



P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 12.3.1
Halifax Regional Council
October 30, 2018

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: **Original Signed**

Carl D. Yates, M.A.Sc., P.Eng. – General Manager, Halifax Water

DATE: October 18, 2018

SUBJECT: Halifax Water 2017/18 Annual Report

INFORMATION REPORT

ORIGIN

Annual operational requirement.

LEGISLATIVE AUTHORITY

Halifax Regional Water Commission Act

BACKGROUND

With the Halifax Water Board approval of the audited financial statements on June 22, 2018, staff completed an annual report to provide an overview of its operation and accomplishments for the fiscal year, ending March 31, 2018. The annual report was presented to the Board on September 27, 2018 with direction to submit the report to its shareholder, the Halifax Regional Municipality.

DISCUSSION

On behalf of the Halifax Water Board, staff are pleased to present the Annual Report for the 2017/18 fiscal year. The theme of the 2017/2018 Annual Report is “Renewal” which highlights the investments in infrastructure including \$41 million in funding through the federal Clean Water and Wastewater Fund (CWWF) program. With CWWF program funding in place for five projects, Halifax Water accelerated the renewal of aging infrastructure for a more reliable and resilient service delivery. Evidence of this capital works activity could be seen by residents across the

municipality as they drove, walked or biked. While much of the work took place on or near the street, in some cases it went right through residential backyards. With extensive resident engagement and the support of area Councillors, staff worked to minimize the impact on residents and businesses.

CWWF funded projects included:

- renewal of 290 meters of deteriorated stormwater infrastructure with Phase One of the Sullivan's Pond storm system in Dartmouth. Daylighting of sections of the former Sawmill River downstream of Sullivan's Pond was a transformational aspect of the project with social, economic, and environmental benefits;
- renewal of 4.1 KM of 100 year old trunk sewer along the Northwest Arm of Halifax from the Armdale Roundabout to Point Pleasant Park using innovative trenchless technology;
- replacement of 3,650 m of 500mm and 750mm diameter 1800 vintage cast iron mains from Chain Lake to Quinpool Road;
- replacement of filter underdrains and media at the J.D. Kline water supply plant at Pockwock Lake; and
- ongoing work to replace the timber crib dam at Lake Major. The new dam, which is scheduled for completion in spring 2019, will allow Halifax Water to better control lake levels, manage flows and provide for mandated fish passage.

In addition to the capital works associated with the CWWF program, staff kept a focus on the core work to enhance customer service, including the roll out of Advanced Metering Infrastructure, lead service line replacement, and wet weather management.

The Halifax Water Board, management and staff appreciate the support of Regional Council and municipal staff as the utility continues to fulfill its mission to provide world-class services for its customers and the environment.

FINANCIAL IMPLICATIONS

Halifax Water is a Government Business Enterprise, and as such follows International Financial Reporting Standards. Halifax Water received a clean audit opinion for the fiscal year ended March 31, 2018, and the utility is included within the consolidated financial statements of the municipality. Halifax Water also is required to report in the format required by the NSUARB - the Accounting and Reporting Handbook (Handbook) for Water Utilities.

Sound financial management remains a priority for the utility. Halifax Water finished the 2017/2018 fiscal year with a net profit of \$8.8 million. Long term debt for the utility decreased by \$12.5 million, with total debt including current portion as of March 31, 2018 of \$214.4 million. In accordance with the agreement between Halifax Water and the Halifax Regional Municipality, a dividend was provided in the amount of \$4.8 million, an increase from \$4.6 million in 2016/2017.

Halifax Water issues debentures through the Municipal Finance Corporation to finance capital, with a cap on unguaranteed debt of \$70 million dollars. A blanket guarantee for Halifax Regional Water Commission Debt was approved by the Halifax Regional Municipality on September 23, 2014, subject to the utility maintaining a debt service ratio less than 35%. The debt service ratio at March 31, 2018 was 21.2%, down from 21.7% in 2016/2017.

Utility rates for water, wastewater and stormwater service continue to benchmark well against other Canadian cities. With a continued sound financial position, Halifax Water does not anticipate filing its next rate application until fall 2019 or later.

COMMUNITY ENGAGEMENT

N/A

ATTACHMENTS

Halifax Water 2017/18 Annual Report

A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/cagenda.php> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 902.490.4210, or Fax 902.490.4208.

Report Prepared by: Original signed
James Campbell, Communications & Public Relations Coordinator, 902.490.4604

Financials Approved by: Original signed
Cathie O'Toole, MBA, CPA, Director of Corporate Services, 902.490.3685

Report Approved by: Original signed
Carl D. Yates, M.A.Sc., P.Eng., General Manager 902.490.4840



Twenty-second
Annual Report
March 31, 2018

**STRAIGHT from
the SOURCE**

**Halifax
Water**

Cover Page:

A graphic depiction of the Water Cycle, showing rain-derived water flowing down a river into a lake. That water is then treated and sent to residences and businesses throughout Halifax Regional Municipality. Once used, the water re-enters Halifax Water infrastructure via the Wastewater system where it flows to a Wastewater Treatment Facility and after treatment, re-enters the environment to complete the water cycle.



Our Mission

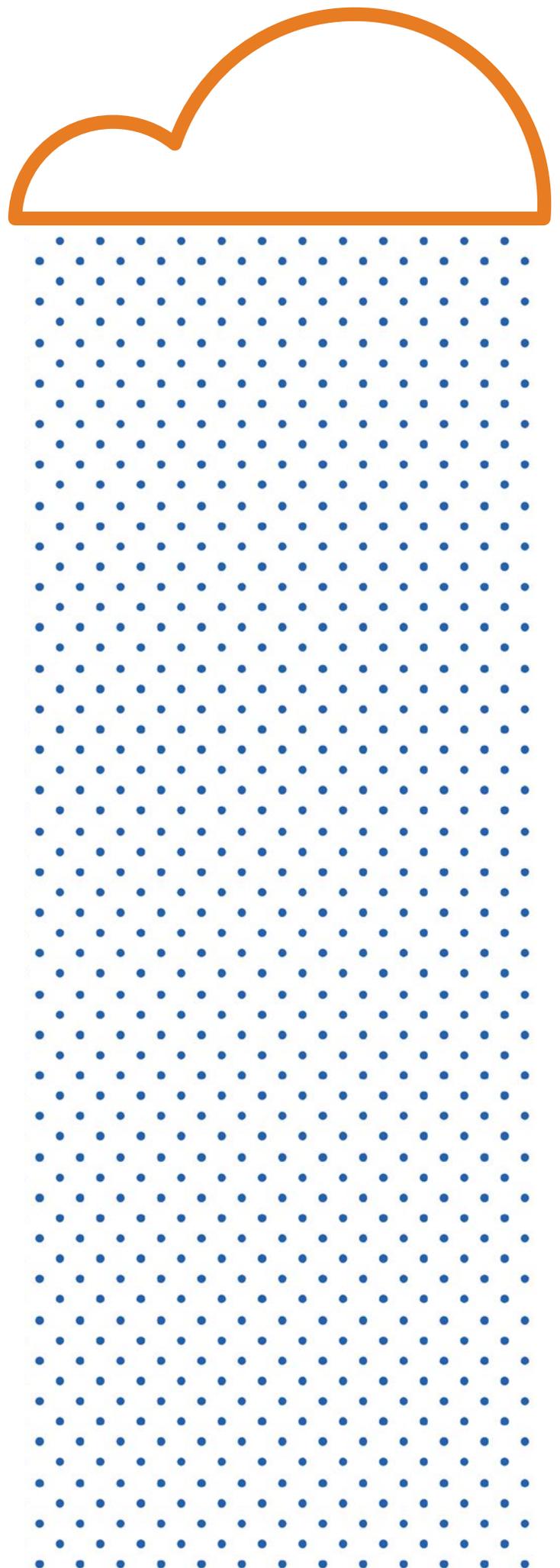
To provide world-class services for our customers and our environment.

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.



Board of Commissioners

March 31, 2018

Executive Staff



Ray Ritcey, BComm, MBA, CPA/CGA
Chair



Councillor Russell Walker,
Vice Chair



Carl Yates, M.A.Sc., P.Eng.
General Manager



Cathie O'Toole, BA, MBA, CPA/CGA
Director, Corporate Services



Darlene Fenton,
Commissioner



Councillor Lisa Blackburn,
Commissioner



Jamie Hannam, MBA, P.Eng.
Director, Engineering &
Information Services



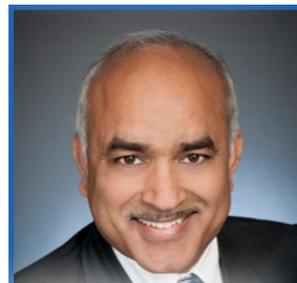
Kenda MacKenzie, P.Eng.
Director, Regulatory Services



Jacques Dubé
Commissioner



Craig MacMullin,
Commissioner



Susheel Arora, M.A.Sc., P.Eng.
Director, Wastewater &
Stormwater Services



Reid Campbell, M. Eng., P.Eng.
Director, Water Services



Councillor Steve Streach,
Commissioner



Councillor Lorelei Nicoll,
Commissioner

Letter from the Chair



September 7, 2018
Mayor Mike Savage and
Members of Regional Council

Re: 2017/18 Annual Report

On behalf of the Halifax
Water Board, we are pleased
to submit the utility's annual
report for the year ending
March 31, 2018, with very

positive outcomes aligned with its business plan. Of particular note, last year saw a focus on infrastructure renewal with an additional \$41 million in funding through the Clean Water and Wastewater Fund (CWWF) program. At the same time, Halifax Water continued with core projects to enhance customer service including the rollout of Advanced Metering Infrastructure (AMI) throughout the region and the replacement of lead service lines and an associated customer rebate program. As of August 31, 2018, there were over 26,000 meter installations with the objective to complete the AMI project by the end of 2019.

In keeping with the governance relationship with the municipality, Halifax Water filed its business plan, financial statements and an accountability report with the City. This ensures our shareholder understands the activities of Halifax Water as it carries out its mission and regional mandate.

The utility finished the 2017/18 fiscal year with excellent financial results including a net income of \$8.82 million [based on the Nova Scotia Utility and Review Board Handbook] which is on par with the 2016/17 results. The net asset base of the utility increased by \$58.45 million to \$1.04 billion. Long term debt for the utility decreased by \$12.5 million with total outstanding debt as of March 31, 2018, at \$191.8 million. The debt service ratio at March 31, 2018, stood at 21.2%, which is well below the threshold of 35% whereby the municipality provides a blanket guarantee for Halifax Water debentures through the Municipal Finance Corporation. In accordance with the agreement between Halifax Water and the Halifax Regional Municipality, a dividend of \$4.8 million was provided, an increase from \$4.6 million for the 2016/17 fiscal year. Revenues have remained stable since the last rate increase on April 1, 2016, and cost containment continues to keep expenses in line. With the current strong financial position, Halifax Water does not anticipate filing its next rate application until 2019 or later.

Last year also saw the renewal of the Natural Science and Engineering Research Council (NSERC), Research Chair through Dalhousie University. The utility continues to realize value from this partnership and in the coming years will be expanding research activities to include wastewater. Future themes for research will centre on lake recovery for drinking water treatment strategies and optimization of wastewater treatment technologies to ensure all plants meet secondary treatment equivalency by 2040 in the most economical way. In addition to the NSERC program, Halifax Water helped to establish a national network, the *forWater* Network, designed to coordinate research to protect forested water sources locally and across Canada. Halifax Water also received international recognition for its research efforts; the utility received the Outstanding Subscriber Award from the Water Research Foundation in June 2018.

With an eye to long term planning, in 2012, Halifax Water completed an Integrated Resource Plan [IRP] that forecast infrastructure needs over a 30 year period based on projected growth, regulatory compliance and asset renewal requirements. The utility is in the process of updating the IRP for the next 30 years to ensure water, wastewater and stormwater assets are optimized to protect public health, protect the environment and support the economic growth of the region.

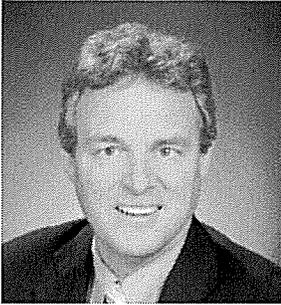
With the support of Regional Council, Halifax Water will continue to pursue its mission, regional mandate, and federal funding programs to keep asset renewal in the forefront and adopt innovative solutions to close the infrastructure deficit while keeping rates affordable.

Respectfully Submitted,



Ray Ritcey, BComm, MBA, CPA/CGA
Chair of the Board

Renewal



Investing in water, wastewater and stormwater is critical to the social, economic and environmental health of our community. Last year was a significant one for infrastructure renewal as the utility took advantage of the federal Clean Water and Wastewater Fund (CWWF) program. The CWWF

program saw the federal government contribute 50%, the provincial government 25% and Halifax Water in for 25%. What was particularly exciting for Halifax Water was the emphasis on renewal of existing assets. As an old municipality with ageing infrastructure, this matched the strategic intent outlined in our 2012 Integrated Resource Plan (IRP) that pegged asset renewal at \$1.3 Billion over a 30 year period, with another \$1.3 billion earmarked for growth and regulatory compliance.

Asset renewal is the bread and butter for a water utility to ensure intergenerational equity, i.e. we look after current and future customers in a fair and equitable manner. With \$41 million in associated funding through the CWWF program, the utility went to work on priority and innovative projects. These included; renewal of 4.1 KM of 100 year old trunk sewer along the Northwest Arm of Halifax; the upgrade of the Sullivan's Pond storm system in Dartmouth; renewal of 1800's vintage water mains from Chain Lake to the Halifax peninsula; replacement of the timber crib dam at Lake Major; and replacement of filter underdrains at the J.D. Kline water supply plant at Pockwock Lake. These projects were carried out with the regular capital budget expenditures including the implementation of the Advanced Metering Infrastructure system and upgrades to the Aerotech wastewater treatment facility. All told, it was a challenging year for staff and the public.

There is no doubt that many of these projects disrupted the normal traffic flow in metro in the short term but in the long run, facilitate the end game of a more robust, responsive and resilient service delivery.

It was particularly rewarding to see the daylighting of sections of the former Sawmill River downstream of Sullivan's Pond and the additional social, economic and environmental benefits that will come from this transformational project. A modern utility should always embrace the triple bottom line when making investment decisions for the betterment of the customers it serves and the environment it protects. As we update our IRP this year, we fully expect that asset renewal will continue to be a focus for the utility over the next 30 years and beyond.

Yours in service,



Carl D. Yates, M.A.Sc., P.Eng.
General Manager

A photograph of a park area featuring a curved black metal bridge over a stone-lined water channel. The foreground is a grassy area with several large grey rocks and a young tree. In the background, there are lush green trees and a brick building with a tower. The sky is overcast.

Daylighted section of Sawmill River at Sullivan's Pond

How to reach us:

For more information about Halifax Water and its services, visit our website at www.halifaxwater.ca, contact our Customer Care Centre at 902.420.9287, email us at customerservice@halifaxwater.ca, send a fax to 902.490.4749, or write us at P.O. Box 8388 RPO CSC, Halifax, NS B3K 5M1. You can also reach us via Facebook and Twitter at @HalifaxWater.

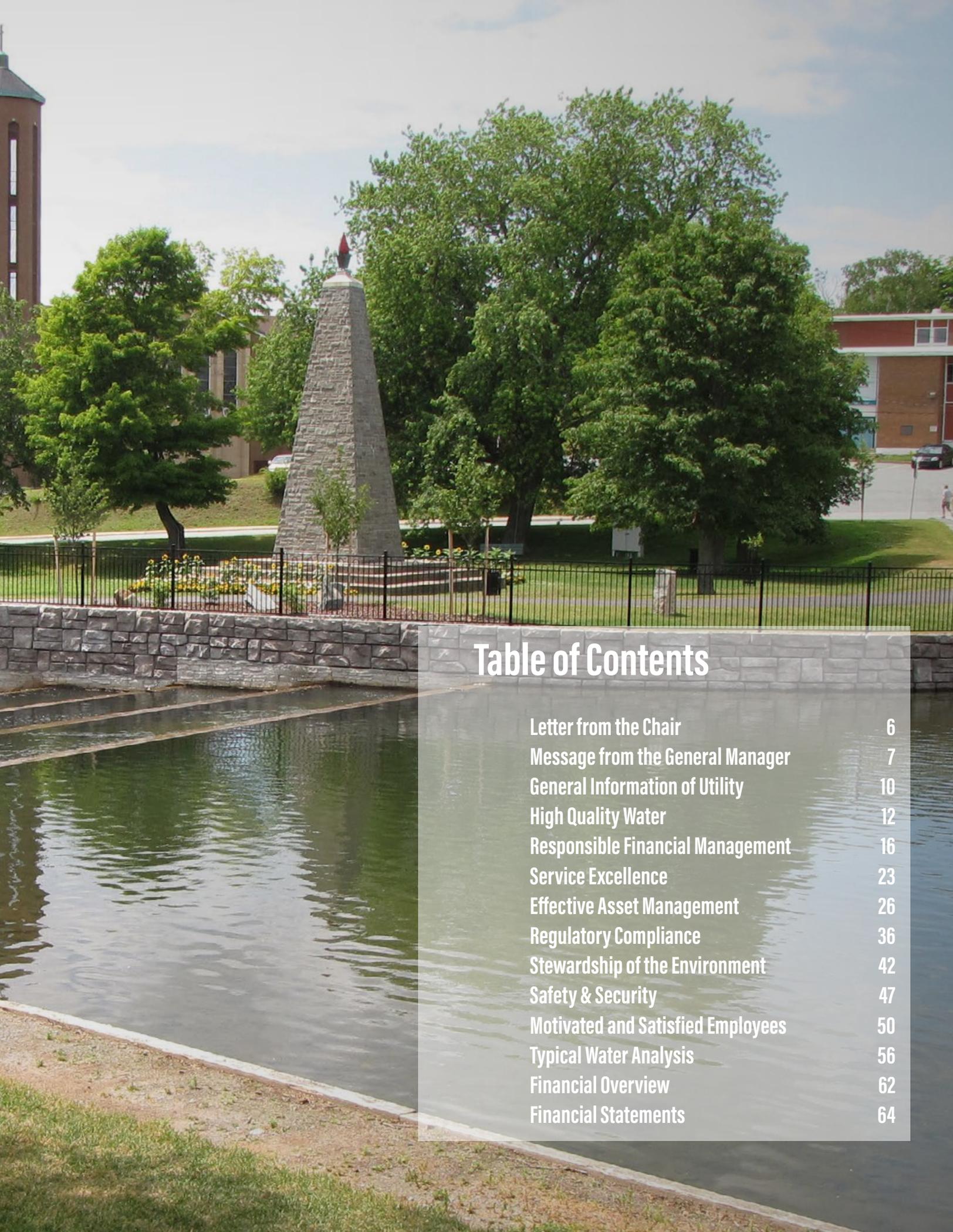


Table of Contents

Letter from the Chair	6
Message from the General Manager	7
General Information of Utility	10
High Quality Water	12
Responsible Financial Management	16
Service Excellence	23
Effective Asset Management	26
Regulatory Compliance	36
Stewardship of the Environment	42
Safety & Security	47
Motivated and Satisfied Employees	50
Typical Water Analysis	56
Financial Overview	62
Financial Statements	64

General Information of Utility

Year Ended March 31, 2018

Water

Treatment Processes

J. D. Kline Water Supply Plant

Source: Pockwock Lake
 Process: Dual Media Direct Filtration, Iron & Manganese Removal
 8 Filters: 143 m²/each
 Max. Flow Rate: 0.137 m³/m²/min
 Design Capacity: 227 000 m³/day
 Design Avg. Flows: 80 010 m³/day

Lake Major Water Supply Plant

Source: Lake Major
 Process: Upflow Clarification, Iron & Manganese Removal
 4 Filters: 85 m²/each
 Max. Flow Rate: 0.192 m³/m²/min
 Design Capacity: 94 000 m³/day
 Design Avg. Flows: 32 644 m³/day

Bennery Lake

Source: Bennery Lake
 Process: Sedimentation, Dual Media Filtration, & Manganese Removal
 2 Filters: 26.65 m²/each
 Max. Flow Rate: 0.10 m³/m²/min
 Design Capacity: 7 950 m³/day
 Design Avg. Flows: 956 m³/day

Middle Musquodoboit

Source: Musquodoboit River
 Process: Raw Water Infiltration Gallery, Ultra/Nano Filtration
 Design Avg. Flows: 48 m³/day

Collins Park

Source: Lake Fletcher
 Process: Ultra/Nano Filtration
 Design Avg. Flows: 40 m³/day

Bomont

Source: Shubenacadie River
 Process: Nano Filtration/ Ionic Exchange Resin
 Design Avg. Flows: 8 m³/day

Silver Sands

Source: 2 Wells
 Process: Green Sand Pressure Filters, Iron & Manganese Removal
 Design Avg. Flows: 27 m³/day

Five Island Lake

Source: 1 Well
 Process: UV Disinfection
 Design Avg. Flows: 8 m³/day

Miller Lake

Source: 3 Wells
 Process: Arsenic Removal
 No Production - Bulk Water Supply

Infrastructure Information

Precipitation

Measured at Pockwock
 Rainfall 1 432.2 mm
 Snowfall 117.7 cm
 Measured at Lake Major
 Rainfall 1 583.1 mm
 Snowfall 68.5 cm

Sources of Supply & Watershed Areas

Pockwock Lake 5 661 ha
 Safe Yield 145 500 m³/day
 Chain Lake 206 ha
 Safe Yield 4 500 m³/day
 Lake Major 6 944 ha
 Safe Yield 65 900 m³/day
 Lake Lemont/Topsail 346 ha
 Safe Yield 4 500 m³/day
 Bennery Lake 644 ha
 Safe Yield 2 300 m³/day

Water Supply Production

Pockwock Lake 29 203 690 m³
 Lake Major 11 915 070 m³
 Bennery Lake 349 076 m³
 Small Systems 47 853 m³

Total 41 515 689 m³

Storage Reservoirs

(Elevation above Sea Level)

Lake Major	(60 m)	9 092 m ³
Pockwock	(170 m)	13 600 m ³
Geizer 158	(158 m)	36 400 m ³
Geizer 123	(123 m)	31 800 m ³
Cowie	(113 m)	11 400 m ³
Robie	(82 m)	15 900 m ³
Lakeside/ Timberlea	(119 m)	5 455 m ³
Mount Edward 1	(119 m)	22 728 m ³
Mount Edward 2	(119 m)	22 728 m ³
Akerley Blvd.	(119 m)	37 727 m ³
North Preston	(125 m)	1 659 m ³
Meadowbrook	(95 m)	9 091 m ³
Sampson	(123 m)	12 273 m ³
Stokil	(123 m)	23 636 m ³
Waverley	(86 m)	1 364 m ³
Middle Musq.	(81 m)	275 m ³
Aerotech	(174 m)	4 085 m ³
Beaver Bank	(156 m)	6 937 m ³

Total 259 213 m³

Transmission & Distribution System

Size of Mains 19 mm - 1 500 mm
 Total Water Mains 1 549 km
 Main Valves 15 526
 Fire Hydrants 8 350
 Distribution of
 Pumping Stations 20
 Pressure Control/ Flow
 Meter Chambers 142

Services & Meters

Water Sprinkler Systems
 (25 mm - 300 mm) 2 146
 Supply Services
 (10 mm - 400 mm) 84 237
 Meters
 (15 mm - 250 mm) 83 907
 Wastewater Services 80 654

Population Served

Halifax Municipality
 Estimated Population
 Served 370 000
 Consumption per Capita
 (all customers) 260 litres/day

General Information of Utility

Year Ended March 31, 2018

Wastewater/Stormwater

Treatment Processes

Halifax

Process: Enhanced Primary - UV
 Design Avg. Flows: 139 900 m³/day
 Area Served: Halifax
 Receiving Water: Halifax Harbour
 Volume Treated: 32 247 054 m³

Dartmouth

Process: Enhanced Primary - UV
 Design Avg. Flows: 83 800 m³/day
 Area Served: Dartmouth
 Receiving Water: Halifax Harbour
 Volume Treated: 19 119 843 m³

Herring Cove

Process: Enhanced Primary - UV
 Design Avg. Flows: 28 500 m³/day
 Area Served: Halifax - Herring Cove
 Receiving Water: Halifax Harbour
 Volume Treated: 2 611 054 m³

Mill Cove

Process: Secondary - UV/Pure Oxygen Activated Sludge
 Design Avg. Flows: 28 400 m³/day
 Area Served: Bedford/Sackville
 Receiving Water: Bedford Basin
 Volume Treated: 8 652 553 m³

Eastern Passage

Process: Secondary - UV/Conventional Activated Sludge
 Design Avg. Flows: 25 000 m³/day
 Area Served: Cole Harbour & Eastern Passage
 Receiving Water: Halifax Harbour
 Volume Treated: 5 161 571 m³

Timberlea

Process: Secondary - Sodium Hypochlorite/RBC
 Design Avg. Flows: 4 540 m³/day
 Area Served: Lakeside & Timberlea
 Receiving Water: Nine Mile River
 Volume Treated: 897 691 m³

Aerotech

Process: Secondary - UV/Membrane Bioreactors
 Design Avg. Flows: 3 000 m³/day
 Area Served: Aerotech Park & Airport
 Receiving Water: Johnson River
 Volume Treated: 304 573 m³

Springfield Lake

Process: Secondary - UV/Activated Sludge
 Design Avg. Flows: 543 m³/day
 Area Served: Springfield Lake
 Receiving Water: Lisle Lake
 Volume Treated: 209 398 m³

Fall River

Process: Tertiary - UV/Activated Sludge & Post Filtration
 Design Avg. Flows: 454.5 m³/day
 Area Served: Lockview - McPherson Road
 Receiving Water: Lake Fletcher
 Volume Treated: 53 819 m³

North Preston

Process: Tertiary - UV/SBR & Engineered Wetland
 Design Avg. Flows: 680 m³/day
 Area Served: North Preston
 Receiving Water: Winder Lake
 Volume Treated: 244 407 m³

Middle Musquodoboit

Process: UV/RBC
 Design Avg. Flows: 114 m³/day
 Area Served: Middle Musquodoboit
 Receiving Water: Musquodoboit River
 Volume Treated: 71 195 m³

Uplands Park

Process: Tertiary - UV/Trickling Filter & Wetland
 Design Avg. Flows: 91 m³/day
 Area Served: Uplands Park
 Receiving Water: Sandy Lake
 Volume Treated: 30 251 m³

Wellington

Process: Tertiary - UV/Activated Sludge/Reed Bleed
 Design Avg. Flows: 68 m³/day
 Area Served: Wellington
 Receiving Water: Grand Lake
 Volume Treated: 6 752 m³

Frame Subdivision

Process: Secondary - UV/Membrane Reactor
 Design Avg. Flows: 80 m³/day
 Area Served: Frame Sub-Division
 Receiving Water: Lake William
 Volume Treated: 6 616 m³

Infrastructure Information & Glossary

Glossary of Terms

ha - hectare
 m - metre
 m² - square metre
 m³ - cubic metre (1,000 litres)
 mm - millimetre
 cm - centimetre
 km - kilometre

Wastewater & Stormwater Collection System

Size of Pipes 50 mm - 3 000 mm
 Total Sewer Length 2 337 km
 Total Manholes 40 279
 Total Pumping Stations 166
 Total Ditch Length Aprx. 500 km
 Driveway Culverts Aprx. 18 000
 Cross Culverts 2 170
 Holding Tanks & Retention Ponds (12-244 00 m³) 42
 Catchbasins 24 246

HIGH QUALITY WATER

Our Vision

We will provide our customers with **high quality water**, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on **public health**, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Lead Service Line Removal

The ongoing removal of lead service lines continued to be a focus of the utility. For homes with lead service lines, the potential for a high level of lead in drinking water is a significant concern. In 2016, the Halifax Water Board approved a comprehensive

business plan for lead service line replacement, and several steps were taken in 2017 to develop this program.

The cost for replacing the portion of the service line on private property is a barrier to customers wishing to remove lead from their home.

LEADLINE

On August 22, 2017, the Nova Scotia Utility and Review Board approved a rebate program proposed by Halifax Water. Homeowners replacing the lead service line on private property are now eligible to receive a rebate for 25% of the cost of work, up to a maximum of \$2500.

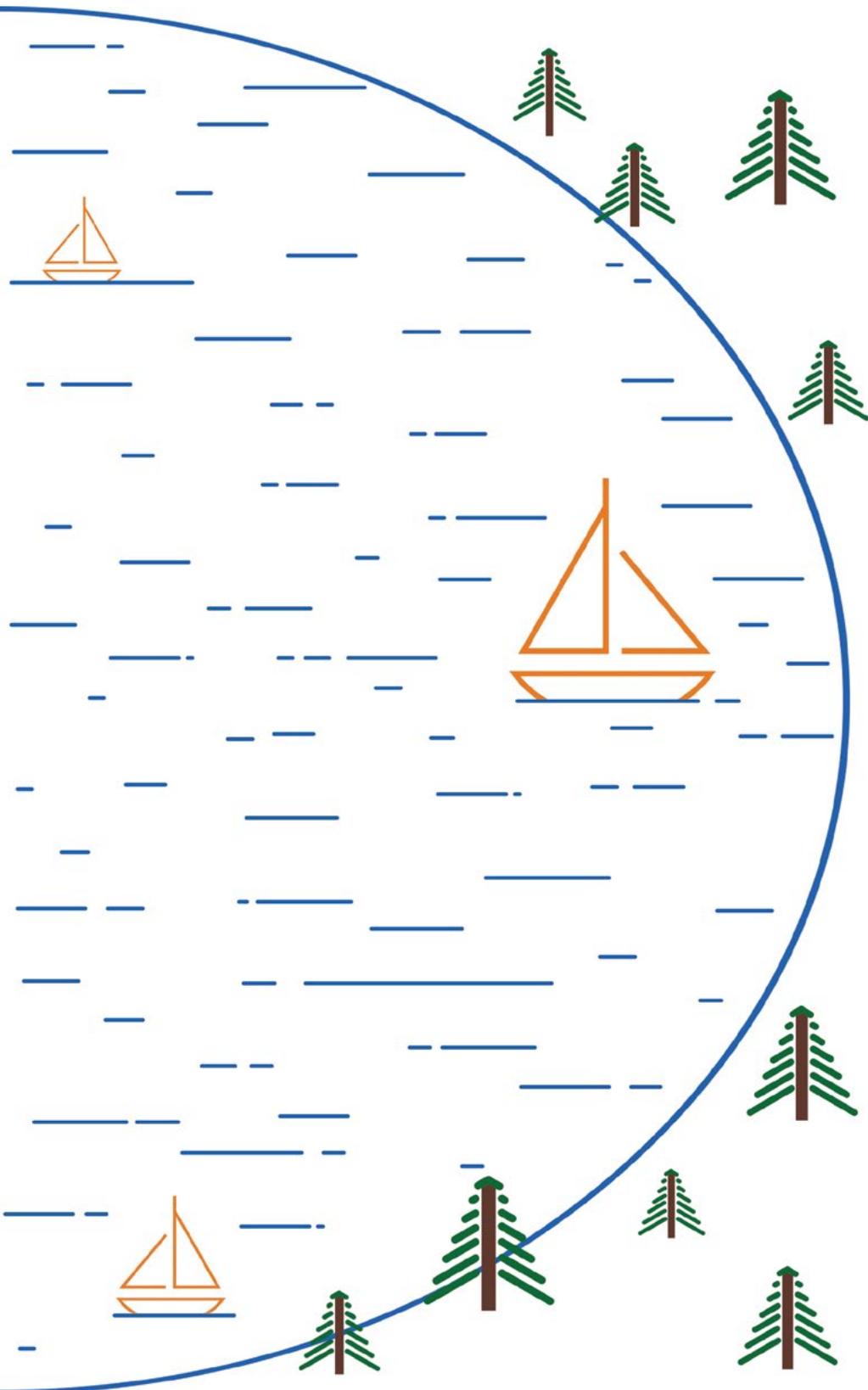
In 2017, 76 lead service lines were replaced by property owners. Eighteen were replaced after August 22 and received rebates from Halifax Water, averaging \$738.

This rebate program is one of just a handful of similar programs adopted by utilities in North America and is a major step in Halifax Water's efforts to assist homeowners in dealing with lead.

The disturbance of a lead service line can occur during a water main repair or sewer lateral replacement. This disturbance can result in increases in lead levels in the residence. On rare occasions, Halifax Water may need to disturb a lead service line without giving a property owner the time required to plan for its replacement. An example of this would be repairing a water main leak where a lead service line is connected close to the location of the repair. In these instances, the residence may see increased lead levels in their drinking water. Therefore, the Nova Scotia Utility and Review Board has also approved a regulation change allowing Halifax Water to replace the entire lead service line, from the water main to the meter, at the expense of the utility, in relation to these disturbances.

Halifax Water is also continuing efforts to improve its inventory of lead service lines. This improvement will enable staff to better plan replacement programs and provide a comprehensive response to customers inquiring about lead.

Halifax Water also launched three short videos on its website and YouTube channel which provide customer information on identifying lead service lines, testing water for lead and the replacement process.



Source Water Quality

Halifax Water continues to learn about the phenomenon of lake recovery. Halifax Water and its customers have always benefitted from pristine protected water

sources. These lakes were typical Nova Scotian lakes in that they contained a moderate amount of natural organic matter and an extremely low level of particles such as bacteria and protozoa that can be a threat to human health.

When our treatment plants were designed in the 1970s, 80s and 90s, our lakes were heavily influenced by acid rain which was caused by sulphur dioxide emissions, primarily from coal-fired power plants in the US Midwest and central Canada. Our lakes had low (acidic) pH and low levels of aquatic organisms such as fish, algae, and plankton. As a result, drinking water in the Halifax area had been immune to taste and odour issues.

Efforts to reduce emissions from coal plants and other industrial sources have led to the phenomenon of lake recovery. The lakes are becoming less acidic which leads to more aquatic life and increases in natural organic matter which is more challenging to treat. Lake recovery has also resulted in the occurrence of taste and odour causing compounds which our treatment plants are not currently designed to deal with.

Although this situation causes operational challenges and higher cost at our water supply plants, we continue to meet regulatory standards based on the Guidelines for Canadian Drinking Water Quality.

Halifax Water has developed a multi-year strategy to adapt to lake recovery. The first step is a project to develop a tool for selecting treatment technology and monitoring plans when source water quality is rapidly changing. This project is being undertaken through the Water Research Foundation with a \$US100,000 contribution under their Tailored Collaboration program.

Other strategy components include increased monitoring and surveillance to detect source water changes and minor treatment process changes to make the plants more adaptable in the short term. Longer term components may include treatment plant upgrades.

Drinking Water Research

Halifax Water continued its drinking water research programs through the Natural Sciences and Engineering Council (NSERC) – Halifax Water Chair in Water Quality and Treatment at Dalhousie University. Halifax Water has sponsored this Chair since 2007 with Dr. Graham Gagnon, who leads a diverse team of researchers looking into water quality challenges faced by Halifax Water. Dr. Gagnon's team has made several significant findings that have shaped Halifax Water's water treatment and lead service line strategies.

Research is continuing in the areas of lake recovery and distribution system water quality.

In 2017, Halifax Water helped to launch the *forWater* Network. This research network, led by Dr. Monica Emelko of the University of Waterloo and Dr. Uldis Silins of the University of Alberta coordinates national research on forested watersheds to improve their protection. Research led locally by Dr. Rob Jamieson, and Dr. Peter Duinker of Dalhousie University will play a key role in developing Canadian approaches to drinking water source management.



Water Treatment Plant Improvements

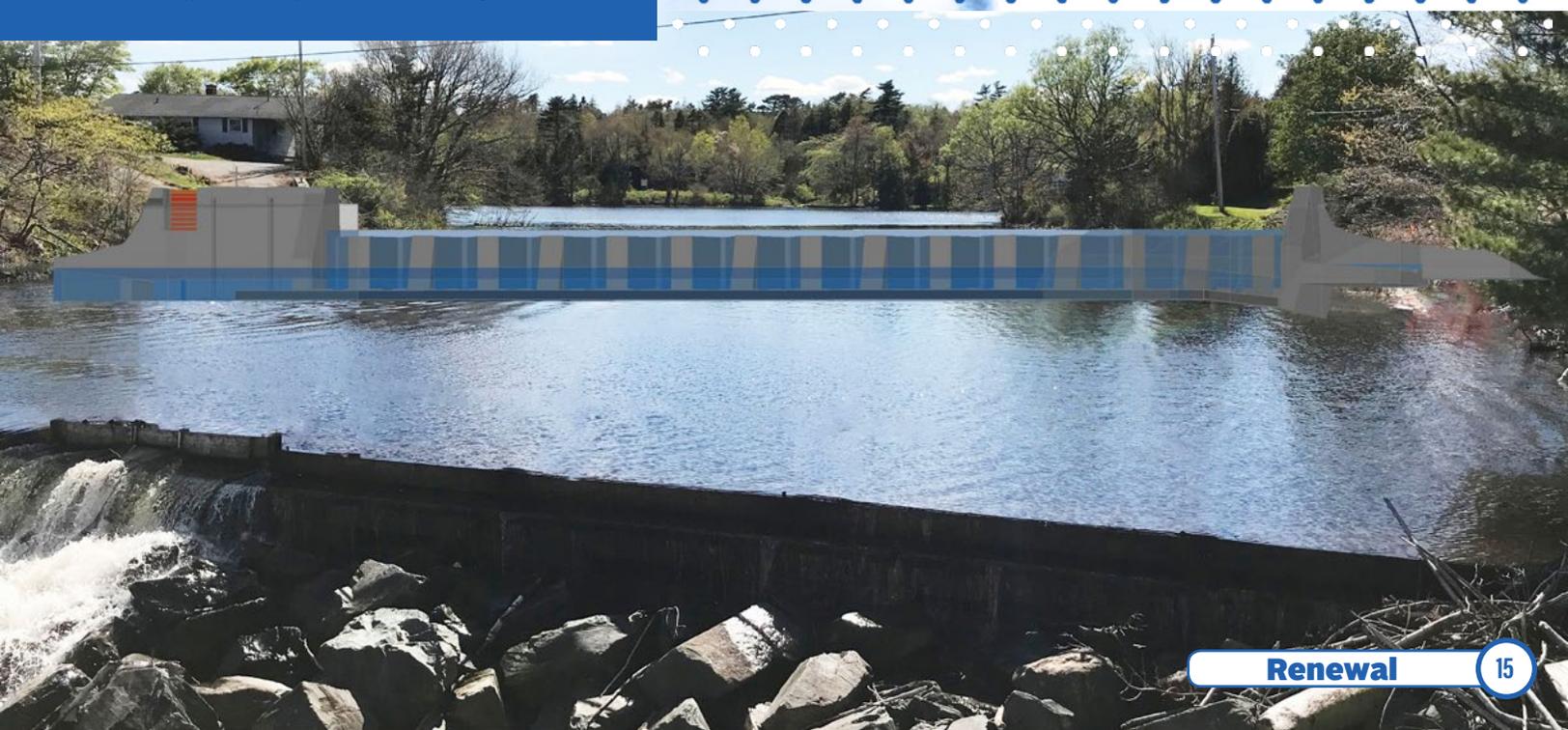
Halifax Water continues to invest in keeping its water supply plants up to date to deal with water treatment challenges. A multi-year upgrade program to the Bennery Lake Water Supply Plant was completed in 2017. Work has also begun at the J.D. Kline Water Supply Plant to upgrade the filter underdrains and install air scour, which is an enhancement to the backwashing process. Preparatory work is ongoing at the Lake Major Water Supply Plant to upgrade plant components and replace the existing intake and lake pumping station.

Lake Major Dam

Halifax Water completed the design of a new dam for Lake Major. The detailed approval process with Nova Scotia Environment, has been completed. Approvals have been obtained and construction began in the spring of 2018.

In addition to replacing an ageing structure, the new dam will provide improved fish passage, and increased protection to upstream and downstream properties.

Existing Lake Major Dam & Concept of New Dam



RESPONSIBLE FINANCIAL MANAGEMENT

Halifax Regional Water Commission Statement of changes in equity Year ended March 31 (in thousands)

Balance at March 31, 2016
Earnings for the year
Other comprehensive income
Comprehensive earnings for the year
Balance at March 31, 2017
Balance at March 31, 2017
Earnings for the year
Other comprehensive loss
Comprehensive earnings for the year
Balance at March 31, 2018

Halifax Regional Water Commission Notes to the financial statements March 31, 2018 (in thousands)

4. Employee benefit obligations

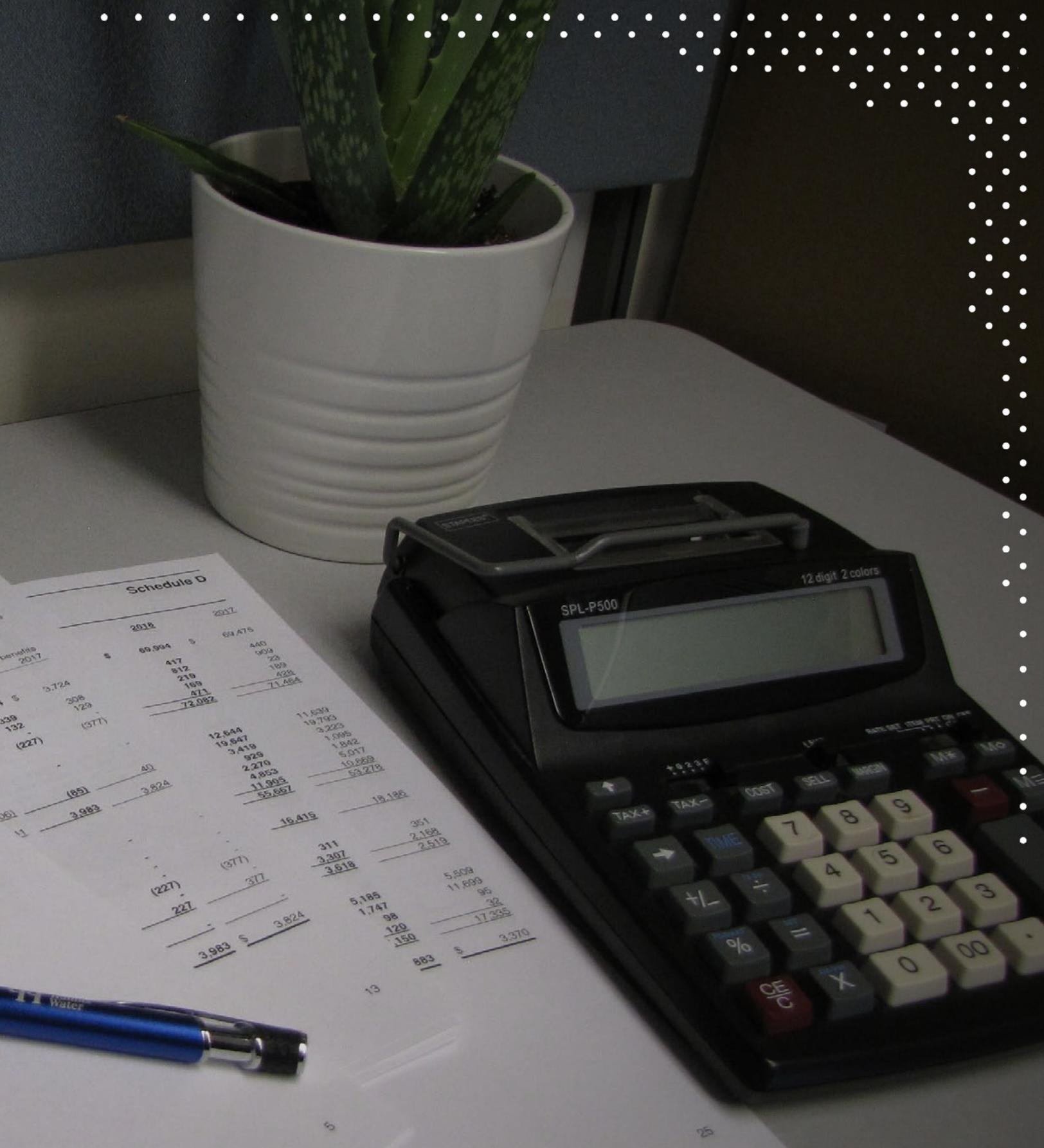
	Accumulated other comprehensive (loss)	Accumulated surplus	Total
Balance at March 31, 2016	\$ (43,936)	\$ 167,626	\$ 123,690
Earnings for the year	743	23,216	23,959
Other comprehensive income	743		743
Comprehensive earnings for the year	(43,193)	190,822	147,629
Balance at March 31, 2017	\$ (43,193)	\$ 190,822	\$ 147,629
Earnings for the year	(1,759)	21,781	20,022
Other comprehensive loss	(1,759)		(1,759)
Comprehensive earnings for the year	(44,943)	21,781	17,838
Balance at March 31, 2018	\$ (44,943)	\$ 212,803	\$ 167,860

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, **fiscal responsibility**, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.



Annual Financial Results

The Utility received a clean audit opinion for the fiscal year ended March 31, 2018. The financial statements are presented in accordance with International Financial Reporting Standards (IFRS). Halifax Water also produces financial information in the format required by the NSUARB - the NSUARB Accounting and Reporting Handbook (Handbook) for Water Utilities.

Annual Financial Results Continued...

The differing requirements result in two unique sets of financial statements. The financial summary information shown on page 63 of the annual report aligns with the NSUARB Handbook. The external financial statements reproduced on pages 64 to 90 of the annual report align with IFRS and were prepared in conjunction with the annual audit by Grant Thornton. Ongoing differences between NSUARB and IFRS will steadily increase as debt increases. IFRS does introduce more volatility, particularly around post-employment benefits and the NSUARB handbook will continue to be used for rate making. Schedules C, D, E, F, G of the Audited Financial Statements are based on NSUARB Accounting and Reporting Handbook. The financial statements also include the report of the auditor, Grant Thornton. The underlying activities and operating results are similar under the two standards.

The key differences are:

1. IFRS includes depreciation on contributed assets in the income statement, resulting in higher depreciation expense;
2. IFRS includes the amortization of contributed capital in the income statement, resulting in higher non-operating revenue;
3. IFRS requires componentization of assets records and shorter useful lives, resulting in higher depreciation expense;
4. IFRS does not permit the appropriation of long-term debt principal payments in the income statement, resulting in lower non-operating expenses;
5. IFRS requires the reporting of the full actuarial liability of employee future benefits as Other Comprehensive Income. This may result in either positive or negative impacts on income, and;
6. IFRS requires contributed capital be treated as a long-term liability, resulting in much higher long-term liabilities and much lower equity.

The Net Income for the year under the NSUARB Handbook is \$8.8 million. Under IFRS, Total Comprehensive Earnings are \$20 million. An explanation of the difference is summarized below.

- NSUARB Handbook Net Income +\$8.8 million
- Include non-cash Pension Plan expense -\$5.0 million
- Remove debt principal appropriation expense +\$21.2 million
- Deduct depreciation on contributed assets -\$17.0 million (offset)
- Amortize contributed capital as revenue \$17.0 million (offset)
- Various depreciation adjustments on componentized assets and pre-1985 assets -\$3.3 million
- Loss on OCI Other Comprehensive Income (benefits) -\$1.7 million
- IFRS Total Comprehensive Earnings \$20.0 million

Halifax Water's cash balance of \$51.5 million is down from \$55.9 million in the prior year. The decline is attributable to substantial expenditures associated with the current capital projects. The liquidity on the balance sheet (ratio of current assets divided by current liabilities) is still very positive at 1.85.

Plant in Service assets, net of Accumulated Depreciation, is \$1.24 billion and is \$63.3 million higher than at this time last year. A total of 335 Capital Work Orders were closed during the year, representing \$103.2 million in Plant in Service Additions. This was offset by retirements of Plant in Service of \$3.8 million and Depreciation of \$36.2 million. The

Northwest Arm Sewer Rehabilitation was the largest capital project completed in the fiscal year, with a value of \$23.2 million. The Dartmouth Crossing-Cutter Avenue subdivision represented the largest developer contributed asset addition at \$2.2 million. Capital Assets Under Construction is down \$3.9 million to \$24.6 million, net of external funding received under the Build Canada and Clean Water and Wastewater Fund programs. The tables shown here highlight the major projects completed and still in progress.

Capital Asset Additions	
	Cumulative '000
Northwest Arm Sewer Rehabilitation	\$ 23,178
Sullivan's Pond Storm Sewer Replacement	\$ 11,280
Quinpool Road/Crown Drive Water Main	\$ 7,148
MacDonald Bridge Transmission Main	\$ 6,964
Computerized Maintenance Management System	\$ 4,155
Leiblin Drive Pump Station Replacement	\$ 3,456
All other projects	\$ 47,044
Total	\$ 103,224

Capital Assets Under Construction	
	Cumulative '000
Aerotech Wastewater Treatment Facility	\$ 19,358
AMI - Automated Metering Infrastructure	\$ 9,161
JD Kline Filtration Replacement	\$ 1,550
Mill Cove UV Upgrade	\$ 1,290
All other projects	\$ 4,574
Total Capital Expenditures	\$ 35,934
External Funding Received	\$ (11,383)
Net Assets Under Construction	\$ 24,550

Current liabilities of \$50.6 million are up \$8.8 million from the prior year. The increase is attributable to holdbacks and accruals associated with completed capital projects.

The Accrued Post Retirement Benefits, Accrued Pre-Retirement Benefit, Deferred Pension Liability and Supplementary Employee Retirement Plan (SERP) have been updated based on the year-end actuarial reports. The Deferred Pension Liability is \$65.5 million, an increase of \$7.0 million. For rate-setting purposes, the NSUARB considers Pension costs on a cash basis, not on the basis of the full Pension liability and expense accrual.

The balance of the reserve for Regional Development Charges has increased from \$13.1 million to \$24.2 million, which is attributable to development activity in the Halifax area.

Long Term Debt is down \$12.5 million from last year, which is a net of new debt of \$10.0 million, repayments of \$23.5 million, and an increase in the Current Portion of Long Term Debt of \$1.0 million. The debt service ratio of 21.2% is well below the maximum 35% ratio allowed under the blanket guarantee agreement with HRM.

Annual Financial Results Continued...

The discussion of Operating Results is based on the NSUARB Accounting and Reporting Handbook, as this is what budgets and rates are based on. The following table compares the results, excluding OCI, with the budget approved at the February 2, 2017 Board meeting. The final results are \$10.6 million better than budget with Revenue finishing higher than budget and Expenses finishing lower than budget.

Summarized Consolidated Operating Results			
	Actual 2017/18 '000	Budget 2017/18 '000	\$ Variance
Operating Revenue	\$ 138,145	\$ 135,587	\$ 2,558
Operating Expenses	\$ 104,452	\$ 106,241	\$ (1,789)
Operating Profit (Loss)	\$ 33,694	\$ 29,346	\$ 4,348
Non Operating Revenue	\$ 4,486	\$ 2,787	\$ 1,699
Non Operating Expenses	\$ 34,376	\$ 38,882	\$ (4,506)
Net Surplus (Deficit)	\$ 3,804	\$ (6,750)	\$ 10,554

Year to Date Operating Results by Service		
	2017/18 '000	2016/17 '000
Water	\$ 1,043	\$ 3,731
Wastewater	\$ 2,884	\$ 3,484
Stormwater	\$ (124)	\$ 1,643
Net Surplus (Deficit)	\$ 3,804	\$ 8,858

The NSUARB Net Profit for the year is \$3.8 million, including accrued pension expenses of \$5 million. When accrued pension expenses are removed, the net profit increases to \$8.8 million. Accrued pension expenses are not included in Halifax Water's rates; however they are expenses associated with liabilities that the utility is required to record.

The cumulative Operating Surplus of \$16.7 million at the beginning of the fiscal year has grown to \$20.5 million with the net profit before other comprehensive income of \$3.8 million. The accumulated Operating Surplus will be drawn down by a budget loss of \$12.1 million in 2018/19 and allows another year with no rate increases for Water, Wastewater, and Stormwater service.

"...another year with no rate increases for Water, Wastewater, and Stormwater service."

Operating Revenues

Operating Revenue is slightly ahead of the previous year and \$2.6 million ahead of budget with Metered Sales accounting for the difference.

Metered Sales consist of base and volumetric charges. Base charges were slightly below budget expectations. Volumetric revenue budgets for 2017/18 were based on a 3% decrease in metered consumption. Billed water consumption was unusually high in the fourth quarter. This offset the normal annual decline in consumption and resulted in consumption 0.1% ahead of the prior year.

Operating Revenue Results			
	Actual 2017/18 '000	Budget 2017/18 '000	\$ Variance
Consumption Revenue	\$ 85,012	\$ 82,969	\$ 2,043
Base Charge Revenue	\$ 32,845	\$ 33,044	\$ (199)
Wastewater Rebate	\$ (642)	\$ (1,646)	\$ 1,004
SW Site Related Charge	\$ 6,169	\$ 6,700	\$ (532)
Sub-total	\$ 123,383	\$ 121,067	\$ 2,316
HRM Fire Protection	\$ 7,074	\$ 7,075	\$ (1)
SW Right of Way Charge	\$ 3,847	\$ 3,881	\$ (34)
Other Operating Revenue	\$ 3,841	\$ 3,564	\$ 277
Total	\$ 138,145	\$ 135,587	\$ 2,558

Operating Expenses

Operating Expenses of \$99.4 million (\$104.4 million less \$5 million accrued pension expenses) are \$6.6 million higher than the prior year and \$2.4 million below the budget for the year. Compared to the prior year, expense categories with the largest increases are Wastewater Collection, Stormwater Collection, Administration and Pension, and Depreciation.

Financial Revenue

Investment income was budgeted to decrease this year as a result of accounting changes. Previously, investment income was earned in part through charges on Capital Assets Under Construction. This practice was eliminated for the current fiscal year, but higher than anticipated cash balances and rising interest rates mitigated the impact on revenue. Miscellaneous revenue is up \$1.2 million including the receipt in December of a payment of \$0.9 million in relation to the total completion of the Harbour Solutions project. Miscellaneous Revenue also includes various unregulated activities such as tower leases, energy generation, consulting activities and some contracted services.

Results by Activity		
	2017/18 '000	2016/17 '000
Regulated Activities	\$ 2,203	\$ 7,626
Unregulated Activities	\$ 1,600	\$ 1,232
Net Surplus (Deficit)	\$ 3,804	\$ 8,858

Long Term Debt costs decreased \$0.7 million from the prior year. Debt servicing savings are a result of new debt issues having lower interest rates than older, maturing issues. New debt was issued in the Municipal Finance Corporation's (MFC's) Fall Debenture in the amount of \$10.0 million. The Dividend/Grant In Lieu of Taxes is paid annually to HRM. The amount is based on the net asset value of water assets and increased this year to \$4.8 million.

Activities regulated by the NSUARB show a profit of \$2.2 million, a decline from the \$7.6 million profit for the same period last year. Unregulated activities show a profit of \$1.6 million, ahead of the profit of \$1.2 million for the prior year. The profit increase is a result of the contract to treat wastewater from the aircraft carrier, the USS Dwight D. Eisenhower that visited Halifax in the summer and lower costs associated with dewatering and biosolids treatment.

Cost Containment

Cost Containment is an on-going focus for the Utility to help stabilize rates. A formal cost containment program has been in place for four years. For 2017/18 \$1.9 million in new cost containment initiatives were recorded. On June 30, 2017, the cumulative total of cost containment initiatives of \$6.6 million was reported to the NSUARB.

Regulatory Activity

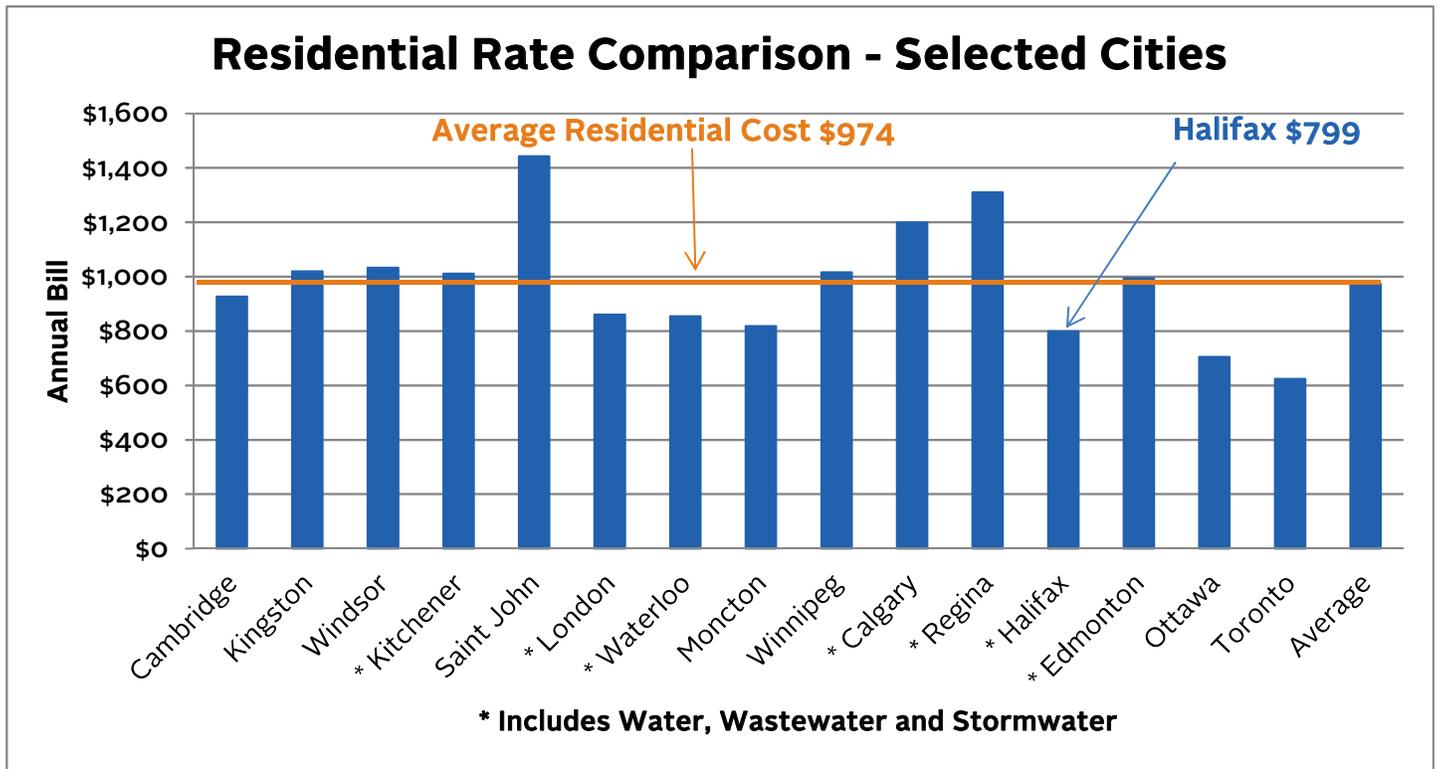
Rates for Water and Wastewater service did not change this fiscal year, having last been adjusted on April 1, 2016. A new rate structure for Stormwater Service took effect July 1, 2017. This new rate structure reset the rates, but did not increase revenues. The rate for many customers decreased, as shown in the Summary of Rate Change – Stormwater table below.

Summary of Rate Change - Stormwater				
	Effective July 1/17	Effective April 1/14	\$ Change	% Change
Residential - Impervious Area				
Less than 50 m2	-	\$ 33.39	- 33.39	- 100%
50 to 200 m2	\$ 14.00	\$ 33.39	- 19.39	- 58.1%
210 to 400 m2	\$ 27.00	\$ 33.39	- 6.39	- 19.1%
410 to 800 m2	\$ 54.00	\$ 33.39	20.61	61.7%
Greater than 810 m2	\$ 81.00	\$ 33.39	47.61	142.6%
Culvert only service	\$ 14.00	Varies	Varies	Varies
ICI Rate per m2	\$ 0.135	\$ 0.149	- 0.014	- 9.4%

"This new rate structure reset the rates, but did not increase revenues. The rate for many customers decreased..."

Comparable Rates

From a competitiveness perspective, Halifax Water's rates compare very favourably and continue to be among the lowest in Canada. The average residential bill for water, wastewater and stormwater service is \$799 per year, compared to the average of \$974 from benchmarked Canadian cities.



Halifax Water Customer Assistance Programs

In 2017/18, Halifax Water took significant steps to enhance, and introduce new programs that will benefit customers with low incomes.



Halifax Water has partnered with the Salvation Army since 2010 to provide emergency assistance to low-income customers through the H2O (Help to Others) Program. This program is available once in a 24 month period to a maximum grant of \$250. In 2017/18 Halifax Water engaged a consultant to complete a Rate Affordability study, and the Halifax Water Board approved an expansion of the H2O Program, which was implemented in 2018. The income eligibility thresholds and the amount of assistance were increased to expand the program in April 2018.

In 2017, Halifax Water implemented a program to provide a rebate to customers of 25% of the cost of private lead service line replacements, up to a maximum of \$2,500. This will benefit all customers replacing lead service lines, as there is no income threshold.



Halifax Water also created a new program in 2017/18 to provide financing assistance to customers doing a full replacement of the private portion of water or wastewater laterals, or private laterals that are part of a new deep stormwater installation in areas where none previously existed. The program is designed to provide a financing option for customers who do not have other more favourable means to pay for or finance their private lateral replacement. This program came into effect May 2018.

SERVICE EXCELLENCE

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, **customer service**, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Customer Care Centre

2017/18 was the first complete fiscal year operating as a full-service Customer Care Centre, as opposed to a billing and account contact centre. The transition from a historical billing and account contact centre began in 2016 and involved implementing a Customer Relationship Management System (CRM), integration with a work order system for water, wastewater, and stormwater operational service requests, and centralization of wastewater and stormwater calls formerly handled by HRM's 311 centre.

2017/18 Customer Care Centre Performance					
Total Calls Answered	Average No. of Calls Daily	Abandonment Rate	Average Speed of Answer	Busiest Day of the Year	Busiest Month of the Year
70,119	327	12%	84 seconds	March 19, 2018 583 Calls	March 2018 7,862 Calls

Customer Care Centre performance in 2017/18 fell short of performance targets primarily due to call duration and volumes increasing in the January to March period due to a convergence of annual billing of stormwater only customers and increasing calls regarding the Advanced Meter Infrastructure (AMI) project. The capacity and staffing of the Customer Care Centre is continuously reviewed in an effort to maintain high-quality customer service.

Customers also contact Halifax Water using online service requests and through a generic email customerservice@halifaxwater.ca.

There appears to be steady growth in email volumes. The email volume in 2017/18 was 6,988. A new process has been implemented to track email correspondence from customers through the CRM, meaning our ability to analyze and track email requests will be improved in future.

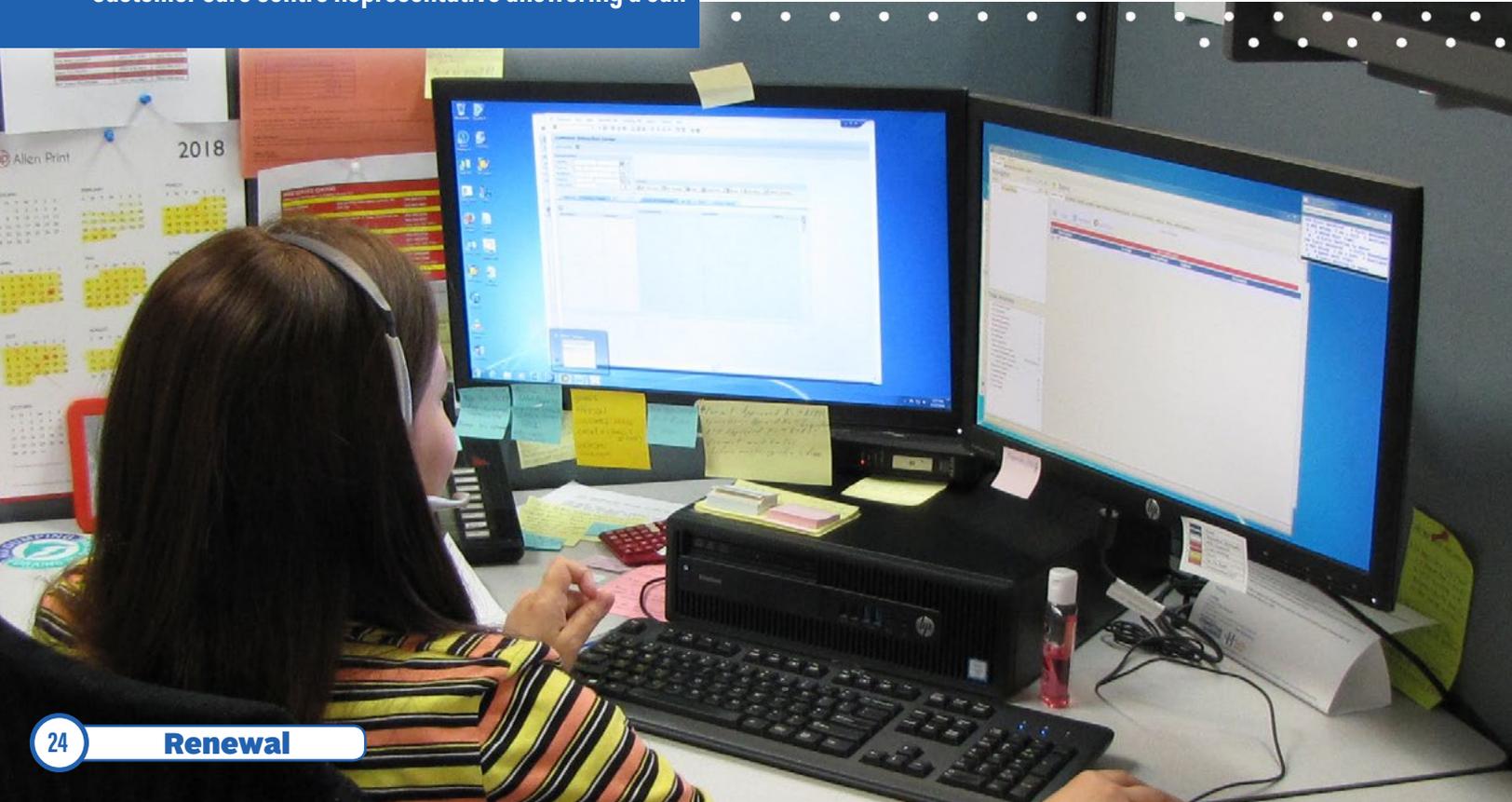
In 2017/18 a new phone number for Customer Care was implemented H2O-WATR (902-420-9287), a campaign was conducted to encourage customers to subscribe to e-billing, and a new customer complaint and Dispute Resolution process was implemented.

Locates

Providing utility infrastructure locates to contractors and other utilities before they dig is an important utility function. In 2017, Halifax Water successfully launched a new business function to specialize on locating. This has improved efficiency and level of service.

In 2018, Halifax Water will be joining other local utilities in a single "call-before-you-dig" service.

Customer Care Centre Representative answering a call



Advanced Metering Infrastructure (AMI)



CUSTOMER CONNECT



AMI Meter Face

In 2016/17, Halifax Water received NSUARB approval to proceed with an Advanced Meter Infrastructure (AMI) project. By the end of 2017/18, 20,000 AMI meters were installed. The project is scheduled to be complete in late 2019. AMI is a system whereby, in lieu of meter readers walking or driving routes, a fixed network of radio devices is established over the service area to read meters on a much more frequent basis (typically hourly).

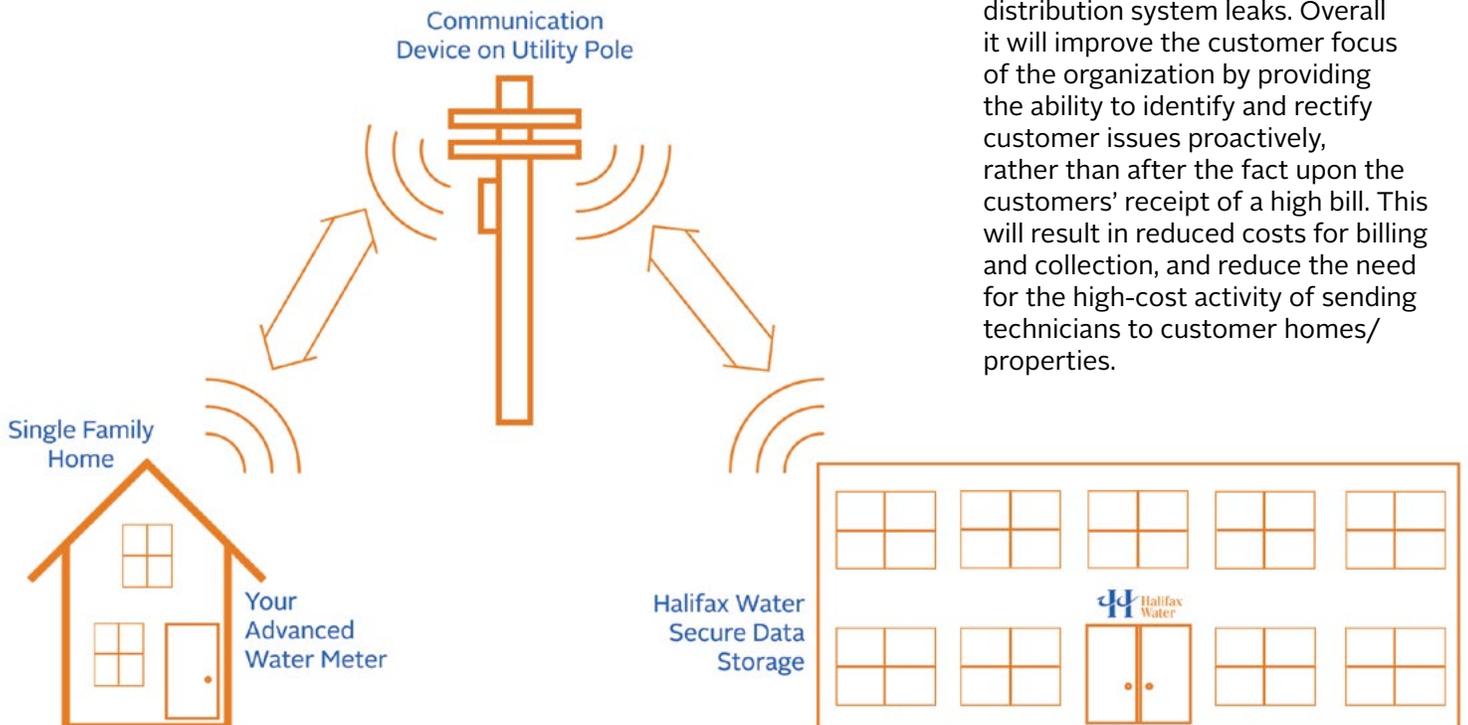
In addition to streamlining the meter reading process and reducing its cost, AMI promises many features that will improve the level of service

Halifax Water can offer in the future to its customers.

These include:

- The ability to offer monthly billing to residential and small commercial customers thus making it easier for customers to manage cash flow and automated payments. Large institutional, commercial and industrial customers are currently billed on a monthly basis.
- Billing errors will be reduced, and estimated meter readings will be eliminated.
- Halifax Water will be able to alert customers to high consumption due to things like plumbing leaks, almost as they happen, reducing billing disputes and high bill amounts.
- Customers will have the ability, through a web link, to manage their water consumption and see the effect of any conservation measures they take.

Advanced Metering Infrastructure Diagram



AMI will provide much more data about customer consumption and distribution system operations. This may enable earlier identification of distribution system leaks. Overall it will improve the customer focus of the organization by providing the ability to identify and rectify customer issues proactively, rather than after the fact upon the customers' receipt of a high bill. This will result in reduced costs for billing and collection, and reduce the need for the high-cost activity of sending technicians to customer homes/properties.

EFFECTIVE ASSET MANAGEMENT

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, **asset management**, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Clean Water and Wastewater Fund

2016/17 saw the approval of five projects under the federal/provincial Clean Water & Wastewater Fund (CWWF) program. 2017/18 was the year to move these critical projects to the construction phase. Three of the projects were successfully completed, while the other two proceeded to construction and are still in progress into 2018/19.

Northwest Arm Sewer Rehabilitation

Federal/Provincial Funding: \$12,257,781

The Northwest Arm Trunk Sewer (NATS) is a 100-year old combined sewer servicing 650 hectares and a population base of some 22,000 people. The trunk sewer is 4.5 km in length and is typically 1200 mm in diameter. It was constructed using a combination of materials and cross-sections. This project saw the rehabilitation of the sewer using “cure in place pipe” (CIPP), also known as “no-dig” technology. CIPP inserts a resin/fabric liner in the existing deteriorated pipe through manholes and other strategic locations. The liner is then heated to form a new, structurally sound pipe designed to last 80+ years. The \$23 million project was substantially complete by December 2017. The project challenges and achievements were many and included:

- stakeholder engagement;
- wastewater bypass system;
- accessibility challenges due to the off-street location and topography of the NATS easement;
- CIPP installation lengths in excess of 400m;
- bridge restrictions imposing constraints on material delivery;
- and a unique design approach for the arch shaped portions of the sewer.

The project goals have been achieved with an 80+ year extended life and have reduced leakage and overflows into Northwest Arm.

Sullivan's Pond Storm System Renewal Phase 1

Federal/Provincial Funding: \$6,321,925

The 580 m Sullivan's Pond stormwater drainage system was constructed in the early 1970s and provides stormwater drainage from Lake Banook/Sullivan's Pond and the upstream watershed to Halifax Harbour at Dartmouth Cove. Condition inspections and investigations determined the piped system was nearing the end of its service life.



Sullivan's Pond Storm System Renewal Phase 1

Sullivan's Pond Storm System Renewal Phase 1 Continued...

- The detailed design provided for the 100-year storm event and fish passage with full consideration of the impacts of climate change. Construction commenced in July of 2017 and was substantially complete by March 31, 2018. The new system includes both cast-in-place concrete and precast concrete to form the open channel, closed channel, and bridge span sections.
- The project challenges and achievements included:
 - provision of fish passage as stipulated by the Department of Fisheries and Oceans;
 - daylighting portions of the system;
 - integration of system within public parks including compatibility with ongoing historical interpretative infrastructure construction (Shubenacadie Canal Marine Railway);
 - integration of system within easement on private property;
 - flow management during construction including adjustment of water levels in Lake Banook (an active canoeing/kayaking lake);
 - access to adjacent residential and commercial properties during construction; pedestrian and vehicle detours;
 - and stakeholder engagement including several advocacy groups, local residents and five canoe and kayak clubs.

Peninsula Transmission Main Rehabilitation

Federal/Provincial Funding: \$5,631,446

The project involved the upsizing/replacement of approximately 3550 metres of transmission mains along Crown Drive and Quinpool Road. The old mains had been installed in the 1800s and were part of the original system that supplied water to peninsular Halifax.

The first phase of the work involved the replacement of all three mains from the end of Crown Drive near Northwest Arm Drive to the Crown Drive/Finch Lane intersection (Peninsula Intermediate Transmission Main, the Peninsula Low North, and the Peninsula Low South Transmission Mains; approximate length of replacement was 1050 metres for each of the three lines).

The second phase involved the upsizing/replacement of the Peninsula Low South Transmission Main along Quinpool Road between Parkwood Terrace and Beech Street.

Lake Major Dam

Federal/Provincial Funding: \$3,388,287

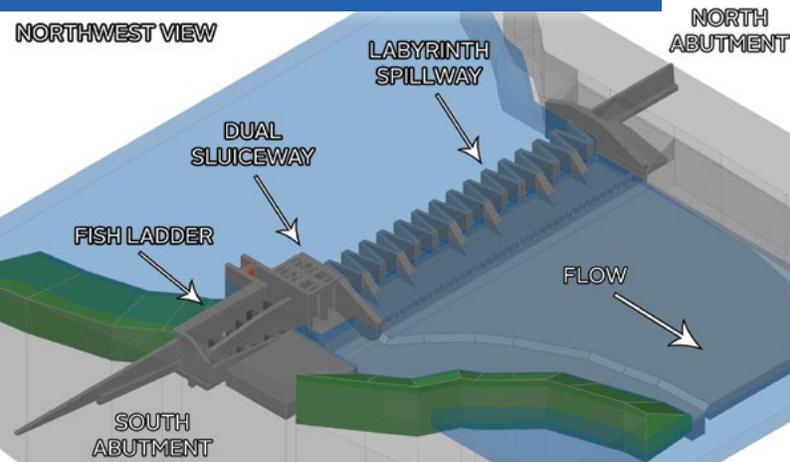
The existing Lake Major Dam was constructed in the 1940s. The timber crib structure has reached the end of its service life. The dam is in the process of being replaced in order to enhance public safety and protect the integrity of the Dartmouth water supply.

The new dam design includes a labyrinth spillway section to help mitigate flood risk, a Department of Fisheries and Oceans approved “pool and weir” fish ladder to support fish migration, and two sluice gates to provide environmental flows to support downstream aquatic life.

Construction is scheduled to begin in June 2018, with the new dam expected to be complete by winter 2019. Removal of the existing dam is anticipated to be complete by Spring/Summer 2019.

The design of the new dam meets Nova Scotia Environment requirements including conformance with an Environmental Assessment approval acquired in 2017.

Lake Major Dam Design



JD Kline Filter Media and Underdrain Replacement

Federal/Provincial Funding: \$3,150,120

This CWWF funded project provides for the retrofitting of all eight existing dual media rapid sand filters at JD Kline Water Supply Plant. As of March 31, 2018 two filters are complete with the work on a third filter and air scour building under way. It takes approximately three months to retrofit each filter along with bringing the air scour capability to these filters. The estimated completion date is December 2019.

Aerotech Wastewater Treatment Facility Expansion and Upgrade

At a total project cost of \$22 million, the Aerotech Wastewater Treatment Facility (WWTF) project, driven by compliance and growth, is benefitting from the federal/provincial New Building Canada Fund. Construction of the new facility began in September 2016 and continued throughout the 2017/18 year.



Installation of membrane modules at the Aerotech WWTF

The project is projected to be completed in early-August 2018. Halifax Water customers in this area will benefit from the significantly improved effluent quality being discharged, and the increased capacity to fuel growth within the adjacent industrial park, and the airport complex.

Bedford By-Pass Water Transmission Main

This project involved the replacement of approximately 1100 metres of the transmission main that supplies the Bedford and Sackville areas. The existing Prestressed Concrete Cylinder Pipe (PCCP) was installed in the Hammonds Plains Road and along the edge of Highway 102. This section of the transmission main had a history of previous failures, and was likely to fail again. The project involved the installation of new piping beside an existing main within a dedicated service easement, and through an existing highway crossing tunnel. Once the new supply line was installed and commissioned, portions of the old main along Hammonds Plains Road and Highway 102 were abandoned. Halifax Water worked with HRM to install a new sidewalk/multi-use trail along a portion of Hammonds Plains Road as part of the work.

Capital Infrastructure Projects

Leiblin Pump Station Elimination

Halifax Water has a significant inventory of wastewater pump stations. Many are coming to the end of their useful life, and either need replacement or comprehensive renovation.

As the capital, operational and maintenance costs of pump stations is significant, staff investigate the feasibility of eliminating a pump station via the installation of a gravity sewer. This was the case for the Leiblin Pump Station.

The Leiblin Pump Station was constructed in the mid-1960s and required an upgrade to add backup power to prevent sanitary sewer overflows during wet weather/ power outages and replace aged mechanical and electrical systems. In lieu of upgrades, the pump station was eliminated by installation of 683 metres of gravity sewer.

The project was completed in 2017 and the final cost was \$3.456 million providing a much lower long-term cost versus renewing the pumping station.



Leiblin Pump Station Elimination

MacDonald Bridge Watermain Replacement

As part of the Harbour Bridge's "Big Lift" re-decking project, Halifax Water's existing water main under the suspended span of the MacDonald Bridge had to be replaced. This 600mm (24") diameter water main was originally installed in 1972 and served as a backup connection allowing water to flow in either direction should the Halifax or the Dartmouth water system need additional supply. Overall, approximately 850 metres of the 1350 metres of the existing main was replaced as part of the project. The main was deactivated and drained in March of 2015 and placed back in service in January of 2018.

The final cost of the Transmission Main Replacement portion of the project was just under \$7.0 million.

The transmission main provides flow in either direction across the bridge. Depending on the supply requirements, the line can supply approximately 2 MIGPD (million imperial gallons per day) from Halifax to Dartmouth and approximately 4 MIGPD from Dartmouth to Halifax. The line is kept in active service with approximately 100 IGPM flowing all the time. This line forms a critical part of Halifax Water's water system resiliency and redundancy approach to supply and emergency management.

MacDonald Bridge



Asset Management Plans

Asset Management Team

The Asset Management (AM) Team is responsible for long-term infrastructure planning and the corporate asset management program.

AM Team Responsibilities

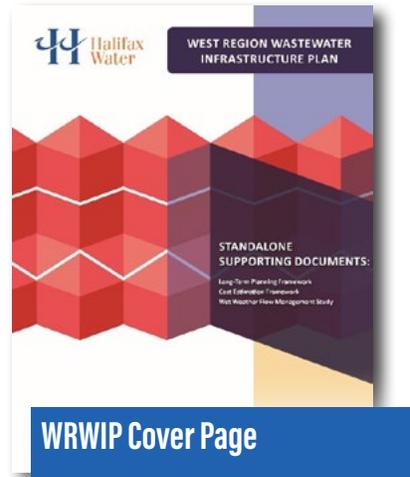
Infrastructure Planning	Asset Management
Infrastructure Master Planning	Foundational Asset Management
Hydraulic System Modelling	Sewer Inspection Program
Flow Monitoring Program	Capital Budget Development

Key achievements in 2017/18 included completion of the West Region Wastewater Infrastructure Plan (WRWIP), updating the Asset Management Plan (AMP) for fiscal 2017, and completing year two of both the corporate flow monitoring program and the sewer inspection program. Additionally, the AM Team is the lead for the preparation of the annual capital budget.

WRWIP

The West Region Wastewater Infrastructure Plan (WRWIP) provides an updated capital investment plan for wastewater infrastructure necessary to support Halifax Regional Municipality's growth projections to 2047 for the west region. Highlights of the project included confirming the west region servicing strategy, enhanced system modelling, and identifying a series of wet weather projects that may free up system capacity and thereby enable Halifax Water to defer expenditures for wastewater facility upgrades into the future. The

WRWIP also provides the foundation for continuing infrastructure planning for the east and central wastewater regions, as well as all water regions in future years.

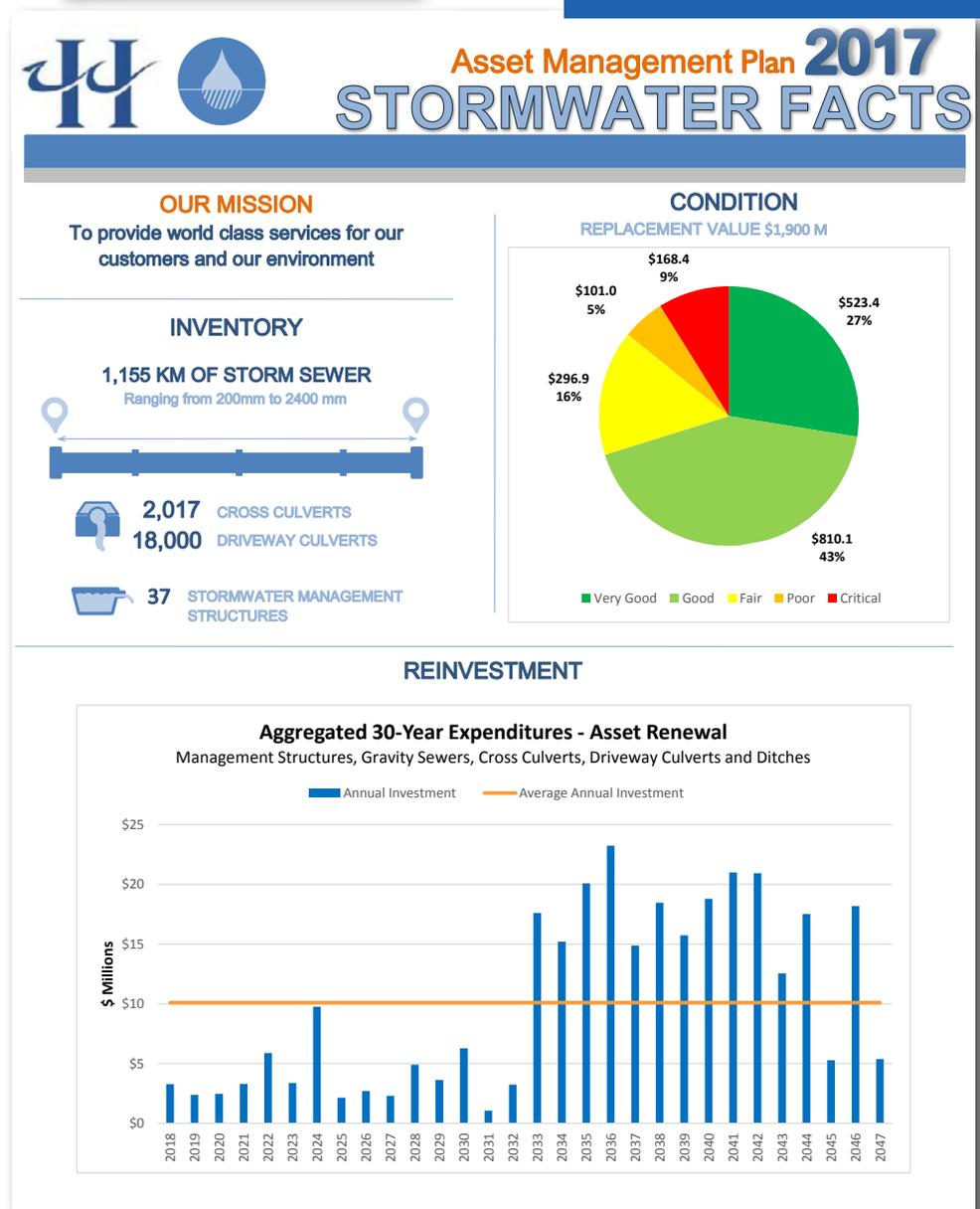


2017 Asset Management Plan

The 2017 Asset Management Plan (AMP) involved significant effort to fill data gaps and resolve data inconsistencies. The resulting update provides an improved picture of the state of Halifax Water infrastructure assets and lays the groundwork for moving into focused asset management implementation teams.

Fact sheets for each of the infrastructure service types illustrate the aggregated information of the asset classes within each service type.

AMP 2017 Stormwater Fact Sheet



Asset Management Plans Continued...

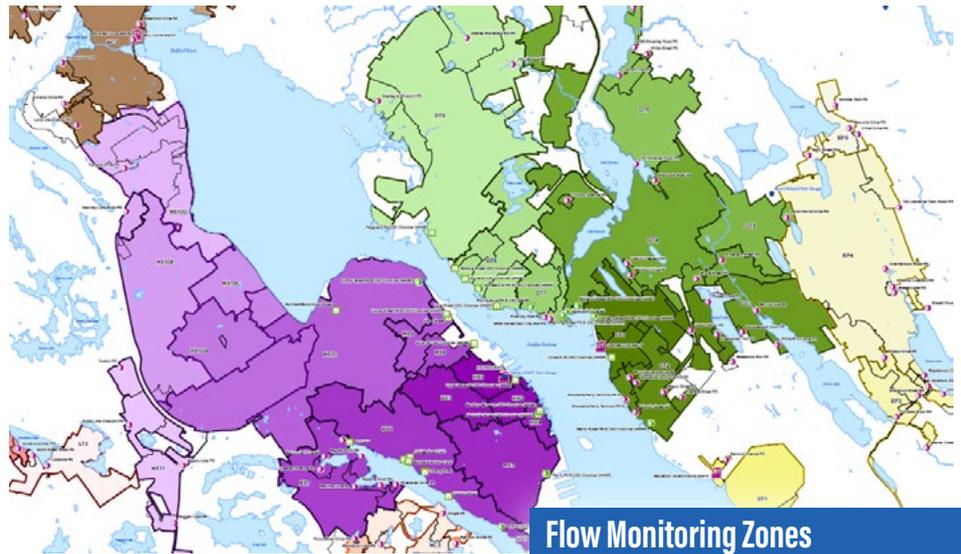
Corporate Flow Monitoring Program

Year two of the corporate flow monitoring program resulted in the deployment of a total of 63 flow monitors: 47 for the Flow Monitoring Zones (FMZs shown in the adjacent map), and 16 for the Wet Weather Management Program (WWMP). This program continues to provide valuable information that is used in advance of specific capital projects, to calibrate the hydraulic models to the way the system operates, and enable monitoring before, during, and after wet weather-related projects.



Typical Field Set Up for Monitor Installs

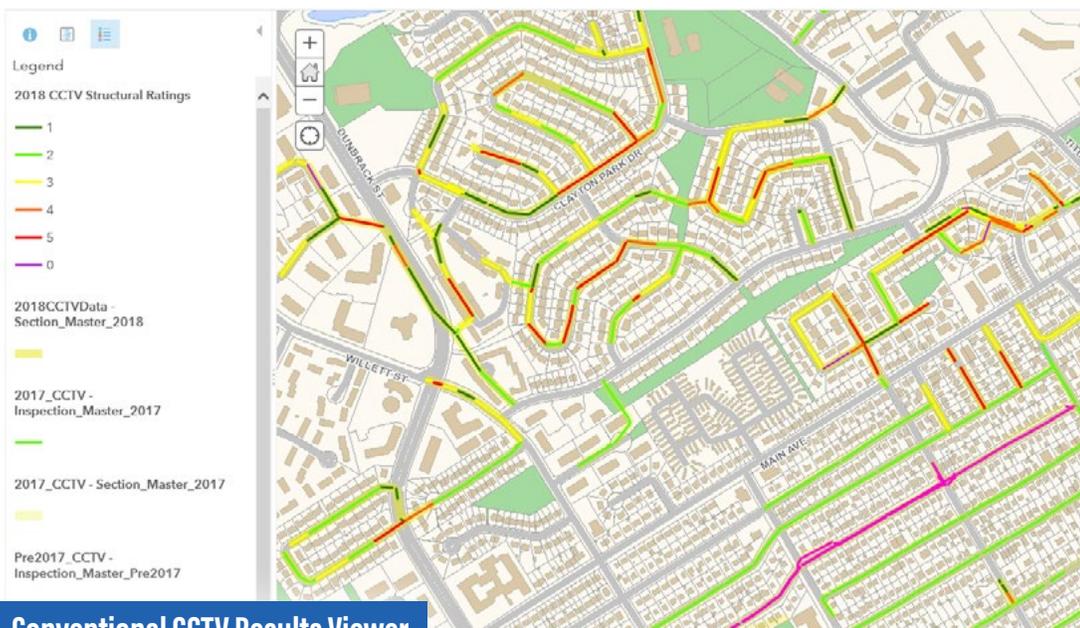
Flow Monitor Installation Site



Flow Monitoring Zones

Sewer Inspection Program

Year two of the sewer inspection program saw an increase in production. In 2017/18, 50,150 metres of sewers, 538 manholes, and 289 catchbasins were inspected. In addition to the production increase, staff worked with a variety of Geographic Information Services (GIS) tools to create easier ways to share the inspection outcomes. ArcGIS viewers were used for conventional closed circuit television (CCTV) inspection and ArcGIS Online Operations Dashboard was used to display zoom camera inspection results.



Conventional CCTV Results Viewer

Energy Management

Energy use in urban water and wastewater/stormwater treatment facilities and their respective distribution and collection systems remains among the highest in North America, typically consuming over 30% of municipal energy usage, and over 4% of the total national energy usage (US Data). With this in mind, Halifax Water has continued efforts to improve its energy footprint.

- The Energy Management Plan was updated to identify specific annual energy reduction targets and activities to be completed in 2017/18.
- Various equipment and infrastructure upgrades were completed in 2017/18, as well as a number of ongoing annual operating initiatives. A number of other projects are being considered for future implementation. The technical and financial feasibility of each opportunity will determine which projects are taken on. Projects and initiatives completed in 2017/18 resulted in over 4,495,000 kWh in annual energy savings, over \$458,000 in cost savings, and over 2,400 Tonnes CO₂e in GHG (greenhouse gas) reductions. Completed projects and annual initiatives are shown in the table below.
- Use of the Energy Management Information System continued in 2017/18, with the addition of potable water consumption data for all of Halifax Water's facilities, and water and wastewater

treatment flow data for the larger facilities. These efforts improve the accuracy of data for each facility.

- Early stage development of the Cogswell District Energy System (DES) has also continued. The preliminary design of the underground linear infrastructure (i.e., DES distribution piping systems) was started in 2017/18, along with a by-law review of similar Canadian systems. Stakeholder information packages are being developed to facilitate the promotion of the project to the local community and updating of the business case to reflect any changes coming from the 60% design exercise. Halifax Regional Municipality has also completed amendments to their City Charter, adding language that will allow district energy systems to be implemented within the city's boundaries, and designating the Cogswell Redevelopment Area a mandatory connection zone for the DES. Next steps include the completion of the detailed designs for the linear infrastructure, energy centre, energy transfer stations, and the development of the required building specifications.
- A continued focus on early stage involvement in infrastructure projects has also brought a focus on energy efficiency and sustainability at the design stage, resulting in efficiency improvements implemented during construction of these projects. Current projects include the Aerotech WWTF

Upgrade, Kearney Lake Trunk Sewer Pump Station upgrades, and the Mill Cove Pump Station upgrade project.

- When appropriate, Halifax Water has also taken advantage of provincial energy efficiency rebate programs offered by Efficiency Nova Scotia, which help to reduce capital costs and improve project payback.



Mill Cove WWTF UV System Upgrade

Overall results for 2017/18 were excellent, with an overall annual energy reduction of -7.2%, an aggregate reduction in water and wastewater flows of -0.9%, and an overall reduction in GHG emissions of -5.9%. A focus on further energy efficiency and operational improvements to existing infrastructure and on completing energy audits in the rest of our facilities in the coming years will allow Halifax Water to continue to build on these results.

Service Area	Facility	Project/Initiative	Annual Savings (\$)	Energy Reductions (kWh)	CO ₂ Reduction (tonnes/yr)	Energy Source
Capital Project Completions						
Water	JD Kline	Boiler Replacement	\$ 3,800.00	47,448	12	Heating Fuel Oil (HFO)
Water	JD Kline	Admin HVAC Upgrades	\$ 83,350.00	482,023	71	HFO/Electricity
Wastewater	Mill Cove WWTF	Pump Station Upgrade	\$ 26,041.00	241,300	202	Electricity
Wastewater	Mill Cove WWTF	Ultraviolet Light Upgrade	\$ 139,698.00	1,253,293	880	Electricity
Wastewater	Dartmouth WWTF	Ventilation Air Heat Recovery	\$ 45,133.00	801,078	130	Natural Gas
Annual Initiatives						
Wastewater	*HHSPs + EPWWTF	Ultraviolet Light Shutdown	\$ 160,632.00	1,669,913	1,169	Electricity
*Halifax Harbour Solutions Plants & Eastern Passage Wastewater Treatment Facility			\$ 458,654.00	4,495,055	2,464	

Information Technology

Information Services developed a Five-Year Information Technology Strategy that focused on improving the customer experience with Halifax Water. This plan incorporates all aspects of customer service, from the Customer Care Centre, to the online experience. The strategy will help modernize our telephone system, improve our systems integration, and rebuild our website. The website rebuild will incorporate input from our customers to make it more user-friendly.

Halifax Water will also implement better IT disaster recovery capabilities.

Future initiatives will provide our customers with AMI meters, online access to their water consumption and billing information. This information can be used by our customers to detect leaks in a timelier manner. Improvements were made to several of our applications including our work order system, our service approvals system, and our Geographic Information System (GIS).

copy and digital mapping and web GIS applications for internal and public use.

The EI team also updates and maintains the GIS database as well as performs quality control (QC) measures on the data.

The Halifax Water capital program is also supported by the Computer Aided Design (CAD) services from the EI team. Key achievements in 2017/18 include:

- bringing the pipe network to more than 99% complete in GIS;
- hosting of the GIS and Cityworks server environments within Halifax Water;
- development of a Cityworks support model;
- growth in Web GIS capabilities and an approved Web GIS governance, and;
- key participants in IT Strategic Plan (beginning the development of a GIS roadmap).

Technical Workgroup	Updating Workgroup	Business Solutions Workgroup
System Admin & Maintenance	Database Updating & Maintenance	Digital Mapping & Data Products
Application Development & Support	Data QA/QC	Web GIS Governance & App Development
Analysis & Technical Solutions	Capital CAD Program	Data Sharing Agreements

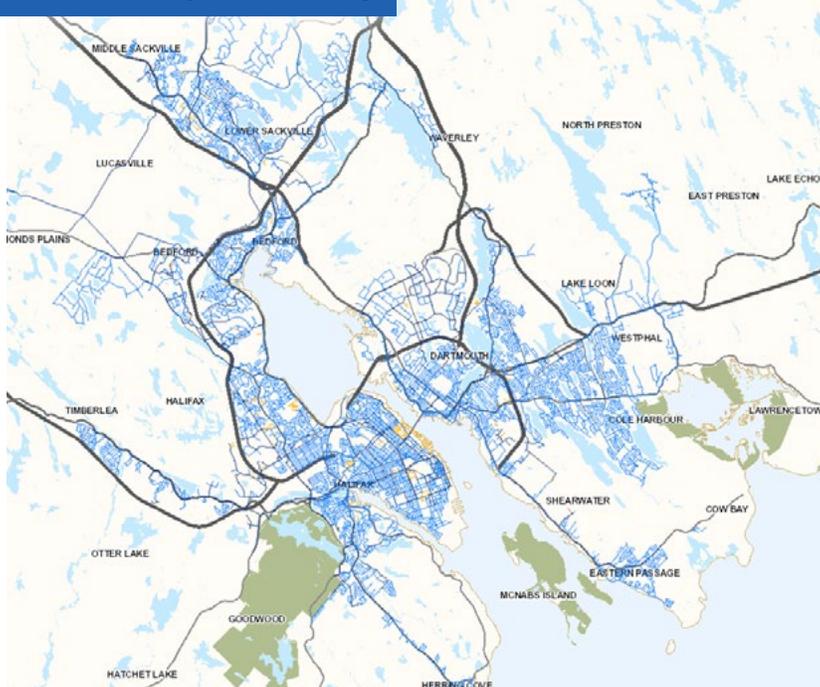
The Engineering Information (EI) Team is responsible for the enterprise Geographic Information System (GIS) including application support, system and server administration and database administration and maintenance. The EI team also produces hard

Pipe Network Build

This project brought the pipe network for water, wastewater and stormwater to greater than 99% complete, the end result of a focused five-year project to

build the full database for the entire pipe network. This year will see the completion of any minor remaining gaps in the system. A complete system network enables the ability to perform other geospatial related capabilities such as network tracing, hydraulic modelling and improved asset planning.

Pipe Network Map

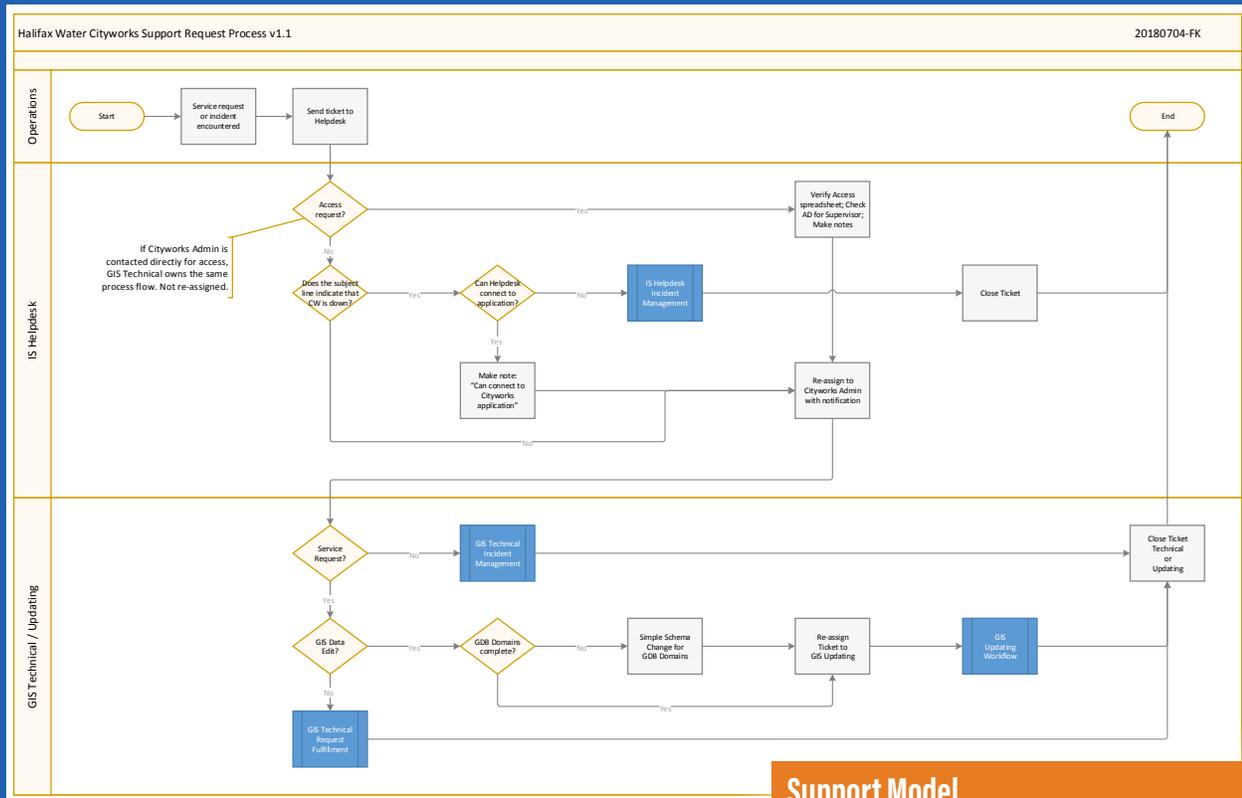


GIS/Cityworks Hosting

This project created a new home for our GIS and Cityworks servers, software, applications and databases allowing for greater control and a more agile environment when it comes to administration and management of our critical infrastructure applications. The project was completed in March of 2018 and saw the hosting of all GIS applications as well as the Cityworks application. The project also facilitated a migration from Oracle to SQL Server for our database environment as well as Active Directory integration with GIS applications. This project established not only a Production environment but also quality assurance, development, and training environments as well. A mechanism for two-way data sharing with Halifax municipality was also implemented.

Support Models

The Engineering Information Team took on the Tier 1 support for the Operational Maintenance Management application, Cityworks. Part of this transition included the development of a support model which involves the GIS workgroup and the IS workgroup jointly providing user and application support.



Support Model

Updating Workflows

New data maintenance workflows were developed for CCTV and zoom camera data. As well, workflows for the updating of facility data in the Cityworks work order system were implemented for the treatment plants.

Web GIS Growth

Web GIS mapping applications continued to grow within the organization both for internal business unit use and for use by our Communications Department when providing project specific information to the public. Examples of these include the Residential Meter Upgrade Application, which provides communication to customers about when the project would be targeting their neighbourhood. Another was the Northwest Arm Trunk Sewer Rehabilitation project where a public mapping application supported project communication to residents who were impacted by the project. These web applications and others can be viewed in the Public App Gallery. Web GIS governance was developed and approved for use in the 2017 year to ensure continued success in web application and map development.

<p>Halifax Water Residential Meter Web Mapping Application</p>	<p>Halifax Water Stormwater Service Web Mapping Application</p>	<p>Halifax Water Lead Service Line Boundary Web Mapping Application</p>	<p>Where Does My Wastewater Go? Web Mapping Application</p>	<p>Where Does My Water Come From? Web Mapping Application</p>
<p>Halifax Water AGOL App Gallery Web Mapping Application</p>	<p>Halifax Water Source Water Protection Areas Web Mapping Application</p>	<p>Halifax Water Bulk Fill Web Mapping Application</p>	<p>Northwest Arm Trunk Sewer Rehabilitation Web Mapping Application</p>	<p>Halifax Water Hydrant-Catchbasin Application Web Mapping Application</p>

Halifax Water Public App Gallery

Link: <http://hwc.maps.arcgis.com/apps/MapAndAppGallery/index.html?appid=e204e61a338a4444b72167cf10a68491>

REGULATORY COMPLIANCE



Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, **regulatory compliance**, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Engineering Approvals

The Engineering Approvals group is focused on adherence to the Halifax Water Design Specifications, the Supplementary Standard Specification, and the Schedule of Rates, Rules and Regulations with respect to connections to, and expansions of, Halifax Water's Systems. The administration of new service connections includes the oversight of the Regional Development Charge.

In 2017/18, the Engineering Approvals group processed:

Application Type	2017/2018	2016/2017
Building Permit applications	655	650
New Service & Renewal applications	287	379
Subdivision Applications	249	292
Demolition Permits	104	115
Clearance Letters	17	32
Tender Reviews	86	95
New Backflow Prevention Applications	93	93
Backflow Prevention Devices are active	6697	6604

In 2017/18, staff reviewed system extensions totalling:

Metres of New Water Main	6,768
Metres of New Wastewater Main	6,395
Metres of New Stormwater Main	6,769

Regional Development Charge

In 2014, Halifax Water received approval to replace the historical Sewer Redevelopment Charge administered by the Municipality with a charge for regional water infrastructure, the Regional Development Charge (RDC). In developing the RDC, staff reviewed the projected population growth and identified the upgrades, and associated costs to Regional wastewater and water infrastructure to accommodate growth over the next 30 years.

A charge per new residential dwelling unit or non-residential floor area was created using this information. Halifax Water committed to regular five-year reviews of the RDC, and to identify interim changes and impacts based on new and best information that may result in a 15% +/- change to the RDC. With the completion of the West Region Wastewater Infrastructure Plan, staff concluded that the new servicing strategy and the associated project costs required for the west region were estimated to cause a 5.1% increase to the wastewater RDC project costs. This did not trigger the need for an interim review or adjustment to the actual RDC rate.

Halifax Water will be engaging stakeholders in the fall of 2018 to commence the five-year update to the RDC in 2019.

Environmental Engineering

The Environmental Engineering group oversees the Pollution Prevention (P2) Program and Inflow & Infiltration (I&I) Reduction Program. The purpose of these two programs is to regulate the quantity and quality of discharge from customer connections to the wastewater and stormwater system. Non-compliant discharges can impact the health and safety of Halifax Water workers, the public, the environment, and create operational and compliance issues with Halifax Water infrastructure and treatment plants.

The disposal of so-called “flushable wipes”, fat, oil and grease (FOG) into the wastewater system causes blockages in pipes, failure of pumps, and impairs the treatment process. The result is wastewater back-ups and pump failures with possible overflows. The P2 Program began using operational data from Cityworks to identify chronic problem locations and focus education and enforcement efforts on those areas first.



Rags clogging Wastewater System

Pollution Prevention is also responsible for regulating the resolution of situations where a private wastewater system was inadvertently connected to a stormwater system. Six of these wastewater to stormwater cross connections were resolved over the past year.

The I&I Reduction Program identifies and resolves private property connections where stormwater is entering the wastewater system. Staff have completed a number of private side assessments on a priority basis across Halifax Regional Municipality and works closely with the Wet Weather Management Program to reduce the amount of stormwater entering the wastewater system.



Smoke Test

Staff inspected over 100 single-family residential properties in Cow Bay, Crescent Avenue and Springfield Lake last year. A number of new approaches to communicating with residential customers about I&I reduction, such as open houses and more reader-friendly written communication have been well received by customers.



Manhole Overflowing

Seasonal Disinfection

Halifax Water's Operating Permits for Halifax, Dartmouth, Eastern Passage and Herring Cove Wastewater Treatment Facilities have been amended successfully to allow for a permanent Seasonal Disinfection program. As part of the treatment process, ultraviolet (UV) disinfection equipment will operated from May to October and be turned off from November to April (except for two weeks before the Polar Bear Swim on January 1). The UV lights at the end of the wastewater treatment process are turned off in the winter months when recreational activities and human contact are reduced.

As a result of these changes, staff are



UV Light Module Removed for Cleaning

able to more safely and efficiently clean and replace the UV lamps within the wastewater facilities. In addition, there were significant cost savings and reductions in greenhouse gases with no noticeable impact in the harbour quality as a result of the UV lamps being turned off. As well, annual savings of \$166,000 were realized, which equates to 1,739,000 kWh of electricity, and 1,218 tonnes of greenhouse gases. This is equivalent to getting 265 vehicles off the road.

Environmental Management Systems (EMS)

An Environmental Management System (EMS) is a system of procedures, records, and processes to manage environmental issues and assist with regulatory compliance. It also makes day to day operations more sustainable and engages

employees in these operational activities. The EMS program can be audited against ISO 14001 standards, and if found to comply, receives a certification through ISO. The ISO standard has recently changed from the 2004 version to a 2015 version with a greater focus placed on organizational leadership and identification of risks and the associated influences, both internal and external to an organization. Staff have completed the process to adjust the existing documents for the Pockwock, Lake Major and Bennery Water Supply Plants and the Herring Cove Wastewater Treatment Facility for an internal audit in April 2018 and an external audit in June 2018. In the coming year, staff will start the process to obtain certification for the Dartmouth Wastewater Treatment Facility.

Wastewater Treatment Facility Compliance

Wastewater Treatment Facilities (WWTFs) in Nova Scotia are regulated by Nova Scotia Environment. They set effluent discharge limits for all wastewater facilities. Those limits define maximum concentrations of parameters, such as; Carbonaceous Biochemical Oxygen Demand (CBOD), a measure of the amount of material in water that will consume oxygen as it decomposes; Total Suspended Solids (TSS), a measure of the amount of particulate matter in the water; and Fecal Coliform, bacteria associated with human waste. For some facilities, parameters such as nutrients (nitrogen and phosphorus that cause excess growth of algae and plants) or pH, a measure of acidity, are also regulated.



Herring Cove WWTF ISO 14001 Certified

Wastewater Treatment Facility Compliance Continued...

Halifax Water oversees five large WWTFs and nine smaller, community-based WWTFs. Since becoming responsible for these facilities in 2007, Halifax Water has worked to optimize and upgrade treatment processes. A major upgrade to the Aerotech WWTF is nearing completion, to improve capacity and performance.

Halifax Water has undertaken a number of optimization projects that involve reduction of wet weather influences, equipment upgrades and process enhancements, which have resulted in improved compliance results.

Compliance for the five large facilities are measured on monthly averages. There has been a significant improvement in the



Aerotech WWTF

compliance at these facilities with nine months where all five were fully

compliant. Two of these facilities, Herring Cove and Eastern Passage, were fully compliant for the entire year. Halifax and Dartmouth WWTFs

both had only one occurrence of non-compliance, and Mill Cove had two throughout the entire year.

There was a noticeable improvement with the smaller facilities in 2017/18. In the third quarter, all facilities were compliant except for one parameter at the Aerotech WWTF. Of the nine

facilities, three, Springfield, Steeves and Frame were fully compliant for the entire year.

Wastewater Treatment Facility Compliance Summary											
Cumulative Performance - April 2017 to March 2018											
WWTF	CBOD ₅	TSS	E. coli	Phosphorus		Ammonia		pH	Dissolved Oxygen	Total Chlorine	Toxicity
				S	W	S	W				
Halifax	30	25	1958	N/A		N/A		7	N/A	N/A	Toxic
Herring Cove	23	21	404	N/A		N/A		7	N/A	N/A	Non-Toxic
Dartmouth	32	25	1561	N/A		N/A		7	N/A	N/A	Non-Toxic
Eastern Passage	6	7	55	N/A		N/A		7	N/A	N/A	Non-Toxic
Mill Cove	13	19	43	N/A		N/A		7	N/A	N/A	Non-Toxic
AeroTech	5	8	62	0.6		2.3	10.0	7	8.4	N/A	Non-Toxic
Frame	4	1	10	N/A		N/A		7	N/A	N/A	N/A
Lakeside-Timberlea	5	21	13	2	2	2	5	7	7	0.10	Non-Toxic
Lockview-MacPherson	4	6	21	0.4		4		7.1	N/A	N/A	N/A
Middle Musquodoboit	7	16	481	N/A		N/A		8	N/A	N/A	N/A
North Preston	5	10	11	0.5		2.1		7	N/A	N/A	N/A
Springfield	5	7	16	N/A		N/A		7	N/A	N/A	Non-Toxic
Steeves (Wellington)	5	5	33	0.17		0.05		7.0	N/A	N/A	N/A
Uplands Park	10	9	516	N/A		N/A		7	N/A	N/A	N/A
Weighted Average	11	13	370	N/A		N/A		7.0	8	0.10	

LEGEND

Definitions:

- Specific parameter limit achieved
- Specific parameter limit not achieved

CBOD₅: Carbonaceous Biochemical Oxygen Demand – a measure of the amount of organic material.

TSS: Total Suspended Solids – a measure of the number of particles in the wastewater.

Fecal Coliform / E. coli: Bacteria which are present in the treated sewage.

Phosphorus (phosphate): A plant nutrient which can impact water bodies.

Ammonia: A chemical compound containing nitrogen, another plant nutrient.

pH: A measure of the acidity of water.

Dissolved Oxygen: The amount of oxygen in the water, essential for fish and other aquatic organisms.

Aluminum: A metal dissolved in water

N/A: Not Applicable

Water Quality

Drinking Water Compliance Summary		
Total Coliform Sample Results - April 2017 to March 2018		
Systems	% Absent	# of Samples
HFX/Pockwock West	100.0%	833
HFX/Pockwock Central	99.8%	521
Lake Major	100.0%	1195
Bennery	100.0%	156
Five Islands	100.0%	104
Silver Sands	100.0%	106
Middle Musquodoboit	100.0%	104
Collins Park	100.0%	103
Miller Lake	100.0%	103
Bomont	100.0%	106
Totals		3331
Absent		3330
Present		1
All Sites - % Absent		
		99.97%

Providing our customers with safe, reliable, affordable, high-quality drinking water requires investment in infrastructure, research, and robust quality assurance/quality control programs. Halifax Water has made considerable investments in all these areas.

In order to ensure quality control is optimized, we maintain ISO 14001 Environmental Management System Registration at the J. Douglas Kline (Halifax), Lake Major (Dartmouth), and Bennery Lake (Halifax Airport) Water Supply plants.

The Municipal Auditor General completed an audit in 2017 of our water systems “Halifax Water – Management of Drinking Water Safety.” The audit was favourable with nine recommendations that either have been addressed or are in the process of implementation.

Halifax Water undertakes a comprehensive water testing program. Bacteriological testing is done weekly at 51 locations within the urban core, and at each of the small systems.

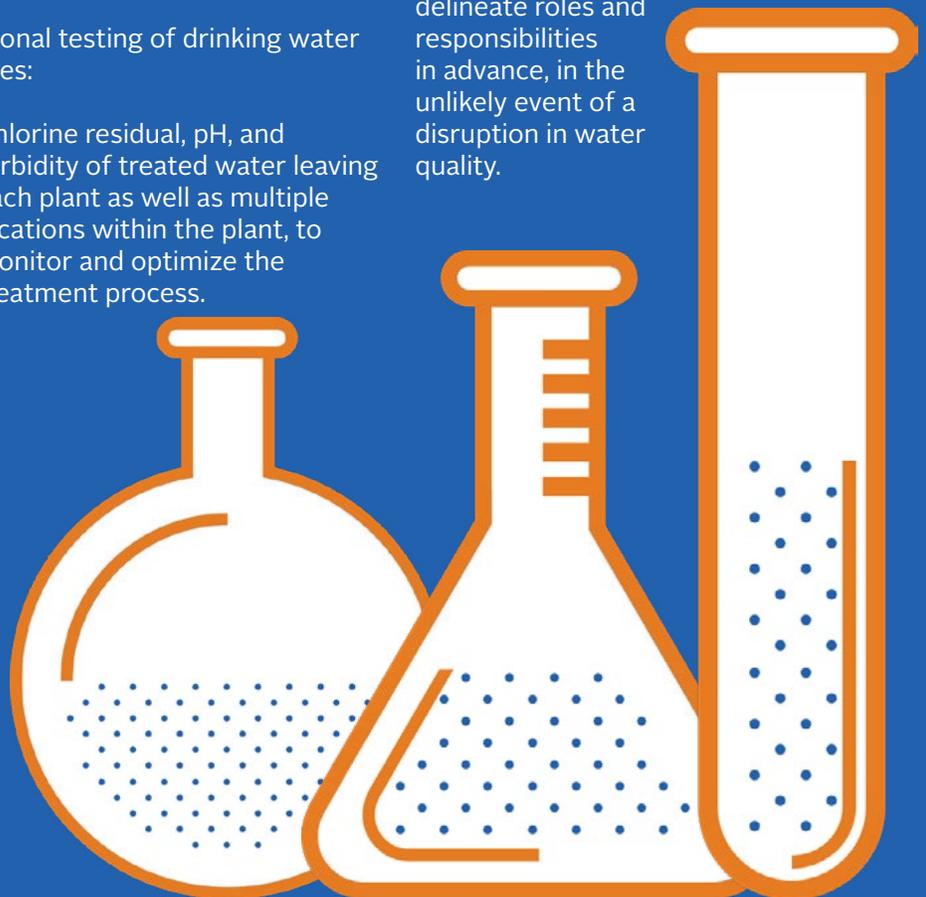
Approximately 3,600 tests for total coliform bacteria are conducted each year. Results of 99.9% of samples with bacteria absent are consistently achieved, as shown above.

Additional testing of drinking water includes:

- Chlorine residual, pH, and turbidity of treated water leaving each plant as well as multiple locations within the plant, to monitor and optimize the treatment process.

- Quarterly sampling of treated water at 2-3 locations within the distribution system for approximately 40 chemical parameters.
- Quarterly sampling of raw lake water and water from contributing streams for approximately 40 chemical parameters.
- Bi-annual sampling of Lake Major and Pockwock Lake raw and treated water for all parameters in the Guidelines for Canadian Drinking Water Quality (Health Canada).
- Bi-annual testing and sampling for giardia and cryptosporidium for treated and raw water for all surface water systems.

Water test results are reported to Nova Scotia Environment and the Nova Scotia Medical Officer of Health on a regular basis. Protocols have been established between Halifax Water, and the provincial Health and Environment departments, to clearly delineate roles and responsibilities in advance, in the unlikely event of a disruption in water quality.



STEWARDSHIP OF THE ENVIRONMENT

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and **stewardship of the environment.**

We will fully engage employees through teamwork, innovation, and professional development.

Wet Weather Management Program

Like many municipalities and utilities across North America, Halifax Water's sanitary sewer system is subject to dramatic flow increases in response to precipitation events. Wet weather flows can lead to sanitary sewer releases, capacity reduction, sewer backups/basement flooding, process upsets, increased operation and maintenance cost, and treatment facility effluent quality issues.

Since its inception in 2013, the goal of Halifax Water's Wet Weather Management Program (WWMP) has been to develop a proactive strategy to address the negative impacts of wet weather generated flow on the collection system, Wastewater Treatment Facilities (WWTFs), and ultimately the environment. To that end, five sewersheds were selected to undertake pilot activities aimed at quantifying the reduction of peak rainfall derived flow and average daily flow for various rehabilitation activities, and the costs associated with each of those activities.

WWMP Pilot Project Summary

Sewershed	Rehabilitation Activity				Peak Flow Reduction (l/s)	Average Daily Flow Reduction (%)
	Mainline Lining	Lateral Lining	Manhole Lining	Private Side Inspection		
Crescent Avenue (MH 182)	350 m	247 m	1	24	74	33
Crescent Avenue (MH 174)	202 m	166 m	4	13	92	80
Stuart Harris	1000 m	1390 m	7	128	16	20
Leiblin Pump Station	2200 m	1090 m	TBD	1	23	15
North Preston	655 m	2272 m	TBD	TBD	24	2

Completed
Planned
To Be Determined

Fairview, Clayton Park, Bridgeview: WWMP Project Summary

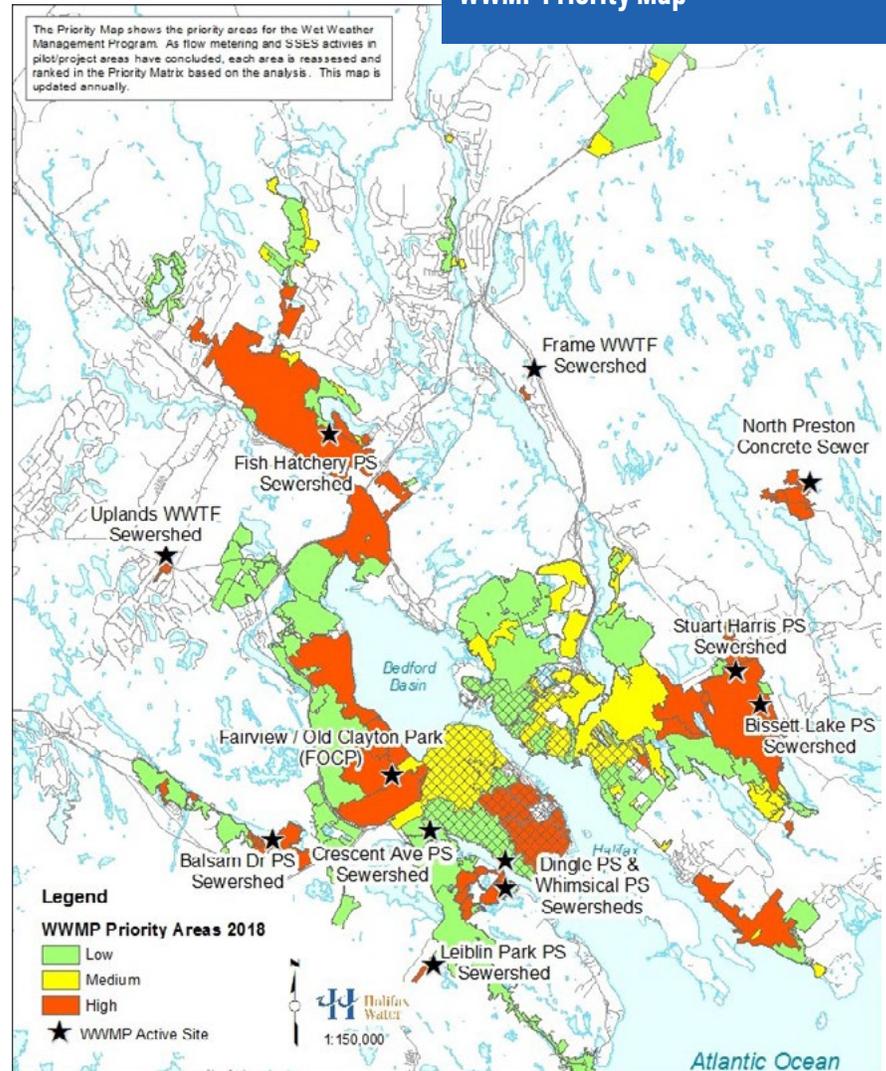
The analysis of flow monitoring data, undertaken as part of the West Region Wastewater Infrastructure Plan identified the potential for a significant reduction in Rainfall Derived Inflow and Infiltration (RDII) in the Fairview, Old Clayton Park and Bridgeview areas. With the goal of reducing peak flows by approximately 200 L/s, a multi-year I&I Reduction Program was initiated in 2017 with overall project planning, sewer evaluation survey and engineering design activities occurring in the 2017/18 year. For the 2018/19 year, Cured in Place Pipe (CIPP) lining of approximately 9.8 km of pipe will be completed as part of Phase 1 of this project. It will include the Fairview area and part of the Bridgeview area. For the 2019/20 year, Phase 2 of the lining project will be completed in the Old Clayton Park area from the candidate list, seeing approximately 9.5 km of CIPP lining accomplished.

Private side inspections will also be performed in 2018/19/20 to identify and potentially eliminate private-property illegal stormwater connections.

Flow monitoring and data analysis will be performed to quantify RDII reductions for the project area and assess the effectiveness of the asset renewal during all phases of the project.

The WWMP team continues to identify areas for future study and I&I reduction activities.

WWMP Priority Map



The above map identifies the current priority areas for the Wet Weather Management Program and the location of current activities.

Enhanced Proactive Maintenance at Wastewater Treatment Facilities

Odour Control System



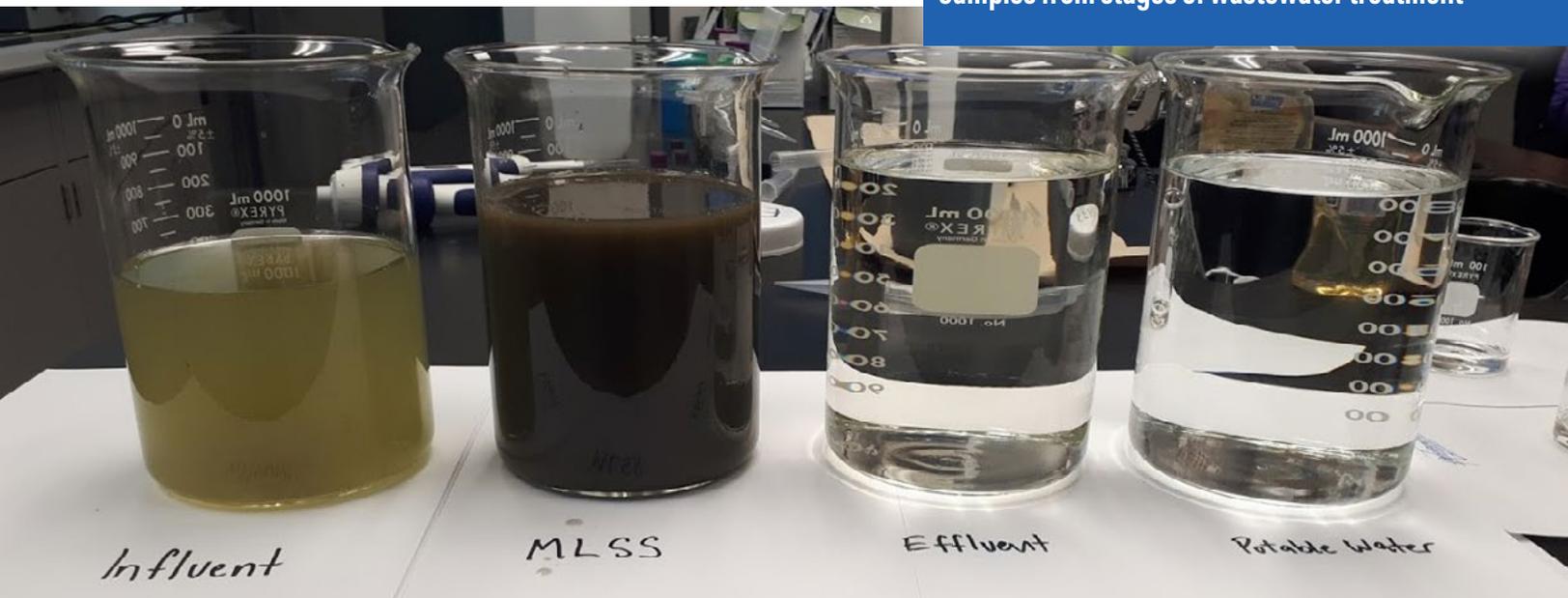
All WWTFs are maintained proactively throughout the year to provide uninterrupted service. These maintenance efforts are often coupled with initiatives to improve resilience, energy efficiency, and treatment process optimization. These efforts were supplemented by the implementation of a Computerized Maintenance Management System (CMMS) in the Halifax WWTF in 2017-18. All other WWTFs are planned to implement CMMS in 2018-19. The shutdown of the UV systems during winter months, where permitted, have provided an excellent opportunity to service these systems while reducing overall energy required to operate them. The odour control systems at the Harbour Solutions and Mill Cove WWTFs received special attention to be ready for Summer of 2018 considering the extended dry periods and warmer than normal temperatures during the Summer of 2017. The system at the Mill Cove facility was upgraded to a larger capacity and a high-efficiency system. The odour control systems at the Harbour Solutions facilities had the carbon replaced, system structure strengthened, and system balanced for optimum performance.

The Frame Subdivision WWTF was upgraded utilizing membrane technology. The design, construction, and commissioning were all completed by Halifax Water staff exhibiting great collaboration between various departments. The innovative upgrade refurbished the existing tankage and other assets to deliver a state of the art facility with significant cost savings when compared to building a new facility. This facility produces consistent and excellent effluent quality better than NSE permit requirements. This small footprint technology is easily scalable to larger facilities and will serve as a great learning experience for Halifax Water staff for future opportunities.



Frame Subdivision WWTF

Samples from stages of wastewater treatment



Computerized Maintenance Management System (CMMS)

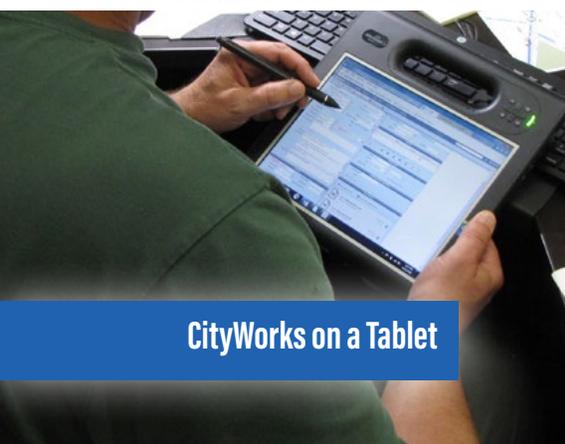
Halifax Water operates and maintains 1,549 km of water mains, 15,526 water main valves, 8,350 fire hydrants, 20 pumping stations, and 142 pressure control/flow meter chambers and other related infrastructure such as water services and sprinkler services to provide water services to its customers.

Halifax Water also operates and maintains over 2,500 km of pipes, 166 pump stations, 500 km of ditches and associated infrastructure such as laterals, manholes, catch basins, culverts and valve chambers etc., to provide wastewater and stormwater services to its customers.

Halifax Water began exploring a CMMS in 2014 with the municipality and began implementing the system in April of 2016 in the Central Region, and June of 2016 in the East and West Regions. The system enables Halifax Water staff to monitor, track, and record all service requests effectively and in a timely manner. Staff have real-time access to Halifax Water data through mobile tablet computers that enable them to perform their job safely and efficiently thus enhancing customer

experience through timely resolution of customer inquiries.

This enhanced monitoring and tracking ensures that Halifax Water is meeting its service standards and maintaining its assets in a proactive manner in accordance with industry standards. The system is integrated with Halifax Water's GIS, and other systems, to provide consistent up-to-date information flowing seamlessly to field crews, supervisors, dispatchers, and management. Halifax Water staff were fully trained in the system and continue to make improvements to understand its functionality and use it for the benefit of our customers. This continuous improvement and integration process is a journey that will continue over the next several years.



CityWorks on a Tablet

Sanitary Servicing for the USS Dwight D. Eisenhower

Over a period of seven days during the summer of 2017, Halifax Water teamed up with Dominion Diving Ltd. to provide a very important service to the American aircraft carrier, the USS Dwight D. Eisenhower.

The USS Dwight D. Eisenhower was docked in Halifax Harbour to participate in the Canada 150 celebrations and requested assistance in dealing with its onboard wastewater. Dominion Diving Ltd. was contracted by the aircraft carrier to collect and transport approximately 3 million liters of grey and black water to Halifax Water's Dartmouth Wastewater Treatment Facility (DWWTF), via the "Honey Barge". Once the barge reached shore adjacent to the DWWTF, the wastewater was pumped through a rigid hose, which had been temporarily placed around the perimeter of the DWWTF parking lot. The wastewater then discharged directly to the DWWTF for treatment. Sampling was conducted on a daily basis to ensure that there were no adverse effects to the treatment process at the Dartmouth facility. The DWWTF was closely monitored to ensure no odour and noise issues arose from this operation. This arrangement is an excellent example of Halifax Water working together with industry to protect our environment and provide essential services to users of Halifax Harbour.

USS Dwight D. Eisenhower



SAFETY & SECURITY

HEALTH & SAFETY

Halifax Water and its employees are committed to providing a healthy and safe work environment to prevent occupational illness and injury. This commitment is based upon our understanding that health and safety is a core business function for our organization and is treated as a priority in our work. To ensure this, Halifax Water continues to evaluate, develop and improve safety and security initiatives across the organization.

Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, **workplace safety and security**, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Safety Audits

With a busy 2017/18 Capital Project season, Halifax Water started a new program where a third-party safety auditor was engaged to conduct random field safety audits at our many project sites. This initiative was well received by both our project management teams and our contractors. It helped raise awareness of everyone's responsibilities to ensure every person went home safely at the end of the day.

Mill Cove WWTF Outfall Replacement Safety Audit Photo



Fall River Water Service Extension Safety Audit



Safety Training

We continue to concentrate on commercial vehicle safety by training all commercial vehicle operators on pre-trip commercial vehicle inspection, hours of service and load securement. Our internal audits have identified significant improvements in overall understanding of the commercial vehicle procedures that ensure early identification of vehicle problems and defects; to prevent the operation of vehicles with conditions that are likely to cause or contribute to a collision or vehicle breakdown; and ensures compliance with the commercial vehicle inspection regulations.

Incident Command System (ICS)

To ensure safe and efficient response to water, wastewater, and stormwater incidents, Halifax Water training exercises are crucial. Staff continue to exercise emergency response plans and training by participating in monthly, tabletop exercises on a rotational basis, with external agencies using the Incident Command System (ICS). Operational staff use ICS when responding to system disruptions.

Preventing Workplace Injuries Program - WCB

In November 2015, Halifax Water engaged in the Preventing Workplace Injury (PWI) Program with WCB. An initial survey was conducted, with 247 employees participating. The survey was designed to gauge individual's perceptions of the current safety culture at Halifax Water and the awareness and understanding of safety policies and practices. After the completion of the survey, a committee known as the Team of Doers was established in February of 2016 with representatives across Halifax Water.

The Team of Doers met monthly for 18 months to review the outcomes of the survey and develop strategies to enhance the safety culture and awareness throughout Halifax Water. One of the first objectives of the team was to establish a Vision to provide direction on their activities:

Working together for an injury free and healthy workplace through empowering employees for positive change, so we will all return home safely.



ICS Exercise

The Team proceeded to review the results of the November 2015 survey to get a sense of the issues and perceptions surrounding Halifax Water's safety culture. Some of the common themes related to communications of safety issues, lack of formalized follow-ups and understanding of safety and the related human resource policies. After implementing some new initiatives, the WCB representative administered the survey again in November 2017 to see if our efforts resulted in a change in the Safety Culture at Halifax Water. We are pleased

to announce, they did! Based on the responses provided by the 265 participants we saw improvements in 29 of the 32 themes included. Staff will continue to implement and maintain some of the initiatives to continue to grow the awareness and enhance the safety culture at Halifax Water.

In recognition of improved safety, WCB presented Halifax Water with the Preventing Workplace Injuries Award.

Thank you to our employees for continuing to work safely. You, your families, friends, and co-workers are counting on it.



CEO of WCB, Stewart MacLean (centre) presenting the Preventing Workplace Injuries Award to Halifax Water Board Chair, Ray Ritcey (left), and General Manager, Carl Yates (right).

MOTIVATED & SATISFIED EMPLOYEES



Our Vision

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will **fully engage employees** through teamwork, innovation, and professional development.



Halifax Water's Greatest Assets

Halifax Water's greatest assets are the people that are behind the operation who continue to provide world-class service for our customers and our environment on a daily basis. Halifax Water recognizes that safe and productive work is directly related to the health and well-being of all employees. Halifax Water is therefore committed to providing a work environment that positively supports employees' mental and physical health.

Halifax Water's Greatest Assets Continued...

When an employee is unable to work, due to a variety of reasons, this could negatively impact other areas of that employee's life such as; finances, mental well-being, physical well-being, etc. These additional impacts are known to increase the number of days an employee is off making it more difficult for the employee to return to work. Recognizing this, and the importance of providing meaningful work to employees whose abilities have been compromised, a "Stay at Work" policy was developed

and implemented. Where possible, employees are provided with alternate work within their capabilities. This option significantly reduces the number of days an employee is off work and enables them to return to their current duties more quickly.

A Health and Wellness Committee was formed with a mandate to increase the health and well-being of all employees and their families. Employees took part in a Health Risk assessment in Fall of 2017, which produced a report of aggregate results. In conjunction with this data, the Health and Wellness team provided programs and information

sessions that focused on awareness and prevention of some of the risk areas identified. This will continue to be a strong focus for Halifax Water. Future initiatives include training Supervisors and Managers to recognize and support employees mental health and wellness.

A civil and respectful workplace also contributes to employees health and wellbeing. A Civility and Respect in the Workplace working group was formed to focus on improving the way employees work and communicate with each other. Some outcomes will be early interventions, increased communication and awareness, and clear expectations.

Service Award Banquet

At the 2017 Service Award Banquet the following awards were presented:

30 Year Award

Corporate Services

Heather Singer

Engineering & Information Services

Norma Belliveau

Wastewater & Stormwater Services

Graham Downey

Danny MacMaster

Greg Stewart

Water Services

Todd Masters

Rob Seguin

25 Year Award

Engineering & Information Services

Harold MacNeil

Regulatory Services

Pat Bellemare

Shawn MacDonald

Wastewater & Stormwater Services

Stephen Murphy

20 Year Award

Corporate Services

Rochelle Bellemare

Denise MacDonald

Maria MacKinnon

Wastewater & Stormwater Services

George Bent

Sheldon Parsons

Shawn Taylor

Water Services

Reid Kaiser

Paul Sutherland

10 Year Award

Corporate Services

Kimberley Peterson

Christine Westhaver

Engineering & Information Services

Jaclyn Chezenko

Alan Ghothani

Daniel Kennie

Roger Levesque

Regulatory Services

Chantel Parkin

Wastewater & Stormwater Services

Colette Clark

Neil Grady

Laurena MacDonald

Water Services

Troy Blackmore

John Eisnor

Mark Feener

John Russell

Terry Vaters

Carl Yates presenting 25 Year Award to Harold MacNeil



Carolyn Bruce Customer Service Excellence Award

The Carolyn Bruce Customer Service Excellence Award was established in 2012 in memory of, and to honour Carolyn's unforgotten legacy. Each year Halifax Water recognizes an employee who has shown exemplary customer service. The 2017 award was presented to Mark McGonnell for his continued commitment and high-level of service provided to Halifax Water's customers.

Carl Yates presenting Mark McGonnell with the Carolyn Bruce Customer Service Excellence Award



Fundraising Initiatives at Halifax Water

Supporting the community we work in is important to Halifax Water and fundraising is an important part of that support. In 2017, Halifax Water employees raised \$4,237.55 for United Way Halifax through various fundraising events.

The Halifax Water/Salvation Army H2O (Help to others) raised a total of \$2,835.00 to assist customers who truly need help with their water/wastewater/stormwater bill. This internal staff fundraising is in addition to the \$25,000.00 Halifax Water provides in funding. Halifax Water also matches funds donated by Halifax Water employees.

Halifax Water Employees also donated \$8,542 toward Water For People to support the digging of wells to provide clean drinking water in nine different countries for 4 million people.

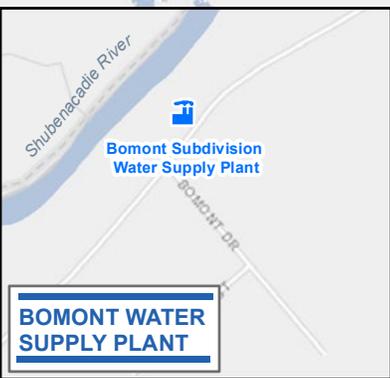
The Christmas Families Fundraising initiatives raised \$845.00 for Carolyn's Angel Tree program through the Salvation Army, and employees donated gifts for 75 children in Halifax Regional Municipality. The funds raised also assisted with providing Christmas meals to those Halifax residents in need through Souls Harbour Rescue Mission.

Halifax Water employees also fundraised in support of Bryony House, Feed NS, Hope Cottage, the Bluenose Marathon charities.

Christmas Families Gift Donation



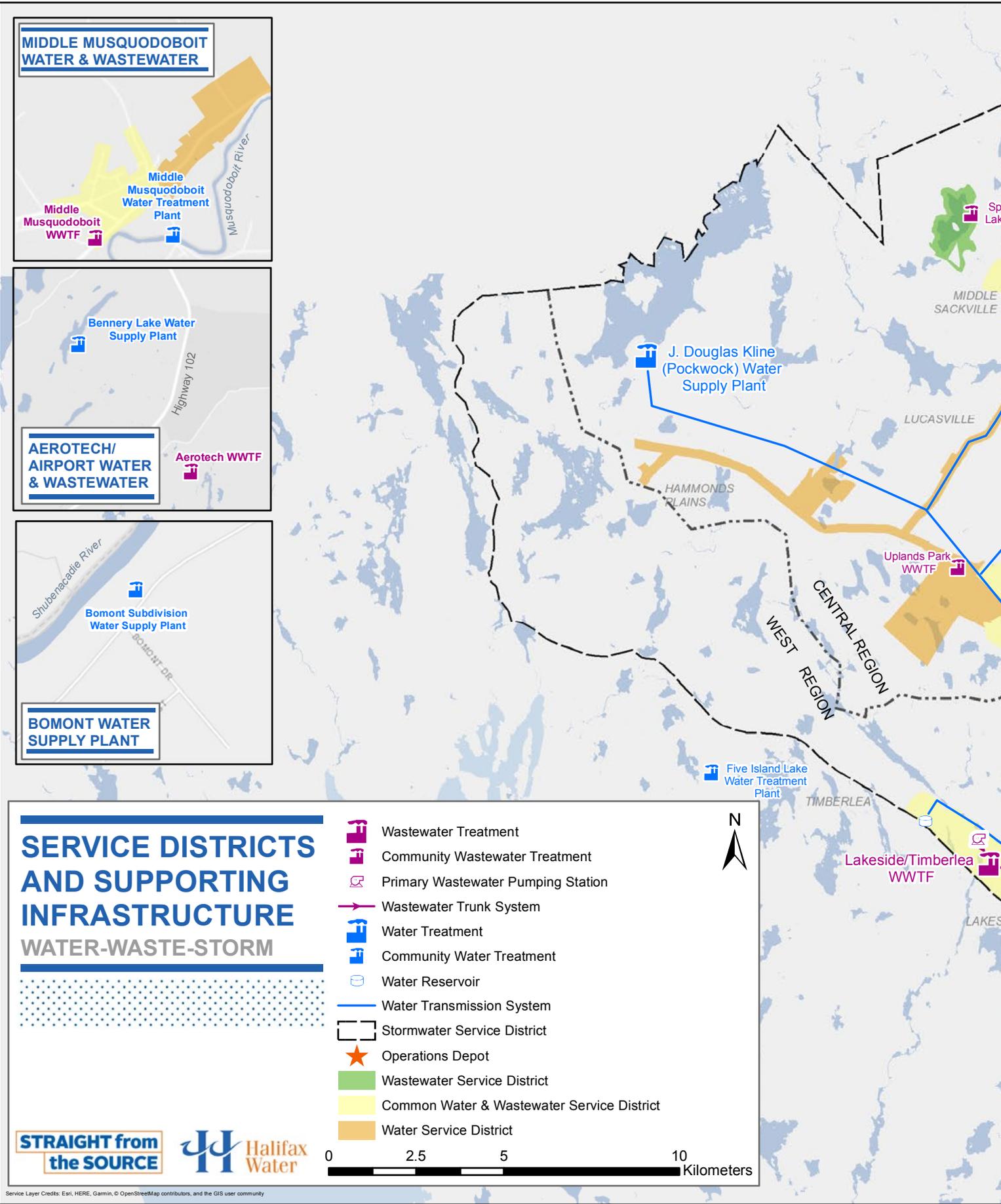
MIDDLE MUSQUODOBOIT WATER & WASTEWATER



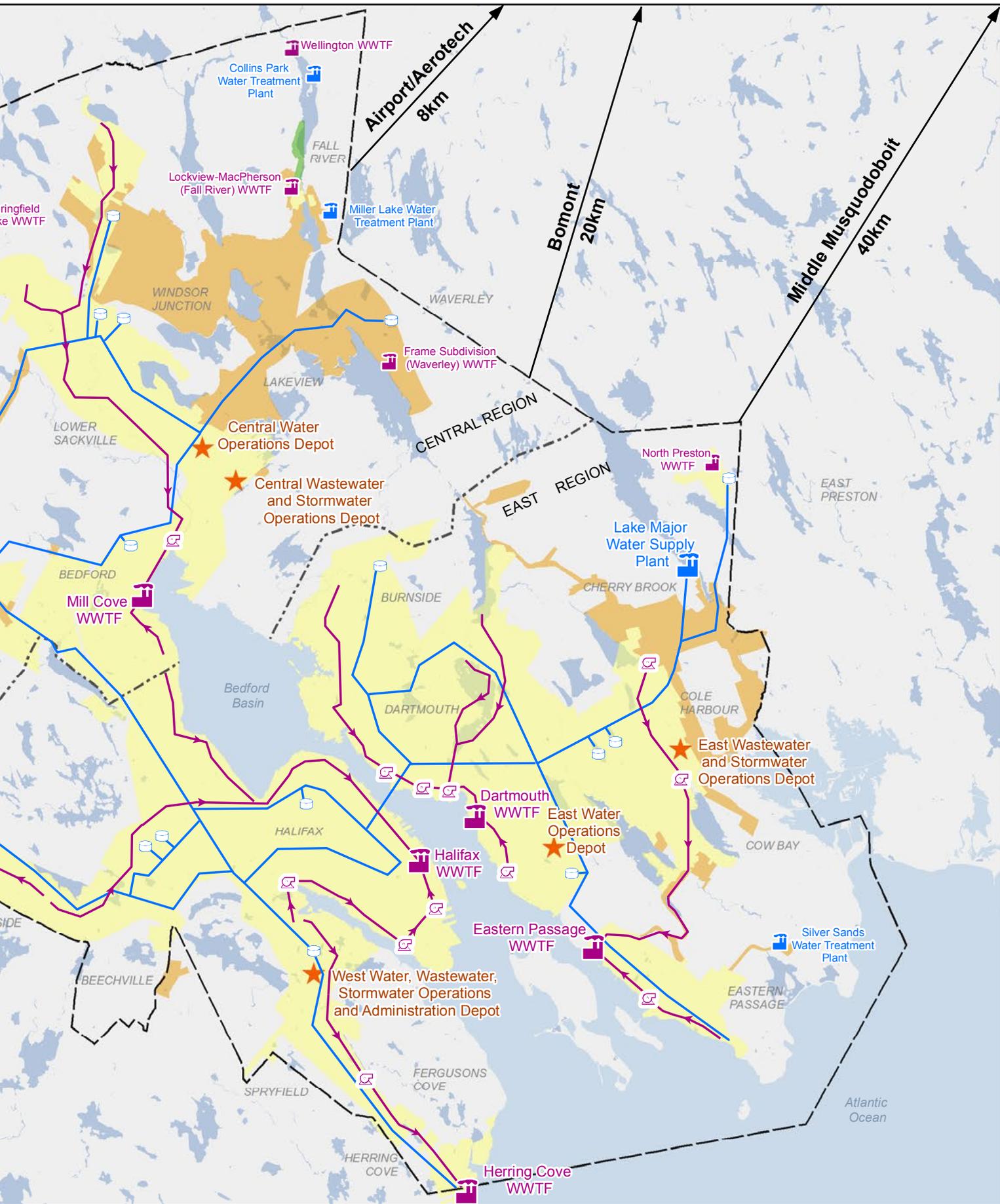
SERVICE DISTRICTS AND SUPPORTING INFRASTRUCTURE WATER-WASTE-STORM

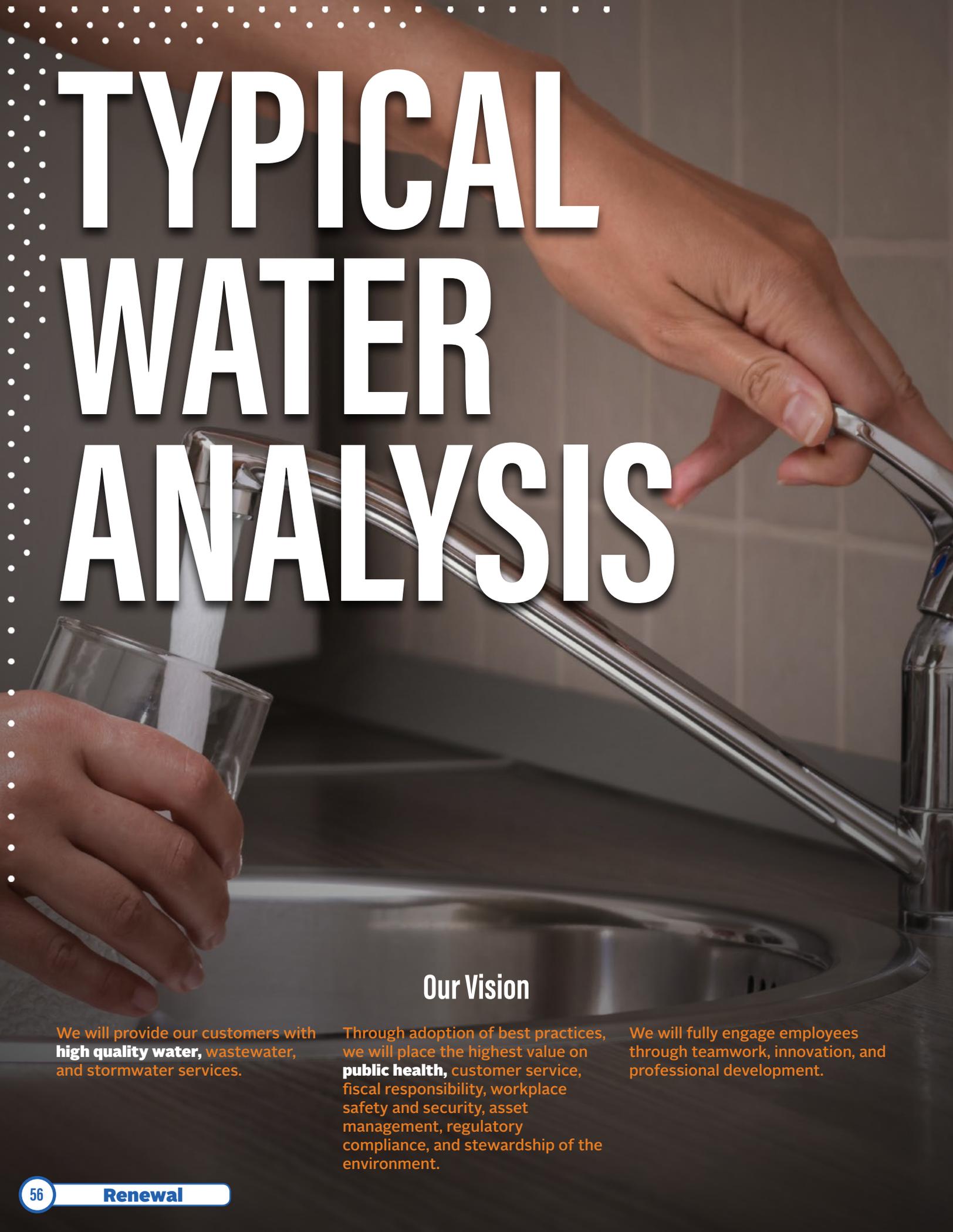
- Wastewater Treatment
- Community Wastewater Treatment
- Primary Wastewater Pumping Station
- Wastewater Trunk System
- Water Treatment
- Community Water Treatment
- Water Reservoir
- Water Transmission System
- Stormwater Service District
- Operations Depot
- Wastewater Service District
- Common Water & Wastewater Service District
- Water Service District

STRAIGHT from the SOURCE



Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community





TYPICAL WATER ANALYSIS

Our Vision

We will provide our customers with **high quality water**, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on **public health**, customer service, fiscal responsibility, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

TYPICAL ANALYSIS OF POCKWOCK LAKE & LAKE MAJOR WATER

2017 - 2018

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	(Halifax) POCKWOCK		(Dartmouth) LAKE MAJOR		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	<1.0	21.5	<1.0	27.0	-	-
Aluminum	0.108	0.108	0.198	0.016	-	*0.20/0.10
Ammonia (N)	<0.050	<0.050	<0.050	<0.050	-	-
Arsenic	<0.001	<0.001	<0.001	<0.001	0.010	-
Calcium	1.00	3.8	0.99	16.0	-	-
Chloride	7.0	8.5	6.1	7.7	-	≤250
Chlorate	<0.1	<0.1	<0.1	<0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	14.0	<5.0	35.3	<5.0	-	≤15.0
Conductivity (µS/cm)	34.0	84.0	31.0	140.0	-	-
Copper (Total)	0.052	<0.002	0.075	<0.002	-	≤1.0
Fluoride	<0.10	0.63	<0.10	0.58	1.5	0.7
Hardness (as CaCO ₃)	4.3	11.3	4.0	42.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	0.30	0.8	0.28	2.96	-	-
HAA5 (avg.)	-	0.040	-	0.044	0.080	-
Iron (Total)	<0.057	<0.050	0.107	<0.050	-	<0.3
Langelier Index @ 4°C	-4.5	-2.47	-5.40	-1.67	-	-
Langelier Index @ 20°C	-4.1	-2.22	-4.40	-1.42	-	-
Lead (Total) (µg/l)	<0.50	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.41	0.40	0.37	0.38	-	-
Manganese (Total)	0.023	0.014	0.048	0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	<0.055	0.059	<0.050	<0.055	10.0	-
pH (pH Units)	6.20	7.3	6.00	7.5	-	7.0 - 10.5
Potassium	0.25	0.31	0.27	0.27	-	-
Sodium	4.4	13.7	3.9	10.7	-	≤200
Solids (Total Dissolved)	30.0	46.5	19.7	83.0	-	≤500
Sulphate	2.9	7.5	2.3	28.3	-	≤500
Turbidity (NTU)	0.30	<0.08	0.27	<0.04	**0.2/1.0	≤5
Total Organic Carbon (TOC)	3.0	1.7	4.7	1.7	-	-
THM's (avg.)	-	0.060	-	0.061	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	<0.005	0.093	<0.005	0.09	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	0.5/1.0	-

*Aluminum objective is related to type of plant filtration; the aluminum objective for direct filtration (i.e. Pockwock) is <0.20 mg/l and conventional filtration (i.e. Lake Major) is <0.10 mg/l. **0.2/1.0 means the plant must produce water with turbidity of <0.2 NTU 95% of the time and <1.0 NTU 100%

TYPICAL ANALYSIS – SMALL SYSTEMS

2017 - 2018

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	BENNERY LAKE		FIVE ISLAND LAKE		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	6.4	38.5	35.0	33.0	-	-
Aluminum	0.115	0.013	0.007	<0.006	-	0.2
Ammonia (N)	<0.50	<0.050	0.06	<0.050	-	-
Arsenic	<0.001	<0.001	0.004	0.004	0.010	-
Calcium	2.50	18.0	9.7	8.7	-	-
Chloride	7.0	10.1	5.4	7.2	-	≤250
Chlorate	<0.1	0.4	<0.1	0.2	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Color (True Color Units)	27.0	<3.0	<5.0	<5.0	-	≤15.0
Conductivity (µS/cm)	39.0	140.0	85.0	86.0	-	-
Copper (Total)	0.282	0.032	0.003	0.012	-	≤1.0
Fluoride	<0.10	<0.10	0.40	0.41	1.5	-
Hardness (as CaCO ₃)	8.4	48.5	29.0	26.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	0.59	3.4	2.0	1.8	-	-
HAA5 (avg.)	-	0.049	-	<0.005	0.080	-
Iron (Total)	0.953	<0.050	<0.056	<0.050	-	≤0.3
Langelier Index @ 4°C	-2.6	-2.3	-1.90	-1.5	-	-
Langelier Index @ 20°C	-2.2	-2.1	-1.65	-1.2	-	-
Lead (Total) (µg/l)	2.1	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.54	0.65	1.1	1.1	-	-
Manganese (Total)	0.431	0.032	<0.002	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	<0.055	<0.053	<0.055	<0.050	10.0	-
pH (pH Units)	6.50	7.4	7.16	7.6	-	7.0 - 10.5
Potassium	0.21	0.25	0.50	0.47	-	-
Sodium	4.0	14.3	5.8	6.7	-	≤200
Solids (Total Dissolved)	28.5	97.5	59.0	58.0	-	≤500
Sulfate	3.6	28.3	2.5	2.4	-	≤500
Turbidity (NTU)	0.94	<0.09	0.26	<0.06	*0.2/1.0**1.0	≤5
Total Organic Carbon (TOC)	4.2	2.3	<0.50	<0.50	-	-
THM's (avg.)	-	0.071	-	<0.001	0.100	-
Uranium (µg/l)	<0.10	<0.10	10.9	10.0	20.0	-
Zinc (Total)	0.006	0.044	<0.005	<0.005	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.050	<0.050	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	0.27/0.46	0.26/<0.12	0.5 / 1.0	-
Lead -210 (Bq/L)	-	-	-	<0.10	0.2	-

*The Bennery Lake plant must produce water with turbidity of <0.2 NTU 95% of the time and <1.0 NTU 100% of the time.

**The Five Island Lake plant must produce water with turbidity of <1.0 NTU 95% of the time, as required by Provincial Permit.

TYPICAL ANALYSIS - SMALL SYSTEMS

2017 - 2018

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	MIDDLE MUSQUODOBOIT		COLLINS PARK		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water			Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	44.0	150.0	12.0	9.4	-	-
Aluminum	0.006	<0.005	0.051	0.006	-	0.2
Ammonia (N)	<0.050	<0.050	<0.050	<0.050	-	-
Arsenic	<0.001	<0.001	0.003	<0.001	0.010	-
Calcium	14.0	3.3	6.3	0.22	-	-
Chloride	12.0	7.2	37.0	8.2	-	≤250
Chlorate	<0.1	0.1	<0.1	0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Color (True Color Units)	<5.0	<5.0	19.0	<5.0	-	≤15.0
Conductivity (µS/cm)	150.0	270.0	160.0	38.0	-	-
Copper (Total)	0.005	0.003	<0.002	<0.002	-	≤1.0
Fluoride	<0.10	<0.10	<0.10	<0.10	1.5	-
Hardness (as CaCO ₃)	56.0	13.0	19.0	<1.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	3.9	0.9	1.3	0.1	-	-
HAA5 (avg.)	-	<0.005	-	<0.005	0.080	-
Iron (Total)	<0.050	<0.050	0.111	<0.050	-	≤0.3
Langelier Index @ 40C	-1.6	-0.9	-2.35	-3.53	-	-
Langelier Index @ 200C	-1.3	-0.6	-2.00	-3.28	-	-
Lead (Total) (µg/l)	0.63	<0.50	<0.50	<0.50	10.0	-
Magnesium	5.0	1.20	0.87	<0.10	-	-
Manganese (Total)	0.002	<0.002	0.054	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate & Nitrite (as N)	0.20	0.18	0.15	<0.09	10.0	-
pH (pH Units)	7.1	7.6	7.6	7.3	-	7.0 - 10.5
Potassium	1.10	0.52	0.84	0.16	-	-
Sodium	6.0	48.5	24.0	7.9	-	≤200
Solids (Total Dissolved)	110.0	145.0	81.5	35.0	-	≤500
Sulfate	11.5	<2.0	7.8	<2.0	-	≤500
Turbidity (NTU)	0.50	<0.10	0.73	<0.06	*0.1/0.3	≤5
Total Organic Carbon (TOC)	0.50	<0.50	3.5	<0.50	-	-
THM's (avg.)	-	<0.005	-	0.004	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	<0.005	0.055	<0.005	0.070	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	0.5 / 1.0	-

*Ultra-filtration membrane plants must produce water with turbidity of <0.1 NTU 99% of the time and <0.3 NTU 100% of the time, as required by Provincial Permit.

TYPICAL ANALYSIS - SMALL SYSTEMS

2017 - 2018

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	SILVER SANDS		MILLER LAKE		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY	
	Raw Water	Treated Water	*Raw Water	Treated Water	Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	71.0	74.0		25.0	-	-
Aluminum	0.007	0.005		0.123	-	0.2
Ammonia (N)	<0.050	<0.050		<0.050	-	-
Arsenic	<0.002	<0.001		<0.001	0.010	-
Calcium	38.0	36.0		4.4	-	-
Chloride	65.0	70.5		8.8	-	≤250
Chlorate	<0.1	0.4		0.2	1.0	-
Chlorite	<0.1	<0.1		<0.1	1.0	-
Color (True Color Units)	<5.0	<5.0		<5.0	-	≤15.0
Conductivity (µS/cm)	350.0	370.0		94.0	-	-
Copper (Total)	<0.002	<0.002		<0.002	-	≤1.0
Fluoride	0.24	0.24		0.74	1.5	-
Hardness (as CaCO ₃)	120.0	110.0		12.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	8.40	7.7		0.85	-	-
HAA5 (avg.)	-	<0.005		0.046	0.080	-
Iron (Total)	0.784	<0.050		<0.050	-	≤0.3
Langelier Index @ 4°C	-0.12	-0.41		-1.87	-	-
Langelier Index @ 20°C	+0.48	-0.16		-1.62	-	-
Lead (Total) (µg/l)	<0.50	<0.50		<0.50	10.0	-
Magnesium	4.90	4.60		0.42	-	-
Manganese (Total)	0.815	<0.002		0.007	-	≤0.05
Mercury (µg/l)	<0.013	<0.013		<0.013	1.0	-
Nitrate & Nitrite (as N)	<0.050	<0.050		0.058	10.0	-
pH (pH Units)	7.70	7.7		7.6	-	7.0 - 10.5
Potassium	0.88	0.81		0.33	-	-
Sodium	25.0	26.5		15.5	-	≤200
Solids (Total Dissolved)	210.0	210.0		69.5	-	≤500
Sulfate	18.0	18.0		11.3	-	≤500
Turbidity (NTU)	8.0	<0.04		<0.08	**1.0 ***0.2/1.0	≤5
Total Organic Carbon (TOC)	<0.50	<0.50		1.9	-	-
THM's (avg.)	-	<0.003		0.067	0.100	-
Uranium (µg/l)	<0.10	<0.10		<0.10	20.0	-
Zinc (Total)	<0.009	<0.005		0.085	-	≤5.0
PCB (µg/l)	<0.05	<0.05		<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.11		<0.11/<0.11	0.5/1.0	-

*Raw water samples were not collected from the Miller Lake wells this past year, since the wells were not in operation. Treated water was supplied from either the Lake Major or Pockwock water systems as facility upgrades are being implemented at the Miller Lake Water Supply System, including the connection of new wells to the facility.

**The Silver Sands plant must produce water with turbidity of <1.0 NTU 95% of the time.

***The Miller Lake plant must produce water with turbidity of <0.2 NTU 95% of the time and <1.0 NTU 100% of the time, as is required by Provincial Permit.

TYPICAL ANALYSIS OF BOMONT WATER

2017 - 2018

(in milligrams per litre unless shown otherwise)

Note: All Regulatory Compliance Analysis are Processed by Third Party Laboratories

PARAMETERS	BOMONT		GUIDELINES FOR CANADIAN DRINKING WATER QUALITY			
	Raw Water	Treated Water			Maximum Acceptable Concentration	Aesthetic Objective Concentration
Alkalinity (as CaCO ₃)	13.0	16.0			-	-
Aluminum	0.130	0.037			-	0.2
Ammonia (N)	0.083	<0.050			-	-
Arsenic	0.002	<0.001			0.010	-
Calcium	8.0	10.0			-	-
Chloride	21.0	41.0			-	≤250
Chlorate	<0.1	0.4			1.0	-
Chlorite	<0.1	<0.10			1.0	-
Colour (True Colour Units)	34.0	5.0			-	≤15.0
Conductivity (µS/cm)	110.0	130.0			-	-
Copper (Total)	0.010	0.007			-	≤1.0
Fluoride	<0.10	<0.10			1.5	-
Hardness (as CaCO ₃)	24.0	28.0			-	-
Hardness (as CaCO ₃) (Grains/IG)	1.7	2.0			-	-
HAA ₅ (avg.)	-	0.060			0.080	-
Iron (Total)	0.230	<0.050			-	<0.3
Langelier Index @ 4°C	-3.0	-2.16			-	-
Langelier Index @ 20°C	-2.8	-1.91			-	-
Lead (Total) (µg/l)	<0.67	<0.50			10.0	-
Magnesium	0.870	0.71			-	-
Manganese (Total)	0.031	0.009			-	≤0.05
Mercury (µg/l)	<0.013	<0.013			1.0	-
Nitrate & Nitrite (as N)	0.17	<0.055			10.0	-
pH (pH Units)	7.1	7.4			-	7.0 - 10.5
Potassium	0.60	0.51			-	-
Sodium	12.0	14.5			-	≤200
Solids (Total Dissolved)	81.0	110.0			-	≤500
Sulphate	15.5	<2.4			-	≤500
Turbidity (NTU)	2.8	0.17			*0.1/0.3	≤5
Total Organic Carbon (TOC)	5.0	1.4			-	-
THM's (avg.)	-	0.064			0.100	-
Uranium (µg/l)	<0.10	<0.10			20.0	-
Zinc (Total)	<0.005	<0.024			-	≤5.0
PCB (µg/l)	<0.05	<0.05			-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10			0.5/1.0	-

*Ultra-filtration membrane plants must produce water with turbidity of <0.1 NTU 99% of the time and <0.3 NTU 100% of the time, as required by Provincial Permit.

FINANCIAL OVERVIEW & STATEMENTS

We will provide our customers with high quality water, wastewater, and stormwater services.

Through adoption of best practices, we will place the highest value on public health, customer service, **fiscal responsibility**, workplace safety and security, asset management, regulatory compliance, and stewardship of the environment.

We will fully engage employees through teamwork, innovation, and professional development.

Financial Overview

Abbreviated Financial Information
March 31, 2018
(In thousands)

ASSETS

Fixed

Utility Plant in Service at Cost	\$	1,661,586
Provision for Depreciation		(429,735)

Net Book Value

1,231,851

Capital Work In Progress

24,550

Regulatory Asset

3,197

Current

93,333

TOTAL ASSETS

\$ 1,352,931

LIABILITIES

Long Term Debt	\$	213,501
----------------	----	---------

Other Than Long Term Debt		97,853
---------------------------	--	--------

TOTAL LIABILITIES

\$ 311,354

EQUITY

Special Purpose Reserves	\$	27,861
--------------------------	----	--------

Contributed Capital Surplus		1,025,797
-----------------------------	--	-----------

Accumulated Other Comprehensive Income		(44,943)
--	--	----------

Operating Surplus used to Fund Capital, Cumulative		12,380
--	--	--------

Capital Surplus		1,021,095
-----------------	--	-----------

Operating Surplus April 1, 2017		16,679
---------------------------------	--	--------

2017/18 OPERATIONS

Operating Revenue	\$	138,145
-------------------	----	---------

Financial Revenue		4,486
-------------------	--	-------

Revenue From all Sources	\$	142,631
--------------------------	----	---------

Expenditures

Operating Expenses	\$	83,190
--------------------	----	--------

Depreciation		21,262
--------------	--	--------

Grant in lieu of taxes HRM		4,774
----------------------------	--	-------

Financial Expenses		29,602
--------------------	--	--------

Total Expenditures	\$	138,828
--------------------	----	---------

Excess of Expenditures over Revenue		3,803
-------------------------------------	--	-------

Accumulated Operating Surplus March 31, 2018		20,482
--	--	--------

TOTAL EQUITY

\$ 1,041,577

TOTAL LIABILITIES & EQUITY

\$ 1,352,931

Figures in the Financial Overview are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities. The audited financial statements on the following pages are prepared in accordance with International Financial Reporting Standards – IFRS.

Financial Statements

Halifax Regional Water Commission
March 31, 2018

Table of Contents

	Page	
Independent auditor's report	66	
Statement of earnings	67	
Statement of comprehensive earnings	68	
Statement of financial position	69	
Statement of changes in equity	70	
Statement of cash flows	71	
Notes to the financial statements	72-80	
Schedules		
A	Schedule of utility plant in service	
	Water	81
	Wastewater	82
	Stormwater	83
B	Schedule of long term debt	84
C	Schedule of operations for water service	85
D	Schedule of operations for wastewater service	86
E	Schedule of operations for stormwater service	87
F	Regulated and unregulated activities	
	Schedule of regulated activities	88
	Schedule of unregulated activities	89
G	Nova Scotia Utility and Review Board information	90

Independent auditor's report

Grant Thornton LLP
Nova Centre, North Tower
Suite 1000, 1675 Grafton Street
Halifax, NS
B3J 0E9

T (902) 421-1734
F (902) 420-1068
www.GrantThornton.ca

To the Members of the Board of the
Halifax Regional Water Commission

We have audited the accompanying financial statements of the Halifax Regional Water Commission, which comprise the statement of financial position as at March 31, 2018, and the statement of comprehensive earnings, statement of changes in equity and statement of cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with International Financial Reporting Standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained in our audit is sufficient and appropriate to provide a basis for our audit opinion.

Other matter

Our audit was conducted for the purposes of forming an opinion on the financial statements taken as a whole. Schedules A to G are presented for purposes of additional information and are not a required part of the financial statements. Such information has been subjected to the auditing procedures applied, only to the extent necessary to express an opinion, on the audit of the financial statements taken as a whole.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Halifax Regional Water Commission as at March 31, 2018 and its financial performance and its cash flows for the years then ended in accordance with International Financial Reporting Standards.



Chartered Professional Accountants
Licensed Public Accountants

Halifax, Canada
June 21, 2018

Halifax Regional Water Commission

Statement of earnings

Year ended March 31, 2018 (in thousands)

	2018	2017
Operating revenues		
Water	\$ 47,220	\$ 47,183
Wastewater	69,994	69,475
Stormwater	10,016	10,542
Fire protection	7,074	7,074
Private fire protection	856	831
Other operating revenue	<u>2,985</u>	<u>2,892</u>
	<u>138,145</u>	<u>137,997</u>
Operating expenditures (Note 14)		
Water supply and treatment	8,646	8,050
Water transmission and distribution	9,410	8,997
Wastewater collection	12,642	11,639
Stormwater collection	4,842	4,097
Wastewater treatment	19,647	19,794
Engineering and information services	8,105	7,576
Regulatory services	2,450	2,356
Customer service	4,896	4,432
Administration and pension	12,553	11,799
Depreciation and amortization	<u>41,625</u>	<u>43,433</u>
	<u>124,816</u>	<u>122,173</u>
Earnings from operations before financial and other revenues and expenditures	<u>13,329</u>	<u>15,824</u>
Financial and other revenues		
Interest	694	780
Contributed capital	17,372	17,980
Other	<u>3,792</u>	<u>2,543</u>
	<u>21,858</u>	<u>21,303</u>
Financial and other expenditures		
Interest on long term debt	7,884	8,475
Amortization of debt discount	202	199
Grant in lieu of taxes	4,774	4,578
Other	<u>354</u>	<u>467</u>
	<u>13,214</u>	<u>13,719</u>
Earnings for the year before regulatory deferral account balance amortization	21,973	23,408
Regulatory deferral account balance amortization (Note 5)	<u>(192)</u>	<u>(192)</u>
Earnings for the year	<u>\$ 21,781</u>	<u>\$ 23,216</u>

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of comprehensive earnings

Year ended March 31 (in thousands)

	2018	2017
Earnings for the year	\$ 21,781	\$ 23,216
Other comprehensive (loss) income		
Items that will not be reclassified subsequently to earnings:		
Re-measurement on defined benefit plans	<u>(1,750)</u>	<u>743</u>
Total comprehensive earnings for the year	<u>\$ 20,031</u>	<u>\$ 23,959</u>

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of financial position

March 31 (in thousands)

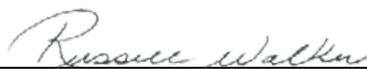
	2018	2017
Assets		
Current		
Cash and cash equivalents	\$ 51,470	\$ 55,879
Receivables		
Customer charges and contractual	17,494	13,321
Unbilled service revenues	16,640	17,158
Halifax Regional Municipality	5,274	1,880
Inventory	1,442	1,601
Prepays	1,013	867
	<u>93,333</u>	<u>90,706</u>
Intangible assets (Note 11)	13,877	10,275
Capital work in progress	24,550	28,406
Utility plant in service (Note 12)	1,200,430	1,144,152
Total assets	<u>1,332,190</u>	<u>1,273,539</u>
Regulatory deferral account balance (Note 5)	<u>3,196</u>	<u>3,388</u>
Total assets and regulatory deferral account debit balances	<u>\$ 1,335,386</u>	<u>\$ 1,276,927</u>
Liabilities		
Current		
Payables and accruals		
Trade	\$ 22,715	\$ 16,790
Interest on long term debt	2,030	2,101
Halifax Regional Municipality	2,439	295
Contractor and customer deposits	186	191
Current portion of deferred contributed capital	13,405	12,889
Current portion of long term debt (Note 13)	22,630	21,669
Unearned revenue	584	787
	<u>63,989</u>	<u>54,722</u>
Deferred contributed capital	842,967	808,632
Long term debt (Note 13)	190,871	203,299
Employee benefit obligation – pension plan (Note 4)	65,486	58,480
Employee benefit obligation – post-retirement benefits (Note 4)	430	341
Employee benefit obligation – pre-retirement benefits (Note 4)	3,983	3,824
	<u>1,167,726</u>	<u>1,129,298</u>
Equity		
Accumulated other comprehensive (loss) (page 5)	(44,943)	(43,193)
Accumulated surplus (page 5)	212,603	190,822
	<u>167,660</u>	<u>147,629</u>
	<u>\$ 1,335,386</u>	<u>\$ 1,276,927</u>

Contingent liabilities (Note 3)
Commitments (Note 6)

Approved by the Board



Commissioner



Commissioner

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of changes in equity

Year ended March 31 (in thousands)

	Accumulated other comprehensive <u>(loss)</u>	Accumulated <u>surplus</u>	<u>Total</u>
Balance at March 31, 2016	\$ (43,936)	\$ 167,606	\$ 123,670
Earnings for the year	-	23,216	23,216
Other comprehensive income	<u>743</u>	<u>-</u>	<u>743</u>
Comprehensive earnings for the year	<u>743</u>	<u>23,216</u>	<u>23,959</u>
Balance at March 31, 2017	<u>\$ (43,193)</u>	<u>\$ 190,822</u>	<u>\$ 147,629</u>
Balance at March 31, 2017	<u>\$ (43,193)</u>	<u>\$ 190,822</u>	<u>\$ 147,629</u>
Earnings for the year	-	21,781	21,781
Other comprehensive loss	<u>(1,750)</u>	<u>-</u>	<u>(1,750)</u>
Comprehensive earnings for the year	<u>(1,750)</u>	<u>21,781</u>	<u>20,031</u>
Balance at March 31, 2018	<u>\$ (44,943)</u>	<u>\$ 212,603</u>	<u>\$ 167,660</u>

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statement of cash flows

Year ended March 31 (in thousands)

	2018	2017
<hr/>		
(Decrease) increase in cash and cash equivalents		
Operating		
Comprehensive earnings for the year	\$ 20,031	\$ 23,959
Depreciation and amortization	25,926	26,692
Employee benefit obligations	7,254	4,191
(Gain) loss on disposal of plant in service	<u>(127)</u>	<u>59</u>
	53,084	54,901
Change in non-cash operating working capital items (Note 7)	<u>754</u>	<u>5,172</u>
	53,838	60,073
Financing		
Proceeds from issuance of long term debt	10,000	9,053
Contributed capital	11,162	9,231
Debt issue costs, net	121	122
Principal repayment on Harbour Solutions long term debt	<u>(6,500)</u>	<u>(6,500)</u>
Principal repayments of long term debt	<u>(15,089)</u>	<u>(16,695)</u>
	(306)	(4,789)
Investing		
Deferred capital contributions	3,701	629
Proceeds from sale of plant in service	120	197
Purchase of capital work in progress	<u>(14,405)</u>	<u>(19,393)</u>
Purchase of utility plant in service	<u>(47,357)</u>	<u>(27,316)</u>
	(57,941)	(45,883)
Net change in cash and cash equivalents	(4,409)	9,401
Cash and cash equivalents, beginning of year	<u>55,879</u>	<u>46,478</u>
Cash and cash equivalents, end of year	\$ 51,470	\$ 55,879

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

1. Nature of operations

The Halifax Regional Water Commission (the Commission) is a public utility owned and controlled by the Halifax Regional Municipality (HRM). The Commission is responsible for the supply of municipal water, wastewater and stormwater services to the residents of the HRM. The Commission's principal place of business is P.O. Box 8388 Station A, 450 Cowie Hill Road, Halifax, Nova Scotia. The Commission is exempt from income tax.

2. Summary of significant accounting policies

(a) Statement of compliance

The financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB). The principal accounting policies applied in the preparation of these financial statements are set out below. These policies have been consistently applied to all years presented, unless otherwise stated.

The financial statements were authorized for issue by the Board on June 21, 2018.

(b) Basis of measurement

The Commission's financial statements are prepared on the historical cost basis, except for certain financial instruments measured at fair value. The financial statements are presented in Canadian dollars and all values are rounded to the nearest thousand. The financial statements are presented in accordance with International Accounting Standards (IAS) 1 "Presentation of Financial Statements".

(c) Regulation

In matters of administrative policy relating to customers, rates, capital expenditures, depreciation rates and accounting matters, the Commission is subject to the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). Rates charged to and collected from customers are designed to recover costs of providing the regulated services. Halifax Water is required to prepare submissions in accordance with the Handbook issued by the NSUARB. There are differences in the accounting treatment of certain transactions from IFRS including the accounting of principal debt payments, employee future benefits, depreciation and amortization, and gains and losses on the disposal of plant in service and accumulated surplus.

Regulatory assets represent costs incurred that have been deferred as approved by the NSUARB and will be recovered through future rates collected from customers. The Commission's regulatory asset is disclosed in Note 5.

(d) Utility plant in service

Utility plant in service (Note 12) is recorded at cost, being the purchase price and directly attributable cost of acquisition or construction, including interest capitalized during construction. Contributions for capital expenditures are treated as deferred contributed capital on the statement of financial position and amortized over the estimated useful lives of the assets. Structures and land taken out of service are removed from utility plant in service and placed in plant not in service at cost less accumulated depreciation. Losses or gains related to assets retired, demolished or sold are charged or credited to the statement of earnings.

(e) Cash and cash equivalents

Cash and cash equivalents consists of cash on hand and balances with banks.

(f) Depreciation

Depreciation is provided using the straight-line method over the estimated useful lives of the assets.

The estimated useful lives for the major classifications of utility plant in service are as follows:

Culverts	25 to 50 years
Hydrants	50 to 80 years
Meters	20 to 25 years
Office equipment and furniture and transportation equipment	3 to 10 years
Pumping equipment	5 to 30 years
Purification and treatment equipment	20 to 50 years
SCADA equipment	5 to 25 years
Services and laterals	50 to 60 years
Structures and improvements	50 to 100 years
Tools and work equipment	5 to 30 years
Water, wastewater and stormwater mains	60 to 100 years

Depreciation commences in the year an asset is put in service and ready for its intended use. In the year of acquisition, depreciation is calculated at 50% of the above rates unless a project is significant, in which case depreciation is prorated for the number of months the asset was in use. The Commission does not maintain a depreciation fund. The Commission has received NSUARB approval for exemption from setting up a depreciation fund as long as net depreciable additions to plant exceed the depreciation charged.

(g) Inventory

Cost of inventory is comprised of direct materials and supplies. Inventories are valued at the lower of cost and net realizable value with cost being determined on a weighted average moving cost method.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

(h) Revenues and expenditures

All revenues and expenditures are recorded on an accrual basis. Revenues relating to supplying water, wastewater and stormwater services are recorded based on cyclical billings and include an accrual for estimated amounts not yet billed. Fire protection revenue is recorded based on approved rates. Other revenues are recorded at the time services are performed, the amount can be measured reliably and collection is reasonably assured.

(i) Long term debt

Debt issue costs are deferred and amortized over the term of the debt to which it relates.

(j) Use of estimates and critical accounting judgments

In preparing the Commission's financial statements, management is required to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and reported amounts of revenue and expenditures during the period. Significant estimates and assumptions include the following:

- At year end, revenue from water, stormwater and wastewater services has been earned, but not yet billed due to the timing of the billing cycles. Management estimates the unbilled revenue accrual based on historic billing trends.
- Management assumptions are used in the actuarial determination of employee benefit obligations, such as standard rates of inflation, mortality, discount rates, and anticipation of future salary increases.
- Useful lives of utility plant in service are reviewed at each reporting date based on expected patterns of usage and historical information.
- Recognition and measurement of provisions and contingencies.

Actual results could differ from these estimates.

(k) Financial instruments

The Commission initially recognizes and measures its financial assets and liabilities at fair value.

All financial instruments are classified into one of five categories: fair value through profit and loss, held to maturity, loans and receivables, available for sale financial assets, or other financial liabilities. All financial instruments are initially measured in the statement of financial position at fair value. Financial instruments subsequently measured at amortized cost include transaction costs.

Subsequent measurement and changes in fair value will depend on their initial classification, as follows:

- Fair value through profit and loss financial instruments are measured at fair value and changes in fair value are recognized in net earnings;
- Available for sale financial assets are measured at fair value with changes in fair value recorded in other comprehensive income until the financial asset is derecognized or impaired at which time the amounts would be recorded in profit or loss; and
- Loans and receivables, held to maturity investments, and other financial liabilities are measured at amortized cost using the effective interest method.

The Commission's financial assets and liabilities are classified and measured as follows:

Asset/Liability	Classification	Measurement
Cash and cash equivalents	Loans and receivables	Amortized cost
Receivables	Loans and receivables	Amortized cost
Receivable from HRM	Loans and receivables	Amortized cost
Payables and accruals	Other financial liabilities	Amortized cost
Long term debt	Other financial liabilities	Amortized cost
Deposits	Other financial liabilities	Amortized cost

(l) Provisions

A provision is recognized in the statement of financial position when the Commission has a legal or constructive obligation as a result of a past event, and it is probable that an outflow of economic benefits will be required to settle the obligation. If the effect is material, provisions are determined by discounting the expected future cash flows at a rate that reflects current market assessment of the time value of money and, where appropriate, the risks specific to the obligation.

(m) Impairments

At the end of each reporting period, the Commission reviews the carrying amounts of its tangible and intangible assets to determine whether there is an indication of an impairment loss. If any such indication exists, the recoverable amount of the assets is estimated in order to determine the extent of impairment loss (if any). The recoverable amount of any asset is the higher of its fair value less costs to sell and its value in use. Where it is not possible to estimate the recoverable amount of an individual asset, the impairment test is carried out on the asset's cash-generating unit (CGU), which is the lowest group of assets to which the asset belongs for which there are separately identifiable cash inflows that are largely independent of the cash inflows from other assets. The Commission has three CGU's (water, wastewater and stormwater) for which impairment testing is performed.

If the recoverable amount of the asset is estimated to be less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. An impairment loss is recognized immediately in earnings. When an impairment loss is subsequently reversed, the carrying amount of the assets is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset in prior years.

(n) Intangibles

Intangible assets include land access easements, water removal rights, studies, and capital master plans and are recorded at cost less accumulated amortization. Land rights include payment for easements and right of use over land and have an indefinite useful life. Intangibles with finite useful lives are amortized annually over the estimated useful lives. The expected useful lives are as follows:

Intangible assets	10 to 30 years
-------------------	----------------

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

(o) Employee benefits obligations

The Commission accrues in its accounts, annually, the estimated liabilities for pensions and other employee benefits.

Pension benefits

The Commission provides employment, post-retirement and pre-retirement benefits through defined benefit plans and defined contribution plans.

The cost of pension benefits for defined contribution pension plans are expensed at the time active employees are compensated.

The defined benefit plans sponsored by the Commission determine the amount of pension benefits employees will receive on retirement by reference to length of service and salary levels. Obligations associated with defined benefit plans reside with the Commission, even if plan assets for funding the plan are set aside.

The liability recognized in the statement of financial position for defined benefit plans is the present value of the defined benefit obligation at the end of the reporting date less the fair value of plan assets.

Management estimates the defined benefit obligation annually with assistance from an independent actuary using the projected unit credit method. The defined benefit obligation uses estimates for inflation, medical cost trends, mortality, and anticipated salary levels. The discount factor used to present value estimated future cash flows is determined with reference to high quality corporate bonds that have terms to maturity approximating the terms of the related pension liability.

Gains and losses resulting from re-measurements of the net defined benefit liability are charged to other comprehensive income in the period in which they arise. Service costs are recognized immediately into earnings.

Net interest cost related to pension obligations and returns on plan assets are included in salary and benefits on the statement of earnings.

Short-term employee benefits

Short-term employee benefit obligations that are due to be settled wholly within twelve months after the end of the annual reporting period in which the employees render the related service are measured on an undiscounted basis and are expensed as the related service is provided.

(p) Regulatory deferral account balance

The Commission early adopted IFRS 14 Regulatory Deferral Accounts and has continued to apply the accounting policies it applied in accordance with the Handbook for the recognition, measurement and impairment of assets and liabilities arising from rate regulation. These are referred to as regulatory deferral account balances.

Explanation of recognized amounts

Regulatory deferral account balances are recognized and measured at cost less amortization. Management continually assesses the likelihood of recovery of regulatory assets. If recovery through future rates is no longer considered probable, the amounts would be charged to the results of operations in the period that the assessment is made.

(q) Future accounting standards

At the date of authorization of these financial statements, certain new IFRS standards, amendments and interpretations to existing standards have been published by the IASB, but are not yet effective and have not been adopted early by the Commission.

Management anticipates that the relevant pronouncements will be adopted in the Commission's accounting policies for the first period beginning after the effective date of the pronouncement. Information on new standards, amendments and interpretations that may be relevant to the Commission's financial statements is provided below.

IFRS 15 Revenue from Contracts with Customers

The IASB released a new standard IFRS 15 Revenue from Contracts with Customers which replaces IAS 18 Revenue, IAS 11 Construction Contracts and certain revenue-related interpretations. The new standard provides a single, principle based five-step model to be applied to all contracts with customers requiring an entity to recognize revenue 1) in a manner that depicts the transfer of goods or services to customers and 2) at an amount that reflects the consideration the entity expects to be entitled to in exchange for those goods or services. IFRS 15 is effective for annual periods beginning on or after January 1, 2018. The Commission has assessed the impact of the new standard and concluded it will not be material to the financial statements.

IFRS 9 Financial Instruments

The IASB has replaced IAS 39 Financial Instruments: Recognition and Measurement in its entirety with a new standard IFRS 9 Financial Instruments. The final version of the standard introduces a new approach to financial asset classification, replaces the "incurred loss" impairment model with a more forward-looking expected loss model and substantially revises hedge accounting. The new standard IFRS 9 is effective for annual periods beginning on or after January 1, 2018. The Commission has assessed the impact of the new standard and concluded it will not be material to the financial statements.

IFRS 16 Leases

The IASB issued IFRS 16, Leases, which replaces IAS 17, Leases. IFRS 16 provides a single lessee accounting model, requiring the recognition of assets and liabilities for all leases, unless the lease term is twelve months or less or the underlying asset has a low value. Lessor accounting remains largely unchanged from IAS 17. The new standard IFRS 16 is effective for annual periods beginning on or after January 1, 2019. The Commission is currently assessing the impact of this new standard.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

3. Contingent liabilities

As a condition of a prior year sale of a property, the Commission indemnified the purchaser from claims or actions resulting from migration of halocarbons. The environmental risk is assessed to be low and the likelihood of any related liability is not determinable.

The Commission has been named along with the contractor for a flooding incident that occurred as a result of an overflow of wastewater at a pumping station associated with the Halifax Harbour Solutions Project (HHSP). The claim is being defended by the Commission's insurer and management believes exposure in this regard is minimal.

There are active claims against the Commission; however, the likelihood of actual liability is not determinable at this time. If the Commission's defense of active claims is unsuccessful, the potential exposure would be \$1,000 - \$2,000.

4. Employee benefit obligations

Retirement benefit plan – employees transferred from HRM

The Commission is responsible for funding the employer share of the contributions to the HRM pension plan for certain employees that transferred from HRM as of August 1, 2007. HRM administers this defined benefit pension plan and the Commission reimburses HRM for the pension costs related to the Commission's proportionate share of the employees covered under the plan. Due to the nature of the plan, the Commission does not have sufficient information to account for the plan as a defined benefit; therefore, the multiemployer defined benefit plan is accounted for in the same manner as a defined contribution plan. An expense is recorded in the period when the Commission is obligated to make contributions for services rendered by the employee. During 2018, the Commission funded \$635 (2017 - \$674) in contributions to the plan.

Defined benefit plans and other long term employment benefits

For all other employees, the Commission maintains a defined benefit pension plan and offers post-retirement health and insurance benefits. The pension plan provides pensions based upon length of service and best seven years' earnings. This defined benefit pension plan is funded by employer and employee contributions with employees contributing 10.65% of regular employee earnings. The Commission contributes 13.29% of payroll which includes 9.85% toward current service cost and 3.44% toward going concern special payments.

Employees who retired prior to July 1, 1998 have extended health benefits coverage for life and drug coverage until age 65. Employees who retired after July 1, 1998 and before December 31, 2008 have coverage for drug, extended health, dental and life insurance until age 65 on a 50/50 cost shared basis (100% basis for employees who retired after December 31, 2008). Extended health coverage for these retirees and their spouses after the age of 65 is available on an optional basis at 100% retiree cost and drug coverage is available through the provincially managed drug program.

The Commission also has a non-funded pre-retirement benefit that is accrued annually, but is payable on retirement, termination or death if the employee has at least 10 years of continuous service. The benefit is equal to three days' pay for each completed year of service, up to a maximum of six month's salary and can be taken

as a lump sum payment at the date of retirement in lieu of pre-retirement leave.

Information about the Commission's plans, based on an actuarial extrapolation as at March 31, 2018, is as follows on the next page:

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

	Pension Plan		Post-retirement benefits		Pre-retirement benefits	
	2018	2017	2018	2017	2018	2017
Change in accrued benefit obligation						
Balance, beginning of year	\$ 168,363	\$ 152,633	\$ 341	\$ 466	\$ 3,824	\$ 3,724
Current service cost	6,112	5,020	-	-	339	308
Interest cost	6,484	6,160	8	11	132	129
Contributions by plan participants	2,725	2,417	-	-	-	-
Benefit payments	(4,265)	(4,715)	(63)	(61)	(227)	(377)
Re-measurements – actuarial (gains)/ losses from changes in demographic assumptions	-	-	(42)	31	-	-
Re-measurements – actuarial (gains)/ losses from changes in financial/experience assumptions	7,762	6,848	186	(106)	(85)	40
Balance, end of year	<u>187,181</u>	<u>168,363</u>	<u>430</u>	<u>341</u>	<u>3,983</u>	<u>3,824</u>
Change in fair value of plan assets						
Balance, beginning of year	109,883	98,368	-	-	-	-
Interest income	4,206	3,934	-	-	-	-
Administrative expenses	(69)	(144)	-	-	-	-
Actual return on plan assets	5,952	7,639	-	-	-	-
Benefit payments	(4,265)	(4,715)	(63)	(61)	(227)	(377)
Contributions: Employee	2,725	2,417	-	-	-	-
Employer	3,263	2,384	63	61	227	377
Balance, end of year	<u>121,695</u>	<u>109,883</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Accrued benefit liability at March 31	<u>\$ 65,486</u>	<u>\$ 58,480</u>	<u>\$ 430</u>	<u>\$ 341</u>	<u>\$ 3,983</u>	<u>\$ 3,824</u>

Included in the statement of earnings is pension expense of \$8,461 (2017 - \$7,390).

The significant actuarial assumptions adopted in measuring the Commission's accrued benefit obligations are as follows:

	2018	2017	2018	2017	2018	2017
	Pension Plan	Pension Plan	Post- Retirement Benefits	Post- Retirement Benefits	Pre- Retirement Benefit	Pre- Retirement Benefit
Discount rate	3.60%	3.80%	3.20%	2.70%	3.60%	3.40%
Expected return on plan assets	3.60%	3.80%	N/A	N/A	N/A	N/A
Rate of compensation increase	3.75%	3.75%	N/A	N/A	3.75%	3.75%
Expenses for life benefits as a % of claims	N/A	N/A	10.00%	10.00%	N/A	N/A
Health benefit inflation per year	N/A	N/A	6.92%	7.16%	N/A	N/A
Dental benefit inflation per year	N/A	N/A	4.50%	4.50%	N/A	N/A

The measurement date used to determine the Plan assets and the accrued benefit obligation was March 31, 2018. The most recent valuation was completed January 1, 2016. The next review is scheduled for January 1, 2019.

The estimated employer contributions expected to be paid into the defined benefit plan and supplemental plan for the next fiscal year are \$3,366.

Halifax Regional Water Commission Notes to the financial statements

March 31, 2018 (in thousands)

5. Regulatory deferral account balance

In June 2011, the NSUARB granted the Commission approval to defer depreciation charges on certain assets transferred in 2010 from HRM relating to the Halifax Harbour Solutions Project (HHSP). Depreciation of \$2,078 was deferred in each of fiscal 2011 and 2012. As a result, the Commission recognized a \$4,156 regulatory deferral account. In absence of rate regulation, this regulatory deferral account balance would have been expensed as depreciation in fiscal 2011 and 2012. In May 2012, the NSUARB granted approval of the amortization of this deferral account over the remaining useful lives of the underlying assets, beginning in 2014. The expense recognized in 2018 is \$192 (2017 - \$192).

	<u>2018</u>	<u>2017</u>
Beginning balance	\$ 3,388	\$ 3,580
Amortization	<u>(192)</u>	<u>(192)</u>
Ending balance	<u>\$ 3,196</u>	<u>\$ 3,388</u>

6. Commitments

There is an agreement with HRM for renewal of the dividend/grant in lieu of taxes for fiscal years 2015/16 to 2019/20 for water services. Dividend payments are approved as part of revenue requirements by the NSUARB. There is no dividend/grant in lieu of taxes approved for wastewater/stormwater. The Commission is committed to a payment of \$4,999 for the 2019 fiscal year.

At March 31, 2018, the Commission had \$85,728 in expenditures from current and past approved capital budgets not yet expended.

7. Supplemental cash flow information

Changes in non-cash operating working capital items

	<u>2018</u>	<u>2017</u>
Receivables, customer charges and unbilled	\$ (3,655)	\$ 1,333
Payable to/receivable from HRM, net	(1,250)	3,389
Inventory	159	83
Prepays	(146)	(5)
Payables and accruals, trade	5,925	104
Accrued interest on long term debt	(71)	(128)
Contractor and customer deposits	(5)	(2)
Unearned revenue	<u>(203)</u>	<u>398</u>
	<u>\$ 754</u>	<u>\$ 5,172</u>

Interest paid during the year was \$7,884 (2017 - \$8,475).

8. Capital management

The Commission's objective when managing capital is to ensure sufficient liquidity to support its financial obligations and execute its operating and capital plans. The Commission monitors and makes adjustments to its capital structure through additional borrowings of long term debt which are used to finance capital projects.

The Commission considers its total capitalization to include all long term debt and total equity. The calculation is set out as follows:

	<u>2018</u>	<u>2017</u>
Long term debt (current portion)	\$ 22,630	\$ 21,669
Long term debt	<u>190,871</u>	<u>203,299</u>
Funded debt	<u>213,501</u>	<u>224,968</u>
Equity	<u>167,660</u>	<u>147,629</u>
Capital under management	<u>\$ 381,161</u>	<u>\$ 372,597</u>

The Commission is a regulated utility and is subject to the regulations of the NSUARB. As part of this regulation, the Commission must obtain approval by the NSUARB for all borrowings. The Commission has obtained regulatory approval for all borrowings during the fiscal year. The Commission is not subject to financial borrowing covenants other than as outlined in Note 10.

9. Financial instruments and risk management

The Commission applies a three-tier hierarchy framework for disclosing fair value of financial instruments, based on whether the inputs into the various valuation techniques are observable or unobservable. Observable techniques reflect market data obtained from independent sources, while unobservable inputs reflect management assumptions. Changes in valuation techniques of financial instruments may result in transfers of assigned levels. The hierarchy of input is as follows:

- Level I Quoted prices in active markets for identical assets or liabilities;
- Level II Inputs other than quoted prices included in Level I that are observable, either directly or indirectly; and
- Level III Inputs that are not based on observable market data.

The carrying values of current assets and current liabilities approximate their fair value due to the relatively short period to maturity of these financial instruments. Loans and receivables are carried at amortized cost. The fair value of variable rate long term debt is assumed to approximate its carrying value. Fair value has been estimated by discounting future cash flows at a rate offered for borrowings of similar maturities and credit quality at year end.

There were no transfers between classes of the fair value hierarchy during the year.

The Commission is exposed to risks as a result of holding financial instruments. Management considers and evaluates those risks on an on-going basis to ensure that the risks are appropriately managed. These potential risks include credit risk, interest risk, market risk and liquidity risk.

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

Credit risk

Credit risk arises from the possibility that the Commission's customers may experience financial difficulty and be unable to fulfill their obligations. The Commission's maximum exposure to credit risk corresponds to the cash and customer charges and contractual receivables. However, the Commission's customers are numerous and diverse, which reduces the concentration of credit risk.

An analysis of the Commission's receivables and continuity of the Commission's provision for impairment losses on receivables is as follows:

	2018	2017
Receivables		
Customer charges, contractual and unbilled	\$ 36,552	\$ 32,702
Less: allowance for doubtful accounts	(2,418)	(2,223)
	<u>\$ 34,134</u>	<u>\$ 30,479</u>

The credit quality of financial assets that are neither past due nor impaired are assessed with reference to historical information and includes the following considerations; new customers, existing customers and payment patterns / history.

Interest risk

Interest risk arises from the possibility that changes in interest rates will cause the Commission a potential loss. All of the Commission's long term debt is at varying fixed rates and has staggered maturity dates which reduce the interest rate risk.

Market risk

Market risk arises from the possibility that the value of an investment will fluctuate as a result of changes in market prices. These changes could affect the market value of the investments in the Commission's employees' pension plan and consequently the plan's deficit. The risk is mitigated by the pension plan diversifying the types of investments in its portfolio.

Liquidity risk

Liquidity risk arises from the possibility of the Commission not being able to meet its cash requirements in a timely and cost effective manner. The Commission manages this risk by closely monitoring the cash on hand in comparison to upcoming cash commitments.

10. Related party transactions

The immediate parent and ultimate controlling party of the Commission is the HRM.

The Commission is obligated to make payments on debt, held in the name of HRM, associated with wastewater and stormwater assets which were transferred to the Commission in 2007 and subsequent years.

Amounts receivable from and payable to HRM have normal credit terms.

The Commission had the following related party transactions with HRM:

- The Commission recorded revenue for provision of water, wastewater and stormwater services to HRM in the amount of \$5,097 (2017 - \$5,025).
- The Commission recorded fire protection revenue from HRM of \$7,074 (2017 - \$7,074).
- The Commission paid a grant in lieu of tax of \$4,774 (2017 - \$4,578).
- The debt issued by the Commission was covered by a blanket guarantee from HRM subject to the Commission maintaining a debt service ratio of less than 35%.

Compensation of key management personnel

Members of the Board of Commissioners and Executive Management team are deemed to be key management personnel. It is the Board of Commissioners and Executive Management team who have the responsibility for planning, directing and controlling the activities of the Commission.

The following is compensation expense for key management personnel:

	2018	2017
Short term benefits	\$ 1,388	\$ 1,345
Post-employment benefits	219	243
Total compensation	<u>\$ 1,607</u>	<u>\$ 1,588</u>

11. Intangible assets

	2018	2017
Cost		
Beginning balance, April 1	\$ 13,213	\$ 12,232
Additions	4,675	981
Total cost, March 31	<u>17,888</u>	<u>13,213</u>
Accumulated amortization		
Beginning balance, April 1	2,938	2,031
Amortization	1,073	907
Total accumulated amortization, March 31	<u>4,011</u>	<u>2,938</u>
Net book value	<u>\$ 13,877</u>	<u>\$ 10,275</u>

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

12. Utility plant in service

	<u>Land</u>	<u>Structures and improvements</u>	<u>Treatment and network equipment</u>	<u>Distribution and collection network</u>	<u>Tools and work equipment</u>	<u>Total</u>
Cost						
Beginning balance, April 1, 2017	\$ 20,780	\$ 214,875	\$ 218,773	\$ 787,646	\$ 18,322	\$ 1,260,396
Additions	592	4,011	11,464	74,724	7,758	98,549
Disposals	-	(10)	(429)	(13)	-	(452)
Total cost, March 31, 2018	<u>21,372</u>	<u>218,876</u>	<u>229,808</u>	<u>862,357</u>	<u>26,080</u>	<u>1,358,493</u>
Accumulated depreciation						
Beginning balance, April 1, 2017	\$ -	\$ 33,807	\$ 34,671	\$ 43,744	\$ 4,022	\$ 116,244
Depreciation	-	9,378	12,409	16,224	3,808	41,819
Total accumulated depreciation March 31, 2018	<u>-</u>	<u>43,185</u>	<u>47,080</u>	<u>59,968</u>	<u>7,830</u>	<u>158,063</u>
Net book value, March 31, 2018	<u>\$ 21,372</u>	<u>\$ 175,691</u>	<u>\$ 182,728</u>	<u>\$ 802,389</u>	<u>\$ 18,250</u>	<u>\$ 1,200,430</u>

	<u>Land</u>	<u>Structures and improvements</u>	<u>Treatment and network equipment</u>	<u>Distribution and collection network</u>	<u>Tools and work equipment</u>	<u>Total</u>
Cost						
Beginning balance, April 1, 2016	\$ 20,518	\$ 206,944	\$ 214,182	\$ 760,027	\$ 12,291	\$ 1,213,962
Additions	262	8,726	4,814	28,005	6,874	48,681
Disposals	-	(795)	(223)	(386)	(843)	(2,247)
Total cost, March 31, 2017	<u>20,780</u>	<u>214,875</u>	<u>218,773</u>	<u>787,646</u>	<u>18,322</u>	<u>1,260,396</u>
Accumulated depreciation						
Beginning balance, April 1, 2016	\$ -	\$ 21,561	\$ 22,714	\$ 28,354	\$ 1,676	\$ 74,305
Depreciation	-	12,246	11,957	15,390	2,346	41,939
Total accumulated depreciation March 31, 2017	<u>-</u>	<u>33,807</u>	<u>34,671</u>	<u>43,744</u>	<u>4,022</u>	<u>116,244</u>
Net book value, March 31, 2017	<u>\$ 20,780</u>	<u>\$ 181,068</u>	<u>\$ 184,102</u>	<u>\$ 743,902</u>	<u>\$ 14,300</u>	<u>\$ 1,144,152</u>

13. Long-term debt

	<u>Interest rates</u>	<u>2018</u>	<u>2017</u>
Payable to Municipal Finance Corporation (MFC)			
Water	1.040% to 6.750%	\$ 63,181	\$ 68,380
Halifax Harbour Solutions	0.900% to 4.329%	7,800	8,450
Wastewater/stormwater	1.040% to 4.500%	86,209	85,120
Stormwater	1.040% to 4.114%	11,723	11,985
		<u>168,913</u>	<u>173,935</u>
Payable to Halifax Regional Municipality			
MFC Wastewater/stormwater	1.200% to 4.940%	45,500	52,066
		<u>214,413</u>	<u>226,001</u>
Less: debt issue costs		<u>(912)</u>	<u>(1,033)</u>
		<u>213,501</u>	<u>224,968</u>
Less: amount payable within one year		<u>(22,630)</u>	<u>(21,669)</u>
		<u>\$ 190,871</u>	<u>\$ 203,299</u>

The debentures are repayable in fixed annual or semi-annual principal instalments plus interest payable semi-annually. Principal instalments for the next five years are as follows:

2019	\$ 22,630
2020	\$ 23,759
2021	\$ 18,084
2022	\$ 16,039
2023	\$ 40,752

Halifax Regional Water Commission

Notes to the financial statements

March 31, 2018 (in thousands)

14. Operating expenditures by nature

	<u>2018</u>	<u>2017</u>
Salaries and benefits	\$ 41,948	\$ 39,839
Training	618	656
Contract services	13,619	12,118
Electricity	6,323	6,295
Operating supplies	9,945	9,423
Professional services	4,559	4,768
Chemicals	4,698	4,404
Depreciation and amortization	<u>43,106</u>	<u>44,670</u>
	<u>\$ 124,816</u>	<u>\$ 122,173</u>

Halifax Regional Water Commission

Schedule of utility plant in service

Year ended March 31, 2018 (in thousands)

Schedule A

	Structures and improvements		Pumping equipment		Purification equipment		SCADA equipment		Transmission and distribution mains		Services		Meters		Hydrants		Aerotech and small systems		Tools and work equipment		Total
	Land	improvements	equipment	equipment	equipment	equipment	equipment	mains	mains	mains	Services	Meters	Meters	Hydrants	Hydrants	Aerotech and small systems	Aerotech and small systems	Tools and work equipment	Tools and work equipment		
Cost																					
Beginning balance, April 1, 2017	\$ 15,417	\$ 92,334	\$ 9,720	\$ 23,771	\$ 5,046	\$ 350,101	\$ 14,920	\$ 19,332	\$ 9,564	\$ 26,871	\$ 602,709										
Cost	592	2,997	593	1,451	125	22,706	1,501	585	270	4,001	36,429										
Additions	-	(5)	(10)	-	-	(13)	(839)	-	-	(2,748)	(3,615)										
Disposals	16,009	95,326	10,303	25,222	5,171	372,794	15,562	19,917	9,834	28,124	635,523										
Total cost, March 31, 2018																					
Accumulated depreciation																					
Beginning balance, April 1, 2017	-	28,034	7,028	15,478	3,689	80,244	5,950	3,902	2,922	18,309	171,933										
Depreciation	-	1,526	263	1,013	171	4,675	125	305	328	(914)	8,104										
Total accumulated depreciation, March 31, 2018	-	29,560	7,291	16,491	3,860	84,919	6,075	4,207	3,250	17,395	180,037										
Net book value, March 31, 2018	\$ 16,009	\$ 65,766	\$ 3,012	\$ 8,731	\$ 1,311	\$ 287,875	\$ 9,507	\$ 15,710	\$ 6,584	\$ 10,729	\$ 455,486										
Cost																					
Beginning balance, April 1, 2016	\$ 15,297	\$ 87,643	\$ 9,711	\$ 22,901	\$ 4,792	\$ 343,510	\$ 14,442	\$ 18,887	\$ 9,467	\$ 23,876	\$ 584,608										
Cost	120	5,486	9	870	254	6,977	701	445	97	3,336	19,846										
Additions	-	(795)	-	-	-	(386)	(223)	-	-	(341)	(1,745)										
Disposals	15,417	92,334	9,720	23,771	5,046	350,101	14,920	19,332	9,564	26,871	602,709										
Total cost, March 31, 2017																					
Accumulated depreciation																					
Beginning balance, April 1, 2016	-	25,551	6,778	14,522	3,545	76,018	5,480	3,605	2,648	17,117	161,059										
Depreciation	-	2,483	250	956	144	4,226	470	297	274	1,192	10,874										
Total accumulated depreciation, March 31, 2017	-	28,034	7,028	15,478	3,689	80,244	5,950	3,902	2,922	18,309	171,933										
Net book value, March 31, 2017	\$ 15,417	\$ 64,300	\$ 2,692	\$ 8,293	\$ 1,357	\$ 269,857	\$ 8,970	\$ 15,430	\$ 6,642	\$ 8,562	\$ 430,776										

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Halifax Regional Water Commission Schedule of utility plant in service

Year ended March 31, 2018 (in thousands)

Schedule A

	Wastewater										Total
	Land improvements	Structures and improvements	Pumping equipment	Treatment equipment	SCADA equipment	Collection system	Laterals	Meters	Tools and work equipment	Aerotech and small systems	
Cost											
Beginning balance, April 1, 2017	\$ 5,329	\$ 175,208	\$ 17,579	\$ 161,122	\$ 8,210	\$ 290,169	\$ 19,108	\$ -	\$ 25,407	\$ 12,089	\$ 714,221
Cost Additions	-	1,003	3,387	1,377	197	29,640	2,790	1,501	7,665	475	48,035
Disposals	-	(5)	-	-	-	-	-	-	(143)	-	(148)
Total cost, March 31, 2018	<u>5,329</u>	<u>176,206</u>	<u>20,966</u>	<u>162,499</u>	<u>8,407</u>	<u>319,809</u>	<u>21,898</u>	<u>1,501</u>	<u>32,929</u>	<u>12,564</u>	<u>762,108</u>
Accumulated depreciation											
Beginning balance, April 1, 2017	-	53,697	6,577	47,255	1,366	57,418	1,502	-	11,573	3,450	182,838
Depreciation	-	4,319	712	8,035	503	4,186	410	38	2,421	443	21,067
Total accumulated depreciation, March 31, 2018	-	58,016	7,289	55,290	1,869	61,604	1,912	38	13,994	3,893	203,905
Net book value, March 31, 2018	<u>5,329</u>	<u>\$ 118,190</u>	<u>\$ 13,677</u>	<u>\$ 107,209</u>	<u>\$ 6,538</u>	<u>\$ 258,205</u>	<u>\$ 19,986</u>	<u>1,463</u>	<u>\$ 18,935</u>	<u>\$ 8,671</u>	<u>\$ 558,203</u>
Cost											
Beginning balance, April 1, 2016	\$ 5,187	\$ 172,048	\$ 16,870	\$ 159,921	\$ 7,777	\$ 283,562	\$ 16,170	\$ -	\$ 22,401	\$ 11,994	\$ 695,930
Cost Additions	142	3,160	709	1,201	433	6,607	2,938	-	3,508	95	18,793
Disposals	-	-	-	-	-	-	-	-	(502)	-	(502)
Total cost, March 31, 2017	<u>5,329</u>	<u>175,208</u>	<u>17,579</u>	<u>161,122</u>	<u>8,210</u>	<u>290,169</u>	<u>19,108</u>	<u>-</u>	<u>25,407</u>	<u>12,089</u>	<u>714,221</u>
Accumulated depreciation											
Beginning balance, April 1, 2016	-	48,798	5,962	39,289	910	53,469	1,149	-	9,877	3,021	162,475
Depreciation	-	4,899	615	7,966	456	3,949	353	-	1,696	429	20,363
Total accumulated depreciation, March 31, 2017	-	53,697	6,577	47,255	1,366	57,418	1,502	-	11,573	3,450	182,838
Net book value, March 31, 2017	<u>5,329</u>	<u>\$ 121,511</u>	<u>\$ 11,002</u>	<u>\$ 113,867</u>	<u>\$ 6,844</u>	<u>\$ 232,751</u>	<u>\$ 17,606</u>	<u>\$ -</u>	<u>\$ 13,834</u>	<u>\$ 8,639</u>	<u>\$ 531,383</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Halifax Regional Water Commission Schedule of utility plant in service

Year ended March 31, 2018 (in thousands)

Schedule A

	Structures and improvements	Collection system	Laterals	Tools and work equipment	Total
Stormwater					
Cost					
Beginning balance, April 1, 2017					
Cost	\$ 9,785	\$ 227,751	\$ 4,611	\$ 3,045	\$ 245,192
Additions	11	17,696	285	767	18,759
Disposals	-	-	-	-	-
Total cost, March 31, 2018	<u>9,796</u>	<u>245,447</u>	<u>4,896</u>	<u>3,812</u>	<u>263,951</u>
Accumulated depreciation					
Beginning balance, April 1, 2017	1,402	36,380	301	870	38,953
Depreciation	177	5,889	95	477	6,638
Total accumulated depreciation, March 31, 2018	<u>1,579</u>	<u>42,269</u>	<u>396</u>	<u>1,347</u>	<u>45,591</u>
Net book value, March 31, 2018	<u>\$ 8,217</u>	<u>\$ 203,178</u>	<u>\$ 4,500</u>	<u>\$ 2,465</u>	<u>\$ 218,360</u>
Cost					
Beginning balance, April 1, 2016					
Cost	\$ 9,705	\$ 218,501	\$ 3,929	\$ 2,034	\$ 234,169
Additions	80	9,250	682	1,011	11,023
Disposals	-	-	-	-	-
Total cost, March 31, 2017	<u>9,785</u>	<u>227,751</u>	<u>4,611</u>	<u>3,045</u>	<u>245,192</u>
Accumulated depreciation					
Beginning balance, April 1, 2016	1,226	30,690	216	504	32,636
Depreciation	176	5,690	85	366	6,317
Total accumulated depreciation, March 31, 2017	<u>1,402</u>	<u>36,380</u>	<u>301</u>	<u>870</u>	<u>38,953</u>
Net book value, March 31, 2017	<u>\$ 8,383</u>	<u>\$ 191,371</u>	<u>\$ 4,310</u>	<u>\$ 2,175</u>	<u>\$ 206,239</u>

During the year, \$267 of interest was capitalized to Utility Plant in Service (2017 - \$491).

	Water	Wastewater	Stormwater	Total
Cumulative utility plant in service				
Net book value, March 31, 2018	\$ 455,486	\$ 558,203	\$ 218,360	\$ 1,232,049
Net book value, March 31, 2017	\$ 430,776	\$ 531,383	\$ 206,239	\$ 1,168,398

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Utility plant in service under IFRS differs from the Handbook due to exclusion of intangible assets, componentization of certain assets and useful lives for depreciation.

Halifax Regional Water Commission

Schedule of long term debt

Schedule B

Year ended March 31, 2018 (in thousands)

	<u>Interest rate</u>	<u>Final Maturity</u>	<u>Balance Remaining</u>	
			<u>2018</u>	<u>2017</u>
Payable to Municipal Finance Corporation				
Water				
Debenture 23 A 1	4.250% to 6.125%	2018	\$ 600	\$ 700
Debenture 27 A 1	4.650% to 5.010%	2017	-	1,108
Debenture 28 A 1	6.500% to 6.750%	2018	1,100	1,200
Debenture 98 A 1	3.750% to 5.088%	2019	3,671	7,128
Debenture 29 A 1	0.900% to 4.329%	2019	450	675
Debenture 30 A 1	1.550% to 3.870%	2020	525	700
Debenture 31 A 1	1.630% to 4.221%	2021	600	750
Debenture 32 A 1	1.636% to 3.480%	2022	1,000	1,200
Debenture 32 C 1	1.510% to 3.160%	2022	8,051	8,587
Debenture 33 A 1	1.330% to 3.489%	2023	8,090	8,595
Debenture 33 B 1	1.285% to 4.114%	2023	5,930	6,300
Debenture 34 B 1	1.200% to 3.190%	2024	11,622	12,305
Debenture 35 B 1	1.040% to 2.894%	2025	12,120	12,794
Debenture 36 A 1	1.150% to 2.925%	2026	1,800	2,000
Debenture 36 B 1	1.150% to 2.506%	2026	4,122	4,338
Debenture 37 A 1	1.734% to 3.073%	2027	3,500	-
Halifax Harbour Solutions				
Debenture 29 A 1	0.900% to 4.329%	2019	7,800	8,450
Wastewater/stormwater				
Debenture 30 A 1	1.510% to 4.500%	2020	2,210	2,380
Debenture 32 A 1	1.636% to 3.480%	2022	1,797	1,917
Debenture 32 B 1	1.380% to 3.156%	2022	24,000	25,600
Debenture 32 C 1	1.510% to 3.160%	2022	3,447	3,676
Debenture 33 A 1	1.330% to 3.489%	2023	13,488	14,331
Debenture 33 B 1	1.285% to 4.114%	2023	8,714	9,259
Debenture 34 A 1	1.245% to 3.347%	2024	4,734	5,012
Debenture 34 B 1	1.200% to 3.190%	2024	7,298	7,727
Debenture 35 B 1	1.040% to 2.894%	2025	12,699	13,405
Debenture 36 B 1	1.150% to 2.506%	2026	1,722	1,813
Debenture 37 A 1	1.735% to 3.073%	2027	6,100	-
Stormwater				
Debenture 33 A 1	1.330% to 3.489%	2023	432	459
Debenture 33 B 1	1.285% to 4.114%	2023	2,111	2,243
Debenture 34 B 1	1.200% to 3.190%	2024	5,017	5,313
Debenture 35 B 1	1.040% to 2.894%	2025	2,907	3,069
Debenture 36 B 1	1.150% to 2.506%	2026	856	901
Debenture 37 A 1	1.734% to 3.073%	2027	400	-
			<u>168,913</u>	<u>173,935</u>
Payable to Halifax Regional Municipality				
Municipal Finance Corporation – Wastewater/stormwater				
Debenture 24 B 1	2.840% to 5.940%	2024	38,500	44,000
Debenture 27 A 1	4.650% to 5.010%	2017	-	66
Debenture 34 B 1	1.200% to 3.190%	2024	7,000	8,000
			<u>45,500</u>	<u>52,066</u>
			<u>214,413</u>	<u>226,001</u>
Less: debt issue costs			<u>(912)</u>	<u>(1,033)</u>
			<u>213,501</u>	<u>224,968</u>
Less: amount payable within one year			<u>(22,630)</u>	<u>(21,669)</u>
			<u>\$ 190,871</u>	<u>\$ 203,299</u>

The debentures are repayable in fixed annual or semi-annual principal instalments plus interest payable semi-annually. Principal instalments for the next five years are as follows:

2019	\$ 22,630
2020	\$ 23,759
2021	\$ 18,084
2022	\$ 16,039
2023	\$ 40,752

Schedule C

Halifax Regional Water Commission Schedule of operations for water service

Year ended March 31, 2018 (in thousands)

	<u>2018</u>	<u>2017</u>
Operating revenues		
Water service	\$ 47,220	\$ 47,183
Fire protection	7,074	7,074
Private fire protection services	856	831
Other operating revenue		
Bulk water stations	304	330
Customer late payment fees	220	282
Miscellaneous	176	153
	<u>55,850</u>	<u>55,853</u>
Operating expenditures		
Water supply and treatment	8,645	8,050
Water transmission and distribution	9,410	8,997
Engineering and information services	3,850	3,828
Regulatory services	496	493
Customer service	2,348	2,290
Administration and pension	6,910	5,966
Depreciation	8,550	7,756
	<u>40,209</u>	<u>37,380</u>
Earnings from operations before financial and other revenues and expenditures	<u>15,641</u>	<u>18,473</u>
Financial and other revenues		
Interest	313	351
Other	485	375
	<u>798</u>	<u>726</u>
Financial and other expenditures		
Interest on long term debt	2,131	2,378
Repayment of long term debt	8,247	8,400
Amortization of debt discount	94	95
Grant in lieu of taxes	4,774	4,578
Other	149	17
	<u>15,395</u>	<u>15,468</u>
Earnings for the year	<u>\$ 1,044</u>	<u>\$ 3,731</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Regional Water Commission

Schedule of operations for wastewater service

Schedule D

Year ended March 31, 2018 (in thousands)

	<u>2018</u>	<u>2017</u>
Operating revenues		
Wastewater service	\$ 69,994	\$ 69,475
Other operating revenue		
Leachate and other contract revenue	417	440
Septage tipping fees	812	909
Over strength surcharge	219	23
Customer late payment fees	169	189
Miscellaneous	471	428
	<u>72,082</u>	<u>71,464</u>
Operating expenditures		
Wastewater collection	12,644	11,639
Wastewater treatment	19,647	19,793
Engineering and information services	3,419	3,223
Regulatory services	929	1,095
Customer service	2,270	1,842
Administration and pension	4,853	5,017
Depreciation	11,905	10,669
	<u>55,667</u>	<u>53,278</u>
Earnings from operations before financial and other revenues and expenditures	<u>16,415</u>	<u>18,186</u>
Financial and other revenues		
Interest	311	351
Other	3,307	2,168
	<u>3,618</u>	<u>2,519</u>
Financial and other expenditures		
Interest on long term debt	5,185	5,509
Repayment of long term debt	11,747	11,699
Amortization of debt discount	98	95
Other	120	32
	<u>17,150</u>	<u>17,335</u>
Earnings for the year	<u>\$ 2,883</u>	<u>\$ 3,370</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Schedule E**Halifax Regional Water Commission
Schedule of operations for stormwater service**

Year ended March 31, 2018 (in thousands)

	<u>2018</u>	<u>2017</u>
Operating revenues		
Stormwater site generated service	\$ 6,169	\$ 6,661
Stormwater right-of-way service	3,847	3,881
Other operating revenue		
Customer late payment fees	93	51
Miscellaneous	105	88
	<u>10,214</u>	<u>10,681</u>
Operating expenditures		
Stormwater collection	4,842	4,096
Engineering and information services	556	525
Regulatory services	1,304	768
Customer service	278	300
Administration and pension	789	816
Depreciation	807	677
	<u>8,576</u>	<u>7,182</u>
Earnings from operations before financial and other revenue and expenditures	<u>1,638</u>	<u>3,499</u>
Financial and other revenues		
Investment income	<u>70</u>	<u>78</u>
Financial and other expenditures		
Interest on long term debt	568	588
Repayment of long term debt	1,253	1,221
Amortization of debt discount	10	9
	<u>1,831</u>	<u>1,818</u>
(Loss) earnings for the year	<u>\$ (123)</u>	<u>\$ 1,759</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Regional Water Commission

Schedule of regulated activities

Schedule F

Year ended March 31, 2018 (in thousands)

	<u>2018</u>	<u>2017</u>
Operating revenues		
Water service	\$ 47,220	\$ 47,183
Wastewater service	69,994	69,475
Stormwater service	10,016	10,542
Public fire protection	7,074	7,074
Private fire protection services	856	831
Other operating revenue	1,230	1,207
	<u>136,390</u>	<u>136,312</u>
Operating expenditures		
Water supply and treatment	9,802	9,137
Water transmission and distribution	10,810	10,411
Wastewater collection	11,252	10,347
Stormwater collection	4,793	4,039
Wastewater treatment	18,054	17,797
Engineering and information services	7,265	7,576
Regulatory services	3,291	2,356
Customer service	4,861	4,396
Administration and pension	12,501	11,768
Depreciation	21,241	19,095
	<u>103,870</u>	<u>96,922</u>
Earnings from operations before financial and other revenues and expenditures	<u>32,520</u>	<u>39,390</u>
Financial and other revenues		
Interest	694	780
Other	3,096	2,289
	<u>3,790</u>	<u>3,069</u>
Financial and other expenditures		
Interest on long term debt	7,884	8,475
Repayment of long term debt	21,247	21,320
Amortization of debt discount	202	199
Grant in lieu of taxes	4,774	4,578
	<u>34,107</u>	<u>34,572</u>
Earnings for the year	<u>\$ 2,203</u>	<u>\$ 7,887</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Schedule F

Halifax Regional Water Commission Schedule of unregulated activities

Year ended March 31, 2018 (in thousands)

	<u>2018</u>	<u>2017</u>
Operating revenues		
Dewatering	\$ 210	\$ 210
Septage tipping fees	812	909
Leachate treatment and contract revenue	417	440
Airplane effluent	121	89
Other operating revenue	<u>196</u>	<u>196</u>
	<u>1,756</u>	<u>1,844</u>
Operating expenditures		
Water supply and treatment	18	16
Wastewater treatment	456	830
Other	87	111
Depreciation	<u>21</u>	<u>6</u>
	<u>582</u>	<u>963</u>
Earnings from operations before financial and other revenues and expenditures	<u>1,174</u>	<u>881</u>
Financial and other revenues		
Other	<u>696</u>	<u>139</u>
Financial and other expenditures		
Other	<u>269</u>	<u>49</u>
Earnings for the year	<u>\$ 1,601</u>	<u>\$ 971</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

Halifax Regional Water Commission Nova Scotia Utility and Review Board information

Schedule G

Year ended March 31, 2018 (in thousands)

Return on rate base	<u>2018</u>	<u>2017</u>
Rate of return on rate base for water service	3.39%	4.54%
Rate of return on rate base for wastewater service	5.65%	6.71%
Rate of return on rate base for stormwater service	3.45%	11.78%

Special purpose reserves

	Wastewater & Stormwater Reserves	RDC Water Reserve	RDC Wastewater Reserve	Other Capital Reserves	2018 Total	2017 Total
Reserve, beginning of year	\$ 3,819	\$ 1,246	\$ 11,842	\$ 5	\$ 16,912	\$ 8,070
Contributions and interest	-	1,086	10,075	1	11,162	9,230
Expenditures	(213)	-	-	-	(213)	(388)
Reserve, end of year	<u>\$ 3,606</u>	<u>\$ 2,332</u>	<u>\$ 21,917</u>	<u>\$ 6</u>	<u>\$ 27,861</u>	<u>\$ 16,912</u>

Summarized consolidated operating results

	<u>Actual 2018</u>	<u>Actual 2017</u>
Operating revenues	\$ 138,145	\$ 137,997
Operating expenditures	<u>99,437</u>	<u>97,839</u>
Earnings from operations before financial and other revenues and expenditures	38,708	40,158
Non-operating revenues	4,486	3,322
Non-operating expenditures	<u>34,376</u>	<u>34,622</u>
Earnings for the year	<u>\$ 8,818</u>	<u>\$ 8,858</u>

Schedules are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities (Handbook).

**STRAIGHT from
the SOURCE**

