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Item No. 12.3

Halifax Regional Council
December 12, 2017

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: November 27, 2017

SUBJECT: Halifax Water 2016/17 Annual Report

INFORMATION REPORT

ORIGIN

Annual operational requirement.

LEGISLATIVE AUTHORITY

Halifax Regional Water Commission Act

BACKGROUND

On behalf of the Halifax Water Board, staff are pleased to present the Annual Report for the 2016/17 fiscal year. The theme of the 2016/2017 Annual Report is “A Decade of One Water” in recognition of the tenth anniversary as an integrated water, wastewater and stormwater utility.

DISCUSSION

In 2007 Halifax Water was given responsibility for the municipality’s wastewater and stormwater assets, building on its stewardship mandate for drinking water dating back to 1945. Over the past ten years much has been accomplished on the water, wastewater and stormwater fronts, including:

- Significantly improved wastewater treatment plant operations. In 2007, only two of fifteen plants were compliant with regulations. All plants are now compliant with federal regulations or on track for compliance by next year.
- Over \$500 million in infrastructure investments, including upgrades and expansions of the Eastern Passage and Aerotech Wastewater Treatment Facilities.
- Water Research Leadership with Dalhousie University through the Natural Science and Engineering Research Council (NSERC) Chair in Water Quality and Treatment. The NSERC Chair

was initiated in 2007 and recently renewed for an additional five years. Much of the understanding on lead in drinking water came directly from this research.

- Continued focus on water loss control in the distribution system, garnering a world class reputation. Halifax Water has recaptured 40 million litres/day of leakage as a result of its efforts and was the first utility in North America to adopt the International Water Association (IWA) methodology.
- Implementation of a distinct stormwater management charge in July 2013. The charge has evolved following constructive feedback from customers and stakeholders. Effective July 1, 2017, a tiered rate structure for residential customers saw 88% of customers receive a reduced stormwater bill and an incentive program was implemented for non-residential customers to minimize peak run-off. These changes put Halifax Water rate structures in line with industry best practice and user-pay principles.
- Implementation of a robust emergency management program aligned with the Incident Command System (ICS).
- Halifax Water is the only utility in Atlantic Canada to implement an environmental management system for water and wastewater treatment facilities, certified to ISO 14001 standards.
- An energy management program to reduce the utility's ecological footprint and costs.
- Continued high regard from customers as measured through the annual survey conducted by Corporate Research Associates. Over 90% of customers were satisfied or very satisfied with Halifax Water's service each and every year that the survey was conducted.

The utility continues to practice sound financial management. This past fiscal year, Halifax Water finished in an excellent financial position with a net profit of \$8.86 million, compared to a budget profit of \$0.16 million. Long term debt for the utility decreased by \$12.6 million with total outstanding debt as of March 31, 2017, at \$204.3 million. In accordance with the agreement between Halifax Water and the Halifax Regional Municipality, a dividend in the amount of \$4.6 million was provided. With a strong financial trend continuing this year, Halifax Water will not need to increase rates this year or next.

The 2016/2017 fiscal year also saw significant accomplishments to enhance customer service. Of particular note was the implementation of advanced metering infrastructure and a new operations management system through Cityworks to improve the customer experience. Last year also saw the Customer Care Centre step up to take billing and operations calls for all three services, as a "one stop" contact for customers.

The Halifax Water Board and management 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, 2017, 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.

Halifax Water annually pays a dividend based on the water rate base to the municipality, which is essentially a grant in lieu of taxes that grows steadily as investment in the water rate base increases.

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, 2017 was 21.7%, a reduction from 2015/2016.

The financial position of the utility has improved in recent years and level of investment in water, wastewater and stormwater capital has been increasing. Utility rates for service benchmark well with other Canadian cities, and water and wastewater rates are expected to remain unchanged in 2017/2018 and 2018/2019.

COMMUNITY ENGAGEMENT

N/A

ATTACHMENTS

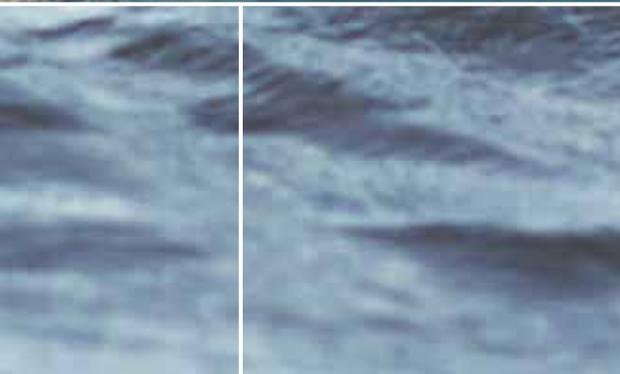
Halifax Water 2016/17 Annual Report

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: James Campbell, Communications & Public Relations Coordinator, 902.490.4604

Report Approved by: Original signed

Carl D. Yates, M.A.Sc., P.Eng., General Manager 902.490.4840



Halifax Water

Twenty-first
Annual Report
March 31, 2017

*A Decade of
One Water*

Cover image: The three services offered by Halifax Water, with the customer and environment in mind





Letter from the Chair



September 19, 2017

Mayor Mike Savage and Members of Regional Council

Re: 2016/17 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, 2017, marking a decade with a "one water" mandate. Significant progress has been made over the last 10 years, as outlined in the General Manager's Message contained in this report.

With respect to last year, I am pleased to report that a positive trend continues with improvements in governance, financial results and customer service. The Board approved revised Terms of Reference for its effective operation, including Terms of Reference for the three committees of the Board: the Board Executive; Audit and Finance; and Environment, Health and Safety.

The Utility submitted an application to the Nova Scotia Utility and Review Board (NSUARB) last fall, with proposed changes to the stormwater rate structure based on the approved Cost of Service Manual. This culminated from a review of best practice and three years of administration of the stormwater charge, initially implemented in July 2013. The application was well received, with refinements to incent non-residential customers to minimize peak run-off and a tiered rate structure for residential customers, consistent with user-pay principles. These changes put Halifax Water rate structures in line with industry best practice and, more importantly, in line with constructive feedback from customers and stakeholders. With the NSUARB Decision in April, the new rate structure came in to effect on July 1, 2017.

The Utility finished the year in an excellent financial position with a net profit of \$8.86 million, compared to a budget profit of \$0.16 million. Long term debt for the utility decreased by

\$12.6 million with total outstanding debt as of March 31, 2017, at \$204.3 million. In accordance with the agreement between Halifax Water and the Halifax Regional Municipality, a dividend in the amount of \$4.6 million was provided. With a strong financial trend continuing this year, Halifax Water will not need to increase rates this year or next.

The past year saw significant accomplishments to enhance customer service. Of particular note was the implementation of advanced metering infrastructure and a new operations management system through Cityworks to improve the customer experience. Last year also saw our Customer Care Centre step up to take all service calls from the customer, whether they are billing or operations related. On that note, a special thank you is extended to our customers and Regional Council who have entrusted us with the stewardship responsibility to deliver water, wastewater and stormwater service under a one water framework.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Ray Ritcey". The signature is fluid and cursive, written over a light grey horizontal line.

Ray Ritcey
Chair of the Board

A Decade of One Water



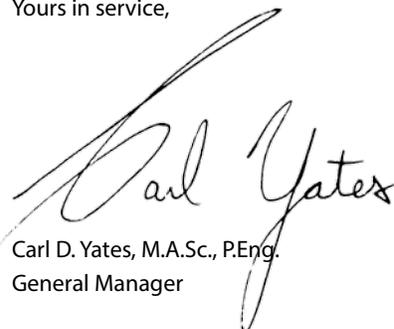
It seems like only yesterday that Halifax Water was given responsibility for stewardship of all things water with the transfer of wastewater and stormwater assets from the municipality in 2007. This transfer was, in large part, based on the track record of the utility since its inception in 1945 and its regional mandate in 1996.

So what have we done? In terms of accomplishments over the past ten years, Halifax Water has made its mark on all three services (water, wastewater and stormwater) with:

- Over \$500 million in infrastructure investments, including upgrades and expansions of the Eastern Passage and Aerotech Wastewater Treatment Facilities to meet federal wastewater system effluent regulations [WSER] and facilitate growth.
- Leadership on the recovery of the Halifax Wastewater Treatment Facility after the flood incident of January, 2009.
- Significantly improved compliance with WSER for all wastewater plants; in 2007, only two of fifteen plants were compliant with regulations. All plants are now compliant or on track for compliance by next year.
- Implementation of a wet weather management program to mitigate inflow and infiltration into the wastewater system, thereby reducing wastewater overflows into the environment.
- Continued focus on water loss control in the distribution system, garnering a world class reputation. Halifax Water has recaptured 40 million litres/day of leakage as a result of its efforts and was the first utility in North America to adopt the International Water Association (IWA) methodology.
- Implementation of a seasonal disinfection program for wastewater treatment facilities discharging to the harbour with triple bottom line results.
- Implementation of a robust emergency management program with a focus on response through the incident command system.
- Mitigation and adaptation programs in response to climate change for a more resilient utility.
- Leadership in water research with Dalhousie University through the Natural Science and Engineering Research Council (NSERC) Chair in Water Quality and Treatment (the NSERC Chair has been in place since 2007 and recently renewed for an additional five years).
- Implementation of an environmental management system for water and wastewater treatment facilities, certified to ISO 14001 standards. Halifax Water is the only utility in Atlantic Canada with this certification.
- Implementation of advanced metering infrastructure to enhance customer service.
- Responsible financial management with a focus on cost containment including a program on energy management across the utility to reduce our ecological footprint and costs.
- Continued high regard from customers as measured through the annual survey conducted by Corporate Research Associates. Over 90% of customers were satisfied or very satisfied with Halifax Water's service each and every year that the survey was conducted.

Although there are many more accomplishments to add to the list, it is the endorsement from customers that keeps us going. Customer Service is the lifeblood of Halifax Water and central to our mission.

Yours in service,



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

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 the 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, 2017



Ray Ritcey, BComm, MBA
CPA/CGA
Chair



Councillor Russell Walker
Vice Chair



Councillor Lisa Blackburn
Commissioner



Councillor Steve Streach
Commissioner



Mayor Mike Savage
Commissioner



Darlene Fenton
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Don Mason, P.Eng., MCIP
Commissioner

Executive Staff



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General Manager



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CPA/CGA
Director, Corporate Services



Jamie Hannam, MBA, P.Eng.
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Information Services



Kenda MacKenzie, P.Eng.
Director, Regulatory Services



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



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

Contents

Letter from the Chair	2
Message from the General Manager	3
General Information of Utility	6
High Quality Water	8
Responsible Financial Management	12
Effective Asset Management	17
Regulatory Compliance	23
Stewardship of the Environment	28
Safety and Security	33
Motivated and Satisfied Employees	35
Typical Water Analyses	40-44
Financial Overview	45
Financial Statements	46

How to reach us:

For more information about Halifax Water and its services, visit our website at www.halifaxwater.ca, contact Customer Service at (902) 420-9287, e-mail us at customerservice@halifaxwater.ca, fax us at (902) 490-4749, or write us at P.O. Box 8388 RPO CSC, Halifax, N.S., B3K 5M1. You can also reach us via Facebook and Twitter at @HalifaxWater.

General Information of Utility

Year Ended March 31, 2017

WATER

Precipitation

Measured at Pockwock	
Rainfall	1 620.90 mm
Snowfall	349.25 cm
Measured at Lake Major	
Rainfall	1 230.8 mm
Snowfall	211.5 cm

Sources of Supply and Watershed Areas

Pockwock Lake	5 661 ha
Safe Yield	145 500 m ³ /day
Chain Lake	206 ha
Safe Yield	4 500 m ³ /day
Lake Major	6 944 ha
Safe Yield	65 900 m ³ /day
Lake Lemont/Topsail	346 ha
Safe Yield	4 500 m ³ /day
Bennery Lake	644 ha
Safe Yield	2 300 m ³ /day

Water Supply Production (Cubic Metres)

Pockwock Lake	29 867 945
Lake Major	12 140 028
Bennery Lake	308 100
Small Systems	47 216
Total	42 633 289

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		
Musquodoboit	(81m)	275 m ³
Aerotech	(174 m)	4 085 m ³
Beaver Bank	(156 m)	6 937 m ³

Total Storage Capacity 259 213 m³

Transmission and Distribution System

Size of mains	19 mm - 1 500 mm
Total water mains	1 582 km
Main valves	15 049
Fire hydrants	8 356
Distribution Pumping Stations	20
Pressure Control/Flow	
Meter Chambers	140

Services and Meters

Water	
Sprinkler services	
(25 mm - 300 mm)	2 117
Supply services	
(10 mm - 400 mm)	88 073
Meters	
(15 mm - 250 mm)	83 406
Wastewater services	80 143

Treatment Processes

J. Douglas Kline Water Supply Plant

Source	- Pockwock Lake
Process	- Dual media direct filtration
	- Iron and manganese removal
8 filters	143 m ² /each
Max. flow rate	0.137 m ³ /m ² /min
Design capacity	227 000 m ³ /day
Design average flows	81 606 m ³ /day

Lake Major Water Supply Plant

Source	- Lake Major
Process	- Upflow clarification and trimedia filtration
	- Iron and manganese removal
4 filters	85 m ² /each
Max. flow rate	0.192 m ³ /m ² /min
Design capacity	94 000 m ³ /day
Design average flows	33 260 m ³ /day

Bennery Lake

Source	- Bennery Lake
Process	- Manganese removal, sedimentation, dual media filtration
2 filters	26.65 m ² /each
Max. flow capacity	0.10/m ³ /m ² /min
Design capacity	7 950 m ³ /day
Design average flows	844 m ³ /day

Bomont

Source - Shubenacadie River
Process - Nano Filtration / Ionic Exchange Resin
Design Average Flows 5 m³/day

Collins Park

Source - Lake Fletcher
Process - Ultra Filtration / Nano Filtration
Design average flows 40 m³/day

Middle Musquodoboit

Source- Musquodoboit River
Process- Raw water infiltration gallery
- Ultra Filtration / Nano Filtration
Design average flows 49 m³/day

Five Island Lake

Source - 1 well
Process - Ultraviolet disinfection
Design average flows 9 m³/day

Silver Sands

Source - 2 wells
Process - Green sand pressure filters
-Iron and manganese removal
Design average flows 25 m³/day

Miller Lake

Source - 3 wells
Process - Arsenic removal with G2 Media
No Production - bulk water supply

Population Served

Halifax Municipality
Estimated population served 365 000
Consumption per capita (all customers) 265 litres/day

Glossary of Terms

ha - hectare
m - metre
m² - square metre
m³ - cubic metre
mm - millimetre
km - kilometre
cm - centimetre

General Information of Utility

Year Ended March 31, 2017

WASTEWATER/STORMWATER

Treatment Processes

Halifax

Process - Enhanced Primary - UV
Design average flows - 139 900 m³/day
Area served - Halifax
Receiving water - Halifax Harbour
Volume treated - 52,272,321 m³

Dartmouth

Process - Enhanced Primary - UV
Design average flows - 83 800 m³/day
Area served - Dartmouth
Receiving water - Halifax Harbour
Volume treated - 18,818,967 m³

Herring Cove

Process - Enhanced Primary - UV
Design average flows - 28 500 m³/day
Area served - Halifax-Herring Cove
Receiving water - Halifax Harbour (Outer)
Volume treated - 3,633,821 m³

Mill Cove

Process - Secondary - UV / Pure oxygen
Activated sludge
Design average 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 average 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 average flows - 4 540 m³/day
Area served - Lakeside-Timberlea
Receiving water - Nine Mile River
Volume treated - 897,691 m³

Aerotech

Process - Tertiary - UV /SBR
Design average flows - 1 360 m³/day
Area served - Aerotech Park-Airport
Receiving water - Johnson River
Volume treated - 304,573 m³

Springfield Lake

Process - Secondary - UV Activated sludge
Design average flows - 543 m³/day
Area served - Springfield Lake
Receiving water - Lisle Lake
Volume treated - 209,398 m³

Fall River

Process - Tertiary - UV / Activated sludge
and post filtration
Design average 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 and
engineered wetland
Design average flows - 680 m³/day
Area served - North Preston
Receiving water - Winder Lake
Volume treated - 244,407 m³

Middle Musquodoboit

Process - Secondary - UV / RBC
Design average flows - 114 m³/day
Area served - Middle Musquodoboit
Receiving water - Musquodoboit River
Volume treated - 71,195 m³

Uplands Park

Process - Tertiary - UV / Trickling filter
and wetland
Design average flows - 91 m³/day
Area served - Uplands Park
Receiving water - Sandy Lake
Volume treated - 30,251 m³

Wellington

Process - Tertiary - UV / Activated sludge
/reed bed
Design average flows - 68 m³/day
Area served - Wellington
Receiving water - Grand Lake
Volume treated - 6,752 m³

Frame

Process - Secondary - Membrane
Bioreactor / UV
Design average flows - 80 m³/day
Area served - Frame Sub-Division
Receiving water - Lake William
Volume treated - 6,616 m³

Belmont

Process - Secondary - Sodium Hypochlorate
Extended Aeration
Design average flows - 114 m³/day
Area served - Belmont Sub-Division
Receiving water - Halifax Harbour

RBC = Rotating Biological Contactor;
SBR = Sequencing Batch reactor;
UV = Ultra Violet
Volume treated - 40,880 m³
(Decommissioned December 2016)

Wastewater & Stormwater Collection System

Size of pipes	38 mm - 3 600 mm
Total sewer length	2 555 km
Total manholes	39 977
Total Pumping Stations	166
Total ditch length	507 km
Driveway culverts	Approximately 18 000
Cross culverts	1748
Holding Tanks and Retention Ponds	54 (12-244,000 m ³)
Catch basins	23 810

High Quality Water

LEAD IN DRINKING WATER

Lead in drinking water remained a focus for Halifax Water in 2016/17. In September of 2017, the Halifax Water Board approved a business plan to facilitate removal of all lead service lines (LSLs) from the Halifax Water system, both those in the public right-of-way, which are owned by Halifax Water, and on private property which belongs to the property owner.

LSLs are found in areas which were connected to the public water system before 1960; these include peninsular Halifax and central Dartmouth. It is estimated that there are 2000-2500 public LSLs remaining and 10,000-15,000 on private property.

With most LSLs on private property, one focus of the program will be to assist property owners in the identification of LSLs. This will involve a thorough review of Halifax Water installation and maintenance records dating back over the last 100 years. It will also involve outreach to customers and development of tools to help them determine if they have a lead service line.

While Halifax Water has replaced the

vast majority of its LSLs over the last 30+ years, many homeowners have not. There are a number of barriers to property owners replacing their LSLs. One barrier is certainly cost but other barriers include, lack of familiarity with the construction process, lack of understanding of the potential health

risks, lack of awareness of the problem or not being sure if they have a lead service line. Over the coming months, Halifax Water will continue to develop programs to remove or lessen barriers to customers.

Halifax Water staff have been participating in a North America-wide effort to understand and address the LSL issue. Several Halifax Water staff have participated in the development of industry policy through the American Water Works Association. Halifax Water



Halifax Water replacing a lead service line with a new copper line

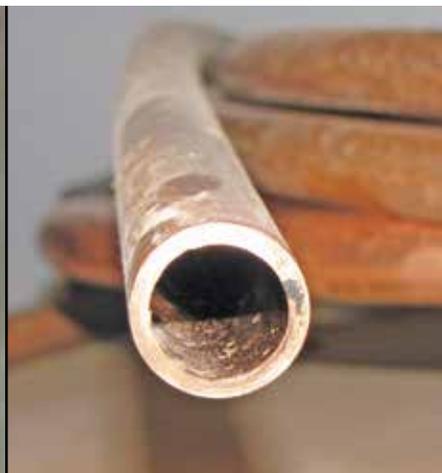
staff has also taken part in industry sponsored research to develop methods for locating and replacing LSLs.

In the last year, Halifax Water has added two new features to its LSL replacement program. Since disturbance or replacement of an LSL can result in a short term increase in lead levels in a home, Halifax Water will now provide pitcher style filters to homes at risk of high lead levels. These include homes with lead services lines that have been disturbed and not yet replaced; and homes that have tested for high lead levels and a contractor is scheduled to begin replacement work.

The second change provides options for homeowners undergoing an LSL



Lead pipe



Copper pipe

replacement. Halifax Water schedules the public LSL replacement after the property owner replaces the private property portion. For reasons such as weather, scheduling, street permits and locates, this gap between the private and public replacement can be two weeks or more during which there may be elevated lead levels in the home. While exposure to lead can be managed in this situation, some customers have expressed concern about this gap. Halifax Water has identified three contractors who have been approved by Halifax Water to replace the public portion of the LSL. If the homeowner chooses to employ one of these contractors, they will coordinate replacement of the public and private into a single project. Homeowners are encouraged to get several prices for qualified contractors prior to making their selection. Information about this program and all things related to LSLs are found on the Halifax Water website.

SOURCE WATER QUALITY

Geosmin continues to occur in the Pockwock water supply. In 2016, geosmin occurred once again beginning in August and lasting until winter 2017. Geosmin is produced from both algae and soil based bacteria. It is not a health concern but does have an earthy, musty taste and odour that is apparent to some consumers.

Since its first occurrence in 2012, Halifax Water has studied both the occurrence of geosmin and treatment options to remove geosmin. There are several treatment options but all are very costly from both an installation and long term operations perspective.

Halifax Water is now looking at geosmin from the broader perspective of other source water changes that have been observed. Halifax Water now has information to suggest that the lakes



Pockwock Lake with wind turbines in background

which supply water to our water systems are undergoing recovery from the effects of acid rain. Decades of emissions from industrialization and fossil fuel consumption have caused lakes in eastern Canada, and elsewhere, to acidify. Halifax area lakes typically have a pH of 5-6 or lower. Legislative efforts, improved technology and the reduction of coal fired power generation has reduced acid rain and permitted lakes to recover. Halifax Water has observed a trend of increasing pH in local lakes.

This is a positive occurrence from an environmental perspective, and for our society at large. From a water treatment perspective it presents some challenges. Increasing pH results in increased levels of natural organic matter (NOM) in our lakes. NOM must be removed in the treatment process because it can lead to disinfection by-products, and also to make drinking water aesthetically acceptable. Increased NOM presents an increased treatment challenge for treatment plants and leads directly to increased operating costs. Increased pH also results in an improved aquatic habitat for fish and the species they rely on for food. This includes microbes and plankton that must be removed in the treatment process, but also species like

algae which can be the cause of a variety of taste and odour causing compounds, such as geosmin.

Halifax Water will be doing increasing study and research over the coming years to fully understand the impacts of recovery on our lakes, the treatment challenges that come with lake recovery, and to plan improvements to treatment processes.

RESEARCH CHAIR

On April 1, 2017, Halifax Water and Dr. Graham Gagnon at Dalhousie University successfully renewed the NSERC/Halifax Water Industrial Research Chair in Water Quality and Treatment for another 5 year term. Under this program, the Natural Sciences and Engineering Research Council (NSERC) of Canada matches funds provided by Halifax Water and other partners to Dalhousie University, to fund research into drinking water quality issues. Many of our efforts to manage lead in drinking water and improve treatment processes have been developed based on research conducted at Dalhousie.

Research conducted over the next five years will be focused on the themes of Understanding Source Water Changes

(such as lake recovery), Adapting Treatment Processes to Meet Source Water Challenges, and Distribution System Water Quality.

Additionally, Halifax Water also joined an application to NSERC by Drs. Monica Emelko at the University of Waterloo and Uldis Silins at the University of Alberta to establish a national network to study how management of forested water sources can improve drinking water quality. This application was successful and the network will be established in 2017. This will result in two other Dalhousie University researchers, Dr. Rob Jamieson and Dr. Peter Duinker working in Halifax Water watersheds to develop tools and techniques for source water protection in collaboration with other network partners across Canada.

2016 DROUGHT

2016 will be remembered across Nova Scotia for the drought that impacted water supplies and many households on private wells.

While many Halifax Water sources

experienced close to historically low lake levels, the impacts of the drought were experienced most directly at Lake Major.

In early September, low water levels in Lake Major resulted in interruption to downstream flows into the Little Salmon River. Later in September, Halifax Water called on its customers to undertake mandatory water use restrictions and began contingency planning in the event lake levels continued to drop.

Both Halifax Water staff and customers responded well to the call to action.



Lake Major Dam September 14, 2016



Lake Major Dam October 21, 2016

Lake Major Pumping Station



Water consumption in the Lake Major system decreased by 3 million litres/day as a result of the restrictions and increased leak detection and repair efforts.

As a result of this experience, Halifax Water will explore modifying the design of a planned new pumping station at Lake Major to access deeper areas of Lake Major.

WATER TREATMENT PLANT IMPROVEMENTS

Halifax Water periodically studies each of its treatment facilities to assess upgrades to improve treatment plant performance replacement. Each plant has a multi year capital plan based on these studies.

Last year Halifax Water began a project to replace the filter underdrains and filter media at the J. Douglas Kline Water Supply plant. New media and underdrains will

improve plant performance and position the plant for challenges that are likely to arise from changing source water quality. The project will also include the installation of air scour. Air scour is a technology to clean filters at the end of each run that has been developed since the plant was designed in the mid 1970's. Filters will be upgraded in a multi-phase project over the next two years to maintain plant operation through the project.

LAKE MAJOR DAM

Last year, Halifax Water completed the design of a new dam for Lake Major. The existing Lake Major dam is due for replacement due to its age and condition. The new dam will improve Halifax Water's ability to manage flows into the Little Salmon River and meet new fisheries maintenance requirements mandated by Fisheries and Oceans Canada.

The dam design will incorporate a labyrinth spillway which will enable the dam to pass more water while protecting upstream properties from flooding.

The project was tendered in the Spring of 2017 and construction is planned to begin once permits are received from approval authorities.

LOCATES

Part of the business of a modern utility is to respond to calls from contractors and other utilities to locate buried infrastructure. Occupational health and safety regulations have resulted in a large increase in demand for locates by Halifax Water and other utilities.

Halifax Water is working to implement a new locates process through its computerized maintenance management system, City Works. Additional staff will be hired in 2017 to assist with the increasing volume of locates.

Later in 2017, Halifax Water is expected to join a computerized, internet based one call service provided for the Halifax area.

CUSTOMER CONNECT

In December 2016, Halifax Water launched Customer Connect, its advanced metering infrastructure (AMI) project.

The Customer Connect project includes the replacement or upgrade of all 83,000 water meters to current technology. Once upgraded, meters will no longer be read manually but will be read hourly by a radio transmitter on the outside of a customer's premise and communicated

to a fixed network located throughout the service area.

Installation of enabling software and network design will take place, beginning in the Spring of 2017, and mass deployment of new water meters will begin in September of 2017, after the completion of test phases in Beaver Bank and north end Halifax in the summer of 2017.

In addition to ending manual meter reading, Customer Connect, will provide Halifax Water Customer Service staff with more detailed information which will allow them to work with customers to a greater degree on resolving billing issues. It will also vastly reduce billing errors and estimated bills. As the project evolves, further functionality will be added, including automatic alerts to customers about leaks or unusual consumption patterns and the ability for customers to view consumption via an online web portal.

The meter installation phase of Customer Connect is expected to be completed in 2020.



Customer Connect digital water meter and radio transmitter

Responsible Financial Management

ANNUAL FINANCIAL RESULTS

The Utility received a clean audit opinion for the fiscal year ended March 31, 2017. 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.

The financial summary information shown on page 45 of the annual report aligns with the NSUARB Handbook. The external financial statements reproduced on pages 46 to 72 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 requirements will steadily increase as debt increases. IFRS does introduce more volatility, particularly around post-employment benefits. The NSUARB handbook will continue to be used for rate making purposes.

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 principle



Painting the interior walls and columns at the Geizer 158 Reservoir

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 \$8.9 M. Under IFRS, earnings for the year are \$23.2 million, and Total Comprehensive Earnings are \$23.9 million. The main differences are debt principle appropriations of \$21.3 million that are not included as an expense under IFRS, and some differences in how assets are componentized and depreciated resulting in \$7 million dollars of additional depreciation expense. ($\$8.9 \text{ M} + \$21.3 \text{ M} - \$7 \text{ M} = \23.2 M IFRS Earnings

for the Year.) IFRS requires the reporting of changes in the full actuarial liability of employee future benefits as Other Comprehensive Income. This may result in either positive or negative impacts on income in any given year. In 2016/17, this resulted in a small improvement which is reflected as Other Comprehensive Income of \$700 thousand, bringing IFRS Total Comprehensive Earnings to \$23.9 million. ($\23.2 IFRS Earnings for the Year, plus \$700 thousand Other Comprehensive Income).

Halifax Water's cash balances and liquidity have increased since 2016. Plant in Service assets, net of Accumulated Depreciation, is \$1.17 billion, \$9.7 million higher than this time last year. A total of 318 Capital Work Orders were closed during the year, primarily in the final two months, representing \$49.7 million in Plant In Service Additions. This was offset by Retirements of Plant In Service of \$2.2 million and Depreciation of \$37.8 million. The Geizer 158 Reservoir Rehabilitation was the largest capital project completed in the fiscal year, with a value of \$5.1

million. The Governor's Brook subdivision represented the largest contributed asset addition at \$3.7 million. Capital Assets Under Construction increased by \$9.9 million to \$28.4 million. The following tables highlight the major projects completed and still in progress:

Capital Asset Additions	
	Cumulative
	'000
Geizer 158 Reservoir Rehab	\$5,135
Governor's Brook Subdivision	\$3,743
Belmont Pump Station & Forcemain	\$2,735
Rockingham South	\$2,435
All other projects	\$35,616
Total	\$49,664

Capital Assets Under Construction	
	Cumulative
	'000
Macdonald Bridge Transmission Main	\$6,282
Aerotech Wastewater Treatment Facility	\$5,359
Computerized Maintenance Management System	\$3,135
Corporate Flow Monitoring Program	\$1,167
All other projects	\$12,462
Total	\$28,406

The major projects underway at the end of 2016/17 include the Macdonald Bridge Transmission Main, the Aerotech Wastewater Treatment Facility Upgrade, the Computerized Maintenance Management System (CMMS), and Corporate Flow Monitoring Program.

Current liabilities decreased by \$5.4 million to \$41.8 million, compared to the prior year. Amounts payable to the municipality are down \$4.3 million as most capital and operating items were settled prior to year-end. The current portion of Long Term Debt balance of \$21.7 million is \$1.5 million less than prior year despite obtaining new debt in the fall debenture because there are no

amounts to be refinanced in the next year.

The Accrued Post Retirement Benefits, Accrued Long Service Award, Deferred Pension Liability and Supplementary Employee Retirement Plan (SERP) have been updated based on the year end actuarial reports. The Deferred Pension Liability is \$58.5 million, an increase of \$4.2 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.

Long Term Debt is down \$12.6 million from last year, which is a net of new debt of \$7.1 million, repayments of \$21.2 million, and a decrease in the Current Portion of Long Term Debt of \$1.5 million. The debt service ratio of 21.7% is well below the maximum 35% ratio allowed under the blanket guarantee agreement with Halifax Regional Municipality. The following discussion of Operating Results is based on the NSUARB Accounting and Reporting Handbook, as this is what budgets and rates are based on.

Long Term Debt by Service		
	2016/17	2015/16
	'000	'000
Water	\$59,599	\$62,042
Wastewater	\$133,409	\$62,042
Stormwater	\$11,324	\$11,083
Combined	\$204,333	\$216,949

Debt Service Ratio by Service		
	YTD Debt Servicing Cost Ratio	
	2016/17	2015/16
Water	19.5%	19.8%
Wastewater	24.2%	23.3%
Stormwater	17.0%	15.6%
Combined	21.7%	22.3%

The following table compares the results with the budget approved at the January 28, 2016 Board meeting. The final results are \$8.7 million better than budget with

Revenue finishing higher than budget and Expenses finishing lower than budget.

Summarized Consolidated Operating Results				
	Actual	Budget		
	2016/17	2016/17		
	'000	'000	\$ Variance	% Variance
Operating Revenue	\$137,997	\$135,675	\$2,322	1.7%
Operating Expenses	\$97,839	\$102,424	(\$4,585)	-4.5%
Operating Profit (Loss)	\$40,158	\$33,251	\$6,907	20.8%
Non Operating Revenue	\$3,322	\$3,314	\$8	0.2%
Non Operating Expenditures	\$34,622	\$36,410	(\$1,788)	-4.9%
Net Surplus (Deficit)	\$8,858	\$156	\$8,702	5578%

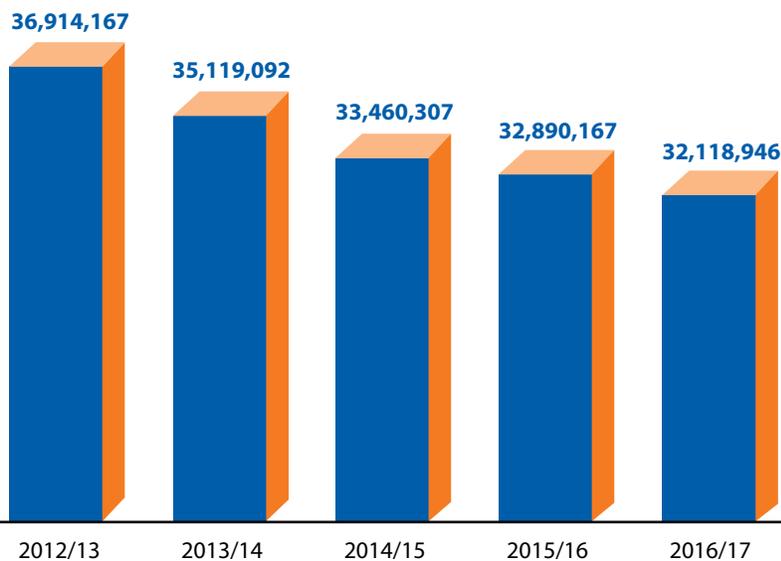
The Net Surplus for the year is \$8.9 million, an increase from the surplus of \$4.9 million in the prior year.

The cumulative Operating Surplus of \$7.8 million at the beginning of the fiscal year has grown to \$16.7 million with the year end profit of \$8.9 million. The accumulated Operating Surplus is expected to be drawn down in 2017/18 with a budget loss of \$6.9 million in 2017/18.

Billed consumption was down 2.4% compared to the prior year. The utility had budgeted for a 3% decrease in billed consumption for 2016/17, so this is a better result than expected. The 3% projection was based on the 4 Year Historic Average Consumption Decrease of 2.68% as at March 31, 2014. The updated 4 Year Historic Average Consumption Decrease is 3.4% based on the most recently completed and audited fiscal year.

The following table shows operating results for each service.

Metered Consumption (Combined Urban Core and Airport/Aerotech)



Year to Date Operating Results by Service		
	2016/17	2015/16
	'000	'000
Water	\$3,731	\$1,136
Wastewater	\$3,369	\$1,621
Stormwater	\$1,759	\$2,120
Net Surplus (Deficit)	\$8,858	\$4,877

Water Operations

Water Operations show a profit of \$3.7 million, compared to a profit of \$1.1 million for the previous year. Water revenue is up \$3.3 million. A reduction in Public Fire Protection revenue is offset by higher Metered Sales and Private Fire Protection revenue. Operating Expenses are up less than \$0.1 million, with higher Administration & Pension offset by lower Water Supply & Treatment and Transmission & Distribution.

Wastewater Operations

Wastewater Operations show a profit of \$3.4 million, up from a profit of \$1.6 million in the prior year. Wastewater revenue has increased \$3.0 million from the prior

year, with Metered Sales and Septage Tipping Fees accounting for the increase. Operating expenses have increased by \$1.3 million from the previous year in relation to Wastewater Collection and Wastewater Treatment Plants. Higher costs in Administration and Pension are for the recording of the final Pension expense.

Stormwater Operations

Stormwater Operations show a profit of \$1.8 million, a decline from the profit of \$2.1 million for the same period last year.

Revenue is down less than \$0.1 million and Expenses are up \$0.2 million as compared to the prior year figures. A portion of Investment Income was allocated to Stormwater for the first time in 2016/17, a total of \$0.1 million. Financial Expenses are up \$0.2 million, reflecting the growing capital expenditures and associated debt servicing costs for Stormwater.

Activities regulated by the NSUARB show a profit of \$7.9 million, ahead of the \$4 million profit last year. Unregulated

activities show a profit of \$971 thousand compared to a profit of \$855 thousand in the prior year. The improvement is mainly due to increased revenue from Septage Tipping Fees; and there is also increased income from energy generation activities.

Results by Activity		
	2016/17	2015/16
	'000	'000
Regulated Activities	\$7,887	\$4,022
Unregulated Activities	\$971	\$855
Net Surplus (Deficit)	\$8,858	\$4,877

COST CONTAINMENT

Cost Containment is an on-going focus for the Utility to help maintain and stabilize rates. A formal cost containment program has been in place for four years. For 2016/17, cost containment initiatives totaled \$5.1 million, and were reported to the NSUARB on June 30, 2017.

REGULATORY ACTIVITY

On April 1, 2016 rates for water and wastewater service increased. This was the the final year of rate increases from Halifax Water's November 24, 2014 Rate Application. No applications for water, wastewater, or stormwater rate increases were made in 2016/17, or planned for 2017/18.

From a competitiveness perspective, Halifax Water's rates compare very favorably and continue to be among the lowest in Canada. The average residential bill for water, wastewater and stormwater service is \$805 per year, compared to the average of \$889 from benchmarked Canadian cities.

Halifax Water engaged a consultant to conduct a Rate Affordability Study in 2016/17. The research addresses the following questions:

1. Are residential rates for water / wastewater / stormwater in the service area covered by Halifax Water affordable

at the community level?

2. Are there residential sub groups in the population for which current rates place undue hardship on the user?
3. If there are such subgroups, what can be done to alleviate or reduce undue hardship?
4. Are Halifax Water service rates for commercial users in line with those in other Canadian cities?

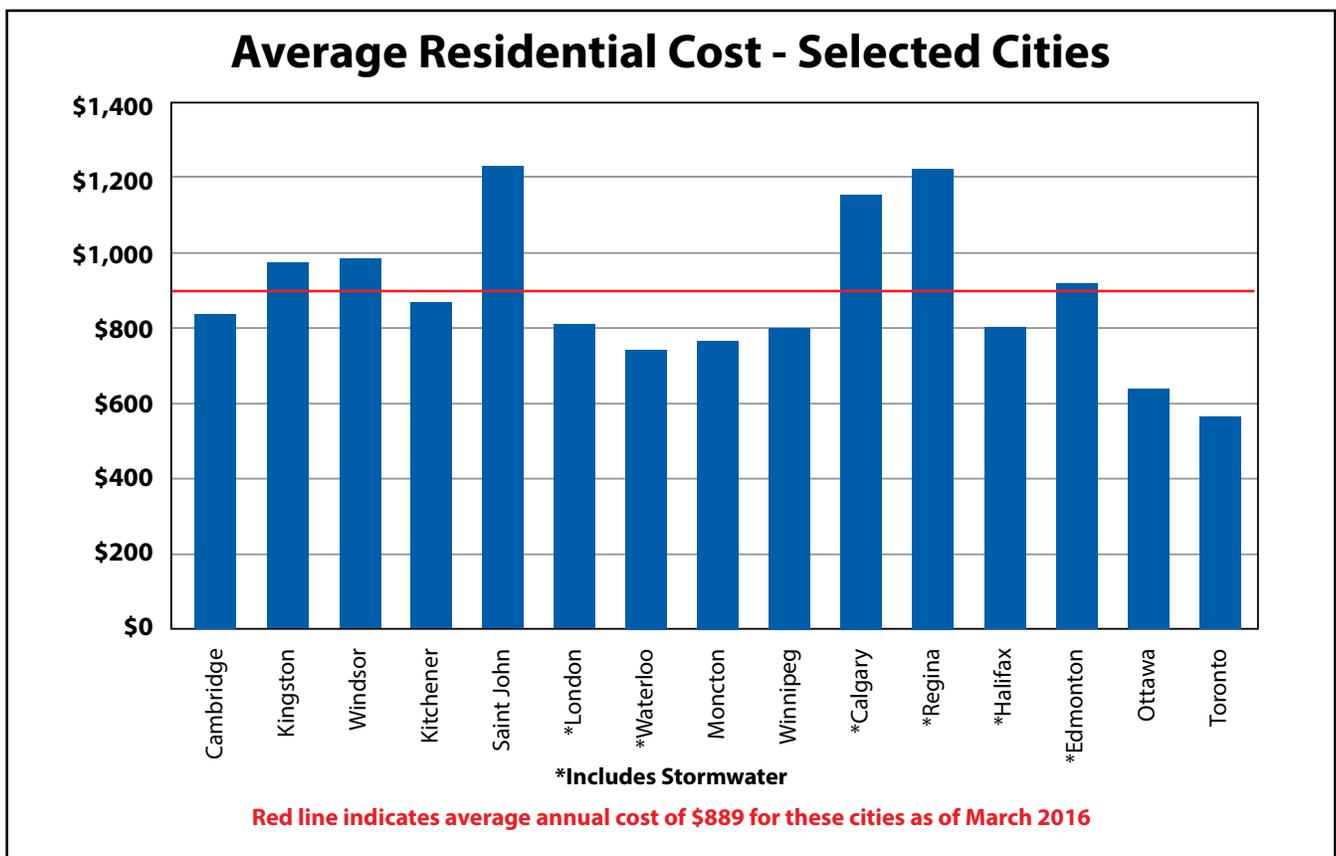
The results from this research will be presented to the Halifax Water Board in 2017/18.

STORMWATER COST OF SERVICE AND RATES

In May 2016 the NSUARB released a Decision on Halifax Water's Application to amend the Cost of Service Manual for Stormwater. Halifax Water put forward proposals in 2015/16 after conducting a review of how the initial stormwater

cost of service and rates compared to best practice, and whether equity and administration could be improved. The outcome from the Decision was very positive and has provided the utility with good direction to shape an application to adjust rates for stormwater service, which was filed on October 31, 2016.

A public hearing took place February 15, 2017. On April 12, 2017 the NSUARB released a Decision on revised Stormwater rates for residential and Industrial, Commercial, Institutional (ICI), effective July 1, 2017. As a result of the Decision, 88% of customers will see their stormwater bills decreased.



Service Excellence

CUSTOMER CARE CENTRE

2016/17 was an exciting year for customer care service at Halifax Water. The Commission ended the year with 83,722 water customer connections, 80,143 wastewater customer connections, and 96,308 stormwater customers.

Call volumes increased by 3.5% in 2016/17 compared to 2015/16.

Customer Service answered 68,921 calls, and the average speed of answer was 51 seconds. On average, customer service answered 300 calls per day with an average call duration of 4.12 minutes and an abandon rate of 7%. These results are viewed positively and represent improved performance.

Customers also contact Halifax Water using on-line service requests and through a generic email customerservice@halifaxwater.ca. The email volume in 2016/17 was 9,609, down 3.5% from 2015/16.

Halifax Water is taking several steps to improve delivery of customer service and communication with its customers, partially as a result of observations made since implementation of the first stormwater charges, feedback from the exemption review process, and community engagement.

The first major initiative involved centralizing all calls for water, wastewater and stormwater service at the utility. Until March 2016, calls for Wastewater and Stormwater service were going through the municipality's 311 Centre. In February 2016 Halifax Water implemented a Customer Relationship Management (CRM) system that will

help promote accountability in tracking and closing service requests, and providing information to customers.

The second major improvement in 2016 was implementation of a Computerized Maintenance Management System (CMMS) that enables better management and operational tracking of repair and maintenance activities.

In February 2017 Water Operations calls were centralized. There will be continued enhancement of Customer Care with improvements to the website, development of a Customer Portal in conjunction with the Customer Connect project, and investigation of new telephony systems.

With all water, wastewater, and stormwater calls directed to the Customer Care Centre in 2016/17, and the continued evolution of the maintenance management system, the utility is well positioned to be responsive to customer needs.

Initiatives underway for 2017/18 include the implementation of a new phone number (902-420-9287), campaigns to encourage customers to subscribe to e-billing, a revised and updated website and a formal customer complaint process.

Effective Asset Management

CLEAN WATER AND WASTEWATER FUND

On August 16, 2016, Prime Minister Justin Trudeau, and the Honourable Stephen McNeil, Premier of Nova Scotia, announced \$238 million for investment in wastewater and public transit projects across the province. These expenditures are part of the first phase of *Investing in Canada*, the Government of Canada's \$120-billion plan to support public infrastructure across the country over the next 10 years.

Five projects under the Clean Water & Wastewater Fund (CWWF) portion of the program were formally approved for Halifax Water. The five projects are highlighted as follows:

1. Northwest Arm Sewer Rehabilitation

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

The 4.5km Northwest Arm trunk sewer is over a century old. It is 1200 mm in diameter and a large part of the line is constructed of clay blocks mortared together. This line needs to be structurally renewed to extend its service life, prevent leakage and overflows into Northwest Arm.

2. Peninsula Transmission Main Rehabilitation

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

This project involves the rehabilitation of critical water transmission mains in Halifax for improved service. There has been significant development activity in peninsular Halifax in recent years, with more planned. Increased water supply is required for future development and increased densities. This project will replace the original pipes that have served the city for over 150 years.

3. Lake Major Dam

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

A dam is required to impound water within Lake Major to provide water supply to the greater Dartmouth area. A new dam is required to replace the existing gravity timber and earthen structure which has reached the end of its service life.

4. Sullivan's Pond Storm Sewer Renewal – Phase 1

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

The existing storm sewer between Sullivan's Pond and Halifax Harbour has reached the end of its service life. A new 580 metre line was designed, with the construction completed in two phases of approximately 290m each. Phase one from Sullivan's Pond to Irishtown Road is approved for funding and will be completed in 2017.

5. JD Kline Filter Media and Underdrain Replacement

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

The J.D. Kline Water Supply Plant supplies treated water to the communities of Halifax, Bedford, Sackville, Fall River, Waverley and Timberlea. This project involves the replacement of the existing filter media and underdrains in all eight filters, the majority of which are beyond their expected life span.

As of March 31, 2017, all projects were at or near final design completion with construction proposed for 2017/18.

The net impact of the CWWF funding assistance will have a positive impact on the overall capital funding plan for Halifax Water in future years and may reduce debt requirements and rate impacts or create capacity to fund other capital projects.

CAPITAL INFRASTRUCTURE PROJECTS

The rehabilitation of the **Geizer 158 Reservoir** was successfully completed in 2016/17. The Geizer 158 Reservoir is a 69m diameter steel tank, originally constructed in 1986. This structure is

New pumping station replaces former Belmont WWTF





Stormwater system enhancements between Sackville Drive and the Little Sackville River

the highest and largest storage tank in the water distribution system in the West Region. The work involved full sandblasting, preparation and recoating of the tank interior, as well as a cleaning and recoating of the tank exterior. During the course of sandblasting the floor, corrosion holes were found in the floor plate and there were indications of widespread, severe corrosion on the underside of the steel floor plate. Based on industry best practice and the recommendations of Halifax Water's consultant, the solution was the replacement of the existing floor plate. The rehabilitation began in May 2016. The floor replacement was carried out during the fall of 2016 and the reservoir was recommissioned and put back into service in January 2017.

The **Chain Control Transmission Main Realignment** project provided critical upgrades to components of the original water supply system for Halifax dating back to the 1800s. The Chain Control facility feeds three transmission mains: the 375mm diameter Peninsula Intermediate (1856), the 600mm diameter Peninsula Low (1862), and the 675mm diameter Peninsula Low (1892). These pipelines passed through the basement of the former Chain Chlorinator building, which was no longer in use, and in a deteriorated condition. The

project involved the demolition and removal of the old Chain Chlorinator building and associated pipework, with the site regraded to facilitate improved municipal parkland/trail access. Three new sections of transmission mains were

installed through this area, connecting to the existing transmission mains downstream on Coronet Avenue. The work also included the abandonment of former raw water pipe connections at the Chain Lake Back-Up Water Supply Station and the demolition of abandoned valve chambers on the site.

Phase 2 of the **Belmont WWTF Decommissioning** project was completed in 2016. The work consisted of the installation of a duplex pump station complete with backup power. The pump station was installed at the location of the Belmont Wastewater Treatment Facility (WWTF) which was removed as part of the project. The pump station was connected to the pipe work which was installed the previous year on Main

Connecting new peninsula watermain to existing circa 1892 watermain



Rd. The work enabled Halifax Water to remove the Belmont WWTF to facilitate compliance with regulations.

The **Sackville Cross Road Stormwater System Renewal** project was completed in 2016. The work consisted of the replacement of 0.5km of storm sewer pipe, ranging in size from 300mm to 1200mm, as well as associated manhole and catchbasin structures. An off street drainage swale was also reconstructed to improve system functionality between Sackville Drive and the Little Sackville River.

The **Aerotech Wastewater Treatment Facility** (AWWTF) Expansion and Upgrade Project is an excellent example of investment where long term thinking and a commitment to balance financial, social and environmental concerns are integral to our service delivery.

The AWWTF was originally constructed in 1985. The newly expanded and upgraded facility will provide tertiary level of treatment with a capacity of 2000 m³/day.

The key drivers of the AWWTF Project are regulatory compliance and growth. At a total project cost of \$22 million dollars, the project is benefiting from \$14 million in cost shared funding from the *Federal/Provincial New Building Canada* fund.

Construction of the facility got under way in September 2016 and is scheduled to be complete by December 2017.

ASSET MANAGEMENT PLANS

In 2016, Halifax Water completed its first formal Asset Management Plan (AMP). Asset management plans aim to answer guiding questions about an organization's assets (refer to Figure 1). The 2016 AMP creates an opportunity to refine the management of assets. It sets the stage for including more



New Aerotech WWTF treatment process tankage under construction

complex and challenging issues such as risk, performance, levels of service, and capital and operational expenditure optimization.

The 2016 AMP included sections for each of the identified asset classes to capture key inventory, condition, and asset valuation. Asset classes were identified for Water (Supply Plants, Supply Dams, Chambers & Booster Stations, Distribution & Transmission Mains, and Service Reservoirs); for Wastewater

(Treatment Facilities, Pumping Stations, Gravity Sewers, and Forcemains); and for Stormwater (Management Structures, Gravity Sewers, Cross Culverts, and Driveway Culverts & Ditches). Fact sheets for each of the infrastructure services were prepared to aggregate the information of the asset classes within the service type (Figure 2).

ENERGY MANAGEMENT

Energy use in municipal water and wastewater/stormwater systems remains

Figure 1 - Asset Management Guiding Questions



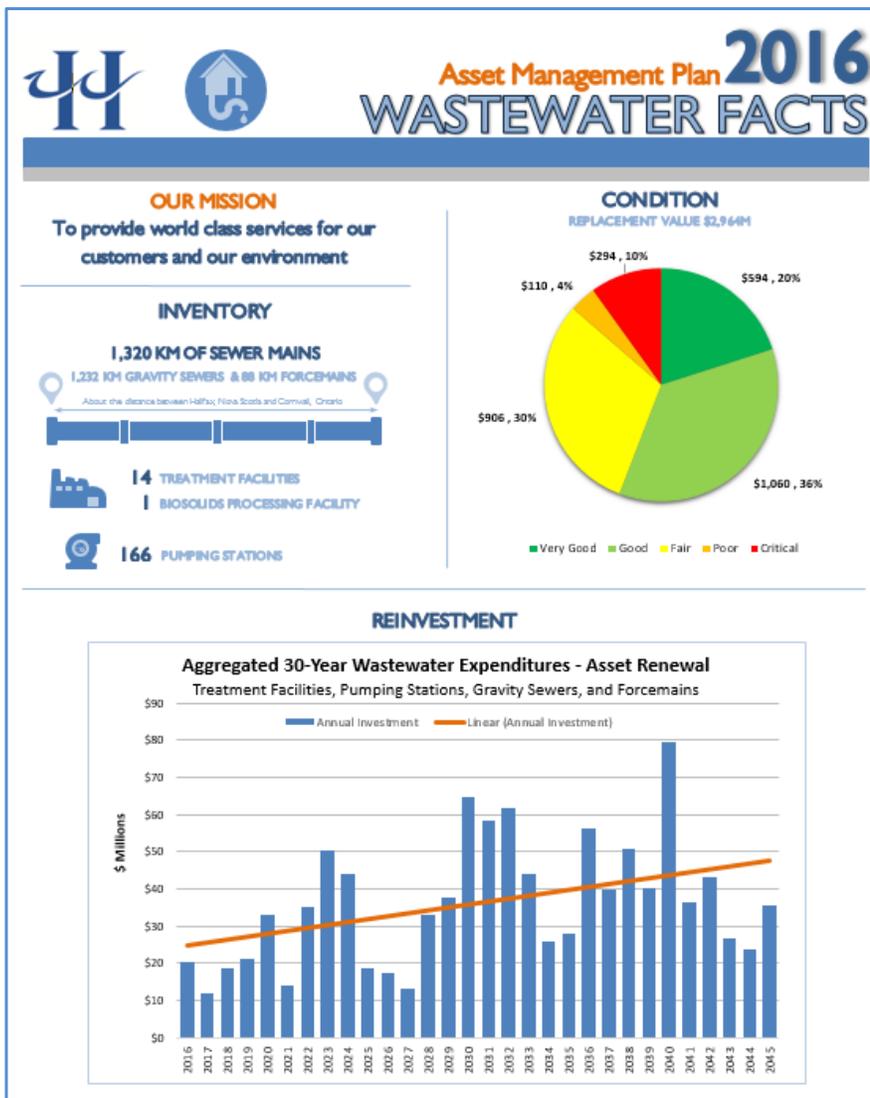


Figure 2 - Typical Fact Sheets

among the highest in North America, typically consuming over 30% of Municipal energy usage and over 4% of the total National energy usage. With this in mind, Halifax Water has continued its efforts to improve its energy footprint. Initiatives in 2016/17 include:

- The Energy Management Plan was updated to identify specific annual energy reduction targets and activities to be completed in 2016/17.
- Ongoing support of Halifax Water's Energy Management Information System (EMIS). The EMIS provides energy use data and other important facility related

information for over 370 Halifax Water facilities. This allows staff to evaluate individual or multiple facility energy performance data, thereby increasing awareness and empowering staff to initiate energy improvement projects.

- Various equipment and infrastructure upgrades were completed, resulting in over 2,724,800 kWh_e in annual energy savings. These projects include ventilation air heat recovery in the Halifax WWTF, operation of the Odour Control Bypass systems in the Herring Cove and Halifax facilities, and a seasonal disinfection program at a number of our wastewater treatment facilities.

ENERGY GENERATION

- Development of renewable energy generation projects has continued.
- The 10 MW wind farm installed at the J.D. Kline WSP continues to operate as expected.
- The 40 kW in-line energy recovery turbine installed in the Orchard Control Chamber in Bedford continues to operate very well providing the energy equivalent to roughly 25 to 30 Nova Scotia households in the Bedford area.
- A Feasibility Study was completed for the proposed Cogswell District Energy System (DES). Results show very positive business and environmental cases for the system. Next steps involve developing by-laws around the implementation of DESs with the Halifax Regional Municipality, and completing the preliminary and detailed design for the DES in parallel with the municipality's Cogswell area redevelopment efforts.

ENERGY EFFICIENCY

A continued focus on early stage involvement in various infrastructure projects has also brought a focus on energy efficiency and sustainability to these projects at the design stage, resulting in efficiency improvements being implemented during construction. 2016/17 projects included the Mill Cove UV System Upgrades, and the Herring Cove Sewer Shed and Pump Station Upgrades.

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

Overall results for 2016/17 were very good, with annual energy intensities



Geizer 158 Water Reservoir restored and back in operation

for the organization being reduced by approximately 5.8% in 2016/17 compared to 2015/16. A focus on further energy efficiency and operational improvements to existing infrastructure in the coming years will allow Halifax Water to continue to build on these results.

INFORMATION SERVICES

Information Services (IS) delivered on several business transformation initiatives at Halifax Water. The first major deliverable was to support work order tracking for linear systems (pipes) through a Computerized Maintenance Management System (CMMS). Known as City Works, the plan is to expand its

use to our “Locates” process as well as treatment plants.

With the consolidation of all calls through our Customer Care Centre, customers can now contact us at one number (420-WATR). This required implementation of an interim Customer Relationship Management (CRM) system in a very short period of time. The Cayenta system was implemented for CRM with integration into the CityWorks system. This integration allows the Customer Care Centre to look at the status of a work order in real time and inform the customer.

The fiscal year began with the migration of the Wastewater and Stormwater (WWSW) calls from the City’s 311 call centre to the Customer Care Centre using the Cayenta system, going live on March 7, 2016.

The next phase of CRM was to introduce integration with the new CityWorks system. This integration allows the Customer Care Centre to send work requests directly into the CityWorks system for specific customer service requests created in Cayenta. The Cayenta service request would remain open until the Work Request in CityWorks was closed. This went live in October 2016.



Halifax Water staff taking part in school career day event

In November we began the next phase of the CRM project to migrate the Water Service calls from the depots to the Customer Care Centre. Following a similar plan used for the WWSW, Cayenta was set up to process the customer calls and configured with CityWorks to receive any generated work requests for operations. The Customer Care Centre went live taking the water calls at the end of February, 2017.



Heat recovery ventilation system at the Halifax WWTF

Regulatory Compliance

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 systems. The administration of new service connections includes the administration of the Regional Development Charge.

In 2016/17, the Engineering Approvals group processed a significant volume of applications, as follows:

Application Type	Amount Processed
Building Permit	
Applications approved	650
New Service & Renewal	
Applications approved	379
Subdivision Applications	292
Demolition Permits	115
Clearance Letters	32
Tender Reviews	95
New Backflow Prevention	
Applications	93
Backflow Prevention	
Devices in Halifax Water's distribution system	6604

ENVIRONMENTAL MANAGEMENT SYSTEM

The International Standards Organization (ISO) establishes standards for a variety of processes and products. The standard pertaining to Environmental Management Systems (EMS) is 14001-2004 and requires an organization to:

1. Establish an environmental policy.
2. Identify environmental aspects that can impact the environment.
3. Identify our applicable legal requirements.



Herring Cove WWTF, ISO 14001 Certified

4. Set appropriate environmental objectives and targets.
5. Establish programs to implement our policy, achieve objectives and meet targets.
6. Periodically audit and review activities to ensure that the policy is complied with and the environmental management system remains appropriate.
7. Be capable of adapting to changing circumstances.

In 2016, Halifax Water obtained the ISO 14001-2004 Designation for the Herring Cove Wastewater Treatment facility expanding the previous scope of the Bennery, Pockwock and Lake Major water treatment facilities. The certification of the Herring Cove WWTF marked the first wastewater facility to obtain certification in Atlantic Canada.

In September 2015, ISO issued a new ISO 14001-2015 Standard and the EMS must be upgraded to be compliant with the new Standard by September 2018. Staff will ensure the current designated facilities meet the new standards and plan for expanding the program to other wastewater facilities.

DRINKING WATER QUALITY

Providing customers with safe, reliable, high-quality drinking water requires investment in infrastructure, research, and robust quality assurance/quality control programs. Halifax Water has made considerable investments in these areas. Two new modern membrane treatment plants were commissioned in Collins Park and Middle Musquodoboit. These new plants were built in response to Nova Scotia Environment's drinking water strategy.

Halifax Water undertakes a comprehensive water testing program. Bacteriological testing is done weekly at



Collins Park Water Treatment Facility, upgraded with membrane technology to ensure high quality water

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 below in the table.

Drinking Water Compliance Summary: Total Coliform			
Sample Result			
April 2016 - March 2017			
System	No. of Samples	No. of Exceedances	% Absent
Pockwock	962	0	100%
Pockwock Central	584	0	100%
Lake Major	1183	3	99.7%
Bennery	158	0	100%
Five Islands	104	0	100%
Silver Sands	103	0	100%
Middle Musquodoboit	102	0	100%
Collins Park	102	0	100%
Miller Lake	104	1	99.0%
Bomont	103	0	100%
TOTAL	3505	4	
Absent (A)	3501		99.89%
Present (P)		4	0.11%

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.

- Sampling twice per year for the *Guidelines for Canadian Drinking Water Quality* which includes approximately 90 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).

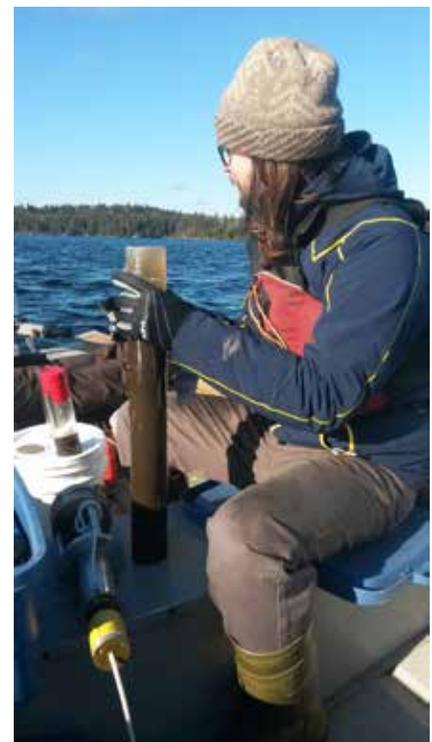
- Bi-annual testing and sampling for giardia and cryptosporidium for treated and raw water for all surface water systems.

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 the unlikely event of a disruption in water quality.

WASTEWATER TREATMENT FACILITY (WWTF) COMPLIANCE

Wastewater treatment facilities in Nova Scotia are regulated by Nova Scotia (NS) Environment. They set effluent discharge limits for all wastewater facilities. The limits define maximum concentrations of parameters such as Carbonaceous Biochemical Oxygen Demand (CBOD – a measure of the amount of material in water which 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 wastewater). For some facilities, parameters such as nutrients (nitrogen and phosphorus which cause excess



Water sampling at Pockwock Lake-part of multiple barrier approach to high quality water



Lake Major Water Treatment Plant – continuing to meet or exceed the highest standard in the land

growth of algae and plants) or pH (a measure of acidity) are also regulated.

In 2007, Halifax Regional Council transferred responsibility for the municipality’s stormwater and wastewater assets to Halifax Water. The older wastewater facilities – 12 in total – were in need of upgrading and often non-compliant with Nova Scotia Environment effluent limits.

Since becoming responsible for these facilities, Halifax Water has completely reconstructed the Wellington Wastewater Treatment Facility (WWTF), and completed a \$61 million expansion and upgrade to the Eastern Passage Facility. The wastewater collection systems for two treatment facilities – Wellington and Frame – were both completely replaced, resulting in significant improvements to the performance of both treatment facilities. This year the small Belmont facility was decommissioned and related sewage directed to the Eastern Passage facility. A major upgrade to the Aerotech WWTF is underway. This will improve capacity and performance. As well, upgrades to the Ultra Violet Disinfection system at Mill Cove started in February.

The treatment processes at several

other facilities have been significantly improved through optimization efforts on the part of Halifax Water staff. Other treatment facilities still require capital improvements, and Halifax Water has developed plans to upgrade and/or expand these facilities to improve their performance and become fully compliant.

In 2013, the federal government published the Wastewater System

Effluent Regulations (WSER). These regulations set national minimum standards for CBOD and TSS in treated wastewater effluent effective January 1, 2015. All of Halifax Water’s wastewater treatment facilities will meet these standards, although the Halifax and Dartmouth advanced-primary treatment facilities will require upgrading to secondary treatment in the future. The WSER provides for defined periods to allow required upgrades to take place,

Eastern Passage WWTF, a \$61 million investment for growth of the community and protection of the environment



Wastewater Treatment Facility Compliance Summary

Cumulative Performance - April 2016 to March 2017

WWTF	CBOD5	TSS	E. coli	Phosphorus		Ammonia		pH	Dissolved Oxygen	Total Chlorine	Toxicity
				S	W	S	W				
Halifax	30	19	2220	N/A	N/A	N/A	N/A	7	N/A	N/A	Non-Toxic
Herring Cove	20	16	167	N/A	N/A	N/A	N/A	7	N/A	N/A	Non-Toxic
Dartmouth	29	22	591	N/A	N/A	N/A	N/A	7	N/A	N/A	Toxic
Eastern Passage	8	9	48	N/A	N/A	N/A	N/A	7	N/A	N/A	Toxic
Mill Cove	12	13	390	N/A	N/A	N/A	N/A	6.6	N/A	N/A	Non-Toxic
AeroTech	5	7	14	0.4	0.1	2.9	7	8.6	N/A	N/A	Non-Toxic
Belmont	23	42	2649	N/A	N/A	N/A	7	N/A	0.38	N/A	N/A
Frame	8	15	101	N/A	N/A	N/A	7	N/A	0.10	N/A	N/A
Lakeside-Timberlea	8	19	18	2	2	2	7	8	0.12	N/A	Non-Toxic
Lockview-MacPherson	5	6	18	0.4	3	N/A	7.1	N/A	N/A	N/A	N/A
Middle Musquodoboit	13	13	102	N/A	N/A	N/A	8	N/A	N/A	N/A	N/A
North Preston	5	9	10	0.6	0.2	N/A	7	N/A	N/A	N/A	N/A
Springfield	4	6	129	N/A	N/A	N/A	7	N/A	0.80	N/A	Toxic
Steeves (Wellington)	5	4	10	0.15	0.07	N/A	7.5	N/A	N/A	N/A	N/A
Uplands Park	11	9	278	N/A	N/A	N/A	7	N/A	N/A	N/A	N/A
Weighted Average	12	14	450	N/A	N/A	N/A	7.1	8	0.35	N/A	N/A

NOTES & ACRONYMS:

CBOD₅ - Carbonaceous 5-Day Biochemical Oxygen Demand

TSS - Total Suspended Solids

TRC - Total Residual Chlorine

S / W - Summer / Winter compliance limits

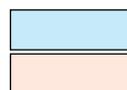
Toxic may indicate only a single sample

NSE requires monthly averages be less than the NSE Compliance Limit for each parameter (Dartmouth, Eastern Passage, Halifax, Herring Cove, Mill Cove)

NSE requires quarterly averages be less than the NSE Compliance Limit for each parameter (Aerotech, Lockview, Mid. Musq., Belmont, Frame, BLT, Uplands, North Preston, Springfield)

NSE requires an annual average be less than the NSE Compliance Limit for each parameter at Steeves

LEGEND:



Specific parameter limit achieved

Specific parameter limit not achieved

based upon a system for ranking the environmental risk of each facility. Under this risk ranking, the Halifax and Dartmouth facilities must be upgraded by 2040.

Performance assessments for the wastewater facilities are based upon monthly averages. Results for April 2016 to March 2017 are presented in the table above:

POLLUTION PREVENTION AND INFILTRATION/INFLOW REDUCTION PROGRAMS

The Environmental Engineering group oversees the Pollution Prevention

Program and Inflow/Infiltration Reduction Program. The purpose of these two programs is to regulate the discharges from customer connections to the wastewater and stormwater system that can impact the health of the public, the environment, and Halifax Water workers, as well as create operational issues with Halifax Water infrastructure and treatment plants.

The use of "flushable wipes" and disposal of fat, oil and grease (FOG) into the wastewater system have been clogging wastewater systems, pipes and pumps, and impacting treatment plants. The result is unnecessary back-ups and pump

failures with possible resulting overflows. The Pollution Prevention program developed two educational videos for customers to better understand the issues surrounding "flushable wipes". The videos were produced locally and include "Toilet Paper: The One and Only Flushable Wipe" and FOG "How to Bacon Responsibly". These entertaining, educational videos can be found at Halifax Water's YouTube channel at www.halifaxwater.ca.

The Inflow/Infiltration Reduction program identifies areas where private sources of stormwater are entering the wastewater system. In recent years



Wipes, FOG and other debris clogging the Susie Lake pumping station

staff have completed private side assessments across the Halifax Regional Municipality including work for the Wet Weather Management Program. This work includes pilot projects in Stuart Harris, Crescent Avenue, Leiblin Park, Munroe Subdivision and Cow Bay Road sewersheds. Enhanced communication strategies with property owners, such as those used in the Cow Bay Road project, have been able to achieve a record response of 76% compliance with the requirement to connect private stormwater sources to Halifax Water's stormwater system. Of the remaining 24%, private property inspections have been completed for 23% and are pending action to make their connection.

STORMWATER ENGINEER

In May of 2016, a dedicated Stormwater Engineer was hired within Regulatory Services to manage stormwater billing appeals, drainage investigations, and liaise with Halifax Regional Municipality on common drainage issues. With the recent decision on stormwater billing enabling credits for non-residential

customers, the Stormwater Engineer will also administer any credit applications.

As well, with the creation of the Dispute Resolution Officer (DRO) position in January 2017, the Stormwater Engineer

provides the DRO with the technical information relating to stormwater based complaints as required to evaluate whether the property receives stormwater service.



Performing ditch maintenance to effectively manage stormwater drainage



Cow Bay Road deep storm sewer project—getting stormwater out of the wastewater system

Stewardship of the Environment

BEECHVILLE/LAKESIDE/TIMBERLEA WASTEWATER TREATMENT FACILITY DE-CHLORINATION

The Beechville/Lakeside/Timberlea Wastewater Treatment Facility (BLT) utilizes sodium hypochlorite for effluent disinfection prior to returning treated flows to the environment. Recent regulatory changes required that Total Residual Chlorine levels in the effluent be below 0.02 mg/L. To meet this requirement would require either a change in the type of disinfection at the facility, or the addition of a de-chlorination process. Engineering and Operations staff considered a few options, including:

- Use of Ultraviolet disinfection, negating the need for chlorine
- Delivery of liquid sodium thiosulfate
- Ozonation
- Addition of a de-chlorination process to existing hypochlorite disinfection

Staff quickly realized that any of the new disinfection options would have high capital costs and add significant complexity to the operation of the disinfection process. Halifax Water staff took it upon themselves to find a more cost effective solution that would minimize operator intervention. After some investigation, it was determined that water soluble sodium sulfite pucks/tablets might be an effective method of de-chlorination.

For trial purposes, operations staff designed and constructed a practical delivery system. There are two chlorination lines at the facility. The trial system was installed on one of the lines to allow for comparative testing and optimization over an 8 week period. Various analyses were conducted and documented over the trial period to determine the effectiveness, and also to ensure there were no negative impacts on other compliance parameters. One of the primary concerns was that the pucks/tablets may exert additional

oxygen demand on the effluent, thus impacting the ability to meet dissolved oxygen effluent requirements. Through optimization and analyses it became evident that this was not the case. Early trial period results showed that the system was very effective in removing Total Residual Chlorine. Staff then began optimizing puck placement, depth and quantity to ensure the minimum amount of sodium sulfite was used to achieve the NSE requirements.

With the trial a success, staff engaged a contractor to fabricate two permanent assemblies. They have been in operation since spring 2017 and the Beechville/Lakeside/Timberlea Wastewater Treatment Facility has been compliant for Total Residual Chlorine, ever since.

MILL COVE DIGESTER CLEANING

Staff from the Mill Cove WWTF undertook a major maintenance project this past year in cleaning and inspecting the Primary Anaerobic Digester. The digester was commissioned in 1996 and is the largest of its kind in Atlantic Canada with a volume of 3,785m³. It had been operating without issue since being put in service, but was in need of cleaning and inspection to ensure its efficient operation well into the future. The Digester plays a pivotal role in the wastewater treatment process, as well as providing methane gas that is utilized within the facility for heating onsite buildings. The cleaning project began in early November and was completed by late December 2016. The entire project was planned and executed by Halifax Water staff with the assistance of external contractors who provided the equipment to complete the job. Once the digester was empty, Mill Cove staff completed several maintenance items including

New de-chlorination system at the Beechville-Lakeside-Timberlea Wastewater Treatment Facility, a staff innovation





Cleaning out the digesters at the Mill Cove WWTF

lining of the supernatant overflow box, rebuilding of the centre impeller mixer and replacement of several piping connections located at the bottom of the digester. The piping connection repairs were of particular significance due to the potential leakage of the digester's contents if one of the connections failed. Upon completing the maintenance, staff followed a strict refilling, reheating and reseeded sequence developed by the staff to ensure the process remained stable and to minimize the amount of time needed to reestablish methane

gas production. Staff maintained strict adherence to the reseeded plan and gas production resumed in 24 days. This was an impressive feat given that most literature suggests that gas production would not resume in less than 45 days. Considering the time of year, this represents a significant savings in heating costs for a facility of its size.

Full operations were maintained at Mill Cove during this project and the facility remained compliant with its Nova Scotia Environment permit. The Mill Cove

WWTF is located in close proximity to condominiums and office buildings. Halifax Water took significant steps to ensure neighbours were informed throughout the project.

MILL COVE ODOUR CONTROL SYSTEM

Air quality and odour issues are taken seriously by Halifax Water in its effort to be a good neighbour in the communities it serves. In the early spring of 2017 a project to install two new Odour Control Systems (OCS) at the Mill Cove WWTF was initiated as a result of odour complaints



The Mill Cove WWTF—part of the community since 1969

Mill Cove South Side Odour Control System



Mill Cove North Side Odour Control System



resulting from the extreme dry Summer of 2016 and related low flows in the wastewater collection system. These low flows increase the length of time wastewater remains in the pipes which can lead to septic conditions and odours. The project consisted of installing two new Odour Control Systems (OCS) utilizing activated carbon media as the odour absorbent on each of the existing North and South Primary Clarifiers. The project will be completed in early 2017/18. The upgrades will result in consistent removal of nuisance odours that are associated with the treatment of municipal wastewater, as well as enhanced monitoring of air quality events that will enable greater ability to respond to future odour concerns.

WET WEATHER MANAGEMENT PROGRAM

Like many municipalities and utilities across North America, Halifax Water’s sanitary sewer system is subject to dramatic flow increases from heavy rain events. Wet weather flows can lead to sanitary sewer releases, capacity reduction, sewer backups/basement flooding, wastewater treatment plant process upsets and increased operation and maintenance costs. Recognizing the impacts of wet weather generated flows on the system, Halifax Water developed a proactive program to systematically address the negative impacts of wet weather on the collection system, wastewater treatment processes, and ultimately the environment. The Halifax Water Wet Weather Management Program (WWMP) developed a strategy to efficiently manage the impacts of wet weather generated flows within the sanitary sewer system. Figure 1 demonstrates the reduction in flow as a result of efforts to rehabilitate a sanitary sewer system within Halifax. Note the reduction in peak flow and the duration of the increased flow.

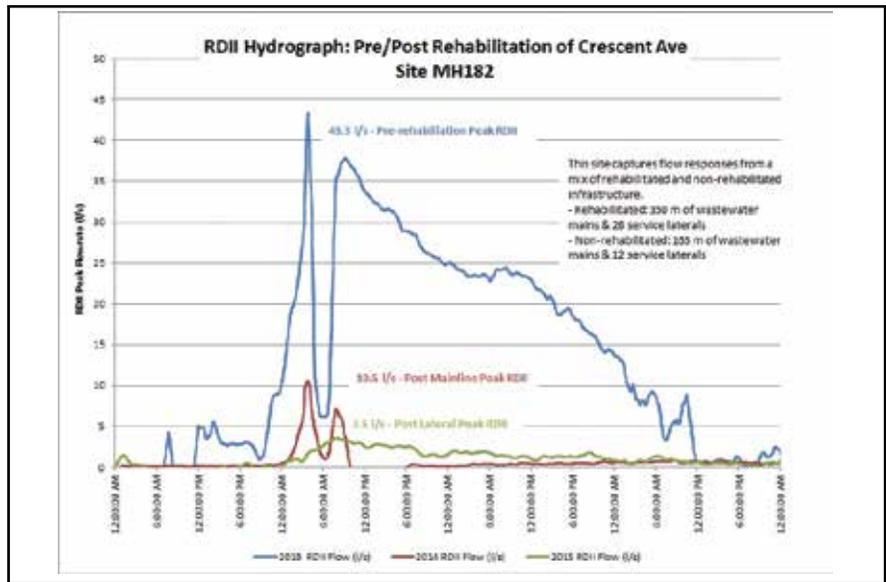


Figure 1: Pre and Post Flow for Crescent Ave rehabilitation.

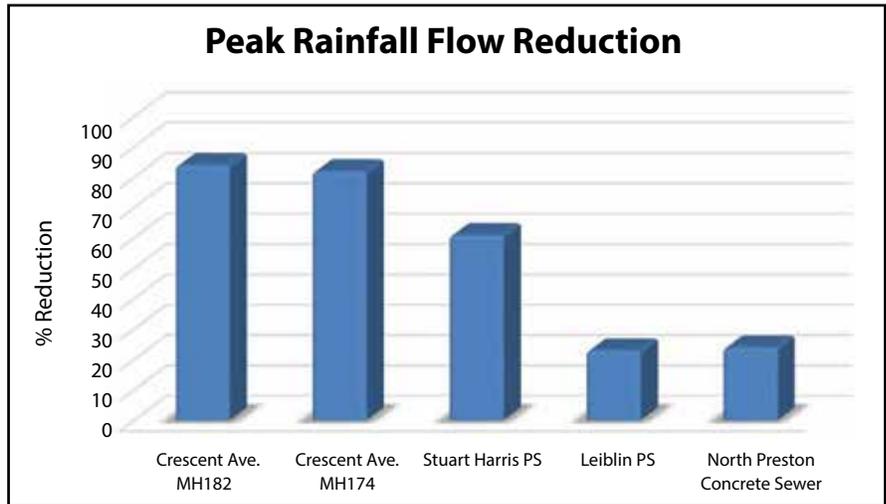


Figure 2: Pilot program average daily flow reduction

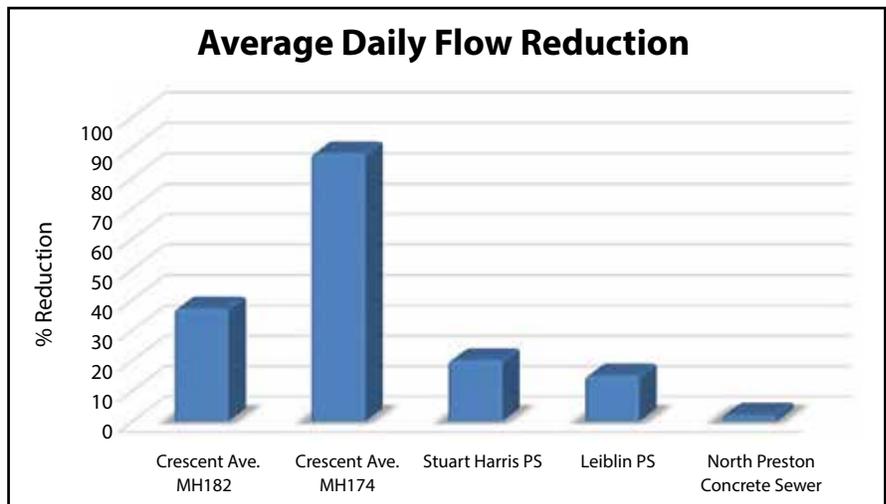


Figure 3: Pilot program rainfall derived flow reduction



Sewer overflowing onto a residential street

Presently the WWMP has five main active pilots that are monitored. The pilots have each undergone some level of public side rehabilitation and private side compliance. The results demonstrate a dramatic reduction in total sewer generation and peak flow response. Figure 2 indicates the percent reduction in average flow generated in each of the pilot sewersheds. Figure 3 indicates the total reduction in peak response to precipitation events.

The five pilot areas saw a flow reduction

of over 150 million litres of sewage that otherwise would have been collected and treated at a wastewater treatment facility. This results in reduced operating costs and increased system capacity. In addition to average flow reduction, the pilots experienced a dramatic reduction in peak response to precipitation events. Collectively the pilots observed a peak flow reduction of almost 15 million litres per day during a 10 year return storm. While all these numbers are impressive, the key result is the reduction in sanitary sewer overflows as a result of Halifax

Water's effort. Three of the pilot areas had pump stations that were frequently overwhelmed during wet weather events. These stations have experienced less than half the frequency of overflow events following rehabilitation. This is a significant environmental benefit. A summary of the annual volume reduction and peak flow reduction for each of the pilot's is summarized in the table below:

Site	Total Annual Volume Reduced (m ³)	Peak Flow Reduction (m ³ /day)
Crescent Ave: MH182	57,670	4,231
Crescent Ave: MH174	60,270	3,147
Stuart Harris PS	6,935	1,798
Leiblin PS	23,561	3,460
North Preston Concrete Sewer	4,696	2,350
Total Reduction	153,132	14,986

*Normalized to a 24-hour 10-year storm return

Summary of flow reductions

The program continues to expand and a new project is planned to see the reduction of over 200 litres per second in wet weather generated flow.

HALIFAX WWTF AUTOMATIC BAR SCREEN UPGRADES

The Halifax Wastewater Treatment Facility was originally equipped with three mechanically cleaned bar screens (2 duty + 1 standby) to remove debris from the screened wastewater entering the facility as part of the Harbour Solutions Upgrade project. These vertically mounted units have individual channels containing multiple rakes to clean the 10 millimetre (mm) spacing between the bars that capture the debris entering the facility. To improve the capture rates and minimize impacts of sewage related debris in the wastewater treatment process, Halifax Water investigated replacement of the screen with 6mm perforated plate technology at a cost of \$1.5 million. The challenge of getting three new fine



The Halifax mother ship, the largest of 14 wastewater treatment facilities

screens installed in the upper levels of the facility while keeping the site running would be significant. Alternatively, Halifax Water Engineering staff investigated the possibility of modifying the existing screens one at a time by reducing the bar spacing to 6mm from 10mm and using specially shaped bars (tear drop

design) to reduce pressure loss and prevent jamming of solids in the bar spacing while maintaining the high flow capacity. With the help of regional suppliers and contactors, two of the three screens were modified to provide 6mm bar spacing. This resulted in significant

improvements in the reduction of debris entering the wastewater treatment process downstream of the screen. This reduced equipment maintenance, while maintaining optimal treatment at a tenth of the cost of replacement with new technology.

Safety and Security

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. To this end, Halifax Water's Occupational Health and Safety Program Manual is continuously reviewed and updated. The intent of this manual is to embody the Occupational Health and Safety Act of Nova Scotia in all our workplaces.

In February, a Joint Occupational Health and Safety (JOHS) responsibilities session was held for all JOHS Committee members and their alternates. The session was led by safety representatives from Halifax Water and the Canadian Union of Public Employees.

In March, the Technical Services Division created an Electrical Safety Program Steering Committee to develop a corporate Electrical Safety Program. The committee is utilizing a product from Electrical Safety Program Solutions called "Product in a Box".

The "Product in a Box" is a licensed collection of template documents and resources which provide a comprehensive Electrical Safety Program. Using the step-by-step implementation guide allows staff to review and customize the documents to create a program that effectively manages the electrical hazards in our workplace.

To ensure safe and efficient response to water and wastewater/stormwater emergencies throughout the service area, Halifax Water recognizes that training

is crucial. Staff continue to exercise emergency response plans and training by participating in monthly tabletop exercises with external agencies using the Incident Command System (ICS). Operational staff also use ICS when responding to a variety of system related incidents.

In 2008, Canada and the State of Israel signed a Declaration of Intent (DOI) to prioritize and manage cooperation in the areas of border management, correctional services, crime prevention, critical infrastructure protection, emergency management, law enforcement, and organized crime. The Canada-Israel Declaration of Intent has been a Ministerial priority since it came into force, and allows for significant, in-depth information sharing with an important international ally identified in the Public Safety International Strategic Framework. Some of the key objectives of the Declaration of Intent are to share information and best practices, identify and share public safety concerns, facilitate technical exchanges, and build on the shared commitment to enhance cooperation.

The DOI established several working groups, including the Critical Infrastructure Protection Working Group (CIPWG). Other working groups cover corrections issues, emergency management, law enforcement, border management and security and crime prevention. All working groups created under the Declaration of Intent meet annually. This past September, Halifax Water hosted a delegation at the Lake Major Water Treatment Facility.

In October, facility assessments were completed for the Pockwock



ICS tabletop exercise—ensuring staff are trained and ready



General Manager Carl Yates taking the safety message to the job site

Transmission Main and the Herring Cove Wastewater Facility in partnership with Public Safety Canada, utilizing the Critical Infrastructure Resilience Tool (CIRT). The

CIRT is a voluntary and non-regulatory vulnerability assessment tool that estimates the resilience and protective

posture of critical infrastructure facilities in support of the National Strategy and Action Plan for Critical Infrastructure.

Motivated And Satisfied Employees

Halifax Water has approximately 450 employees, operating under collective agreements with CUPE Locals 227 and 1431. Turnover is low relative to other public sector organizations, and employee satisfaction as measured by annual employee surveys is generally high.

Employee satisfaction is key to employee engagement and productivity. According to Halifax Water's 2016 Employee Satisfaction Survey 69% of employees are completely or mostly satisfied with their job overall which is a slight increase from the previous year. Also, 60% of employees believe that Halifax Water is one of the best Employers to work for in the Halifax area.

In 2016 Halifax Water participated in a Workforce Management Planning Survey led by the Municipal Auditor General's Office. The survey results found that 87% surveyed believe the organization is a good place to work, and 94% feel engaged. The survey also identified some challenges from the perspective of employees.

Statement	Percent Agree or Strongly Agree
The organization is a good place to work	87%
I am fully engaged in the success of the organization	94%
The work I do helps in achieving the organization's goals and priorities	100%
I feel the work I do has an impact on the organization	94%
I feel the work I do has an impact on the residents of the municipality	94%

Halifax Water continues to develop ways to increase employee satisfaction. A review of current policies, practices and programs was completed and updates were made to reflect industry best standards. Employees' physical and psychological health and wellness will continue to be a focus in the future to assist employees to live happier, healthier lives for them and their families.

Halifax Water is committed to improve employee relations and to instill a shared accountability for success across the organization. Throughout the year several meetings were held between Human Resources and Union leaders to discuss ways to improve labour relations. The meetings were very beneficial and will continue in the future.

A respectful workplace for all employees is paramount at Halifax Water. Mandatory civility and respectful workplace training sessions were held for all employees and a final report of findings was received which will be a focus next year.

There were 127 incidences where Employees received a formal recognition for going above and beyond their normal course of duty through Halifax Water's employee recognition program.

SERVICE AWARD BANQUET

At the 2016 Service Award Banquet the following awards were presented:

30 Year Award

Administration

Sandy Hood

Wastewater & Stormwater Services

Richard Brown

Lloyd Ferguson

Brian Gazeley

Rory MacNeil

Rick Reid

Water Services

Dave Hiscock

Rob Hood

25 Year Award

Water Services

Raymond Doucette

Karen Gardiner

Wastewater & Stormwater Services

Tim Dewolfe

Dave Dort

Laurie Sperry

20 Year Award

Corporate Services

Karen Kearney

Gail Reid

Tanya Shatford

Dawn Slaunwhite

Engineering & Information Services

Ian Guppy

Mike Slayter

Mike Slayter
Rudy Thomas

Regulatory Services

Charles Lloyd

Wastewater & Stormwater Services

Evan Beaton
Robert Cohoon
Eric Dorey
Rick Gage
William Hannam
Richard Masters
Gary McPherson
Jeff Oldham
Doug Rafuse
Heather Shea
Blair Titus
Chris Weeks
Rob Wyman

Water Services

Mike Campbell
Andrea LeGassie
Perry Pinkham
Mark Stevens

10 Year Award

Engineering & Information Services

Nola Button
Valerie Williams

Regulatory Services

Andrew Driscoll
Kimberley Gillis
Paul Taylor

Wastewater & Stormwater Services

Tracy Hatch
Ross Turner

Water Services

James Bruce
Daniel Englehutt
Barry Geddes
Andrew MacCallum
Jerry MacDonald
Hannah MacKay
Barry McMullin
Amanda Richards



Rory MacNeil receiving his 30 Year Service Award from Carl Yates, General Manager

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. In 2016 this award was presented to Kelly Pereira for her continued commitment

and high level of service provided to Halifax Water's customers.

FUNDRAISING INITIATIVES

Halifax Water supports the communities we work in as reflected in the many fundraising initiatives such as the United Way Halifax. Halifax Water employees raised \$6,074.10 for the United Way through direct donations and



Kelly Pereira receives Carolyn Bruce Customer Service Excellence Award from General Manager Carl Yates

fundraising events.

The Halifax Water/Salvation Army H2O (Help to Others) program raised a total of \$2,509 to assist customers who truly need help with their water/wastewater/stormwater bill. This internal staff fundraising is in addition to the \$25,000 base funding that Halifax Water provides. Funds donated by Halifax Water employees were matched by Halifax Water.

Halifax Water Employees also donated \$8,092 toward Water For People to support the digging of wells to provide clean drinking water in 9 different countries for 4 million people.

The Christmas Families Fundraising initiatives raised \$4035 for Carolyn's Angel Tree program through the Salvation Army and was used to buy gifts for 75 kids in Halifax Regional Municipality who need it the most.

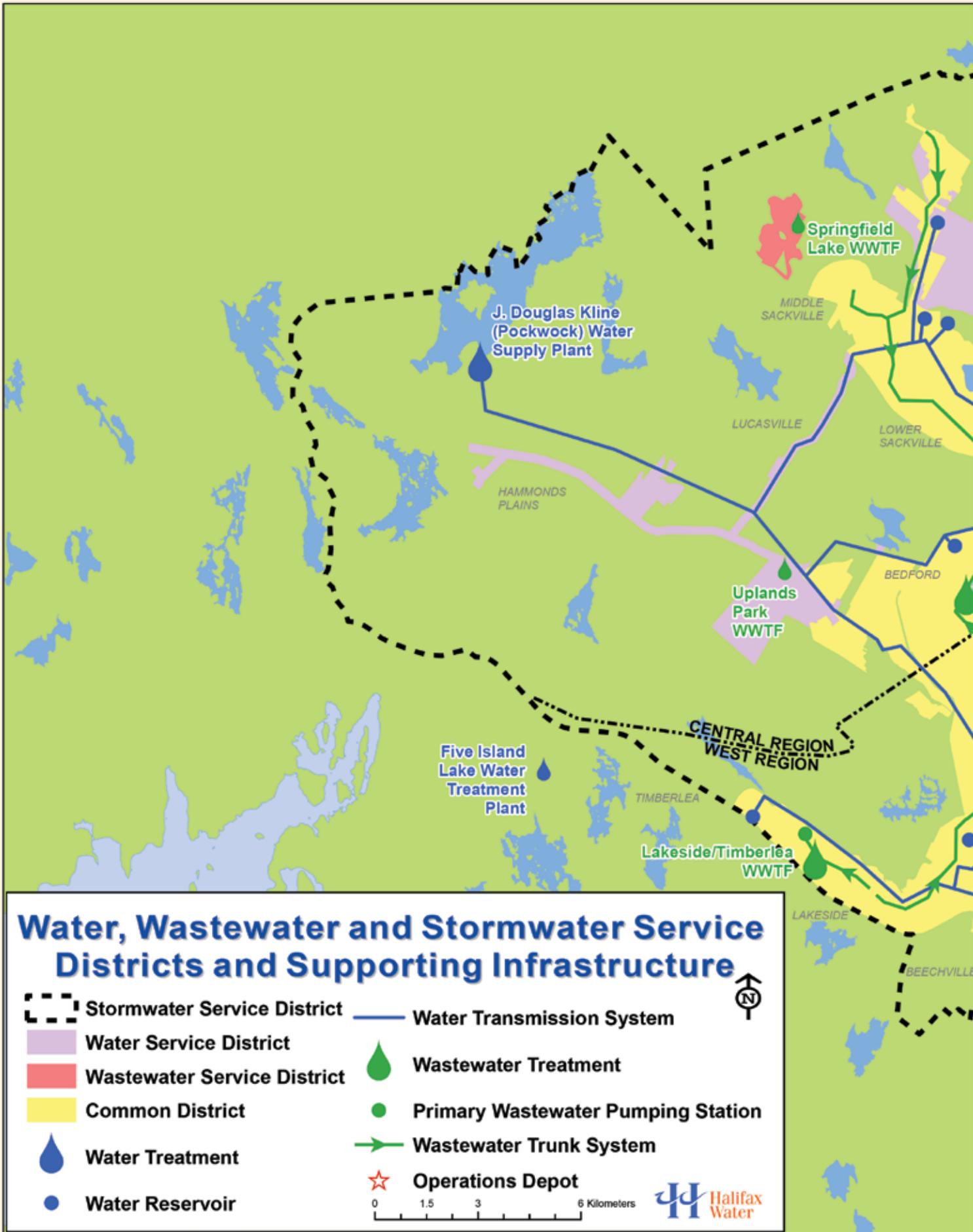


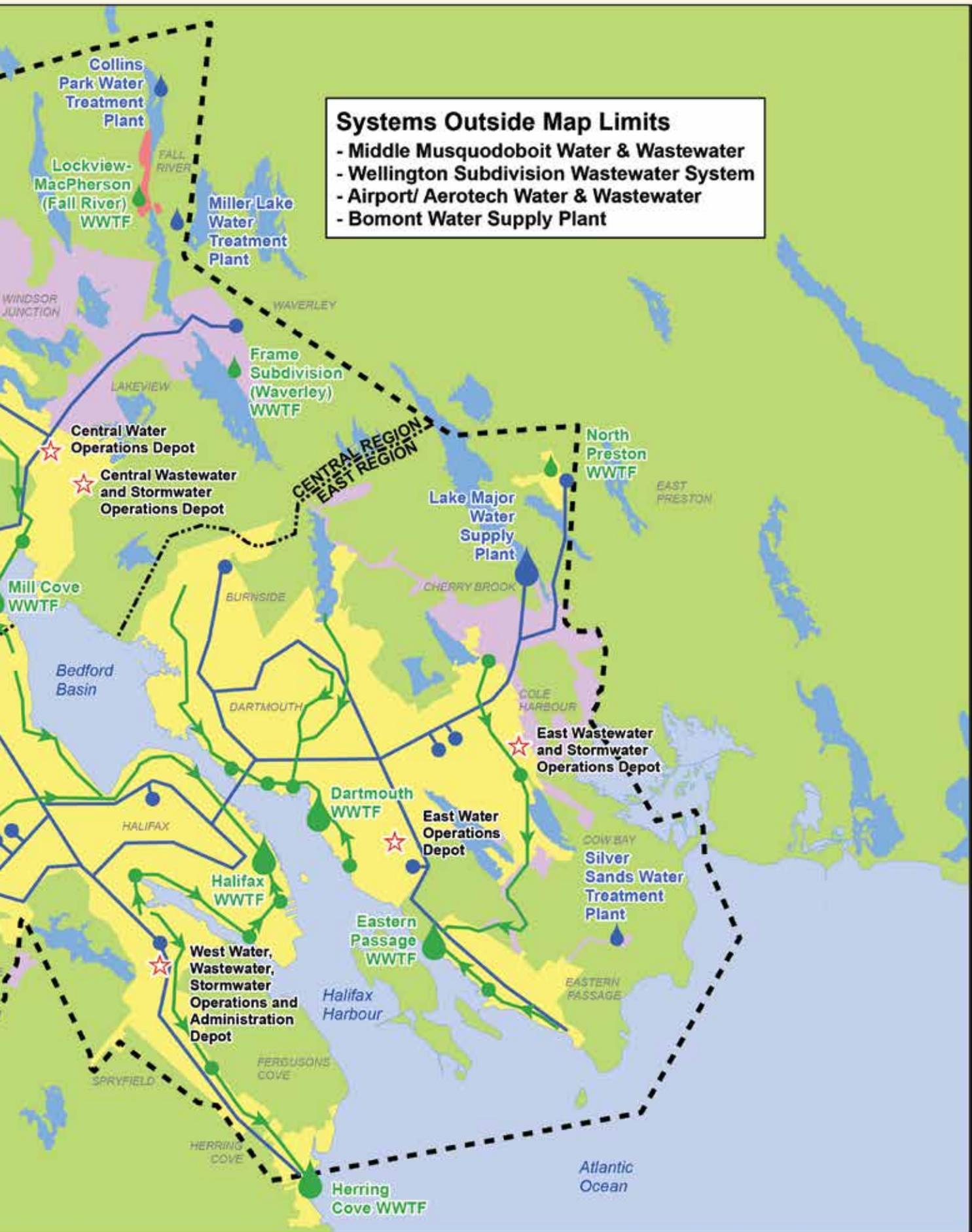
Halifax Water employees help spread Christmas joy to kids in need

Halifax Water Employees were also very generous in donations to support Bryony House, Feed NS, Hope Cottage, Special Olympics Nova Scotia and The Credit Union Lung Run.

Employees and family members run to raise funds for Credit Union Lung Run 2016







TYPICAL ANALYSIS OF POCKWOCK/LAKE MAJOR WATER 2016 - 2017

(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	Objective Concentration
Alkalinity (as CaCO ₃)	<1.0	19.5	<1.0	25.0	-	-
Aluminum	0.104	0.101	0.200	0.018	-	*0.20 / 0.10
Ammonia (N)	<0.050	0.088	<0.050	<0.050	-	-
Arsenic	<0.001	<0.001	<0.001	<0.001	0.010	-
Calcium	1.10	3.9	0.87	15.0	-	-
Chloride	7.2	8.6	5.5	7.1	-	≤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)	14.5	<3.0	36.0	<3.0	-	≤15.0
Conductivity (µS/cm)	32.0	94.0	28.0	140.0	-	-
Copper (Total)	0.033	<0.002	0.069	<0.003	-	≤1.0
Fluoride	<0.10	0.62	<0.10	0.64	1.5	0.7
Hardness (as CaCO ₃)	4.4	11.9	3.7	39.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	0.31	0.84	0.26	2.75	-	-
HAA5 (avg.)	-	0.038	-	0.044	0.080	-
Iron (Total)	<0.051	<0.050	0.103	<0.050	-	<0.3
Langelier Index @ 4°C	-4.6	-2.4	-5.4	-1.8	-	-
Langelier Index @ 20°C	-4.2	-2.1	-4.4	-1.6	-	-
Lead (Total) (µg/l)	0.50	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.38	0.40	0.36	0.38	-	-
Manganese (Total)	0.028	0.011	0.044	0.003	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate and Nitrite (as N)	<0.057	0.057	<0.058	<0.056	10.0	-
pH (pH Units)	6.1	7.3	6.1	7.3	-	7.0 - 10.5
Potassium	0.33	0.29	0.28	0.26	-	-
Sodium	4.1	12.0	3.5	12.2	-	≤200
Solids (Total Dissolved)	29.5	49.3	16.0	76.0	-	≤500
Sulfate	3.3	8.5	2.6	30.8	--	≤500
Turbidity (NTU)	0.32	<0.098	0.30	<0.038	**0.2 / 1.0	≤5
Total Organic Carbon (TOC)	2.9	1.5	4.7	1.5	-	-
THM's (avg.)	-	0.049	-	0.052	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	<0.005	0.094	0.007	0.079	-	≤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% of the time, as required by Provincial Permit.

TYPICAL ANALYSIS - SMALL SYSTEMS 2016 - 2017

(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	Objective Concentration
Alkalinity (as CaCO ₃)	<5.0	32.8	31.0	31.0	-	-
Aluminum	0.112	0.012	0.007	<0.005	-	0.2
Ammonia (N)	<0.50	<0.050	0.19	<0.050	-	-
Arsenic	<0.001	<0.001	0.004	0.004	0.010	-
Calcium	2.53	16.0	8.1	8.1	-	-
Chloride	6.6	9.0	4.4	5.3	-	≤250
Chlorate	<0.1	0.3	<0.1	<0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	32.7	<3.0	<5.0	<3.0	-	≤15.0
Conductivity (µS/cm)	35.0	120.0	77.0	81.0	-	-
Copper (Total)	0.360	0.037	0.004	0.012	-	≤1.0
Fluoride	<0.10	<0.10	0.45	0.41	1.5	-
Hardness (as CaCO ₃)	8.2	45.3	24.0	24.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	0.58	3.2	1.7	1.7	-	-
HAA5 (avg.)	-	0.045	-	<0.005	0.080	-
Iron (Total)	0.520	<0.050	<0.050	<0.050	-	≤0.3
Langelier Index @ 4°C	-2.6	-2.3	-2.06	-1.4	-	-
Langelier Index @ 20°C	-2.2	-2.1	-1.81	-1.1	-	-
Lead (Total) (µg/l)	0.77	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.57	0.64	1.0	1.0	-	-
Manganese (Total)	0.305	0.022	<0.002	<0.002	-	≤0.05
Mercury (µg/l)	0.028	<0.013	<0.013	<0.013	1.0	-
Nitrate and Nitrite (as N)	0.065	<0.065	0.055	<0.052	10.0	-
pH (pH Units)	6.50	7.4	7.0	7.7	-	7.0 - 10.5
Potassium	0.20	0.27	0.45	0.45	-	-
Sodium	4.1	12.3	5.5	6.3	-	≤200
Solids (Total Dissolved)	27.3	110.0	57.0	61.0	-	≤500
Sulfate	3.9	30.0	2.9	2.8	-	≤500
Turbidity (NTU)	1.27	<0.10	<0.17	<0.11	*0.2 / 1.0 **1.0	≤5
Total Organic Carbon (TOC)	4.4	1.5	<0.50	<0.50	-	-
THM's (avg.)	-	0.057	-	<0.001	0.100	-
Uranium (µg/l)	<0.10	<0.10	9.9	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 / <0.17	<0.10 / <0.10	0.24 / 0.11	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 2016 - 2017

(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	Raw Water	Treated Water	Maximum Acceptable Concentration	Objective Concentration
Alkalinity (as CaCO ₃)	48.0	83.5	12.0	7.2	-	-
Aluminum	0.007	<0.005	0.045	0.006	-	0.2
Ammonia (N)	<0.050	<0.050	0.07	<0.050	-	-
Arsenic	<0.001	<0.001	0.002	<0.001	0.010	-
Calcium	15.0	4.8	6.6	0.18	-	-
Chloride	14.5	8.9	42.5	6.3	-	≤250
Chlorate	<0.1	0.3	<0.1	0.3	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	<5.0	<5.0	16.0	<5.0	-	≤15.0
Conductivity (μS/cm)	150.0	230.0	160.0	22.0	-	-
Copper (Total)	0.002	0.010	<0.002	<0.019	-	≤1.0
Fluoride	<0.10	<0.10	<0.10	<0.10	1.5	-
Hardness (as CaCO ₃)	61.0	19.0	20.0	<1.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	4.3	1.3	1.4	0.1	-	-
HAA5 (avg.)	-	<0.005	-	<0.005	0.080	-
Iron (Total)	<0.050	<0.050	0.075	<0.050	-	≤0.3
Langelier Index @ 4°C	-1.8	-1.5	-2.55	-3.83	-	-
Langelier Index @ 20°C	-1.5	-1.2	-2.30	-3.58	-	-
Lead (Total) (μg/l)	<0.50	<0.50	<0.50	<0.64	10.0	-
Magnesium	5.4	1.80	0.91	<0.10	-	-
Manganese (Total)	0.003	<0.002	0.042	<0.002	-	≤0.05
Mercury (μg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate and Nitrite (as N)	0.65	0.64	0.14	<0.052	10.0	-
pH (pH Units)	6.9	7.2	7.3	7.0	-	7.0 - 10.5
Potassium	1.10	0.60	0.93	0.11	-	-
Sodium	7.2	39.0	24.5	5.5	-	≤200
Solids (Total Dissolved)	115.0	120.0	0.99	23.0	-	≤500
Sulfate	24.0	2.7	8.4	<2.0	-	≤500
Turbidity (NTU)	0.49	<0.10	1.02	<0.12	*0.1 / 0.3	≤5
Total Organic Carbon (TOC)	0.54	<0.50	3.5	<0.50	-	-
THM's (avg.)	-	<0.002	-	<0.003	0.100	-
Uranium (μg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	0.013	0.096	<0.005	0.029	-	≤5.0
PCB (μg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.014/<0.10	<0.010/<0.46	<0.010/<0.10	<0.010/<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 2016 - 2017

(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	Objective Concentration
Alkalinity (as CaCO ₃)	69.0	64.0	-	23.0	-	-
Aluminum	<0.009	0.013	-	0.088	-	0.2
Ammonia (N)	0.063	<0.050	-	<0.050	-	-
Arsenic	<0.002	<0.001	-	<0.001	0.010	-
Calcium	35.0	35.0	-	4.6	-	-
Chloride	63.0	66.5	-	9.2	-	≤250
Chlorate	<0.1	0.3	-	<0.1	1.0	-
Chlorite	<0.1	<0.1	-	<0.1	1.0	-
Colour (True Colour Units)	<5.0	<5.0	-	<5.0	-	≤15.0
Conductivity (µS/cm)	390.0	390.0	-	89.0	-	-
Copper (Total)	<0.002	<0.003	-	<0.002	-	≤1.0
Fluoride	0.23	0.22	-	0.59	1.5	-
Hardness (as CaCO ₃)	110.0	110.0	-	13.0	-	-
Hardness (as CaCO ₃) (Grains/IG)	7.7	7.7	-	0.9	-	-
HAA5 (avg.)	-	<0.005	-	0.051	0.080	-
Iron (Total)	0.856	<0.050	-	<0.050	-	≤0.3
Langelier Index @ 4°C	-0.32	-0.51	-	-2.07	-	-
Langelier Index @ 20°C	+0.28	-0.26	-	-1.82	-	-
Lead (Total) (µg/l)	<0.50	<0.50	-	<0.50	10.0	-
Magnesium	4.9	4.85	-	0.36	-	-
Manganese (Total)	1.030	<0.002	-	0.008	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	-	<0.013	1.0	-
Nitrate and Nitrite (as N)	<0.050	<0.050	-	<0.050	10.0	-
pH (pH Units)	7.9	7.6	-	7.4	-	7.0 - 10.5
Potassium	0.86	0.79	-	0.32	-	-
Sodium	22.5	26.5	-	14.0	-	≤200
Solids (Total Dissolved)	210.0	210.0	-	56.0	-	≤500
Sulfate	19.5	19.0	-	9.0	-	≤500
Turbidity (NTU)	7.4	<0.18	-	<0.14	**1.0 ***0.2 / 1.0	≤5
Total Organic Carbon (TOC)	<0.50	<0.50	-	1.6	-	-
THM's (avg.)	-	<0.004	-	0.074	0.100	-
Uranium (µg/l)	<0.10	<0.10	-	<0.10	20.0	-
Zinc (Total)	<0.005	0.023	-	0.069	-	≤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	-
Lead - 210 (Bq/L)	-	-	-	-	0.2	-

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

TYPICAL ANALYSIS - SMALL SYSTEMS 2016 - 2017

(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	Objective Concentration
Alkalinity (as CaCO ₃)	12.0	15.0			-	-
Aluminum	0.059	0.010			-	0.2
Ammonia (N)	<0.050	0.082			-	-
Arsenic	0.002	<0.001			0.010	-
Calcium	11.0	10.0			-	-
Chloride	30.0	150.0			-	≤250
Chlorate	<0.1	0.5			1.0	-
Chlorite	<0.1	<0.10			1.0	-
Colour (True Colour Units)	18.5	<5.0			-	≤15.0
Conductivity (μS/cm)	130.0	120.0			-	-
Copper (Total)	<0.002	0.012			-	≤1.0
Fluoride	<0.10	<0.10			1.5	-
Hardness (as CaCO ₃)	31.0	28.0			-	-
Hardness (as CaCO ₃) (Grains/IG)	2.2	2.0			-	-
HAA5 (avg.)	-	0.070			0.080	-
Iron (Total)	0.100	0.086			-	≤0.3
Langelier Index @ 4°C	-2.8	-2.26			-	-
Langelier Index @ 20°C	-2.6	-2.01			-	-
Lead (Total) (μg/l)	<0.050	0.71			10.0	-
Magnesium	1.000	0.76			-	-
Manganese (Total)	0.048	0.007			-	≤0.05
Mercury (μg/l)	<0.013	<0.013			1.0	-
Nitrate and Nitrite (as N)	0.08	<0.050			10.0	-
pH (pH Units)	7.3	7.3			-	7.0 - 10.5
Potassium	0.67	0.75			-	-
Sodium	18.5	26.0			-	≤200
Solids (Total Dissolved)	74.0	220.0			-	≤500
Sulfate	18.0	<2.0			-	≤500
Turbidity (NTU)	1.5	<0.10			*1.0/0.3	≤5
Total Organic Carbon (TOC)	4.2	0.97			-	-
THM's (avg.)	-	0.053			0.100	-
Uranium (μg/l)	0.25	<0.10			20.0	-
Zinc (Total)	<0.005	0.030			-	≤5.0
PCB (μg/l)	<0.05	<0.05			-	-
Gross Alpha / Gross Beta (Bq/L)	<0.16/<0.10	<0.12/<0.10			0.5/1.0	-

Ultra-filtration membrane plants must produce water with turbidity of <1.0 NTU 99% of the time and <0.3 NTU 100% of the time, as required by Provincial Permit.

FINANCIAL OVERVIEW

Abbreviated Financial Information

March 31, 2017

(in thousands)

ASSETS

Fixed

Utility Plant in Service at Cost	\$ 1,562,125
Provision for Depreciation	(393,727)

Net Book Value	<u>1,168,398</u>
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Capital Work in Progress	28,406
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Regulatory Asset	3,388
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Current	90,706
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TOTAL ASSETS	<u>\$ 1,290,898</u>
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LIABILITIES

Long Term Debt	\$ 224,968
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Other Than Long Term Debt	82,808
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TOTAL LIABILITIES	<u>\$ 307,776</u>
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EQUITY

Special Purpose Reserves	\$ 16,912
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Contributed Capital Surplus	980,344
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Accumulated Other Comprehensive Income	(43,193)
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Operating Surplus used to Fund Capital, Cumulative	12,380
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Capital Surplus	<u>966,443</u>
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Operating Surplus (Deficit) April 1, 2016	7,819
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2016/17 OPERATIONS

Operating Revenue	\$ 137,998
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Financial Revenue	3,323
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Revenue From all Sources	<u>\$ 141,321</u>
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Expenditures

Operating Expenses	\$ 78,738
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Depreciation	19,102
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Grant in lieu of taxes HRM	4,578
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Financial Expenses	30,043
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Total Expenditures	<u>\$ 132,461</u>
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Excess of Expenditures over Revenue	<u>8,860</u>
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Accumulated Operating Surplus March 31, 2017	16,679
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TOTAL EQUITY	<u>\$ 983,122</u>
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TOTAL LIABILITIES & EQUITY	<u>\$ 1,290,898</u>
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Figures in the Financial Overview are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities.

Financial Statements

Halifax Regional Water Commission

March 31, 2017

Contents	Page
Independent auditor's report	48
Statements of earnings	49
Statements of comprehensive earnings	50
Statements of financial position	51
Statements of changes in equity	52
Statements of cash flows	53
Notes to the financial statements	54-61
Schedules	
A Schedule of utility plant in service	
Water	62
Wastewater	63
Stormwater	64
B Schedule of long term debt	65-66
C Schedule of operations for water service	67
D Schedule of operations for wastewater service	68
E Schedule of operations for stormwater service	69
F Regulated and unregulated activities	
Schedule of regulated activities	70
Schedule of unregulated activities	71
G Nova Scotia Utility and Review Board information	72

Independent auditor's report

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, 2017, 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, 2017 and its financial performance and its cash flows for the years then ended in accordance with International Financial Reporting Standards.

Emphasis of Matter

Without modifying our opinion, we draw attention to note 15 to the financial statements, which explains that certain comparative information for the year ended March 31, 2016 has been restated.

Halifax, Canada
June 28, 2017


Chartered Professional Accountants
Licensed Public Accountants

Halifax Regional Water Commission

Statements of earnings

Year ended March 31, 2017 *(in thousands)*

	2017	2016
		Restated (Note 15)
Operating revenues		
Water	\$ 47,183	\$ 43,193
Wastewater	69,475	66,601
Stormwater	10,542	10,595
Fire protection	7,074	8,032
Private fire protection	831	679
Other operating revenue	2,892	2,617
	137,997	131,717
Operating expenditures (note 14)		
Water supply and treatment	8,050	8,623
Water transmission and distribution	8,997	9,094
Wastewater collection	11,639	10,577
Stormwater collection	4,097	4,237
Wastewater treatment	19,794	19,285
Engineering and information services	7,576	7,018
Regulatory services	2,356	2,370
Customer service	4,432	4,450
Administration and pension	11,799	9,681
Depreciation and amortization	43,433	40,254
	122,173	115,589
Earnings from operations before financial and other revenues and expenditures	15,824	16,128
Financial and other revenues		
Interest	780	883
Contributed capital	17,980	17,446
Other	2,543	2,487
	21,303	20,816
Financial and other expenditures		
Interest on long term debt	8,475	8,889
Amortization of debt discount	199	186
Grant in lieu of taxes	4,578	4,528
Other	467	198
	13,719	13,801
Earnings for the year before regulatory deferral account balance amortization	23,408	23,143
Regulatory deferral account balance amortization (note 5)	(192)	(192)
Earnings for the year	\$ 23,216	\$ 22,951

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statements of comprehensive earnings

Year ended March 31, 2017 (in thousands)

	2017	2016
Earnings for the year	\$ 23,216	\$ 22,951
Other comprehensive income (loss)		
Items that will not be reclassified subsequently to earnings:		
Re-measurement on defined benefit plans	743	10,389
Total comprehensive earnings for the year	\$ 23,959	\$ 33,340

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statements of financial position

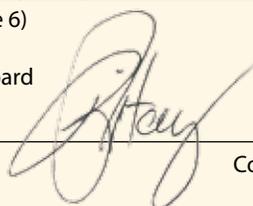
Year ended March 31, 2017 (in thousands)

	March 31 2017	March 31 2016	March 31 2015
		Restated (Note 15)	Restated (Note 15)
Assets			
Current			
Cash and cash equivalents	\$ 55,879	\$ 46,478	\$ 39,271
Receivables			
Customer charges and contractual	13,321	15,641	14,181
Unbilled service revenues	17,158	16,171	15,479
Halifax Regional Municipality	1,880	9,558	3,743
Inventory	1,601	1,684	1,528
Prepays	867	862	915
	90,706	90,394	75,117
Intangible assets (note 11)	10,275	10,201	10,672
Capital work in progress	28,406	18,529	41,423
Utility plant in service (note 12)	1,144,152	1,139,658	1,096,257
Total assets	1,273,539	1,258,782	1,223,469
Regulatory deferral account balance (note 5)	3,388	3,580	3,772
Total assets and regulatory deferral account debit balances	\$ 1,276,927	\$ 1,262,362	\$ 1,227,241
Liabilities			
Current			
Payables and accruals			
Trade	\$ 16,790	\$ 16,686	\$ 15,612
Interest on long term debt	2,101	2,229	2,137
Halifax Regional Municipality	295	4,584	6,973
Contractor and customer deposits	191	193	198
Current portion of deferred contributed capital	12,889	12,526	21,603
Current portion of long term debt (note 13)	21,669	23,195	22,374
Unearned revenue	787	389	511
	54,722	59,802	69,408
Deferred contributed capital	808,632	804,641	790,315
Long term debt (note 13)	203,299	215,794	208,231
Employee benefit obligation – pension plan (note 4)	58,480	54,265	65,005
Employee benefit obligation – post-retirement benefits (note 4)	341	466	458
Employee benefit obligation – pre-retirement benefits (note 4)	3,824	3,724	3,494
	1,129,298	1,138,692	1,136,911
Equity			
Accumulated other comprehensive (loss) (page 5)	(43,193)	(43,936)	(54,325)
Accumulated surplus (page 5)	190,822	167,606	144,655
	147,629	123,670	90,330
	\$ 1,276,927	\$ 1,262,362	\$ 1,227,241

Contingent liabilities (note 3)

Commitments (note 6)

Approved by the Board



Commissioner



Commissioner

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statements of changes in equity

Year ended March 31, 2017 (in thousands)

	Accumulated other comprehensive (loss)	Accumulated surplus	Total
Balance at April 1, 2015	\$ (54,325)	\$ 144,655	\$ 90,330
Earnings for the year	-	22,951	22,951
Other comprehensive income	10,389	-	10,389
Comprehensive earnings for the year	10,389	22,951	33,340
Balance at March 31, 2016	\$ (43,936)	\$ 167,606	\$ 123,670
Balance at March 31, 2016	\$ (43,936)	\$ 167,606	\$ 123,670
Earnings for the year	-	23,216	23,216
Other comprehensive income	743		743
Comprehensive earnings for the year	743	23,216	23,959
Balance at March 31, 2017	\$ (43,193)	\$ 190,822	\$ 147,629

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Statements of cash flows

Year ended March 31, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Increase (decrease) in cash and cash equivalents		
Operating		
Comprehensive earnings for the year	\$ 23,959	\$ 33,340
Depreciation and amortization	26,692	23,934
Employee benefit obligations	4,191	(10,504)
Gains on disposal of plant in service	59	158
	54,901	46,928
Change in non-cash operating working capital items (note 7)	5,172	(9,420)
	60,073	37,508
Financing		
Proceeds from issuance of long term debt	9,053	28,307
Contributed capital	9,231	5,013
Debt issue costs, net	122	(49)
Principal repayment on Harbour Solutions long term debt	(6,500)	(6,500)
Principal repayments of long term debt	(16,695)	(13,373)
	(4,789)	13,398
Investing		
Deferred capital contributions	629	4,148
Proceeds from sale of plant in service	197	90
Purchase of capital work in progress	(19,393)	(10,321)
Purchase of utility plant in service	(27,316)	(37,616)
	(45,883)	(43,699)
Net change in cash and cash equivalents	9,401	7,207
Cash and cash equivalents, beginning of year	46,478	39,271
Cash and cash equivalents, end of year	\$ 55,879	\$ 46,478

See accompanying notes to the financial statements.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (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 28, 2017.

(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. Halifax Water'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.

(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 are not limited to, but 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.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (*in thousands*)

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:

<u>Asset/Liability</u>	<u>Classification</u>	<u>Measurement</u>
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 CGUs (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
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(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. They are assessed for impairment on the same basis as other non-financial assets as described below.

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 all of 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

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (in thousands)

and interpretations that are expected to 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.

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.

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.

Management believes these new and revised standards will have minimal impact on the financial statements.

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 \$2,000 - \$3,000.

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 2017, the Commission funded \$674

(2016 - \$627) 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 to all of its employees. 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, each contributing 12.95% of regular employee earnings effective January 1, 2014. As of January 1, 2016, the pension plan was amended with employees currently contributing 10.65%. The employer 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, 2017, is as follows on the next page:

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (in thousands)

	Pension Plan		Post-retirement benefits		Pre-retirement benefits	
	2017	2016	2017	2016	2017	2016
Change in accrued benefit obligation						
Balance, beginning of year	\$ 52,633	\$ 157,296	\$ 466	\$ 458	\$ 3,724	\$ 3,494
Current service cost	5,020	5,777	-	-	308 2	74
Interest cost	6,160	5,938	11	11	129	130
Past service cost	-	(2,787)	-	-	-	-
Contributions by plan participants	2,417	3,274	-	-	-	-
Benefit payments	(4,715)	(4,496)	(61)	(65)	(377)	(254)
Remeasurements – actuarial (gains)/ losses from changes in demographic assumptions	-	(1,101)	31	(21)	-	-
Remeasurements – actuarial (gains)/ losses from changes in financial/experience assumptions	6,848	(11,268)	(106)	83	40	80
Balance, end of year	168,363	152,633	341	466	3,824	3,724
Change in fair value of plan assets						
Balance, beginning of year	98,368	92,291	-	-	-	-
Interest income	3,934	3,644	-	-	-	-
Administrative expenses	(144)	(163)	-	-	-	-
Actual return on plan assets	7,639	(1,896)	-	-	-	-
Benefit payments	(4,715)	(4,496)	(61)	(65)	(377)	(254)
Contributions: Employee	2,417	3,273	-	-	-	-
Employer	2,384	5,715	-	65	377	254
Balance, end of year	109,883	98,368	-	-	-	-
Accrued benefit liability at March 31	\$ 58,480	\$ 54,265	\$ 341	\$ 466	\$ 3,824	\$ 3,724

Administration and pension expense includes pension expense of \$7,390 (2016 - \$5,448).

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

	2017	2016	2017	2016	2017	2016
	Pension Plan	Pension Plan	Post- Retirement Benefits	Post- Retirement Benefits	Pre- Retirement Benefit	Pre- Retirement Benefit
Discount rate	3.80%	4.00%	2.70%	2.90%	3.40%	3.50%
Expected return on plan assets	3.80%	4.00%	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	7.16%	7.43%	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, 2017. 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 \$2,368.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (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 2017 is \$192 (2016 - \$192). IFRS 14 permits a first-time adopter of IFRS to continue to account, with some limited changes, for 'regulatory deferral account balances' in accordance with its previous GAAP, both on initial adoption of IFRS and in subsequent financial statements.

	2017	2016
Beginning balance	\$ 3,580	\$ 3,772
Amortization	(192)	(192)
Ending balance	\$ 3,388	\$ 3,580

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 \$4,774 for the 2018 fiscal year.

At March 31, 2017, the Commission had \$124,395 in expenditures from current and past approved capital budgets not yet expended.

7. Supplemental cash flow information

	2017	2016
Changes in non-cash operating working capital items		
Receivables, customer charges and contractual	\$ 1,333	\$ (2,152)
Payable to/receivable from HRM, net	3,389	(8,204)
Inventory	83	(156)
Prepays	(5)	53
Payables and accruals, trade	104	1,074
Accrued interest on long term debt	(128)	92
Contractor and customer deposits	(2)	(5)
Unearned revenue	398	(122)
	\$ 5,172	\$ (9,420)

Interest paid during the year was \$8,475 (2016 - \$8,889).

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:

	2017	2016
Long term debt (current portion)	\$ 21,669	\$ 23,195
Long term debt	203,299	215,794
Funded debt	224,968	238,989
Equity	147,630	123,670
Capital under management	\$ 372,598	\$ 362,659

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.

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 accounts receivable. 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:

	2017	2016
Receivables		
Customer charges, contractual and unbilled	\$ 32,702	\$ 33,754
Less: allowance for doubtful accounts	(2,223)	(1,941)
	\$ 30,479	\$ 31,813

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.

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (in thousands)

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 \$5,025(2016 - \$4,705).
- The Commission recorded fire protection revenue from HRM of \$7,074(2016 - \$8,032).
- The Commission paid a grant in lieu of tax of \$4,578 (2016 - \$4,528).
- 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:

	2017	2016
Short term benefits	\$ 1,345	\$ 1,481
Post-employment benefits	243	233
Total compensation	\$ 1,588	\$ 1,714

11. Intangible assets

	2017	2016
Cost		
Beginning balance, April 1	\$ 12,232	\$ 11,669
Additions	981	563
Total cost, March 31	13,213	12,232
Accumulated depreciation		
Beginning balance, April 1	2,031	997
Depreciation	907	1,034
Total accumulated depreciation, March 31	2,938	2,031
Net book value	\$ 10,275	\$ 10,201

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (in thousands)

12. Utility plant in service

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tools and work equipment	Total
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	20,780	214,875	218,773	787,646	18,322	1,260,396
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	-	33,807	34,671	43,744	4,022	116,244
Net book value, March 31, 2017	\$ 20,780	\$ 181,068	\$ 184,102	\$ 743,902	\$ 14,300	\$ 1,144,152

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tools and work equipment	Total Restated (Note 15)
Cost						
Beginning balance, April 1, 2015	\$ 18,983	\$ 199,526	\$ 204,676	\$ 700,532	\$ 7,838	\$ 1,131,555
Additions	1,605	7,418	10,041	59,495	5,275	83,834
Disposals	(70)	-	(535)	-	(822)	(1,427)
Total cost, March 31, 2016	20,518	206,944	214,182	760,027	12,291	1,213,962
Accumulated depreciation						
Beginning balance, April 1, 2015	-	10,690	11,254	13,790	(436)	35,298
Depreciation	-	10,871	11,460	14,564	2,112	39,007
Total accumulated depreciation March 31, 2016	-	21,561	22,714	28,354	1,676	74,305
Net book value, March 31, 2016	\$ 20,518	\$ 185,383	\$ 191,468	\$ 731,673	\$ 10,615	\$ 1,139,657

13. Long-term debt

	Interest rates	2017	2016
Payable to Municipal Finance Corporation (MFC)			
Water	1.040% to 6.750%	\$ 68,380	\$ 72,356
Halifax Harbour Solutions	0.900% to 4.329%	8,450	9,100
Wastewater/stormwater	1.040% to 4.500%	85,120	88,228
Stormwater	1.040% to 4.114%	11,985	11,699
		173,935	181,383
Payable to Halifax Regional Municipality			
MFC Wastewater/stormwater	1.200% to 4.940%	52,066	58,762
		226,001	240,145
Less: debt issue costs		(1,033)	(1,156)
		224,968	238,989
Less: amount payable within one year		(21,669)	(23,195)
		\$ 203,299	\$ 215,794

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:

2018	\$ 21,669
2019	\$ 22,130
2020	\$ 23,259
2021	\$ 17,581
2022	\$ 15,538

Halifax Regional Water Commission

Notes to the financial statements

Year ended March 31, 2017 (in thousands)

14. Operating expenditures by nature

	2017	Restated 2016
Salaries and benefits	\$ 39,839	\$ 33,538
Training	656	409
Contract services	12,118	16,326
Electricity	6,295	6,964
Operating supplies	9,423	8,349
Professional services	4,768	3,878
Chemicals	4,404	4,742
Depreciation and amortization	44,670	41,381
	\$ 122,173	\$ 115,587

15. Restatement

During the fiscal year ended March 31, 2017, the Commission completed Asset Management Plans for various assets. In the course of completing this initiative, management compiled an inventory of stormwater assets that were not previously recorded, specifically culverts for driveways and under roadways (cross culverts). Most of these assets are contributed assets installed prior to the transfer of wastewater and stormwater assets from HRM in 2007. At the time of the 2007 transfer no records were available on asset quantities, location, cost and condition. The Commission has added the assets to utility plant in service due to the relative significance of the assets to stormwater service. The assets were valued using an estimated depreciated replacement cost and prior year figures restated. The impact of restatement is as follows:

	Previously Reported April 1, 2015	Restated Adjustment	April 1, 2015
Distribution and collection network			
Cost	\$ 597,781	\$ 102,751	\$ 700,532
Accumulated depreciation	\$ 9,877	\$ 3,913	\$ 13,790
Deferred contributed capital	\$ 691,477	\$ 98,838	\$ 790,315
	2016	Adjustment	2016
Depreciation expense	\$ 10,650	\$ 3,914	\$ 14,564
Contributed capital revenue	\$ 13,533	\$ 3,914	\$ 17,447

16. Comparative figures

Certain of the comparative figures have been reclassified to conform with the financial statement presentation adopted for the current year.

Halifax Regional Water Commission Schedule of utility plant in service

Year ended March 31, 2017 (in thousands)

Schedule A

Water	Cost										Total	
	Land improvements	Structures and improvements	Pumping equipment	Purification equipment	SCADA equipment	Transmission and distribution mains	Services	Meters	Hydrants	Aerotech and small systems		Tools and work equipment
Cost												
Beginning balance, April 1, 2016	\$ 15,297	\$ 87,643	\$ 9,711	\$ 22,901	\$ 4,792	\$ 343,510	\$ 34,082	\$ 14,442	\$ 18,887	\$ 9,467	\$ 23,876	\$ 584,608
Additions	120	5,486	9	870	254	6,977	1,551	701	445	97	3,336	19,846
Disposals	-	(795)	-	-	-	(386)	-	(223)	-	-	(341)	(1,745)
Total cost, March 31, 2017	15,417	92,334	9,720	23,771	5,046	350,101	35,633	14,920	19,332	9,564	26,871	602,709
Accumulated depreciation												
Beginning balance, April 1, 2016	-	25,551	6,778	14,522	3,545	76,018	5,795	5,480	3,605	2,648	17,117	161,059
Depreciation	-	2,483	250	956	144	4,226	582	470	297	274	1,192	10,874
Total accumulated depreciation, March 31, 2017	-	28,034	7,028	15,478	3,689	80,244	6,377	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	\$ 29,256	\$ 8,970	\$ 15,430	\$ 6,642	\$ 8,562	\$ 430,776
Cost												
Beginning balance, April 1, 2015	\$ 15,440	\$ 86,583	\$ 9,711	\$ 22,613	\$ 4,326	\$ 327,226	\$ 32,931	\$ 13,801	\$ 18,400	\$ 9,248	\$ 22,913	\$ 563,192
Additions	54	1,060	-	288	466	16,662	1,151	1,021	487	219	963	22,371
Disposals	(197)	-	-	-	-	(378)	-	(380)	-	-	-	(955)
Total cost, March 31, 2016	15,297	87,643	9,711	22,901	4,792	343,510	34,082	14,442	18,887	9,467	23,876	584,608
Accumulated depreciation												
Beginning balance, April 1, 2015	-	24,250	6,523	13,624	3,459	72,021	5,269	5,132	3,326	2,388	15,601	151,592
Depreciation	-	1,301	255	898	86	3,997	526	348	279	260	1,516	9,466
Total accumulated depreciation, March 31, 2016	-	25,551	6,778	14,522	3,545	76,018	5,795	5,480	3,605	2,648	17,117	161,059
Net book value, March 31, 2016	\$ 15,297	\$ 62,092	\$ 2,933	\$ 8,379	\$ 1,247	\$ 267,492	\$ 28,287	\$ 8,962	\$ 15,282	\$ 6,819	\$ 6,759	\$ 423,549

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.

Schedule A

Halifax Regional Water Commission Schedule of utility plant in service

Year ended March 31, 2017 (in thousands)

Wastewater	Structures and improvements				Pumping equipment			Treatment equipment	SCADA equipment	Collection system	Laterals	Tools and work equipment	Aerotech and small systems	Total
	Land	improvements			equipment									
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	142	3,160	709	1,201	433	6,607	2,938	3,508	95	18,793				
Additions	-	-	-	-	-	-	-	(502)	-	(502)				
Disposals	-	-	-	-	-	-	-	-	-	-				
Total cost, March 31, 2017	5,329	175,208	17,579	161,122	8,210	290,169	19,108	25,407	12,089	714,221				
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	\$ 5,329	\$ 121,511	\$ 11,002	\$ 113,867	\$ 6,844	\$ 232,751	\$ 17,606	\$ 13,834	\$ 8,639	\$ 531,383				
Cost														
Beginning balance, April 1, 2015	\$ 5,187	\$ 171,473	\$ 9,568	\$ 159,922	\$ 7,061	\$ 279,268	\$ 13,465	\$ 21,161	\$ 11,730	\$ 678,835				
Cost	-	575	7,302	54	716	4,294	2,705	1,240	264	17,150				
Additions	-	-	-	(55)	-	-	-	-	-	(55)				
Disposals	-	-	-	-	-	-	-	-	-	-				
Total cost, March 31, 2016	5,187	172,048	16,870	159,921	7,777	283,562	16,170	22,401	11,994	695,930				
Accumulated depreciation														
Beginning balance, April 1, 2015	-	44,715	5,684	31,406	552	50,104	903	7,834	2,610	143,808				
Depreciation	-	4,083	278	7,883	358	3,365	246	2,043	411	18,667				
Total accumulated depreciation, March 31, 2016	-	48,798	5,962	39,289	910	53,469	1,149	9,877	3,021	162,475				
Net book value, March 31, 2016	\$ 5,187	\$ 123,250	\$ 10,908	\$ 120,632	\$ 6,867	\$ 230,093	\$ 15,021	\$ 12,524	\$ 8,973	\$ 533,455				

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

Schedule A

Year ended March 31, 2017 (in thousands)

Stormwater	Structures and improvements	Collection system	Laterals	Tools and work equipment	Total Restated (Note 15)
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	9,785	227,751	4,611	3,045	245,192
Accumulated depreciation					
Beginning balance, April 1, 2016					
Depreciation	1,226	30,690	216	504	32,636
	176	5,690	85	366	6,317
Total accumulated depreciation, March 31, 2017	1,402	36,380	301	870	38,953
Net book value, March 31, 2017	\$ 8,383	\$ 191,371	\$ 4,310	\$ 2,175	\$ 206,239
Cost					
Beginning balance, April 1, 2015					
Cost	\$ 8,945	\$ 211,223	\$ 3,636	\$ 1,624	\$ 225,428
Additions	760	7,278	293	410	8,741
Disposals	-	-	-	-	-
Total cost, March 31, 2016	9,705	218,501	3,929	2,034	234,169
Accumulated depreciation					
Beginning balance, April 1, 2015					
Depreciation	1,062	25,317	168	332	26,879
	164	5,373	48	172	5,757
Total accumulated depreciation, March 31, 2016	1,226	30,690	216	504	32,636
Net book value, March 31, 2016	\$ 8,479	\$ 187,811	\$ 3,713	\$ 1,530	\$ 201,533

During the year, \$267 of interest was capitalized to Utility Plant in Service (2016 - \$491).

Cumulative utility plant in service	Water		Wastewater		Stormwater		Total
Net book value, March 31, 2017	\$ 430,776	\$ 531,383	\$ 206,239	\$ 1,168,398			\$ 1,168,398
Net book value, March 31, 2016	\$ 423,549	\$ 533,455	\$ 201,533	\$ 1,158,537			\$ 1,158,537

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.

Schedule B

Halifax Regional Water Commission Schedule of long term debt

Year ended March 31, 2017 (in thousands)

	Interest rate	Final Maturity	Balance Remaining	
			2017	2016
Payable to Municipal Finance Corporation				
Water				
Debenture 23 A 1	4.250% to 6.125%	2018	\$ 700	\$ 800
Debenture 26 A 1	5.500% to 8.000%	2016	-	2,200
Debenture 96 A 1	4.350% to 4.880%	2016	-	80
Debenture 27 A 1	4.650% to 5.010%	2017	1,108	2,165
Debenture 28 A 1	6.500% to 6.750%	2018	1,200	1,300
Debenture 98 A 1	3.750% to 5.088%	2019	7,128	10,383
Debenture 29 A 1	0.900% to 4.329%	2019	675	900
Debenture 30 A 1	1.550% to 3.870%	2020	700	875
Debenture 31 A 1	1.630% to 4.221%	2021	750	900
Debenture 32 A 1	1.636% to 3.480%	2022	1,200	1,400
Debenture 32 C 1	1.510% to 3.160%	2022	8,587	9,124
Debenture 33 A 1	1.330% to 3.489%	2023	8,595	9,101
Debenture 33 B 1	1.285% to 4.114%	2023	6,300	6,671
Debenture 34 B 1	1.200% to 3.190%	2024	12,305	12,989
Debenture 35 B 1	1.040% to 2.894%	2025	12,794	13,467
Debenture 36 A 1	1.150% to 2.925%	2026	2,000	-
Debenture 36 B 1	1.150% to 2.506%	2026	4,338	-
Halifax Harbour Solutions				
Debenture 29 A 1	0.900% to 4.329%	2019	8,450	9,100
Wastewater/stormwater				
Debenture 30 A 1	1.510% to 4.500%	2020	2,380	2,550
Debenture 32 A 1	1.636% to 3.480%	2022	1,917	2,037
Debenture 32 B 1	1.380% to 3.156%	2022	25,600	27,200
Debenture 32 C 1	1.510% to 3.160%	2022	3,676	3,906
Debenture 33 A 1	1.330% to 3.489%	2023	14,331	15,174
Debenture 33 B 1	1.285% to 4.114%	2023	9,259	9,804
Debenture 34 A 1	1.245% to 3.347%	2024	5,012	5,291
Debenture 34 B 1	1.200% to 3.190%	2024	7,727	8,157
Debenture 35 B 1	1.040% to 2.894%	2025	13,405	14,110
Debenture 36 B 1	1.150% to 2.506%	2026	1,813	-
Stormwater				
Debenture 33 A 1	1.330% to 3.489%	2023	459	486
Debenture 33 B 1	1.285% to 4.114%	2023	2,243	2,375
Debenture 34 B 1	1.200% to 3.190%	2024	5,313	5,608
Debenture 35 B 1	1.040% to 2.894%	2025	3,069	3,230
Debenture 36 B 1	1.150% to 2.506%	2026	901	-
			173,935	181,383

Continued on page 66

Halifax Regional Water Commission

Schedule of long term debt

Schedule B cont'd

Year ended March 31, 2017 (in thousands)

	Interest rate	Final Maturity	Balance Remaining	
			2017	2016
Payable to Halifax Regional Municipality				
Municipal Finance Corporation – Wastewater/stormwater				
Debenture 24 B 1	2.840% to 5.940%	2024	44,000	49,500
Debenture 26 A 1	4.350% to 4.880%	2016	-	126
Debenture 26 B 1	4.265% to 4.410%	2016	-	5
Debenture 27 A 1	4.650% to 5.010%	2017	66	131
Debenture 34 B 1	1.200% to 3.190%	2024	8,000	9,000
			52,066	58,762
			226,001	240,145
Less: debt issue costs			(1,033)	(1,156)
			224,968	238,989
Less: amount payable within one year			(21,669)	(23,195)
			\$ 203,299	\$ 215,794

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:

2018	\$ 21,669
2019	\$ 22,130
2020	\$ 23,259
2021	\$ 17,585
2022	\$ 15,538

Schedule C Halifax Regional Water Commission Schedule of operations for water service

Year ended March 31, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Operating revenues		
Water service	\$ 47,183	\$ 43,193
Fire protection	7,074	8,032
Private fire protection services	831	679
Other operating revenue		
Bulk water stations	330	265
Customer late payment fees	282	198
Miscellaneous	153	181
	55,853	52,548
Operating expenditures		
Water supply and treatment	8,050	8,232
Water transmission and distribution	8,997	9,485
Engineering and information services	3,828	3,528
Regulatory services	493	505
Customer service	2,290	2,268
Administration and pension	5,966	4,919
Depreciation	7,756	8,411
	37,380	37,348
Earnings from operations before financial and other revenues and expenditures	18,473	15,200
Financial and other revenues		
Interest	351	442
Other	375	434
	726	876
Financial and other expenditures		
Interest on long term debt	2,378	2,531
Repayment of long term debt	8,400	7,766
Amortization of debt discount	95	90
Grant in lieu of taxes	4,578	4,528
Other	17	29
	15,468	14,944
Earnings for the year	\$ 3,731	\$ 1,132

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, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Operating revenues		
Wastewater service	\$ 69,475	\$ 66,601
Other operating revenue		
Leachate and other contract revenue	440	424
Septage tipping fees	909	648
Overstrength surcharge	23	135
Customer late payment fees	189	238
Miscellaneous	428	382
	71,464	68,428
Operating expenditures		
Wastewater collection	11,639	10,578
Wastewater treatment	19,793	19,286
Engineering and information services	3,223	3,010
Regulatory services	1,095	1,134
Customer service	1,842	1,877
Administration and pension	5,017	4,095
Depreciation	10,669	11,975
	53,278	51,955
Earnings from operations before financial and other revenues and expenditures	18,186	16,473
Financial and other revenues		
Interest	351	441
Other	2,168	2,054
	2,519	2,495
Financial and other expenditures		
Interest on long term debt	5,509	5,786
Repayment of long term debt	11,699	11,462
Amortization of debt discount	95	89
Other	32	11
	17,335	17,348
Earnings for the year	\$ 3,370	\$ 1,620

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, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Operating revenues		
Stormwater site generated service	\$ 6,661	\$ 6,713
Stormwater right-of-way service	3,881	3,881
Other operating revenue		
Customer late payment fees	51	63
Miscellaneous	88	82
	10,681	10,739
Operating expenditures		
Stormwater collection	4,096	4,236
Engineering and information services	525	480
Regulatory services	768	729
Customer service	300	305
Administration and pension	816	666
Depreciation	677	523
	7,182	6,939
Earnings from operations before financial and other revenue and expenditures	3,499	3,800
Financial and other revenues		
Investment income	78	-
Financial and other expenditures		
Interest on long term debt	588	571
Repayment of long term debt	1,221	1,100
Amortization of debt discount	9	8
	1,818	1,679
Earnings for the year	\$ 1,759	\$ 2,121

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, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Operating revenues		
Water service	\$ 47,183	\$ 43,193
Wastewater service	69,475	66,601
Stormwater service	10,542	10,594
Public fire protection	7,074	8,032
Private fire protection services	831	679
Other operating revenue	1,207	1,262
	136,312	130,361
Operating expenditures		
Water supply and treatment	9,137	9,308
Water transmission and distribution	10,411	10,534
Wastewater collection	10,347	9,537
Stormwater collection	4,039	4,186
Wastewater treatment	17,797	17,421
Engineering and information services	7,576	7,018
Regulatory services	2,356	2,369
Customer service	4,396	4,415
Administration and pension	11,768	9,660
Depreciation	19,095	20,903
	96,922	95,351
Earnings from operations before financial and other revenues and expenditures	39,390	35,010
Financial and other revenues		
Interest	780	883
Other	2,289	2,055
	3,069	2,938
Financial and other expenditures		
Interest on long term debt	8,475	8,889
Repayment of long term debt	21,320	20,328
Amortization of debt discount	199	186
Grant in lieu of taxes	4,578	4,528
Other	-	158
	34,572	34,089
Earnings for the year	\$ 7,887	\$ 3,859

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, 2017 (in thousands)

	2017	2016
		Restated (Note 15)
Operating revenues		
Dewatering	\$ 210	\$ 210
Septage tipping fees	909	648
Leachate treatment and contract revenue	440	424
Airplane effluent	89	51
Other operating revenue	196	219
	1,844	1,552
Operating expenditures		
Water supply and treatment	16	10
Wastewater treatment	830	822
Other	111	68
Depreciation	6	6
	963	906
Earnings from operations before financial and other revenues and expenditures	881	646
Financial and other revenues		
Other	139	376
Financial and other expenditures		
Other	49	-
Earnings for the year	\$ 971	\$ 1,022

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, 2017 (in thousands)

Return on rate base	2017	2016
Rate of return on rate base for water service	4.54%	3.64%
Rate of return on rate base for wastewater service	6.71%	6.18%
Rate of return on rate base for stormwater service	11.78%	15.45%

Special purpose reserves

	Wastewater & Stormwater Reserves	RDC Water Reserve	RDC Wastewater Reserve	Other Capital Reserves	2017 Total	2016 Total
Reserve, beginning of year	\$ 3,638	\$ 774	\$ 3,653	\$ 5	\$ 8,070	\$ 24,875
Contributions and interest	-	471	8,759	-	9,230	5,012
Expenditures	182	-	(570)	-	(388)	(21,817)
Reserve, end of year	\$ 3,820	\$ 1,245	\$ 11,842	\$ 5	\$ 16,912	\$ 8,070

Summarized consolidated operating results

	Actual 2017	Actual 2016 Restated (Note 15)
Operating revenues	\$ 137,997	\$ 131,716
Operating expenditures	97,839	96,238
Earnings from operations before financial and other revenues and expenditures	40,158	35,478
Non-operating revenues	3,322	3,370
Non-operating expenditures	34,622	33,961
Earnings for the year	\$ 8,858	\$ 4,877

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

