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Item No. 01
Halifax Regional Council
December 6, 2016

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 18, 2016

SUBJECT: Halifax Water 2015/16 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 2015/16 fiscal year. The theme of the 2015/2016 Annual Report is “Twenty Years of Regional Stewardship”. This is in recognition of the twentieth anniversary of the Utility’s regional mandate, resulting from metro amalgamation in 1996.

DISCUSSION

With a regional mandate established in 1996, Halifax Water embarked on the construction of a new water supply plant at Lake Major which was commissioned in 1999. In conjunction with this project, staff recognized that leakage in the water distribution system should be brought under control based on sound economics. Halifax Water adopted an international best practice in 1999 to significantly reduce water leakage and by 2007, 40 million litres per day was recovered, resulting in savings of $600,000 annually. The utility is now recognized internationally as a leader in water loss control. During this time frame, Halifax Water also attained ISO 140001 certification for its environmental management system for the water supply plants at Pockwock Lake, Lake Major and Bennery Lake.

In recognition of this stewardship track record, in 2007 Halifax Council approved the transfer of the region's wastewater and stormwater assets to Halifax Water with a clear mandate to turn the system around. At the time of the transfer, the region was looking at a liability of over $1 billion to refurbish aging assets and meet new federal wastewater system effluent regulations.

Halifax Water has always taken a long term view to sustainable infrastructure and produced an integrated resource plan in 2012 to provide a framework for asset investments over a 30 year period. This was followed by our first integrated cost of service manual which was approved in 2012 by the Nova Scotia Utility and Review Board (NSUARB) and the establishment of the first stand-alone stormwater rate in 2013. In 2015, Halifax Water submitted an application to revise the cost of service manual and in 2016 the NSUARB gave approval for a revised methodology. An application has been made to the NSUARB to implement stormwater rates consistent with the revised methodology with a public hearing scheduled for February 2017.

From an operational/capital investment standpoint, much has been accomplished with wastewater and stormwater services since the transfer. In 2007, only two of fifteen wastewater treatment facilities (WWTFs) were compliant with regulations. By the end of 2016, it is expected that all but two will be in compliance, with plans to close this gap within two years. In particular, construction is currently underway on the $21 million expansion and upgrade to the Aerotech WWTF to meet federal regulations and facilitate growth at the Halifax International Airport and Aerotech Business Park. With the support of Halifax Council, Halifax Water also secured $31 million from the Clean Water and Wastewater Fund for five key water, wastewater and stormwater projects. To further enhance its environmental stewardship, the utility is also extending its environmental management system to wastewater treatment facilities; the Herring Cove WWTF will be the first to receive ISO 14001 certification this year.

In terms of financial results for the 2015/16 fiscal year, Halifax Water realized a net income of $4.9 million, based on the NSUARB Handbook, inclusive of a dividend of $4.5 million to the Halifax municipality. It is also noteworthy that for the first time, the financial statements for the 2015/16 fiscal year were prepared in accordance with the International Financial Reporting Standard [IFRS] and received a clean audit opinion. The future will see further transformation as Halifax Water strives to meet or exceed customer expectations, protect the environment for future generations, and leave a legacy of sound water, wastewater and stormwater investments. It is expected that customer service will be enhanced over the coming years with the installation of advanced metering infrastructure in combination with a new operations maintenance management system.

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, 2016, 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, 2016 was 22.3%.

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 should be stable in 2016/17 and 2017/18. An application is currently before the NSUARB to adjust Stormwater Rates, and the majority of customers will see a decrease in the stormwater portion of their bill.

COMMUNITY ENGAGEMENT

N/A

ATTACHMENTS

Attachment A - Halifax Water 2015/16 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

Twentieth Annual Report
March 31, 2016
Twenty Years of Regional Stewardship

Cover: Photo collage of Halifax Water facilities and the community and environment they serve

Halifax Waterfront photo courtesy of Communications Nova Scotia

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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.*

Halifax Water

Letter from the Chair

September 19, 2016
Mayor Mike Savage and Members of Council

Re: 2015/16 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, 2016. This date represents a significant milestone for the utility; it has completed 20 years with a regional mandate, following metro amalgamation in 1996.

Significant progress has been made by Halifax Water over this period of time, including construction of a new water supply plant at Lake Major, recapture of 40 ML/day of leakage within the water distribution systems of the region, and a successful merger in 2007 to become the first regulated water, wastewater and stormwater utility in Canada.

Following on the stormwater theme, last year marked another milestone with a favourable Decision from the Nova Scotia Utility and Review Board (NSUARB) with regard to our stormwater Cost of Service Application. The majority of our proposed refinements to the stormwater rate methodology were accepted, and an Application will follow this fall to implement the NSUARB Decision. The Application is being made to enhance understanding of the stormwater charges, implement a tiered rate structure for residential customers, and provide an opportunity for Institutional, Commercial and Industrial (ICI) customers to mitigate surface runoff on their property which will culminate in lower stormwater charges.

The 2015/16 fiscal year also saw the Utility's first labour disruption. This was an unfortunate and challenging situation that stemmed from the necessity to establish a more sustainable pension plan that is affordable to the utility and the ratepayers we serve. A savings of $20.2 million is projected over the next 14 years, with a 50% probability that the plan will be fully funded in 10 years.

With regard to overall financial results, the Utility realized a net income of $4.9 million for the fiscal year, in accordance with the NSUARB Accounting and Reporting Handbook. Although the NSUARB Handbook governs all aspects of rates charged to customers, Halifax Water is now reporting its financial statements in accordance with the International Financial Reporting Standard (IFRS). The Utility received a clean audit opinion for last year, marking the first year of reporting under IFRS. It should be noted that the long-term debt for the utility stood at $240.1 million as of March 31, 2016, up $8.4 million from the previous year. The debt service ratio stands at 22.3%, which is well below the maximum benchmark of 35%, as approved by Halifax Municipality.

In keeping with responsible governance, the Halifax Water Board reviewed and approved a governance manual last year to reflect best practice and guide future Board oversight.

Other significant highlights for the year included the completion of the design for the Aerotech Wastewater Treatment Facility upgrade and expansion project which received federal and provincial funding under the Building Canada Program. Construction at the Aerotech Facility is scheduled to commence this fall. The utility was also successful in securing $31 million of federal and provincial financial support through the Clean Water and Wastewater Fund for five key infrastructure projects, namely:

- J.D. Kline Water Supply Plant Filter Media and Underdrain Replacement
- Halifax Peninsula Transmission Main Rehabilitation
- Lake Major Dam Replacement
- Northwest Arm Sewer Rehabilitation
- Sullivan's Pond Storm Sewer Replacement

The Halifax Water Board also approved the Advanced Metering Infrastructure Project (AMI), which is planned to get underway this fall. The project will see the replacement and upgrade of all meters to

enhance customer service and provide for more efficient and effective meter reading and billing. This project is being done concurrently with the installation of a computerized maintenance management system for operations, in concert with the Halifax Municipality. Both the Municipality and Halifax Water have adopted City Works for the template to leverage operational and asset management information. These investments will bode well for an expanded customer service experience as more information will be at the fingertips of our customer care staff to ensure timely, accurate and reliable information. With these investments, Halifax Water is well positioned for service and growth for existing and future customers who rely on the strong stewardship of a regional utility.

We wish to thank Halifax Council for their continued support and confidence in Halifax Water as it delivers critical water, wastewater and stormwater services to the greater Halifax area.

Respectfully Submitted,

Ray Ritcey
Chair of the Board

Twenty Years of Regional Stewardship

With a regional mandate established in 1996, Halifax Water went right to work to establish a high level of service for all customers served by the utility. It started with the construction of a new water supply plant at Lake Major which was commissioned in 1999. Coincident with this project was the recognition that high quality water from the plant should not be wasted through leaks in the distribution system. To that end, in 1999, Halifax Water adopted an international best practice to significantly reduce the leakage in Dartmouth and all systems in the region. By 2007, leakage had been reduced by 40 million litres per day, resulting in savings of $600,000 annually with Halifax Water established as a world leader in water loss control. During this timeframe, Halifax Water also showed environmental leadership by attaining ISO 140001 certification for its environmental management system for water supply plants at Pockwock Lake, Lake Major and Bennery Lake. Halifax Council recognized this track record, and the critical social, economic and environmental role that wastewater and stormwater assets play in our community. In 2007, Halifax Council approved the transfer of the region's wastewater and stormwater system to Halifax Water with a clear mandate to turn the system around. This role is one Halifax Water is familiar with dating back to 1945 when it was given the mandate to turn around the water system of the former City of Halifax.

At the time of the transfer, the region was looking at a liability of over $1 billion to refurbish aging assets and meet new federal wastewater system effluent regulations. With sound governance oversight through the Halifax Water Board and Nova Scotia Utility and Review Board [NSUARB], the utility established a long term view and in 2012, produced an integrated resource plan which is a framework to renew assets, meet environmental regulations and facilitate growth. In conjunction with this initiative, Halifax Water established a formal cost of service for water, wastewater and stormwater services to ensure fair and equitable treatment of all customers throughout the region. The first integrated cost of service manual was approved in 2012 by the NSUARB and the first stand-alone stormwater rate was established in 2013. After two years of experience administering the stormwater charge, Halifax Water submitted an application to revise the cost of service manual in 2015. In 2016, the NSUARB gave approval for a revised methodology which will be implemented through an application to the NSUARB this fall.

Although there has been intentional focus on governance and a regulatory framework for delivering services since 2007, much has been accomplished with wastewater and stormwater services from an operational standpoint. In 2007, only two of fifteen wastewater treatment plants were compliant with regulations. By the end of 2016, it is expected that all but two will be in compliance, with plans to close this gap within two years. The utility is also extending its environmental management system to wastewater treatment facilities with the Herring Cove plant on track to receive ISO 14001 certification this year. In addition, an asset management roadmap has been completed to keep assets performing at an optimal level. Even with these achievements, Halifax Water has no intention of sitting on its laurels. The next few years will see further transformation as we respond to meet or exceed customer expectations and protect the environment for future generations. In this regard, we are reminded that success is a journey, not a destination.

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

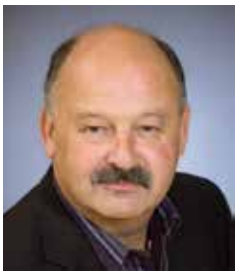
Board of Commissioners

March 31, 2016

Ray Ritcey, BComm, MBA, CPA/CGA
Chair

Councillor Russell Walker
Vice Chair

Councillor David Hendsbee
Commissioner



Councillor Barry Dalrymple
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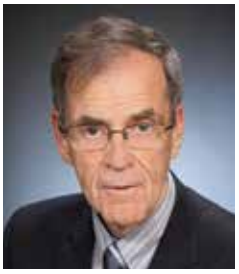

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Executive Staff

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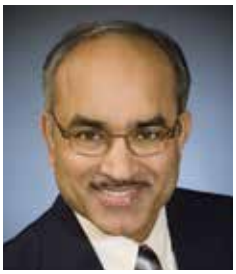
General Manager

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

Jamie Hannam, MBA, P.Eng.
Director, Engineering and 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

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) 490-4820, e-mail us at Cust_Inq@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 Twitter at @HalifaxWater.

General Information of Utility

Year Ended March 31, 2016

WATER

Precipitation

Measured at Pockwock	
Rainfall	1 476.8 mm
Snowfall	467.7 cm
Measured at Lake Major	
Rainfall	1 535.4 mm
Snowfall	351.2 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	31 101 269
Lake Major	12 916 130
Bennery Lake	307 540
Small Systems	42 368
Total	**44 367 307**

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 m^3**

Transmission and Distribution System

Size of mains	19 mm - 1 500 mm
Total water mains	1 574 km
Main valves	14 884
Fire hydrants	8 288
Distribution Pumping Stations	22
Pressure Control/Flow Meter Chambers	136

Services and Meters

Water	
Sprinkler services (25 mm - 300 mm)	2 109
Supply services (10 mm - 400 mm)	86 886
Meters (15 mm - 250 mm)	82 956
Wastewater services	79 747

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	85 209 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	35 290 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	843 m^3/day

Bomont

Source - Shubenacadie River
Process - Nano Filtration / Ionic Exchange Resin
No production - bulk water supply

Collins Park

Source - Lake Fletcher
Process - Ultra Filtration / Nano Filtration
Design average flows 37 m^3/day

Middle Musquodoboit

Source- Musquodoboit River
Process- Raw water infiltration gallery
- Ultra Filtration / Nano Filtration
Design average flows 47 m^3/day

Five Island Lake

Source - 1 well
Process - Ultraviolet disinfection
Design average flows 10 m^3/day

Silver Sands

Source - 2 wells
Process - Green sand pressure filters
-Iron and manganese removal
Design average flows 21 m^3/day

Miller Lake

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

Population Served

Halifax Municipality	
Estimated population served	360 000
Consumption per capita (all customers)	272 litres/day

Glossary of Terms

ha - hectare
m - metre
m^2 - square metre
m^3 - cubic metre
mm - millimetre
km - kilometre
cm - centimetre

General Information of Utility

Year Ended March 31, 2016

WASTEWATER/STORMWATER

Treatment Processes

Halifax

Process - Enhanced Primary - UV
Design average flows - 139 900 m^3/day
Area served - Halifax
Receiving water - Halifax Harbour

Dartmouth

Process - Enhanced Primary - UV
Design average flows - 83 800 m^3/day
Area served - Dartmouth
Receiving water - Halifax Harbour

Herring Cove

Process - Enhanced Primary - UV
Design average flows - 28 500 m^3/day
Area served - Halifax-Herring Cove
Receiving water - Halifax Harbour (Outer)

Mill Cove

Process - Secondary - UV / Pure oxygen Activated sludge
Design average flows - 28 400 m^3/day
Area served - Bedford-Sackville
Receiving water - Bedford Basin

Eastern Passage

Process - Secondary - UV / Pure oxygen Activated sludge
Design average flows - 25 000 m^3/day
Area served - Cole Harbour-Eastern Passage
Receiving water - Halifax Harbour

Timberlea

Process - Secondary - Sodium Hypochlorite / RBC
Design average flows - 4 540 m^3/day
Area served - Beechville-Lakeside -Timberlea
Receiving water - Nine Mile River

Aerotech

Process - Tertiary - UV /SBR
Design average flows - 1 360 m^3/day
Area served - Aerotech Park-Airport
Receiving water - Johnson River

Springfield Lake

Process - Secondary - Sodium Hypochlorite/Activated sludge
Design average flows - 543 m^3/day
Area served - Springfield Lake
Receiving water - Lisle Lake

Fall River

Process - Tertiary - UV / Activated sludge and post filtration
Design average flows - 454.5 m^3/day
Area served - Lockview-McPherson Road
Receiving water - Lake Fletcher

North Preston

Process - Tertiary - UV / SBR and engineered wetland
Design average flows - 680 m^3/day
Area served - North Preston
Receiving water - Winder Lake

Middle Musquodoboit

Process - Secondary - UV / RBC
Design average flows - 114 m^3/day
Area served - Middle Musquodoboit
Receiving water - Musquodoboit River

Uplands Park

Process - Tertiary - UV / Trickling filter and wetland
Design average flows - 91 m^3/day
Area served - Uplands Park
Receiving water - Sandy Lake

Wellington

Process - Tertiary - UV / Activated sludge /reed bed
Design average flows - 68 m^3/day
Area served - Wellington
Receiving water - Grand Lake

Frame

Process - Secondary - Sodium Hypochlorite / Extended Aeration
Design average flows - 80 m^3/day
Area served - Frame Sub-Division
Receiving water - Lake William

Belmont

Process - Secondary - Sodium Hypochlorate Extended Aeration
Design average flows - 114 m^3/day
Area served - Belmont Sub-Division
Receiving water - Halifax Harbour

RBC = Rotating Biological Contactor;
SBR = Sequencing Batch Reactor;
UV = Ultra Violet

Wastewater & Stormwater Collection System

Size of pipes	200 mm - 3 000 mm
Total sewer length	2 538 km
Total manholes	39 479
Total pumping stations	172
Total ditch length	503 km
Cross Culverts	1 990
Holding Tanks and Retention Ponds	54 (12-244 000 m^3)

High Quality Water

Lead

Lead can get into drinking water through contact with sources of lead in the water system and the customer's premise plumbing. Sources of lead include the lead service pipe connecting the main to the house, lead solder on plumbing and as a component in brass used for plumbing fixtures.

Like many utilities in North America, Halifax Water's treatment processes make the water non-corrosive to lead. This is effective in reducing lead exposure from solder and brass but in some homes where the lead service line still exists, customers remain at risk of exposure to lead. The only certain way to reduce exposure to lead is to remove the lead service line.

It is important that Halifax Water customers be aware of sources of lead in their water system as even short term exposure to lead can result in health impacts to young children and pregnant women.

In the months following the situation in Flint, Michigan coming to light, Halifax Water customers have been increasingly concerned about lead service lines and lead in drinking water.

The use of lead for water service lines ended in the Halifax metro area in the mid 1950's. Halifax Water, and it pre-existing utilities have been operating programs to replace lead service lines since the 1970's. Today, there are about 2500 publically owned lead service lines remaining in the Halifax system.

The portion of the lead service line on a customer's property is owned by the property owner. The property owner is responsible to replace the lead service line at their expense. Due to the cost and difficulty in doing this type of work, many customers who have seen the public lead service line removed by Halifax Water have not yet removed the private property portion. Removing only a portion of the lead service line does not reduce the customer's exposure to lead and in many cases can make it worse.

Halifax Water is developing a plan to remove all lead service lines, public and private from the system over the next several years. In order to reduce the customer's exposure to lead, it's important that both the customer and Halifax Water remove the lead service line at approximately the same time. If Halifax Water is going to be successful in getting the lead out, we will need to work with our customers to address the costs and other barriers associated with the removal of lead service lines on private property.

In the coming year, Halifax Water will be launching a new approach to lead service lines. This will include the following elements which will ensure the Utility has a program that is comparable to the best in North America:

- Developing an inventory of existing lead service lines.
- Accelerated replacement of lead service lines.
- Frequent communication with customers who have lead services.
- Improved corrosion control at the treatment plant.
- Support for customers replacing private lead service lines.
- Sampling upon request for customers with lead service lines.

Geosmin/Source Water Quality

Geosmin occurred in the Pockwock water supply for the fourth consecutive year in 2015. Fortunately, the episode was the most short lived since its occurrence in 2012 and was noticeable to only residents with a heightened sense of taste or smell.

Geosmin continues to be a challenge from a water treatment perspective. While it is not related to the safety of the drinking water, its taste and odour are unpleasant. It is also detected by some customers at extremely low concentrations. Halifax Water has investigated a number of treatment options, all of which are very expensive to build and operate. Also, the seasonal nature of geosmin occurrence limits the types of treatment process that can be installed and be reliably ready to go when needed.

Halifax Water is continuing to study geosmin to understand its occurrence and viable treatment technologies.

Lead service line being replaced with copper

Above: Aerial view of Pockwock Lake and water treatment plant
Right: Pockwock pilot plant

Research Chair

Halifax Water has sponsored a Research Chair, Natural Science and Engineering Research Council (NSERC) in drinking water at Dalhousie University since 2007 through Dr. Graham Gagnon. Dr. Gagnon recently alerted Halifax Water staff to discoveries that provide insight into source water quality changes.

Since the 1980s, governments in Canada and the US have been taking steps to reduce sulfur dioxide emissions. These emissions, primarily from coal and oil fired power generation plants in central Canada and the US Midwest, were the cause of acidification of lakes and streams in our area due to the phenomenon known as acid rain. These efforts have indeed reduced sulfur dioxide emissions to the point where our lakes are now recovering and lake pH is increasing.

While this is great news for fishermen and others interested in the health of our lakes, it presents challenges for water utilities. Increased pH results in increased colour and natural organic matter in the water which makes water treatment more challenging. Our plants are still producing excellent water but it takes much more effort to do so. With increased pH in

Lake Major plant exterior

the lakes also comes increased biological activity such as planktonic species and algae. This leads to taste and odour causing substances, like geosmin which our water treatment plants were never designed to treat.

Understanding the lake recovery issue and how to adapt our water treatment plants will be one of our research focusses in the coming years.

Plant Optimization

Halifax Water has continued its ongoing process to optimize each of its water supply plants. Optimization is the process whereby incremental improvements are made in the effectiveness of each plant at the least possible cost.

An optimization study was done at the Bennery Lake plant in 2012. We are now in the middle of optimizing the plant with a series of improvement projects over a period of 5 years.

An optimization study was conducted for the Lake Major plant in 2015. Staff have already begun what will be a ten year process to implement dozens of incremental improvements in the plant.

All process improvements are guided by the Partnership for Safe Water. Halifax Water joined the Partnership for Safe Water in 2013. This is a peer reviewed optimization program run by the American Water Works Association. The Partnership has assisted hundreds of water plants across North America improve their treatment processes.

Lake Major Dam

Halifax Water is in the process of replacing the Lake Major dam. In January 2015, emergency repairs were successfully completed to the dam's fishway. While the fishway was stabilized to ensure its safety, it was rendered unusable for its primary use of allowing passage of migratory fish around the dam. The Department of Fisheries and Oceans (DFO) directed Halifax Water to ensure migratory fish could travel around the dam to reach Lake Major.

Halifax Water staff explored several options and settled on a unique solution to meet DFO's tight deadlines and not further compromise the existing dam. Halifax Water and its consulting team opted to install a fish pump. The fish pump is manufactured locally and used primarily for aquaculture applications. The pump had not however been widely used for migratory fish passage applications.

The pump was installed successfully by May 2015, on time for the spring Gaspereau run. The pump successfully transported over 35,000 individual fish to the upstream side of the dam.

Critical Valves

Maintenance of water distribution system valves is a critical part of operating the water distribution and transmission system. Valves that operate reliably are critical to ensuring the utility can isolate areas for repair and maintenance while keeping as many customers as possible in service.

Halifax Water has a significant number of large diameter valves, primarily on the Halifax peninsula, that are deemed critical due to both their size and location. Many of these valves are in excess of 100 years old and are becoming difficult to maintain.

Dr. Graham Gagnon at the NSERC/Halifax Water sponsored lab

Fish ladder repair at the Lake Major dam January 17, 2015

For the past several years, Halifax Water has operated a critical valve replacement program. Each year several valves are identified for replacement. Since these valves have a relatively high unit cost, are located on high volume mains, and often on high traffic streets, it was only possible to do a small number each year.

In 2015, Halifax Water contracted Wachs Water Services to conduct a pilot project in Halifax. Wachs has mobile capability to repair and rehabilitate valves in the field. The project was very successful. Twelve valves were repaired or rehabilitated, extending their life by years at a fraction of the cost of replacing a single valve. The valve rehabilitations were done without any interruption of service to customers and minimal traffic disruption during the overnight hours.

Halifax Water will incorporate this capability into the routine maintenance and accelerate our critical valve program.

Valve Turning Trailers

Water distribution valves are typically operated manually using keys that utility workers carry on their trucks. This work can be physically demanding and, because it is manual, provides no opportunity to monitor and control the force applied to a valve.

In 2015, Halifax Water procured its first trailer mounted valve operator. These trailers are towed behind a standard pick-up truck and contain a device to mechanically operate a valve. They have already been successful in operating valves that were believed stuck and scheduled for replacement. The trailers also provide the ability to control and record the force required to operate a valve. This information can now be collected and used to track the condition of buried valves in the field. The use of the trailers will also reduce the potential for employee injury.

Water valve trailer safely and reliably operating critical valves

Responsible Financial Management

Annual Financial Results

The year ended March 31, 2016 saw Halifax Water file its first set of financial statements presented in accordance with International Financial Reporting Standards (IRFS). The Utility received a clean audit opinion. Halifax Water also continues to produce information consistent with the Accounting and Reporting Handbook (The Handbook) for Water Utilities as issued by the Nova Scotia Utility and Review Board (NSUARB).

The differing requirements of the standards results in two unique sets of financial statements. The financial summary information shown on page 44 of the annual report aligns with the NSUARB Handbook. The external financial statements on pages 45 to 71 of the annual report align with IFRS and were prepared in conjunction with the annual audit by Grant Thornton. Ongoing differences between the NSUARB Handbook and IFRS will increase as debt increases. IFRS introduces more volatility, particularly around post-employment benefits. The NSUARB Handbook will continue to be used for rate making. Schedules A through G of the Audited Financial Statements are based on the NSUARB Handbook. Included in the notes and schedules of the audited statements is information on the conversion to IFRS as well as the financial results under the NSUARB standards. The financial statements also include the report of the auditor, Grant Thornton.

The underlying activities and operating results are similar under the two standards. The key differences are:
1) IFRS includes depreciation on contributed assets in the income statement, resulting in higher depreciation expense,
2) IFRS includes the amortization of contributed capital in the income statement, resulting in higher non-operating revenue,
3) IFRS requires componentization of asset records and shorter useful lives, resulting in higher depreciation expense,
4) IFRS does not permit the appropriation of long term debt principle 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,
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 $4.9 million. Under IFRS, earnings for the year are $22.9 million, and Total Comprehensive Earnings are $33.3 million. The main differences are debt principle appropriations of $20.3 million are not included as an expense under IFRS, and 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 in any given year. In 2015/16, due to an actuarial valuation of the pension plan conducted January 1, 2016 and the redesign of the pension plan there was a $10.4 million improvement that was reflected in Other Comprehensive Earnings for the year.

Halifax Water's cash balances and liquidity have increased since 2015. A significant amount of capital work was completed in 2015/16 - $84.4 million. The most notable projects were the Beechville/Lakeside/Timberlea wastewater diversion project, which accounts for $24.6 million of the Capital Additions, and the Kearney Lake Road Trunk Sewer & Pump Stations, which accounts for $13.7 million. The table below highlights the Capital Additions.

Capital Asset Additions

	Cumulative '000
Lakeside Pumping Station Diversion	**$24,580**
Kearney Lake Road Trunk Sewer & Pumping Stations	**$13,681**
Bedford West Subdivider and CCCs	**$8,472**
Cow Bay Road Deep Storm Sewer	**$5,960**
All other projects	**$31,723**
Total	**$84,415**

A number of other major projects got underway in 2015/16 including the Macdonald Bridge Transmission Main, the Aerotech Wastewater Treatment Facility Upgrade, and the Belmont Pump Station and Forcemain installation. There was $18.5 million in Capital Assets under

An upgraded section of the Chain of Lakes and Beechville, Lakeside, Timberlea trails. A legacy of the Lakeside Pumping Station Diversion Project

Macdonald Bridge line replacement, part of "The Big Lift"

Construction at year end.

Capital Asset Under Construction

	Cumulative '000
Macdonald Bridge Transmission Main	**$2,345**
Aerotech Wastewater Treatment Facility	**$1,475**
Belmont Pumping Station & Forcemain	**$1,409**
All other projects	**$13,299**
Total	**$18,529**

The accumulated Regional Development Charge (RDC) balance is $4.4 million. Since the charge was implemented in July 2014, $10.4 million has been collected with $6.0 million used as a funding source for the Lakeside Pumping Station Diversion project. A total of $1.3 million remains in the legacy reserves.

Plant in Service assets net of Accumulated Depreciation is $1.8 billion, which is $47.0 million higher than last year.

The Accrued Post Retirement Benefits, Accrued Long Service Award and Deferred Pension Liability have been updated for the annual adjustments required by the actuaries. The Deferred Pension Liability is $54.3 million. This has increased substantially from what was reported in past years because the underlying accounting for reporting the pension liability is now based on IFRS and reflects the full actuarial liability of the plan. On the audited statements, the liability is an improvement of $10.7 million from $65.0 million in the previous year whereas in the previous audited statements the liability was $10.8 million. For rate setting purposes, the NSUARB considers Pension costs on a cash basis.

Long Term Debt is up $8.4 million from last year, with new debt of $28.3 million offset by repayments of $19.9 million. The debt service ratio, which is the ratio of debt related costs (including principal and interest payments and amortization of debt discount) divided by operating revenue, is an indicator of the ability to make debt payments. The debt service ratio is 22.3%, up slightly from 21.3% last year as a result of debt servicing costs growing slightly more than revenues. This is well below the maximum 35% ratio allowed under the blanket guarantee agreement with the Halifax municipality.

Total Debt by Service

	2015/16 '000	2014/15 '000
Water	**$72,355**	$69,039
Wastewater	**$156,090**	$153,749
Stormwater	**$11,699**	$8,923
Combined	**$240,144**	$231,711

Debt Servicing Ratio by Service

	YTD Debt Servicing 2015/16	Cost Ratio 2014/15
Water	**19.8%**	19.4%
Wastewater	**25.3%**	24.1%
Stormwater	**15.6%**	12.0%
Combined	**22.3%**	21.3%

The following discussion of Operating Results is based on the NSUARB Accounting and Reporting Handbook, as this is what rates are based on.

Consolidated operating revenue of $131.7 million is $1.4 million (1.1%) greater than revenue reported for the same period last year. Consolidated operating expenses of $96.2 million are $1.9 million (2.0%) higher than the same period last year.

Summarized Consolidated Operating Results

	Actual YTD 2015/16 '000	Actual YTD 2014/15 '000	$ Change	% Change
Operating Revenue	**$131,716**	$130,320	$1,396	1.1%
Operating Expenses	**$96,243**	$94,387	$1,856	2.0%
Operating Profit (Loss)	**$35,473**	$35,933	($460)	-1.3%
Non Operating Revenue	**$3,370**	$3,129	$242	7.7%
Non Operating Expenditure	**$33,961**	$32,166	$1,795	5.6%
Net Surplus (Deficit)	**$4,883**	$6,896	($2,013)	-29.2%

The Net Profit for the year is $4.9 million, down somewhat from the profit of $6.9 million in the prior year.

Year to Date Operating Results by Service

	2015/16 '000	2014/15 '000
Water	**$1,130**	$244
Wastewater	**$1,632**	$3,709
Stormwater	**$2,120**	$2,942
Net Surplus (Deficit)	**$4,883**	$6,896

The cumulative Operating Surplus was $2.9 million at the beginning of the fiscal year. As a result of the Operating Profit, the cumulative Operating Surplus as of March 31, 2016 is $7.8 million.

Billed consumption was down 1.7% compared to the prior year. The utility had budgeted for a 3% decrease in billed consumption for 2015/16, so a 1.7% decrease was a better result than expected. The 3% 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 3.07% based on the most recently completed and audited fiscal year.

Water and Wastewater results were both positively impacted by higher than expected consumption. Stormwater Revenue is down $0.3 million from the prior year. The change is attributable to a decline the in Site Generated Charge revenue as exemptions continued to be received and processed.

Operating Expenses declined by $1.1 million. Significant savings were seen in Wastewater Treatment Expenses, primarily in the operation of the Eastern Passage Wastewater Treatment Facility. Savings in some departments were offset by increased expenses in others. Depreciation Expense increased $2.9 million, reflecting the growth in capital assets.

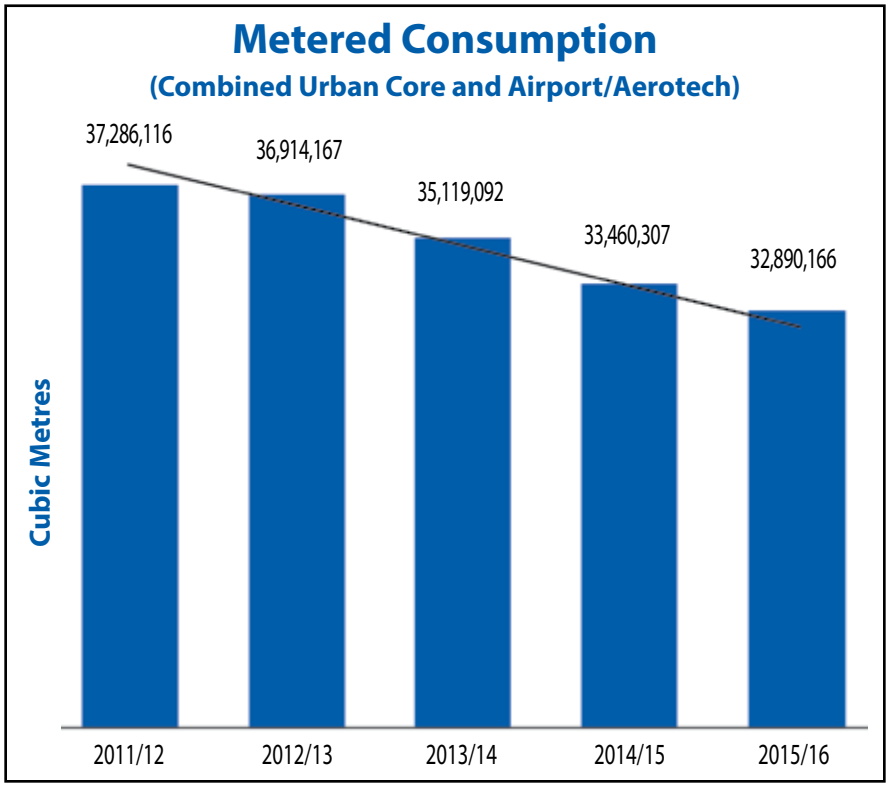
As a whole, the regulated Water, Wastewater, and Stormwater activities had a surplus of $3.9 million for the fiscal year. Unregulated activities include Septage Treatment, Energy Generation, Land Leases, Leachate Treatment, and the operation of several small water and wastewater systems. These activities show a profit of $1.0 million, ahead of the profit of $0.5 million in the prior year. The improvement is a result of higher revenue from energy generation activities and slightly lower expenses.

Results by Activity

	2015/16 '000	2014/15 '000
Regulated Activities	**$3,859**	$6,400
Unregulated Activities	**$1,024**	$496
Net Surplus (Deficit)	**$4,883**	$6,896

Cost Containment

To help stabilize rates, Cost Containment is an on-going focus for the Utility. For 2015/16 cost containment initiatives totaled $1.2 million. Increased cost savings



Halifax WWTF Odour Control System bypass duct

as a result of new 2015/16 cost containment initiatives are most evident in the sectors of Human Resource Strategies ($0.7 million), Procurement Strategies ($0.2 million) and Facilities/ Process Strategies ($0.2 million).

Pension plan re-design (Human Resource Strategies) produced the most significant impact with respect to cost containment. Annual savings from pension plan re-design is anticipated to be in the range of $1.0-$1.7 million, with $0.4 million representing the savings in 2015/16. Employer contributions in 2016 on pensionable earnings decreased from 12.95% to 9.85%, with employees experiencing a similar decrease from 12.95% to 10.65%. Pension plan re-design was a collaborative effort through collective bargaining, to realize a more sustainable plan. A savings of $20.2 million for the employer is projected over the next 14 years, with a 50% likelihood the plan will be fully funded within 10 years.

Halifax Water's Energy Efficiency Program continued to make strides in 2015/16 with respect to cost containment, with six additional projects (Facilities/ Process Strategies) implemented in 2015/16, contributing some $125 thousand in cost savings. As part of an assessment process within the Engineering and IT Services, specifically in Development Approvals, the department was able to reduce two (2) full-time, permanent positions resulting in savings of approximately $140 thousand. In a similar fashion within Customer Service, $48 thousand in annual savings is expected to be realized through the utilization of technology associated with the Customer Relationship Management System (CRM) allowing a budgeted position to be removed in the future.

Under Human Resource Strategies there were several initiatives considered one-time in nature, the most notable of which were two hiring deferments for $100 thousand in savings. These positions will be re-evaluated for the 2016/17 fiscal year, with a potential of future cost savings.

Chemical costs are key to the operations of Halifax Water, in both water and wastewater services. Through its Procurement Strategies, staff continues to negotiate the best product and pricing to enable the facilities to operate in an efficient manner. This is evident in 2015/16 where savings related to chemical purchasing amounted to $211 thousand.

The Advanced Metering Infrastructure (AMI) Study was completed and presented to the Halifax Water Board in January, 2014. At the November 2015 meeting,

the Halifax Water Board approved proceeding in principle with the adoption of an AMI system subject to successful negotiation with the preferred proponent. Halifax Water staff initiated a procurement process for the purchase of water meters and installation of meter and end point devices in the customer premises. Based on the pricing obtained through the procurement process, in April 2016 the Halifax Water Board approved proceeding with the AMI project. Once completed, the on-going operating savings will be approximately $1 million dollars a year compared to the status quo.

Regulatory Activity

On November 24, 2014 Halifax Water submitted a two year rate application to increase rates for Water, and Wastewater. This was the first Rate Application reflecting consolidation of the Aerotech/Airport System and the combined Regional Development Charge for the Urban Core and Aerotech/Airport System. Also, the Utility proposed an approach to rate smoothing and some rate design changes to enhance revenue stability which were approved by the NSUARB. Some of the changes in the rate structure include:

- Water base charges increasing 1% to 8.3% on May 1, 2015
- Wastewater base charges increasing 1% to 7.7% on April 1, 2016
- Public Fire Protection will be reduced to the Cost of Service based level by 2016/17, assisting the municipality in lowering the Fire Protection charge in 2015/16 and 2016/17. Public Fire Protection decreases from $8,952,880 in 2014/15 to $8,031,718 in 2015/16 and $7,074,373 in 2016/17.
- Private Fire Protection charges will increase to the Cost of Service based level by 2016/17.

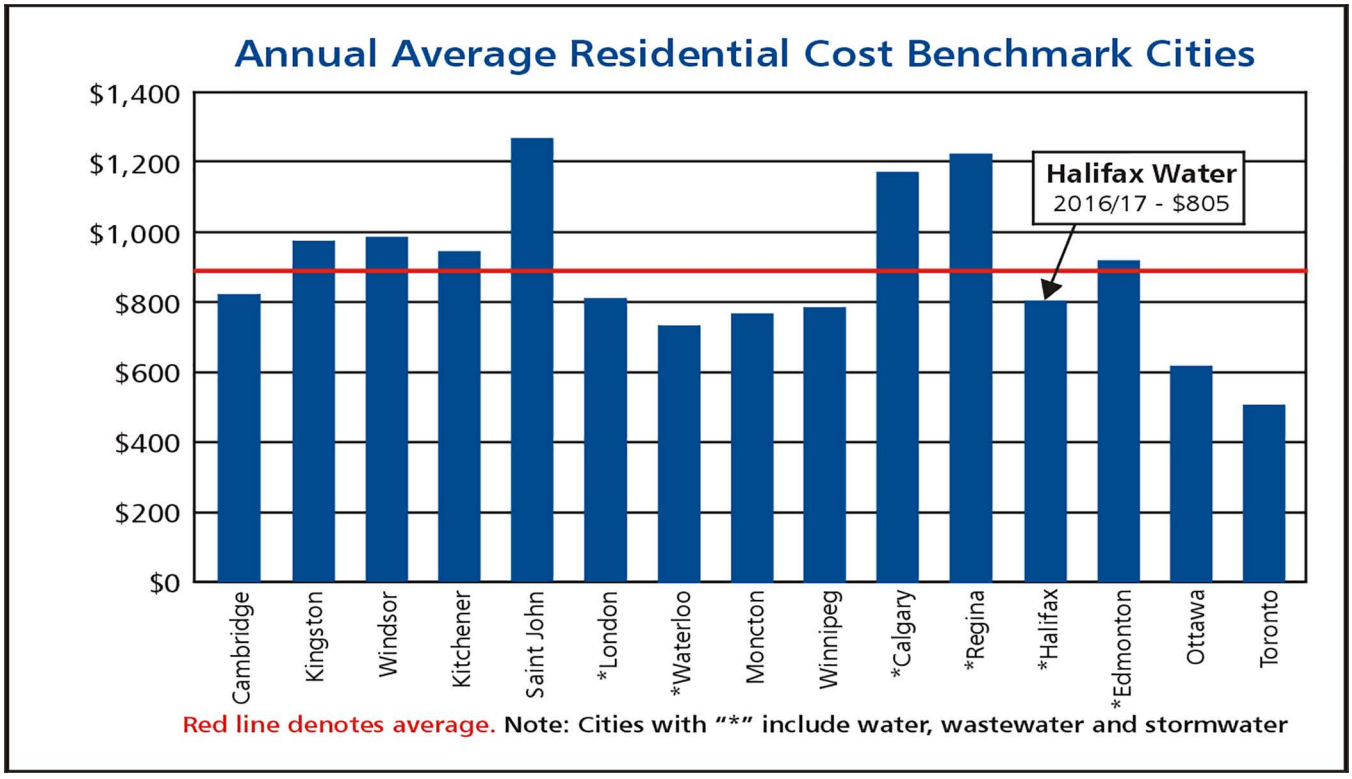
Halifax Water's rates compare very favorably to other cities and continue to be among the lowest in Canada, as indicated in the chart below (updated April 2016).

Stormwater Cost of Service and Rates

During 2015/16 Halifax Water conducted a review of how the current stormwater cost of service and rates compared to best practice, and how equity and administration could be improved. The Utility is taking several steps to improve delivery of stormwater service and communication with its customers. These are the result of observations made since the implementation of a separate stormwater charge in 2013, feedback from the exemption review process, and community engagement meetings held in September 2015. Halifax Water also received recommendations for ways to improve service from an expert in stormwater rate design.

Halifax Water filed an application on October 30, 2015 to amend the Stormwater section of the Cost of Service Manual. A public hearing was held on February 15 – 17, 2016. A Decision was received in May 2016. The outcome was generally very positive and has provided the utility with good direction to shape a future application to adjust rates for stormwater service. Some of the key changes that will be submitted in a future Application as a result of this Decision are:

- A broader definition of stormwater service to align with industry best practice elsewhere in North America. Service is provided if stormwater from the property enters into Halifax Water's stormwater system, or if the property is accessed directly by a driveway which crosses over a Halifax Water culvert.
- Properties will be exempt from the



Stormwater Charge if the Chargeable Impervious Area on the property is less than 50 square meters.

• Some changes that provide additional flexibility to recognize unusual circumstances. All properties will be treated the same, with exemptions based on the specific circumstances, including when part of a non-residential property is outside the service boundary.

• Residential properties in future shall pay a Site Related Flow Charge based on a tiered structure rather than a uniform charge based on an average. This will result in properties with less impervious area paying less than properties with more impervious area.

• Billing based on increments of 10 m^2 rather than billing based on 1 m^2 of impervious area. This aligns with industry best practice and reduces the impact of any small measurement errors.

• Implement a credit system for non-residential (Industrial, Commercial, Institutional) properties with a portion of stormwater flows that do not enter Halifax Water's system; or who have implemented stormwater best management practices such as storage or retention ponds which reduce or delay stormwater entering the Utility's system.

• Add a self-assessment tool for customers through the Halifax Water website to enable them to determine if they are receiving service. This may reduce the volume of Notice of Objections as customers would have a better sense of whether there are strong grounds for appeal.

• Include funds in future operating budgets and revenue requirements to conduct research in partnership with non-profit groups regarding effectiveness of green infrastructure in cold climates as an ancillary tool for the stormwater system in Halifax. Green infrastructure is believed to provide a benefit and perform well in 1 in 5 year return rain events.

Ditch and culvert maintenance and enhancements, Hammonds Plains

Other Key Findings from the Stormwater Rate Design Hearing:

Site visits to properties going through the Notice of Objection Process are conducted when necessary and based on Halifax Water's engineering judgment.

The Board ruled that it does not matter how far upstream the water from the property is discharged to the drainage system. If the property is receiving stormwater service it should be charged accordingly.

The Board directed Halifax Water to establish a Dispute Resolution Officer (DRO) function. The concept was raised during the hearing, and Halifax Water indicated in its Post Hearing Submission that it was not opposed to exploring this and bringing it forward in the future application to adjust stormwater rates. Halifax Water also noted that there would be benefits to having a DRO address other customer issues in addition to stormwater complaints.

Service Excellence

Customer Contact Centre

2015/16 was an excellent year for customer service at Halifax Water. The Commission ended the year with 97,416 customers – 83,279 water customer connections, 79,745 wastewater customer connections, and 96,417 stormwater customers.

Call volumes decreased by 0.4% in 2015/16 compared to 2014/15.

Customer Service answered 72,312 calls (or 293 calls per day) with an average speed of answer of 74 seconds. The average call duration was 04.01 minutes with an abandon rate of 7%. These results represent improved performance in Customer Service.

Employee turnover, combined with increasing call volumes and changing rate structures will continue to mean that the organization is sometimes challenged to achieve the benchmark of 70 seconds for call wait time.

Halifax Water implemented a new Customer Relationship Management (CRM) system in February 2016, and in March 2016 started taking wastewater and stormwater calls that formerly went to the Halifax 311 Centre. Over the past three years we have implemented on-line service requests for some types of service, and have also implemented a generic email for Customer Service. Administering service requests from on-line forms, and responding to the Customer Service email has contributed to an increased workload. The email volume (total responses) in 2015/16 was 14,809, which surpassed the 2014/15 level by 63% (9,086 total responses by email in 2014/15).

There are many on-going initiatives that will impact customer service business processes and workloads during the coming year, such as centralizing water operations calls in Winter 2016/17 and the AMI project.

Advance Metering Infrastructure

In 2015/16 Halifax Water completed the analysis of the feasibility of Advanced Metering Infrastructure (AMI). AMI is a system whereby, in lieu of meter readers walking routes, or driving routes to read meters with radio devices , a fixed network of radio devices is established over the service area to read meters on a much more frequent basis (typically hourly). Based on an initial positive business case, Halifax Water went to market in October 2015 to purchase an AMI technology system. The Halifax Water Board approved adoption of AMI in principle, subject to concluding negotiations with the preferred vendor that results in a positive business case. Based on current schedules, and subject to Regulatory approvals, Halifax Water is proposing to launch a four year AMI project starting in Fall 2016.

In addition to streamlining the meter reading process and reducing its cost, AMI promises many features that will improve the level of service Halifax Water can offer its customers. These include:

- The ability to offer monthly billing to residential and small commercial customers thus making it easier for customers to manage cash flow and automated payments. Large institutional, commercial and industrial customers are already billed on a monthly basis.

- Billing errors will be reduced and estimated meter readings will be eliminated.

- Halifax Water will be able to alert customers to high consumption which could be caused by plumbing leaks, almost as they happen, reducing billing disputes and high bill amounts.

- Customers will have the ability, through a web portal, to manage their water consumption in real time and see the effect of any conservation measures they take.

AMI will form the backbone of the utility of the future, which means more customer-focused and efficient service for everyone. It will also provide much more data about customer consumption and distribution system operations, thereby enabling earlier identification of distribution system leaks. Overall it will improve the customer focus of the organization by providing the ability to identify and rectify customer issues proactively, rather than after the fact once customers have received a high bill. This will result in reduced costs for billing and collection, and reduce the need of sending technicians to customer homes.

Effective Asset Management

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

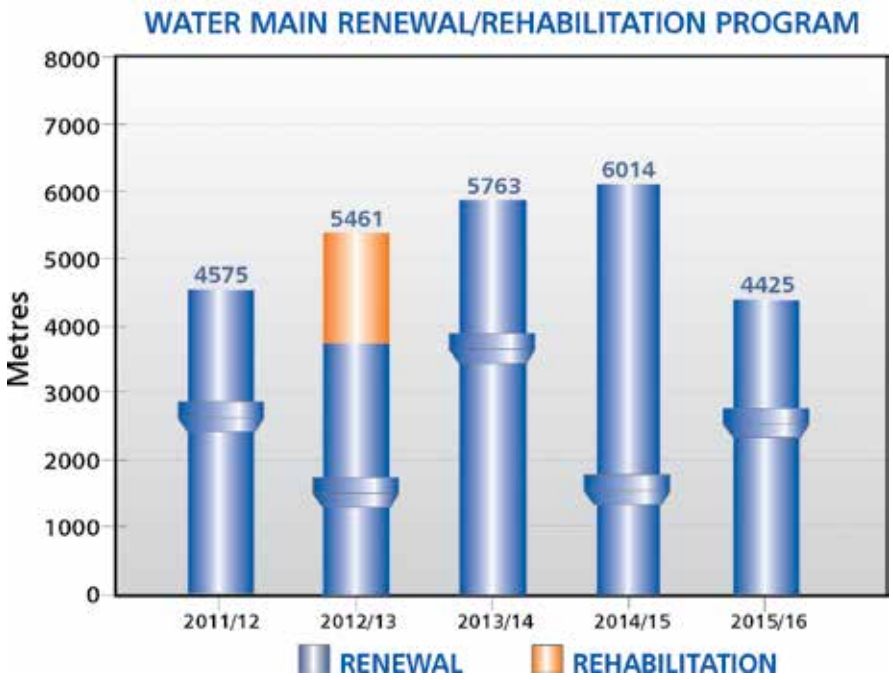
The AM Team is well underway with the West Region Wastewater Infrastructure Plan (WRWIP). The WRWIP will confirm the preferred wastewater servicing strategy for the west region and outline a range of projects necessary to meet these goals. Key to this project was the creation of a number of foundational guidance documents to assist with managing growth, standardizing cost frameworks, and confirming the approach to infrastructure that benefits both the existing customers and the development industry.

The asset management team substantially completed condition assessment projects for Wastewater Treatment Facilities, Wastewater Pumping Stations and Stormwater Culverts. These projects are important for guiding decision making about what assets require investment and when, in particular, the Stormwater Culvert project has been enormously beneficial. Halifax Water has been able to move from a historical inventory of approximately 200 cross culverts to a validated inventory of 1,749 cross culverts. This is coupled with condition assessment of all cross culverts in the inventory and enables Halifax Water to generate condition profiles and justifiable priority lists for renewal investment. This is an exciting example of the benefits of bottom-up AM work that supports planning and decision making.

Culvert Inventory & Condition Assessment Completed by Asset Management Team

Halifax Water completed a range of watermain renewal projects in conjunction with the Municipality's Street Renewal program. In the 2015/16 season, 4425 metres of watermain were renewed.

Two new Pressure Reducing Valve (PRV) chambers were installed in the water distribution system. The PRV chambers improved fire flows and helped reduce electrical costs by eliminating the need for two booster stations.



Halifax Water successfully completed an important phase of the Critical Valve Rehabilitation program. The program involved proactive rehabilitation/maintenance activities on identified older valves on the transmission mains that serve the peninsular Halifax area. The program successfully rehabilitated and extended the life cycle of many of these critical valves.

Design work progressed for the new Lake Major Dam. Halifax Water successfully installed a fish pump and syphon to convey fish around the existing Lake Major Dam. The fish pump and siphon were installed as an interim environmental stewardship measure until the new Lake Major Dam and fish ladder are constructed in the near future.

In 2015 the first phase of a two phase project was completed to decommission the Belmont Wastewater Treatment Facility (BWWTF). The BWWTF is located in Eastern Passage and was constructed in the early 1960s. It currently provides wastewater treatment for approximately

Field Crews Rehabilitated Critical Large Water Valves on the Halifax Peninsula

100 properties. The facility is at the end of its useful life and the effluent produced by the facility does not meet regulatory standards.

The project consists of the construction of a new pumping station at the site of the existing BWWTF and a wastewater collection system along Main Road to direct wastewater to the recently expanded and upgraded Eastern Passage WWTF. The wastewater collection system was constructed in 2015 and included 0.8 km of dual wastewater forcemains (one 200mm and one 250mm) and 0.6 km of 250mm pressure sewer. Integrated with this project was the replacement of a 1.4 km section of 400mm diameter water transmission main. The second phase of the project is the construction of the pumping station in 2016.

Energy use in municipal water and wastewater/stormwater treatment facilities and their respective distribution and collection systems typically account for 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 foot print. Initiatives in 2015/16 include:

- Equipment and infrastructure upgrades were completed resulting in over 1,555,800 kWhe in annual energy savings. These projects include ventilation air heat recovery in the Herring Cove WWTF, Odour Control System Bypass capabilities in the Herring Cove and Dartmouth WWTF facilities, ventilation system upgrades and pump upgrades in a number of other facilities. Also included in this amount were savings of approximately 357,000 kWh incurred as a result of UV disinfection system shutdown as part of a trial seasonal disinfection program at wastewater treatment facilities in Halifax, Dartmouth, Herring Cove and Eastern Passage.
- Development of renewable energy generation projects has continued.
  - The 10 MW wind farm installed at the J.D. Kline WSP is in full operation and operating as expected.
  - The 40 kW in-line energy recovery turbine installed in the Orchard Control Chamber in Bedford is operating very well, exceeding energy production and revenue recovery expectations.
  - A Feasibility Study and Preliminary Design work were completed, and Detailed Design work started on the Mill Cove Biogas Combined Heat & Power (CHP) System.
- Further development of Halifax Water's Energy Management Information System (EMIS) and roll-out to operations and engineering staff. The EMIS provides energy use and other important facility related data for over 370 Halifax Water facilities, and allows staff to evaluate individual or multiple facility energy performance data, thereby increasing awareness and empowering staff to initiate energy improvement projects.
- When appropriate, Halifax Water has also taken advantage of Provincial energy efficiency programs being offered by Efficiency One (Efficiency Nova Scotia), which help to reduce capital costs and improve project payback.

Overall results for 2015/16 were good, with annual energy intensities for the organization being reduced by approximately 2.4%. A focus on further energy

Stabilizing the fish ladder at the Lake Major dam January 17, 2015

Installation of New Wastewater Forcemains along Main Road in Eastern Passage as part of the Belmont Wastewater Treatment facility decommissioning

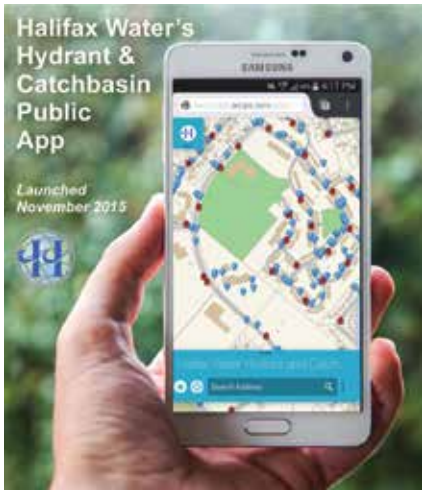
efficiency and operational improvements to existing infrastructure and on completing energy audits for other facilities in the coming years will allow Halifax Water to continue to build on these results.

The 2015/16 year saw the continuation of the Corporate GIS Data Plan where additional network infrastructure was added to the corporate GIS database bringing the total network completed to just over 86%. Significant areas in the Central region were completed including the communities of Bedford and Lower Sackville. The program will continue in the 2016/17 year with updates focused within the East Region.

The GIS corporate database is being used through web based applications such as GIS Dashboard and GIS FORMS. The 2015/16 year saw the release of new Collection system FORMS which will be used for the entry and query of the more than 100,000 sewer lateral records.

Halifax Water launched a new public facing web application intended to assist the public with locating hydrant and catchbasin infrastructure. The HW Hydrant & Catchbasin App continues to be well received and is one of the early ventures by Halifax Water into the ArcGIS Online platform.

Halifax Water successfully developed and implemented a new Computerized Maintenance Management System. The new system, named *Operational Maintenance Management – OMM*, was developed in partnership with Halifax Municipality



Hydrant and Catchbasin Location Web Application

Pockwock wind farm

within the *CityWorks* software and went live within our Operational groups in March 2016. The new *OMM* will help operations and maintenance workers do their jobs more effectively and help management make better informed decisions. It will also calculate the cost of asset repair versus preventive maintenance for each asset, potentially leading to the better allocation of resources. The data in *CityWorks* may also be used to verify regulatory compliance and inform other asset management decisions.

Halifax Water developed a new *Customer Relationship Management (CRM)* strategy to better manage customer interactions and information. The CRM will leverage technology to create stronger relationships with current and prospective customers/citizens while maximizing Halifax Water's customer service capabilities. The call centre was rebranded as the Customer Care Centre and will be used to handle all water, wastewater and stormwater calls as a "one stop shop".

On March 7, 2016 the Customer Care Centre went live with the *Cayenta* CRM system to document interactions with customers and for handling customer account, billing and meter reading related calls.

New High Efficiency Pumps and Motors Installed at Highway No. 7 Water Booster Station

Regulatory Compliance

Environmental Services…a New Name

Over the last number of years the mandate and role of the Environmental Services Department has evolved and expanded. With these changes, the name became less reflective of the diverse nature of the work undertaken within the department. In order to better align the name with the services offered,in January 2016 the department's name was changed to Regulatory Services. Regulatory Services is now made up of the Environmental Engineering, Regulatory Compliance, Engineering Approvals, and the Safety & Security divisions.

Although a lot of the work completed by the Department impacts the environment, its objectives were more aligned with ensuring compliance with Halifax Water's Schedule of Rates, Rules and Regulations, and adherence to Provincial and Federal Regulations.

The Engineering Approvals group is focused on adherence to Halifax Water's Design and Construction Specifications and Schedule of Rates, Rules and Regulations with respect to system connections and expansions. Synergies exist between the Engineering Approvals and Environmental Engineering groups. The Pollution Prevention and Inflow & Infiltration teams, within Environmental Engineering, identify compliance issues with existing connections, while Engineering Approvals are responsible to approve renewals and repairs to service connections. Engineering Approvals also plays a role in the protection of the potable water system through the Cross Connection Control Program, which manages the installation and annual certification of Backflow Prevention devices. There are over 5500 devices within the potable water system to mitigate the risk of cross contamination from a premise to the water system.

The Safety & Security and Regulatory Compliance groups are similar in nature. Safety & Security manages compliance to Joint Occupational Health and Safety, while the Regulatory Services group ensures compliance of facility operating permits via the sampling and reporting program.

Halifax Water's 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. The standard requires an organization to:

1. Establish an environmental policy.
2. Identify environmental aspects that can impact the environment.
3. Identify our applicable legal requirements.
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 April 2003 Halifax Water obtained the ISO 14001 designation for the J. Douglas Kline Water Supply Plant which was the first plant (water or wastewater) in Atlantic Canada. In 2004, Lake Major followed and in 2010 Bennery Lake obtained the designation.

With the success of the EMS in the water supply plants Halifax Water expanded the program to the wastewater facilities. In spring of 2014, the Herring Cove Wastewater Treatment Facility started to develop an EMS program. It was quickly realized that our EMS system became too big to maintain in its current structure. With a concerted effort, a new corporate "Core Manual" was developed along with "Facility Specific Manuals". Our corporate Core Manual defines the basic structure and framework of the EMS in place at Halifax Water, while the Facility Specific Manuals have been designed to ensure activities, products and services associated with the certified facilities do not result in unacceptable, adverse environmental impacts.

Pipe installation as part of the Kearney Lake linear project

Backflow prevention devices to prevent cross contamination

To further support the program, an EMS Coordinator was appointed, along with support staff, who answer directly to the EMS Steering Committee comprised of the Directors of Water Services, Wastewater Services, and Regulatory Services.

This past March, the J. Douglas Kline, Lake Major and Bennery Lake Water Supply Plants went through a series of audits including a compliance review, a management review, Stage 1 and Stage 2 external audits, and were successful in being re-certified as having an Environmental Management System meeting the ISO14001-2004 Standard.

In January 2016, Herring Cove successfully completed the first internal audit of its Environmental Management System. This coming year, staff will look to obtain the ISO 14001 designation for the Herring Cove Wastewater Treatment Facility.

The ISO program is also evolving. In September 2015, a new ISO 14001-2015 Standard was issued. 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.

Regulatory Enforcement

Halifax Water regulates discharges into its wastewater and stormwater systems to ensure compliance with Regulations as approved by the Nova Scotia Utility and Review Board. A discharge containing hazardous chemicals, solvents, fuels, heavy metals, fats, oils, grease, rags, wipes and eroded soil into our systems, may disrupt wastewater treatment processes or result in pollution of our rivers, lakes and the harbour.

Some discharges are immediate in nature, for example a failure of a fuel storage tank or an illegal dump of a noxious substance into a storm or wastewater system. Other discharges are ongoing, such as a non-compliant discharge from an industrial or institutional facility, a cross connection of a wastewater lateral into a storm sewer which then discharges into a water body, or the discharge of stormwater into the wastewater system, which causes operational and compliance problems within the wastewater system.

The Pollution Prevention Program at Halifax Water uses a variety of tools to address issues of non-compliant discharge, including customer and discharger education, system monitoring, investigations and the development of improved

Bennery Lake Water Supply plant

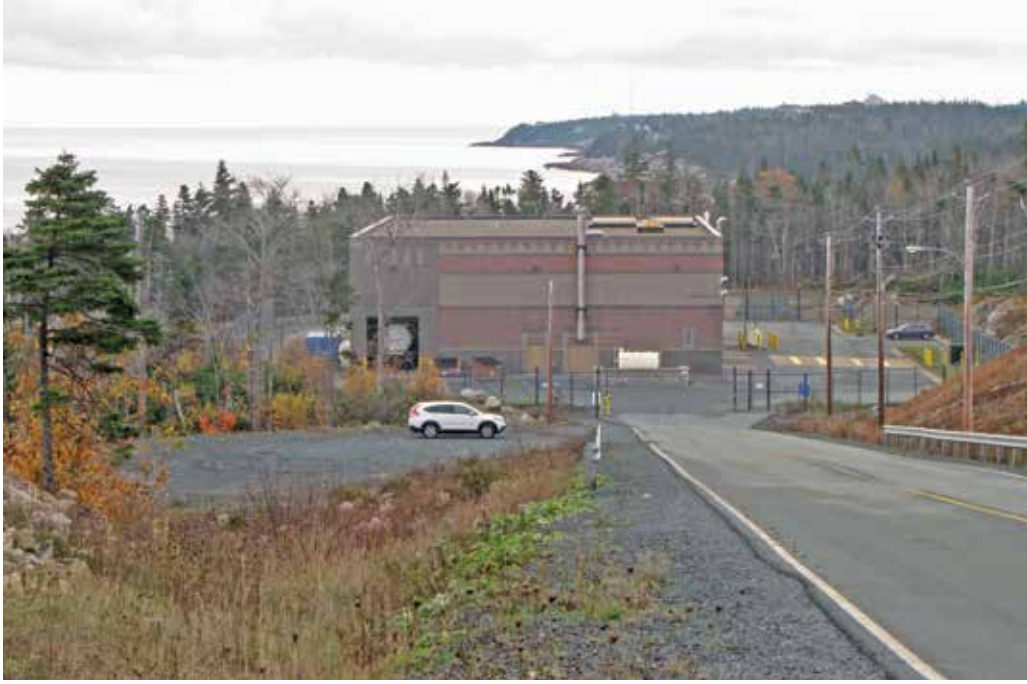
construction practices. Enforcement and other regulatory responses are also provided for in our Regulations.

Environmental Engineering staff removing rags, wipes and debris from the wastewater system

Halifax Water continues to find cross connections where wastewater laterals from homes and other buildings are incorrectly connected to the stormwater system. In 2015/16, seven cross connections were identified. The discharge of wastewater into a stormwater system poses a direct risk to public health and the environment, and is therefore addressed on a priority basis.

The Inflow and Infiltration (I & I) Reduction Program is intended to address the most serious operational issue facing Halifax Water's wastewater system, the increase in wastewater flow during wet weather. This increase in flow can cause overflows into the environment and can disrupt treatment processes, thereby

The result of excess stormwater in the wastewater system – a system surcharging



Herring Cove WWTF, a tranquil setting in the Outer Harbour

posing a risk to public health and receiving waters. The I & I Program focuses primarily on customer connections that allow stormwater to enter the wastewater system. In 2015/16 the I & I Program investigated over 16 commercial sites, 28 streets or neighbourhoods and over 19 residential properties in support of our corporate Wet Weather Management Program.

Drinking Water Quality

Our customers expect Halifax Water to provide safe, affordable, high quality drinking water. To ensure our water meets customer expectations, Halifax Water undertakes a comprehensive water testing program. Bacteriological testing is done once or twice per week at 48 locations within the urban core, and weekly at each of the small water systems owned by Halifax Water. Approximately 3,600 tests for total coliform bacteria are conducted each year. Results of 99.7% of samples with bacteria absent were achieved overall.

Additional testing of drinking water includes:

• Chlorine residual, pH, and turbidity of treated water leaving each water treatment plant, as well as at multiple locations within the plant, in order to optimize the treatment process.

• Quarterly sampling of treated water at two or three locations within the distribution system for approximately 40 chemical parameters.

• Quarterly sampling of raw lake water and water from contributing streams for approximately 40 chemical parameters.

• Bi-annual sampling of Lake Major and Pockwock Lake raw and treated water for all parameters in the Guidelines for Canadian Drinking Water Quality.

• Bi-annual testing and sampling for giardia and cryptosporidium of 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

Drinking Water Compliance Summary

Total Coliform Sample Results

	April 2015-March 2016	
Systems	% Absent	# of Samples
HFX/Pockwock	99.6%	1061
Lake Major	99.9%	1197
Bennery	100.0%	157
Five Island	100.0%	105
Silver Sands	99.0%	105
Middle Musquodoboit	98.1%	106
Collins Park	100.0%	104
Miller Lake	100.0%	105
Bomont	100.0%	104
Totals		3584
Absent		3573
Present		11
All Sites - % Absent		99.7%

basis. Protocols have been established between Halifax Water and the provincial departments to clearly delineate roles and responsibilities in the event of a disruption in water quality.

Wastewater Treatment Facility (WWTF) Compliance

Wastewater treatment facilities in Nova Scotia are regulated by Nova Scotia Environment, who set effluent discharge limits for all facilities. The limits define maximum concentrations of parameters such as carbonaceous biochemical oxygen demand (a measure of the amount of material in water which will consume oxygen as it decomposes), total suspended solids (a measure of the amount of particulate matter in the water), and Escherichia coli (a type of bacteria associated with wastewater). For some facilities, parameters such as nutrients (nitrogen and phosphorus which cause excess growth of algae and plants) and pH (a measure of acidity) are also regulated.

Right: Environmental Engineering staff use smoke testing to find stormwater connections to the wastewater system

Some older wastewater facilities – 12 in total – were in need of upgrading and/or were over-stressed by the volume of wastewater, and were therefore often non-compliant with Nova Scotia Environment effluent limits. In an effort to address these issues, Halifax Water has completely reconstructed the Wellington Wastewater Treatment Facility, and completed a $61 million expansion and upgrade to the Eastern Passage Facility. The wastewater collection systems for two treatment facilities – Wellington and Frame subdivision – were both completely replaced, resulting in major improvements to the performance of both treatment facilities. The treatment processes at several other facilities have been significantly improved through optimization efforts by Halifax Water staff. Also, a substantial diversion of sewage from the Lakeside-Timberlea sewershed to the Halifax sewershed has recently been completed. This reduced the loading on the existing Lakeside-Timberlea treatment facility, to improve its performance and compliance status. Longer-term options for this facility are under consideration.

The harbourside view of Dartmouth WWTF

In 2013, the federal government published the Wastewater System Effluent Regulations. These Regulations set national minimum standards for carbonaceous biochemical oxygen demand and total suspended solids in treated wastewater effluent effective January 1, 2015. All of Halifax Water's wastewater treatment facilities will meet these

Wastewater Treatment Facility Compliance Summary

Cumulative Performance - April 2015 to March 2016

Wastewater Treatment Facility	$CBOD_5$	TSS	F. Coliform /E. coli	Phosphorus S	Phosphorus W	O-Phosphate	Ammonia S	Ammonia W	pH	Dissolved Oxygen	Total Chlorine	Toxicity
Halifax	36	21	7710	N/A		N/A	N/A		6.8	N/A	N/A	Non-Toxic
Herring Cove	15	12	764	N/A		N/A	N/A		6.9	N/A	N/A	Non-Toxic
Dartmouth	25	29	5343	N/A		N/A	N/A		7.1	N/A	N/A	Non-Toxic
Eastern Passage	9	9	56	N/A		N/A	N/A		7.3	N/A	N/A	Non-Toxic
Mill Cove	13	14	706	N/A		N/A	N/A		6.8	N/A	N/A	Non-Toxic
AeroTech	5	8	21	0.3		N/A	2	8	7.3	N/A	N/A	Non-Toxic
Belmont	16	32	518	N/A		N/A	N/A		7.2	N/A	0.83	N/A
Frame	12	41	1784	N/A		N/A	N/A		7.3	N/A	0.74	N/A
Lakeside-Timberlea	8	17	26	2	2	N/A	7	12	7.1	9	0.12	Non-Toxic
Lockview-MacPherson	6	14	52	0.7	0.3	N/A	12	3	7.2	N/A	N/A	N/A
Middle Musquodoboit	7	15	519	N/A		N/A	N/A		7.5	N/A	N/A	N/A
North Preston	5	5	9	0.2		0.14	0.6		7.4	N/A	N/A	N/A
Springfield	5	5	1218	N/A		N/A	N/A		7.9	N/A	0.21	Non-Toxic
Steeves (Wellington)	5	1	25	N/A		0.15	2.1		7.6	N/A	N/A	N/A
Uplands Park	10	8	222	N/A		N/A	N/A		6.8	N/A	N/A	N/A
Weighted Average	12	15	1265	N/A		0.15	N/A		7.2	9	0.47	

NOTES & ACRONYMS:

$CBOD_5$ - Carbonaceous 5-Day Biochemical Oxygen Demand

TSS - Total Suspended Solids Specific parameter limit not achieved

TRC - Total Residual Chlorine

S / W - Summer / Winter compliance limits

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, Steeves, Springfield

N/A - Not Applicable

LEGEND:

Specific parameter limit achieved

Specific parameter limit not achieved

standards, although the Halifax and Dartmouth advanced-primary treatment facilities will require upgrading to the equivalent of secondary treatment in the future. The federal Regulations provide for defined periods to allow required upgrades to take place, 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 2041.

Nova Scotia Environment has adopted the newer federal system, under which average values must meet the effluent limits for each facility. Under these criteria and as demonstrated by the above tables, four of fifteen facilities were fully compliant for 2015/16. A further six were non-compliant for a single parameter. Capital and operational improvements undertaken by Halifax Water have resulted in performance improvements for several of our wastewater treatment facilities, and this will continue in the future. However, as the compliance results demonstrate, some treatment facilities still require capital and operational improvements. Halifax Water has developed Compliance Plans to upgrade and/or expand these facilities to improve their performance and become fully compliant. A major upgrade to the Aerotech wastewater treatment facility is in the final design stages. The Belmont facility is scheduled to be decommissioned with sewage transferred to the new Eastern Passage facility, commencing in 2016.

Chlorine disinfection will be replaced with ultraviolet disinfection in 2016, to meet the chlorine limit and avoid any risk of toxicity.

Stewardship of the Environment

Springfield Lake Ultra Violet Disinfection System Upgrades

Example of UV system to be installed at the Springfield Lake WWTF

Upgrades to the Ultra Violet (UV) disinfection process at the Springfield Lake wastewater treatment facility (WWTF) are required in response to recently implemented federal Wastewater System Effluent Requirements (WSER). The Springfield Lake WWTF is a secondary treatment wastewater facility, serving the Springfield Lake area in Middle Sackville. The facility currently employs a chlorine based disinfection system and residual chlorine levels need to be reduced to meet the enhanced regulations of the new WSER standards. Halifax Water explored alternate de-chlorination technologies as well as other disinfection technologies. Replacement of the chlorine disinfection system with an Ultraviolet (UV) light disinfection system was found to be the best option. UV disinfection systems are commonly used in wastewater treatment applications, including many Halifax Water facilities. UV light does not result in the creation of harmful disinfection by-products, eliminates toxicity issues associated with chlorine, and is a proven, environmentally friendly technology.

Multiple UV disinfection systems were compared to determine the most advantageous system based on life cycle costing and operation and maintenance expectations. Following evaluation, Halifax Water selected a Non-Contact UV Disinfection System. This innovative system is designed such that the UV lamps are kept separate from the water. Water flows through the light tubes while the UV lamps are placed on the outside of the tubes, keeping the lamps dry. This new technology lowers operating and maintenance costs and produces an effluent quality that meets the enhanced WSER regulations.

Wet Weather Management

The amount of Rain Derived Inflow and Infiltration (RDI&I) that enters Halifax Waters sanitary sewer system is one of the biggest operational challenges facing wastewater services. The extra burden placed on Halifax Water's wastewater system can overload the collection system-leading to overflows into the environment and negatively impact processes within treatment facilities.

Halifax Water has developed a wet weather management program (WWMP) to manage wet weather generated flows and ensure protection of the environment. Halifax Water's WWMP is structured to gain location specific information with respect to various wet weather management techniques. Once sufficient data has been collected and analyzed, Halifax Water will make improvements to manage wet weather flows for each sewershed.

The WWMP is structured to be a long term program with a phased approach and in the first two years over 8 projects have been actioned by the WWMP. While the field and desktop activities have been successful, it is important to revisit the goal and mandate of the program and ensure the action plan supports the strategy to meet the program goals.

The WWMP Steering committee reviewed the program phasing at the end of the second year to ensure activities stay on track.

• Phase I-Program Initiation - The initial phase of Halifax Water's WWMP involved initiation of the program and its structure. Early on it was realized there is no one size fits all solution to wet weather management and the program needed to reflect this when implementing strategies. The initial organizational structure

UV lightbank at the Halifax WWTF

Overflowing manhole discharges into the street during a significant rain event

for the program was comprised of a wet weather steering committee and a wet weather action committee. This structure has been revisited in the last year to ensure that key contributors to the program are engaged.

• Phase II-Prioritization - Phase II of the program required identifying individual sewersheds that demonstrated a need for wet weather management. There was limited flow information available to make informed prioritization decisions in the service boundary. In the absence of flow information, pump station run time information was used as surrogate flow data. The entire service boundary was characterized using existing flow information and pump runtime data.

• Phase III-Pilot Program - Pilot-sewersheds were identified from the prioritization matrix from phase II. The pilots were selected strategically so that specific wet weather management techniques could be assessed. Pre and post project flows are being analyzed and compared in the individual sewersheds and a cost benefit analysis will be conducted on the projects with respect to wet weather flow reductions. This pilot program is intended to gather sound information on the costs of various wet weather management techniques and the possible impact they can have on the flow response to wet weather.

• Phase IV-Service Boundary Implementation - As information from phase III is matured it will be applied to the service boundary to recommend and implement wet weather management projects in specific sewersheds. This will allow Halifax Water to implement the most cost effective strategies to manage wet weather flows.

While it is early in the data collection period, the pilot program has demonstrated a measurable reduction in RDIBI in response to wet weather events in the pilot sewersheds. For example, the Stuart Harris sewershed has undergone mainline rehabilitation by trenchless technologies. Prior to rehabilitation the

Sliplining a wastewater pipe to reduce inflow & infiltration

Sewer inspection to help reduce I & I

system exceeded capacity, leading to overflows, multiple times per year during wet weather events. Since renewal, flows have remained below the system's available capacity and no sanitary sewer overflows have been observed.

Phase III of the WWMP requires intensive data acquisition and review that is a joint effort of many departments within Halifax Water. The most important pieces of data that WWMP uses to conduct Sanitary Sewershed Evaluation Studies (SSES) are flow measurement, pipeline assessment and condition rating. Both of these service contracts were significantly overhauled by the asset management group in 2015/16 and resulted in an increased level of service that will greatly benefit the WWMP.

To seamlessly manage data and efforts between Halifax Water departments, a centralized repository of information has been established. WWMP staff created a real-time viewer to host data and information from the various wet weather participants. The Wet Weather Action Committee viewer was created in house and is web hosted by software that communicates with corporate GIS and corporate data services to provide real-time access to staff through both desktop and mobile applications.

At present, the WWMP has three operating pilots with 2 more planned for integration in 2016. In addition to formal pilots, there are 6 monitoring areas that are being researched for wet weather management techniques. The program is expected to complete compilation of the data set over the next three years and begin to implement location specific strategies in all sewersheds that are negatively impacted by wet weather generated flows.

Stormwater Services and Levels of Service

Recognizing that existing stormwater services are largely corrective and based on historical practices, Halifax Water is developing a business plan inclusive of standards, business processes, and defined levels of service. Implementation of this plan will be ongoing with full integration expected to take a significant period of time. The industry benchmark for implementation is 7 – 10 years.

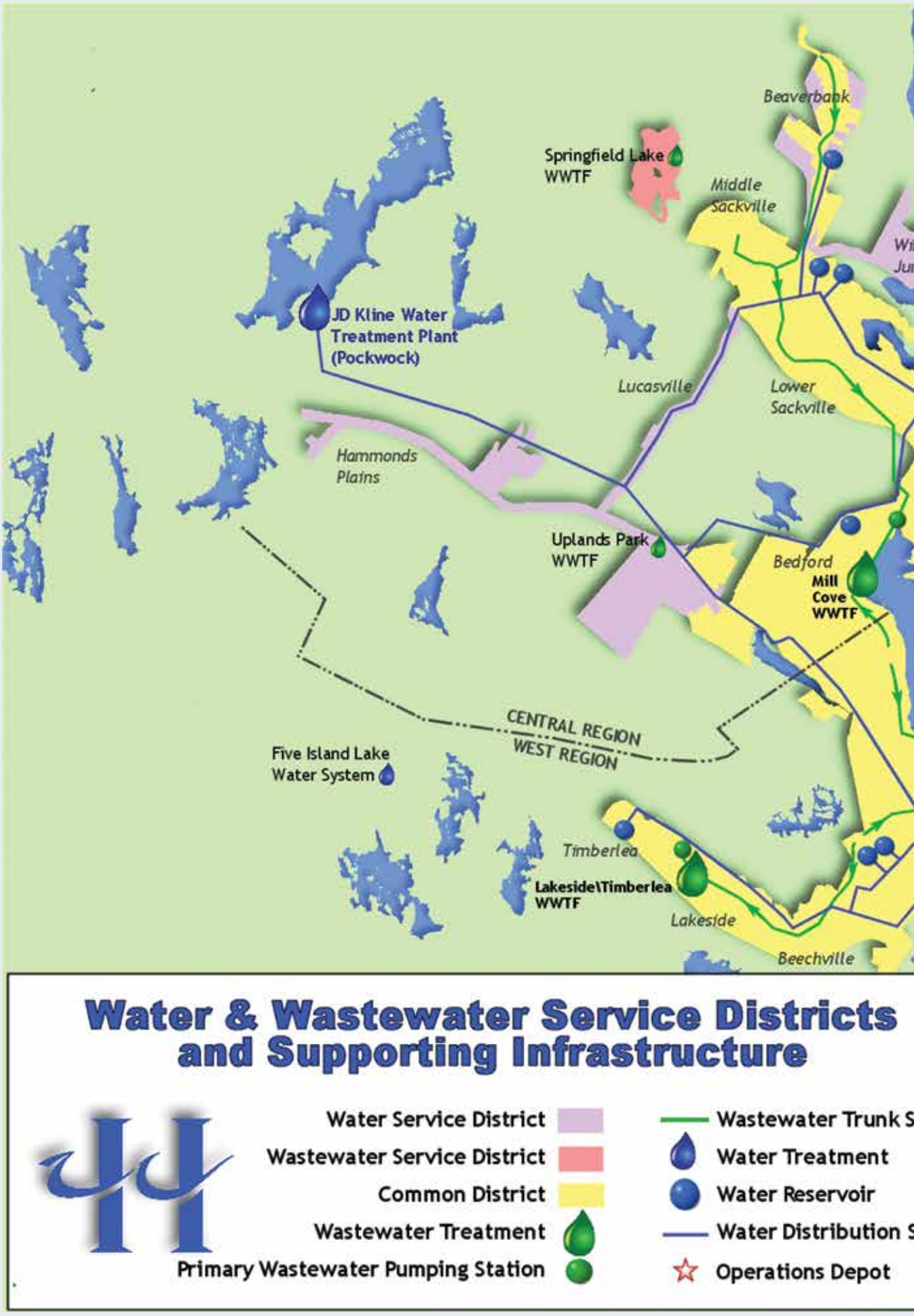
Halifax Water presently operates the stormwater system from a corrective action approach augmented by a preventative maintenance program. While the existing service delivery method is effective at delivering stormwater services to the service boundary, Halifax Water recognizes the need to restructure and redefine how it maintains the stormwater system.

A stormwater cost of service application was submitted to the NSUARB in 2015 and a high level stormwater servicing plan was prepared to support the submission. The document described the existing stormwater processes, identified opportunities for continual improvement, and outlined a customer focused future state.

Halifax water recognizes that Level of Service (LOS) is one of the most important components of an established stormwater servicing plan. A stormwater LOS is being prepared and will be implemented in coordination with the Operational Maintenance Management (OMM) project. The stormwater LOS will enhance our service delivery from our customer care centre as well as provide service standards for our field operations.

Repairing a watewater pipe using innovative sliplining technology

Ditch and culvert repair to improve stormwater service for the community of Hammonds Plains


Beaverbank
Springfield Lake WWTF
Middle Sackville
JD Kline Water Treatment Plant (Pockwock)
Lucasville
Lower Sackville
Hammonds Plains
Uplands Park WWTF
Bedford
Mill Cove WWTF
CENTRAL REGION
WEST REGION
Five Island Lake Water System
Timberlea
Lakeside\Timberlea WWTF
Lakeside
Beechville
Water & Wastewater Service Districts and Supporting Infrastructure
Water Service District
Wastewater Service District
Common District
Wastewater Treatment
Primary Wastewater Pumping Station
Wastewater Trunk S
Water Treatment
Water Reservoir
Water Distribution S
Operations Depot


Fall River
(Lockview\MacPherson)
WWTF
Fall River
Miller Lake
Water System
Waverley
Frame Subdivision
WWTF
Lakeview
Central Water
Operations Depot
Central Wastewater
Operations Depot
CENTRAL REGION
EAST REGION
North Preston
WWTF
East
Preston
Lake Major Water
Treatment Plant
Cherrybrook
Burnside
Bedford
Basin
Dartmouth
Cole
Harbour
East Wastewater
Operations Depot
East
Water
Operations
Depot
Dartmouth
WWTF
Halifax
Halifax
WWTF
Belmont
WWTF
Eastern Passage
WWTF
Cow Bay
Silversands
Water System
West Water,
Wastewater,
Stormwater
Operations and
Administration
Depot
Halifax
Harbour
Eastern
Passage
Spryfield
Fergusons
Cove
Herring Cove
WWTF
Herring
Cove
Atlantic
Ocean
Systems Outside Map Limits
- Collins Park Water System
- Middle Musquodoboit Water & Wastewater
- Wellington Subdivision Wastewater System
- Airport\Aerotech Water & Wastewater
- Bomont Water System

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 in our work. Halifax Water has an Occupational Health and Safety Program Manual that is continuously reviewed and updated. The intent of this program manual is to embody the Occupational Health and Safety Act of Nova Scotia in our workplaces and ensure that every Halifax Water employee goes home safely at the end of their work day.

One of the key tasks Halifax Water employees perform daily involves working in and around excavations and trenches. Our employees perform below grade inspections, service connections and maintenance and repairs to water, wastewater and storm water infrastructure every day. In the spring of 2015 the Excavation and Trenching Safety procedure was updated and now includes an enhanced Field Level Hazard Assessment (FLHA) tool. All employees involved in excavation work were provided training on the revised procedure and in use of the FHLA tool. Senior management have been taking part in random audits of construction sites to ensure employees are using the FLHA to the fullest extent.

Halifax Water has partnered with Workers Compensation Board (WCB) of Nova Scotia in their Preventing Workplace Injury (PWI) initiative. In the fall, all employees were asked to complete a survey to measure what their managers, supervisors and employees understand and feel about workplace health and safety. A "Team of Doers" was established at Halifax Water and monthly meetings are held to develop action plans to further enhance and build a stronger safety culture.

Left: Good trench; Right: Bad trench, an accident waiting to happen

The Doers Team–keeping a spotlight on safety

The safety of employees and the public, as well as the security of Halifax Water's infrastructure forms the basis of every activity undertaken at the utility.

Motivated and Satisfied Employees

Halifax Water underwent a significant challenge in 2015/16 as it encountered its first labour disruption. As with every challenge Halifax Water endures, it finds opportunities for improvement. A focus for the human resource department was relationship building through fair and consistent policies and practices, and administration of the new collective agreement. A review of policies and standards was conducted to determine our strengths and weaknesses and we continue to focus on leadership training initiatives to ensure fair and consistent administration.

Halifax Water understands the importance of an engaged workforce and focused on effective communications. A provider was selected to deliver civility, respect and engagement in the workplace workshops which will be delivered in the next fiscal year.

Halifax Water also understands that retaining valued employees is just as important as attracting the best employees. Through collaboration with Halifax Water leaders, the framework for a strategic workforce management plan has been developed and will continue to be the focus in future years.

Service Award Banquet

At the 2015 Service Award Banquet the following awards were presented:

35 Year Award
- Wastewater Services
  - Kenneth Drummond

30 Year Award
- Engineering & information Services
  - Bernie Corbett
  - Craig Muir
  - Ming Szeto
- Water Services
  - Beth Hubley

25 Year Award
- Finance & Customer Service
  - Ronald Cranidge
  - Cynthia Murray
- Wastewater/Stormwater Services
  - Andrew Eisan
  - Reginald Awalt

20 Year Award
- Engineering & Information Services
  - Greg Rice
- Wastewater/Stormwater Services
  - Brian Barkhouse
  - Cleve Barkhouse
  - Royce Hellesoe
  - Wayne Hiltz
  - Robert Jewers
  - James McEachren
  - Gerald Ryan
- Water Services
  - Brian MacDonald

10 Year Award
- Finance & Customer Service
  - Warren Brake
- Wastewater/Stormwater Services
  - Susheel Arora
  - Heather Crowell
  - Danny Patey
- Water Services
  - Jason Avery
  - Jason Barkhouse
  - Melvin Cameron
  - Paul Canning
  - Jan-Michael Kidd
  - Cynthia Quigley
  - Jason Rutledge

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 2015 this award was presented to Kenda MacKenzie for her continued commitment and high level service provided to Halifax

Kenda MacKenzie receives Carolyn Bruce Customer Service Excellence Award

Christmas Families gifts

Water's customers, developers and consultants. No issue is too big or too small; her approach is always with respect, vigor and compassion.

Fundraising initiatives at Halifax Water

The community we work in is important to Halifax Water and continues with many fundraising initiatives such as the United Way Halifax. Halifax Water employees raised $5,436.00 for the United Way Halifax through fundraising events.

Halifax Water Employees also donated $7,150.00 toward Water For People to support the construction of wells to provide clean drinking water in 9 different countries for 4 million people.

The Christmas Families Fundraising initiatives raised $4075 for Carolyn's Angel Tree program and were able to buy gifts for over 50 kids in the Halifax Municipality.

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

Halifax Water is also in the community almost every weekend from late spring to early fall with our water station program. This program sees Halifax Water provide water stations for community events large and small throughout the region. The program helps community groups reduce their costs and impact on the environment by reducing or eliminating the need for bottled water and promoting the use of tap water. The program is available beginning in late May through to mid-October. Halifax Water provides the delivery, set up, water testing and removal of the water station.

This year Halifax Water provided water stations for events ranging from the Men's Field Lacrosse 2015 National Championships, to a local T-ball tournament. No matter what the event, staying hydrated with tap water is always a good idea.

H2O Help to Others

The Halifax Water/Salvation Army H2O (Help to Others program) raised a total of $2,184.00 to assist customers who truly need help with their water/wastewater/ stormwater bill. This internal staff fundraising is in addition to the $25,000.00 Halifax Water provides in funding. Funds donated by Halifax Water employees were matched by Halifax Water.

Carolyn's Crusaders at the 2015 Credit Union Lung Run

TYPICAL ANALYSIS OF POCKWOCK/LAKE MAJOR WATER
2015 - 2016

(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	22.5	<1.0	19.0	-	-
Aluminum	0.130	0.184	0.203	0.025	-	*0.20 / 0.10
Ammonia (N)	<0.050	0.070	<0.053	<0.050	-	-
Arsenic	<0.001	<0.001	<0.001	<0.001	0.010	-
Calcium	0.96	3.5	0.81	12.5	-	-
Chloride	7.3	8.9	5.8	7.5	-	≤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)	14.3	<3.0	37.7	<3.0	-	≤15.0
Conductivity (µS/cm)	34.0	94.0	28.0	120.0	-	-
Copper (Total)	0.015	<0.003	0.147	<0.004	-	≤1.0
Fluoride	<0.10	0.70	<0.10	0.60	1.5	0.7
Hardness (as $CaCO_3$)	3.9	10.1	3.4	32.0	-	-
Hardness (as $CaCO_3$) (Grains/IG)	0.27	0.71	0.24	2.24	-	-
HAA5 (avg.)	-	0.044	-	0.044	0.080	-
Iron (Total)	<0.062	<0.050	0.097	<0.050	-	<0.3
Langelier Index @ 4°C	-4.6	-2.6	-5.4	-1.9	-	-
Langelier Index @ 20°C	-4.2	-2.3	-4.4	-1.7	-	-
Lead (Total) (µg/l)	<0.50	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.37	0.39	0.33	0.41	-	-
Manganese (Total)	0.033	0.009	0.047	0.005	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate and Nitrite (as N)	<0.050	0.052	<0.050	<0.050	10.0	-
pH (pH Units)	6.1	7.3	6.1	7.2	-	6.5 - 8.5
Potassium	0.25	0.29	0.28	0.26	-	-
Sodium	4.3	14.5	3.4	11.3	-	≤200
Solids (Total Dissolved)	25.5	48.0	20.5	69.0	-	≤500
Sulfate	3.1	7.9	2.3	25.0	--	≤500
Turbidity (NTU)	0.32	<0.098	0.30	<0.038	**0.2 / 1.0	≤5
Total Organic Carbon (TOC)	2.9	1.6	4.7	1.8	-	-
THM's (avg.)	-	0.060	-	0.059	0.100	-
Uranium (µg/l)	<0.10	<0.10	<0.10	<0.10	20.0	-
Zinc (Total)	0.006	0.070	0.008	0.083	-	≤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
2015 - 2016

(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 $CaCO_3$)	<5.5	43.8	31.0	33.0	-	-
Aluminum	0.158	0.014	0.006	<0.005	-	0.2
Ammonia (N)	0.23	<0.050	<0.11	<0.097	-	-
Arsenic	<0.001	<0.001	0.004	0.004	0.010	-
Calcium	2.23	18.7	8.3	8.4	-	-
Chloride	5.8	9.9	4.5	5.3	-	≤250
Chlorate	<0.1	0.6	<0.1	<0.1	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	34.3	<3.0	<5.0	<3.0	-	≤15.0
Conductivity (µS/cm)	38.0	210.0	75.0	78.0	-	-
Copper (Total)	0.400	0.034	<0.002	0.011	-	≤1.0
Fluoride	<0.10	<0.10	0.44	0.41	1.5	-
Hardness (as $CaCO_3$)	7.6	47.0	25.0	26.0	-	-
Hardness (as $CaCO_3$) (Grains/IG)	0.53	3.3	1.8	1.8	-	-
HAA5 (avg.)	-	0.044	-	<0.010	0.080	-
Iron (Total)	0.567	<0.050	<0.050	<0.050	-	≤0.3
Langelier Index @ 4°C	-2.7	-1.6	-2.3	-1.5	-	-
Langelier Index @ 20°C	-2.3	-1.5	-2.0	-1.3	-	-
Lead (Total) (µg/l)	0.67	<0.50	<0.50	<0.50	10.0	-
Magnesium	0.48	0.56	1.1	1.1	-	-
Manganese (Total)	0.370	0.030	<0.002	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.024	<0.015	<0.015	1.0	-
Nitrate and Nitrite (as N)	<0.060	<0.060	<0.050	<0.050	10.0	-
pH (pH Units)	6.50	7.4	7.0	7.6	-	6.5 - 8.5
Potassium	0.24	0.37	0.45	0.47	-	-
Sodium	3.5	15.9	5.5	6.2	-	≤200
Solids (Total Dissolved)	25.0	135.0	53.0	54.0	-	≤500
Sulfate	2.6	28.7	3.2	3.2	-	≤500
Turbidity (NTU)	1.41	<0.10	<0.16	<0.11	*0.2 / 1.0 **1.0	≤5
Total Organic Carbon (TOC)	4.0	1.5	<0.50	<0.50	-	-
THM's (avg.)	-	0.067	-	<0.001	0.100	-
Uranium (µg/l)	<0.10	<0.10	10.0	10.0	20.0	-
Zinc (Total)	0.008	0.071	<0.005	<0.005	-	≤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 / <0.17	0.30 / 0.44	0.24 / 0.19	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
2015 - 2016

(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 $CaCO_3$)	54.0	57.0	15.0	10.0	-	-
Aluminum	0.012	<0.005	0.039	0.008	-	0.2
Ammonia (N)	<0.050	<0.130	0.12	0.071	-	-
Arsenic	<0.001	<0.001	0.005	<0.001	0.010	-
Calcium	16.0	3.3	8.2	0.35	-	-
Chloride	10.5	6.4	45.0	9.2	-	≤250
Chlorate	<0.1	0.1	<0.1	0.3	1.0	-
Chlorite	<0.1	<0.1	<0.1	<0.1	1.0	-
Colour (True Colour Units)	<6.0	<5.0	18.0	<5.0	-	≤15.0
Conductivity (µS/cm)	150.0	120.0	210.0	44.0	-	-
Copper (Total)	0.002	0.009	<0.002	<0.002	-	≤1.0
Fluoride	<0.10	<0.10	<0.10	<0.10	1.5	-
Hardness (as $CaCO_3$)	65.0	13.0	25.0	<1.0	-	-
Hardness (as $CaCO_3$) (Grains/IG)	4.6	0.9	1.8	0.1	-	-
HAA5 (avg.)	-	<0.005	-	<0.005	0.080	-
Iron (Total)	<0.050	<0.050	0.180	<0.050	-	≤0.3
Langelier Index @ 4°C	-1.9	-2.3	-2.6	-3.83	-	-
Langelier Index @ 20°C	-1.7	-2.1	-2.3	-3.58	-	-
Lead (Total) (µg/l)	<0.50	<0.50	<0.50	<0.50	10.0	-
Magnesium	5.8	1.10	1.0	<0.10	-	-
Manganese (Total)	0.004	<0.002	0.125	<0.002	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	<0.013	<0.013	1.0	-
Nitrate and Nitrite (as N)	0.33	0.26	0.12	0.080	10.0	-
pH (pH Units)	6.8	7.0	7.0	7.0	-	6.5 - 8.5
Potassium	1.10	0.50	1.10	0.22	-	-
Sodium	5.5	20.0	25.5	7.8	-	≤200
Solids (Total Dissolved)	110.0	70.0	115.0	34.5	-	≤500
Sulfate	10.9	<2.0	7.4	<2.0	-	≤500
Turbidity (NTU)	0.22	0.05	1.08	<0.10	*0.1 / 0.3	≤5
Total Organic Carbon (TOC)	0.53	<0.53	3.2	<0.50	-	-
THM's (avg.)	-	<0.002	-	<0.003	0.100	-
Uranium (µg/l)	<0.10	<0.10	<1.0	<0.10	20.0	-
Zinc (Total)	0.009	0.078	0.008	0.077	-	≤5.0
PCB (µg/l)	<0.05	<0.05	<0.05	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	0.5/1.0	-

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

TYPICAL ANALYSIS - SMALL SYSTEMS
2015 - 2016

(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	68.0	-	24.0	-	-
Aluminum	<0.005	0.005	-	0.086	-	0.2
Ammonia (N)	0.063	<0.130	-	<0.050	-	-
Arsenic	<0.002	<0.001	-	<0.001	0.010	-
Calcium	35.0	37.0	-	5.1	-	-
Chloride	67.0	65.0	-	10.5	-	≤250
Chlorate	<0.1	0.2	-	<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	370.0	-	98.0	-	-
Copper (Total)	<0.002	<0.002	-	<0.002	-	≤1.0
Fluoride	0.20	0.23	-	0.37	1.5	-
Hardness (as $CaCO_3$)	110.0	110.0	-	14.0	-	-
Hardness (as $CaCO_3$) (Grains/IG)	7.7	7.7	-	1.0	-	-
HAA5 (avg.)	-	<0.005	-	0.050	0.080	-
Iron (Total)	1.000	<0.050	-	<0.050	-	≤0.3
Langelier Index @ 4°C	-0.02	-0.54	-	-2.03	-	-
Langelier Index @ 20°C	+0.23	-0.29	-	-1.78	-	-
Lead (Total) (µg/l)	<0.50	<0.50	-	<0.50	10.0	-
Magnesium	4.9	5.30	-	0.38	-	-
Manganese (Total)	0.950	0.004	-	0.004	-	≤0.05
Mercury (µg/l)	<0.013	<0.013	-	<0.013	1.0	-
Nitrate and Nitrite (as N)	<0.050	<0.050	-	<0.053	10.0	-
pH (pH Units)	7.8	7.6	-	7.4	-	6.5 - 8.5
Potassium	0.86	0.85	-	0.33	-	-
Sodium	23.0	25.0	-	14.5	-	≤200
Solids (Total Dissolved)	200.0	210.0	-	58.0	-	≤500
Sulfate	22.0	20.0	-	12.2	-	≤500
Turbidity (NTU)	12.6	<0.15	-	<0.18	**1.0 ***0.2 / 1.0	≤5
Total Organic Carbon (TOC)	<0.50	<0.50	-	1.9	-	-
THM's (avg.)	-	<0.003	-	0.065	0.100	-
Uranium (µg/l)	<0.10	<0.10	-	<0.10	20.0	-
Zinc (Total)	<0.005	<0.005	-	0.055	-	≤5.0
PCB (µg/l)	<0.05	<0.05	-	<0.05	-	-
Gross Alpha / Gross Beta (Bq/L)	0.10/0.10	<0.10/<0.15	-	<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. ***The Miller Lake plant must produce water with turbidity of <0.2 NTU 95% of the time and <0.1 NTU 100% of the time, as required by Provincial Permit.

TYPICAL ANALYSIS - SMALL SYSTEMS
2015 - 2016

(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 $CaCO_3$)	7.9	15.0			-	-
Aluminum	0.102	0.029			-	0.2
Ammonia (N)	0.089	0.082			-	-
Arsenic	0.002	<0.001			0.010	-
Calcium	6.5	10.0			-	-
Chloride	18.5	38.0			-	≤250
Chlorate	<0.1	0.6			1.0	-
Chlorite	<0.1	<0.10			1.0	-
Colour (True Colour Units)	36.5	<5.0			-	≤15.0
Conductivity (µS/cm)	85.0	120.0			-	-
Copper (Total)	<0.002	0.006			-	≤1.0
Fluoride	<0.10	<0.10			1.5	-
Hardness (as $CaCO_3$)	19.0	28.0			-	-
Hardness (as $CaCO_3$) (Grains/IG)	1.33	2.0			-	-
HAA5 (avg.)	-	0.071			0.080	-
Iron (Total)	0.130	<0.050			-	≤0.3
Langelier Index @ 4°C	-3.15	-2.46			-	-
Langelier Index @ 20°C	-2.90	-2.21			-	-
Lead (Total) (µg/l)	<0.050	<0.50			10.0	-
Magnesium	0.660	0.76			-	-
Manganese (Total)	0.016	0.005			-	≤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)	7.0	7.1			-	6.5 - 8.5
Potassium	0.72	0.75			-	-
Sodium	10.2	13.0			-	≤200
Solids (Total Dissolved)	81.0	83.0			-	≤500
Sulfate	10.0	<2.0			-	≤500
Turbidity (NTU)	1.39	<0.10			*1.0/0.3	≤5
Total Organic Carbon (TOC)	4.6	0.97			-	-
THM's (avg.)	-	0.072			0.100	-
Uranium (µg/l)	<0.10	<0.10			20.0	-
Zinc (Total)	<0.005	0.014			-	≤5.0
PCB (µg/l)	<0.05	<0.05			-	-
Gross Alpha / Gross Beta (Bq/L)	<0.10/<0.10	<0.10/<0.10			0.5/1.0	-

Ultra-filtration membrane plants must produce water with turbidity of <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, 2016 (in thousands)

ASSETS		
Fixed		
Utility Plant in Service at Cost		$ 1,411,957
Provision for Depreciation		$ (351,149)
Net Book Value		$ 1,060,808
Capital Work in Progress		$ 18,529
Regulatory Asset		$ 3,580
Current		$ 90,394
TOTAL ASSETS		**$ 1,173,311**
LIABILITIES		
Long Term Debt		$ 238,989
Other Than Long Term Debt		$ 82,535
TOTAL LIABILITIES		**$ 321,524**
EQUITY		
Special Purpose Reserves		$ 8,070
Contributed Capital Surplus		$ 867,454
Accumulated Other Comprehensive Income		$ (43,936)
Operating Surplus used to Fund Capital, Cumulative		$ 12,380
Capital Surplus		$ 843,968
Operating Surplus April 1, 2015		$ 2,936
2015/16 OPERATIONS		
Operating Revenue	$ 131,717	
Financial Revenue	$ 3,370	
Revenue From all Sources	$ 135,087	
Expenditures		
Operating Expenses	$ 75,334	
Depreciation	$ 20,909	
Grant in lieu of taxes HRM	$ 4,528	
Financial Expenses	$ 29,433	
	$ 130,204	
Total Expenditures		
Excess of Revenue over Expenditures		$ 4,883
Accumulated Operating Surplus March 31, 2016		$ 7,819
TOTAL EQUITY		**$ 851,787**
TOTAL LIABILITIES & EQUITY		**$ 1,173,311**

Figures in the Financial Overview are presented in accordance with the NSUARB Accounting and Reporting Handbook for Water Utilities. See note 15 of the audited financial statements for a reconciliation of the transition from the NSUARB to IFRS accounting formats.

Financial Statements

Halifax Regional Water Commission
March 31, 2016

Contents

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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 statements of financial position as at March 31, 2016, March 31, 2015 and April 1, 2014, and the statements of comprehensive earnings, statements of changes in equity and statements of cash flows for the years ended March 31, 2016 and March 31, 2015, 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, 2016, March 31, 2015 and April 1, 2014 and its financial performance and its cash flows for the years ended March 31, 2016 and March 31, 2015 in accordance with International Financial Reporting Standards.

Halifax, Canada
June 30, 2016

Grant Thornton LLP
Chartered Accountants

Audit • Tax • Advisory
Grant Thornton LLP. A Canadian Member of Grant Thornton International Ltd

Halifax Regional Water Commission
Statements of earnings

Year ended March 31, 2016 (in thousands)

	2016	2015
Operating revenues		
Water service	**$ 43,193**	$ 39,583
Wastewater service	**66,601**	67,770
Stormwater service	**10,595**	10,951
Fire protection	**8,032**	8,953
Private fire protection services	**679**	558
Other operating revenue	**2,617**	2,505
	131,717	130,320
Operating expenditures (note 14)		
Water supply and treatment	**8,623**	8,090
Water transmission and distribution	**9,094**	9,139
Wastewater collection	**10,577**	11,210
Stormwater collection	**4,237**	3,992
Wastewater treatment	**19,285**	20,296
Engineering and information services	**7,018**	6,770
Environmental services	**2,370**	2,656
Customer service	**4,450**	4,121
Administration and pension	**9,681**	9,649
Depreciation and amortization	**36,341**	34,912
	111,676	110,835
Earnings from operations before financial and other revenues and expenditures	**20,041**	19,485
Financial and other revenues		
Interest	**883**	836
Contributed capital	**13,533**	12,792
Other	**2,487**	2,294
	16,903	15,922
Financial and other expenditures		
Interest on long term debt	**8,889**	8,958
Amortization of debt discount	**186**	163
Grant in lieu of taxes	**4,528**	4,340
Other	**198**	513
	13,801	13,974
Earnings for the year before regulatory deferral account balance amortization	**23,143**	21,433
Regulatory deferral account balance amortization (note 5)	**(192)**	(192)
Earnings for the year	**$ 22,951**	$ 21,241

See accompanying notes to the financial statements.

Halifax Regional Water Commission
Statements of comprehensive earnings

Year ended March 31, 2016 (in thousands)

		2016		2015
Earnings for the year	**$**	**22,951**	$	21,241
Other comprehensive income (loss)				
Items that will not be reclassified subsequently to earnings:				
Re-measurement on defined benefit plans		**10,389**		(16,205)
Total comprehensive earnings for the year	**$**	**33,340**	$	5,036

See accompanying notes to the financial statements.

Halifax Regional Water Commission
Statements of financial position

Year ended March 31, 2016 (in thousands)

	March 31 2016	March 31 2015	April 1 2014
Assets			
Current			
Cash and cash equivalents	**$ 46,478**	$ 39,271	$ 38,290
Receivables			
Customer charges and contractual	**15,641**	14,181	9,927
Unbilled service revenues	**16,171**	15,479	13,510
Halifax Regional Municipality	**9,558**	3,743	818
Inventory	**1,684**	1,528	1,445
Prepaids	**862**	915	694
	90,394	75,117	64,684
Intangible assets (note 11)	**10,201**	10,672	11,480
Capital work in progress	**18,529**	41,423	10,676
Utility plant in service (note 12)	**1,044,733**	997,419	993,727
Total assets	**1,163,857**	1,124,631	1,080,567
Regulatory deferral account balance (note 5)	**3,580**	3,772	3,964
Total assets and regulatory deferral account debit balances	**$ 1,167,437**	$ 1,128,403	$ 1,084,531
Liabilities			
Current			
Payables and accruals			
Trade	**$ 16,686**	$ 15,612	$ 21,143
Interest on long term debt	**2,229**	2,137	2,026
Halifax Regional Municipality	**4,584**	6,973	3,796
Contractor and customer deposits	**193**	198	190
Current portion of deferred contributed capital	**12,526**	21,603	19,637
Current portion of long term debt (note 13)	**23,195**	22,374	28,139
Unearned revenue	**389**	511	118
	59,802	69,408	75,049
Deferred contributed capital	**709,716**	691,477	684,837
Long term debt (note 13)	**215,794**	208,231	186,964
Employee benefit obligation – pension plan (note 4)	**54,265**	65,005	48,307
Employee benefit obligation – post-retirement benefits (note 4)	**466**	458	868
Employee benefit obligation – pre-retirement benefits (note 4)	**3,724**	3,494	3,212
	1,043,767	1,038,073	999,237
Equity			
Accumulated other comprehensive (loss) (page 5)	**(43,936)**	(54,325)	(38,120)
Accumulated surplus (page 5)	**167,606**	144,655	123,414
	123,670	90,330	85,294
	$ 1,167,437	$ 1,128,403	$ 1,084,531

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, 2016 (in thousands)

	Accumulated other comprehensive (loss)	Accumulated surplus	Total
Balance at April 1, 2014	$ (38,120)	$ 123,414	$ 85,294
Earnings for the year	-	21,241	21,241
Other comprehensive loss	(16,205)	-	(16,205)
Comprehensive (loss) for the year	(16,205)	21,241	5,036
Balance at March 31, 2015	$ (54,325)	$ 144,655	$ 90,330
Balance at March 31, 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**

See accompanying notes to the financial statements.

Halifax Regional Water Commission
Statement of cash flows

Year ended March 31, 2016 (in thousands)

		2016		2015
Increase (decrease) in cash and cash equivalents				
Operating				
Comprehensive earnings for the year	**$**	**33,340**	$	5,036
Depreciation and amortization		**23,934**		23,395
Employee benefit obligations		**(10,504)**		16,571
Gains on disposal of plant in service		**158**		445
		46,928		45,447
Change in non-cash operating working capital items (note 7)		**(9,420)**		(11,294)
		37,508		34,153
Financing				
Proceeds from issuance of long term debt		**28,307**		43,730
Contributed capital		**5,013**		7,095
Debt issue costs		**(49)**		(90)
Principal repayment on Harbour Solutions long term debt		**(6,500)**		(16,500)
Principal repayments of long term debt		**(13,373)**		(11,639)
		13,398		22,596
Investing				
Deferred capital contributions		**4,148**		3,187
Proceeds from sale of plant in service		**90**		482
Purchase of capital work in progress		**(10,321)**		(33,331)
Purchase of utility plant in service		**(37,616)**		(26,106)
		(43,699)		(55,768)
Net change in cash and cash equivalents		**7,207**		981
Cash and cash equivalents, beginning of year		**39,271**		38,290
Cash and cash equivalents, end of year	**$**	**46,478**	$	39,271

See accompanying notes to the financial statements.

Halifax Regional Water Commission
Notes to the financial statements

Year ended March 31, 2016 (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 statementshave 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. These are the Commission's first annual financial statements prepared in accordance with IFRS.

An explanation of how the transition from the Accounting and Reporting Handbook for Water Utilities (Handbook) to IFRS as at April 1, 2014 (the date of transition) has affected the reported statement of financial position, earnings and comprehensive income and cash flows of the Commission is provided in note 15.

The financial statements were authorized for issue by the Board on June 30, 2016.

(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:

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 estimated amount for amounts not yet billed. Fire protection revenue is recorded based on approved rates. Other revenues are recorded at the time that 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.

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

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

- Fair value through profit and loss financial instruments are measured at fair value and changes in fair value are recognized in net earnings;

- Available for sale financial assets are measured at fair value with changes in fair value recorded in other comprehensive income until the financial asset is derecognized or impaired at which time the amounts would be recorded in profit or loss; and

- Loans and receivables, held to maturity investments, and other financial liabilities are measured at amortized cost using the effective interest method.

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

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

(l) Provisions

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

(m) Impairments

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

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

(n) Intangibles

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

Intangible assets	10 to 30 years

(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 has 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 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. Management is assessing the impact of this new standard on the financial statements.

IFRS 9 Financial Instruments
The IASB has replaced IAS 39 Financial Instruments: Recognition and Measurement in its entirety with a new standard IFRS 9 Financial Instruments. The final version of the standard introduces a new approach to financial asset classification, replaces the "incurred loss" impairment model with a more forward-looking expected loss model and substantially revises hedge accounting.

The new standard IFRS 9 is effective for annual periods beginning on or after January 1, 2018. Management is assessing the impact of this revised standard on the financial statements.

IFRS 16 Leases
The IASB issued IFRS 16, Leases, which replaces IAS 17, Leases. IFRS 16 provides a single lessee accounting model, requiring the recognition of assets and liabilities for all leases, unless the lease term is twelve months or less or the underlying asset has a low value. Lessor accounting remains largely unchanged from IAS 17.

The new standard IFRS 16 is effective for annual periods beginning on or after January 1, 2019. Management is assessing the impact of this revised standard 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 - $2,500.

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 2016, the Commission funded $627 (2015 - $692) 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 five 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 include 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, 2016, is as follows:

	Pension Plan		Post-retirement benefits		Pre-retirement benefits	
	2016	2015	**2016**	2015	**2016**	2015
Change in accrued benefit obligation						
Balance, beginning of year	**$ 157,296**	$ 125,427	**$ 458**	$ 868	**$3,494**	$ 3,212
Current service cost	**5,777**	4,317	**-**	-	**274**	257
Interest cost	**5,938**	5,722	**11**	30	**130**	147
Past service cost	**(2,787)**	-	**-**	-	**-**	-
Contributions by plan participants	**3,274**	2,893	**-**	-	**-**	-
Benefit payments	**(4,496)**	(3,774)	**(65)**	(66)	**(254)**	(133)
Remeasurements – actuarial (gains)/ losses from changes in demographic assumptions	**(1,101)**	-	**(21)**	(224)	**-**	-
Remeasurements – actuarial (gains)/ losses from changes in financial/experience assumptions	**(11,268)**	22,711	**83**	(150)	**80**	11
Balance, end of year	**152,633**	157,296	**466**	458	**3,724**	3,494
Change in fair value of plan assets						
Balance, beginning of year	**92,291**	77,120	**-**	-	**-**	-
Interest income	**3,644**	3,589	**-**	-	**-**	-
Administrative expenses	**(163)**	(182)	**-**	-	**-**	-
Actual return on plan assets	**(1,896)**	6,314	**-**	-	**-**	-
Benefit payments	**(4,496)**	(3,774)	**(65)**	(66)	**(254)**	(133)
Contributions: Employee	**3,273**	2,894	**-**	-	**-**	-
Employer	**5,715**	6,330	**65**	66	**254**	133
Balance, end of year	**98,368**	92,291	**-**	-	**-**	-
Accrued benefit liability at March 31	**$ 54,265**	$ 65,005	**$ 466**	$ 458	**$ 3,724**	$ 3,494

Administration and pension expense includes pension expense of $5,448 (2015-$6,631).

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

	2016 Pension Plan	2015 Pension Plan	**2016 Post-Retirement Benefits**	2015 Post-Retirement Benefits	**2016 Pre-Retirement Benefit**	2015 Pre-Retirement Benefit
Discount rate	**4.00%**	3.70%	**2.90%**	2.60%	**3.50%**	3.70%
Expected return on plan assets	**4.00%**	3.70%	**2.90%**	2.60%	**3.50%**	3.50%
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	**7.43%**	4.50-7.70%	**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, 2016. 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 $2,287.

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 2016 is $192 (2015 - $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.

	2016	2015
Beginning balance	**$ 3,772**	$ 3,964
Amortization	**(192)**	(192)
Ending balance	**$ 3,580**	$ 3,772

6. Commitments

An agreement with HRM for renewal of the dividend/grant in lieu of taxes for fiscal years 2011 to 2015 for water services was approved by the NSUARB as part of the January 1, 2011 rate decision. There was no dividend/grant in lieu of taxes approved for wastewater/stormwater. The Commission is committed to a payment of $4,578 for the 2017 fiscal year.

At March 31, 2016, the Commission had $74,515 in expenditures from current and past approved capital budgets not yet expended.

7. Supplemental cash flow information

	2016	2015
Changes in non-cash operating working capital items		
Receivables, customer charges and contractual	**$ (2,152)**	$ (6,223)
Payable to/receivable from HRM, net	**(8,204)**	252
Inventory	**(156)**	(83)
Prepaids	**53**	(221)
Payables and accruals, trade	**1,074**	(5,531)
Accrued interest on long term debt	**92**	111
Contractor and customer deposits	**(5)**	8
Unearned revenue	**(122)**	393
	$ (9,420)	$ (11,294)

Interest paid during the year was $8,889 (2015 - $8,958).

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:

	2016	2015
Long term debt (current portion)	**$ 23,195**	$ 22,374
Long term debt	**215,794**	208,231
Funded debt	**238,989**	230,605
Equity	**123,670**	90,330
Capital under management	**$ 362,659**	$ 320,935

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.

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:

		2016		2015
Receivables				
Customer charges, contractual and unbilled	**$**	**33,754**	$	31,432
Less: allowance for doubtful accounts		**(1,941)**		(1,772)
	$	**31,813**	$	29,660

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

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

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

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

10. Related party transactions

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

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

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

A Service Level Agreement outlining the terms for exchange of services between the Commission and HRM was executed during the year. 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 $4,705 (2015 - $4,726).
- The Commission recorded fire protection revenue from HRM of $8,032 (2015 - $8,953).
- The Commission paid a grant in lieu of tax of $4,528 (2015 - $4,340).
- 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%.
- A Memorandum of Agreement was executed between the Commission and HRM, and subsequently approved by the NSUARB approving the exchange of certain responsibilities regarding intrusion of tree roots in sewer laterals, and adjustments of appurtenances such as manholes and valve boxes.

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:

		2016		2015
Short term benefits	**$**	**1,481**	$	1,379
Post-employment benefits		**233**		266
Total compensation	**$**	**1,714**	$	1,645

11. Intangible assets

		2016		2015
Cost				
Beginning balance, April 1	**$**	**11,669**	$	11,480
Additions		**563**		189
Total cost, March 31		**12,232**		11,669
Accumulated depreciation				
Beginning balance, April 1		**997**		-
Depreciation		**1,034**		997
Total accumulated depreciation, March 31		**2,031**		997
Net book value	**$**	**10,201**	$	10,672

Halifax Regional Water Commission
Notes to the financial statements

Year ended March 31, 2016 (in thousands)

12. Utility plant in service

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tolls and work equipment	Total
Cost						
Beginning balance, April 1, 2015	**$ 18,983**	**$ 199,526**	**$ 204,678**	**$ 597,781**	**$ 7,838**	**$ 1,028,804**
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**	**657,276**	**12,291**	**1,111,211**
Accumulated depreciation						
Beginning balance, April 1, 2015	**-**	**10,690**	**11,254**	**9,877**	**(436)**	**31,388**
Depreciation	**-**	**10,871**	**11,460**	**10,650**	**2,112**	**35,093**
Total accumulated depreciation March 31, 2016	**-**	**21,561**	**22,714**	**20,527**	**1,676**	**66,481**
Net book value, March 31, 2016	**$ 20,518**	**$ 185,383**	**$ 191,468**	**$ 636,749**	**$ 10,615**	**$ 1,044,733**

	Land	Structures and improvements	Treatment and network equipment	Distribution and collection network	Tools and work equipment	Total
Cost						
Beginning balance, April 1, 2014	$ 19,126	$ 197,173	$ 201,767	$ 567,078	$ 8,583	$ 993,727
Additions	54	2,394	10,792	31,391	2,424	47,055
Disposals	(197)	(41)	(7,883)	(688)	(3,169)	(11,978)
Total cost, March 31, 2015	18,983	199,526	204,676	597,781	7,838	1,028,804
Accumulated depreciation						
Beginning balance, April 1, 2014	-	-	-	-	-	-
Depreciation	-	10,690	11,254	9,877	(436)	31,385
Total accumulated depreciation March 31, 2015	-	10,690	11,254	9,877	(436)	31,385
Net book value, March 31, 2015	$ 18,983	$ 188,836	$ 193,422	$ 587,904	$ 8,274	$ 997,419

13. Long-term debt

	Interest rates	2016	2015
Payable to Municipal Finance Corporation (MFC)			
Water	1.200% to 8.000%	**$ 72,356**	$ 69,039
Halifax Harbour Solutions	0.900% to 4.329%	**9,100**	9,750
Wastewater/stormwater	1.200% to 4.500%	**88,228**	78,333
Stormwater	1.200% to 4.114%	**11,699**	8,923
		181,383	166,045
Payable to Halifax Regional Municipality			
MFC Wastewater/stormwater	1.200% to 4.940%	**58,762**	65,666
		240,145	231,711
Less: debt issue costs		**(1,156)**	(1,106)
		238,989	230,605
Less: amount payable within one year		**(23,195)**	(22,374)
		$ 215,794	$ 208,231

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:

2017	$ 23,195
2018	$ 21,036
2019	$ 21,576
2020	$ 16,206
2021	$ 15,980

14. Operating expenditures by nature

	2016	2015
Salaries and benefits	**$ 34,854**	$ 38,590
Training	**409**	450
Contract services	**16,556**	14,011
Electricity	**6,964**	6,749
Professional services	**3,878**	3,809
Operating supplies	**12,674**	12,314
Depreciation and amortization	**36,341**	34,912
	$ 111,676	$ 110,835

15. Explanation of transition to IFRS

This is the first year that the Commission has presented its financial statements under IFRS. The accounting policies set out in note 2 have been applied in preparing the financial statements for the year ended March 31, 2016, the comparative information presented in these financial statements for the year ended March 31, 2015, and in the preparation of an opening IFRS statement of financial position as at April 1, 2014, (the Commission's date of transition to IFRS). An explanation of how the transition from the Handbook to IFRS has affected the financial position, equity, financial performance and cash flows is set out in the following tables and the accompanying notes.

The IFRS 1 applicable exemptions and exceptions applied in the conversion from the Handbook to IFRS are as follows:

Deemed cost for utility plant in service and intangible assets
The Commission has elected the deemed cost exemption applicable to entities subject to rate regulation as described under IFRS 1. The election permits the Commission, at the date of transition to IFRS, to use the previous Handbook carrying amount of items of utility plant in service and intangible assets as deemed cost (thereby eliminating any accumulated depreciation balances existing at the date of transition); hence there will be no impact on equity for opening balances of utility plant in service and intangible assets at the date of transition. In accordance with the election, the Commission has tested these items of utility plant in service and intangible assets at the date of transition to IFRS for impairment and no such losses were identified.

Effect on the statement of financial position

		March 31, 2015 (Date of last Handbook statements)			April 1, 2014 (Date of transition)		
	Note	Handbook	Effect of transition to IFRS	IFRS	Handbook	Effect of transition to IFRS	IFRS
Assets							
Current							
Cash and cash equivalents		$ 39,271	$ -	$ 39,271	$ 38,290	$ -	$ 38,290
Receivables							
Customer charges and contractual		29,660	-	29,660	23,437	-	23,437
Halifax Regional Municipality		3,743	-	3,743	818	-	818
Inventory		1,528	-	1,528	1,445	-	1,445
Prepaids		915	-	915	694	-	694
		75,117	-	75,117	64,684	-	64,684
Regulatory asset		3,772	-	3,772	3,964	-	3,964
Capital work in progress		41,423	-	41,423	10,676	-	10,676
Intangible assets	c	-	10,672	10,672	-	11,480	11,480
Utility plant in service	c	1,013,765	(16,346)	997,419	1,005,207	(11,480)	993,727
		$ 1,134,077	$ (5,674)	$ 1,128,403	$ 1,084,531	$ -	$ 1,084,531
Liabilities							
Current							
Payables and accruals							
Trade	a	$ 14,645	$ 967	$ 15,612	$ 20,202	$ 941	$ 21,143
Interest on long term debt		2,137	-	2,137	2,026	-	2,026
Halifax Regional Municipality		6,973	-	6,973	3,796	-	3,796
Contractor and customer deposits		198	-	198	190	-	190
Current portion of deferred contributed capital	d	-	21,603	21,603	-	19,637	19,637
Current portion of long term debt		22,374	-	22,374	28,139	-	28,139
Unearned revenue		511	-	511	118	-	118
		46,838	22,570	69,408	54,471	20,578	75,049
Deferred contributed capital	d	-	691,477	691,477	-	684,837	684,837
Long term debt		208,231	-	208,231	186,964	-	186,964
Employee benefit obligation - pension liability	a	10,796	54,209	65,005	10,234	38,073	48,307
Employee benefit obligation - post-retirement benefits	a	604	(146)	458	617	251	868
Employee benefit obligation - pre-retirement benefit	a	3,425	69	3,494	3,159	53	3,212
		269,894	768,179	1,038,073	255,445	743,792	999,237
Equity							
Accumulated other comprehensive (loss)	a	-	(54,325)	(54,325)	-	(38,120)	(38,120)
Accumulated surplus	b, c, d	864,183	(719,528)	144,655	829,086	(705,672)	123,414
		864,183	(773,853)	90,330	829,086	(743,792)	85,294
		$ 1,134,077	$ (5,674)	$ 1,128,403	$ 1,084,531	$ -	$ 1,084,531

Halifax Regional Water Commission
Notes to the financial statements

Year ended March 31, 2016 (in thousands)

Effect on the statement of earnings and comprehensive earnings

	Note	March 31, 2015 (Date of last Handbook statements) Handbook	Effect of transition to IFRS	IFRS
Operating revenues				
Water service		$ 39,583	$ -	$ 39,583
Wastewater service		67,770	-	67,770
Stormwater service		10,951	-	10,951
Fire protection		8,953	-	8,953
Private fire protection services		558	-	558
Other operating revenue		2,505	-	2,505
		130,320	-	130,320
Expenses				
Water supply and treatment		8,090	-	8,090
Water transmission and distribution		9,139	-	9,139
Wastewater collection		11,210	-	11,210
Stormwater collection		3,992	-	3,992
Wastewater treatment		20,296	-	20,296
Engineering and information services		6,770	-	6,770
Environmental services		2,656	-	2,656
Customer service		4,121	-	4,121
Administration and pension	a	10,072	(423)	9,649
Depreciation and amortization	c, d	18,042	17,062	35,104
		94,388	16,639	111,027
Earnings from operations before financial and other revenues and expenditures		35,932	(16,639)	19,293
Financial and other revenues				
Interest		836	-	836
Contributed capital	d	-	12,792	12,792
Other		2,294	-	2,294
		3,130	12,792	15,922
Expenses				
Interest on long term debt		8,958	-	8,958
Repayment of long term debt	b	18,638	(18,638)	-
Amortization of debt discount		163	-	163
Grant in lieu of taxes		4,340	-	4,340
Other	c, d	68	445	513
		32,167	(18,193)	13,974
Earnings for the year		6,895	14,346	21,241
Comprehensive earnings				
Remeasurement on defined benefit plans	a	-	(16,205)	(16,205)
Total comprehensive earnings		$ 6,895	$ (1,859)	$ 5,036

Notes to the reconciliations

a. *Employee benefit obligation*
Under IFRS, the Commission recognizes actuarial gains and losses for defined benefit plans in other comprehensive income in the period in which they arise. Under the Handbook, actuarial gains and losses for post-employment defined benefit plans were deferred and subject to amortization under the 'corridor method', and actuarial gains and losses for other-long term employee benefits were deferred and amortized over a period that was linked to the type of benefit. The effect of the change was an increase of $38,377 to employee benefit obligations. For the year ended March 31, 2015, the Commission recorded additional expenses of ($423) and ($16,205) to other administration and pension and comprehensive income, respectively, related to its employee benefit obligations. In addition, short term employee benefits were recorded which were not previously recorded under the Handbook.

b. *Debt servicing*
Under IFRS, the principle portion of debt servicing is not recognized in net earnings. Under the Handbook, the debt servicing was recognized as an expense in the statement of net earnings.

c. *Utility plant in service and intangibles*
Utility plant in service has been componentized in additional detail with the adoption of IFRS, specifically buildings and treatment plants. Some depreciation rates are higher with the componentization, reflecting shorter useful lives and increased depreciation which has increased the depreciation expense and accumulated depreciation. Additionally, depreciation will commence for pre-1985 assets that were not previously depreciated under the Handbook. As a result, accumulated depreciation has increased on adoption of IFRS. In addition, intangibles have been reclassified from utility plant in service.

d. *Deferred contributed capital*
Under IFRS, contributions of utility plant in service are recorded as deferred contributed capital and are recognized as revenue on a straight-line basis over the useful life of the contributed asset in the statement of earnings. As a result, an adjustment was made to reallocate contributed capital in equity to deferred contributed capital on the statement of financial position.

Halifax Regional Water Commission
Schedule of utility plant in service

Year ended March 31, 2016 (in thousands)

Schedule A

Water	Land	Structures and improvements	Pumping equipment	Purification equipment	SCADA equipment	Transmission and distribution mains	Services	Meters	Hydrants	Aerotech and small systems	Tools and work equipment	Total
Cost												
Beginning balance, April 1, 2015												
Cost	$ 14,524	$ 63,207	$ 3,438	$ 9,641	$ 1,278	$ 265,628	$ 28,284	$ 9,446	$ 15,262	$ 7,775	$ 4,107	$ 422,590
Additions	701	1,446	-	553	170	9,918	1,081	626	587	68	2,301	17,451
Disposals	(70)	-	-	-	-	-	-	(506)	-	-	(121)	(697)
Total cost, March 31, 2016	15,155	64,653	3,438	10,194	1,448	275,546	29,365	9,566	15,849	7,843	6,287	439,344
Accumulated depreciation												
Beginning balance, April 1, 2015	-	3,507	255	898	86	3,888	871	344	279	385	673	11,186
Depreciation	-	3,413	250	919	114	4,167	897	260	288	385	1,233	11,926
Total accumulated depreciation, March 31, 2016	-	6,920	505	1,817	200	8,055	1,768	604	567	770	1,906	23,112
Net book value, March 31, 2016	$ 15,155	$ 57,733	$ 2,933	$ 8,377	$ 1,248	$ 267,491	$ 27,597	$ 8,962	$ 15,282	$ 7,073	$ 4,381	$ 416,232
Cost												
Beginning balance, April 1, 2014												
Cost	$ 14,667	$ 62,160	$ 3,438	$ 9,376	$ 812	$ 249,654	$ 27,133	$ 8,813	$ 14,775	$ 7,556	$ 3,828	$ 402,212
Additions	54	1,060	-	265	466	16,662	1,151	1,021	487	219	956	22,341
Disposals	(197)	(13)	-	-	-	(688)	-	(388)	-	-	(677)	(1,963)
Total cost, March 31, 2015	14,524	63,207	3,438	9,641	1,278	265,628	28,284	9,446	15,262	7,775	4,107	422,590
Accumulated depreciation												
Beginning balance, April 1, 2014	-	-	-	-	-	-	-	-	-	-	-	-
Depreciation	-	3,507	255	898	86	3,888	871	344	279	385	673	11,186
Total accumulated depreciation, March 31, 2015	-	3,507	255	898	86	3,888	871	344	279	385	673	11,186
Net book value, March 31, 2015	$ 14,524	$ 59,700	$ 3,183	$ 8,743	$ 1,192	$ 261,740	$ 27,413	$ 9,102	$ 14,983	$ 7,390	$ 3,434	$ 411,404

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, 2016 (in thousands)

Wastewater

	Land	Structures and improvements	Pumping equipment	Treatment equipment	SCADA equipment	Collection system	Laterals	Tools and work equipment	Aerotech and small systems	Total
Cost										
Beginning balance, April 1, 2015										
Cost	$ 4,459	$ 127,703	$ 9,945	$ 130,711	$ 7,214	$ 203,592	$ 13,064	$ 2,406	$ 9,968	$ 509,062
Additions	870	5,782	6,599	799	441	33,495	2,500	2,343	198	53,027
Disposals	-	-	(29)	-	-	-	-	(701)	-	(730)
Total cost, March 31, 2016	5,329	133,485	16,515	131,510	7,655	237,087	15,564	4,048	10,166	561,359
Accumulated depreciation										
Beginning balance, April 1, 2015	-	7,048	5,173	2,962	384	3,365	246	(1,281)	490	18,388
Depreciation	-	7,285	434	7,913	403	3,630	298	624	494	21,081
Total accumulated depreciation, March 31, 2016	-	14,334	5,607	10,875	787	6,995	544	(657)	984	39,469
Net book value, March 31, 2016	$ 5,329	$ 119,151	$ 10,908	$ 120,635	$ 6,868	$ 230,092	$ 15,020	$ 4,705	$ 9,182	$ 521,890
Cost										
Beginning balance, April 1, 2014										
Cost	$ 4,459	$ 127,129	$ 2,643	$ 138,154	$ 6,498	$ 199,298	$ 10,359	$ 3,840	$ 9,704	$ 502,084
Additions	-	574	7,302	52	716	4,294	2,705	1,058	264	16,965
Disposals	-	-	-	(7,495)	-	-	-	(2,492)	-	(9,987)
Total cost, March 31, 2015	4,459	127,703	9,945	130,711	7,214	203,592	13,064	2,406	9,968	509,062
Accumulated depreciation										
Beginning balance, April 1, 2014	-	-	-	-	-	-	-	-	-	-
Depreciation	-	7,048	5,173	2,962	384	3,365	246	(1,281)	490	18,387
Total accumulated depreciation, March 31, 2015	-	7,048	5,173	2,962	384	3,365	246	(1,281)	490	18,387
Net book value, March 31, 2015	$ 4,459	$ 120,655	$ 4,772	$ 127,749	$ 6,830	$ 200,227	$ 12,818	$ 3,687	$ 9,478	$ 490,675

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, 2016 (in thousands)

Stormwater

	Structures and improvements	Collection system	Laterals	Tools and work equipment	Total
Cost					
Beginning balance, April 1, 2015					
Cost	$ 8,617	$ 84,754	$ 2,459	$ 1,325	$ 97,155
Additions	188	11,168	1,367	634	13,357
Disposals	-	-	-	-	-
Total cost, March 31, 2016	8,805	95,922	3,826	1,959	110,512
Accumulated depreciation					
Beginning balance, April 1, 2015	136	1,459	48	172	1,815
Depreciation	173	1,593	65	255	2,086
Total accumulated depreciation, March 31, 2016	309	3,052	113	427	3,901
Net book value, March 31, 2016	$ 8,496	$ 92,870	$ 3,713	$ 1,532	$ 106,611
Cost					
Beginning balance, April 1, 2014					
Cost	$ 7,885	$ 78,468	$ 2,166	$ 915	$ 89,434
Additions	760	6,286	293	410	7,749
Disposals	(28)	-	-	-	(28)
Total cost, March 31, 2015	8,617	84,754	2,459	1,325	97,155
Accumulated depreciation					
Beginning balance, April 1, 2014	-	-	-	-	-
Depreciation	136	1,459	48	172	1,815
Total accumulated depreciation, March 31, 2015	136	1,459	48	172	1,815
Net book value, March 31, 2015	$ 8,481	$ 83,295	$ 2,411	$ 1,153	$ 95,340

During the year, $491 of interest was capitalized to Utility Plant in Service (2015 - $373).

Cumulative utility plant in service	**Water**	**Wastewater**	**Stormwater**	**Total**
Net book value, March 31, 2016	$ 416,232	$ 521,890	$ 106,611	$ 1,044,733
Net book value, March 31, 2015	$ 411,404	$ 490,675	$ 95,340	$ 997,419

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, 2016 (in thousands)

	Interest rate	Final Maturity	Balance Remaining 2016	2015
Payable to Municipal Finance Corporation				
Water				
Debenture 23 A 1	4.250% to 6.125%	2018	$ 800	$ 900
Debenture 25 A 1	2.970% to 4.560%	2016	2,500	2,750
Debenture 96 A 1	5.500% to 8.000%	2016	2,200	160
Debenture 26 A 1	4.350% to 4.880%	2016	80	2,400
Debenture 27 A 1	4.650% to 5.010%	2017	2,165	3,175
Debenture 28 A 1	3.750% to 5.088%	2018	10,383	1,400
Debenture 98 A 1	5.625% to 6.125%	2019	900	13,448
Debenture 99 A 1	6.500% to 6.750%	2019	1,300	1,125
Debenture 30 B 1	1.550% to 3.870%	2020	875	1,050
Debenture 31 A 1	1.630% to 4.221%	2021	900	1,050
Debenture 32 A 1	1.636% to 3.480%	2022	1,400	1,600
Debenture 32 C 1	1.510% to 3.160%	2022	9,124	9,661
Debenture 33 A 1	1.330% to 3.489%	2023	9,101	9,607
Debenture 33 B 1	1.285% to 4.114%	2023	6,671	7,041
Debenture 34 B 1	1.200% to 3.190%	2024	12,989	13,672
Debenture 35 B 1		2025	10,967	-
Halifax Harbour Solutions				
Debenture 29 A 1	0.900% to 4.329%	2019	9,100	9,750
Wastewater/stormwater				
Debenture 30 A 1	1.510% to 4.500%	2020	2,550	2,720
Debenture 32 A 1	1.636% to 3.480%	2022	2,037	2,157
Debenture 32 B 1	1.380% to 3.156%	2022	27,200	28,800
Debenture 32 C 1	1.510% to 3.160%	2022	3,906	4,136
Debenture 33 A 1	1.330% to 3.489%	2023	15,174	16,017
Debenture 33 B 1	1.285% to 4.114%	2023	9,804	10,348
Debenture 34 A 1	1.245% to 3.347%	2024	5,291	5,569
Debenture 34 B 1	1.200% to 3.190%	2024	8,157	8,586
Debenture 35 B 1		2025	14,110	-
Stormwater				
Debenture 33 A 1	1.330% to 3.489%	2023	486	513
Debenture 33 B 1	1.285% to 4.114%	2023	2,375	2,507
Debenture 34 B 1	1.200% to 3.190%	2024	5,608	5,903
Debenture 35 B 1		2025	3,230	-
			181,383	166,045
Payable to Halifax Regional Municipality				
Municipal Finance Corporation – Wastewater/stormwater				
Debenture 24 B 1	2.840% to 5.940%	2024	49,500	55,000
Debenture 25 A 1	2.970% to 4.560%	2015	-	174
Debenture 25 B 1	3.630% to 4.830%	2020	-	34
Debenture 26 A 1	4.350% to 4.880%	2016	126	251
Debenture 26 B 1	4.265% to 4.410%	2016	5	10
Debenture 27 A 1	4.650% to 5.010%	2017	131	197
Debenture 34 B 1	1.200% to 3.190%	2024	9,000	10,000
			58,762	65,666
			240,145	231,711
Less: debt issue costs			1,156	1,106
			238,989	230,605
Less: amount payable within one year			23,195	22,374
			$ 215,794	$ 208,231

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:

2017	$ 23,195
2018	$ 21,036
2019	$ 21,576
2020	$ 16,206
2021	$ 15,980

Halifax Regional Water Commission
Schedule of operations for water service

Schedule C

Year ended March 31, 2016 (in thousands)

		2016		2015
Operating revenues				
Water service	**$**	**43,193**	$	39,583
Fire protection		**8,032**		8,953
Private fire protection services		**679**		558
Other operating revenue				
Bulk water stations		**265**		286
Customer late payment fees		**198**		189
Miscellaneous		**181**		128
		52,548		49,697
Operating expenditures				
Water supply and treatment		**8,232**		7,909
Water transmission and distribution		**9,485**		9,319
Engineering and information services		**3,528**		3,490
Environmental services		**505**		656
Customer service		**2,268**		2,101
Administration and pension		**4,919**		5,163
Depreciation		**8,411**		7,387
		37,348		36,025
Earnings from operations before financial and other revenues and expenditures		**15,200**		13,672
Financial and other revenues				
Interest		**442**		417
Other		**434**		218
		876		635
Financial and other expenditures				
Interest on long term debt		**2,531**		2,553
Repayment of long term debt		**7,766**		7,020
Amortization of debt discount		**90**		83
Grant in lieu of taxes		**4,528**		4,340
Other		**29**		67
		14,944		14,063
Earnings for the year	**$**	**1,132**	$	244

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

Schedule D

Halifax Regional Water Commission
Schedule of operations for wastewater service

Year ended March 31, 2016 (in thousands)

		2016		2015
Operating revenues				
Wastewater service	**$**	**66,601**	$	67,770
Other operating revenue				
Leachate and other contract revenue		**424**		431
Septage tipping fees		**648**		608
Overstrength surcharge		**135**		140
Customer late payment fees		**238**		236
Miscellaneous		**382**		384
		68,428		69,569
Operating expenditures				
Wastewater collection		**10,578**		11,211
Wastewater treatment		**19,286**		20,296
Engineering and information services		**3,010**		2,723
Environmental services		**1,134**		1,353
Customer service		**1,877**		1,677
Administration and pension		**4,095**		4,074
Depreciation		**11,975**		10,242
		51,955		51,576
Earnings from operations before financial and other revenues and expenditures		**16,473**		17,993
Financial and other revenues				
Interest		**441**		419
Other		**2,054**		2,074
		2,495		2,493
Financial and other expenditures				
Interest on long term debt		**5,786**		5,930
Repayment of long term debt		**11,462**		10,770
Amortization of debt discount		**89**		76
		17,337		16,776
Earnings for the year	**$**	**1,631**	$	3,710

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

Halifax Regional Water Commission — Schedule E

Schedule of operations for stormwater service

Year ended March 31, 2016 (in thousands)

		2016		2015
Operating revenues				
Stormwater site generated service	$	**6,713**	$	7,070
Stormwater right-of-way service		**3,881**		3,881
Other operating revenue				
Customer late payment fees		**63**		12
Miscellaneous		**82**		91
		10,739		11,054
Operating expenditures				
Stormwater collection		**4,236**		3,992
Engineering and information services		**480**		557
Environmental services		**729**		647
Customer service		**305**		343
Administration and pension		**666**		834
Depreciation		**523**		412
		6,939		6,785
Earnings from operations before financial and other expenditures		**3,800**		4,269
Financial and other expenditures				
Interest on long term debt		**571**		475
Repayment of long term debt		**1,100**		848
Amortization of debt discount		**8**		4
		1,679		1,327
Earnings for the year	$	**2,121**	$	2,942

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

Schedule F

Halifax Regional Water Commission
Schedule of regulated activities

Year ended March 31, 2016 (in thousands)

		2016		2015
Operating revenues				
Water service	**$**	**43,193**	$	39,583
Wastewater service		**66,601**		67,770
Stormwater service		**10,594**		10,951
Public fire protection		**8,032**		8,953
Private fire protection services		**679**		558
Other operating revenue		**1,262**		1,167
		130,361		128,982
Operating expenditures				
Water supply and treatment		**9,308**		8,982
Water transmission and distribution		**10,534**		10,289
Wastewater collection		**9,537**		10,175
Stormwater collection		**4,186**		3,925
Wastewater treatment		**17,421**		18,446
Engineering and information services		**7,018**		6,770
Environmental services		**2,369**		2,656
Customer service		**4,415**		4,093
Administration and pension		**9,660**		10,042
Depreciation		**20,903**		18,036
		95,351		93,414
Earnings from operations before financial and other revenues and expenditures		**35,010**		35,568
Financial and other revenues				
Interest		**883**		836
Other		**2,055**		2,096
		2,938		2,932
Financial and other expenditures				
Interest on long term debt		**8,889**		8,958
Repayment of long term debt		**20,328**		18,638
Amortization of debt discount		**186**		163
Grant in lieu of taxes		**4,528**		4,340
Other		**158**		-
		34,089		32,099
Earnings for the year	**$**	**3,859**	$	6,401

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

Halifax Regional Water Commission
Schedule of unregulated activities

Schedule F

Year ended March 31, 2016 (in thousands)

		2016		2015
Operating revenues				
Dewatering	**$**	**210**	$	210
Septage tipping fees		**648**		608
Leachate treatment and contract revenue		**424**		431
Airplane effluent		**51**		69
Other operating revenue		**219**		30
		1,552		1,348
Operating expenditures				
Water supply and treatment		**10**		12
Wastewater treatment		**822**		898
Other		**68**		119
Depreciation		**6**		6
		906		1,035
Earnings from operations before financial and other revenues and expenditures		**646**		313
Financial and other revenues				
Other		**248**		252
Financial and other expenditures				
Other		**(128)**		67
Earnings for the year	**$**	**1,022**	$	498

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

Schedule G

Halifax Regional Water Commission
Nova Scotia Utility and Review Board information

Year ended March 31, 2016 (in thousands)

	2016	2015
Return on rate base		
Rate of return on rate base for water service	3.64%	3.21%
Rate of return on rate base for wastewater service	6.18%	6.82%
Rate of return on rate base for stormwater service	15.45%	21.26%

Special purpose reserves

	Wastewater & Stormwater Reserves	RDC Water Reserve	RDC Wastewater Reserve	Other Capital Reserves	**2016 Total**	2015 Total
Reserve, beginning of year	$ 19,211	$ 136	$ 5,316	$ 212	**$ 24,875**	$ 18,030
Contributions and interest	-	638	4,374	-	**5,012**	7,095
Expenditures	(15,573)	-	(6,037)	(207)	**(21,817)**	(250)
Reserve, end of year	$ 3,638	$ 774	$ 3,653	$ 5	**$ 8,070**	$ 24,875

Summarized consolidated operating results

	Actual 2016	Actual 2015
Operating revenues	**$ 131,716**	$ 130,320
Operating expenditures	**96,243**	94,387
Earnings from operations before financial and other revenues and expenditures	**35,473**	35,933
Non-operating revenues	**3,370**	3,219
Non-operating expenditures	**33,961**	32,166
Earnings for the year	**$ 4,882**	$ 6,896

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