Clause 8 in Report No. 16 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on October 15, 2015.

A recorded vote on the adoption of the recommendations in this Clause was as follows:

For: Altmann, Bevilacqua, Dawe, Di Biase, Ferri, Hackson, Hogg, Jones, Pellegrini, Quirk, Rosati, Spatafora, Van Bynen, Wheeler (14)

Against: Armstrong, Heath, Taylor (3)

8
2016 - 2019 Water and Wastewater Rates

Committee of the Whole recommends:

1. Receipt of the presentation by Lucas Cugalj, Director, Strategy and Business Planning and Kelly Strueby, Director, Office of the Budget.

2. Adoption of the following recommendations contained in the report dated September 25, 2015 from the Commissioner of Finance and the Commissioner of Environmental Services, with the following amendment to recommendation 1 to approve full cost recovery pricing model Option 5 in the report:

    1. Council approve annual rate increases for water and wastewater user rates effective April 1, 2016 through April 1, 2021 as shown below:

Recommended Water and Wastewater Rates

Year Starting	Wholesale Rate (m^3)
April 1, 2016	$2.37
April 1, 2017	$2.59
April 1, 2018	$2.82
April 1, 2019	$3.07
April 1, 2020	$3.35
April 1, 2021	$3.45

    2. The Regional Clerk circulate this report to Clerks of the local municipalities.

1. Recommendations

It is recommended that:

1. Council approve annual rate increases for water and wastewater user rates for the four-year period commencing April 1, 2016 to March 31, 2020 as shown in Table 1.

Table 1
Recommended Water and Wastewater Rates

Year Starting	Wholesale Rate (m^3)
April 1, 2016	$2.50
April 1, 2017	$2.83
April 1, 2018	$3.00
April 1, 2019	$3.09

2. The Regional Clerk circulate this report to Clerks of the local municipalities.

2. Purpose

This report seeks Council approval for annual water and wastewater rates. The recommended rates are supported by a detailed analysis described in the Financial Sustainability Plan (Attachment 1), which focuses on achieving full cost recovery pricing and eliminating shortfalls in asset management funding. This is critical to the long-term financial sustainability of water and wastewater services in York Region.

Rate increases are needed to:

- Build adequate reserves for future asset rehabilitation and replacement
- Maintain existing assets
- Cover day to day operations
- Eliminate the need to issue rate-supported debt
- Achieve full cost recovery pricing in 2018.

3. Background

York Region and its nine local municipalities provide water and wastewater services to more than one million residents

York Region is responsible for providing and delivering clean, safe drinking water to more than one million residents. Unlike other upper or single-tier municipalities in the Greater Toronto Area, the Region lacks direct access to Lake Ontario. The Region must purchase both water and wastewater services from neighbouring municipalities.

Over 85 per cent of the Region's drinking water needs are provided through long term service agreements with Peel Region and the City of Toronto. The balance of the Region's drinking water need is met through groundwater wells and surface-water treatment plants.

The Region, through its system of sewer pipes and pumping stations, collects wastewater from local municipalities. Approximately 85 per cent of wastewater is conveyed to the Duffin Creek Plant in Pickering, which is jointly owned with Durham Region, with 10 per cent going to Peel Region and the remainder treated by Region-owned facilities.

After receiving water from the Region, local municipalities deliver it to residents and businesses at rates determined by their respective local councils. Similarly, local municipalities convey wastewater from their residents and businesses to the Region's system and charge local wastewater fees.

Council approved 10 per cent annual rate increases for water and wastewater services in May 2011

At its meeting of May 5th, 2011, Council approved a 10 per cent per year combined wholesale rate increase for each of the years between April 1, 2012 and March 31, 2016. The approved rates were intended to address funding shortfalls and build reserves.

Additional revenue is needed due to greater system complexity and a growing asset base

Although the rate increases over the last five years were initially expected to be sufficient, more needs to be done to achieve financial sustainability, for the following reasons:

- Water demand has declined both on a per capita basis and a total overall volume basis as a result of successful conservation programs, building code changes and weather patterns, creating a significant revenue shortfall despite population growth

- Compliance with complex and evolving legislation and regulations has been more costly than expected, as a result of increasingly stringent requirements under the *Occupational Health and Safety Ac*t, *Safe Drinking Water Act, 2002*, *Clean Water Act*, Source Protection Plans, Lake Simcoe Protection Plan and the Drinking Water Quality Management Standard

- Much better information on asset management, which has more accurately identified rehabilitation and replacement needs

- A growing, complex asset base that is becoming more expensive to operate and maintain as the Region urbanizes and access to infrastructure becomes more limited.

Enhanced 2015 rate review process included best practices review and development of a Financial Sustainability Plan

In 2014, a Steering Committee and Working Group were formed with staff from Finance and Environmental Services Departments to undertake a detailed rate review for water and wastewater services. The goal was to develop a long-term fiscal plan for the Region's water and wastewater systems and identify rate increases necessary to achieve full cost recovery pricing and build sufficient reserves. This detailed review has culminated in a Financial Sustainability Plan and a multi-year rate recommendation.

The detailed review involved many steps, including:

- Inter-jurisdictional review of water and wastewater financing policies and practices to identify best practices in rate setting

- Establishing a funding policy for major rehabilitation and replacement projects that will eliminate debt funding in 2016 and beyond

- Reviewing asset condition reports, plans for system expansions/renewal and estimates of future operating costs

- Using advanced analytics to prepare demand forecasts under various funding scenarios

- Consulting with Community and Health Services to review the impact of rate increases on vulnerable residents

- Reviewing various rate structures, including mixed rate structures
- Proposing a separate rate stabilization reserve be established, to protect funds reserved for capital replacement and renewal.

Staff provided updates on the process to local treasurers and senior public works staff late in 2014 and again in June 2015. Staff met throughout July, August and September 2015 with local treasurers and public works staff.

Extensive public consultation led to development of a comprehensive public campaign to communicate value of water

As part of an ongoing effort to communicate with the public about water issues and the value of water, York Region has consulted with stakeholders through surveys, public focus groups, workshops, public events, and York Region's Water Conservation Advisory Committee.

Probe Research conducted telephone surveys of 1,000 York Region adult residents in both 2013 and 2015. The research was conducted exclusively among individuals residing in single family dwellings, duplexes, townhouses or semi-detached homes that rely on municipal drinking water. The surveys were administered to a random and representative sampling across all local municipalities. With this sample size, the results are within +/- 3.1 percentage points of what they would have been if all qualified adult residents of the Region had been interviewed.

The results of the surveys showed increased willingness to pay higher rates to ensure safety of water supply, judging by the response to a question aimed at measuring attitudes towards source water protection. Agreement with the statement "I am willing to pay more to ensure that there is a long-term plan in place to protect the source of my future tap water supplies" increased by four percentage points in the two years.

The market research completed in 2015 found that:

- Roughly three-quarters of respondents were satisfied with performance in maintaining water infrastructure (76 per cent), running an efficient operation (74 per cent) and keeping water rates stable (73 per cent)
- Two-thirds expressed satisfaction with the ability of their water utility to ensure consumers are paying a fair price (69 per cent)
- The share of respondents who feel "confident that their tap water is safe to drink" has increased since 2013 (up from 60 per cent in 2013 to 65 per cent in 2015)

- There are high levels of satisfaction with the ability of water utilities to ensure long-term water supplies (83 per cent “satisfied,” including 47 per cent “very satisfied”)

- Satisfaction is high regarding competence to meet federal and provincial standards (82 per cent “satisfied,” including 53 per cent “very satisfied”).

The *Water Is* campaign provides extensive information and educational materials through its website (www.york.ca/wateris), social media and advertising. Findings from stakeholder engagement have informed the *Water Is* campaign to support this plan. Public outreach highlights the safety and reliability of York Region’s services and the value customers receive for services delivered.

4. Analysis and Options

Full cost recovery pricing is the key to financially resilient and sustainable water and wastewater systems

The recommended rates are based on the principle of sustainability. “Sustainable” means that the Region, through the rates it charges, will recover all of its costs of providing water and wastewater services. Full cost recovery includes:

- Operating costs of Region-owned infrastructure (i.e., labour, energy and chemicals)

- Payments to other municipalities for water and wastewater services (Peel, Toronto, Durham)

- Resources to carry out a multi-billion-dollar long-term investment plan, including building reserves for future asset rehabilitation and replacement

- Debt servicing costs

- Environmental costs, including source water protection

- Contributions to Conservation Authorities for natural hazard management and environmental protection

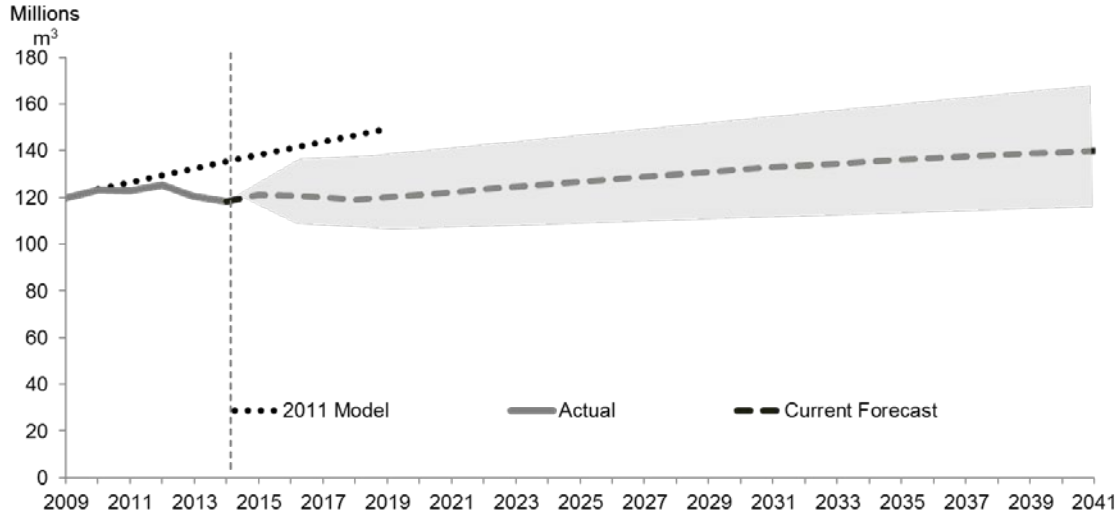
Corporate costs for water and wastewater services.The proposed Financial Sustainability Plan recommends annual rates for the next four years and is based on ensuring water and wastewater services are sustainable over the long-term.

Lower water demand has affected revenues and contributions to reserves

Since the mid-1990s, per capita water demand has been declining in York Region as it has throughout Ontario and North America. This decline is due to a number of factors, including Ontario Building Code requirements for water-efficient fixtures, smaller lot sizes as the Region becomes more urban, more water-efficient business practices, better technology such as high efficiency washing machines, and water conservation programs such as *Water for Tomorrow*. All of these factors have combined to encourage behaviour change and fixture retrofits.

Although the Region continues to experience steady population growth, total water demand is not increasing at the same rate. Since 2012, the Region has seen a fairly steady decline in total annual water demand despite population growth. Figure 1 illustrates the original flow volume forecast from the 2011 model and resulting actual volumes. Actual flows in 2014 were 13 per cent below the 2011 forecast.

Figure 1
Comparison of Flow Forecasts



While lower water consumption reduces impact on existing infrastructure and timing of additional capacity, it also reduces revenue. This resulted in substantially lower contributions to reserves than previously expected.

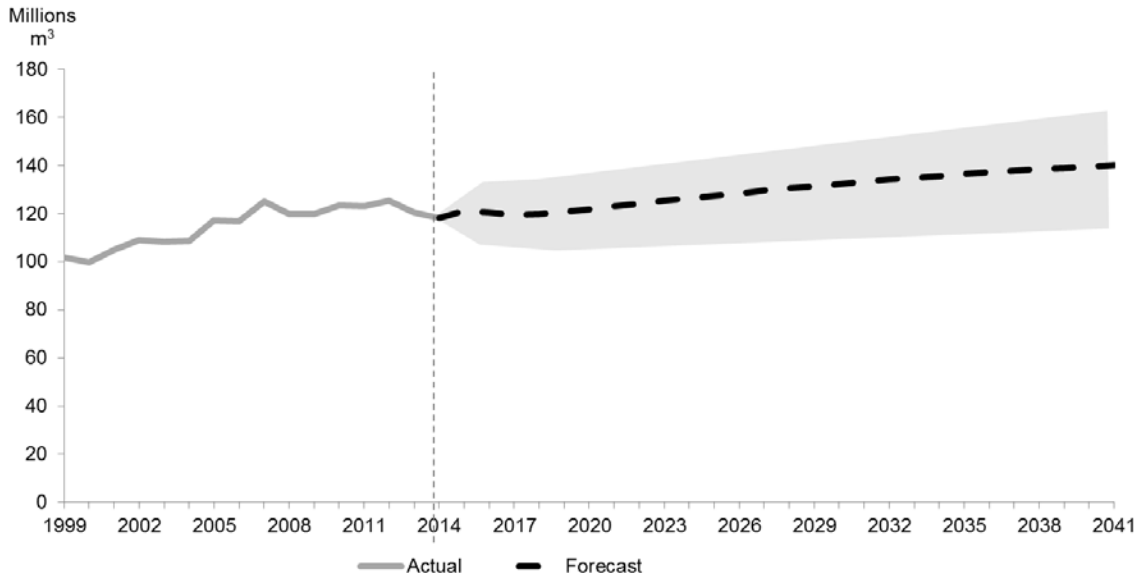
Enhanced modelling yields a better water demand forecast

Given the importance of the water consumption forecast for rate setting, an updated long-term demand forecast model for York Region was prepared using regression analysis. This model factored in population growth, weather, response to prices, building code/technological changes, urban density and housing types,

demand by businesses and conservation patterns. The model is described in the attached Financial Sustainability Plan.

The water demand forecast presented in Figure 2 shows relatively moderate increases through 2041. The shaded area around the forecast line represents the range of flows that can be expected in 95 per cent of all possible situations.

Figure 2
Actual Flow Volume and Forecast



Replacement and rehabilitation of growing infrastructure asset base will require adequate reserves to avoid debt

The 2015 10-year Capital Plan includes $2.2 billion in planned capital investments ($1.6 billion growth-related projects) and the Region has spent nearly $3.8 billion on water and wastewater capital over the last 10 years. While growth capital is funded through development charges, rehabilitation and replacement projects are not eligible and will require reserve funding to eliminate the current practice of funding a significant portion of rehabilitation and replacement projects by debt.

Asset management is a key component of rate setting

Asset management is an integrated, lifecycle approach that brings together the physical and financial aspects of existing and planned infrastructure systems and the assets that comprise them to ensure the right investments and activities happen at the right time. The goal is to minimize costs over time while providing the desired level of service with an appropriate level of risk.

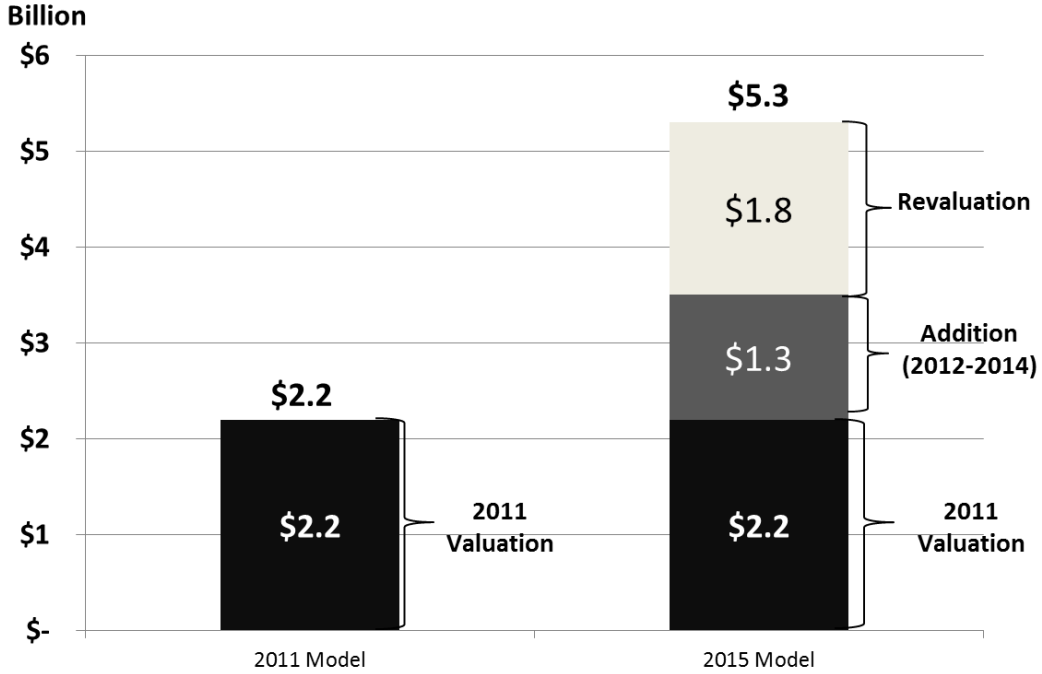
At the time of the 2011 rate analysis, the replacement cost of water and wastewater infrastructure was estimated at $2.2 billion. The addition of assets between 2012 and 2014 increased the asset base by $1.3 billion, bringing the total asset base at December 31, 2014 to $3.5 billion as shown in Figure 3.

A further increase in the replacement value of the asset base resulted from a recent independent review. The goals of this work were to update the asset values, better understand cost drivers, and identify future investment needs.

This review helped provide improved estimates of asset replacement value. The current replacement value for water and wastewater assets is now estimated to be $5.3 billion, as shown in Figure 3. In addition to more accurate asset valuation, the increase takes into account the increased complexity of replacing assets, including:

- Maintaining operation of existing assets to ensure that services are not disrupted during construction
- Ensuring integrity of other infrastructure in the vicinity is not compromised
- Minimizing impact to traffic and the community during construction
- Ensuring works are carried out in compliance with new and more stringent regulations.

Figure 3
Increasing Replacement Value of Asset Base



Properly planned asset management strategies will not only inform the rate study but identify performance challenges, enable early detection in the event of any impending asset failure and enable action before a potentially catastrophic failure.

Full cost recovery pricing model identified proposed rate increase options

The Financial Sustainability Plan outlines the steps involved in determining required revenue to achieve full cost recovery pricing.

Several options were considered to move the Region to full cost recovery pricing. Each option achieves full cost recovery in different years, as noted below:

- Option 1 - Year 1
- Option 2 - Year 2
- Option 3 - Year 3
- Option 3a - Year 3
- Option 4 - Year 4
- Option 4a - Year 4
- Option 5 - Year 6

Table 2 outlines the rates associated with each option, with corresponding percentage increases shown in Table 3.

Table 2
Options Reviewed to Reach Full Cost Recovery Pricing

Options	Wholesale Rates (m^3) Effective April 1st of Each Year					
	2016	2017	2018	2019	2020	2021
Option 1	$2.77	$2.87	$2.98	$3.09	$3.20	$3.31
Option 2	$2.55	$2.97	$3.05	$3.14	$3.23	$3.32
Option 3	$2.46	$2.78	$3.10	$3.19	$3.28	$3.37
Option 3a	$2.50	$2.83	$3.00	$3.09	$3.18	$3.28
Option 4	$2.41	$2.67	$2.94	$3.24	$3.33	$3.43
Option 4a	$2.46	$2.71	$2.95	$3.13	$3.22	$3.32
Option 5	$2.37	$2.59	$2.82	$3.07	$3.35	$3.45

- Highlighted cells indicate year in which full cost recovery pricing is achieved
- For comparison, 2015 combined water and wastewater rate is $2.18 / m^3

Table 3
Increases Associated with Options Reviewed

Options	Wholesale Rate Increases Effective April 1st of Each Year					
	2016	2017	2018	2019	2020	2021
Option 1	27.1%	3.7%	3.7%	3.7%	3.7%	3.7%
Option 2	17.2%	16.2%	2.9%	2.9%	2.9%	2.9%
Option 3	12.9%	12.9%	11.7%	2.7%	2.9%	2.8%
Option 3a	15.0%	13.0%	6.0%	3.0%	3.0%	3.0%
Option 4	10.8%	10.5%	10.2%	10.2%	2.9%	2.9%
Option 4a	13.0%	10.0%	9.0%	6.0%	3.0%	3.0%
Option 5	9.0%	9.0%	9.0%	9.0%	9.0%	2.9%

- Highlighted cells indicate year in which full cost recovery pricing is achieved

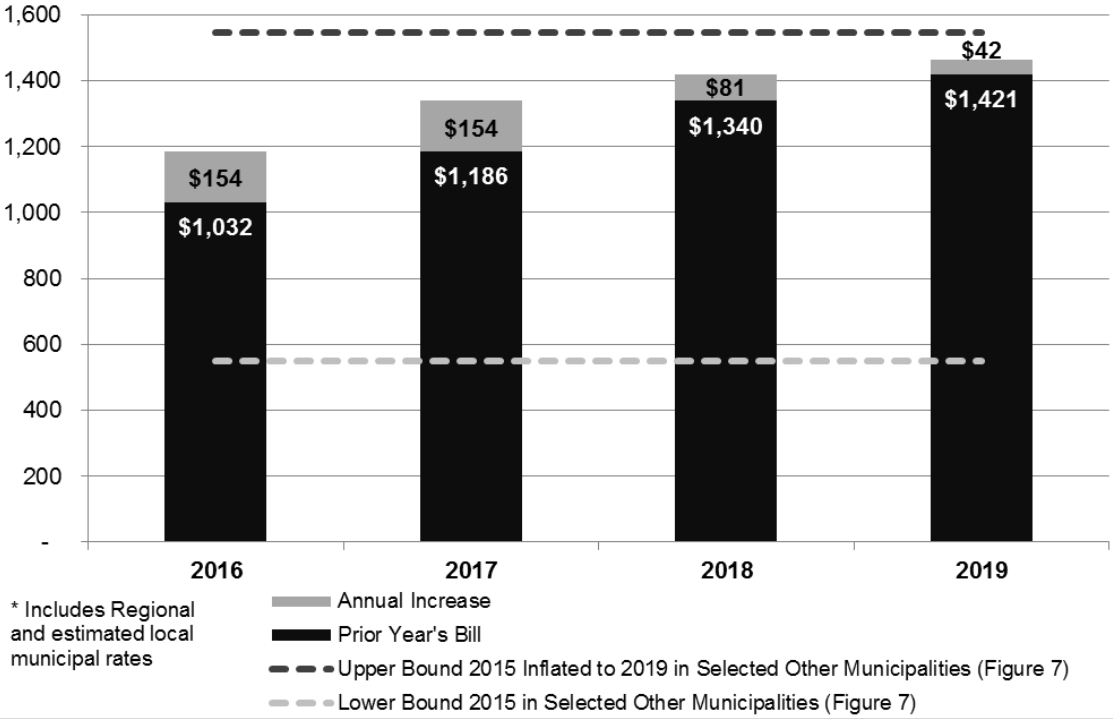
To moderate the initial impact on users, but achieve full cost pricing quickly, option 3a is recommended (full cost pricing in 2018). Under the recommended option, the annual rate increases effective April 1st of each year are shown in Table 4.

Table 4
Recommended Rate Increases Under Option 3a

Options	Wholesale Rate Increases Effective April 1st of Each Year			
	2016	2017	2018	2019
Option 3a	15.0%	13.0%	6.0%	3.0%

If approved by Council, the recommended rate increase will result in an average household of four paying approximately $154 more in 2016 for water and wastewater services resulting in a total annual cost of $1,186, as shown in Figure 4. While retail rate increases are at the discretion of local municipalities, estimated household costs are based on the assumption that local municipalities will increase water and wastewater rates by the same percentage as the Regional wholesale rate. The impact on the annual bill for the average household is also shown for 2017, 2018 and 2019 in Figure 4.

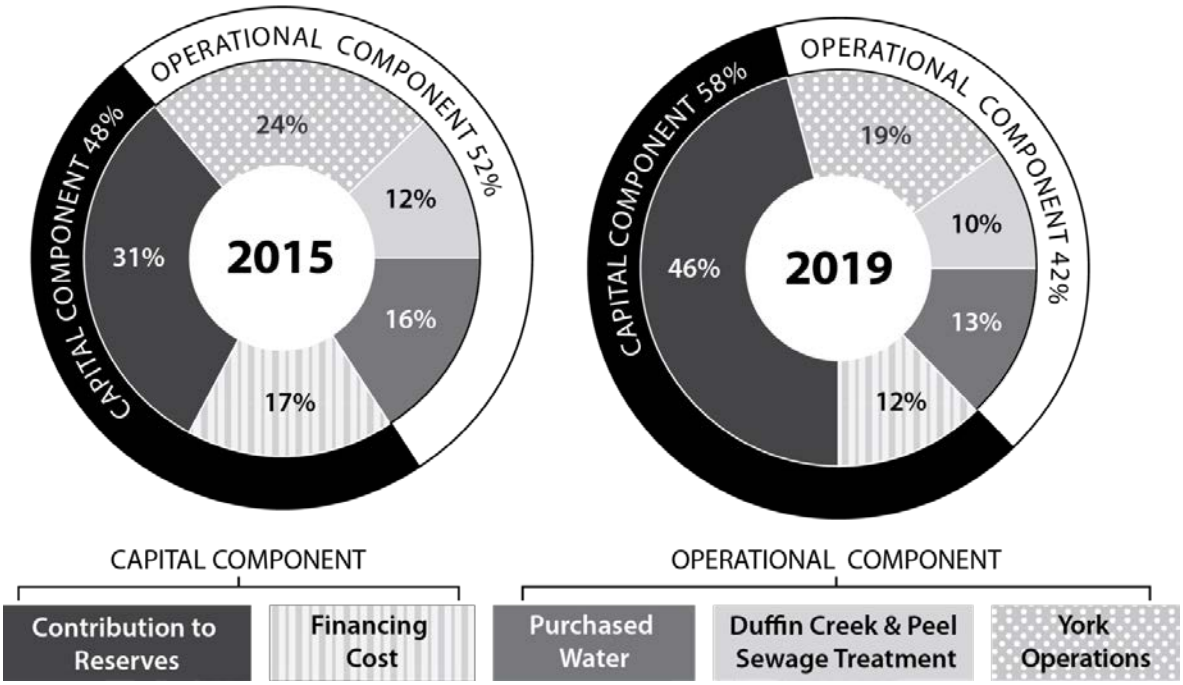
Figure 4
Annual Water and Wastewater Bill
for an Average Household using 270 m^3 per year*



The proposed rate increase will support the capital investment needed for asset management

Under full cost recovery pricing, the focus is to ensure that adequate reserves are in place to fully fund current and future capital, eliminating the need for debt financing of rehabilitation and replacement projects. As a result, the share of the rate for contributions to asset replacement and rehabilitation reserves increases from 31 per cent to 46 per cent between 2015 and 2019 and the financing cost decreases, as shown in Figure 5.

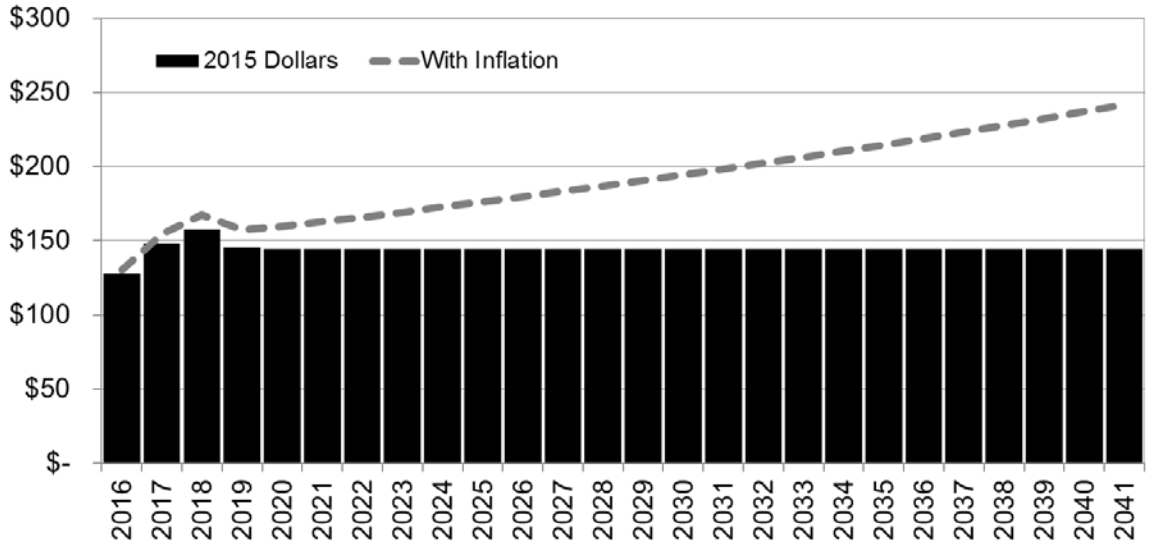
Figure 5
Components of User Rates



Ensuring fairness in rate setting

Intergenerational equity refers to how costs and benefits are spread between current and future users. The objective is to ensure all users pay their share of costs and to ensure that no users are unfairly burdened. For example, this means that each person should pay the same real cost per capita for rehabilitation, replacement and financing costs regardless of when they use the system.

Figure 6
Annual Per Capita Contribution to Rehabilitation and Replacement



All options result in intergenerational equity at the point when full cost pricing is achieved. For example, in option 3a, a user in 2019 will pay the same real per capita amount for rehabilitation and replacement projects as a user in 2041, as shown in Figure 6.

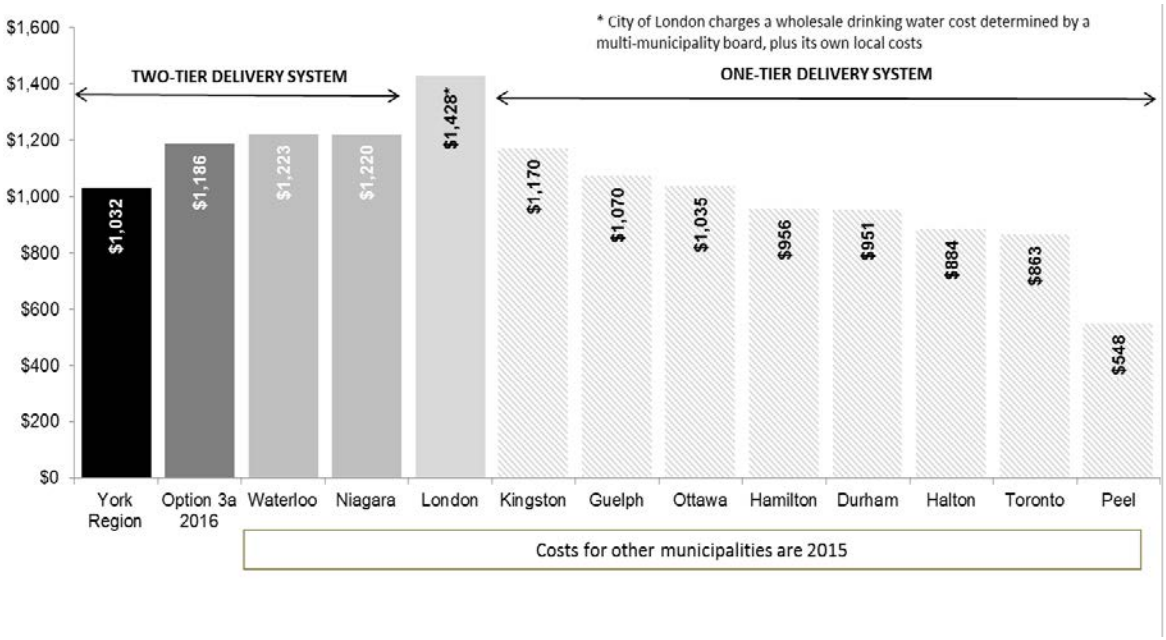
Retail rates in York Region are lowest of two-tier delivery systems

An inter-municipal survey was undertaken to compare the annual cost for a household that uses 270 cubic metres of water per year, the average demand in York Region. The Region's weighted average retail cost is $1,032 per year for 2015.

Average annual retail costs in York Region are the lowest in two-tier water systems. Niagara Region's annual retail cost is $1,220 and Waterloo Region's is $1,223.

Figure 7 shows the impact of option 3a on estimated household cost, assuming that the local municipalities increase water and wastewater rates by the same percentage as the increase in the Regional wholesale rate. Under the recommended scenario, York Region would remain the lowest cost provider among two-tier systems in 2016, even compared to 2015 rates for other two-tier municipalities.

Figure 7
Estimated Residential Cost per Household using 270 m^3 per year in 2015



Staff consultation to review impact and affordability of rates indicated that current rates fall within affordability guidelines

As part of the user rate review, a task group was formed to analyze the potential impact of higher water costs on low-income households. It found that low-income households in York Region were paying between 1.4 and 5.0 per cent of after-tax income on water and wastewater services, depending on household size and local municipality. These percentages fall within affordability guidelines set by organizations such as the United Nations and the Organization for Economic Cooperation and Development.

There are two programs offered by Community and Health Services to provide York Region residents with financial assistance if they are at risk of losing their housing as a result of non-payment of rent, mortgage payments, utilities and other housing costs: the Housing Stability Program and the Homelessness Prevention Program. The Housing Stability Program is for residents who are already receiving Ontario Works or Ontario Disability Support Program (ODSP) benefits. The Homelessness Prevention program is for residents who are not receiving Ontario Works or ODSP (residents may be receiving other forms of financial assistance such as CPP disability or WSIB). To date, York Region has not received any specific requests from residents for water and wastewater financial assistance. In addition, it should be noted that most tenants of Housing York Inc. buildings are not billed for water, as the cost is embedded in the rent.

Link to key Council-approved plans

The rate recommendation in this report has been prepared drawing on financial information and details contained in the approved 2015 operating and capital budgets and the 2015-2024 Ten-Year Capital Plan.

The Financial Sustainability Plan aligns with objectives of the Region's *2015 to 2019 Strategic Plan – From Vision to Results* to ensure a fiscally prudent and efficient Region and provide proactive stewardship of the Region's assets.

5. Financial Implications

Proposed rate increase will strengthen reserves for asset management and eliminate future user rate debt

Recommended water and wastewater rates for 2016-2019 are outlined in Table 1. These rate increases will bring the Region to full cost recovery pricing by 2018, making the Region one of the few municipalities in the Province to achieve long-term financial sustainability.

It is proposed that the new rates come into effect on April 1, 2016. There will be no impact on the tax levy budget. The recommended rates will increase reserve balances to fund future capital rehabilitation and replacement needs over the long-term without the need to issue any new user rate debt.

Staff to monitor planned targets and take corrective action

Performance relative to the forecasts used in this rate analysis will be monitored annually. If the contribution to reserves is significantly below planned targets for any year within the term of the approval, staff will report back to Council with a revised rate recommendation as part of the annual budget process.

Rate Stabilization Reserve will be created to mitigate operational variances

A new rate stabilization reserve will be created to help offset the impact of an unexpected event in the year it occurred. The reserve will be included in the Fiscal Strategy update that will be brought to Council in late 2015.

6. Local Municipal Impact

The Region is a wholesaler of water and wastewater services to local municipalities who face many of the same challenges as the Region in operating their distribution systems and dealing with the cost of aging infrastructure. With approval of new water and wastewater rates in fall 2015, local municipalities will have timely information for developing their 2016 budgets.

Consultation with local municipalities throughout 2014 and 2015 has been key to developing this Plan. Feedback was essential to understanding local concerns and views on potential rate structure changes, affordability of rates, projected flows and costs of rehabilitating and replacing major infrastructure.

7. Conclusion

This report recommends annual increases in water and wastewater rates for the period from April 1, 2016 to March 31, 2019, as outlined in Table 1. The recommended rates will help ensure long term financial sustainability of York's water and wastewater services.

For more information on this report, please contact Kelly Strueby, Director, Office of the Budget, Finance, at Ext. 71611 or Lucas Cugalj, Director, Strategy and Business Planning, Environmental Services, at Ext. 75041.

The Senior Management Group has reviewed this report.

September 25, 2015

Attachment

6323322

Accessible formats or communication supports are available upon request

APPROVED

WATER AND WASTEWATER

FINANCIAL SUSTAINABILITY PLAN

OCTOBER 2015

York Region

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report sets out annual water and wastewater rates approved by York Regional Council in October 2015. The rates are intended to put the Region in the position of receiving enough revenue to cover all of its costs of providing water and wastewater services. This is an important and highly-recommended position that few other North American municipalities have so far achieved.

The full cost recovery rates approved by Regional Council for the next six years are shown in the table below.

Year beginning April 1	Wholesale cost (per cubic metre)
2016	$2.37
2017	$2.59
2018	$2.82
2019	$3.07
2020	$3.35
2021	$3.45

Full cost recovery pricing is expected to be achieved in the year beginning April 1, 2021, after five years of increases of 9 per cent a year. For 2021, rates would increase by only 2.9 per cent, or ten cents a cubic metre, and subsequent increases would also be low.

This phase-in to full cost recovery pricing was chosen to address a number of goals:

- a pressing need to rehabilitate and renew major assets;
- a corporate commitment to reduce debt funded by user rates; and
- a desire to keep increases reasonably close to those of recent years.

Even after the phase-in, water rates will remain below 1 per cent of the average income of York Region households, a level that

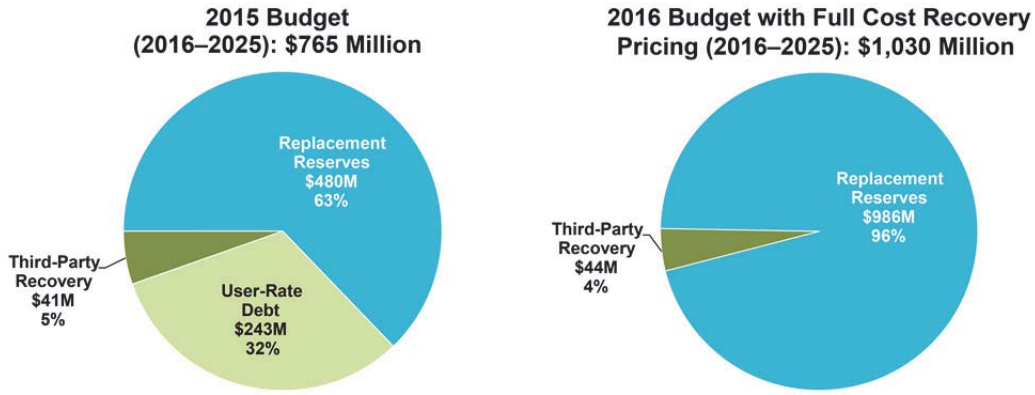
The benefits of moving to full cost recovery pricing include both improvements to the systems that deliver safe drinking water and remove and treat wastewater, and a significant reduction in debt.

will continue to be among the lowest relative to income across Ontario municipalities.

In developing new rates, York Region relied on the principles of fairness to users, predictability in rate changes, adequacy of revenue, and transparency in the rate structure. In line with the need to ensure adequate revenues, a further guiding principle was that affordability should be addressed, if necessary, through support under existing programs for low-income households, not a general subsidy to all users.

Benefits of moving to full cost recovery pricing include the ability to carry out major rehabilitation and replacement (R&R) work on the systems that deliver safe drinking water and collect and treat wastewater.

As the pie charts show, the new rate structure will allow a much larger share of rate revenue to go to R&R. These investments will increase to $1,030 million from the $765 million presented in the 2015 budget.

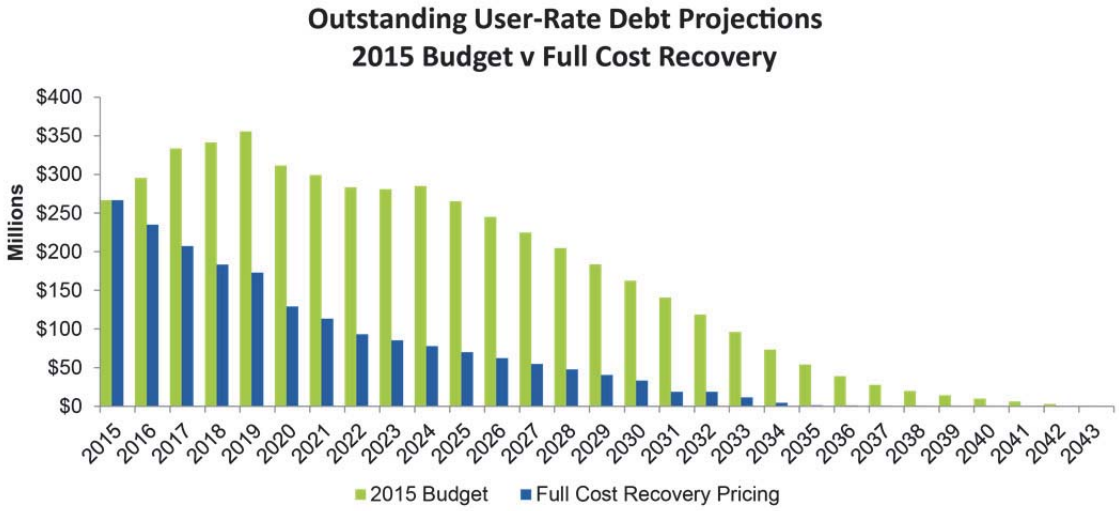


Note: In these charts, total rehabilitation and replacement costs include the costs of growth projects that are funded by user rates and replacement reserves.

The right-hand chart above shows that, in addition to allowing more needed investments, full cost recovery pricing is expected to end the need to fund these with debt.

The long-term benefits of reducing reliance on debt are significant. Under full cost recovery pricing, no new debt will be

issued to fund rehabilitations and replacements, and almost all existing user-rate debt will be paid off by 2034, as this next graph shows.



Full cost recovery pricing will achieve this reduction in debt by growing the reserves needed to properly care for assets in future and replace them when needed.

While annual rates have been approved for the next six years, the plan is based on ensuring water and wastewater services are sustainable over the long term.

Recognizing that actual results may differ from projections, Regional staff will monitor the outcomes of the new rate structure. If reserve contributions fall significantly below planned levels, they will report back to Council with revised rate recommendations as part of the annual budget process. For additional prudence, the rate structure also includes a proposed rate stabilization reserve to protect against unforeseen one-time changes that reduce revenues, increase costs, or both.

INTRODUCTION

The purpose of this plan, developed jointly by the York Region Environmental Services and Finance departments, is to ensure a financially sustainable water and wastewater rate structure for the Region, and to describe how the Region developed the plan.

"Sustainable" means that the Region, through the rates it charges, will recover all of its costs of providing water and wastewater services. These costs comprise:

- operating expenses, including purchases of water and wastewater treatment, salaries and benefits, regulatory compliance, repairs and maintenance, utilities, chemicals, and programs that support water and wastewater service delivery;
- interest payments on water and wastewater-related debt and debt repayments when needed; and
- the costs of inspecting, rehabilitating, and replacing existing assets as they age.

On the last point, the plan recognizes that user rates need to cover rehabilitating and replacing existing assets only. Roughly 99 per cent of growth-related capital projects are paid for by development charges.

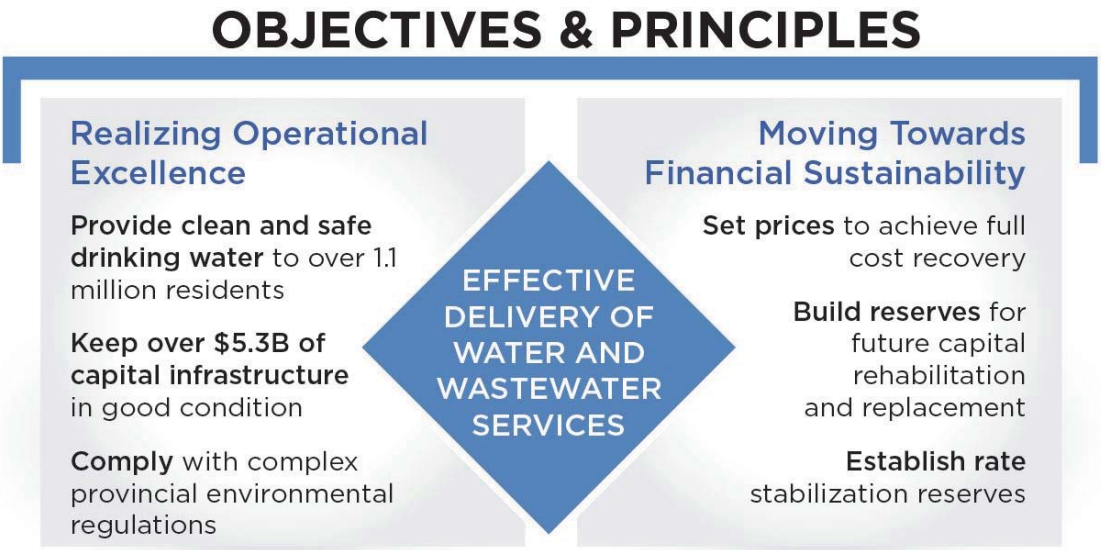
York Region's main role: Acting as wholesaler to its local municipalities

The Regional Municipality of York, also described as "York Region" or "the Region" in this report, provides a range of services to more than one million residents, often in concert with its nine local municipalities.

In the area of water and wastewater services, the main role of York Region, as a regional municipality and as required under provincial legislation, is to act as a wholesale provider of water and wastewater services to the local municipalities.

These responsibilities reside within the Environmental Services department, which is guided by specific goals and principles to

ensure it meets its operating, capital, regulatory, and financial requirements.



In acting as the wholesale provider of drinking water, York Region:

- purchases water from the Region of Peel and the City of Toronto, which together supply more than 85 per cent of York Region's total municipal drinking water need;
- works with these municipalities on joint initiatives to ensure the adequacy of supply, for example through sharing the costs of capital projects and carrying out studies on how to optimize system performance;
- operates and maintains 40 groundwater production wells and two surface-water treatment plants for the balance of the drinking-water demand; and
- provides and delivers drinking water through 22 pumping stations, 44 elevated water tanks and reservoirs, and 344 kilometres of transmission mains.

The long-term arrangements with Peel and Toronto are necessary because York Region is unique among the cities and regions in the Greater Toronto Area in that it lacks direct access to Lake Ontario.

In its role as a wholesale provider of wastewater services, York Region:

- collects wastewater from the local municipalities and conveys it to treatment plants through a system of 322 kilometres of sewer pipe, 19 pumping stations, and two wastewater equalization tanks;
- manages the operation and maintenance of the Duffin Creek Water Pollution Control Plant in Pickering, which is jointly owned with Durham Region and which treats about 85 per cent of the Region's wastewater;
- manages an agreement with the Region of Peel for the treatment of roughly a further 10 per cent of the Region's wastewater; and
- operates and maintains seven wholly-owned water resource recovery facilities, mainly in the northern part of the Region, that treat the balance.

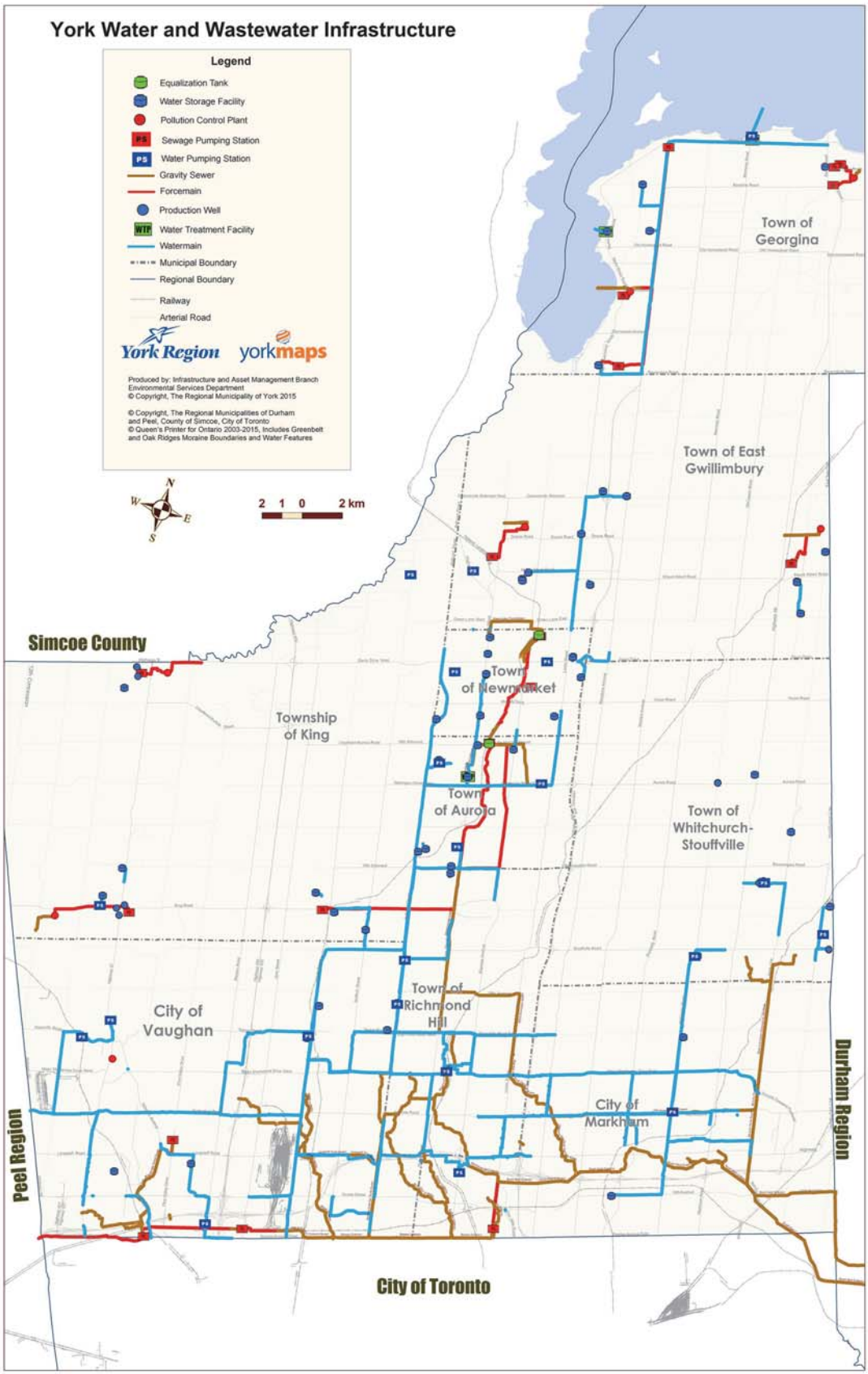
Duffin Creek, the most highly regulated plant discharging into the open waters of Lake Ontario, reflects the province's long-term vision to grow and service both York Region and Durham Region

The York Durham Sewage System forms the largest part of the wastewater conveyance and treatment network. First constructed by the Province of Ontario in the late 1970s and early 1980s, it serves the Region's central and southern municipalities. Collection systems from York and Durham converge at the Duffin Creek Water Pollution Control Plant.

Duffin Creek reflects the province's long-term vision to grow and service both York Region and Durham Region. More than three-quarters of the wastewater it treats originates in York Region.

Duffin Creek is the most highly regulated plant discharging treated wastewater into the open waters of Lake Ontario, and the only one with a limit of any kind on phosphorus returned to the environment. It replaced a number of smaller and older wastewater treatment facilities, improving water quality and fisheries in local rivers and creeks.

The following map shows the major elements of the water and wastewater systems.


York Water and Wastewater Infrastructure
Legend
Equalization Tank
Water Storage Facility
Pollution Control Plant
Sewage Pumping Station
Water Pumping Station
Gravity Sewer
Forcemain
Production Well
Water Treatment Facility
Watermain
Municipal Boundary
Regional Boundary
Railway
Arterial Road
York Region
yorkmaps
Produced by: Infrastructure and Asset Management Branch
Environmental Services Department
© Copyright, The Regional Municipality of York 2015
© Copyright, The Regional Municipalities of Durham and Peel, County of Simcoe, City of Toronto
© Queen's Printer for Ontario 2003-2015, Includes Greenbelt and Oak Ridges Moraine Boundaries and Water Features
N
W
E
S
2 1 0 2 km
Town of Georgina
Town of East Gwillimbury
Simcoe County
Township of King
Town of Aurora
Town of Whitchurch-Stouffville
City of Vaughan
City of Markham
Peel Region
Durham Region
City of Toronto

Other York Region water and wastewater responsibilities include:

- metering and billing for water purchased by local municipalities and billing for wastewater collected and conveyed, using a uniform region-wide rate per cubic metre, with the wastewater volume generally assumed to be the same as the volume of water supplied;
- ensuring its systems meet regulatory requirements, including the province's Drinking Water Quality Management Standard (DWQMS), and operate to international ISO standards;
- carrying out a range of compliance functions, for example enforcing the Sewer Use bylaw, which prohibits contaminants from entering the sewer system, and billing for activities other than providing service to local municipalities;
- planning for, undertaking and managing the building of new infrastructure, as well as expansions, rehabilitation and replacement of existing assets;
- working with partners, including the University of Toronto, Ryerson University and University of Waterloo, on innovative research and development projects; and
- working with local municipalities and other partners to improve system efficiency, conserve water and protect drinking water sources.

After receiving water from the Region, local municipalities deliver it to their residents and businesses at rates which they determine under a variety of structures. Similarly, they collect wastewater from their residents to convey to the Region's system, applying local wastewater fees.

Most residents of York Region are connected to a municipal water and wastewater system. Large areas of land, however, are not served by a municipal system. Because these areas are mainly rural, the share of residents on private wells (and/or septic systems) is estimated to be relatively small.

What is full cost recovery and why is it desirable?

Providing water and wastewater services in Ontario is largely a municipal responsibility. Municipalities set water rates, which — unlike electricity rates, for example — are not subject to formal regulation. Instead, municipal councils typically provide approval.

Municipalities across Ontario may balance a number of considerations in setting rates, including:

- generating enough revenue to pay for rehabilitation and replacement of assets as well as day-to-day operations and regulatory compliance;
- setting rates appropriately to protect against wasting water and to encourage conservation;
- taking into account service users' ability to pay and/or their response to higher rates;
- avoiding a subsidy to the service from the general tax base, especially where some taxpayers are on private systems;
- conversely, avoiding a risk that water rates generate more revenue than the water and wastewater service needs.

As this list indicates, some of the drivers are at odds with others — for example, trying to keep rates affordable while encouraging conservation. To help municipal councils work through all the issues, the provincial government, water organizations and other authorities have provided guidance. Their advice is consistent: water and wastewater rates should be designed so as to recover the full costs of providing the service.

Various bodies have found that full cost recovery is not yet happening in Ontario (nor, indeed, in most North American jurisdictions). *Watertight*, the 2005 report of an expert panel on water and wastewater infrastructure and financing in the province, noted the difficulties. After identifying a shortfall of some $1.2 billion a year across the province between then-current revenues and estimated investment needs, it went on

> "Delivering reliable municipal water services requires considerable expertise and expense, yet is often undervalued by the public."
>
> *— The Canadian Municipal Water Consortium*

to point out that "a consistent problem in Ontario has been that municipal councils, which represent both the owners and customers of water systems, are reluctant to set rates high enough."

The 2008 report of the Infrastructure Table of the Provincial-Municipal Fiscal and Service Delivery Review took a similar view. (The review was a joint initiative of the Province of Ontario, City of Toronto and Association of Municipalities of Ontario.) The report found that the annual gap between revenues and full costs had grown, estimating that the shortfall in revenue was then at least $1.3 billion a year. The table called moving to full cost recovery "a central element of water sector reform."

The 2013–14 annual report of the Environmental Commissioner of Ontario evaluated efforts across Ontario since the Walkerton tragedy to put full cost recovery pricing in place. Its conclusion was that "many municipalities are still not assessing and recovering the full costs of their drinking-water systems, putting the financial sustainability of these systems at risk."

In 2014, leadership within the Canadian Municipal Water Consortium, which is founded on national and international collaboration and knowledge-sharing with leading-edge water professionals, identified financial sustainability as one of four priorities critical to water management decisions.

In a subsequent report in 2015, the consortium noted that "delivering reliable municipal water services requires considerable expertise and expense, yet is often undervalued by the public. Most municipalities face significant challenges from historic underfunding that leads to backlogs of infrastructure repair or replacement, while simultaneously facing greater system demands."

A guiding principle underlying this plan was achieving full cost recovery rates, including eliminating shortfalls in asset management funding, over a relatively short period of time. This is critical to the long-term financial sustainability of water and wastewater services in York Region.

"...many municipalities are still not assessing and recovering the full costs of their drinking water systems, putting the financial sustainability of these systems at risk."

— 2013–14 annual report, Environmental Commissioner of Ontario

The costs and risks of setting rates too low

What happens when rates are too low for financial sustainability? Systems face higher risks and greater future costs. Current and future residents of a community might feel these impacts in a variety of ways:

- Badly-needed rehabilitation or renewal of assets could be postponed. In addition to reducing the day-to-day reliability of service, this tactic increases the risks and costs of catastrophic failure, often with collateral damage, including health and safety and legal impacts.
- Proper upkeep of assets could be put off to save money. This also tends to be very expensive over time, because the costs down the road of correcting the problems caused by poor maintenance are almost always much higher than the upfront savings. Estimates vary across types of asset, but many experts cite a “Rule of Five” that says every dollar of maintenance put off now will cost five dollars later. Watermain breaks are an example: they disrupt traffic, can shatter pavement and may create dangerous sinkholes.

Watermain break on Bathurst Street.

- The service provider could fail to retire outdated equipment and invest in new technologies that would better protect public health, enhance service quality and/or improve efficiency.
- Efforts to achieve conservation could be hampered. When water users aren't seeing the full costs of the service, they are not as likely to think about conserving water. The results could include having to build systems larger than they need to be, putting unnecessary pressure on the environment and wasting energy on pumping water and wastewater.
- Debt could be used to fill the gap between needs and resources. While some debt may be justified for timing reasons, consistently borrowing to fill a funding gap is simply another way of putting off higher costs until later. As well, because of limits on how much debt a municipality can carry, it can unnecessarily hamper investment in other critical assets.
- The community could end up subsidizing water and wastewater from the general tax base. This would raise concerns about equity: taxpayers would be supporting water and wastewater services not on the basis of their consumption, but through their property taxes.
- The municipality might seek funding from senior levels of government. For systems that have the capacity to fund themselves through rates, relying on a senior level of government to provide regular grants or subsidies is not a realistic expectation.
- Capital investments and operations might not be fully coordinated, increasing overall costs. When the service provider must look to its customers to cover all its costs, it tends to be more focused on keeping those costs as low as possible while meeting service expectations. Conversely, when funds are available from another source, especially as a subsidy from the municipal tax base and/or another level of government, there is far less incentive for efficiency.

York Region, like many other Ontario municipalities, recognizes the benefits of full cost recovery pricing and the risks of not implementing it. It has been moving toward full cost recovery pricing for several years. It was hampered, however, by the need for better models for projecting demand for water and the costs of rehabilitating and replacing assets.

As a result, user-rate revenues were not adequate to build reserves to the level needed to cover all asset management costs. Debt was used to fill part of the gap.

With a foundation of more sophisticated forecasting methodology and more detailed information, this plan represents the next major step in achieving full cost recovery through water and wastewater rates.

York Region, like many other Ontario municipalities, recognizes the benefits of full cost recovery pricing and the risks of not implementing it.

A complex set of calculations

While, on paper, full cost recovery appears to be a straightforward exercise — determine the needed funding and set rates to recover those amounts — in practice, there are many complexities. These include the need to:

- have detailed information about the condition of existing assets and well-developed plans for maintaining them and rehabilitating/replacing them when required, with all the costs (which, in the case of York Region, run to billions of dollars);
- develop a realistic forecast for water demand that takes into account as many drivers as possible, such as weather and more water-efficient fixtures;
- tie plans for building new projects to population growth forecasts that are as accurate as possible, while recognizing that, for cost-effectiveness, new facilities often must be built bigger than the current or near-term population needs;
- strike a fair balance between the capital-related costs to be borne by today's users and those which future users will bear; and

- recognize that rate-setting is a step-by-step process that can take several years, because higher rates generally result in lower demand, which can result in actual revenues that are lower than projected.

These complexities reflect the need to continually collect information, monitor results and refine rate-setting to develop a structure that ensures full cost recovery.

How the work was carried out

In developing this plan and its underlying elements, the Finance and Environmental Services departments worked in close co-operation to capture operational business needs, refine forecasts and align the proposed rate structure with corporate priorities.

Staff reviewed literature on water and wastewater financing policies and practices in use elsewhere, especially in other municipalities, to identify best practices to incorporate into planning and forecasting.

The financial modelling work focused on developing robust projections for both the demand for water and the revenues needed to create and maintain a system to meet the demand. Water-demand projections were based on historical data and likely trends in major drivers of demand. Cost projections drew on asset condition reports, plans for system expansion/renewal and estimates of future operating costs.

Developing an estimate of maintenance and repair costs throughout the life of assets and their ultimate replacement costs was essential to the plan. Environmental Services carried out studies of those costs by broad asset class to project annual spending over the long term as an input into the financial model.

York Region introduced the “Water Is” campaign in 2013. In addition to educating and informing the broader public about the complexity of providing clean, safe drinking water, the importance of conservation and the value of water and wastewater systems, the “Water Is” campaign has regularly sampled public attitudes and organized research in such areas

as the relationships between rate structures and conservation. This plan reflects and reports on many of those findings.

The Region also reached out to senior public works and financial staff within each local municipality to provide them with updates on the rate study and gather their feedback on potential rate structures. These discussions also covered challenges around rate-setting at the local level.

The balance of this document explains how York Region developed its proposed options for this financial sustainability plan. It sets out recommendations and rationale, and concludes by outlining the benefits across the Region of moving to full cost recovery pricing.

BACKGROUND

Where York Region is now

As the Introduction noted, York Region has been committed to full cost recovery water and wastewater rates for several years. This plan reaffirms the commitment and sets out the final steps towards achieving it.

At a meeting in December 2008, Council approved rate increases of 10 per cent a year for both water and wastewater in each year from 2009 to 2011 inclusive. In May 2011, Council continued to recognize the importance of full cost recovery pricing by approving an annual blended rate increase of 10 per cent out to 2016.

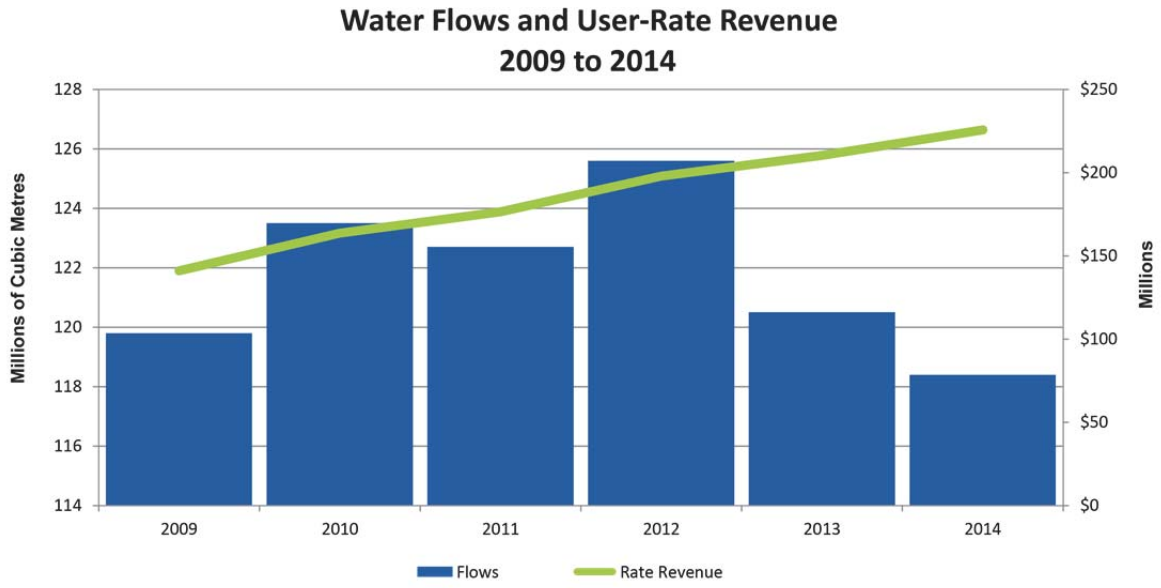
In 2014, as part of the "Water Is" campaign, a research study looked at progress towards full cost recovery rates. It noted that the Region appeared to be "on the right track in terms of developing and adopting strategies that move towards full cost recovery. [It] has made strides in recent years with long-term commitments to wholesale water (and sewage) rate increases…" It noted, however, user-rate revenues did not yet cover all costs, particularly longer-term costs related to aging infrastructure.

The work done for this plan confirms that finding, for which there appear to be two main reasons: lower-than-forecast demand for water, and a better, higher estimate of the costs of rehabilitating and replacing assets.

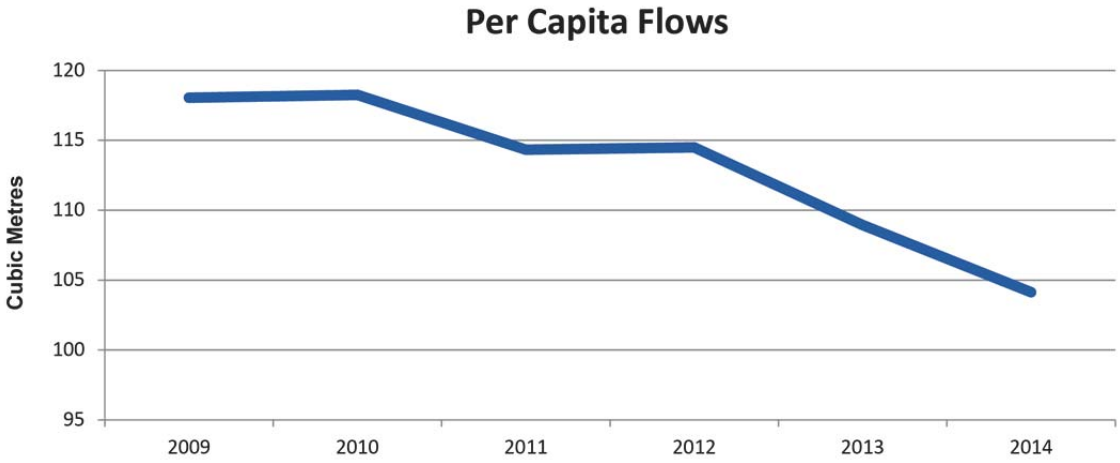
Water demand per capita is falling

While revenues have shown a generally rising trend from 2009 through to 2014, reflecting the new rates, lower-than-expected demand for water limited the growth in revenues.

As this graph shows, total flows of water and wastewater rose somewhat between 2009 and 2012, but have since declined to slightly below the 2009 level.



On a per capita basis, the decline in flows is much more noticeable.



The section on demand forecasting that starts on page 36 explains the possible reasons for this decline, and how the forecast model has been refined in the interest of greater accuracy.

The costs of proper asset management

The study cited on the previous page noted that, at the time it was written, work on asset management planning was underway. It went on to say that this work would refine and enhance information on the costs of maintaining, rehabilitating

and replacing existing assets. This, in turn, would enable the Region to improve its forecast of revenue need and enhance its funding strategy.

A discussion on the subsequent progress on asset management planning starts on page 29. It also explains how the updated information was incorporated into the financial sustainability plan.

Regulatory requirements for financial sustainability

Although water and wastewater rates in Ontario are not formally regulated, provincial statutes and guidance underscore the importance of financial sustainability for water utilities. Sustainability, in turn, is tied to ensuring the rates charged to users are adequate.

…provincial statutes and guidance underscore the importance of financial sustainability for water utilities. Sustainability, in turn, is tied to ensuring the rates charged to users are adequate.

Concerns about the financial sustainability of Ontario's water and wastewater systems rose after the Walkerton tragedy in 2000, in which seven people died and thousands became ill as a result of contaminated municipal drinking water.

An inquiry into the tragedy headed by Justice Dennis O'Connor resulted in numerous recommendations. Two of his recommendations focused on ensuring that drinking-water providers could fund their total costs.

In making these recommendations, Justice O'Connor noted that "over the long term, safety depends on stable and adequate financing to maintain the water system's infrastructure and its operational capacity to supply high-quality water consistently. Without adequate resources, corners will inevitably be cut, whether in the day-to-day operation of the facility, or in its long-term capital infrastructure. Ultimately, safety will be jeopardized."

The recommendations appear in Part 2, chapter 10 of the *Report of the Walkerton Inquiry*:

- Owners of municipal drinking water systems (which are usually municipalities) should be required to submit a financial plan to the province laying out the full costs of running and sustaining systems, including an asset

management plant, and explaining how those costs would be recovered.

- Municipalities should plan to raise adequate resources for their water systems from local revenue sources, without relying on support from higher levels of government.

The government's response was the *Sustainable Water and Sewage Systems Act, 2002,* which would have made such plans mandatory. While its passage prompted many municipalities to look more closely at their costs and revenues, the act was never proclaimed in force and was repealed a decade later.

The *Water Opportunities Act, 2010* allows the province to require municipalities to submit water system sustainability plans (including financial plans and asset management plans). The required regulations, however, have not yet been issued.

In the meantime, the main mechanism for supporting financial sustainability is a 2007 regulation under the *Safe Drinking Water Act, 2002.* The regulation requires a financial plan for drinking water systems to be approved by the municipal council and submitted to the Ministry of the Environment and Climate Change. Such plans are encouraged, although not mandatory, for wastewater systems.

The financial plan must show, for at least the following six years, the proposed or projected:

- financial position of the drinking water system, including total assets and liabilities;
- financial operations of the drinking water system, including expected revenues and expenses; and
- cash flows related to such activities as issuing debt, selling or acquiring tangible capital assets, and investing.

In addition, the regulation requires that all new systems be "financially viable." Although the term is not defined, the wording and a separate guidance document from the ministry suggest this means they must recover their full costs. The guidance document, for example, includes the following principles:

"Without adequate resources, corners will inevitably be cut, whether in the day-to-day operation of the facility, or in its long-term capital infrastructure. Ultimately, safety will be jeopardized."

— Report of the Walkerton Inquiry

- Ensuring users pay for the services they are provided leads to equitable outcomes and can improve conservation. In general, metering and rates can help ensure users pay for services received.
- Revenues collected for the provision of water and wastewater services should ultimately be used to meet the needs of those services.
- A sustainable level of revenue allows for reliable service that meets or exceeds environmental protection standards, while providing sufficient resources for future rehabilitation and replacement needs.
- An asset management plan is a key input to the development of a financial plan.

The guidance encourages municipalities to introduce full-cost pricing for existing systems. It also notes the need for ongoing public engagement and transparency on financial sustainability.

York Region submitted its most recent six-year water financial plan to the ministry in 2014. It documented financial commitments and funding sources for the 2014 budget year and provided projections for the subsequent six years, including both capital and operating spending.

Drawing up the six-year plan built a better understanding of what is involved in financial sustainability for the York Region water and wastewater systems. The timing of the water licence renewal, however, required that the plan be submitted to the province before this financial sustainability plan was complete. In the future, the provincially-required plan and the financial sustainability plan will be increasingly linked.

Best practices in full cost recovery

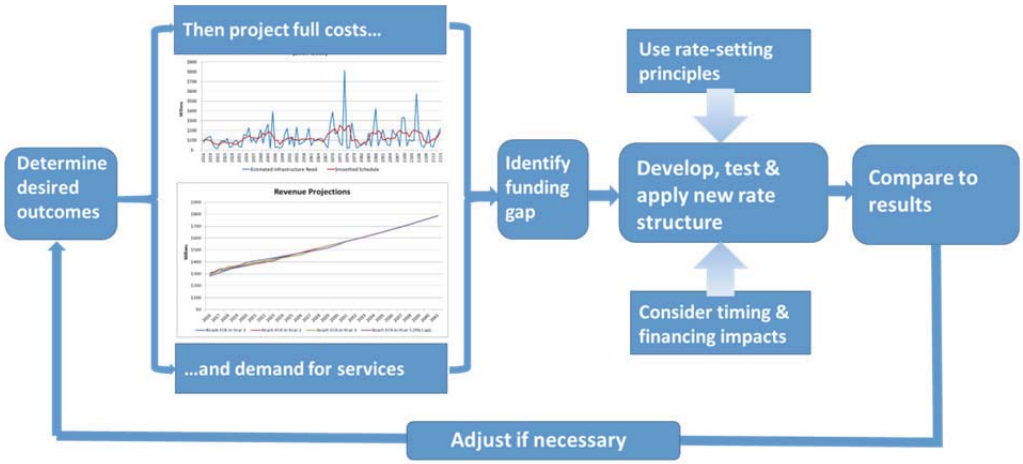
At a high level, there are two major aspects to developing a financial plan for water and wastewater that ensures the full costs of providing the service are recovered through rates:

- determining what “full costs” are over the long term; and

- determining the rates that will yield revenues equal to those costs over the long term.

In practice, developing a full cost recovery financial plan is a complex process because it relies on predicting future cash needs, revenues and timing of cash inflows and outflows. It also involves an understanding of high-level goals for the organization as a whole, and must ensure the rates that result follow well-thought-out principles. Finally, it must be flexible to respond to actual outcomes.

This diagram provides an overview of the steps and activities involved in developing a plan for a water and wastewater service to achieve financial sustainability over time.



In line with this overview, the Region reviewed recent rate-setting studies for other water and wastewater services and leading-edge research on water-demand forecasting and asset management. (Sources are listed in the bibliography.) The goal was to find and apply best practices in its own planning.

This research provided the foundation for the steps outlined below that the Region took to develop this plan:

1. Set out the goals of the water and wastewater service that affect its operational and financial direction. For York Region, these included:

    - aligning with Vision 2051, the long-term plan for the Region, and the 2015–19 strategic plan

- supporting two other corporate initiatives, asset management planning and the Regional fiscal strategy
- meeting specific service levels and the needs of growth and intensification
- supporting sustainable development
- complying with current and expected regulations and operating standards
- conserving and protecting water and other resources
- operating and building as efficiently as possible, including reducing inflow and infiltration.

From this starting point, two major sets of projections were developed, as steps 2 and 3 below indicate. Although they are labelled separately, in practice they took place simultaneously. Along the way, staff collaborated closely to ensure each set of results reflected and incorporated the other.

The asset management work was largely carried out by technical experts in Environmental Services. Economic forecasting experts in the Finance department, with the support of water conservation experts in Environmental Services, created the forecast model for water demand and revenues.

2. Identify the full costs involved in achieving the long-term goals, and estimate the costs of managing the required assets. For York Region, the costs that have an impact on user rates comprise these five points:

   - Capital: enhancements, upgrades, rehabilitation and replacement; funding for Conservation Authorities; and growth-related new assets and expansions funded by development charges. This plan focuses on the revenues generated by user rates and the costs they cover. Growth-related projects, although not funded upfront by user rates, have an impact on financing decisions, incremental operating costs and long-term asset management. For

this reason, such projects and their expected funding sources are included in the modelling.

- Regulation: operator training and licensing, source water protection, environmental assessments, Environmental Compliance Approvals, Supervisory Control Data Acquisition (SCADA) monitoring and an Integrated Management System.
- Operations, maintenance and administration: labour costs, water purchases, sample collection and analysis (the Region collects and tests about 35,000 samples each year), chemicals, power, parts and repairs, and the supporting information technology, finance and accounting, and human resource functions.
- Research and development: pilot projects and technical reviews to support continuous improvement in compliance and/or operating efficiency.
- Financing: interest expense and debt repayment.

3. An asset management plan is central to estimating full costs, because most spending will be on capital investments, repairs, rehabilitation and replacements. This involves:

    - Developing an inventory of existing assets and their condition, which together provide an asset condition report
    - Using the asset condition report to develop an asset management plan and forecast that
        - covers a long enough time period to match the cycle of asset investment and replacement;
        - ensures the right spending at the right points to optimize asset condition, synchronize with growth-related capital projects and minimize life cycle costs; and
        - brings together capital investments, operations and maintenance, and reflects such cost drivers as greater urbanization and increasingly stringent regulation.

Estimating full costs also depends on projecting the other costs outlined above — operations, financing, administration and so on. Because many of these costs are driven by demand, the size of the asset portfolio and the financing strategy, this step takes place as part of developing the full forecasting model (Step 4).

4. Develop projections of future demand:

   This step looked at impacts on demand arising from such factors as population and business growth, new technologies, weather and climate expectations, building code changes, building densities, shifts in housing preferences, shifts in behaviour and changes in water rates.

   The section below entitled “Demand forecast” provides more detail on how York Region developed its demand projections, and the outcomes.

5. Integrate the two previous steps with a projection of operating costs to create a full forecasting model that includes both revenues and full costs. This forecast included only revenues generated for water and wastewater services: that is, revenues from user rates and development charges for growth-related capital projects.

6. Identify any gaps between projected funds and projected costs, and at what point these occur over time. Looking at the timing of gaps is critical. Asset management costs can vary hugely from year to year, while user-rate revenues tend to be more stable, and managing this mismatch is a key element of the plan.

7. Decide on how to smooth those timing mismatches — building reserves, borrowing, or both — while recognizing that all funds must ultimately come from user-rate revenues. This step, which must also align with the Regional fiscal strategy, is discussed in more detail below in the section entitled “Financial sustainability: the bigger picture.”

8. Develop principles for setting rates and designing a rate structure. As part of this step, the Region discussed possible

rate structures with the local municipalities as its customers, sampled end users' attitudes towards rates, looked at experience elsewhere, and reviewed the literature. These activities are discussed in more detail below in the sections entitled "Principles in setting rates and designing a rate structure" and "Outreach and consultation."

9. Develop and test options for rates and a rate structure that would:

    - rely ultimately on user rates to match projected cash inflows to funding needs over time;
    - align with the region's fiscal strategy; and
    - be consistent with the principles underlying rates and rate structure design.

    This step resulted in a range of options that were recommended to Council.

10. With an option now chosen and approved by Council, the final step will be to review revenues, costs, cash flows and other results each year, and adjust the plan as needed.

    - This step recognizes the challenge of predicting future behaviour and other drivers of outcome. In particular, as rates rise, users may cut back on consumption. The exact response over time will depend on many factors, however, and some of these are impossible to model with certainty at present. As well, weather — a major factor in demand for water and, hence, revenues — is impossible to forecast in any detail beyond a few days. New technologies and further changes in the Ontario Building Code may also reduce water consumption.
    - These inherent uncertainties underline that moving to full cost recovery will require close monitoring and the flexibility to respond to actual outcomes.

Key factors that influence costs

Forecasting the full costs of York Region's water and wastewater systems must take into account its specific asset mix, growth projections, asset condition and geography:

- As explained in the Introduction, the Region acts as a wholesale provider to its local municipalities. Its location requires it to purchase both water and wastewater services from neighbouring municipalities. As a result of both factors, it owns and operates a unique mix of assets that is dominated by large-diameter watermains and wastewater collectors and pumps, and it manages a number of service agreements.
- The Region is continuing to grow and urbanize, directed both by a provincial growth plan and its own Centres and Corridors Strategy. The Water and Wastewater Master Plan is being updated to help meet the demands of this growth. But intensification has impacts beyond the need for significant new investments. It also means different infrastructure systems are located closer to one another and in increasingly urbanized settings. This makes it more challenging and costly for the Region to build, maintain and manage its water and wastewater assets.

With intensification, working on infrastructure becomes more complex and costly. (Location: North Don)

- Existing assets are aging, underscoring the need for renewal plans to be developed and funded.
- Regulatory requirements are very stringent, in part because of the Region's location. As well as being subject to general water and wastewater regulation, including the new source water protection framework, the Region crosses the provincially-protected Oak Ridges Moraine. The moraine is an environmentally sensitive landform overlaying an aquifer that feeds 65 river systems. In its northern reaches, the Region borders Lake Simcoe, which is also protected by its own legislation because of increasing pressures from agriculture and development.

These factors are major drivers of the cost of delivering water and wastewater services. They have an impact on what needs to be built and where, the cost of managing assets once they are in place, and day-to-day operating costs.

In addition, such factors as labour, energy, and general and industry-specific inflation create cost pressures. While the Region is always working to manage these and other costs, some increase is inevitable over the forecast horizon. Minimizing

total costs over time is a best practice for infrastructure, and one that York Region works to achieve. It involves life-cycle costing, which estimates the costs of designing, building, operating, maintaining and, finally, decommissioning a major system over its expected useful life, and finds the combination that results in the lowest total cost.

The Oak Ridges Moraine, source of 65 river systems, crosses the Region.

Life-cycle costing recognizes that there are trade-offs between how a system is built and how much it costs to operate, maintain and even decommission. It also recognizes that failing to properly maintain an asset or rehabilitate it when needed will shorten its service life and increase life-cycle costs.

In developing its asset management plans and forecasts, the Region assumes that minimizing life-cycle costs is a goal in every major project.

The next section looks at how York Region is working to better understand its water and wastewater assets and how best to manage them to minimize risks and life-cycle costs, and the impact this has on capital investment needs. The assumptions underlying future operating costs are discussed in the section entitled “Creating the full forecast model” below.

Asset management is an integrated, life-cycle approach that brings together the physical and financial aspects of existing and planned infrastructure systems to ensure the right investments and activities happen at the right time.

Asset management planning is critical to optimizing life-cycle costs

Asset management is an integrated, life-cycle approach that brings together the physical and financial aspects of existing and

planned infrastructure systems and the assets that comprise them to ensure the right investments and activities happen at the right time. The goal is to minimize costs, including borrowing costs, over time while providing the needed level of service and reducing risks.

Asset management is a corporate, Region-wide initiative that feeds into budgeting and other planning exercises.

For water and wastewater, creating links among asset management planning and revenue projections is also key to ensuring financial sustainability, because user-rate revenues must ultimately pay the full cost of providing the service, including managing assets properly.

Asset management plans take into account the physical condition of infrastructure and the funding needed to ensure it can perform properly. (Location: Keswick)

As the Introduction noted, failure to include asset management as an element of full cost has been cited as a widespread problem in municipal water and wastewater efforts to move to full cost recovery pricing.

State of Infrastructure reporting gives a grade of C for financial criteria

The early stages of asset management generally involve gathering information. As part of the Region's move to

comprehensive asset management, it prepared its first "State of Infrastructure" report for presentation to Regional Council in 2010. It has continued to issue these reports every two years since, with the next report to be presented in 2016.

The State of Infrastructure Report is built on four key dimensions, and each class of asset is scored on each dimension. The first three dimensions relate to the physical state of the assets:

Reliability. Can an asset perform as required for a specified period of time?

Soundness. What is the current physical condition of the infrastructure, its age and maintenance history?

Capacity. Can the asset meet current and future demand?

In line with industry best practices, numerous factors are considered for each of the above dimensions, and a score given for each. For ease of understanding, the scores are then rolled up to give a simple alphabetic grade on each dimension for each infrastructure class.

The final dimension is **financial**: What are the short- and long-term funding needs compared to revenues and other funding sources over the same period? As with the physical dimensions, financial condition is summarized with a letter grade. The grade reflects shorter-term considerations, such as the approved capital spending plan, and the longer-term issue of whether rate revenues are adequate.

In the most recent State of Infrastructure Report, released in 2014, on the physical dimensions of soundness, reliability and capacity, water infrastructure received a grade of A with a stable trend and wastewater infrastructure a grade of B with an upward trend.

On the financial dimension, however, the score for both classes of assets was only C, largely because rates were not yet fully covering asset management costs and debt was being used to fill the gap.

On the physical dimensions, water infrastructure scored A with a stable trend, and wastewater a grade of B with an upward trend. On the financial dimension, however, the score for both was only C, largely because rates were not yet fully covering asset management costs...

Estimating asset replacement costs is a key step in financial planning

Work on the State of Infrastructure Report also involved developing an estimate of replacement costs for all water and wastewater assets. This is a key aspect of asset management and is the starting point for determining the funds needed over the time period in which all assets are likely to need to be replaced. This process needs to take place regularly to reflect changing conditions that might affect replacement costs.

Asset replacement value refers to the cost of fully replacing an existing asset, and is generally different from the asset's original cost. Several factors may be involved, and most of them tend to push costs higher:

- changes in the built environment, including new infrastructure installed or expanded close to the existing asset that forces costly realignment of infrastructure when it has to be rehabilitated or replaced
- new technologies, greater technical complexity and higher regulatory requirements
- industry-specific cost pressures
- cost to maintain existing services during construction
- changes in design standards, which in some cases can reduce costs
- consumer expectations

Water and wastewater assets are of two major types: facilities, which include instrumentation, control and mechanical process components and the structures that house them; and linear assets such as watermains and sewers, which are typically buried. Linear assets, which can have an expected useful life of 100 years or more, are generally much longer-lived than facilities.

Estimating facility replacement values is highly complex because each facility is unique and may include highly specialized components that must be individually priced.

For linear assets, estimation tended historically to be more straightforward, because the specifications and thus the costs were similar for the entire length of the asset (although geography could have an impact, for example through soil type or depth or the need to cross waterways). These estimates are also becoming more challenging, however, as assets become more complex and the Region becomes more urbanized. These factors are also resulting in higher estimates of replacement cost.

Replacement value of water and wastewater assets is estimated at $5.3 billion. (Location: Duffin Creek Water Pollution Control Plant)

With work underway to prepare a comprehensive Asset Management Plan and State of Infrastructure Report update for release in 2016, an independent review of the replacement costs of water and wastewater assets and the methods the Region uses to determine these costs recently took place. The goals were to update the cost estimates and better understand cost drivers.

The review helped in the work of developing this financial sustainability plan by improving estimates of asset replacement value. By offering guidance on how to improve the quality of future cost estimates, it will also aid in refining the plan over time.

As a result of the review of asset costing, the current replacement values for water and wastewater assets have been adjusted upward to $5.3 billion from the previous estimate of $3.6 billion — an increase of almost 50 per cent.

The higher estimate reflects increases in the cost of the underlying assets, as well as impacts of the other factors outlined above. These include the rising costs of:

- maintaining operation of existing assets to ensure that services are not disrupted during construction
- ensuring integrity of other infrastructure in the vicinity is not compromised
- minimizing impact to traffic and the community during construction
- ensuring works are carried out in compliance with new and more stringent regulations

Asset management strategy and plan

York Region's asset management strategy for water and wastewater infrastructure identifies practices, processes and goals for the long-term, sustainable delivery of services. In support, the asset management plan sets out specific steps needed to achieve the strategy. It also provides a framework for making the best investment decisions.

Together, the strategy and plan are working to answer these important questions:

- What is the current state of the Region's water and wastewater assets? This includes developing an up-to-date inventory of the portfolio, the condition of the assets that make it up, and the cost of replacing them. Much of this step was carried out in 2015 as part of the work done for the Asset Management Plan and State of Infrastructure Report update. The findings also fed into this financial sustainability plan.
- When are individual assets (or groups of assets) likely to need rehabilitation or replacement? This part of the process looks at the entire time horizon — typically several decades — over which every existing asset is likely to need rehabilitation and/or replacement.
- What are the best strategies for managing risks and costs over the long term while meeting service delivery needs? Proactive asset management involves periodic rehabilitation work to extend the normal useful life of an asset. Examples include coating elevated tanks and lining sewers. The plan includes these ongoing costs.

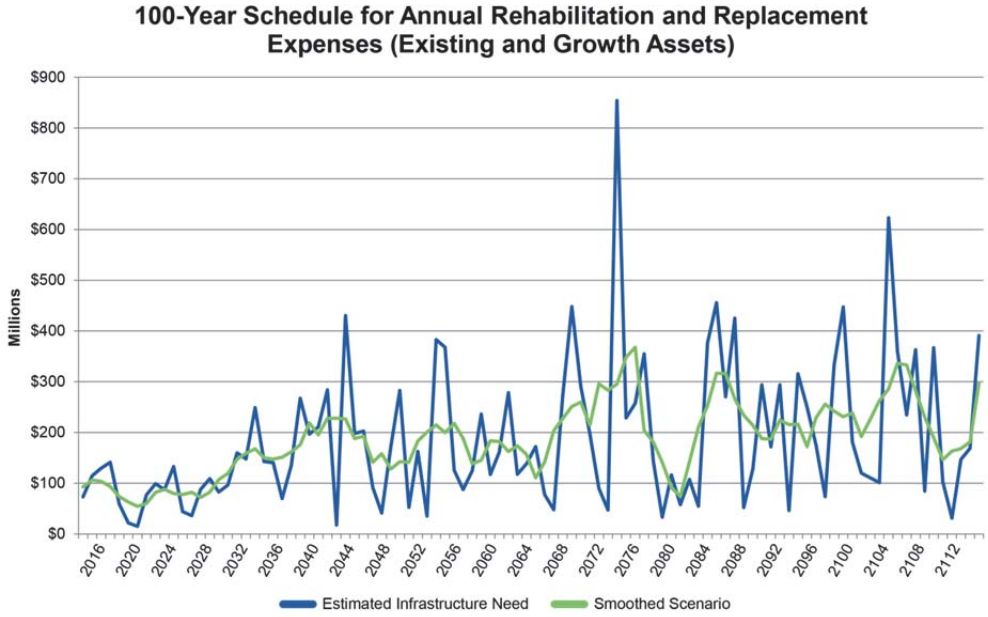
The Region's asset portfolio comprises many different asset types that have different expected useful lives. Pumps, for instance, have a shorter useful life than concrete structures. The plan takes this into account.

Some assets are more critical than others because the consequences of their failure are much greater. For example, a single forcemain (pumped sewer line) serving a large community could render the entire community without sewage service if it broke.

For prudence, the plan assumed more critical assets would be replaced earlier than their normal expected service life, to better manage the higher risks associated with their failure.

Planners are also looking at how to make the system more resilient in future by building redundancy — that is, ensuring back-up assets are available in case of unexpected failure.

- How would or could work be carried out in practical terms? Asset management planning techniques tend to identify major investments in specific years. In reality, however, projects are normally spread out over longer periods. This led to a smoothing of project peaks and valleys, as shown in the graph below.



Despite this smoothing, the planned projects and required funding are still not as stable from year to year as expected revenues, which tend to grow at a steady rate. The peaks are driven by specific large asset management projects in the plan, like the Southeast Collector and Duffin Creek work described starting on page 57.

- Is there enough revenue to maintain service levels and close any service gaps, as well as address future demands created by growth, demographics, public expectations, technology, regulatory requirements, and other factors? In 2014, before the work to refine replacement costs was carried out, water and wastewater was already graded only a C on its financial capacity. As the Region carries out more work to understand its full asset management costs, the need for additional resources is clear.

Developing a demand forecast

This section provides an overview of the demand forecast model, including a discussion of key factors that affect demand. As part of the user-rate review, staff updated the long-term water demand forecast for York Region. To project future trends, forecasters used historical data for the major drivers noted above. They also identified areas where collecting and analyzing more data might improve future forecasts.

The model combines two elements:

- A “base” forecast that applies winter demand to the entire year and covers such uses as laundry, baths and showers, toilets and dishwashing, along with business uses. The base accounts for about 90 per cent of demand.
- An added seasonal component that mainly reflects demand for water use outdoors in the warmer months, for example lawn and garden watering, swimming pool filling, water park and

splash pad use, and car washing. This component accounts for about 10 per cent of demand.

The forecasters considered all of the following factors in developing a model:

- population growth
- weather
- response to prices
- changes in capital stock, such as lower-flow fixtures and appliances
- urban density and housing types
- demand by businesses
- conservation patterns and attitudes
- non-revenue water

Understanding all of the factors that drive demand was important, but not all of them could be included in the current forecast model. In some cases (for example, the rate of change in capital stock, like plumbing fixtures) this was because of lack of historic data. In other cases, it was because the factor (for example, attitudes to conservation) is hard to measure quantitatively. Because of their importance, more drivers of demand will be tracked and analyzed in future to improve forecasting.

Using historical data to project underlying trends, the current model is based on expected population growth, response to price changes and weather. These factors are important in their own right as drivers of demand, but also have an impact on some of the factors that could not be included in the model.

For example, when prices rise, consumers are more likely to conserve water, through changing their behaviour, investing in water-saving technology, or both. Similarly, population growth increases the Region’s density and is likely to change its mix of housing types, which also has an impact on demand.

When the model was used to "forecast" a recent historical period, the result was close to actual demand. This provided evidence about the credibility of the model and increased confidence in its predictive ability.

The balance of this section looks at each factor in more detail and how (or whether) it was modelled, as well as at the outcomes of the modelling exercise.

Population growth

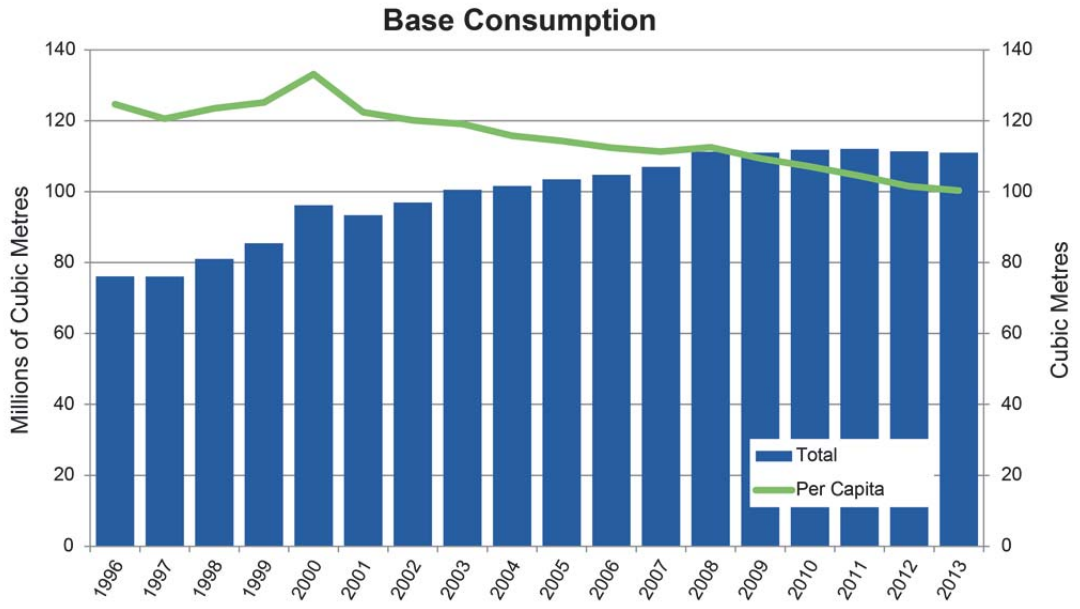
Population and water demand in York Region are not growing at the same rate. Analysis of historic water bill data showed that a resident in newer housing uses less water than a resident in older housing. Because population growth is linked to new housing, this means that a one-per-cent increase in population results in an increase in demand of less than one per cent.

This reflects the changing characteristics of housing stock. Newer housing is built to higher Ontario Building Code standards for water conservation. As well, it may have a smaller (or no) yard and more water-efficient appliances and fixtures beyond building code requirements. These are some of the ways in which using population growth in the model also helps to capture changes in the capital stock and population density.

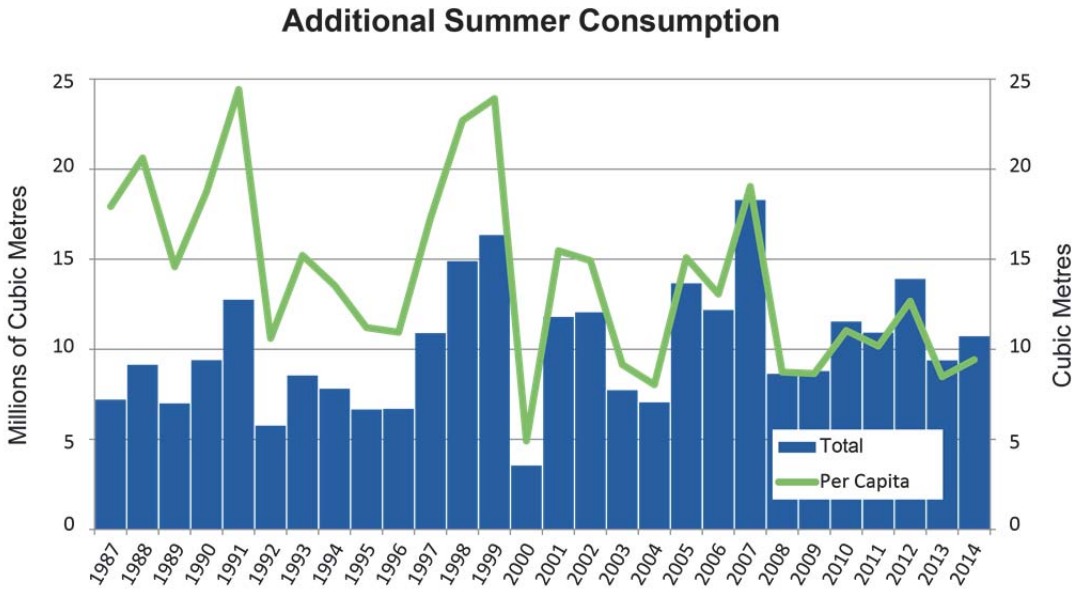
Businesses in the Region also consume water. The ratio of residential population to employees in the Region has remained fairly constant over the past several years and is not expected to change significantly over the forecast period. It is also assumed that there will be no major shifts in the demand for process water. (See, however, "Demand by businesses" on page 46.) As a result, water used by businesses in the Region was considered to be a constant share of total demand.

Weather

Weather has a major impact on seasonal water consumption. This becomes clear by examining the differences between base and seasonal consumption. From year to year, the general trend for total base consumption is stable, and is declining on a per capita basis.



For the more weather-related uses like gardening, lawn-watering and recreation, however, the swings from year to year can be pronounced. For example, seasonal consumption in 2007, with an unusually hot, dry summer, was more than four times that of wet, cool 2000.



More recent experience reflects this as well. A hot, dry summer in 2012 resulted in higher seasonal demand than in any of the

previous four years. The two subsequent years, with more moderate summers, saw a significant drop in seasonal demand.

Underlying such year-to-year swings, however, is a long-term trend of general decline in summer use. This is likely related to such factors as higher population density, a shift in housing types towards smaller lots, and changes in attitudes.

Another possible long-term factor that might work in the opposite direction is a change in the global climate, especially a warming trend. This could increase water demand in York Region in a number of ways: more drought, more extreme heat days, and a longer growing season. The University of Michigan has forecast warming trends for the Region, which staff reviewed. Overall, however, the impact on demand projections was minimal for the water demand forecast horizon.

Because of the difficulties in forecasting weather over the long term, as well as uncertainty as to whether and to what extent the decline in summer demand in recent years would continue, the model used two different scenarios to build weather into the forecast. Using actual historical weather data, it simulated two forecasts out to 2041. One assumed a cooler, wetter trend, while the other was based on a hotter, drier trend. The median between these two extremes was treated as the most likely forecast.

Historical data underscore that year-to-year fluctuations in weather are highly likely, however, and that the timing of these will be unpredictable. The possible need to stabilize rates because of weather (or other highly unpredictable factors) led to a recommendation for a rate stabilization reserve. The proposed reserve is discussed in more detail on page 76.

Response to prices

Numerous studies have shown price to be an important driver of demand for water in some service areas, with outside use generally more responsive than indoor use. Responsiveness varies widely with location, however, because of the impact of such factors as local climate, attitudes, incomes and the relative price of water.

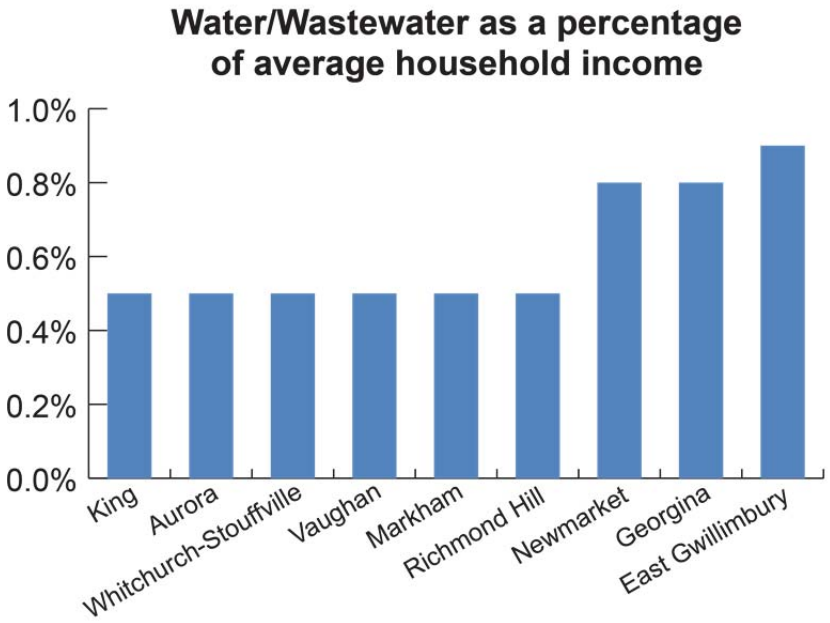
Work carried out for the Region found that demand for water does not change sharply with the price it charges. A study done for the long-term water conservation strategy estimated that for indoor water use, a 10 per cent increase in rates would result in a 1.5 per cent reduction in demand. Responsiveness was found to be slightly greater for outdoor use, with a 10 per cent increase in rates expected to result in a 2.5 per cent drop in demand.

The forecasting work carried out for this plan was in general agreement with these findings. It found that when base and seasonal response patterns were blended, a 10 per cent increase in price should result in a 2.1 per cent decline in demand.

Responsiveness to changes in price appears to have been very stable over time: work carried out in 2001 showed almost exactly the same low price response — a 2 per cent demand decrease in response to a 10 per cent price increase.

The low responsiveness to rate increases may be because water rates are generally low relative to residents' average incomes and their other expenses. (Nonetheless, work done to prepare this plan took affordability into account, as discussed below in the section titled "Principles in setting rates and designing a rate structure.")

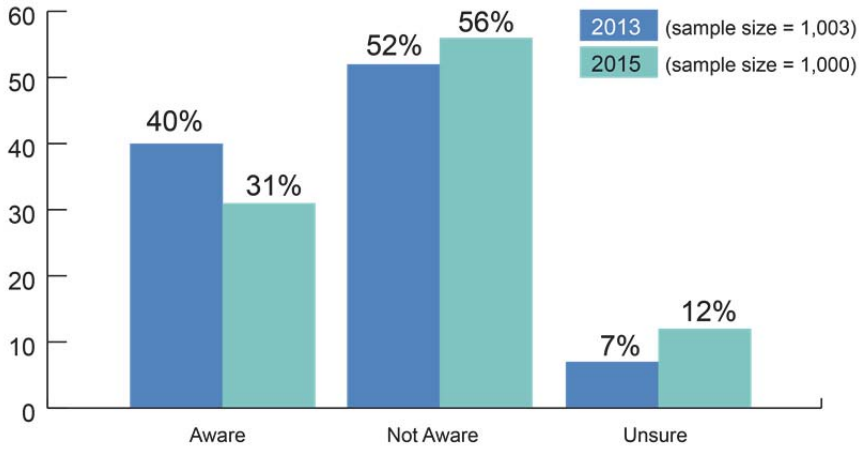
The 2014 Municipal Benchmarking Study compared water and wastewater costs as a percentage of household income across participating Ontario municipalities. In every municipality in York Region, water and wastewater costs ranked as "low," at less than one per cent on average of household income.



Water is also typically a household's lowest utility cost, lower than telephone, electricity, gas or oil. In general, the less that a good costs relative to income or other expenses, the less consumers respond to changes in its price.

Survey work carried out for the "Water Is" campaign found that most residents do not know how much they pay for water, which suggests rates are not high enough to be causing widespread concern. In fact, awareness fell between a 2013 survey and one carried out in 2015.

Responses to the Survey Question "Are you aware how much you pay for water?"



Another reason for the low responsiveness of demand to the rates charged by the Region may be that many residents have already invested in water-efficient fixtures and appliances. A study carried out for an Australian water system found that consumers who had made such investments showed about half the responsiveness to price as those who had not. Those who have bought more water-efficient appliances and fixtures may feel it would be hard to further reduce base demand.

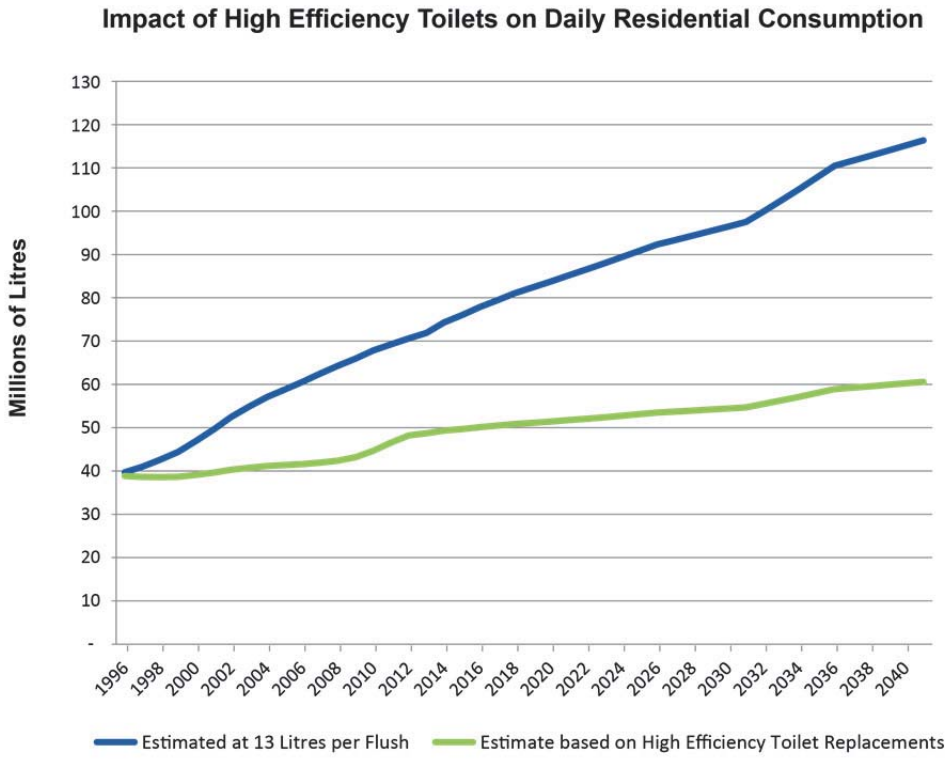
A final consideration in working to understand the impacts of price on the end user is the Region's position as a wholesale supplier to local municipalities, which charge their own rates to retail customers. Local rates may to some extent mask changes in the wholesale rate, making it hard to link changes in retail prices clearly to changes in demand.

Changes in capital stock are reducing consumption

Changes to building codes and shifts in technology have been driving lower consumption of water for many years. In 1996, the Ontario Building Code changed to require lower-flow fixtures in new homes. Since then, more code changes and technological innovations — mainly the introduction of increasingly lower-flow toilets, washing machines, showerheads and dishwashers — have further increased the water efficiency of homes and other buildings.

The Region supported this shift with a rebate program for consumers who changed to a lower-flow toilet. Starting in 1998, support from the program replaced 106,000 showerheads with more water-efficient models, changed 95,000 toilets and switched 245,000 toilet flappers with early closing models. With the growth in availability of low-flow models and new building code standards, it was possible to phase out the rebate program in 2013.

It is hard to include the impact of lower-flow fixtures in the model, as better data on the initial capital stock and rate of replacement are needed. Tracking this trend, however, is important: it is estimated that if 13-litre-per-flush toilets had not been replaced with more efficient toilets, daily water consumption from residential toilet use would have been higher by 50 per cent, or roughly 25 million litres, by 2015. The graph shows the continuing estimated impacts out to 2040.



Changes to other residential appliances, such as washing machines, showerheads and dishwashers, are also having an

impact, but this is even more difficult to track and especially to predict. As well, both the likelihood and impact of further code changes are unknown.

At a minimum, however, awareness of new water-related technologies and their rate of adoption will be essential for future modelling exercises.

Urban density and housing types

Research that the Region carried out found that areas with higher population density consumed less water on average, probably because of lower outdoor water use.

Population density is increasing in the Region, and its Centres and Corridors Strategy aims to focus growth in higher-density building forms. Given the study's findings, this should reduce per capita consumption — an outcome suggested by the finding that consumption is growing, generally, more slowly than population.

Conversely, however, higher-density growth is increasing the Region's costs. The discussion of the full forecasting model, below, touches on the cost implications.

Higher population density is reducing per capita demand for water. (Location: Markham)

One particular building form may, however, offset some of that lower demand. Analysis of water demand in the Region found that neighbourhoods with a greater share of apartment units had higher water use. This is very likely because individual units are

not metered; instead, water is included in a flat condo fee or apartment rent.

Numerous surveys have shown that metering reduces water demand. The balance between apartments and other higher-density buildings such as townhouses, which are metered, may therefore have an impact on future demand for water as the Region intensifies.

Demand by businesses

The nature of businesses in an area can affect water demand. York Region provides free water use consultations, otherwise known as water audits, to industrial, commercial and institutional (ICI) properties that consume a significant volume of water.

This program has generally engaged the top industrial water consumers. It has been running for more than 10 years, with about 10 facilities taking part each year. In 2014 the program was expanded to include wastewater audits.

Participants who implement the permanent water savings recommendations are eligible for an incentive from the Region. Many companies have taken advantage of this element of the ICI program. For example, York Region worked with Canada's Wonderland to reduce onsite water consumption through more efficient equipment and water re-use where economically feasible.

This work has been helpful in identifying water-intensive companies that are likely to invest in water efficiency. Food and beverage companies, for example, are intensive water users. There are already a number of such companies in the Region, and tracking both growth in the segment and water efficiency trends would be helpful for understanding total ICI demand trends.

At present, the Region's focus is the largest 100 water users. This group represents less than 1 per cent of the total ICI accounts in the Region and about 30 per cent of ICI water consumption. While this unquestionably provides qualitative insights into general trends, there may be opportunities to gather more aggregate data on the entire ICI sector and its water

conservation direction to inform modelling on a quantitative level, as well.

Attitudes towards conservation

The impact of changing attitudes towards conservation — as opposed to pure price signals or building code requirements — is difficult to factor into a forecast. The literature shows that conservation programs can do a good job in getting users to consume less for a given period of time, particularly during a drought or other crisis. After conservation messaging (and the crisis) ends, users typically increase their water use, but there are some lasting effects.

The Region has been tracking attitudinal changes over time. The results of several "Water Is" surveys carried out by the Region are summarized below, in the section entitled "Communicating the value of water." Results suggest that residents are increasingly aware of the importance of conservation.

For future forecasting work, questions will be refined to focus on getting more detailed information that can be used in modelling. For example, questions could touch on planned or actual purchases of more water-efficient appliances and plumbing fixtures, moves to low water-demand landscaping and other conservation-driven changes in behaviour. This would help the model better capture how changes in attitudes are resulting in reduced water use, and whether these are affecting base or seasonal demand.

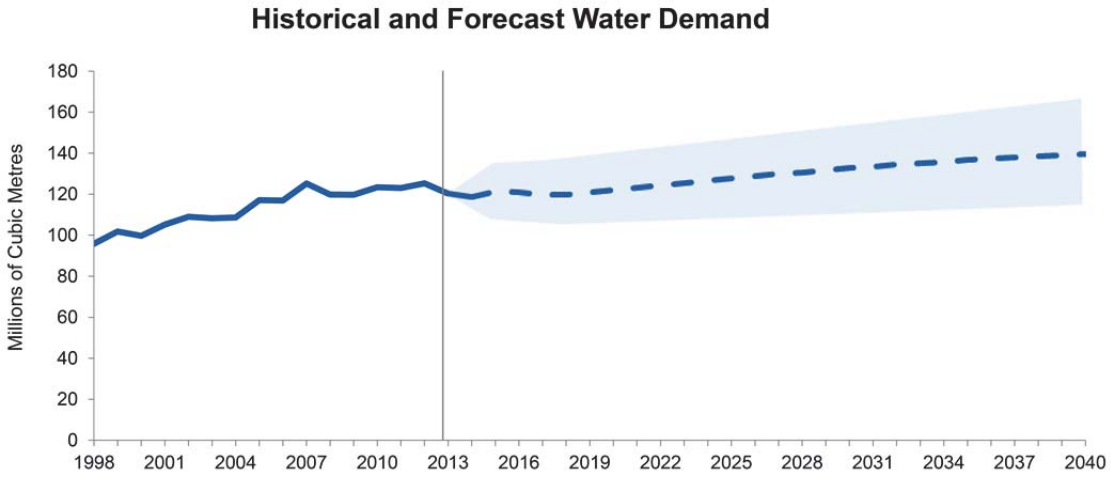
Non-revenue water

"Non-revenue water" is, as the term suggests, water a utility supplies to its distribution system that is not reflected in customers' bills. It includes water used for firefighting, system flushing, customer meter inaccuracies, unauthorized use and data handling errors, plus system leakage and storage tank overflows. Many municipalities, including York Region, are improving their measurement of non-revenue water.

The modelling took into account current non-revenue water volume and used a range of scenarios to assess its potential impact on water consumption in the long run.

Outcomes of the demand forecast

As a result of the inherent uncertainty in predicting the future, the model returned forecasts with a range of possible outcomes. In all cases, the range of possible outcomes — shown as the shaded area in the next graph — became wider the further into the future the forecast went.



This underscores the importance of the Region being prepared for a wide possible range of outcomes.

Despite the variability in forecasts, one trend seems likely to continue: the decline in per capita demand for water. Current views are that 150 litres a day is a reasonable per capita “floor” below which residential demand is unlikely to fall.

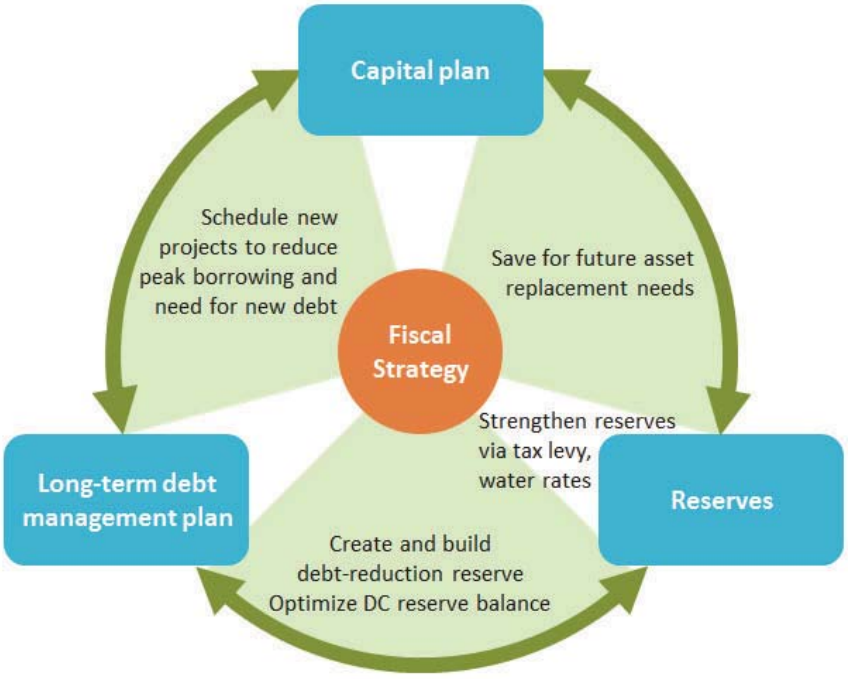
With daily per capita use of about 190 litres, the average York Region resident is consuming somewhat above this floor. Based on the declining consumption per capita built into the current model, the 150-litre per day floor would not be reached until near the end of the forecast period.

With technological innovation, increasing population density, rising water rates and greater conservation/efficiency efforts, however, it is entirely possible that a lower floor might emerge sooner, with a parallel decrease in consumption for the average York Region resident.

Financial sustainability: the bigger picture

Financial sustainability for York Region as a whole depends on its ability to build and maintain all of its infrastructure, which includes roads, bridges, buses, rapidways, buildings and housing as well as water and wastewater assets, without relying too heavily on debt.

As a result, financial sustainability for the Region brings together three distinct strands of activity: managing the capital plan, which sets priorities among infrastructure projects; reducing reliance on debt; and saving for the future by building up reserves.



As steward of one of the Region's largest asset portfolios, the water and wastewater service is committed to aligning its financial sustainability plan with the Regional fiscal strategy.

Understanding the links among the water and wastewater capital plan, debt, and reserves starts by recognizing that capital projects are of two types, with two distinct sources of financing:

- Building and acquiring new assets and expanding existing ones to accommodate a growing population. These investments are almost entirely funded by development

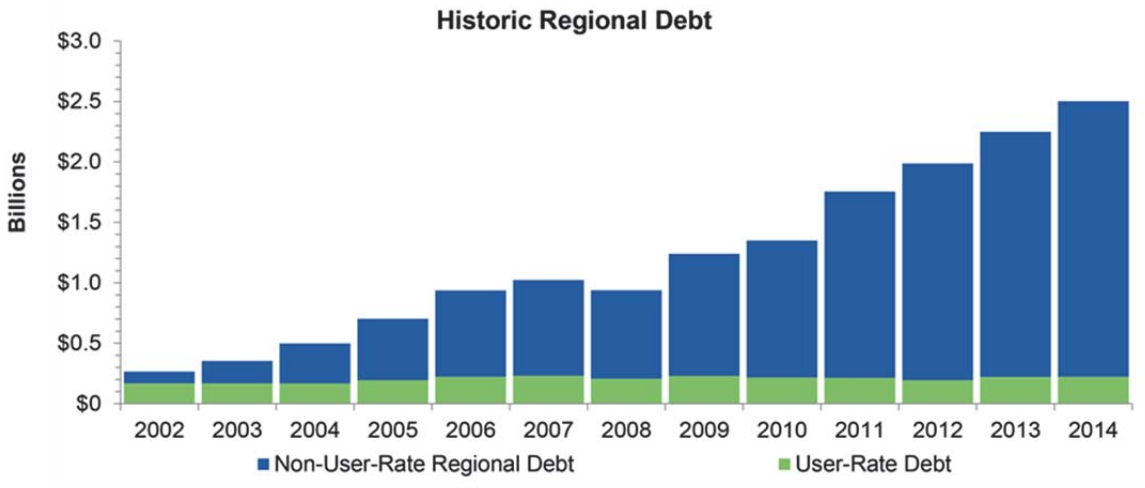
charges. Because charges are usually collected after the assets are built, the Region must often borrow the funds for the upfront investment.

- Rehabilitating existing assets and replacing them as they reach the end of their service lives. These are not funded by development charges. Instead, under full cost recovery pricing, they must be funded through water and wastewater rates.

Making the first type of investment, to serve growth, is not a direct driver of water rates, because it is funded by development charges. It does affect the water and wastewater financial sustainability plan, however, through impacts on the Region's debt levels and, after the assets are in place, on long-term rehabilitation and replacement needs.

New water and wastewater infrastructure also increases operating costs. The relationship between the size and complexity of the asset base and such costs as salaries and repairs and maintenance is discussed in a later section.

Reflecting the strong actual and expected population growth in the Region, debt levels have grown steadily to finance infrastructure. At December 31, 2014, the Region's debt was $2.5 billion, up from $498 million a decade earlier. (Because of its rapid growth, the Region has been granted some relief from the debt limitations that the province imposes on municipalities.)



The bulk of the total debt, some 84 per cent, was issued to finance water and wastewater projects. While most of this will be repaid through the collection of development charges, the graph above shows that a significant share is also attributable to user-rate-supported debt.

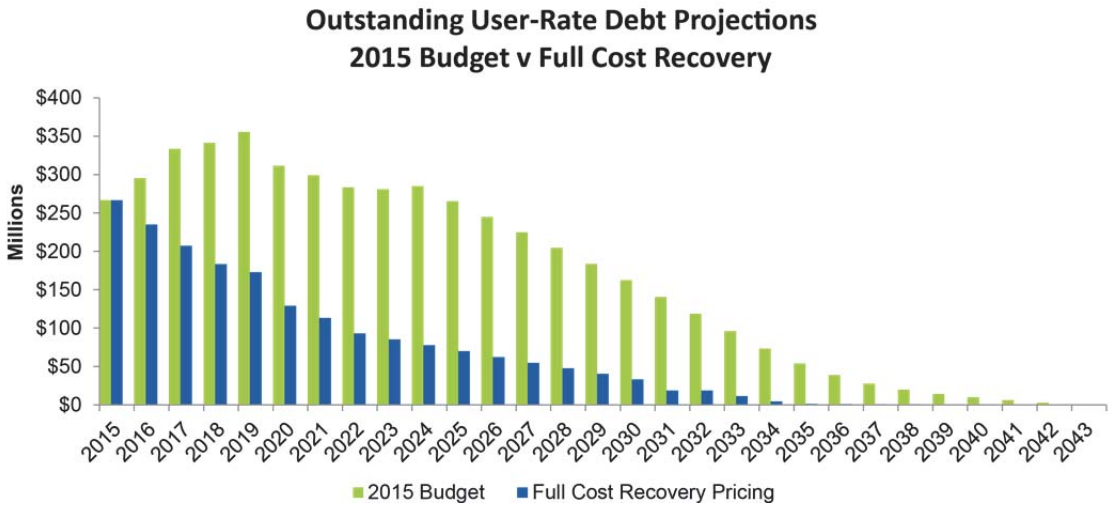
For debt that is to be repaid by development charges, timing of the cash inflows is always subject to some uncertainty. If collections of development charges are later or lower than projected, financial risks and costs increase.

Recognizing the challenges of needing to borrow to fund growth projects, Standard & Poor's, a major rating agency, last year changed York Region's rating from AAA to AA+. The agency specifically cited very large growth-related capital spending requirements and a high debt burden in its decision to change the rating.

The level of user-rate debt has also had an impact on the financial picture. As noted in the earlier section on the findings of the State of the Infrastructure report, it is the major reason that water and wastewater assets are graded only C on the financial dimension.

The Region is now taking several steps through the Regional fiscal strategy to reduce reliance on debt, including rescheduling some capital projects and making more use of reserves.

This plan aligns with that direction. Moving to full-cost pricing, as recommended, eliminates new user-rate funded debt in 2016 and beyond, and allows existing debt to be paid off faster.



This supports the Region's goals of reducing debt, achieving the highest possible credit rating and improving the financial score in its water and wastewater state-of-infrastructure ratings.

Smoothing out the timing and ensuring intergenerational equity

Even with a commitment to full cost recovery rates, there is a need to decide exactly how rates will pay for major projects over time. Trying to fund capital projects as they are being carried out is not practical, because the amounts of money involved are large and projects don't happen on a regular schedule. Users would face huge year-to-year fluctuations in rates.

Two mechanisms are available to smooth out the required cash flows and make rates more predictable — reserves and borrowing. These mechanisms have different implications for timing and costs:

- Reserves consist of funds saved for future use. For major projects, the water and wastewater service provider builds up reserves over several years by putting aside a portion of revenues from current users. Once the funds are available, the project goes ahead.
- Conversely, if the project is funded by borrowing, the service provider spends the money first. It must then pay interest and repay the capital over a period of years. For

asset replacement and rehabilitation projects, funds come from rates charged to future users.

This difference highlights an important issue: intergenerational equity. This term refers to how costs and benefits are spread between current and future users.

It can be argued that building reserve funds for capital projects means current users are paying the costs of something that will benefit future users as much as, or more than, them.

For example, suppose a homeowner pays higher water rates for 10 years to help build reserves for a replacement treatment plant. If the homeowner then moves to another municipality, all the benefits of the new plant will go to other users, including those who have just moved to the municipality.

This example, however, assumes that the municipality only rarely invests in replacing a major piece of infrastructure. But in many municipalities — including York Region — rehabilitation and replacement investments represent a steady stream of investment needs.

In this case, today's water service users benefit from investments paid for by reserves built in earlier years, while they contribute to reserves that will fund investments in future years. As long as the amounts contributed over time are fair, intergenerational equity is assured.

Using debt to fund the asset is another possible means of improving intergenerational equity. Because the debt and the interest on it are repaid over future years, the amounts users pay through water rates mirror as closely as possible the timing of the benefit they enjoy while the asset is in service. But this approach is less acceptable than using the principle of fairness discussed above, because too heavy a reliance on debt creates unacceptable risks.

This is why, in preparing this plan, York Region addressed intergenerational equity by choosing a rate structure based on equality of contributions. Under any of the recommended pricing options that were considered, the user rate for each customer

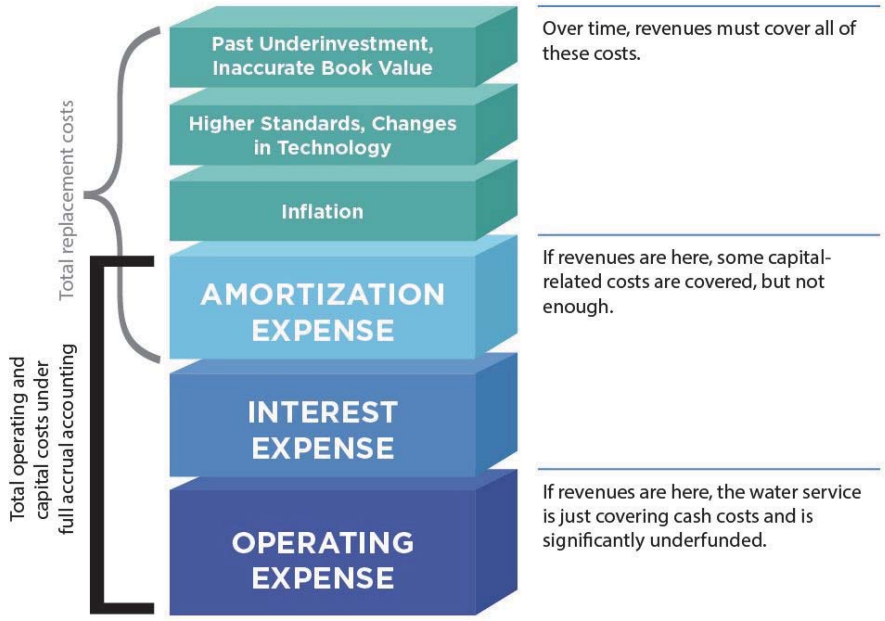
would reflect (after taking inflation into account) the same amount over time for capital costs, reserve contributions, and financing, once full-cost pricing is in effect. Equal contribution to these major costs over the duration of the plan ensures fairness to current and future customers.

Amortization and its relationship to full costs

Amortization is an accounting concept that allows for smoothing of the costs of capital investments in financial statements. When an organization purchases or builds a major asset, accounting rules allow for the costs to be spread out over the expected life of the asset. The amount shown as an expense each year is called amortization. This accounting treatment avoids the impact of recording the asset as a major expense in just the year or years it is acquired or built.

Amortization can also serve to remind the organization that the asset is aging each year, with the cost of that process shown as an ongoing expense. (On the balance sheet, as well, amortization is deducted each year from the value of the asset, so that its “book value” declines as it ages.)

Amortization is an important concept, and one that underlies the financial reporting of most major organizations in the private and public sectors, including York Region. But, as the diagram on the next page underscores, it does not capture the full costs of capital assets, because it does not take into account the normally higher cost of replacing the asset, the impact of inflation, and other asset management-related costs.



Adapted from the Infrastructure Table working paper of the Provincial Municipal Fiscal and Service Delivery Review.

The Region prepares its budgets and related financial plans, including this sustainability plan, on the basis of actual cash flows. Amortization is not an actual cash flow. As a result, amortization did not directly affect the calculation of the proposed user rates in this plan.

For those who are familiar with accrual accounting for capital assets, however, this discussion explains the relationship between amortization and the full costs of asset management.

Creating the full forecast model

The full forecast model brought together the projected capital projects, revenues based on the demand forecast, and operating costs.

For the purposes of planning and budgeting, York Region includes both day-to-day costs of running systems and “pay-as-you-go” capital, which is capital-related work that is paid for from current year revenues, in operations. The forecast model uses the same categories.

Operating costs

The forecast of operating costs began with a review of the main operating line items before financing charges or reserves, and their share of the total in 2016, as shown in the following table.

	Water	Wastewater	Combined
Purchased services	57.8%	50.5%	54.4%
Salaries and benefits	27.9%	31.6%	29.7%
Occupancy	7.3%	8.6%	7.9%
Other*	7.0%	9.3%	8.0%
Total operating costs before financing / reserve contributions	100.0%	100.0%	100.0%

* “Other” includes general expenses, pay-as-you-go capital, professional contracted services, minor capital, program-specific expenses (net of purchased services) and allocations and recoveries.

Together, operating expenses were expected to amount to $476 million in 2016. The items in the table above accounted for $141 million of that. Contributions to reserves were a further $103 million. Financing costs amounted to $232 million, $191 million of which was paid for from development charges.

“Purchased services,” at $76.5 million, was the largest operating item. It includes the water services provided under agreements with the Region of Peel and the City of Toronto, a wastewater service agreement with Peel, and the co-ownership agreement with Durham Region for the Duffin Creek plant.

Based on historic experience and current outlook, the forecast assumes that the costs of the Toronto and Peel drinking water agreements will increase by 4 per cent a year to 2023, and 1 per cent a year after that. The Duffin Creek cost increases are projected to be identical, while the wastewater agreement with Peel is expected to increase by 4 per cent a year over the forecast horizon.

Modelling of salaries and benefits took into consideration recent major building projects that the Region has undertaken, which include:

The Southeast Collector Trunk Sewer. This massive project addresses the risk of lack of capacity in the southern portion of the York Durham Sewage System, which is more than 30 years old. It will allow both responsible system operation and service of additional population allocated under the province's growth plan. The project, which underwent a rigorous environmental assessment, is now complete.

The Southeast Collector project is serving expected growth and also allowing older assets to be rehabilitated.

Duffin Creek Water Pollution Control Plant. To accommodate growth in York and Durham Regions to the year 2035, the plant is increasing its wastewater treatment capacity from 420 million to 630 million litres a day, an increase of 50 per cent, through a number of major capital projects. Stage 3 liquids and solids expansions were completed in 2014 and remaining Stage 1 and 2 upgrades are to be completed by the end of 2017. An environmental assessment for work to increase the permitted hydraulic capacity of the plant's outfall was submitted to the provincial government in 2013.

Keswick Water Resource Recovery Facility. The Region rehabilitated and expanded the existing plant, which serves the town of Georgina. The project included optimizing the wastewater treatment process by adding membrane technology,

as discussed on page 60, as well as upgrading the SCADA and electrical systems.

Upper York Sewage Solutions. This project is intended to address wastewater servicing for growth in the northern section of the Region. It would include a water reclamation centre in East Gwillimbury employing environmentally sustainable wastewater purification and water recycling technologies, along with trunk sewer pipes to transport sewage to it for treatment and a pipe to carry treated water to the outfall location. To date, the project has involved mainly planning and environmental assessment costs.

This represents a major building program, with the Southeast Collector and Duffin Creek work alone totalling more than $1 billion.

The magnitude of the program is one of the reasons why growth in salary and benefit costs is 1.9 per cent for every 1.0 per cent increase in the value of the asset base over the 2005 to 2018 period.

While some of these projects have been growth-related, and so funded by development charges, they have also increased costs that are supported by user rates, and will continue to do so. In both the Southeast Collector and Duffin Creek, adding new capacity is allowing the Region to carry out badly-needed rehabilitation work on older parts of those assets. This requires staff for planning, project and contract management, and other roles related to rehabilitation work.

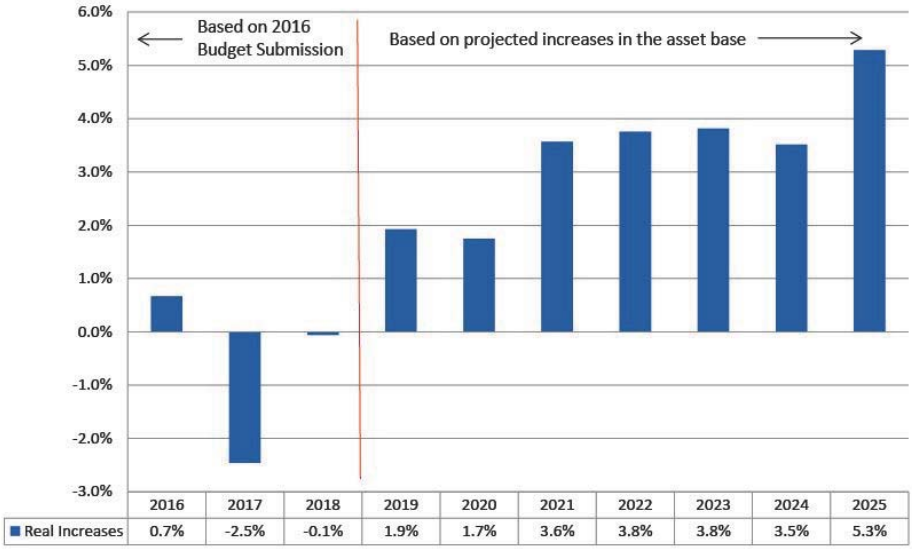
Higher regulatory standards and new provincial policies are also responsible for growth in salaries and benefits. More sophisticated technology, such as new membranes used to treat wastewater at the Keswick plant, is more operator-intensive and drives up staffing cost. The impacts of higher regulatory standards are discussed in more detail starting on page 60.

The rate of growth in salaries should come closer into line with that of growth in the asset base in the near term, now that the two largest projects, Duffin Creek and the Southeast Collector, are nearing completion. The model assumes that by 2019, both

elements will grow at the same rate (that is, salaries and benefits will increase 1 per cent with every 1 per cent increase in asset base value). Staffing pressures related to new regulatory requirements, however, may put upward pressure on this assumption. Two mechanisms to help manage the risk of regulatory cost pressures are discussed on page 76.

For occupancy costs, earlier modelling assumed a growth rate of 2.0 per cent each year in real terms. For the current model, historic and current budgeted data were analyzed and compared to increases in the asset base. This showed that an expected increase of 1.23 per cent in real terms for every 1.0 per cent increase in the asset base would be a reasonable forecast assumption. This is illustrated in the graph that follows.

Projected Real Increases in Occupancy and R&M Costs



	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Real Increases	0.7%	-2.5%	-0.1%	1.9%	1.7%	3.6%	3.8%	3.8%	3.5%	5.3%

All of the above increases are expressed in real terms — that is, before inflation. The model adds 2 per cent a year to the increases to account for inflation.

Pay-as-you-go capital

Pay-as-you-go capital is defined as regular, ongoing maintenance and repair activities that are required to ensure that assets serve for their expected useful life.

Although the name suggests they are part of capital spending, many of them are not considered "tangible capital" projects under accounting principles because they do not increase capacity, extend the useful life or enhance efficiency. In the table on page 56, they are included in the "Other" line.

In the current forecast model, pay-as-you-go capital costs are assumed to increase at the same rate as general repair and maintenance costs, with the rate of increase linked to the size of the asset base, and to be funded from user rates in the year they are incurred.

These assumptions make sense as long as the timing of pay-as-you-go projects is relatively steady and predictable and the amounts involved are small relative to the total operating budget. If and when that is no longer the case, it might become necessary to look more closely at pay-as-you-go projects to see if any should be paid from reserves.

The cost of meeting increasingly stringent regulatory standards

York Region is a leader in regulatory compliance, receiving a perfect score of 100 per cent in the most recent report of the province's Chief Drinking Water Inspector.

The Region works diligently to keep in step with regulatory changes, which are becoming increasing stringent. Since the Walkerton tragedy in 2000, the province has added many new requirements for water and wastewater services, and continues to do so. Examples that are especially relevant to York Region because of their cost impacts in recent years include the *Lake Simcoe Protection Act, 2008,* and the *Clean Water Act, 2006*:

- The *Lake Simcoe Protection Act* had an impact on the $60 million cost of rehabilitating and expanding the water resource recovery facility in Keswick, and continues to be felt in higher operating costs. Because its outfall goes to Lake Simcoe, the plant must meet very stringent limits for phosphorus, a nutrient that can cause too much growth in aquatic plants. New state-of-the-art membrane technology was installed that removes most of the phosphorus, as

well as bacteria and suspended solids, from wastewater before it can enter the lake. The technology increases operating costs through higher energy use, a need for more intensive operator attention, and careful ongoing monitoring and maintenance.

Sophisticated membrane technology at the Keswick plant has reduced pollutants, but increased operating and capital costs.

- The *Clean Water Act* provided the framework and regulatory backing to formalize source water protection in Ontario. Planning is done on the basis of watersheds. Two source protection plans affect York Region because its northern waterways drain into Lake Simcoe while, in the south, it is part of the Lake Ontario watershed. As part of source protection, Regional staff provide formal conditions on development applications in vulnerable areas to safeguard drinking water. Staff also work cooperatively with land and business owners to mitigate potential risks. The costs of source protection, including some activities the Region undertook before the program was provincially mandated, are on the order of $1 million a year.

New infrastructure or infrastructure renewal projects generally require a change to Environmental Compliance Approval or

Municipal Drinking Water Works Permits. Over the next four years, Environmental Services anticipates undertaking 200 water and wastewater capital projects. The dramatic increase in the number and complexity of facilities brings with it specialized staffing and operational challenges to maintain high compliance standing.

Impacts of higher regulatory standards are difficult to capture in the modelling, especially over a 25-year time horizon. Forecasters attempted to ensure costs arising from reasonable changes in regulatory standards and compliance costs would be covered, but precise impacts are impossible to predict.

Principles in setting rates and designing a rate structure

Once the full revenue need is known, and how it will be collected over time to ensure intergenerational equity and meet corporate fiscal priorities, the next step is deciding how rates will be designed. Because providing water and wastewater is a natural monopoly — that is, having one provider is the lowest-cost option — rate-setting needs to take into account a balance between customers' interests and those of the supplier.

Much work has been done on this in regulated industries, such as gas and electricity distribution, with the result that there are well-established principles for rate-setting, including:

Rates should be efficient. They should discourage wasteful use of the service.

Rates should be effective. They should yield the revenue needed by the service provider.

Rates should be fair to users and predictable. They should apportion costs properly among users, while avoiding undue discrimination, and should not change unexpectedly.

Rate structures should be practical. They should be simple, easy to understand and interpret, acceptable to the customer, and feasible to apply.

There are limitations, however, in applying all of the work done on setting rates in regulated industries to the Ontario water and wastewater sector.

For example, a common goal in regulated industries is rate stability. In Ontario, as noted earlier, water services are not independently regulated, and a consistent problem is that rates are set too low. As water services move to full cost recovery pricing, rates cannot be stable — but designing rates to be as stable as possible once full-cost pricing is in place is important.

A further complication for York Region is that it is a wholesaler, providing water services to local municipalities which, in turn, serve the end user and set their own rates. This creates challenges for the rate structure, as discussed below.

Jurisdictions such as California that are facing severe supply problems are trying to design rates to more strongly encourage conservation.

Rate design

On the issue of rate design, the Canadian Municipal Water Consortium noted that “Canadian municipalities are moving to more sophisticated fee structures” from the standard approach of charging a uniform price for every cubic metre consumed (or an older one of charging less per unit as consumption rises). One of the benefits, the consortium noted, may be to achieve greater conservation.

In this shift, Canadian municipalities may be following the lead of water services in other jurisdictions, such as California, that are facing severe supply problems and trying to design rates to more strongly encourage conservation.

Conservation-based pricing takes a number of forms. The simplest are increasing block (where the first cubic metres of consumption are at a lower cost per cubic metre, with the rate rising as consumption increases) and seasonal (where summer rates are higher than winter ones).

Such structures may be helpful in encouraging conservation — although an analysis for York Region showed little responsiveness, unless rates were raised very aggressively — but for a water service they have a major drawback: they work exactly in opposition to cost structures.

Water services, like many utilities, face high fixed costs — that is, costs that are incurred even if no water is provided or wastewater collected. The most effective structures to match rate revenues to costs are a declining block rate or a combination of fixed and variable rates. Both of these capture more revenues for lower volumes of water used, giving the service more assurance of covering its fixed costs.

In the past, regulated utilities argued strongly for declining block rates as a way of capturing their fixed costs. Use of that structure has been discouraged by regulators, however, because of equity issues: the smallest consumers pay the highest unit cost. In the water sector, declining block rates have been further criticized because they work against conservation efforts, since the largest users pay the lowest average costs per unit.

Many municipalities in Ontario base their retail water charges on some form of fixed-plus-variable amounts. (Often the fixed charge is based on meter size, which in a way reflects consumption — or at least, potential consumption — and may help to address equity concerns.)

As part of the “Water Is” campaign, research was carried out on the impact a fixed component might have on revenues. The conclusion was that adopting a relatively high fixed fee, for example covering roughly 50 per cent of wholesale costs, could improve the Region’s revenue stability.

However, moving ahead on any approach that included a fixed-rate component would present significant challenges. One of the largest of these follows from the Region’s role as a wholesaler. Through discussions with water and finance officials at the local municipalities, it is clear that moving to a different structure from the current volumetric charge would require careful coordination to avoid administrative burden and customer confusion. Another key concern would be developing a methodology to determine the fixed amount each municipality would pay.

Regional staff will continue to work with local municipal staff to review fixed-cost models and determine if moving to a rate

structure that better reflects a supplier's fixed costs might be reasonable at a future point in time.

In addition, based on experience with the electricity sector and items like the debt-reduction charge on bills in Ontario, the public may see use of a fixed rate as a sign of historical infrastructure mismanagement.

Finally, as noted above, a fixed-plus-variable rate structure is the exact opposite of the types of rate structure designed to encourage conservation.

For these reasons, the Region is continuing its current rate structure, which is based entirely on volume, with a constant price per cubic metre.

Affordability

Increasing water rates brings concerns about whether the lowest-income households will be able to afford the costs. This is an important issue, because it is often put forward as a reason to keep rates low.

Both *Watertight* and the Infrastructure Table report of the Provincial–Municipal Fiscal and Service Delivery Review touched on the question of affordability, and both recommended against keeping rates low for everyone to help those households that might be struggling to pay. As the Infrastructure Table report noted, "addressing (affordability) through a widespread subsidy for all users causes more problems than it solves."

The concern of the Infrastructure Table was that setting rates too low can lead to revenue shortfalls, triggering all the risks discussed earlier — including increased debt and a need to subsidize water from the general tax base (which raises its own concerns about affordability). Keeping rates low also fails to send a message about conservation.

The Infrastructure Table report suggested that "solutions are better directed at the individual, not the system — making this a question to address in the wider context of income supports and social services."

> "...addressing (affordability) through a widespread subsidy for all users causes more problems than it solves. ... Solutions are better directed at the individual, not the system."
>
> *— Infrastructure table report, Provincial–Municipal Fiscal and Service Delivery Review*

As part of the user-rate review, a task group was formed to analyze the potential impact of higher water costs on low-income households. (The group looked at low-income households that receive a water bill; many low-income households live in apartments and their water costs are included in their rent.)

The task group found that low-income households in York Region were paying between 1.4 per cent and 5.0 per cent of after-tax income on water and wastewater services, depending on household size and which municipality they lived in.

These percentages fall within affordability guidelines set by such organizations as the United Nations and the Organisation for Economic Cooperation and Development.

This does not rule out, however, that some households might struggle to meet their obligations under the new rates.

The Region manages two existing programs, the Housing Stability Program and the Homelessness Prevention program, that provide financial assistance for rent, mortgage payments, utilities and other housing costs.

To date, these programs have not received any requests for financial help specifically for a water bill. The Region will continue to monitor to see if any requests arise. If they do, it is expected that they can be accommodated under the existing programs.

Key principles

In developing its rate structure, York Region has adopted these principles:

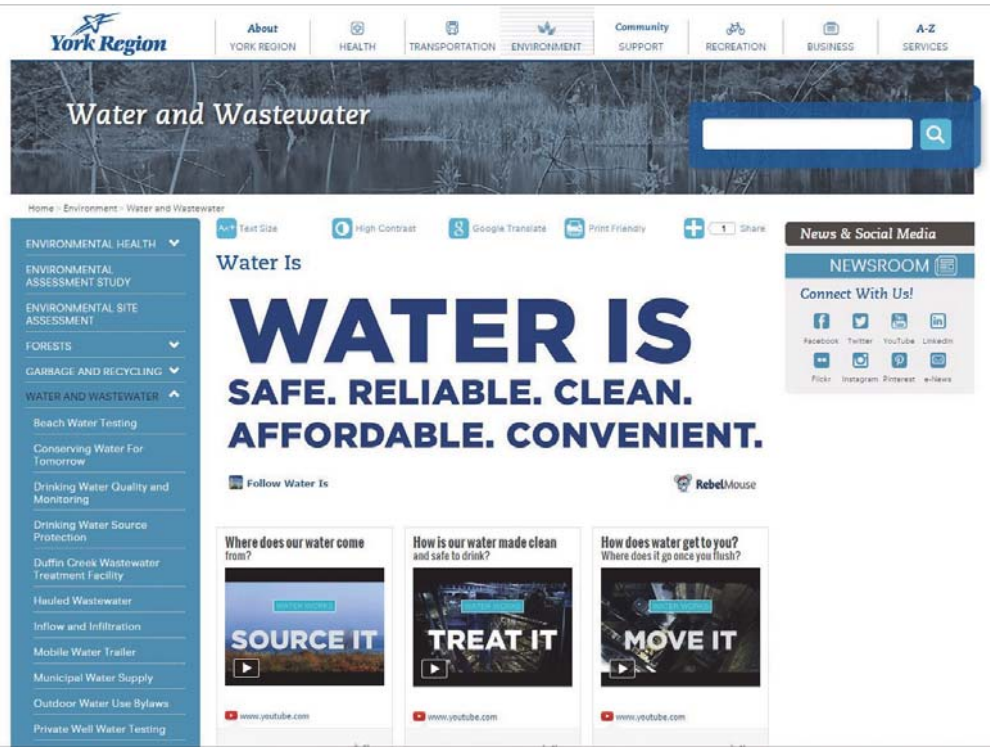
- Rates should be efficient, effective, fair to users and predictable.
- Once pricing that recovers all costs, including asset management, is achieved, rates should be as stable as possible.
- The rate structure should be transparent, and any change in structure should be made in coordination with local municipalities.

- Affordability should be addressed through support for struggling households under existing programs, not a general subsidy to all users.

Communicating the value of water

The potential response of households and other end users to changes in rates makes clear the importance of keeping the public informed about water issues and providing education on the value of water. York Region has emulated the best-in-class approaches of municipalities such as London, Ontario, in designing its communications initiatives.

The “Water Is” campaign provides extensive information and educational materials through its website (shown below). Its other communication channels include Youtube videos, advertisements, brochures, a Facebook page and advertorials.



In direct support of building greater understanding of the value of water and gaining a wide range of perspectives, York Region held two stakeholder workshops in 2012. These workshops included local municipal representatives, academia, not-for-profit

groups, water industry experts and members of York Region's Water Conservation Advisory Committee.

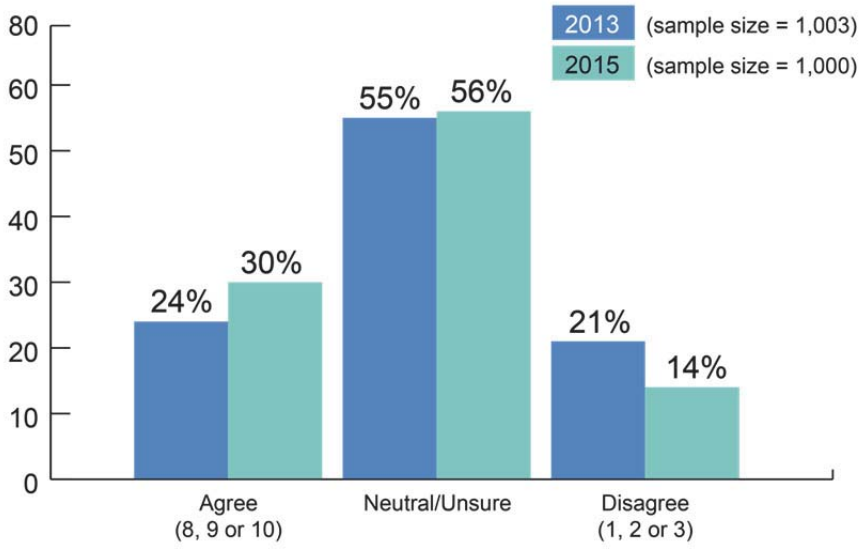
The Region conducted market research between December 12, 2012 and January 5, 2013 through a telephone survey of more than 1,000 residents living in single-family dwellings who rely on municipal drinking water. The main objective of the market research was to establish benchmarks on current awareness, views and beliefs concerning water use, pricing options and conservation.

A follow-up to the 2013 telephone survey took place in January 2015, again to more than 1,000 residents. The main goal was to measure any changes from 2013.

The survey showed increased willingness to pay higher rates to ensure safety of water supply, judging by the response to a question aimed at measuring attitudes towards source water protection.

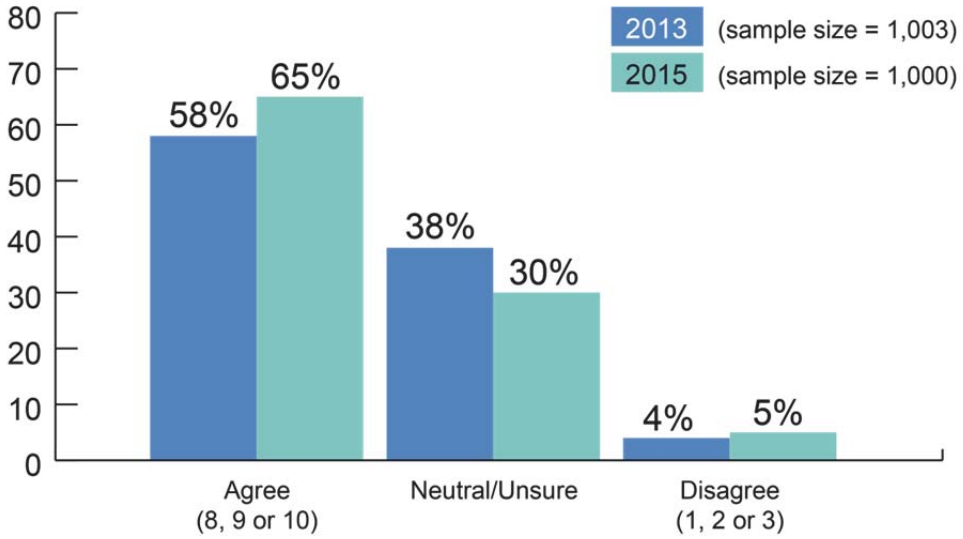
Agreement with the statement "I am willing to pay more to ensure that there is a long-term plan in place to protect the source of my future tap water supplies" increased by six percentage points in two years.

Willingness to Pay Full Cost



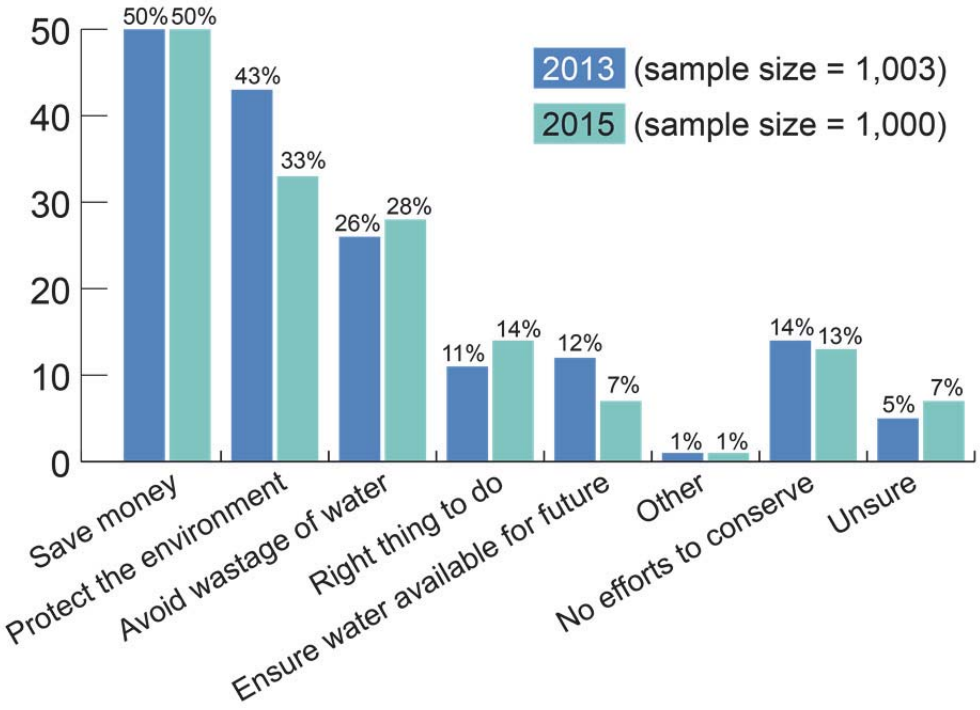
Efforts to instil a conservation ethos appear also to have had some success. Agreement with the statement “I am always careful to use water wisely” rose by an even larger amount.

Perception of Wise Use of Water



Somewhat paradoxically, given the research that showed low price-responsiveness in the Region and survey results that showed low awareness of the cost of water, the single most frequent reason given by residents who had cut their water use was to save money.

Reasons for Cutting Water Use



It is important to note, however, that such reasons as “Protect the environment,” “Avoid wastage of water” and “It’s the right thing to do” — all of which suggest conservation-driven motivation — sum to more than “Save money.” Because respondents could give more than one answer, it is hard to know the balance between saving money and more conservation-driven behaviour at the level of individual consumers.

The market research also found that:

- Roughly three-quarters of respondents were satisfied with performance in maintaining water infrastructure (76 per cent), running an efficient operation (74 per cent) and keeping water rates stable (73 per cent).
- Two-thirds expressed satisfaction with the ability of their water utility to ensure consumers are paying a fair price (69 per cent).
- The share of respondents who feel “confident that their tap water is safe to drink” has increased since 2013 (up from 60 per cent in 2013 to 65 per cent in 2015).

- There are high levels of satisfaction with the ability of water utilities to ensure long-term water supplies: 83 per cent “satisfied,” including 47 per cent “very satisfied.”
- Satisfaction is high regarding competence to meet federal and provincial standards: 82 per cent “satisfied,” including 53 per cent “very satisfied.”

Explaining why full cost recovery rates are needed

With the approval of new rates, a new phase of the communications program is underway, with the purpose of explaining the importance of full cost recovery rates. Messages highlight the safety and reliability of York Region’s services and tangible value customers receive for services delivered. A range of media, including videos, posters, brochures, advertorials, social media, and face-to-face discussion, is targeting several audiences.

The Region is leveraging products that were already created to explain how water systems work and why they are valuable. Examples include the Water Works and Water Hero videos, brochures and frequently asked questions.

To support the new rates, it is also developing new material, including a customized York Region-specific version of the “Water: What You Pay For” video produced by the Alliance for Water Efficiency. As well, two new advertorials will appear in local publications, one explaining how water revenue is invested and the other focusing on the relative affordability of water compared to other household expenditures. These will be complemented by a “How Your Water Dollars are Invested” infographic brochure.

The Region is also looking at various means of explaining the more technical aspects of developing the plan, including the use of best practices throughout the process, to audiences interested in municipal infrastructure, the water and wastewater industry, public policy, and/or public administration.

Outreach to local municipalities

For the Region, ongoing engagement with local municipalities, the core customer base, was key to developing this plan.

Environmental Services and Finance staff discussed development of the financial sustainability plan with their counterparts at the local municipalities throughout 2014 and 2015. Outreach included presentations to local municipal treasurers and public works directors and commissioners in June 2014, November 2014 and June 2015. Staff also held individual meetings from July to September 2015 to follow up on feedback received at the earlier meetings.

Local municipalities, which set retail rates for customers, face many of the same challenges as the Region regarding costs of operating the distribution system and dealing with aging infrastructure.

Feedback from municipalities was key to understanding local concerns and views on potential rate structure changes, affordability of rates, projected flows and costs of rehabilitating and replacing major infrastructure. In particular, the 2015 meetings underscored the importance of coordinating any change in the basic rate structure with the local municipalities.

With Regional Council approval of the new rate structure, staff presented an update to the Area Treasurers, with a full communication package to follow. Engagement with local municipalities will continue as the new rates are implemented.

APPROVAL OF OPTION

In October 2015, staff presented a report to York Regional Council seeking approval for new annual water and wastewater rates. The report set out several options for achieving full cost recovery rates.

The options were supported by the detailed analysis described in this Financial Sustainability Plan. They all focused on achieving full cost recovery pricing and eliminating shortfalls in asset management funding, which is critical to the long-term financial sustainability of water and wastewater services in York Region.

All of the options achieved the following crucial goals:

- covering annual operating and financing costs;
- meeting the full asset management needs of the capital plan, including funding reserves to maintain existing assets and replace assets when needed;
- ensuring intergenerational equity once full-cost pricing is reached; and
- eliminating new issues of user-rate debt.

These are all important aspects of ensuring rates recover the full costs of providing water and wastewater services in ways that are fair over time and support the financial sustainability of the Region as a whole.

Where the options differed was mainly in timing:

- Option 1 would achieve full cost recovery pricing in one year;
- Option 2, in two years;
- Option 3 or 3a, in three years;
- Option 4 or 4a, in four years; and
- Option 5, in six years.

The table below shows the percentage increases in the wholesale rate that would be required under each option to

achieve full cost recovery. The shaded boxes indicate the year in which full cost recovery would be achieved for each option.

Wholesale Rate Increases April 1 of Each Year

	2016	2017	2018	2019	2020	2021
Option 1	27.1%	3.7%	3.7%	3.7%	3.7%	3.7%
Option 2	17.2%	16.2%	2.9%	2.9%	2.9%	2.9%
Option 3	12.9%	12.9%	11.7%	2.7%	2.9%	2.8%
Option 3a	15.0%	13.0%	6.0%	3.0%	3.0%	3.0%
Option 4	10.8%	10.5%	10.2%	10.2%	2.9%	2.9%
Option 4a	13.0%	10.0%	9.0%	6.0%	3.0%	3.0%
Option 5	9.0%	9.0%	9.0%	9.0%	9.0%	2.9%

The above table shows that in each case, after full cost recovery was achieved, the rate of increase would drop significantly in future years. Except in the case of Option 1, future increases would range between 2.7 and 3.0 per cent a year.

The table below shows the wholesale rates to be charged under each option, again with the year of full cost recovery highlighted.

Wholesale Rate April 1 of Each Year

	2016	2017	2018	2019	2020	2021
Option 1	$2.77	$2.87	$2.98	$3.09	$3.20	$3.31
Option 2	$2.55	$2.97	$3.05	$3.14	$3.23	$3.32
Option 3	$2.46	$2.78	$3.10	$3.19	$3.28	$3.37
Option 3a	$2.50	$2.83	$3.00	$3.09	$3.18	$3.28
Option 4	$2.41	$2.67	$2.94	$3.24	$3.33	$3.43
Option 4a	$2.46	$2.71	$2.95	$3.13	$3.22	$3.32
Option 5	$2.37	$2.59	$2.82	$3.07	$3.35	$3.45

Deciding which option to recommend involved looking at the potential impacts of each on current and future end users. A key consideration is that intergenerational equity is achieved in the model only after full cost recovery pricing is in place.

Taking a longer time to reach full cost recovery therefore reduces the fairness to end users across time. Moving to full cost recovery pricing more quickly, however, also involves potential drawbacks.

Striking a balance between the short- and longer-term benefits and risks is critical, as the analysis below shows:

- Option 1 would involve a significant increase in one year. Most studies of how water consumers respond to price changes have looked at relatively small changes. An increase of the magnitude involved in Option 1 might lead to unpredictable consumer behaviour, potentially including sharp reduction in demand. While in theory this option would best support a quicker move to full cost recovery revenues, if it had a negative impact on demand it might actually threaten that goal.

- Similarly, Option 2 involves two consecutive years of increases that, while not as large as Option 1, are significantly higher than those implemented by the Region in recent years. While it would reduce the risks of Option 1, it would not eliminate them.

- Options 3 and 3a both offer a phased-in approach over three years. In both options, the increases are higher than in recent years. After phase-in, rate increases would then become significantly lower.

- Option 4 or 4a takes four years to phase in full cost recovery pricing. This modestly reduces intergenerational equity, as discussed above, while involving lower annual increases than options 1, 2, 3 or 3a.

- Option 5 represents the longest phase-in for a new rate structure. A longer phase-in allows rate increases to be slightly below those of recent years. As well, the new rates are in line with increases set out in the Region's financial plan prepared for the Drinking Water Quality Management Standard. This achieves the goal of creating consistency between the two financial plans.

Regional Council discussed all options in committee of the whole on October 8, 2015. After a wide-ranging discussion, including consideration of other possible phase-in periods, committee of the whole took forward a recommendation to approve Option 5.

Approval took place at the Regional Council meeting on October 15, 2015.

Elements of prudence

The new rates are built on a forecast for water demand and costs that uses refined forecasting techniques and updated information. Despite this, however, all forecasting involves inherent uncertainties.

In the case of the water and wastewater plan, these uncertainties are of two broad types:

- **Unforeseen or unpredictable "one-time" factors** that result in differences between forecast and actual results. These factors would include, for example, an unexpected change in provincial standards that suddenly increased costs, or an unusually cool, wet summer that reduced revenues below forecast.
- **Underlying trends** that are different from those built into the model. The demand forecast reflects the best currently available information on such factors as per capita demand, the impact of price changes on demand, and the relationship between costs and the size of the asset base. Actual trend lines might differ, however, which is why the Region's forecasters will continue to collect and analyze data about more of the factors that affect demand and costs.

Two mechanisms are recommended to deal with the two different types of uncertainty:

A **rate stabilization reserve** would help offset the impact of an unexpected event in the year in which it occurred. The reserve will be included in the Regional fiscal strategy update that will be brought to Regional Council for approval in late 2015.

A **rate review** would respond to the possibility of a longer-term shift in the factors underlying the model. It would be triggered if reserve contributions were 10 per cent or more below planned targets for any year within the term of the approval. If the review

suggested the need for a rate adjustment, this would require Council approval through the annual Regional budget process.

Some factors might have to be managed using both mechanisms. Unlike a single season of extreme weather, for example, a “one-time” change like a new regulatory standard would have both immediate and ongoing impacts. The reserve would help cover unexpected costs in the short term, while the review would assess the risk of higher ongoing costs and whether a rate adjustment might be needed to deal with them.

CONCLUSION

With approval of new annual water and wastewater rates, York Region has taken what is expected to be its final step in moving to full cost recovery pricing. With a plan built on detailed water demand forecasting and projected asset management needs, in 2021 the Region will achieve a goal that many other jurisdictions in North America are pursuing, but few have yet attained.

For the Region, the ability to reach this position reflects several years of commitment to the concept of full cost recovery through user rates, and of in-depth analysis of the factors driving both demand and costs.

As this plan notes, modelling will be further refined to build greater understanding and more precise forecasts. Because of the inherent uncertainty in any forecast, the plan also includes mechanisms to deal with both one-time disruptions and longer-term changes to the trends underlying the model.

The expectation is, however, that the general direction the modelling has provided, and the prudence built into it, should allow rate increases to moderate significantly in 2021 and beyond.

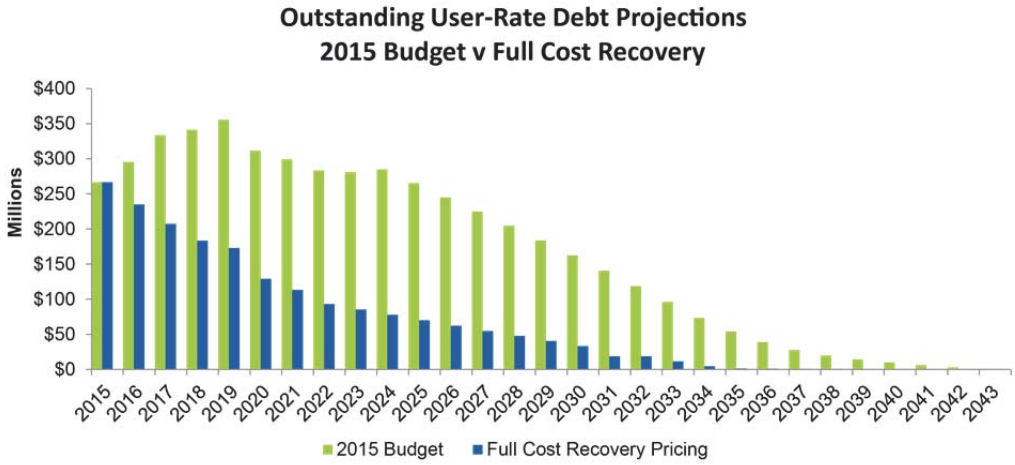
In addition to bringing much lower growth in water and wastewater rates, the move to full cost recovery pricing set out in this plan provides major benefits to the Region and its residents.

At present, 52 per cent of user-rate revenue is used to support operations and 48 per cent goes to current and future capital needs. Experience has shown, however, that the amounts currently going to capital are insufficient, and debt has been used to fill some of the gap.

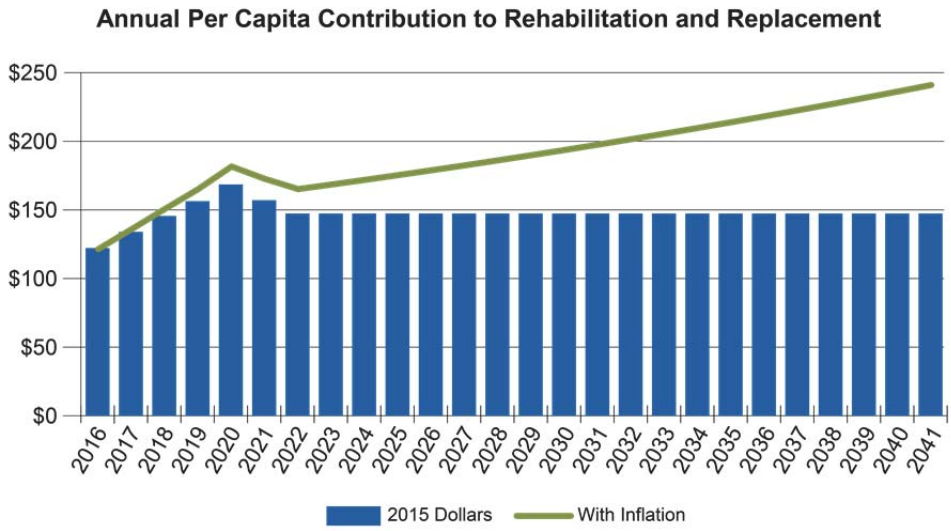
To end that reliance on debt, roughly 79 per cent of the proposed rate increase will go to ensuring the Region is investing enough in its capital costs.

The new rates and the reserves they will build are essential to funding the significant needs of the next decades. York Region will need to spend close to $1 billion over the next 10 years and nearly $1.7 billion by 2034 to rehabilitate and replace existing infrastructure, including trunk sewers, the Southeast Collector, and Duffin Creek Incinerators.

By ensuring these projects are paid by reserves funded by rates, the new structure puts water and wastewater on a financially sustainable path. It does this by eliminating new user-rate debt and paying down almost all existing user-rate debt by 2034.



The new rate structure ensures today's residents are not contributing more than their fair share to asset rehabilitation and replacement once full cost recovery pricing is achieved. It achieves this by following the principle of equal contributions across the forecast horizon, after full cost recovery.

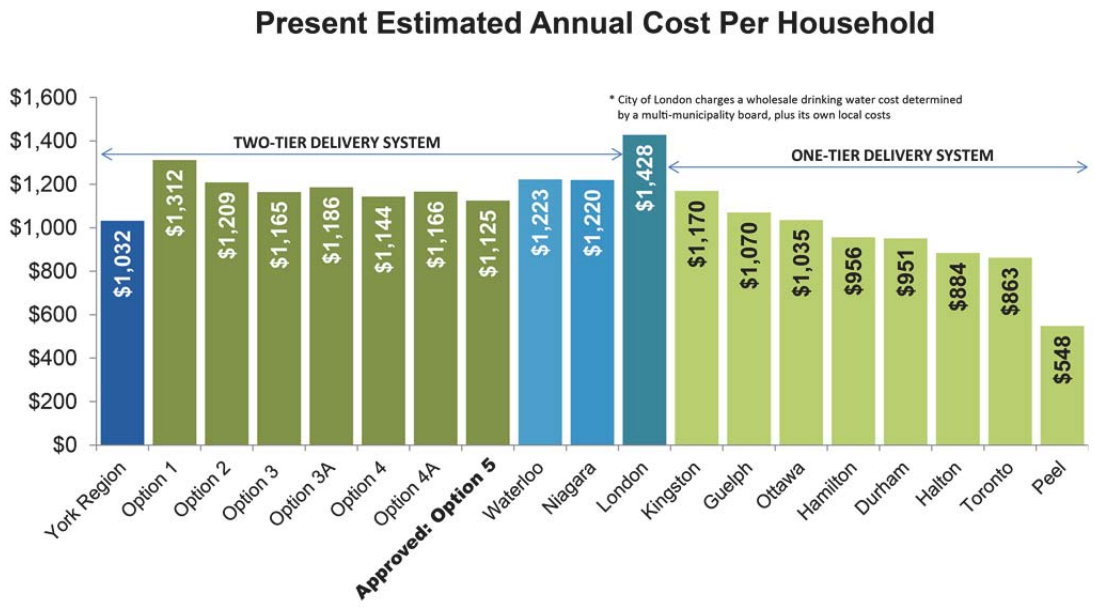


Finally, it reduces the risks associated with a sharp increase over a short time period by phasing in full cost recovery rates by the sixth year.

In designing the rate structure, the Region was guided by principles that aim to ensure fairness to users, rate predictability and, after full cost recovery is achieved, rate stability. Other key goals were that the rate structure should be transparent and efficient, and any future change in structure should be made in coordination with local municipalities.

Affordability was also an important guiding principle. Even after full cost recovery pricing is in place, the average water and wastewater bill in York Region is expected to be below the amount being paid by households elsewhere in Ontario. In addition, average water bills are expected to remain under 1 per cent of average household income in the Region, well below thresholds set by water organizations to signal lack of affordability.

The graph below compares the proposed York Region rate for 2016 to actual 2015 rates in other municipalities. It compares the annual costs for a household that uses 270 cubic metres of water a year, the average Regional consumption, and uses a weighting factor to reflect local municipal rates.



At $1,125 a year in 2016 under the approved option, York Region would remain the lowest-cost provider among two-tier systems, even assuming other municipalities do not increase their rates.

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2016 – 2019
Water and Wastewater Rates

Presentation to

Finance & Administration Committee

Kelly Strueby and Lucas Cugalj

October 8, 2015

Policy Objectives and Principles

Objectives and Principles

Realizing Operational Excellence

- Provide clean and safe drinking water to over 1.1 million residents
- Keep over $5.3B of capital infrastructure in good condition
- Comply with complex Provincial environmental regulations

Effective delivery of water and wastewater services

Moving Towards Financial Sustainability

- Set prices to achieve full cost recovery
- Build reserves for future capital rehabilitation and replacement
- Establish rate stabilization reserves

Rate Review Objectives Align with Fiscal Strategy

Essence of the Fiscal Strategy

- Manage the capital plan
- Reduce reliance on debt
- Save for the future

+

Additional Objectives for Water and Wastewater

- Fully fund operating and non-growth capital requirements through user rate
- Promote intergenerational equity

The rate review objectives were developed based on the Fiscal Strategy

Elements of Full Cost Recovery Pricing

Full cost recovery pricing means that water and wastewater rates include all costs associated with delivering the service:

- Operating costs of York-owned infrastructure (i.e., labour, energy and chemicals)
- Payments to other municipalities for water and wastewater services (operating)
- Major life cycle and asset replacement contributions to capital reserves based on current replacement values
- Environmental costs, including source water protection
- Allocation of corporate costs to water and wastewater services
- Debt servicing costs

Full cost recovery pricing is essential
for long-term financial sustainability

Rationale for Full Cost Pricing

- Reflects the true value of water
- Generates the revenue needed to pay for operations, regulatory compliance and water purchases
- Ensures adequate funding available for proper stewardship of assets, which lowers costs and reduces risk of failures
- Ensures current and future rate payers are paying their fair share
- Eliminates reliance on new debt financing for asset management

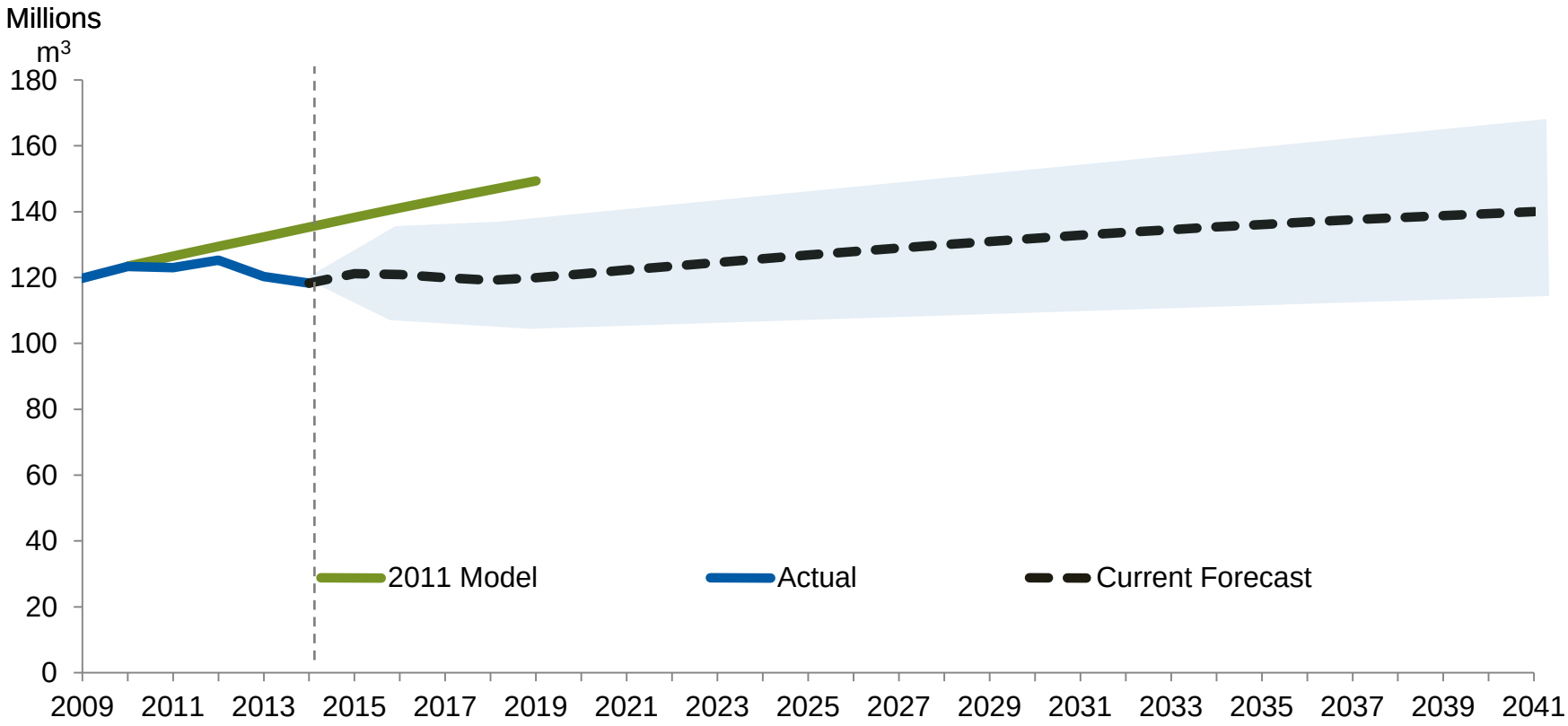
Full cost pricing aligns with objectives of 2015 to 2019 Strategic Plan

Why Aren't We Already at Full Cost Pricing?

- Significant progress made towards full cost recovery since 2011 rate study, but we are not there yet
- Better information now available on long-term asset management requirements
- Compared to previous rate model:
  - True replacement value of built infrastructure 141 per cent higher
  - Asset management spending has increased
  - New infrastructure more complex to operate and maintain
  - Flows are lower than anticipated

Asset management and future operating costs key to full cost pricing

Actual Flows Lower Than Anticipated



2014 flows were 13 per cent lower than previously forecast

Rate Review Process

- Inter-jurisdictional review of best practices in rate setting
- Consultation with CHS to review impact of rate increases on vulnerable sectors
- Establish funding policy for major rehabilitation and replacement projects to eliminate debt funding
- Establish separate rate stabilization reserve to protect funds reserved for capital replacement
- Review of asset condition and long-term asset management cost estimates
- Review of various rate structures, including mixed rate structures
- Advanced demand forecast including multi-variable flow forecasting
- Public consultation surveys to measure views on water use, pricing and conservation

Engagement with local municipalities throughout review

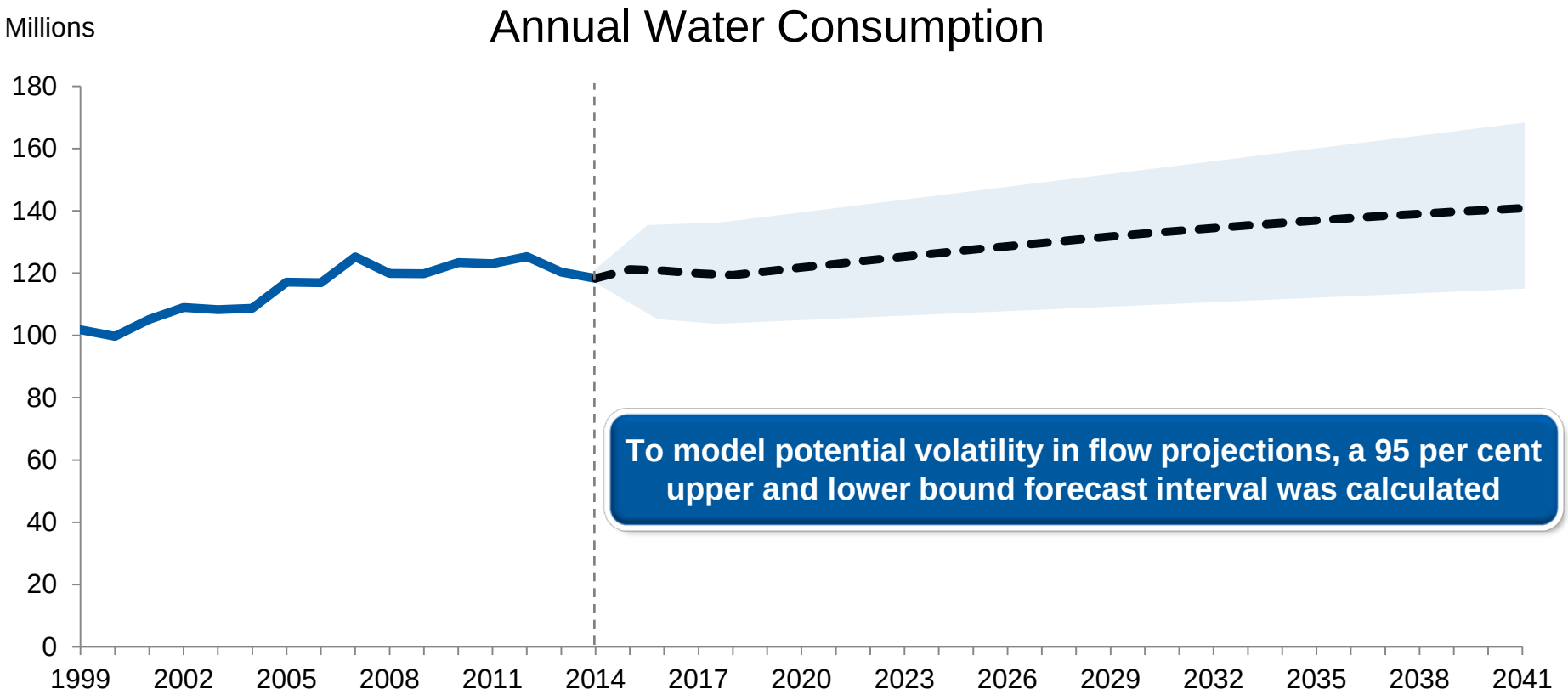
Key Influences on Rates

Water Demand Forecast is a Key Driver of Required Rates

- Region's current combined water and wastewater rate effective April 1, 2015 is $2.18 per cubic meter
- Cost per cubic meter $= \frac{\text{Total Annual Costs}}{\text{Water Demand}}$
- If actual flow volumes are lower than anticipated, revenue from rates will not cover costs

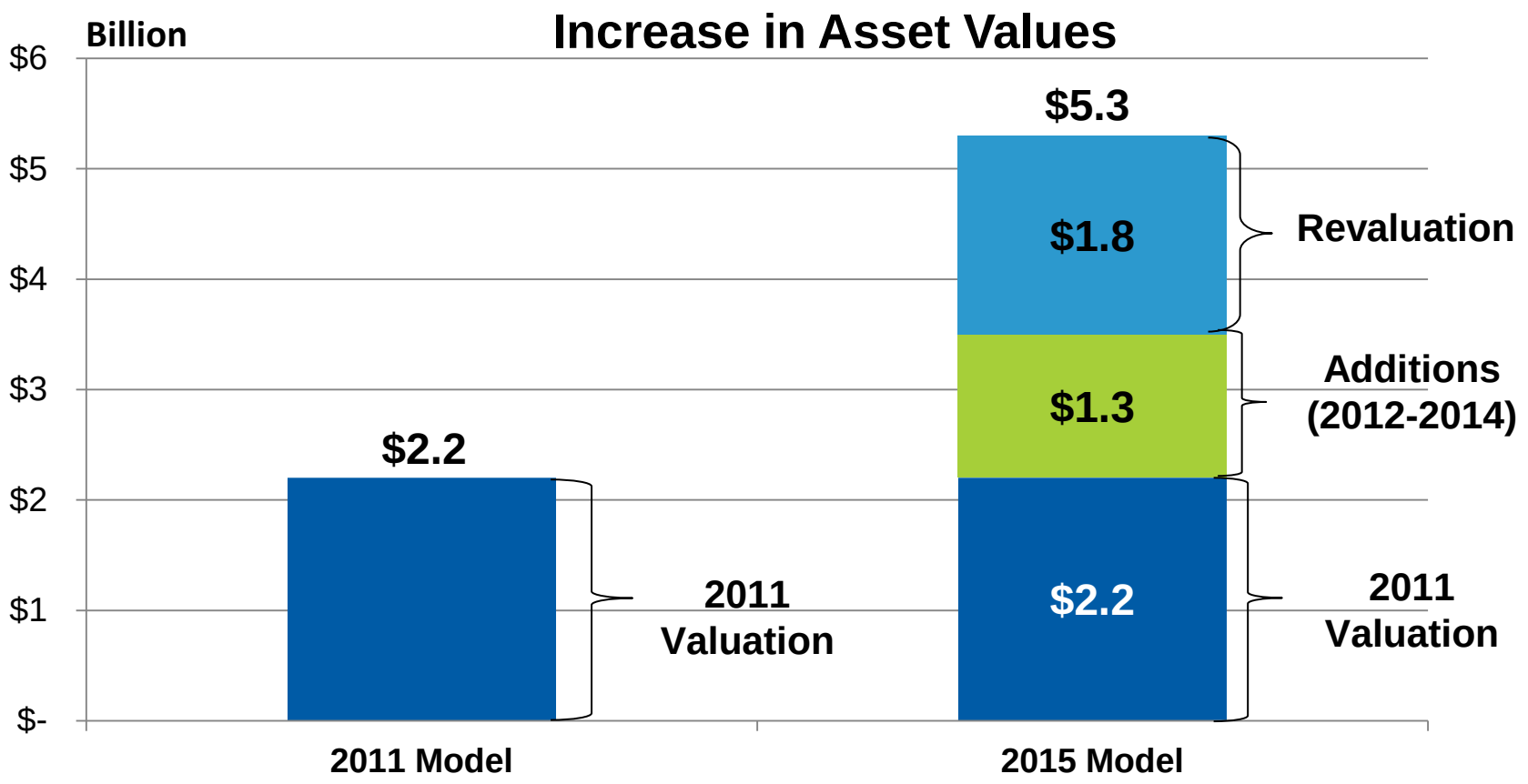
Rates recover costs for water and wastewater

Historical and Forecasted Water Demand



Conservation and other factors offset population growth

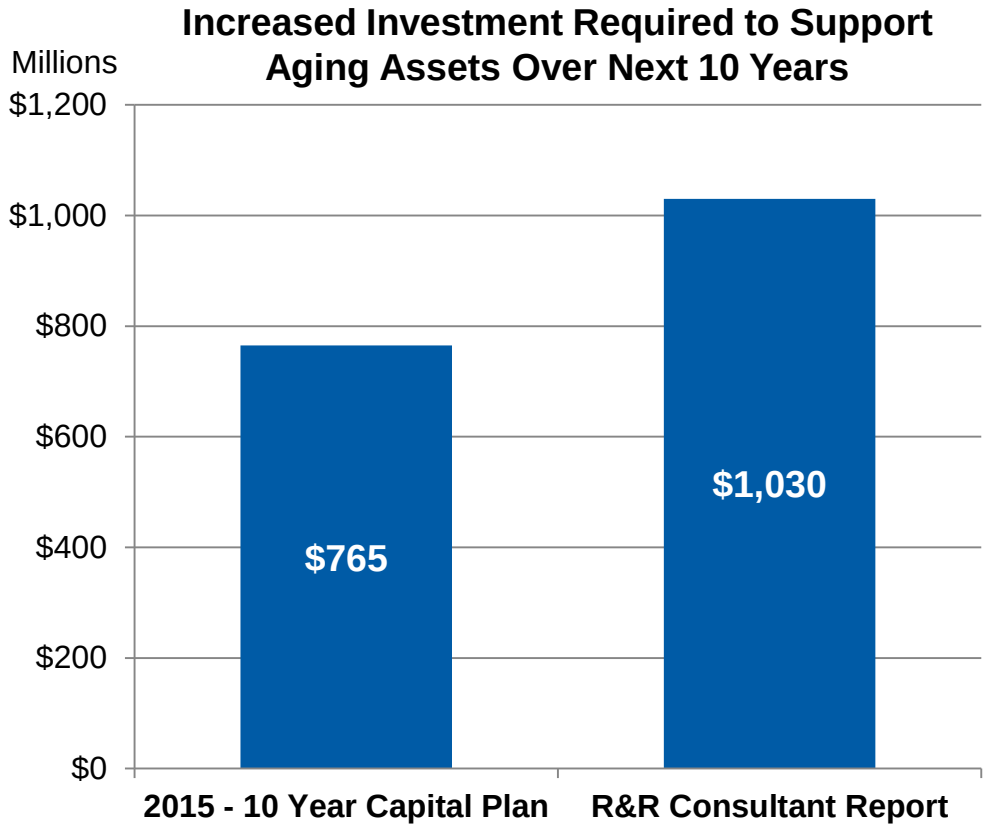
High Value Asset Base



True replacement value of built infrastructure 141 per cent higher

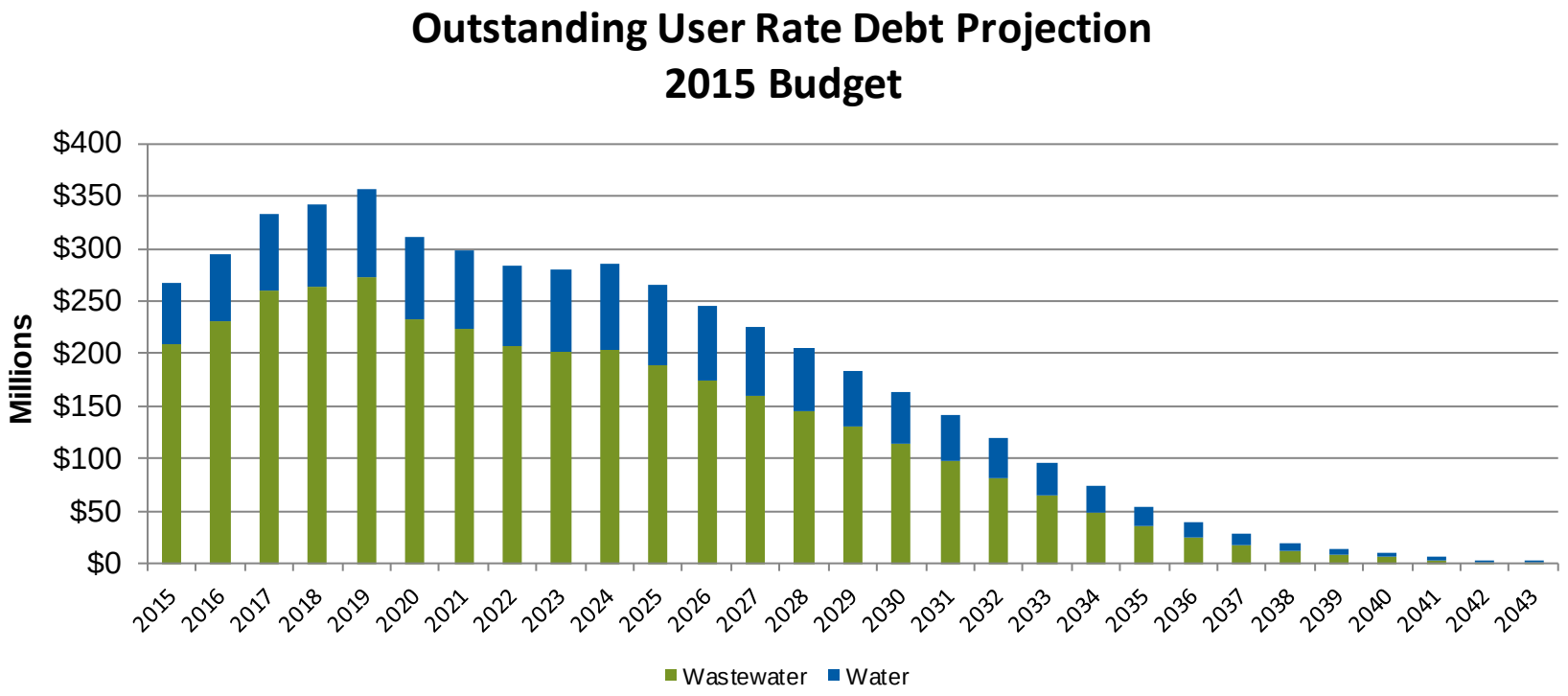
Significant Investment Required to Support Aging Assets

- Asset management needs in the next ten years over $1 billion
- Over 50 per cent of this relates to rehabilitation work on the York Durham Sewage System



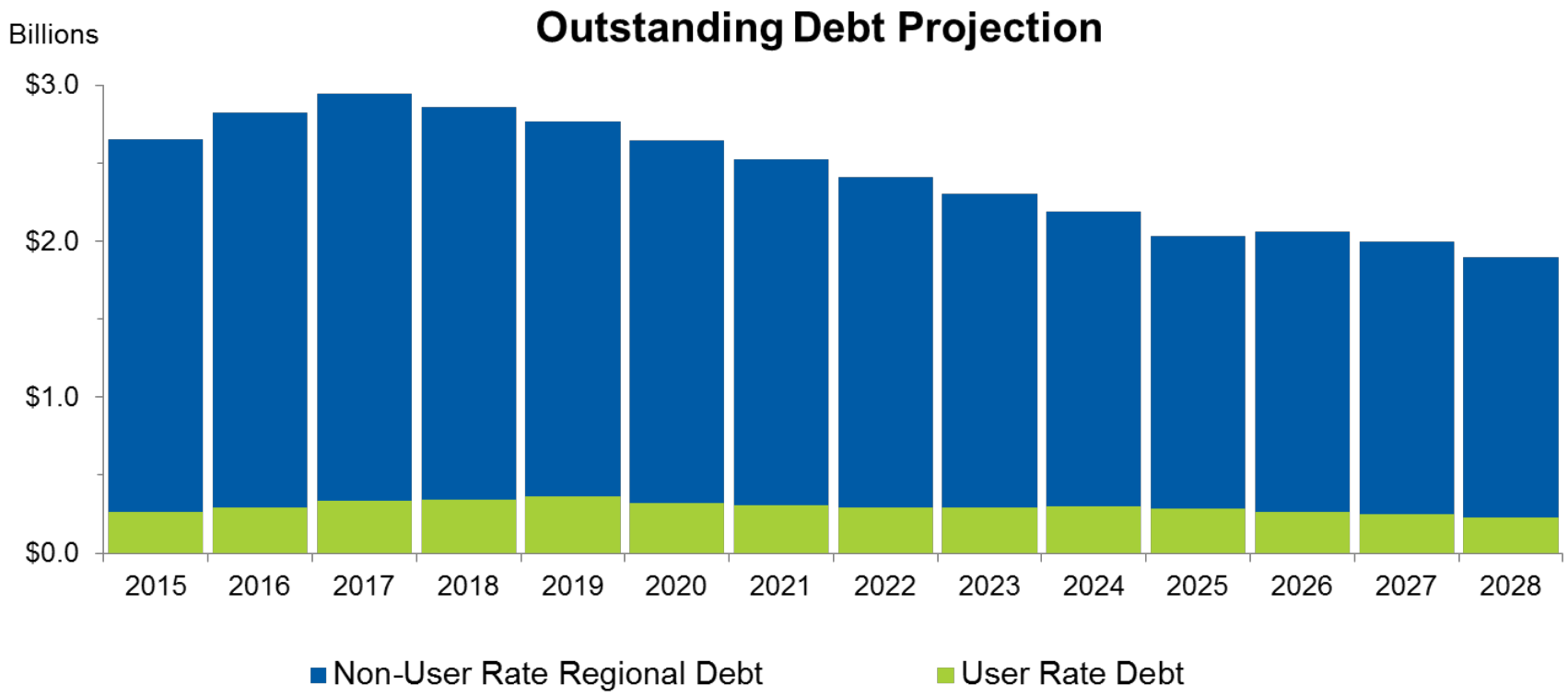
Better information available on future asset management needs

Debt Projections Based on 2015 Budget



Debt financing is a major funding source for rehabilitation and replacement in 2015 approved budget

User Rate Debt Contributes to Overall Debt Burden



User rate debt accounts for an average of 10 per cent of Regional debt

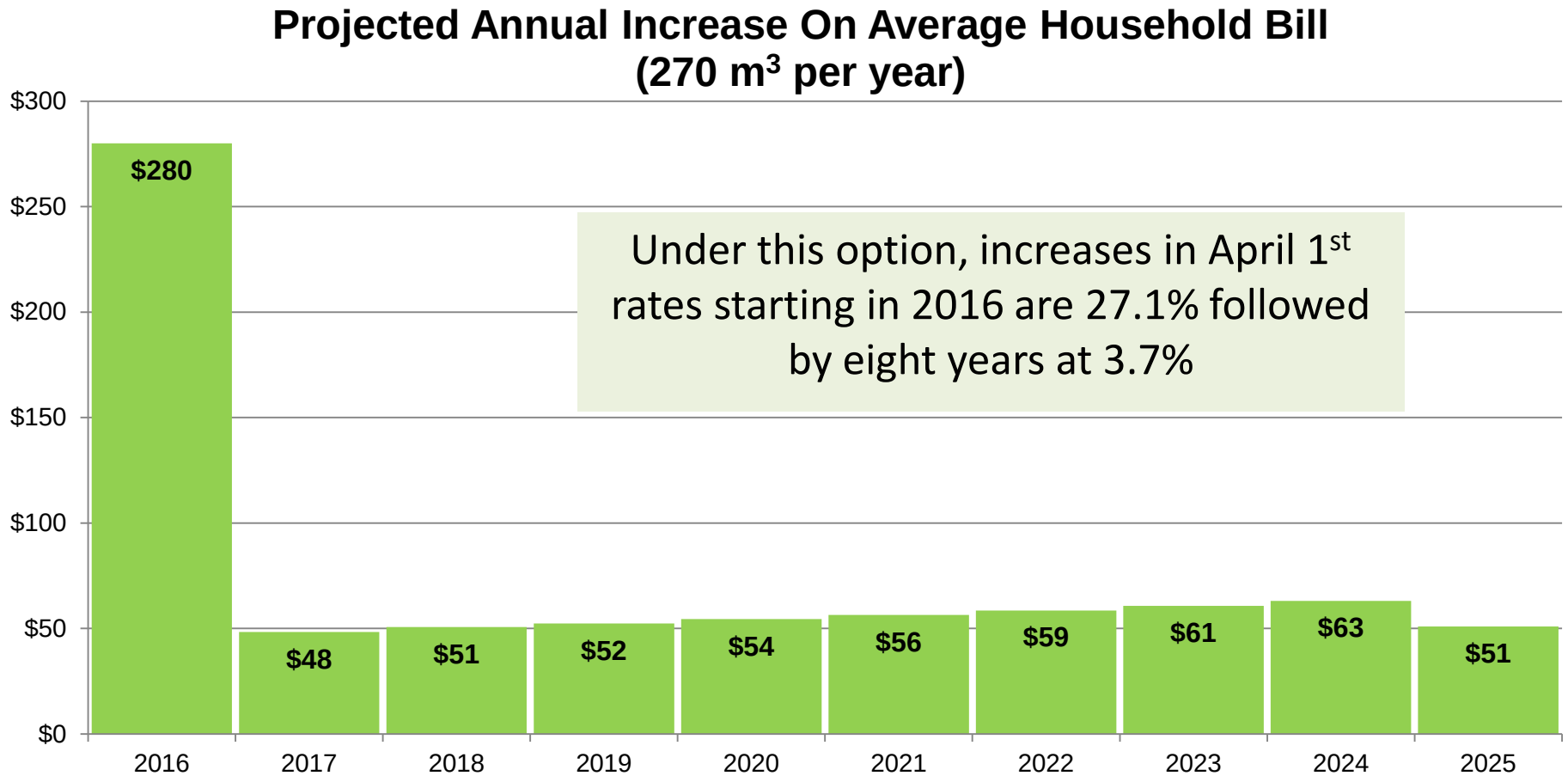
Options

Seven Rate Options to Achieve Financial Sustainability Were Reviewed

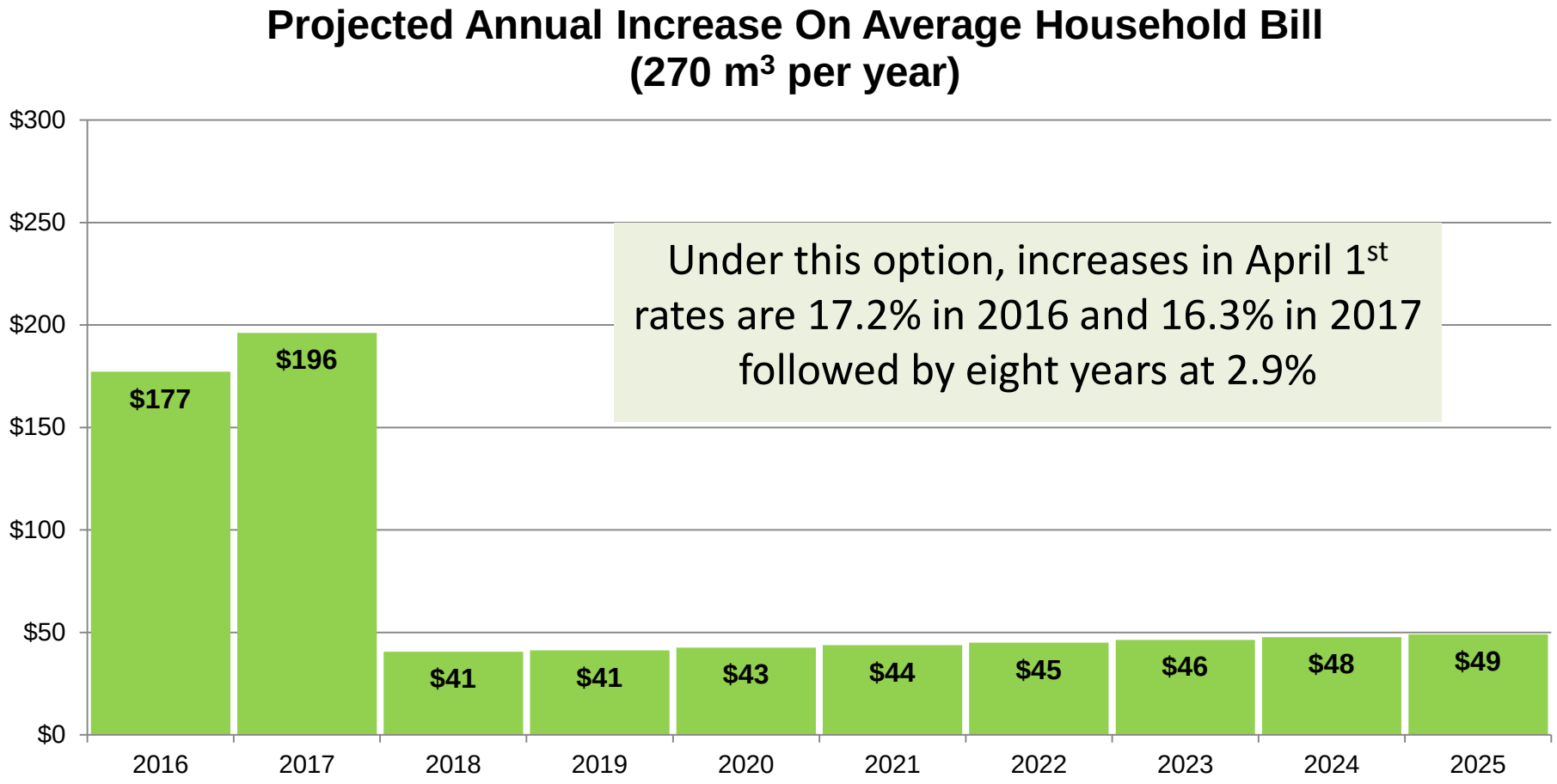
Option	Meet annual operating requirements	Meet capital plan requirements	No new user rate debt issued	Meet full cost recovery pricing by
1	✓	✓	✓	2016
2	✓	✓	✓	2017
3	✓	✓	✓	2018
3A (Recommended)	✓	✓	✓	2018
4	✓	✓	✓	2019
4A	✓	✓	✓	2019
5	✓	✓	✓	2021

Options to achieve full-cost recovery in 1 to 6 years

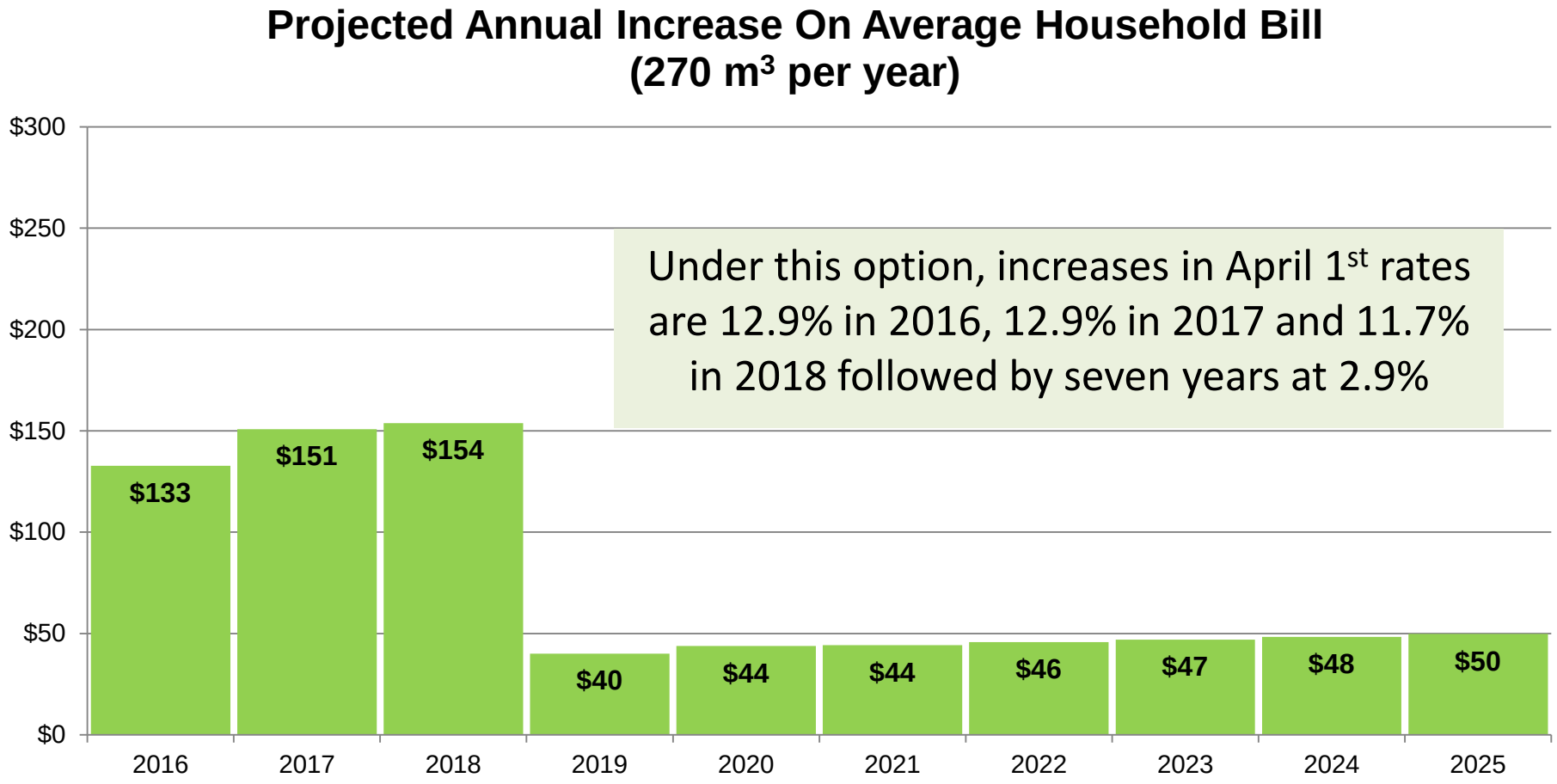
Option 1:
Reach Full Cost Recovery Pricing in 2016



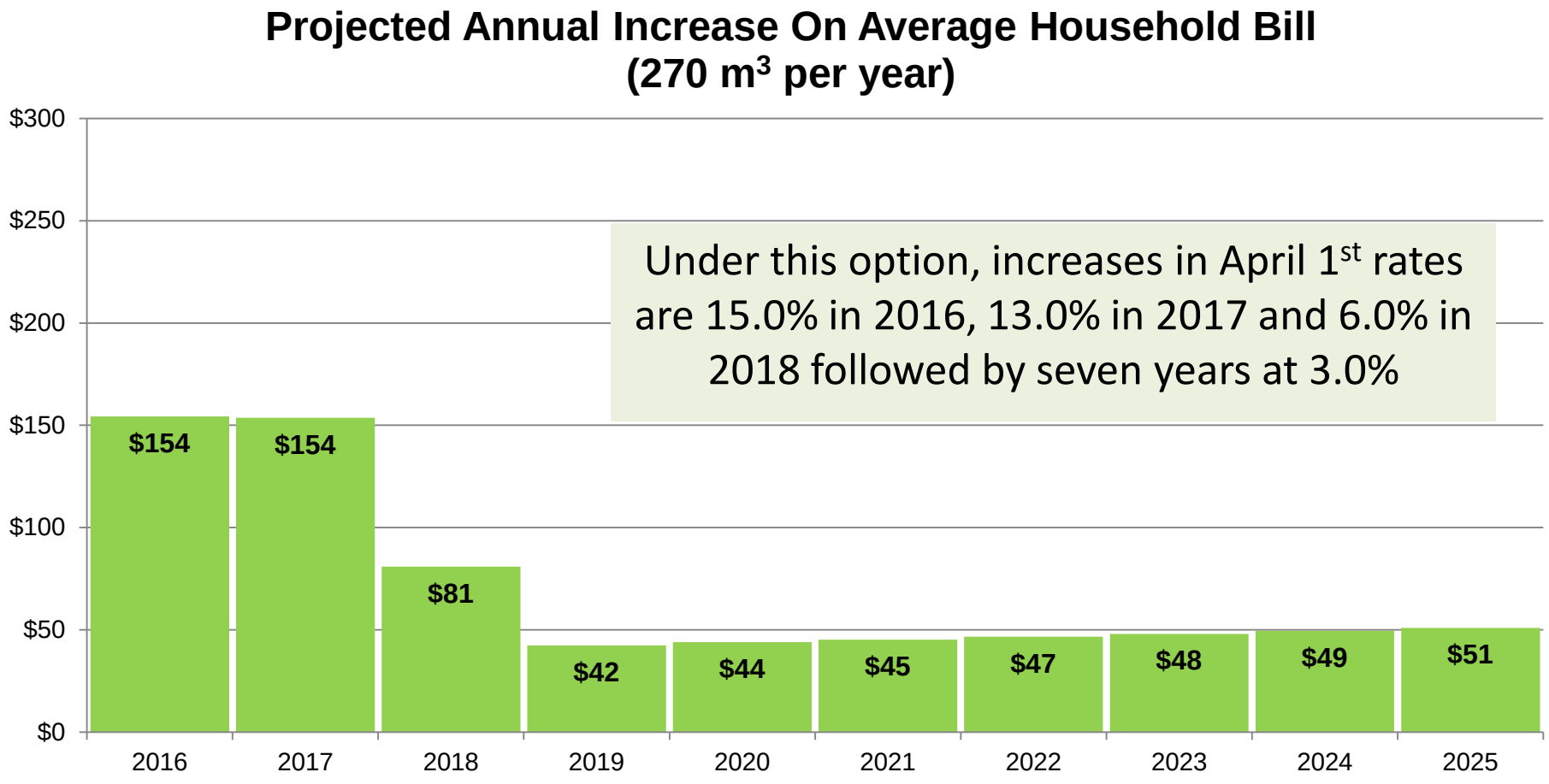
Option 2:
Reach Full Cost Recovery Pricing in 2017



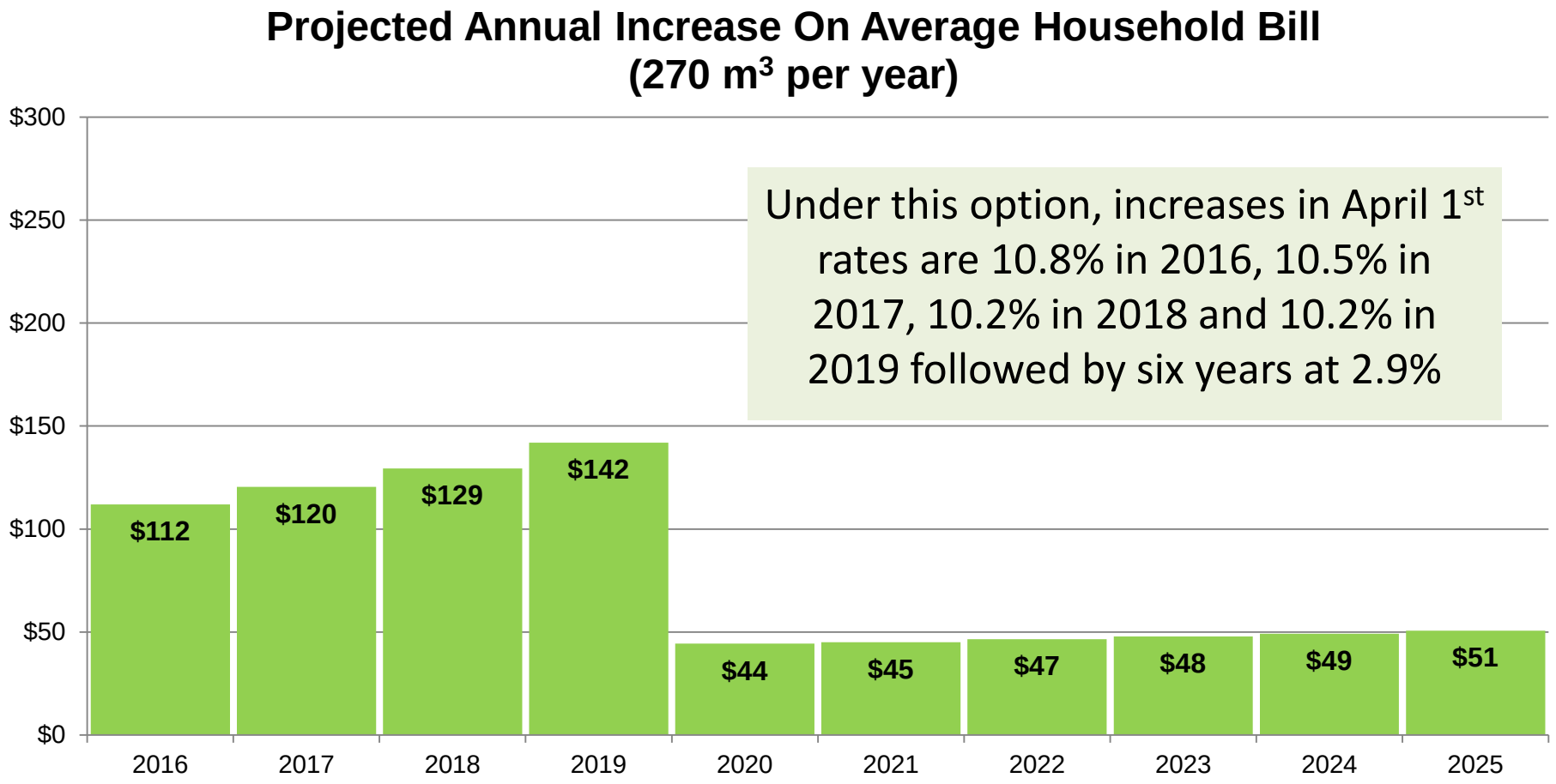
Option 3:
Reach Full Cost Recovery Pricing in 2018



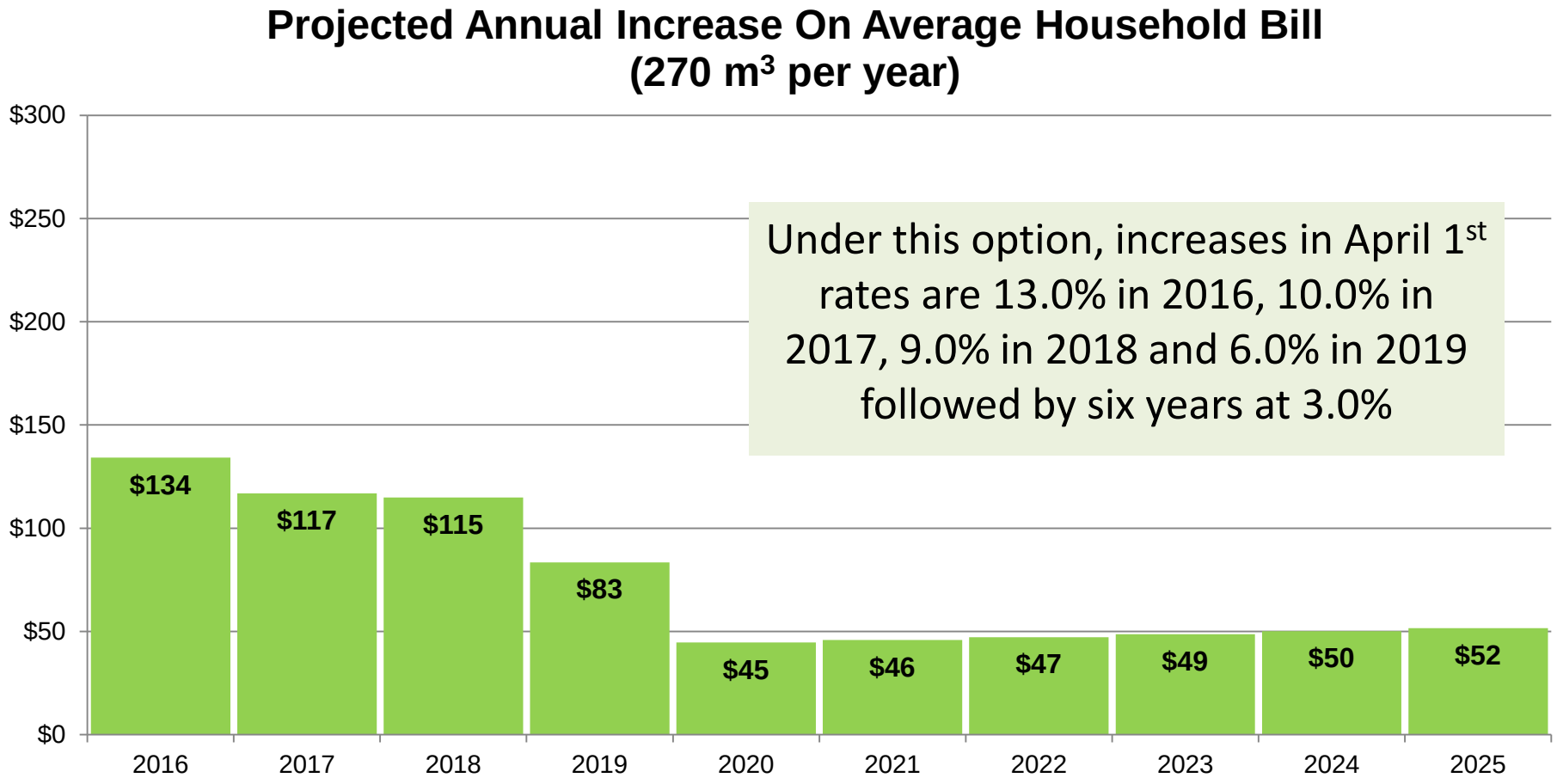
Option 3A (Recommended): Reach Full Cost Recovery Pricing in 2018



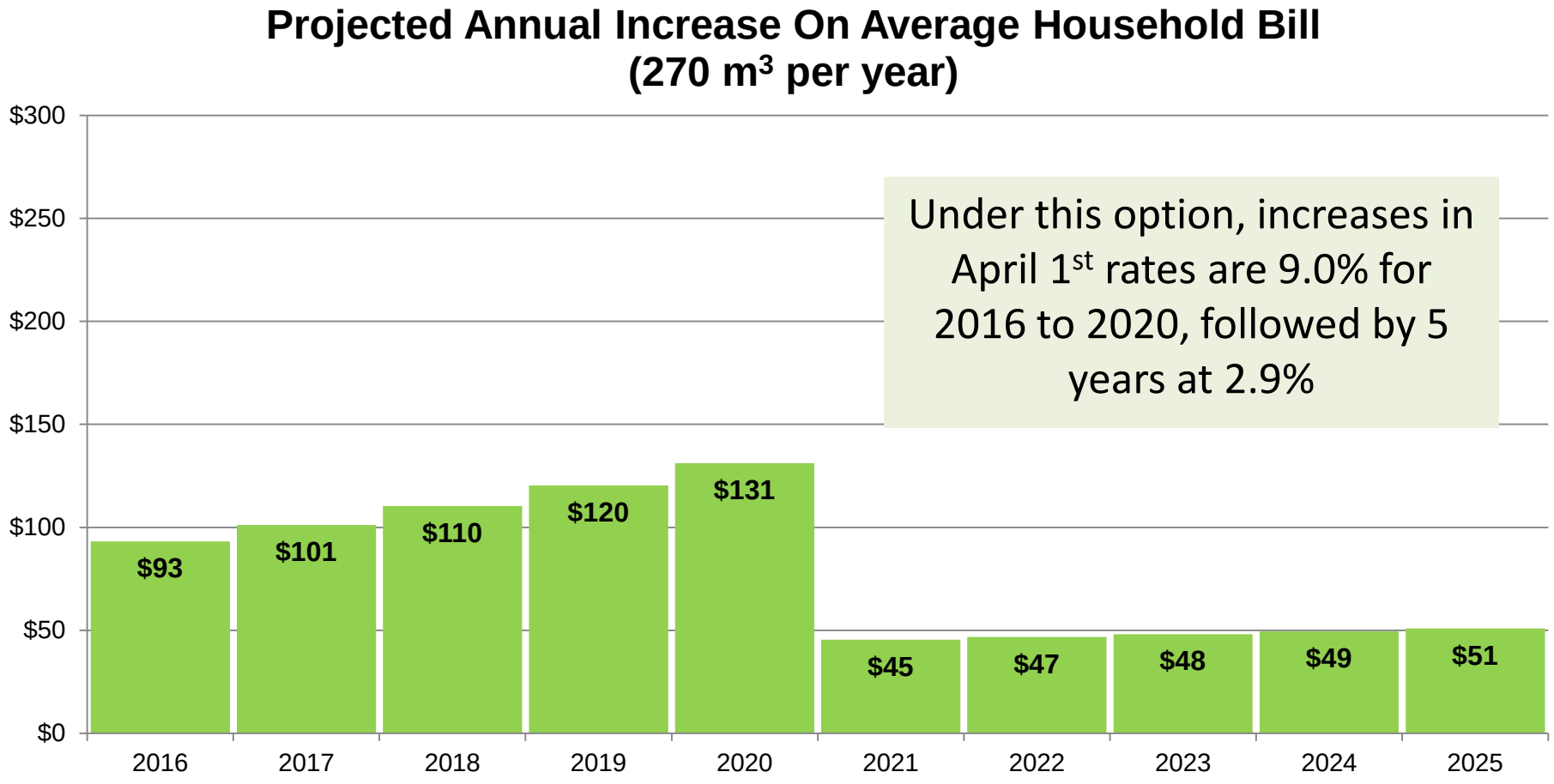
Option 4:
Reach Full Cost Recovery Pricing in 2019



Option 4A:
Reach Full Cost Recovery Pricing in 2019

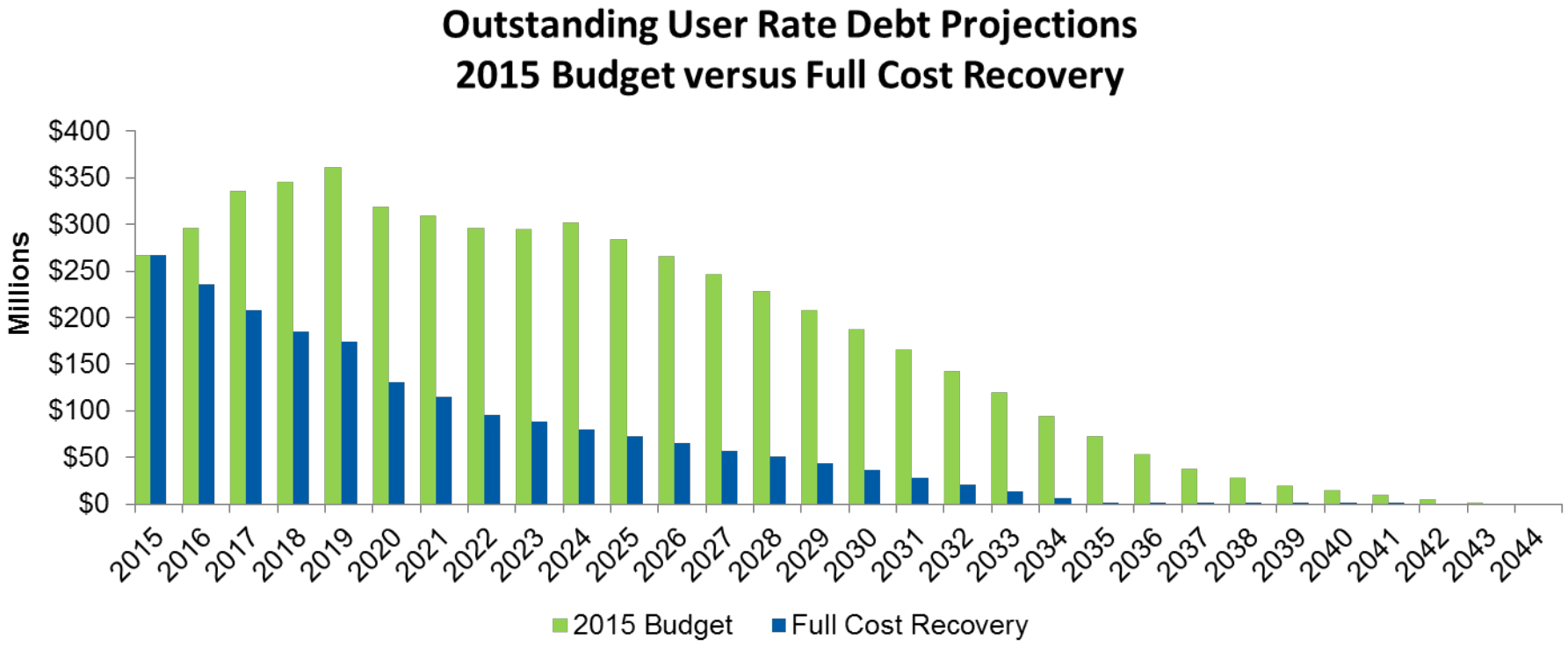


Option 5:
Reach Full Cost Recovery Pricing in 2021



Results of Full Cost Pricing

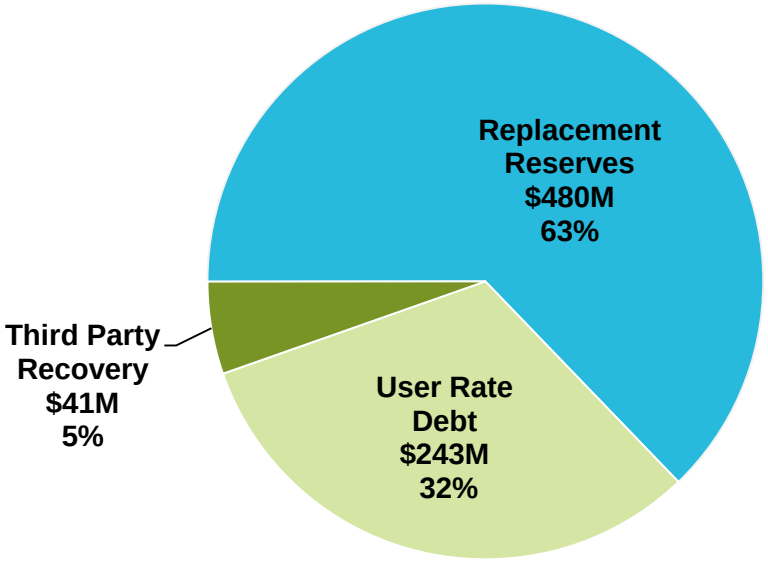
User Rate Debt Significantly Reduced Under Recommended Rate Scenario



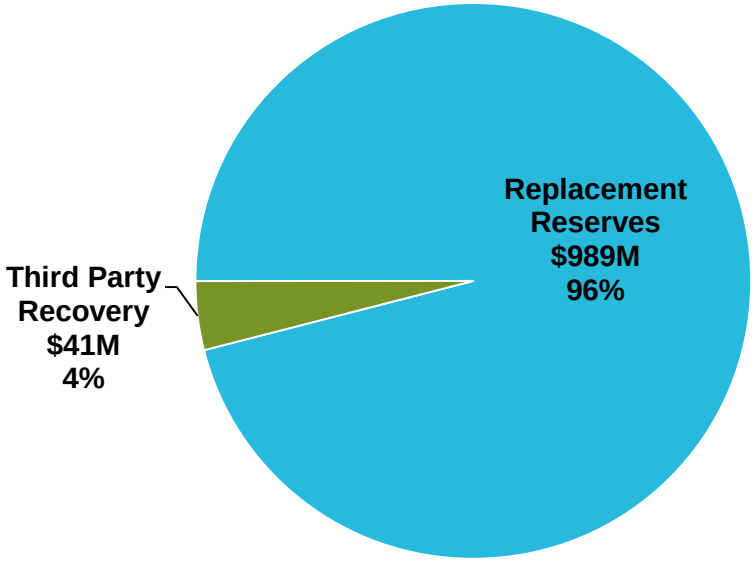
All new user rate debt avoided under full cost pricing

Recommended Rate Increases Meet Capital Investment Need and Eliminate Debt Financing

Funding for Rehabilitation & Replacement in 2015 Budget (2016-2025): $765 Million



Funding for Rehabilitation & Replacement in Full Cost Recovery Pricing (2016-2025): $1,030 Million



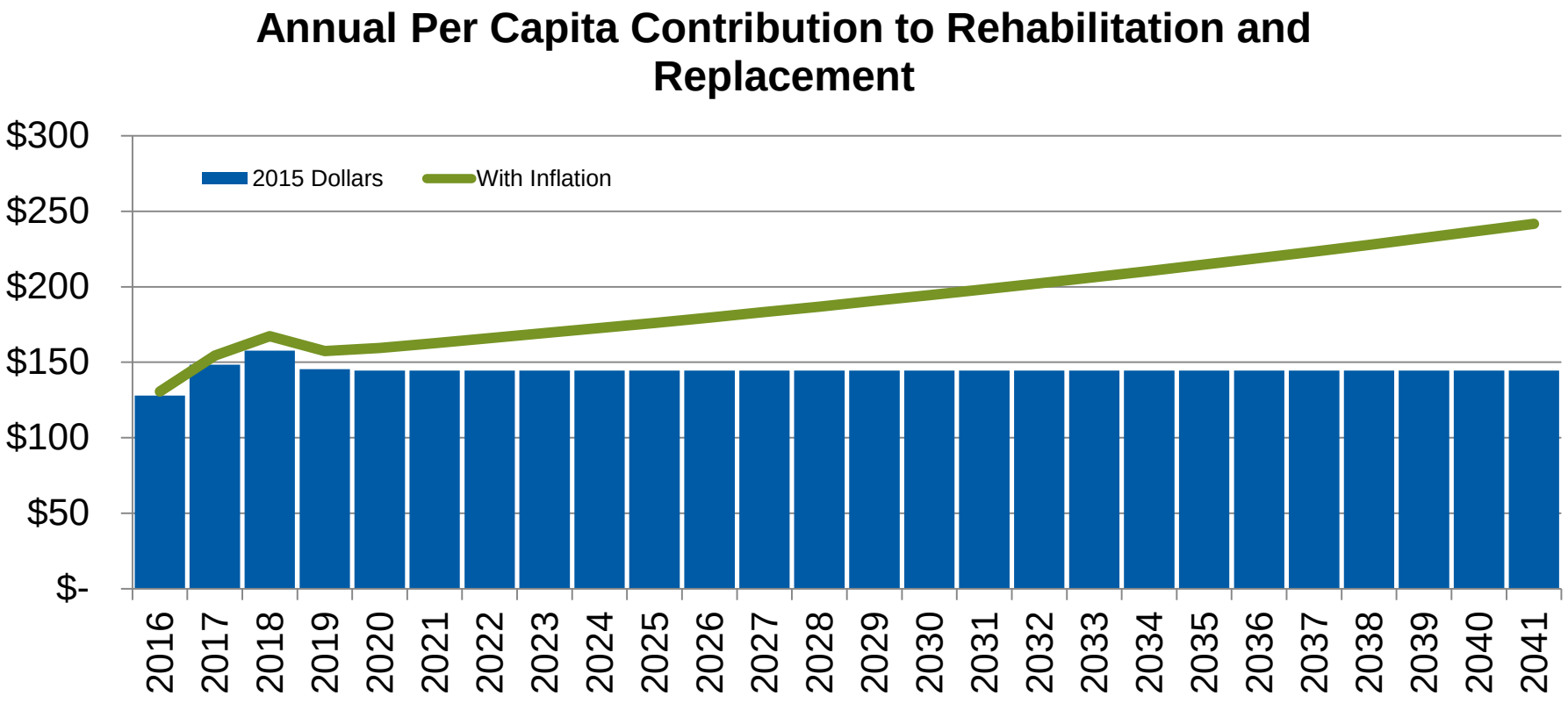
Recommended rates fund $265M increase in rehabilitation and replacement

Intergenerational Equity

- Intergenerational equity means spreading costs and benefits between current and future users fairly
- Objective is to ensure all users pay their share and to ensure no users or group of users are unfairly burdened
- Guiding principle that each person should pay the same real capital cost per capita regardless of when they use the system
- Can only be realized once full cost recovery pricing is reached – longer it takes to get to full cost recovery pricing, longer it will take to achieve intergenerational equity

Fair distribution of long-term rehabilitation and replacement costs

Option 3A Achieves Intergenerational Equity



All users pay same for rehabilitation and replacement after 2018

Affordability Considered as Part of Rate Review

- Households in York Region at the low income threshold pay between 1.4 per cent and 5.0 per cent after tax income for water and wastewater
- This is consistent with findings of international studies
- Programs exist within Community and Health Services to provide residents with financial assistance including rent, mortgage, utilities and housing costs: the Housing Stability Program and the Homelessness Prevention Program
- Some local municipalities also have programs

Water Affordability Studies Analyzed

- Organization for Economic Cooperation and Development
- United Nations
- Environmental Protection Agency
- California Department of Public Health

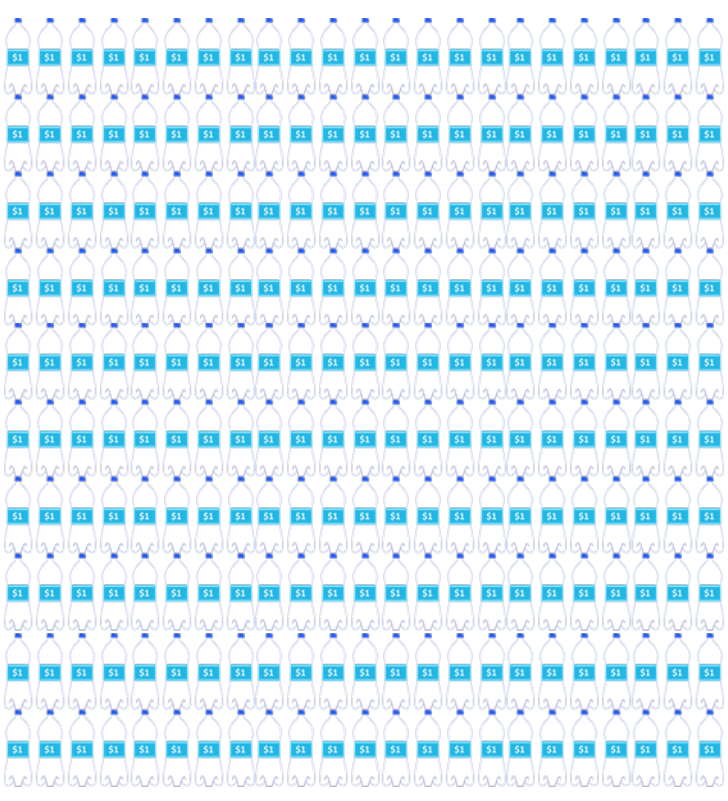
Water rates are a small component of most homeowners' monthly bills

Average Annual Water & Wastewater Cost per Household

	2015	2016	2017	2018	2019
Option 1	$1,032	$1,312	$1,360	$1,410	$1,462
Option 2	$1,032	$1,209	$1,405	$1,446	$1,487
Option 3	$1,032	$1,165	$1,316	$1,469	$1,510
Option 3A (recommended)	$1,032	$1,186	$1,340	$1,421	$1,463
Option 4	$1,032	$1,144	$1,264	$1,394	$1,536
Option 4A	$1,032	$1,166	$1,283	$1,398	$1,481
Option 5 (2021)	$1,032	$1,125	$1,226	$1,337	$1,457

Notes:
Based on water consumption of 270 m^3 per year.
Assuming area municipalities match rate increase in each year.

Water is Affordable

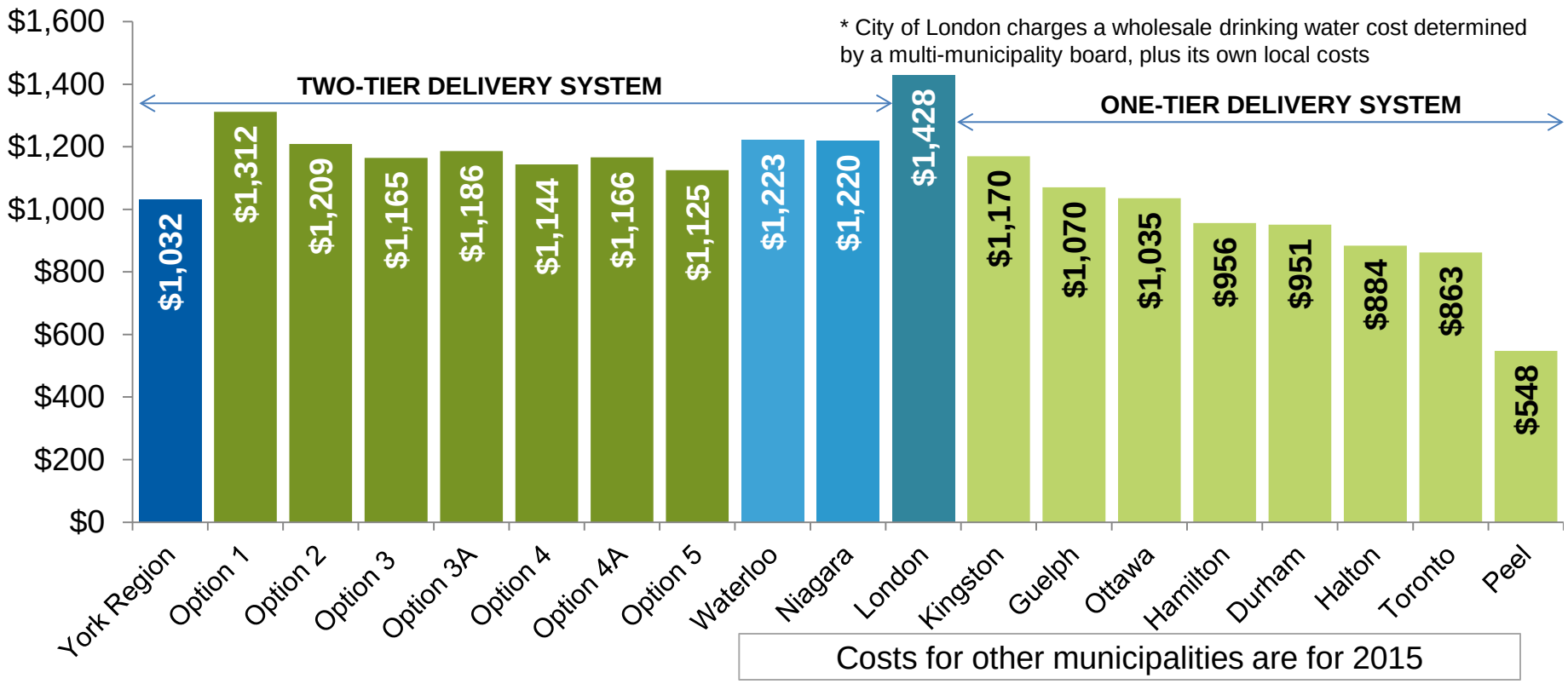


455
500 ml
refills

=

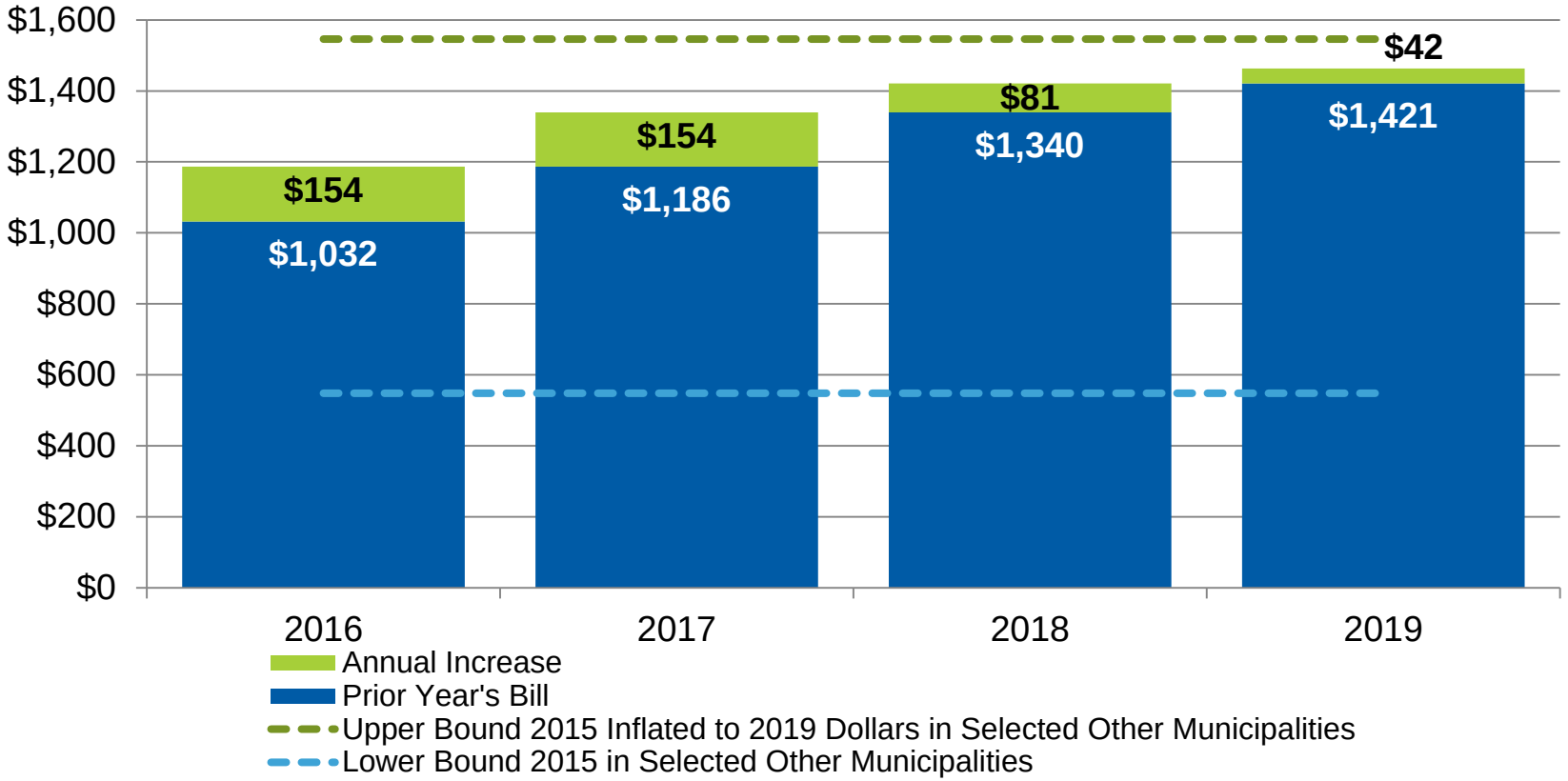
Under the recommended scenario, spending $1 on a bottle of water in 2016 would be equivalent to refilling a 500 ml bottle of water 455 times, including wastewater costs

Estimated Cost per Household



York Region is lowest among two-tier water and wastewater providers

Estimated Cost per Household Under the Recommended Scenario (Option 3A)

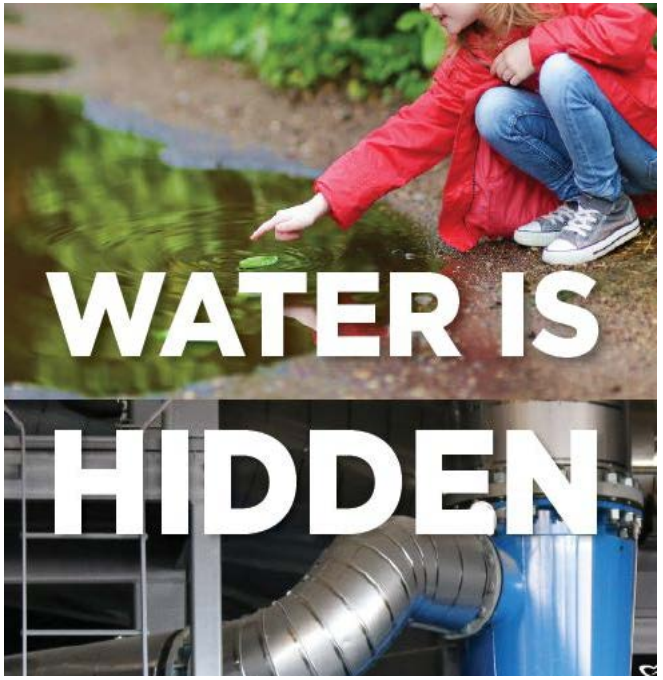


Average household bill by 2019 within range of other municipalities.

Communication and Outreach

Consultation with Local Municipalities

- Multiple presentations to Area Municipal Liaison Committee and Area Treasurers
- One on one meetings with local municipalities
- Local municipalities provided feedback regarding implementation of rate structure changes and communication plans

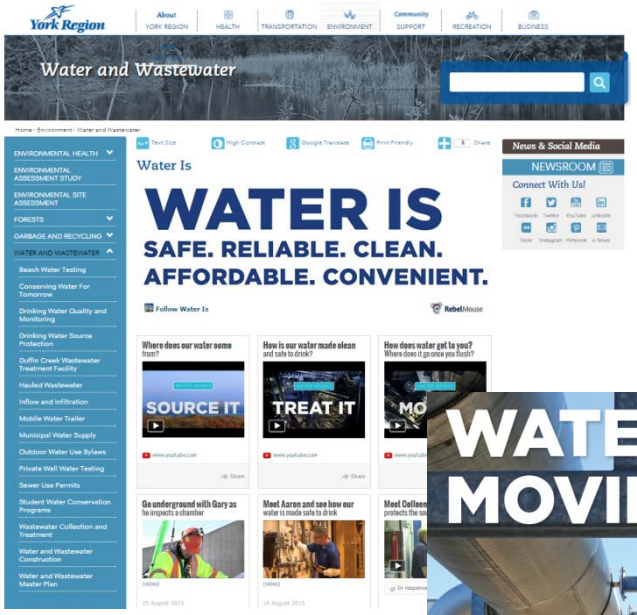


Consultation with local municipalities throughout 2014 and 2015 has been key to developing these recommendations

Water Is Campaign

Multi-year comprehensive, multi-media campaign to connect residents with the value of water - three phases:

1. Foundational work starting with increased awareness of importance of clean and safe drinking water
2. Reveal the complexity and scale of hidden water and wastewater system and explain how these systems work
3. Communicating what rates pay for, why rates are increasing and importance of full cost recovery



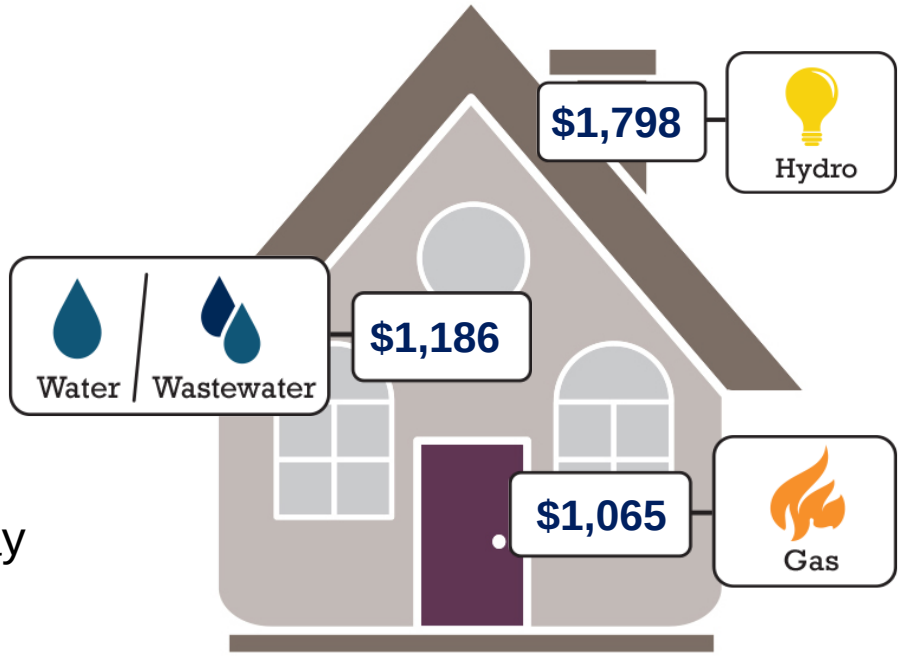
Additional print, social media and video on new rates being developed as key communication tools with local municipalities and the public

Public Survey Results

What we have heard:

- **65 per cent feel confident** that their tap water is safe to drink
- Approximately **75 per cent are satisfied** with York Region's performance in maintaining water infrastructure, running an efficient operation and keeping water rates stable
- Most people don't know what they pay for water yet, **more than 50 per cent feel the price is fair**

Comparison of 2016 Average Household Costs



Extensive public communication on value of water with over 2,000 residents surveyed across the Region

Recommendation – Option 3A

- It is recommended that:

1. Council approve water and wastewater user rates for the four-year period commencing April 1, 2016 to March 31, 2020 as follows:

Year Starting	Wholesale Rate (m^3)
April 1, 2016	$2.50
April 1, 2017	$2.83
April 1, 2018	$3.00
April 1, 2019	$3.09

2. The Regional Clerk circulate this report to the local municipalities.

Water and wastewater user rates to be reviewed annually