

**City of Brampton**

## **Infrastructure Capacity Review of Utilities and Services within the City of Brampton**

---

Prepared by:

**UMA Engineering Ltd. doing business as AECOM**

220 Advance Boulevard, Brampton, ON, Canada L6T 4J5  
T 905.459.4780 F 905.459.7869 [www.aecom.com](http://www.aecom.com)

Date: June 17, 2009

# Statement of Qualifications and Limitations

2008 UMA Engineering Ltd. ALL RIGHTS RESERVED THIS DOCUMENT IS PROTECTED BY COPYRIGHT AND TRADE SECRET LAW AND MAY NOT BE REPRODUCED IN ANY MANNER, OR FOR ANY PURPOSE, EXCEPT BY WRITTEN PERMISSION OF UMA Engineering Ltd."

The attached Report (the "Report") has been prepared by UMA Engineering Ltd. doing business as AECOM ("AECOM") for the benefit of the City of Brampton ("Client") in accordance with the agreement between AECOM and Client (the "Agreement").

The information, data, recommendations and conclusions contained in the Report:

- are subject to the budgetary, time and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represent AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to AECOM which has not been independently verified
- have not been updated
- must be read as a whole and sections thereof should not be read out of such context
- were prepared for the specific purposes described in the Report and the Agreement and must not be used for any other purpose whatsoever

Unless expressly stated to the contrary in the Report or the Agreement, AECOM:

- shall not be responsible for any events or circumstances that may have occurred since the date on which the Report was prepared or for any inaccuracies contained in information that was provided to AECOM
- makes no guarantees or warranties whatsoever, whether express or implied, with respect to the Report or any part thereof, other than that the Report represents AECOM's professional judgement as described above
- shall not be deemed to have represented that the Report or any part thereof is exhaustive or applicable to any specific use other than that described in the Report and the Agreement

Except as required by law or otherwise agreed by AECOM and Client, the Report:

- is to be treated as confidential
- may not be used or relied upon by third parties

Except as described above, AECOM denies any liability in respect of the Report or parts thereof and shall not be responsible for any damages arising from use of the Report or parts thereof.

This Disclaimer is attached to and forms part of the Report.

June 17, 2009

Project Number: 4020-012-00

Daniella Grosvenor, MCIP, RPP  
Growth Management Policy Planner III  
City of Brampton  
2 Wellington Street West  
Brampton, ON L6Y 4R2

Dear Daniella:

**Re: Infrastructure Capacity Review of Utilities and Hard Services**

We are pleased to submit, herewith, our final report titled "Infrastructure Capacity Review of Utilities and Hard Services within the City of Brampton" in accordance with our original proposal dated May 9, 2008.

The Report is presented in seven (7) sections as follows:

- Section 1 – Introduction and Background
- Section 2 – Problem/Opportunity Statement
- Section 3 – Planning Forecasts
- Section 4 – Design Criteria
- Section 5 – Review of Utilities
- Section 6 – Review of Hard Services
- Section 7 – Suggested Policy Directions

The report has been prepared in two (2) volumes as follows:

- Volume 1 – Text
- Volume 2 – Appendices

During the course of preparing this report, the Project Team coordinated with various utility vendors such as Hydro One Networks Inc., Hydro One Brampton, Enbridge Gas, Bell Canada and Rogers Cable and received information from planning and engineering staff at the City of Brampton. Their assistance is gratefully acknowledged.

Sincerely,

**AECOM**



Chris Hamel, P.Eng.  
Regional Manager, Infrastructure Planning  
Chris.Hamel@aecom.com

## Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	LB	November 14, 2008	First Draft
2	SM/JG	Jan 14 2009 March 30, 2009	Tracked changes – includes comments from S. Makki and K. Stolch (only on Exec Summary). Comments from Farhad Aziz (SWM) provided to UMA directly. Includes Adrian Smith revisions.
3	LB	April 8, 2009	Revised City's changes prior to issuing to utilities for final draft review.
4	LB	May 29, 2009	Incorporated final comments received from utility stakeholders.
5	LB	June 17, 2009	Incorporated revisions received from the City.



## Signature Page

Report Prepared By:	Report Reviewed By:
Laura Borowiec, B.A.Sc., E.I.T. Municipal Engineer-In-Training	Chris Hamel, P.Eng. Regional Manager, Infrastructure Planning

Report Prepared By:	Report Reviewed By:
Janelle Wepler, P.Eng. Water Resources Engineer	Steve Hollingworth, P.Eng. Senior Water Resources Engineer

# Executive Summary

## Background

*The Infrastructure Capacity Review of Utilities and Hard Services* forms part of the overall Growth Plan Conformity Exercise for the City of Brampton. This study represents one element of Brampton's overall response to the Provincial Growth Plan. This study is intended to provide the necessary background to develop an Infrastructure Strategy for utilities (hydro, gas, cable, and telephone) and hard services (water, wastewater, and stormwater) within the City of Brampton while meeting the objectives of the Growth Plan.

The study area encompasses the area bounded by the municipal limits of the City of Brampton. The study area is bordered by Highway 50 (Vaughan) to the east, Winston Churchill Boulevard (Halton Hills) to the West, Mayfield Road (Caledon) to the north (including Snelgrove which is slightly north of Mayfield Road) and the Hydro Corridor (Mississauga) to the south.

## Planning Forecasts

As part of the overall Growth Plan Conformity Program, the City of Brampton has reviewed and updated its population and employment projections based on interim planning data developed by Hemson Consulting in June 2008 for the City of Brampton. This data will be finalized by Fall 2009, simultaneously with the Region of Peel's forecasts.

The Infrastructure Capacity Review Study has utilized the City-wide planning projections for population and employment which have been geographically allocated by small geographic units (SGUs), a spatial allocation in greater detail than traffic survey zones (TSZs). Planning projections were provided by the City for every year between 2006 and 2031 for each separate SGU covering the entire study area.

These planning forecasts address greenfield growth out to the municipal boundary of the study area as well as provide detailed information on intensification within the current urban built boundary.

**Table 1. Interim Population Forecasts**

	2006	2011	2016	2021	2026	2031
Brampton <sup>1</sup>	451,740	534,010	599,340	659,390	713,870	758,280
Peel <sup>2</sup>		1,320,000	1,405,000	1,490,000	1,565,000	1,640,000

Notes: <sup>1</sup> – City of Brampton, *Interim Population Forecasts, June 2008*. Numbers are still interim and final numbers are pending.

<sup>2</sup> – *Places To Grow, Growth Plan for the Greater Golden Horseshoe, 2006*; 2016 and 2026 values were interpolated.

Based on the preliminary allocation of this growth, areas anticipated to experience the greatest increases in population include Mount Pleasant, Bram West, Northwest Brampton, Credit Valley, and Highway 427 Industrial Secondary Plan Areas, representing a combined growth of close to 194,000 persons between 2006 and 2031.

**Table 2. Interim Employment Forecasts**

	2006	2011	2016	2021	2026	2031
Brampton <sup>1</sup>	154,870	203,070	238,980	273,810	295,260	320,020
Peel <sup>2</sup>	530,000	730,000	775,000	820,000	845,000	870,000

Notes: <sup>1</sup> – City of Brampton, Interim Employment Forecasts, June 2008. Numbers are still interim and final numbers are pending.

<sup>2</sup> – Places To Grow, Growth Plan for the Greater Golden Horseshoe, 2006; 2016 and 2026 values were interpolated.

Based on the preliminary allocation of this employment growth, areas anticipated to experience the greatest increases in employment growth include Bram West, Northwest Brampton, Highway 427 Industrial, and the Queen Street Corridor, representing a combined growth of close to 83,700 jobs between 2006 and 2031.

The most recent planning forecasts for the City of Brampton slightly exceed recent projections used for Master Planning studies. However, the magnitude and location is generally in keeping with previous data and should not have significant impact on overall servicing strategies. The more detailed intensification information has led to specific upgrade and coordination requirements.

### **Downtown Brampton and Queen Street Corridor**

A key area in the intensification program for Brampton is the downtown core Urban Growth Centre (UGC). The Provincial Growth Plan identified the City of Brampton UGC as the third largest in the GTA, covering approximately 219 hectares and six municipal wards. The boundary of the UGC generally follows the Queen Street Corridor between McLaughlin Road in the west and Highway 410 in the east and extends along Main Street as far north as Voddin Street. Development within the Brampton UGC has been established at a density target of 200 residents and jobs per hectare by 2031.

## **HYDRO**

### Review of Hydro Infrastructure

Coordination has been undertaken with staff from Hydro One Brampton Networks Inc. under this study to review the existing network and future infrastructure planning. The anticipated population and employment growth in the Region is estimated to require approximately 500 MW (megawatts) of electricity. The existing electrical transmission infrastructure is close to reaching capacity and is forecast to be beyond capacity by 2012.

Typically, provision for new hydro infrastructure is provided as new developments occur. Extension of hydro services typically requires review of key transmission lines and transformer stations. Hydro One Networks Inc. has confirmed the need to construct new high voltage transmission lines which are nearing capacity and is capable of meeting these ongoing growth needs. However, Hydro One Networks Inc. has indicated that linear corridors will be required to minimize construction costs.

In response to the need for hydro transmission corridors, the City of Brampton has committed to integrating provision of sufficient width for a new hydro transmission corridor for overhead transmission lines as part of the

Environmental Assessment (EA) study for Bram West Parkway/North-South Transportation Corridor. This EA study is expected to commence in 2009, following the completion of the City's Transportation and Transit Master Plan update and the release of the Halton Peel Boundary Area Transportation Study. This new hydro corridor will be integrated with all development plans affecting the combined use of the corridor for a road and transmission lines. However, the City of Brampton has requested that the hydro transmission corridor be limited to accommodating freestanding poles within an 8 to 10 metre width of the combined road and hydro road right-of-way, instead of the traditional lattice towers. A typical 2-circuit or 4-circuit lattice tower design requires a dedicated greenfield right-of-way of approximately 45 m in width. Hydro One Networks Inc. is sensitive to the concerns of the City. However, there are technical and safety challenges with using a corridor of such narrow width. Hydro One and other users of a joint corridor will explore economic measures to reduce the total width of the corridor.

Hydro One's long term infrastructure planning is not typically completed beyond a 15 year planning horizon. Key elements to be coordinated with Hydro One Networks Inc. to meet the long term growth plan will be securing land for future expansion of transmission lines and new additional transformer station locations with relation to rights of way, easements and encroachments.

#### Suggested Policy Directions for Hydro Infrastructure

The preliminary review indicates that the existing transformer stations (TS) and all available dual element spot network (DESN), including existing and already approved for expansion, may cover power supply to the City of Brampton up to 2022, when it is expected that peak loads may reach 1000 MW.

Based on the coordination undertaken to date under this study with Hydro One Brampton on the location of the anticipated growth, the following is suggested:

- Explore potential TS studies in the following areas: (see Figure 9):
  - Transmission Utility Corridor: Kennedy Road/ Highway 407 area
  - Transmission Utility Corridor: Airport Road/Highway 407 area
  - Transmission Utility Corridor: Heritage Road/ Highway 407 area
  - North West sector of the City: Mayfield Road/Wanless Drive and Chinguacousy Road/McLaughlin Road area
  - North East sector of the City: Mayfield Road/Countryside Drive and Airport Road/ Goreway Drive area
  - Expansion of the existing 44kV yard at Goreway TS
  - Expansion of the existing 44kV yard at Bramalea TS
- Construct new transformer stations to provide capacity to meet post 2022 needs. Potential sites for evaluation will depend on load growth patterns resulting from population and employment growth within the City.
- Development in the Downtown Brampton and Queen Street Corridor will require extensive work in replacing, relocating and installing new underground hydro infrastructure
- Consider new transformer station in the vicinity of Kennedy Road and the utility corridor or highway 407 to support development in the Downtown Brampton and Queen Street Corridor

- Carry out a detailed integrated study for the underground infrastructure supporting development of the Downtown Brampton and Queen Street Corridor, including determining impact to existing, interim and ultimate road cross-sections and road allowances
- Formalize coordination process between Hydro One and City to better integrate long term planning requirements

- 

## **NATURAL GAS**

### Review of Natural Gas Infrastructure

Coordination has been undertaken with staff from Enbridge (Carmelo Tancioco provided input into Enbridge's natural gas distribution network in a meeting and Joe Marozzo provided GIS layers of the gas distribution system by e-mail). A review of the existing network and future results infrastructure planning was completed, and found that the natural gas infrastructure within the City is extensive and consists of low, intermediate, high, and extra high pressure gas mains, including a 6 km spine through the centre of the City.

Typically, provision for new natural gas infrastructure is provided as new developments occur. Extension of natural gas services has some flexibility as extensions can typically be tapped from trunk gas infrastructure. As such, Enbridge is capable of meeting these ongoing growth needs. However, natural gas services provided by Enbridge are planned on a 5 to 10 year program. As such, the long term program is not available at this time.

### Suggested Policy Directions for Natural Gas Infrastructure

No constraints or issues were flagged for the natural gas system servicing Brampton's planned growth. Enbridge confirmed that sufficient capacity is in place to meet future needs including those within the Main Central Area. Based on the coordination undertaken to date under this study with Enbridge, the following is suggested:

- Carry out a detailed integrated study for the underground infrastructure supporting development of the Downtown Brampton and Queen Street Corridor, including determining impact to existing, interim and ultimate road cross-sections and road allowances
- Formalize coordination process between Enbridge and City to better integrate long term planning requirements
- Facilitate extensions of trunk gas mains on significant road allowances as required

## **TELECOMMUNICATION**

### Review of Telecommunication Infrastructure

Coordination was undertaken with Rogers (Darryl Dimitroff and Tony Ranieri provided information through a meeting) and Bell (John La Chapelle and Frank Fucile provided information through a meeting) to review their networks and understand their long term planning approach. Telecommunication infrastructure is available virtually on every Regional Road and most major road allowances. Therefore an exhaustive review of all telecommunication infrastructure was not carried out in this study.

Telecommunication service providers do not plan their infrastructure in the same way as a municipality would plan their hard services. While it is prudent to plan for ensuring that services are in place to meet customer demands in a timely fashion, planning more than two years in advance may be considered premature in the field of telecommunication services. This is to avoid having 'stranded' or unused infrastructure for undeveloped areas; and as a result of the nature of the telecommunications industry, market competitiveness, and the pace of advancements in the technologies. Therefore system expansions/upgrades rely on a reactive approach that is contiguous to system needs which is typically identified upon the approval of developers plans.

#### Suggested Policy Directions for Telecommunication Infrastructure

Through discussions with Rogers and Bell, it was anticipated that telecommunication service providers will be capable of meeting the long term growth program. Based on the coordination undertaken to date under this study with Rogers and Bell, the following is suggested:

- Carry out a detailed integrated study for the underground infrastructure supporting development of the Downtown Brampton and Queen Street Corridor, including determining impact to existing, interim and ultimate road cross-sections and road allowances
- Formalize coordination process between Rogers and Bell and the City to better integrate long term planning requirements and to review potential conflicts and relocation requirements

## **WATER**

#### Review of South Peel Water System

Review of the water system needs to meet the City's growth management plan was based on two principal components: the South Peel trunk water system comprising the treatment plants, trunk feeder mains and pumping stations/reservoirs; and the sub-trunk and local distribution network.

The Region of Peel currently plans and implements the program for the South Peel system through recommendations made in the Region's Water and Wastewater Master Plan. The Master Plan has utilized available planning forecasts to the year 2031 for this exercise.

Based on the preliminary review of the planning projections for Brampton, it is noted that overall the City's interim projections differ from the projections used in the 2007 Region of Peel Master Plan, differing in some areas by up to 15,000 persons. As such, the overall capacity required to meet Brampton's projected growth has needed to be reviewed within the context of the overall South Peel System capacity. However, given that the Region of Peel Master Plan utilized overall Places to Grow projections for the Region, it is expected that the trunk system capacity is adequate to meet the revised projections.

The South Peel Water System capital program that is currently being implemented will meet the Region's and the City of Brampton's growth management plan. The following facilities and infrastructure have direct impact to the City of Brampton and are either currently undertaking upgrades or will have future upgrades completed in time to meet the forecasts:

#### **East System**

- Beckett Sproule Pumping Station and Reservoir
- East Brampton Pumping Station and Reservoir
- North Brampton Pumping Station and Reservoir
- Airport Road Pumping Station and Reservoir
- Future Tullamore Pumping Station and Reservoir
- Hanlan Feedermain
- Beckett Sproule Feedermain
- Tullamore Feedermain

#### West System

- Meadowvale North Pumping Station and Reservoir
- West Brampton Pumping Station and Reservoir
- Future Alloo Pumping Station and Reservoir
- Herridge Feedermain
- Alloo Feedermain

The upgrades to infrastructure feeding these Brampton facilities, including the water treatment plants at Lakeview Water Treatment Plant (WTP) and Lorne Park WTP also have programs in place to meet the Region's growth management plan.

#### Review of Sub-Trunk and Distribution System

The intensification evaluation requires a higher level of detailed analysis on the sub-trunk feedermain and local watermain network. In order to facilitate this analysis, the project team has used the Region's full pipe model with updated demand forecasts to evaluate the impact of the planning projections and intensification requirements specifically. The focus of the evaluation has been to determine key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades.

Preliminary steady-state modelling results show that the existing system has sufficient capacity to meet the interim planning forecasts in growth areas and within intensification areas, in particular Zone 5, which stretches across the southwest, southcentral, and northeast areas of the City. Modelling results for intensification within the Main Central Area showed that pressures were maintained between 51 pounds per square inch (psi) of pressure and 79 psi. This pressure range falls within the allowable pressure limits of 40 psi to 100 psi. Potential revisions to the local servicing requirements could arise based on results from the Region's final Growth Plan conformity exercise and any refinements to the intensification forecasts.

It is also noted that under typical development practices to date, the process for extension of the water distribution system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address greenfield and intensification growth.

#### Suggested Policy Directions for Water Infrastructure

It is anticipated that the current practice and processes for providing water supply to new growth will be capable of meeting the City of Brampton's growth. To support the provision of water supply and maintaining adequate level of service, the following is suggested:

- Continue to work with the Region to plan and implement the South Peel Water System program through the Region of Peel's Master Plan and capital program delivery.
- Continue to utilize development review processes to plan and install new water system infrastructure to meet ongoing growth.
- Ensure further and extensive coordination amongst Works and Transportation and other relevant City Divisions is undertaken for review and analysis of water infrastructure within intensification nodes and corridors.

## WASTEWATER

### Review of Wastewater System

Similar to the water system, review of the wastewater system needs to meet the City's growth management plan was based on two principal components: the South Peel trunk wastewater system comprising the treatment plants, trunk sewers and pumping stations; and the sub-trunk and local collection system.

As noted, the Region's Water and Wastewater Master Plan has utilized available planning forecasts to the year 2031 for the long term planning of the infrastructure. Given that the Region of Peel Master Plan utilized overall Places to Grow projections for the Region, it is expected that the trunk system capacity is adequate to meet the City's revised projections.

The South Peel water system capital program that is currently being implemented will meet the Region's and the City of Brampton's growth management plan. The following facilities and infrastructure have direct impact to the City of Brampton and are either currently undertaking upgrades or will have future upgrades completed in time to meet the forecasts:

#### East

- East (Etobicoke Creek) Trunk Sewer twinning
- McVean Sewage Pumping Station expansion
- Brampton East industrial trunk sewer twinning

#### West System

- West (Credit River) Trunk Sewer twinning
- West sub-trunk sewer extension
- Fletchers creek sub-trunk sewer extension
- West to East Diversion sewer

The upgrades to infrastructure conveying flows from these Brampton facilities, including the wastewater treatment plants at Lakeview Wastewater Treatment Plant (WWTP) and Clarkson WWTP, also have programs in place to meet the Region's growth management plan.



### Review of Sub-Trunk and Collection System

Also similar to water, the intensification evaluation requires a higher level of detailed analysis on the sub-trunk sewer and local sewer system. In order to facilitate this analysis, the project team has used the Region's full pipe model with updated flow forecasts to specifically evaluate the impact of the planning projections and intensification requirements. The focus of the evaluation has been to determine the key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades. It will be critical to determine the coordination and staging requirements within these areas to facilitate the upgrades.

Preliminary steady-state modelling results show that under 2031 conditions with intensification allocated to the Main Central Area, the existing system could experience surcharging in the following areas:

- Isolated sewers surrounding the intersection of Main and Queen Streets
- Hurontario/Main Street Sub-Trunk Sanitary Sewer
- Downstream of the UGC along the west branch of the Etobicoke Creek Trunk Sanitary Sewer, generally between highway 407 and just north of Steeles Avenue

Therefore, it is suggested that further analysis be undertaken through the Region's Water and Wastewater Master Plan Update utilizing more sophisticated, dynamic modelling to confirm whether or not surcharge levels exceed critical elevations. It is suggested that this detailed analysis be undertaken once planning forecasts are finalized, particularly the allocation of intensification growth. Potential revisions to the local servicing requirements could arise based on results from the Region's final Growth Plan conformity exercise and any refinements to the intensification forecasts.

It is also noted that under typical development practices to date, the process for extension of the wastewater collection system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address greenfield and intensification growth.

### Suggested Policy Directions for Wastewater Infrastructure

It is anticipated that the current practice and processes for providing wastewater servicing to new growth will be capable of meeting the City of Brampton's growth plan. To support the provision of wastewater servicing and maintaining adequate level of service, the following is suggested:

- Continue to work with the Region to plan and implement the South Peel wastewater system program through the Region of Peel's Master Plan and capital program delivery.
- Continue to utilize development review processes to plan and install new wastewater system infrastructure to meet ongoing growth.
- Ensure further and extensive coordination amongst Works and Transportation and other relevant City Divisions is undertaken for review and analysis of wastewater infrastructure within intensification nodes and corridors.

## STORMWATER

### Review of Stormwater Infrastructure

There is a considerable length of storm sewer infrastructure through the City of Brampton that could be impacted by future growth and intensification. Storm sewer systems range from private systems on commercial and industrial sites, to City storm sewers on local municipal roads, and to Regional storm sewers on Regional roads. Unlike other hard services that form a connected, city-wide network, storm drainage systems are typically short, independent systems that carry storm runoff from developed areas and roadways to the nearest watercourse. Given the large number of watercourses that flow southerly through the City of Brampton, there are a very large number of discrete storm sewer systems within the City.

Review and coordination was undertaken with recent and concurrent studies completed for the City including the Downtown Drainage Studies and the draft City of Brampton Stormwater Management Master Plan. Through the subject study, a test area was selected to evaluate the potential impacts of intensification of an existing single family residential area backing onto a designated intensification corridor. Based on the analysis carried out for this area, redevelopment to a high density residential and/or mixed use, if unmitigated, would increase the peak flows in the receiving storm sewer system by as much as 42%, or well above the available capacity in the storm sewer system.

For new development in Greenfield areas, new storm infrastructure will be designed and constructed by and for new development. The City will eventually assume and maintain these systems. Maintenance is currently partially funded through a perpetual maintenance fee charged to new development, though funding may be restructured in the future.

Intensification in existing developed areas could result in an increase in lot coverage. An increase in impervious cover will generate more runoff relative to current conditions for the same rainfall event, and therefore could impact the performance of the existing storm sewer systems.

The current approach to managing storm drainage for new development is generally considered adequate to manage impacts on storm drainage infrastructure. No additional recommendations for new development arose from the subject study prepared by Aquafor Beech.

Redevelopment and intensification in existing developed areas has some potential to impact storm drainage infrastructure. Intensification may result in an increase in impervious cover (roofs, surface parking, laneways, etc) relative to current conditions. The increased impervious area has the potential to generate more runoff volume, higher runoff rates and additional pollutant loadings.

A particular area of note, is the Urban Growth Centre and Queen St/Main St intensification corridors, where the Etobicoke Creek Regional storm flood plain has the potential to impact planned intensification. Much of the flood plain through the downtown area is included in a Special Policy Area, which allows for some redevelopment.

### Suggested Policy Directions for Stormwater Infrastructure

Based on the review of the relevant stormwater studies being undertaken by the City and on the local analysis carried out for the “test area” within the Special Policy Area, the following measures are suggested:

- Implement on-site controls on redevelopment sites to prevent any increase in peak flow rates to the storm sewer system and major (overland) drainage system
- Mitigate potential impacts from intensification on water quality and erosion in the receiving watercourses through a combination of on-site controls, conveyance controls and stormwater retrofits
- Prepare site-specific studies for intensification applications in the Etobicoke Creek floodplain to determine if and how the increase in flood risk can be managed

## SUMMARY

Detailed long term planning information for the utilities is currently not sufficiently available. However, it is anticipated that provision for new hydro transformer stations in northwest Brampton and northeast Brampton and transmission corridors will be required. Similarly, extension of trunk natural gas mains will be required. It is anticipated that the telecommunications upgrades and extensions can be facilitated as growth proceeds.

Review of the trunk water and wastewater infrastructure shows that the current implementation programs for the South Peel water and wastewater system will be sufficient to meet the City of Brampton’s servicing needs. New trunk infrastructure and facilities are being provided in time to service the future growth areas. Class EAs and construction projects are currently being implemented to meet these timelines. Based on preliminary modelling, the water system meets the City’s planned growth. Preliminary modelling of the wastewater system indicates a potential for surcharging in sections within and downstream of the UGC. Further analysis is suggested to determine the degree and severity of the sanitary sewer surcharging.

The current approach to managing storm drainage for new development is generally considered adequate to manage impacts on storm drainage infrastructure. It is suggested that on-site controls, conveyance control and stormwater retrofits be carried out as development occurs. Site specific studies within the Etobicoke Creek floodplain should continue to be carried out to manage flood risk.

## OTHER SUGGESTED POLICY DIRECTIONS

Based on the coordination undertaken to date under this study with the various utilities providers, it is suggested that the coordination process be more formalized in order to better integrate the long term planning requirements. Current Public Utilities Coordination Committees (PUCC) coordinate at the time a project is in design. However, there is a need for a PUCC at the planning level as it appears that the utilities providers may not be sufficiently informed of long term planning forecasts and the potential impacts on their infrastructure. A formalized coordination process will support a better exchange of information and ensure infrastructure is being planned, where possible, to the same planning horizons. This coordination process should immediately address the following issues:

- Long term infrastructure and facility locations – as part of the infrastructure upgrade requirements, it is anticipated that additional hydro corridors and transformer stations will be required. These sites and corridors, as an example, should be adequately reflected and protected. As a minimum, the potential future northwest and northeast Brampton sites should be reviewed.

- Based on coordination with Hydro One, it is understood that Environmental Assessments would need to be completed for the future transformer stations and that these processes can exceed 10 years in completing. As such, these studies should be confirmed and initiated immediately, including designating study leads.
- Intensification nodes and corridors – based on the plans for intensification, the future road alignments, frontages, cross sections, etc. will require review and upgrade/relocation of utilities. It is suggested that the coordination process develop staging plans for these key nodes and corridors. In particular, the Queen Street corridor will require detailed planning. It is suggested that these planning exercises be completed as Corridor Master Plans and Staging Plans.

It is also suggested that coordination with the Region of Peel be undertaken to regularly review current design standards to ensure that they accurately reflect trends in water usage and wastewater flows to the treatment plants. Changes in the design criteria over time could be warranted particularly in light of water efficiency and conservation programs, climate change factors, changes in water quality requirements and changes in wastewater effluent limits. Review of design criteria has the potential to extend the life and capacity of existing and future infrastructure.

As an overall suggested policy direction, a comprehensive inventory of all underground facilities should be undertaken to confirm the location and extents of existing infrastructure within its municipal boundaries, and where information does exist, the transfer to digital format. This will facilitate locating, updating and managing information and will support future studies.

# Table of Contents

<b>1.</b>	<b>Introduction and Background .....</b>	<b>1</b>
1.1	Overview .....	1
1.2	Objectives .....	1
1.3	Relevant Studies .....	1
1.3.1	Employment Land Strategy .....	2
1.3.2	Intensification Study .....	2
<b>2.</b>	<b>Problem/Opportunity Statement .....</b>	<b>3</b>
2.1	Problem/Opportunity Statement .....	3
2.2	Study Area .....	3
2.3	Planning Context .....	3
2.3.1	Places to Grow, Growth Plan for the Greater Golden Horseshoe 2006 .....	5
2.3.2	Provincial Policy Statement 2005 .....	5
2.3.3	City of Brampton Official Plan .....	5
2.3.4	Greenbelt Plan 2005 .....	5
<b>3.</b>	<b>Planning Forecasts .....</b>	<b>7</b>
3.1	Overview .....	7
3.2	Population .....	9
3.3	Employment .....	9
3.4	Downtown Brampton/Queen Street Corridor .....	12
<b>4.</b>	<b>Design Criteria .....</b>	<b>14</b>
4.1	Utilities .....	14
4.2	Water .....	14
4.3	Wastewater .....	15
4.4	Stormwater .....	15
<b>5.</b>	<b>Review of Utilities .....</b>	<b>16</b>
5.1	Overview of Existing Systems .....	16
5.1.1	Hydro Services .....	16
5.1.1.1	Load Forecasts .....	18
5.1.2	Natural Gas .....	19
5.1.3	Cable and Telecommunication .....	22
5.2	Opportunities/Constraints .....	23
<b>6.</b>	<b>Review of Hard Services .....</b>	<b>24</b>
6.1	Water .....	24
6.1.1	Overview of Existing System .....	24
6.1.2	Opportunities/Constraints .....	24
6.1.3	Trunk System Requirements .....	24

# Table of Contents

6.1.4	Local System Requirements .....	27
6.2	Wastewater .....	28
6.2.1	Overview of Existing System .....	28
6.2.2	Opportunities/Constraints .....	28
6.2.3	Trunk System Requirements .....	28
6.2.4	Local System Requirements .....	31
6.3	Stormwater .....	32
6.3.1	Overview of Existing System .....	32
6.3.2	Review of Relevant Studies .....	32
6.3.2.1	Downtown Drainage Study – Part 1 .....	32
6.3.2.2	Downtown Drainage Study – Part 2 .....	33
6.3.2.3	City of Brampton Stormwater Management Master Plan (Draft) .....	34
6.3.3	Opportunities/Constraints .....	35
6.3.3.1	Intensification in Commercial/ Industrial Areas .....	35
6.3.3.2	Intensification in Residential Areas .....	36
6.3.4	Modelling Analysis .....	36
6.3.5	Water Quality and Streambank Erosion Impacts .....	38
6.3.6	Regional Storm Floodplain .....	39
<b>7.</b>	<b>Suggested Policy Directions .....</b>	<b>41</b>
7.1	Utilities .....	41
7.1.1	Overview .....	41
7.1.2	Coordination Requirements .....	42
7.2	Water .....	45
7.2.1	Overview .....	45
7.2.2	Other Servicing Considerations .....	45
7.3	Wastewater .....	46
7.3.1	Overview .....	46
7.3.2	Other Servicing Considerations .....	46
7.4	Stormwater .....	47
7.4.1	Overview .....	47
7.5	Summary of Suggested Policy Directions .....	48
7.6	Other Suggested Policy Directions .....	48

# Table of Contents

## List of Figures

Figure 1.	City of Brampton .....	4
Figure 2.	Location of Transit Nodes and Intensification Corridors.....	8
Figure 3.	Distribution of Population Growth.....	10
Figure 4.	Distribution of Employment Growth.....	11
Figure 5.	Brampton UGC and Existing Land Uses .....	13
Figure 6.	Hydro Load Growth in the GTA West.....	17
Figure 7.	Existing GTA West Hydro Transmission System.....	17
Figure 8.	Existing Water Distribution System .....	25
Figure 9.	Existing Wastewater Collection System .....	29
Figure 10	Urban Growth, Special Policy Areas, Intensification Corridors and the Regional Floodplain within Downtown City of Brampton .....	40
Figure 11	Suggested Hydro System Upgrades .....	44

## List of Tables

Table 1.	Intensification Within Built Boundary .....	7
Table 2.	Interim Population Forecasts .....	9
Table 3.	Interim Employment Forecasts .....	9
Table 4.	Region of Peel Water Design Criteria .....	14
Table 5.	Transformer Stations – 2008 to 2010.....	20
Table 6.	Historical and Projected Hydro Load Forecasts.....	21

## Appendices

- A. Planning Information
- B. Utility Vendor Contact List
- C. Master Plan Recommended Water & Wastewater Servicing Strategy Maps
- D. Region of Peel Water & Wastewater Development Charges Maps
- E. Stormwater System “Test Area” Calculations
- F. Stormwater Drawings

# 1. Introduction and Background

## 1.1 Overview

*Places to Grow, the Growth Plan for the Greater Golden Horseshoe (GGH)* has required, municipalities across Ontario to initiate a significant amount of resources into preparing and/or coordinating the undertaking of background studies, reviewing current land use policies and developing implementation policies and programs. The City of Brampton's Planning, Design and Development has taken a proactive role in establishing a multi-faceted growth management program to address the Provincial Growth Plan. This report represents one element of Brampton's overall response to the Provincial Growth Plan. The study is intended to provide the necessary background to develop a strategy for providing utilities (hydro, gas, cable, and telephone) and hard services (water, wastewater, and stormwater) within the City of Brampton while meeting the objectives of the Growth Plan.

## 1.2 Objectives

*The Infrastructure Capacity Review of Utilities and Hard Services* forms part of the overall Growth Plan Conformity Exercise for the City of Brampton. The key goals and objectives of this study are as follows:

- Provide comment and information on private and municipal utilities and services to support the Growth Plan analysis and ultimate recommended population and employment targets
- Complete a capacity review for the stormwater management facilities
- Coordinate and complete a capacity review for the City's water and wastewater services
- Provide a capacity review of utilities including Hydro, Gas, Cable and Telecommunication
- Identify constraints and opportunities with respect to the utilities and services for the growth plan analysis
- Provide feedback and impacts to the Growth Plan Conformity Exercise team for potential modification of the planning projections
- Provide analysis of the utilities and services based on growth plan and specifically intensification within the City's downtown
- Provide infrastructure upgrade requirements and capital costs

## 1.3 Relevant Studies

Other studies being undertaken concurrent to *The Infrastructure Capacity Review of Utilities and Hard Services* include:

- Employment Land Strategy
- Land Inventory and Density Analysis
- Intensification Study
- Natural System Conservation Review
- Transit and Transportation Master Plan Sustainable Update
- Financial and Municipal Management Review
- Population and Employment Allocation



### 1.3.1 Employment Land Strategy

The Employment Land Strategy will provide an inventory of all employment lands in the City, identify employment lands that do not meet current or future demands, recommend types of employment lands and optimal locations to meet future demands, prepare an employment lands strategy for the City and recommend policy directions for an Official Plan Amendment. Conclusions from this study will be fed into the Region of Peel's Employment Lands Project being undertaken as part of the Regional Official Plan Review.

### 1.3.2 Intensification Study

The purpose of the Intensification Study is to carry out an inventory of existing lands suitable for intensification, identify opportunities for intensification in the City including, prepare an intensification strategy for the City and recommend policy directions for an Official Plan Amendment.

## 2. Problem/Opportunity Statement

### 2.1 Problem/Opportunity Statement

Over the past three years, the Province has adopted a more proactive role in growth management and planning issues. The key provincial initiatives that now provide directives such as the *Provincial Policy Statement*, *Places to Grow*, and Bill 51 (Planning Act Amendment) require Municipal Official Plans to conform to the Growth Plan for the Greater Golden Horseshoe within three years of its approval. Therefore, the Growth Plan requires all municipalities to implement its policies by amending their Official Plans by June 16, 2009.

The population and employment growth forecast established by the Growth Plan for the Region of Peel is 1,640,000 people and 870,000 jobs by 2031 while meeting specific intensification and Greenfield density targets. The Growth Plan provides upper tier municipalities with the flexibility in allocating this growth amongst their lower tier area municipalities. While Mississauga's Greenfields are just about developed, Brampton's current city structure consists of 33% Greenfield area (8,986 hectares), which means significant potential for future development to occur within its municipal boundaries. Future growth in the City of Brampton will occur through urban expansion into current Greenfield areas, and through intensification within existing developed areas. Much of the intensification is proposed to be directed to major transit nodes and intensification nodes through the City. In order to ensure that this growth is well managed, sustainable, quality of life is enhanced and that the natural environment is protected, the City of Brampton has undertaken background studies similar to this.

### 2.2 Study Area

The study area encompasses the area bounded by the municipal limits of the City of Brampton and is depicted in Figure 1. The study area is bordered by Highway 50 (Vaughan) to the east, Winston Churchill Boulevard (Halton Hills) to the West, Mayfield Road (Caledon) to the north (including Snelgrove which is slightly north of Mayfield Road) and the Hydro Corridor (Mississauga) to the south. Brampton has a total land area of almost 270 square kilometres.

### 2.3 Planning Context

The study area is currently governed by the land use policies set forth in the *City of Brampton Official Plan* which establishes population and employment growth projections within the City of Brampton to 2031. The Region of Peel is currently undertaking a Growth Plan Conformity Study that will guide the updating of the Official Plan and growth projections to 2031, however these numbers were not complete for this exercise.





CONFIDENTIAL - DRAFT



### 2.3.1 Places to Grow, Growth Plan for the Greater Golden Horseshoe 2006

*Places to Grow, the Growth Plan for the Greater Golden Horseshoe* (GGH) is the first Provincial Growth Plan and was adopted by the Province of Ontario in June, 2006 under the *Places to Grow Act*, 2005. This Growth Plan provides a framework for implementing the vision for building stronger, more prosperous communities by better managing growth in the GGH to 2031. The key goals of the Provincial Growth Plan are summarized as follows:

- Create compact, vibrant and complete communities
- Support a strong and competitive economy
- Optimize infrastructure to support growth
- Protect natural resources

The Growth Plan provides the framework for infrastructure investments in the Greater Golden Horseshoe, so that existing infrastructure and future investments are optimized to service growth to 2031 and beyond.

### 2.3.2 Provincial Policy Statement 2005

*The Provincial Policy Statement* (PPS) provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for citizens of Ontario.

The PPS specifically requires that "planning for infrastructure and public service facilities shall be integrated with planning for growth so that these are available to meet current and projected needs" (Section 1.6.1). Furthermore, the PPS states that infrastructure should be located to support the delivery of emergency management services. The PPS provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural environment. It also supports improved land use planning and management, which contributes to a more effective and efficient land use planning system.

### 2.3.3 City of Brampton Official Plan

The current *City of Brampton Official Plan* was adopted by Council on October 11, 2006. As part of the Official Plan, policies related to water, wastewater, stormwater, hydro, gas, and telecommunications are outlined under Section 4.7 titled "Infrastructure and Utilities". In 2007, the City of Brampton Council endorsed interim growth management policies be added to both the 1993 and 2006 Official Plan to guide applications for high-density residential intensification outside of the Central Area and applications for employment land conversions across the City, until the overall Growth Plan conformity exercise was completed.

### 2.3.4 Greenbelt Plan 2005

In 2005 the Province released its *Greenbelt Plan*. The *Greenbelt Plan* identifies areas around the GGH where urbanization should not occur to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape. The *Greenbelt Plan* includes the areas of the Oak Ridges Moraine Conservation Plan, Niagara Escarpment Plan and the Parkway Belt West Secondary Plan. Areas within

the Greenbelt Plan are considered to not be suitable for future development. The *Greenbelt Plan* is considered to be the foundation upon which the Province's growth strategy, *Places to Grow*, is built.

## 3. Planning Forecasts

### 3.1 Overview

The City's current Official Plan (OP) identifies transit nodes and corridors for major intensification; however it does not specify growth targets within the Built-up or Greenfield areas. In order to determine the City's future needs and infrastructure requirements, the *Infrastructure Capacity Review* has based its population and employment projections on interim planning data developed by Hemson Consulting in June 2008 for the City of Brampton (see Appendix A for full planning information).

City-wide planning projections provided for population and employment growth were geographically allocated by small geographic units (SGUs), a spatial allocation in greater detail than traffic survey zones (TSZs). Figure 2 provides a map of all the SGUs in relation to the existing city structure. Planning forecasts were provided for every year between 2006 and 2031 for each separate SGU covering the entire study area.

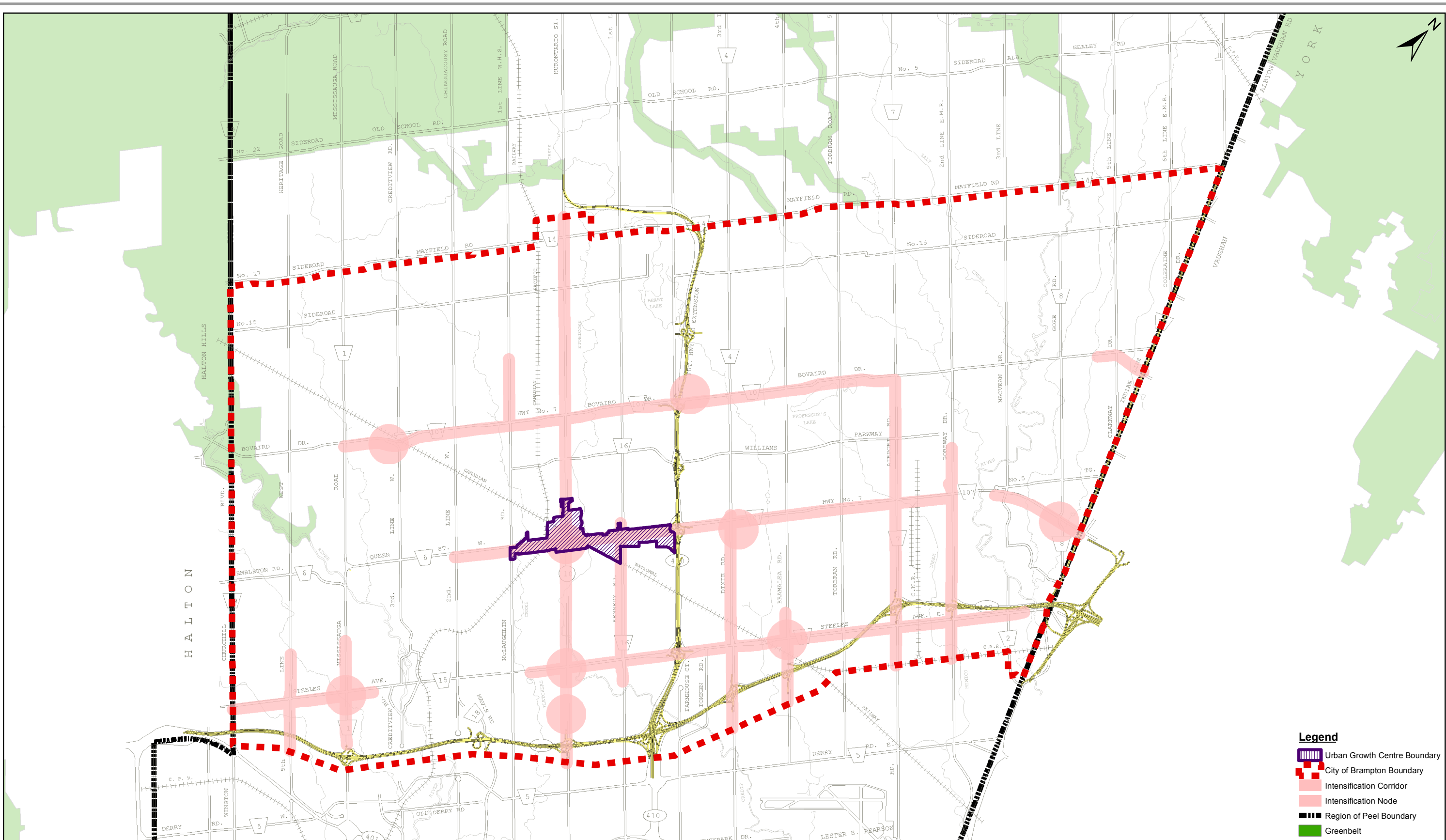
The most recent planning forecasts for the City of Brampton slightly exceed recent projections used for Master Planning studies. However, the magnitude and location is generally in keeping with previous data and should not have significant impact on overall servicing strategies. The more detailed intensification information has led to specific upgrade and coordination requirements.

For development within designated Greenfield areas excluding environmentally protected areas, the Growth Plan has provided a target of 50 people and jobs per hectare. Properties considered to be within intensification corridors are defined as having one property boundary that abuts the right-of-way defining the intensification corridor. Properties within a Transit Supportive Node are defined as being within a 500-metre radius of the intersecting roads defining the Transit Supportive Node. Potential intensification growth within the built boundary was evaluated by Hemson Consulting. Interim results are summarized in Table 1.

**Table 1. Intensification Within Built Boundary**

Area	Intensification Units	Area (Ha)
UGC	9,300	68
Central Area (except UGC)	10,200	104
Transit Nodes	6,300	77
Intensification Corridors	4,500	81
Other Opportunities for Intensification	3,700	64
<b>TOTAL</b>	<b>34,000</b>	<b>393</b>

Notes: <sup>1</sup> – Hemson Consulting, November 2008. Numbers are still interim and final numbers are pending.



CONFIDENTIAL - DRAFT



City of Brampton  
Infrastructure Capacity Review  
**Figure 2**  
**Transit Nodes and Intensification Corridors**

## 3.2 Population

Based on *Places to Grow*, the Region of Peel is forecast to reach a population of 1.64 million by 2031. Based on Hemson's interim population projections, almost 760,000 of this population will reside within the City of Brampton. This growth represents an increase of almost 300,000. The interim population forecasts provided in Table 2 indicate that between 50% and 75% of the population growth in the Region to 2031 is anticipated to occur within the City of Brampton. These planning forecasts address greenfield growth out to the buildout limits of the study area as well as provide detailed information on intensification within the current urban built boundary.

**Table 2. Interim Population Forecasts**

	2006	2011	2016	2021	2026	2031
Brampton <sup>1</sup>	451,740	534,010	599,340	659,390	713,870	758,280
Peel <sup>2</sup>		1,320,000	1,405,000	1,490,000	1,565,000	1,640,000

Notes: <sup>1</sup> – City of Brampton, *Interim Population Forecasts*, June 2008. Numbers are still interim and final numbers are pending.

<sup>2</sup> – *Places To Grow*, *Growth Plan for the Greater Golden Horseshoe*, 2006; 2016 and 2026 values were interpolated.

Based on interim planning forecasts, areas anticipated to experience the greatest increases in population include Mount Pleasant, Bram West, Northwest Brampton, Credit Valley, and Highway 427 Industrial Secondary Plan Areas, representing a combined growth of close to 194,000 persons between 2006 and 2031. The distribution of the projected population growth is depicted in Figure 3, where darker shades represent a greater intensity of growth. The Provincial Growth Plan requires a minimum of 40% of all residential development occurring annually within each upper and single-tier municipality to be within the built-up area by 2015 and for each year thereafter.

## 3.3 Employment

Based on *Places to Grow*, the Region of Peel is forecast to reach a 870,000 jobs by 2031. Based on Hemson's interim employment projections, approximately 320,000 of these jobs will be created within the City of Brampton. This growth represents an increase of more than 165,000 jobs. The interim employment forecasts provided in Table 3 indicate that Brampton's share of Peel's overall employment growth steadily increases from 48% up to 92% by 2031.

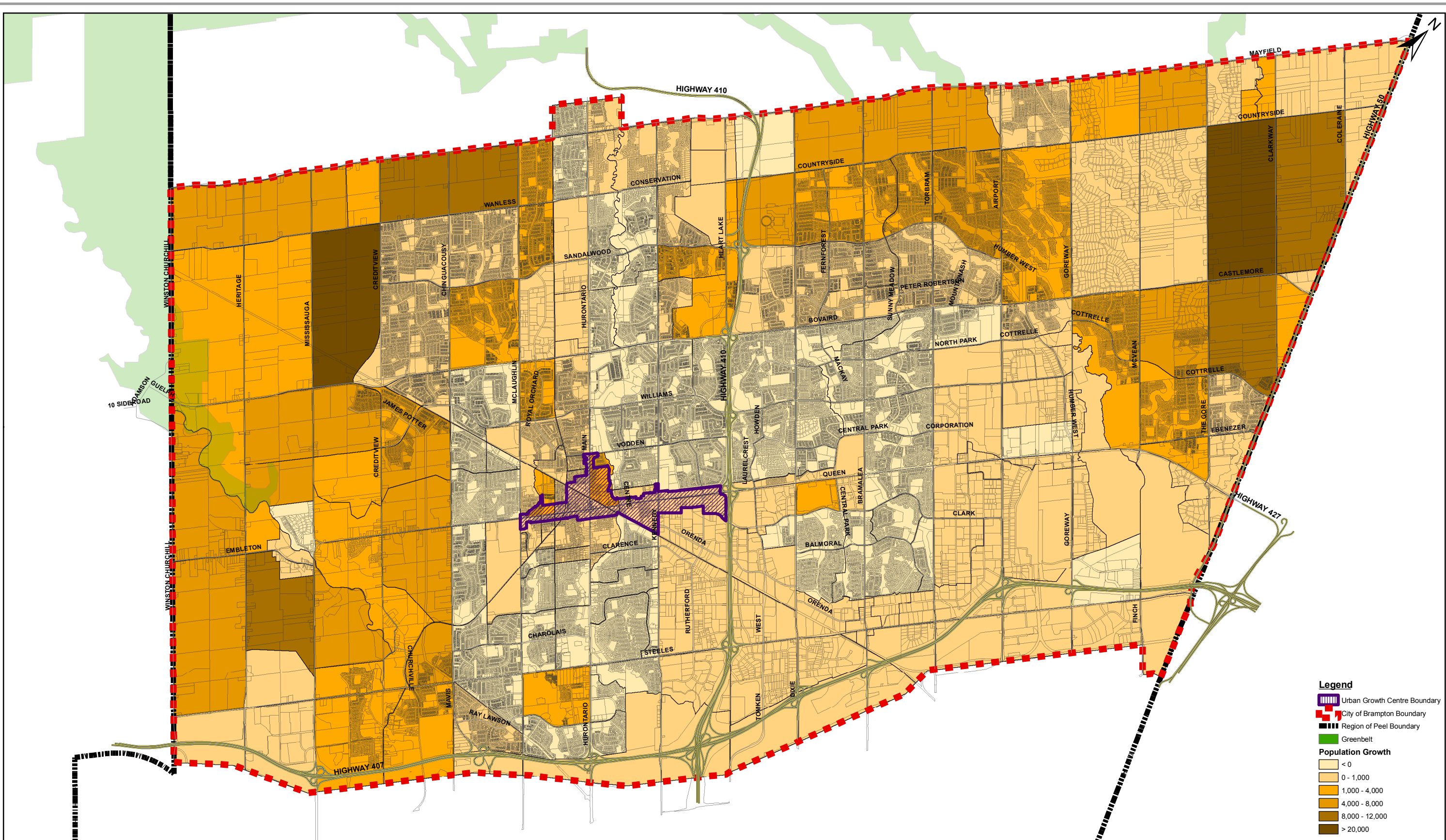
**Table 3. Interim Employment Forecasts**

	2006	2011	2016	2021	2026	2031
Brampton <sup>1</sup>	154,870	203,070	238,980	273,810	295,260	320,020
Peel <sup>2</sup>	530,000	730,000	775,000	820,000	845,000	870,000

Notes: <sup>1</sup> – City of Brampton, *Interim Employment Forecasts*, June 2008. Numbers are still interim and final numbers are pending.

<sup>2</sup> – *Places To Grow*, *Growth Plan for the Greater Golden Horseshoe*, 2006; 2016 and 2026 values were interpolated.





Note: Information on this map is confidential and should only be used for the purposes of this Study. Numbers are still interim and final numbers are pending.

City of Brampton  
 Infrastructure Capacity Review

**Figure 3**  
**Distribution of Population Growth**

April 2009  
 N.T.S.





Based on interim forecasts, areas anticipated to experience the greatest increases in employment growth are Bram West, Northwest Brampton, Highway 427 Industrial, and the Queen Street Corridor, representing a combined growth of close to 83,700 jobs between 2006 and 2031. Over 50% of future employment growth is anticipated to occur within the large industrial areas of Brampton. The distribution of the projected employment growth is depicted in Figure 4, where darker shades represent a greater intensity of growth. The Growth Plan has established a target of 50 people and jobs per hectare for greenfield growth, excluding environmentally protected areas. Interim recommendations from Hemson Consulting include maintaining all existing employment lands.

### 3.4 Downtown Brampton/Queen Street Corridor

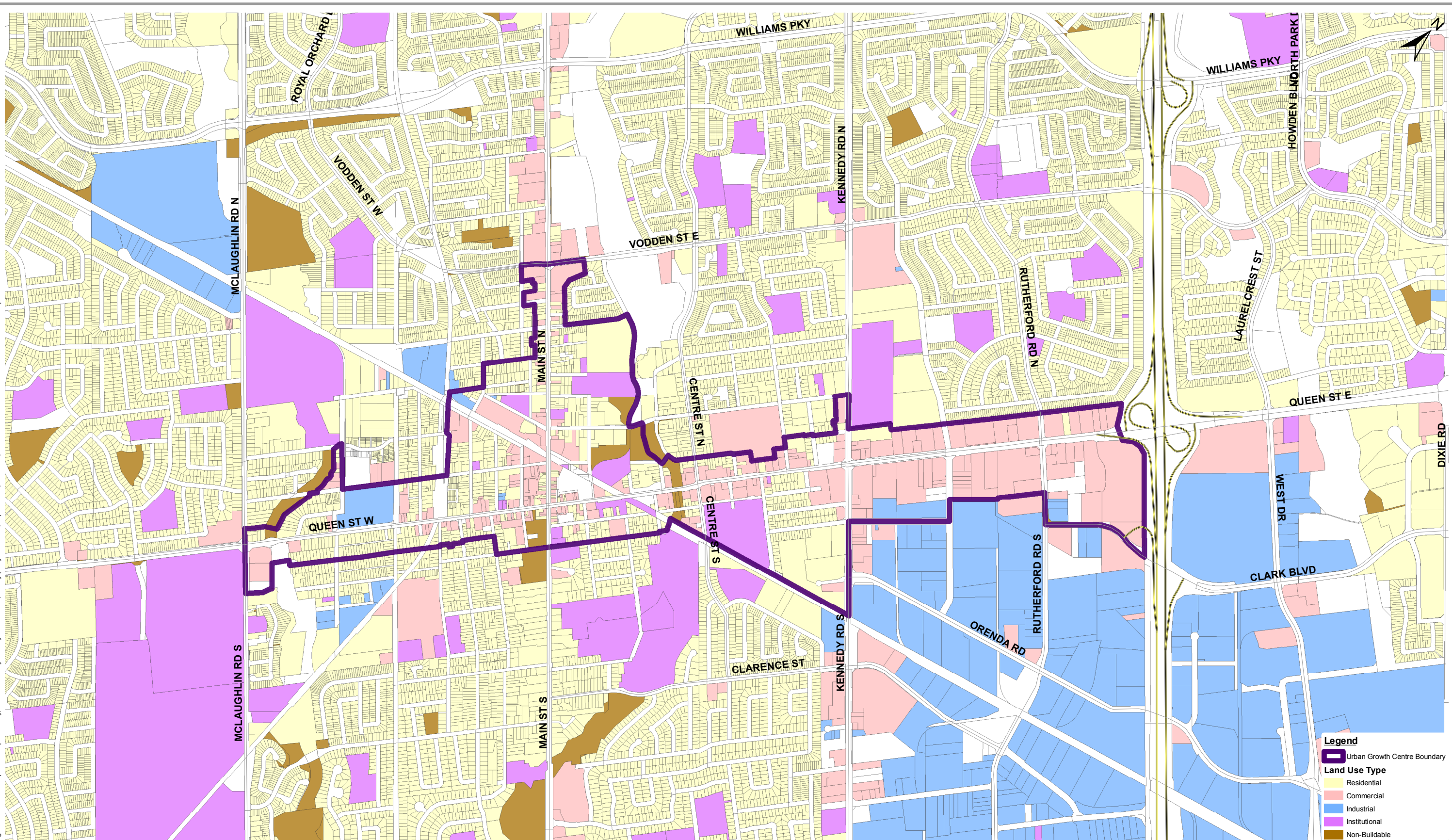
The Provincial Growth Plan identified the City of Brampton Urban Growth Centre (UGC) as the third largest UGC in the GTA at approximately 219 hectares and covering six municipal wards. The boundary of the UGC generally follows the Queen Street Corridor between McLaughlin Road in the west and Highway 410 in the east and extends along Main Street as far north as Vodden Street. The Brampton UGC, which lies at the heart of the downtown core and the Queen Street Corridor, is provided in Figure 5.

Latest figures provided by Hemson indicate that as of 2008, the Brampton UGC contains 6,200 people and 14,100 jobs, which equates to approximately 93 persons and jobs per hectare. The City is required to achieve 200 persons and jobs per hectare by 2031. Based on Hemson's preliminary findings, the target for the Brampton UGC is approximately 10,000 additional units based on a 60:40 people to jobs ratio.

The Brampton Central Area is located in the center of the city, located generally across Queen Street between Chinguacousy Road and Bramalea Road and encompasses the UGC. This Central Area includes significant civic, institutional, cultural and entertainment facilities as well as important commercial, employment and residential areas. The City's Planning Design and Development are developing the conceptual vision behind this Central Area as three sections having distinct functional and character features as follows:

- Downtown Brampton: This area extends from Chinguacousy Road to Centre Street and features distinct image and character
- Queen Street Corridor: This area extends from Centre Street to Highway 410 and transitions to a mixed use, transit-oriented, pedestrian environment
- Bramalea City Centre – This area extends from Highway 410 to Bramalea Road and has the potential to develop into an Urban Centre Model





Note: Information on this map is confidential and should only be used for the purposes of this Study. General grouping of land uses based on Municipal Property Assessment Corporation (MPAC) data.

City of Brampton  
 Infrastructure Capacity Review

## 4. Design Criteria

### 4.1 Utilities

Comment on design criteria was only received from Hydro One Brampton Networks Inc. (HOBNI). The HOBNI feeder network has been designed to achieve the following criteria:

- For 27.6 kV feeders, the maximum loading is to be between 13 and 17 MW depending on the servicing distance from the TS and the voltage drop. The 27.6kV feeders are designed to provide supply to residential, commercial and small industrial customers. The feeder load needs to be reduced for customers located more than 6 km away from the TS.
- For 44 kV feeders, the maximum loading is to be between 22 and 27 MW depending on the servicing distance from the TS and the voltage drop. The feeder load should be significantly reduced if the customer is located more the 10 km from the TS. The 44 kV feeders are designed to supply power to large industrial customers and municipal stations.

### 4.2 Water

The current Region of Peel Design Criteria for Watermains is outlined in the City's *Public Works Design, Specifications and Procedures Manual* (July 2007). The manual requires that typical water demands are calculated as follows:

**Table 4. Region of Peel Water Design Criteria**

	Unit	Average Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap/d	280	2.0	3.0
Industrial Commercial Institutional	L/emp/d	300	1.4	3.0

Large water consumers require specific flow calculations based on historical patterns, type of industry, etc. It should also be noted that use of unique development specific criteria is required on a development-by-development basis during servicing review.

Watermains are classified generally by size. Transmission mains are generally used to pump water from downstream pumping stations to reservoirs and are usually located along major arterial roads. Major distribution feeder mains are generally used to distribute water within a pressure zone and are typically greater than 600 mm in diameter. Local distribution feeder mains are generally used to supply water to subdivision are typically between 400 mm and 600 mm. Local watermains are used to distribute water within subdivisions and are typically 300 mm in diameter or less. Only local watermains should be located along residential streets.



A minimum 300 mm diameter is required for servicing high density residential areas, school and industrial/commercial areas. All water services shall have 1.2 m minimum horizontal clearance from all other utilities.

### 4.3 Wastewater

The current Region of Peel Design Criteria for Sanitary Sewers is outlined in the City's *Public Works Design, Specifications and Procedures Manual* (September 2007). The manual requires that typical wastewater flows are calculated based on an equivalent population and a domestic flow criterion of 302.8 L/cap/d. In addition to this average day flow, extraneous flows shall be added as follows:

- Infiltration shall be 0.2 L/s/ha applied to the gross area of all tributary lands
- In areas known to be greater than 25 years old, an additional allowance shall be made of 0.08 L/s/drain for potential contribution from foundation drain connections to the collection system
- Allowance for maintenance hole inflow shall be 0.028 L/s/m of sewer length

The wastewater collection system consists of the primary collection system containing major trunk sanitary sewers greater than 750 mm in diameter conveying flows to wastewater treatment plants. Local trunk sanitary sewers convey flows from local subdivision to the primary collection system and generally range in size between 375 and 675 mm in diameter. The local collection system collects flows within a subdivision and generally ranges in size between 250 mm and 300 mm in diameter.

Velocities should be limited to 3.5 m/s at full flow and should be at least 0.75 m/s at actual flow to ensure proper cleansing velocities. The obvert of the sanitary sewer pipe should be at least 2.5 m below the centreline of the road allowance.

### 4.4 Stormwater

The current general stormwater management design criteria for new development and redevelopment in the City of Brampton are outlined in the City's *Subdivision Design Manual* (November 2006). The manual requires that storm drainage systems be designed such that the combination of the minor system (storm sewers) and the major system (overland flow within the right-of-way) is capable of handling a 100-year return storm without flooding private property.

In general, the minor system is to be designed for a 10-year storm event, with the major system conveying the additional flow up to the 100-year storm event. There are some exceptions to this requirement. Where a separate foundation drainage collection system is used, the storm sewers can be designed for the 2-year event (5-year event on arterial roads). The storm sewer system can also be designed for the 2-year event (5-year event on arterial roads) where on-site peak flow controls are used. Based on discussions with City of Brampton Engineering staff, the majority of the storm sewer systems within the City of Brampton have been designed for the 10-year storm event. There are relatively few developments with a foundation drainage collection system where the reduced standard has been applied. Many sewers within the downtown area do not have sufficient capacity for 10-year flows as this area was developed prior to the current design standard, as discussed in Section 2.3.4.

## 5. Review of Utilities

Throughout this study, the Project Team contacted and met with four major utility service providers in the City of Brampton including: Hydro One Brampton, Bell Canada, Rogers Cable, and Enbridge Natural Gas. A vendor utility contact list was developed and correspondence was issued to obtain information on the existing utility infrastructure. Comments received from utility stakeholders were reviewed and incorporated into this study. Appendix B contains all utility stakeholder consultation correspondence. High level capacity concerns for the entire City were addressed with a focus on intensification areas, particularly the Downtown Brampton and Queen Street Corridor. The following sections provide information compiled through these discussions.

### 5.1 Overview of Existing Systems

#### 5.1.1 Hydro Services

The supply of electric power for the City of Brampton is provided by Hydro One Brampton Networks Inc. (HOBNI). Hydro One Brampton Network Inc. is a subsidiary of Hydro One Networks Inc. (HONI) and is responsible for supplying electricity to more than 127,000 customers (residential, commercial and industrial) in the City of Brampton. The following section provides an overview of the existing Hydro One network.

The existing hydro infrastructure consists of the following:

- 14,500 distribution line poles
- 15,000 distribution transformers
- 2,200 km of underground primary feeder and distribution cable
- 8,000 km of overhead primary bare conductor (feeder and distribution)

Brampton's hydro network within the context of the GTA and the existing GTA West Transmission System is provided in Figure 6 and Figure 7.

The main operating voltages are 44 kV and 27.6 kV, however there are legacy voltages of 13.8, 8.23 and 4.16 kV which have to be maintained for local roads. There are 13 active municipal stations (MS) and four major Transformer Stations (TS) converting transmission voltages down to a distribution level which is utilized by the Local Distribution Utility to feed the hydro network and its customers as follows:

- **Jim Yarrow Transformer Station (TS)** is located north of Steeles Avenue and west of Chinguacousy Road and is the only TS owned by Hydro One Brampton (all other stations are owned by Hydro One Networks Inc.). The station was commissioned in 2002 and supplies residential and commercial loads. The Jim Yarrow Station has a dual supply from the 230 kV transmission circuits that share the same right of way.
- **Pleasant TS** is located at the southwest corner of Chinguacousy Road and Williams Parkway. The Pleasant Station is configured with two dual supplies from the double circuit line R19T/R21T.
- **Brampton Goreway TS** is located on the east side of Goreway Drive, half way between Castlemore Road and Queen Street East. The station is owned by Hydro One Networks Inc. and Hydro One Brampton connects the distribution feeders to the distribution breakers at the transformer station.
- **Bramalea TS** is located on the west side of Bramalea Road south of Highway 407.

Figure 6. Hydro Load Growth in the GTA West

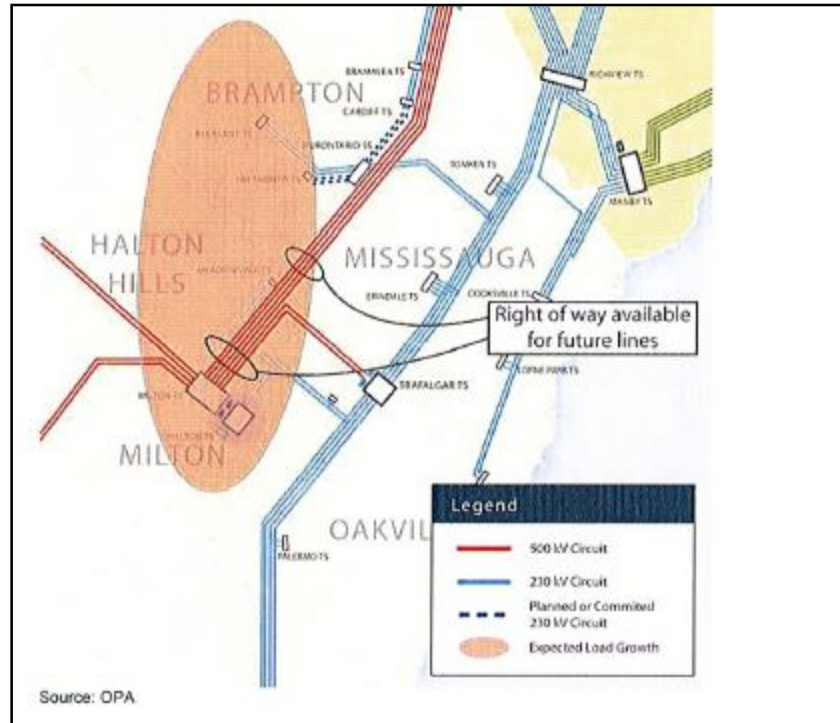
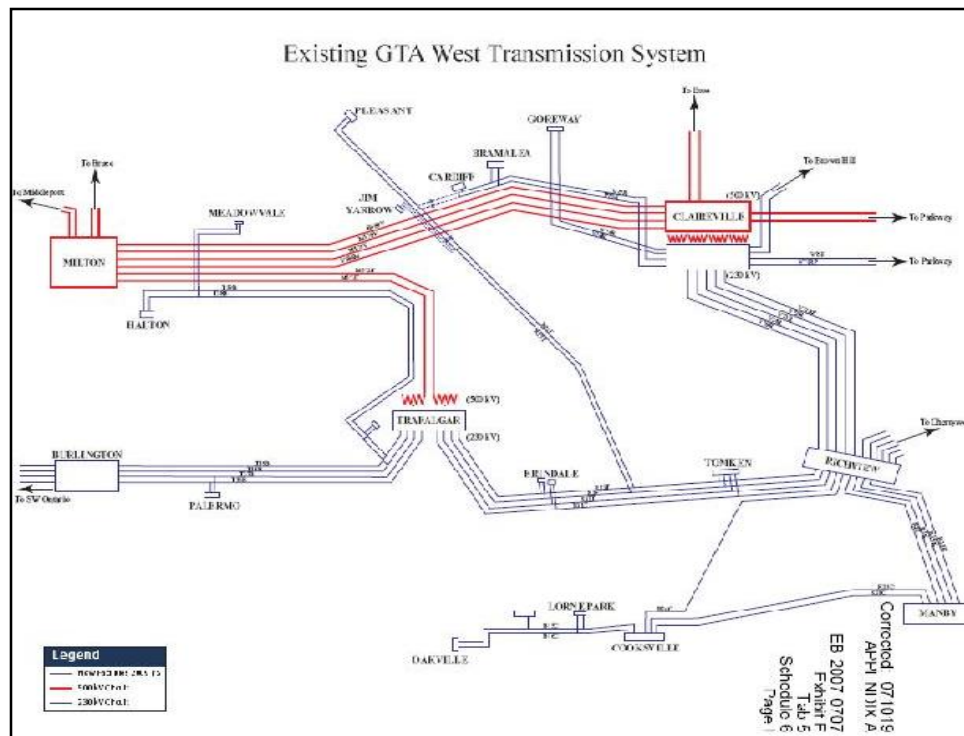


Figure 7 Existing GTA West Hydro Transmission System





Capacities relating to these and other transformer stations are provided in Table 5. Most of the electric power supply facilities, such as transmission lines, transformer stations and distribution stations are located aboveground. All existing transmission lines are rated as 230 kV double line in radial configuration to each TS. Three of them are overhead tower lines and one underground line to Goreway TS.

Transmission lines and transmission stations are under jurisdiction of HONI and need to examine existing and future capacity of transmission lines and each DESN in the City of Brampton as well as securing land for future expansion of transmission lines and TS location with relation to rights of way, easements and encroachments. Although the City endeavours to have cabled services located underground wherever possible, it should be noted that the cost for underground installations could cost up to three times more than aboveground installations.

Intensification within the Brampton Central Area will trigger significant hydro upgrades, as this will impact existing, interim and ultimate road cross-sections and road allowances. Within the Downtown Brampton/Queen Street Corridor, it was determined that any hydro upgrades or expansions within the major corridors would need to be underground. Plans for any new electric power facilities required by Hydro One would be consulted with the City and submitted for site plan approval. Criteria that the new power facilities would need to meet include land use compatibility, urban design, traffic, environmental, and cost.

Typically, provision for new hydro infrastructure is provided as new developments occur. Extension of hydro services typically requires review of key transmission lines and transformer stations. Hydro One Networks Inc. has confirmed the need to construct new high voltage transmission lines which are nearing capacity and is capable of meeting these ongoing growth needs. However, Hydro One Networks Inc. has indicated that linear corridors will be required to minimize construction costs.

In response to the need for hydro transmission corridors, the City of Brampton has committed to integrating provision of sufficient width for a new hydro transmission corridor for overhead transmission lines as part of the Environmental Assessment (EA) study for Bram West Parkway/North-South Transportation Corridor. This EA study is expected to commence in 2009, following the completion of the City's Transportation and Transit Master Plan update and the release of the Halton Peel Boundary Area Transportation Study. This new hydro corridor will be integrated with all development plans affecting the combined use of the corridor for a road and transmission lines. However, the City of Brampton has requested that the hydro transmission corridor be limited to accommodating freestanding poles within an 8 to 10 metre width of the combined road and hydro road right-of-way, instead of the traditional lattice towers. A typical 2-circuit or 4-circuit lattice tower design requires a dedicated greenfield right-of-way of approximately 45 m in width. Hydro One Networks Inc. is sensitive to the concerns of the City. However, there are technical and safety challenges with using a corridor of such narrow width. Hydro One and other users of a joint corridor will explore economic measures to reduce the total width of the corridor.

#### *5.1.1.1 Load Forecasts*

The anticipated population and employment growth in the Region is estimated to require approximately 500 MW (megawatts) of electricity. The existing electrical transmission infrastructure is close to reaching capacity and is forecast to be beyond capacity by 2012.

Historical peak loads and projected peak loads to 2031 were provided by Hydro One Brampton and are provided in Table 6. Future hydro loads were estimated based on two sources of available data:

- Historical data of hydro load growth and extrapolation of trends to 2031
- Interim population and employment projections for the City of Brampton

Brampton's population in 2006 was approximately 433,800 (Statistics Canada, Census 2006) requiring a total demand of approximately 785 MW (Hydro One Brampton, 2008). Future hydro loads are estimated based on historic peak (summer) loads, which represent a conservative indicator when it comes to evaluating the need for existing and future expansions of hydro infrastructure such as transmission lines, DESNs, number of breakers and feeders. Based on the City's interim population and employment growth projections, the new DESN will be required by 2022 when it is expected that peak loads may reach 1000 MW. Hydro One Brampton is planning to develop one or two new 27.6 kV feeders per year up to year 2031, when peak loads will reach close to 1300 MW, to accommodate the load growth.

### 5.1.2 Natural Gas

TransCanada Pipelines Limited operates one high pressure natural gas pipeline within its rights-of-way as identified in Schedule F of the Official Plan (see Appendix A). The natural gas infrastructure provided by Enbridge within the City is extensive and consists of low, intermediate, high, and extra high pressure gas mains, including a 6 km spine through the centre of the City. Any plans for new infrastructure would continue to be subject to the policies regarding minimum setbacks stipulated in the City's Official Plan.

Natural gas services provided by Enbridge are planned on a 5 to 10 year program. Similar to cabled services, Enbridge Gas avoids having unused buried infrastructure and hence will only upgrade upon the approval of developers plans. Gas mains are designed with conservative pressure limits to accommodate future increases in demands. This allows for increasing the capacity of existing lines without compromising the level of service for existing customers as regulated by the Ontario Energy Board (OEB).

**Table 5 Transformer Stations – 2008 to 2010**

Transformer Station (TS)	TX Id	Transmission Connection	MVA Rating	High Voltage/ Low voltage	LTR (MVA)	Exist HOB Breakers	Total HOB Breaker Capacity (MVA)	Non HOB Breaker Capacity (MVA)
Pleasant TS	T1	R19T	75/100/125MVA	230/44kV	165	3	61.9	103.1
	T2	R21T	75/100/125MVA	230/44kV				
	T5	R19T	75/100/125MVA	230kV/27.6kV	198.6	12	198.6	0.0
	T6	R21T	75/100/125MVA	230kV/27.6kV				
	T7	R19T	75/100/125MVA	230kV/27.6kV	171	12	171.0	0.0
	T8	R21T	75/100/125MVA	230kV/27.6kV				
Bramalea TS	T1	V72R	75/100/125MVA	230kV/27.6kV	165.2	6	82.6	82.6
	T2	V73R	75/100/125MVA	230kV/27.6kV				
	T3	V72R	50/66/83MVA	230/44kV	112	2	44.8	67.2
	T4	V73R	50/66/83MVA	230/44kV				
	T5	V72R	75/100/125MVA	230/44kV	177	4	118	59
	T6	V73R	75/100/125MVA	230/44kV				
Goreway TS	T4	V43	50/66/83MVA	230/44kV	40	1	40	0
	T5	V73R	75/100/125MVA	230kV/27.6kV	191.8	12	191.8	0
	T6	V43	75/100/125MVA	230kV/27.6kV				
Goreway TS Future DESN #2 (2010)	T?	V43	75/100/125MVA	230kV/27.6kV	171	12	171	0
	T?	V73R	75/100/125MVA	230kV/27.6kV				
Jim Yarrow MTSB <sup>1</sup>	T1	R19T	75/100/125MVA	230kV/27.6kV	167	12	167	0
	T2	R21T	75/100/125MVA	230kV/27.6kV				
Woodbridge TS <sup>2</sup>	1 feeder available from Woodbridge TS to Supply Load within HOB Boundary					1	30.5	0

Notes: <sup>1</sup> Jim Yarrow MTS is owned by Hydro One Brampton. All other stations are owned by Hydro One Networks.

<sup>2</sup> Woodbridge TS is located west of Regina Road and south of Highway 7 in the Town of Vaughan.

**Table 6 Historical and Projected Hydro Load Forecasts**

Year	City of Brampton Population Growth			Historical HOBNI <sup>1</sup> Data	
	Population	Population Growth % Change	Peak Load Forecast Based on Population Growth (MW)	HOB Peak Load Forecast	
				HOB Peak Growth %	Summer Peak (MW)
1997			510.3		510.3
1998			522	2.3	522.0
1999			545.7	4.5	545.7
2000			554.5	1.6	554.5
2001			629.1	13.5	629.1
2002			655.7	4.2	655.7
2003			661.8	0.9	661.8
2004			645.9	-2.4	645.9
2005			731.2	13.2	731.2
2006			784.9	7.3	784.9
2007			772.1	-1.6	772.1
2008			729.2	-5.6	729.2
2009	500,070		800.0	*1.9	800.0
2010	517,040	3.4	827.1	3.0	824.0
2011	534,010	3.3	854.3	3.0	848.7
2012	548,250	2.7	877.1	2.5	869.9
2013	561,620	2.4	898.5	2.5	891.7
2014	574,480	2.3	919.0	2.5	914.0
2015	587,040	2.2	939.1	2.2	934.1
2016	599,340	2.1	958.8	2.2	954.6
2017	611,550	2.0	978.3	2.2	975.6
2018	623,660	2.0	997.7	2.2	997.1
2019	635,670	1.9	1016.9	2.2	1019.0
2020	647,580	1.9	1036.0	2.2	1041.5
2021	659,390	1.8	1054.9	2.2	1064.4
2022	670,420	1.7	1072.5	2.2	1087.8
2023	681,380	1.6	1090.1	2.2	1111.7
2024	692,280	1.6	1107.5	2.2	1136.2
2025	703,110	1.6	1124.8	2.2	1161.2
2026	713,870	1.5	1142.0	2.2	1186.7
2027	722,820	1.3	1156.4	2.2	1212.8
2028	731,740	1.2	1170.6	2.2	1239.5
2029	740,630	1.2	1184.8	2.2	1266.8
2030	749,470	1.2	1199.0	2.2	1294.6
2031	758,280	1.2	1213.1	2.2	1323.1

Notes: <sup>1</sup> "HOBNI" denotes Hydro One Brampton Networks Inc.

\* 1.9% increase from 2006 HOB peak (baseline)

### 5.1.3 Cable and Telecommunication

A number of cable and telecommunication sources are available to residents and business in the City of Brampton. Bell Canada and Rogers Communications Inc. are the two major cable and telecommunication service providers delivering telephone, cellular, cable, and internet services to Brampton residents and businesses. Hydro One Telecom has a city-wide, state-of-the-art, fibre-optic network providing broadband telecommunication services for large commercial customers, carriers, internet service providers. Hydro One Telecom's point-to-point fibre and access ring infrastructure and its high capacity optic network make Brampton one of the most fibre-dense communities in Canada. Other companies such as MTS Allstream Inc. also offer telephone services to a small number of large and medium size businesses in the City.

Telecommunication service providers do not plan their infrastructure in the same way as a municipality would plan their hard services such as treatment plants, pumping stations, watermains, and trunk sanitary sewers. While it is prudent to plan for ensuring that services are in place to meet customer demands in a timely fashion, planning more than two years in advance may be considered premature in the field of telecommunication services. The first reason for this reactive approach is to avoid having 'stranded' or unused infrastructure for undeveloped areas. The second reason stems from the nature of the telecommunications industry, market competitiveness, and the pace of advancements in the technologies. Therefore system expansions/upgrades rely on a reactive approach that is contiguous to system needs which is typically identified upon the approval of developers plans.

However, in light of Provincial policy, it is critical to understand the complexity of expanding and enhancing the telecommunications network to accommodate growth, both through outward expansion of an urban area and through intensification, infill and redevelopment. All types of growth and development place demands on the telecommunications network and its associated support infrastructure.

Telecommunication infrastructure is available virtually on every Regional Road and most major road allowances. Therefore an exhaustive review of all telecommunication infrastructure was not carried out in this study. For telecommunication providers, the impact anticipated within Greenfield areas is minimal. Greater potential for impact is anticipated within the Downtown Brampton/Queen Street Corridor area and in areas with mixed land uses (i.e. residential and commercial). To mitigate potential impacts, relocation work within an intensification area could be coordinated in unison with other utilities and during planned municipal roadwork.

The Bell telephone system has a dedicated cable connection from the source to the customer. This arrangement results in what resembles a 'spiderweb' system of cross-connects throughout the city. As a result of this layout, Bell would need to confirm the presence of support infrastructure when planning to service a new subdivision. In terms of type of technology, both fibre optics and copper are used depending on the area and the proximity to nodes, and provide the same level of service. Growth and development would not only require extension of fibre and copper cable, but can also precipitate the need for reinforcement and replacement of the support infrastructure. Reinforcement and replacement of the telecommunications network can represent an extensive and costly undertaking, which needs to be managed to avoid disruption of public services, particularly emergency services. All new Bell infrastructure is installed underground, with the exception of designated heritage areas where poles may be preserved for their heritage value.

Roger's Cable network architecture allows for new connections to be tapped off main lines. The majority of Roger's customers in the City of Brampton are residential users. Generally, all Rogers Cable services are run

aboveground. Therefore, cable upgrades are typically carried out at the same time hydro upgrades are carried out. There is one main hub in the City of Brampton located at Hanson Road, south of Queen Street. Future service areas include the new development at Mississauga Road and Queen Street. Historically, Rogers has experienced a growth of approximately 20,000 single family units per year across a large footprint extending from the City of Pickering to the Burlington Skyway.

## 5.2 Opportunities/Constraints

With respect to the Brampton Urban Growth Centre and corridor, all the utilities (hydro, gas, and telecommunication) identified potential infrastructure issues, indicating that not only would extension of infrastructure be required but also reinforcement and replacement of support infrastructure, which can be costly.

Intensification pressure and associated road, water/wastewater infrastructure projects will impact the Bell network from an infrastructure and technological perspective. This will largely be dependant on the type of work proposed and the land use envisioned coupled with changing telecommunication technologies. In order to ensure that sufficient Bell infrastructure is available to meet future demands particularly in the Downtown Brampton area, Bell has expressed their desire to become more involved early in the planning process, and to remain informed of planned growth and future road and related infrastructure improvements within these critical service areas. This allows for greater consideration of the size and location needs of large telecommunications infrastructure and equipment that houses key electronics. With respect to servicing new growth in Greenfield areas, Bell did not identify any existing bottlenecks or constraints

For growth within intensification areas including Downtown Brampton, Rogers would continue to coordinate with other utilities to make any upgrades/expansions. With respect to servicing new growth in Greenfield areas, Rogers Cable did not identify any existing bottlenecks or constraints. Rogers noted that they would like to be made aware of short term planned growth ahead of time, such that they are able to work needed infrastructure into their capital budgets.

A common theme heard across the board of utilities was the need for improving the existing lines of communication between the City and the utility service providers regarding planned growth and capacity requirements. This study could potentially serve as an avenue to help initiate a constructive two-way information exchange process which would alleviate risks to the infrastructure systems and provide support for growth.

## 6. Review of Hard Services

### 6.1 Water

#### 6.1.1 Overview of Existing System

The Region of Peel is responsible for the supply and distribution of water throughout the Region including the City of Brampton. Brampton is serviced by the South Peel system which is supplied via two water treatment plants, Lakeview and Lorne Park, both located in the City of Mississauga along the Lake Ontario shoreline. The Lakeview Water Treatment Plant (WTP) is located in southeast Mississauga and currently has a rated capacity of 920 ML/d with a potential ultimate site capacity of 1150 millions of litres per day (ML/d). The Lorne Park WTP is currently being expanded to a capacity of 500 ML/d and also has an ultimate plant site capacity of 1,150 ML/d.

In addition to the two water treatment plants, the South Peel system also includes the trunk feeder mains, pumping stations, and reservoirs servicing seven pressure zones. There are two main trunk feeder mains: the East supplied by the Lakeview WTP servicing through the eastern portion of Brampton in addition to providing a direct supply to York; and, the West supplied by the Lorne Park WTP servicing through the western portion of Brampton. The City of Brampton is located within Water Pressure Zones 4, 5, and 6.

#### 6.1.2 Opportunities/Constraints

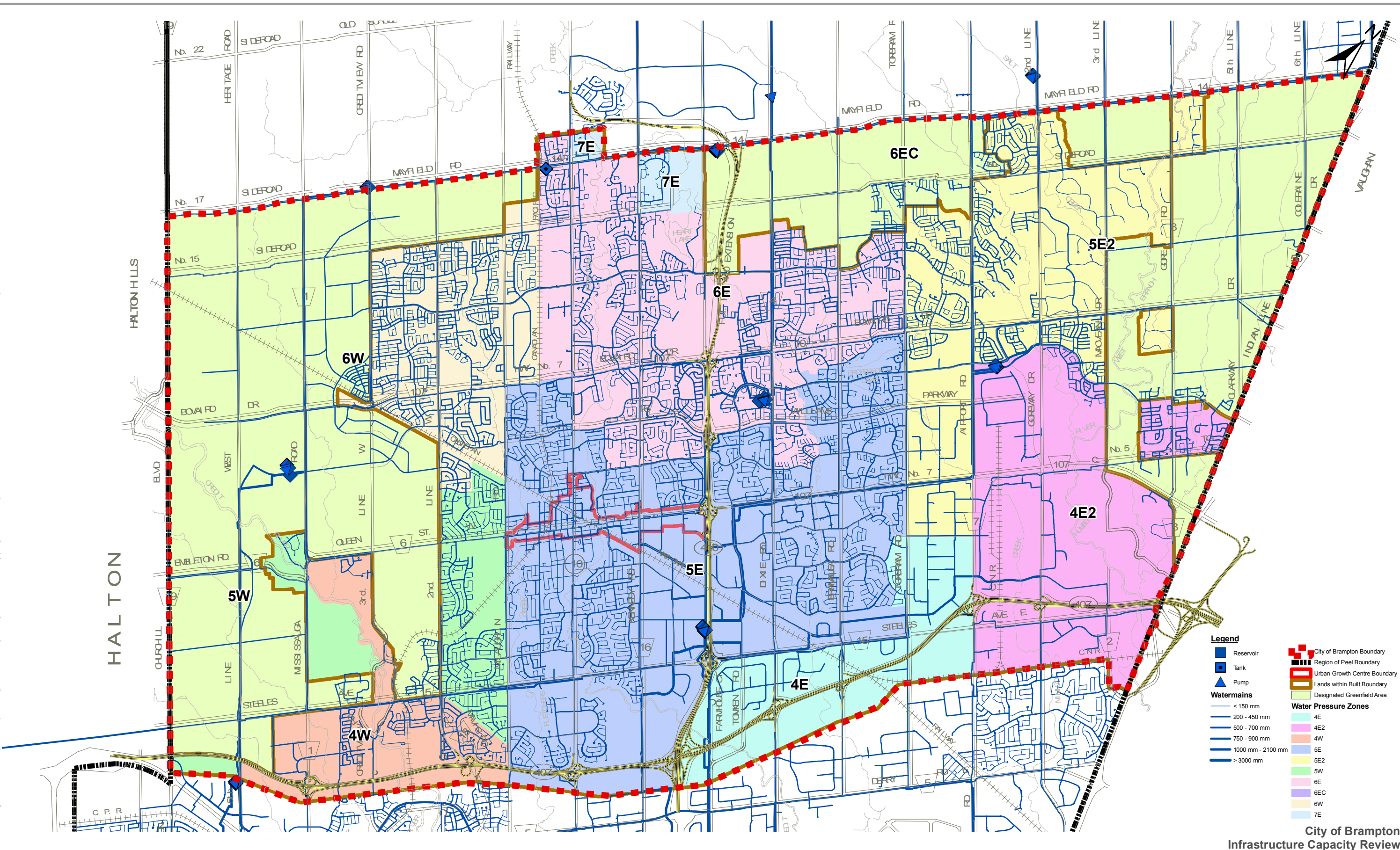
Based on the preliminary review of the planning projections for Brampton, it is noted that the overall projections are greater than the projections used in the 2007 Region of Peel Master Plan. As such, the overall capacity required to meet the Brampton has needed to be reviewed within the context of the overall South Peel System capacity. However, given that the Region of Peel Master Plan utilized overall Places to Grow projections for the Region, it is expected that the trunk system capacity is adequate to meet the revised projections.

The intensification evaluation requires a higher level of detailed analysis on the sub-trunk feeder main and local watermain network. In order to facilitate this analysis, the project team has used the Region's full pipe model with updated demand forecasts to evaluate the impact of the planning projections and intensification requirements specifically. The focus of the evaluation has been to determine key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades. It has been determined through this study, that long term development on key intensification nodes and corridors will trigger significant upgrades to utilities and municipal infrastructure. It will be critical to determine the coordination and staging requirements within these areas to facilitate the upgrades.

#### 6.1.3 Trunk System Requirements

The key trunk infrastructure and facilities required to support the water supply strategy in Brampton is described below. A map of the existing water distribution system within the City of Brampton is provided in Figure 8.







### East

- Beckett Sproule Pumping Station and Reservoir
- East Brampton Pumping Station and Reservoir
- North Brampton Pumping Station and Reservoir
- Airport Road Pumping Station and Reservoir
- Future Tullamore Pumping Station and Reservoir
- Hanlan Feedermain
- Beckett Sproule Feedermain
- Tullamore Feedermain

Beckett Sproule, North Brampton and Airport Road have all recently undergone facility expansions and upgrades. Based on the demands projected for the east service area of Brampton, the long term facility programs will be sufficient to meet these water needs.

The Airport Road facility was recently constructed to meet Peel and York water supply requirements. There is sufficient capacity to meet Peel's short term needs. There is an expansion program in place to provide additional capacity for both Peel and York as the water demand requirements increase. The long term facility program will be sufficient to meet these water needs.

The future Tullamore facility will support servicing the north east limits of Brampton as well as Bolton in the Town of Caledon. The scheduling of this facility was staged to bring more capacity on line as the Peel requirements increase. The schedule for studies and design/construction for this facility will meet Brampton's projections. The design and construction project is currently underway with start of construction anticipated in 2009.

The critical feedermain projects to support moving water supply north through Mississauga and Brampton are the Tullamore, Beckett Sproule and Hanlan feedermain. The construction of the Tullamore feedermain has already been coordinated through the work undertaken with the Airport Road facility. The Beckett Sproule feedermain has completed the Class EA requirements and is moving forward with design and construction. The Hanlan feedermain from the Lakeview WTP will undertake a future Class Environmental Assessment (EA) prior to implementation. All these feedermain projects are on schedule to deliver additional capacity as the system demands increase.

### West

- Meadowvale North Pumping Station and Reservoir
- West Brampton Pumping Station and Reservoir
- Future Allosa Pumping Station and Reservoir
- Herridge Feedermain
- Allosa Feedermain

The Meadowvale North facility has recently undergone expansion and upgrades. Based on the demands projected for the west service area of Brampton, the long term facility program will be sufficient to meet these water needs.

The West Brampton facility is currently under construction. This program is on schedule to provide additional capacity to the west limit service area. The long term facility program will be sufficient to meet the water needs of west Brampton.

The future Alloo facility will support servicing the north west limits of Brampton. The scheduling of this facility was staged to bring more capacity on line as the Peel requirements increase. The schedule for studies and design/construction for this facility will meet Brampton's projections. The Class EA study for this facility is currently underway with anticipated start of construction by 2011.

The critical feedermain projects remaining to support moving water supply north through Mississauga and Brampton are the Alloo and Herridge feedermain. A portion of the construction of the Alloo feedermain has already been coordinated through the work undertaken with the West Brampton facility. The remaining portion will be coordinated with the implementation of the Alloo facility. The Herridge feedermain from the Lorne Park WTP has completed the Class EA and design phases and is currently under construction. All these feedermain projects are on schedule to deliver additional capacity as the system demands increase.

#### **6.1.4 Local System Requirements**

Preliminary steady-state modelling results show that the existing system has sufficient capacity to meet the interim planning forecasts in growth areas and within intensification areas, including Zone 5, which stretches across the southwest, southcentral, and northeast areas of the City. Modelling results for intensification within the Main Central Area showed that pressures were maintained between 51 pounds per square inch of pressure (psi) and 79 psi, which is within the allowable pressure range of 40 psi to 100 psi. Potential revisions to the local servicing requirements could arise based on results from the Region's final Growth Plan conformity exercise and any refinements to the intensification forecasts.

It is also noted that under typical development practices to date, the process for extension of the water distribution system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address greenfield and intensification growth.

## 6.2 Wastewater

### 6.2.1 Overview of Existing System

The Region of Peel is also responsible for conveying and treating wastewater flows generated within the Region including the City of Brampton. Brampton is serviced by the Region's lake-based wastewater system which conveys flows to two wastewater treatment plants, Lakeview and Clarkson, both located in the City of Mississauga along the Lake Ontario shoreline. The Lakeview Wastewater Treatment Plant (WWTP) has recently completed an expansion and has a current expansion program which will result in a rated capacity of 518 ML/d. The estimated ultimate site capacity is 636 ML/d. The Clarkson WWTP has a recently upgraded capacity of 250 ML/d and there are plans to expand the capacity to 350 ML/d, with an estimated ultimate site capacity of 453 ML/d.

The collection system includes gravity sewers, pumping stations, and forcemains. The lake-based wastewater system consists of two separate gravity trunk sewer systems, the east trunk system (Etobicoke Creek) and the west trunk system (Credit River). The Etobicoke Creek East and the Credit River West trunk systems convey flows to the Lakeview WWTP and the Clarkson WWTP, respectively.

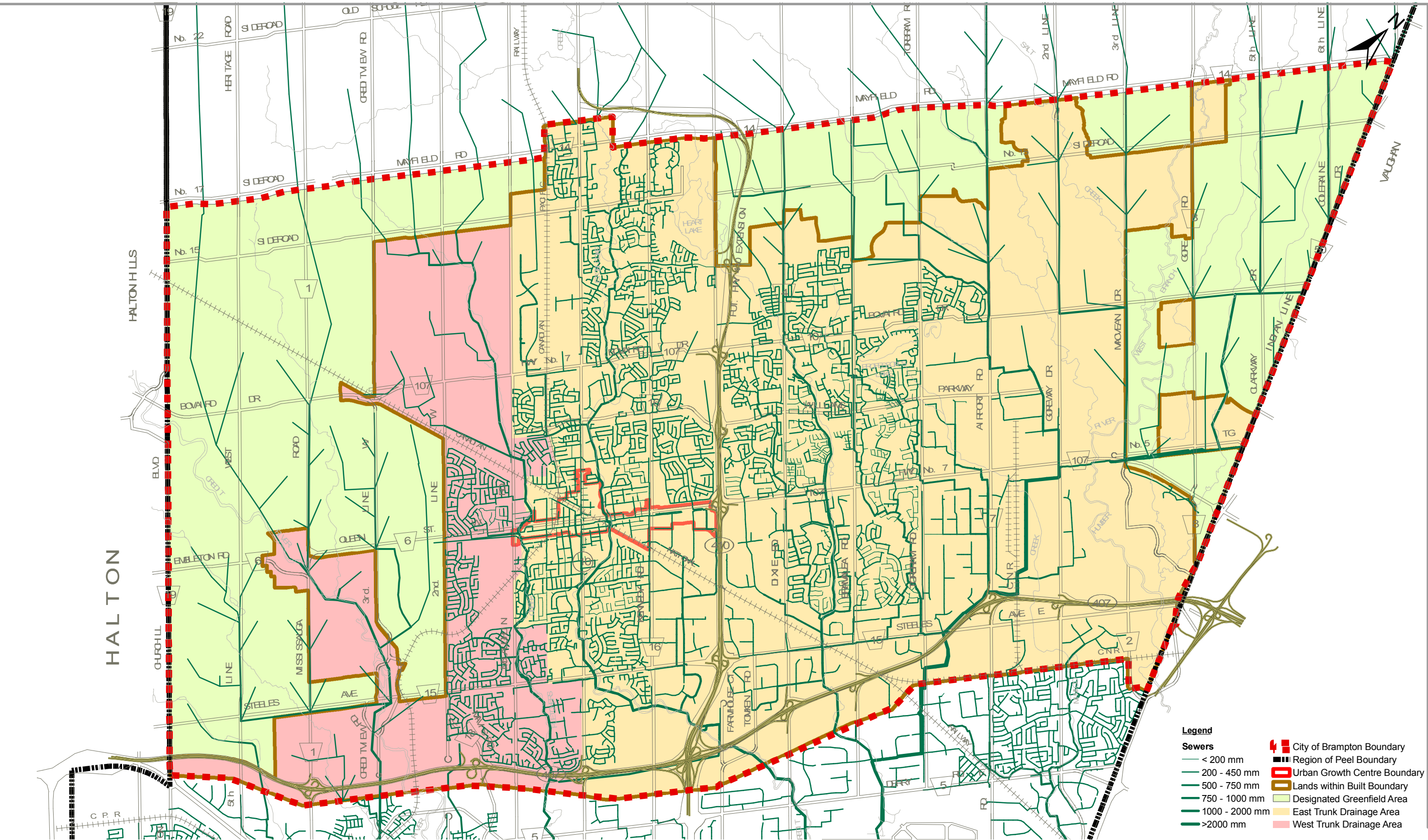
### 6.2.2 Opportunities/Constraints

Similar to the water system evaluation, it was noted that the overall projections are greater than the projections used in the 2007 Region of Peel Master Plan. As such, the overall capacity required to meet the Brampton has needed to be reviewed within the context of the overall South Peel System capacity. However, given that the Region of Peel Master Plan utilized overall Places to Grow projections for the Region, it is expected that the trunk system capacity is adequate to meet the revised projections.

Also similar to the water system evaluation, the intensification evaluation requires a higher level of detailed analysis on the sub-trunk sewer and local sewer network. In order to facilitate this analysis, the project team has used the Region's full pipe model with updated flow forecasts to evaluate the impact of the planning projections and intensification requirements specifically. The focus of the evaluation has been to determine key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades. It has been determined through this study, that long term development on key intensification nodes and corridors will trigger significant upgrades to utilities and municipal infrastructure. It will be critical to determine the coordination and staging requirements within these areas to facilitate the upgrades.

### 6.2.3 Trunk System Requirements

The key trunk infrastructure and facilities required to support the wastewater servicing strategy in Brampton is described below. A map of the existing water distribution system within the City of Brampton is provided in Figure 9.



CONFIDENTIAL - DRAFT



### East

- East (Etobicoke Creek) Trunk Sewer twinning
- McVean Sewage Pumping Station expansion
- Brampton East industrial trunk sewer twinning

The East (Etobicoke Creek) trunk sewer twinning project has been underway for a number of years. All sections south of the 407 have been completed and the trunk sewer system is adequately sized to meet all future flows from Brampton.

The McVean SPS expansion is currently under construction. The schedule for facility upgrades is being undertaken to meet Peel's needs and will support the additional Brampton flow requirements.

The future Brampton East industrial trunk sewer twinning has also been schedule to meet Peel's needs and will support the additional Brampton flow requirements.

All the east trunk infrastructure projects are on schedule to deliver additional capacity as the system flows increase.

### West

- West (Credit River) Trunk Sewer twinning
- West sub-trunk sewer extension
- Fletchers creek sub-trunk sewer extension
- West to East Diversion sewer

The West (Credit River) trunk sewer twinning is a significant project that will require a large length of trunk sewer through a significant portion of built up Mississauga. The Class EA for this project has been initiated. At this time, this project is on schedule to provide additional capacity when required in the future.

The west sub-trunk sewer extension was recently completed north of Hwy 401. This trunk sewer supports servicing and extension of sewers into North West Brampton. This sewer was adequately sized to meet Northwest Brampton's system flows.

The Fletchers creek sub-trunk sewer extension is currently under design. The schedule for facility upgrades is being undertaken to meet Peel's needs and will support the additional Brampton flow requirements. The sewer extension strategy will consider the availability of the diversion sewer to allow Northwest Brampton flows to utilize available capacity in the east system.

In order to support the trunk sewer capacity limitations in the West (Credit River) trunk sewer, a diversion sewer was established to divert west system flows to the east system where there is current trunk sewer and WWTP capacity. The diversion sewer is currently completing construction and is available for use in the diversion strategy.

#### 6.2.4 Local System Requirements

Preliminary steady-state modelling results show that under 2031 conditions with intensification allocated to the Main Central Area, the existing system could experience surcharging in the following areas:

- West Branch of Etobicoke Creek Trunk Sanitary Sewer ranging from 600 mm to 1050 mm along Main Street (south of Queen Street and north of Eldomar Avenue)
- West Branch of Etobicoke Creek Trunk Sanitary Sewer ranging between 900 mm and 1050 mm (between Peel Village Parkway and highway 410)
- Isolated local sewers within UGC surrounding the intersection of Main and Queen Streets, ranging between 200 mm and 400 mm
- 1375 mm diameter Fletcher's Creek Trunk Sanitary Sewer (south of Steeles Avenue and north of Ray Lawson Boulevard)
- 525 mm diameter sub-trunk sanitary sewer located at Clarence Street and Rutherford Road South
- 500 mm diameter sub-trunk sanitary sewer at Clark Boulevard, west of highway 410

Therefore, it is suggested that further analysis be undertaken utilizing more sophisticated, dynamic modelling to confirm whether or not surcharge levels exceed ground elevations. It is suggested that this detailed analysis be undertaken once planning forecasts are finalized, particularly the allocation of intensification growth. Potential revisions to the local servicing requirements could arise based on results from the Region's final Growth Plan Conformity exercise and any refinements to the intensification forecasts.

It is also noted that under typical development practices to date, the process for extension of the wastewater collection system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address Greenfield and intensification growth.

## 6.3 Stormwater

### 6.3.1 Overview of Existing System

There is a considerable length of storm sewer infrastructure through the City of Brampton that could be impacted by future growth and intensification. Storm sewer systems range from private systems on commercial and industrial sites to City storm sewers on local municipal roads to Regional storm sewers on Regional roads. Unlike other hard services that form a connected, city-wide network, storm drainage systems are typically short, independent systems that carry storm runoff from developed areas and roadways to the nearest watercourse. Given the large number of watercourses that flow southerly through the City of Brampton, there are a very large number of discrete storm sewer systems within the City.

Assessment of the characteristics and performance of all storm sewer systems throughout the City was not undertaken at this time. It is suggested that the City undertake this exercise once a complete GIS inventory of storm drainage infrastructure is available.

### 6.3.2 Review of Relevant Studies

#### 6.3.2.1 *Downtown Drainage Study – Part 1*

A review was carried out for the Downtown Drainage Study Part 1: Flood Risk Assessment prepared by Aquafor Beech on June 26, 2006. Key findings and issues were identified and outlined as followed.

The Etobicoke Creek Diversion was constructed in the early 1950's to divert flows from the downtown area in response to frequent flooding. The 600 m long and 22 m wide concrete diversion channel by-passes flow upstream (north) of Church Street East then reconnects with the original Etobicoke Creek valley corridor downstream (south) of the railroad tracks.

Although the downtown area has not been subject to flooding since the construction of the Etobicoke Creek Diversion, most of the area is considered flood-susceptible as it is still in the Etobicoke Creek regulatory floodplain. As a result, this area was identified as a Special Policy Area (SPA) in the 1980's.

The reviewed study undertaken by Aquafor Beech identified the existing flood risk characteristics in downtown Brampton and found that both Regional Storm and 350-year floodwaters spill from the Etobicoke Creek Diversion at the inlet (north of Church Street East) and into the downtown area. The spilled flow meanders through the downtown area then back towards Etobicoke Creek but is blocked due to backwater flow within Etobicoke Creek at the downstream end of the diversion channel's outlet (south end).

Several flood protection options were reviewed for both flood protection of individual buildings and flood relief to reduce or eliminate flood flows. Flood-proofing options in the design of buildings included elevated structures, watertight floodwalls, watertight doors and seals (non-residential) and/or intentional flooding for non-inhabitable structures. Alternatives for flood relief measures included redesign of the Etobicoke Creek bypass as a wide natural channel with new bridges, larger railway openings, widened floodplain downstream of downtown and a berm/wedge near Church Street East and Ken Whillans Drive (including raising Rosealea Park to the level of the 350-year floodplain). The berm/wedge option was found to be the optimal solution.

The existing Secondary Plan Policies for the area provide a policy framework for the review of development applications within the Special Policy Area affected by the flooding risk, which includes requirements for addressing flooding risk and life safety. Any development proposed must be reviewed in the context of these policies and the Provincial Policy Statement. In addition the City is evaluating broader strategies such as the ongoing environmental assessment evaluation and implementation of the berm/wedge solution and intensification potential through the Growth Plan work.

#### 6.3.2.2 *Downtown Drainage Study – Part 2*

A review was carried out for the *Downtown Drainage Study Part 2: Stormwater Management* prepared by Aquafor Beech and dated April 11, 2008. The purpose of the study was to assess storm drainage infrastructure capacities in Downtown Brampton and identify stormwater management requirements for future redevelopment in the area.

The study focussed on the trunk storm sewer on Main Street, which runs from Vodden Street southerly to its outlet to Etobicoke Creek. Initially, a Rational Method analysis was completed for the system. The analysis indicated that a number of the storm sewer segments along Main Street did not have capacity for the 10 year event, which is the current City of Brampton storm sewer design standard.

A more complex modelling analysis of the storm sewer system was undertaken, using DHI Water and Environment's MOUSE hydrologic/hydraulic modelling software. The MOUSE model considered the capacity of the catchbasins in the study area, which restrict the rate at which runoff enters the storm sewer system. Modelling indicated that the existing storm sewer system capacity is limited by catchbasin inlet capacity rather than the storm sewer capacity. Additional catchbasins may improve intake into the storm sewer system however it will also increase the potential for flooding due to surcharging. The MOUSE model also indicated that during some storm events, the storm sewer system was found to be surcharged in some areas while flowing under capacity in others. The capacity of the storm sewer system overall was found to vary from 5-year to 25-year storms whereas new storm sewer within the City of Brampton are design using the Rational Method for a 10-year storm event.

Expected redevelopment of the Queen Street corridor and its potential hydrological impact was discussed within the report. The study noted that the downtown core area (Wellington Street to the CN railway) is already highly impervious, and therefore redevelopment of the area would not be expected to generate significantly higher runoff rates and volumes. The study also predicted that the historic areas south of Wellington Street would not be subjected to significant intensification, given the parks, church lands and historic homes in the area. The areas north of the CN rail line are likely to increase in imperviousness through redevelopment, and therefore have the greatest potential to generate higher runoff rates and volumes to the existing storm sewer system.

To mitigate the impacts of future development on the existing storm sewer systems in Downtown Brampton, the study recommended that the following criteria be applied to redevelopment applications in the area:

- Runoff rates be controlled to existing rates or below for the 2-year through 100-year storms
- No new connections allowed to the storm sewer system
- Drainage outlet routes and rates should be maintained



- Provide Level 1 or enhanced level of protection for Etobicoke Creek water quality (Ministry of the Environment standard required by TRCA)

The report recommends that lot-level or on-site stormwater management measures be implemented (rather than conveyance or end-of-pipe) due to the site-by-site nature of the redevelopment.

Alternative stormwater management practices and applications include; rooftop storage, parking lot storage, superpipe, oil-grit separators, soakaway pits, biofilters, green rooftops, rainwater harvesting, pervious pavement, filter strips/snow treatment areas, dry swales and fee-in-lieu charges in place of a stormwater management measure.

#### 6.3.2.3 *City of Brampton Stormwater Management Master Plan (Draft)*

A review was carried out for the draft City of Brampton Stormwater Management Master Plan, which is currently being prepared by Aquafor Beech Ltd.

The report prepared by Aquafor Beech identified that a consistent approach for funding of stormwater measures does not exist and as a result, several municipalities have been forced to find alternatives for funding. The report includes an inventory of all stormwater retention ponds within the City of Brampton, including 150 existing ponds and approximately 216 additional ponds required in the future, needing \$225 million in funding for construction costs and 600 ha of land.

New stormwater management facilities are required to mitigate the impacts of new development in Greenfield areas on the receiving watercourses. New development in the City of Brampton must first go through a rigorous planning process. Locations for centralized stormwater management facilities are identified early in subwatershed studies and block plan studies, and the design of these facilities are refined through the draft plan of subdivision and permit processes. Currently, developers are responsible for the design and construction of stormwater management facilities, including provision of land for facilities. The report prepared by Aquafor Beech does not recommend any changes to the current practice.

Maintenance of new stormwater management facilities is funded through a perpetual maintenance fee charged to the developer. The report prepared by Aquafor Beech suggests that current rates fall short of funding actual maintenance costs. Aquafor Beech recommends that the perpetual maintenance fee charged to new development be restructured to reflect true maintenance costs and sufficiently fund pond maintenance fees.

The maintenance of existing ponds is currently funded through perpetual maintenance fee reserves. Aquafor Beech identifies that this source for funding is inadequate to support the maintenance of existing ponds and recommends that in addition to the perpetual maintenance fee reserves, a stormwater charge also be implemented.

Redevelopment provides opportunities for stormwater management improvements in areas that were built prior to the implementation of current design standards and/or before consideration was given to stormwater management issues. Areas being considered for land-use intensification have the opportunity to implement both source and conveyance control programs into the redevelopment.

Source control measures, often referred to as low-impact development measures, have not been widely implemented through the City of Brampton and surrounding municipalities. The Aquafor Beech study recommends that, until additional studies and monitoring are completed, implementation of source controls in existing developed areas should rely on stewardship and private sector resources. Conveyance controls, such as bioretention swales and exfiltration storm sewer systems, are typically installed in municipal right of ways. The study recommends that, if additional studies and pilot projects determine that conveyance controls are effective, that they be integrated into road reconstruction and other complementary capital construction projects.

The report discusses a previous study undertaken in 2003 titled *The City of Brampton Stormwater Retrofit Study* which identified 33 potential sites that could either have a wet pond constructed at the end of an existing storm sewer outfall or reconstruct a dry pond to a wet pond. The cost was estimated at \$53 million in 2003 then extrapolated to \$69 million for 2008. Construction of pond retrofits is currently funded through fee-in-lieu charges. The fee-in-lieu policy allows for small infill development and redevelopment to pay a fee towards future stormwater retrofit projects in the City instead of implementing on-site quantity and/or quality controls. Aquafor Beech recommends that the fee-in-lieu charges continue with future development with the augmentation of an additional stormwater charge to provide adequate funding.

### 6.3.3 Opportunities/Constraints

Future growth in the City of Brampton will occur through urban expansion into current Greenfield areas, and through intensification within existing developed areas. Much of the intensification is proposed to be directed to major transit nodes and intensification nodes through the City.

For new development in Greenfield areas, new storm infrastructure will be designed and constructed by and for new development. The City will eventually assume and maintain these systems. Maintenance is currently funded through a perpetual maintenance fee charged to new development, though funding may be restructured in the future.

Intensification in existing developed areas could result in an increase in lot coverage. An increase in impervious cover will generate more runoff relative to current conditions for the same rainfall event, and therefore could impact the performance of the existing storm sewer systems.

#### 6.3.3.1 Intensification in Commercial/ Industrial Areas

An examination of the potential impacts of intensification in commercial and industrial areas was investigated. Within the City of Brampton, commercial and industrial areas are typically comprised of large building structures, surrounded by surface parking. Up to 90 % of the site area may be covered by hard surfaces, with limited landscaping around the perimeter of the site.

The form of future intensification of these areas will vary, but is expected to generally result in more and/or taller building coverage on the site. While site coverage will be altered, it is expected that some landscaping will remain, covering approximately 10% of the site area.

With no change in the total imperviousness of a commercial/industrial site following intensification, there should be no change in the total peak flow generated, relative to current conditions for the same storm event. The City of

Brampton Subdivision Design Manual stipulates a runoff coefficient of 0.90 to represent commercial and industrial areas in the calculation of peak flow rates for the design of storm sewer systems. This runoff coefficient will remain appropriate to represent future intensification in commercial and industrial areas. There are therefore few impacts anticipated on existing storm infrastructure as a result of the planned intensification in existing developed commercial and industrial areas.

#### 6.3.3.2 *Intensification in Residential Areas*

A typical residential lot in the City of Brampton is covered by a house, garage, driveway, and possibly sidewalks, patios and/or decks. In older estate residential subdivisions with large lots, such as those found in north-east Brampton, approximately 30 to 35 % of the lot is covered by hard surfaces, on average. In the more recently developed residential areas in the City of Brampton, lots are not as large, and a greater fraction of the lots are covered by hard surfaces, with less grass and landscaped areas. These lots are typically considered to be 50% impervious or more.

The City of Brampton's Subdivision Design Manual stipulates a runoff coefficient of 0.25 for parks, 0.50 for single and semi-detached residential development, 0.75 for multiple dwellings and institutional areas, and 0.90 for commercial and industrial developments and roadways.

Intensification within existing residential areas could take the form of dense townhouse style development, mid to high-rise condominium development, and/or a mix of commercial and high density residential development. Following intensification, a greater fraction of the site is expected to be covered by impervious surfaces (larger roof areas, surface parking, etc), and is therefore expected to generate higher rates and volumes of runoff.

Limitations on information readily available from the City of Brampton and the Region of Peel prevented an analysis of the existing capacity and potential impacts on all existing storm sewer systems within the residential areas planned for intensification. Instead, a representative residential area was selected for analysis, to gain an understanding of the likely impacts of intensification through other residential areas within the City.

#### 6.3.4 **Modelling Analysis**

A residential area located on the west side of Main Street North between Bovaird Drive and Queen Street West as illustrated in the Key Map of Drawing Number 00-CW1004, was selected as the test area. Main Street North is one of the corridors in the City of Brampton planned for intensification. The City of Brampton provided plans for the existing storm sewer systems in the area, as well as drawings illustrating the drainage areas and runoff coefficients used in the design of the sewers (See Appendix E). Unfortunately, storm sewer design sheets were not available for the test area.

Drainage within the test area includes runoff from local and adjacent properties to the storm sewer system located on Murray Street and Greenleaf Crescent. The lots located on Greenleaf Crescent and backing on to Main Street North have a flow divide approximately halfway back on the property. This flow divide causes the front half of these properties to drain west to Greenleaf Crescent and the rear half of these properties to drain east to Main Street North.

## Existing Conditions

The storm sewer system within the test area should have been designed for the 10-year storm event as there are currently no separate foundation drain collectors or apparent on-site controls. The runoff coefficient used in the design of these storm sewers was provided in Figure F3-3-25 as 0.50 and corresponds to the single and/or semi-detached homes within the area, as per the City of Brampton Subdivision Design Manual. A storm sewer design sheet was prepared for the existing system as part of the subject study. The storm sewer design sheet from The City of Brampton Works and Transportation Department (Drawing No. 342) was used to model the storm runoff through the storm sewer system provided in Figure F3-3-25 in Appendix F.

As expected, the analysis found that the existing storm sewer system within the area just has sufficient capacity for the 10-year storm peak flow rates. A copy of the 10-year storm sewer design sheet for current conditions is provided in Appendix E.

## Proposed Conditions

A hypothetical redevelopment scenario was prepared for the area to evaluate the potential impact of intensification on existing storm infrastructure. It was assumed that all of the residential lots on the east side of Greenleaf Crescent (as illustrated in Drawing 00-CW1004), would be removed and replaced by high-density development that would front onto Main Street North. It was further assumed that this development would cover the majority of the site, with only a limited amount of landscaping around the perimeter of the site. Note also that the area draining to the local storm sewer system was conservatively increased to include the total area between Greenleaf Crescent and the Main Street North right-of-way. A plan illustrating the assumed re-developed area is included in Drawing 00-CW1004 of Appendix F. Consistent with the City of Brampton Subdivision Design Manual, a runoff coefficient of 0.90 was applied to the intensified area.

A second storm sewer design sheet was prepared for the proposed intensification within the test area. As expected, the increase in runoff coefficient from 0.50 to 0.90 resulted in an increase in peak flow rates of 42% at the system outlet in both the 10-year and 100-year storm. The existing storm sewer system would not have capacity for this increase in peak flow rates. The storm sewer design sheet for proposed conditions is provided in Appendix E.

One alternative to manage the increase in peak flow rates from the site would be to replace the storm sewers leading from the site to the receiving watercourse with larger pipes. For the storm sewer system in the test area, pipe sizes would have to be increased by 1 to 3 size increments (75 mm to 225 mm) to accommodate the increased 10-year design flow rate. Calculations are provided in Appendix E.

Upgrading the capacity of the storm sewer system would represent a considerable expense, as it would require reconstruction of the roadways along the sewer alignment for its removal and replacement.

As an alternative to replacing the storm sewer system downstream of the site, on-site stormwater management controls were evaluated. On-site peak flow controls are commonly applied to new and redevelopment, to either mitigate impacts on existing drainage infrastructure or to prevent an increase in peak flow rates and erosion in receiving watercourses. An analysis was undertaken to estimate the on-site storage volume required to control the 10-year peak flow rate from the intensified area to the capacity of the existing system. It was determined that



a storage volume equivalent to 7 mm over the site would be necessary. The detailed calculations are provided in Appendix E.

Roof drain restrictions are a common practice for flat roof development and redevelopment, temporarily ponding 10 cm or more water on the roof during severe storm events. Catchbasin restrictions are also common in surface parking areas, with maximum ponding depths of up to 30 cm. It should therefore be relatively simple and inexpensive to implement on-site controls within the redevelopment area to restrict peak flow rates to the capacity of the storm sewer for the 10 year design event, avoiding the need to replace the downstream storm sewer system.

Recall that the City of Brampton Subdivision Design Manual guidelines apply to rainfall events up to and including the 100-year storm, and consider the minor (piped) and major (overland) flow systems. It has been determined that a relatively small volume of on-site storage would be required to control the 10-year peak flow from an intensified site to the capacity of the storm sewer system. However, the proposed intensification could potentially impact the depth of flow and degree of flooding along the major system overland flow routes leading to the receiving watercourse during a 100-year storm event.

To verify that there would be no impacts on the existing major system, an analysis was undertaken to determine the on-site storage volume that would be required to control the 100-year peak flow from the site to the capacity of the existing storm sewer, effectively eliminating any major system flow from the site for up to the 100-year storm event.

Calculations provided in Appendix E demonstrate that the required storage volume would be equivalent to a depth of 12 mm over the site. This is small relative to storage depths typically available on the roof (10 cm or more) and parking surface (up to 30 cm) for new development. Note that additional storage volumes may be required in areas where there is a reduced storm sewer design standard, such as the older downtown area and areas with separate foundation drainage collectors.

### **6.3.5 Water Quality and Streambank Erosion Impacts**

Growth and intensification have the potential to impact the quality of runoff delivered to the watercourses through the City of Brampton. While it is difficult to assign a cost associated with water quality impacts, degraded water quality in the City's watercourses could be argued to have a social cost to the users of the trails and amenities through the valley corridors.

Similarly, growth and intensification can lead to increased rates of erosion in the receiving watercourses through the City. Excessive erosion has the potential to expose buried infrastructure (watermains, trunk sanitary sewers) in the valley corridors, and could lead to slope failures, threatening existing development at the top of the valley slope. Potential costs to the City include emergency repairs to exposed infrastructure and long term stream bank and valley slope stabilization works.

For new development in Greenfield areas, stormwater management practices and facilities are generally incorporated into the development to mitigate any impacts on water quality and streambank erosion.

Redevelopment and intensification in existing developed areas is expected to increase impervious cover, and therefore has the potential for increased pollutant loadings to receiving watercourses and increased rates of erosion in receiving watercourses.

Stormwater management practices and measures are available at the site level to maintain or enhance the quality of runoff generated from the site. These include traditional structural measures such as oil-grit separators, and emerging low-impact development practices such as green roofs, bioretention swales and rainwater re-use. Low impact development practices, which reduce runoff rates and volumes, are also capable of mitigating erosion impacts in receiving watercourses.

The City of Brampton also has completed the Stormwater Retrofit Study to implement stormwater management controls at existing uncontrolled and under-controlled storm outlets. Funding for these retrofit projects currently comes from fees-in-lieu of on-site quality controls on redevelopment sites. Additional funding for stormwater retrofit projects, such as stormwater charges, are currently under consideration by the City.

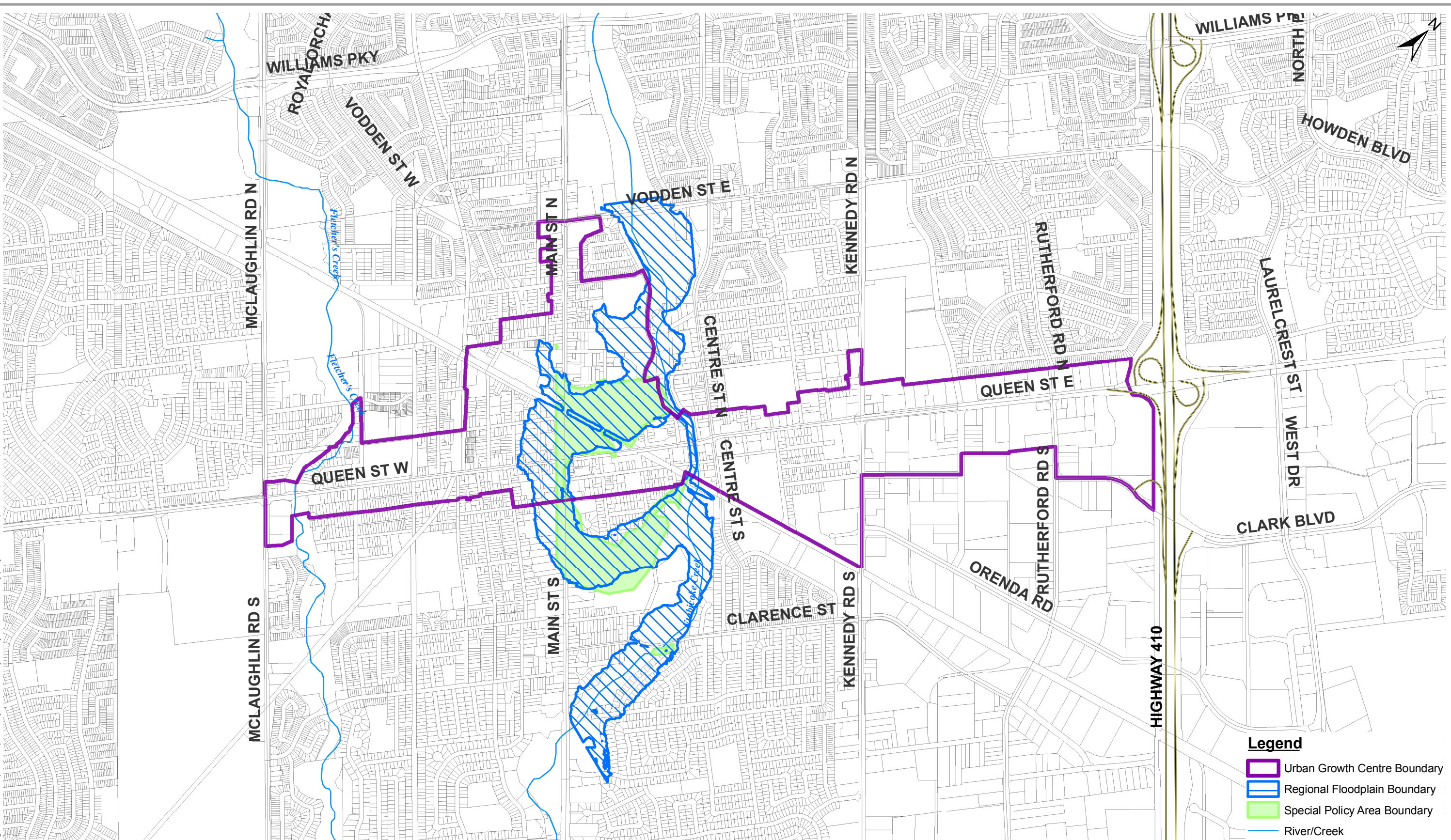
It is therefore concluded that any potential impacts of intensification on stormwater quality and streambank erosion can be mitigated through on-site controls and/or the City's current stormwater retrofit program.

#### **6.3.6 Regional Storm Floodplain**

The Regional Storm floodplain associated with Etobicoke Creek is not confined to the flood control channel. Recall from section 2.3.3 that the Regional storm floodplain spills through the Brampton downtown area. The Etobicoke Creek Regional storm floodplain is illustrated in Figure 10. As can be seen from the figure, a portion of the Downtown Urban Growth area is located in the Regional storm floodplain, and several intensification corridors pass through the floodplain.

A portion of the Etobicoke Creek floodplain through the downtown area is a designated SPA, which allows for some redevelopment to occur. Approval for redevelopment is possible, provided that a number of criteria are satisfied to manage flood risk. These include safe ingress and egress, adequate flood proofing of buildings, and the availability of safe flood routes for emergency evacuation.

The Regional storm floodplain represents a significant constraint to development in the downtown urban growth area. However, it does not preclude intensification in the urban growth area. At this time, redevelopment applications in the Brampton SPA are evaluated on an individual basis. Site specific studies must be prepared to develop appropriate flood protection measures and to demonstrate that flood risk will be adequately mitigated. The planned flood control 'wedge' near Church Street East and Ken Whillans Drive should reduce flood levels in the downtown, which may allow for redevelopment with more reasonable flood proofing measures.



CONFIDENTIAL - DRAFT

Figure 10 - Regional Floodplain and Special Policy Areas within the Brampton Urban Growth Centre



## 7. Suggested Policy Directions

### 7.1 Utilities

#### 7.1.1 Overview

Given the significant growth forecasts for the City of Brampton both within and outside the built boundary, system upgrades and expansions will need to occur concurrently. Growth anticipated in the northeast and northwest greenfield areas will require strengthening of utility infrastructure, such as hydro. One solution could involve the construction of new transformer stations in the northwest and northeast ends of the City, requiring new transmission lines in both cases along the north-south corridors to feed these new growth areas.

The Downtown Brampton and Queen Street Corridor are located some distance from the existing Transformer Stations, thereby creating challenges regarding future power supply to the Queen Street corridor. Development in the downtown core will require extensive work in replacing, relocating and installing new underground hydro infrastructure (such as concrete encased duct banks) as the existing infrastructure can support only existing loads. *A practical solution to supply power (via a primary feeder) along the Queen Street Corridor is the construction of a new Transformer Station in the vicinity of Kennedy Road and the utility corridor or Highway 407.*

Coordination undertaken with staff from Hydro One Brampton Networks Inc. under this study has indicated that the anticipated population and employment growth in the Region is estimated to require approximately 500 MW (megawatts) of electricity. The existing electrical transmission infrastructure is close to reaching capacity and is forecast to be beyond capacity by 2012.

In regards to the existing transformer stations (TS) and all available dual element spot network (DESN), including existing and already approved for expansion, indicates sufficient capacity to supply power to the City of Brampton up to 2022, when it is expected that peak loads may reach 1000 MW. This will trigger new transformer stations to provide capacity to meet post 2022 needs. Potential sites for evaluation will depend on load growth patterns resulting from population and employment growth within the City.

In response to these needs, it is suggested that the City and Hydro One Networks Inc. continue to coordinate to provide the rights-of-way for the provision of new hydro transmission corridors, while endeavouring to minimize required road-right-of-way widths. Opportunities to integrate provision of hydro transmission corridor widths exist through the Environmental Assessment (EA) study for Bram West Parkway/North-South Transportation Corridor (expected to start in 2009) and through development plans pertaining to these service areas.

Based on the coordination undertaken to date under this study with Hydro One Brampton and on the location of the anticipated growth, a preliminary high level recommended hydro strategy has been identified and is depicted in Figure 11. It is also suggested that the following potential TS studies be undertaken with Hydro One Networks Inc. in the following areas:

- Transmission Utility Corridor: Kennedy Road/ Highway 407 area
- Transmission Utility Corridor: Airport Road/Highway 407 area



- Transmission Utility Corridor: Heritage Road/ Highway 407 area
- North West sector of the City: Mayfield Road/Wanless Drive and Chinguacousy Road/McLaughlin Road area
- North East sector of the City: Mayfield Road/Countryside Drive and Airport Road/Goreway Drive area
- Expansion of the existing 44kV yard at Goreway TS
- Expansion of the existing 44kV yard at Bramalea TS

No constraints or issues were flagged for the natural gas system servicing Brampton's planned growth. Enbridge confirmed that sufficient capacity is in place to meet future needs including those within the Main Central Area. Extensions of trunk gas mains on significant road allowances will continue to be facilitated as required.

Similarly, it is anticipated that telecommunication service providers will be capable of meeting the long term growth program and will coordinate with the City and other utilities as development occurs. However, based on the coordination through this study, the following policy directions were suggested for supporting provisioning needs of telecommunications providers:

- Complete a technology audit to determine the existing capabilities of the existing telecommunications network
- Facilitate coordination between growth management and the maintenance and expansion of the telecommunication sector, both in terms of technological advancement and service provision
- Protect and enhance existing communications networks
- Undertake discussions with telecommunications providers regarding the feasibility of servicing existing and future employment areas with industry standard telecommunications services, including broadband technology, to attract knowledge-based industries and support the technological advancement and growth of existing businesses
- Cooperate with both private and public telecommunication providers responsible for the regulation, transmission and delivery of telecommunications services within the City in planning the future development and staging of the networks

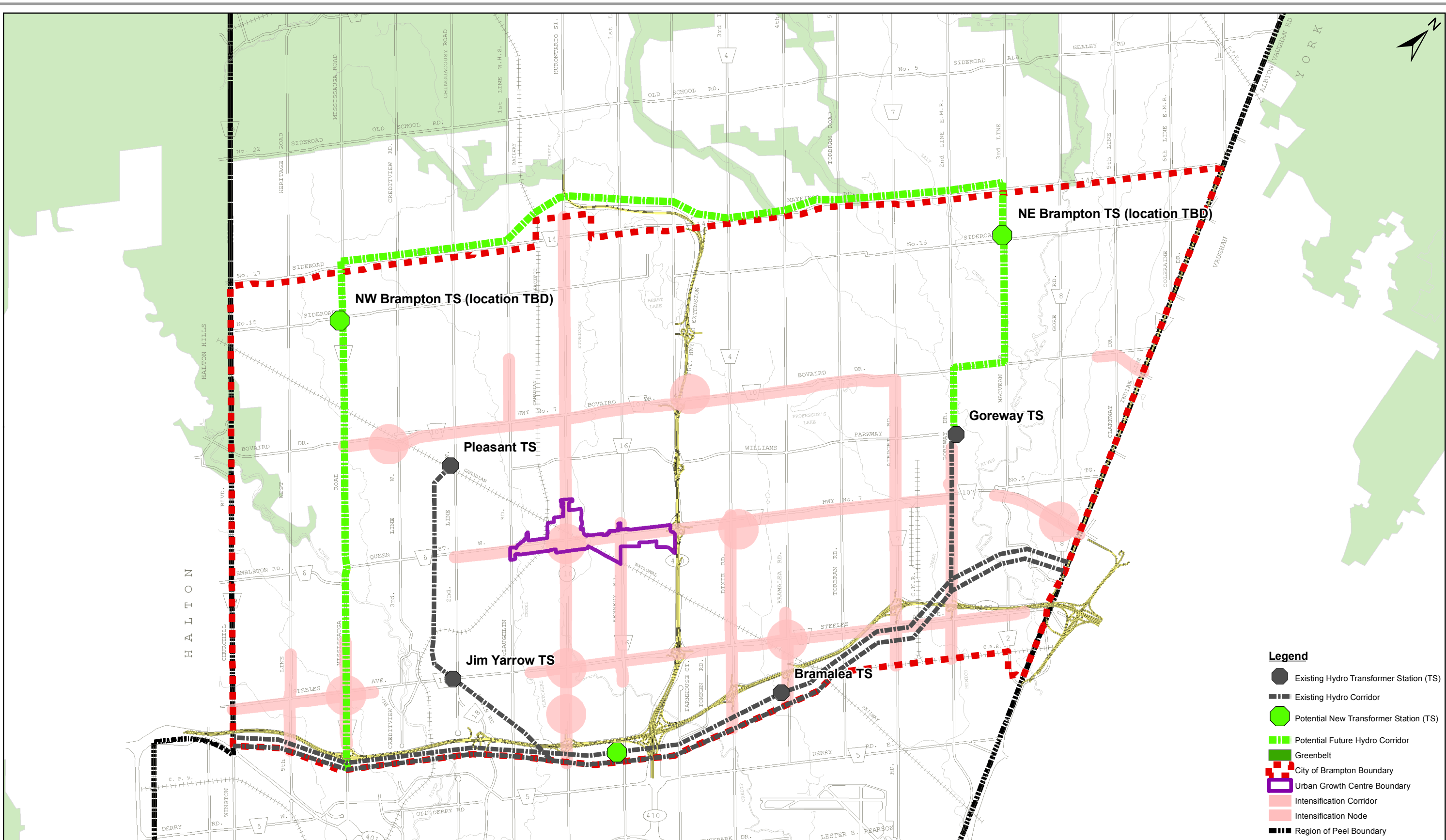
### 7.1.2 Coordination Requirements

In order to support development of the downtown core, it is imperative that underground infrastructure services be ready and accessible in a timely manner. Given the level of visioning for this area, it is suggested that the City undertake a Master Plan study for the design and implementation of underground infrastructure within the Downtown Brampton/Queen Street Corridor. The objective of this study would be to streamline the process of planning, designing and developing the underground infrastructure to support the aboveground developments ultimately planned along the corridor. Key aspects of this Master Plan study would:

- Formalize coordination process between utilities and the City to better integrate long term planning requirements
- Identify opportunities for streetscaping along the Downtown Brampton/Queen Street Corridor, concerning widths of streets, pedestrian sidewalks, bike/bus dedicated lanes and natural landscaping
- Provide an implementation plan for the various road cross-sections and identify potential locations for hydro lines, gas pipelines, telecommunication cables, watermains, sanitary sewers, and storm sewers throughout the corridor
- Coordinate with all utilities to ensure that relocation of services is minimized

**It is suggested that the City undertake a Master Plan study for the design and implementation of underground infrastructure for the Queen Street Corridor**

A formalized coordination process between the City and the various utility providers is also required for the entire City, particularly for developments that represent infill and intensification relative to infrastructure projects. Coordination with service providers early in the planning process will ensure the necessary provisions for the efficient and effective delivery of services to existing and future residents prior to undertaking extensive works.



Note: Potential New Transformer Stations and Future Hydro Corridors are strictly conceptual at this stage and are not currently proposed by Hydro One Network. Preferred sites and alignments to be refined and finalized through future detailed studies.

City of Brampton  
Infrastructure Capacity Review

## 7.2 Water

### 7.2.1 Overview

The recommended water servicing strategy for the City of Brampton was presented as part of the South Peel servicing strategy in the Regional Master Plan Update completed in September 2007. This preferred servicing strategy along with recommendations made as part of the 2007 DC are depicted in Appendices C and D, respectively.

The intensification evaluation requires a higher level of detail analysis on the sub-trunk feedermain and local watermain network. In order to facilitate this analysis, the project team has used the Region's full pipe model with updated demand forecasts to evaluate the impact of the planning projections and intensification requirements specifically. The focus of the evaluation has been to determine key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades.

Preliminary steady-state modelling results show that the existing system has sufficient capacity to meet the interim planning forecasts in growth areas and within intensification areas, including Zone 5. Modelling results for intensification within the Main Central Area showed that pressures were maintained between 51 psi and 79 psi, which is within the allowable pressure range of 40 psi to 100 psi. Potential refinements could arise based on results from the Region's final Growth Plan Conformity exercise.

It is suggested that the Region of Peel continue to maintain a full pipe Regional hydraulic water model and regularly feed any capacity issues back to the City of Brampton. This process would ensure that any work needed to upgrade or expand the system are planned such that they coincide with planned municipal roadwork and utility upgrades.

### 7.2.2 Other Servicing Considerations

It is suggested that the Region of Peel regularly review current design standards to ensure that they accurately reflect trends in water usage supplied via the water treatment plants. Changes in the design criteria over time could be warranted particularly in light of water efficiency and conservation programs and changes in water quality requirements.

Supporting principles and standards should be established to ensure ongoing development review, particularly for the intensification areas, adequately addresses overall system level of service. The practices and processes to date for extension of the water distribution system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address Greenfield and intensification growth.



## 7.3 Wastewater

### 7.3.1 Overview

The recommended wastewater servicing strategy for the City of Brampton was presented as part of the South Peel servicing strategy in the Regional Master Plan Update completed in September 2007. This preferred servicing strategy along with recommendations made as part of the 2007 DC are depicted in Appendices C and D, respectively.

Similar to water, the intensification analysis required the project team to utilize the Region's full pipe model with updated flow forecasts to evaluate the impact of the planning projections and intensification requirements specifically. The focus of the evaluation has been to determine key infrastructure to be upgraded and determine the feasibility and coordination requirements of implementing these upgrades. It will be critical to determine the coordination and staging requirements within these areas to facilitate the upgrades.

Preliminary steady-state modelling results show that under 2031 conditions with intensification allocated to the Main Central Area, the existing system could experience surcharging in the following areas:

- Isolated sewers surrounding the intersection of Main and Queen Streets
- Hurontario/Main Street Sub-Trunk Sanitary Sewer
- Downstream of the UGC along the west branch of the Etobicoke Creek Trunk Sanitary Sewer, generally between highway 407 and just north of Steeles Avenue

Therefore, it is suggested that further analysis be undertaken utilizing more sophisticated, dynamic modelling to confirm whether or not surcharge levels exceed ground elevations. It is suggested that this detailed analysis be undertaken once planning forecasts are finalized, particularly the allocation of intensification growth. Potential refinements could arise based on results from the Region's final Growth Plan Conformity Exercise.

It is suggested that the Region of Peel continue to maintain a full pipe Regional hydraulic wastewater model and regularly feed any capacity issues back to the City of Brampton. This process would ensure that any work needed to upgrade or expand the system are planned such that they coincide with planned municipal roadwork and utility upgrades.

### 7.3.2 Other Servicing Considerations

It is also suggested that the Region of Peel regularly review current design standards to ensure that they accurately reflect trends wastewater flows to the wastewater treatment plants. Changes in the design criteria over time could be warranted particularly in light of water efficiency and conservation programs, climate change factors, and changes in wastewater effluent limits.

Supporting principles and standards should be established to ensure ongoing development review, particularly for the intensification areas, adequately addresses overall system level of service. The practices and processes to date for extension of the wastewater collection system and review of the acceptable level of service has been addressing the City of Brampton's and Region of Peel's needs. It is anticipated that these processes will continue to address Greenfield and intensification growth.

## 7.4 Stormwater

### 7.4.1 Overview

Future growth in the City of Brampton will occur through expansion into existing undeveloped areas, and redevelopment and intensification in existing developed areas. Both new and redevelopment have the potential to impact storm drainage infrastructure, both in terms of the capacity of existing storm sewer systems, and in terms of water quality, erosion and flooding in the receiving watercourses that flow through the City of Brampton.

New development in the City of Brampton is typically preceded by Master Environmental Servicing Plans or Block Plans that include a framework for stormwater management. Developers are responsible for the design and implementation of storm drainage infrastructure, including stormwater management practices and facilities to mitigate the impacts of development on water quality, erosion and flooding in the receiving watercourses. Future maintenance of the storm drainage infrastructure is funded through a perpetual maintenance charge, which may be restructured in the future.

The current approach to managing storm drainage for new development is generally considered adequate to manage impacts on storm drainage infrastructure. No additional recommendations for new development arose from the subject study prepared by Aquafor Beech.

Redevelopment and intensification in existing developed areas has some potential to impact storm drainage infrastructure. Intensification may result in an increase in impervious cover (roofs, surface parking, laneways, etc) relative to current conditions. The increased impervious area has the potential to generate more runoff volume, higher runoff rates and additional pollutant loadings.

Through the subject study, a test area was selected to evaluate the potential impacts of intensification of an existing single family residential area backing onto a designated intensification corridor. Redevelopment of the area to high density residential and/or mixed use, if unmitigated, would increase the peak flows in the receiving storm sewer system by as much as 42%, or well above the available capacity in the storm sewer system. To accommodate the increase in peak flow rates from intensification would require the storm sewers to be increased by between 1 and 3 pipe sizes (75 mm to 225 mm). A further scenario was evaluated to determine the on-site storage requirements to control peak flow rates to the capacity of the existing storm sewer and major system capacities. It was determined that the required storage volume could be provided through common design practices (ponding of excess runoff on roof and surface parking areas). It is therefore suggested that on-site controls be implemented on redevelopment sites to prevent any increase in peak flow rates to the storm sewer system and major (overland) drainage system.

**Redevelopment of the area to high density residential and/or mixed use, if unmitigated, would increase the peak flows in the receiving storm sewer system by as much as 42%, or well above the available capacity in the storm sewer system.**

Existing commercial and industrial areas are already largely impervious, often with 10 % or less of the site area left in its natural state or landscaped. Redevelopment and intensification of these areas is not expected to further reduce the pervious cover over the site. Therefore, no significant impacts to storm drainage infrastructure are anticipated due to intensification of existing commercial and industrial areas.

It is suggested that potential impacts from intensification on water quality and erosion in the receiving watercourses be mitigated through a combination of on-site controls, conveyance controls and stormwater retrofits. The City already has a stormwater retrofit program to construct new stormwater management ponds at existing older uncontrolled storm outlets, and to improve the performance of older (dry) stormwater management ponds. Funding for these retrofit projects currently comes from cash-in-lieu charges from redevelopment and infill development applications. Conveyance controls such as exfiltration storm sewers can be implemented where appropriate through planned roadway reconstruction projects. Implementation of on-site low-impact development practices such as permeable pavement, green roofs, bioretention swales, etc will be encouraged through stewardship programs.

## 7.5 Summary of Suggested Policy Directions

Detailed long term planning information for the utilities is currently not sufficiently available. However, it is anticipated that provision for new northwest Brampton and northeast Brampton transformer stations and transmission corridors will be required. Similarly, extension of trunk natural gas mains will be required. It is anticipated that the telecommunications upgrades and extensions can be facilitated as growth proceeds.

Review of the trunk water and wastewater infrastructure shows that the current implementation programs for the South Peel water and wastewater system will be sufficient to meet the City of Brampton's servicing needs. New trunk infrastructure and facilities are being provided in time to service the future growth areas. Class EAs and construction projects are currently being implemented to meet these timelines. Based on preliminary modelling, the water system meets the City's planned growth. Preliminary modelling of the wastewater system indicates a potential for surcharging in sections within and downstream of the UGC. Further analysis is suggested to determine the degree and severity of the sanitary sewer surcharging.

The current approach to managing storm drainage for new development is generally considered adequate to manage impacts on storm drainage infrastructure. It is suggested that on-site controls, conveyance control and stormwater retrofits be carried out as the development occurs. Site specific studies within the Etobicoke Creek floodplain should continue to be carried out to manage flood risk.

## 7.6 Other Suggested Policy Directions

Based on the coordination undertaken to date under this study with the utilities, it is suggested that the coordination process be more formalized in order to better integrate the long term planning requirements. Current Public Utilities Coordination Committees (PUCC) coordinate at the time a project is in design. However, there is a need for a PUCC at the planning level as it appears that the utilities may not be sufficiently informed of long term planning forecasts and the potential impacts on their infrastructure. A formalized coordination process will support a better exchange of information and ensure infrastructure is being planned, where possible, to the same planning horizons. This coordination process should immediately address the following issues:

- Long term infrastructure and facility locations – as part of the infrastructure upgrade requirements, it is anticipated that additional hydro corridors and transformer stations will be required. These sites and

corridors, as an example, should be adequately reflected and protected. As a minimum, the potential future northwest Brampton and northeast Brampton sites should be reviewed.

- Based on coordination with Hydro One Networks Inc., it is our understanding that Environmental Assessments would need to be completed for the future transformation stations and that it takes approximately 4 to 6 years from the beginning of the Environmental Assessment to the commissioning of the facility. As such, these studies should be initiated immediately, including designating study leads.
- Intensification nodes and corridors – based on the plans for intensification, the future road alignments, frontages, cross sections, etc. will require review and upgrade/relocation of utilities. It is suggested that the coordination process develop staging plans for these key nodes and corridors. In particular, the Queen Street corridor will require detailed planning. It is suggested that these planning exercises be completed as Corridor Master Plans and Staging Plans.

It is also suggested that coordination with the Region of Peel be undertaken to regularly review current design standards to ensure that they accurately reflect trends in water usage and wastewater flows to the treatment plants. Changes in the design criteria over time could be warranted particularly in light of water efficiency and conservation programs, climate change factors, changes in water quality requirements and changes in wastewater effluent limits. Review of design criteria has the potential to extend the life and capacity of existing and future infrastructure.

As an overall suggestion, a comprehensive inventory of all underground facilities should be undertaken to confirm the location and extents of existing infrastructure within its municipal boundaries, and where information does exist, the transfer to digital format. This will facilitate locating, updating and managing information and will support future studies.