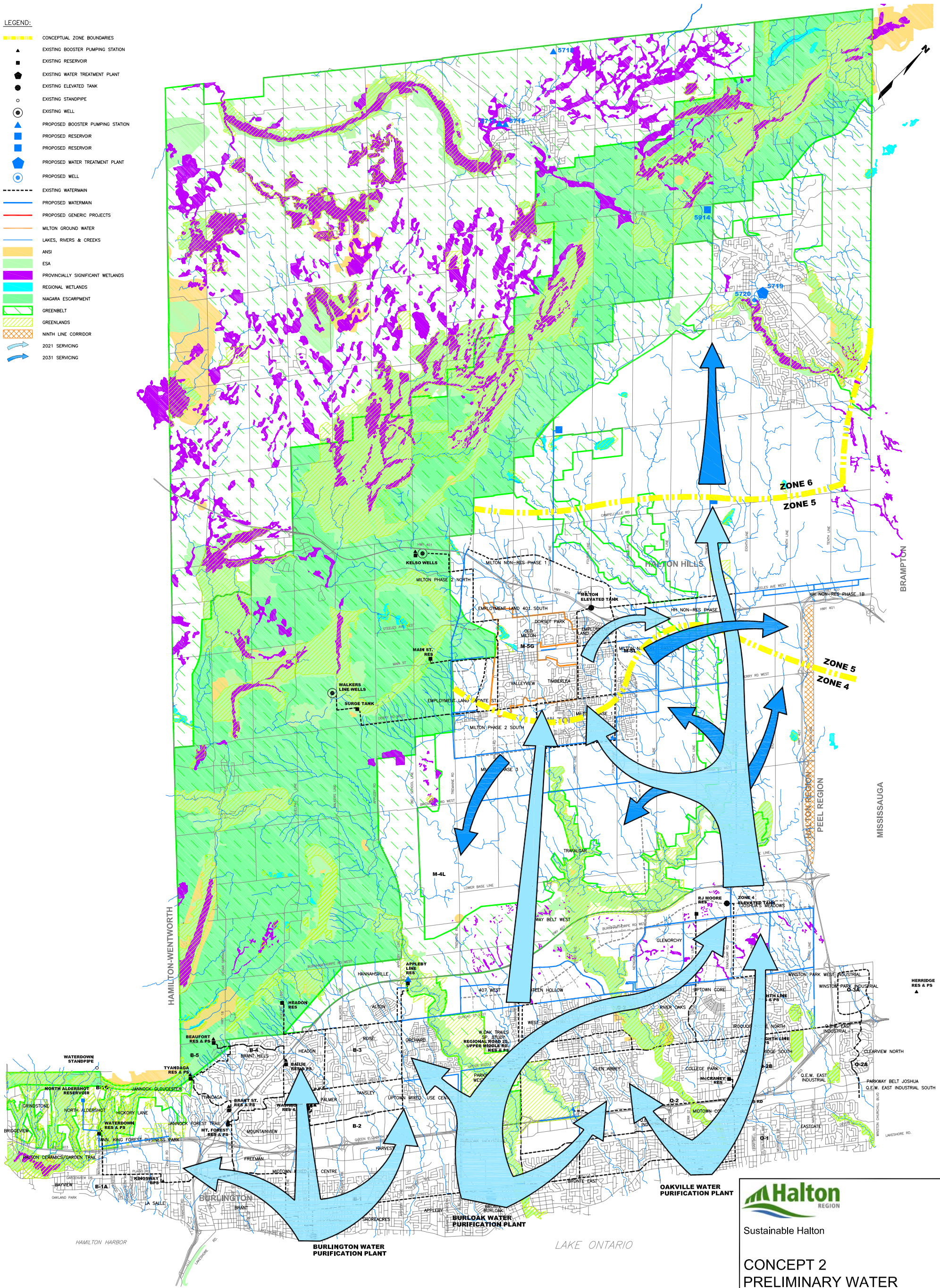
Once a Preferred Growth Option has been established, a detailed evaluation of a full spectrum of servicing options will be completed under the Water and Wastewater Master Plan context. This evaluation will refine the servicing strategies, allow for a more detailed look at the viability of integrating servicing from Peel, review the ability to maximize available capacity in existing infrastructure, review the impact of phasing, and develop an implementation program.

All three Growth Concepts have viable and achievable Halton lake-based water and wastewater servicing strategies.



**LEGEND:**

-  CONCEPTUAL ZONE BOUNDARIES
-  EXISTING BOOSTER PUMPING STATION
-  EXISTING RESERVOIR
-  EXISTING WATER TREATMENT PLANT
-  EXISTING ELEVATED TANK
-  EXISTING STANDPIPE
-  EXISTING WELL
-  PROPOSED BOOSTER PUMPING STATION
-  PROPOSED RESERVOIR
-  PROPOSED WATER TREATMENT PLANT
-  PROPOSED WELL
-  EXISTING WATERMAIN
-  PROPOSED WATERMAIN
-  PROPOSED GENERIC PROJECTS
-  MILTON GROUND WATER
-  LAKES, RIVERS & CREEKS
-  ANSI
-  ESA
-  PROVINCIALLY SIGNIFICANT WETLANDS
-  REGIONAL WETLANDS
-  NIAGARA ESCARPMENT
-  GREENBELT
-  GREENLANDS
-  NINTH LINE CORRIDOR
-  2021 SERVICING
-  2031 SERVICING



Sustainable Halton

**CONCEPT 2  
PRELIMINARY WATER  
STRATEGY**

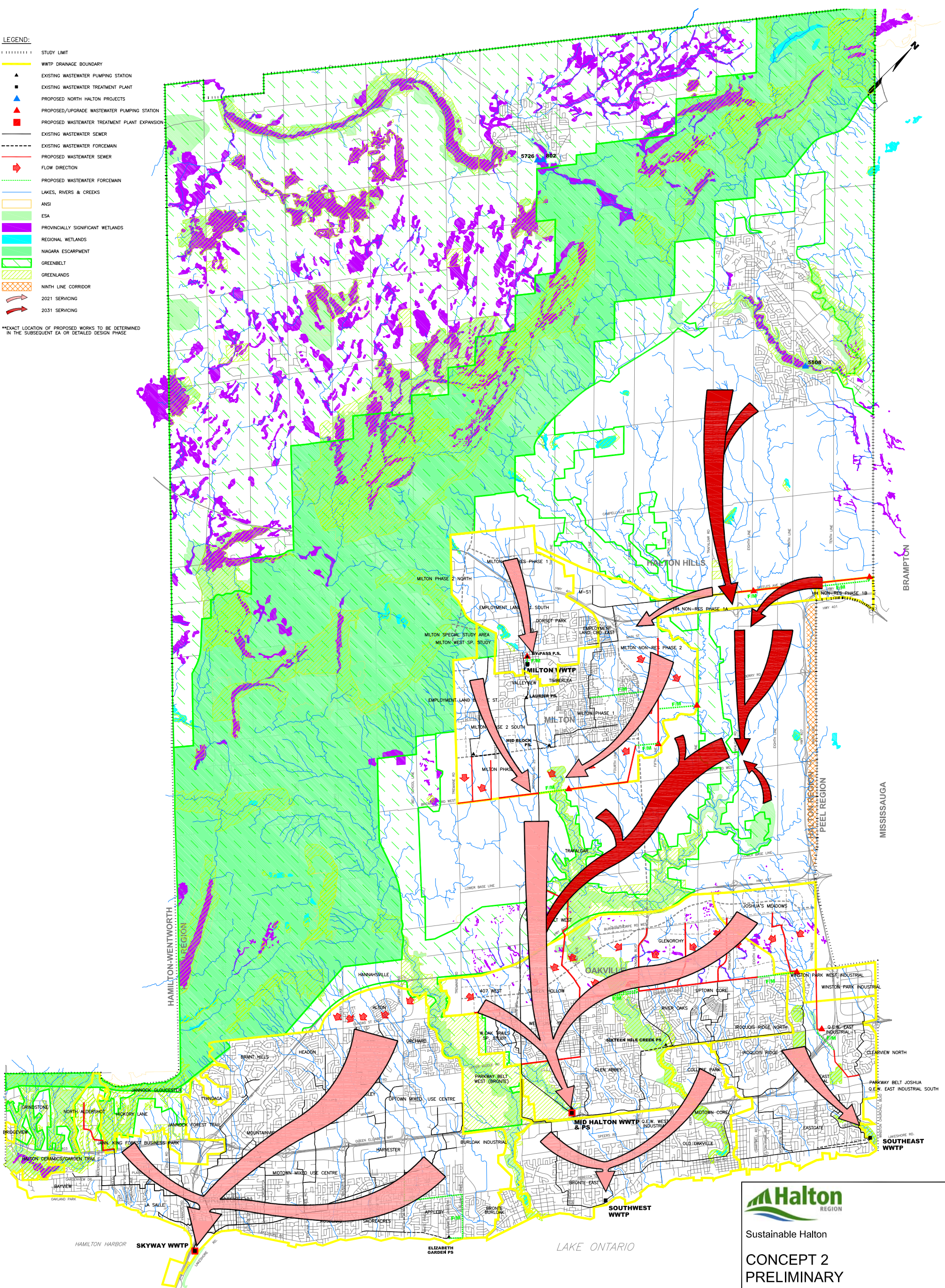




**LEGEND:**

- STUDY LIMIT
- WWTPL DRAINAGE BOUNDARY
- ▲ EXISTING WASTEWATER PUMPING STATION
- EXISTING WASTEWATER TREATMENT PLANT
- ▲ PROPOSED NORTH HALTON PROJECTS
- ▲ PROPOSED/UPGRADE WASTEWATER PUMPING STATION
- PROPOSED WASTEWATER TREATMENT PLANT EXPANSION
- EXISTING WASTEWATER SEWER
- EXISTING WASTEWATER FORCEMAIN
- PROPOSED WASTEWATER SEWER
- PROPOSED WASTEWATER FORCEMAIN
- LAKES, RIVERS & CREEKS
- ANSI
- PROVINCIAL SIGNIFICANT WETLANDS
- REGIONAL WETLANDS
- NIAGARA ESCARPMENT
- GREENBELT
- GREENLANDS
- NINTH LINE CORRIDOR
- 2021 SERVICING
- 2031 SERVICING

\*\*EXACT LOCATION OF PROPOSED WORKS TO BE DETERMINED IN THE SUBSEQUENT EA OR DETAILED DESIGN PHASE



**Halton**  
REGION

Sustainable Halton

**CONCEPT 2  
PRELIMINARY  
WASTEWATER  
STRATEGY**

**KMK**  
Consultants  
Limited