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water & wastewater Master Plan Update

*Achieving Sustainable Long Term
Water and Wastewater Servicing in York Region*





THE REGIONAL MUNICIPALITY OF YORK

Water and Wastewater Master Plan Update

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D R A F T

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Overview

Planning for growth is a key municipal responsibility, and one for which York Region has established an award winning approach through the *York Region Sustainability Strategy – Towards a Sustainable Region*¹. The foundation of the strategy involves integration of economic, environmental, and community issues to facilitate decisions about growth management that are responsive, rational, and timely.

York Region adopted the same approach for planning long term water and wastewater servicing. The *York Region Sustainability Strategy – Towards a Sustainable Region* was used as the overall guide, along with information about current water and wastewater regulatory requirements, existing York Region policies, programs, and practices, and the best practices of jurisdictions in Canada, the United States, and beyond. The Region then developed a sustainability strategy for water and wastewater servicing. The *York Region Water and Wastewater Sustainability Strategy* emphasizes transparency, equity, accountability, and community involvement as well as monitoring and continuous improvement toward sustainability.

The need for York Region to plan for long term water and wastewater servicing is urgent. York Region is the fastest growing region in the Greater Toronto Area and one of the fastest growing municipalities in all of Canada. The provincial government has forecast York Region's population will grow to 1.5 million by 2031. Other forecasts have indicated a population of as much as 1.8 million by 2051. Economic growth is expected to double over the same period – increasing from 462,000 jobs in 2006 to 799,000 jobs by 2031, and potentially reaching over 950,000 jobs by 2051.

The result of the expected rapid growth in population and employment will be increased demand for water and wastewater services. York Region has undertaken to provide long-term water and wastewater services that are safe, well-managed, and sustainable. To that end, on June 22, 2006, Regional Council authorized the commencement of the Water and Wastewater Master Plan Update study, with the purpose of determining how best to continue to provide the highest quality servicing to ensure that the:

- Natural heritage and environment of the Region are preserved and protected,
- Projects, programs and policies supporting the servicing are delivered in a fiscally responsible manner,
- Works and services are in compliance with applicable legislation, regulations and guidelines, and,
- Delivery of water and wastewater works and services is integrated with the Region's other infrastructure, planning, and growth management responsibilities.

Regional Council's authorization marked the first time water and wastewater Master Plans were updated together, and would cover the entire Region. This combined Master Plan is an update of

¹ The *York Region Sustainability Strategy: Towards a Sustainable Region* is available on-line at www.york.ca and is contained in Appendix 1 of this report.

previous master plans such as the original 1997 master plans, the 2002 York-Durham Sewage System Master Plan Update, and the 2004 York Water System Master Plan Update.

Planning Process

The Water and Wastewater Master Plan Update study followed the “master planning process” as set out in Ontario legislation for Municipal Class Environmental Assessments. This process integrated the planning of municipal infrastructure requirements for existing and future land use with the principles of environmental assessment. The preparation of the Master Plan Update thus conforms to the requirements of both Ontario’s *Planning Act* and *Environmental Assessment Act*.

The Master Plan Update study continued the work done in previous master planning efforts and individual Class Environmental Assessments. The process involved six main steps. The process began with the establishment of a baseline, in terms of existing population and employment along with existing water and wastewater services and system components. Population and employment forecasts were used to determine future water and wastewater flows. A comparison between existing water and wastewater system capabilities, regulatory and Regional requirements, and future flows allowed for the identification of future servicing needs. Different approaches to servicing future needs were identified and evaluated using criteria based on the main themes contained in York Region’s *Water and Wastewater Sustainability Strategy*. A preferred alternative was identified and used as the basis for developing detailed recommendations for the Region’s long term water and wastewater servicing. The Master Plan Update covered the period to 2031; however potential future needs to 2051 were also examined to ensure that recommended actions would align with eventual environmental, infrastructure, and land use development requirements, thus assuring the long term sustainability of York’s water and wastewater systems.

York Region actively engaged the public and agency stakeholders throughout the Master Plan Update study. York Region used a combination of communications strategies, including newsletters, public consultation centres, and a web-portal. Liaison with First Nations was maintained throughout the study to ensure their interest and historical connections in the Region were understood and respected. York Region also established a Technical Advisory Committee (TAC), comprising representatives from York Region, Provincial Government Ministries (including the Ministries of Environment, Municipal Affairs and Housing, and Natural Resources), conservation authorities, neighbouring regional and York Region local area municipalities, and the York Region study team, with the mandate to discuss issues, provide input, and make recommendations about long term water and wastewater servicing for the Region. The issues identified via the various consultation vehicles were used to guide the progress of the Master Plan Update. All comments were addressed and incorporated in the selection of the preferred alternative and in the development of recommendations for policies and programs to support sustainable, long term servicing.

Context

Water supplied to homes in York Region originates either from a lake or as groundwater. The urban areas in Markham, Richmond Hill and Vaughan are serviced by treated water from Lake Ontario, from treatment facilities that service the City of Toronto and Peel Region. Aurora,

Newmarket, Holland Landing, Sharon, Queensville, Mount Albert, King City, Nobleton, Schomberg, Stouffville, Ballantrae/Musselman Lake, Kleinburg and Ansnorveldt obtain water from groundwater via a system of production wells operated by York Region². Keswick, Sutton, and the Georgina lakeshore communities obtain water from Lake Simcoe. In rural areas, individual private wells provide water supply.

Most wastewater is collected in a large trunk sewer system (York-Durham Sewage System) and treated at the Duffin Creek Water Pollution Control Plant in Pickering before it is discharged into Lake Ontario³. This system serves Newmarket, Aurora, Stouffville, Richmond Hill, King City, Vaughan, and Markham. Separate treatment plants discharging into river tributaries exist in Mount Albert, Holland Landing, Schomberg and Kleinburg. Wastewater treatment plants serving Keswick and Sutton discharge into Lake Simcoe.

Water and wastewater servicing in York Region is multi-jurisdictional, based on the Region's location, two-tier municipal governance structure, and through inter-regional servicing agreements with the City of Toronto, Peel Region, and Durham Region.

For both water and wastewater servicing, the Region is the “wholesaler”, supporting supply, treatment, storage, pumping, and transmission mains in the case of drinking water, and major pumping stations, trunk sewers and treatment facilities in the case of wastewater. The area municipalities distribute the water to local customers and are responsible for local wastewater collection and local wastewater pumping.

The water system itself is divided into two distinct parts: (1) the York Water System, which serves the larger urban communities of York Region; and, (2) individual systems serving smaller communities located mainly in the northern and central parts of the Region. York Region's wastewater system is also divided into two distinct components: (1) the York-Durham Sewage System (YDSS), which serves York Region's larger urban communities; and, (2) individual systems serving smaller communities.

A main feature of York Region is that it contains a watershed divide. Streams and rivers in the upper portion of the Region drain to Lake Simcoe, which lies in the Lake Huron watershed, while streams and rivers in the lower portion of the Region drain to Lake Ontario. This presents a challenge for York Region because provincial law and the Great Lakes Charter Agreement ban new or increased transfers of drinking water from one Great Lakes watershed to another (known as intra-basin transfers), unless specific conditions known as exception criteria are met.

Preferred Alternative

The Region considered a number of alternative approaches to long term water and wastewater servicing. These alternatives were derived from past master planning efforts, and Class Environmental Assessment requirements, and took into consideration provincial legislation and

² Aurora and Newmarket also receive small quantities of City of Toronto, and Peel water to supplement the current groundwater source.

³ A portion of the York-Durham Sewage System flow is treated at the G.E. Booth Water Pollution Control Facility in Peel Region.

regional policies governing growth management. Public input identified four top priorities (which were translated into evaluation criteria) for York Region's long term water and wastewater servicing, namely the need to:

- Ensure certainty of supply,
- Meet and exceed Ontario Drinking Water Standards,
- Meet or exceed water quality and air quality requirements, and,
- Ensure water and wastewater system reliability.

Assessment of various alternatives showed that enhancing and expanding existing water and wastewater systems would provide the most appropriate solution to effectively accommodate the Region's long term growth. Based on the physical, hydrological and topographical characteristics of the Region, as well as the locations of existing water and wastewater system components, this alternative was carried forward as two separate alternatives: (1) Lake Ontario-based servicing; and, (2) Lake Simcoe-based servicing.

A comparative evaluation of the two alternatives was undertaken, using criteria based on the principles articulated in *York Region's Water and Wastewater Sustainability Strategy*, with the result that Lake Ontario-based servicing was identified as the preferred alternative to meet York Region's long term water and wastewater servicing needs because it:

- Best meets the Region's sustainability principles while supporting future growth within the Region,
- Protects Lake Simcoe by reducing nutrient discharges,
- Protects Lake Ontario through the advanced treatment afforded by the Duffin Creek WPCP in Durham Region and the Lakeview WPCP in Peel Region,
- Supports the Great Lakes water balance by returning flow to Lake Ontario,
- Supports the major investment in Lake Ontario oriented infrastructure already in place, and,
- Supports water supply system security and operational flexibility.

The public strongly supported York Region's preferred alternative (Alternative 1 – Lake Ontario-based servicing), and acknowledged the need to continue with, and enhance, the Region's water efficiency and conservation efforts while at the same time strengthen efforts to reduce and prevent further inflow and infiltration to the wastewater collection system.

The majority of proposed projects had previously been identified through past master planning efforts and Class Environmental Assessments. This Master Plan Update served to re-affirm the previously identified projects. Among the new infrastructure projects identified through the Master Plan Update, the single largest will be a new Primary trunk sewer. Currently, the existing Primary trunk sewer conveys all wastewater generated in the York-Durham Sewage System service area to the Duffin Creek water pollution control plant. The new Primary trunk sewer will increase the overall security of the system, and it will be designed to accommodate future growth. The new water and wastewater projects that have been identified through the Master

Plan Update are needed to service future growth in north Vaughan, north Markham, and East Gwillimbury.

Figures ES-1 and ES-2 show York Region's planned water and wastewater servicing for 2031.

Supportive Policies and Programs

The preferred alternative will involve the construction of major capital works. Equally important will be the adoption and implementation of policies and programs that support sustainable servicing, as outlined in the Region's *Water and Wastewater Sustainability Strategy*.

As part of the Master Plan Update, York Region conducted a review of its existing policies and programs to confirm on-going relevance. The review identified opportunities for refinement and for the adoption of additional policies and programs to support sustainable water and wastewater services.

The goal of these programs, which include the Region's highly successful *Water for Tomorrow* program, York's *Sustainable Housing Incentive Program*, and the York Region and Local Municipality Inflow and Infiltration Reduction program, is to effectively manage the demands placed upon water and wastewater services. For example, an integral part of the development of the conceptual designs for the infrastructure projects that comprise the preferred alternative has been to effectively and efficiently manage energy usage, limit the production of greenhouse gas emissions, and minimize potential impacts on the Region's natural heritage areas. As well, the conceptual designs take into account the benefits that are expected to accrue from existing Regional programs, such as *Water for Tomorrow*. In addition, the Region plans to continue efforts to protect its natural heritage, attract residents and businesses, and optimize asset performance – all of which are vital elements important to the sustainability of the Region's water and wastewater systems.

Estimated Costs

The estimated capital cost of the water and wastewater infrastructure projects comprising the Master Plan Update is expected to reach \$4.8 billion⁴ in the period to 2031, and \$6.6 billion in the period to 2051. Over 60 % of the capital costs are attributed to wastewater projects.

Implementation Strategy

York Region developed a priority setting framework to ensure that construction of water and wastewater infrastructure projects and implementation of supportive policies and programs is carried out as effectively and efficiently as possible so that benefits are maximized.

⁴ The capital costs are for the completion of the indicated projects and do not include previous project expenditures. The capital cost estimates are based on a conceptual level of design except in the case of some on-going projects. Cost estimates at the conceptual level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

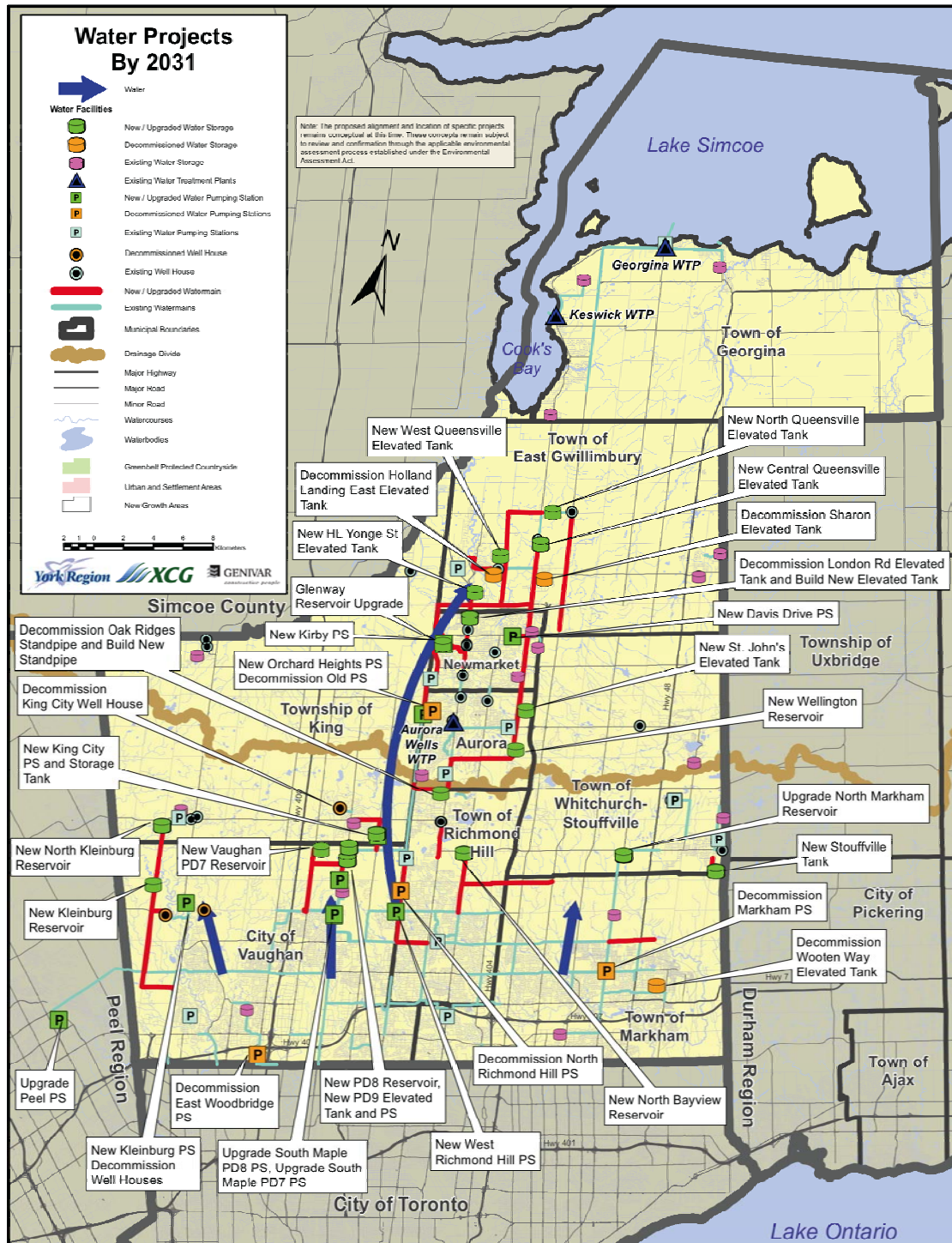


Figure ES-1 York Region Water Servicing by 2031



The framework served to identify the sequencing of water and wastewater infrastructure projects, as well as initiation and timing for policies and programs. The rationale underlying the framework was the Region's commitment to build water and wastewater facilities and deliver services that are safe, well-managed, and sustainable, and that promote the preservation of the Region's natural heritage, minimize impacts to the Region's environment, and demonstrate fiscal responsibility.

The priority setting framework considered the extent to which individual projects comprising the preferred alternative contribute to achieving the following Regional planning objectives:

- Need to meet existing water and wastewater servicing demands,
- Ability to meet forecasted future needs,
- Requirement to comply with regulations,
- Contribution to existing Regional strategies and policies,
- Affirmation of the *York Region Sustainability Strategy – Towards a Sustainable Region*, and,
- Validation of the Region's water and wastewater sustainability principles.

The projects, policies, and programs comprising the preferred alternative were assigned one of three levels of priority, depending on anticipated need. In all cases, York Region took a prudent approach and made allowance for infrastructure projects to accommodate new growth, thus assuring the on-going sustainability of water and wastewater servicing over the long term.

2016 Action Plan

The Preferred Alternative identified through this Water and Wastewater Master Plan Update includes over 80 capital works projects that the Region intends to initiate in the period to 2016 plus the Water for Tomorrow program and water and wastewater infrastructure asset management. The 2016 Action Plan includes improvements, expansions and priority strengthening of both treatment facilities as well as linear infrastructure. These new projects follow-on from the projects that had been approved and initiated as a result of the previous master plan updates and individual Class EAs and are currently under construction.

The estimated capital project cost of the 2016 Action plan is almost \$2.4 billion exclusive of program costs and rehabilitation/replacement costs. This amount includes both water and wastewater capital projects.

The Region is committed to carrying out the projects so that expected growth can be appropriately accommodated and serviced. The Region's ability to accomplish its 2016 goals will be a function of its ability to respond quickly and prudently to issues as they arise, such as infrastructure complexity, integration with other infrastructure projects, and inter-jurisdictional and regulatory considerations.

Next Steps

The Master Plan Update defines the broad framework for delivery of York Region's long term water and wastewater servicing and is intended to address the initial steps of the Class EA process. Thus, to this point, the evaluation has been of a general nature. The infrastructure projects are still subject to the requirements of the Class EA process. Those projects that are classified as Schedule A and A⁺ are pre-approved, and York Region can begin design and construction of these projects shortly. In the case of Schedule "B" and "C" projects, additional investigation and evaluation is required before approval is received to commence design and construction.

The Region will continuously monitor and respond to changes in the assumptions used for this Master Plan Update, including assumptions related to economic factors, regulatory requirements, and environmental conditions. York Region is already tracking changes in greenfields consumption, and population and employment growth and densities, through the Census Place of Work and Census Place of Residences surveys. The information generated by the surveys, in conjunction with information about new development applications, issuance of building permits, numbers of business permits and licenses, as well as progress of individual projects identified through the Transportation Master Plan update, will provide data to ground-truth the Provincial Government population and employment forecasts. In turn, York Region can use these data to ensure that water and wastewater servicing is keeping pace with population and employment.

York Region recognizes the importance of coordinating the actions identified through this Master Plan Update with other Regional initiatives, and is actively working toward seamless integration of this Master Plan Update with the Transportation Master Plan Update and the Region's *Planning for Tomorrow* growth management efforts.

1. The Challenge

1.1 Problem Statement

York Region is forecast to achieve remarkable population growth over the next 25 plus years, reaching a population of 1.5 million by 2031 and potentially 1.8 million by 2051. Economic growth is expected to double over the same period to almost 800,000 jobs in the Region by 2031, potentially reaching over 950,000 jobs by 2051.

This growth, which has been forecast by the Provincial Government, will put enormous pressure on the Region's environment and its infrastructure. Without appropriate action, the demand for water and wastewater servicing resulting from the rapid population and economic growth will eventually exceed water and wastewater system capacities. Limitations on where this growth can occur have a direct impact on individual components of the existing water and wastewater systems serving York Region. Furthermore, recent changes to the regulatory framework in Ontario mean additional, more stringent conditions will likely be imposed on existing systems.

In consideration of these challenges, and with a view to adopting an integrated and sustainable approach to growth management, York Region has formulated the following problem statement to guide the Class EA for future long term water and wastewater servicing:

"To provide long-term water and wastewater services for the communities of York Region, that are safe, well-managed, and sustainable, ensuring in so doing that the natural heritage and environment of the Region are preserved and protected, that the projects, programs and policies supporting the servicing are delivered in a fiscally responsible manner, that the works and services are in compliance with applicable legislation, regulations and guidelines, and that the delivery of water and wastewater works and services is integrated with the Region's other infrastructure, planning, and growth management responsibilities."

York Region has a long-established history of planning for water and wastewater servicing. To address the issues identified in the problem statement in a way that achieves the stated goals and builds on past efforts, the Region determined that the most appropriate approach would be to update its existing separate water and wastewater master plans into a single, overall plan. This Master Plan Update thus encompasses the York Water System, the York-Durham Sewage System, and all small community water and wastewater systems.

The Region chose this approach for a number of reasons, namely:

- The unprecedented population and economic growth that the Provincial Government has mandated for York Region;
- Direction from the Provincial Government about where this growth can take place;

- York Region’s responsibility to provide a range of services – not just water and wastewater, but all other services needed to meet population and economic demands, such as transportation, housing, and human services; and,
- The Region’s need to deliver the range of services in a way that would protect and enhance its natural environment, ensure healthy communities, and promote on-going economic vitality.

1.2 Triple Bottom Line Philosophy

In November 2007, York Region Council adopted the *York Region Sustainability Strategy – Towards a Sustainable Region*⁵. This award-winning⁶ Strategy provides a long-term framework for making timely, knowledgeable, and appropriate decisions about growth management and municipal responsibilities that better integrate the economy, environment, and community, as shown in Figure 1–1. The Region refers to this integration of economy, environment, and community as its “triple bottom line”.



Figure 1–1 York Region Sustainability Strategy Triple Bottom Line

The York Region Sustainability Strategy builds on existing policies and activities presently supported by the Region, while strengthening core values and enhancing the implementation of sustainable approaches. The Strategy is predicated on nine guiding principles, which are intended to facilitate integrated, innovative and collaborative decision-making:

⁵ The *York Region Sustainability Strategy: Towards a Sustainable Region* is available on-line at www.york.ca and is contained in Appendix 1 of this report.

⁶ In 2008, York Region was awarded first place and the gold award at the International Liveable Community Awards in the "whole city" population category of 750,000 and over for the Region's Sustainability Strategy: Towards a Sustainable Region.

1. Provide a long-term perspective on sustainability.
2. Evaluate using the triple bottom-line elements of environment, economy and community.
3. Create a culture of continuous improvement, minimizing impact, maximizing innovation and increasing resiliency.
4. Identify specific short-term achievable actions that contribute towards a sustainability legacy.
5. Set targets, monitor and report progress.
6. Foster partnerships and public engagement.
7. Create a spirit of stewardship, shared responsibility and collaboration.
8. Raise the level of sustainability awareness through education, dialogue and reassessment.
9. Promote sustainable lifestyles and re-evaluation of our consumption and expectations.

The policies and initiatives of the Strategy are categorized under six themes, and these are shown in Table 1–1. For each theme, the Region has identified actions that demonstrate its commitment to sustainability-based governance; in all, the Region has identified more than 100 actions and illustrative examples of actions for each theme area are shown in the table.

The *York Region Sustainability Strategy – Towards a Sustainable Region* is not the first, nor is it the only, effort that the Region has made to integrate sustainability into its decision-making and its operations. Before formally adopting the Sustainability Strategy, York Region already had in place a number of policies, procedures, and programs related to sustainability that specifically address infrastructure, and these are listed in Table 1–2.

Some of these initiatives listed in Table 1–2, such as *Vision 2026*, are high level policies that guide the Region’s decision-making. Others, such as York Region’s Energy and Environmental Management System, provide information on an on-going basis that can be used to continuously improve operations. Collectively, York Region’s actions and strategies are intended to ensure there is appropriate and timely water and wastewater servicing to meet growing demand while at the same time making efficient use of public funds.

Complete information about all of the Region’s initiatives is available on York Region web-site, www.york.ca.

Table 1–1 York Region Sustainability Strategy Themes and Example Actions

Theme	Description	Illustrative Example of Action
Corporate Culture of Sustainability	The Region understands that sustainability is very much a way of thinking that begins with raising awareness and integrating sustainability principles into all Regional decision-making processes. This approach will assist the Region in optimizing productivity, performance and overall employee well-being.	Development and implementation of corporate training for businesses in York Region, including: (1) The Guide to Greening Your Business; (2) sustainability workshops for York Region businesses; and, (3) a workplace skills initiative with Seneca College.
Healthy Communities	Sustainability is about achieving a state of well-being. The Region strives to improve the quality of life and health of residents and employees and support overall independence and personal development by planning and developing strong healthy communities. The Region's goal is to create self-sustaining and healthy communities that emphasize the human condition. This objective involves an integrated decision-making process that simultaneously considers land-use and infrastructure planning, human services and fiscal impacts.	Prepare and adopt a York Region Pedestrian and Cycling Master Plan.
Economic Vitality	Sustainability will make York Region more competitive. This approach can result in efficiencies and savings, create attractive, balanced communities, and help attract a talented labour force and leading edge companies. The Region can provide a climate for the growth of innovative and competitive companies that can contribute toward a resilient, diverse and prosperous economy. In short, sustainability makes business sense.	Work with the area municipalities to expedite key industrial/commercial developments through the Regional approval process.
Sustainable Natural Environment	York Region's natural environment is one of its greatest assets. The Greenbelt includes 69% of the Region's land areas. It contributes to the quality of life of residents and helps attract new business to the Region. The Region's goal is not only to protect, but also to enhance and strengthen its natural heritage.	Increase the Region's waste diversion rate from 65% by 2010 and 75% by 2016.
Education, Engagement and Partnerships	Many of the elements of sustainability lie outside traditional municipal responsibility. This is why partnerships with other sectors and organizations are essential to create a common vision and coordinated action.	Produce a citizen brochure that describes how York Region residents can contribute to the Region's sustainability goals and actions.
Sustainability Implementation and Monitoring	The key to a successful sustainability strategy is its implementation, continuous monitoring and improvement. It is important to identify and address the practical requirements for implementing the Regional Sustainability Strategy.	Benchmark Regional performance on an annual basis against a set of criteria, targets and indicators that define sustainability in York Region.

Table 1–2 Corporate Initiatives Supporting Sustainability

Format	Initiative
<i>Strategies and Policies</i>	• Vision 2026 • Regional Official Plan • Planning for Tomorrow – York Region's Growth Management Initiative • Greening Strategy • Protection of the Oak Ridges Moraine • Natural Heritage System
<i>Procedures</i>	• State of the Environment Reporting
<i>Programs</i>	• Energy and Environmental Management System • Water for Tomorrow • Sustainable Housing Incentive Program (SHIP) • Inflow and Infiltration Reduction/Prevention Program

1.3 Sustainability Strategy for Water and Wastewater

In 2008, York Region took its region-wide sustainability strategy one step further and developed a sustainability strategy specifically geared to water and wastewater works and services.

Using the *York Region Sustainability Strategy – Towards a Sustainable Region* as the overall guide, along with information about current water and wastewater regulatory requirements, existing York Region policies, programs, and practices, and the best practices of jurisdictions in Canada, the United States, and beyond, the Region developed a sustainability strategy for water and wastewater servicing comprised of ten principles.

Specific components of the water and wastewater sustainability strategy, shown in Figure 1–2, are intended to ensure that the Region’s water and wastewater works and services meet “the need of the present without compromising the ability of future generations to meet their own needs”⁷. Over 40 actions are identified in the strategy, ranging from ensuring that water supplied from surface and groundwater sources will be within safe yield limits, through minimizing service disruptions, to optimizing energy use.

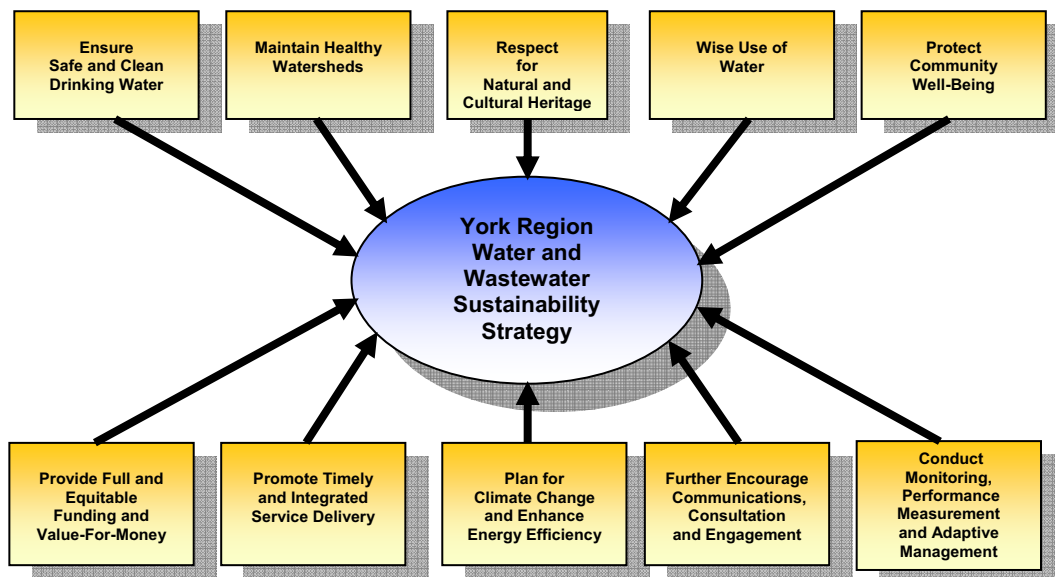


Figure 1–2 Water and Wastewater Sustainability Strategy Principles

⁷ Brundtland, G. H. (1987). *Our Common Future*. United Nations World Commission on Environment and Development, Oxford University Press, Oxford.

The water and wastewater sustainability strategy⁸ has been endorsed by Regional Council and provides an essential building block for this Master Plan Update and the principles it advances. It relies on evaluation of the “triple bottom line”, which measures success by looking at three main goals: healthy communities, economic vitality, and a sustainable natural environment. This approach emphasizes transparency, equity, accountability, and community involvement as well as monitoring and continuous improvement toward sustainability. The overall effectiveness of the water and wastewater sustainability strategy will be evaluated by measuring the performance of various indicators linked to the ten principles depicted in Figure 1–2.

Successful implementation of York Region’s water and wastewater sustainability strategy relies on an adaptive management approach, which allows for adjustments to be made in the timing and scope of strategy components to better accommodate changes in:

- Socio-economic factors, that is, the estimates of population and economic growth, including the rates of growth and the locations within the Region where growth is occurring;
- Regulatory requirements, which are external pressures and to which the Region’s policies and programs must be able to respond; and,
- Environmental conditions, notably the potential impacts of climate change, which can affect the quantity and quality of drinking water sources as well as the receiving environments for wastewater effluents and biosolids.

Incorporating adaptive management into the water and wastewater sustainability strategy will generally involve emphasizing particular aspects. For example, because the Region does not directly own or manage all aspects of its water resources, there will be a need to strengthen existing water partnerships and possibly enter into new partnerships that address issues such as management of stormwater discharges. There is also a need to develop specific water and wastewater goals, objectives, and targets to allow measurement and feedback on the success of mitigative measures, which may include, for example, so-called resilient strategies that are based on a safe fail approach to infrastructure design and operation. These goals, objectives, and targets will be operationalized through the identification of appropriate infrastructure and implementation of supportive policies and programs.

⁸ The *York Region Water and Wastewater Sustainability Strategy* is available on-line at www.york.ca, and in contained in Appendix 1 of this report.

2. Overview Description of York Region

The Regional Municipality of York is located in south central Ontario, in the heart of the Greater Toronto Area. The Region covers 1,776 square kilometres, and includes farmlands, wetlands and kettle lakes, the Oak Ridges Moraine and over 2,070 hectares of forest. It is bounded to the north by Lake Simcoe, the Holland Marsh and Simcoe County, to the west by the Regional Municipality of Peel and Simcoe County, to the east by the Regional Municipality of Durham, and to the south by the City of Toronto.

York Region is one of ten regional, “upper tier” municipalities in Ontario. Regional municipalities were created by the Provincial government in the 1970s to increase efficiency and effectiveness in local governance and in the delivery of municipal services.

There are nine local area, or “lower tier”, municipalities in York Region: the City of Vaughan, the Towns of Aurora, East Gwillimbury, Georgina, Markham, Newmarket, Richmond Hill, Whitchurch-Stouffville, and the Township of King. A map of the Region, showing the area municipalities is presented in Figure 2–1.

York Region is a mix of urban and rural communities, and is currently home to almost 930,000 residents (based on 2006 census data). This population represents a significant increase from the 169,000 people who resided in York Region in 1971, at the time of the Region’s creation. There has been a continual shift in the type of development over this period, from predominantly green field suburban and rural development to development that includes more compact urban forms focused on centres and corridors in the Region’s urban areas, as part of York Region’s city-building focus. In the towns and village areas, there has been a focus on complete communities serving as hubs to the broader rural areas.

2.1 Natural Environment

York Region contains significant natural terrestrial and water resources features. Key landforms include the Oak Ridges Moraine as well as extensive greenlands. The moraine's underlying geology makes it an important source of groundwater recharge and it is the source for headwaters for 65 river systems⁹.

Water resources features in York Region include numerous streams, major rivers such as the Don, Holland, Humber and Rouge Rivers, and Lake Simcoe.

The Region contains a watershed divide with streams and rivers in the upper portion of the Region draining to Lake Simcoe, which lies in the Lake Huron watershed, and streams and rivers in the lower portion of the Region draining to Lake Ontario. Lake Simcoe and its tributaries

⁹ The Ontario Provincial Government has enacted legislation and planning directives aimed at protecting the ecological and hydrological integrity of the Moraine area. These Provincial government initiatives are presented in more detail in Section 1.3.



Figure 2-1 York Region Showing Area Municipalities

presently have limited capacity to accept additional wastewater discharges. The Humber River, located in the Lake Ontario watershed, also has a limited capacity to accept additional wastewater discharges.

2.2 Current Water and Wastewater Servicing

Water and wastewater servicing in York Region is a multi-jurisdictional undertaking, based on the Region's location and two-tier municipal governance structure¹⁰.

¹⁰ Comprehensive information about the Region's current water and wastewater systems is contained in *Water and Wastewater Master Plan Baseline Report* prepared by Genivar and XCG Consultants Ltd. (2007), in Appendix 1.

The sources for York Region's drinking water include both surface waters, namely Lakes Ontario and Simcoe, and groundwater from Regional aquifers. Approximately 80% of York Region's drinking water is sourced from Lake Ontario, 3% from Lake Simcoe, with groundwater making up the rest. Figure 2-2 shows the sources of drinking water supply in York Region. The water system itself is divided into two distinct parts: (1) the York Water System, which serves the larger urban communities of York Region; and, (2) individual systems serving smaller communities located mainly in the northern and central parts of the Region. To provide its residents and businesses with drinking water, York Region operates and maintains two water treatment facilities, seventeen pumping stations, 37 storage facilities (elevated tanks and reservoirs), 38 production wells, and almost 230 km of transmission mains. In addition to the water purchased from the City of Toronto and Peel Region, York Region treated just over 23,000 megalitres of drinking water in 2006. In all cases, the Region acts as the water "wholesaler" supporting supply, treatment, storage and pumping, and transmission mains. In turn, the area municipalities distribute the water to local customers.

Responsibility for wastewater servicing in York Region is similarly divided between the area municipalities, which are responsible for local wastewater collection and local pumping, and the Region, which is responsible for major pumping stations, trunk sewers and treatment facilities. York Region's wastewater system is also divided into two distinct components: (1) the York-Durham Sewage System (YDSS), which serves York Region's larger urban communities; and, (2) individual systems serving smaller communities, located mainly in the northern and central parts of the Region. Figure 2-3 presents the location of wastewater facilities in York Region.

2.2.1 York Water System

Through partnership agreements with the City of Toronto and the Regional Municipality of Peel, water is supplied to York Region. The City of Toronto and Peel Region provide potable water treated in their own treatment plants using Lake Ontario raw water. York Region, in turn, supplies drinking water to the Towns of Markham and Richmond Hill, the City of Vaughan, and parts of the Towns of Aurora, Newmarket and, as of April 2009, the Town of Stouffville, and will encompass King City as of the summer of 2010.

2.2.2 Small Community Systems – Water

Communities that are served by individual systems unique to the community include Ansnorveldt, Ballantrae, Keswick, King City, Kleinburg, Mount Albert, Sharon, Queensville, Holland Landing, Nobleton, Schomberg, and Sutton. Several communities rely on groundwater supplies. Specifically, groundwater is the source of supply for Ansnorveldt, Ballantrae, Kleinburg, Mount Albert, Nobleton, Schomberg, Holland Landing, King City, Queensville and Sharon. Surface water from Lake Simcoe supplies the communities of Keswick and Sutton. Newmarket, Aurora and, as of April, 2009, Stouffville, have a blended water supply, which is a combination of surface water from the York Water System and groundwater from local wells. King City will have a blended water supply by the summer of 2010.

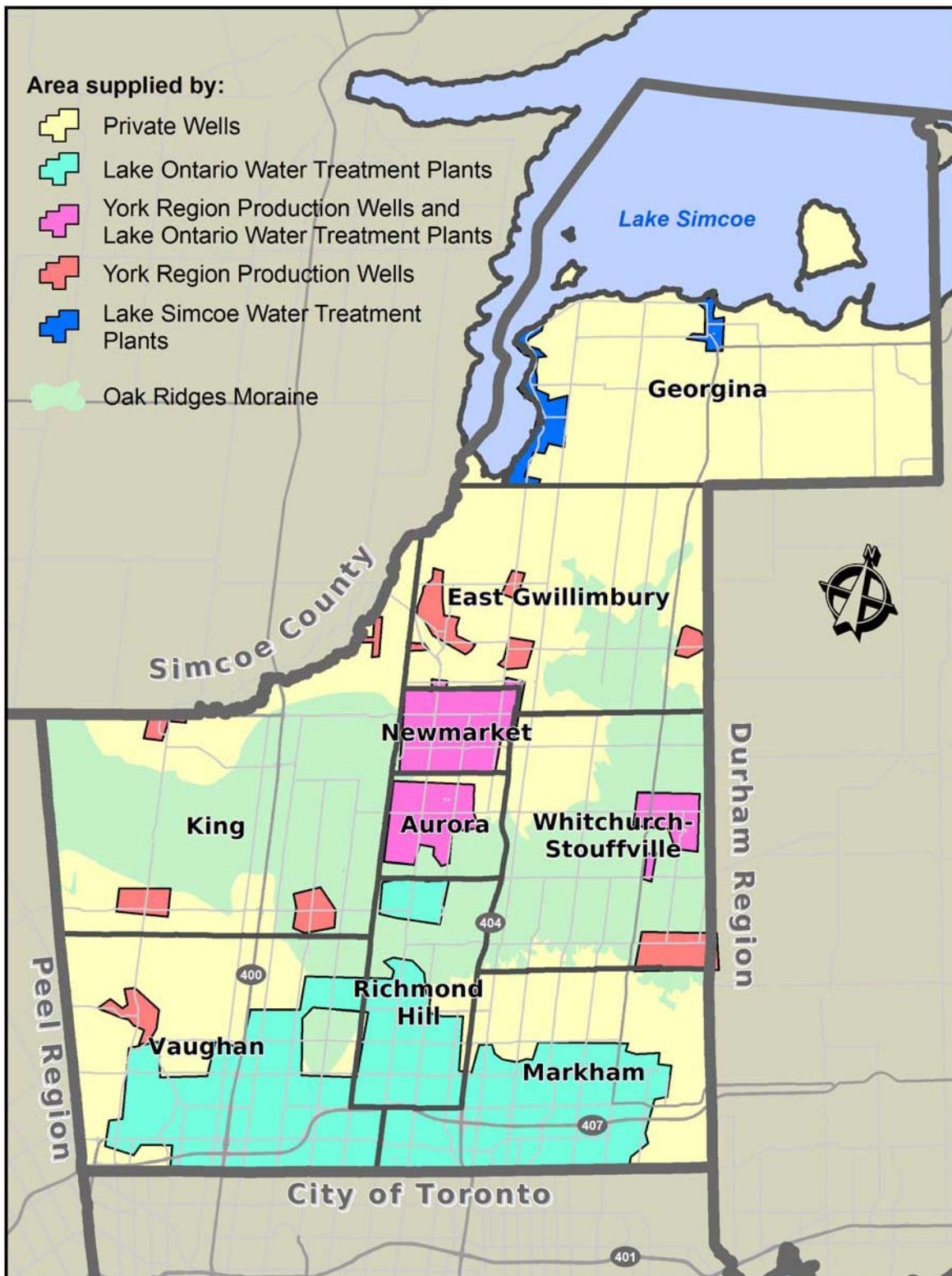


Figure 2-2

York Region Water Sources

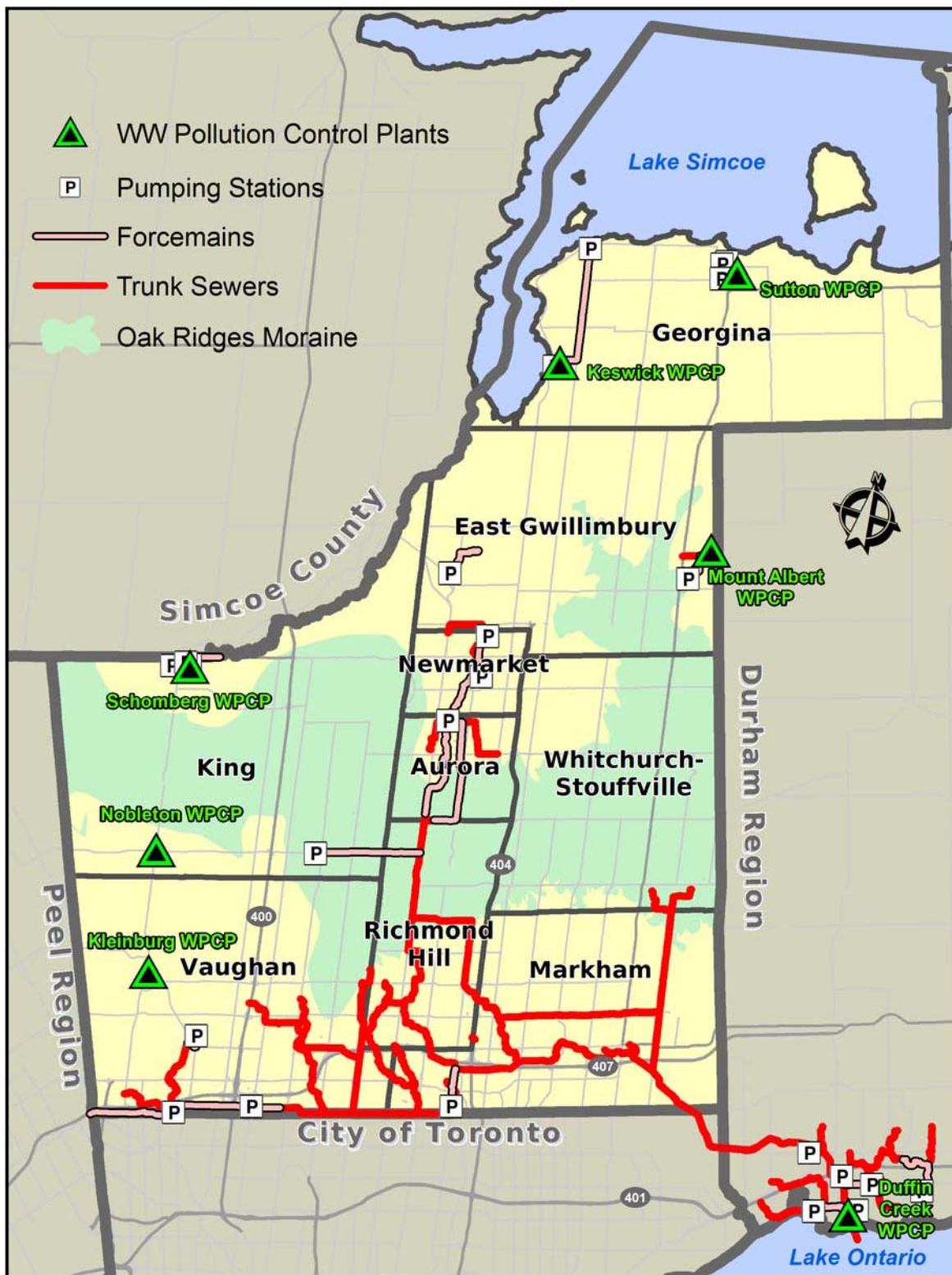


Figure 2-3 York Region Wastewater Facilities

2.2.3 York-Durham Sewage System (YDSS)

In the southern half of the Region, wastewater is primarily treated in facilities discharging directly to Lake Ontario or its tributaries. Urban areas in York Region, including Aurora, King City, Markham, Newmarket, Richmond Hill, Stouffville, and Vaughan, are connected to the York-Durham Sewage System (YDSS). Portions of the YDSS are jointly owned by York and Durham Regions and, depending upon location, operated by both Regions. This system consists of a series of gravity sewers, pumping stations, equalization tanks, and forcemains that collect and convey the bulk of the wastewater to the Duffin Creek water pollution control plant, which discharges directly into Lake Ontario and has a current rated capacity of 420 ML/d. A small fraction of the wastewater is transmitted to Peel Region for treatment at the G.E. Booth water pollution control facility.

2.2.4 Small Community Systems – Wastewater

A number of smaller communities, located in the northern and central parts of York Region, are not connected to the YDSS, but are served by individual systems. Wastewater systems servicing these communities include six existing wastewater treatment facilities located in Schomberg, Holland Landing, Keswick, Sutton, Mount Albert, and Kleinburg. In addition, construction of a new water pollution control plant and collection system for the community of Nobleton has commenced. The wastewater treatment facilities serving most of these communities are located either on Lake Simcoe or on one of Lake Simcoe's tributaries. As noted above, Lake Simcoe and its tributaries presently have limited capacity to accept additional wastewater discharges. The wastewater treatment facility serving Kleinburg and the new facility which will service Nobleton are located on the Humber River. The Humber River also has a limited capacity to accept additional wastewater discharges.

2.3 Growth in York Region

As previously noted, provincial forecasts indicate York Region is expected to grow to over 1.5 million by the year 2031. Figure 2-4 shows projected population growth in five year increments to 2031. The average annual growth rate is about 2%. A number of key assumptions have been made in making the projections of future population growth, including:

- Continuing attractiveness of York Region as a place for people to live and work;
- On-going and long-term economic prosperity of the Greater Toronto Area; and,
- Levels of net annual migration to the Greater Toronto Area consistent with Federal government immigration policy.

The distribution of estimated population growth in the area municipalities of York Region varies, with most of the future growth expected to occur in the larger urban municipalities. Table 2-1 shows projected population growth distribution for area municipalities in York Region to 2031¹¹.

¹¹ The Regional Municipality of York, Planning and Economic Development Committee, January 7, 2009, Report of the Commissioner of Planning and Development Services. YORK REGION 2031 POPULATION AND EMPLOYMENT FORECASTS.

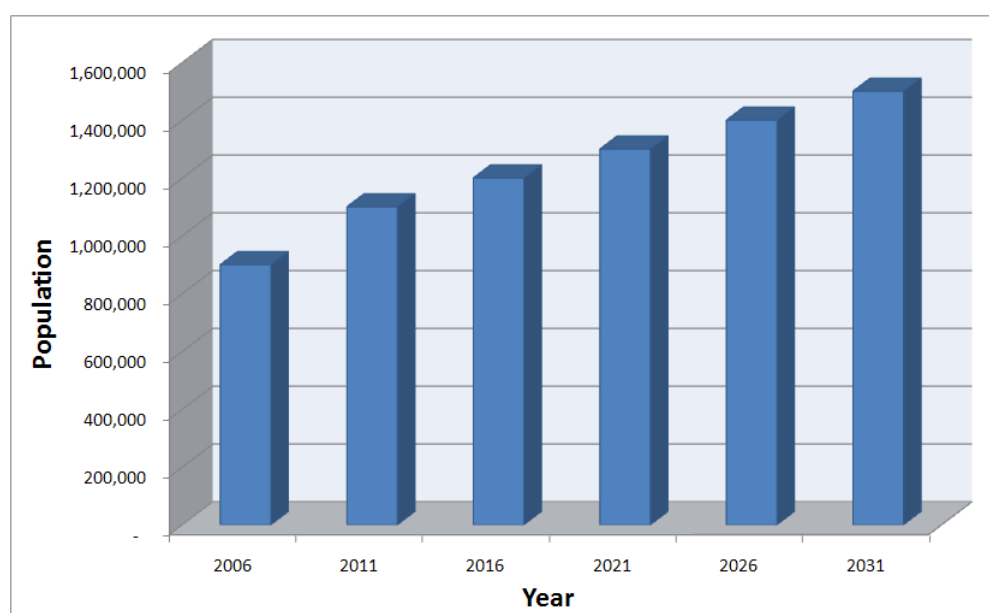


Figure 2–4 York Region Population Projections to 2031

Table 2–1 Distribution of Population Growth in York Region to 2031 by Area Municipality

Municipality	Actual Population (2006)	Forecast Population (2031)	Percent of Regional Growth 2006 to 2031
Aurora	49,600	70,400	4%
East Gwillimbury	21,900	88,000	11%
Georgina	44,500	70,700	5%
King	20,300	35,100	3%
Markham	272,500	423,500	26%
Newmarket	77,400	97,300	3%
Richmond Hill	169,500	242,800	13%
Vaughan	248,800	418,800	29%
Whitchurch-Stouffville	25,400	60,800	6%
York Region	929,900	1,507,400	100%

York Region's employment is expected to grow by about 2.2% per year – a faster rate of growth than population – increasing from 462,000 jobs in 2006 to 799,000 jobs by 2031. The distribution of employment growth by area municipality essentially mirrors the distribution of population growth shown in Table 2–1. Seventy-seven percent of expected job growth will occur in the urban municipalities of Markham, Richmond Hill and Vaughan¹².

<<http://www.york.ca/NR/rdonlyres/6s4l2wngdtwaddxita73sl7hehgurruihztmtdhjezj2kfc426r4fljj4bopvwuv73dait6qel6lpmnqu5j25kavd/2031PopandEmployForecaststafrrpt.pdf>>.

¹² *ibid.*

Population and employment will continue to grow beyond 2031, and for this reason, York Region has also prepared a 2051 growth scenario that analyzes potential population and employment growth beyond the 2031 planning horizon. The Region's post-2031 population and employment forecast is shown in Figure 2–5.

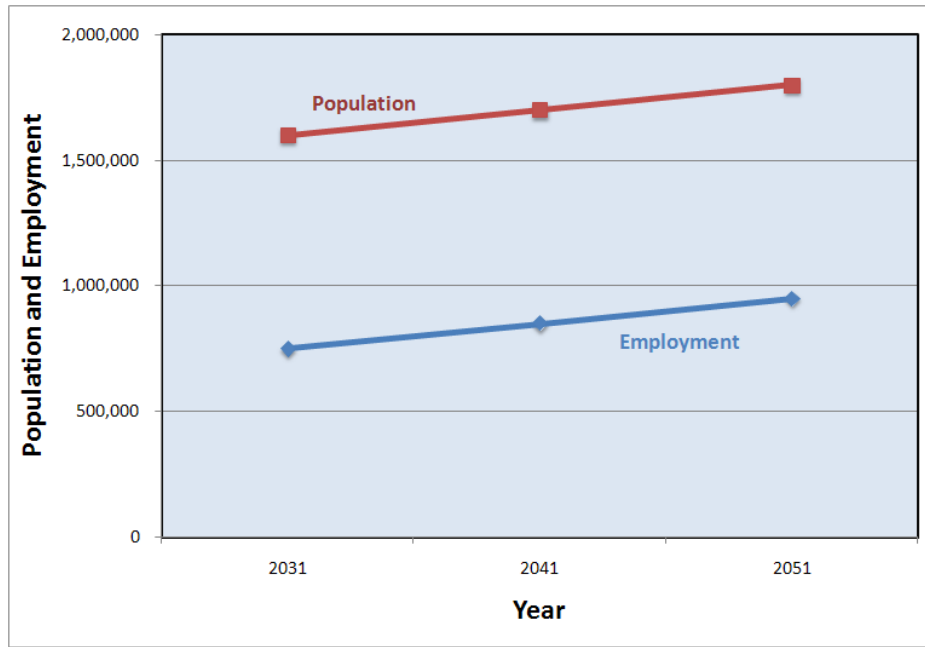


Figure 2–5 York Region Post 2031 Forecast

The 2051 forecast was developed to assist the Region in taking a comprehensive planning approach and a long term view, in order to plan efficiently for eventual environmental, infrastructure and land use development requirements. The forecast provides general guidance about the long term growth potential of the Region, which can, in turn, help to identify long term infrastructure investment requirements.

2.4 Legislative and Regulatory Influences

Delivery of water and wastewater services in York Region is governed by a variety of federal and provincial Acts, Regulations, guidelines, and policies. These government directives can be grouped into two main categories, namely, directives that govern (1) planning and growth, and which indirectly affect York Region's approach and ability to deliver water and wastewater services and, (2) water and wastewater systems and servicing directly. Table 2–2 and Table 2–3 list the major provincial legislation and guidelines with which the Region must comply, along with brief descriptions of each¹³.

¹³ For the most up-to-date and complete information, readers are advised to refer to the appropriate Ontario Provincial Government Ministry < <http://www.gov.on.ca> > and, for provincial legislation and regulations, to e-Laws, the on-line database of Ontario's statutes and regulations < <http://www.e-laws.gov.on.ca> >.

Table 2–2 Provincial Laws that Impact Growth in York Region

Statute/Guideline	Description
Oak Ridges Moraine Conservation Act	The Provincial Government passed the Oak Ridges Moraine Conservation Act with the goal of protecting the natural and water resource features on the Oak Ridges Moraine, preserving agricultural land, and focusing development in approved settlement areas. Under the authority of the Act, the government established the Oak Ridges Moraine Conservation Plan, which provides land use and resource management planning direction to provincial ministers, ministries, and agencies, municipalities, municipal planning authorities, landowners and other stakeholders on how to protect the Moraine's ecological and hydrological features and functions. <i>Impact on York Region:</i> This Act precludes York Region from using lands within the Oak Ridges Moraine to accommodate future growth, except in approved settlement areas. The Act also affects the location of water and wastewater infrastructure as it is prohibited to locate utilities in some restrictive areas unless there is no other reasonable alternative.
Greenbelt Act	The Greenbelt Act, 2005, resulted in the creation of a Greenbelt Plan covering approximately 1.8 million acres (approximately 730,000 hectares) of environmentally sensitive and agricultural land in the Golden Horseshoe, and it includes and builds on the 800,000 acres already protected by the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan. The aim of the plan is to protect these lands from urban development and sprawl. <i>Impact on York Region:</i> This Act precludes York Region from using lands comprising the Greenbelt protection area to accommodate future growth. The Act also impacts water and wastewater servicing because it prohibits lake-based supply connections to communities that do not currently have a lake-based supply, unless there is a health-related problem.
Places to Grow Act	Places to Grow is the Ontario government's initiative to manage growth and development in the Greater Golden Horseshoe in a way that supports economic prosperity, protects the environment and helps communities achieve a high quality of life. The plan provides the framework for infrastructure investment, including water and wastewater infrastructure, in the Greater Golden Horseshoe area so that existing and future investments are optimized to serve growth to 2031 and beyond. <i>Impact on York Region:</i> This Act sets the future population and employment targets for York Region and requires the Region to accommodate growth through intensification of existing settlement areas.

Table 2–3 Provincial Laws and Guidelines that Impact Water and Wastewater Servicing in York Region

Statute/Guideline	Description
Clean Water Act	Ontario's Clean Water Act was passed in 2006 and is intended to ensure that communities are able to protect their municipal drinking water supplies through developing collaborative, locally driven, science-based protection plans. <i>Impact on York Region:</i> Protection plans for watersheds within York Region will provide guidance about potential risks to sources of drinking water. York Region can use this information to make choices about the size and locations of water and wastewater servicing elements (treatment plants, pumping stations, and transmission and collection mains).
Safe Drinking Water Act	The purpose of the Safe Drinking Water Act is to provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing. Regulations made under the Act, such as Regulation 268/03 – Ontario Drinking Water Quality Standards, spell out detailed requirements regarding drinking water systems, testing services, drinking water quality standards, certification of drinking water system operators and drinking water quality analysts, and compliance and enforcement. <i>Impact on York Region:</i> This Act specifies the quality of the drinking water that the Region is responsible for producing and delivering, as well as how the Region's drinking water treatment systems must be operated and managed.
Safeguarding and Sustaining Ontario's Water Act	The purpose of this Act, which was passed in 2007 and amended the <i>Ontario Water Resources Act</i> (OWRA), is to provide for the conservation, protection and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social and economic well-being. Specifically, the Act implements the province's commitments under the 2005 Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement (the "2005 Agreement") between the Province, Quebec and the eight Great Lakes States. <i>Impact on York Region:</i> The Act restricts new or increased transfers of water in amounts of 379,000 litres per day or greater between Great Lakes watersheds, subject to certain exceptions. The supply of Lake Ontario-based drinking water to municipalities will be subject to the restrictions imposed under this Act.

Table 2–3 Provincial Laws and Guidelines that Impact Water and Wastewater Servicing in York Region cont'd.

Statute/Guideline	Description
Environmental Protection Act	The purpose of the Environmental Protection Act is to provide for the protection and conservation of the natural environment, by controlling discharges to the air, land, and water. Regulations made under the Act prescribe limits on what can be discharged to the environment, and allow for fines and other penalties when unauthorized discharges occur. <i>Impact on York Region:</i> This Act affects how York Region can dispose of biosolids from water pollution control plants. It also affects how York Region will approach its construction activities, so as to ensure that there are no deleterious effects on the environment.
Ontario Water Resources Act	The purpose of this Act is to provide for the conservation, protection and management of Ontario's waters by setting out requirements for water works (including wells) and sewage works in relation to planning, design, siting, public notification and consultation, establishment, insurance, facilities, staffing, operation, maintenance, monitoring, and record-keeping. <i>Impact on York Region:</i> This Act specifies the requirements that York Region must satisfy in order for the provincial government to grant approval for establishing, altering, extending, or replacing wastewater system components.
Ontario Ministry of the Environment Guideline F-5	Ontario Ministry of the Environment Guideline F-5 is a policy document, made under the legislative authority of the Ontario Water Resources Act, RSO 1990, Section 53. The purpose of the guideline is to ensure that sewage treatment works are located, designed, constructed and operated so as to minimize pollution of receiving waters and interference with water uses. It describes the levels of treatment required at municipal and private sewage treatment works, including outfall structures and emergency overflow facilities, and states that the normal level of treatment required for sewage treatment works discharging to surface waters is secondary treatment, or equivalent. <i>Impact on York Region:</i> York Region will use the design specifications contained in Guideline F-5 when siting, designing, and determining operational strategies for wastewater system components.
Lake Simcoe Protection Act	The Lake Simcoe Protection Act was enacted in 2008, with the aim of restoring and protecting the ecological health of Lake Simcoe. The Act will result in the creation of a protection plan for the lake and surrounding regions. Key elements expected to be included in the plan are reductions in phosphorus loadings and discharges of pollutants to Lake Simcoe and its tributaries. <i>Impact on York Region:</i> This Act places restrictions on the use of Lake Simcoe and its tributaries as locations for water pollution control plant discharges.
Environmental Assessment Act	The Environmental Assessment Act codifies a planning process that requires the evaluation of potential environmental effects and of an undertaking before the project may proceed. It applies to activities or projects of public bodies, and major commercial or business undertakings of non-public entities, if designated by regulation. <i>Impact on York Region:</i> The class environmental assessment document, which guides the environmental assessment process for most water and wastewater servicing projects undertaken by the Region, is approved under this Act. In certain circumstances projects may undergo an individual environmental assessment process set out under the Act.

The provincial laws and guidelines that govern delivery of water and wastewater servicing impose constraints that are unique to York Region.

Safeguarding and Sustaining Ontario's Water Act, 2007, affected a number of amendments to the OWRA which are not yet in force. Several of the amendments served to implement the commitments the province made under the 2005 Agreement. Among these amendments is a prohibition on new or increased transfers of water 379,000 L/d or more from one Great Lakes watershed to another (known as "intra-basin transfers") subject to strictly regulated exceptions. This law poses a challenge because York Region straddles two Great Lakes watersheds: the Lake Huron watershed to the north, which encompasses Lake Simcoe, and the Lake Ontario watershed to the south. The approximate location of the watershed divide is shown in Figure 2–6.

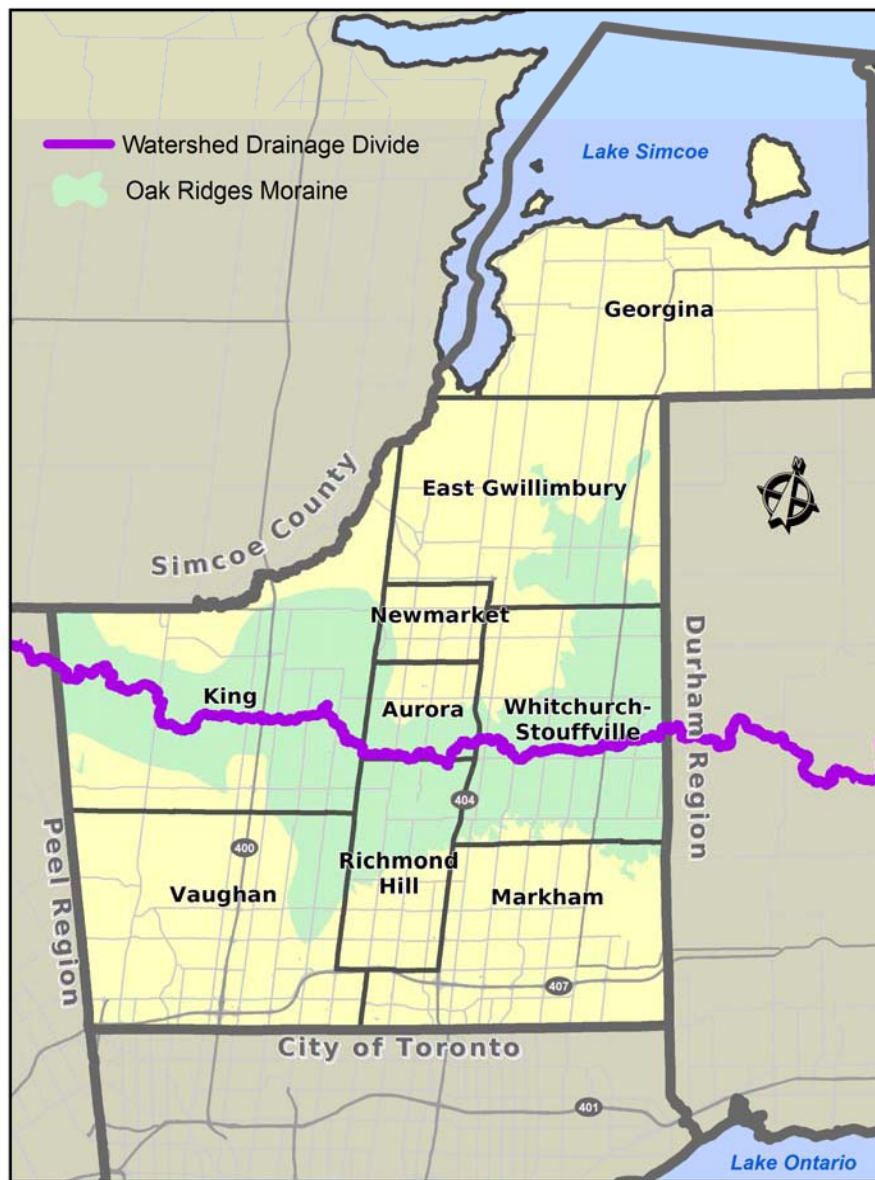


Figure 2-6 Approximate boundary between Lake Huron and Lake Ontario Watersheds

York Region's actions to date have been in good faith in anticipation of the enactment of measures under the *Safeguarding and Sustaining Ontario's Water Act, 2007*, to implement the 2005 Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement. The 2005 Agreement, which was signed by the Province of Ontario, Quebec and the Great Lakes States, adds to the principles surrounding "Diversions" and "Consumptive Uses" of water from the Great Lakes as originally set out in the 1985 Great Lakes Charter.

At this time, the Province is currently developing the regulations required to support the amendments to the OWRA, designed to implement the commitments made by the Province under the 2005 Agreement. Along with proposed regulations pertaining to the amendment of the permit to take water process, the establishment of baseline transfer volumes and the calculation of consumptive use, specific requirements are being developed to satisfy the “exception criteria”. Under the proposed regulatory regime, intra-basin transfers may be permitted provided the following “exception criteria” can be demonstrated¹⁴:

1. Efficient use and conservation of existing water supplies - Article 201(4)(a): The need for all or part of the Exception cannot be reasonably avoided through the efficient use and conservation of existing water supplies.
2. Reasonable Quantities - Article 201(4)(b): The Exception shall be limited to quantities that are considered reasonable for the purposes for which it is proposed.
3. Return Flow of Water Withdrawn - Article 201(4)(c): All Water Withdrawn shall be returned, either naturally or after use, to the Source Watershed less an allowance for Consumptive Use. No surface water or groundwater from outside the Basin may be used to satisfy any portion of this criterion except if it:
 - i) Is part of a water supply or wastewater treatment system that combines water from inside and outside of the Basin;
 - ii) Is treated to meet applicable water quality discharge standards and to prevent the introduction of invasive species into the Basin.
4. No Significant Adverse Impact - Article 201(4)(d): The Exception shall be implemented so as to ensure that it shall result in no significant individual or cumulative adverse impacts to the quantity or quality of the Waters and Water Dependent Natural Resources of the Basin with consideration given to the potential Cumulative Impacts of any precedent-setting consequences associated with the Proposal.
5. Efficient Use and Conservation of Transferred Water - Article 201(4)(e): The Exception shall be implemented so as to incorporate Environmentally Sound and Economically Feasible Water Conservation Measures to minimize Water Withdrawals or Consumptive Use.
6. Compliance with Applicable Laws and Agreements - Article 201(4)(f): The Exception shall be implemented so as to ensure that it is in compliance with all applicable municipal, State, Provincial and federal laws as well as regional interstate, inter-provincial and international agreements, including the Boundary Waters Treaty of 1909.
7. Other Applicable Criteria – Article 201(4)(g): All applicable criteria in this Article have also been met.

The draft plan released under the *Lake Simcoe Protection Act, 2008*, describes the Provincial Government’s intended policies for reducing phosphorus loadings, reducing pathogen loadings so that beach closings are eliminated, and reducing contaminants to levels that meet Provincial

¹⁴ Readers are directed to section 34 of the *Ontario Water Resources Act* for the specific wording of the “exception criteria”.

Water Quality objectives. York Region is fully supportive of the plan, and is cognizant of the challenges the plan imposes on the Region's ability to deliver wastewater services. The Region has been proactive in meeting these challenges by taking the lead in implementing state-of-the-art membrane treatment in the Keswick water pollution control plant.

In terms of the provincial laws and guidelines that impact growth, the combined impact of the *Oak Ridges Moraine Conservation Act, 2001*, the *Greenbelt Act, 2005*, and *Places to Grow* is to accommodate at least 40% population growth inside existing built boundaries through infill and intensification. Expansion into the white belt will be required to support the growth set out in *Places to Grow*. The lands for growth, including the urban areas, towns, villages and white belt areas represent 31% of York Region. The remaining 69% of York Region comprises green space, agricultural lands, and rural properties and is protected. The Regional Official Plan is required to conform to provincial legislation Amendment 41. The *Oak Ridges Moraine Conservation Plan* conformity amendment has been completed. Conformity with the *Greenbelt Act* and *Places to Grow* will be completed in 2009.

Directing growth to areas that are already settled, or contiguous to settled areas, supports intensification, a key sustainability principle. Protecting the 69% of York Region that is "rural" means that the natural and existing features of these lands will be safeguarded and preserved. At the same time, limiting population growth to only 31% of the Region means there are restrictions on the locations for water and wastewater servicing elements.

2.5 Previous Master Planning Efforts

All municipalities in Ontario are subject to the provisions of the *Environmental Assessment Act* (EAA). The Municipal Engineers Association Municipal Class Environmental Assessment (the "Class EA") is an approved planning process that municipal proponents can use in order to meet the requirements of the EAA. The Class EA process allows for the evaluation of the environmental effects of alternatives to a project and alternative methods of carrying out a project. It includes mandatory requirements for public consultation and/or notification and expedites the environmental assessment process for municipal projects that are similar in nature, carried out routinely, have a predictable range of environmental effects, and are responsive to mitigating measures. Municipal water and wastewater projects are covered by the Class EA process.

The master planning approach provides a comprehensive long-range vision to guide development. The master plan explains the Region's anticipated future water and wastewater demands and how servicing needs can be fulfilled. It is intended to guide the orderly, long-term development of water and wastewater servicing in York Region in an effective and economical manner by:

- Providing direction for the planning and implementation of water and wastewater servicing;
- Guiding the capital works program for water and wastewater infrastructure; and,
- Serving as the starting point for updating existing policies and developing new policies and programs to address York Region's long term goals and objectives.

Through the master planning process, individual projects are identified that are dispersed geographically throughout the Region and are to be individually implemented over an extended period of time to keep pace with demand. Individual projects included in the water and wastewater master plans are categorized as Schedule A, Schedule B or Schedule C, and are subject to the requirements of the Class EA process in advance of their implementation. The different project schedules used in the Class EA process are listed in Table 2–4.

Table 2–4 Class EA Project Schedules

Type	Description
Schedule A	• Projects are limited in scale • Minimal adverse environmental effects • May proceed to implementation without following the full Class EA planning process • Examples: normal or emergency operational and maintenance activities
Schedule A+	• Under Schedule A, there is a Schedule A+ category, which is applied to ensure public notification for certain Schedule A projects that are pre-approved under the Municipal Class EA.
Schedule B	• Projects have the potential for some adverse environmental effects • Mandatory contact with directly affected public and with relevant government agencies to ensure that they are aware of the project and that their concerns are addressed • Examples: improvements and minor expansions to existing facilities
Schedule C	• Potential for significant environmental effects • Must proceed under the full planning and documentation procedures specified in this Class EA document • Require that an Environmental Study Report (ESR) be prepared and filed for review by the public and review agencies • Examples: construction of new facilities and major expansions to existing facilities

The Class EA process may not apply to all municipal projects. Under certain conditions, an Individual Environmental Assessment may be required for very complex projects with significant environmental impacts. As well, Schedule “B” and Schedule “C” projects can be elevated to an Individual EA by an Order of the Minister of the Environment, with the result that the project would be subject to the full provisions of the *Environmental Assessment Act*. Two projects that were identified as part of the 2002 Wastewater Master Plan Update and were the subject of Minister’s Orders¹⁵ are the Southeast Collector and the Upper Leslie Street Trunk (the Upper York Sewage Solutions), both projects are proceeding as Individual EAs and are anticipated to be connected to the York-Durham Sewage System.

Two projects that were identified as part of the 2002 Wastewater Master Plan Update and were the subject of Minister’s Orders are the Southeast collector and the Upper York Sewage Solutions (UYSS), both connected to the York-Durham Sewage System. For both of these projects, the Minister ordered York Region to comply with the full provisions of the *Environmental Assessment Act*, principally due to the potential for these projects to cause

¹⁵ Letter from the Hon. Leona Dombrowsky, Minister of the Environment, to Mr. Kees Schipper, Commissioner of Transportation and Works, Regional Municipality of York, dated October 1, 2004. Ref. No. ENV1283MC-2004-5305. Contained in Appendix 1.

adverse environmental impacts. The Minister's Order¹⁶ also identified a range of ancillary, related projects, and imposed monitoring and mitigation measures as conditions for approval of the Class EA for these projects.

By using a master plan approach under the Class EA process, York Region is better able to define the need and justification for individual projects within the broader Regional context. The Master Plan Update, which covers the first two phases of the Class EA process, serves as the blueprint for water and wastewater strategies and forms the basis upon which capital improvements will be made.

As a starting point for this water and wastewater Master Plan Update, the status of existing water and wastewater works and services of each municipality in the Region was reviewed with a view to determining the appropriate course of action to assure long term servicing. Table 2-5 and Table 2-6, presented below, show the status of water and wastewater recommended actions previously identified in the original 1997 master plans, the 2002 York-Durham Sewage System master plan update, the 2004 York Water System master plan update, the most recent individual Class EAs for small community systems. The information shown in these tables served as the starting point for this Water and Wastewater Master Plan Update.

¹⁶ Letter from the Hon. Leona Dombrowsky, Minister of the Environment, to Mr. Kees Schipper, Commissioner of Transportation and Works, Regional Municipality of York, dated October 1, 2004. Ref. No. ENV1283MC-2004-5305. Contained in Appendix 1.

Table 2–5 York Region Water Servicing – Status of Previous Master Plan and Class EA Projects, as at February, 2009

Project	Project Description and Location	Source of Recommendation	Status of Project
Peel Pressure District 6 Pumping Station	Pumping Station located at Peel Reservoir	York Region	Construction completed
Markham Booster Pumping Station	Pumping Station at Milliken Reservoir, pumping from Pressure District 4 to Pressure District 6	York Region	On-going
South Maple Pumping Station Upgrade	Pumping Station from Pressure District 6 to Pressure District 7	2004 Master Plan Update	Construction completed
Maple Pressure District 8 Pumping Station	Pumping Station at Maple Reservoir from Pressure District 6 to Pressure District 8/Aurora South Reservoir	2004 Master Plan Update	Construction completed
Aurora East Pumping Station	St. John's Sideroad – AC to AE	2004 Master Plan Update	Construction completed
Stouffville Zone 2 Booster Pumping Station	Booster Pumping Station on 10 th Line – Zone 2 to Zone 1	Stouffville Master Plan	Construction completed
King City Booster Pumping Station	Booster Pumping Station from Aurora Newmarket Feedermain to Town of King City	King City Class EA	On-going
Peel Reservoir	Combined Peel/York storage located in Peel	York Region	Construction completed
North Markham Reservoir	Pressure District 6 Reservoir at McCowan and Stouffville Sideroad	1996 Master Plan	Construction completed
Aurora South Reservoir	Pressure District 8 Reservoir at Bloomington Road and Bathurst Street	York Region	Construction completed
Oak Ridges Elevated Tank	Pressure District 9 Elevated Tank Bloomington Road	2004 Master Plan Update	Construction completed
Oak Ridges Elevated Tank 2	Replacement of existing standpipe	2004 Master Plan Update	On-going
King City Elevated Tank	Dufferin Street north of King-Vaughan Sideroad	2004 Master Plan Update	On-going
Kleinburg Elevated Tank	Huntington north of Rutherford	Kleinburg Class EA	On-going
Mount Albert Elevated Tank	Elevated Tank in Mount Albert	2004 Master Plan Update	Construction completed
Stouffville Zone 1 Elevated Tank	Elevated Tank for Zone 1 in Stouffville	Stouffville Master Plan	Construction completed
Aurora Well Upgrades	Upgrade Well Supply to Aurora	York Region	Under construction
Aurora Newmarket Water Treatment Plant Upgrades	Treatment changes – Chlorination/Ammoniation	Aurora/Newmarket Introduction of Surface Water	Construction completed
Ballantrae Water Supply	New well for firm capacity	2004 Master Plan Update	On-going
Mount Albert Water Supply	New well for firm capacity	2004 Master Plan Update	On-going
Nobleton Water Supply	New well for additional capacity	2004 Master Plan Update	On-going
Schomberg Water Supply	New well for additional firm capacity	2004 Master Plan Update	On-going

Table 2–6 York Region Wastewater Servicing – Status of Previous Master Plan and Class EA Projects, as at February, 2009

Project	Project Description and Location	Source of Recommendation	Status of Project
Humber Pumping Station Forcemain	Twin forcemains on Steeles Avenue West from Islington Avenue westerly to Torbram Road	2002 Wastewater Master Plan Update	Construction completed
Lower Leslie Trunk Sewer	On Leslie Street from 19 th Avenue to existing YDSS ¹ system at Elgin Mills Road	2002 Wastewater Master Plan Update	Construction completed
16 th Avenue Trunk Sewer	On 16 th Avenue from existing YDSS system to 9 th Line	2002 Wastewater Master Plan Update	Construction completed
9 th Line Trunk Sewer	On 9 th Line from Little Rouge Creek to existing YDSS system south of Highway 7	2002 Wastewater Master Plan Update	Construction completed
19 th Avenue Interceptor	On 19 th Avenue from existing YDSS system at Yonge Street easterly to Leslie Street	2002 Wastewater Master Plan Update	Construction completed
South East Collector	Parallel alignment with existing YDSS system from the 9 th Line to Scarborough-Pickering Town Line Road	2002 Wastewater Master Plan Update (Priority Project)	On-going
Duffin Creek Water Pollution Control Plant Re-Rating	Optimization to increase rated capacity from 360 MLD ² to 420 MLD	2002 Wastewater Master Plan	Complete
Newmarket Sewage Equalization Tank	8,800 m ³ Storage tank to detain high inflow and infiltration in Newmarket	2002 Wastewater Master Plan Update	Construction completed
Newmarket Pumping Station Upgrade	Installation of new impellers to increase capacity of pumping station from 1,190 L/s ³ to 1,290 L/s	2002 Wastewater Master Plan Update	Construction completed
Peel System and Treatment	Completion of necessary conveyance and treatment improvements plus existing capacity utilization payment to Peel	2002 Wastewater Master Plan Update	On-going project
Bathurst Trunk Sewer	On Bathurst Street from Major Mackenzie Drive to existing YDSS system on Steeles Avenue	2002 Wastewater Master Plan Update	Construction completed
Langstaff Trunk Sewer	On Langstaff Road from Maple Collector easterly to Bathurst Trunk Sewer	2002 Wastewater Master Plan Update	On-going project
Duffin Water Pollution Control Plant Expansion Stage 3, Expanded Outfall and Stage 3 Pumping Station	Expansion of Duffin Creek to a rated capacity of 630 MLD including an expanded outfall and Stage 3 pump station	2002 Wastewater Master Plan Update	On-going project
East Holland Trunk Sewer	Trunk Sewer, Pumping Station and Forcemain from Leslie Street to Aurora Pumping Station	2002 Wastewater Master Plan Update	Construction completed
King City Pumping Station and Forcemain	New pumping station and forcemain to connect King City with YDSS	2002 Wastewater Master Plan Update	Construction completed
Holland Landing/Queensville Trunk Sewer and Forcemain	New trunk sewer and gravity sewer to Newmarket Pumping Station	2002 Wastewater Master Plan Update	On-going - 2016 Phasing
Aurora Sewage Equalization Tank	10,000 m ³ Storage tank to detain high inflow and infiltration in Aurora	2002 Wastewater Master Plan Update	Construction completed
New Newmarket Pumping Station	New Pumping Station at the old STP site at the north end of Bayview Parkway	2002 Wastewater Master Plan Update	On-going under Upper York Sewage Solutions
New Newmarket Pumping Station forcemains	From new Newmarket Pumping Station to Leslie Street at Davis Drive	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
North Newmarket Trunk Sewer	On Leslie Street from Davis Drive to Mulock Pumping Station	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions

Table 2–6 York Region Wastewater Servicing – Status of Previous Master Plan and Class EA Projects, as at February, 2009, cont’d.

Project	Project Description and Location	Source of Recommendation	Status of Project
Mulock Pumping Station	On Leslie Street at Mulock Street	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
Mulock Pumping Station Forcemain	On Leslie Street from Mulock Pumping Station to Wellington Pumping Station	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
Wellington Pumping Station	On Leslie Street at Wellington	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
Wellington Pumping Station Forcemain	On Leslie Street from Wellington Avenue to Bloomington Sideroad	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
Upper York Sewage Solutions	On Leslie Street from Bloomington Sideroad to 19 th Avenue (actual routing will be determined by UYSS IEA)	2002 Wastewater Master Plan	On-going under Upper York Sewage Solutions
YDSS Upgrades	From Leslie Street Trunk Sewer at Elgin Mills to existing YDSS at Warden Avenue	2002 Wastewater Master Plan	Construction completed
Schomberg Water Pollution Control Plant Upgrade	Capacity upgrade to rated capacity of 2,055 m ³ /d	Schomberg Water pollution control plant Class EA, Environmental Study Report (December 2004)	On-going
Kleinburg Water Pollution Control Plant Upgrade	Capacity upgrade to a rated capacity of 2,874 m ³ /d	Class Environmental Assessment Wastewater Servicing Capacity for Kleinburg-Nashville (May 2007)	On-going
Mount Albert Water Pollution Control Plant	Capacity upgrade to a rated capacity of 2,043 m ³ /d	Class Environmental Assessment Addendum to Environmental Study Report (July 2002)	Construction completed
Nobleton	New sewage collection and treatment plant with a rated capacity of 2,925 m ³ /d	Nobleton Sewage Servicing Environmental Study Report (March 2003)	On-going

Notes: ¹York-Durham Sewage System. ²Megalitres per day. ³Litres per second. ⁴Cubic metres per day.

3. Future Water and Wastewater Servicing Elements

The process of establishing York Region's long term water and wastewater servicing needs was conducted according to the requirements of Ontario's Municipal Class Environmental Assessment process¹⁷ and in compliance with the Ontario *Environmental Assessment Act*.

P U B L I C E N G A G E M E N T	Step 1	The first step in identifying the Region's long term water and wastewater servicing needs involved establishing those system components over which York Region has jurisdiction; this was necessary because of the multi-tier approach to delivery of water and wastewater services, in which not only the Region but the area municipalities and neighbouring jurisdictions make substantive contributions to the effective and efficient operation of the systems.
	Step 2	The next step in the process involved estimating future water and wastewater flows. This was done by establishing rates for water consumption and wastewater production and applying these rates to annual population and employment forecasts, up to 2051.
	Step 3	Detailed problem statements were developed for the York Water System, the York-Durham Sewage System and for the small community systems. The problem statements described growth and capacity challenges, explained environmental and regulatory challenges, and served as the basis for determining future needs.
	Step 4	Once problem statements had been developed, alternative approaches to resolving York Region's long term water and wastewater servicing needs were examined. These were narrowed down to two main alternatives that could feasibly address the Region's needs.
	Step 5	Evaluation criteria were developed using the main themes of York Region's sustainability strategy for water and wastewater, which in turn supports the York Region's triple bottom line philosophy.
	Step 6	Modifications were made to the evaluation criteria based on public and agency input, and the modified criteria were used to evaluate the two main alternatives. A preferred alternative was identified and used as the basis for developing detailed recommendations for long term water and wastewater servicing in York Region.

¹⁷ Municipal Engineers Association (2007).

York Region actively engaged the public, agency stakeholders, and First Nations throughout the Master Plan Update process, by providing proposals and seeking input, so that the long term servicing needs were well understood by all, and were addressed within a supportive and collaborative framework.

3.1 Water and Wastewater System Future Needs

3.1.1 Jurisdiction

In order to proceed appropriately with identification of future water and wastewater servicing elements, there is a need to explicitly describe the division of responsibility between the Region and its lower tier municipalities. As described in Section 2.2 above, York Region is responsible for water supply, production, treatment, storage, and trunk distribution. York Region is the wholesale supplier of water to the nine area municipalities. The area municipalities are the retail suppliers of water to the consumer and are responsible for their own distribution networks. The area municipalities are responsible for the collection of the wastewater from the consumer and conveyance to the York-Durham wastewater system. Additionally, the City of Toronto and Peel Region supply water to the southern portion of York Region. Durham Region and Peel Region provide treatment of wastewater from the majority of York Region.

York Region has established criteria to assist in determining jurisdictional responsibilities, and these are presented in Table 3–1. The jurisdictional responsibilities identify the range of water and wastewater system components for which the Region is responsible and to which this Class EA applies.

3.1.2 Future Water and Wastewater Demands

Knowledge about future water and wastewater flows is necessary in order to provide infrastructure that is of sufficient size to accommodate the future flows.

The first step in establishing the future water and wastewater servicing needs in York Region involved estimating future demand. To do this, unit rates for water consumption and wastewater production were developed and applied to the growth forecasts in order to estimate the demands that will be made on the water supply and wastewater collection systems¹⁸.

Unit rates for water consumption for both residential and employment populations were estimated for each community in York Region, based on historical water use over the six year period 2001 to 2006, and adjusted to account for reductions in future demand in recognition of the impact of York Region's on-going water efficiency program, *Water for Tomorrow*. The maximum day factors for the water unit rates were also based on historical data for each community, with adjustments as necessary to account for gaps in the data.

¹⁸ Regional Municipality of York (2008). Unit Rates. Water and Wastewater Master Plan Update. Prepared by Genivar and XCG Consultants Ltd., May, 2008. Available on line at http://www.york.waterwastewatermasterplan.ca/files/unit_rates_%20report.pdf

Table 3–1 York Region Water and Wastewater Servicing Jurisdictional Responsibilities

Water System Jurisdiction	Wastewater System Jurisdiction
Treatment of water including wells.	Treatment of wastewater prior to discharge to the natural environment.
Pumping of water either: a. Directly to storage facilities; or, b. To a Regional system and which is of sufficient capacity to be considered Regional in the context of the community profile and the Master Plan.	Pumping of wastewater to a Regional system and which is of sufficient capacity to be considered Regional in the context of the community profile and the Master Plan.
Storage of water , which is of sufficient capacity to be considered Regional in the context of the community profile and the Master Plan.	Flow equalization for the purpose of increasing pumping efficiency and security and typically located adjacent to Regional pumping facilities (not to include oversized sewers primarily intended for conveyance unless the sewer meets Regional criteria).
Metering to determine inter-municipal flow and other flow information necessary to support the management of the Regional system.	Metering to determine inter-municipal flow and other flow information necessary in support of managing the Regional system.
Conveyance systems in the form of watermain whose primary purpose is to transmit water to the distribution system of a local area municipality. These watermain do not have service connections (to a private property), or fire hydrants along their length and: a. Provide a link between a supply source that is outside a municipally approved urban area/town/village boundary and an appropriate location within the local municipal distribution system; or, b. Provide a link between a supply point at the Regional boundary to a Regional facility; or, c. Provide a metered interconnection between local municipalities; or, d. Are necessary to allow a service area to be in a desired Regional pressure district; or, e. Are necessary to service more than one municipality; and, f. In all cases of sufficient capacity to be considered Regional in the context of the community profile and the Master Plan.	Conveyance systems: a. That do not have service connections; or, b. Are necessary to service more than one municipality; or, c. That terminate at a local treatment facility; and, d. In all cases of sufficient capacity to be considered Regional in the context of the community profile and the Master Plan.
Control and data for the Regional SCADA system.	
Boundary Control between pressure districts or pressure zones be established by the Region in consultation with local municipalities.	
Interconnectivity between Regional facilities where appropriate and supported through the Master Plan.	Interconnectivity between Regional facilities where appropriate and supported through the Master Plan.

Unit rates for wastewater for residential and employment populations in each community were assumed equal to the water unit rates. This is a conservative approach but is considered reasonable for purposes of infrastructure sizing. Specifically the average unit rates for wastewater were assumed to be equal to the average water unit rates plus 90 L/ca/d¹⁹ for dry weather infiltration for both residential and employment populations. The adoption of the 90 L/ca/d allowance for dry weather infiltration is considered suitable for the design of wastewater treatment systems.

Wastewater linear infrastructure was designed to accommodate the sum of peak dry and wet weather flows. The flow components were estimated on the basis of:

- Overall measured peak dry weather wastewater flows from existing communities;
- Modelled peak wet weather flows from existing communities using the Region's calibrated *InfoWorks* model and a 25 year design storm;

¹⁹ Litres per capita per day.

- Projected peak dry weather flows from new development; and,
- Projected peak inflow and infiltration flows using a conservative allowance of 0.26 L/s/ha for new development.

Details about the development and values of the water and wastewater unit rates for each community are available on-line in the Background section of York Region's Water and Wastewater Master Plan Update web-page, <http://www.york.waterwastewatermasterplan.ca/>, and in Appendix 1 of this report.

Total water and wastewater demand projections were estimated as the sum of the future demand projections and measured and/or modelled flows from existing development. Total demand projections for water and wastewater were estimated every five years for the planning period from 2006 to 2031. Estimates of water demand and wastewater flow were also carried out for 2041, 2046 and 2051.

The detailed problem statements for water servicing and for wastewater servicing are provided in the following sections. The problem statements are based on comparing projected demands with system capacities for treatment, storage, pumping and pipes. The details of the capacity assessments are presented in Appendix 1. The Appendix also presents information about the Region's *InfoWorks* model used to assess the capacity and operation of the York Water System and information about the Region's *InfoWorks* wastewater model used to assess the capacity and operation of the YDSS. As an illustrative example, the water demand curve for the York Water System for the period 2006 to 2051 is shown in Figure 3–1.

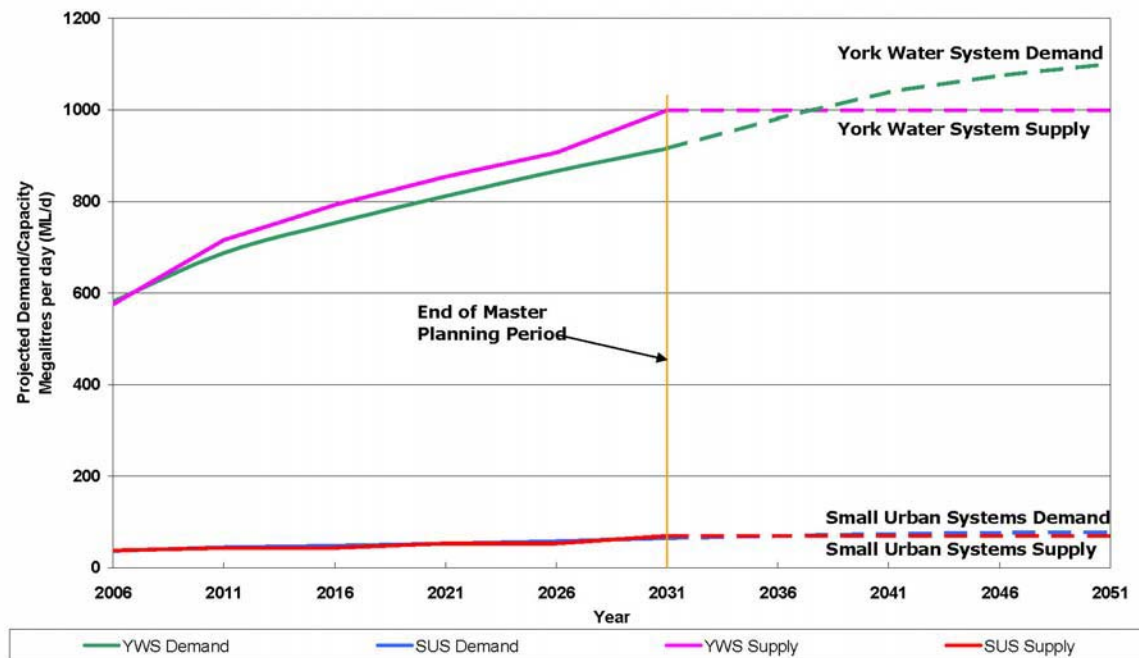


Figure 3–1 Long Term Flow Projections for the York Water System

As shown in Figure 3–1, the York Water System is expected to be capable of providing adequate water supplies to meet demand beyond 2031, with an expansion in system capacity likely needed on or about 2037. York Region is developing enhanced water efficiency programs, such as the Sustainable Home Incentive Program (SHIP), and is expanding its water efficiency programs to new development (previously, the water efficiency programs were directed at existing development). Once they are in place, the additional water conservation may extend the timing of needed expansion and, if sufficient water savings are achieved, may preclude the need for future expansion.

Demand curves similar to that shown in Figure 3–1 were prepared for the York-Durham Sewage System and for the small community water systems and the small community wastewater systems. A complete set of demand curves is contained in Appendix 1.

3.2 Detailed Problem Statements

The guidance provided by the problem statement presented in Section 1.1 was translated to the detailed needs of individual communities and systems.

3.2.1 York Water System

The York Water System supplies potable water to the Town of Markham, the Town of Richmond Hill, the City of Vaughan, Town of Aurora, and the Town of Newmarket with the communities of Holland Landing, Queensville, and Sharon; the Town of Stouffville and King City soon to be connected. The York Water System comprises drinking water supplied from the City of Toronto, from the Regional Municipality of Peel, and from local groundwater sources in Aurora, Newmarket, Holland Landing, and Queensville. Analysis of the supply indicates that there will be sufficient supply from Toronto, Peel and groundwater to meet the expected drinking water needs of residents and businesses served by the York Water System to 2031.

Although supply is expected to be sufficient, expansion of the water delivery system – including pumping, storage, and transmission – will be needed. Additionally, significant expansion of the water distribution systems of local communities connected to the York Water System will be needed to assure delivery of potable water to all customers.

It is expected that population and employment growth beyond 2031 will exceed the 999.2 ML/d capacity of the York Water System by 2037. Maximum day demand in 2051 is anticipated to be 1,100 ML/d, which could be managed by pursuing more aggressive water efficiency and conservation measures and by acquiring additional water from Toronto and Peel.

Aurora

Aurora's water service relies on a combination of surface water from the York Water System and groundwater from local wells. There are four pressure zones in Aurora: Aurora South, Aurora West, Aurora Central, and Aurora East. The 2004 Water Master Plan Update identified a number of water service improvements, including a new pumping station and new ground storage (reservoir), both of which have been completed. Increases in population in Aurora are expected to be small (representing 4% of the expected Regional growth, as shown in Table 2-1),

in comparison to other communities in the Region. Nevertheless, additional infrastructure projects may be required to aid with servicing to zones external to the municipal boundary.

Markham

The Town of Markham is serviced by three pressure districts, namely PD5, PD6, and PD7. The 2004 Water Master Plan Update identified a number of water service improvements, including a new pumping station and new ground storage (reservoir), and many of these have been completed. The increased population, especially in PD7, will require additional infrastructure projects to meet the increased demand.

Newmarket

The Town of Newmarket is connected to the York Water System through the Aurora system. There are three pressure zones in Newmarket: Newmarket West, Newmarket Central, and Newmarket East. Many of the infrastructure projects identified in the 2004 Water Master Plan Update have been completed. Increases in population in Newmarket are expected to be small (representing 3% of the expected Regional growth, as shown in Table 2–1, which translates to a 26% increase in population for Newmarket), in comparison to other communities in the Region. Nevertheless, additional infrastructure projects may be required to aid with servicing to zones external to the municipal boundary.

Holland Landing, Queensville and Sharon

The Communities of Holland Landing, Queensville and Sharon will be supplied by the York Water System through the Newmarket system. The area is currently supplied by groundwater from the local wells in Holland Landing and Queensville. Currently the supply exceeds the demands of the three communities and the excess supplies the eastern portion of Newmarket. The anticipated growth will result in demands that exceed the well capacity. Additional supply is required in conjunction with aggressive water efficiency and conservation measures. The growth will also require infrastructure projects to create new pressure districts to adequately supply the expanded service areas.

Richmond Hill

The Town of Richmond Hill is serviced by pressure districts PD6, PD7, PD8 and PD9. Many of the infrastructure projects identified in the 2004 Water Master Plan Update have been completed. The remaining projects are currently underway.

Vaughan

The City of Vaughan is serviced by pressure districts PD4, PD5, PD6, PD7, PD8 and PD9. The existing PD9 area in Vaughan is currently serviced by the municipality. The 2004 Water Master Plan Update identified a number of water service improvements, including a new pumping station and new ground storage (reservoir), and many of these have been completed. The increased population will require additional infrastructure projects to meet the increased demand. The community of Kleinburg will be split into 2 pressure districts with most of the area switching to PD6.

3.2.2 Small Community Systems – Water

Communities that are not connected to the York Water System are served by individual systems, and these include Ansnorveldt, Ballantrae, Musselman Lake, Keswick, King City, Kleinburg, Mount Albert, Nobleton, Schomberg, Stouffville, and Sutton. Connections to the York Water System for the communities of King City, Stouffville and most of Kleinburg are currently underway. An important part of the water supply solution for each small community system will include more aggressive water efficiency and conservation measures to ensure adequate future supplies.

Ansnorveldt

The communal water system supplying Ansnorveldt consists of two production wells, treatment facilities and a reservoir. The system was taken over by York Region and the Township of King prior to 2004. The findings contained in the 2004 Water Master Plan Update indicated that no further improvements in terms of supply or storage capacity were needed for the system serving Ansnorveldt. The population of the community is not anticipated to grow beyond the capacity of the existing system. No expansions are required.

Ballantrae-Musselman Lake

The community of Ballantrae-Musselman Lake is supplied by groundwater and water demand currently exceeds 2.3 ML/d, which is the firm capacity of the wells. Growth in Ballantrae water system, which includes the Musselman Lake area, is expected to result in a maximum day demand of 5.5 ML/d by 2016. The need for a new source of supply was identified in the 2004 Water Master Plan Update, and development of the new well is on-going.

Keswick and Sutton

The Georgina Water System serves the communities of Keswick and Sutton. The capacity of the existing system is 30 ML/d. Growth in water demand is expected to exceed the 30 ML/d capacity by 2012. Additional storage facilities will be required in Keswick and Sutton to accommodate the growth and increased water demand. By 2051, water demand in the communities of Keswick and Sutton is expected to reach 60 ML/d. Additional expansions of the Georgina water treatment plant will be required.

King City

The need for additional supply and storage for the community of King City was identified in the 2004 Water Master Plan Update. The subsequent EA recommended decommissioning the wells and obtaining supply from the York Water System. The design of the supply watermain, pumping station, and elevated tank is currently underway.

Kleinburg

A recent EA suggested that servicing for the community of Kleinburg should come primarily from the YWS from pressure district PD6. The existing groundwater supply will be decommissioned and the community will be split into 2 pressure districts. Most of the community will be serviced by PD6. The existing Kleinburg elevated tank will service the remaining area with a booster pumping station from PD6. These modifications will meet the anticipated long term demands.

Mount Albert

Residents and businesses in Mount Albert are supplied by groundwater, and water demand currently exceeds the firm well capacity of 1.8 ML/d. As detailed in Table 2–5, the need for a new well was identified in the 2004 Water Master Plan Update. The new well, which will increase firm capacity to 3.9 ML/d, is expected to be operational in 2011. An elevated tank, also identified in the 2004 Water Master Plan Update, has already been constructed.

Growth in water demand is expected to exceed the increased firm capacity of 3.9 ML/d by 2028, and additional water supply will be required after that date.

Nobleton

Residents and businesses in Nobleton are supplied by groundwater, and water demand currently exceeds the firm well capacity of 1.9 ML/d. As detailed in Table 2–5, the need for a new well was identified in the 2004 Water Master Plan Update. The new well, which will increase firm capacity to 4.0 ML/d, is expected to be operational in 2011. An elevated tank, also identified in the 2004 Water Master Plan Update, is currently planned.

Growth in water demand is expected to exceed the increased firm capacity of 4.0 ML/d by 2013, and additional water supply on the order of 2.5 ML/d will be required after that date to accommodate the predicted increases in population and employment to 2031.

Beyond 2031, it is estimated that peak water demand will reach 7.4 ML/d by 2051. Additional water supply will be required to accommodate growth after 2051.

Schomberg

Residents and businesses in Schomberg are supplied by groundwater, and water demand currently exceeds the firm well capacity of 1.6 ML/d. As detailed in Table 2–5, the need for a new well was identified in the 2004 Water Master Plan Update. Development of the new well and treatment plant, which will increase firm capacity to 3.1 ML/d, is currently on-going.

Growth in water demand in Schomberg is expected to exceed the increased well capacity of 3.1 ML/d by 2031, and additional storage will be needed.

Stouffville

The Town of Stouffville is currently serviced by 3 pressure districts. Groundwater is the source of water for Stouffville with all wells supplying Zone 2. Zone 1 is supplied via a booster pumping station from Zone 2 while Zone 3 is a pressure reduced from Zone 2. The water demand currently exceeds the firm well capacity of 12 ML/d. There is a new pumping station recently constructed to connect the community to the York Water System in 2009, which will increase supply to the Town to 31 ML/d. To accommodate the additional supply, additional system storage will be required in Zone 2. Beyond 2031, growth in water demand is expected to exceed the increased capacity of 31 ML/d by 2038. This situation will require either a further increase in supply from the YWS or more aggressive water efficiency to meet expected water demand to 2051.

3.2.3 York-Durham Sewage System

East Gwillimbury (Holland Landing, Queensville and Sharon)

The Communities of Holland Landing, Queensville and Sharon together with Mount Albert are the urban areas of East Gwillimbury. Holland Landing is presently serviced by seasonal retention lagoons. Sharon and Queensville are presently served by private systems. Mount Albert has a stand alone water pollution control plant that is discussed in the Small Community Systems section. The anticipated growth in Holland Landing, Queensville and Sharon will result in wastewater demands that exceed the lagoon capacity. Additional wastewater treatment or capacity is required. The growth will also require infrastructure projects to collect wastewater from the expanded service areas.

A number of alternative solutions for wastewater servicing in Holland Landing, Queensville and Sharon will be examined in greater detail through the Upper York Servicing System (UYSS) Individual EA project. An interim measure for wastewater servicing for the period up to 2016, when the UYSS is expected to be commissioned, is through a new Second Concession pumping station which will discharge to the Newmarket pumping station of the YDSS. The Second Concession pumping station will also receive flows from the Green Lane Sewer and as a result, the capacity limitations of the Green Lane pumping station will be addressed.

Newmarket

The Town of Newmarket is connected to the YDSS through the Bogart Creek and Newmarket pumping station. An equalization basin was recently implemented to reduce the impact of peak wet weather flows on Newmarket and Aurora pumping station operation. The Newmarket pumping station presently discharges to the Aurora pumping station. Growth in wastewater demand will remain within the firm capacity of the Newmarket and Bogart Creek pumping stations until 2016 when a permanent solution to wastewater servicing (UYSS) in East Gwillimbury will be developed. With UYSS in place, the firm capacity of the Newmarket and Bogart Creek pumping station will be adequate to 2051. Both the Newmarket pumping station and the Bogart Creek pumping station discharge to a single forcemain. All other major pumping stations in the Region discharge to two or more forcemains and as a result, have a higher degree of system security. The Newmarket pumping station forcemain therefore should be twinned.

Aurora

The Town of Aurora is connected to the YDSS through the Aurora pumping station. An equalization basin was recently implemented to reduce the impact of peak wet weather flows on pumping station operation. Growth in wastewater demand will remain within the firm capacity of the Aurora pumping station until 2016 when a permanent solution to wastewater servicing (UYSS) in East Gwillimbury will be developed. With UYSS in place, the firm capacity of the Aurora pumping station will be adequate to 2051.

King City

Growth in wastewater flows is expected to be within the firm capacity of the King City pumping station until 2031 and beyond to 2051.

Vaughan

Analysis indicates that future growth in north western Vaughan as well as anticipated growth in parts of Kleinburg will require wastewater services by the period 2016 to 2021. Similarly, the north eastern growth areas of Vaughan will also require wastewater services by the period 2016 to 2021.

Richmond Hill

No additional trunk sewers beyond those already in the on-going YDSS trunk sewer development (for example, 19th Avenue, 16th Avenue, Southeast collector) will be needed.

Markham

The north eastern growth areas of Markham will require additional wastewater services by the period 2016 to 2021.

Stouffville

Growth in wastewater flows is expected to be within the firm capacity of the Stouffville pumping station until 2031 and beyond to 2051.

Lower YDSS Pumping Stations and Peel Diversion

Analysis of the south western series of pumping stations Humber, Black Creek, and Leslie pumping stations shows that the Humber and Black Creek facilities will not have sufficient capacity for future peak wastewater flows from the north west of Vaughan and Kleinburg by the period 2031 to 2036. Improvements to the Leslie pumping station to increase reliable firm capacity will be needed by the period from 2021 to 2026. The Leslie pumping station is currently being upgraded to increase the firm capacity to meet 2026 requirements. Moreover, an additional (third) forcemain from the Leslie pumping station should be considered to enhance system security. Wastewater flows currently being treated in Peel Region will continue under the existing agreement until 2031 at which time further inter-regional discussion will be needed.

Duffin Creek Water Pollution Control Plant, Southeast Collector and Primary Trunk Sewer

Urban areas in York Region, including Aurora, King City, Markham, Newmarket, Richmond Hill, Stouffville, and Vaughan, are connected to the York- Durham Sewage System (YDSS). This system consists of a series of gravity sewers, pumping stations, equalization tanks, and forcemains that collect and convey wastewater to the Duffin Creek water pollution control plant, which discharges into Lake Ontario, and has a current rated capacity of 420 ML/d.

The portion of this system located within Durham Region is jointly owned by York and Durham Regions and is operated by Durham Region. The Duffin Creek water pollution control plant is presently operating at 85% of rated capacity. It is expected that wastewater flows will exceed the current rated capacity of 420 ML/d by 2010. An expansion of the capacity to 630 ML/d is currently underway. This capacity will also require the additional expansion of the plant outfall sewer. The capacity is restricted to 520 ML/d until this expansion of the plant outfall sewer can be implemented.

Future population and employment growth are expected to produce wastewater flows that will exceed the increased capacity of 630 ML/d. Beyond 2031, growth in wastewater flows is

expected to increase by a factor of 2.6 between now and 2051. Expansion of the capacity of the Duffin Creek water pollution control plant to 840 ML/d was identified as a strategic project in the 2002 Wastewater Master Plan Update, and this expansion will serve demand until 2051.

In addition to the above, analysis carried out in the current Master Plan Update shows that the Primary trunk sewer, located in Durham Region, which connects the Southeast collector to the Duffin Creek plant will require a second conduit as early as the period between 2016 and 2021. The recommendation for a second conduit connecting the Southeast collector and the Duffin Creek plant is based on anticipated capacity requirements as well as system security. The second conduit will allow inspection and any needed maintenance on the existing Primary trunk sewer and provide a redundant flow route. This should be considered a priority project.

3.2.4 Small Community Systems – Wastewater

Communities in York Region that are serviced by local wastewater collection and treatment facilities include Keswick, Kleinburg, Mount Albert, Nobleton, Schomberg and Sutton.

Keswick

The community of Keswick is currently served by a water pollution control plant with a capacity of 12.07 ML/d. The plant expansion is planned for 2010, when the capacity will increase to 18 ML/d; the expansion is presently in the design phase. It is expected that the expanded wastewater treatment capacity of 18 ML/d will accommodate anticipated growth to 2028. York Region is presently in discussions with regulatory agencies about a further expansion to 24 ML/d.

Growth in wastewater flows is expected to increase by a factor of 2.2 between now and 2051 to approximately 20.7 ML/d. If the planned expansion to 24 ML/d moves forward, then future wastewater flows beyond 2051 can be accommodated. The new Lake Simcoe Protection Plan may require additional measures to reduce phosphorus loadings from the Keswick water pollution control plant in the future.

Kleinburg

In 2007, York Region completed a Class EA of wastewater servicing alternatives for the community of Kleinburg (including the community of Nashville). The Class EA recommended a preferred solution that involved upgrading the Kleinburg water pollution control plant to a rated capacity of 2.87 ML/d.

Growth in wastewater flow is expected to exceed the expanded wastewater treatment system capacity of 2.87 ML/d by 2016, and wastewater flows are expected to increase by a factor of 15 between now and 2031, and by a factor of 16 between now and 2051. A further expansion to a rated capacity of 5.75 ML/d therefore will be required by 2011. Construction of a new Northwest Vaughan collector will be required by 2016 to divert flows in excess of the Kleinburg water pollution control plant rated capacity to the Humber pumping station.

Mount Albert

In 2002, York Region completed a Class EA of wastewater servicing alternatives for the community of Mount Albert. The Class EA recommended a preferred solution that involved upgrading the Mount Albert water pollution control plant to a rated capacity of 2.04 ML/d. In addition to expanding the plant, the Class EA recommended advanced treatment so that the effluent could continue to be discharged to local creeks. Construction of the expanded facility has been completed.

Growth in wastewater flows is expected to increase by a factor of 2.4 between now and 2031, and this increase can be accommodated by the expanded wastewater system. Growth to 2051 is expected to increase wastewater flows by a factor of 2.6 from present conditions, and this, too, can be accommodated by the expanded wastewater system. As a result, no additional facilities are required to provide wastewater servicing to 2051. While system capacity is no longer an issue, the new Lake Simcoe Protection Plan may require additional measures to reduce phosphorus loadings from the Mount Albert water pollution control plant in the future.

Nobleton

In 2003, York Region completed a Class EA of wastewater servicing alternatives for the community of Nobleton. The Class EA recommended a preferred solution that would accommodate future growth via a water pollution control plant and associated pumping station and forcemain with no connection to the YDSS. Construction of the new water pollution control plant and collection system has started. The rated capacity of the treatment plant will be 2.93 ML/d. Effluent from the treatment plant will be discharged to the Humber River, and this has been accounted for in the assimilative capacity of the river. However, no additional phosphorus loadings to the Humber River are possible and any future flows in excess of 2.93 ML/d would require a higher level of treatment.

Growth in wastewater flow is expected to exceed the new wastewater treatment system capacity at some point in the period to 2031. The growth should be monitored. Evolving population projections, the Region's enhanced water efficiency and other sustainability programs and other factors such as the state of the economy will influence the timing of planning for future servicing.

Schomberg

In 2004, York Region completed a Class EA of wastewater servicing alternatives for the community of Schomberg. The Class EA recommended a preferred solution that involved upgrading the Schomberg water pollution control plant to a rated capacity of 2.06 ML/d. Commissioning of the expanded facility is taking place now.

Growth in wastewater flows is expected to increase by a factor of 2.4 between now and 2031, which is within the expanded treatment plant capacity of 2.06 ML/d. Future demand to 2051, when growth in wastewater flows is expected to increase by a factor of 2.9 based on present conditions, can also be accommodated within the capacity of the expanded water pollution control plant. However, the new Lake Simcoe Protection Plan may require additional measures to reduce phosphorus loadings in the future.

Sutton

The community of Sutton is currently served by a water pollution control plant with a capacity of 3.41 ML/d. Growth in wastewater flows is expected to exceed present plant capacity by 2010. In 2007, York Region commissioned a Class EA of wastewater servicing alternatives for the community of Sutton. The Class EA recommended a preferred solution that involved upgrading the Sutton water pollution control plant to a rated capacity of 7.51 ML/d. The treatment plant expansion is on-going (Lake Simcoe receives effluent from the Sutton water pollution control plant, and York Region is presently awaiting clarification about future effluent requirements to permit on-going discharge to Lake Simcoe).

Growth in wastewater flows is expected to increase by a factor of 2.7 by 2031, and this increase can be accommodated within the expanded capacity of 7.51 ML/d. Demand will exceed the capacity of the expanded water pollution control plant by 2035, and growth in wastewater flows is anticipated to increase by a factor of 5.0 by 2051. The new Lake Simcoe Protection Plan may require additional measures to reduce phosphorus loadings in the future.

3.3 Alternatives Overview

The Problem Statement in Section 1-1 presents the overarching water and wastewater servicing issue to which York Region must respond. To do this, the Region considered a number of alternative solutions, derived from past master planning efforts and based on Municipal Class EA requirements. The alternatives considered were:

- Do Nothing
- Limit Growth
- Implement Water Use Efficiency and Wastewater Reduction Measures
- Build New Systems
- Enhance/Expand Existing Systems

As required by the Municipal Class EA process, the “Do Nothing” alternative must be considered. “Do Nothing” means just that: no improvements or enhancements would be made to any of the Region’s water and wastewater systems, including the small community systems. This alternative would preclude growth in York Region, is contrary to the Regional Official Plan, and does not abide by the Provincial *Places to Grow* growth projections. For these reasons, “Do Nothing” is not a feasible alternative and was not carried forward.

The “Limit Growth” alternative essentially has the same effect as the “Do Nothing” alternative: population and employment growth would be minimized, with the result that no improvements or enhancements would need to be made to the water and wastewater systems serving the Region. The “Limit Growth” alternative does not support the Region’s growth objectives, nor does it support the Provincial *Places to Grow* growth projections. For these reasons, “Limit Growth” is not a feasible alternative and was not carried forward.

Under the “Implement Water Use Efficiency and Wastewater Reduction Measures” alternative, York Region would rely on reductions in water demand and wastewater production to increase the capacity of the existing water and wastewater systems to support growth. The Region

already has a water efficiency program in place (*Water for Tomorrow*) and is developing new programs, such as the Sustainable Home Incentive Program (SHIP). The Region has also been working with area municipalities to reduce existing and prevent further inflow and infiltration to the wastewater collection system in order to increase collection and treatment capacity. However, the increase in capacity generated by these programs is insufficient to support York Region's expected long-term growth. Consequently, "Implement Water Use Efficiency and Wastewater Reduction Measures" in and of itself is not feasible and was not carried forward as a stand-alone alternative, but will contribute to the overall solution.

The "Build New Systems" alternative considered Georgian Bay as a source of water supply for York Region. This alternative was originally identified as part of the first water master plan, detailed in the 1997 York Region Long Term Water Project report. It was eliminated as an alternative in 1997, and was again considered an unfeasible option in this Master Plan Update. The distance and terrain through which water would need to be transmitted from Georgian Bay to York Region would involve a relatively high economic cost and high environmental impacts.

The "Build New Systems" alternative also considered two new stand-alone wastewater treatment facilities to service the northern portions of Vaughan and Markham. The facilities would discharge to the Humber River and Rouge River, respectively. Given the difficulties in siting these facilities, the significant effluent loadings expected to be generated by the facilities, the high value of the receiving waters and the limited assimilative capacity of the receiving waters these alternatives were discarded from further consideration. For these reasons, stand-alone wastewater treatment facilities for Vaughan and Markham were considered unfeasible and were not carried forward.

The "Enhance/Expand Existing Systems" alternative provides the most appropriate solution to effectively accommodate the Region's long term growth. This alternative involves identifying appropriate enhancements and/or expansions to existing systems that will support the projected growth. For this reason, the "Enhance/Expand Existing Systems" alternative was carried forward for investigation.

Based on the physical, hydrological and topographical characteristics of the Region, as well as the locations of existing water and wastewater system components, the "Enhance/Expand Existing Systems" alternative was divided into two separate alternatives: (1) Lake Ontario-based servicing; and, (2) Lake Simcoe-based servicing. Each of these alternatives is described below.

3.4 Short List of Alternatives

In this section, overview descriptions of the two alternatives, Lake Ontario-based servicing and Lake Simcoe-based servicing, are presented. The descriptions focus on conceptual designs of the physical aspects of the alternatives so that York Region residents can know the source of their drinking water and how it will be treated and delivered to them and how the wastewater they generate will be collected and where it will go for treatment.

Equally important has been the proactive of the need to plan for the long term sustainability of York Region's water and wastewater systems. Thus, an integral part of the development of the

conceptual designs for both alternatives has been to incorporate the need to encourage energy efficiency, limit greenhouse gas emissions, and minimize potential impacts on natural heritage areas such as the Oak Ridges Moraine. Furthermore, the conceptual designs take into account the benefits that are expected to accrue from existing Regional programs, such as *Water for Tomorrow*.

Emerging or proposed programs, such as enhanced and expanded inflow and infiltration reduction/prevention and the Sustainable Home Incentive Program (SHIP), have not been explicitly incorporated at this time. Rather, as details about these programs become firm and the results of the Region's pilot efforts become evident, it is expected that the demand analysis and infrastructure conceptual designs presented in this Master Plan Update will be reviewed and updated, as appropriate.

3.4.1 Lake Ontario Based Servicing

The conceptual framework underlying the Lake Ontario-based servicing alternative is shown in Figure 3–2.

Under this alternative, water supply for all of the communities currently connected or proposed to connect to the YWS will continue to be supplied by the combined Toronto/Peel/Groundwater source. The communities of Keswick and Sutton will continue to be supplied from Lake Simcoe and the remaining small urban systems will remain on groundwater.

Wastewater flows from all area municipalities currently connected to the York-Durham Sewage System (YDSS) plus wastewater from the Town of East Gwillimbury and a portion of the community of Kleinburg would be sent to treatment facilities discharging to Lake Ontario. Most of the wastewater will flow to the Duffin Creek wastewater treatment plant. Wastewater generated in the southwest section of York Region, principally parts of Vaughan, will be sent to the Regional Municipality of Peel for treatment.

New trunk sewer infrastructure will be needed to serve East Gwillimbury, northern Vaughan, Kleinburg and Markham as well as a second pipe for the Primary trunk sewer located in Durham just upstream of the Duffin Creek water pollution control plant. New flow equalization storage capacity will eventually be needed at the North West Vaughan Collector. The second Southeast collector pipe, which is currently being designed (see Table 2–6 above), will need to be completed.

Wastewater systems in Keswick, Mount Albert, Nobleton, Schomberg, and Sutton would be used to treat wastewater flows generated by the urban populations in these communities. The wastewater treatment facilities serving these communities are located either on Lake Simcoe or on one of Lake Simcoe's tributaries.

Wastewater systems in Kleinburg and Nobleton will be used to treat wastewater flows generated by the urban populations in these communities. The wastewater treatment facilities serving these communities are located on the Humber River. A portion of the wastewater flows generated in Kleinburg will be diverted to the YDSS (Humber pumping station) once the rated capacity of

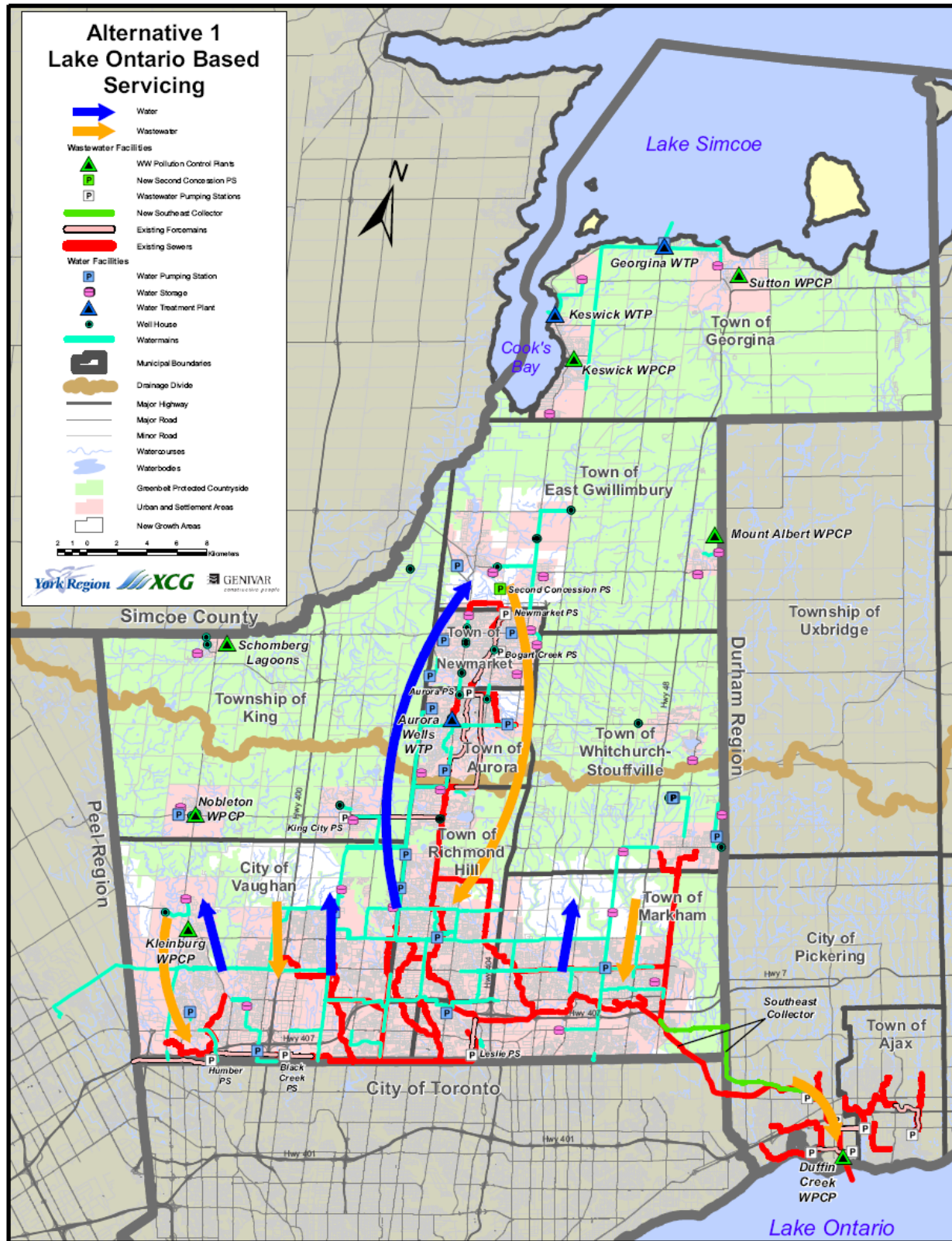


Figure 3-2

Lake Ontario-based Servicing Alternative

5.75 ML/d at the Kleinburg water pollution control plant is exceeded. In addition, all water and wastewater projects currently under construction will need to be completed (per Table 2–5 and Table 2–6 above).

3.4.2 Lake Simcoe Based Servicing

The concept framework underlying the Lake Simcoe-based servicing alternative is shown in Figure 3–3.

Under this alternative, the additional demand in the East Gwillimbury communities of Holland Landing, Queensville, and Sharon will be supplied from the Georgina Water System, which currently supplies the communities of Keswick and Sutton. The communities south of East Gwillimbury will continue to be supplied by the combined Toronto/Peel/Groundwater source. The remaining small urban systems will remain on groundwater.

With respect to wastewater, Alternative 2, Lake Simcoe-based servicing, consists of a number of projects will allow for the construction of a new Northern York wastewater system that will convey and treat wastewater from Queensville, Holland Landing, and Sharon and discharge treated wastewater to Lake Simcoe.

Wastewater in Alternative 2, with the exception of East Gwillimbury, will still flow to the Duffin Creek water pollution control plant. Wastewater generated in the southwest section of York Region, principally parts of Vaughan, will be sent to the Regional Municipality of Peel for treatment.

New trunk sewer infrastructure will be needed to serve East Gwillimbury, northern Vaughan, Kleinburg and Markham as well as a second pipe for the Primary trunk sewer located in Durham just upstream of the Duffin Creek water pollution control plant. New flow equalization storage capacity will eventually be needed at the North West Vaughan Collector. The second Southeast collector pipe, which is currently being designed (see Table 2–6 above), will need to be completed.

Wastewater systems in Keswick, Mount Albert, Nobleton, Schomberg, and Sutton would be used to treat wastewater flows generated by the urban populations in these communities. The wastewater treatment facilities serving these communities are located either on Lake Simcoe or on one of Lake Simcoe's tributaries.

Wastewater systems in Kleinburg and Nobleton will be used to treat wastewater flows generated by the urban populations in these communities. The wastewater treatment facilities serving these communities are located on the Humber River. A portion of the wastewater flows generated in Kleinburg will be diverted to the YDSS (Humber pumping station) once the rated capacity of 5.75 ML/d at the Kleinburg water pollution control plant is exceeded.

In addition, all water and wastewater projects currently under construction will need to be completed (per Table 2–5 and Table 2–6 above).

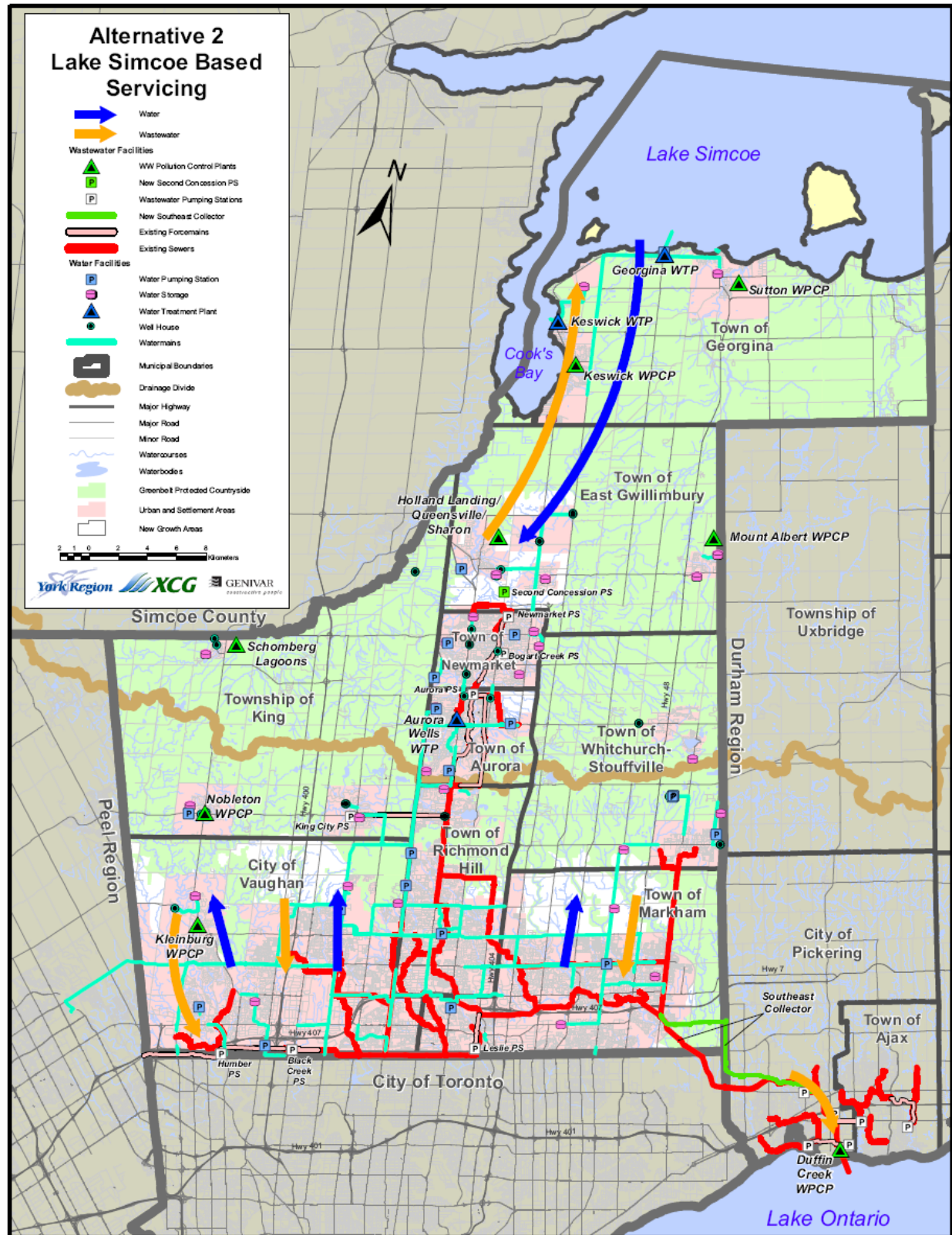


Figure 3-3

Lake Simcoe-based Servicing Alternative

3.5 Evaluation Criteria and Approach

The evaluation criteria used to compare the two alternatives were based on the ten principles comprising the *York Region Water and Wastewater Sustainability Strategy*²⁰ and formulated so that the range of criteria contemplated by the Municipal Class EA process was captured.

The process of developing the evaluation criteria was an iterative one, beginning with proposals made by the Region followed by a number of consultations with the public and the Region's stakeholders. The final criteria used to evaluate the alternatives are presented in Table 3–2, Table 3–3 and Table 3–4, and reflect input obtained from the public and stakeholders.

Table 3–2 Sustainable Natural Environment Evaluation Criteria

Triple Bottom Line	Sustainability Strategy Principle	Criterion
Sustainable Natural Environment	Healthy Watersheds	Managing discharges to stressed or sensitive receiving waters
		Managing annual loadings to receiving watercourses
		Reducing annual net volume of intra-basin transfers
	Respect for Natural and Cultural Heritage	Need for greenbelt crossings or on-greenbelt construction
		Need for ORM crossings or on-moraine construction
		Proximity to areas of First Nations traditional use
	Climate Change and Energy Efficiency	Reducing annual greenhouse gas emissions as CO ₂ equivalent
		Reducing annual energy utilization

Table 3–3 Economic Vitality Evaluation Criteria

Triple Bottom Line	Sustainability Strategy Principle	Criterion
Economic Vitality	Full and Equitable Funding and Value-For-Money	Estimated project cost
		Estimated O&M cost
	Timely and Integrated Service Delivery	Ease of construction
		Ease of integration with existing water and wastewater infrastructure
	Monitoring, Performance Measurement and Adaptive Management	Complexity of water and wastewater systems
		Need for new management and reporting systems

Table 3–4 Healthy Communities Evaluation Criteria

Triple Bottom Line	Sustainability Strategy Principle	Criterion
Healthy Communities	Community Well Being	Managing construction impacts
		Proximity of facilities to residences, businesses, and institutions
	Wise Use of Water	Promotion of water use reduction
		Promotion of inflow and infiltration reduction
	Communications, Consultation and Engagement	Impact on existing inter-regional agreements
		Number of conservation authorities involved
	Safe and Clean Drinking Water	Maintaining or enhancing security of supply
		Maintaining or enhancing drinking water quality

²⁰ Regional Municipality of York (2008). *York Region Water and Wastewater Sustainability Strategy*. Report prepared by XCG Consultants Ltd., February, 2008. Available on-line at <http://www.york.waterwastewatermasterplan.ca/files/Water%20and%20Wastewater%20Sustainability%20Strategy%20FINAL.pdf>.

Each of the two main alternatives was evaluated against the criteria shown in Table 3–4, Table 3–3 and Table 3–2. A determination was made about the likelihood of each alternative to achieve each criterion using a comparative assessment methodology that relied on a three point scale comprising “poor”, “good”, and “best”. Symbols have been used to indicate how well each alternative is expected to achieve each criterion, and these are shown in Table 3–5.

Table 3–5 Symbols Used for Comparative Evaluation of Alternatives

Scale	Symbol
Best	●
Good	◐
Poor	○

Table 3–6 presents the results of the evaluation. For the majority of the criteria (almost 60%), both alternatives were judged to produce similar results. For these criteria, either alternative proved to be acceptable. Specifically, it was determined that both alternatives would enable the Region to successfully promote water use reduction, reduce inflow and infiltration, ensure the security of drinking water supply, and ensure high quality drinking water.

However, there were marked differences between the two alternatives when it came to:

- Management of discharges to stressed or sensitive receiving waters
- Need for greenbelt crossing or on-greenbelt construction
- Proximity to areas of First Nations traditional use
- Complexity of water and wastewater systems

For these four indicators, it was determined that Alternative 1 (Lake Ontario-based servicing) would result in a better outcome than Alternative 2 (Lake Simcoe-based servicing), which scored poor for all four of these indicators. Specifically, when comparing the two alternatives it was determined that Alternative 1 (Lake Ontario-based servicing) would be the better choice for managing discharges to stressed or sensitive receiving waters, would result in less need for greenbelt crossings or on-greenbelt construction, would not be as near to areas of First Nations traditional use, and would result in relatively less complex water and wastewater systems.

It was also determined that Alternative 2 (Lake Simcoe-based servicing) would result in greater construction challenges, and greater efforts would be required to integrate Alternative 2 with existing water and wastewater infrastructure. As well, managing construction impacts associated with Alternative 2 was determined to be relatively more onerous than managing impacts associated with Alternative 1.

Furthermore, Alternative 1 protects Lake Simcoe by reducing nutrient discharges and supports the major investment in Lake Ontario oriented infrastructure already in place.

Table 3–6 Comparative Evaluation of Alternatives

Triple Bottom Line	Sustainability Strategy Theme	Indicator	Alternative 1	Alternative 2
Sustainable Natural Environment	Healthy Watersheds	Managing discharges to stressed or sensitive receiving waters	●	○
		Managing annual loadings to receiving watercourses	◐	◐
		Reducing annual net volume of intra-basin transfers	◐	●
	Natural And Cultural Heritage	Need for greenbelt crossing or on-greenbelt construction	●	○
		Need for ORM crossings or on-moraine construction	◐	◐
		Proximity to areas of First Nations traditional use	●	○
	Climate Change and Energy Efficiency	Reducing annual greenhouse gas emissions as CO ₂ equivalent	◐	◐
		Reducing annual energy utilization	◐	◐
Economic Vitality	Full and Equitable Funding and Value-For-Money	Estimated project cost	◐	◐
		Estimated lifecycle cost	◐	◐
	Timely and Integrated Service Delivery	Ease of construction	◐	○
		Ease of integration with existing water and wastewater infrastructure	◐	○
	Monitoring, Performance Measurement and Adaptive Management	Complexity of water and wastewater systems	●	○
		Need for new management and reporting systems	◐	◐
Healthy Communities	Community Well Being	Managing construction impacts	◐	○
		Proximity of facilities to residences, businesses and institutions	◐	◐
	Wise Use of Water	Promotion of water use reduction	●	●
		Promotion of inflow and infiltration reduction	●	●
	Communications, Consultation and Engagement	Maintaining or enhancing inter-regional agreements	◐	◐
		Complexity of stakeholder engagement	●	◐
	Safe & Clean Drinking Water	Maintaining or enhancing security of supply	●	●
		Maintaining or enhancing drinking water quality	●	●

In summary, based on the comparative assessment of the two alternatives, it was determined that Alternative 1 – Lake Ontario-based servicing – was the preferred alternative to meet York Region’s long term water and wastewater servicing needs.

3.6 Public and Agency Involvement

A requirement under the *Environmental Assessment Act* is consultation with public and agency stakeholders. This requirement is carried forward within the context of the master planning outlined in the Class EA process, and was a key component of York Region’s long term water and wastewater servicing update. An extensive consultation program was developed and implemented throughout the course of the Master Plan Update process, such that the planning process was a collaborative venture among York Region, its residents and businesses, the Region’s area municipalities, neighbouring jurisdictions, and regulatory agencies.

The main objectives of the consultation program were to:

1. Explain the purpose of the study and how the study was being undertaken;
2. Discuss and obtain input about how the public and stakeholders were to be consulted;
3. Provide opportunities for the public and agency stakeholders to comment on
 - a. How the problem/opportunity was defined;
 - b. The master planning approach and Class EA process;
 - c. The proposed alternatives and technical and environmental assessment studies to be conducted;
 - d. The evaluation criteria and evaluation methodology; and,
 - e. The draft Master Plan report.

The consultation program comprised five components, namely:

- Communications
- Public consultation
- Agency consultation
- First Nations liaison
- Issues identified and addressed

Complete details about the Region’s public and agency consultation program are contained in Appendix 3. Below are presented highlights of the consultation program and input received from stakeholders.

3.6.1 Communications

The Communications component of the consultation program began with release of the Notice of Study Initiation. The Notice was published in local newspapers throughout the Region in November, 2006; at the same time, the Notice was mailed to municipal representatives, agencies,

and study stakeholders. The Notice included an announcement about the first round of public consultation centres.

York Region used a combination of communications strategies. The Region released a series of three newsletters over the course of the Master Plan Update, starting with the first newsletter in November, 2006. The second newsletter was released in November, 2007, and provided information about both the Water and Wastewater Master Plan Update and the Transportation Master Plan Update.

The third newsletter was released in January 2009, and contained a summary of the main findings of the Master Plan Update and an overview of the preferred water and wastewater servicing alternatives.

York Region also developed and maintained a web portal on the York Region web-site (www.york.waterwastewatermasterplan.ca) in order to provide access to up-to-date information about the water and wastewater Master Plan Update process, including newsletters, reports, presentations, display panels used at the public consultation centres, and other relevant information, on an on-going basis. The web portal also contained an on-line survey, so that the public could provide instant input to the update process. In addition, the Region implemented a comment tracking protocol and made public comments and the Region's responses available on-line.

3.6.2 Public Consultation

York Region hosted three rounds of public consultation centres (PCCs) over the course of the Water and Wastewater Master Plan Update, including two rounds held in conjunction with the Transportation Master Plan Update. Each PCC included:

- A formal presentation;
- Display panels, outlining aspects of the study, for members of the public to review; and,
- Staff from York Region and the Region's consultant team, who were available for discussions and to answer questions.

The first round of PCCs took place on November 21-23, 2006, in Aurora, Keswick, and Vaughan. As part of the first round, a PCC was also held on April 17, 2007, in Pickering, and was delivered jointly with Durham Region.

The second round of PCCs was held on November 6, 15 and 21, 2007, in East Gwillimbury, Markham, and King City. These PCCs were held concurrently for both Master Plan Update studies. The second round of PCCs gave the public an opportunity to review up-to-date information about both the water and wastewater and the transportation master plans, including information about York Region's sustainability principles, the criteria proposed to be used to evaluate alternatives, and preliminary findings.

The third round of PCCs was conducted on January 15, 20, 21, and February 4, 2009, in Newmarket, Richmond Hill, Whitchurch-Stouffville, and Aurora. For the third round of PCCs, York Region incorporated a variation of the *Dot-mocracy* technique to gauge public opinion about recommendations presented by the study team.

Because several of York Region's Water and Wastewater Master Plan recommendations could result in joint York-Durham projects, York Region participated as a guest in a number of Public Consultation Centres held by Durham Region in Ajax on February 21, 2008 and in Pickering on February 25, 2008.

3.6.3 Agency Consultation

To address technical aspects of the Water and Wastewater Master Plan Update, York Region established a Technical Advisory Committee (TAC). Membership on the TAC included representatives from York Region, Provincial Government Ministries (including the Ministries of Environment, Municipal Affairs and Housing, and Natural Resources), conservation authorities, neighbouring regional and York Region local area municipalities, and the York Region study team.

The TAC provided a forum for York Region and agency stakeholders to discuss issues, provide input, and make recommendations about long term water and wastewater servicing for the Region. The TAC formally met five times over the course of the study; the meeting dates and corresponding agendas were as follows:

TAC Meeting 1	October 16, 2006	To provide background information on the study.
TAC Meeting 2	May 23, 2007	To discuss population forecasts, design criteria, and sustainability.
TAC Meeting 3	November 2, 2007	To discuss sustainability principles, infrastructure assessment, and PCC#2 for Water, Wastewater and Transportation.
TAC Meeting 4	October 31, 2008	To discuss population forecasts, design criteria, and sustainability.
TAC Meeting 5	May 7, 2009	To review recommended Water and Wastewater Master Plan.

3.6.4 First Nations Liaison

The first step in York Region's liaison with First Nations involved identifying First Nations with presence, interest or historical connections in the Region. The knowledge of the Region and its consultants, Indian and Northern Affairs Canada and the Ontario Secretariat for Aboriginal Affairs was used to make the initial identifications.

Liaison with First Nations was maintained throughout the study via telephone calls and letters, which were used to provide information about progress and status and to solicit feedback, input and to discuss with First Nation leaders their issues regarding water and wastewater servicing in York Region.

3.6.5 Issues Identified and Addressed

York Region sought and received input from the public and stakeholders throughout the study and this input was used to guide the conduct of the master planning process, including evaluation of the alternatives.

Public input identified four top priorities (which were translated into evaluation criteria) for York Region's long term water and wastewater servicing, namely the need to:

- Ensure certainty of supply;
- Meet and exceed Ontario Drinking Water Standards;
- Meet or exceed water quality and air quality requirements; and,
- Ensure water and wastewater system reliability.

The public strongly supported York Region's preferred alternative (Alternative 1 – Lake Ontario-based servicing), and acknowledged the need to continue with, and enhance, the Region's water efficiency and conservation efforts (such as through the *Water for Tomorrow* program) while at the same time continue to reduce and prevent further inflow and infiltration to the wastewater collection system. Specifically, the public supported the following solutions to York Region's long-term water and wastewater needs:

- Proceed with Lake Ontario-based servicing (Alternative 1) as the most sustainable long term solution;
- Seek approval for an increase under the Great Lakes Charter for an Intra-basin transfer;
- Explore with Peel Region the potential to treat additional wastewater above the current agreement;
- Continue to enhance the Region's water efficiency and conservation program (*Water for Tomorrow*);
- Continue with inflow and infiltration reduction and prevention programs;
- Implement operational changes in order to optimize the use of groundwater from the Yonge Street Aquifer;
- Limit wastewater discharges to Lake Simcoe to comply with the Lake Simcoe Protection Act;
- Ensure consideration of natural environment enhancements associated with each major infrastructure project;
- Develop an overall climate change strategy including a program aimed at reducing greenhouse gases on a per capita basis; and,
- Develop an overall climate change strategy including a program to manage future risks in water and wastewater infrastructure based on principles of adaptation and building resiliency.

Apart from supporting the recommendations of the project team, the members of the public also provided verbal and written comments. These comments included:

- Review the Region's role in stormwater management
- Reduce reliance on groundwater for drinking water supply
- Eliminate or reduce infiltration and inflow into the Regional sewer system
- Extend municipal services into the Vandorf/Gormley area

Each comment was addressed and incorporated in the selection of the preferred alternative and in the development of recommendations for policies and programs. However, on the issue of extending municipal services into the Vandorf and Gormley area, discussions are currently ongoing with Town staff and the various provincial ministries to determine what servicing options are possible given the legislation and planning policies in place.

Section 3.7 below presents the description of the preferred alternative, while Section 4 contains the program and policy recommendations that address the public commentary.

3.7 Preferred Alternative and Recommendations

Lake Ontario-based servicing is the preferred alternative for satisfying York Region's long term water and wastewater servicing needs.

3.7.1 Infrastructure Requirements

For long term water servicing, the Lake Ontario based alternative consists of a number of projects that will result in the expansion of the York Water System, including extension of the York Water System to service new growth areas within King City, Kleinburg, Stouffville, Queensville, Holland Landing, and Sharon, along with expansions to small community water systems. Key elements of the preferred alternative for long term water servicing include:

- Expansion of the York Water System in East Gwillimbury that includes additional storage facilities, watermains, and pumping stations.
- Increased demand at the top end of the system, in East Gwillimbury, will result in additional infrastructure or expansion of facilities in the municipalities of Aurora, Newmarket and Richmond Hill.
- Additional demand and expansion of PD6 in Vaughan and Markham requires storage in both municipalities.
- Expansion of PD7 in Vaughan and Markham will require storage and pumping stations.
- Expansion of PD8 in Vaughan will require storage and pumping stations.
- To relieve the stress on the Pugsley pumping station in Richmond Hill, a new pumping station is proposed near Elgin Mills Road and Bathurst Street.
- Expansion of PD9 in Vaughan will require storage and a pumping station.

- The Georgina water system will require additional supply from the Georgina water treatment plant, storage and a pumping station to create a new pressure district in Sutton.
- Additional supply is required for the small urban systems of Ballantrae, Mount Albert, Nobleton and Schomberg.
- Additional storage required for Schomberg and Nobleton.

For long term wastewater servicing, the Lake Ontario based alternative will result in the expansion of the YDSS, including extension of the YDSS to service new growth areas within Queensville, Holland Landing, and Sharon, along with expansions to small community wastewater systems. Key elements of the preferred alternative for long term wastewater servicing consist of the following:

- A new Upper York Sewage Solutions (UYSS) to convey wastewater from new growth areas within Holland Landing, Queensville and Sharon to the YDSS. One component of the UYSS system will be the Second Concession pumping station that will pump flow from Holland Landing/ Queensville and Sharon to the YDSS as well as diverted flows from the Green Lane Sewer. As a result of these works, capacity limitations of the Green Lane pumping station will be addressed.
- Decommissioning of the Holland Landing lagoons and conveyance of wastewater currently discharged to these lagoons to the UYSS.
- New equalization storage at the North West Vaughan Collector to equalize flows and reduce pumping station requirements at the Humber and Black Creek pumping stations.
- Treatment plant expansions in the smaller communities to service community-based growth. Expansions are planned for Kleinburg, Schomberg, Keswick, and Sutton while a new water pollution control plant is planned for Nobleton.
- Pumping station upgrades at Dr. Kay pumping station (Schomberg) and High Street pumping station (Sutton) to be completed as part of treatment plant upgrades.
- Continued diversion of flows from the Humber pumping station to Peel Region.
- Construction of three new trunk sewers to service new growth areas in north Markham and north Vaughan (including Kleinburg).
- Expansions at the Duffin Creek water pollution control plant (Stage 3 and Stage 4) to treat wastewater conveyed by the YDSS including implementation of additional influent pumping capacity and an increase in plant outfall capacity.
- A second Primary trunk sewer within Durham Region to provide additional conveyance capacity and to increase system security.
- A second Southeast collector sewer from the Ninth Line to Townline Road in Pickering. This will provide additional conveyance capacity and to increase system security.

3.7.2 Supportive Policies and Programs

Equally important to the success of York Region's long term servicing is the Region's commitment to implementation of its *Water and Wastewater Sustainability Strategy*. This strategy includes a broad range of policies and programs intended to assure the Region's water and wastewater works and services meet "the need of the present without compromising the ability of future generations to meet their own needs"²¹.

The next section presents over 50 additional policy and program recommendations in support of the *Water and Wastewater Sustainability Strategy*, ranging from ensuring that water supplied from surface and groundwater sources will be within safe yield limits, through minimizing service disruptions, to optimizing energy use. The recommended policies and programs support the Region's goals of service delivery that emphasize transparency, equity, accountability, and community involvement, as well as monitoring and continuous improvement toward sustainability.

3.7.3 Potential Environmental Impacts and Mitigation

York Region recognizes the potential for construction and operation of the proposed infrastructure components of the preferred alternative to cause environmental impacts and is committed to mitigating such impacts.

As noted earlier, the master planning process defines a broad, long term plan for water and wastewater servicing, consisting of a series of projects over an extended time period. The individual projects are still subject to the requirements of the Class EA process. The potential magnitude and scope of environmental impacts associated with the preferred alternative will be fully identified at the time that individual projects are examined through the Class EA process.

3.7.4 Compliance with Intra-Basin Transfer Requirements

In order to implement the preferred alternative, York Region will need to comply with any regulations that are developed under the *Safeguarding and Sustaining Ontario's Water Act, 2007*, in respect of the 2005 Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement, originally signed by the Province of Ontario and the other nine parties to the 1985 Great Lakes Charter, and described earlier in Section 2.4. Implementation measures established by the 2005 Agreement are still under development and the "prior notice and consultation process" of the 1985 Great Lakes Charter continues to apply to proposed "Diversions" and "Consumptive Uses". At the same time, the Ministries of the Environment and of Natural Resources jointly released a Technical Bulletin, titled *Environmental Assessment Direction for Municipal Water and Wastewater Projects Proposing an Intra-Basin Transfer*²², in March, 2009, which provides additional direction to municipalities about potential regulatory

²¹ Brundtland, G. H. (1987). *Our Common Future*. United Nations World Commission on Environment and Development, Oxford University Press, Oxford.

²² Ontario Ministry of the Environment and Ontario Ministry of Natural Resources (2009). Technical Bulletin: *Environmental Assessment Direction for Municipal Water and Wastewater Projects Proposing an Intra-Basin Transfer*. Toronto, Ontario. March 2009.

obligations related to water and wastewater infrastructure projects that fall under the Great Lakes Charter.

York Region recognizes and supports the intent of the 2005 Agreement. Table 3–7 presents information to demonstrate that York Region’s selection of Lake Ontario-based servicing for long-term drinking water supply accords with the principles established by the 2005 Agreement and the direction provided by the Technical Bulletin, by showing how the preferred alternative satisfies each of the seven “exception criteria”²³ outlined in Section 2.4 applicable to intra-basin transfers and associated consumptive uses.

Table 3–7 Summary of York Region’s Compliance with the Exception Criteria of the 2005 Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement

Exception Criteria	Compliance Summary
Efficient Use and Conservation of Existing Water Supplies Article 201(4)(a): <i>The need for all or part of the Exception cannot be reasonably avoided through the efficient use and conservation of existing water supplies.</i>	• In recent years, York Region developed an asset management strategy which considers the full life cycle of assets to maximize the reliability of the system and attempt to maintain a high level of service to York Region residents. • Current municipal groundwater taking rate in the Yonge Street Aquifer has reached a sustainable level, indicated by stable groundwater levels. • Through the <i>Water for Tomorrow</i> program, York Region has embraced water use efficiency for the past eleven years as a very effective component of the long-term drinking water supply strategy.
Reasonable Quantities Article 201(4)(b): <i>The Exception shall be limited to quantities that are considered reasonable for the purposes for which it is proposed.</i>	• York Region has instituted a large scale planning process that evaluates and reviews drinking water and sewer servicing requirements on a periodic basis in order to address growth and manage infrastructure and operations more effectively and to deliver a sustainable future for our residents. • Specific components of the <i>Water and Wastewater Sustainability Strategy</i> are intended to assure that York Region’s water and wastewater works and services meet “the need of the present without compromising the ability of future generations to meet their own needs”. • All planning projections for transfer quantities take into account water savings from the <i>Water for Tomorrow</i> conservation and efficiency program and follow provincial design guidelines.
Return Flow of Water Withdrawn Article 201(4)(c): <i>All Water Withdrawn shall be returned, either naturally or after use, to the Source Watershed less an allowance for Consumptive Use. No surface water or groundwater from outside the Basin may be used to satisfy any portion of this criterion except if it: i) Is part of a water supply or wastewater treatment system that combines water from inside and outside of the Basin; ii) Is treated to meet applicable water quality discharge standards and to prevent the introduction of invasive species into the Basin.</i>	• Intra-basin Transfer will involve “return flow” of the transferred water as treated effluent back to the Lake Ontario watershed via Duffin Creek water pollution control plant and the G.E. Booth water pollution control facility.

²³ Readers are directed to section 34 of the *Ontario Water Resources Act* for the specific wording of the “exception criteria”.

Table 3–7 Summary of York Region’s Compliance with the Exception Criteria of the 2005 Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement cont’d.

Exception Criteria	Compliance Summary
No Significant Adverse Impact Article 201(4)(d): <i>The Exception shall be implemented so as to ensure that it shall result in no significant individual or cumulative adverse impacts to the quantity or quality of the Waters and Water Dependent Natural Resources of the Basin with consideration given to the potential Cumulative Impacts of any precedent-setting consequences associated with the Proposal.</i>	- No indication that Lake Ontario is undergoing stress and the current number of municipal and residential takings suggests sufficient capacity to support the proposed taking. - York Region complies with several federal and provincial initiatives that inform and direct how York Region activities are conducted in a manner that serves to protect and minimize impacts to Lake Ontario. - Certificates of approval issued under the Ontario Water Resources Act, 1990 impose operational controls, compliance limits and operating objectives on municipal sewage treatment plants that direct the acceptable levels of biological organisms, phosphorous, nitrogen and other nutrients and substances of concern in treated effluent that is discharged into a water body after treatment. - Since its inception, the YDSS has contributed to improvements in the water quality of Lake Ontario and the rivers and creeks in the surrounding watersheds. - The Duffin Creek water pollution control plant and the G.E. Booth water pollution control facility are currently undergoing an expansion and associated commitments dramatically exceed the regulatory compliance limits and level of treatment.
Efficient Use and Conservation of Transferred Water Article 201(4)(e): <i>The Exception shall be implemented so as to incorporate Environmentally Sound and Economically Feasible Water Conservation Measures to minimize Water Withdrawals or Consumptive Use.</i>	- York Region completed an update of the Water Efficiency Master Plan to ensure that the Water for Tomorrow program continues to be proactive and save even more water. - York Region pioneered the proactive distribution leakage reduction program in Canada, which will help determine where it will be most beneficial to undertake leak reduction activities. - To reduce and manage the amount of potable water used during the summer months, each municipality in York Region has an outdoor water use by-law in place.
Compliance with Applicable Laws and Agreements Article 201(4)(f): <i>The Exception shall be implemented so as to ensure that it is in compliance with all applicable municipal, State, Provincial and federal laws as well as regional interstate, inter-provincial and international agreements, including the Boundary Waters Treaty of 1909.</i>	- York Region conducts its planning activities pursuant to its Official Plan within the Province of Ontario’s regulatory framework and develops and implements the infrastructure required to provide services to its residents. - York Region complies with the Province of Ontario’s growth management policies which primarily dictate how and where municipalities grow and how the environment is considered and protected in the distribution of growth. - York Region’s growth management planning strives to balance environmental, social and economic considerations. - York Region operates within several federal and provincial initiatives that inform and direct how York Region’s infrastructure activities and municipal services are conducted, such that they protect and minimize impacts to the environment and receiving water bodies. - In York Region, a minimum of 40 per cent of provincially forecasted population and employment growth will be accommodated in existing developed and designated areas, but additional growth in those lands that are outside of protected areas and existing urban designations are necessary to meet Provincial regulatory requirements. - Operational conditions imposed by the Province of Ontario accord with provincial and federal agreements and bilateral agreements such as the <i>Canada-United States Great Lakes Water Quality Agreement</i>.
Other Applicable Criteria Article 201(4)(g): <i>All applicable criteria in this Article have also been met.</i>	York Region’s approach meets all other applicable criteria.

Additional information is available in York Region’s application for Intra-Basin Transfer.²⁴

²⁴ Regional Municipality of York (2008). Application for Intra-Basin Transfer: *A Needs and Justification Analysis to Support the Application for a Permit to Take Water to Permit the Intra-basin Transfer of Drinking Water sourced from Lake Ontario.*

4. Triple Bottom Line Policies and Programs Supporting Sustainable Water and Wastewater Servicing

The preferred alternative, presented in Section 3.7 above, identifies the system components – the pipes and plants – needed to satisfy York Region’s long term water and wastewater servicing requirements. But infrastructure alone will not be sufficient. The Region is strongly committed to the wise use of water whereby future growth will be based on increasingly more water efficient residential and employment development. The goal of these programs, which include the Region’s highly successful *Water for Tomorrow* program, the proposed Sustainable Home Incentive Program (SHIP), and the York Region and Local Municipal Inflow and Infiltration Reduction program, will be to limit insofar as possible the demands placed upon water and wastewater services. In addition, the Region will continue on-going efforts to protect its natural heritage, attract residents and businesses, and optimize asset performance. These are all vital elements important to the sustainability of the Region’s water and wastewater systems.

York Region already has an impressive history of policies and programs that address water and wastewater servicing and focus on sustainability. As part of the Master Plan Update, York Region conducted a review of its existing policies and programs to confirm on-going relevance. The review identified opportunities for refinement and for the adoption of additional policies and programs to support sustainable water and wastewater services.

This section presents the existing Regional policies and programs, as well as recommendations for new policies and programs. The focus here is on those policies and programs directly linked to long term delivery of sustainable water and wastewater services.

4.1 Recommended Water and Wastewater Regional Official Plan (ROP) Policies

The Region’s policies on water and wastewater are documented in Chapter 6, Section 6.7 Water and Sewer Strategies, of the Regional Official Plan (ROP) 1996. The section outlines fourteen policies recommended to be endorsed by York Region Council that share the objective of providing adequate water and sanitary sewer services to residents and businesses. Table 4–1 lists the fourteen policies.

Recommendation 1

When the Region proceeds with a new or amended ROP, the policies presented in Table 4–1 should be considered for adoption by Council.

Table 4–1 Proposed ROP Water & Wastewater Policies

Policy Area	Policy Statement
General	To provide full water and wastewater servicing to accommodate growth in the Urban Areas based on updates to servicing master plans.
General	Development within and expansion to towns and villages will occur on the basis of full municipal water and wastewater treatment services where such facilities currently exist.
General	Continue to negotiate arrangements with other partners for the provision of water and wastewater services for the Region.
General	That long-term water and wastewater servicing strategies will be prepared for adoption by Regional Council to coordinate the supplies of these services with the phased development of the regional structure.
General	The construction or expansion of partial services be prohibited in the Oak Ridges Moraine Conservation Plan area unless deemed necessary to address a serious health or environmental concern.
General	That water rates are based on full cost recovery of the enhancement, operation, maintenance, and rehabilitation/replacement of the water and wastewater systems.
General	That primary components of the water and wastewater systems be sized to consider the potential for expansion of the service area, intensification and increased allocation.
General	Additional policies related to sustainable infrastructure be considered.
General	Allocation, reallocation and phasing of water and wastewater services will be completed in cooperation with the area municipalities as part of the community building process.
General	To provide water and wastewater treatment capacity from Lake Simcoe to service the Keswick, Sutton and Georgina Lakeshore communities.
General	To consider other alternatives for servicing northern York Region in keeping with the requirements of the Environmental Assessment Act, the Water and Wastewater Master Plan and the Upper York Servicing Strategy Individual Environmental Assessment.
General	That where the protection of public health is an issue, in areas of existing groundwater contamination, as determined by a Medical Officer of Health, and where full municipal water and wastewater services cannot be provided, communal water supply and wastewater treatment systems shall be considered for all multi-lot/unit proposals. Consideration of communal systems shall be reviewed in the context of suitable administrative and financial arrangements to the satisfaction of the Region and the Province.
Water	It is the Region's intent to supply major urbanized areas with water from the Great Lakes, or from Lake Simcoe, subject to the restrictions of the Greenbelt Plan. A limited amount of groundwater resources will be used and managed in a way that sustains healthy flow into creeks, streams and rivers.
Water	Carefully monitor the Region's well water systems to ensure acceptable quality and quantity while not depleting the supply below the aquifer's sustainable level.
Water	To pursue, in cooperation with area municipalities, water conservation and demand reduction strategies designed to improve the efficiency of the Region's systems.
Wastewater	Where local official plans permit, minor infill in Towns, Villages, and Hamlets on private individual wastewater systems will only be permitted if it can be demonstrated to the local municipality that there are no adverse impacts on soil or groundwater quality.
Wastewater	That where private individual sewage systems are appropriate, the proposed plan must be supported by a hydrogeological study which will determine specific site-related minimum lot sizes and development standards. Final approval of all draft approved plans of subdivision/condominium on private services shall be conditional upon reconfirmation of the recommendations of the hydrogeological study.
Wastewater	To investigate methods of improving capacity of stand-alone wastewater treatment plants within the assimilation capacity of receiving streams, rivers and lakes.
Wastewater	To ensure the protection of source water for water supply systems by placing restrictions on the location and operation of private wastewater systems, maintenance yards, and other potential sources of contamination as required by the Region under the Clean Water Act.

4.2 Healthy Communities

One of the three foundational principles underlying the York Region Sustainability Strategy is devoted to healthy communities, and the Region has identified a number of actions under this principle that have a direct bearing on the delivery of water and wastewater works and services.

4.2.1 Safe and Clean Drinking Water

York Region is committed to providing safe and clean drinking water to all of its residents.

Ensuring safe and clean drinking water is a multi-jurisdictional undertaking in York Region. It is based on the existing governance structures between York and its area municipalities and York and its neighbouring regional municipalities.

Objectives:

1. The drinking water supply will be designed and operated to ensure drinking water that meets or exceeds Ontario Drinking Water Standards and which is safe for human health and is aesthetically acceptable.
2. The drinking water supply will be protected through source and intake zone protection strategies.

Master Plan Recommendations:

To ensure Safe and Clean Drinking Water it is recommended that York Region:

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| Recommendation 2 | Coordinate with municipal partners (City of Toronto and Region of Peel) to ensure the provision/delivery of a reliable source of safe and aesthetically acceptable drinking water. |
| Recommendation 3 | Monitor and report on the quality of the drinking water in accordance with applicable regulations. |
| Recommendation 4 | Ensure the protection of the drinking water supply through the development of source protection strategies for groundwater supplies and intake zone protection strategies for surface water supplies. |
| Recommendation 5 | Coordinate with municipal partners (City of Toronto and Region of Peel) to ensure the protection of the drinking water supply through the development of source protection strategies for groundwater supplies and intake zone protection strategies for surface water supplies. |
| Recommendation 6 | Ensure that drinking water quantities supplied from surface and groundwater sources will be within safe yield limits for the water body or aquifer. Report on water takings in accordance with Permits to Take Water and applicable legislation/regulations. |
| Recommendation 7 | Optimize water treatment facilities and processes to minimize chemical use and process waste residuals and to minimize energy consumption and greenhouse gas production. |
| Recommendation 8 | Develop and implement a Drinking Water Quality Management System (DWQMS), as required by the <i>Safe Drinking Water Act</i> , to facilitate York Region's ability to consistently produce and deliver safe and pleasing drinking water and to enhance consumer |

protection through the effective application and continual improvement of the DWQMS. The effectiveness of the DWQMS will be reported following each annual internal audit.

4.2.2 Wise Use of Water

York Region is committed to the wise use of water ensuring adequate water resources for today's residents and for future generations.

Because York Region has limited access to surface water, as both a source of supply and as receiving water for wastewater effluent, the wise use of water is a key driver in the sustainable delivery of water and wastewater services. The Region already has significant programs in place that emphasize the need to conserve resources, including *Water for Tomorrow*, York Region and Local Municipal Inflow and Infiltration Reduction Program, a multi-year program to reduce inflow and infiltration to the wastewater collection system, and a multi-jurisdictional agreement to manage groundwater resources.

Objectives:

1. Drinking water demand for existing and future development should be managed through conservation and public education to ensure wise use of available water supply and the efficient use of available water and wastewater infrastructure.
2. Drinking water system leakage should be managed in partnership with municipalities through asset management programs to ensure the wise use of available water supply and the efficient use of available water and wastewater infrastructure.
3. Wastewater extraneous flows should be managed in partnership with municipalities to ensure efficient use of wastewater collection and treatment infrastructure and to ensure wise use of water and other natural resources.

Master Plan Recommendations:

To ensure Wise Use of Water it is recommended that York Region:

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| Recommendation 9 | Continue and intensify the <i>Water for Tomorrow</i> program for existing Regional water users. |
| Recommendation 10 | Continue implementation of water conservation programs, including the Sustainable Home Incentive Program (SHIP), for new residential and employment growth. These programs should be developed in conjunction with area municipalities and the development community and should include guidance regarding program implementation, accepted conservation technologies and follow-up monitoring and maintenance. |
| Recommendation 11 | Continue implementation of inflow and infiltration reduction programs in existing collection systems in partnership with area municipalities. The programs should include specific targets and timeframes to achieve inflow and infiltration reduction. |

- Recommendation 12** Develop an inflow and infiltration prevention strategy based on a Region-wide program recommending best practices for sewer design, construction, inspection testing and follow-up performance monitoring.
- Recommendation 13** Develop a consolidated “Wise Use of Water Strategy” that consolidates and extends the currently evolving enhanced water efficiency and inflow and infiltration reduction programs and tracks progress in achieving water conservation and wastewater flow reduction.

4.2.3 Community Well-Being

York Region will provide reliable water and wastewater services to its residents to ensure continuing community well-being and economic vitality of the Region.

The *Water and Wastewater Master Plan Working Paper – Policies and Criteria* presents details about water and wastewater design criteria. The criteria are based on previous Master Plan documents and design criteria recently developed by York Region. The criteria were used to assess the existing infrastructure and to plan new infrastructure as part of the Master Plan Update process. The infrastructure designs based on these criteria support the goal of Community Well-Being.

Objectives:

1. The Region’s drinking water and wastewater systems should be designed and operated to minimize service interruptions.
2. The Region’s drinking water systems should be designed and operated to ensure adequate pressure and security of supply to all residents served by the Region’s communal systems.
3. The Region’s drinking water systems should be designed and operated to ensure adequate fire flow to all residents served by the Region’s communal systems.
4. The Region’s wastewater collection system should be designed and operated to limit the risk of surface and basement flooding.

Master Plan Recommendations:

To ensure Community Well-Being it is recommended that York Region:

- Recommendation 14** Review and incorporate (where appropriate) the water and wastewater criteria employed in the Master Plan update into York Region’s design criteria and harmonize the standards with the local municipalities.
- Recommendation 15** Build appropriate safety systems and redundancies into water and wastewater systems, such as standby power and redundant flow routes, so as to minimize the risk of water and wastewater infrastructure failure. These are priority projects

- Recommendation 16** Monitor and report levels of service for water and wastewater system operations.
- Recommendation 17** Develop a monitoring program with the local municipalities to measure water consumption rates for different land use types and use this updated information for future system planning.

4.2.4 Communications, Consultation and Engagement

York Region is committed to planning and implementing water and wastewater services in an open, transparent and accountable manner based on broad consultation, citizen engagement, strong communications and to building public consensus toward the need to practice sustainability.

York Region has a strong commitment to transparent and accountable decision-making, and knows that open communications and proactive public consultation and engagement are some of the best ways to demonstrate that commitment. The Region has identified actions that will continue to make consultation and engagement a priority to build on the success of the consultations undertaken during development of the York Region Sustainability Strategy and the Water and Wastewater Master Plan Update.

Objectives:

1. On-going water and wastewater planning will be developed through broad communications and meaningful consultation.
2. Citizens will understand and reach consensus about the role they play in delivering sustainable solutions.
3. Through citizen engagement, citizens will volunteer to deliver water conservation measures and other water and wastewater sustainability initiatives.
4. Sustainability principles that underlie water and wastewater planning will be well communicated through a variety of methods.
5. All relevant information about on-going water and wastewater planning issues and opportunities will be available to the public in an open, transparent and accountable manner.
6. On-going water and wastewater planning will employ a communications process that involves just as much listening as it does communicating key messages.

Master Plan Recommendations:

To ensure Communications, Consultation and Engagement it is recommended that York Region:

- Recommendation 18** Identify and support the individual or group within the Region with responsibility to implement the Water and Wastewater Sustainability Strategy.

- Recommendation 19** Develop and implement a communications strategy for water and wastewater sustainability that reaches out to people of all ages, cultural backgrounds and walks of life.
- Recommendation 20** Provide a point of public access on up-to-date information about water and wastewater issues, ideas and trends.
- Recommendation 21** Establish interest-based sustainable water and wastewater committees to provide input into water and wastewater planning.
- Recommendation 22** Engage citizens as volunteers in support of water and wastewater planning and project implementation, for example, by seeking volunteers for water conservation programs.
- Recommendation 23** Track public comments and provide a considered response to the comments.
- Recommendation 24** Develop social marketing programs promoting wise use of water and water conservation.
- Recommendation 25** Utilize a broad variety of methods to communicate water and wastewater sustainability:
- Kitchen table discussions, neighbourhood meetings and mall displays
 - Websites (which would include project records and comment matrices/records)
 - Newsletters (digital and hardcopy) and brochures
 - Public surveys on water and wastewater sustainability issues
 - Meetings and workshops (e.g., public meetings and meetings with particular stakeholder groups such as First Nations and other important stakeholder groups)
 - Water festivals (e.g., events open to the public, providing information about water efficiency or other issues)
- Recommendation 26** Encourage Municipal and Provincial governments to develop new policies in support of sustainable water use (e.g. water metering).

4.3 Sustainable Natural Environment

York Region's Official Plan describes the Region's intent "*to conserve and improve the natural environment for this and future generations so that it will sustain life, maintain health and provide an improved quality of life*". York Region has established specific policies and procedures intended to safeguard land, water, air quality, and the Oak Ridges Moraine, by, for example:

- Requiring that public works protect, maintain, or remediate significant landscapes in a manner compatible with surrounding lands;
- Maintaining and improving water quality through source water protection measures;
- Minimizing greenhouse gas emissions and providing the best air quality for its residents; and,
- Permitting only those land and resource uses that maintain, improve or restore the ecological and hydrological functions of the Oak Ridges Moraine Area.

4.3.1 Healthy Watersheds

York Region recognizes the “connectedness” of the natural world and therefore actively promotes healthy land, air and water in all its watersheds.

York Region further recognizes the important role that all its residents play as stewards of its watersheds.

Maintaining healthy watersheds is an integral part of assuring the on-going availability of high quality water supplies, a robust and diverse natural environment, and healthy communities.

Flexible (adaptive) approaches will be needed based upon a holistic view of water resources. Critical elements of the Region’s approach will be managing groundwater resources, wastewater effluents and supporting municipal and Conservation Authority programs for stormwater.

Objectives:

1. York Region, in conjunction with its municipal and wider regional partners, supports the watershed-based management of the total hydrologic cycle, thus ensuring a comprehensive approach to sustaining water resources.
2. York Region encourages its residents to be stewards of the Region’s watersheds through day-to-day monitoring of watershed health and through watershed education and restoration programs.
3. York Region will manage the intra-basin transfer of water recognizing international obligations and meeting provincial requirements.
4. Drinking water quantities supplied from surface and groundwater sources will be within safe yield limits for the water body or aquifer.
5. Wastewater effluents will be disinfected to protect public health.
6. Wastewater effluents will be treated to produce effluents that meet provincial requirements for aquatic life.
7. Wastewater effluents will be treated to reduce, where possible, the release of emerging pollutants such as endocrine disrupting compounds.
8. Wastewater effluents will be treated to reduce effluent nutrient (nitrogen, phosphorus), oxygen demand, and solids loadings consistent with management goals for individual watersheds.

9. Wastewater facilities will be designed and operated to ensure that no bypass of untreated sewage occurs unless human life or the facilities themselves are threatened.
10. Wastewater facilities will be designed and operated to ensure safe and aesthetically acceptable air quality in neighbouring areas and to ensure that the management of wastewater biosolids residues will not impair public health and the natural environment.

Master Plan Recommendations:

To ensure Healthy Watersheds it is recommended that York Region:

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| Recommendation 27 | Support comprehensive watershed or sub-watershed strategies that address all aspects of water quality and quantity. This activity should address all surface and groundwater taking activities, wastewater discharges, and stormwater discharges. Planning should be done in partnership with area municipalities, conservation authorities, First Nations, adjacent communities, and other interested agencies. |
| Recommendation 28 | Strengthen specific monitoring strategies and reporting requirements for each wastewater treatment facility. These should address performance measures supporting York Region's watershed goals and objectives as well as any regulatory requirements. Reporting on wastewater effluents, air emissions, and biosolids residues should be incorporated into York Region's comprehensive water and wastewater sustainability reporting framework. |

4.3.2 Respect for Natural and Cultural Heritage

York Region through integrated growth and servicing planning and through advanced construction and operations practices will restore and enhance the natural environment.

York Region respects and protects its First Nation heritage.

York Region respects and protects its cultural heritage.

York Region recognizes the value of maintaining its natural and cultural heritages and understands that, to maintain these features, actions are needed that emphasize their importance.

The policies contained in the Official Plan have generated a number of targeted strategies, such as:

- The *Greening Strategy*, which is intended to protect York Region's vast natural heritage, including wetlands, significant wildlife habitats and woodlands throughout York Region's rural and urban areas. Under the aegis of the *Greening Strategy*, York Region has the opportunity to implement natural environment enhancements for each infrastructure project identified through the Master Plan Update.
- The *Oak Ridges Moraine Tri-Regional Strategy*, which was developed by York Region in concert with the Regions of Peel and Durham. This strategy, which was approved by the Regions in 2001, contains a series of proposals to protect the moraine by using more comprehensive policies and better information.

York Region has long recognized that increased understanding, management, and protection of groundwater resources are imperative. In 2000, the Region joined forces with the Regional Municipalities of Peel, Durham and six conservation authorities from the Greater Toronto Area to develop a unified approach to groundwater management.

Objectives:

1. Water and wastewater services will be planned in an integrated manner in conjunction with York Region's Growth Management Strategy and other servicing strategies to ensure that the Region's natural and cultural heritage will be protected.
2. Water and wastewater services will be planned through the appropriate Ontario Environmental Assessment process ensuring full regard for the natural and cultural heritage of York Region.
3. Water and wastewater services will be constructed and operated in a manner that restores and enhances the environment and provides net benefit to York Region's natural heritage.
4. The planning and implementation of water and wastewater services will identify and protect areas of cultural significance.
5. The planning and implementation of water and wastewater services will identify and protect areas of First Nations traditional use.

Master Plan Recommendations:

To ensure Respect for Natural and Cultural Heritage it is recommended that York Region:

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| Recommendation 29 | Implement policies specifically prohibiting the construction or expansion of partial services in the Oak Ridges Moraine Conservation Plan area, unless deemed necessary to address serious health or environmental concerns. |
| Recommendation 30 | Adopt a clear policy statement that explains the Region's intent to supply major urbanized areas with water from the Great Lakes, thus freeing up groundwater resources for agricultural, rural and recreational uses and optimizing emergent flow into creeks, streams, and rivers, taking into consideration the spirit and intent of the Great Lakes Charter and the 2005 Agreement. |
| Recommendation 31 | Strengthen the integration of the planning process for water and wastewater infrastructure with the Region's Growth Management, other Regional infrastructure planning, and with existing and evolving natural heritage strategies. |
| Recommendation 32 | Develop and implement specific First Nations consultation and traditional use area policy and strategies. |
| Recommendation 33 | Continue the program of environmental enhancements associated with new infrastructure implementation. Develop measurement metrics and monitoring programs to evaluate the benefits of the enhancements. Report to the public on the enhancement programs. |

4.3.3 Climate Change and Energy Efficiency

York Region will mitigate the impacts of climate change through demand and capacity planning and the design and efficient operation of water and wastewater services.

Resource conservation, in terms of energy efficiency, and acknowledgement and accommodation of the uncertainties that may result from changes in climate are main components of both the York Region Sustainability Strategy and the Region's Water and Wastewater Sustainability Strategy.

The York Region Sustainability Strategy outlines a number of actions that will be taken to promote energy conservation; specifically the Region intends to continue to increase the energy efficiency and sustainability of York Region Buildings through retrofits, procurement and conservation measures and to adopt energy efficient systems and utilize state of the art infrastructure construction techniques to minimize impact on the environment.

One way that the Region plans to do this will be to expand on energy efficiency initiatives and pursue other forms of renewable energy (i.e. solar, wind). The Region also plans to investigate and adopt principles for sustainable green communities in order to create more liveable, energy efficient communities with smaller ecological footprints. With respect to climate change, the

Sustainability Strategy explains that York Region will reduce greenhouse gas emissions in existing and future Regional Facilities and provide reduction targets over time as per our Partners for Climate Protection commitments.

Objectives:

1. Water and wastewater services design will reflect the impact of future climate change within the design life of the facilities.
2. The impacts of climate change on water supply availability, receiving water assimilative capacity, and the influence of wet weather on sewage flows, will be considered during the planning and design of water and wastewater services.
3. Water and wastewater facilities will be designed and operated to optimize (greatest return per unit energy expended) energy use and where possible recover useable energy.
4. Greenhouse gas emissions will be minimized to the extent possible in the operation of water and wastewater facilities.

Master Plan Recommendations:

To ensure its program for Climate Change and Energy Efficiency it is recommended that York Region:

- | | |
|--------------------------|---|
| Recommendation 34 | Develop and implement an energy efficiency and greenhouse gas strategy for water and wastewater facilities including benchmarking current energy usage and greenhouse gas production. |
| Recommendation 35 | Incorporate climate change considerations into the design of linear wastewater infrastructure and wastewater treatment facilities. |
| Recommendation 36 | Prepare an analysis of climate change effects on water resources including water supply availability and assimilative capacity, and depending on the outcome of this analysis, develop mitigation strategies. |

4.4 Economic Vitality

York Region addresses economic well-being through its Regional Official Plan, which outlines a number of policies that aim “to create a competitive and adaptable economic environment that encourages investment and a diversity of employment opportunities”. The policies focus on attracting economic development and providing locations for a wide array of economic activity, complementing other corporate initiatives by area municipalities and the Region.

4.4.1 Full and Equitable Funding and Value-for-Money

York Region is committed to full and equitable funding of water and wastewater services. York Region is committed to Value-for-Money in delivering water and wastewater services.

Full cost for water and wastewater works and services represents the amount of funding needed to provide sustainable services. The costs that typically need to be considered to achieve a sustainable level of funding include: capital facilities costs, operations and maintenance, rehabilitation/renovation/renewal, municipal overhead, and potential external costs such as funding needed for source water protection. Equitable funding for water and wastewater implies that users of the service pay for the benefits received. In order for water and wastewater works and services to be sustained over the long term, equity dictates that each generation of users should pay for the facilities that they require.

As part of the York Region Sustainability Strategy, under the principle of Corporate Culture of Sustainability, the Region intends to recommend that all York Region capital projects consider life-cycle costs which include maintenance. Taking a life-cycle approach to determining water and wastewater costs ensures that sufficient funds are set aside for the entire service life of the infrastructure. At the same time, the Region will continue to find new and innovative infrastructure construction techniques that result in positive economic, environmental and social impacts. A secondary benefit of this action may result in lower overall costs to deliver the water and wastewater services.

Objectives:

1. The full cost of water and wastewater servicing will be assessed and equitably allocated.
2. Sustainable water and wastewater servicing programs will be fully funded considering the full life-cycle of the project.
3. Value-for-Money will be achieved through careful planning, sound project management, streamlined project delivery, benchmarking, and commercially astute business practices.

Master Plan Recommendations:

To ensure Full and Equitable Funding and Value-for-Money it is recommended that York Region:

- | | |
|--------------------------|---|
| Recommendation 37 | Base its rates on full cost recovery including the enhancement, operation, maintenance, and rehabilitation/replacement of the water and wastewater systems. |
| Recommendation 38 | Continue to monitor the service agreements it has with its municipal partners (the Regions of Peel and Durham, and the City of Toronto) and identify and negotiate, as appropriate and feasible, arrangements with other partners, public and private, for the provision of water and wastewater services |

Recommendation 39 Develop full cost life-cycle funding requirements for water and wastewater services over the time horizon of the Master Plan.

Recommendation 40 Benchmark water and wastewater project delivery and develop specific indicators supporting the value-for-money concept.

4.4.2 Timely and Integrated Service Delivery

York Region supports economically efficient growth through the timely delivery of water and wastewater services.

York Region will deliver water and wastewater infrastructure in a manner that is coordinated with other services such as roads and transit.

Integration of services is a main highlight of York Region's approach to service delivery. Timeliness, in terms of ensuring that services are available when needed, is recognized as a key determinant to appropriately and effectively accommodating future population growth.

York Region is committed to fully integrating its various related initiatives and is proceeding to update the Region's Infrastructure Master Plans and integrate them with the Growth Management Strategy and Natural Heritage System. Part of the integration process requires York to update the Region's Water, Wastewater, and Transportation Master Plans utilizing sustainability principles, and this is being done. Through the integration and updating processes, York will be working to ensure triple bottom line assessments of all infrastructure initiatives and context-sensitive designs.

Objectives:

1. Water and wastewater services will be provided in a timely manner ensuring that authorized growth is not unduly impeded and that current and future residents are treated in an equitable manner.
2. The planning of infrastructure will be carried out in an expeditious manner consistent with the Environmental Assessment Act and other regulatory requirements.
3. The design and construction of water and wastewater services will be carried out in an expeditious manner through sound planning, public outreach and effective project management.
4. The planning, design and construction of water and wastewater infrastructure will be carried out in coordination with other services such as roads and transit.

Master Plan Recommendations:

To ensure its program for Timely and Integrated Service Delivery it is recommended that York Region:

Recommendation 41 Develop and update implementation schedules through the Master Plan process.

- Recommendation 42** Coordinate the phasing of its future water and wastewater service elements to align with the phased development of the Regional structure. This recommendation is extended to include phasing of water and wastewater servicing elements in cooperation with the area municipalities as part of the community building process
- Recommendation 43** Size the primary components of the water and wastewater systems by considering the potential for expansion of the service area and intensification.
- Recommendation 44** Investigate and implement operational changes in water supply to Aurora, Newmarket and East Gwillimbury to reduce the dependency on groundwater from the Yonge Street Aquifer.
- Recommendation 45** Prepare risk analyses for major stages of major projects so that timely mitigation strategies may be implemented.
- Recommendation 46** Develop a public communication program to explain the importance of maintaining the schedule and the role that York Region, agencies, and the public play in the process.

4.4.3 Monitoring, Performance Measurement and Adaptive Management

York Region will monitor and report on the implementation and operation of water and wastewater sustainability strategies through a range of objective performance measures. York Region will learn from sustainability successes and challenges. It will adapt management methods and practice continual improvement toward sustainability leadership.

Demonstrating progress is the true measure of success. Both the York Region Sustainability Strategy and the Region's Water and Wastewater Sustainability Strategy contain principles and actions that address the need to monitor actions and document the achievement of sustainability goals.

The York Region Sustainability Strategy sets out two actions that specifically address performance monitoring. The first action is to benchmark Regional performance on an annual basis against a set of criteria, targets and indicators that define sustainability in York Region. From there, the Region plans to set up a Regional Internal Steering Committee to assist in the monitoring, resourcing and improvement of the Sustainability Strategy's implementation.

Objectives:

1. Organizational learning and adaptive management will be entrenched in the process of monitoring and evaluation.
2. Each component of the Water and Wastewater Sustainability Strategy will be re-evaluated at least annually, so as to continually test experience and to transform the experience into knowledge accessible to everyone involved in water and wastewater programs.
3. Water and wastewater performance measures will be gauged and reported using time periods that allow accurate conclusions to be drawn.

4. Knowledge gained from public communications, engagement, and consultation will help inform sustainability learning, re-evaluation, and adaptive management processes.

Master Plan Recommendations:

To ensure its program for Monitoring Performance and Adaptive Management it is recommended that York Region:

Recommendation 47	Develop a water and wastewater sustainability report.
Recommendation 48	Establish communications networks on water and wastewater sustainability within the Region, among lower tier and neighbouring municipalities, and other jurisdictions (locally, provincially, nationally and internationally).
Recommendation 49	Through customer service surveys, learn whether Regional water and wastewater services are measuring up to customer expectations.
Recommendation 50	Construct internal and external monitoring and reporting mechanisms involving: surveys, focus groups, brochures, outreach during Public Works week, web-based customer input, and the like.
Recommendation 51	Develop and implement a monitoring, performance measurement, and adaptive management system that will provide information to update the implementation of York Region's Water and Wastewater Master Plan.

4.5 Adaptive Management

A key feature of York Region's approach to sustainable water and wastewater servicing is adaptive management, whereby the Region will continuously monitor and respond to changes in the underlying assumptions upon which actions and plans have been based. In the context of long term water and wastewater servicing, there is a need for the Region to be cognizant of changes in socio-economic factors, regulatory requirements, and environmental conditions, and it is recommended that the Region develop and adopt sustainable infrastructure policies that anticipate and address these issues.

4.5.1 Socio-Economic Factors

The rate of population and economic growth in York Region is projected to be high over the next 25 to 30 years. These projections are primarily based on assumptions about factors related to settlement patterns and the economy. Any changes in the values of the underlying assumptions may have an impact on the actual growth that occurs.

There are a wide variety of factors influencing settlement, and these can include direct influences, such as the cost of housing, availability of services, and employment opportunities, as

well as indirect influences, such as federal government immigration policies. While York Region has some ability to influence population changes, such as by providing services that people want, there are many external factors that can impact the population growth rate and over which the Region has little control. A similar situation exists with respect to economic growth. York Region has some ability to provide an environment that is conducive to increased economic activity, such as offering attractive tax rates, but has little ability to mitigate changes in the broader economy.

Monitoring changes in the factors that directly and indirectly influence the socio-economic reality in York Region is an appropriate approach to accommodating any changes that occur. The application of adaptive management to changes in socio-economic factors will typically call for modifications and refinements in the scope and timing of sustainability strategy actions, to reconcile expectations with actual circumstances.

4.5.2 Regulatory Framework

Adapting to changes in the regulatory regime under which water and wastewater services are provided in York Region will be an on-going effort. In the same way that the Region is committed to preserving and enhancing the natural and built environments, so too is the provincial government and the main instruments used to achieve the Province's commitments are legislation and regulations. The challenge for York Region is to anticipate and adapt its own actions in order to accommodate changes to the regulatory regime. Such changes generally fall into two categories: (1) increasing the stringency of existing rules and guidelines; and, (2) enacting new rules and/or guidelines.

There are already a number of regulatory changes that are expected to occur in the short term:

- The *Sustainable Water and Sewage Systems Act* is intended to ensure that municipalities can finance essential water and sewer services and ensure clean, safe drinking water. The Act makes it mandatory for municipalities to assess the costs of providing water and sewage services, and to recover the amount of money needed to operate and maintain them. This Act has been passed, but has not yet come into force.
- The *Lake Simcoe Protection Act*, which was passed in December, 2008, codifies the provincial government's intent to develop legislation and programs for Lake Simcoe that will protect the health of the lake and address all sources of phosphorus through the "Lake Simcoe Protection Plan". It is expected that this Plan will impose strict limitations on water pollution control plants operating in the Lake Simcoe watershed.
- The *Safeguarding and Sustaining Ontario's Water Act* (SSOWA) amends the *Ontario Water Resources Act* to help implement the commitments Ontario made in signing the Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement in 2005. This Agreement bans water diversions or transfers, with strictly regulated exceptions. Among the amendments is the prohibition of a new or increased transfer of 379,000 litres of water per day or greater from one Great Lakes Watershed to another subject to strict exceptions. The Ontario Ministries of Environment and Natural Resources (MNR) are working to develop regulations to manage intra-basin transfers. Until regulations are completed, the 1985 Great Lakes Charter remains in

force. The Charter commits Ontario to prior notice and consultation with the eight Great Lakes States and Québec before approving any new or increased water diversion (transfer out of the Great Lakes Basin or from the watershed of one Great Lake to another) over 19 million litres per day. The Charter also requires prior notice and consultation for any new or increased consumptive use of water over 19 million litres per day.

Although water and wastewater regulation is typically a provincial responsibility, recent initiatives by the federal government, such as the Canadian Council of Ministers of the Environment's *Canada-Wide Strategy for the Management of Municipal Wastewater Effluent* and Environment Canada's *Proposed Regulatory Framework for Wastewater*, may impose additional requirements on York Region.

The application of adaptive management to changes in the regulatory regime will typically involve increases to the scope of water and wastewater actions. Regulatory changes often take place as a result of issues identified at the local level and the Ontario provincial government rules require consultation before implementation. Because of its proactive stance on environmental issues and its proven commitment to public engagement, York Region is well-positioned to anticipate and accommodate changes to regulatory requirements within the water and wastewater sustainability strategy.

4.5.3 Environmental Factors and Climate Change

One of the most pressing environmental impacts that York Region is facing is the potential impact of climate change. Currently, most water and wastewater infrastructure is designed based on a single climate perspective that has not been fully adapted to potential climatic trends. As a result, infrastructure built on the basis of this perspective may be vulnerable to future climate changes. Moving forward, the Region will need to adopt an approach that accommodates the uncertainty associated with climate change in the planning, design, and operation of its infrastructure.

The literature that addresses the science of climate change is extensive and identifies the changing hydrologic cycle as a key concern related to sustainable water and wastewater servicing. The importance of changes in the hydrologic cycle lies in the fact that municipal design rules are typically based on historical data with the assumption that local hydrology is static. The result is that water and wastewater infrastructure that is designed and built today may be based on hydrologic conditions that will no longer be valid in the future. Acknowledging this concept is the first step to actively accounting for the possible implications of climate change, which may include, but are not limited to:

- Lower water levels in the Great Lakes;
- Increased flooding in terms of magnitude and frequency, in response to more intense rainfalls;
- Changes in stream flows due to the changing pattern of rainfall events (e.g., fewer but higher volume events with less opportunity for recharge and interflow);

- Higher surface water temperatures that will reduce the assimilative capacity of receiving waters; and,
- Increased runoff volumes due to higher precipitation, which may result in higher storm water loads of contaminants entering receiving waters.

The application of adaptive management to accommodate potential impacts related to climate change begins with establishing a solid understanding of York Region's existing water resources (surface and groundwater), how they interact with water supply and wastewater treatment facilities, and how future management actions can and will influence desired outcomes. Incorporating adaptive management into the strategy will generally involve emphasizing particular aspects of the water and wastewater sustainability strategy. For example, because the Region does not directly own or manage all aspects of its water resources, there will be a need to strengthen existing partnerships and possibly enter into new partnerships that address issues such as management of stormwater discharges. There is also a need to develop specific water and wastewater goals, objectives and targets to allow measurement and feedback on the success of mitigative measures, which can include, for example, so-called resilient strategies that are based on a fail-safe approach to infrastructure design and operation.

5. Implementation Strategy

An implementation strategy that emphasizes priorities, considers costs, and promotes on-going review and adaptation has been adopted in order to move forward with the preferred alternative with long-term water and wastewater services for the communities of York Region.

The implementation strategy is founded on the need to build water and wastewater facilities and deliver services that are safe, well-managed, and sustainable, and that promote the preservation of the Region's natural heritage and minimize impacts to the Region's environment. Fiscal responsibility is a key cornerstone of the implementation strategy, as is York Region's commitment to full compliance with applicable legislation, regulations, and guidelines.

5.1 Priority Setting Framework

To determine timing and rationale for construction of water and wastewater infrastructure projects and implementation of supportive policies and programs, a priority setting framework was developed. The framework facilitated identification and sequencing of water and wastewater servicing infrastructure elements, as well as initiation timing for policies and programs.

The priority setting framework considered the extent to which individual projects comprising the preferred alternative would contribute to achieving the Region's planning objectives and providing water and wastewater servicing benefits. The main issues considered in the priority setting framework were:

- Need to meet existing servicing demands;
- Ability to meet forecast future needs;
- Requirement to comply with regulations;
- Contribution to existing Regional strategies and policies;
- Contribution to *York Region Sustainability Strategy – Towards a Sustainable Region*; and,
- Contribution to York Region's water and wastewater sustainability principles.

Three levels of priority were determined and applied to the recommended projects, policies, and programs comprising the preferred alternative:

1. Priority ~ requiring immediate action to ensure continued water and wastewater system safety and security. These high priority activities are not driven by new growth, but are needed to address existing conditions and ensure compliance with existing regulatory requirements; as such, these activities must be undertaken regardless of economic or other conditions. Notwithstanding the fact that these priorities are not driven by growth, the prudent approach requires that they be designed to accommodate new growth, thus assuring the on-going sustainability of water and wastewater servicing over the long term.

2. Strategic ~ these actions are necessary to accommodate forecast future growth as well as potential future changes in the regulatory regime. The triggering requirement here is when water or wastewater demand is nearing current system capacity.
3. Future Growth ~ actions needed to address forecast future growth over the longer term. These projects are generally subsequent phases of Strategic actions when on-going growth in demand approaches the then system capacity. In order to make appropriate accommodations, York Region will monitor population and employment growth and adjust the timing of actions in the future, as necessary.

5.2 On-going Water and Wastewater Infrastructure Projects

This Master Plan updates previous master planning and environmental assessment efforts by the Region. A logical starting point for implementation of the preferred alternative within this Master Planning effort is to determine the current situation of previously identified and approved water and wastewater infrastructure. Many of these infrastructure projects have been completed, or are under construction and will be operational in the short term. In other cases, the projects have been carried forward and are integrated within this Master Plan. In yet other cases, the originally identified project has been modified or no longer required in response to changing socio-economic and/or environmental conditions.

Below are described water and wastewater infrastructure projects, identified as a result of previous master plans or environmental assessments, and that are currently under construction.

5.2.1 Water Projects

Water projects that were identified as a result of previous master planning or environmental assessment efforts and are currently being constructed are described below. Included are projects to enhance the York Water System as well as facilities serving individual communities.

York Water System

Kennedy Road Watermain

The East Markham Supply project was moved to Milliken pumping station. The new pumping station will pump water from Pressure District 4 to Pressure District 6 to supply the eastern portion of Markham. The watermain along Kennedy Road is currently under design for construction this year.

Don Cousens Parkway and 9th Line Watermains

The Don Cousens Parkway (previously, the Markham By-pass) and 9th Line watermains were originally proposed as part of the East Markham Supply project. The watermains are still required to supply east Markham from the new Markham Supply at Milliken pumping station. The design of the project is underway.

Yonge Street (Aurora Central)

The watermain along Yonge Street from Batson Drive to Gladman Road is under construction.

Orchard Heights Pumping Station

An upgrade to the pumping station is required to increase the capacity. The existing pumping station has been experiencing problems with supplying the maximum day demands during the summer peaks. The upgrade is currently being designed.

East Gwillimbury Water Meters

Three boundary water meters will be installed. Two will be located on Yonge Street while the third will be on Leslie Street.

Queensville Elevated Tank

The development area is expanding beyond the current Sharon service area. New storage is required for the Queensville and Sharon communities and the existing Sharon elevated tank can be decommissioned. The new tank construction is scheduled for 2009.

Toronto Peel External Projects

Various water system projects external to York Region required to improve supply to the Region. Projects in both the City of Toronto and Region of Peel are currently underway.

Small Community Systems

Mount Albert Well and Supply Watermain

New well is being installed to meet firm capacity requirements. A watermain is also being constructed to connect the new well to the system.

New Nobleton Well Supply

A new well installation is required to meet the increasing community demands.

Schomberg Well and Supply Watermain

The project consists of a new well to meet the increasing demands and a watermain from the new well to the community. The project construction is nearing completion.

Stouffville Water Supply

An EA for additional water supply for Stouffville suggested that the preferred alternative was a connection to the York Water System. A pumping station is currently being constructed at the North Markham reservoir. A watermain is also required to connect the pumping station to the community system. The project is currently under construction.

Table 5-1 presents current capital cost estimates to complete the water projects presently under construction, and includes information about the expected timeframe within which each project will be completed. As shown in the table, the total estimated capital cost for completion of water projects currently being constructed is in excess of \$443 million. Most of the costs to complete the water projects are associated with the York Water System.

Table 5-1 Water Projects Currently Under Construction

Project	Estimated Project Cost to Complete	Estimated Timeframe for Completion
York Water System		
Kennedy Road Watermain	\$23,200,000	2009 - 2011
Don Cousens Parkway and 9 th Line Watermains	\$11,500,000	2011 - 2016
Yonge Street (Aurora Central)	\$5,700,000	2009 - 2011
Orchard Heights Pumping Station	\$3,500,000	2009 - 2011
East Gwillimbury Water Meters	\$2,800,000	2009 - 2011
Queensville Elevated Tank	\$6,300,000	2009 - 2011
Toronto/Peel External Projects	\$377,600,000	2009-2011
Small Community Systems		
Mount Albert Well and Supply	\$5,500,000	2009 - 2011
New Nobleton Well	\$4,100,000	2009 - 2011
Schomberg Well and Supply Watermain	\$3,200,000	2009 - 2011
Stouffville Water Supply	\$200,000	2009 - 2011
Total Cost	\$443,600,000	

Notes: The capital costs presented above are for the completion of the indicated project and do not include previous project expenditures. The capital cost estimates are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.2.2 Wastewater Projects

Wastewater projects that were identified as a result of previous master planning or environmental assessment efforts that are currently being constructed are described below. Included are projects to enhance the York-Durham Sewage System as well as facilities serving individual communities.

York-Durham Sewage System

Temporary Flow Control System for the YDSS

The temporary flow control system consists of modifications to three existing chambers to allow for the installation of control gates. These gates are intended to be used to allow for in-line storage to occur in upstream areas of the YDSS. The chambers are located in the Ninth Line trunk sewer, the 16th Avenue trunk sewer, and the 19th Avenue trunk sewer. These gates are intended to provide additional system capacity for the immediate period prior to the completion of the Southeast collector; they also provide future operating flexibility. The control gates are currently under construction and are expected to be in service in 2009.

Duffin Creek Water Pollution Control Plant Expansion – Stage 3

The Stage 3 expansion of the Duffin Creek water pollution control plant will increase the rated treatment capacity provided at the Duffin Creek water pollution control plant from 420 ML/d to 630 ML/d. This project is currently in detailed design with construction expected to be completed by 2011.

YDSS 16th Avenue Trunk Sewer

The YDSS 16th Avenue Trunk Sewer is a new trunk sewer that will extend from Woodbine Avenue to Ninth Line along 16th Avenue in the Town of Markham. The sewer connects to the Lower Leslie Trunk Sewer which conveys sewage from Yonge Street. In addition, this trunk sewer will convey wastewater from North Markham. The trunk sewer was in service in 2008.

YDSS Bathurst Collector (Phases I and II)

The YDSS Bathurst collector is a new trunk sewer located in the City of Vaughan along Bathurst Street. The trunk sewer is planned to convey flows from northeast Vaughan. The trunk sewer is currently operational.

YDSS Langstaff Trunk

The YDSS Langstaff trunk is a new trunk sewer located in the City of Vaughan along Langstaff Avenue that will discharge into the Bathurst Collector. The trunk sewer is currently nearing completion and is expected to be in service in 2009.

YDSS Interceptor Sewer

The YDSS Interceptor Sewer is a new trunk sewer located within the Town of Richmond Hill along 19th Avenue from Yonge Street to Leslie Street and along Leslie Street from 19th Avenue to the Lower Leslie trunk sewer. A control chamber at Yonge Street will allow for the diversion of flows in the YDSS at Yonge Street to the 19th Avenue trunk sewer. This trunk sewer has also been designed to receive wastewater from the UYSS system. The trunk sewer was in service in 2008.

King City Collection System

The King City Collection System consists of local sewers, trunk sewers, and the King City pumping station and forcemain to collect wastewater in King City and convey it to the YDSS. The King City pumping station and forcemain are already in place. The King City Collection System is currently under construction.

Aurora Equalization Tank

The Aurora equalization tank is located at the Aurora pumping station in the Town of Aurora. The equalization tank is intended to store flows in excess of the pumping capacity at the Aurora pumping station. The tank contains 10,000 m³ of storage volume and is intended to eliminate the need for a pumping station upgrade at the Aurora pumping station and improvements to the downstream interceptor sewer system. The tank is currently operational.

West Rainbow Creek Trunk Sewer

The West Rainbow Creek trunk sewer is a new trunk sewer located in the City of Vaughan along the West Rainbow Creek. This trunk sewer has been designed to convey flows from development areas in west Vaughan. The trunk sewer is currently nearing completion and is expected to be in service in 2009.

Green Lane Pumping Station Upgrade

This project consists of an upgrade to the Green Lane pumping station. The station is located within the Town of Newmarket. The upgrade is currently under construction.

Overflow Security

The overflow security project consists of a number of minor upgrades at the Region's YDSS pumping stations to improve the overall security of the Region's wastewater system. The upgrades are on-going and are anticipated to be completed in 2009.

Peel Shared Works

These works include improvements in the Peel Region collection and treatment system.

Leslie Street Pumping Station Upgrade

The Leslie Street pumping station upgrade consists of electrical, structural and mechanical upgrades. This project will increase the capacity of the pumping station to 6,700 L/s. The full capacity of 7,500 L/s will require implementation of an additional forcemain which will be carried out as a separate project. The upgrade to 6,700 L/s is presently in design and is expected to be constructed by 2011.

Small Community Systems

Lagoon Decommissioning

The Region has a number of lagoon decommissioning studies underway to assess requirements for the decommissioning of existing lagoons. Studies are on-going in Stouffville and in Holland Landing. The Stouffville lagoon was taken off line in 2007 with the construction of the Ninth Line Sewer. The Holland Landing lagoon will continue to operate at least until the completion of the Second Concession pumping station and the Holland Landing wastewater collection system. Construction of the Second Concession pumping station and the Holland Landing wastewater collection system is expected to be completed by 2011.

Keswick – Joe Dales Forcemain and Pumping Station Upgrade

The Joe Dales forcemain and pumping station upgrade is located within Keswick in the Town of Georgina. The upgrade will be under construction in 2009.

Kleinburg Water Pollution Control Plant Expansion

An expansion to the Kleinburg water pollution control plant is currently under construction. The expansion will increase the rated capacity of the Kleinburg water pollution control plant to 2.87 ML/d. Construction is expected to be completed by 2011.

Schomberg Water Pollution Control Plant Expansion

An expansion to the Schomberg water pollution control plant is currently under construction. The expansion will increase the rated capacity of the Schomberg water pollution control plant to 2.06 ML/d. Construction is expected to be completed by 2011.

Nobleton Servicing and Water Pollution Control Plant

A new wastewater collection system and water pollution control plant are required to provide sanitary sewer servicing for Nobleton. These facilities have been designed and construction is planned to be completed by 2011.

Table 5-2 presents capital cost estimates for the completion of wastewater projects under construction, and includes information about the expected timeframe within which each project will be completed.

Table 5-2 Wastewater Projects Currently Under Construction

Project	Estimated Project Cost to Complete	Estimated Timeframe for Completion
York-Durham Sewage System		
Temporary Flow Control System for YDSS	\$3,200,000	2006 - 2011
Duffin Creek Water Pollution Control Plant Stage 3 Expansion (York Region share)	\$368,000,000	2006 - 2011
16 th Avenue Trunk Sewer	\$4,300,000	2006 - 2011
YDSS Bathurst Collector (Phases I and II)	\$1,900,000	2006 - 2011
YDSS Langstaff Trunk	\$6,000,000	2006 - 2011
YDSS Interceptor Sewer	\$200,000	2006 - 2011
King City Collection System	\$3,000,000	2006 - 2011
Aurora EQ Tank	\$400,000	2006 - 2011
West Rainbow Creek Trunk Sewer	\$6,300,000	2006 - 2011
Green Lane Pumping Station Upgrade	\$70,000	2006 - 2011
YDSS Overflow Security	\$4,000,000	2006 - 2011
Leslie Street Pumping Station Upgrade	\$3,500,000	2006-2011
Peel Shared Works	\$44,900,000	2006 - 2011
Small Community Systems		
Lagoon Decommissioning Studies	\$200,000	2006 - 2011
Joe Dales Forcemain and Pumping Station Upgrade	\$15,500,000	2006 - 2011
Kleinburg Water Pollution Control Plant Expansion	\$11,500,000	2006 - 2011
Schomberg Water Pollution Control Plant Expansion	\$2,100,000	2006 - 2011
Nobleton Water Pollution Control Plant and Collection System	\$11,700,000	2006 - 2011
Total Cost	\$486,770,000	

Notes: The capital costs presented above are for the completion of the indicated project and do not include previous project expenditures. The capital cost estimates in some cases are based on a conceptual level of design. Cost estimates at the conceptual level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

As shown in the table, the total estimated capital cost for the completion of the wastewater projects currently being constructed is nearly \$487 million. This estimate is largely comprised of the cost of expanding the Duffin Creek water pollution control plant. All the wastewater projects that are currently being constructed are expected to be completed by the end of 2011.

5.3 Priority, Strategic, and Future Growth Projects

The priority setting framework, described earlier, was used to establish when individual projects should be initiated to maximize water and wastewater system benefits.

5.3.1 Priority Water Projects

Five priority water projects have been identified. All of the priority water projects are associated with the York Water System and each one is described below.

West Richmond Hill Pumping Station

The Richmond Hill (Pugsley) pumping station located in the Town of Richmond Hill is integral to water supply in Pressure District 7 (PD7). The pumping station has reached its capacity limit and the site is not large enough for an expansion. Furthermore, there are issues associated with constructing any additional watermains in the area due to the height of the groundwater table and poor soil conditions. A new pumping station is proposed for Pressure District 8 near Bathurst Street and Elgin Mills Road. The new pumping station is intended to pump water from PD6 into PD8, eliminating the PD8 demand from the Pugsley pumping station. The new pumping station would also allow for the North Richmond Hill pumping station, which has a history of operational challenges, to be decommissioned. The new pumping station will be designed to address those issues. The new watermains from the new PD8 pumping station along Teston Road and Bathurst Street from the pumping station to the Jefferson reservoir will be considered a priority.

Orchard Heights Pumping Station

The existing Orchard Heights pumping station is not capable of adequately servicing existing system demands. The pumping station is currently being upgraded but the upgraded pump capacity will not be able to meet long term demands due to the recently updated population projections. The existing site is not large enough to accommodate the expansion needed to satisfy the expected 2051 demand. The new pumping station, to be located on lands near Bathurst Street, should be planned as soon as possible so that it can be commissioned before the demands exceed the upgraded pump capacity at the existing pumping station.

Bathurst Street Watermain

The watermain is required to increase the supply to the Jefferson reservoir and for system security.

Yonge Street Watermain

The watermain is required to join the two existing sections of watermain along Yonge Street between Jefferson Sideroad and Old Colony Road. The completion of this section will increase the system security and improve the system pressures in the surrounding developments.

Wellington Street/Leslie Street Watermains and Pressure Reducing Valve

The watermains along Wellington Street and Leslie Streets are required to create the Aurora East Pressure District and for an additional supply to the Newmarket East Pressure District. The Newmarket East Pressure District has a lower service elevation range so a pressure reducing valve is required at the municipal boundary.

Table 5-3 presents capital cost estimates for the five priority water projects, and includes information about the expected timeframe within which each project will be completed. As shown in the table, the total estimated capital cost for the priority water projects is in excess of \$33 million. Almost forty percent of the priority water project estimated costs will be incurred for construction of the West Richmond Hill pumping station.

Table 5-3 Priority Water Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
West Richmond Hill Pumping Station (new PD8 Pumping Station)	\$14,100,000	2011 – 2016
Orchard Heights Pumping Station (Aurora West)	\$4,000,000	2011 - 2016
Bathurst Street (PD8)	\$4,000,000	2006 - 2011
Yonge Street (PD9)	\$3,500,000	2006 - 2011
Wellington Street/Leslie Street/PRV (Aurora East)	\$7,600,000	2006 - 2011
Total Cost	\$33,200,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.3.2 Strategic Water Projects

The strategic water projects that have been identified are needed to accommodate expected growth in the near term. A total of 52 strategic water projects have been identified, with the majority of projects related to the York Water System. Brief descriptions of each project are presented below.

York Water System

Toronto/Peel External Projects

Various water system projects external to York Region required to increase the supply to the Region. Projects are within both the City of Toronto and Region of Peel.

Kleinburg Reservoir and Watermains (PD5)

The East Woodbridge elevated tank, located in Pressure District 5 in Woodbridge, has reached the limit of its storage capacity. Because PD5 in Woodbridge is isolated from the rest of PD5, which encompasses Thornhill and Markham, as growth occurs and the pressure district builds out, additional storage capacity will be needed. A reservoir in Kleinburg is recommended to provide the required additional storage. Watermains along Huntington Road to connect the new reservoir to the system will also be necessary.

West Woodbridge Pumping Station Decommissioning

The West Woodbridge pumping station can be decommissioned once additional storage is available.

Huntington Road Watermain (PD6)

A watermain along Huntington Road is required to expand PD6 into the community of Kleinburg. This project will be in addition to the booster pumping station required to alter the Kleinburg pressure district boundary to the north-east area of the community.

Decommissioning of Markham Pumping Station and Wooten Way Elevated Tank (PD6)

When the new PD6 supply from Milliken comes online, the Markham pumping station will no longer be required to supply water to PD6. The Markham pumping station should be decommissioned when the Milliken supply infrastructure is fully commissioned. The Wooten Way elevated tank will not be required as PD6M can utilize the storage from PD6. The tank is getting older and the operating and maintenance costs are likely increasing. The tank should be decommissioned in the near future to save those associated costs.

North Markham Reservoir Expansion (PD6)

As PD6 demands increase in Markham, additional storage will be required. The North Markham Reservoir expansion was considered in the reservoir design.

Various Watermains (PD6)

Various new watermains are required within PD6 including watermains along Major Mackenzie Drive and Huntington Road to supply increased demands in Markham and Vaughan.

North Kleinburg Reservoir and Watermains (PD6)

As PD6 demands increase in Vaughan, additional storage will be required.

Maple Pumping Station Upgrade (PD7)

An upgrade at the Maple pumping station will be required in Pressure District 7 as development builds out and demand increases.

Vaughan Reservoir (PD7)

As PD7 demands increase in Vaughan, additional storage will be required.

Bayview Reservoir (PD7)

As PD7 demands increase in Richmond Hill, additional storage will be required.

Various Watermains (PD7)

Various new watermains are required within PD7 including watermains along Elgin Mills and Warden to supply increased demands in Markham, Vaughan and Richmond Hill.

Kirby Road Watermain

A new watermain to the Vaughan Pressure District pumping station is required to meet increased demands in Pressure District 9.

Decommissioning of North Richmond Hill Pumping Station

The North Richmond Hill pumping station can be decommissioned when the new Pressure District 8 pumping station is completed.

North Maple Pumping Station Upgrade (PD8)

As demands increase in the communities north of the pumping station, additional pumping capacity will be required. This upgrade was considered in the original pumping station design.

Various Watermains (PD8)

Various new watermains are required within PD8 including watermains along Jane Street and Teston Road to supply increased demands in Vaughan and Richmond Hill.

Vaughan Elevated Tank and Watermains (PD9)

Additional storage is required as demand increases in Oak Ridges Pressure District 9. A new elevated tank is to be constructed on the site of existing standpipe.

Vaughan 9 Pumping Station and Watermains (PD9)

A pumping station will be required for the expanded PD9 area in Vaughan.

Oak Ridges Standpipe Replacement (PD9)

The standpipe can be removed at any time as the newly constructed Oak Ridges elevated tank should have adequate capacity until the new elevated tank is constructed.

Bathurst Watermain (Aurora West)

A new watermain is required from the new Orchard Heights pumping station to supply increased demands in Aurora West and Newmarket West.

Wellington Reservoir (Aurora Central)

Additional storage required to meet increased demands in Aurora Central.

Bloomington Road Watermain (Aurora Central)

A watermain is required between Bathurst Street and Yonge Street to supply the Aurora Central Zone.

Various Watermains – Aurora Central

Various new watermains are required within Aurora Central including watermains along Leslie Street, Yonge Street, Bloomington Road, Mulock Drive and Vandorf Sideroad to supply increased demands in Aurora Central, Aurora West, Aurora East, Newmarket Central, Newmarket East, Newmarket West and East Gwillimbury.

St. John's Elevated Tank and Watermains (Aurora East)

A new storage tank for the Aurora East Zone is required to meet peak demands and fire flows. It will be supplied by the Leslie Street watermains.

Glenway Reservoir Expansion (Newmarket Central)

A reservoir expansion is required at the Glenway reservoir to meet increased demands in Newmarket Central and Newmarket West.

London Road Elevated Tank Replacement (Newmarket Central)

Additional storage for Newmarket Central is required. The existing London Road elevated tank is aging and should be replaced with a larger elevated tank.

Various Watermains - Newmarket Central

New watermains in Newmarket Central are required parallel to Yonge Street and Eagle Street to supply the Kirby pumping station and to meet the increased demands in Newmarket Central and Newmarket West.

Davis Drive Pumping Station (Newmarket East)

The existing Davis Drive pumping station is currently not in operation as the Sharon Queensville wells supply Newmarket East. As demands increase in East Gwillimbury and the Queensville well supply is needed to meet the demands in Sharon Queensville, a new pumping station from Newmarket Central will be required.

Various Watermains - Newmarket East

New watermains in Newmarket East are required to meet increased demands in Newmarket East and East Gwillimbury.

Holland Landing West Elevated Tank

Additional storage required at the Holland Landing West elevated tank to meet increased demands in Newmarket West.

Kirby Pumping Station

An expansion is required at the Kirby pumping station to meet the increased demands in Newmarket West and East Gwillimbury.

Various Watermains – Newmarket West

New watermains in Newmarket West are required parallel to Yonge Street and Green Lane to supply the increased demands in Newmarket West.

Various Watermains - Holland Landing Central

New watermains are required in Holland Landing Central to supply the increased demands in East Gwillimbury.

Queensville West Elevated Tank (Queensville/Sharon East)

Additional storage required to supply the increased demands in East Gwillimbury.

Decommissioning of Sharon Elevated Tank (Queensville/Sharon East)

The existing elevated tank will be decommissioned once the Queensville tank becomes operational. With the additional storage constructed in Queensville, the Sharon community no longer requires its own storage facility.

Decommissioning of Holland Landing Elevated Tank (Queensville/Sharon East)

The existing elevated tank will be decommissioned once the Queensville tank becomes operational.

Queensville-Sharon East – Various Watermains

New watermains are required in Queensville-Sharon East to meet the increased demands in East Gwillimbury.

King City – YWS Supply

New watermains, storage and pumping station to supply King City from the York Water System to meet the increased demands in the community. The existing wells will be decommissioned.

Kleinburg Booster Pumping Station and Well Decommissioning

Most of the community of Kleinburg will be moved into Pressure District 6 (PD6). Areas above the PD6 service elevations will continue to be supplied by the Kleinburg pressure district. The existing elevated tank will be used for the new pressure district area. The new zone will require a pumping station from PD6. The existing wells will be decommissioned when the York Water System supply becomes available.

Stouffville Zone 2 Elevated Tank and Watermain

Additional storage is required to supply the increased demands in Stouffville. A new watermain connecting the tank to the community will also be required.

Iron Removal – YWS Wells (East Gwillimbury, Aurora, Newmarket, Stouffville)

It is suggested that the Region consider adding iron removal to the wells servicing the communities of Aurora, Newmarket, East Gwillimbury and Stouffville.

Small Community Systems

Keswick Various Watermains

New watermains are required in the Keswick community to complete the Regional system and meet the increased demands in Keswick.

Keswick Elevated Tank

New elevated tank proposed to supply the increased demands.

Georgina Water Treatment Plant

Expansion of existing treatment plant to meet additional needs.

Sutton Elevated Tank 2

New elevated tank proposed to supply the increased demands in Sutton.

Sutton – Various Watermains

New watermains required in Sutton community to complete the Regional system and meet the increased demands in Sutton.

Schomberg Elevated Tank 2 and Watermain

New elevated tank proposed to supply the increased demands in Schomberg.

Schomberg Well and Watermain

New well to supply the increased demands in the community of Schomberg.

Ballantrae-Musselman Lake Supply

New well to supply the increased demands in the community of Ballantrae-Musselman Lake.

Nobleton Elevated Tank 2 and Watermain

New elevated tank proposed to supply the increased demands in Nobleton.

Nobleton Well and Supply Watermain – Phase 1

New well to supply the increased demands and for firm capacity in the community of Nobleton.

Nobleton Well and Supply Watermain – Phase 2

As the growth continues in Nobleton an additional well will be required to supply the increased demands and for firm capacity in the community of Nobleton.

Table 5-4 presents capital cost estimates for the 52 strategic water projects, and includes information about the expected timeframe within which each project will be completed. As shown in the table, the total estimated capital cost for the strategic water projects is \$903 million. This estimate is largely comprised of enhancements to the York Water System, with watermain construction comprising the largest percentage of total estimated cost.

Table 5–4 Strategic Water Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
York Water System		
Toronto/Peel External Projects	\$322,900,000	2011-2021
Kleinburg Reservoir & Watermain (PD5)	\$45,900,000	2011 – 2016
West Woodbridge PS Decommissioning	\$500,000	2011 - 2016
Huntington Road Watermain (PD6)	\$10,500,000	2011 – 2016

Table 5–4 Strategic Water Projects cont'd.

Project	Estimated Project Cost	Estimated Timeframe for Completion
Decommissioning of Markham Pumping Station and Wooten Way Elevated Tank (PD6)	\$800,000	2011 – 2016
North Markham Reservoir Expansion	\$14,700,000	2017 – 2021
Various Watermains (PD6)	\$15,900,000	2011 – 2016
North Kleinburg Reservoir & Watermain (PD6)	\$43,700,000	2021 – 2026
Maple Pumping Station Upgrade (PD7)	\$300,000	2009 – 2011
Vaughan Reservoir (PD7)	\$11,300,000	2011 – 2016
Bayview Reservoir (PD7)	\$18,600,000	2021 – 2026
Various Watermains (PD7)	\$29,700,000	2011 – 2036
Kirby Road Watermain (PD8)	\$100,000	2011 – 2016
Decommissioning of North Richmond Hill Pumping Station (PD8)	\$500,000	2011 – 2016
North Maple PS Upgrade (PD8)	\$600,000	2011-2016
Various Watermains (PD8)	\$21,300,000	2011 – 2041
Vaughan ET & Watermain (PD9)	\$10,800,000	2021 – 2026
Vaughan 9 PS & Watermain (PD9)	\$4,700,000	2011 – 2016
Oak Ridges Standpipe Replacement (PD9)	\$7,300,000	2009 – 2011
Bathurst Watermain (Aurora West)	\$14,100,000	2011 – 2016
Wellington Reservoir (Aurora Central)	\$10,600,000	2011 – 2016
Bloomington Rd (Aurora Central)	\$8,800,000	2011 – 2016
Various Watermains – (Aurora Central)	\$26,500,000	2011 – 2031
St. John's Elevated Tank & Watermain (Aurora East)	\$8,400,000	2011 – 2016
Glenway Reservoir Expansion (Newmarket Central)	\$8,900,000	2011 – 2016
London Road Elevated Tank Replacement (Newmarket Central)	\$8,600,000	2017 – 2021
Newmarket Central – Various Watermains	\$31,400,000	2011 – 2031
Davis Drive PS (Newmarket East)	\$6,800,000	2026 – 2031
Newmarket East – Various Watermains	\$15,200,000	2009 – 2016
Holland Landing West Elevated Tank (Newmarket West)	\$7,900,000	2011 – 2016
Kirby Pumping Station (Newmarket West)	\$8,500,000	2011 – 2016
Newmarket West – Various Watermains	\$9,900,000	2011 – 2021
Holland Landing Central – Various Watermains	\$6,500,000	2011 – 2021
Queensville West Elevated Tank (Queensville/Sharon East)	\$7,600,000	2017 – 2021
Decommissioning of Sharon Elevated Tank (Queensville/Sharon East)	\$300,000	2009 – 2011
Decommissioning of Holland Landing Tank (Queensville/Sharon Central)	\$300,000	2011 – 2016
Queensville-Sharon – Various Watermains	\$24,600,000	2011 – 2021

Table 5–4 Strategic Water Projects cont'd.

Project	Estimated Project Cost	Estimated Timeframe for Completion
King City – YWS Supply	\$13,800,000	2009 – 2011
Kleinburg Booster Pumping Station and Well Decommissioning	\$7,000,000	2009 – 2011
Stouffville Zone 2 Elevated Tank & Watermain	\$5,500,000	2011 – 2016
Iron Removal – YWS Wells (East Gwillimbury, Aurora, Newmarket, Stouffville)	\$29,000,000	2011 – 2016
Small Community Systems		
Keswick – Various Watermains	\$28,600,000	2009 – 2016
Keswick Elevated Tank	\$6,400,000	2009 – 2011
Georgina Water Treatment Plant	\$9,900,000	2009 – 2011
Sutton Elevated Tank 2	\$5,800,000	2021-2026
Sutton – Various Watermains	\$7,400,000	2009 – 2026
Schomberg Elevated Tank 2 and Watermain	\$3,800,000	2021 – 2026
Schomberg Well and Watermain	\$4,900,000	2026 – 2031
Ballantrae-Musselman Lake Supply and Watermain	\$5,100,000	2009 – 2011
Nobleton Elevated Tank 2 and Watermain	\$5,500,000	2009 – 2011
Nobleton Well Supply Watermain – Phase 1	\$300,000	2009 – 2011
Nobleton Well and Supply Watermain – Phase 2	\$4,900,000	2011 – 2016
Total Cost	\$902,900,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.3.3 Future Growth Water Projects

Eight future growth water projects have been identified, which are needed to accommodate expected growth over the longer term, that is, beyond 2021. The majority of these projects are related to the York Water System, and include two projects to satisfy future growth demands in Georgina.

Markham PD7 Pumping Station

A new pumping station will be required in the period 2031 to 2036 to supply the expanded PD7 in Markham.

Vaughan PD8 Pumping Station

A new pumping station will be required in the period 2036 to 2041 to supply the expanded PD8 in Vaughan.

Vaughan PD8 Reservoir

A new reservoir will be required in the period 2021 to 2026 to supply the expanded PD8 in Vaughan.

Queensville Central Elevated Tank

Additional storage for the Queensville/Sharon area will be required in the period 2026 to 2031.

Queensville Southeast Elevated Tank

Additional storage for the Queensville/Sharon area will be required in the period 2036 to 2041.

Stouffville Zone 2 Pumping Station Upgrade

Expansion of the Zone 2 pump station located at McCowan Road and Stouffville Sideroad will be required in the period 2031 to 2036.

Georgina Water Treatment Plant Expansion

Additional treatment capacity in the existing Georgina water treatment plant will be required in the period 2031 to 2036.

Sutton South Elevated Tank

A new elevated tank will be required to service growth increases in Sutton. Various watermains will also be required to connect the storage to the system. The tank will be required in the period 2021 to 2026.

Table 5-5 presents capital cost estimates for the eight future growth water projects, and includes information about the expected timeframe within which each project will be completed.

Table 5-5 Future Growth Water Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
York Water System		
Markham PD7 Pumping Station	\$13,100,000	2031-2036
Vaughan PD8 Pumping Station	\$12,000,000	2036-2041
Vaughan Reservoir (PD8)	\$14,700,000	2021-2026
Queensville Central Elevated Tank	\$7,600,000	2026-2031
Queensville Southeast Elevated Tank	\$7,600,000	2036-2041
Stouffville Zone 2 Pumping Station Upgrade	\$200,000	2031-2036
Small Community Systems		
Georgina Water Treatment Plant Expansion	\$19,800,000	2031-2036
Sutton South Elevated Tank	\$5,800,000	2021-2026
Cost	\$80,800,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

As shown in the table, the total estimated capital cost for the future growth water projects is almost \$81 million. Approximately 70 percent of the estimated costs are for future enhancements to the York Water System, and the remaining 30+ percent needed for water infrastructure to accommodate longer term growth in Georgina.

5.3.4 Priority Wastewater Projects

Six priority wastewater projects have been identified that are needed to remedy specific existing problems. All six priority wastewater projects involve infrastructure associated with the York-Durham Sewage System. Descriptions of the projects are presented below.

Leslie Street Pumping Station Upgrade

The Leslie Street pumping station upgrade consists of the installation of an additional forcemain at the station to improve the overall security of the system as well as increase the rated capacity of the station. The forcemain will be approximately 2,500 metres in length and will be located in an alignment separate from the two existing forcemains. By locating the forcemain in a separate alignment, the overall security of the system will be improved. With the third forcemain in place, the firm capacity of the Leslie Street pumping station will be 7,500 L/s. This project is recommended to be constructed between 2021 and 2026.

Bogart Creek Pumping Station Modifications

The Bogart Creek pumping station modifications consists of decommissioning of the existing pumping station and forcemain and installation of a new trunk sewer that would discharge to the proposed Upper York Sewage Solutions (UYSS). This project will increase the overall security of the system and reduce operational requirements. This project will also reduce flows to the Aurora pumping station and reduce the potential for an overflow to environment to occur at the control chamber located upstream of the Aurora pumping station. This project is recommended to be constructed at the same time as the UYSS between 2011 and 2016.

Newmarket Pumping Station Upgrade

The Newmarket pumping station upgrade consists of the construction of a second forcemain. An additional forcemain is required to improve the overall system security and decrease the risk of an overflow to the environment occurring at the control chamber located upstream of the Newmarket pumping station. The second forcemain would be 3,500 m in length, would be located parallel to Green Lane Road and would discharge to the UYSS. This project will also reduce flows to the Aurora pumping station and reduce the potential for an overflow to environment to occur at the control chamber located upstream of the Aurora pumping station. This project is recommended to be constructed at the same time as the UYSS between 2011 and 2016.

Southeast Collector Sewer – Second Pipe

The existing Southeast collector sewer is approximately 14 km long extending from 9th Line to Valley Farm Road in Pickering. Based on the recently completed Individual Environmental Assessment (IEA) a second new Southeast collector will be built along 14th Ave down Townline Rd and then routed between Finch Ave and the 3rd Concession

to Valley Farm Rd. The second pipe will be approximately 14 km in length and is recommended to increase system capacity while at the same time increasing system security. This project is located within both York Region and Durham Region.

Primary Trunk Sewer – Second Pipe

The Primary trunk sewer second pipe consists of the construction of a new Primary trunk sewer along a yet to be determined route from the terminus of the Southeast collector at Valley Farm Road through to the Duffin Creek water pollution control plant. The proposed second pipe is for the present estimated as 4,500 metres in length and is recommended to be located within an alignment separate from the existing Primary trunk sewer to increase system security and it will be designed to accommodate future growth. This project is located within Durham Region. This project will increase the overall security of the system as it will provide redundancy for the existing Primary trunk sewer which conveys all wastewater generated in the YDSS service area to the Duffin Creek water pollution control plant. This project will be required at the latest in the period 2021 to 2026 but implementation as early as 2016 is recommended.

Duffin Creek Water Pollution Control Plant Stage 3 Pumping Station

This project consists of the construction of a new pumping station in conjunction with Stage 3 of the Duffin Creek water pollution control plant. This pumping station is required to facilitate the construction of the new Southeast collector and the Primary trunk sewer second pipe and to extend the life of the existing Primary trunk sewer. This project will also provide additional operational flexibility at the Duffin Creek water pollution control plant. This project is scheduled for the period 2006 to 2011.

Table 5-6 presents capital cost estimates for the six priority wastewater projects, and includes information about the expected timeframe within which each project will be completed. As shown in the table, the total estimated capital cost for the priority wastewater projects is nearly \$729 million, with the single largest project, the Southeast collector, accounting for about 70 percent of the estimated costs.

Table 5-6 Priority Wastewater Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
Leslie Street Pumping Station Forcemain	\$4,800,000	2021-2026
Bogart Creek Pumping Station Modifications	\$18,900,000	2011-2016
Newmarket Pumping Station Upgrade	\$7,100,000	2011-2016
Southeast Collector Second Pipe	\$501,500,000	2011-2016
Primary Trunk Second Pipe	\$171,500,000	2021-2026
Duffin Creek Stage 3 Pumping Station	\$25,000,000	2006-2011
Total Cost	\$728,800,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.3.5 Strategic Wastewater Projects

Ten strategic wastewater projects have been identified, which are needed to accommodate expected growth in the near term. Seven of the strategic wastewater projects are for enhancements to the York-Durham Sewage System and the other three projects are for infrastructure related to small community systems.

York-Durham Sewage System

North Markham Collector Sewer

The North Markham collector sewer is required to service future growth in North Markham. This collector sewer is expected to be 8,300 metres of 1050 mm diameter trunk sewer to be located parallel to McCowan Avenue and extend from 19th Avenue to 16th Avenue. The North Markham trunk sewer would discharge into the 16th Avenue trunk sewer. The North Markham trunk sewer is required to be constructed between 2016 and 2021 to accommodate future development within North Markham.

North West Vaughan Collector

The North West Vaughan collector sewer is required to service future growth in North West Vaughan and future growth in Kleinburg. This collector sewer is expected to be 7,400 metres of 3000 mm diameter trunk sewer to be located parallel to Highway 27 and extend from the Kleinburg water pollution control plant to the Rainbow Creek trunk sewer. The collector has been oversized to provide in-line storage to equalize wastewater peaks flows reaching the Rainbow Creek trunk sewer and the Humber PS. It is strongly recommended that the Region consider all options in relation to the need for in-line storage including the possibility of negotiating an increase in flows directed to Peel through the existing or a new diversion.

The North West Vaughan collector is required to be constructed between 2016 and 2021 to accommodate future development within northwest Vaughan and Kleinburg.

North East Vaughan Collector

The North East Vaughan Collector is required to service future growth in North East Vaughan. This collector sewer is expected to be 8,200m of 3000mm diameter trunk sewer to be located parallel to Jane Street from King Vaughan Road to Major MacKenzie Drive. The North East Vaughan Collector is required to be constructed between 2016 and 2021 to accommodate future development within north east Vaughan.

Queensville/ Holland Landing/ Sharon Servicing

To accommodate growth in the near term in Queensville/ Holland Landing and Sharon, a series of new trunk sewers and pumping stations are required. Infrastructure requirements include a total of three new pumping stations located in Queensville, Holland Landing and Sharon, a new trunk sewer along 2nd Concession, a new Sharon trunk sewer, the Second Concession pumping station and the Second Concession Forcemain which will discharge into the Newmarket pumping station in the short term. This infrastructure is needed to service growth between 2011 and 2016.

Upper York Sewage Solutions (UYSS)

Infrastructure is needed to allow for the servicing of new growth in the Queensville/Holland Landing and Sharon areas. This infrastructure is required between 2011 and 2016.

Duffin Creek Water Pollution Control Plant New Outfall Sewer

Expansion of the outfall capacity at the Duffin Creek water pollution control plant is required to expand the rated capacity of the facility beyond 520 ML/d. An outfall expansion will enable the rated capacity of the facility to be increased to 620 ML/d. A Class EA for the outfall expansion has recently been initiated and the new capacity will be required between 2011 and 2016.

Sharon Trunk Sewer

New trunk sewer to service Sharon ranging in size from 900 mm to 975 mm and proposed along existing right-of-way from approximately Leslie Street to Second Concession.

Greenlane Diversion Sewer

An 825mm diameter sanitary sewer along Second Concession from Greenlane to the Second Concession Pumping Station. This project will be required between 2011 and 2016 to service future growth in East Gwillimbury along the Greenlane corridor.

Queensville Pumping Station

A new pumping station located on Queensville Sideroad immediately to the west of future Hwy 404 including new forcemain along Queensville Sideroad and Second Concession discharging to Second Concession gravity sewer. This station will be required between 2016 and 2021 to service growth in the northeast portion of East Gwillimbury.

Small Community Systems

Sutton Water Pollution Control Plant Expansion

A Class Environmental Assessment for the expansion of the Sutton water pollution control plant was initiated by the Region in 2007 to service future growth within Sutton. The project is expected to result in an increase of the rated capacity of the facility to 7.51 ML/d. Construction is expected to be completed between 2011 and 2016.

Kleinburg Water Pollution Control Plant Expansion

An expansion to the rated capacity of the Kleinburg water pollution control plant from 2.87 ML/d to 5.87 ML/d is required to service growth in Kleinburg. This expansion will enable the completion of the North West Vaughan collector sewer to be deferred to between 2016 and 2021. The Kleinburg water pollution control plant expansion is required between 2011 and 2016.

Keswick Water Pollution Control Plant Expansion

An expansion to the rated capacity of the Keswick water pollution control plant to 18 ML/d is required to service growth in Keswick. The Kleinburg water pollution control plant expansion is required between 2006 and 2011.

Table 5-7 presents capital cost estimates for the ten strategic wastewater projects, and includes information about the expected timeframe within which each project will be completed.

As shown in Table 5-7, the total estimated capital cost for the strategic wastewater projects is in excess of \$917 million, with the single largest project, the Upper York Sewage Solutions, accounting for almost half of the estimated costs.

Table 5-7 Strategic Wastewater Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
York-Durham Sewage System		
North Markham Collector	\$78,600,000	2016-2021
North West Vaughan Collector	\$105,200,000	2016-2021
North East Vaughan Collector	\$116,500,000	2016-2021
Queensville/ Holland Landing/ Sharon Servicing	\$64,900,000	2011-2016
Upper York Sewage Solutions (UYSS)	\$388,200,000	2011-2016
Duffin Creek Water Pollution Control Plant New Outfall Sewer (total cost – York + Durham)	\$73,400,000	2011-2016
Queensville Pumping Station	\$7,000,000	2016-2021
Greenlane Diversion Sewer	\$1,000,000	2011-2016
Sharon Trunk Sewer	\$6,000,000	2011-2016
Small Community Systems		
Sutton Water Pollution Control Plant Upgrade	\$22,400,000	2011-2016
Kleinburg Water Pollution Control Plant Expansion	\$27,800,000	2011-2016
Keswick Water Pollution Control Plant Expansion	\$26,800,000	2006-2011
Total Cost	\$917,800,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.3.6 Future Growth Wastewater Projects

Future growth projects have been identified, which are needed to accommodate expected growth in the medium and long term. Two projects have been identified: one project connected with the York-Durham Sewage System and one project serving a small community. Descriptions of the two future growth wastewater projects are provided below.

York-Durham Sewage System

Duffin Creek Water Pollution Control Plant Stage 4 Expansion

An expansion of the Duffin Creek water pollution control plant is needed to provide wastewater treatment capacity for wastewater generated in the YDSS service area. The YDSS service area includes the area in York Region as well as area in Durham Region. The Stage 4 expansion will increase the rated capacity of the facility from 630 ML/d to 800 ML/d. A rated capacity of 800 ML/d will be sufficient to provide treatment capacity for growth in York and Durham Regions to the year 2051. This expansion will be required between 2031 and 2036.

Small Community System

Keswick Water Pollution Control Plant Expansion

An expansion at the Keswick water pollution control plant to a rated capacity of 24 ML/d will be required to service long term growth. This expansion will be required between 2026 and 2031 to provide wastewater treatment capacity for future growth to the year 2051.

Table 5-8 presents capital cost estimates for the two future growth wastewater projects, and includes information about the expected timeframe within which each project will be completed.

Table 5-8 Future Growth Wastewater Projects

Project	Estimated Project Cost	Estimated Timeframe for Completion
York-Durham Sewage System		
Duffin Creek Water Pollution Control Plant Stage 4 Expansion (total cost – York +Durham)	\$541,700,000	2031-2036
Small Community Systems		
Keswick Water Pollution Control Plant Expansion	\$31,000,000	2021-2026
Total Cost	\$572,700,000	

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

As shown in the table, the total estimated capital cost for the future growth wastewater projects is nearly \$573 million. Ninety-five percent of the estimated capital costs for future growth

wastewater infrastructure can be attributed to the Stage 4 expansion of the Duffin Creek water pollution control plant.

5.3.7 Projected Water and Wastewater Servicing for this Master Plan Update

The infrastructure projects identified through this Master Plan Update include construction of over 160 km of trunk watermain, 12 additional water pumping stations, 22 additional water storage facilities, 48 km of trunk sewers and forcemains, three new pump stations, one new wastewater treatment plant and a wastewater equalization facility, and, expansion and/or upgrade of eight wastewater treatment facilities. Figures 5-1 and 5-2 show York Region's planned water and wastewater servicing to 2031, respectively.

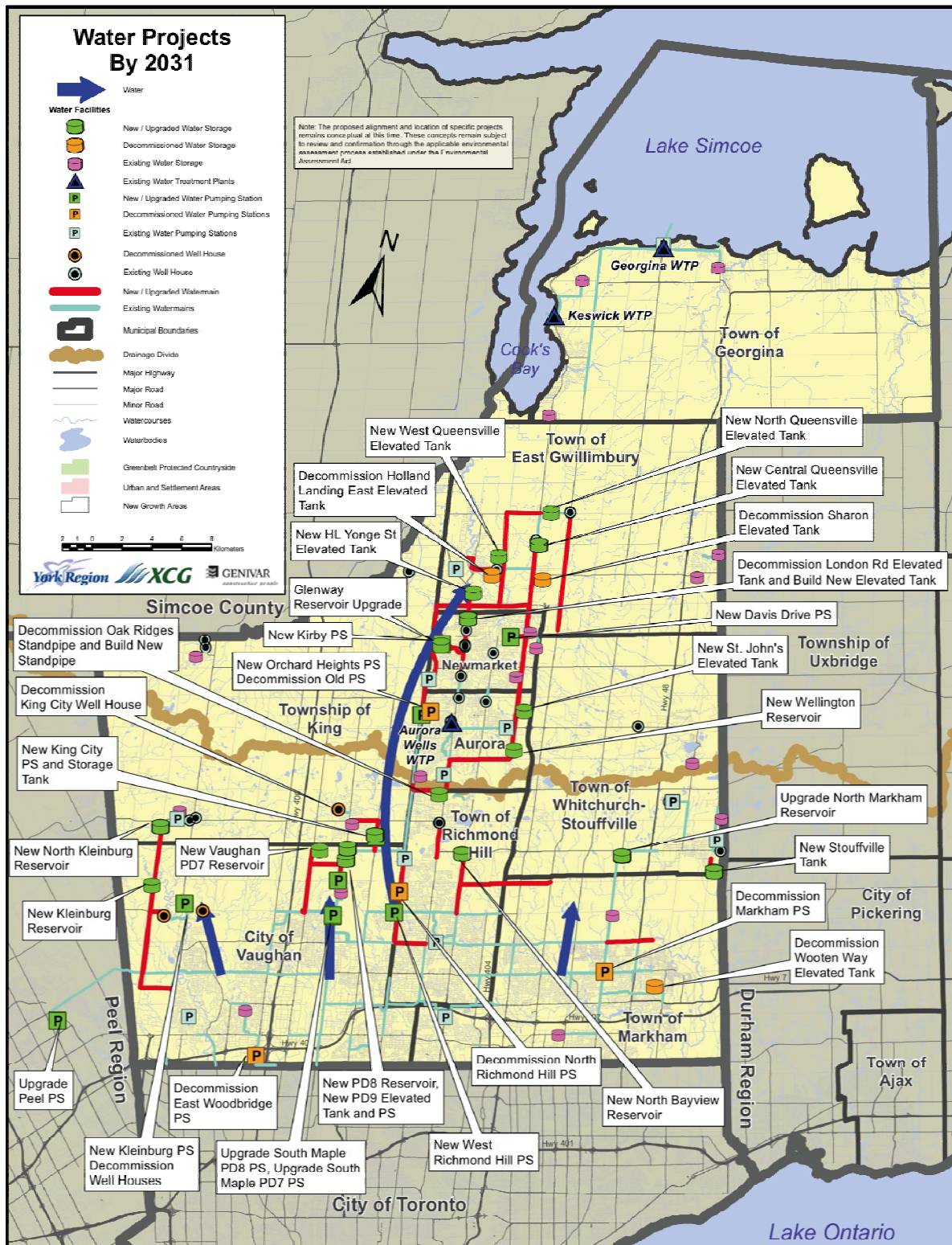


Figure 5-1 York Region Water Servicing by 2031

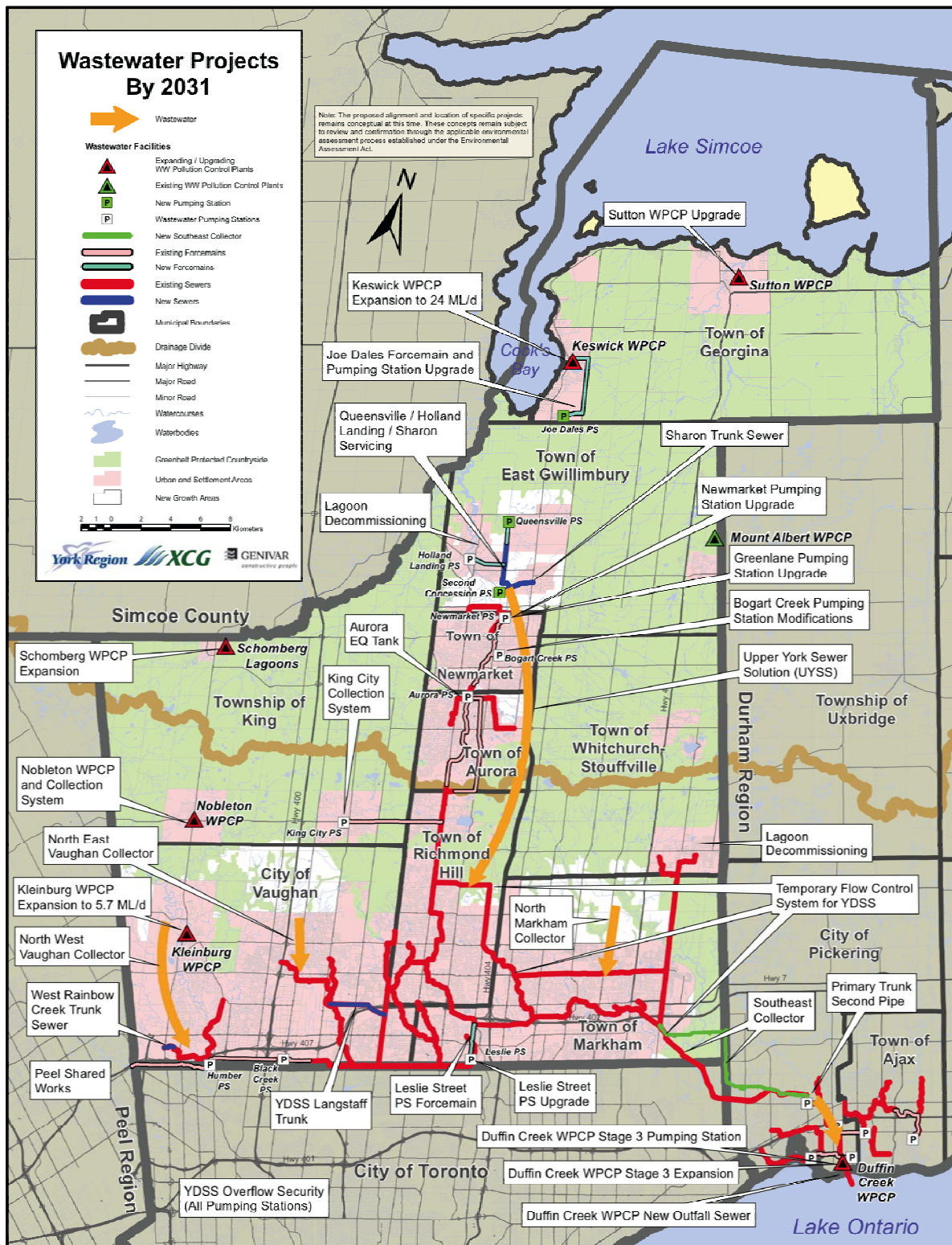


Figure 5-2

York Region Wastewater Servicing by 2031.

5.4 Water and Wastewater Programs, Infrastructure Management, Operations and Maintenance, and Inter-Regional Transfers

Along with on-going infrastructure construction activities, the Region also has a number of on-going water and wastewater infrastructure programs as well as operations and maintenance activities, infrastructure management, and transfer of water and wastewater to and from adjacent Regional municipalities. These programs include:

Water for Tomorrow Program

The *Water for Tomorrow* Program provides for water conservation in the existing system. This program features a number of dimensions, including reduction of water demand through incentives, water loss reduction, and public education. This is included as a capital cost.

Water and Wastewater Infrastructure Management

This program addresses rehabilitation and replacement over time of the water and wastewater infrastructure asset base. This is included as a capital cost.

Environmental Enhancement Improvement Initiatives

These are measures that are included in every Regional capital project to not only protect but where possible restore the Region's natural heritage. This is included as a program cost.

System Capacity Assessments and Master Plan Updates

These are on-going evaluation and planning activities aimed at assessing the status of the current water and wastewater systems and planning for future expansion and enhancement of these systems. This program includes the Region's inflow and infiltration reduction pilot program. This is included as a program cost.

Operations and Maintenance

This entails day to day operations and operational enhancement of the existing systems as well as reactive, preventative and predictive maintenance programs. This is included as a program cost.

Inter-Regional Water and Wastewater Transfer

These include agreements with Toronto and Peel Region for the provision of water to York Region and the movement of wastewater to Peel and Durham Regions for treatment. This is included as a program cost.

5.4.1 Regional Official Plan Amendments

The top policy priority for implementation is amendment of the Regional Official Plan to integrate the proposed water and wastewater policies presented in Section 4. The policies presented in Section 4 provide overall guiding principles for water and wastewater servicing in the Region, and include general statements applying to both types of servicing, as well as policies directed specifically at water and wastewater. As recommended, when the Region

proceeds with a new or amended ROP, the policies presented in Table 4–1 should be considered for adoption by Council.

5.4.2 Triple Bottom Line Policies and Programs

The priority setting framework was applied to the triple bottom line policies and programs recommended in Section 4, with a view to identifying the relative importance of actions and activities, so that the Region can move forward with initiatives in a way that facilitates the delivery of high quality water and wastewater servicing in a way that best utilizes available resources. In this case, only two categories were identified: (1) priority; and, (2) strategic and future growth. Strategic and future growth were consolidated into a single category to reflect the fact that policies and programs once initiated would apply to both short- and long-term growth.

Tables 5-9 and 5-10 present the list of priority and strategic policies and programs. The numbers in parentheses refer to the recommendation number from Section 4.

Table 5–9 Priority Policies and Programs

Healthy Communities: Community Well Being
(14) Review and incorporate (where appropriate) the water and wastewater criteria employed in the Master Plan update into York Region’s design criteria and harmonize the standards with the local municipalities.
(15) Build appropriate safety systems and redundancies into water and wastewater systems, such as standby power and redundant flow routes, so as to minimize the risk of water and wastewater infrastructure failure. These are priority projects
(16) Monitor and report levels of service for water and wastewater system operations.
(17) Develop a monitoring program with the local municipalities to measure water consumption rates for different land use types and use this updated information for future system planning.
Healthy Communities: Wise Use of Water
(9) Continue and intensify the <i>Water for Tomorrow</i> program for existing Regional water users.
(10) Continue implementation of water conservation programs, including the Sustainable Home Incentive Program (SHIP), for new residential and employment growth. These programs should be developed in conjunction with area municipalities and the development community and should include guidance regarding program implementation, accepted conservation technologies and follow-up monitoring and maintenance.
(11) Continue implementation of inflow and infiltration reduction programs in existing collection systems in partnership with area municipalities. The programs should include specific targets and timeframes to achieve inflow and infiltration reduction.
(12) Develop an inflow and infiltration prevention strategy based on a Region-wide program recommending best practices for sewer design, construction, inspection testing and follow-up performance monitoring.
(13) Develop a consolidated “Wise Use of Water Strategy” that consolidates and extends the currently evolving enhanced water efficiency and inflow and infiltration reduction programs and tracks progress in achieving water conservation and wastewater flow reduction.
Healthy Communities: Communications, Consultation and Engagement
(18) Identify and support the individual or group within the Region with responsibility to implement the Water and Wastewater Sustainability Strategy.
(19) Develop and implement a communications strategy for water and wastewater sustainability that reaches out to people of all ages, cultural backgrounds and walks of life.
Healthy Communities: Safe & Clean Drinking Water
(2) Coordinate with municipal partners (City of Toronto and Region of Peel) to ensure the provision/delivery of a reliable source of safe and aesthetically acceptable drinking water.
(3) Monitor and report on the quality of the drinking water in accordance with applicable regulations.
(4) Ensure the protection of the drinking water supply through the development of source protection strategies for groundwater supplies and intake zone protection strategies for surface water supplies.
(5) Coordinate with municipal partners (City of Toronto and Region of Peel) to ensure the protection of the drinking water supply through the development of source protection strategies for groundwater supplies and intake zone protection strategies for surface water supplies.
(6) Ensure that drinking water quantities supplied from surface and groundwater sources will be within safe yield limits for the water body or aquifer. Report on water takings in accordance with Permits to Take Water and applicable legislation/regulations.
(8) Develop and implement a Drinking Water Quality Management System (DWQMS), as required by the <i>Safe Drinking Water Act</i> , to facilitate York Region’s ability to consistently produce and deliver safe and pleasing drinking water and to enhance consumer protection through the effective application and continual improvement of the DWQMS. The effectiveness of the DWQMS will be reported following each annual internal audit.
Economic Vitality: Full and Equitable Funding and Value-For-Money
(37) Base its rates on full cost recovery including the enhancement, operation, maintenance, and rehabilitation/replacement of the water and wastewater systems.

Table 5–9 Priority Policies and Programs cont’d.

Economic Vitality: Timely and Integrated Service Delivery
(41) Develop and update master implementation schedules through the Master Plan process.
(42) Coordinate the phasing of its future water and wastewater service elements to align with the phased development of the Regional structure. This recommendation is extended to include phasing of water and wastewater servicing elements in cooperation with the area municipalities as part of the community building process
(43) Size the primary components of the water and wastewater systems by considering the potential for expansion of the service area and intensification.
(45) Prepare risk analyses for major stages of major projects so that timely mitigation strategies may be implemented.
Sustainable Natural Environment: Natural And Cultural Heritage
(29) Implement policies specifically prohibiting the construction or expansion of partial services in the Oak Ridges Moraine Conservation Plan area, unless deemed necessary to address serious health or environmental concerns.
(30) Adopt a clear policy statement that explains the Region’s intent to supply major urbanized areas with water from the Great Lakes, thus freeing up groundwater resources for agricultural, rural and recreational uses and optimizing emergent flow into creeks, streams, and rivers, taking into consideration the spirit and intent of the Great Lakes Charter and the 2005 Agreement.
Sustainable Natural Environment: Climate Change and Energy Efficiency
(35) Incorporate climate change considerations into the design of linear wastewater infrastructure and wastewater treatment facilities.

Table 5–10 Strategic Policies and Programs

Healthy Communities: Communications, Consultation and Engagement
(20) Provide a point of public access on up-to-date information about water and wastewater issues, ideas and trends.
(21) Establish interest-based sustainable water and wastewater committees to provide input into water and wastewater planning.
(22) Engage citizens as volunteers in support of water and wastewater planning and project implementation, for example, by seeking volunteers for water conservation programs.
(23) Track public comments and provide a considered response to the comments.
(24) Develop social marketing programs promoting wise use of water and water conservation.
(25) Utilize a broad variety of methods to communicate water and wastewater sustainability, such as kitchen table discussions, neighbourhood meetings and mall displays, websites (which would include project records and comment matrices/records), newsletters (digital and hardcopy) and brochures, public surveys on water and wastewater sustainability issues, meetings and workshops (e.g., public meetings and meetings with particular stakeholder groups such as First Nations and other important stakeholder groups), and water festivals (e.g., events open to the public, providing information about water efficiency or other issues).
(26) Encourage Municipal and Provincial governments to develop new policies in support of sustainable water use (e.g., water metering).
Healthy Communities: Safe & Clean Drinking Water
(7) Optimize water treatment facilities to minimize chemical use and process waste residuals and to minimize energy consumption and greenhouse gas production.
Economic Vitality: Full and Equitable Funding and Value-For-Money
(38) Continue to monitor the service agreements it has with its municipal partners (the Regions of Peel and Durham, and the City of Toronto) and identify and negotiate, as appropriate and feasible, arrangements with other partners, public and private, for the provision of water and wastewater services.
(39) Develop full cost life-cycle funding requirements for water and wastewater services over the time horizon of the Master Plan.
(40) Benchmark water and wastewater project delivery and develop specific indicators supporting the value-for-money concept.
Economic Vitality: Timely and Integrated Service Delivery
(44) Investigate and implement operational changes in water supply to Aurora and Newmarket and East Gwillimbury to reduce the dependency on groundwater from the Yonge Street Aquifer
(46) Develop a public communication program to explain the importance of maintaining the schedule and the role that York Region, agencies, and the public play in the process.
Economic Vitality: Monitoring, Performance Measurement and Adaptive Management
(47) Develop a water and wastewater sustainability report.
(48) Establish communications networks on water and wastewater sustainability within the Region, among lower tier and neighbouring municipalities, and other jurisdictions (locally, provincially, nationally and internationally).
(49) Through customer service surveys, learn whether Regional water and wastewater services are measuring up to customer expectations.
(50) Construct internal and external monitoring and reporting mechanisms involving: surveys, focus groups, brochures, outreach during Public Works week, web-based customer input, and the like.
(51) Develop a monitoring, performance measurement, and adaptive management system that will provide information to update the implementation of York Region’s Water and Wastewater Master Plan.

Table 5–10 Strategic Policies and Programs cont'd.

Sustainable Natural Environment: Healthy Watersheds
(27) Support comprehensive watershed or sub-watershed strategies that address all aspects of water quality and quantity. This activity should address all surface and groundwater taking activities, wastewater discharges, and stormwater discharges. Planning should be done in partnership with area municipalities, conservation authorities, First Nations, adjacent communities, and other interested agencies.
(28) Strengthen specific monitoring strategies and reporting requirements for each wastewater treatment facility. These should address performance measures supporting York Region's watershed goals and objectives as well as any regulatory requirements. Reporting on wastewater effluents, air emissions, and biosolids residues should be incorporated into York Region's comprehensive water and wastewater sustainability reporting framework.
Sustainable Natural Environment: Natural And Cultural Heritage
(31) Strengthen the integration of the planning process for water and wastewater infrastructure with the Region's Growth Management, other Regional infrastructure planning, and with existing and evolving natural heritage strategies.
(32) Develop and implement specific First Nations consultation and traditional use area policy and strategies.
(33) Continue the program of environmental enhancements associated with new infrastructure implementation. Develop measurement metrics and monitoring programs to evaluate the benefits of the enhancements. Report to the public on the enhancement programs.
Sustainable Natural Environment: Climate Change and Energy Efficiency
(34) Develop and implement an energy efficiency and greenhouse gas strategy for water and wastewater facilities including benchmarking current energy usage and greenhouse gas production.
(36) Prepare an analysis of climate change effects on water resources including water supply availability and assimilative capacity, and depending on the outcome of this analysis, develop mitigation strategies.

5.5 Estimated Costs

The estimated costs are presented in 2008 dollars and have been rounded to the nearest \$100,000. The costs are presented for the period from 2009 to 2051. The Region's Water and Wastewater Capital Budget for the period 2009 to 2018 has been used as the basis of many of the capital and program cost estimates

5.5.1 Water and Wastewater Capital Costs

The estimated costs associated with implementation of the preferred alternative for long term water and wastewater servicing in York Region are presented in Table 5-11. The information in the table includes costs for new infrastructure as well as for completion of construction that is currently under way. The capital costs also include the costs for the *Water for Tomorrow* program as well as the costs for water and wastewater infrastructure management.

Water for Tomorrow Program

Based on the Region's 2009-2018 budget the estimated capital cost for the 10 year program is \$44,975,000 or \$4.5 million per year.

Water and Wastewater Infrastructure Management

The 2009 to 2018 capital budget estimates costs for this program to be \$310,000,000 or \$31 million per year. This includes sanitary sewer inspection, water and wastewater asset upgrade and rehabilitation and minor and other upgrades to the Duffin Creek water pollution control plant.

The methodology used to estimate the costs along with detailed cost estimates for individual projects and programs are presented in Appendix 6.

Table 5–11 Summary of Water and Wastewater Estimated Capital Costs

Type		Estimated Costs 2009 - 2031	Estimated Costs 2031 - 2051
Water	Water For Tomorrow	\$108,000,000	\$90,000,000
	Water Infrastructure Management	\$215,000,000	\$218,000,000
	On-going Construction	\$443,600,000	
	Priority Projects	\$33,200,000	
	Strategic Projects	\$902,900,000	
	Future Growth Projects	\$58,500,000	\$22,300,000
	Water Total	\$1,761,200,000	\$330,300,000
Wastewater	Wastewater Infrastructure Management	\$509,000,000	\$630,000,000
	On-going Construction	\$486,800,000	
	Priority Projects	\$728,800,000	
	Strategic Projects	\$917,800,000	
	Future Growth Projects	\$31,000,000	\$541,700,000
	Wastewater Total	\$2,673,400,000	\$1,171,700,000
Water and Wastewater Total		\$4,434,600,000	\$1,502,000,000

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors.

5.5.2 Water and Wastewater Program, Operations and Maintenance, and Inter-Regional Transfer Costs

In addition to the costs associated with the projects and programs presented above, there are additional costs that the Region will incur as a result of implementation of this Master Plan Update.

Environmental Enhancement and Improvement Initiatives

The 2009 to 2018 capital budget contains project by project allowances for the enhancement and improvement initiatives. These are included in the capital budget. In the current capital budget, these initiatives include joint initiatives with local Conservation Authorities, odour and corrosion control, contributions to watershed planning, and aquifer management and monitoring.

Table 5-12 presents a summary of the environmental enhancement and improvement initiatives and their costs for the period from 2009 to 2051.

Table 5–12 Environmental Enhancement and Improvement Initiatives.

Description	Estimated Costs 2009 - 2031	Estimated Costs 2032 - 2051
<i>Water</i>	\$154,000,000	\$133,000,000
<i>Wastewater</i>	\$140,000,000	\$122,000,000
Water and Wastewater Total	\$294,000,000	\$255,000,000

In total, the Region has budgeted about \$128 million to be spent on various environmental enhancements and improvements over the next 10 years. On average, the annual expenditures over the next 10 years will be \$12.8 million. For the purposes of developing program costs to 2051, it was assumed that the Region would continue to dedicate \$12,800,000 per year towards environmental enhancement and improvement projects and initiatives. These costs correspond to a total of \$294 million for the period 2008 to 2031 and \$255 million for the period 2032 to 2051.

System Capacity Assessments and Master Plan Updates

The 2009 to 2018 capital budget contains project allowance for system capacity assessments and master planning. Table 5-13 presents a summary of the system capacity assessment and Master Plan Update costs for the period from 2009 to 2051.

Table 5–13 Estimated System Capacity Assessments and Master Plan Costs (2009-2018).

Description	Estimated Costs 2009 - 2031	Estimated Costs 2032 - 2051
<i>Water</i>	\$12,000,000	\$10,000,000
<i>Wastewater</i>	\$53,000,000	\$46,000,000
Water and Wastewater Total	\$65,000,000	\$56,000,000

Over the next 10 years, the Region has plans to expend considerable effort on locating and addressing sources of inflow and infiltration into the YDSS. This effort is reflected in the budget costs for wastewater system capacity assessments. For the period between 2019 and 2051, it was assumed that the Region would continue to spend \$2.8 million on an annual basis for system capacity assessment and master plans for both water and wastewater systems. These costs correspond to a total of \$65 million for the period 2009 to 2031 and \$56 million for the period 2032 to 2051.

Operations and Maintenance

Annual costs for O&M were calculated based on the actual 2009 operating budget and projected based on estimated water and wastewater flows from 2009 to 2051.

Table 5-14 presents the estimated annual operations and maintenance costs for water and wastewater. It should be noted that the annual O&M costs presented do not include O&M costs associated with inter-Regional water supply or wastewater treatment facilities that service York Region.

Table 5-14 Annual Water and Wastewater Operations and Maintenance Costs.

Year	Annual Wastewater O&M Costs	Annual Water O&M Costs	Total O&M Costs
2009	\$21,000,000	\$22,000,000	\$43,000,000
2011	\$22,000,000	\$23,000,000	\$45,000,000
2016	\$24,000,000	\$25,000,000	\$49,000,000
2021	\$26,000,000	\$27,000,000	\$53,500,000
2026	\$28,000,000	\$29,000,000	\$57,000,000
2031	\$29,000,000	\$31,000,000	\$60,000,000
2036	\$31,000,000	\$33,000,000	\$64,000,000
2041	\$33,000,000	\$35,000,000	\$68,000,000
2046	\$35,000,000	\$38,000,000	\$73,000,000
2051	\$37,000,000	\$40,000,000	\$77,000,000

Inter-Regional Water and Wastewater Transfer Costs

These are external operating costs borne by the Region to pay for drinking water and wastewater transfers from and to adjacent municipalities. Water is provided from the City of Toronto and from Peel Region to York. Wastewater generated in York is conveyed and treated at facilities located in Durham (Duffin Creek water pollution control plant) and Peel Regions.

Table 5-15 presents the estimated annual costs for water provided by the City of Toronto and Peel Region. Similarly Table 5-16 presents the estimated costs to treat the wastewater flows in Durham and Peel Regions.

Table 5-15 Annual Inter-Regional Water Costs.

Year	City of Toronto	Peel Region	Total
2009	\$20,000,000	\$9,000,000	\$29,000,000
2011	\$24,000,000	\$10,000,000	\$34,000,000
2016	\$33,000,000	\$14,000,000	\$47,000,000
2021	\$46,000,000	\$20,000,000	\$66,000,000
2026	\$63,000,000	\$27,000,000	\$90,000,000
2031	\$86,000,000	\$37,000,000	\$123,000,000
2036	\$117,000,000	\$51,000,000	\$168,000,000
2041	\$160,000,000	\$69,000,000	\$229,000,000
2046	\$217,000,000	\$94,000,000	\$311,000,000
2051	\$296,00,000	\$128,000,000	\$424,000,000

Table 5-16 Annual Inter-Regional Wastewater Costs

Year	Durham Region	Peel Region	Total
2009	\$24,000,000	\$4,000,000	\$28,000,000
2011	\$28,000,000	\$5,000,000	\$33,000,000
2016	\$39,000,000	\$7,000,000	\$46,000,000
2021	\$54,000,000	\$9,000,000	\$63,000,000
2026	\$73,000,000	\$12,000,000	\$85,000,000
2031	\$99,000,000	\$17,000,000	\$116,000,000
2036	\$135,000,000	\$23,000,000	\$158,000,000
2041	\$182,0,000	\$31,000,000	\$213,000,000
2046	\$246,000,000	\$42,000,000	\$288,000,000
2051	\$333,000,000	\$56,000,000	\$389,000,000

5.6 Infrastructure Approvals

This master plan defines the broad framework for delivery of York Region's long term water and wastewater servicing and is intended to address the initial steps of the Class EA process described earlier. At this stage the evaluation has been of a general nature. The requirements for completion of the Class EA process for each type of project are shown in Table 5-17.

Table 5-17 Requirements for Completion of the Class EA Process

Schedule	Completion Requirements
Schedule A	Considered to be approved.
Schedule A+	Considered to be approved; public notice of implementation required.
Schedule B	Requires additional documentation about the preferred method of implementation, siting and other requirements, and mitigation of local environmental impacts; need for public consultation on the additional documentation.
Schedule C	Requires completion of Phases 3 and 4 of the Class EA process: Phase 3 ~ Alternative Design Concepts for Preferred Solution ~ requires examination of alternative methods of implementing the project, based upon the existing environment, public and government agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects. Phase 4 ~ Environmental Study Report ~ is a summary of the rationale, planning, design, and consultation process for the project. The Report is subject to review by stakeholders and the public prior to finalization.

As described in the table, more detailed evaluations of Schedule B and Schedule C projects will be necessary in order to address project-specific issues. In the case of Schedule C projects, this will be done through project-specific Environmental Study Reports that will be prepared prior to implementation.

There are a number of projects that fall under the Great Lakes Charter. According to the Technical Bulletin²⁵ released jointly by the Ministries of Natural Resources and of Environment in March 2009, “projects resulting in an intra-basin transfer subject to the Agreement or consumptive uses that trigger the Prior Notice and Consultation provisions of the Charter are considered complex projects”. The Technical Bulletin also states that “proponents of undertakings for municipal water or wastewater projects where one of the alternatives will result in a new or increased intra-basin transfer of 379,000 litres per day or more should consider treating the undertaking as a Schedule C undertaking under the MEA Class EA”. Thus, all individual infrastructure projects identified through this Master Plan Update that result in a new or increased intra-basin transfer of 379,000 litres per day and have not yet started, must proceed as Schedule C.

Tables 5-18, 5-19 and 5-20 show the Class EA Schedules for each individual priority, strategic, and future growth infrastructure project, respectively. Projects that are or may be subject to the future regulations under the *Safeguarding and Sustaining Ontario’s Water Act, 2007*, will be determined as part of Master Plan implementation.

Table 5–18 Class EA Schedules of Priority Projects

Priority Project	Class EA Schedule*
Water	
West Richmond Hill Pumping Station (new PD8 Pumping Station)	Schedule B
Orchard Heights Pumping Station (Aurora West)	Schedule B
Bathurst Street (PD8)	Schedule A+
Yonge Street (PD9)	Schedule A+
Wellington Street/Leslie Street/Pressure Reducing Valve (Aurora East)	Schedule A+
Wastewater	
Leslie Street Sewage Pumping Station Forcemain	Schedule B
Bogart Creek Pumping Station Modification	Schedule B
Newmarket Pumping Station Upgrade	Schedule B
Southeast Collector – Second Pipe	Individual EA
Primary Trunk Sewer – Second Pipe	Schedule B
Duffin Creek Water Pollution Control Plant Stage 3 Expansion Pumping Station	Schedule B

*The applicability of a Schedule C project classification will be considered for projects subject to the MOE 2009 Municipal Directive.

²⁵ Ontario Ministry of the Environment and Ontario Ministry of Natural Resources (2009). Technical Bulletin: *Environmental Assessment Direction for Municipal Water and Wastewater Projects Proposing an Intra-Basin Transfer*. Toronto, Ontario. March 2009.

Table 5–19 Class EA Schedules of Strategic Projects

Strategic Project	Class EA Schedule and Status
Water	
Toronto/Peel External Projects	Schedule A/B
Kleinburg Reservoir in Pressure District 5	Schedule B
West Woodbridge Decommissioning	Schedule B
Huntington Road Watermain in Pressure District 6	Schedule A+
Decommissioning of Markham Pumping Station and Wooten Way Elevated Tank	Schedule B
North Markham Reservoir Expansion	Schedule B
Various Watermains (PD6)	Schedule A/A+
North Kleinburg Reservoir and Watermain (PD6)	Schedule B
Maple Pumping Station Upgrade in Pressure District 7	Schedule A
Vaughan Reservoir (PD7)	Schedule B
Bayview Reservoir (PD7)	Schedule B
Various Watermains (PD7)	Schedule A/A+
Kirby Road Watermain (PD8)	Schedule A
Decommissioning of North Richmond Hill Pumping Station (PD8)	Schedule B
North Maple PS Upgrade (PD8)	Schedule B
Various Watermains (PD8)	Schedule A/A+
Oak Ridges Standpipe Replacement (PD9)	Schedule B
Vaughan ET and Watermain (PD9)	Schedule B
Vaughan PS and Watermain (PD9)	Schedule B
Bathurst Street Watermain (Aurora West)	Schedule A+
Wellington Reservoir (Aurora Central)	Schedule B
Bloomington Road (Aurora Central)	Schedule A
Various Watermains - Aurora Central	Schedule A/A+
St. John's Elevated Tank and Watermain (Aurora East)	Schedule B
Glenway Reservoir Expansion	Schedule B
London ET Replacement (Newmarket Central)	Schedule B
Various Watermains – Newmarket Central	Schedule A/A+
Davis Drive PS (Newmarket East)	Schedule B
Various Watermains – Newmarket East	Schedule A/A+
Holland Landing West Elevated Tank	Schedule B
Kirby Road Pumping Station	Schedule B

Table 5–19 Class EA Schedules of Strategic Projects cont'd.

Strategic Project	Class EA Schedule and Status
Water	
Various Watermains – Newmarket West	Schedule A/A+
Various Watermains – Holland Landing Central	Schedule A/A+
Queensville West Elevated Tank	Schedule B
Sharon Elevated Tank Decommissioning (Queensville/Sharon East)	Schedule B
Holland Landing Tank Decommissioning (Queensville/Sharon Central)	Schedule B
Queensville-Sharon Various Watermains	Schedule A+
King City – York Water Supply	Schedule B
Kleinburg Booster Pumping Station and Well Decommissioning	Schedule B
Stouffville Zone 2 Elevated Tank and Watermain	Schedule B
Iron Removal – YWS Wells	Schedule A
Keswick – Various Watermains	Schedule A/A+
Keswick Elevated Tank	Schedule B
Georgina Water Treatment Plant	Schedule B
Sutton – Various Watermains	Schedule A/A+
Sutton ET and Watermain	Schedule B
Schomberg Elevated Tank 2 and Watermain	Schedule B
Schomberg Well and Watermain	Schedule C
Ballantrae Well and Watermain	Schedule C
Nobleton Elevated Tank 2 and Watermain	Schedule B
Nobleton Well Supply Watermain – Phase 1	Schedule C
Nobleton Well and Supply Watermain – Phase 2	Schedule C
Wastewater	
North Markham Collector	Schedule B
North West Vaughan Collector	Schedule B
North East Vaughan Collector	Schedule B
Queensville/ Holland Landing/ Sharon Servicing	Schedule B
Upper York Sewage Solutions (UYSS)	Individual EA initiated
Duffin Creek Water Pollution Control Plant New Outfall Sewer	Schedule C initiated
Greenlane Diversion Sewer	Schedule B
Queensville Pumping Station	Schedule B
Sharon Trunk Sewer	Schedule B
Sutton Water Pollution Control Plant Upgrade	Schedule C initiated
Kleinburg Water Pollution Control Plant Expansion	Schedule C
Keswick Water Pollution Control Plant Expansion	Schedule C

**The applicability of a Schedule C project classification will be considered for projects subject to the MOE 2009 Municipal Directive.*

Table 5-20 Class EA Schedules of Future Growth Projects

Future Growth Project	Class EA Schedule
Water	
Markham PD7 Pumping Station	Schedule B
Vaughan PD8 Pumping Station	Schedule B
Vaughan Reservoir (PD8)	Schedule B
Queensville Central Elevated Tank	Schedule B
Queensville Southeast Elevated Tank	Schedule B
Stouffville Zone 2 Pumping Station Upgrade	Schedule A
Georgina WTP Expansion	Schedule B
Sutton South Elevated Tank	Schedule B
Wastewater	
Duffin Creek Water Pollution Control Plant Stage 4 Expansion	Schedule C
Keswick Water Pollution Control Plant Expansion	Schedule C

**The applicability of a Schedule C project classification will be considered for projects subject to the MOE 2009 Municipal Directive.*

5.7 Infrastructure Phasing

Infrastructure phasing has been developed to map out actions in five year increments to 2031, and for the entire post 2031 to 2051 period. The phasing is based on constructing necessary for water and wastewater infrastructure in a logical progression that keeps pace with forecast growth and ensures uninterrupted service delivery. It also enables York Region to plan anticipated expenditures well in advance to ensure these can be accommodated within the Region's capital budget. The individual project timing was presented in the on-going, priority, strategic and future growth water and wastewater projects tables presented in previous sections. Table 5-21 presents the capital project phasing exclusive of the *Water for Tomorrow* program and the costs of water and wastewater infrastructure management. The recommended initial phasing to 2016 of infrastructure and programs is presented in Section 6. Detailed phasing maps are provided in Appendix 5.

Table 5–21 Proposed Phasing of Water and Wastewater Master Plan Capital Projects

Community/ System	Capital Projects By Completion Date					
	2009- 2011	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Post-2031
Water						
York Water System	\$462,900,000	\$237,600,000	\$394,800,000	\$73,100,000	\$108,300,000	\$62,600,000
Small Community Systems	\$40,200,000	\$33,500,000		\$17,000,000	\$10,700,000	\$19,800,000
Wastewater						
York Durham Sewage System	\$470,800,000	\$1,061,000,000	\$307,300,000	\$176,300,000		\$541,700,000
Small Community Systems	\$67,800,000	\$50,200,000		\$31,000,000		
Total	\$1,041,800,000	\$1,382,300,000	\$702,100,000	\$297,400,000	\$119,000,000	\$624,100,000

Notes: The capital costs presented above are for the completion of the indicated project and do not include previous project expenditures. The capital cost estimates are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors

5.8 Monitoring, Review and Adaptation

The final component of the implementation strategy is initiation of a monitoring and review program that can be used to track key water and wastewater performance indicators in relation to agreed targets.

York Region is already tracking changes in greenfields consumption, population and employment growth and densities, through the Census Place of Work and Census Place of Residences surveys, which are conducted every five years. The information generated by the surveys, in conjunction with information about new development applications, issuance of building permits, numbers of business permits and licenses (such as generated by the *BizPal* on-line service), as well as progress of individual projects identified through the Transportation Master Plan update, will provide data to ground-truth the Provincial Government population and employment forecasts. In turn, York Region can use these data to ensure that water and wastewater servicing is keeping pace with population and employment.

Ensuring that services are available when needed is one aspect of on-going monitoring. Another, equally important, aspect is ensuring that the services are of high quality and are being provided as effectively and efficiently as possible. As described in Section 4, York Region's Sustainability Strategy sets out two actions that specifically address performance monitoring: (1) the first action is to benchmark performance on an annual basis against a set of criteria, targets, and indicators, that define sustainability in York Region; and (2) from there, the Region plans to set up a Regional Internal Steering Committee to assist in the monitoring, resourcing and improvement of the Sustainability Strategy's implementation.

A third aspect of effective implementation of the Water and Wastewater Master Plan relates to the integration of adaptive management into the Region's approach to service delivery. Adaptive management is a systematic process for continually improving management policies and practices by learning from operational outcomes. The adaptive management approach is based on the assumption that management policies and programs are dynamic, and can and should be adjusted based on new technical and socio-economic information. It is applied especially to environmental problems that are poorly understood and difficult to control, such as climate change. It is a way to acknowledge and manage risks under conditions of uncertainty by identifying what are the uncertainties and testing the impact of those uncertainties. Adaptive management is a tool that can be used not only to make changes to the water and wastewater systems, but as a tool to learn about the systems.

As outlined in Section 4, five recommendations have been made that specifically address monitoring and adaptive management, with the aim of ensuring peak performance of York Region's water and wastewater systems. A necessary first step is the Region's commitment to developing and implementing a monitoring, performance measurement, and adaptive management system, which will evaluate the effectiveness of York Region's Water and Wastewater Master Plan Update, including publication of a water and wastewater sustainability report. Communication and information exchange are hallmarks of any effective monitoring system, and these can be accomplished by establishing communications networks on water and wastewater sustainability within the Region, among lower tier and neighbouring municipalities, and other jurisdictions (locally, provincially, nationally and internationally). Customer service surveys should be included as part of communication and information exchange, so that the Region can use to learn whether Regional water and wastewater services are meeting customer expectations. Other ways and means of information exchange include groups, brochures, outreach during Public Works week, and web-based customer input.

By implementing monitoring, review, and adaptive management, which actively engage internal and external regional stakeholders, York Region can effectively ensure servicing continues to meet demand, by proactively identifying when changes may be necessary in capital and operating expenditures, and in supportive policies and programs. It is also expected that the results accruing from the Region's monitoring and adaptive management efforts will help guide subsequent Water and Wastewater Master Plan updates.

6. 2016 Action Plan

York Region is presently experiencing a significant rate of growth. This is forecast to continue into the future. To accommodate this growth, the Region has updated and consolidated its water and wastewater servicing Master Plans, incorporating the latest population and economic growth forecasts, and reinforcing York's commitment to the triple bottom line philosophy of healthy communities, economic vitality and sustainable natural environment.

The Master Plan Update has been instrumental in affirming York Region's approach to water and wastewater servicing. The analyses undertaken as part of the Master Plan Update confirm there is a pressing, on-going need for services and the process of updating the Master Plan has provided the Region with the opportunity to fine-tune previous plans to match anticipated demand.

6.1 2016 Action Plan Infrastructure Projects

The Preferred Alternative identified through this Water and Wastewater Master Plan Update includes a number of capital works projects that the Region intends to initiate in the period to 2016. These new capital projects follow-on from the projects currently under construction and which had been approved and initiated as a result of the previous master plan updates and individual Class EAs. Table 6-1 presents the 25 water and wastewater projects currently under construction, while Table 6-2 presents the 56 new projects. Together, these 81 projects represent the capital component of the 2016 Action Plan.

Table 6-1 2016 Water And Wastewater Capital Works Action Plan – Projects Under Construction

York Region 2016 Capital Works Action Plan Projects		
Water		
York Water System		1. Kennedy Road Watermain 2. Don Cousens Parkway and 9 th Line Watermains 3. Yonge Street (Aurora Central) 4. Orchard Heights Pumping Station 5. Queensville Elevated Tank 6. East Gwillimbury Water Meters
Small Community Water Systems		7. Mount Albert Well and Supply 8. New Nobleton Well 9. Schomberg Well and Supply Watermain 10. Stouffville Water Supply
Wastewater		
York-Durham Sewage System		11. Expansion of the Duffin Creek Water Pollution Control Plant 12. Installation of Trunk Sewer along 16 th Avenue 13. Installation of Trunk Sewers along Bathurst Street, Langstaff Road 14. Installation of Trunk Sewer along West Rainbow Creek 15. Upgrading of the Green Lane Pumping Station 16. Installation of Sewers in King City 17. Construction of an Equalization Tank in Aurora 18. Implementation of Various Flow Control and Overflow Security Measures 19. YDSS Overflow Security 20. Peel Shared Works
Small Community Wastewater System		21. Decommissioning of Various Lagoons 22. Expansion/Upgrade of the Kleinburg Water Pollution Control Plant 23. Implementation of the Nobleton Water Pollution Control Plant and Collection System 24. Expansion/Upgrade of the Schomberg Water Pollution Control Plant 25. Upgrade the Joe Dales Forcemain and Pumping Station

Table 6-2 2016 Water and Wastewater Capital Works Action Plan – New Projects.

York Region 2016 Capital Works Action Plan Projects	
Water	
York Water System	1. West Richmond Hill Pumping Station (New PD8 Pumping Station) 2. Orchard Heights Pumping Station (Aurora West) 3. Bathurst Street (PD8) 4. Yonge Street (PD9) 5. Wellington Street/Leslie Street/PRV (Aurora East) 6. Toronto/Peel External Projects 7. Kleinburg Reservoir (PD5) 8. West Woodbridge PS Decommissioning (PD5) 9. Huntington Road Watermain (PD6) 10. Decommissioning of Markham Pumping Station and Wooten Way Elevated Tank (PD6) 11. Major Mackenzie Drive (PD6) 12. Maple Pumping Station Upgrade (PD7) 13. Vaughan Reservoir (PD7) 14. Kirby Road Watermain (PD8) 15. Decommissioning of North Richmond Hill Pumping Station (PD8) 16. North Maple PS Upgrade (PD8) 17. Oak Ridges Standpipe Replacement (PD9) 18. Vaughan PS & Watermain (PD9) 19. Various Watermains (Aurora Central) 20. Bathurst Watermain (Aurora West) 21. Wellington Reservoir (Aurora Central) 22. Bloomington Reservoir (Aurora Central) 23. Various Watermains – (Aurora Central) 24. St. John's Elevated Tank (Aurora East) 25. Glenway Reservoir Expansion (Newmarket Central) 26. Newmarket Central – Various Watermains 27. Newmarket East – Various Watermains 28. Holland Landing West Elevated Tank (Newmarket West) 29. Kirby Pumping Station (Newmarket West) 30. Sharon Elevated Tank Decommissioning (Queensville/Sharon East) 31. Holland Landing Tank Decommissioning (Queensville/Sharon Central) 32. Queensville-Sharon – Various Watermains 33. King City – YWS Supply 34. Kleinburg Booster Pumping Station 35. Stouffville Zone 2 Elevated Tank
Small Community Water Systems	36. Keswick – Various Watermains 37. Keswick Elevated Tank 38. Georgina Water Treatment Plant 39. Sutton – Various Watermains 40. Ballantrae Well and Watermain 41. Nobleton Elevated Tank 2 and Watermain 42. Nobleton Well Supply Watermain – Phase 1 43. Nobleton Well and Supply Watermain – Phase 2
Wastewater	
York-Durham Sewage System	44. Leslie Street Pumping Station Upgrade 45. Bogart Creek Pumping Station Modifications 46. Newmarket Pumping Station Upgrade 47. Southeast Collector Second Pipe 48. Duffin Creek Stage 3 Pumping Station 49. Queensville/ Holland Landing/ Sharon Servicing 50. Queensville Pumping Station 51. Greenlane Diversion Sewer 52. Sharon Trunk Sewer 53. Upper York Sewage Solutions (UYSS) 54. Duffin Creek Water Pollution Control Plant New Outfall Sewer
Small Community Wastewater Systems	55. Sutton Water Pollution Control Plant Upgrade. 56. Kleinburg Water Pollution Control Plant Expansion.

The 2016 Action Plan includes improvements, expansions and priority strengthening of both treatment facilities as well as linear infrastructure. All of the priority water and wastewater projects are included in the 2016 Action Plan, with one exception: the second pipe of the

Primary trunk sewer has been allocated to the 2021 to 2026 time period although if the planning, design and construction of this facility could be accelerated it would be beneficial to include this project in the 2016 Action Plan.

The Region's sustainable water and wastewater servicing plans are ambitious. In order to help visualize the water and wastewater servicing progress that will be made in York Region to 2016, Figure 6-1 presents the nine water projects under construction and the 39 water projects proposed for implementation by 2016. Figure 6-2 shows the sixteen wastewater projects under construction and the ten new wastewater projects proposed for implementation by 2016.

In addition to the capital projects (under construction and new), a key cornerstone of York Region's long term servicing will be the implementation of sustainability strategies, as described in York Region's *Water and Wastewater Sustainability Strategy*. As stated earlier, an integral part of the development of the conceptual designs for the new infrastructure projects has been to effectively and efficiently manage energy usage, limit the production of greenhouse gas emissions, and minimize potential impacts on the Region's natural heritage areas. As well, the conceptual designs take into account the benefits that are expected to accrue from existing Regional programs, such as *Water for Tomorrow*. The programs that have been identified as part of this Master Plan Update, such as enhanced and expanded inflow and infiltration reduction/prevention and the Sustainable Home Incentive Program (SHIP), have not been explicitly incorporated at this time. However, as details about these programs become firm and the results of the Region's pilot efforts become evident, it is expected that the demand analysis and infrastructure conceptual designs presented in this Master Plan Update will be reviewed and updated, as appropriate.

The Region is committed to carrying out the capital works described above, so that expected growth can be appropriately accommodated and serviced. The Region's ability to accomplish its 2016 goals will be a function of its ability to respond quickly and prudently to issues as they arise, such as infrastructure complexity, integration with other infrastructure projects, and inter-jurisdictional and regulatory considerations.

6.2 Action Plan 2016 - Supportive Policies and Programs

There are ten immediate policy and program priorities that York Region has identified and for which action is needed within the period to 2016. They include:

1. Regional Official Plan Amendments, in particular those that will result in new and stronger policies.
2. On-going York Region and municipal partner (i.e., City of Toronto and Peel Region) programs aimed at ensuring safe and clean drinking water including development and implementation of the Region's Source Water Protection and Drinking Water Quality Management System (DWQMS) programs.
3. Implementation of the recommended alternative will require the Region to apply to the Government of Ontario for a Permit to Take Water to permit the Intra-basin transfer of drinking water originating in Lake Ontario.

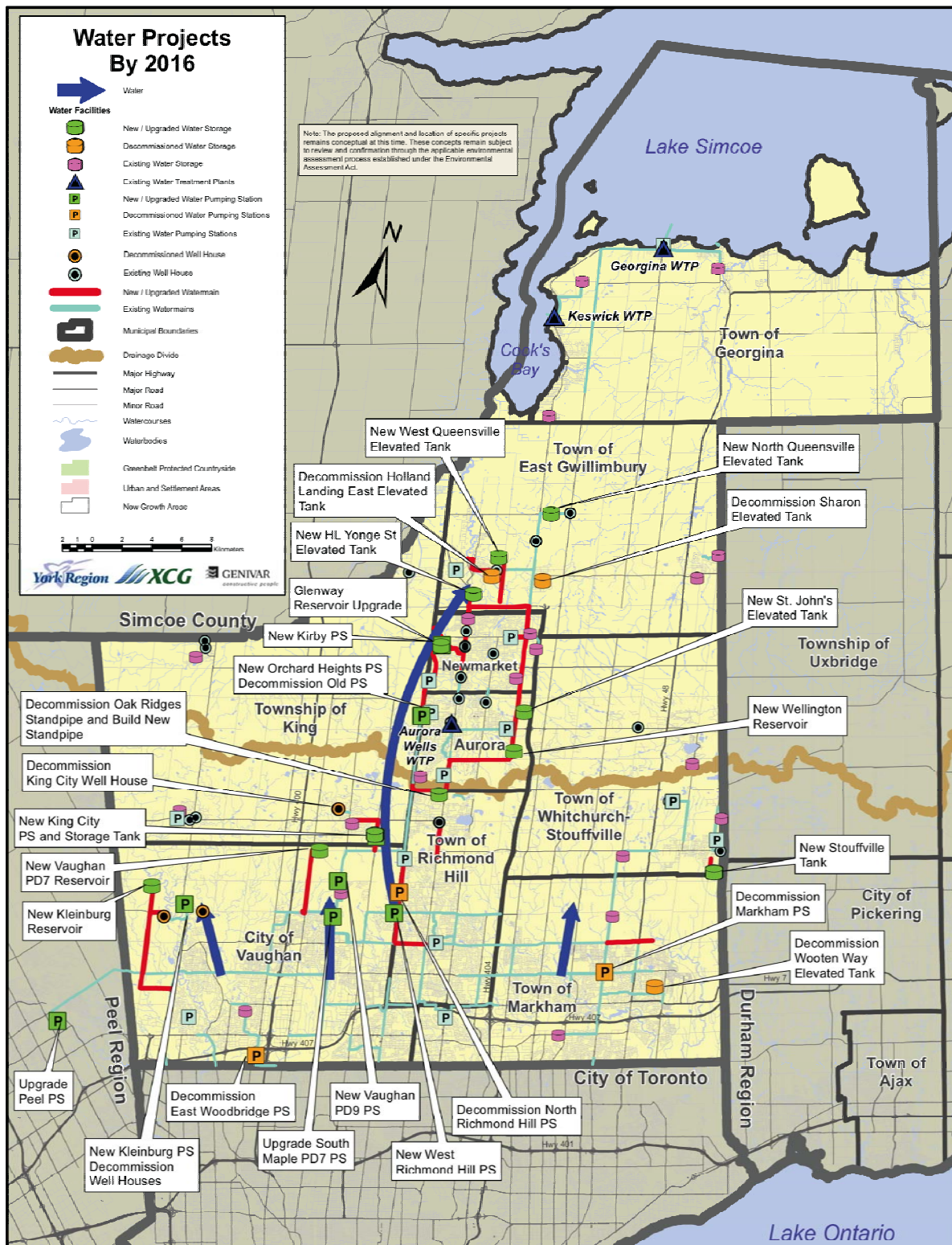


Figure 6-1

2016 Water Projects

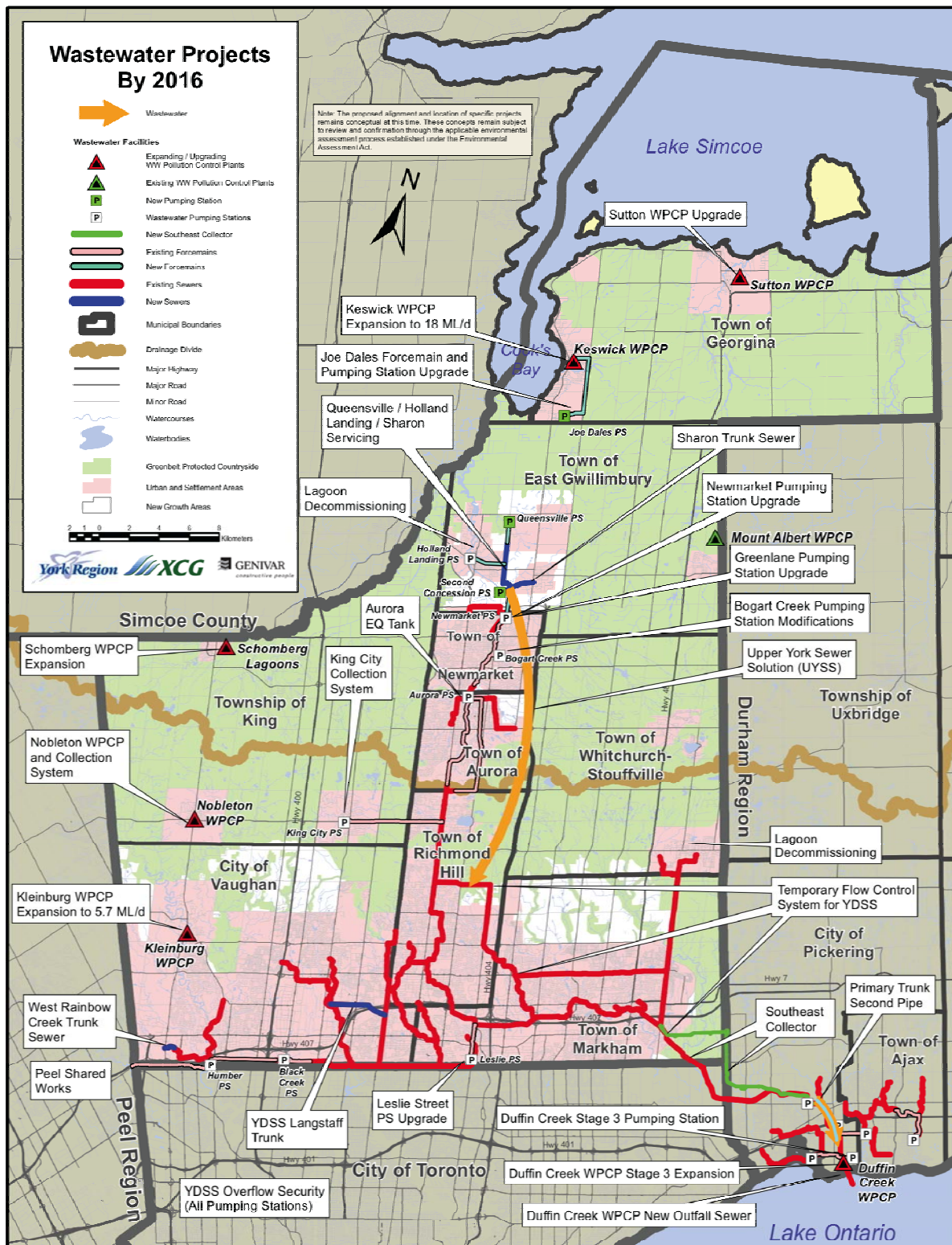


Figure 6-2

2016 Wastewater Projects

4. The treatment of additional wastewater flows in Peel beyond the limits of the current inter-regional agreement should be explored. The enhanced partnership with Peel will allow improved operational flexibility, increased wastewater system reliability and may address some short term capacity limitations.
5. The *Water for Tomorrow* program has yielded demonstrable savings of approximately 20.4 ML/d in water use over its 11-year lifetime. The program will extend for an additional 10 years to existing development. The program should be enhanced to include new development and to embrace water saving technologies beyond those contemplated in the current Ontario Plumbing Code. The Region's SHIP program is an example of such an initiative. Furthermore, the *Water for Tomorrow* program should also be extended beyond the current 10-year lifetime.
6. The Region has embarked on an advanced inflow and infiltration reduction program for existing development. The York Region and Local Municipal Inflow and Infiltration Reduction Program should be implemented to the extent determined as cost beneficial.
7. York Region should seek to develop sustainable water and wastewater systems through enhanced water efficiency programs addressing existing and new development and through inflow and infiltration prevention based on the implementation of uniform cross-region policies, procedures and practices for sewer design, inspection, testing and on-going asset management.
8. York Region has started the dialogue among its residents and other stakeholders on the implications of climate change. The Region should develop an overall climate change strategy including:
 - A program aimed at reducing greenhouse gases including those generated through water and wastewater infrastructure in York; and,
 - A program of managing future risks in water and wastewater infrastructure based on principles of adaptation and building resiliency.
9. The Region has developed a *Water and Wastewater Sustainability Strategy* under the umbrella of the overall Regional sustainability program. A number of the elements described in the *Water and Wastewater Sustainability Strategy* are in place, and others are yet to be developed. The Region should continue implementation of this strategy and should base future water and wastewater servicing on the water and wastewater sustainability principles including:
 - Development of a consolidated "wise use of water strategy" that consolidates and extends the currently evolving enhanced water efficiency and inflow and infiltration reduction programs;
 - Implementation of energy and greenhouse gas reductions programs complete with targets;
 - Implementation of natural environment enhancements associated with each infrastructure project;

- Implementation of operational changes in water supply to Aurora and Newmarket to reduce the dependency on groundwater from the Yonge Street Aquifer;
 - Limitation of wastewater discharges to Lake Simcoe from the bordering communities of Keswick and Sutton only;
 - Monitoring of future changes in development, water use and wastewater generation to assess the impact on servicing and to assess the progress in achieving sustainable servicing; and,
 - Continuation of communication with York residents and other stakeholders regarding the progress toward sustainable water and wastewater services.
10. Updating of the Water and Wastewater Master Plan should be carried out as part of the Region's adaptive management approach and should be carried out on an on-going basis to accommodate the rapid changes in growth, environment and regulation. The Region should implement an appropriate framework to accommodate this planning function.

6.3 2016 Action Plan Capital Cost Summary

The estimated capital costs exclusive of Water for Tomorrow or water and wastewater infrastructure management costs that will be incurred to realize the Region's 2016 action plan are presented in Table 6-3. The anticipated capital cost will be nearly \$2.4 billion.

Table 6-3 2016 Action Plan Capital Costs

2016 Action Plan	Capital Costs 2009-2016
Water Projects	
1. York Water System	\$700,500,000
2. Small Community Water Systems	\$73,700,000
Wastewater Projects	
1. York-Durham Sewage System	\$1,531,800,000
2. Small Community Wastewater Systems	\$118,000,000
2016 Action Plan Capital Total	\$2,424,000,000

Notes: The capital cost estimates presented are based on a conceptual level of design. Cost estimates at this level of design are normally considered to be accurate to a range of -25% to +40%. Actual construction costs will depend on the site conditions, the design approach used, the construction environment at the time of tendering, and other factors. The capital cost estimates include the project costs to complete the on-going water and wastewater projects currently under construction.

6.4 Next Steps

The next step for York Region is to file a “Notice of Completion” of the Water and Wastewater Master Plan update. The Notice will advise the public and stakeholders that the update has been completed and is available for review and comment. The Notice, which will be distributed to residents on the Water and Wastewater Master Plan Update mailing list, to government and agency stakeholders, advertised in local print media, and will also be made available at Regional and area municipality offices. Copies of the Master Plan Update itself will also be made available in municipal offices and on-line, on the Region’s web-site, www.york.ca. The Notice will include a prescribed comment period, which will be determined by the Region.

As specified by the Class EA process, new water and wastewater infrastructure projects that have been identified through the Master Plan Update and are classified as Schedule A or A+ are pre-approved and can proceed to implementation.

As required by the Class EA process, all identified Schedule B and Schedule C projects will require additional studies and reporting at a project-specific level before approval for these projects can be sought.

Over the coming period to 2016, projects that were identified and initiated through previous Master Planning efforts will be completed, and new projects will be implemented. Policies and programs that promote the Region’s goals of sustainable servicing and support the priority water and wastewater projects identified through the Master Plan process will also be initiated. The overall goal will be to ensure the Region’s residents, businesses, and visitors continue to enjoy high quality, uninterrupted water and wastewater servicing.

Appendix 1. Background Studies and Supporting Documents

- Baseline Report
- Unit Rates Report
- Policy and Criteria Report
- Water and Wastewater Sustainability Strategy
- Alternative Solutions

Appendix 2. Public and Agency Consultation

- Communications
- Public Consultation
- Issues Identified and Addressed
- First Nations Liaison

Appendix 3. Identification and Evaluation of Alternatives

- Schedule 3 Report for Intra-Basin Transfer (December, 2008)

Appendix 4. Detailed Description of Preferred Water and Wastewater System Projects and Programs

- Drawings for each of the Small Community Systems combined water and wastewater – existing and 2051
- Drawings for the York Water System – existing and for each planned forecast time period
- Drawings for the York-Durham Sewage System – existing and for each planned forecast time period

Appendix 5. Cost Estimation Procedures and Detailed Estimated Costs

- Write-up about cost estimates – including rationale for the various percentages
- Cost estimate phasing spreadsheets