902.H2O.WATR
902.420.9287
450 Cowie Hill Road
P.O. Box 8388 RPO CSC
Halifax, Nova Scotia
Canada B3K 5M1

November 23, 2018

Ray Ritcey, Chair
Halifax Water
Halifax, NS

The regular meeting of the Halifax Water Board will be held on Thursday, November 29, 2018 at 9:00 a.m. in the Boardroom at 450 Cowie Hill Road, Halifax.

AGENDA

In Camera Reports

1C Approval of Minutes of the In-Camera Meeting held on Thursday, September 27, 2018

2C Business Arising from Minutes
a) Personnel Matter – *Verbal*

3C Personnel Matter

4C Land Matter

Regular Reports

1. a) Ratification of In-Camera Motions
b) Approval of the Order of Business and Approval of Additions and Deletions

2. Approval of Minutes of the Regular Meeting held on Thursday, September 27, 2018

3. Business Arising from Minutes
a)

Financial

4 Operating Results for the Seven Months ended October 31, 2018

Capital

5.1 Quinpool Road CN Utility Bridge – Additional Funding $1,473,000
5.2 Roach's Pond Pumping Station (PS) Component Upgrade ..... $ 360,000

TOTAL: ..... $**1,833,000**

Other

6. National Disaster Mitigation Program – Flood Risk Assessment Study
7. Board of Commissioners Travel & Expense Policy

Information Reports

1-I Operations and Financial Monthly Update
2-I Capital Budget Approvals to Date
3-I Bank Balance
4-I 2018/19 Q2 Cost Containment
5-I Halifax Regional Water Commission Employees' Pension Plan Financial Report – 3rd Quarter (Q3), 2018
6-I Stormwater Billing Update

Original Signed By

James G. Spurr
Secretary

HALIFAX REGIONAL WATER COMMISSION
MINUTES

September 27, 2018

PRESENT: Commissioner Ray Ritcey, Chair
Commissioner Russell Walker, Vice Chair
Commissioner Jacques Dube
Commissioner Darlene Fenton
Commissioner Steve Streatch
Commissioner Lorelei Nicoll
Commissioner Lisa Blackburn
Commissioner Craig MacMullin

REGRETS:

STAFF: Carl Yates, General Manager, HRWC
Cathie O'Toole, Director, Corporate Services, HRWC
James Spurr, Legal Counsel, HRWC
Lorna Skinner, Administrative Assistant, HRWC

TABLE OF CONTENTS

CALL TO ORDER

The Chair called the regular meeting to order at 9:03 a.m. in the Board Room of the HRWC, 450 Cowie Hill Road. The Board moved In Camera at 9:03 and the regular meeting reconvened at 10:20 a.m.

1.a) RATIFICATION OF IN CAMERA MOTIONS

MOVED BY Commissioner Blackburn, seconded by Commissioner Nicoll that the Halifax Regional Water Commission Board ratify the In Camera motions.

MOTION PUT AND PASSED.

1.b) APPROVAL OF THE ORDER OF BUSINESS AND APPROVAL OF ADDITIONS AND DELETIONS

MOVED BY Commissioner Nicoll, seconded by Commissioner Fenton that the Halifax Regional Water Commission Board approve the order of business and approve additions and deletions.

MOTION PUT AND PASSED

2.a) APPROVAL OF MINUTES – June 21, 2018 and July 20, 2018

MOVED BY Commissioner Fenton, seconded by Commissioner MacMullin that the Halifax Regional Water Commission Board approve the minutes of the regular meeting of June 21, 2018, and the special meeting of July 20, 2018.

MOTION PUT AND PASSED.

3. BUSINESS ARISING FROM MINUTES

a) HIAA Complaint Update

Cathie O'Toole informed the Board that the NSUARB Decision in this matter has been released. The NSUARB ruled entirely in Halifax Water's favour. Since then the HIAA has been in contact with HW to begin discussions on how to resolve the compliance issues of their tenants.

b) Solar Photovoltaic Project Application Update

Carl Yates informed the Board that the application was successful for a 75 kilowatt solar array system at the Pockwock site.

c) Investing in Canada Infrastructure Program Update

Carl Yates stated that the Board has approved the Master List projects and the list was

subsequently forwarded to HRM for endorsement with their own list of projects. The final list has been sent via the Province to the Federal Government for their consideration.

4.1 OPERATING RESULTS FOR THE FIVE MONTHS ENDED AUGUST 31, 2018

A report dated September 18, 2018 was submitted.

Cathie O'Toole gave a brief overview of the operating results. She did note that this was the first time in 14 years that water consumption increased. She also noted that a new table was added was "Cash On Hand".

4.2 CAPITAL PROJECT SPENDING SUMMARY – 2017/18

A report dated September 21, 2018, was submitted.

MOVED BY Commissioner MacMullin, seconded by Commissioner Nicoll that the Halifax Regional Water Commission Board approve the individual project over expenditures as identified within Attachment 2, "*Capital Project Spending Summary, April 1, 2017 – March 31, 2018"* and direct staff to forward the subset of projects "over $250,000" to the NSUARB for information and approval

MOTION PUT AND PASSED.

5. CAPITAL PROJECTS

5.1 JD Kline – Raw Water Intake Traveling Screen Replacement Program

A report dated September 14, 2018, was submitted.

5.2 Doyle Street Storm Sewer – Phase 2

A report dated September 21, 2018, was submitted.

5.3 Leiblin Drive Booster Station – Replacement of Diesel Fire Pump

A report dated September 21, 2018, was submitted.

5.4 Bissett Forcemain Replacement – AC Pipe Removal Funding

A report dated September 21, 2018, was submitted.

5.5 2018/19 Coburg Road WM Renewal and Coburg Road WW Integrated Project – Additional Funding

MOVED BY Commissioner Streatch, seconded by Commissioner Nicoll that the Halifax Regional Water Commissioner Board approve all Capital Projects Items 5.1 – 5.5 as noted above.

MOTION PUT AND PASSED.

6. 2018 FALL DEBENTURE

A report dated September 18, 2018, was submitted.

MOVED BY Commissioner MacMullin, seconded by Commissioner Blackburn that the Halifax Regional Water Commission Board:

1. **Approve the financing of $15,000,000 for a 10-year term with a twenty year amortization schedule and an all-inclusive rate not to exceed 5.5%**

MOTION PUT AND PASSED.

7. BOARD MEETING FORMAT

A report dated September 21, 2018, was submitted.

There was a significant discussion regarding the opening of HW Board meetings to the general public. While the current level of transparency was deemed to be extensive, it was the consensus of the Board that there were benefits to changing the current format to a public forum.

MOVED BY Commissioner Walker, seconded by Commissioner Nicoll that the Halifax Regional Water Commission Board begin the process to conduct open Board meetings for the public to observe its deliberations on the matters which come before it. It is further recommended that Halifax Water retain a portion of its Board meetings for in camera discussion of certain matters, including those listed in the "DISCUSSION" section of the report.

MOTION PUT AND PASSED.

8. DATE OF NEXT MEETING

The next meeting is scheduled for November 29, 2018.

The meeting was adjourned at 11:23 a.m.

Original Signed By:
James G. Spurr
Secretary

Original Signed By:
Commissioner Ray Ritcey
Chair

The following Information Items were submitted:

1-I Operations and Financial Monthly Update
2-I Capital Budget Approvals to Date
3-I Bank Balance
4-I 2017/2018 Annual Report
5-I 2018/19 Capital Budget Update
6-I HRM Pension Plan Investment Performance – 2nd Quarter 2018
7-I HRWC Employees' Pension Plan Financial Report – 2nd Quarter 2018
8-I Lake Major Water Levels

ITEM # 4
HRWC Board
November 29, 2018

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA/CGA, Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: November 16, 2018

SUBJECT: **Operating Results for the Seven Months Ended October 31, 2018**

INFORMATION REPORT

ORIGIN

Financial Statements

BACKGROUND

The Board is required to review periodic financial information throughout the year.

DISCUSSION

Attached are the operating results for the first seven (7) months of the 2018/19 fiscal year, period ending October 31, 2018. The statements reflect direct operating costs by department and allocations among water, wastewater and stormwater for common costs shared across all the services provided by Halifax Regional Water Commission (HRWC).

HRWC is a fully regulated government business enterprise, falling under the jurisdiction of the Nova Scotia Utility and Review Board (NSUARB). The NSUARB requires that HRWC file Financial Statements and rate applications with the Board based on the NSUARB Handbook for Accounting and Reporting for Water Utilities. The Accounting Standards Board (AcSB) requires rate regulated entities to conform to International Financial Reporting Standards (IFRS). The Commission maintains the SAP financial records in IFRS for the purposes of the annual audit and consolidation of the financial statements with those of Halifax Regional Municipality (HRM). The budget for the 2018/19 fiscal year was prepared using the NSUARB format and financial results continue to be provided in NSUARB format.

Summary information is provided for the Balance Sheet on Page 1 and the Income Statement on Page 2. A detailed presentation of the Balance Sheet and Income Statement is provided on Pages 3 and 4. Pages 5 through 8 provide Income Statements by Service and for Regulated and Un-Regulated Services. Pages 9 and 10 provide the Balance Sheet and Income Statement in IFRS format.

Consolidated Income Statement - Page 2

Summarized Consolidated Operating Results				
	Actual YTD 2018/19 '000	Actual YTD 2017/18 '000	$ Change	% Change
Operating Revenue	**$84,340**	$83,138	$1,202	1.4%
Operating Expenses	**$57,765**	$55,331	$2,433	4.4%
Operating Profit (Loss)	**$26,575**	$27,807	($1,232)	-4.4%
Non Operating Revenue	**$1,030**	$2,176	($1,146)	-52.7%
Non Operating Expenditure	**$19,826**	$20,250	($425)	-2.1%
Net Surplus before OCI	**$7,779**	$9,733	($1,953)	-20.1%
Pension Plan Expense	**($3,033)**	($2,918)	($115)	3.9%
OCI	**$0**	$1,286	($1,286)	-100.0%
Net Surplus (Deficit)	**$4,746**	$8,101	($3,354)	-41.4%

Figures used in the various tables throughout the report may contain differences due to Excel rounding.

Key items of note:

- Operating revenue of $84.3 million is an increase of $1.2 million over the prior year.
- Operating expenses of $57.8 million are $2.4 million higher than the prior year.
- Excluding OCI and Pension Plan Expense, the Net Surplus for the year is $7.8 million, a decline of $2.0 million.
- The Net Surplus for the year is $4.7 million, a decline of $3.4 million from the prior year.
- The approved budget was for a loss of $12.1 million.
- The Forecast is for a loss of $6.1 million, an improvement of $6.0 million. Further to the forecast changes recorded to date, Water Services increased their operating expense forecast by $900,000 in relation to the North End Feeder repairs. It is likely that a portion of these expenses may be capitalized at year end, as rehabilitation of an access tunnel was completed as part of this project.

Balance Sheet - Page 3

Key indicators and balances from the Balance Sheet are as follows:

Cash On Hand		
	2018/19	2017/18
Cash On Hand	**$50,538**	$58,450

Balance Sheet Liquidity (Current Ratio)		
	2018/19	2017/18
Current Assets ('000)	**$96,508**	$99,053
Current Liabilities ('000)	**$49,138**	$60,018
Current Ratio	**1.96**	1.65

Accounts Receivable		
	2018/19	2017/18
Customer Receivables	**$16,421**	$17,013
Unbilled Services	**$18,291**	$17,940
Halifax Regional Mun.	**$9,045**	$3,569
Total	**$43,757**	$38,522

Accounts Payable		
	2018/19	2017/18
Trade Payables	**$15,164**	$24,835
LTD Interest	**$2,409**	$2,476
Halifax Regional Mun.	**$3,652**	$4,831
Total	**$21,226**	$32,142

Capital Assets Under Construction	
	Cumulative '000
Aerotech Wastewater Treatment Facility	**$20,988**
AMI - Automated Metering Infrastructure	**$14,629**
JD Kline Filtration Replacement	**$3,161**
Lake Major Dame Replacement	**$2,501**
All other projects	**$24,458**
Total Capital Expenditures	**$65,737**
External Funding Received	**($13,422)**
Net Assets Under Construction	**$52,315**

Long Term Debt by Service		
	2018/19	2017/18
	'000	'000
Water	**$52,216**	$55,511
Wastewater	**$117,885**	$124,182
Stormwater	**$11,016**	$11,297
Combined	**$181,118**	$190,991

Debt Servicing Ratio by Service		
	YTD Debt Servicing Cost Ratio	
	2018/19	2017/18
Water	**17.3%**	19.0%
Wastewater	**22.3%**	22.9%
Stormwater	**18.0%**	17.3%
Combined	**20.0%**	20.9%

- Long Term Debt is down $9.9 million from the prior year as debt repayments have been greater than new debt acquired for the capital program.
- The debt service ratio of 20.0% is well below the maximum 35% ratio allowed under the blanket guarantee agreement with HRM.

Operating Surplus		
	2018/19	2017/18
Opening Op Surplus	**$20,481**	$16,677
YTD Net Profit	**$4,746**	$8,101
Cumulative Op Surplus	**$25,227**	$24,778

Income Statement – All Services - Page 4

The following tables compare the results with the five month pro-rated budget and forecasts for the year.

Summarized Consolidated Operating Results			
	Actual YTD 2018/19 '000	Seven Month Budget 2018/19 '000	$ Variance
Operating Revenue	**$84,340**	$78,856	$5,483
Operating Expenses	**$57,765**	$63,449	($5,684)
Operating Profit (Loss)	**$26,575**	$15,407	$11,168
Non Operating Revenue	**$1,030**	$587	$443
Non Operating Expenditure	**$19,826**	$21,329	($1,503)
Net Surplus (Deficit)	**$7,779**	($5,335)	$13,114

Summarized Consolidated Operating Results			
	Actual YTD 2018/19 '000	Seven Month Forecast 2018/19 '000	$ Variance
Operating Revenue	**$84,340**	$80,271	$4,069
Operating Expenses	**$57,765**	$62,194	($4,429)
Operating Profit (Loss)	**$26,575**	$18,077	$8,498
Non Operating Revenue	**$1,030**	$946	$84
Non Operating Expenditure	**$19,826**	$19,520	$306
Net Surplus (Deficit)	**$7,779**	($497)	$8,276

- Year to date results are $13.1 million better than the pro-rated budget and $8.3 million ahead of the pro-rated forecast.
- Revenue and expenses are expected to align with the forecast as the fiscal year progresses.

Operating Revenue

Operating Revenue Results			
	Actual 2018/19 '000	Budget 2018/19 '000	$ Variance
Consumption Revenue	**$51,718**	$47,686	$4,031
Base Charge Revenue	**$19,511**	$19,400	$111
Wastewater Rebate	**$944**	($730)	$1,675
Metered Sales Sub-total	**$72,173**	$66,356	$5,817
SW Site Generated Charge	**$3,642**	$3,939	($297)
HRM Fire Prot & ROW	**$6,364**	$6,364	$0
Other Operating Revenue	**$2,161**	$2,198	($36)
Operating Revenue Total	**$84,340**	$78,856	$5,483

Operating Revenue Results			
	Actual 2018/19 '000	Prior Year 2017/18 '000	$ Variance
Consumption Revenue	**$51,718**	$51,477	$241
Base Charge Revenue	**$19,511**	$19,252	$258
Wastewater Rebate	**$944**	($259)	$1,203
Metered Sales Sub-total	**$72,173**	$70,470	$1,703
SW Site Generated Charge	**$3,642**	$3,879	($237)
HRM Fire Prot & ROW	**$6,364**	$6,371	($7)
Other Operating Revenue	**$2,161**	$2,418	($257)
Operating Revenue Total	**$84,340**	$83,138	$1,202

Operating Revenue has increased $1.2 million from previous year. Key items of note include:

- The dry weather into the early fall has driven increased consumption revenue.
- Water consumption is up 1.2% from the previous year on a volumetric basis. Consumption had been budgeted to decline by 2.5%.
- Metered Sales revenue is up $0.4 million (1.2%) for Water Service as compared to the prior year.
- Metered Sales revenue is up $1.4 million (3.2%) for Wastewater Service as compared to the prior year.

Wastewater Rebate is normally an offset to revenue. It is available to certain customers whose water does not enter the Wastewater system. The uptake has been less than anticipated and one

eligible large customer allowed an accrued rebate to expire. The total benefit to Metered Sales is $1.6 million.

Stormwater Site Generated revenue is below budget and the prior year. A large portion of this revenue is billed annually to Stormwater-only customers in March. Other revenue categories are comparable with budget and forecasted amounts.

Operating Expenses

Summary of Operating Expenses by Department				
	Actual YTD 2018/19 '000	Budget YTD 2018/19 '000	$ Variance	% Variance
Water Services	**$11,270**	$12,385	($1,115)	-9.0%
WW Services	**$17,764**	$19,505	($1,741)	-8.9%
SW Services	**$2,847**	$3,078	($231)	-7.5%
Engineering & IS	**$4,555**	$4,770	($214)	-4.5%
Regulatory Services	**$1,861**	$2,195	($334)	-15.2%
Corporate Services	**$6,597**	$7,846	($1,249)	-15.9%
Depreciation	**$12,870**	$13,670	($800)	-5.9%
Total Operating Expenses	**$57,765**	$63,449	($5,684)	-9.0%

Key items to note:

- Operating Expenses of $57.8 million are $2.4 million higher than the prior year and $5.7 million below the pro-rated budget for the year.
- All categories are under the pro-rated budget.
- Compared to the prior year, expense categories with the largest increases in costs to date are Water Supply & Treatment, Engineering and Information Systems, and Depreciation.

Financial Revenue

Key items to note:

- Higher than anticipated cash balances and rising interest rates have generated higher interest income.
- The agreement with the Province of Nova Scotia for funding for the Halifax Harbour Solutions Project concluded in 2017/18.
- Miscellaneous Revenue includes various un-regulated activities such as tower leases, energy generation, consulting activities and some contracted services.

Financial Expenses

Key items to note:

- Long Term Debt costs have decreased $0.5 million from the prior year. Debt servicing savings are a result of:
    - New debt issues having lower interest rates than older, maturing issues.
    - Debt repayments having been greater than new debt issues for the past two years.

- New debt of $15.0 million was acquired through MFC's Fall Debenture in November.

Operating Results by Service - Pages 5-7

Year to Date Operating Results by Service		
	2018/19	2017/18
	'000	'000
Water	**$1,790**	$2,351
Wastewater	**$3,350**	$4,380
Stormwater	**($395)**	$84
Net Surplus (Deficit)	**$4,746**	$6,815

Regulated and Unregulated Operations - Page 8

Results by Activity		
	2018/19	2017/18
	'000	'000
Regulated Activities	**$3,946**	$5,542
Unregulated Activities	**$800**	$1,272
Net Surplus (Deficit)	**$4,746**	$6,815

Key items to note:

- The higher profit in the prior year in unregulated activities is a result of the contract to treat wastewater from the aircraft carrier that visited Halifax in the summer.

Results under International Financial Reporting Standards - Pages 9 & 10

As noted previously, the AcSB requires HRWC, as a rate regulated utility, to report financial results using International Financial Reporting Standards (IFRS).

On the IFRS Balance Sheet, Accumulated Depreciation is higher producing a lower value for assets, Contributed Capital is treated as a long term liability and amortized rather than being treated as a contribution to equity, and the Operating Surplus is much higher due to changes in the Income Statement.

On the IFRS Income Statement, Operating Revenue is the same. Depreciation Expense is higher as contributed assets are depreciated and some assets are depreciated more quickly. Financial Revenue is higher as the amortization of contributed capital is treated as revenue. The most significant change is Financial Expenses are lower as there is no expense for the Long Term Debt Principal appropriation – a difference of $22.6 million for the full year.

The IFRS Net Profit for the year to date is $13.8 million.

ATTACHMENTS

Unaudited Operating Results for the seven (7) months ended October 31, 2018

Report prepared by: *Original Signed By Cathie O'Toole*

Warren Brake, B.Comm, CPA, CGA, Manager, Accounting, 902-490-4814

HALIFAX WATER
UNAUDITED BALANCE SHEET - CONSOLIDATED
AS OF OCTOBER 31, 2018

	2019 '000	2018 '000
ASSETS		
Cash	$50,538	$58,450
Accounts Receivable	$43,757	$38,522
Materials & Supplies	$1,953	$1,713
Prepaid Expenses	$260	$368
	$96,508	$99,053
Regulatory Asset	$3,085	$3,277
Plant in Service	$1,206,585	$1,152,001
Assets Under Construction	$52,315	$66,710
	$1,261,985	$1,221,987
Unamortized Debt Discount & Issue Expense	$808	$918
	$1,359,301	**$1,321,959**
LIABILITIES & CAPITAL		
Trade Payables & Accrued Liabilities	$21,226	$32,142
Deposits & Unearned Revenue	$5,283	$4,707
Current Portion of Long Term Debt	$22,630	$23,169
	$49,138	$60,018
Pension & Accrued Retirement Benefits	$72,950	$64,421
RDC & Special Purpose Reserves	$34,487	$21,053
Long Term Debt	$181,118	$190,991
Total Liabilities	$337,693	$336,482
Capital Surplus, Committed Reserves, & Accumulated OCI	$996,381	$961,985
Operating Surplus	$20,481	$16,677
Excess (Deficiency) of Revenue over Expenditure - Consolidated	$4,746	$6,815
Total Capital & Surplus	$1,021,608	$985,477
	$1,359,301	**$1,321,959**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - CONSOLIDATED
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of FORECAST
$12,159	$11,838	**OPERATING REVENUE**	$84,340	$83,138	$135,182	$137,607	61.29%
$8,394	$7,547	**OPERATING EXPENSES**	$57,765	$55,331	$108,770	$106,618	54.18%
$3,765	**$4,291**	**OPERATING PROFIT**	**$26,575**	**$27,807**	**$26,412**	**$30,989**	**85.75%**
		FINANCIAL REVENUE					
$102	$69	INVESTMENT INCOME	$607	$364	$480	$1,000	60.73%
$0	$167	PNS FUNDING HHSP DEBT	$0	$1,167	$0	$0	0.00%
$60	$41	MISCELLANEOUS	$423	$646	$526	$622	68.02%
$162	**$277**		**$1,030**	**$2,176**	**$1,006**	**$1,622**	**63.52%**
		FINANCIAL EXPENSES					
$609	$655	LONG TERM DEBT INTEREST	$4,375	$4,683	$8,560	$7,325	59.73%
$1,795	$1,740	LONG TERM DEBT PRINCIPAL	$12,388	$12,564	$22,601	$20,916	59.23%
$17	$17	AMORTIZATION DEBT DISCOUNT	$118	$118	$245	$207	57.21%
$417	$393	DIVIDEND/GRANT IN LIEU OF TAXES	$2,916	$2,785	$5,142	$4,999	58.33%
($7)	$3	MISCELLANEOUS	$27	$101	$16	$16	175.36%
$2,831	**$2,808**		**$19,826**	**$20,250**	**$36,564**	**$33,463**	**59.25%**
$1,097	**$1,761**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$7,779**	**$9,733**	**($9,146)**	**($852)**	**1013.33%**
		NON NSUARB ITEMS					
($1,563)	($417)	PENSION PLAN EXPENSE	($3,033)	($2,918)	($2,940)	($5,200)	58.33%
$0	$184	OTHER COMPREHENSIVE INCOME	$0	$1,286	$0	$0	0.00%
($1,563)	**($233)**		**($3,033)**	**($1,632)**	**($2,940)**	**($5,200)**	**58.33%**
($466)	**$1,527**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$4,746**	**$8,101**	**($12,086)**	**($6,052)**	**178.43%**

HALIFAX WATER
UNAUDITED BALANCE SHEET
AS OF OCTOBER 31, 2018

	2019 '000	2018 '000
ASSETS		
Cash	$50,538	$58,450
Accounts Receivable		
Customers & Contractual	$16,421	$17,013
Customers & Contractual - Unbilled Services	$18,291	$17,940
Halifax Regional Municipality	$9,045	$3,569
Materials & Supplies	$1,953	$1,713
Prepaid Expenses	$260	$368
	$96,508	$99,053
Regulatory Asset	$3,085	$3,277
Plant in Service - Water	$635,225	$600,097
Plant in Service - Wastewater	$761,829	$714,184
Plant in Service - Stormwater	$263,952	$245,193
Less: Accumulated Depreciation - Water	($186,702)	($172,693)
Accumulated Depreciation - Wastewater	($218,109)	($192,045)
Accumulated Depreciation - Stormwater	($49,609)	($42,736)
	$1,209,670	$1,155,277
Assets Under Construction	$52,315	$66,710
	$1,261,985	$1,221,987
Unamortized Debt Discount & Issue Expense	$808	$918
	$1,359,301	**$1,321,959**
LIABILITIES & CAPITAL		
Trade Payables	$15,164	$24,835
Interest on Long Term Debt	$2,409	$2,476
Halifax Regional Municipality	$3,652	$4,831
Contractor & Customer Deposits	$213	$191
Unearned Revenue	$5,070	$4,516
Current Portion of Long Term Debt	$22,630	$23,169
	$49,138	$60,018
Accrued Post-Retirement Benefits	$430	$341
Accrued Pre-Retirement Benefit	$4,001	$3,968
Deferred Pension Liability	$68,519	$60,112
Special Purpose Reserves not allocated to projects	$1,307	$1,222
Regional Development Charge	$33,180	$19,831
Long Term Debt-Water	$52,216	$55,511
Long Term Debt-Wastewater	$117,885	$124,182
Long Term Debt-Stormwater	$11,016	$11,297
Total Liabilities	$337,693	$336,482
Capital Surplus	$1,026,553	$989,122
Committed Reserves	$2,391	$2,391
Accumulated Other Comprehensive Income	($44,943)	($41,907)
Operating Surplus used to Fund Capital	$12,380	$12,380
Operating Surplus	$20,481	$16,677
Excess (Deficiency) of Revenue over Expenditure - Consolidated	$4,746	$6,815
Total Capital & Surplus	$1,021,608	$985,477
	$1,359,301	**$1,321,959**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - ALL SERVICES
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of BUDGET*	% of FORECAST
		REVENUE						
$4,208	$4,056	METERED SALES - WATER	$28,642	$28,291	$46,152	$46,802	62.06%	61.20%
$6,162	$5,981	METERED SALES - WASTEWATER	$43,531	$42,180	$67,601	$69,751	64.39%	62.41%
$527	$588	STORMWATER SITE GENERATED SERVICE	$3,642	$3,879	$6,752	$6,452	53.94%	56.44%
$590	$590	FIRE PROTECTION	$4,127	$4,127	$7,074	$7,074	58.33%	58.33%
$320	$321	STORMWATER RIGHT OF WAY SERVICE	$2,237	$2,244	$3,835	$3,835	58.33%	58.33%
$287	$234	OTHER SERVICES AND FEES	$1,676	$1,930	$2,905	$2,830	57.70%	59.23%
$33	$39	CUSTOMER LATE PAY./COLLECTION FEES	$238	$207	$491	$491	48.48%	48.48%
$34	$31	MISCELLANEOUS	$247	$282	$371	$371	66.57%	66.57%
$12,159	**$11,838**		**$84,340**	**$83,138**	**$135,182**	**$137,607**	**62.39%**	**61.29%**
		EXPENSES						
$710	$503	WATER SUPPLY & TREATMENT	$4,514	$3,967	$8,750	$8,970	51.59%	50.33%
$1,128	$806	TRANSMISSION & DISTRIBUTION	$5,559	$5,075	$10,323	$10,465	53.85%	53.12%
$987	$799	WASTEWATER COLLECTION	$6,348	$6,393	$10,622	$10,938	59.76%	58.04%
$1,300	$1,404	WASTEWATER TREATMENT PLANTS	$9,648	$10,480	$19,160	$17,909	50.35%	53.87%
$355	$367	STORMWATER COLLECTION	$2,820	$2,819	$5,239	$5,088	53.82%	55.42%
$223	$222	SMALL SYSTEMS AND OTHER SERVICES	$1,690	$1,523	$3,286	$3,139	51.43%	53.83%
$177	$163	SCADA, CONTROL & PUMPING	$1,303	$1,232	$2,565	$2,204	50.79%	59.12%
$543	$534	ENGINEERING & INFORMATION SERVICES	$4,555	$3,883	$8,177	$8,089	55.71%	56.32%
$264	$314	REGULATORY SERVICES	$1,861	$1,930	$3,763	$3,335	49.45%	55.80%
$395	$362	CUSTOMER SERVICE	$2,787	$2,670	$5,522	$5,450	50.48%	51.14%
$528	$425	ADMINISTRATION & PENSION	$3,810	$3,713	$7,929	$7,597	48.05%	50.15%
$1,784	$1,649	DEPRECIATION	$12,870	$11,645	$23,434	$23,434	54.92%	54.92%
$8,394	**$7,547**		**$57,765**	**$55,331**	**$108,770**	**$106,618**	**53.11%**	**54.18%**
$3,765	**$4,291**	**OPERATING PROFIT**	**$26,575**	**$27,807**	**$26,412**	**$30,989**	**100.62%**	**85.75%**
		FINANCIAL REVENUE						
$102	$69	INVESTMENT INCOME	$607	$364	$480	$1,000	126.52%	60.73%
$0	$167	PNS FUNDING HHSP DEBT	$0	$1,167	$0	$0	0.00%	0.00%
$60	$41	MISCELLANEOUS	$423	$646	$526	$622	80.44%	68.02%
$162	**$277**		**$1,030**	**$2,176**	**$1,006**	**$1,622**	**102.44%**	**63.52%**
		FINANCIAL EXPENSES						
$609	$655	LONG TERM DEBT INTEREST	$4,375	$4,683	$8,560	$7,325	51.12%	59.73%
$1,795	$1,740	LONG TERM DEBT PRINCIPAL	$12,388	$12,564	$22,601	$20,916	54.81%	59.23%
$17	$17	AMORTIZATION DEBT DISCOUNT	$118	$118	$245	$207	48.33%	57.21%
$417	$393	DIVIDEND/GRANT IN LIEU OF TAXES	$2,916	$2,785	$5,142	$4,999	56.71%	58.33%
($7)	$3	MISCELLANEOUS	$27	$101	$16	$16	175.36%	175.36%
$2,831	**$2,808**		**$19,826**	**$20,250**	**$36,564**	**$33,463**	**54.22%**	**59.25%**
$1,097	**$1,761**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$7,779**	**$9,733**	**($9,146)**	**($852)**	**185.05%**	**1013.33%**
		NON NSUARB ITEMS						
($1,563)	($417)	PENSION PLAN EXPENSE	($3,033)	($2,918)	($2,940)	($5,200)	103.16%	58.33%
$0	$184	OTHER COMPREHENSIVE INCOME	$0	$1,286	$0	$0	0.00%	0.00%
($1,563)	**($233)**		**($3,033)**	**($1,632)**	**($2,940)**	**($5,200)**	**103.16%**	**58.33%**
($466)	**$1,527**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$4,746**	**$8,101**	**($12,086)**	**($6,052)**	**139.27%**	**178.43%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WATER OPERATIONS
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of FORECAST
		REVENUE					
$4,208	$4,056	METERED SALES	$28,642	$28,291	$46,152	$46,802	61.20%
$590	$590	FIRE PROTECTION	$4,127	$4,127	$7,074	$7,074	58.33%
$76	$74	PRIVATE FIRE PROTECTION SERVICES	$507	$500	$860	$860	58.97%
$34	$22	BULK WATER STATIONS	$231	$228	$329	$329	70.33%
$21	$23	CUSTOMER LATE PAY./COLLECTION FEES	$136	$123	$233	$233	58.35%
$14	$13	MISCELLANEOUS	$102	$112	$154	$154	66.13%
$4,943	**$4,777**		**$33,746**	**$33,381**	**$54,803**	**$55,453**	**60.85%**
		EXPENSES					
$710	$503	WATER SUPPLY & TREATMENT	$4,514	$3,967	$8,750	$8,970	50.33%
$1,128	$806	TRANSMISSION & DISTRIBUTION	$5,559	$5,075	$10,323	$10,465	53.12%
$86	$95	SMALL SYSTEMS (inc. Contract Systems)	$724	$649	$1,194	$1,142	63.45%
$60	$59	SCADA, CONTROL & PUMPING	$473	$444	$965	$867	54.55%
$277	$240	ENGINEERING & INFORMATION SERVICES	$2,038	$1,808	$3,681	$3,728	54.67%
$65	$88	REGULATORY SERVICES	$419	$424	$997	$890	47.09%
$201	$184	CUSTOMER SERVICE	$1,420	$1,448	$2,813	$2,777	51.15%
$1,068	$431	ADMINISTRATION & PENSION	$3,507	$3,717	$5,538	$6,520	53.79%
$714	$672	DEPRECIATION	$5,157	$4,750	$9,229	$9,229	55.88%
$4,309	**$3,078**		**$23,813**	**$22,282**	**$43,490**	**$44,588**	**53.41%**
$634	**$1,699**	**OPERATING PROFIT**	**$9,933**	**$11,099**	**$11,313**	**$10,865**	**91.42%**
		FINANCIAL REVENUE					
$46	$31	INVESTMENT INCOME	$274	$164	$216	$455	60.17%
$52	$33	MISCELLANEOUS	$359	$303	$428	$524	68.40%
$98	**$65**		**$632**	**$467**	**$644**	**$979**	**64.58%**
		FINANCIAL EXPENSES					
$159	$182	LONG TERM DEBT INTEREST	$1,122	$1,278	$2,363	$1,813	61.87%
$677	$644	LONG TERM DEBT PRINCIPAL	$4,673	$5,000	$8,227	$7,477	62.50%
$8	$8	AMORTIZATION DEBT DISCOUNT	$54	$56	$108	$88	61.12%
$417	$393	DIVIDEND/GRANT IN LIEU OF TAXES	$2,916	$2,785	$5,142	$4,999	58.33%
($6)	$2	MISCELLANEOUS	$11	$96	$11	$11	100.87%
$1,254	**$1,229**		**$8,775**	**$9,214**	**$15,850**	**$14,387**	**60.99%**
($522)	**$535**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$1,790**	**$2,351**	**($3,893)**	**($2,543)**	**170.41%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - WASTEWATER OPERATIONS
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of FORECAST
		REVENUE					
$6,162	$5,981	METERED SALES	$43,531	$42,180	$67,601	$69,751	62.41%
$1	$3	WASTEWATER OVERSTRENGTH AGREEMENTS	$38	$181	$0	$40	93.86%
$24	$27	LEACHATE CONTRACT	$179	$174	$387	$387	46.32%
$8	$6	CONTRACT REVENUE	$46	$48	$86	$86	53.71%
$17	$17	DEWATERING FACILITY/SLUDGE LAGOON	$122	$122	$210	$210	58.33%
$28	$0	AIRLINE EFFLUENT	$58	$68	$118	$118	49.06%
$98	$84	SEPTAGE TIPPING FEES	$494	$608	$915	$800	61.77%
$15	$15	CUSTOMER LATE PAY./COLLECTION FEES	$100	$90	$238	$238	42.24%
$11	$10	MISCELLANEOUS	$88	$94	$128	$128	68.62%
$6,365	**$6,145**		**$44,656**	**$43,566**	**$69,683**	**$71,758**	**62.23%**
		EXPENSES					
$987	$799	WASTEWATER COLLECTION	$6,348	$6,393	$10,622	$10,938	58.04%
$1,300	$1,404	WASTEWATER TREATMENT PLANTS	$9,648	$10,480	$19,160	$17,909	53.87%
$98	$88	SMALL SYSTEMS	$691	$669	$1,323	$1,269	54.50%
$18	$15	DEWATERING FACILITY/ SLUDGE MGM'T	$118	$54	$331	$297	39.75%
$0	$0	BIOSOLIDS TREATMENT	$1	$1	$101	$101	0.58%
$21	$24	LEACHATE CONTRACT	$156	$151	$337	$332	47.02%
$113	$100	SCADA, CONTROL & PUMPING	$803	$763	$1,563	$1,310	61.26%
$229	$253	ENGINEERING & INFORMATION SERVICES	$2,162	$1,785	$3,400	$3,325	65.02%
$82	$111	REGULATORY SERVICES	$507	$567	$1,133	$1,305	38.87%
$167	$153	CUSTOMER SERVICE	$1,176	$1,050	$2,455	$2,425	48.48%
$880	$353	ADMINISTRATION & PENSION	$2,869	$2,507	$4,585	$5,399	53.13%
$997	$917	DEPRECIATION	$7,183	$6,477	$13,251	$13,251	54.20%
$4,892	**$4,217**		**$31,660**	**$30,896**	**$58,262**	**$57,860**	**54.72%**
$1,473	**$1,928**	**OPERATING PROFIT**	**$12,996**	**$12,670**	**$11,420**	**$13,898**	**93.51%**
		FINANCIAL REVENUE					
$46	$31	INVESTMENT INCOME	$273	$164	$216	$455	59.97%
$0	$167	PNS FUNDING HHSP DEBT	$0	$1,167	$0	$0	0.00%
$8	$8	MISCELLANEOUS	$64	$343	$97	$97	65.97%
$54	**$206**		**$337**	**$1,674**	**$313**	**$552**	**61.03%**
		FINANCIAL EXPENSES					
$405	$426	LONG TERM DEBT INTEREST	$2,934	$3,069	$5,427	$4,942	59.36%
$1,010	$990	LONG TERM DEBT PRINCIPAL	$6,974	$6,833	$12,783	$12,123	57.52%
$8	$8	AMORTIZATION DEBT DISCOUNT	$59	$56	$119	$104	56.56%
($0)	$1	MISCELLANEOUS	$17	$5	$5	$5	331.99%
$1,424	**$1,425**		**$9,983**	**$9,963**	**$18,334**	**$17,174**	**58.13%**
$103	**$709**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$3,350**	**$4,380**	**($6,600)**	**($2,724)**	**223.00%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - STORMWATER OPERATIONS
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of FORECAST
		REVENUE					
$527	$588	STORMWATER SITE GENERATED SERVICE	$3,642	$3,879	$6,752	$6,452	56.44%
$320	$321	STORMWATER RIGHT OF WAY SERVICE	$2,237	$2,244	$3,835	$3,835	58.33%
($3)	$0	CUSTOMER LATE PAY./COLLECTION FEES	$2	($6)	$21	$21	8.73%
$8	$7	MISCELLANEOUS	$57	$75	$89	$89	64.39%
$851	**$916**		**$5,938**	**$6,192**	**$10,696**	**$10,396**	**57.11%**
		EXPENSES					
$355	$367	STORMWATER COLLECTION	$2,820	$2,819	$5,239	$5,088	55.42%
$4	$3	SCADA, CONTROL & PUMPING	$27	$26	$37	$26	103.53%
$37	$41	ENGINEERING & INFORMATION SERVICES	$356	$290	$1,095	$1,037	34.33%
$117	$116	REGULATORY SERVICES	$934	$939	$1,634	$1,139	82.01%
$27	$25	CUSTOMER SERVICE	$191	$171	$253	$248	77.07%
$143	$57	ADMINISTRATION & PENSION	$467	$408	$746	$878	53.13%
$73	$60	DEPRECIATION	$530	$418	$954	$954	55.54%
$756	**$669**		**$5,325**	**$5,071**	**$9,958**	**$9,370**	**56.83%**
$95	**$246**	**OPERATING PROFIT**	**$613**	**$1,120**	**$738**	**$1,026**	**59.75%**
		FINANCIAL REVENUE					
$10	$7	INVESTMENT INCOME	$61	$36	$48	$90	67.37%
$0	$0	MISCELLANEOUS	$0	$0	$0	$0	0.00%
$10	**$7**		**$61**	**$36**	**$48**	**$90**	**67.37%**
		FINANCIAL EXPENSES					
$45	$47	LONG TERM DEBT INTEREST	$320	$337	$770	$570	56.15%
$107	$106	LONG TERM DEBT PRINCIPAL	$742	$730	$1,591	$1,316	56.39%
$1	$1	AMORTIZATION DEBT DISCOUNT	$6	$6	$18	$15	39.09%
$153	**$154**		**$1,068**	**$1,073**	**$2,379**	**$1,901**	**56.18%**
($48)	**$100**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**($395)**	**$84**	**($1,593)**	**($785)**	**50.24%**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - REGULATED AND UNREGULATED OPERATIONS
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR	ACTUAL (YEAR TO DATE) LAST YEAR	APR 1/18 MAR 31/19 BUDGET*	APR 1/18 MAR 31/19 FORECAST	% of FORECAST
REGULATED ACTIVITIES					
REVENUE					
METERED SALES	$75,815	$74,349	$120,505	$123,005	61.64%
FIRE PROTECTION	$4,127	$4,127	$7,074	$7,074	58.33%
PRIVATE FIRE PROTECTION	$507	$500	$860	$860	58.97%
STORMWATER SERVICE	$2,237	$2,244	$3,835	$3,835	58.33%
OTHER OPERATING REVENUE	$732	$875	$1,154	$1,194	61.29%
	$83,418	**$82,095**	**$133,429**	**$135,969**	**61.35%**
EXPENSES					
WATER SUPPLY & TREATMENT	$4,514	$3,967	$8,750	$8,970	50.33%
TRANSMISSION & DISTRIBUTION	$5,559	$5,075	$10,323	$10,465	53.12%
WASTEWATER & STORMWATER COLLECTION	$9,145	$9,202	$15,753	$15,917	57.46%
WASTEWATER TREATMENT PLANTS	$9,648	$10,480	$19,160	$17,909	53.87%
SMALL SYSTEMS	$1,405	$1,308	$2,492	$2,385	58.90%
SCADA, CONTROL & PUMPING	$1,303	$1,232	$2,565	$2,204	59.12%
ENGINEERING & INFORMATION SERVICES	$4,555	$3,883	$8,177	$8,089	56.32%
REGULATORY SERVICES	$1,861	$1,930	$3,763	$3,335	55.80%
CUSTOMER SERVICE	$2,767	$2,649	$5,487	$5,415	51.09%
ADMINISTRATION & PENSION	$6,819	$6,603	$10,639	$12,567	54.26%
DEPRECIATION	$12,859	$11,642	$23,416	$23,416	54.92%
	$60,435	**$57,972**	**$110,524**	**$110,671**	**54.61%**
FINANCIAL REVENUE					
INVESTMENT INCOME	$607	$364	$480	$1,000	60.73%
MISCELLANEOUS	$155	$1,205	$110	$206	75.02%
	$762	**$1,569**	**$590**	**$1,206**	**63.17%**
FINANCIAL EXPENSES					
LONG TERM DEBT INTEREST	$4,375	$4,683	$8,560	$7,325	59.73%
LONG TERM DEBT PRINCIPAL	$12,388	$12,564	$22,601	$20,916	59.23%
AMORTIZATION DEBT DISCOUNT	$118	$118	$245	$207	57.21%
DIVIDEND/GRANT IN LIEU OF TAXES	$2,916	$2,785	$5,142	$4,999	58.33%
	$19,799	**$20,150**	**$36,548**	**$33,447**	**59.19%**
NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES	**$3,946**	**$5,542**	**($13,053)**	**($6,943)**	**156.83%**
UNREGULATED ACTIVITIES					
REVENUE					
SEPTAGE TIPPING FEES	$494	$608	$915	$800	61.77%
LEACHATE CONTRACT	$179	$174	$387	$387	46.32%
CONTRACT REVENUE	$46	$48	$86	$86	53.71%
DEWATERING	$122	$122	$210	$210	58.33%
AIRLINE EFFLUENT	$58	$68	$118	$118	49.06%
ENERGY PROJECTS	$92	$89	$167	$167	55.47%
MISCELLANEOUS	$22	$22	$37	$37	59.79%
	$1,014	**$1,132**	**$1,919**	**$1,804**	**56.22%**
EXPENSES					
WATER SUPPLY & TREATMENT	$11	$10	$25	$25	43.10%
WASTEWATER TREATMENT	$297	$217	$877	$838	35.48%
SPONSORSHIPS & DONATIONS	$44	$48	$266	$266	16.72%
DEPRECIATION	$10	$3	$18	$18	0.00%
	$363	**$278**	**$1,186**	**$1,146**	**31.66%**
FINANCIAL REVENUE					
MISCELLANEOUS	$176	$518	$249	$249	70.62%
	$176	**$518**	**$249**	**$249**	**70.62%**
FINANCIAL EXPENSES					
MISCELLANEOUS	$27	$101	$16	$16	175.36%
	$27	$101	$16	$16	**175.36%**
NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES	**$800**	**$1,272**	**$967**	**$892**	**89.75%**
NET PROFIT (LOSS) AVAILABLE FOR TOTAL CAPITAL EXPENDITURES (REG & UNREG)	**$4,746**	**$6,815**	**($12,086)**	**($6,052)**	**178.43%**

HALIFAX WATER
UNAUDITED BALANCE SHEET - IFRS FORMAT
AS OF OCTOBER 31, 2018

	2019 '000	2018 '000
ASSETS		
Cash	$50,538	$58,450
Accounts Receivable		
Customers & Contractual	$16,421	$17,013
Customers & Contractual - Unbilled Services	$18,291	$17,940
Halifax Regional Municipality	$9,045	$3,569
Materials & Supplies	$1,953	$1,713
Prepaid Expenses	$260	$368
	$96,508	$99,053
Regulatory Asset	$3,085	$3,277
Plant in Service - Water	$635,225	$600,097
Plant in Service - Wastewater	$761,829	$714,184
Plant in Service - Stormwater	$263,952	$245,193
Less: Accumulated Depreciation - Water	($196,053)	($181,707)
Accumulated Depreciation - Wastewater	($227,429)	($201,556)
Accumulated Depreciation - Stormwater	($49,606)	($42,734)
	$1,191,002	$1,136,754
Assets Under Construction	$52,315	$66,710
	$1,243,318	$1,203,464
Unamortized Debt Discount & Issue Expense	$808	$918
	$1,340,633	**$1,303,436**
LIABILITIES		
Trade Payables	$15,164	$24,835
Interest on Long Term Debt	$2,409	$2,476
Halifax Regional Municipality	$3,652	$4,831
Contractor & Customer Deposits	$213	$191
Unearned Revenue	$5,070	$4,516
Current Portion of Deferred Contributed Capital	$13,405	$12,889
Current Portion of Long Term Debt	$22,630	$23,169
	$62,543	$72,906
Accrued Post-Retirement Benefits	$430	$341
Accrued Pre-Retirement Benefit	$4,001	$3,968
Deferred Pension Liability	$68,519	$60,112
Deferred Contributed Capital	$842,568	$810,427
Long Term Debt-Water	$52,216	$55,511
Long Term Debt-Wastewater	$117,885	$124,182
Long Term Debt-Stormwater	$11,016	$11,297
Total Liabilities	$1,159,178	$1,138,745
EQUITY		
Accumulated Other Comprehensive Income	($44,943)	($41,907)
Accumulated Surplus	$212,604	$190,822
Excess (Deficiency) of Revenue over Expenditure	$13,794	$15,776
Total Equity	$181,455	$164,691
	$1,340,633	**$1,303,436**

HALIFAX WATER
UNAUDITED INCOME STATEMENT - IFRS FORMAT - ALL SERVICES
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
58.33%

ACTUAL (CURRENT MONTH) THIS YEAR '000	ACTUAL (CURRENT MONTH) LAST YEAR '000	DESCRIPTION	ACTUAL (YEAR TO DATE) THIS YEAR '000	ACTUAL (YEAR TO DATE) LAST YEAR '000	APR 1/18 MAR 31/19 BUDGET* '000	APR 1/18 MAR 31/19 FORECAST '000	% of BUDGET*	% of FORECAST
		REVENUE						
$4,208	$4,056	METERED SALES - WATER	$28,642	$28,291	$46,152	$46,802	62.06%	61.20%
$6,162	$5,981	METERED SALES - WASTEWATER	$43,531	$42,180	$67,601	$69,751	64.39%	62.41%
$527	$588	STORMWATER SITE GENERATED SERVICE	$3,642	$3,879	$6,752	$6,452	53.94%	56.44%
$590	$590	FIRE PROTECTION	$4,127	$4,127	$7,074	$7,074	58.33%	58.33%
$320	$321	STORMWATER RIGHT OF WAY SERVICE	$2,237	$2,244	$3,835	$3,835	58.33%	58.33%
$287	$234	OTHER SERVICES AND FEES	$1,676	$1,930	$2,905	$2,830	57.70%	59.23%
$33	$39	CUSTOMER LATE PAY./COLLECTION FEES	$238	$207	$491	$491	48.48%	48.48%
$34	$31	MISCELLANEOUS	$247	$282	$371	$371	66.57%	66.57%
$12,159	**$11,838**		**$84,340**	**$83,138**	**$135,182**	**$137,607**	**62.39%**	**61.29%**
		EXPENSES						
$710	$503	WATER SUPPLY & TREATMENT	$4,514	$3,967	$8,750	$8,970	51.59%	50.33%
$1,128	$806	TRANSMISSION & DISTRIBUTION	$5,559	$5,075	$10,323	$10,465	53.85%	53.12%
$987	$799	WASTEWATER COLLECTION	$6,348	$6,393	$10,622	$10,938	59.76%	58.04%
$1,300	$1,404	WASTEWATER TREATMENT PLANTS	$9,648	$10,480	$19,160	$17,909	50.35%	53.87%
$355	$367	STORMWATER COLLECTION	$2,820	$2,819	$5,239	$5,088	53.82%	55.42%
$223	$222	SMALL SYSTEMS AND OTHER SERVICES	$1,690	$1,523	$3,286	$3,139	51.43%	53.83%
$177	$163	SCADA, CONTROL & PUMPING	$1,303	$1,232	$2,565	$2,204	50.79%	59.12%
$543	$534	ENGINEERING & INFORMATION SERVICES	$4,555	$3,883	$8,177	$8,089	55.71%	56.32%
$264	$314	REGULATORY SERVICES	$1,861	$1,930	$3,763	$3,335	49.45%	55.80%
$395	$362	CUSTOMER SERVICE	$2,787	$2,670	$5,522	$5,450	50.48%	51.14%
$2,091	$842	ADMINISTRATION & PENSION	$6,843	$6,631	$10,869	$12,797	62.96%	53.47%
$3,837	$3,633	DEPRECIATION	$27,307	$25,951	$23,434	$35,959	116.53%	75.94%
$12,010	**$9,948**		**$75,235**	**$72,555**	**$111,710**	**$124,343**	**67.35%**	**60.51%**
$149	**$1,889**	**OPERATING PROFIT**	**$9,104**	**$10,583**	**$23,472**	**$13,264**	**38.79%**	**68.64%**
		FINANCIAL REVENUE						
$102	$69	INVESTMENT INCOME	$607	$364	$480	$1,000	126.52%	60.73%
$0	$167	PNS FUNDING HHSP DEBT	$0	$1,167	$0	$0	0.00%	0.00%
$1,618	$1,558	MISCELLANEOUS	$11,374	$11,264	$526	$13,051	2164.21%	87.15%
$1,720	**$1,794**		**$11,981**	**$12,794**	**$1,006**	**$14,051**	**1191.51%**	**85.27%**
		FINANCIAL EXPENSES						
$609	$655	LONG TERM DEBT INTEREST	$4,375	$4,683	$8,560	$7,325	51.12%	59.73%
$17	$17	AMORTIZATION DEBT DISCOUNT	$118	$118	$245	$207	48.33%	57.21%
$417	$393	DIVIDEND/GRANT IN LIEU OF TAXES	$2,916	$2,785	$5,142	$4,999	56.71%	58.33%
($75)	($11)	MISCELLANEOUS	($119)	$15	$12	$12	-961.09%	-961.09%
$968	**$1,054**		**$7,292**	**$7,602**	**$13,959**	**$12,544**	**52.23%**	**58.13%**
$900	**$2,629**	**NET PROFIT (LOSS) BEFORE OTHER COMPREHENSIVE INCOME**	**$13,794**	**$15,776**	**$10,518**	**$14,771**	**131.15%**	**93.38%**
$0	$184	**OTHER COMPREHENSIVE INCOME**	$0	$1,286	$0	$0	0.00%	0.00%
$900	**$2,813**	**NET PROFIT (LOSS) AVAILABLE FOR CAPITAL EXPENDITURES**	**$13,794**	**$17,062**	**$10,518**	**$14,771**	**131.15%**	**93.38%**

ITEM # 5.1
HWRC Board
November 29, 2018

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Jamie Hannam, P. Eng.
Director, Engineering & Information Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: November 22, 2018

SUBJECT: **Quinpool Road CN Utility Bridge - Additional Funding**

ORIGIN

2018/19 Capital Budget.

RECOMMENDATION

The Halifax Water Board approve additional funding of $1,473,000 for the Quinpool Road CN Utility Bridge for a revised project total cost of $2,170,000.

BACKGROUND

In recent years, the Halifax Regional Municipality (HRM) and Canadian National Railways (CN) have been developing a program to rehabilitate the older road bridges that cross the CN rail-cut on the Halifax Peninsula. The bridges are owned by CN and as such, the rehabilitation program is being led by CN. Given the importance of the road bridges to the municipality, the bridge rehabilitation program is being jointly planned and coordinated by CN and HRM.

The Quinpool Road Bridge is one of the bridges that was identified as a priority for rehabilitation as it is over 100 years old. Detailed planning and design began in 2017 for the bridge rehabilitation. The bridge structure consists of a concrete arch that supports a shallow gravel-filled road-base structure.

There is a 225mm diameter cast iron water main and a 450mm combined sewer main located above the concrete arch, below the shallow road base. These utilities were installed in 1916 as part of the original bridge construction.
Due to the nature of the bridge rehabilitation, Halifax Water needed to replace the water and wastewater infrastructure on the Quinpool Bridge as part of the ongoing HRM-Halifax Water Integrated Projects planning process. Funds for the replacement of the water and wastewater infrastructure on the bridge were identified and approved as part of the 2018/2019 Capital Budget - Integrated Projects list (Water - $197,000 & Wastewater - $500,000). At the time of budget preparations, it was assumed that the new water and wastewater piping would be installed in a similar methodology as existing conditions. (This has been the method of replacement on previous CN Bridge work).

In the fall of 2017, Halifax Water began meeting with HRM and CN to plan the integrated bridge project. In early 2018, CN's bridge design consultant, Hatch, identified that the recommended bridge rehabilitation methodology involves removing all road gravels above the concrete arch. The old arch would then be used as a base/formwork for the construction of a new concrete arch. Unfortunately, the thickness of the new concrete arch prevents the installation of new utility lines because the road base is too shallow to accommodate new mains.

DISCUSSION

Based on the above information, Halifax Water retained CN's consultant, Hatch, to carry out a Servicing Options Analysis to determine the best path forward with respect to finding a new corridor for the water and wastewater utilities across the rail-cut.

Hatch's Quinpool Road Bridge Servicing Options Report, dated May 11, 2018, recommended that a separate utility bridge be constructed adjacent to the existing Quinpool Road Bridge. One of the identified advantages of the separate utility bridge was that it avoided the expense and risk of having to temporarily pump or convey wastewater around the construction site during the bridge rehabilitation work. Based on the Hatch Report, the concept-level estimate cost for the utility bridge was $610,560, excluding HST.

The Quinpool Bridge Rehabilitation project is scheduled to begin in April 2019. In order to avoid the costs of temporary wastewater bypass work, the utility bridge must be installed and commissioned prior to the demolition phase of the bridge project. In May 2018, Halifax Water authorized Hatch to proceed with the detailed design for the separate utility bridge. It was determined that Halifax Water would be responsible for the delivery and project management of the utility bridge installation.

The utility bridge will span the rail-cut on the north side of the existing bridge. The abutments for the new bridge are located within the existing boundaries of upper and lower sections of Flinn Park. A sketch of the utility bridge and the service re-alignments is attached.

In order to meet the April 2019 timeline, construction of the utility bridge must be carried out this winter. In order to expedite the schedule, the project was broken into two tenders. The first tender dealt with the pre-purchase and supply of the utility bridge. The second tender dealt with the installation of the utility bridge and installation of the realigned water and wastewater pipes.

The tender for the supply of the utility bridge closed on September 19, 2018 and was awarded to Algonquin Bridge at a tendered price of $195,438, excluding HST.

Hatch was asked to update their construction cost estimate based on the tender results for the pre-purchase of the bridge. Hatch's revised construction cost estimate, as of September 24, 2018, was $743,948, excluding HST.

The tender for the installation of the bridge and installation of relocated services closed on November 15, 2018. There were three tenders submitted. The low tender, submitted by Atlantic Road Construction and Paving Limited (ARCP) was $1,480,000 excluding HST.

The other tender prices were as follows:

Dexter Construction Company Ltd. -$1,484,395 (0.02% above the low bid)
Brycon Construction Company Ltd. - $1,815,000 (22.3% above the low bid)

Staff requested that Hatch review the tender results and provide an explanation on the discrepancy between their cost estimates and the tender results. A copy of their letter dated November 19, 2018 is attached.

Based on a review of the tender submission, and the relative pricing, it is evident that the low bid reflects the market price for this work.

Based on these two tenders, the revised project cost is $2,170,000. A copy of the Project cost estimate is attached. Funding in the amount of $697,000 has already been approved, thus additional funding in the amount of $1,473,000 is required.

BUDGET IMPLICATIONS

Table 1 shows the capital line items and the amounts available for reallocation to the Quinpool Road CN Utility Bridge.

Table 1: Proposed Reallocated Funding Sources

Capital Line Item	Budget Year	Budget Amount	Amount for Reallocation
GIS CityWorks Upgrade	2018/19	$350,000	$200,000
(Project has been combined with the GIS Dashboard Replacement project noted below. Combined scope resulted in reduced funding requirement.)			
GIS Dashboard Replacement	2018/19	$200,000	$100,000
(Project was combined with the GIS/CityWorks project. Combined scope resulted in reduced funding requirement.)			
GIS Desktop Progression Plan	2018/19	$100,000	$100,000
(Project is being undertaken in-house. Capital funds no longer required)			
Sampson Stokil Reservoir Rechlorination System	2018/19	$390,000	$150,000
(The scope of project was reduced. Surplus funds available for reallocation)			
Weybridge Lane Pump Station Construction (CCC)	2018/19	$506,000	$506,000
(This work was scheduled to begin in 2018/19, subject to development buildout. Based on a review of flows, the work has been deferred and will be included in future budgets (+5 years) when capacity upgrades are warranted.)			
Wastewater – Lateral Lining 2018	2018/19	$2,100,000	$200,000
(Project completed under budget.)			
Dartmouth WWTF – UV Densedeg Channel Gate Actuators (x8)	2018/19	$155,000	$95,000
(Project is not proceeding. Funds are available for reallocation as project was cancelled by Operations Staff)			
Inglis Street Sewer Pier A Ventilation/Odour control	2018/19	$80,000	$80,000
(Project was cancelled. Funds are available for reallocation. Project cancelled by Operations staff)			
Eastern Passage WWTF – Secondary Launder Covers	2018/19	$150,000	$42,000
(Project is not proceeding. Funds are available for reallocation as project was cancelled by Operations Staff)			
Total Available for Reallocation			**$1,473,000**

The proposed expenditure meets the "NO REGRETS – UNAVOIDABLE NEEDS" approach of the 2012 Integrated Resource Plan. The proposed work meets the NR-UN criteria of "required to ensure infrastructure system integrity and safety". The project meets the criteria, as the work is required in order to maintain an acceptable level of service.

ATTACHMENTS:

- Hatch letter dated November 19, 2018
- Project Site Plan
- Project Cost Estimate Sheet

Report Prepared By:	*Original Signed By:* Tom Gorman, Water Infrastructure Engineering Manager, Engineering and IS, 902-490-4176
Financials Reviewed by:	*Original Signed By:* Allan Campbell, B. Comm. CPA, CMA, Manager, Finance, 902-266-8655

1809 Barrington Street, Suite 1009
Halifax, NS B3J 3K8
Tel: (902) 420-6469 ◆ Fax: (902) 429-3525 ◆ www.hatch.com

ITEM # 5.1
HRWC Board
November 29, 2018
ATTACHMENT 1

November 19, 2018

Mr. Kevin Healy, P. Eng.
Project Engineer
Halifax Water
450 Cowie Hill Rd, PO Box 8388 RPO CSC
Halifax, NS B3K 5M1

Dear Mr. Healy,

Subject: Tender T45.2018 – Quinpool Road Utilities Relocation – Tender Review

Three (3) tender submissions were received by Halifax Water for Tender T45.2018 – Quinpool Road Utilities Relocation. Hatch was forwarded and has reviewed the lowest price tender, which was submitted by Atlantic Road Construction & Paving Ltd. No calculation errors were found in the submission.

The tender price of $1,480,000 exclusive of HST is 2.5 times higher than the estimated price of $593,510. Note that the estimated price has been adjusted to exclude the purchase of the pre-fabricated bridge, as this pre-purchase was not part of the tender documents.

The variance in tendered cost versus construction cost estimate is related to differences in unit prices on several items. Commentary on these unit prices, and the primary sources of the cost exceedance follows:

<u>Earthwork</u>
4 – Mass Excavation and Embankment (Rock)

Typical rock removal pricing received by Hatch on recent tender responses and job change orders has been $50 - $100 per m^3 in contrast to the $296 per m^3 received in the tender.

<u>Water Main System</u>
11.1, 11.2, 11.3, 11.5 - Pipe
16.1, 16.2 & 16.3 – Connection to Existing Main

Some unit prices submitted for standard utility work (water, sanitary and storm) are approximately 40% to 50% higher than estimated based on recent tender responses plus an allowance for reinstatement. A portion of this difference could be that reinstatement costs were higher than expected given that much of the pipe installation is not under road or asphalt. Another possible cause is an unusually large allowance for winter work, which requires additional care in handling material to be compacted for pipe bedding and backfill.

Connections to the existing main are almost order of magnitude higher for each connection than typically expected. No special conditions have been identified that would suggest these connections would be more complex or time consuming than a standard tie-in.

Street Construction
51 – Segmental Retaining Wall

The segmental retaining wall cost is approximately two to three times the expected cost for a Redi-Rock or equivalent wall system.

Additional Items
78.1 & 78.2 – Bridge Abutments
79 – Prefabricated Bridge Installation

The volume of concrete in the bridge abutments is approximately 60 m^3. At $300,000, this works out to approximately $5,000 per cubic metre of concrete. Typical cast-in-place concrete pricing is $900 to $1,200 per cubic metre. Cold weather construction does require some additional cost to allow heating of concrete during curing, but the footprint of the abutments is relatively limited and does not require extensive amounts of heating tarps compared to a linear installation like curbing or sidewalk.

The prefabricated bridge installation, which does not include pre-purchase of the bridge itself, is approximately 2.5 times the installation cost of another, similar span, temporary bridge more than twice the width that is currently being installed.

The latest construction cost estimate prepared by Hatch was completed using an earlier revision of the project drawings. The tender form is based on a design that reduced the amount of concrete by half and added the segmental retaining wall. Some pipe lengths and sizes were changed but would not have had a material effect on the pricing. The variation in price is related to several unit cost variances rather than item quantities and components.

The variance in unit costs on the items discussed in this memo account for a difference of approximately $675,000 from the estimate. No single item can be isolated as a major contributor; rather it is a cumulative effect from the items above.

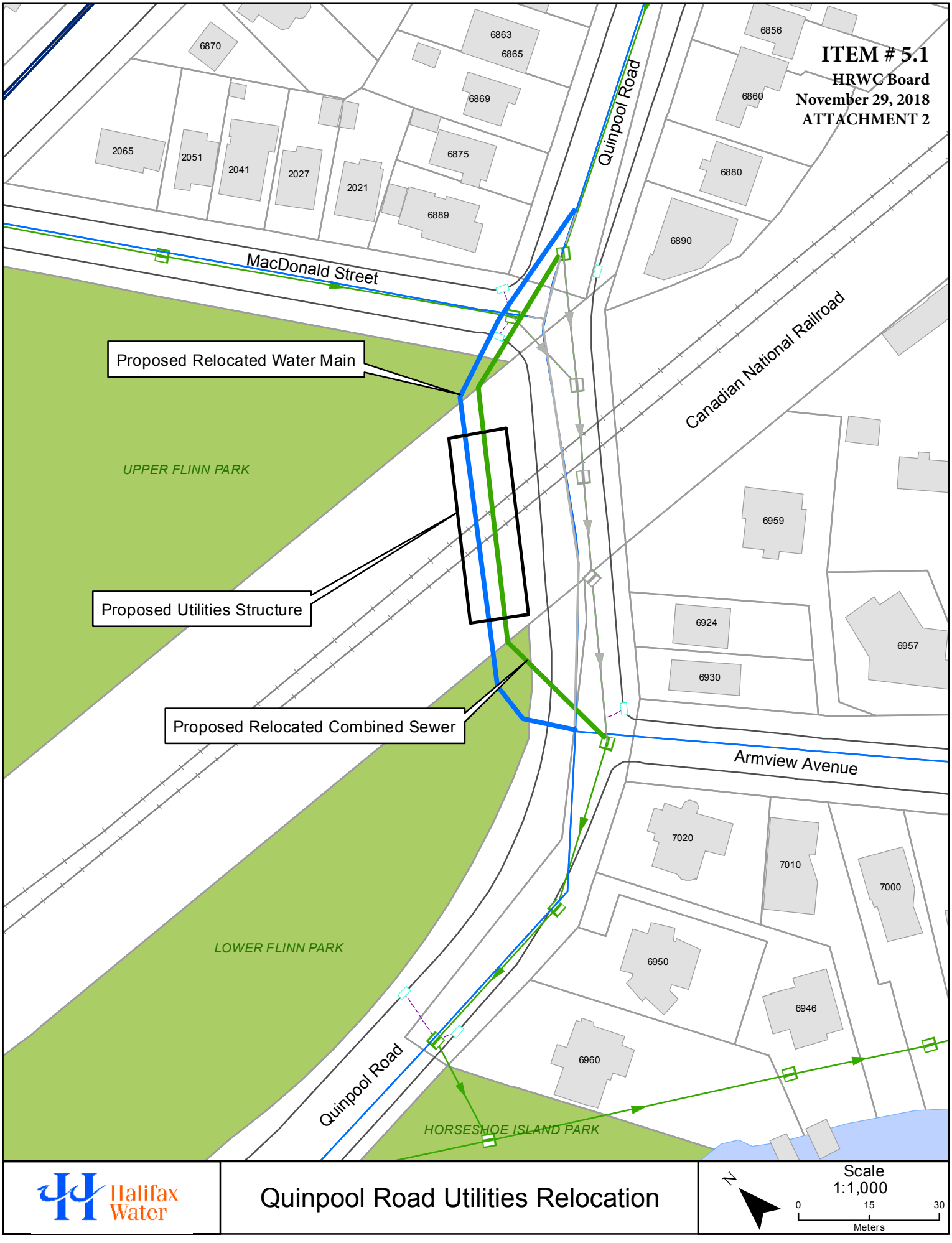
We have examined the bid for compliance with the Tender requirements and find no reason why Halifax Water cannot award to the lowest bidder.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Jeffrey Theriault, P. Eng.
Project Engineer – Hatch Infrastructure
(902) 420-6469

Matt Delorme, P. Eng.
Project Manager – Hatch Infrastructure
(902) 420-6497


ITEM # 5.1
HRWC Board
November 29, 2018
ATTACHMENT 2
Proposed Relocated Water Main
Proposed Utilities Structure
Proposed Relocated Combined Sewer
MacDonald Street
Quinpool Road
Canadian National Railroad
Armview Avenue
Quinpool Road
UPPER FLINN PARK
LOWER FLINN PARK
HORSESHOE ISLAND PARK
6870
6863
6865
6869
6856
6860
2065
2051
2041
2027
2021
6875
6889
6880
6890
6959
6924
6930
6957
7020
7010
7000
6950
6946
6960
Halifax Water
Quinpool Road Utilities Relocation
N
Scale
1:1,000
0
15
30
Meters

SUMMARY BUDGET	
Category Description	**Total Project Cost Estimate $**
Engineering and Design	$33,380.00
Utility Structure Supply	$195,438.00
Change Order	$15,536.50
†Easement Purchase	$105,000.00
CN Permits	$1,200.00
†HRM ROW Permit	$14,785.00
Construction Contract	$1,480,000.00
Construction Contingency (10%)	$148,000.00
*Construction Inspection	$37,720.00
**Record Information Package	$3,960.00
HW Time	$25,000.00
SUB-TOTAL	**$2,060,019.50**
Net HST (4.286%)	$88,292.44
SUB-TOTAL	**$2,148,311.94**
Interest & Overhead (1%)	$21,483.12
TOTAL	**$2,169,795.06**
ROUNDED TOTAL	**$2,170,000.00**

†Estimate only, subject to final agreement
*Construction inspection $4,715.00/week as per Hatch proposal - estimated 8 weeks
**Record information package $3,960.00 as per Hatch proposal

ITEM #5.2
HWRC Board
November 29, 2018

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*

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

APPROVED: *Original Signed By:*

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

DATE: November 22, 2018

SUBJECT: **Roach's Pond Pumping Station (PS) Component Upgrade**

ORIGIN

2018/19 Capital Budget.

RECOMMENDATION

The Halifax Water Board approve funding in the amount of $360,000 for the Roach's Pond PS Component Upgrade Project.

BACKGROUND

The Roach's Pond Pumping Station is located on Princeton Avenue in the Spryfield area of Halifax, and was originally built in 1964 with a significant upgrade in 2009. It is the third largest pumping station owned by Halifax Water in terms of pumping capacity, and serves a sewershed with an estimated population of 11,000.

DISCUSSION

The Roach's Pond pump station has five pumps and two of the pumps have failed completely leaving the station without standby pumping capacity. This project will include replacement of the two failed pumps and associated mechanical and electrical alterations and will reinstate standby pumping capacity of the station. Since all five pumps were installed at the same time (in 2009), it is expected that the remaining three pumps are

nearing the end of their useful life. Accordingly, funding is being allocated in future capital budget years to replace the remaining three.

The total estimated cost of the first phase of the Roach's Pond PS Component Upgrade project is $360,000.

BUDGET IMPLICATIONS

Funding in the amount of $275,000 is available in the 2018/19 Capital Budget under Wastewater - Structures - Roach's Pond PS Component Upgrade. The remaining $85,000, is available from the Wastewater System – Trenchless Rehabilitation Program (CWO#6-1668). The Wastewater System – Trenchless Rehabilitation Program is nearing completion and it is expected to be under budget.

The proposed expenditure meets the "NO REGRETS – UNAVOIDABLE NEEDS" approach of the 2012 Integrated Resource Plan. The proposed work meets the NR-UN criteria of "Required to ensure infrastructure system integrity and safety". The project meets the criteria as the work is required in order to maintain an acceptable level of service.

ATTACHMENT

Project Cost Estimate Sheet

Report Prepared By: *Original Signed By:*
Greg Rice, Project Engineer, (902) 476-3520

Financials Reviewed by: *Original Signed By:*
Allan Campbell, B. Comm. CPA, CMA, Manager, Finance, (902) 266-8655

Project Cost Estimate
Roach's Pond PS Component Upgrade

Item	Total Cost
Pump Supply Costs	$220,000
Pump Install Costs	$80,000
Enginering Services	$10,000
Sub-total	$310,000
Contingency (10%)	$31,000
Sub-total	$341,000
Net HST (4.286%)	$14,615
Sub-total	$355,615
Halifax Water Staff and Related Expenses	$2,000
Sub-total	$357,615
Interest & Overhead (1%)	$3,576
Total Estimated Cost	**$360,000**

Halifax Water
Halifax Regional Water Commission

ITEM # 6
HRWC Board
November 29, 2018

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Darlene Fenton, Chair Halifax Regional Water Commission Environment, Health and Safety Committee

DATE: November 21, 2018

SUBJECT: **National Disaster Mitigation Program – Flood Risk Assessment Study**

ORIGIN

- June 23, 2015 - Regional Council passed a motion directing staff to submit an application to the National Disaster Mitigation Program (NDMP) to carry out a risk assessment on flood prone areas in the municipality. Halifax Water committed to cost sharing 50% of the Municipal Share up to $50,000.

- July 25, 2016 - HRM received the fully executed funding agreement from the Province of Nova Scotia for the National Disaster Mitigation Program (NDMP) – Flood Risk Assessment study.

RECOMMENDATION

It is recommended the Environment, Health and Safety Committee recommend to the Halifax Water Board that we:

- Accept the methodology contained in the National Disaster Flood Risk Assessment study (Attachment E), as the basis for prioritizing mitigation projects in flood prone areas.

- Direct the General Manager to work with the Municipality to develop a joint flood risk assessments implementation plan for the ten sites outlined in the Discussion section of this report, which will include a funding/cost-sharing strategy with options for consideration of Regional Council during the 2019/20 and 2020/21 business plan and budget deliberations.

BACKGROUND

On February 26, 2013, Regional Council approved an interim Stormwater Infrastructure Funding Solution to help remedy private property flooding impacts that are not funded through either the tax rate or the utility rate. The interim funding solution, which expired in 2015, included projects that were evaluated on how well they met the following criteria:

- Residential/Utility/Municipal experience (flooding claims, roadway icing)
- Solution feasibility
- Diversion from wastewater system
- Opportunities for secondary funding from any sources (Provincial, Federal, Utility)
- Severity of impact on the community
- Project integration opportunity

While the evaluation criteria did include severity impacts on communities, it did not specifically address risk. In recognition of increasing disaster risks and costs, the Federal Government established the National Disaster Mitigation Program (NDMP) in 2014, as part of the Government's commitment to building safer and more resilient communities through investment in projects addressing rising flood risk and costs.

In broad terms, there are four categories of project that are eligible for funding: risk assessments, flood mapping, mitigation planning, and small-scale mitigation projects. The NDMP is intending to address rising flood risks and costs, and to inform future mitigation investments that could reduce, or even negate, the effects of flood events.

Halifax Water staff participated in the Municipality's development of an inventory of areas in the Municipality that are at risk of flooding or that have flooded because of storm events. The overall list consists of almost 700 individual properties that are flood prone or have drainage issues. In addition, there are approximately 500 sites that are routinely visited by operations staff prior to a storm to clean inlets and to prevent flooding.

From compiled historical service records and operational data, the Municipality and Halifax Water have identified thirty (30) key areas that are prone to frequent flooding concerns during heavy rainfall events. These key sites are shown in Attachment A.

The National Disaster Mitigation Program:

The NDMP Study involved completion of a Risk Assessment Information Template (RAIT), issued by Public Safety Canada, which are included in Attachment B.

The current study falls under the first of four (4) available NDMP funding streams:

- **Stream 1: Risk Assessment (This Study**) - Identification of the potential hazards; impact(s) of the hazard to people, economy, structures and networks, the natural environment, etc.; the community's vulnerabilities; and assessment of the likelihood of occurrence. Involves determination of risk thresholds to serve as an informal decision-making support tool, and to inform the prioritization and selection of mitigation projects.

- **Stream 2: Flood Mapping** - Flood mapping to identify structures, people and assets most likely to be impacted.

- **Stream 3: Mitigation Planning** - Using information on identified flood risks to make informed planning decisions. Involves identifying broad mitigation goals, objectives/strategies, and key activities to meet the objectives

- **Stream 4:** Investments in Non-Structural and Small Scale Structural Mitigation - Implementation of a specific mitigation project.

It is important to note that the NDMP funding guidelines recognize that additional work beyond Stream 1: Risk Assessment is needed to study and mitigate the flooding. The intent of the Stream 1 study is to identify and assess flooding as a hazard risk using the best information that is available, understanding that flood mapping and/or modelling (i.e., Stream 2 activities) may be required for the risk to be fully understood and addressed.

Types, Causes & Consequences of Flooding:

The NDMP Guidelines define flooding as "The overflow of natural drainage channels, natural shorelines and/or human-made facsimiles leading to partial or complete inundation from the overflow of inland or tidal waters, and/or the accumulation or runoff of surface waters from any source".

Flooding can typically be described by the following terms:

- Riverine;
- Coastal;
- Urban;
- Failure of Water-Retaining Structures.

The primary causes of flooding in Canada are typically related to hydro-meteorological conditions such as:

- Extreme Rainfall;
- Snowmelt Runoff;
- Rainfall on Frozen Ground;
- Rain on Snow;

- Ice Jams;
- Natural Dams;
- Coastal Storm Surge.

Flooding can have a variety of impacts on a community at both a small and large scale, such as:

- Infrastructure: damage to transportation systems, water supply, wastewater system, communications.
- Public Safety: injury, fatalities, access to hospitals, limited emergency health response.
- Society: evacuation, relocations, access to schools, public perception.
- Economic: damage to businesses, loss of business, loss of economic assets, disruption to local economy, cost of damage recovery and re-build.
- Environment: damage to the natural environment such as vegetation, sedimentation, impacts on water quality.
- Property and Building Damage: structural damage, damage to building contents, sewer backups, basement flooding, water damage.

These were the primary criteria used in the NDMP Risk: Assessment.

Study Framework:

From a previous "Baseline Study", Halifax Water coordinated with Municipal staff in consolidating a short-list of thirty (30) key sites (Attachment A) as candidates for assessment under the NDMP. The thirty sites were identified as ones where municipal and Halifax Water staff most frequently respond to during rain events.

The goal of this study was to investigate and document flood risks at these key flood-prone areas identified within the Municipality, focusing on the impacts at the community level. The results will assist Council and the Halifax Water Board in making decisions and to support future funding strategies for the implementation of flood mitigation measures within the Municipality.

The following framework was used for this study:

- Background Review and Information Compilation: Review of available background material regarding the study, including the existing

- Baseline Study: Compilation of background information on the 30-key flood-prone areas identified by HRM.

- Preliminary Risk Assessments (30 Key Areas): Completion of preliminary site investigations for the 30 key areas identified by HRM;

- Facilitation of Preliminary Risk Assessment Workshops to engage HRM and Halifax Water staff and to inform the preliminary risk assessments and site ranking;

- Completion of Preliminary Risk Assessments for each of the 30 key areas, based on RAIT criteria and information collected in the consultation process.

- Site Risk Ranking: Ranking of the Top-30 flood-prone sites, per the RAIT forms, with the goal of identifying the 10 highest flood risk sites to proceed to detailed assessment. Informed through review of background information, workshop feedback and preliminary site assessments.

- Detailed Risk Assessments (10 Highest-Flood Risk Areas):
  Completion of detailed site investigations for the Top-10 highest risk areas;
  Facilitation of Detailed Risk Assessment Workshops with HRM and Halifax Water staff to inform the detailed risk assessments and mitigation strategies;
  Completion of Detailed Risk Assessments for each of the 10 highest risk areas including detailed RAIT forms.

  Preliminary Mitigation Strategy Recommendations:
  Development of Preliminary Mitigation Strategy Recommendations complete with order of magnitude cost estimates and NDMP funding streams for recommended remedial works.

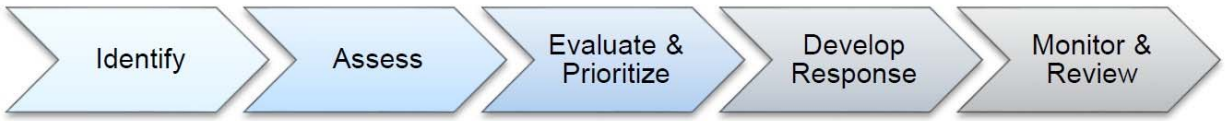
Risk Assessment Methodology:

This flood risk assessment considered the collected data on impacts, consequences, and frequency of occurrence for floods. Taking this data into account, certain mitigation recommendations for each site were formulated which may be eligible for funding under the NDMP or other similar programs.

For the purposes of this study, Flood Risk is defined as an uncertain event or condition that, if occurs, has potential negative impact on the community. Subsequently, Risk Management is the process of identifying risks, determining the likelihood of occurrence, severity of the consequences, and addressing those, which are the most threatening to the community. The following outlines the Risk Assessment Methodology process used in this study:

Identify the Risk:

- What type of flood?
- What area is at risk?
- Assess the Risk: What is the likelihood of the event occurring?
- Evaluate and Prioritize Risks: Is the flood risk low or high? What are the most critical risks?
- Develop Response: What mitigation strategies should be applied to manage the risk?
- Monitor and Review: Continue to monitor risks and implemented mitigation measures.



Top Ten Highest Priority Sites for Detailed Risk Assessment:

Based on the study's evaluation framework, a list of the top ten highest priority sites for detailed risk assessment was developed, and a more detailed analysis was carried out for each of the sites. The prioritization matrix can be found in Attachment C. The top ten sites are as follows:

NDMP Ranking	Site Numbers (Attachment A)	Site Description
1	20, 21,25,26	Sackville Rivers
2	17,30	Shubenacadie Lakes
3	8	Karlson's Wharf (Upper Water Street)
4	9	Inglis Street at Barrington
5	16,17,23, 24	Highway 2
6	7	Pleasant Street (near Dartmouth General Hospital)
7	3, 5	Cole Harbour Road at Perron Drive
7	2	Shore Road – Eastern Passage
7	22	Hammonds Plains Road at Bluewater Road
7	A2	Bedford Highway at Mount St. Vincent

Flood Risk Site Categorization:

When the "Baseline Study" was first commissioned, staff had a collection of several thousand service calls. These service calls ranged primarily from localized events

occurring at individual properties to large flooding events impacting traffic and adjacent properties. The Baseline study identified 700 properties that have been impacted by stormwater drainage in some manner.

Out of the 700 properties, 30 key sites (Attachment A) were selected for further assessment under the NDMP. Sites being assessed vary from a neighborhood or street location, to a broader community, depending on the operational issues and severity of the flooding impacts. The sites have been grouped as either Large Natural Watershed Systems, Localized Drainage Infrastructure, or Tidal Influenced Systems. Each group shares similar hydrologic and hydraulic causes, impacts and consequences, as well as mitigation strategies and are discussed below.

Large Natural Watershed Systems: Three of the ten highest priority sites may be categorized as Large Natural Watershed Systems, since they are located immediately adjacent and within the floodplain of one of the major natural drainage channel in the areas:

- Sackville River System
- Shubenacadie Lakes System,
- Cole Harbour / Bissett Lake Watershed System

Localized Drainage Infrastructure: Flooding at four of the ten highest priority sites may be characterized as the result of limited or inadequate capacity of the local stormwater drainage infrastructure systems:

- Highway 2, (Sites #16, #17, #23, and #24)
- Pleasant Street, near Dartmouth General Hospital - Dartmouth
- Hammonds Plains Road at Bluewater Road – Bedford
- Bedford Highway at Mount Saint Vincent

Of these sites, work is already underway on the Hammonds Plains Road at Bluewater Road site where a consultant has been engaged to develop preliminary design options and capital cost estimates.

Tidal Influence Systems: Three of the ten highest priority sites are understood to be influenced by the normal and extreme tidal range of the Atlantic Ocean coincident with peak stormwater runoff conditions:

- Karlson's Wharf at Upper Water Street - Halifax
- Inglis Street at Barrington Street – Halifax
- Shore Road - Eastern Passage

The Karlson’s Wharf Site is within the boundaries of the Cogswell Interchange Redevelopment project. As a result, the Cogswell project consultant is preparing a design solution. The solution will be presented in a follow-up report to HRM Regional Council.

Costs of Possible Mitigation Actions:

As part of this study, a recommended mitigation strategy along with an order of magnitude costing for the strategy was completed for the 10 highest priority areas. The strategies include interim, short term (1-2 years), medium (3-5 years) and long-term (5+ years) solutions. Most of these time frames have been designated with a respective and associated costing.

Aggregating the information provided, the overall financial implications for mitigating these top ten sites is estimated to be in the range of $6.3 to $15 million. This order of magnitude is considered by staff to be the "known cost" to mitigate the issues at the top ten sites. Some costs are unknown and are not included in this order of magnitude estimate, specifically, the long-term costs for the Sackville River and Shubenacadie Lakes Systems, as well as Shore Road and Inglis Street at Barrington.

Summary:

Estimated costs provided by the consultant indicate that known cost of adaptation or mitigation of the top ten sites is at least $15 million. This amount will undoubtedly grow as studies are carried out on the Sackville River and Shubenacadie Lakes systems. It is important to note that the top ten sites that ranked high did so because of the impact of flooding on major corridors and streets. It is also important to note that the impacts are expected to become more severe in terms of both magnitude and frequency as the result of climate change.

Federal and provincial funding programs may provide a source of funding to help offset the cost of upgrading the stormwater system. The federally budgeted programs include the following:

NDMP's final cycle in fiscal 2019/20 (Applications deadline is set for October 23, 2018);

Disaster Mitigation and Adaption Fund as announced and in 2017 Federal Budget

To qualify for the NDMP federal funding program, applications need to be submitted by October 23, 2018. Municipal staff are recommending that an application be submitted to have follow up studies carried out for the Sackville River ($150,000) and Shubenacadie Lakes systems ($300,000). Under the NDMP program, federal funding is provided up to 50% of the project costs. There is no Provincial cost-sharing component.

Additionally, in January 2018, the Municipality and Halifax Water adopted a framework for and commitment to develop an Integrated Stormwater Management Policy which recognized the various roles and responsibilities of stakeholders including Federal and Provincial Governments. This policy will provide a fair and rational basis on which to apportion costs of upgrading a stormwater system, based on the benefit received from an

upgrade. In this respect, the benefit received by the Municipality derives from protecting the road infrastructure and reducing flooding in the public right of way, the benefit received by Halifax Water derives from reduced inflow into the wastewater system, and the benefit received by private property owners derives from reducing flooding on private property.

A flood risk assessments implementation plan can be developed by applying these cost sharing principles to the findings of the NDMP Flood Risk Assessment Study.

Acceptance of the report recommendations would provide staff with a framework by which HRM's flood related matters would be prioritized and actioned.

BUDGET IMPLICATIONS

Based on the cost estimates provided in the risk assessment report (Attachment D), Municipal staff anticipate that the Sackville Rivers study will require funding of $150,000 and the Shubenacadie Lakes study will require $300,000 for a total cost of $450,000. Through the NDMP program, this work is eligible to be cost shared to a maximum of 50% with Public Safety Canada, requiring $225,000 of municipal funding for the work. Halifax Water proposes to cost share an upper limit of $50,000 within the Stormwater Capital Budget for these two studies, provided the Municipality funds the balance of the studies.

Within the next 12 months, staff will return to the Halifax Water Board for consideration of a flood risk assessment implementation plan and a long-term funding strategy.

ALTERNATIVES

The Environment, Health and Safety Committee could recommend that Halifax Water not direct the General Manager to develop an integrated funding strategy or flood risk assessments implementation plan with the Municipality. This is not recommended for the reasons outlined in the report.

ATTACHMENTS

Attachment A:	30 Key Sites
Attachment B:	Risk Assessment Information Templates
Attachment C:	Site Prioritization Matrix
Attachment D:	Summary of Recommended Strategies & Order of Magnitude Costing
Attachment E:	National Disaster Mitigation (NDMP) Flood Risk Assessments Consultant Main Report
Attachment F:	Financial Summary

Report Prepared by: *Original Signed By:*

Kenda MacKenzie, Director Regulatory Services, (902) 237-7116

Financial Reviewed by: *Original Signed By:*

Cathie O'Toole, MBA, CPA, CGA, ICD.D
Director, Corporate Services, (902) 490-3685

Report Reviewed by: *Original Signed By:*

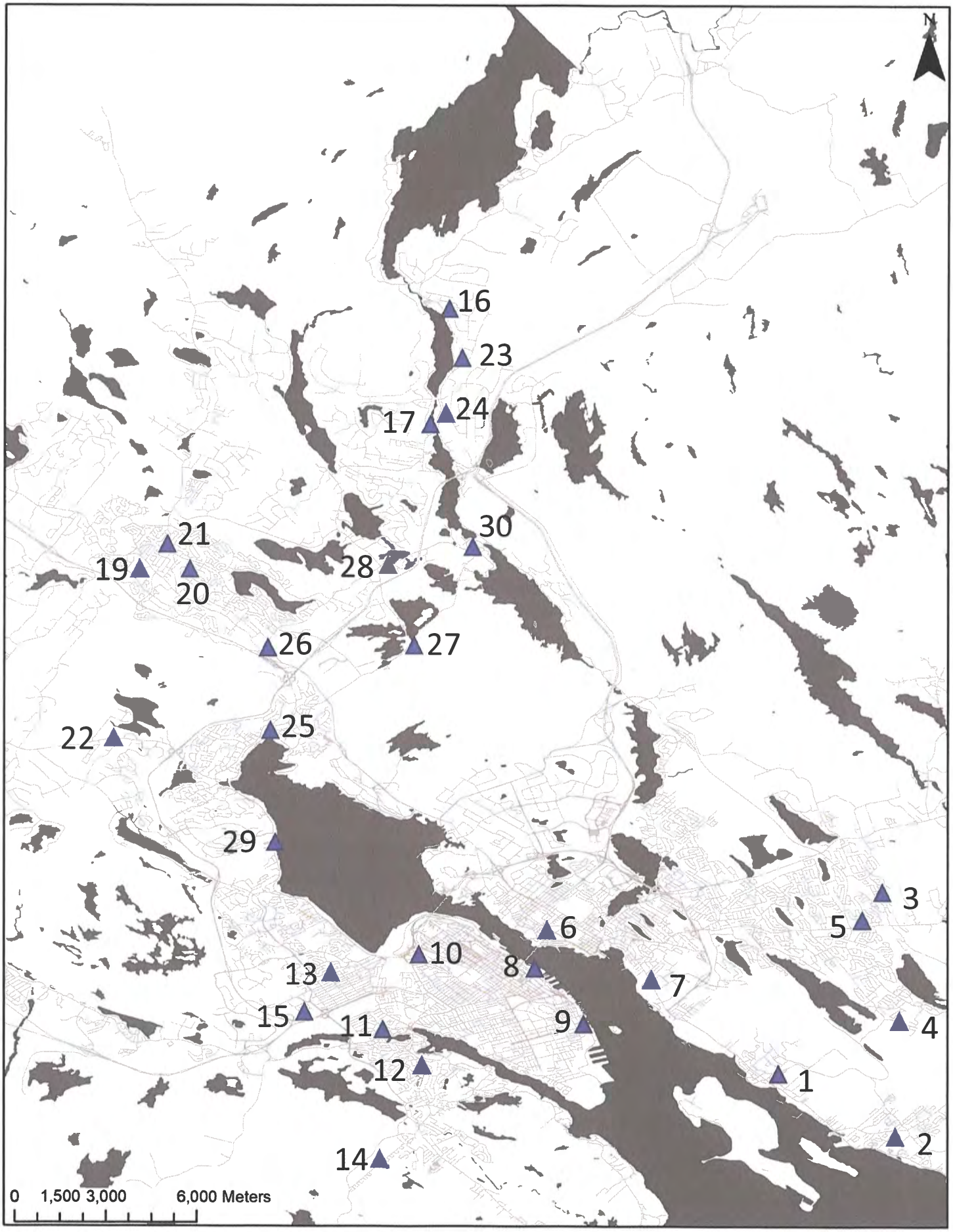
Carl Yates, M.A.Sc., P.Eng., General Manger, (902) 490-4840

Attachment A

OVERVIEW OF 30 KEY SITES

Following completion of the HRM Stormwater Funding Strategy – Baseline Study (SDMM, 2015), HRM and Halifax Water developed a short-list of 30 flood prone areas within the municipality that are subject to frequent flooding. These 30 sites serve as a starting point for the current study, identified as candidates for preliminary risk assessment and potential funding under the Federal NDMP. An overview Figure of the 30 Key Sites is presented in the following page. The following table presents the list of 30 Key Sites provided in the Terms of Reference:

SITE NO.	LOCATION	REGION	DISTRICT
1	Autoport; Eastern Passage	East	3
2	Shore Road; Eastern Passage	East	3
3	John Stewart Drive; Dartmouth	East	4
4	Beaver Crescent; Cole Harbour	East	4
5	Cole Harbour Road @ Perron Drive; Cole Harbour	East	4
6	Nantucket Avenue @ Wyse Road; Dartmouth	East	5
7	Pleasant Street, near Dartmouth General Hospital; Dartmouth	East	5
8	Karlson's Wharf @ Upper Water Street; Halifax	West	7
9	Inglis Street @ Barrington Street; Halifax	West	7
10	Kempt Road @ Lady Hammond; Halifax	West	8
11	Keating Road @ Crown Drive; Halifax	West	9
12	Melville Avenue @ Winchester Avenue	West	9
13	Glenforest Weir; Halifax	West	10
14	Leiblin Drive @ Guildwood Crescent; Halifax	West	11
15	Bently Drive @ Ramsbrook Court; Halifax	West	12
16	Wellington Fire Station, Highway 2; Wellington	Central	1
17	Fletcher's Drive, near civic 57; Fall River	Central	1
18	Hammonds Plains Road, near Kynock Resources; Hammonds Plains	Central	13
19	Bambrick Road @ Orchard Drive; Middle Sackville	Central	14
20	Rankin Drive @ Glendale; Lower Sackville	Central	15
21	Sunnyvale Crescent @ Beaverbank Road; Lower Sackville	Central	15
22	Hammonds Plains Road @ Bluewater Road; Bedford	Central	16
23	Holland Road @ Highway 2; Fletcher's Lake	Central	1
24	Highway 2, from Holland Road to Miller Lake Road; Fall River	Central	1
25	Bedford Highway, from Union Street to Highway 102; Bedford	Central	16
26	Sackville Drive @ Cobequid Road; Lower Sackville	Central	15
27	Rocky Lake Drive, near quarry entrance; Bedford	Central	16
28	Cobequid Road @ Regwood Drive; Windsor Junction	Central	1
29	Bedford Highway @ Shaunslieve Drive; Bedford	Central	16
30	Ridge Avenue, from School Street to end; Waverley	Central	1


N
16
23
24
17
21
30
19
28
20
26
27
22
25
29
3
5
6
10
8
13
7
15
11
9
4
12
1
2
14
0 1,500 3,000 6,000 Meters

ATTACHMENT B

Public Safety Canada | Sécurité publique Canada
Ottawa, Canada
K1A 0P8

UNCLASSIFIED

National Disaster Mitigation Program (NDMP)
Risk Assessment Information Template

Risk Event Details			
Start and End Date	Provide the start and end dates of the selected event, based on historical data.	Start Date:	End Date:
Severity of the Risk Event	Provide details about the risk, including: • Speed of onset and duration of event; • Level and type of damaged caused; • Insurable and non-insurable losses; and • Other details, as appropriate.		
Response During the Risk Event	Provide details on how the defined geographic area continued its essential operations while responding to the event.		
Recovery Method for the Risk Event	Provide details on how the defined geographic area recovered.		
Recovery Costs Related to the Risk Event	Provide details on the costs, in dollars, associated with implementing recovery strategies following the event.		
Recovery Time Related to the Risk Event	Provide details on the recovery time needed to return to normal operations following the event.		

Risk Event Identification and Overview	
Provide a qualitative description of the defined geographic area, including: • Watershed/community/region name(s); • Province/Territory; • Area type (i.e., city, township, watershed, organization, etc.); • Population size; • Population variances (e.g., significant change in population between summer and winter months); • Main economic areas of interest, • Special consideration areas (e.g., historical, cultural and natural resource areas); and an • Estimate of the annual operating budget of the area.	
Methodolgies, processes and analyses	
Provide the year in which the following processes/analyses were last completed and state the methodology(ies) used: • Hazard identification; • Vulnerability analysis; • Likelihood assessment; • Impact assessment; • Risk assessment; • Resiliency assessment; and/or • Climate change impact and/or adaptation assessment. *Note:* It is recognized that many of the processes/analyses mentioned above may be included within one methodology.	

Hazard Mapping	
To complete this section: • Obtain a map of the area that clearly indicates general land uses, neighbourhoods, landmarks, etc. For clarity throughout this exercise, it may be beneficial to omit any non-essential information from the map intended for use. Controlled photographs (e.g. aerial photography) can be used in place of or in addition to existing maps to avoid the cost of producing new maps. • Place a grid over the maps/photographs of the area and assign row and column identifiers. This will help identify the specific area(s) that may be impacted, as well as additional information on the characteristics within and affecting the area. • Identify where and how flood hazards may affect the defined geographic area. • Identify the mapped areas that are most likely to be impacted by the identified flood hazard. Map(s)/photograph(s) can also be used, where appropriate, to visually represent the information/prioritization being provided as part of this template.	
Hazard identification and prioritization	
List known or likely flood hazards to the defined geographic area in order of proposed priority. For example: (1) dyke breach overland flooding; (2) urban storm surge flooding ; and so on.	
Provide a rationale for each prioritization and the key information sources supporting this rationale.	
Risk Event Title	
Identify the name/title of the risk. An example of a risk event name or title is: "A one-in-one hundred year flood following an extreme rain event."	
Type of Flood Hazard	
Identify the type of flood hazard being described (e.g., riverine flooding, coastal inundation, urban run-off, etc.)	

Secondary hazards	
Describe any secondary effects resulting from the risk event (e.g., flooding that occurs following a hurricane).	
Primary and secondary organizations for response	
Identify the primary organization(s) with a mandate related to a key element of a natural disaster emergency, and any supporting organization(s) that provide general or specialized assistance in response to a natural disaster emergency	

Risk Event Description	
Description of risk event, including risk statement and cause(s) of the event	
Provide a baseline description of the risk event, including: • Risk statement; • Context of the risk event; • Nature and scale of the risk event; • Lead-up to the risk event, including underlying cause and trigger/stimulus of the risk event, and • Any factors that could affect future events. *Note:* The description entered here must be plausible in that factual information would support such a risk event.	

Location	
Provide details regarding the area impacted by the risk event such as • Province(s)/territory(ies); • Region(s) or watershed(s); • Municipality(ies); • Community(ies); and so on.	
Natural environment considerations	
Document relevant physical or environmental characteristics of the defined geographic area.	
Meteorological conditions	
Identify the relevant meteorological conditions that may influence the outcome of the risk event.	

Seasonal conditions	
Identify the relevant seasonal changes that may influence the outcome of the risk assessment of a particular risk event.	
Nature and vulnerability	
Document key elements related to the affected population, including: • Population density; • Vulnerable populations (identify these on the hazard map from step 7), • Degree of urbanization; • Key local infrastructure in the defined geographic area; • Economic and political considerations; and • Other elements, as deemed pertinent to the defined geographic area.	

Asset inventory	
Identify the asset inventory of the defined geographic area, including: • Critical assets; • Cultural or historical assets; • Commercial assets; and • Other area assets, as applicable to the defined geographic area. Key asset-related information should also be provided, including: • Location on the hazard map (from step 7); • Size; • Structure replacement cost; • Content value; • Displacement costs, • Importance rating and rationale; • Vulnerability rating and reason; and • Average daily cost to operate. A total estimated value of physical assets in the area should also be provided.	
Other assumptions, variability and/or relevant information	
Identify any assumptions made in describing the risk event, define details regarding any areas of uncertainty or unpredictability around the risk event, and supply any supplemental information, as applicable.	
Existing Risk Treatment Measures	
Identify existing risk treatment measures that are currently in place within the defined geographic area to mitigate the risk event, and describe the sufficiency of these risk treatment measures.	

Likelihood Assessment		
Return Period		
Identify the time period during which the risk event might occur. For example, the risk event described is expected to occur once every X number of years. Applicants are asked to provide the X value for the risk event.		
Period of interest		
Applicants are asked to determine and identify the likelihood rating (i.e. period of interest) for the risk event described by using the likelihood rating scale within the table below.		
Likelihood Rating	**Definition**	
5	The event is expected and may be triggered by conditions expected over a 30 year period.	
4	The event is expected and may be triggered by conditions expected over a 30 - 50 year period.	
3	The event is expected and may be triggered by conditions expected over a 50 - 500 year period.	
2	The event is expected and may be triggered by conditions expected over a 500 - 5000 year period.	
1	The event is possible and may be triggered by conditions exceeding a period of 5000 years.	
Provide any other relevant information, notes or comments relating to the likelihood assessment, as applicable.		

Impacts/Consequences Assessment			
There are 12 impacts categories within 5 impact classes rated on a scale of 1 (least impacts) to 5 (greatest impact). Conduct an assessment of the impacts associated with the risk event, and assign one risk rating for each category. Additional information may be provided for each of the categories in the supplemental fields provided.			
A) People and societal impacts			
	Risk Rating	**Definition**	**Assigned risk rating**
Fatalities	5	Could result in more than 50 fatalities	
	4	Could result in 10 - 49 fatalities	
	3	Could result in 5 - 9 fatalities	
	2	Could result in 1 - 4 fatalities	
	1	Not likely to result in fatalities	
Supplemental information (optional)			
Injuries	5	Injuries, illness and/or psychological disablements cannot be addressed by local, regional, or provincial/territorial healthcare resources, federal support or intervention is required	
	4	Injuries, illnesses and/or psychological disablements cannot be addressed by local or regional healthcare resources; provincial/territorial healthcare support or intervention is required.	
	3	Injuries, illnesses and/or psychological disablements cannot be addressed by local or regional healthcare resources additional healthcare support or intervention is required from other regions, and supplementary support could be required from the province/territory	
	2	Injuries, illnesses and/or psychological disablements cannot be addressed by local resources through local facilities; healthcare support is required from other areas such as an adjacent area(ies)/municipality(ies) within the region	
	1	Any injuries, illnesses, and/or psychological disablements can be addressed by local resources through local facilities; available resources can meet the demand for care	
Supplemental information (optional)			

		Risk Rating	Definition	Assigned risk rating
Displacement	Percentage of displaced individuals	5	> 15% of total local population	
		4	10 - 14.9% of total local population	
		3	5 - 9.9% of total local population	
		2	2 - 4.9% of total local population	
		1	0 - 1.9% of total local population	
	Duration of displacement	5	> 26 weeks (6 months)	
		4	4 weeks - 26 weeks (6 months)	
		3	1 week - 4 weeks	
		2	72 hours - 168 hours (1 week)	
		1	Less than 72 hours	
Supplemental information (optional)				
B) Environmental impacts				
		5	> 75% of flora or fauna impacted or 1 or more ecosystems significantly impaired; Air quality has significantly deteriorated; Water quality is significantly lower than normal or water level is > 3 meters above highest natural level; Soil quality or quantity is significantly lower (i.e., significant soil loss, evidence of lethal soil contamination) than normal; > 15% of local area is affected	
		4	40 - 74.9% of flora or fauna impacted or 1 or more ecosystems considerably impaired; Air quality has considerably deteriorated; Water quality is considerably lower than normal or water level is 2 - 2.9 meters above highest natural level; Soil quality or quantity is moderately lower than normal; 10 - 14.9% of local area is affected	
		3	10 - 39.9% of flora or fauna impacted or 1 1 or more ecosystems moderately impaired; Air quality has moderately deteriorated; Water quality is moderately lower than normal or water level is 1 - 2 meters above highest natural level; Soil quality is moderately lower than normal; 6 - 9.9 % of area affected	

	2	< 10 % of flora or fauna impacted or little or no impact to any ecosystems; Little to no impact to air quality and/or soil quality or quantity; Water quality is slightly lower than normal, or water level is less than 0.9 meters above highest natural level and increased for less than 24 hours, 3 - 5.9 % of local area is affected	
	1	Little to no impact to flora or fauna, any ecosystems, air quality, water quality or quantity, or to soil quality or quantity; 0 - 2.9 % of local area is affected	
Supplemental information (optional)			

C) Local economic impacts

	Risk Rating	Definition	Assigned risk rating
	5	> 15 % of local economy impacted	
	4	10 - 14.9 % of local economy impacted	
	3	6 - 9.9 % of local economy impacted	
	2	3 - 5.9 % of local economy impacted	
	1	0 - 2.9 % of local economy impacted	
Supplemental information (optional)			

D) Local infrastructure impacts			
	Risk Rating	Definition	Assigned risk rating
Transportation	5	Local activity stopped for more than 72 hours; > 20% of local population affected; lost access to local area and/or delivery of crucial service or product; or having an international level impact	
	4	Local activity stopped for 48 - 71 hours; 10 - 19.9% of local population affected; significantly reduced access to local area and/or delivery of crucial service or product; or having a national level impact	
	3	Local activity stopped for 25 - 47 hours; 5 - 9.9% of local population affected; moderately reduced access to local area and/or delivery of crucial service or product; or having a provincial/territorial level impact	
	2	Local activity stopped for 13 - 24 hours; 2 - 4.9% of local population affected; minor reduction in access to local area and/or delivery of crucial service or product; or having a regional level impact	
	1	Local activity stopped for 0 - 12 hours; 0 - 1.9% of local population affected; little to no reduction in access to local area and/or delivery of crucial service or product	
Supplemental information (optional)			
Energy and Utilities	5	Duration of impacts > 72 hours; > 20% of local population without service or product; or having an international level impact	
	4	Duration of impact 48 - 71 hours; 10 - 19.9% of local population without service or product; or having a national impact	
	3	Duration of impact 25 - 47 hours; 5 - 9.9% of local population without service or product; or having a provincial/territorial level impact	
	2	Duration of impact 13 - 24 hours; 2 - 4.9% of local population without service or product; or having a regional level impact	
	1	Local activity stopped for 0 - 12 hours; 0 - 1.9% of local population affected; little to no reduction in access to local area and/or delivery of crucial service or product	

Supplemental information (optional)			
Information and Communications Technology	5	Service unavailable for > 72 hours; > 20 % of local population without service; or having an international level impact	
	4	Service unavailable for 48 - 71 hours; 10 - 19.9 % of local population without service; or having a national level impact	
	3	Service unavailable for 25 - 47 hours; 5 - 9.9 % of local population without service, or having a provincial/territorial level impact	
	2	Service unavailable for 13 - 24 hours; 2 - 4.9 % of local population without service; or having a regional level impact	
	1	Service unavailable for 0 - 12 hours; 0 - 1.9 % of local population without service	
Supplemental information (optional)			
Health, Food, and Water	5	Inability to access potable water, food, sanitation services, or healthcare services for > 72 hours; non-essential services cancelled; > 20 % of local population impacted; or having an international level impact	
	4	Inability to access potable water, food, sanitation services, or healthcare services for 48-72 hours; major delays for nonessential services; 10 - 19.9 % of local population impacted; or having a national level impact	
	3	Inability to access potable water, food, sanitation services, or healthcare services for 25-48 hours; moderate delays for nonessential services; 5 - 9.9 % of local population impacted; or having a provincial/territorial level impact	
	2	Inability to access potable water, food, sanitation services, or healthcare services for 13-24 hours; minor delays for nonessential; 2 - 4.9 % of local population impacted; or having a regional level impact	
	1	Inability to access potable water, food, sanitation services, or healthcare services for 0-12 hours; 0 - 1.9 % of local population impacted	

Supplemental information (optional)			
Safety and Security	5	> 20 % of local population impacted; loss of intelligence or defence assets or systems for > 72 hours; or having an international level impact	
	4	10 - 19.9 % of local population impacted; loss of intelligence or defence assets or systems for 48 – 71 hours; or having a national level impact	
	3	5 - 9.9 % of local population impacted; loss of intelligence or defence assets or systems for 25 – 47 hours; or having a provincial/territorial level impact	
	2	2 - 4.9 % of local population impacted; loss of intelligence or defence assets or systems for 13 – 24 hours; or having a regional level impact	
	1	0 - 1.9 % of local population impacted; loss of intelligence or defence assets or systems for 0 – 12 hours	
Supplemental information (optional)			

E) Public sensitivity impacts			
	Risk Rating	Definition	Assigned risk rating
	5	Sustained, long term loss in reputation/public perception of public institutions and/or sustained, long term loss of trust and confidence in public institutions; or having an international level impact	
	4	Significant loss in reputation/public perception of public institutions and/or significant loss of trust and confidence in public institutions; significant resistance; or having a national level impact	
	3	Some loss in reputation/public perception of public institutions and/or some loss of trust and confidence in public institutions; escalating resistance	
	2	Isolated/minor, recoverable set-back in reputation, public perception, trust, and/or confidence of public institutions	
	1	No impact on reputation, public perception, trust, and/or confidence of public institutions	
Supplemental information (optional)			

Confidence Assessment		
Based on the table below, indicate the level of confidence regarding the information entered in the risk assessment information template in the "Confidence Level Assigned" column. Confidence levels are language-based and range from A to E (A=most confident to E=least confident).		
Confidence Level	**Definition**	**Confidence Level Assigned**
A	Very high degree of confidence Risk assessment used to inform the risk assessment information template was evidence-based on a thorough knowledge of the natural hazard risk event; leveraged a significant quantity of high-quality data that was quantitative and qualitative in nature; leveraged a wide variety of data and information including from historical records, geospatial and other information sources; and the risk assessment and analysis processes were completed by a multidisciplinary team with subject matter experts (i.e., a wide array of experts and knowledgeable individuals on the specific natural hazard and its consequences) Assessment of impacts considered a significant number of existing/known mitigation measures	
B	High degree of confidence Risk assessment used to inform the risk assessment information template was evidence-based on a thorough knowledge of the natural hazard risk event; leveraged a significant quantity of data that was quantitative and qualitative in nature; leveraged a wide variety of data and information including from historical records, geospatial and other information sources; and the risk assessment and analysis processes were completed by a multidisciplinary team with some subject matter expertise (i.e., a wide array of experts and knowledgeable individuals on the specific natural hazard and its consequences) Assessment of impacts considered a significant number of potential mitigation measures	

C	Moderate confidence Risk assessment used to inform the risk assessment information template was moderately evidence-based from a considerable amount of knowledge of the natural hazard risk event; leveraged a considerable quantity of data that was quantitative and/or qualitative in nature; leveraged a considerable amount of data and information including from historical records, geospatial and other information sources; and the risk assessment and analysis processes were completed by a moderately sized multidisciplinary team, incorporating some subject matter experts (i.e., a wide array of experts and knowledgeable individuals on the specific natural hazard and its consequences) Assessment of impacts considered a large number of potential mitigation measures	
D	Low confidence Risk assessment used to inform the risk assessment information template was based on a relatively small amount of knowledge of the natural hazard risk event; leveraged a relatively small quantity of quantitative and/or qualitative data that was largely historical in nature; may have leveraged some geospatial information or information from other sources (i.e., databases, key risk and resilience methodologies); and the risk assessment and analysis processes were completed by a small team that may or may not have incorporated subject matter experts (i.e., did not include a wide array of experts and knowledgeable individuals on the specific natural hazard and its consequences). Assessment of impacts considered a relatively small number of potential mitigation measures	
E	Very low confidence Risk assessment used to inform the risk assessment information template was not evidence-based; leveraged a small quantity of information and/or data relating to the natural risk hazard and risk event; primary qualitative information used with little to no quantitative data or information; and the risk assessment and analysis processes were completed by an individual or small group of individuals little subject matter expertise (i.e., did not include a wide array of experts and knowledgeable individuals on the specific natural hazard and its consequences). Assessment of impacts did not consider existing or potential mitigation measures	

Rationale for level of confidence	
Provide the rationale for the selected confidence level, including any references or sources to support the level assigned.	

Key Information Sources	
Identify all supporting documentation and information sources for qualitative and quantitative data used to identify risk events, develop the risk event description, and assess impacts and likelihood. This ensures credibility and validity of risk information presented as well as enables referencing back to decision points at any point in time. Clearly identify unclassified and classified information.	
Description of the risk analysis team	
List and describe the type and level of experience of each individual who was involved with the completion of the risk assessment and risk analysis used to inform the information contained within this risk assessment information template.	

Attachment C

SITE PRIORITIZATION MATRIX

NDMP Flood Risk Assessments: Prioritization Matrix

Table E1: NDMP Impact Assessment

		RESULTS				NDMP RAIT CRITERIA[4]												ADDITIONAL CRITERIA[4]				
						A				B	C	D					E					
						People and Societal				Environmental	Local Economic	Local Infrastructure					Public Sensitivity	Residential Property Damage	Commercial Property Damage	Public Property Damage (Schools, Public Buildings, EMS Buildings)	Cultural/ Historical Assets	Operations & Maintenance Requirements
	CRITERIA WEIGHTING:					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Site #[1]	Site Name	GROUPED PRIORITY RANKING[2,3]	OVERALL WEIGHTED PRIORITIZATION SCORE	WORKSHOP RANKING COMPARISON: HW Overall Rating (Workshop 1)	WORKSHOP RANKING COMPARISON: HRM Overall Rating (Workshop 2)	Fatalities	Injuries	Displacement (population)	Duration of Displacement			Transportation	Energy and Utilities	Information and Communications Technology	Health, Food, and Water	Safety and Security						
25	Bedford Highway, from Union Street to Highway 102 - Bedford	1	38	3	3	2	2	2	3	2	3	3	2	2	3		3	3	3	2	2	1
A6	Shubenacadie Lakes	2	27	3	3	2	2	2	3	2	2	2		2	2		3			2	3	
8	Karlson's Wharf @ Upper Water Street - Halifax	3	25	3	3					2	3	2	3		3	2	3		2	2	2	1
9	Inglis Street @ Barrington Street - Halifax	4	21	3	2.5			1	1	2	1	1	2		3		3	2		1	1	3
24	Highway 2, from Holland Road to Miller Lake Road - Fall River	5	18	3	N/A	1	2				1	3	2	2	2		2	1				2
7	Pleasant Street, near Dartmouth General Hospital - Dartmouth	6	17	2	3					1	1	2	1	1	2		3			3	1	2
5	Cole Harbour Road @ Perron Drive - Cole Harbour	7	15	2	3					1	1	2	1		1		2	1	2	1	1	2
2	Shore Road - Eastern Passage	7	15	3	2			2	1			3	1		1		2	2			1	2
22	Hammonds Plains Road @ Bluewater Road - Bedford	7	15	3	3					2	2	2			1		3	1	1			3
A2	Mount Saint Vincent at Bedford Highway	7	15	3	3	1	1				2	2			2		3				1	3
19	Bambrick Road @ Orchard Drive - Middle Sackville	11	12	2	2			1	1	1		1	1		1		2	2			1	1
6	Nantucket Avenue @ Wyse Road - Dartmouth	11	12	2	3					1	2	2			1		3		1			2
1	Autoport - Eastern Passage	13	11	1	2					1	2	2			1		2		3			
27	Rocky Lake Drive, near quarry entrance - Bedford	14	10	1	2	1	1			3	2	1					2					
28	Cobequid Road @ Regwood Drive - Windsor Junction	15	9	1	1	1	1					1			1		1	1			2	1
12	Melville Avenue @ Winchester Avenue	15	9	1	1			2	2								1	1			1	2
11	Keating Road @ Crown Drive - Halifax	17	8	1	1			1	1	1							1	1			1	2
10	Kempt Road @ Lady Hammond - Halifax	17	8	3	1						1						1		1		2	3
21	Sunnyvale Crescent @ Beaverbank Road - Lower Sackville	19	7	1	2					1		1			1		1	1				2
18	Hammonds Plains Road, near Kynock Resources - Hammonds Plains	19	7	1	2					2	1	1					1		2			
13	Glenforest Weir - Halifax	19	7	2	1		2										1	1	1			2
14	Leiblin Drive @ Guildwood Crescent - Halifax	22	4	1	1												1	1				2
4	Beaver Crescent - Cole Harbour	22	4	1	1												1	1				2
15	Bently Drive @ Ramsbrook Court - Halifax	24	3	1	1													1				2
26	Sackville Drive @ Cobequid Road - Lower Sackville	N/A	25	2	0	1		1	2	2	1	2	2	2	2		2	2	1	2	2	1
30	Ridge Avenue, from School Street to end - Waverley	N/A	22	3	0			2	2	2		3	2	1	2		2	1		2	1	2
3	John Stewart Drive - Dartmouth	N/A	13	3	1			1	1	1							2	2		2	1	3
20	Rankin Drive @ Glendale - Lower Sackville	N/A	12	1	2			1	1	2		1	1				2	2				2
16	Wellington Fire Station, Highway 2 - Wellington	N/A	9	1	0							2			2		1			2		2
17	Fletcher's Drive, near civic 57 - Fall River	N/A	6	1	N/A												1	2			1	2
23	Halland Road @ Highway 2 - Fletcher's Lake	N/A	4	N/A	N/A												1	1				2
29	Bedford Highway @ Shaunslieve Drive	N/A	2	1	0						1										1	

Notes

Sites A2 and A6 were not originally included on the list of 30 sites, but were identified during the Preliminary Assessment Workshops as opportunities for a more community based risk assessment.

[1] The Top 30 Priority Sites, based on the Preliminary Prioritization process, are highlighted in blue.

[2] A Priority Ranking of "N/A" denotes the site was considered part of a grouping. The site in the grouping with the highest score was used in the Priority Ranking

[3] The Grouped Priority Ranking references the site with the highest score within the grouping.

The following should be considered in review of the Preliminary NDMP Impact Assessment Table above:

- **The prioritization rating system** is a tool to scope the relative priorities across the 30 sites in comparison to each other.
- **Impact ratings** should be considered to be subjective, but were informed through stakeholder workshops, consultation, and preliminary review. Workshops and consultation involved representatives from HRM, Halifax Water and the project team the fields of engineering, operations, planning emergency management, and climate change.
- **The Overall Priority Score for each site was developed by combining its scores for each of the Prioritization Impact criteria.** See Table E-2 for descriptions of how the Level of Impact scoring was applied. Each Impact Criteria was weighted equally.
- **Preliminary Consultation identified the opportunity to group several key sites under common themes better suited for future analysis and/or funding under the NDMP for a more community-based assessment.**

Table 3: Overview of Level of Impact Rating System for Site Prioritization

Level of Impact	Scoring Range	General Description
No Impact	0	Impact of the criteria is not applicable, or unknown at the site.
Low Impact	1	Low level of impact of the criteria at the site.
Moderate Impact	2	Moderate level of impact of the criteria at the site.
High Impact	3	High level of impact of the criteria at the site.

Table 4: Level of Impact Rating System, by Category

Classification	Overall Priority Score Range	General Description
Low Priority	0-15	Lower level of impact. Least urgent in comparison to other sites. Consider further assessment or mitigation through other funding streams to reduce flood risks.
Moderate Priority	15-24	Moderate level of impact. Action or further analysis may be required. Consider proceeding to detailed risk assessment through the NDMP and consider mitigation measures to reduce flood risks.
High Priority	25-38	High level of impact. Action or further analysis required. Proceed to detailed risk assessment through the NDMP and consider mitigation measures to reduce flood risks.

Table E2: Level of Impact Rating System, by Category - Site Prioritization

	Category	Rating	Description
NDMP RAIT CRITERIA	Fatalities	0	No identified history of impact of this criteria at site location
		1	Mild risk of a fatality due to an event
		2	Moderate risk of fatality or multiple fatalities due to an event (ex. road hazards such as hydroplaning; high flows)
		3	Higher risk of fatalities due to event (ex. high risk road hazards such as adjacent bodies of water or high speed travel; extreme flows)
	Injuries	0	No identified history of impact of this criteria at site location
		1	Mild risk of an injury due to an event
		2	Moderate risk of an injury or multiple injuries due to an event (ex. road hazards such as hydroplaning; high flows)
		3	Higher risk of injuries due to an event (ex. high risk road hazards such as high speeds; extreme river flows)
	Displacement	0	No identified history of impact of this criteria at site location
		1	Possible displacement of a few constituents within the site location
		2	Possible displacement of a portion of constituents within or adjacent the site location
		3	Possible or certain displacement of a community of constituents within or adjacent the site location
	Duration of Displacement	0	No identified history of impact of this criteria at site location
		1	Displacement during the event, requires clean-up work
		2	Displacement for the duration of up to 1 week or requires some remedial work
		3	Displacement for more than 1 week or requires re-build
	Environmental	0	No identified history of impact of this criteria at site location
		1	Potential for minor environmental effect to a small portion of the site, or near an environmentally sensitive area.
		2	Recorded or potential for environmental damage, or near an area of environmental importance; combined sewer overflows.
		3	Recorded or potential for wide spread/severe environmental damage; storage of hazardous materials; likely release of contaminants.
	Local Economy	0	No identified history of impact of this criteria at site location
		1	Minor delays to delivery/shipping of goods and services, or impact on some nearby economic infrastructure
		2	Major delays to delivery/shipping of goods and services, or impact on nearby economic infrastructure
		3	Delivery/shipping of goods and services halted, or wide-spread impact on economic infrastructure
	Transportation	0	No identified history of impact of this criteria at site location
		1	Minor delays/impact to commuter/public transit/shipping routes
		2	Major delays/impact to commuter/public transit/shipping routes or Minor delays to emergency services routes
		3	Commuter/public transit routes re-routed or halted or Major delays/cut offs of emergency services routes
	Energy and Utilities	0	No identified history of impact of this criteria at site location
		1	Minor disruption to electricity, water/wastewater, or natural gas services
		2	Major disruption to electricity, water/wastewater, or natural gas services; or minor infrastructure damage
		3	Services cut off or major infrastructure damage
	Information and Communications Technology	0	No identified history of impact of this criteria at site location
		1	Minor disruption to Information/Communications services
		2	Major disruption to Information/Communications services, or minor infrastructure damage
		3	Services cut off or major infrastructure damage
	Health, Food and Water	0	No identified history of impact of this criteria at site location
		1	Minor health and water
		2	Major disruption to services or minor infrastructure damage
		3	Services cut off or major infrastructure damage
	Safety and Security	0	No identified history of impact of this criteria at site location
		1	Minor impacts to a single public safety/national defense asset
		2	Limited access to a single public safety/national defense asset or minor impacts to assets
		3	Multiple public safety/national defense asset assets impacted or no access to the asset(s)
	Public Sensitivity	0	No identified history of impact of this criteria at site location
		1	Known issue to some constituents within the site location or effects felt on an individual site level
		2	Known issue to the majority of constituents within the site location or effects felt throughout the local community
		3	Known issue to constituents outside of the site location/press news coverage or impact effects felt outside of the local community
ADDITIONAL CRITERIA	Residential Property Damage	0	No identified history of impact of this criteria at site location
		1	Recorded or potential for localized residental property damage
		2	Recorded or potential for property damage to a neighbourhood or high density area
		3	Recorded or potential for wide spread property damage at the community level
	Commercial Property Damage	0	No identified history of impact of this criteria at site location
		1	Recorded or potential for localized commercial property damage
		2	Recorded or potential for property damage to a commercial neighbourhood or high density area
		3	Recorded or potential for wide spread commercial property damage at the community level
	Public Property Damage (Schools, Public Buildings, EMS Buildings)	0	No impact of criteria at site location
		1	Recorded or potential minor impacts to public buildings.
		2	Recorded or potential impacts to educational and daycare facilities
		3	Recorded or potential to critical buildings such as police, fire, EMS and extended care
	Cultural/ Historical Assets	0	No identified history of impact of this criteria at site location
		1	Small pockets of elevated archaeological potential with the site location
		2	Site includes an area of elevated archaeological potential or contains an archaeological/culturally significant location or structure
		3	Presence of multiple archaeological/culturally significant locations or structures
	Operations & Maintenance Requirements	0	No identified history of impact of this criteria at site location
		1	Occasional site operational/maintenance issues reported, or minor nuissance issue
		2	Consistent site operational/maintenance issues reported, moderate demand for operational resources
		3	Reoccuring site operational/maintenance issues, high demand for operational resources

ATTACHMENT D

Priority	Site Name	Recommended Strategy
1	Sackville Rivers System	Engineering Feasibility Study Potential Flood Remediation Measures. Also, Update Planning & Development Policy within Floodplain
2	Shubenacadie Lakes	Watershed & Floodplain Mapping Study
3	Karlson's Wharf	Analysis & Preliminary Design of Future Local Storm System. Also, Construction of Local Storm Sewer System Infrastructure
4	Inglis Street at Barrington	Local Stormwater System Study & Concept Design
5	Highway 2	Highway 2 Stormwater Drainage Study
6	Pleasant Street	Hydrologic/Hydraulic Assessment & Conceptual Design of Flood Remediation Infrastructure
7	Cole Harbour Road at Peron Drive	Detailed Bisset Run Watershed Drainage Study & Mitigation Concept Development
7	Shore Road – Eastern Passage	Public Engagement & Emergency Preparedness
7	Hammonds Plains Road at Bluewater Road	Sandy Lake Watershed Drainage Study & Mitigation Concept Development. Also, Analysis & Design of Hammonds Plains Road Upgrades
7	Bedford Highway at Mt St. Vincent	Bedford Highway Sewer System Capacity Study for Future Development

Priority	Site Name	Order of Magnitude Costing		
		Short Term (0-2yrs)	Medium Term (3-5 yrs)	Long Term (+5 yrs)
1	Sackville Rivers System	$50-150K	$25-75K	TBD
2	Shubenacadie Lakes	$250-500K	$50-150K	TBD
3	Karlson's Wharf	$200-350K	$250-500K	Operations
4	Inglis Street at Barrington	$25-150K	TBD	TBD
5	Highway 2	$50-100K	$2-5M	$50-100K
6	Pleasant Street	$25-60K	$0.4-1M	TBD
7	Cole Harbour Road at Peron Drive	$50-90K	Operations	$0.5-$1M
7	Shore Road	$15-30K	$25-60K	TBD
7	Hammonds Plains Road at Bluewater Road	$50-200K	TBD	$2-5M
7	Bedford Highway at Mt. St Vincent	$50-100K	$75-150K	TBD
Totals		$0.8-$1.7M	$2.8-$6.9M	$2.6M-6.1M
		$6M - $15M		

ATTACHMENT E

HALIFAX REGIONAL MUNICIPALITY

NATIONAL DISASTER MITIGATION PROGRAM (NDMP)

FLOOD RISK ASSESSMENTS

FINAL REPORT - JANUARY 31, 2018

January 1956 - Chronicle Herald

NATIONAL DISASTER MITIGATION PROGRAM (NDMP)

FLOOD RISK ASSESSMENTS

HALIFAX REGIONAL MUNICIPALITY

FINAL REPORT

PROJECT NO.: 171-01778
DATE: JANUARY 2018

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS, CANADA B3B 1X7

T +1 902-835-9955
F +1 902-835-1645
WSP.COM

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NS, CANADA B3B 1X7

T +1 902-835-9955
F +1 902-835-1645
wsp.com

January 31, 2018

Youssef Habboush, P.Eng., MBA
Program Engineer
Infrastructure Policy and Standards
Planning & Development
Halifax Regional Municipality
via email: [redacted]

Subject: HRM NDMP Flood Risk Assessments Final Report

Dear Sir:

We are pleased to provide to HRM for review, the Final Report for the HRM National Disaster Mitigation Program (NDMP) Flood Risk Assessments project. This submission includes the results of our Preliminary Risk Assessment process, Prioritization of the Top-Ten sites, Detailed Risk Assessments, and Recommended Mitigation Strategies.

Yours sincerely,

ORIGINAL SIGNED

Patrick Lewis, P. Eng.
Project Manager

Encl.
cc:
Suzanna Lewis, P.Eng, PMP (WSP)
Paul Burgess, P.Eng. (HRM)
Mark McGonnell, P.Eng (HW)
WSP ref.: 171-01778

PRODUCTION TEAM

CLIENT

Program Engineer, HRM	Youssef Habboush, MBA
Manager, Infrastructure Planning, HRM	Peter Duncan, P.Eng. Paul Burgess, P.Eng.
Stormwater Engineer, Halifax Water	Mark McGonnell, P.Eng.

WSP

Project Manager	Patrick Lewis, P.Eng.
Senior Advisor	Richard Stephenson, P.Eng.
Assistant Project Manager	Suzanna Lewis, P.Eng.
Engineer in Training	Devin Bell

SUBCONSULTANT - CLIMACTION SERVICES

Senior Meteorologist	Jim Abraham
Climate Change Meteorologist	Gary Lines
Climate Change Strategic Planning Advisor	David Kelly
Administrator	Vikki Bewsher

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

PROJECT SCOPE

The National Disaster Mitigation Program (NDMP) was recently established by the Canadian Federal Government to focus on targeted investments to build safer and more resilient communities by addressing increased flood risks and the planning for the implementation of future mitigation measures. The NDMP fills a critical gap in the Halifax Regional Municipality's ability to effectively mitigate, prepare for, respond to, and recover from, flood-related events. As part of the program, the Halifax Regional Municipality (HRM) has retained WSP Canada Inc. (WSP) project team to carry out risk assessment and develop mitigation strategies for key areas of the Municipality.

Based on results of a recent 'baseline' study, and in coordination with Halifax Water, HRM developed a short-list of 30 key sites as candidates for assessment under the NDMP. The overall goal of this project is to investigate and document flood risks at these key flood-prone areas identified within the Municipality, focussing on the impacts at the community level. The results of the investigation will be used to inform future decisions of the HRM Council and to support future funding strategies for the implementation of flood mitigation measures within the Municipality. The current project involves the following activities:

- → **Background Review and Information Compilation** on key flood-prone areas identified by HRM.
- → **Preliminary Risk Assessments (30 Key Areas),** including site investigations, workshops and desktop assessments.
- → **Site Prioritization,** involving ranking of the 30 flood-prone sites with the goal of identifying the Top Ten (10) highest priority sites to proceed to detailed assessment.
- → **Detailed Risk Assessments (10 Highest-Priority Areas),** including detailed site investigations, workshops and completion of detailed RAIT forms, site maps and photos.
- → **Preliminary Mitigation Strategy Recommendations** for each of the Top Ten (10) Sites including order-of magnitude cost estimates for recommended remedial works.

NATIONAL DISASTER MITIGATION PROGRAM FUNDING

The NDMP has four (4) available funding streams: 1- Risk Assessment, 2-Flood Mapping, 3-Mitigation Planning 4-Investments in Non-Structural and Small Scale Structural Mitigation. The current study falls under **Stream 1: Risk Assessment**, which involves identification of the potential hazards; assessment of the likelihood of occurrence; impact(s) to people, economy, structures and networks, the natural environment, etc.; and the community's vulnerabilities. The NDMP recognizes that a comprehensive assessment of a flooding risk cannot be *completed* under Stream 1 alone. The intent of a Stream 1 project is to identify and assess flooding as a hazard risk using the best information that is available, understanding that flood mapping and/or modelling (ie. Stream 2 activities) are required for the risk to be fully understood and assessed.

GUIDING PRINCIPLES AND OUTCOMES OF THE PROJECT

The following guiding principles have served as a basis for all work performed as part of the current project:

- → **Multidisciplinary Team Approach:** The process was completed using a collaborative approach, involving an integrated team of consultants, subject matter experts, and HRM and HW departmental staff, including management, engineering, planning, emergency response, and operations personnel.
- → **Founded on NDMP Assessment Criteria, with a Focus on Local Context:** The project used a risk assessment and prioritization process based on the Federal NDMP program, while incorporating additional strategies to bring focus to the local context of the Halifax Regional Municipality.
  - — A project-specific preliminary assessment and prioritization method was applied to narrow the original 30 key sites to a list of the Top Ten Highest Priority Sites to proceed to detailed assessment. The Detailed Assessment process focussed on identifying site vulnerabilities, hazards and impacts, and involved completion of the NDMP Risk Assessment Information Template (RAIT).

→ **Inclusiveness:** Four (4) project workshops brought together key stakeholders within the HRM and HW organizations to hear varying opinions and perspectives as well as to gather background and historical information, in order to develop a collaborative understanding of the impacts of flooding at each site.

— Two workshops each were held with HRM and HW staff, at both the preliminary assessment stage and the detailed assessment/mitigation planning stage. The process was successful in gathering a unified consensus on the sites of highest priority within the municipality on which to focus the detailed assessment and development of mitigation measures.

→ **Consideration of Future Climate Changes:** The process examined future climate change factors, identifying the projected increase in the intensity and frequency of rainfall events, which could trigger flood events. This emphasizes the importance of planning for, developing, and implementing flood mitigation strategies in the near future to protect and plan for these future events.

— Projections of future trends in precipitation patterns involved development of extreme climate scenarios in the next 50-100 years using the Climate Change Hazards Information Portal (CHIP). The supplementary report, titled "Climate Observations and Projections in Support of Flood Risk Assessment for Halifax Regional Municipality" is included in Appendix C of this report.

→ **Evaluation of a Variety of Mitigation Options:** The four (4) available NDMP funding streams were reviewed and considered as potential next steps for recommended mitigation strategies for each of the Top Ten sites.

— Mitigation strategies for the Top Ten Highest Priority Sites were developed in consultation with the key HRM and HW project stakeholders. Recommended next steps were identified for each site, including reference to the applicable NDMP funding stream, and Rough Order of Magnitude Costing. Additional and subsequent strategies have been provided for each site for the Short, Medium and/or Long Term horizons.

→ **Municipality-Wide Flood Management Context:** While risk assessment and mitigation strategy development for each site was focussed on a particular area or community within the Municipality, the process considered flood management for the region as a whole.

— The project resulted in recommendation of a Municipality-Wide Comprehensive Flood Management Strategy, focussed on emergency preparedness, improving community resiliency, effective planning and development for community growth, and adaptive management.

MITIGATION STRATEGY RECOMMENDATIONS FOR THE TOP-10 HIGHEST PRIORITY SITES

Following the project-specific prioritization process, the Top Ten Sites of Highest Priority were identified for further detailed assessment. The results of the Risk Assessments for each of the ten (10) priority sites are presented in individual Site Reports, including an overview of site-specific background information, identified vulnerabilities and flood impacts, and mitigation strategy concepts. Each report also contains a completed NDMP RAIT Form. A snapshot of the risk assessment and mitigation strategies for each Site is presented in an Executive Summary Table found at the beginning of each Report. The following table summarizes the list of Top Ten Highest Priority sites, and their recommended next steps of the Federal National Disaster Mitigation Program:

Site Number	Site Name	Stream 1: Risk Assessment	Stream 2: Flood Mapping	Stream 3: Mitigation Planning	Stream 4: Infrastructure Investment
2	Shore Road	✓	⇨	●	●
5	Cole Harbour Road	✓	✓	●	●
7	Pleasant Street	✓	⇨	●	●
8	Karlson's Wharf	✓	⇨	⇨	●
9	Inglis at Barrington	✓	⇨	●	●
22	Bluewater Road	✓	●	●	●
24	Highway 2	✓	●	●	●
25	Sackville River	✓	✓	●	●
A2	Mt. St. Vincents	✓	●	●	●
A6	Shubenacadie Lakes	✓	●	●	●

✓	Completed
●	Next Step
●	Future Step
⇨	Proceed to Next Step

1 OVERVIEW

1.1 INTRODUCTION

The National Disaster Mitigation Program (NDMP) was recently established by the Canadian Federal Government to focus on targeted investments to build safer and more resilient communities by addressing increased flood risks and the planning for the implementation of future mitigation measures. The NDMP fills a critical gap in the Halifax Regional Municipality's ability to effectively mitigate, prepare for, respond to, and recover from flood-related events. As part of the NDMP, the Halifax Regional Municipality (HRM) has retained WSP Canada Inc. (WSP) project team to carry out risk assessment and develop mitigation strategies for key areas of the Municipality.

Through a review of historical service records and operational data, a recent 'baseline' study directed by HRM identified areas that are subject to flooding on a frequent basis. Based on the results of the study, and in coordination with Halifax Water, HRM developed a short-list of 30 key sites as candidates for further review and assessment under the NDMP.

The objectives of the current project are to investigate and document flood risks at these 30 key flood-prone areas identified within the Municipality; prioritize the 10 most critical flood locations; prepare a detailed risk assessment for these areas; and provide preliminary mitigation strategy recommendations to inform future decision making.

1.2 THE NATIONAL DISASTER MITIGATION PROGRAM (NDMP)

In 2014 the Federal Government implemented the National Disaster Mitigation Program (NDMP), aimed at establishing safer and more resilient communities through investment in projects addressing rising flood risk and costs. The 2014 Federal budget allocated $200M over five years to the NDMP, of which $183.8M is to be contributed to cost-shared projects with the provinces/territories, with remaining funding targeted to national-level initiatives. The primary objective is to reduce the impacts of natural disasters on Canadians by planning for future investments focussing on significant, recurring flood risks and costs; and advancing work to facilitate private residential insurance for overland flooding.

The NDMP Guidelines issued by Public Safety Canada are included in **Appendix A.** The current study falls under the first of four (4) available NDMP funding streams:

→ **Stream 1: Risk Assessment *(This Study)*** - Identification of the potential hazards; impact(s) of the hazard to people, economy, structures and networks, the natural environment, etc.; the community's vulnerabilities; and assessment of the likelihood of occurrence. Involves determination of risk thresholds to serve as an informal decision-making support tool, and to inform the prioritization and selection of mitigation projects.

→ **Stream 2: Flood Mapping** - Flood mapping to identify structures, people and assets most likely to be impacted.

→ **Stream 3: Mitigation Planning** - Using information on identified flood risk to make informed planning decisions. Involves identifying broad mitigation goals, objectives/strategies, and key activities to meet the objectives.

→ **Stream 4: Investments in Non-Structural and Small Scale Structural Mitigation** - Implementation of a specific mitigation project.

It is important to note that the NDMP Guidelines recognizes that a comprehensive assessment of a flooding risk cannot be *completed* under the current Stream 1: Risk Assessment. The intent of the Stream 1 project is to identify and assess flooding as a hazard risk using the best information that is available, understanding that flood mapping and/or modelling (ie. Stream 2 activities) are required for the risk to be fully understood and assessed.

1.3 GUIDING PRINCIPLES OF THE PROJECT

The following guiding principles have served as a basis for all work performed as part of the current project:

→ **Multidisciplinary Team Approach:** The process was completed using a collaborative approach, involving an integrated team of consultants, subject matter experts, and HRM and HW departmental staff, including management, engineering, planning, emergency response, and operations personnel.

→ **Founded on NDMP Assessment Criteria, with a Focus on Local Context:** The project used a risk assessment and prioritization process based on the Federal NDMP program, while incorporating additional strategies to bring focus to the local context of the Halifax Regional Municipality.

→ **Inclusiveness:** Four (4) project workshops brought together key stakeholders within the HRM and HW organizations to hear varying opinions and perspectives as well as to gather background and historical information, in order to develop a collaborative understanding of the impacts of flooding at each site.

→ **Consideration of Future Climate Changes:** The process examined future climate change factors, identifying the projected increase in the intensity and frequency of rainfall events, which could trigger flood events. This emphasizes the importance of planning for, developing, and implementing flood mitigation strategies in the near future to protect and plan for these future events.

→ **Evaluation of a Variety of Mitigation Options:** The four (4) available NDMP funding streams were reviewed and considered as potential next steps for recommended mitigation strategies for each of the Top Ten sites. Mitigation strategies for the Top Ten Highest Priority Sites were developed in consultation with the key HRM and HW project stakeholders.

→ **Municipality-Wide Flood Management Context:** While risk assessment and mitigation strategy development for each site was focussed on a particular area or community within the Municipality, the process considered flood management for the region as a whole.

1.4 SCOPE OF WORK

The overall goal of this project is to complete flood risk assessments for key areas of the Municipality that are susceptible to surface flooding, focussing on the impacts at the community level. The intent of the work is to investigate and define the localized and community-wide effects, impacts and risks associated with the flooding of these areas to inform future decisions of HRM Staff and HRM Council. The results of the investigation will be used to support future funding strategies for the design and construction of flood mitigation infrastructure and measures within the Municipality. The NDMP Flood Risk Assessments Project involves the following activities:

→ **Background Review and Information Compilation:**
- Review of available background material concerning the project, including the existing Baseline Study;
- Compilation of background information on the 30 key flood-prone areas identified by HRM.

→ **Preliminary Risk Assessments (30 Key Areas):**
- Completion of preliminary site investigations for the 30 key areas identified by HRM;
- Facilitation of Preliminary Risk Assessment Workshops to engage HRM and Halifax Water staff and to inform the preliminary risk assessments and site prioritization;
- Completion of Preliminary Risk Assessments for each of the 30 key areas, based on RAIT criteria and information collected in the consultation process.

→ **Site Prioritization:**
- Ranking of the Top-30 flood-prone sites with the goal of identifying the 10 highest priority sites to proceed to detailed assessment. Informed through review of background information, workshop feedback and preliminary site assessments.

→ **Detailed Risk Assessments (10 Highest-Priority Areas):**
- Completion of detailed site investigations for the Top-10 highest priority areas;
- Facilitation of Detailed Risk Assessment Workshops with HRM and Halifax Water staff to inform the detailed risk assessments and mitigation strategies;
- Completion of Detailed Risk Assessments for each of the 10 highest priority areas, including detailed RAIT forms, site maps and photos.

→ **Preliminary Mitigation Strategy Recommendations:**
- Development of Preliminary Mitigation Strategy Recommendations complete with order-of magnitude cost estimates and NDMP funding streams for recommended remedial works.

2 BACKGROUND

This section provides an overview of key flooding concepts, climate change considerations, the results of a literature review, and an overview of risk assessment methodology.

2.1 CONCEPTUAL BACKGROUND ON FLOODING

Flooding is defined in the NDMP Guidelines as "The overflow of natural drainage channels, natural shorelines and/or human-made facsimiles leading to partial or complete inundation from the overflow of inland or tidal waters, and/or the accumulation or runoff of surface waters from any source". Flooding can be described using the following concepts:

TYPES OF FLOODING

Flooding can typically be described by the following terms:

- **Riverine:** overflow of natural drainage channels such as brooks, streams, and rivers. Flooding causes can vary in nature from rainfall, snowmelt, ice jamming, etc. Characteristics such as size and shape, vegetation, and structures can affect the level of water in a waterway.
- **Coastal:** overflow of shorelines and coasts (lakes and oceans).
- **Urban:** overflow of human-made infrastructure such as swales, ditches, streets, sewers, foundation drains. Can also be contributed to by riverine flooding.
- **Failure of Water-Retaining Structures:** structural failure or breaching of water retaining infrastructure such as dams or dikes protecting against floods.

CAUSES OF FLOODING

The primary causes of flooding in Canada are typically related to hydro-meteorological conditions such as:

- **Extreme Rainfall:** Heavy rainfall, storms, and hurricanes of significant intensity and/or duration. When rain falls over land, some is captured by vegetation and infiltration into the soil, while the rest becomes runoff. The amount of rainfall runoff that reaches waterways and flood-prone areas depends on the characteristics of the tributary drainage area.
- **Snowmelt Runoff:** Melting snow and ice, often occurring in the spring.
- **Rainfall on Frozen Ground:** Frozen ground is impervious to infiltration resulting in 100% runoff.
- **Rain on Snow:** Heavy rain falling on melting snow, typically occurring in winter months. Frozen ground also contributes to reduced soil infiltration.
- **Ice Jams:** Obstruction of a riverine system by broken ice.
- **Natural Dams:** Blockage of a riverine system by landslide or buildup of debris.
- **Coastal:** Storm surge (rise of coastal water beyond the predicted astronomical tide driven by high winds and pressure during a storm), as well as large astronomical tides and rising sea levels can contribute coastal flooding.

CONSEQUENCES OF FLOODING

Extreme flooding can have a variety of impacts on the affected community at both a small and large scale, such as:

- **Infrastructure:** damage to transportation systems, water supply, wastewater system, communications.
- **Public Safety:** injury, fatalities, access to hospitals, limited emergency health response.
- **Society:** evacuation, relocations, access to schools, public perception.
- **Economic:** damage to businesses, loss of business, loss of economic assets, disruption to local economy, cost of damage recovery and re-build.
- **Environment:** damage to the natural environment such as vegetation, sedimentation, impacts on water quality.
- **Property and Building Damage:** structural damage, damage to building contents, sewer backups, basement flooding, water damage.

2.2 HALIFAX CLIMATE AND FLOODING

2.2.1 RAINFALL-RUNOFF

Halifax enjoys the benefits and challenges associated with the Maritime climate including receipt of average annual precipitation between 1200-1300 mm. While the normal or average total precipitation experienced in any given month may be only 100 mm – 130 mm, the peak volume of precipitation in a single day during the late summer hurricane period can exceed 200 mm in 24 hours. Two such extreme precipitation events have been recorded in the region: In Sept 1942, rainfall in excess of 230 mm fell and then in August 1971, associated with Hurricane Beth, HRM again experienced amounts in excess of 200 mm in 24 hours. More recently, many areas of the city experienced notable flooding events on March 31/April 1, 2003 (150 mm) and December 11/12, 2014 (107 mm).

In the urban areas of the municipality, stormwater infrastructure systems are typically designed based on the annual intensity-duration-frequency (IDF) curves for varying return periods. Current standard practice involves design of minor systems (catchbasins, storm sewers and driveway culverts) to convey the 1 in 5 or 1 in 10 year rainfall event, and design of major drainage route (streets, detention ponds and watercourse crossings) to handle the 1 in 100 year rainfall event.

Land-use within the municipality is diverse, ranging from highly urbanized in the downtown core, medium-density mixed-use and residential development in the suburban areas, to rural and natural landscapes in the outer areas of the city.

In highly urbanized areas, the time of concentration is typically short and the degree of imperviousness is high. Here, the influence of snow melt on system capacity is often minimal, however ice and snow build-up can block catchbasins and culverts, restricting their drainage capacity.

The municipality also encompasses several larger natural watersheds, including the Sackville Rivers System and the Shubenacadie Lakes System. In these larger watersheds, where the time of concentration is much longer, the definitive winter design storm may result in the greatest system impact. The winter storm typically includes a smaller total rainfall than the late summer storms but the degree of imperviousness increases significantly above the summer value due to frozen ground. In fact, one of the greatest flooding experienced recently along the lower reaches of the Sackville River in the past 30 years, occurred on April 1, 2003, when the flooding was the result of approximately 150 mm of rain falling on frozen ground combined with the significant snow melt from snow pack on the watershed. Similarly, increased urbanization of the tributary watersheds to these systems can increase the imperviousness and decreases runoff time, resulting in increased peak flows and volumes to both the natural and man-made drainage systems.

2.2.2 COASTAL CLIMATE & STORM SURGE

Situated on the Atlantic Coast of Nova Scotia, the Halifax Regional Municipality is subjected to a wide range of storms, including hurricanes, tropical storms and tropical cyclones. The wind, waves and low atmospheric pressure associated with such large-scale storms often produce storm surge: defined as the height difference between the water level due to astronomical tides and the total water level at the peak of a storm event. The intensity of such events, as well as rising sea levels, presents flooding and erosion risks to the coastal areas of HRM.

One of the most notable storms to hit the municipality was Hurricane Juan in September of 2003. The Category 2 hurricane imposed damage to property, infrastructure and the environment, with total losses of $130 million reported by the Insurance Bureau of Canada (2008). Then in February of 2004 a severe winter blizzard known as "White Juan" dumped nearly 90 cm of snow on the city, resulting in $5 million in snow removal and damage costs. (NRCAN, 2015)

While the scope of the current study was focussed primarily on pluvial (rainfall-induced) flooding, the potential risk of coastal flooding at many areas of the Municipality must be acknowledged. For the examined flood-prone areas which are situated near the coastline, efforts have been made to make note of potential hazards that could be caused or influenced by coastal flooding, storm surge and/or tidal levels. It is understood that separate work is being conducted by the Municipality and other Provincial initiatives to further identify and assess coastal flood-risk within the region.

2.3 BACKGROUND INFORMATION REVIEW

2.3.1 STORMWATER FUNDING STRATEGY - BASELINE STUDY

As part of the development of an Integrated Stormwater Management Policy in conjunction with Halifax Water, HRM commissioned the Stormwater Funding Strategy – Baseline Study, completed in 2015 by SDMM. The study involved compilation and review of historical flood service records and operational data, as well as consultation with HRM and Halifax Water staff on the nature of known/recorded incidents. The study identified over 900 flood-prone sites throughout the Municipality, from which HRM and Halifax Water developed a short-list of 30 key areas identified for further review and assessment. These 30 sites were historically subject to frequent flooding and were considered to pose the greatest flood risk to the community.

The Baseline Study outlined a map of recorded flood-related issues within the municipality, which was reviewed as part of the preliminary assessment process of the current project. As expected, many of the 30 identified sites were represented by large numbers of reported incidents/issues. It is important to note that while a number of other flood-prone locations identified in the Baseline Study did not make the Top-30 list, many of these sites may still be candidates for future mitigation or assessment by HRM/Halifax Water.

2.3.2 SITE-SPECIFIC STUDIES & ANALYSES

To gain a better understanding of flooding issues within the municipality, the following additional information was provided by HRM and reviewed as part of the current work:

- Sackville Rivers Floodplain Study – Phase II (CBCL, 2017)
- Sandy Lake Watershed Study (AECOM, 2014)
- Cole Harbour Floodplain Assessment Report (Dillon, 2015)

Additional online research and field investigations were conducted for each site as part of the current project, which is further detailed in the individual site reports in Appendix F.

2.3.3 HISTORICAL FLOODING: CANADIAN CONTEXT

In an effort to gain a relative understanding of the causes and impacts of severe flood events on communities and municipalities across the country, a Literature Review was undertaken of significant flooding events in other jurisdictions. Appendix B-1 provides an overview of the following flood events within Canada:

- **Calgary, Alberta – June 2013**
- **Hurricane Matthew, Sydney, Nova Scotia – October 9, 2016**
- **Toronto, Ontario – July 2005 & 2013**
- **Hurricane Hazel, Toronto, Ontario – October 15, 1954**
- **Saguenay, Quebec – July 19/20, 1996**
- **Red River, Manitoba – April/May 1997**

Sydney, NS - October 12, 2016 CBC/Island Aerial Media

2.4 CONSIDERATION OF CLIMATE CHANGE

There is now widespread scientific consensus that significant and unsustainable changes are being experienced within the climate of the Earth. Among the many changes anticipated, we expect to see an increase in the frequency, duration and volume of total precipitation in extreme events, which may have significant impact on municipal stormwater systems. While much of our stormwater infrastructure has been designed to handle the existing design storms, or based on

historical regulations (or lack thereof), it is recognized that this increase will stress much of our existing systems well beyond their design capacity. Many stormwater infrastructure systems in HRM built since Hurricane Beth (1971) have yet to be tested by an extreme event.

2.4.1 FUTURE TRENDS IN PRECIPITATION PATTERNS

In recognition of the importance of considering future climate change impacts on flooding, analysis of potential future precipitation events was performed as part of this project. This work involved projecting future trends in precipitation patterns to determine how often thresholds will be exceeded in the next 50-100 years and considering how this might impact future flooding events in HRM. These future extreme climate scenarios were developed using the Climate Change Hazards Information Portal (CHIP) to assess threats, risks and vulnerabilities, and develop adaptation strategies to help HRM achieve its sustainable development objectives.

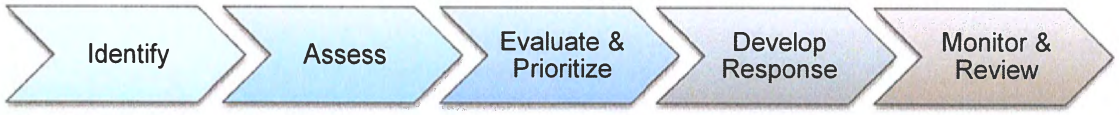
Please refer to **Appendix C** for the full supplementary report, titled "Climate Observations and Projections in Support of Flood Risk Assessment for Halifax Regional Municipality".

2.5 RISK ASSESSMENT METHODOLOGY OVERVIEW

2.5.1 FUNDAMENTAL RISK ASSESSMENT PRINCIPLES

For the purposes of this study, Flood Risk is defined as an uncertain event or condition that, if occurs, has potential negative impact on the community. Risk Management is the process of identifying risks, determining the likelihood of occurrence, severity of the consequences, and addressing those which are the most threatening to the community. The following outlines the typical Risk Assessment Methodology process:

Figure 1: Risk Methodology



1. **Identify the Risk:** What type of flood? What area is at risk?
2. **Assess the Risk:** What is the likelihood of the event occurring?
3. **Evaluate and Prioritize Risks:** Is the flood risk low or high? What are the most critical risks?
4. **Develop Response:** What mitigation strategies should be applied to manage the risk?
5. **Monitor and Review:** Continue to monitor risks and implemented mitigation measures.

ONGOING MONITORING & REVIEW: ADAPTIVE MANAGEMENT

It is important to note that the Risk Management process does not conclude at the completion of the current project. The mitigation measures and next steps identifies the work that will need to be implemented and planned for. Following implementation of proposed strategies, it is critical that HRM and Halifax Water continue to monitor the identified risks. This should include a review of the effectiveness of implemented measures into the future, including an evaluation based on future risk management processes, to identify new risks as the municipality grows, the climate changes and as new regulations emerge.

2.5.2 NDMP RISK ASSESSMENT INFORMATION TEMPLATE (RAIT)

The NDMP Risk Assessment Information Template (RAIT) was developed by Public Safety Canada for the input of risk information based on a completed risk assessment process. The NDMP Guidelines including the RAIT form, can be found in **Appendix A.** The Stream 1 program requires that the template be completed and submitted to Public Safety Canada to proceed to the next stage(s) of funding. Completion of the RAIT generally involves the following activities:

COLLECTION OF INFORMATION FOR IDENTIFIED HAZARDS

Completion of the RAIT involves outlining and describing local risk. Information should include an estimate of the likelihood of occurrence and examination of the potential magnitude and type of consequences or impacts related to the identified risk. The NDMP Guidelines suggest that risk event descriptions include historical context, as well as consideration of future risk from climate change. Existing infrastructure, technologies and community capabilities shall be considered.

ASSESSMENT OF CONSEQUENCES AND IMPACTS

Generally, the evaluation criteria within the RAIT are organized under five (5) specific qualitative and quantitative impact categories, with the risks defined and ranked on a five-point scale. The five impact rating categories include:

- **People and Societal Impacts**, which may result in significant societal disruptions such as human and other evacuations and relocations as well as injuries, immediate fatalities, and deaths from unattended injuries or displacement.
- **Environmental Impacts**, which may include direct or indirect environmental damage resulting from a flooding event and involving cleanup and restoration costs in the short-term and far into the future.
- **Local Economic Impacts**, which may include the costs of damage and loss to local economically productive assets, as well as disruptions to the normal functioning of the local economic system of the community or the region for significant periods of time.
- **Local Infrastructure Impacts**, which may include damage, disruption or destruction of the wide range of municipal and regional infrastructure systems such as transportation, water supply, wastewater management, and communications systems, the proper functioning of which the community depends on for its quality of life and viability.
- **Public Sensitivity Impacts,** which include the operation and reputation of all levels of government, upon which the trust and welfare of the general public typically rests.

CONFIDENCE LEVELS

Completion of the RAIT also involves defining the level of confidence in the estimate and impact risk rating associated with the flood event. Confidence levels may vary depending on data availability, relevant expertise and information, and understanding of specific events. The levels are indicated by a rating raging from A to E where 'A' is the highest confidence level and 'E' is the lowest.

2.5.3 COMPARISON TO OTHER RISK ASSESSMENT PROGRAMS

Methodology of the following programs was reviewed based on their similarities to the NDMP.

- **PIEVC Protocol:** The Public Infrastructure Engineering Vulnerability Committee (PIEVC) was established by Engineers Canada to oversee the planning and execution of a national engineering assessment of the vulnerability of public infrastructure across Canada to anticipated climate change. The five-step process includes risk assessments, risk assessment workshops, identification of risk tolerance thresholds, risk ranking, and review of data sufficiency.
- **Municipal Climate Change Action Plans (MCCAP):** Under the 2010 - 2014 Municipal Funding Agreement, municipalities across Nova Scotia were asked to prepare Climate Change Action Plans, aiming to reduce greenhouse gas emissions and identify priorities for climate change adaptation. The six-step process involves: Build a Team (including local government staff, officials, and stakeholders); Identify Impacts and Hazards (past and future); Identify Affected Locations; Identify Affected Facilities, Infrastructure, and Service Delivery; Identify Social, Economic, and Environmental Considerations; and Identify Priorities for Adaptive Actions.

The Detailed Risk Assessment methodology employed during the current project follows a similar process to these other risk assessment programs, focused directly on flood risk and tailored specifically to the Federal NDMP Guidelines.

3 PRELIMINARY RISK ASSESSMENT & PRIORITIZATION

3.1 OVERVIEW OF 30 KEY SITES

Following completion of the HRM Stormwater Funding Strategy – Baseline Study (SDMM, 2015), HRM and Halifax Water developed a short-list of 30 flood prone areas within the municipality that are subject to frequent flooding. These 30 sites serve as a starting point for the current study, identified as candidates for preliminary risk assessment and potential funding under the Federal NDMP. An overview Figure of the 30 Key Sites is presented in the following page. The following table presents the list of 30 Key Sites provided in the Terms of Reference:

Table 1: List of 30 Key Sites

SITE NO.	LOCATION	REGION	DISTRICT
1	Autoport; Eastern Passage	East	3
2	Shore Road; Eastern Passage	East	3
3	John Stewart Drive; Dartmouth	East	4
4	Beaver Crescent; Cole Harbour	East	4
5	Cole Harbour Road @ Perron Drive; Cole Harbour	East	4
6	Nantucket Avenue @ Wyse Road; Dartmouth	East	5
7	Pleasant Street, near Dartmouth General Hospital; Dartmouth	East	5
8	Karlson's Wharf @ Upper Water Street; Halifax	West	7
9	Inglis Street @ Barrington Street; Halifax	West	7
10	Kempt Road @ Lady Hammond; Halifax	West	8
11	Keating Road @ Crown Drive; Halifax	West	9
12	Melville Avenue @ Winchester Avenue	West	9
13	Glenforest Weir; Halifax	West	10
14	Leiblin Drive @ Guildwood Crescent; Halifax	West	11
15	Bently Drive @ Ramsbrook Court; Halifax	West	12
16	Wellington Fire Station, Highway 2; Wellington	Central	1
17	Fletcher's Drive, near civic 57; Fall River	Central	1
18	Hammonds Plains Road, near Kynock Resources; Hammonds Plains	Central	13
19	Bambrick Road @ Orchard Drive; Middle Sackville	Central	14
20	Rankin Drive @ Glendale; Lower Sackville	Central	15
21	Sunnyvale Crescent @ Beaverbank Road; Lower Sackville	Central	15
22	Hammonds Plains Road @ Bluewater Road; Bedford	Central	16
23	Holland Road @ Highway 2; Fletcher's Lake	Central	1
24	Highway 2, from Holland Road to Miller Lake Road; Fall River	Central	1
25	Bedford Highway, from Union Street to Highway 102; Bedford	Central	16
26	Sackville Drive @ Cobequid Road; Lower Sackville	Central	15
27	Rocky Lake Drive, near quarry entrance; Bedford	Central	16
28	Cobequid Road @ Regwood Drive; Windsor Junction	Central	1
29	Bedford Highway @ Shaunslieve Drive; Bedford	Central	16
30	Ridge Avenue, from School Street to end; Waverley	Central	1

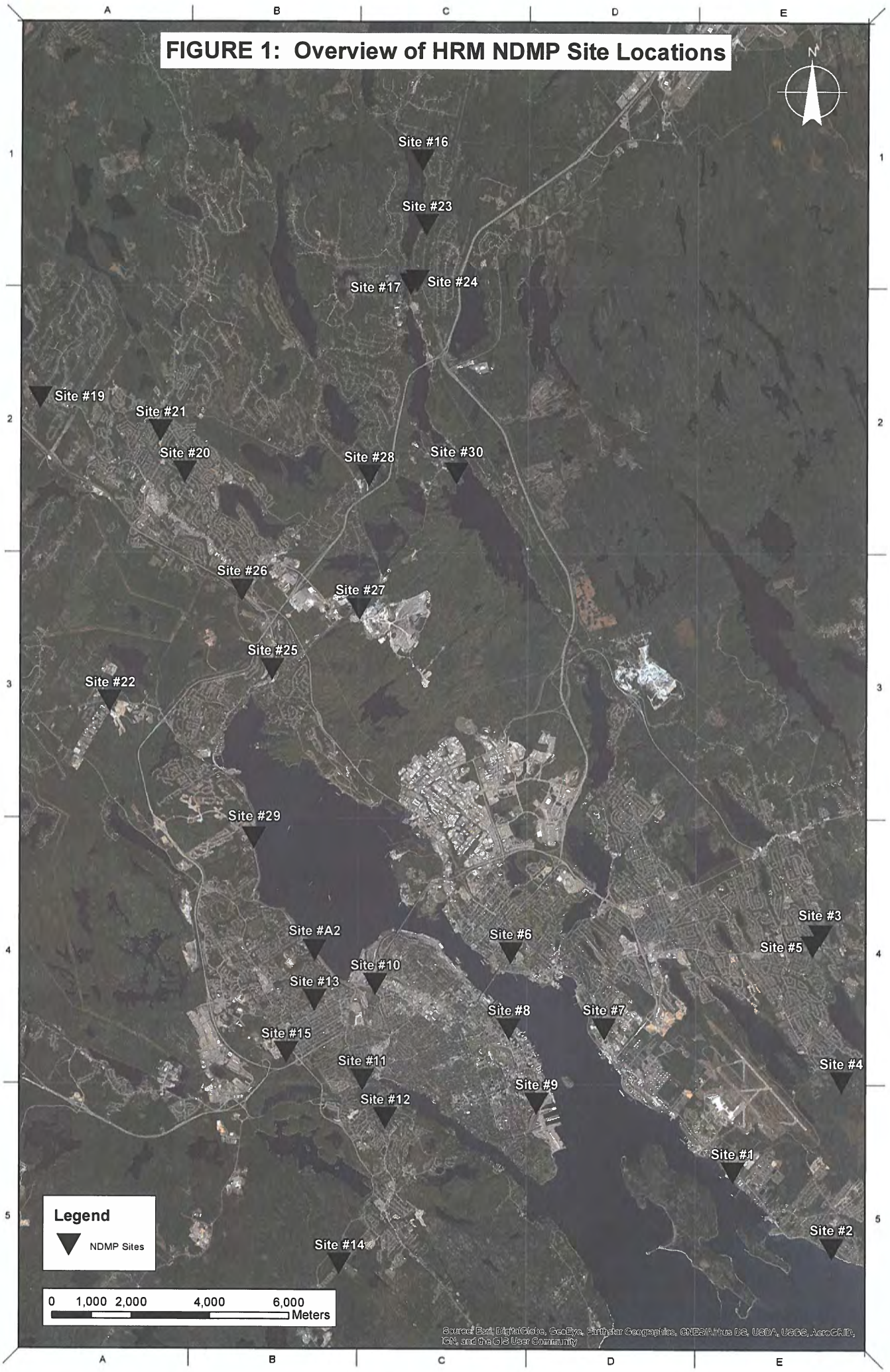


FIGURE 1: Overview of HRM NDMP Site Locations
N
Site #16
Site #23
Site #17
Site #24
Site #19
Site #21
Site #20
Site #28
Site #30
Site #26
Site #27
Site #25
Site #22
Site #29
Site #A2
Site #6
Site #3
Site #5
Site #10
Site #13
Site #8
Site #7
Site #15
Site #11
Site #4
Site #9
Site #12
Site #1
Site #2
Site #14
Legend
NDMP Sites
0 1,000 2,000 4,000 6,000
Meters
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.2 PRELIMINARY INVESTIGATIONS

3.2.1 PRELIMINARY DESKTOP INVESTIGATIONS

In the early stages of the preliminary risk assessment process, desktop investigations were performed for each of the 30 sites. This included a historical review of:

- Previously recorded flooding issues,
- Topographic mapping,
- Previously completed background reports,
- Nearby public infrastructure systems,
- Publicly available site photos and aerial photos,
- Anecdotal information, and
- Previous media releases.

Information provided for the sites as part of the Baseline Study was also compiled. Road and property mapping data were used to describe the characteristics of the site and identify nearby areas and population groups that could potentially be impacted by surface flooding. The information collected as part of the desktop review was carried forward to inform the subsequent preliminary site investigations, workshops, and risk assessments.

3.2.2 PRELIMINARY SITE INVESTIGATIONS

On Sunday May 7, 2017, project team members visited each of the 30 key sites during a wet weather event. The intention of the visits was to familiarize the project team with each site area, obtain site photos, and review drainage issues. The visits were planned following a rainfall event on saturated ground in an effort to time the visits with wet-weather conditions.

3.3 PRELIMINARY RISK ASSESSMENT WORKSHOPS NO. 1 & 2

As part of the preliminary risk assessment process, two Preliminary Risk Assessment Workshops were facilitated with HRM and Halifax Water (HW) staff. The workshops were designed to liaise with representatives from various departments such as engineering, community and land use planning, operations, environmental control, and emergency services. The workshops were designed to bring awareness of the project to key municipal personnel, as well as to collect data on each of the 30 sites to ultimately inform the overall Preliminary Risk Assessment.

3.3.1 SITE QUESTIONNAIRE

In advance of the workshops, a Preliminary Site Questionnaire was circulated to attendees as an opportunity to collect background information on each site. A total of 44 questionnaires were returned with supplementary information. The Preliminary Site Questionnaire template is presented in **Appendix D**.

3.3.2 WORKSHOP SUMMARIES

WORKSHOP NO. 1 – HALIFAX WATER

Workshop No.1 was held with Halifax Water staff and included project engineers and on-the-ground operation managers for regions throughout the municipality's service boundary. This workshop provided the Project Team with information on each site from an operational stand point and included prevailing stormwater management issues, existing mitigation efforts, issue frequency, asset vulnerability, and level of impact on each site when events do occur.

WORKSHOP NO. 2 – HALIFAX REGIONAL MUNICIPALITY

Workshop No. 2 was held with HRM staff and included staff members from various departments including community and regional planning, environmental performance, transportation public works, planning and development, and municipal

emergency response services. This workshop provided the Project Team with information of each site from a regional land use perspective including community impacts, flood plain management efforts, evacuation and emergency response routes, environmental impacts and potential groundwater contamination risks, as well as impacts on vulnerable municipal and provincial infrastructure such as access to hospitals, NS Power plants, and bridge/road closures.

INFORMING PRELIMINARY RISK ASSESSMENTS

Each workshop began with a PowerPoint presentation providing background on the project and overview of the risk assessment process to the stakeholders. Background information was provided to the workshop attendees for reference, including location maps and summary of information compiled from the initial background review and questionnaires. An interactive review of each site was conducted, during which attendees offered feedback, discussion and anecdotal knowledge on past issues, impacts and vulnerabilities specific to each location.

Following an overview and discussion of the flooding concerns at each site, the group was then asked to collectively rate the risk level for each site from low to high (1 being low priority and 3 being high priority). Once each site was given a score, the groups were then asked to collectively identify the sites of highest priority. Results of each workshop's level of risk ranking and site prioritization have been presented in the following section.

ADDITIONAL RISK AREAS AND SITE GROUPINGS

In each of the two workshops, a heightened focus on potential future rainfall trends was discussed. By considering increased precipitation events, additional flood prone areas within the municipality beyond the original 30 sites were identified during each of the two workshops. Suggested site groupings were also provided by workshop attendees, as many of the original 30 sites were in close proximity to one another and would likely benefit by similar mitigation efforts. These workshop ratings, feedback and groupings were documented and considered in the Preliminary Risk Assessment Process.

3.4 PRELIMINARY ASSESSMENT CONSIDERATIONS

Following the Preliminary Workshops, a number of considerations were carried forward into to the Preliminary Risk Assessment and Prioritization process. Considerations included site specific characteristics at the preliminary-level evaluation, potential to group similar sites together, size and extent of particular watersheds, and consideration of sites beyond the preliminary 30 provided by HRM.

SITE-SPECIFIC CHARACTERISTICS AND RISK FACTORS

While the preliminary assessment process referenced the Federal NDMP Risk Assessment Information Template (RAIT) criteria, the collected information was summarized in a simplified table format, considered more suitable for this preliminary level of evaluation. Several key characteristics and risk factors of each site were considered, including:

- Site Geography
- Site Vulnerabilities (Social, Economic, Environmental and Infrastructure)
- Public Perception
- Emergency Services and Access Routes
- Affected Stakeholders

ADDITIONAL RISK AREAS AND SITE GROUPINGS

In an effort to broaden the scope of the current risk assessment to the community level, opportunities for site groupings were identified during the consultation process. This was based on an understanding that the effects of a flood event may extend beyond the specific points of interest covered by the Top-30 sites. These groupings may share infrastructure or may be impacted by the same drainage issues, or may have been flagged for consideration as a single cohesive group to be examined as a whole for future capital projects.

The site groupings carried forward for Preliminary Risk Assessment and Prioritization are as follows:

- Additional Site #A6: Shubenacadie Lakes System (including Sites #17 and #30)
- Site #25: Sackville River System (including Sites #20, #21, and #26)

- Site #5: Bissett Run (including Site #3)
- Site #24: Highway No.2 (including Sites #16, #17 and #23)
- Additional Site #A2: Bedford Highway at Mount St. Vincent (including Site #29)

These sites encompass large complex drainage areas, and could experience extensive impacts from flooding at multiple locations during an extreme rainfall event. Additionally, changes to any single part of such a system can have impacts felt throughout. The far-reaching extent of these major drainage networks gives rise to the need for assessment of flood risk at the watershed level.

The Sackville River system (Site 25), including the Little Sackville River, is currently being studied by HRM as part of the Sackville Rivers Floodplain study. The potential for a similar watershed study, including delineation of flood limits, was also identified for the Shubenacadie Lakes system (Site A6) during the workshop consultation process. Defining the current and future floodplain extents of these systems in response to rainfall events is beneficial in terms of emergency planning, protection of infrastructure assets and future development.

Though the Shubenacadie Lakes System and Highway No.2 are adjacent to each other, these two sites were considered separate based on differing flooding mechanisms. The Shubenacadie Lakes System considers the performance of the lakes, canals and rivers within the system and associated flooding. The Highway No.2 system considers the impacts of surface runoff on the roadway and adjacent drainage systems, beyond the flood levels of the Lakes system.

CONSIDERATION OF FLOOD RISK AREAS BEYOND 30 IDENTIFIED SITES

With a heightened focus on potential future rainfall trends, the preliminary investigative process also involved examination of the community and infrastructure beyond the initial geographic site extents. Several other flood prone areas within the municipality were identified by Preliminary Workshop attendees that were not originally listed in the Top-30:

- Kings Road near Grand Lake
- Mount Saint Vincent University at the Bedford Highway (Carried forward as Site A2 to replace original Site 29)
- Armdale Roundabout, Halifax
- Willow Tree Intersection, Halifax
- Quigley's Corner, Eastern Passage
- Kinsac Lake Area near the Fall River Road
- Sullivan's Pond, Dartmouth

While risk assessment of the above-noted sites is outside of the current scope of work focussing on the Top-30 pre-determined key sites, it is recommended that HRM and Halifax Water consider these areas for future review as part of subsequent work.

3.5 PRELIMINARY RISK ASSESSMENT & PRIORITIZATION

Using the information collected in the background information review, desktop investigation, site investigations, and stakeholder workshops, initial preliminary risk assessments were conducted for each of the Top-30 sites. The assessments were completed as part of a prioritization process aimed at identifying the Top-10 sites of highest priority to be addressed by HRM in the more immediate future, and to be carried forward to the Detailed Risk Assessment phase.

The preliminary assessment and prioritization strategy considers criteria from the NDMP Risk Assessment Information Template (RAIT) and implements a methodology developed specifically for this project, as outlined in the following sections.

3.5.1 INFORMING ASSESSMENTS & PRIORITIZATION THROUGH WORKSHOPS

During Preliminary Workshops held with HRM and HW staff, attendees were asked to collectively rate the risk level for each site as low-, medium-, and high-priority. The following Risk Rating scale was used:

Figure 2: Workshop Overall Site Risk Categorization Scale

Based on these ratings, the group was then asked to collectively identify the top priority sites. This Risk Categorizations and Prioritization feedback was documented and carried forward as a tool in the Preliminary Prioritization process.

3.5.2 PRELIMINARY RISK ASSESSMENT & PRIORITIZATION METHODOLOGY

CONSIDERATION OF NDMP RAIT CRITERIA

The Impacts/Consequences Assessment presented in the NDMP RAIT involves scoring each site from 1-5 under several criteria, falling under the following categories:

- People and Societal Impacts
- Environmental Impacts
- Local Economic Impacts
- Local Infrastructure Impacts
- Public Sensitivity Impacts

While the RAIT is a comprehensive tool at the national level, there were limitations to using the NDMP rating system alone during the Preliminary Prioritization process. The RAIT criteria and scoring scale was considered broad and did not give enough specificity for the project team to differentiate sites within the Top-30 from one another. Given that all of the sites are within the same geographic area (HRM), and have similar physical and environmental characteristics, minimal scoring variations were observed between the sites. Since many of the RAIT criteria require further analysis to quantify and assign a definitive impact rating, the level of uncertainty at this preliminary stage would have also resulted in similar scores for many of the sites.

In order for the project team to distill the list of Top-30 sites down to a list of Top-10 highest priority to be carried on to Detailed Risk Assessment, additional project- and HRM-specific criteria were required.

PROJECT-SPECIFIC PRIORITIZATION CRITERIA

The prioritization process implemented for this project considers the impacts and consequence categories identified in the RAIT, paired with additional evaluation criteria derived from the Preliminary Workshops, intended to incorporate HRM-specific issues and staff concerns.

The following 17 Criteria were considered as part of the Preliminary Risk Assessment and Prioritization process:

Table 2: Project-Specific Prioritization Criteria

NDMP RAIT Criteria	People and Societal	Fatalities	As part of the Preliminary Risk Assessment and Prioritization, each site was evaluated under these criteria as "Level of Impact" during a flood event on a scale of 0-3 (0= no impact 3= high impact).
		Injuries	
		Displacement (population)	
		Duration of Displacement	
	Environmental		
	Local Economic		
	Local Infrastructure	Transportation	
		Energy and Utilities	
		Information and Communications Technology	
		Health, Food, and Water	
		Safety and Security	
	Public Sensitivity		
Additional Criteria (HRM context-specific)	Residential Property Damage		
	Commercial Property Damage		
	Public Property Damage		
	Cultural/Historical Asset Damage		
	Operations & Maintenance Requirements		

RATING THE LEVEL OF IMPACT FROM FLOODING ON EACH CRITERIA

The prioritization process was primarily qualitative in nature, focussed on assigning a "Level of Impact" rating under each of the criteria noted in Table 2. The scale ranged from 0-3, with 0 being no impact (or not applicable), and 3 being a high level of impact. For example, at a particular site, Residential Property Damage may be given a score of 0 due to no residential homes existing in the area, while given a score of 3 under Environmental due to the potential for contamination of a nearby wetland. The ratings for each criteria, at each of the 30 sites, were assembled based on feedback from the Preliminary Workshops as well evaluation by the project team and subject matter experts.

This impact scoring method was project-specific for the purpose of prioritizing the Top-30 sites in relation to one another, and therefore does not correspond with the 1-5 rating scale in the NDMP RAIT template. Further information on the HRM context-specific criteria rating is outlined in Appendix E.

PRIORITIZATION RAKING

An **"Overall Priority Score"** for each site was developed by combining the scores for each Impact Criteria listed in Table 2. This Overall Priority Score was then used to rank the 30 sites from highest to lowest priority. It is important to note that the priority scoring was used only to rank the sites in relation to one another, and is not intended to replace a more detailed flood risk assessment. A general classification of the site priority level based on its Overall Score is provided in Table 3 below.

Table 3: Classification of Priority Sites

Relative Priority Classification	"Overall Priority Score" Range	General Description
Low Priority	0-12	Lower level of impact, in the context of this study. Least urgent in comparison to other sites. Consider further assessment or mitigation through other funding streams to reduce flood risks.
Moderate Priority	13-24	Moderate level of impact, in the context of this study. Action or further analysis may be required. Consider proceeding to detailed risk assessment through the NDMP and consider mitigation measures to reduce flood risks.
High Priority	25-38	High level of impact, in the context of this study. Action or further analysis required. Proceed to detailed risk assessment through the NDMP and consider mitigation measures to reduce flood risks.

3.5.3 PRIORITIZATION RESULTS

Table 4 summarizes the prioritization scores and ranking for the original Top-30 flood-prone sites in HRM. Appendix E provides details on criteria scoring and site prioritization during the Preliminary Risk Assessment and Prioritization Analysis.

Prior to preforming the Preliminary Risk Assessment and Prioritization Analysis, several of the Top-30 sites were combined under common groupings (as discussed in Section 3.4) to better suit future analysis and/or funding for streams under the NDMP. The sites that were repositioned under common grouping have been shown as "N/A" under Grouped Priority Ranking in Table 4.

The following key points should be considered regarding the prioritization process:

- **All 30 Flood-Prone Sites are priorities for the Municipality.** The Top-10 list is not intended to be definitive. Mitigation measures should eventually be implemented for all sites.
- **Prioritization is a Tool to Direct Focus.** By prioritizing ten sites of highest risk, focus can be dedicated to develop site-specific strategies. This focus helps to achieve action that is manageable in applying for and receiving funding.
- **Prioritization is Relative.** The process scores and ranks the 30 sites in relation to each other.

The site prioritization list was circulated and reviewed by the project advisory team, including HRM and Halifax Water, for comment and acceptance prior to proceeding with the Detailed Risk Assessment for the Top-10 Highest-Priority Areas.

Table 4: Summary of Preliminary Prioritization Matrix

Site#	Site Name	GROUPED PRIORITY RANKING[2,3]	OVERALL PRIORITIZATION SCORE	WORKSHOP RANKING COMPARISON	
				HW Overall Rating (Workshop 1)	HRM Overall Rating (Workshop 2)
25	Bedford Highway, from Union Street to Highway 102 - Bedford	1	38	High	High
A6	Shubenacadie Lakes	2	27	High	High
8	Karlson's Wharf @ Upper Water Street - Halifax	3	25	High	High
9	Inglis Street @ Barrington Street - Halifax	4	21	High	Medium
24	Highway 2, from Holland Road to Miller Lake Road - Fall River	5	18	High	-
7	Pleasant Street, near Dartmouth General Hospital - Dartmouth	6	17	Medium	High
5	Cole Harbour Road @ Perron Drive - Cole Harbour	7	15	Medium	High
2	Shore Road - Eastern Passage	7	15	High	Medium
22	Hammonds Plains Road @ Bluewater Road - Bedford	7	15	High	High
A2	Mount Saint Vincent at Bedford Highway	7	15	High	High
19	Bambrick Road @ Orchard Drive - Middle Sackville	11	12	Medium	Medium
6	Nantucket Avenue @ Wyse Road - Dartmouth	11	12	Medium	High
1	Autoport - Eastern Passage	13	11	Low	Medium
27	Rocky Lake Drive, near quarry entrance - Bedford	14	10	Low	Medium
28	Cobequid Road @ Regwood Drive - Windsor Junction	15	9	Low	Low
12	Melville Avenue @ Winchester Avenue	15	9	Low	Low
11	Keating Road @ Crown Drive - Halifax	17	8	Low	Low
10	Kempt Road @ Lady Hammond - Halifax	17	8	High	Low
21	Sunnyvale Crescent @ Beaverbank Road - Lower Sackville	19	7	Low	Medium
18	Hammonds Plains Road, near Kynock Resources - Hammonds Plains	19	7	Low	Medium
13	Glenforest Weir - Halifax	19	7	Medium	Low
14	Leiblin Drive @ Guildwood Crescent - Halifax	22	4	Low	Low
4	Beaver Crescent - Cole Harbour	22	4	Low	Low
15	Bently Drive @ Ramsbrook Court - Halifax	24	3	Low	Low
26	Sackville Drive @ Cobequid Road - Lower Sackville *(see Site 25)*	N/A	25	Medium	Low
30	Ridge Avenue, from School Street to end – Waverley *(see Site A6)*	N/A	22	High	Low
3	John Stewart Drive – Dartmouth *(see Site 5)*	N/A	13	High	Low
20	Rankin Drive @ Glendale - Lower Sackville *(see Site 25)*	N/A	12	Low	Medium
16	Wellington Fire Station, Highway 2 – Wellington *(see Site A6)*	N/A	9	Low	Low
17	Fletcher's Drive, near civic 57 - Fall River *(see Sites A6 & 24)*	N/A	6	Low	-
23	Holland Road @ Highway 2 - Fletcher's Lake *(see Site 24)*	N/A	4	Low	-
29	Bedford Highway @ Shaunslieve Drive *(see SiteA2)*	N/A	2	Low	Low

Notes:

[1]Sites A2 and A6 were not originally included on the list of 30 Sites, but were identified during the Preliminary Assessment Workshops as opportunities for a more community-based risk assessment.

[2]The Top-10 Priority Sites, based on the Preliminary Prioritization process, are highlighted in blue.

[3]A Priority Ranking of 'N/A' denotes the site was considered part of a grouping. The site in the grouping with the highest score was used in the Priority Ranking

[5]The Grouped Priority Ranking references the site with the highest score within the grouping.

The following should be considered in review of the Preliminary Prioritization Table:

- The prioritization rating system is a tool to scope the relative priorities across the 30 sites in comparison to each other.
- Impact ratings should be considered to be subjective, but were informed through stakeholder workshops, consultation, and preliminary review. Workshops and consultation involved representatives from HRM, Halifax Water and the project team the fields of engineering, operations, planning emergency management, and climate change.
- The Overall Priority Score for each site was developed by combining its scores for each of the Prioritization Impact criteria. See Table E-2 for descriptions of how the Level of Impact scoring was applied. Each Impact Criteria was weighted equally.
- Preliminary Consultation identified the opportunity to group several key sites under common themes better suited for future analysis and/or funding under the NDMP for a more community-based assessment.

4 DETAILED RISK ASSESSMENT OF 10 HIGHEST PRIORITY SITES

With the intent to better understand each of the site-specific risks and impacts associated with the Top-10 sites, a Detailed Risk Assessment was completed. This involved completion of detailed site visits and investigations, further desktop reviews, and additional HRM and HW staff workshops. The Detailed Risk Assessment also involved populating the NDMP Risk Assessment Information Template (RAIT) for possible submission for federal funding under subsequent NDMP Streams in flood risk assessment and mitigation measures.

4.1 OVERVIEW OF TOP-10 KEY SITES

The scope of the Detailed Risk Assessment process was limited to the **Top-10 highest-priority sites** that were identified in the Preliminary Risk Assessment and Prioritization Analysis, as shown in Table 5 below.

Table 5: Top Ten (10) Highest Priority Sites for Detailed Risk Assessment

Priority Ranking	Site #	Site Name
1	25	Bedford Highway, from Union Street to Highway 102 – Bedford *(including Sites #20, #21, and #26)*
2	A6	Shubenacadie Lakes *(including Sites #17 and #30)*
3	8	Karlson's Wharf at Upper Water Street - Halifax
4	9	Inglis Street at Barrington Street - Halifax
5	24	Highway 2, from Holland Road to Miller Lake Road - Fall River *(including Sites #16, #17 and #23)*
6	7	Pleasant Street, near Dartmouth General Hospital - Dartmouth
7	5	Cole Harbour Road at Perron Drive - Cole Harbour *(including Site #3)*
7	2	Shore Road - Eastern Passage
7	22	Hammonds Plains Road at Bluewater Road - Bedford
7	A2	Bedford Highway at Mount Saint Vincent

Building on the strategies implemented during the Preliminary Risk Assessment Phase, a Detailed Risk Assessment Methodology was developed for application on each of the Top-10 sites. The Detailed Risk Assessment Methodology is meant to fulfil the requirements of the NDMP's RAIT form, while also considering the usefulness and practicality of the results for HRM in further examining and responding to site specific risks.

The objective of the Detailed Risk Assessments are to identify the interactions between the sites-specific infrastructure, weather and climate, surrounding communities, natural and physical environments, as well as any other factors that could lead to vulnerability at the site.

4.2 DETAILED INVESTIGATIONS

4.2.1 DETAILED DESKTOP INVESTIGATIONS

Information previously collected for each of the Top-10 sites was compiled, including data collected from the background review, site questionnaires, Preliminary Workshops with staff, and information utilized during the Preliminary Risk Assessment and Prioritization process. Additional detailed site-specific information was also collected, including a more detailed inventory of existing site infrastructure, surrounding community populations, site and historical event documentation, and watershed and infrastructure site mapping.

4.2.2 DETAILED SITE INVESTIGATIONS

In November and December of 2017, project team members visited each of the 10 key sites during a wet weather event. The intention of the visits was to re-examine the site area based on information obtained during the preliminary assessment process, obtain additional site photos, and consider potential mitigation options. The visits were planned during wet weather in an effort to time the visits with wet weather conditions. The site visits were documented with notes and photos to supplement the results of the desktop investigation.

4.3 DETAILED RISK ASSESSMENTS & MITIGATION STRATEGIES WORKSHOPS NO. 3 & 4

Two separate follow up workshops were held with HRM and HW staff as part of the Detailed Risk Assessment process. The workshops were designed to validate and review initial assumptions and findings on impacts, risks, and mitigation measures for the Top-10 priority sites.

WORKSHOP NO. 3 – HALIFAX REGIONAL MUNICIPALITY

Workshop No. 3 was held with HRM staff, many of whom had taken part in the Preliminary Workshop held previously. Various departments including community and regional planning, environmental performance, transportation public works, planning and development, and municipal emergency response services were represented. HRM staff were able to validate and comment on the presented Detailed Risk Assessment and Mitigation Strategies for each of the Top-10 sites from the Municipality's perspective. These insights included:

- Conflicts with broad-based policies and land uses
- Impacts to existing and future communities
- Environmental control parameters
- Existing studies available for funding collaboration
- Real estate ownership and acquisition challenges
- Emergency response times and routing
- Operational response during flooding events

WORKSHOP NO. 4 – HALIFAX WATER

Workshop No. 4 was held with Halifax Water staff, many of whom had also taken part in the Preliminary Workshops held previously. Workshop attendees included project engineers, as well as on-the-ground operation managers for region throughout the service boundary. HW staff were able to validate and comment on the presented Detailed Risk Assessment and Mitigation Strategies for each of the Top-10 sites from an operational perspective. These insights included:

- Cause and impact of flooding events a each site
- Impacts to existing infrastructure during flooding events
- Ownership of infrastructure (e.g. HW or NSTIR)
- Existing and future studies/capital projects available for funding collaboration
- Capital projects accounted for in upcoming HW budgets
- Mitigation measures likely needed to reduce impacts on each site

4.4 DETAILED RISK ASSESSMENTS & NDMP RAIT FORMS

The Detailed Risk Assessments were completed according to the NDMP's Risk Assessment Information Template User's Guide, included in the NDMP Guidelines (Appendix A). Aspects of the assessment process and completion of RAIT forms are summarized below:

Documentation of Background Information: Risk Event Details (Historical); Previous Studies/Analysis; Hazard Identification and Mapping

Considerations and Vulnerabilities: Area Impacted; Natural environment, meteorological/seasonal conditions; Vulnerability of the affected population; Asset inventory Existing Risk Treatment Measures

Likelihood Assessment: The return period of an event at the site.

Impacts/Consequences Assessment: Assessment and scoring of the following Impacts at the site, according to the RAIT system:

A) **People and Societal Impacts**
   - Fatalities
   - Injuries
   - Population Displaced
   - Duration of Displacements

B) **Environmental Impacts** (ie. Flora/fauna; ecosystems; air quality; water quality; water levels; soil quality/quantity)

C) **Local Economic Impacts** (ie. Percentage of local economy impacted)

D) **Local Infrastructure Impacts**
   - Transportation (Local activity stopped, reduced access, delivery of crucial services or products)
   - Energy and Utilities
   - Information and Communications Technology
   - Health, Food, and Water (ie. Access to potable water, food, sanitation services, or healthcare services
   - Safety and Security (ie. Loss of intelligence or defence assets or systems)

E) **Public Sensitivity Impact** (ie. loss of reputation, public perception, trust, and/or confidence of public institutions)

Confidence Level: Indication of the level of confidence regarding the information entered in the risk assessment information template, ranging from A to E, with A being a very high degree of confidence and E being a very low degree of confidence. Considers the degree to which the assessment was evidence-based, knowledge of the natural hazard risk event, the quantity/quality of data leveraged, the variety of data and information, composition of the Assessment Team, and the amount of mitigation measures considered.

4.4.1 COMPLETED DETAILED RISK ASSESSMENTS (10 SITES)

The results of the Risk Assessments for the Top-10 highest priority sites are presented in **Appendix F** as individual Site Reports. Each report provides an overview of site-specific background information, identified vulnerabilities and flood impacts, and mitigation strategy concepts. Each report also contains a completed NDMP RAIT form.

For a snapshot of the risk assessment and mitigation strategies for each Site, please refer to the **Executive Summary Table** that can found at the beginning of each Site Report.

4.5 DETAILED ASSESSMENT CONSIDERATIONS & DISCUSSION

4.5.1 FLOOD RISK CATEGORIZATION

Several of the Top-10 sites can be grouped under over-arching categories which share similar hydrologic and hydraulic causes, impacts and consequences, as well as mitigation strategies. To aid in the assessment and development of response/mitigation strategies for these sites (and potentially others) within the municipality, three site categories are discussed: Large Natural Watershed Systems, Localized Drainage Infrastructure, and Tidal Influenced Systems.

LARGE NATURAL WATERSHED SYSTEMS

A significant portion of urban development within HRM is located within the floodplain of large natural watershed systems. Three of the highest priority sites may be categorized as Large Natural Watershed Systems, since they are located immediately adjacent and within the floodplain of one of the major natural drainage channel in the areas:

- Site 25 - Sackville River System
- Site A6 - Shubenacadie Lakes System,
- Site 5 – Cole Harbour / Bissett Lake Watershed System

The overall degree and duration of flooding in the floodplain is typically influenced by the extent of the tributary watershed and the extended time of concentration for the peak of the runoff hydrograph to pass the location of the site. While most urban stormwater infrastructure systems can accommodate the peak runoff for a relatively short duration (less than 1 hour), the peak runoff from large natural watersheds can take much longer (>12 hours) to pass through their floodplain system. During the extended duration of the flood inundation, the cumulative costs and risks to the health and safety of the residents and the general public may be extensive and intolerable.

A challenge in addressing flooding within larger watersheds is the scale of work required to significantly alter the overall characteristics of the tributary watershed and stream channel system, or to store a portion of the peak runoff. Localized modifications to the layout and cross-section of a particular reach along a major drainage channel can, however, help to accommodate the 100-year peak flow and improve conveyance.

Often, the residential, commercial, and institutional development located within the floodplain are required to maintain adequate flood insurance to protect their investment. Where acceptable to the federal and provincial environmental authorities, the municipality may choose to make structural changes to increase the hydraulic capacity of the channel or to protect the inhabitants of the floodplain from damage. Recently, federal and provincial governments have expressed reluctance to intervene in the hydraulic behaviour of these large natural watershed and floodplain systems, opting instead to encourage residents to flood-proof their structures or to relocate outside the boundaries of the floodplain.

While several of these larger natural watershed systems have been studied under joint federal and provincial floodplain studies completed in past decades, the impacts of climate change and ongoing development within the tributary watershed will alter the characteristics of design storms and the resultant floodplain boundaries. In recognition of the potential for increased risk to the general public and damage to public and private assets, it is recommended that each of the large natural watershed systems within HRM be the subject of an up-to-date hydrologic and hydraulic floodplain study. These studies should be intended to identify the expanded floodplain boundaries, potential improvements to the hydraulics of the stream channel, and upstream changes in the tributary watershed.

LOCALIZED DRAINAGE INFRASTRUCTURE

Flooding at four of the highest priority sites may be characterized as the result of limited or inadequate capacity of the local stormwater drainage infrastructure systems:

- Site 7 – Pleasant Street, near Dartmouth General Hospital - Dartmouth
- Site 22 – Hammonds Plains Road @ Bluewater Road – Bedford
- Site 24 - Highway 2, from Holland Road to Miller Lake Road - Fall River (including Sites #16, #17 and #23)
- Site A2 – Bedford Highway at Mount Saint Vincent

While these sites have proven to be flood-prone under recent storm events, it is noted that many of the man-made, engineered stormwater collection, storage and transmission systems, constructed within HRM over the past 5 decades have never been tested by an event greater than their definitive design storm. As the intensity, duration, and frequency of rainfall and runoff events increase with climate change, the potential for failure of many of these stormwater systems will increase, potentially resulting in a higher risk of damage to public and private property.

Typically, flooding at these sites is due to the limited hydraulic capacity of the existing man-made stormwater systems to collect and convey peak flows from the tributary drainage area to a natural drainage receiving system. In many instances, the engineered drainage system may have been designed only to accommodate peak runoff from a 2-year or 5-year event, with excess flows being carried in the public roads or a local natural drainage channel.

In general, mitigation of these localized drainage infrastructure systems is achieved by completion of a proper hydrologic and hydraulic drainage study and the construction of capital improvements, such as upgrades to culverts and other local drainage conveyance systems.

TIDAL INFLUENCED SYSTEMS

Three of the highest priority sites are understood to be influenced by the normal and extreme tidal range of the Atlantic Ocean coincident with peak stormwater runoff conditions:

- Site 2 – Shore Road - Eastern Passage
- Site 8 - Karlson's Wharf @ Upper Water Street - Halifax
- Site 9 – Inglis Street @ Barrington Street - Halifax

Where the outlets of local drainage systems are located immediately adjacent to a marine water body such as the Bedford Basin, the Halifax Harbour, or the Atlantic Ocean, the hydraulic capacity of the sewer system may be impacted by normal and/or extreme tides and storm surge conditions.

Tidal conditions can also impact sanitary and combined sewer systems and sewage pumping stations. The occurrence of a peak combined sewage flow, combined with extensive inflow and infiltration (I/I) entering the sanitary collection system, can result in an extreme sewage discharge coincident with an extreme high tide, which can result in overflow of the local sanitary pumping stations and even backflow into private residences.

At Site 9, where Inglis Street meets the south end of Barrington Street, the Pier A Sewage Pumping Station is equipped with an overflow pipe that discharges through a rectangular box culvert to Halifax Harbour during extreme flow conditions. During normal rainfall and runoff conditions, when the pump station can handle the peak sewage flows, the station does not overflow. When the wet weather flows exceed the capacity of the pumps, then combined sanitary sewage overflows through the box culvert to the Harbour under most normal tidal conditions. When the extreme wet weather flows coincide with the highest high tides, however, the ocean causes a backwater effect on the wetwell resulting in system surcharge and even overflow of sewage to the public street.

Modification of these stormwater and sanitary sewer systems impacted by the tides can require extensive and expensive upgrades that may be challenging to achieve. The influence of tide waters on these system will continue to increase with future sea level rise associated with climate change.

4.5.2 DISCUSSION ON CONFIDENCE LEVELS

The NDMP Risk Assessment Information Template (RAIT) involves indication of the Level of Confidence regarding the information used to inform the risk assessment. The assigned Confidence Level considers the variety and quality of data leveraged, composition of the Assessment Team, and the amount of mitigation measures considered. The following common themes were taken into account in determination of Confidence Levels for the assessment of the Top ten sites.

DATA AVAILABILITY

- **Infrastructure Data:** Since the Risk Assessments were more qualitative in nature, the infrastructure data available for assessment use was sufficient, particularly where non-numerical, engineering judgement-based screening was applied. It is, however, recommended that more detailed numerical data be collected for future detailed assessment and mitigation planning at each site.

- **Rainfall Data:** A historical climate analysis was conducted using data from a variety of sources. As outlined in Appendix C, data from a nearby Environment Canada station was referenced based on proximity, the completeness of data over the period of record and the ability to relate it to the future data provided from the Future Climate Projections.

STRENGTHS OF THE PROJECT-SPECIFIC RISK ASSESSMENT PROCESS

The current project uses a risk assessment and prioritization process based on the Federal NDMP program, while incorporating additional strategies to bring focus to the local context of the Halifax Regional Municipality. The work performed to date has successfully met the expectations of HRM to examine vulnerabilities of the key flood-prone areas within the Municipality and identify high priority areas for further assessment and/or mitigation. Strengths and benefits of the process include:

- The process was completed using a collaborative approach, involving an integrated team of consultants, subject matter experts, departmental staff, management, engineering, planning, emergency response, and operations personnel.
- The project workshops brought together key stakeholders to hear varying opinions, information, and perspective to develop a collaborative understanding of each site, considering a variety of impacts.
- The process was successful in gathering a unified consensus on the sites of highest priority within the municipality to focus on more detailed assessment and development of mitigation measures.
- The process examined future climate change considerations, identifying the projected increase in the intensity and frequency of rainfall events, which could trigger flood events. This emphasizes the importance of planning for, developing, and implementing flood mitigation strategies in the near future to protect and plan for these future events.
- The process is flexible and reproducible, which can serve as a reference for additional sites for application under the NDMP, or in considering other risk events/geographic areas.
- The compilation of information for each site provides valuable information for use in future mitigation planning and engineering work.

ASSUMPTIONS & CONSIDERATIONS

Due to the limited amount data available at the first stage of the NDMP process (Stream 1), the Risk Assessment and Prioritization process does have limitations; however, we believe this does not compromise its ability to meet the expectations of HRM to identify high priority areas for further assessment and/or mitigation. Considerations, limitations and assumptions of the process include:

- The prioritization scoring provides a relative ranking of the 30 flood-prone sites previously identified by HRM. The scoring is a tool for comparison only, and not intended to replace a risk assessment or analysis.
- Prioritization ratings were assigned using project-specific criteria descriptions, assembled based on feedback obtained during the stakeholder workshop and professional judgement.
- Risks are primarily assessed based on available historical information, anecdotal information, feedback from engineering and operations staff, site questionnaires, site visits, workshop feedback and high-level desktop review of topography, infrastructure, and aerial photos. There are data gaps in terms of single-point values that are absent for certain sites (for example, lack of detailed information on existing stormwater infrastructure, lack of historical reports, limited anecdotal data, etc.).
- Approximations for municipal population growth projections and distribution of population projections affected by the area impacted directly by each flood area were not undertaken (with similar limitations related to the lack of detailed flood limits).
- The assessments were conducted at a community level as opposed to an individual component level, therefore recommendations on specific asset upgrades within each system are not within the scope of this assignment.
- In the absence of detailed flood mapping using analytical techniques for most sites, the impact of flooding is based on assumptions particular to each site, such as:
  - Extent of severe flooding if not previously recorded or reported.

- Extent of flooding due to future climate events.
- Impacts of a future event more severe than previously recorded.
- General assumptions related to emergency response and emergency preparedness.
- Potential environmental impacts or probability of contaminant release.
- Number of people affected by an event (dependant on event).
- Likelihood of the particular event causing damage to infrastructure with secondary impacts.

5 PRELIMINARY MITIGATION MEASURES RECOMMENDATIONS

Once flood risk and impacts were identified at the various key sites across the Municipality, the next step involved review and recommendation of strategies and measures to help mitigate the risk and impacts. Mitigation strategies were reviewed for the Top-10 sites, as well as on a municipal-wide level.

5.1 METHODOLOGY

To help inform the development of potential mitigation strategies to address flooding challenges across HRM, a literature review was conducted to examine mitigation techniques, adaptation strategies and best management practices (BMPs) from other municipalities and jurisdictions. Information collected from the Literature Review is presented in Appendix B-2.

Following the detailed risk assessment of the Top 10 sites, initial Mitigation Strategy ideas were developed by the project team. Initial concepts were presented and discussed as part of the second phase of Stakeholder Consultation (Workshops 3 & 4). During the workshops, attendees were asked to comment on the suitability of the potential mitigation strategies, suggest any additional strategy concepts, and comment on potential coordination of strategies with other planned or upcoming work. In recognition of common themes for addressing flooding many of the key sites, opportunities for implementation of municipality-wide mitigation strategies were also identified.

5.2 MITIGATION STRATEGY TIMELINES

Each mitigation strategy concept identified for the sites has been assigned a suggested time frame for implementation. The following timeline horizons have been considered:

- → **Interim:** Next steps to be implemented in the immediate future. Typically, these measures can be completed using existing capital funds or within operations budgets. The recommended step may be urgent in nature, or only require a small investment of time, budget, or resources.
- → **Short Term (1-2 Years):** These strategies are recommended for implementation within the next two years. The strategies may fall under previously identified capital or operations work. The suggested measures may be somewhat urgent in nature, and should be completed in a timely fashion. If a funding mechanism has been identified, the application process should begin immediately/in the near future.
- → **Medium Term (3-5 Years):** These strategies are recommended for implementation within the next three to five years. The strategies may first require completion of a study, planning or design process in the short-term. The strategies may fall under identified future capital work or should be worked into the organization's 5-year business plan.
- → **Long-Term (5+ Years):** These strategies are recommended for implementation beyond the 5-year planning horizon. The strategies may be less urgent in nature, or require prior completion of a study, planning or design process that would occur within the next 5 years. Opportunities to expedite prior work to allow for implementation of these strategies within the short or medium term horizon should still be considered, where feasible.

While efforts were made to identify reasonable timelines considering capital budgeting and funding application processes, the timelines identified for the implementation of mitigation strategies should not be considered definitive. HRM and Halifax Water are encouraged to consider opportunities to expedite further assessment and implementation of the suggested next steps wherever possible.

5.3 COSTING & FUNDING MECHANISMS

5.3.1 NDMP FUNDING STREAMS

Available subsequent funding streams under the National Disaster Mitigation Program are further defined in Section 2 of this report, summarized below:

→ **Stream 2: Flood Mapping** - Defining the geographical boundaries of a flooding event, used to help perform an updated risk assessment of flood impacts.

→ **Stream 3: Mitigation Planning** – Using risk information to make informed planning decisions. Involves identifying mitigation goals, strategies, objectives and key activities.

→ **Stream 4: Investments in Non-Structural and Small Scale Structural Mitigation** – Implementation of a specific mitigation project.

5.3.2 PROJECT COORDINATION

It is recommended that HRM and Halifax Water consider and investigate the potential application of the following funding programs to implement further assessment, analysis and/or implementation of the mitigation strategies:

→ **Coordination with Other Ongoing/Upcoming Projects:** Identify and act on potential opportunities to coordinate flood mitigation/infrastructure improvement work with upcoming planned capital projects in the vicinity of the site For example, planned road upgrades, new residential development, etc.

→ **Paired Study/Design/Implementation** – Grouping upcoming study, design and/or construction for a particular site under one project and funding application, such as Stream 4 – Investments.

5.3.3 ORDER OF MAGNITUDE COSTING

As part of the recommended next steps, Rough Order of Magnitude costs have been provided for each project. The intent of the costing is to give HRM and Halifax Water an idea of the potential level of effort required for the possible work. Estimates of this nature are extremely high-level and should be further reviewed against the detailed project scope of work (once defined) when allocating capital funds.

5.4 SITE-SPECIFIC MITIGATION STRATEGIES

Appendix F contains individual site reports for the Top-10 sites, presenting mitigation strategy options, with suggested implementation timelines, Rough Order of Magnitude Costs, and potential funding mechanisms. Each report also discusses operability, construction, and funding considerations related to each strategy.

In development of the site-specific strategies, common themes were identified for adaptation and mitigation that could be applied to many of the sites, as well as sites beyond the limits of the current study. This resulted in development of a proposed municipality-wide flood management strategy as discussed in the following section.

5.5 MUNICIPALITY-WIDE COMPREHENSIVE FLOOD MANAGEMENT STRATEGY

The following relevant flood mitigation techniques and adaptation strategies were reviewed for potential application in addressing flooding challenges across HRM.

1. EMERGENCY PREPAREDNESS AND RESPONSE PLANNING

- Evacuation route planning:
  - Incorporate identified flood-risk zones into evacuation route planning.
  - Conduct detailed traffic modelling of emergency routes.
- Maintain forecasting and early warning communication systems.
- Consider thresholds for evacuation of high-risk areas.
- Document flood management plans.

2. COORDINATION

- Coordination between coastal and pluvial flood mitigation/response strategies.
- Incorporate flood risk analysis and mitigation planning into upcoming capital work and studies.
- Coordinate recommended flood mitigation infrastructure or upgrades with ongoing and future capital projects.
- Enhanced information sharing between agencies.
- Dedication of a Flood Management Action Team to foster increased commitment, cooperation and communication between government and utilities.

3. DATA COLLECTION AND MONITORING

- Increase monitoring and collection of flood-related data to help improve understanding of flood risks within the municipality and inform future planning initiatives.
- Logging of historic and ongoing flooding in a digital database to allow for forensic analysis, including information such as:
  - Location of surface flooding;
  - Nature of the area (intersection of roads, Road dip);
  - Any obvious obstruction to drainage; and
  - Date and time of flooding.
- Coordinate with existing asset management programs. Incorporate data logging and reporting with the HRM and Halifax Water GIS systems.

4. LAND USE AND DEVELOPMENT POLICIES

- Review land use planning regulations to restrict development within defined floodplains, including:
  - No-build zones;
  - Defining types of development permitted within flood limits of varying return periods;
  - Mandatory incorporation of flood protection into new developments near/adjacent floodplains.
- Monitor and enforce policies to prevent development and expansion of property in high risk areas.
- Consider long term, strategic water-shed level stormwater management objectives through Stormwater Master Planning.

5. STORMWATER POLICIES

- Develop and/or enhance stormwater management policies, including management of stormwater quantity and quality.
- Enforce drainage standards (major/minor systems, design-storms).
- Monitor and enforce the regulations.
- Policy for implementation of stormwater management Best Management Practices (BMPs) in new developments.
  - Low Impact Development (LID) Measures can be used to mitigate peak flow rates from individual properties and, by extension, mitigate storm water quality and temperature impacts of overall development.
  - Possible LID measures include controlled flow roof drains, green roofs, rain gardens and underground storage.

6. REGIONAL FLOOD RISK MAPPING AND RISK ASSESSMENT

- Develop, or obtain from available sources, a high-level flood risk map for the municipality.
- Include vulnerability indicators, hazard mapping, and previously mapped flood extents.
- Use as a high-level planning and emergency management tool to help identify areas of high risk.
- Identify areas for further risk assessment and/or analysis.
- Include both pluvial (rainfall) and coastal flood risk mapping.

7. PUBLIC EDUCATION AND AWARENESS

- Conduct community outreach initiatives to educate the community on how to prepare for floods.
- Strengthen public awareness of flood risks and policies.

8. EMBRACING ADAPTIVE MANAGEMENT

- Ongoing data collection and monitoring of implemented mitigation strategies.
- Inter-departmental/utility coordination.

REFERENCES

AECOM Engineering Ltd. (2014). *Sandy Lake Watershed Study – Final Report*. Halifax, NS.

CANADA'S TOP TEN WEATHER STORIES OF 2013. (2013). Ottawa. Retrieved from https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=5BA5EAFC-1&offset=2&toc=hide

CBCL Ltd. (2017). *Sackville Rivers Floodplain Study – Phase II*. Halifax, NS.

Dillon Consulting Ltd. (2015). *Cole Harbour Floodplain Assessment Report – Investigation of Flood Mechanisms and Drainage near Cole Harbour Road and John Stewart Drive*. Halifax, NS.

Fisher, G. (2011). *Municipal Climate Change Action Plan Guidebook*. Service Nova Scotia and Municipal Relations: Halifax, NS.

Halifax Regional Municipality. (2017). *HRM Open Data.* Retrieved from http://catalogue-hrm.opendata.arcgis.com/.

Halifax Regional Water Commission. (2017). *Geographic Information System of Municipal Infrastructure* [Data file]. Unpublished data.

Palko, K. and Lemmen, D.S. (Eds.). (2017). *Climate Risks and Adaptation Practices for the Canadian Transportation Sector 2016*. Ottawa, ON: Government of Canada.

PLANNING FOR SEA-LEVEL RISE IN HALIFAX HARBOUR. (2015). Ottawa. Retrieved from https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/mun/pdf/halifax_e.pdf

SDMM Ltd. (2015). *HRM Stormwater Funding Strategy – Baseline Study*. Halifax, NS.

THANKSGIVING FLOODS IN ATLANTIC CANADA CAUSED MORE THAN $100 MILLION IN INSURED DAMAGE. (2016). Halifax. Retrieved from https://www.canadianunderwriter.ca/insurance/thanksgiving-floods-atlantic-canada-caused-100-million-insured-damage-catiq-1004103794/

THE STATE OF NOVA SCOTIA'S COAST: TECHNICAL REPORT. (2009) Halifax. Retrieved from https://novascotia.ca/coast/documents/report/Coastal-Tech-Report-Nov-09.pdf

TIMELINE: HOW THE GREAT FLOOD OF 2013 EVELOVED. (2013). Calgary. Retrieved from http://calgaryherald.com/news/local-news/timeline-how-the-great-flood-of-2013-evolved

ATTACHMENT F

Priority	Site Name	Recommended Strategy
1	Sackville Rivers System	Engineering Feasibility Study Potential Flood Remediation Measures. Also, Update Planning & Development Policy within Floodplain
2	Shubenacadie Lakes	Watershed & Floodplain Mapping Study
3	Karlson's Wharf	Analysis & Preliminary Design of Future Local Storm System. Also, Construction of Local Storm Sewer System Infrastructure
4	Inglis Street at Barrington	Local Stormwater System Study & Concept Design
5	Highway 2	Highway 2 Stormwater Drainage Study
6	Pleasant Street	Hydrologic/Hydraulic Assessment & Conceptual Design of Flood Remediation Infrastructure
7	Cole Harbour Road at Peron Drive	Detailed Bisset Run Watershed Drainage Study & Mitigation Concept Development
7	Shore Road – Eastern Passage	Public Engagement & Emergency Preparedness
7	Hammonds Plains Road at Bluewater Road	Sandy Lake Watershed Drainage Study & Mitigation Concept Development. Also, Analysis & Design of Hammonds Plains Road Upgrades
7	Bedford Highway at Mt St. Vincent	Bedford Highway Sewer System Capacity Study for Future Development

Priority	Site Name	Order of Magnitude Costing		
		Short Term (0-2yrs)	Medium Term (3-5 yrs)	Long Term (+5 yrs)
1	Sackville Rivers System	$50-150K	$25-75K	TBD
2	Shubenacadie Lakes	$250-500K	$50-150K	TBD
3	Karlson's Wharf	$200-350K	$250-500K	Operations
4	Inglis Street at Barrington	$25-150K	TBD	TBD
5	Highway 2	$50-100K	$2-5M	$50-100K
6	Pleasant Street	$25-60K	$0.4-1M	TBD
7	Cole Harbour Road at Peron Drive	$50-90K	Operations	$0.5-$1M
7	Shore Road	$15-30K	$25-60K	TBD
7	Hammonds Plains Road at Bluewater Road	$50-200K	TBD	$2-5M
7	Bedford Highway at Mt. St Vincent	$50-100K	$75-150K	TBD
Totals		$0.8-$1.7M	$2.8-$6.9M	$2.6M-6.1M
		$6M - $15M		

ITEM # 7
HRWC Board
November 29, 2018

TO: Mr. Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, ICD.D
Director, Corporate Services

APPROVED: *Original Signed By:*
Carl Yates M.A.Sc., P.Eng., General Manager

DATE: November 22, 2018

SUBJECT: **Board of Commissioners Travel and Expense Policy**

ORIGIN

Halifax Regional Water Commission (HRWC) Corporate Governance Manual, approved by the Board on January 28, 2016.

RECOMMENDATION

It is recommended that the Halifax Water Board:

1. Approve the Board of Commissioners Travel and Expense Policy in substantially the form attached hereto as Schedule 'A'.

BACKGROUND

The HRWC Corporate Governance Manual provides in Article 5.14 thereof that "All Commissioners shall be reimbursed by the Corporation for reasonable expenses incurred on Board business in accordance with the Employment Expense Reimbursement Policy #8.14" [copy attached for reference].

DISCUSSION

At the time of its approval by the Board in January 2016, the HRWC Corporate Governance Manual provided that Commissioners would be reimbursed for reasonable expenses incurred on Board business on the same basis as Directors, Supervisors, Managers, and Employees in accordance with HRWC's Employment Expense Reimbursement Policy #8.14. Experience with reimbursement of Commissioners' expenses since January 2016 indicates that it would be appropriate to develop a Travel and Expense Policy specifically for Commissioners.

BUDGET IMPLICATIONS

None, although such a policy may make Commissioners' expenses more readily auditable.

ALTERNATIVES

HRWC could choose to continue to reimburse Commissioners' expenses under Policy #8.14.

ATTACHMENTS

1. Board of Commissioners Travel and Expense Policy
2. Employment Expense Reimbursement Policy #8.14

Report prepared by: *Original Signed By:*

James G. Spurr, Corporate Legal Counsel 902-490-6101

Schedule A

ITEM # 7
HRWC Board
November 29, 2018
ATTACHMENT 1

BOARD OF COMMISSIONERS

TRAVEL AND EXPENSE POLICY

1.0 COMMISSIONER TRAVEL AND EXPENSE POLICY

1.1 Objective

The objective of this policy is to establish the procedures by which Halifax Regional Water Commission ("HRWC") will reimburse reasonable travel and related expenses of Commissioners incurred in the course of carrying out their activities related to HRWC.

1.2 Approach

Commissioners shall exercise good judgment and act prudently when incurring expenses for the account of HRWC. The applicable provisions of the Code of Conduct shall apply.

Travel on HRWC business should be managed in a cost effective manner while maintaining high safety and reasonable comfort and taking into account the other professional and personal demands on individual Commissioners.

1.3 Air Travel

(a) Economy class airfare will be reimbursed;

(b) Commissioners will be eligible for reimbursement of the air fare and other transportation costs actually incurred to attend a given event or meeting which they are required to attend, but not exceeding such costs between their Canadian place of permanent residence and the location of such event or meeting unless the prior written consent of the Chair in respect of that event or meeting has been obtained; and

(c) HRWC will pay for the use of a private automobile to and from either office or home to an airport and return.

1.4 Ground Transportation

(a) HRWC will reimburse expenses for transportation required between airports, event or meeting locations and hotels;

(b) Car rental at destination required primarily for the purpose of HRWC business may also be reimbursed;

(c) HRWC will provide an allowance to Commissioners for the use of a personal vehicle for business purposes at HRWC's approved rate, as amended from time to time; and

(d) HRWC will reimburse parking expenses incurred while carrying out duties while on travel status, including airports, hotels or event or meeting locations.

1.5 Accommodation

(a) Where an overnight stay is necessary, reasonable out-of-pocket accommodation expenses will be reimbursed.

(b) Reasonable valet and telephone charges will be paid by HRWC.

1.6 Meals

(a) HRWC will reimburse Commissioners for reasonable and appropriate expenses relating to meals while travelling or engaged on HRWC business. Itemized receipts must be provided for meal expense reimbursement. Reimbursement will not exceed the meal limits listed below, unless specifically authorized by the Chair.

(b) Without receipts, meal expenses may be claimed as follows:

- Breakfast $13.00
- Lunch $15.00
- Dinner $27.00
- Daily total $55.00

(c) A daily incidental expense of $10.00 contingent upon an overnight stay in a hotel.

1.7 Telephone

HRWC will reimburse Commissioners for HRWC business calls incurred and for reasonable personal calls incurred while travelling or engaged on HRWC business.

1.8 Miscellaneous

(a) Commissioners may be reimbursed for other reasonable expenses they incur in the course of carrying out their duties (examples: periodic conference or course attendance). Approval by the Chair (and the Vice-Chair in the case of the Chair) for significant or unusual expenses should be obtained prior to incurring them.

(b) Commissioners may be reimbursed for reasonable tips and goods and services or other sales tax related to reimbursable expenses.

1.9 Reimbursement of Expenses

(a) Expense claims should be submitted in a timely manner. A claim form is attached as Appendix A for your use;

(b) A quarterly summary of each Commissioner's expenses, prepared by staff, will be reviewed by the Chair;

(c) An annual summary of the Chair's expenses, prepared by staff, will be reviewed by the Chair of the Audit & Finance Committee;

(d) Detailed receipts (not just credit card receipts or statements) are to be attached to the claims; and

(e) Claims must be dated and signed by the claimant.

2.0 In the event of a conflict between this Policy and HRWC's Employment Expense Reimbursement Policy #8.14, this Policy shall govern.

APPENDIX A
SAMPLE EXPENSE CLAIM FORM

Halifax Water

EXPENSE CLAIM FORM

Commissioner's Name: _____

Date of Expense Report: _____

Meeting(s) Attended: _____

Date of Meeting(s): _____

Expense Details[1]		Total Expense (Cdn $)
Transportation		
Air		
Train		
Taxi		
Parking		
Mileage	Km x $0.52/km=	
Accommodation		
Meals		
Miscellaneous		
	Total to be Reimbursed:	
[1] Attach receipts where applicable		
Signature of Claimant		Approved By

EMPLOYMENT EXPENSE REIMBURSEMENT **Policy #8.14**

Purpose:

The purpose of the Employment Expense Reimbursement Policy is to define and provide clarity regarding the reimbursement of approved employment expenses incurred by employees while conducting business on behalf of Halifax Water (HW).

Additionally, in the context of Entertainment and Hospitality expense, the purpose is to ensure entertainment and hospitality extended by Halifax Water (HW) is managed in a consistent and cost effective manner that facilitates and supports its mission and activities while maintaining controls for accountability in the use of public funds.

Objectives:

Proper implementation of this policy will achieve the following objectives:

- Educate employees who travel on behalf of HW or incur employment expenses, so they clearly understand HW's cost control and reporting objectives and how they can help in achieving these objectives;
- Provide a means to evaluate the effectiveness of the policy;
- Provide accountability and structure to protect from allegations of improper use;
- Provide for periodic review.

Policy Statement:

This policy has been designed to balance the need of HW to contain costs and demonstrate prudence in the conduct of its activities and the employee's need for convenience, including travel for business related activities of HW. These provisions provide for the reimbursement of reasonable and appropriate expenses incurred and do not constitute income or other compensation resulting in personal gain.

Scope:

The scope of this policy is directed more to out-of-town travel expenses, however, general guidelines can be applied to local travel expenses as well. For example, in Section I below, under Meals, direct reference is made to personal meal expenses related to local business.

This policy also addresses how HW employees are responsible for exercising rigorous management of entertainment and hospitality, including measures to reduce, minimize and/or avoid costs. They must ensure that the decision to offer entertainment and hospitality has been carefully considered and demonstrates its necessity based on courtesy, diplomacy or protocol as well as for the effective conduct of HW business.

Responsibility:

All employees who submit employment expenses for reimbursement are stating their request is consistent with this policy.

All employees who approve employment expense reimbursement requests are attesting that the request is consistent with this policy and they have the appropriate authorization to approve such a request.

Approval authority and limits are consistent with HW's existing organizational structure and hierarchy, including the Chair of the Board of Directors.

Accountability:

Directors -

- Each Director has the responsibility to make certain an approval process exists to ensure all expense claims are properly prepared, documented and approved.
- Directors are responsible to authorize all out-of-town travel requests.
- For out-of-town travel requests, Directors must justify situations where more than two (2) employees from their department attend the same convention, conference or training seminar/workshop. Some examples of justified situations include:
    - Cost effective local training opportunity (versus out of town opportunities)
    - Requirement for multiple employees to get CEU's or Professional Development points to maintain professional designations for qualifications
    - Special technical training required by more than 2 people for job performance
    - Succession planning candidates where the training is part of a professional development plan

Supervisors/Managers –

- Supervisors and Managers have the responsibility for administering employment expense reimbursement in accordance with the requirements of this policy. Supervisors/Managers must:
    - Ensure that this directive is made available to employees either in hardcopy form or electronically through HW's Intranet;
    - In situations involving travel, determine whether travel is necessary and by whom;
    - Ensure the means of travel, the mode and class selected and accommodations to be used are consistent with the provisions of this policy;
    - Pre-authorize travel through the prescribed process;
    - Verify and approve employment expense reimbursement requests for payment.

Employee –

- The Employee shall:
    - Obtain prior authorization for out-of-town travel by completing the prescribed form;

    - Submit fully completed employment expense reimbursement requests with necessary supporting documentation, including detailed receipts and explanations as required;
    - Submit claims promptly within the timelines provided for in this policy.
- The employee has the responsibility to become familiar with the provisions of this policy.
- Any fraudulent activity in employment expense claims submitted by an employee, or any other misuse or misappropriation of public funds will result in disciplinary action.

Introduction

All out-of-town travel is to be documented in prescribed form and is subject to budget pre-approval by the Director prior to travel. Upon his/her return, the employee will complete the claim form for actual reimbursement of travel expenses, approved again by the Director for payment. Completed claim forms must be submitted to Accounting for final processing within two (2) weeks of return from travel. Deviations greater than ten percent (10%) between the pre-approved budget and the actual expenses need to include explanations.

Other reimbursable expenses, including local business, are to be documented in prescribed form and subject to final approval by the Supervisor and/or Director. The employee will complete the claim form for actual reimbursement and submit to Accounting for final processing on a monthly basis. Resources provided to the employee to assist in the completion of claims would include travel grids, etc.

In the sections below, employment expenses are reimbursed to the employee using two (2) methods, either a per diem allowance or submitted detailed receipts. In situations where receipts are required, the receipts must be detailed with respect to items purchased, taxes, etc.

Employment expenses not covered by per diems can typically be paid using a HW procurement card if so provided to the employee. An exception would be for mileage expense claims which are reimbursed through the accounts payable process.

Employment expenses cannot be submitted on behalf of another employee. Those individuals must submit a request for reimbursement directly.

SECTION I - Description of Employment Expense Types

Transportation

The mode of transportation chosen should be that which enables the employee to conveniently meet scheduled appointments with the least amount of working time spent travelling.

Air Travel:

Receipts Required	YES
Use of Procurement Card Permitted?	YES

Air travel will be approved based on the least expensive air fare available and booked through a major airline where feasible. The standard for air travel is economy class. Employees opting first class travel will be reimbursed based on economy class fares unless there is a physical or medical accommodation requirement. Employees are encouraged to consider risk of change fees and mitigate them.

Conditions/ Restrictions:

- Air travel should be booked at the advanced purchase excursion rates using the most efficient and direct route. Variances from excursion rates or stop-over costs must be explained and pre-approved prior to travel and submission of the claim;
- Discount and reduced fares shall be selected rather than full economy when these rates are available.

In some circumstances it might be more economical to book the airfare for an extended period to include, for example, a Saturday night stay. Meal and accommodation costs will be reimbursed for this extended stay provided these costs do not exceed the savings in the cost of the air fare (pre-approval required).

Ground Travel:

Receipts Required	YES
Use of Procurement Card Permitted?	YES

Employees may travel by bus, rail, boat, taxi or rental car, whichever is the most economical means of transportation and considered reasonable under the circumstances.

Conditions/ Restrictions:

- First class rail or boat may be booked in situations necessary to obtain sleeping accommodations;
- The use of local public transportation and inter-city buses should be used where practical;
- The use of taxis should be confined to short trips and in situations where the use of public transportation is not feasible.

Employee-Driven Personal Automobile:

Receipts Required	NO
Use of Procurement Card Permitted?	NO

Employees choosing to use their own automobile when other modes of transportation are more feasible must do so on their own time and will only be reimbursed to the maximum of the cost of the equivalent least expensive mode of transportation available.

Conditions/ Restrictions:

- Reimbursement is based on the prescribed rates and conditions detailed in ***Policy #4.02 – Mileage Policy and Personal Vehicles;***
- Employees are responsible for all costs associated with the automobile while conducting HW business, such as repairs, fines, etc.;
- In situations where more than one employee is attending the convention, conference or training seminar/workshop, automobile pooling is encouraged where feasible.

Other:

Receipts Required	YES
Use of Procurement Card Permitted?	YES

Other transportation costs will be reimbursed for such expenses as tolls and parking if incurred and required as a normal part of business activity.

Convention, Conference, Training/Workshop Registration Fees

Receipts Required	YES
Use of Procurement Card Permitted?	YES

Registration fees for the employee will be paid by HW. Any additional costs associated with entertainment, spousal/companion programs, tours or other types of excursions are all considered personal in nature and are not reimbursable expenses. For additional clarity, alcohol or spousal/partner/companion expenses will NOT be covered by HW.

Accommodations

Commercial:

Receipts Required	YES
Use of Procurement Card Permitted?	YES

It is recommended, where possible, the employee reserve the conference hotel or accommodations in close proximity to the event. A per diem rate is offered for those situations where an employee has secured private overnight accommodation (see below).

Conditions/ Restrictions:

- Accommodations should be conveniently located and comfortably equipped;
- The use of luxury accommodations will not be approved;
- Most hotels offer government or corporate rates and employees are responsible to inquire about their existence;

- Expenses are reimbursable based on individual travel for the employee. Additional accommodation expenses for a spouse/partner/companion, or an upgrade of rooms is the responsibility of the employee and not an eligible HW expense;
- Employees shall ensure reservations are cancelled promptly and obtain proof of cancellation in circumstances where travel plans have changed, thus avoiding unnecessary charges;
- Employees shall investigate any overcharges made by the establishment regarding rates or additional charges;
- Employees choosing to travel earlier or later than the duration of the event are doing so at their own personal expense.

Private-Overnight:

Per Diem (receipts not required)
Private accommodations only (see below)
- Daily Rate - $40.00 / night

Use of Procurement Card Permitted? NO

The purpose of the per diem is to provide an adequate allowance in situations where the employee is required to be away overnight and the employee has secured private accommodations in lieu of commercial accommodations.

Meals

Per Diem (receipts not required)
- Breakfast - $13.00 / day
- Lunch - $15.00 / day
- Dinner - $27.00 / day
- Daily Total - $55.00 / day

Use of Procurement Card Permitted? NO

The purpose of the per diem is to provide an adequate allowance for meals for each day. Meals are reimbursed in accordance with the above per diem rates and are inclusive of taxes and gratuities. Prohibiting use of the procurement card is common in per diems systems, as it prevents duplicate payments.

Conditions/ Restrictions:
- Breakfast – the cost of breakfast may be claimed only when the employee has been travelling for more than one hour before the recognized time for the start of the work day;
- Dinner – the cost of the evening meal may be claimed when the employee is not expected to return to his/her residence before 6:30 pm;

- Meal costs will not be reimbursed where the cost is included in the air fare, accommodation costs, or in registration fees for the convention, conference or training seminar/workshop. Itineraries should be attached to the expense claim form;
- Employees are reminded the consumption of alcohol while conducting official HW business is not permitted and is not a reimbursable expense;
- Entertainment/Hospitality expenses are not considered travel expenses, and due to their special nature, are covered in a separate section under this policy;
- Costs associated with a spouse/partner/companion while travelling are personal to the employee and are not a reimbursable expense;

With respect to travel to the United States, per diem rates shall be adjusted based on the currency exchange rate in effect at the time of the travel. With respect to travel to countries other than the United States, currency rates will be considered for each specific circumstance to see if adjustment is warranted.

In situations where an employee is exposed to unusually high costs, claims supported with detailed receipts are permitted provided they are reasonable, justifiable and approved by the appropriate Director. Gratuities with respect to meals are based on the standard of 15%. These types of claims are subject to final approval by the Director of Finance and Customer Service or General Manager. Claims submitted in this manner cannot be used in conjunction with per diem reimbursements and the employee must submit receipts for all meals they are seeking reimbursement for on that particular day. As stated above, use of procurement cards is not permitted.

Personal meal expenses relating to local business will not normally be reimbursed unless the personal meal expenses meet one of the following criteria:

a) Employees are required to work through meal times or two (2) hours beyond normal meal hours on an unscheduled basis;
b) Employees are required to attend formal full-day conferences, seminars, meetings or public hearings, and meals are not provided by the event.

When local meal expenses occur, they will be reimbursed based on submitted detailed receipts to a maximum of the per diem rates listed previously. Consistent with the above, use of procurement cards for local meals is not permitted.

Procurement cards can be used to purchase meals in the following circumstances only:

- During emergency work, based on the criteria detailed in ***Policy #4.03 – Meals – CUPE Local 227***;
- Meals for pre-approved meetings or group training as outlined in Section II below.

Incidental Expenses

Per Diem (receipts not required)
- Daily Rate - $10.00 / night

Use of Procurement Card Permitted? NO

The purpose of the per diem is to cover miscellaneous out-of-pocket expenses such as gratuities (other than meals), dry cleaning, laundry and personal needs. Incidental expenses are only reimbursed in situations where the employee is required to be away overnight and the travel has been pre-approved.

SECTION II - Entertainment and Hospitality Expense

Principles:

1. Entertainment and hospitality expenses must:
    - Contribute to HW's overall business goals, including strengthening business relationships and links;
    - Relate directly to activities that arise from the performance of duties and responsibilities of the employee incurring the expenditure;
    - Be supported by appropriate documentation;
    - Be within the claimant's spending authority;
    - Are confined to the Directors and the General Manager;
    - Be pre-approved by Directors for others.

2. Normally accepted purposes for entertaining and hospitality involve a HW guest or visitor.

3. The most senior person in attendance is to pay and claim the related expenses.

4. Expenses involving only HW employees who can regularly meet during working hours will not normally be considered a reimbursable expense.

5. Expenses relating to social events, such as Christmas/holiday parties and retirement functions that are departmental in nature and not part of an organizational initiative are not considered a reimbursable expense under this policy.

6. Expenses must not exceed departmental budget limits, must be for official purposes, must not be excessive and must be reasonable.

Introduction

There will be business circumstances where it will be appropriate for HW to offer entertainment from time to time to key stakeholders. Entertainment and hospitality occurs when meals and or entertainment is provided that is more than light meals/ refreshments associated with a related business activity. Entertainment and hospitality expenses are defined as expenses incurred for receptions, shows, performances or other functions and events that are not connected to an

employee's travel expenses while conducting business on behalf of HW. Entertainment and hospitality expenses may include:

- Tables at industry or functions where customers and stakeholders are invited;
- Expenditures where the prime purpose is for customers, stakeholders and interest groups;
- Expenditures for business visitors.

An employee who pays for entertainment and hospitality expenses may request reimbursement of such costs by completing an expense claim form, documented in the prescribed form. Supporting documentation for entertainment and hospitality expenses will include:

- Documentation of the business purpose and potential benefits;
- Details of invitees and attendees, including internal, external and accompanying persons;
- Budgeted and actual costs;
- Attaching original detailed receipts (not just the credit card receipt).

The claim for reimbursement of entertainment and hospitality expenses must be approved by the General Manager for payment (HW Board Chair for the General Manager). Completed claim forms must be submitted to Accounting for final processing within two (2) weeks of the function or event. The HW procurement card may be used only in an exceptional circumstance and if approval had been given in advance.

Allowable Entertainment and Hospitality Expenses

The following provides an outline of entertainment and hospitality categories with examples of allowable expenses.

a) **HW sponsored functions or events:**
HW may pay or reimburse expenses related to HW sponsored functions or events such as the annual Christmas dinner or function or events acknowledging long service or awards.

b) **Meals or refreshments served at meetings with external parties:**
HW may pay or reimburse expenses relating to meals or refreshments served during meetings, provided business is actively being conducted during the meeting and/or meal period. Examples of allowable meeting expenses where meals and refreshments are reimbursable would include:

   i. Working breakfast, lunch or dinner meetings with external parties where the meeting could not be reasonably scheduled at another time. Care and judgment should be exercised by management to ensure expenses are not being claimed for meetings of colleagues working together on a regular basis;

   ii. HW sponsored meetings, seminars, workshops, group training or orientation sessions;

iii. HW sponsored meetings of advisory groups, external reviewers or other committees when the group is composed of both HW employees and non-employees.

Costs

The number of people being entertained should be kept to the minimum appropriate to carry out the business purpose of the function or event. Functions should minimize costs but be consistent with the status or rank of the guest(s).

The provision of meals and beverages at functions or events is acceptable in accordance with the standard and maximum per person cost limits in Table 1, which are based on the per diem allowances in Section I, under Meals. The only exception would be for meals or refreshments served at meetings (i.e. training), which are limited to the per diem allowances outlined in Section I under Meals.

Table 1 - Food and Beverage Cost per Person*

Food and Beverages	Standard Cost per Person[1]	Maximum Cost per Person[2]
Breakfast	1.5 [multipled by] meal per diem allowance	1.5 [multipled by] Standard Cost per Person
Lunch	2.0 [multipled by] meal per diem allowance	
Dinner	1.75 [multipled by] meal per diem allowance	
Reception	2.0 [multipled by] Breakfast per diem allowance	

1 - The Standard Cost per Person is the expected meal cost per person to be applied in normal circumstances, particularly for events involving HW personel only.

2 - A cost per person exceeding the Standard Cost per Person and up to the Maximum Cost per Person is to be applied in exceptional circumstances, justified by the type of function or event, the status and nature of the participants and for reasons of courtesy, diplomacy and/or protocol.

* - This table reflects per person hospitality costs that would be provided per meal type over the course of a single day and per serving for refreshments. Per diem allowances are set out in Section I of this policy, under Meals.

A written request stating the purpose of the function or event, the expected cost and justification for the function or event must be submitted to the General Manager (HW Board Chair in the case of the General Manager) for pre-approval. A HW procurement card may be used in exceptional situations as a means of payment, however, such use also requires pre-approval.

Participants:

Entertainment and hospitality expenses will generally be extended to customers, stakeholders and interest groups where there is a perceived business benefit to HW, or in reciprocation of

hospitality where it is perceived as being important to the business relationship. For such functions or events, invited guests would comprise a significant portion of the total attendees, with the participation of HW employees at a level appropriate under the circumstances.

HW will not reimburse expenses for employee spouses/ partners/ accompanying persons.

Alcoholic Beverages:

The standard for entertainment and hospitality is the provision of non-alcoholic beverages. Alcoholic beverages are not an allowable expense at functions or events.

Home Entertaining:

In certain situations, entertainment at a HW employee's home is more desirable and less costly. When a HW employee hosts an allowable event in his/her home, reimbursement may be granted for food, beverages and other expenses directly related to the event. Expenditures in excess of $100 must be pre-approved by the General Manager (HW Board Chair for the General Manager) and expense claims must be supported with detailed, itemized receipts.

Unallowable Expenses:

Certain hospitality and entertainment expenses are not eligible for reimbursement. The following are examples of expenses that are not eligible:

a) Employee Functions:
Expenses incurred in relation to the following events are considered personal in nature and therefore not reimbursable:

   i. Christmas and holiday receptions, parties, luncheons, meals or other gatherings except where sponsored by the HW and available to departmental employees;

   ii. Celebration of birthdays, weddings, births, showers or other similar functions;

   iii. Retirement and farewell receptions, except where sponsored by the HW.

The costs of these functions are the responsibility of the individuals participating, or the personal responsibility of the employee(s) sponsoring the function or event. HW facilities may be used to host such functions or events subject to availability, operational requirements and prior approval of the Director.

December 2, 2003. (Revised: February 27, 2014)

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY:

Original Signed By:
Cathie O'Toole, MBA, CPA, CGA, ICD.D, Director, Corporate Services

Original Signed By:
Reid Campbell, P.Eng., Director, Water Services

Original Signed By:
Susheel Arora, M.A.Sc., P.Eng., Director, Wastewater & Stormwater Services

Original Signed By:
Kenda MacKenzie, P.Eng., Director, Regulatory Services

APPROVED: *Original Signed By:*
Carl D. Yates, M.A.Sc., P.Eng., General Manager

SUBJECT: **Financial and Operations Information Report**

INFORMATION REPORT

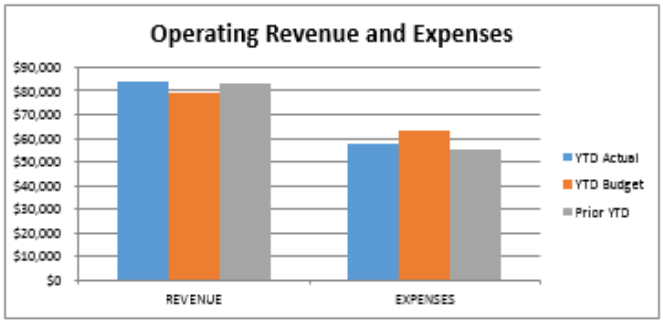
ORIGIN:

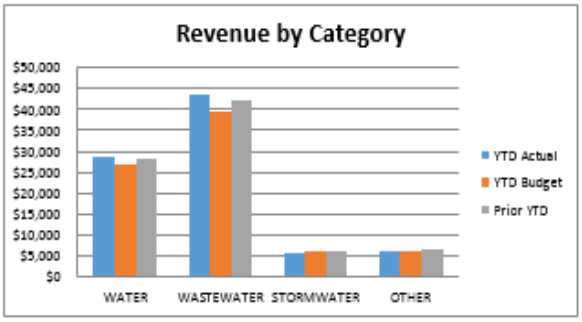
Regular update.

This report provides a high level overview of financial and operational performance for the utility. Financial results are presented first, followed by indicators and statistics for water and wastewater.

FINANCIAL

HALIFAX WATER
UNAUDITED FINANCIAL INFORMATION
APRIL 1/18 - OCTOBER 31/19 (7 MONTHS)
'000



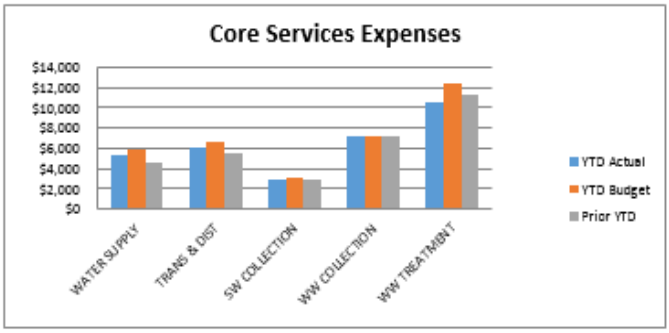


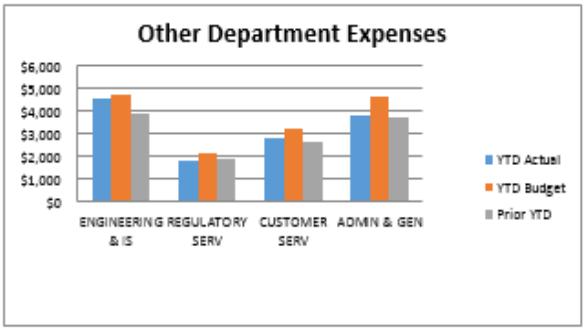
OPERATING REVENUE AND EXPENSES

	YTD Actual	YTD Budget	Prior YTD	% of Budget
REVENUE	$84,340	$78,856	$83,138	62.39%
EXPENSES	$57,765	$63,449	$55,331	53.11%
	$26,575	**$15,407**	**$27,807**	**100.62%**

REVENUE BY CATEGORY

	YTD Actual	YTD Budget	Prior YTD
WATER	$28,642	$26,322	$28,291
WASTEWATER	$43,531	$39,434	$42,180
STORMWATER	$5,879	$6,176	$6,123
OTHER	$6,288	$6,324	$6,545
	$84,340	**$78,856**	**$83,138**



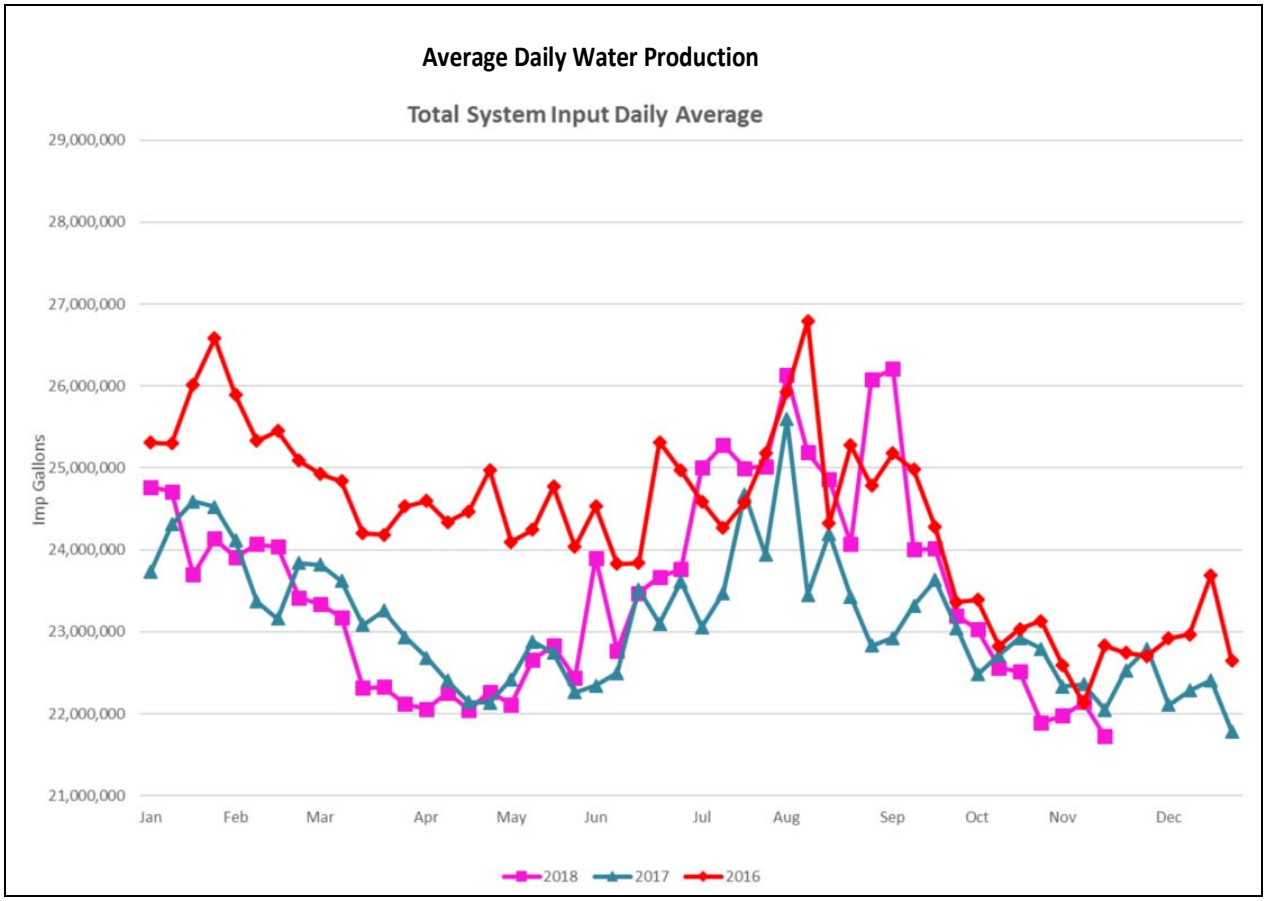


CORE SERVICES EXPENSES

	YTD Actual	YTD Budget	Prior YTD	% of Budget
WATER SUPPLY	$5,238	$5,800	$4,615	52.68%
TRANS & DIST	$6,032	$6,585	$5,519	53.44%
SW COLLECTION	$2,847	$3,078	$2,845	53.35%
WW COLLECTION	$7,151	$7,108	$7,156	58.68%
WW TREATMENT	$10,614	$12,397	$11,355	43.34%
	$31,882	**$34,968**	**$31,491**	**53.18%**

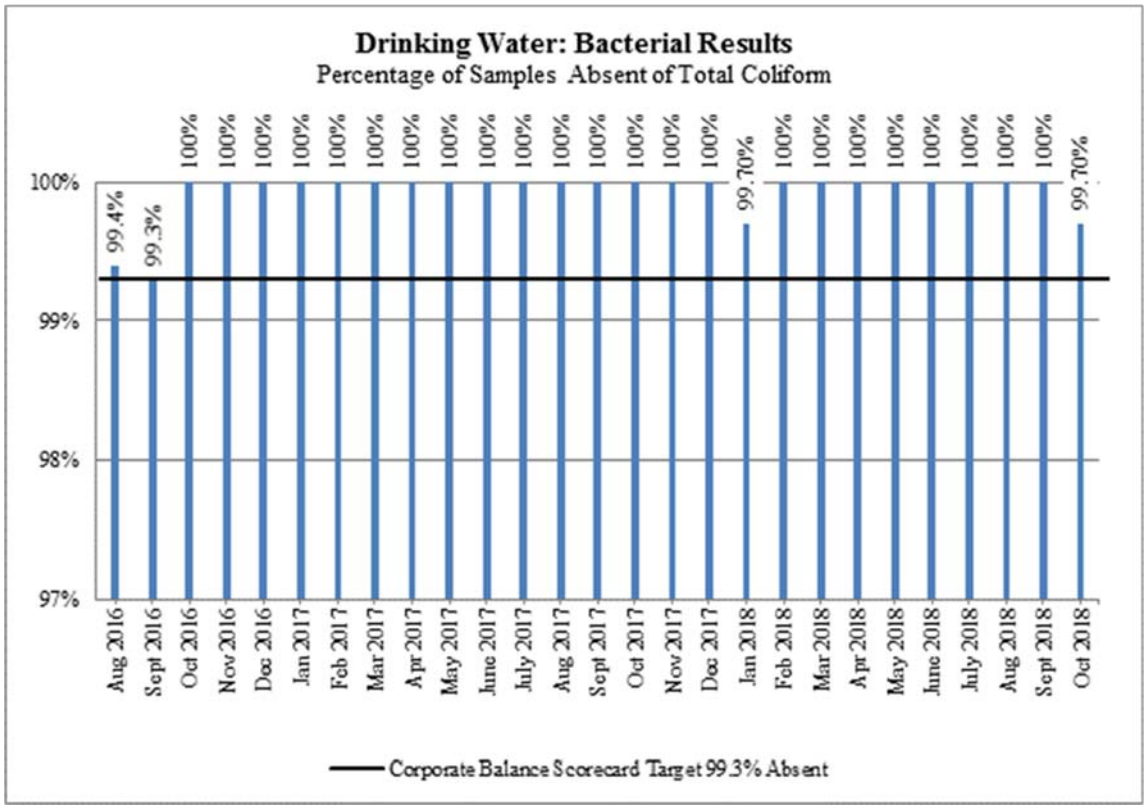
OTHER DEPARTMENT EXPENSES

	YTD Actual	YTD Budget	Prior YTD
ENGINEERING & IS	$4,555	$4,770	$3,883
REGULATORY SERV	$1,861	$2,195	$1,930
CUSTOMER SERV	$2,787	$3,221	$2,670
ADMIN & GEN	$3,810	$4,625	$3,713
	$13,014	**$14,812**	**$12,195**



Regional Water Main Break/Leak Data		
Year	**Total Breaks/Leaks**	**Current 12 Month Rolling Total *(up to Oct. 31, 2018)***
2017/18	206	202
2016/17	216	
2015/16	226	
2014/15	210	
2013/14	213	
Total	**1071**	
Yr. Avg.	**214.2**	

Water Accountability
Losses per Service Connection/Day (International Water Association Standard)
Period Ending September 30, 2018
Real Losses: 202 litres CBS Target: 180



Water Quality Master Plan Objectives 2018-2019 Q2				
Objective	Total Sites	% of Sites Achieving Target	All Sites: 90th Percentile < 15 µg/L	CBSC Awarded Points
Disinfection	64	95%	---	15
Total Trihalomethanes	25	84%	---	7
Haloacetic Acids	21	90%	---	12
Particle Removal	5	93%	---	13
Corrosion Control	69	---	3.96	20
TOTAL				67

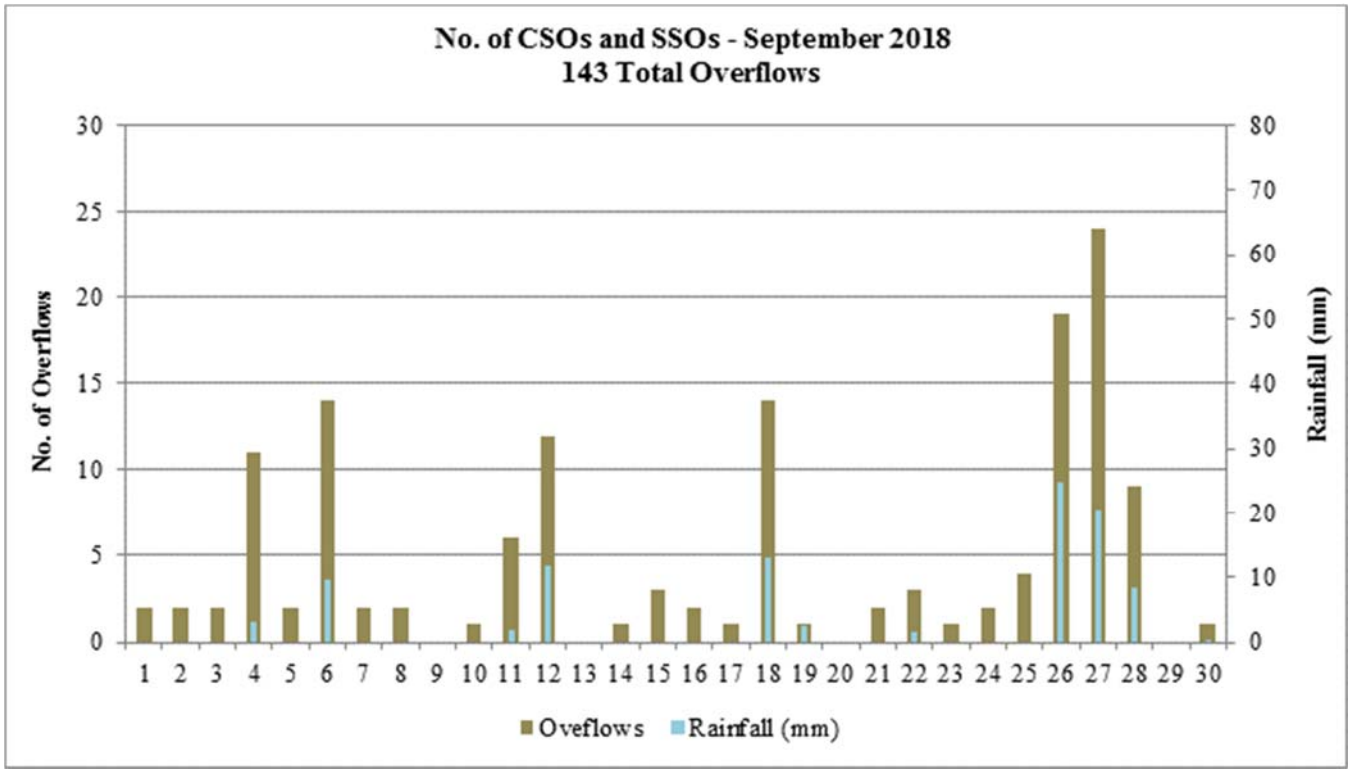
In this report each facility is assessed using monthly or quarterly averages, depending on the averaging period specified in its Approval to Operate.

Wastewater Treatment Facility Compliance Summary
Rolling Averages - August, September and October 2018

Wastewater Treatment Facility	$CBOD_5$ (mg/L)		TSS (mg/L)		E. coli (counts/ 100mL)		pH		Ammonia (mg/L)		Phosphorous (mg/L)		TRC (mg/L)		Dissolved Oxygen (mg/L)		Toxicity	Trend
	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.	NSE Limit	Avg.		
Halifax	50	47	40	27	5000	10688	6-9	6.8	-		-		-		-		Lethal	Continued
Dartmouth	50	59	40	33	5000	17131	6-9	6.9	-		-		-		-		Lethal	Continued
Herring Cove	50	28	40	9	5000	42	6-9	6.9	-		-		-				Not acutely lethal	Continued
Eastern Passage	25	9	25	6	200	53	6-9	6.7	-		-		-		-		Not acutely lethal	Continued
Mill Cove	25	12	25	16	200	16	6-9	6.4	-		-		-		-		Not acutely lethal	Continued
Springfield	20	7	20	4	200	10	6-9	7.0	-		-		-		-		-	Continued
Frame	20	7	20	1	200	10	6-9	7.4	-		-		-		-		-	Continued
Middle Musq.	20	5	20	5	200	10	6-9	7.5	-		-		-		-		-	Continued
Uplands	20	10	20	10	200	63	6-9	6.9	-		-		-		-		-	Continued
Aerotech	5	4	5	1	200	10	6-9	7.4	5.7 W 1.2 S	0.6	0.13	0.10	-		6.5	8.5	Not acutely lethal	Continued
North Preston	10	5	10	4	200	13	6-9	6.8	3	0.4	1.5	0.5	-		-		-	Continued
Lockview	20	5	20	1	200	10	6.5-9	6.9	8.0 S	0.9	1.2 S	0.3	-		-		-	Continued
Steeves (Wellington)	20	5	20	2	200	10	6.5-9	7.3	14.4 S	0.1	1.0 S	0.1	-		-		-	Continued
BLT	15	6	20	12	200	14	6-9	7.2	5 W 3 S	1	3 W 1 S	1	0.02 *	0.10	-		Not acutely lethal	Continued
Avg. of all Facilities	15		9		2006		7.0		0.6		0.4		0.18		8.5			

NOTES & ACRONYMS:
$CBOD_5$ - Carbonaceous 5-Day Biochemical Oxygen Demand
TSS - Total Suspended Solids
* TRC - Total Residual Chlorine - Maxxam can only measure 0.10 mg/L residual; results of 0.1 mg/L are compliant
W / S - Winter / Summer 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., Frame, BLT, Uplands, North Preston, Steeves, Springfield)
Continued - All parameters remain essentially unchanged since the last report
Improved - One or more parameter(s) became compliant since the last report
Declined - One or more parameters(s) became non-compliant since the last report

LEGEND
NSE Compliant
NSE Non-Compliant



NOTES & ACRONYMS: CSO - Combined Sewer Overflow SSO - Sanitary Sewer Overflow

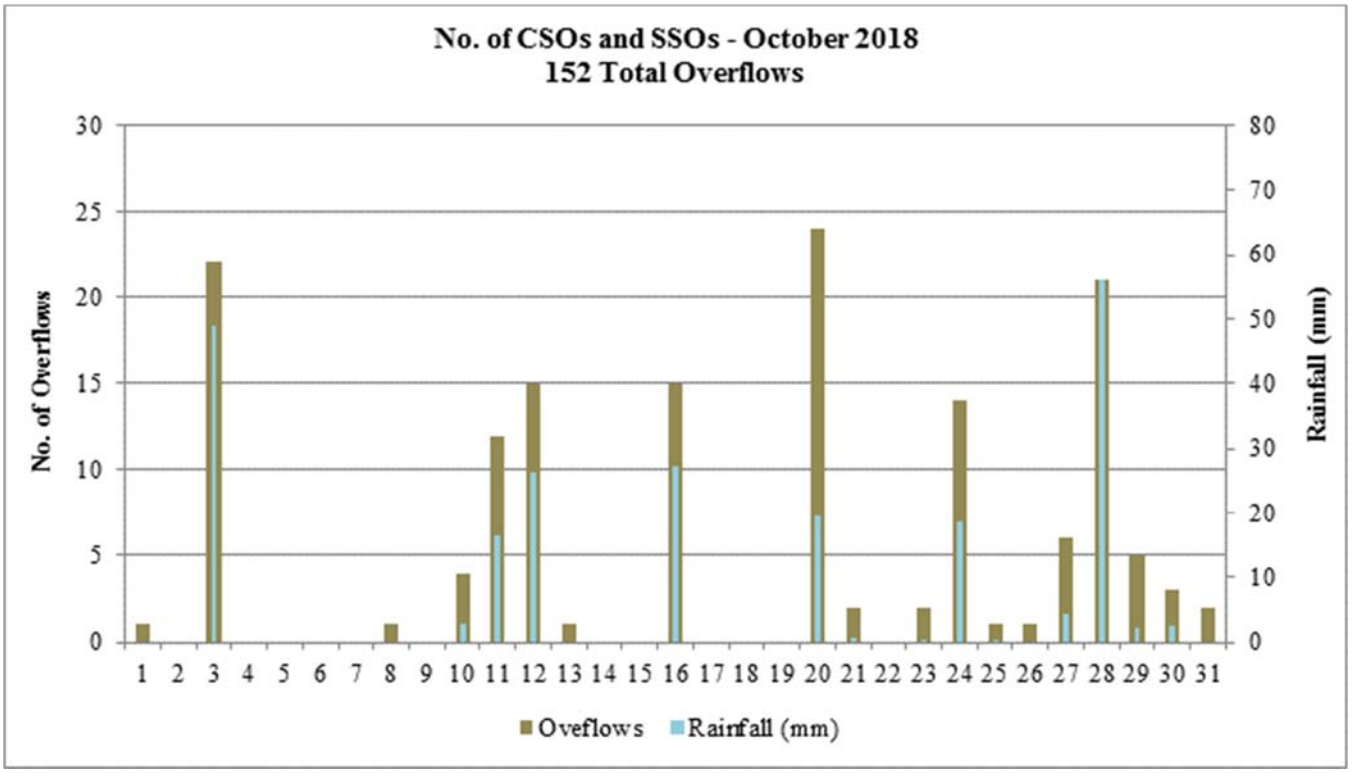
- Rainfall data is from Halifax Water's rain gauge at the Halifax WWTF.
- There were thirty overflows on days when there was no recorded rainfall, as follows:

1. September 24: The CSOs at the Lyle St CSO and Melva St PS & CSO were due to a planned maintenance performed at the Dartmouth WWTF. NSE was made aware prior to the performance of the maintenance.

2. September 25: The CSOs at the Lyle St CSO, Park Ave PS & CSO, Old Ferry Rd PS & CSO and the Melva St CSO occurred as a result of a planned maintenance performed at the Dartmouth WWTF. NSE was made aware prior to the performance of the maintenance.

3. September 30: The CSO at the Duffus St PS was due to rain on the previous days.

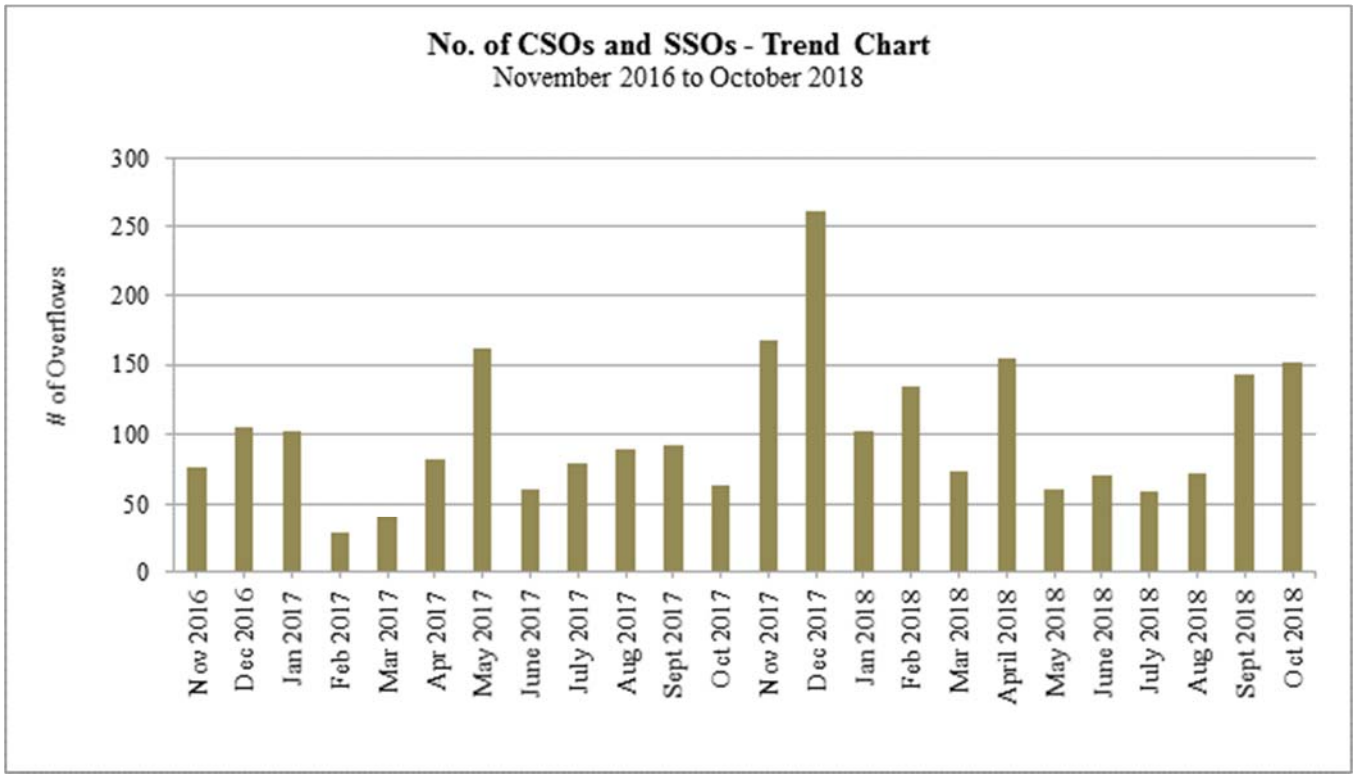
4. Throughout the month, CSOs at the Maritime Museum CSO occurred due to a partial blockage caused by debris. NSE was informed of the issue on October 2, once it was discovered.

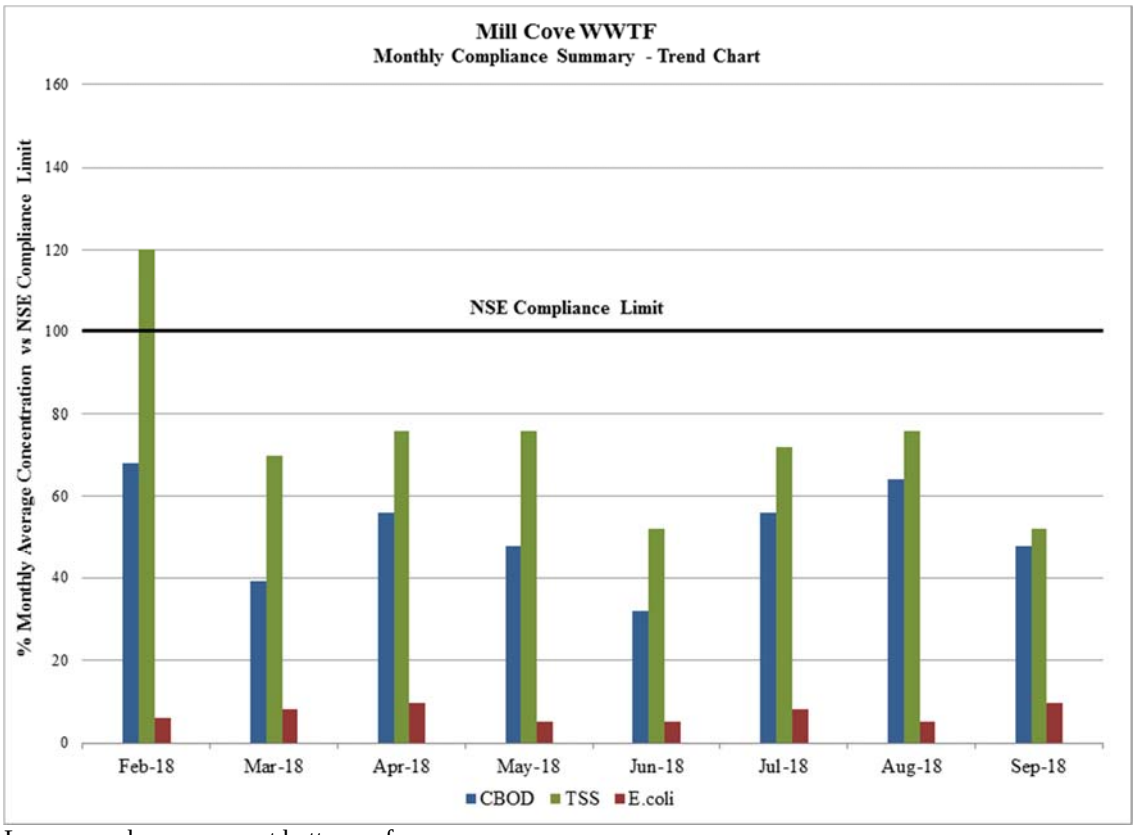


NOTES & ACRONYMS: CSO - Combined Sewer Overflow SSO - Sanitary Sewer Overflow

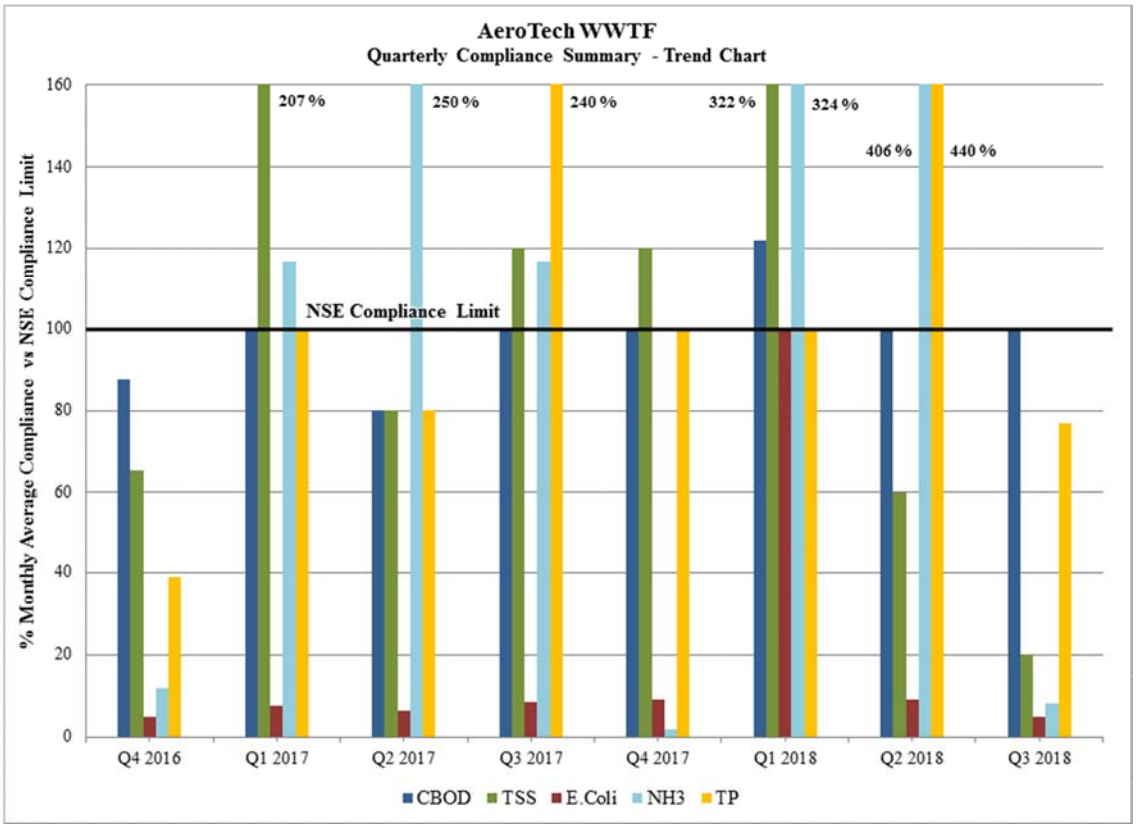
- Rainfall data is from Halifax Water's rain gauge at the Halifax WWTF.
- There were nine overflows on days when there was no recorded rainfall, as follows:

1. October 1: The CSO at the Maritime Museum CSO occurred due to a partial blockage caused by debris. NSE was informed of the issue on October 2, once it was discovered.
2. October 8: The CSO at the Fairview CSO occurred due a partial blockage caused by debris.
3. October 13: The CSO at the Duffus St PS was due to rain on the previous day.
4. October 23: The CSOs at the Maritime Museum CSO and the Sackville St CSO were due to rain on the previous day.
5. October 25: The CSO at the Sackville St CSO was due to rain on the previous day.
6. October 26: The CSO at the Upper Water St CSO was due to rain on the previous day.
7. October 31: The CSO at the Maritime Museum CSO occurred because of a partial blockage caused by debris. The CSO at the Fairview CSO occurred due to a large amount of rain over previous days.

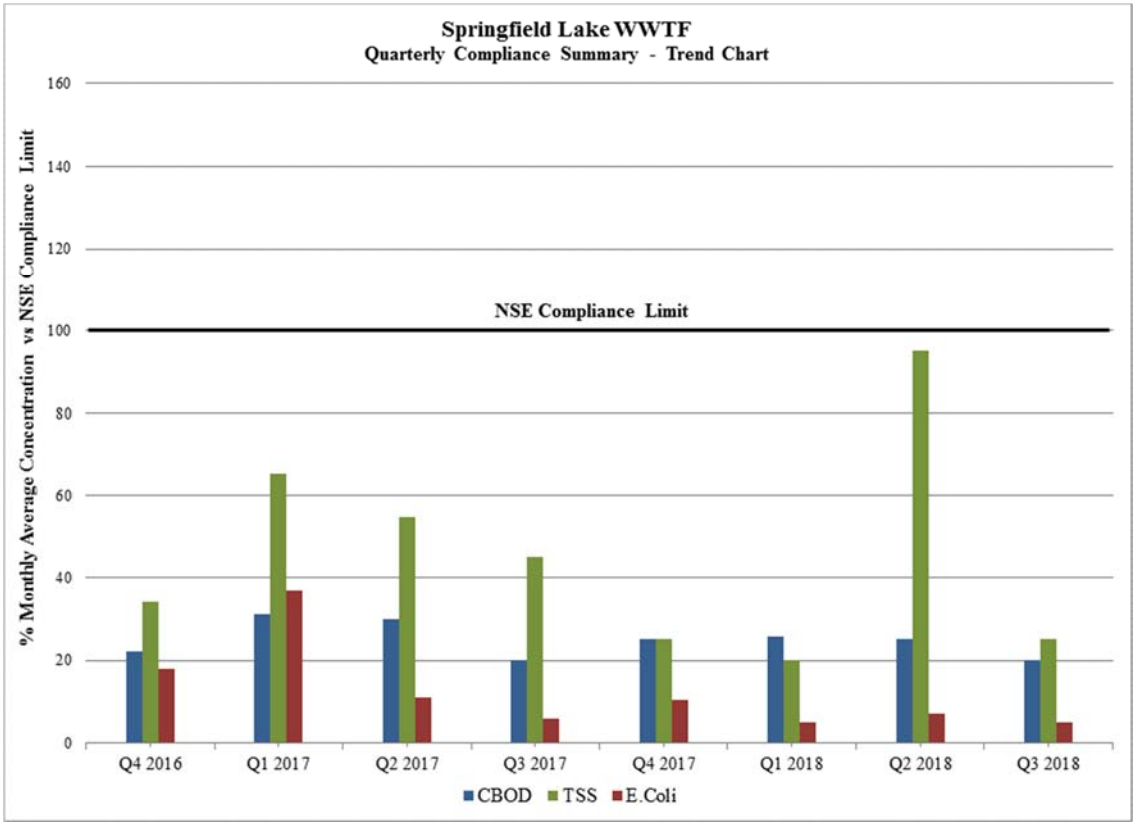




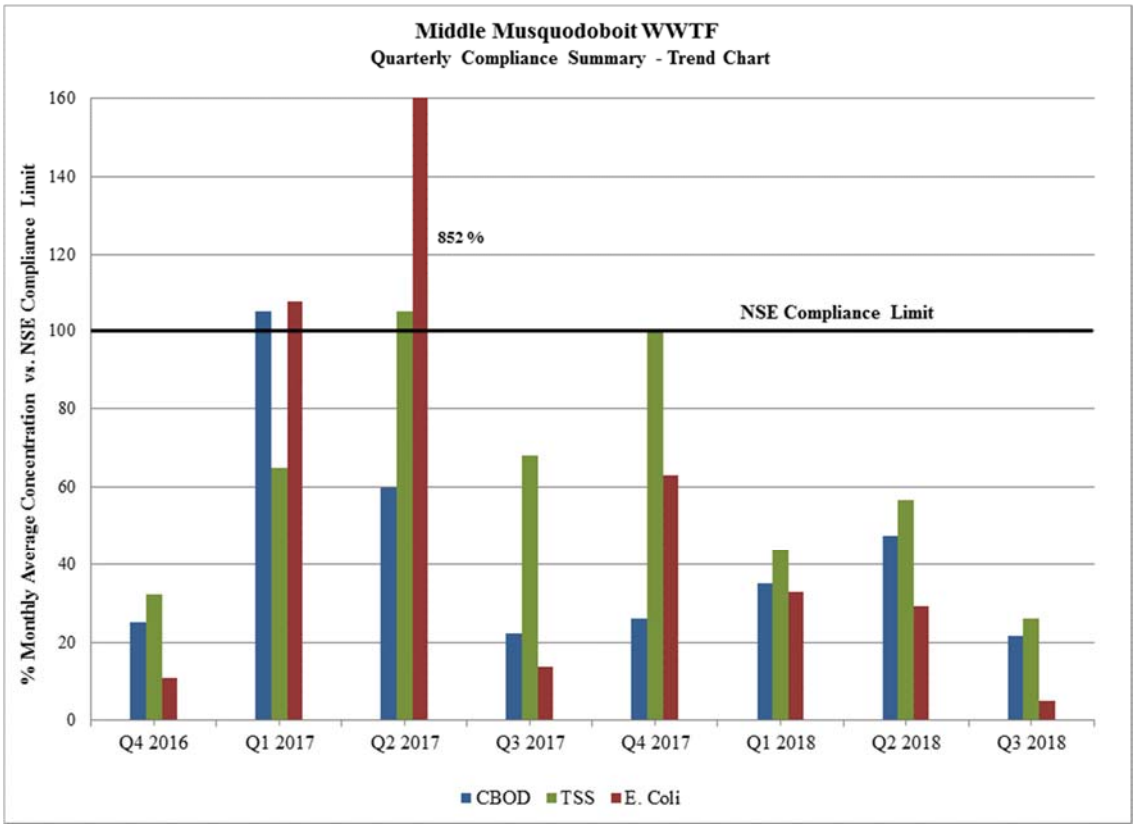
Lower numbers represent better performance



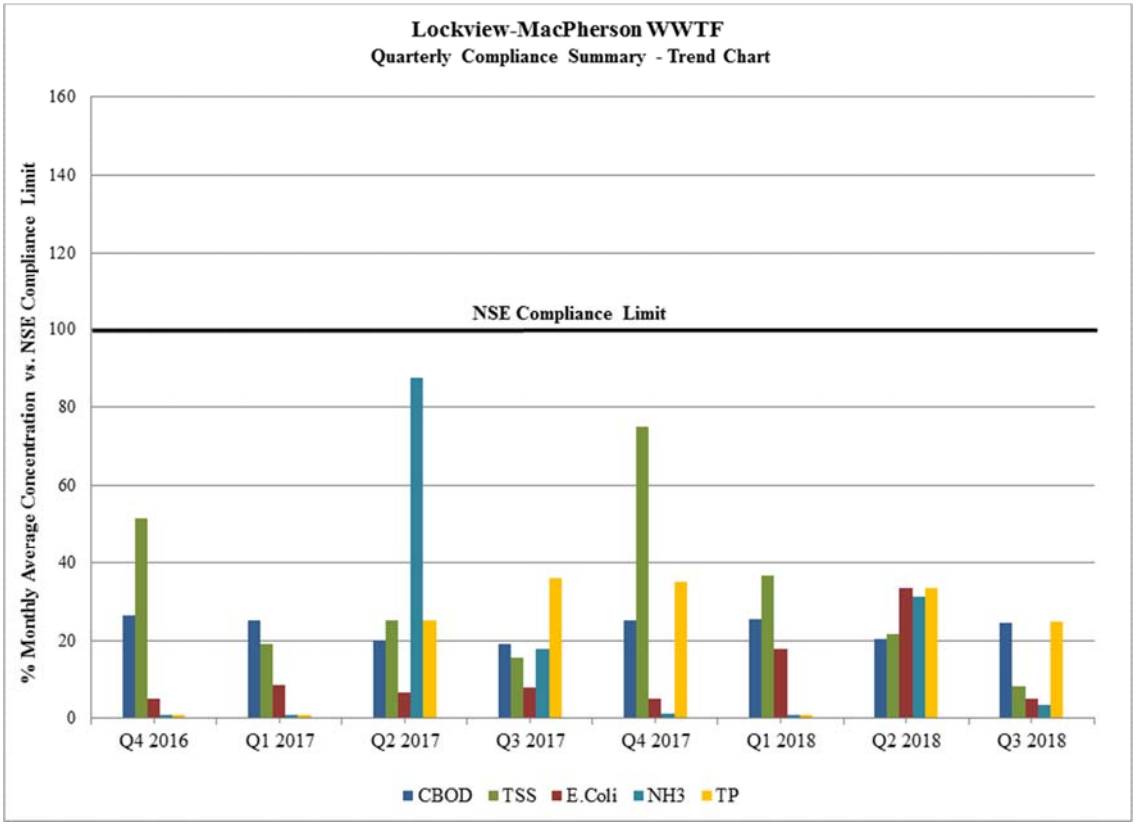
Lower numbers represent better performance.



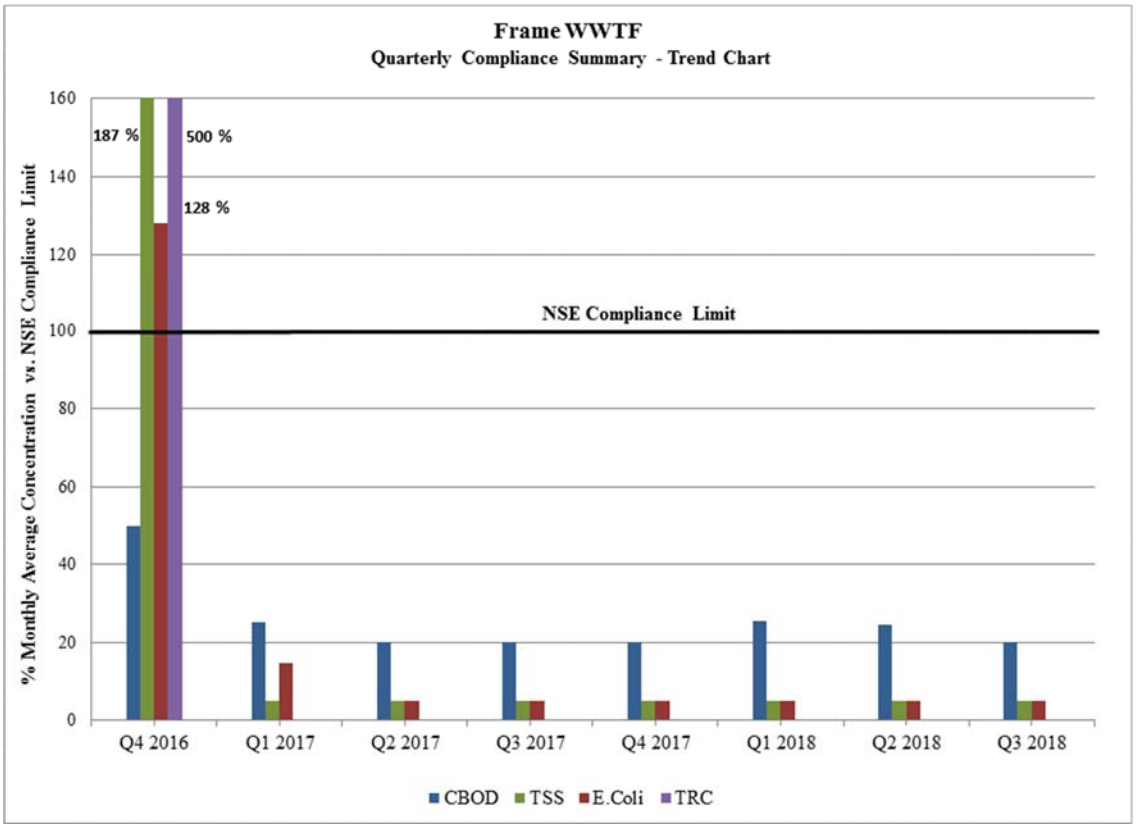
Lower numbers represent better performance.



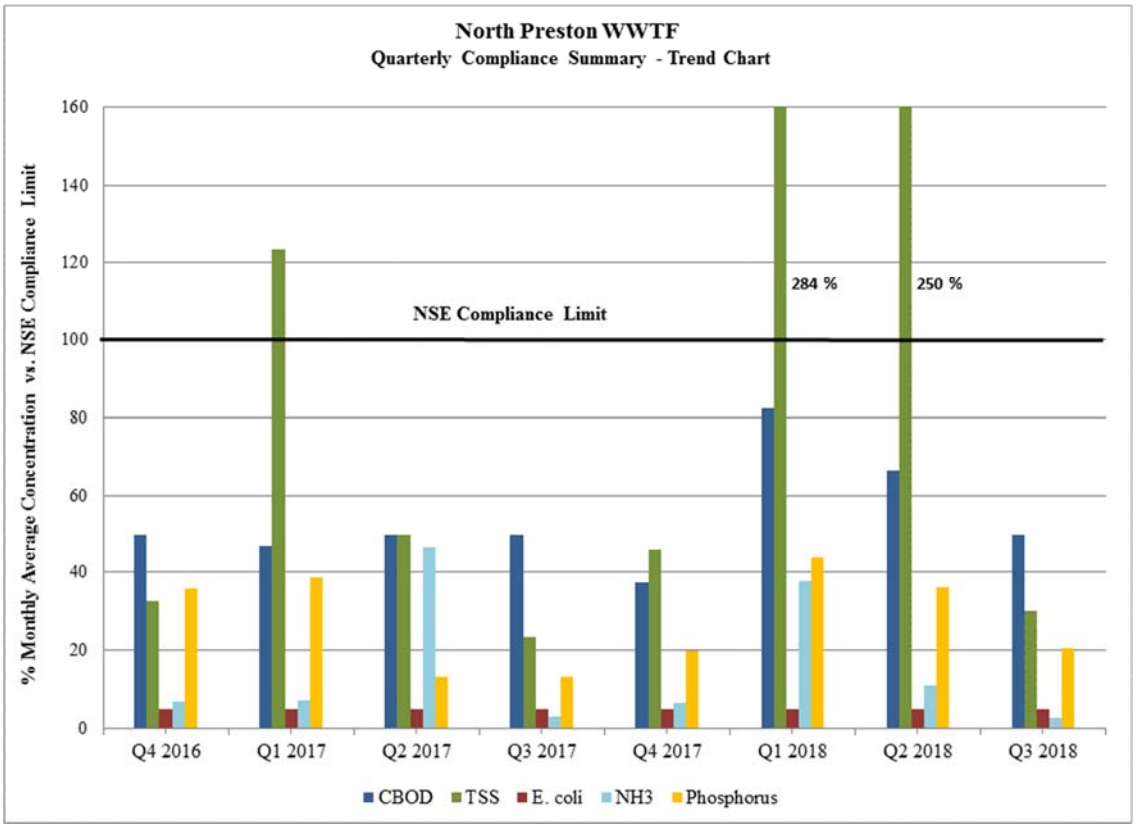
Lower numbers represent better performance.



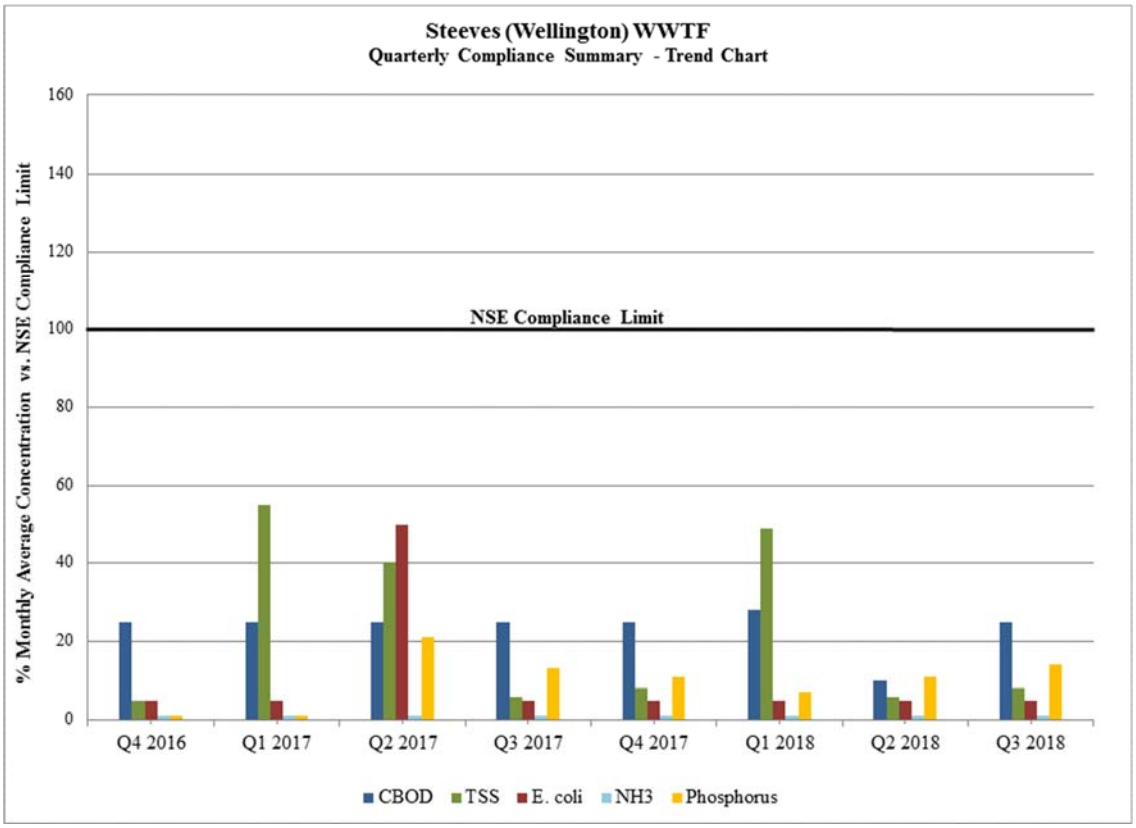
Lower numbers represent better performance



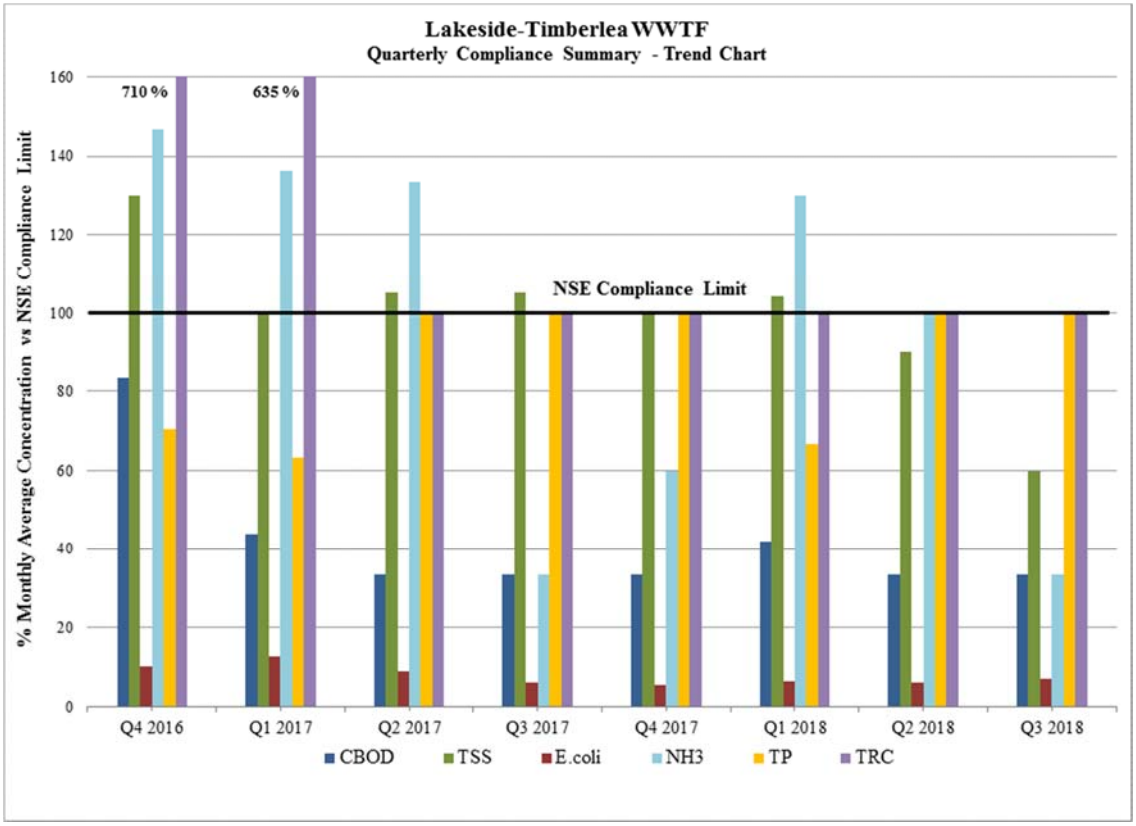
Lower numbers represent better performance.



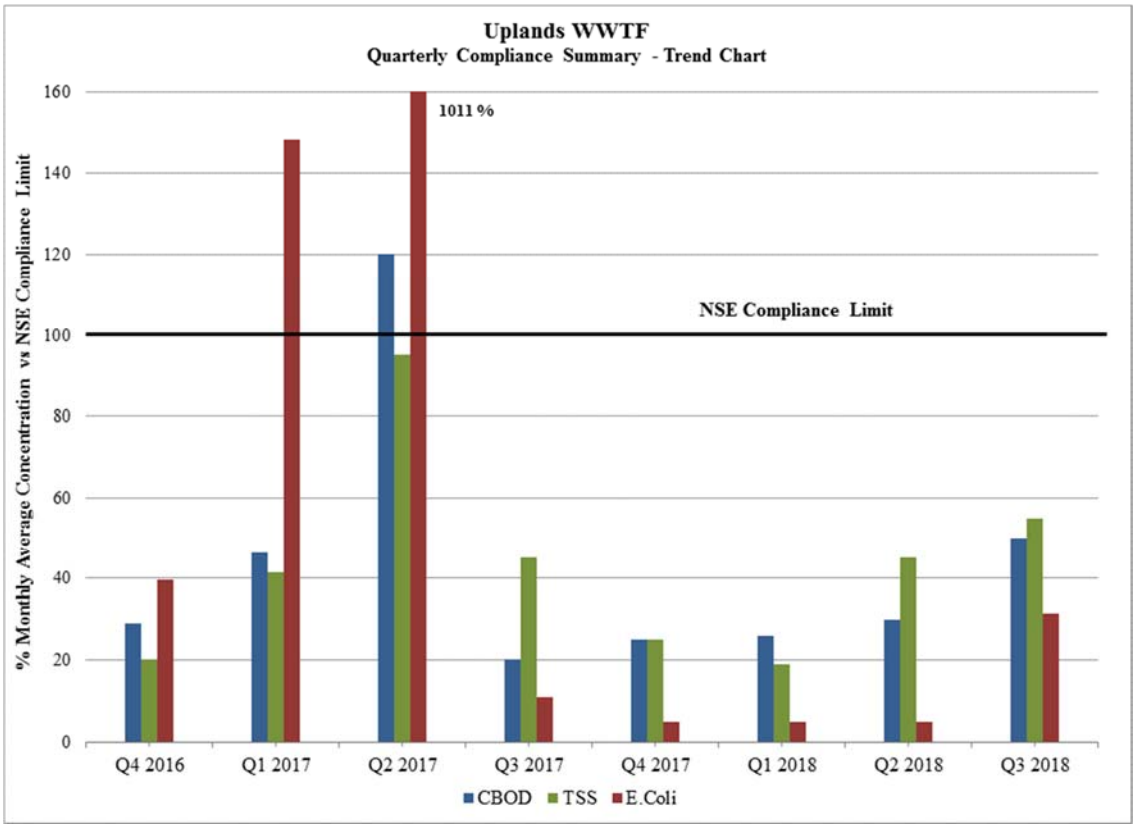
Lower numbers represent better performance.



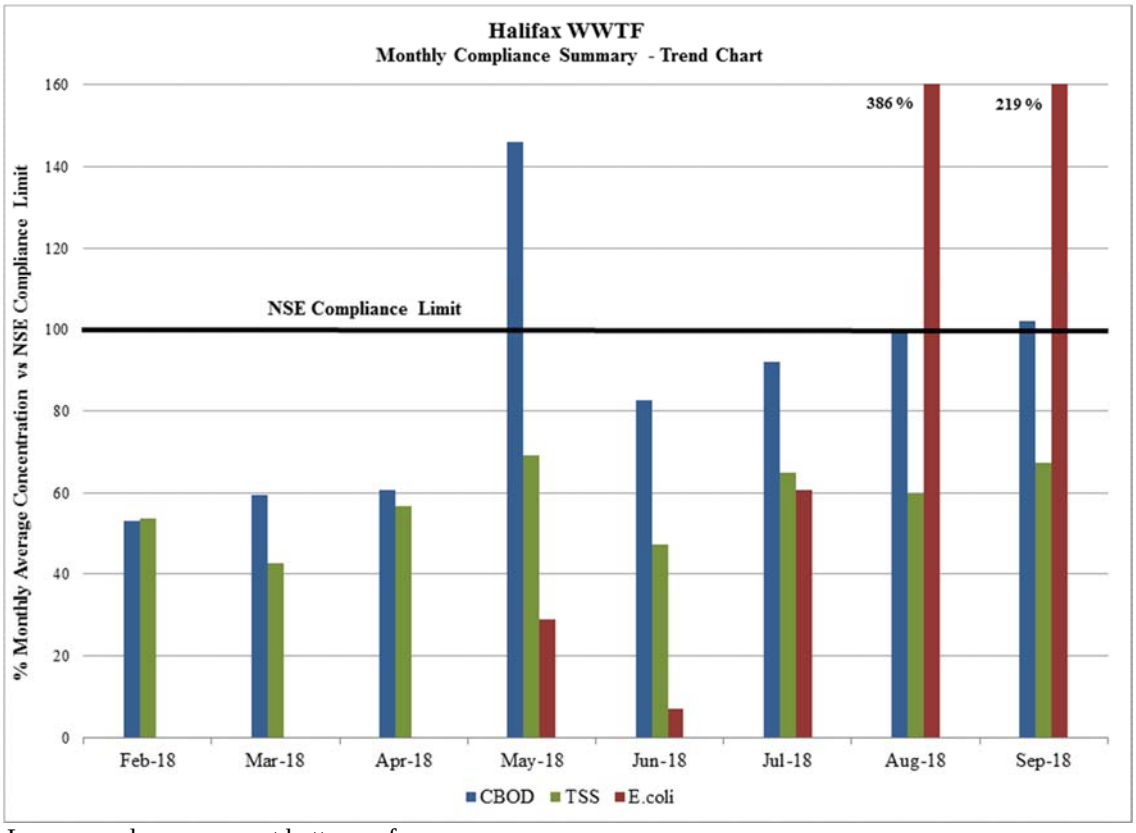
Lower numbers represent better performance.



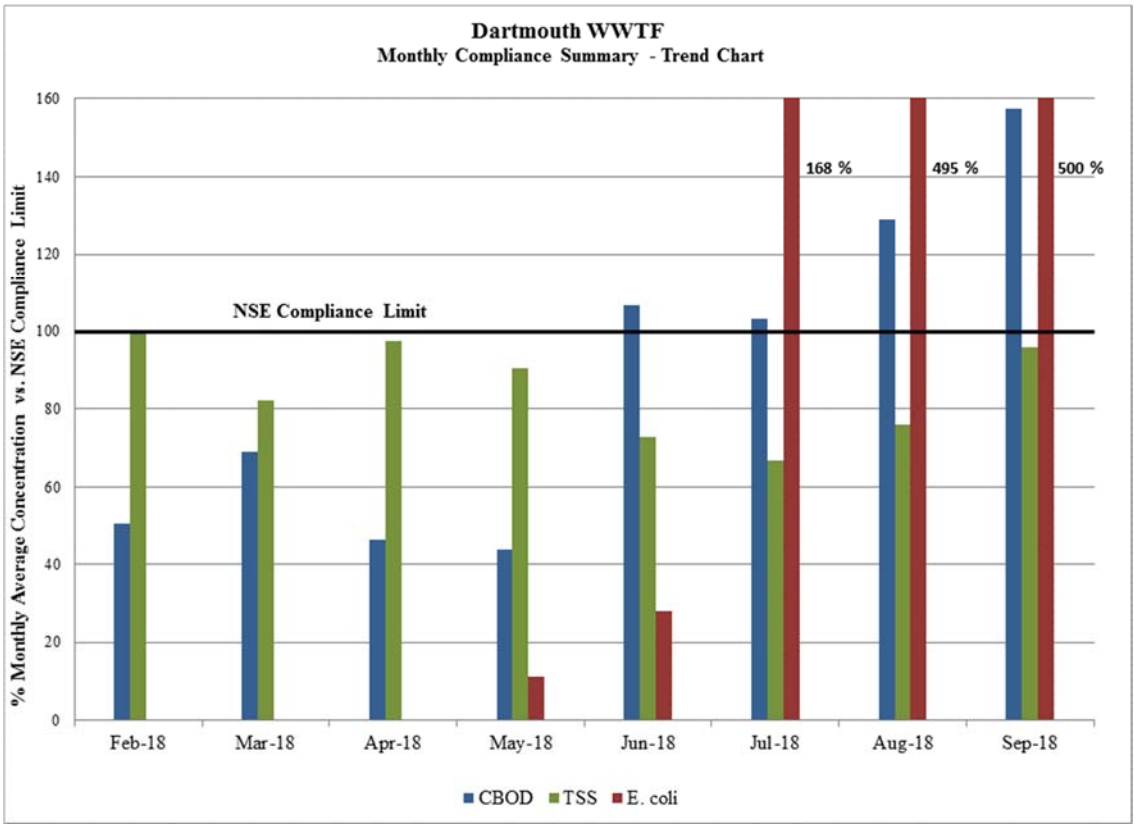
Lower numbers represent better performance.



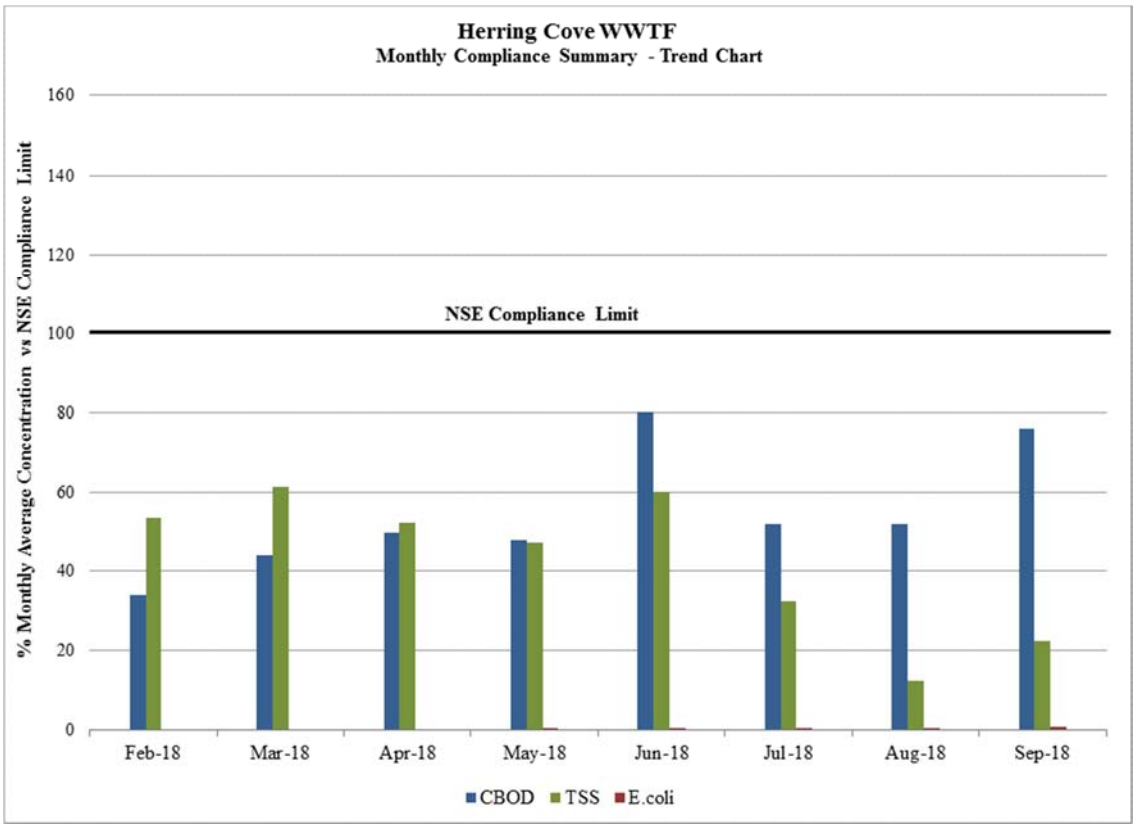
Lower numbers represent better performance



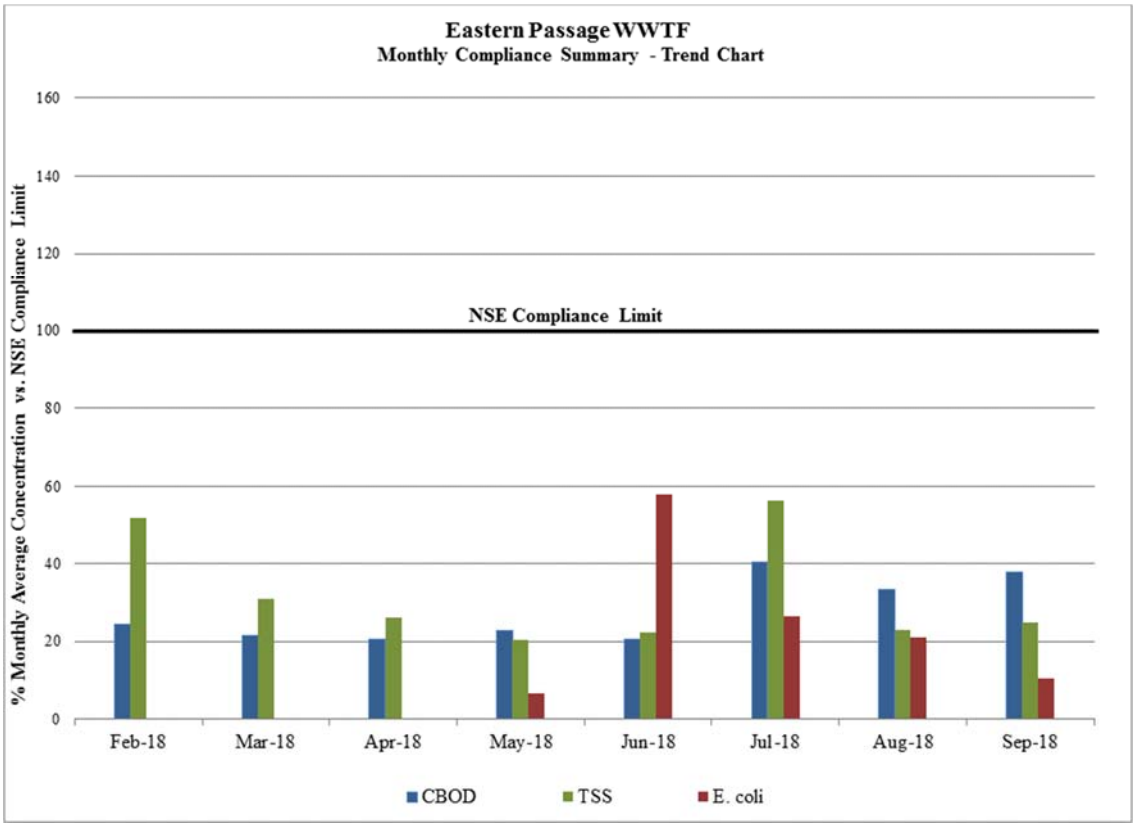
Lower numbers represent better performance.



Lower numbers represent better performance.



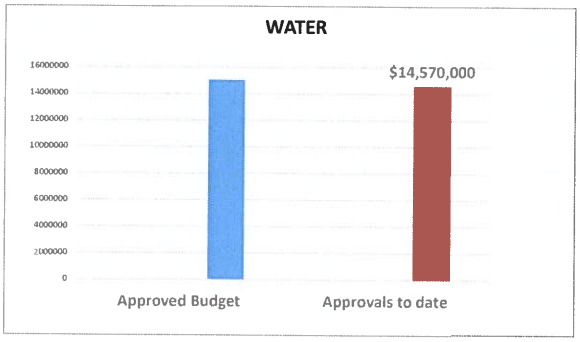
Lower numbers represent better performance

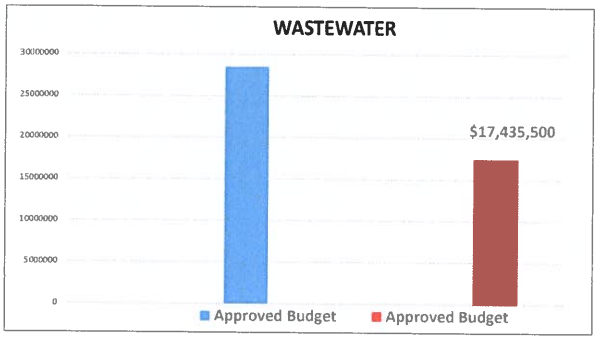

Eastern Passage WWTF
Monthly Compliance Summary - Trend Chart
% Monthly Average Concentration vs. NSE Compliance Limit
160
140
120
100
80
60
40
20
0
NSE Compliance Limit
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
CBOD
TSS
E. coli

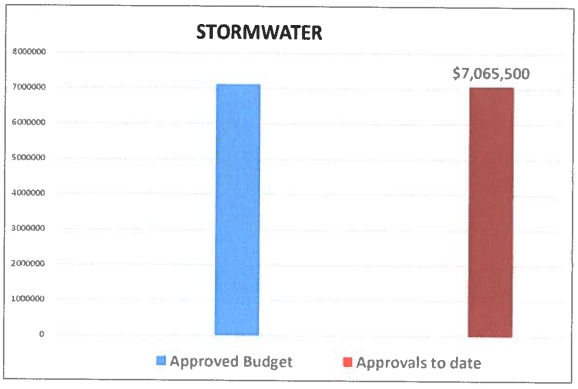
Halifax Water
Halifax Regional Water Commission

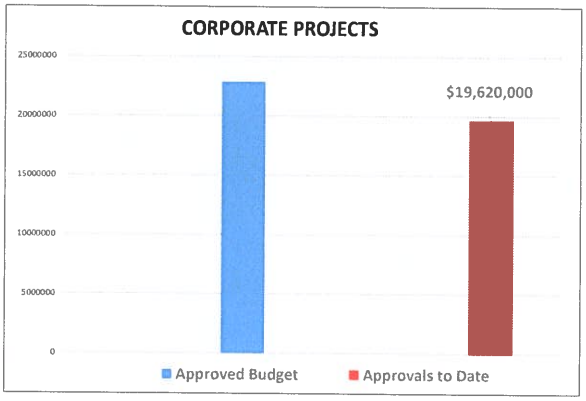
ITEM 2-I
HRWC Board
November 29, 2018

CAPITAL BUDGET APPROVALS TO DATE - 2018 - 2019









WATER

Approved Budget	$15,011,000
Approvals to date	$14,570,000

WASTEWATER

Approved Budget	$28,471,000
Approvals to date	$17,435,500

STORMWATER

Approved Budget	$7,111,000
Approvals to date	$7,065,500

CORPORATE PROJECTS

Approved Budget	$22,855,000
Approvals to date	$19,620,000

Total Budget:	**$73,448,000**
Total To Date:	**$58,691,000**
Total % to date	**80%**

Nov 26/18

Report Approved: **Date**
Jamie Hannam

HRWC Board Report 2- I - 2018/19
Capital Budget Approvals to Date - November 29, 2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Water			
Collection System			
Coburg Road Water - Integrated project/Cogburg Road Wastewater IP	$522,000	$522,000	10/4/2018
Distribution			
Water Distribution Main Renewal Program	$3,500,000	$3,500,000	4/5/2018
Valve Renewals	$125,000	$125,000	4/25/2018
Hydrant Renewals	$75,000	$75,000	4/25/2018
Service Line Renewals	$100,000	$100,000	4/25/2018
Lead Service Line Replacement Program	$600,000	$600,000	4/25/2018
Automated Flushing Program	$20,000	$20,000	2/20/2018
Water Sampling Station Relocation Program	$30,000	$30,000	2/23/2018
Watermain Renewal Stand Alone Projects, Catamaran Road ($220K), Parkmoo Avenue ($246K) and Wright Avenue Watermain ($85K)	$551,000	$0	7/16/2018
North End Feeder Replacement Concept Design Route Selection Funding Increase	$40,000	$0	7/12/2018
Energy			
JD Kline WSP - 2nd Boiler Replacement	$100,000	$100,000	2/6/2018
Lake Major WSP - Process Area HVAC Upgrades			
Equipment			
Miscellaneous Equipment Replacement	$50,000	$50,000	4/23/2018
JD Kline Purchase of Bosun Chair Lifting Safety Equipment	$9,000	$0	8/17/2017
Facilities			
JD Kline WSP Underdrains and Filter Media Replacement Program	$4,100,000	$4,100,000	1/19/2018
JD Kline WSP Raw Water Intake Travelling Screen Replacement Program	$905,000	$905,000	4/17/2018
JD Kline WSP Replace Filter Isolation Gates	$50,000	$50,000	2/23/2018
JD Kline WSP Storage Building Improvements	$76,000	$76,000	2/23/2018
JD Kline WSP Purchase New Boat for Lake sampling	$32,000	$32,000	2/20/2018
JD Kline WSP Replace Existing 4160 Transformer in Low lift Station	$26,000	$26,000	2/23/2018
JD Kline WSP New Grounding Bar for Crane	$17,000	$17,000	3/5/2018
JD Kline WSP Caustic Tank liner Replacements	$26,500	$13,000	10/8/2136
JD Kline WSP Effluent Valve Actuator Replacement Program	$100,000	$100,000	2/20/2018
JD Kline WSP Replace CO2 Feeders	$70,000	$70,000	2/23/2018
JD Kline WSP Upgrades to the Process Wastewater Lagoons	$50,000	$50,000	2/23/2018
JD Kline WSP Replace Turbidity Meters	$50,000	$50,000	2/23/2018
JD Kline WSP Ampgard III to Vacuum Contactor Conversion	$40,000	$40,000	2/20/2018
JD Kline WSP Filter Gallery Electrical Wiring Upgrades	$55,000	$55,000	2/23/2018
JD Kline WSP Pilot Plant PLC Upgrade	$19,000	$19,000	2/20/2018
Lake Major WSP - Replace Raw Water Pumping Station Design	$250,000	$250,000	5/1/2018
Lake Major WSP - Replace Contactors in the MCC	$34,000	$34,000	2/23/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Lake Major WSP - Butterfly valve replacement program	$100,000	$100,000	2/28/2018
Lake Major WSP - Clarifier Repair			
Lake Major WSP - New Alum and Fluoride Tanks	$145,000	$145,000	3/5/2018
Lake Major WSP - Improved access to pipe gallery	$50,000	$50,000	3/5/2018
Lake Major WSP - Purchase H-frame for fall arrest system	$9,000	$9,000	2/23/2018
Lake Major WSP - Pre-Oxidation Strategy Study	$120,000	$120,000	3/5/2018
Lake Major WSP - Yard Drainage and Parking Area Improvements	$160,000	$160,000	2/23/2018
Lake Major WSP - East Lake Dam Repairs	$65,000	$65,000	3/5/2018
Lake Major WSP - Dechlorination System Design	$75,000	$75,000	3/5/2018
Lake Major WSP - Motor Protection Relays	$60,000	$60,000	3/5/2018
Bennery Lake WSP - Access Road Improvements Study Phase Only	$130,000	$130,000	2/20/2018
Bennery Lake WSP - Sludge Valve Replacement Program	$7,000	$7,000	2/20/2018
Bennery Lake WSP - New Low Lift VFD pump Replacement Program	$110,000	$110,000	2/20/2018
Bennery Lake WSP - Manganese Removal Strategy Study	$60,000	$60,000	2/20/2018
NON-URBAN Core WSP			
Miller Lake Small System - Supply Treatment Improvements	$50,000	$50,000	9/13/2018
Miller Lake Small System - Water storage Tank	$16,000	$16,000	
Collins Park WSP - Air Exchange System	$26,000	$26,000	2/20/2018
Lake Lamont - Replace Suction Piping and Chlorine Injection	$72,000	$72,000	6/6/2018
Chlorine Analyzer Replacement Program	$23,000	$23,000	2/20/2018
JD Kline WSP Replace Westinghouse Electrical Panel	$5,000	$5,000	2/23/2018
Bennery Lake WSP - Actuator for Backwash Control Valve	$13,000	$13,000	2/20/2018
Collin's Park WSP Ventilation System Upgrades	$35,000	$0	5/9/2018
Middle Musquodoboit WSP Ventilation System Upgrades	$35,000	$0	6/18/2018
Collin's Park WSP Raw Water Intake Strainer Replacement	$16,000	$16,000	5/1/2018
Aerotech Park Fire Flow and Distribution System Assessment Study	$60,000	$0	9/7/2018
Facility			
Geizer 158 Reservoir - Mechanical Mixer	$50,000	$0	10/2/2018
Land			
Watershed Land Acquisition			
SCADA & Other Equipment			
Purchase Hand held water quality Sonde equipment	$17,000	$0	10/10/2018
DND Facility SCADA Installation	$50,000	$0	10/10/2018
Security			
Security Upgrades			
Structures			
Beaver Bank Reservoir Meter Upgrade	$35,000	$35,000	2/20/2018
Bedford South (Hemlock) Reservoir CCC	$250,000	$250,000	4/17/2018
Bluewater PRV Chamber CSE Retrofit	$76,000	$76,000	2/20/2018
Brunello Booster Station - Pump Control Modifications	$27,000	$27,000	2/20/2018
Cowie Hill Reservoir Rehabilitation	$100,000	$100,000	10/10/2018
Eaglewood Pumping Station - Upgrades	$9,000	$9,000	2/20/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Golf View Drive PRV Chamber Rehabilitation	$18,000	$18,000	2/20/2018
Leiblin Drive Booster Station - Replacement of Diesel Fire Pump	$510,000	$395,000	9/27/2018
Lyle Street Pumping Station Upgrades	$235,000	$235,000	3/5/2018
Main Control Chamber Annubar Meter Replacement	$55,000	$55,000	3/5/2018
Parkdale Booster Station Decommissioning	$22,000	$22,000	2/23/2018
Ritcey Crescent PRV - New Meter	$11,000	$11,000	2/23/2018
Robie 2 Emergency Pump - Pump Control Review and Optimization	$105,000	$105,000	2/23/2018
Sampson and Stokil Reservoirs Rechlorination System	$390,000	$390,000	4/23/2018
Steel Reservoir Inspection and Assessment Study	$175,000	$175,000	2/20/2018
Bulk Fill Service Connection for the Cowie Hill Operations Depot	$51,000	$51,000	2/20/2018
Port Wallace Transmission Main Caledonia Section	$120,000	$120,000	5/23/2018
Macdonald PRV Chamber - Confined Space Entry Retrofit	$110,000	$0	3/5/2018
AMI - SAP Integration additional Funding	$220,000	$0	2/26/2018
Windsor Junction Road Railway Crossing - Watermain Lining	$100,000	$0	9/21/2018
Blowers and Grafton Intersection Watermain Replacement	$130,000	$0	10/26/2018
Meter Replacements - South Park Street and Bilby Street	$27,000	$0	9/24/2018
Transmission			
Critical Valve Replacement Program - Gottingen Street	$175,000	$175,000	9/14/2018
Bedford West CCC - Various Phases			
Regional Development Charge Studies			
Treatment Facilities			
Leiblin Drive Booster Station - Replacement of Diesel Fire Pump	$55,000	$0	11/1/2018
Lake Major - Dedicated Service Water Pumping Project	$135,000	$0	9/14/2018
JD Kline Raw Water Intake Traveling Screen Replacement Program	$1,230,000	$0	9/27/2018
Structure			
Concrete Gunite Reservoir Assessment	$110,000	$0	4/5/2018
Governor's Brook Phase 3 oversizing	$116,000	$0	4/10/2018
AMI - SAP Integration additional	$20,000	$0	4/5/2018
North End Feeder Replacement Concept Design Route Selection	$75,000	$0	4/6/2018
JD Kline Access Road Bridge Replacement Funding Increase (2015/16 CB)	$60,000	$0	6/20/2018
Steel Reservoir Inspection & Assessment Study Funding Increase	$30,000	$0	7/17/2018
East Harbour Solutions SCADA Redesign and Upgrade	$60,000	$0	9/7/2018
Geizer 158 Reservoir Perimeter Drainage	$93,500	$0	7/29/2137
Geizer 158 Reservoir Mechanical Mixer	$50,000	$0	
Geizer 158 Reservoir Tank Shark Pilot	$40,000	$0	4/23/2018
Water Total	**$18,207,000**	**$14,570,000**	
Wastewater			
Collection System			
Regional Development Charge Studies			
Integrated Wastewater Projects - Program	$1,915,000	$1,915,000	4/5/2018
Wastewater System - Trenchless Rehabilitation Program	$1,490,000	$1,490,000	4/18/2018
Fairview Clayton Park Bridgeview I/I Reduction	$2,880,000	$2,880,000	4/18/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Inglis Street Sewer/Pier A PS Ventilation/Odour Control Modifications	$80,000	$80,000	11/29/2018
Wanda Lane Sanitary Sewer Replacement			
Auburn Avenue Sanitary Sewer	$25,000	$25,000	5/4/2018
Glendale Drive to Sackville Trunk Sewer - System Upgrade	$500,000	$400,000	4/16/2018
Lateral Replacements WW (non tree roots)	$1,650,000	$1,650,000	4/23/2018
Lateral Replacements WW (tree roots)	$520,000	$520,000	4/23/2018
Wet weather management program	$225,000	$225,000	6/4/2018
Bedford West Collection System CCC			
Young Street Sewer Separation	$100,000	$100,000	7/17/2018
Kempt Road Phase 1 - Sewer Separation			
Bayer's Road Phase 1 Sewer Separation	$75,000	$75,000	7/17/2018
Joseph Howe Drive Sewer Separation	$75,000	$75,000	7/17/2018
Romans Federal Avenues Sewer Separation	$170,000	$170,000	7/17/2018
Gottingen/North Flow Split - Alteration to Combined Sewer	$50,000	$50,000	3/5/2018
Wastewater Lateral Lining	$2,100,000	$2,100,000	5/2/2018
High Street WW IP 2018/19 and High Street SW IP 2018/19	$26,000	$0	5/1/2018
Glendale Drive to Sackville Trunk Sewer WWS Upgrade Funding Increase	$246,000	$0	6/5/2018
Coronation Wastewater Lateral Replacement	$100,000	$0	6/18/2018
WW System - Trenchless Rehabilitation Program Phase 2	$248,000	$0	6/29/2018
Bissett Forcemain Replacement - AC Pipe Removal - Funding Increase	$64,000	$64,000	10/31/2018
Manhole Renewals WW East/West/Central	$25,000	$25,000	4/23/2018
Wastewater System Fairview, Clayton Park and BridgeviewInflow/Infiltration Phase 2	$244,000	$0	6/29/2018
Dartmouth WWTF - CN Driveway Crossing Renewal	$17,200	$0	11/27/2018
Catamaran Drive WW IP 2018/19	$18,000	$0	11/27/2018
Energy			
Pump Station HVAC Retro-Commissioning Program			
HHSP - BAS-HVAC Recommissioning	$50,000	$50,000	11/13/2018
Dartmouth WWTF - UV Channel/Densadeg Gate Actuators	$155,000	$155,000	10/18/2018
Halifax WWTF - UV Channel/Densadeg Gate Actuators	$120,000	$120,000	1/31/2018
Halifax Harbour Solutions Plants (HHSPS) Main Wastewater Influent GatActuators	$80,000	$0	1/31/2018
Cogswell District Energy System - Engineering Consulting Services	$60,000	$0	7/18/2018
Wastewater Pump Stations - Nova Scotia Power Meter Relocations	$50,000	$50,000	2/12/2018
Equipment			
Miscellaneous Equipment Replacement	$70,000	$70,000	4/23/2018
I&I Reduction (SIR)Program Flow Meters and Related Equipment	$25,000	$25,000	4/23/2018
Facilities			
HHSP Surge Suppression Investigation	$30,000	$0	9/6/2018
Facility			
Roach's Pond Pumping Station - Trash Rack	$30,000	$0	10/2/2018
Emergency Pumping Station Pump Replacements - Jamieson Street	$79,600	$0	10/2/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Bayers Lake Phase V Wastewater Pumping Station	$198,000	$0	10/5/2018
Emergency Pumping Station Pump Replacements Atlantic School offheology Pumping Station	$55,000	$0	10/29/2018
Emergency Pumping Station Pump Replacements - Herring Cove	$73,000	$0	10/2/2018
Fleet			
AWWTF Sludge Trailer Funding	$215,000	$0	9/21/2018
Forcemains			
Pipes			
Mill Cove WWTF Emergency Overflow Outfall Pipe Replacement	$2,090	$0	7/17/2018
Security			
Security Upgrade Program			
Structures			
Emergency Pumping Station Pump Replacements	$250,000	$250,000	8/28/2018
Wastewater Pumping Station Component Replacement Program - East Region	$200,000	$200,000	7/23/2018
Wastewater Pumping Station Component Replacement Program - Central Region	$150,000	$150,000	9/21/2018
Weybridge Lane Pump Station CCC	$5,060,000	$506,000	
Bissett PS Component Upgrade			
Shipyard Road PS	$915,000	$915,000	6/21/2018
Windmill Road PS Replacement - used for Northwest Arm Sewer Rehab and $90K for the Roach's Pump Station Catwalk/Stair Replacement Project and $246,000 was used for the Glendale Drive to Sackville Drive Trunk Sewer	$1,455,000	$1,455,000	
PS Control Panel/Electrical Replacement	$100,000	$100,000	5/14/2018
CSO Upgrade Program	$80,000	$80,000	10/22/2018
Halifax CSO Surveying	$45,000	$45,000	3/22/2018
Emergency Pumping Station Pump Replacements - Mann Street	$250,000	$20,000	9/21/2018
Emergency Pumping Station Pump Replacements - Duffus Street	$250,000	$72,500	9/21/2018
Roach's Pond PS Component Upgrade	$275,000	$275,000	11/29/2018
Treatment Facilities			
Plant Optimization Audit Program	$125,000	$125,000	5/22/2018
Emergency Wastewater Treatment Facility equipment replacements			
HWWTF - Duct Work Replacements	$50,000	$50,000	5/9/2018
HWWTF - New Raw Water Pumps			
DWWTF - Duct Work Replacement	$25,000	$25,000	5/9/2018
HCWWTF - Duct Work Replacement Program	$25,000	$25,000	5/9/2018
HCWWTF - Densadeg Flow Meters	$20,000	$20,000	5/11/2018
Mill Cove WWTF - Civil Asset Condition Assessment			
Mill Cove WWTF - Compactor/Conveyor Replacement	$375,000	$300,000	5/25/2018
Mill Cove WWTF - RAS Piping Replacement	$200,000	$200,000	3/5/2018
Mill Cove WWTF - Process Upgrade Conceptual Design			
Eastern Passage WWTF - Process Upgrade Program			
Eastern Passage WWTF - Secondary Launder Covers	$150,000	$150,000	
Aerotech WWTF - Process Upgrade Program			
Timberlea WWTF - Asset Renewal Program			

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Uplands WWTF - New Screening Facility			
Fall River/Lockview WWTF Waterline Replacement	$25,000	$25,000	6/21/2018
Fall River/Lockview WWTF Driveway Replacement	$38,000	$38,000	10/1/2018
Biosolids Processing Facility - Asset Renewal Program	$95,000	$95,000	7/25/2018
Biosolids Processing Facility - Dryer Bypass Conveyor			
Timberlea Wastewater Treatment Facility Rotating Biological Contactor (RBC) Repairs	$120,000	$0	2/23/2018
Mill Cove WWTF Laboratory Dishwasher Replacement	$12,000	$0	9/14/2018
HWWTF New Air Compressors	$70,000	$0	10/22/2018
Halifax Harbour Solutions Plants (HHSPs) & Eastern Passage WWTF Surge Protective Device (SPD) Installation	$150,000	$0	3/29/2018
Trunk Sewer			
Kearney Lake Road Wastewater Sewer Upgrades			
Bedford to Halifax Trunk Sewer Upgrade			
Northwest Arm Sewer Rehabilitation Additional work	$119,702	$0	5/29/2018
Structure			
Bissett Forcemain Replacement - AC Pipe Removal	$240,000	$0	10/30/2136
Mill Cove WWTF - PS Siding and Asphalt	$50,000	$0	4/27/2018
Roach's Pump Station Catwalk Stair Replacement	$90,000	$0	5/30/2018
Coburg Road WW IP 2018/19	$119,000	$0	6/26/2018
Emergency Pumping Station Pump Replacements - Greenwood Ave and Village Road WW Pumping Station	$14,000	$0	6/28/2028
South Park St. WW IP 2018	$10,000	$0	9/6/2018
Coburg Road @ Robie Street WW IP 2018/19 and Coburg Road Robie Street SW IP 18/19	$177,000	$0	8/14/2018
Emergency Pumping Station Pump Replacements -Fish Hatchery Wastewater PS WW Pumping Station	$28,000	$0	8/28/2018
Emergency Pumping Station Pump Replacement - Pier A Wastewater Pumping Station	$73,000	$0	9/6/2018
Main Street Sewer Main Replacement - Design	$10,000	$0	11/16/2018
Beaver Crescent PS Forcemain Replacement Design	$10,000	$0	11/16/2018
Woodcrest Avenue WW IP (18/19)	$12,000	$0	11/21/2018
Sinclair Street/Lorne Avenue WW IP 18/19	$31,000	$0	11/21/2018
Ridgeview Drive WW IP 18/19	$7,000	$0	11/21/2018
Wastewater Total	**$25,636,592**	**$17,435,500**	
Stormwater			
Collection System			
Doyle Street Storm Sewer - Phase 2	$311,000	$0	11/2/2018
Homecrest Terrace SW IP 18/19	$22,000	$0	11/27/2018
Culverts/Ditches			
Driveway Culvert Replacements	$795,000	$795,000	7/25/2018
Street Specific Culvert Replacements:			
St. Margarets Bay Road 2797	$82,000	$82,000	10/18/2018
Lake Major Road 190	$77,000	$54,500	8/13/2018
Clarence St near civic 4	$80,000	$80,000	9/13/2018
Windgate Dr near civic 107	$80,000	$80,000	8/13/2018
Nottingham Drive near civic 53	$90,000	$90,000	6/6/2018
Penny Lane at Windsor Drive	$90,000	$90,000	8/13/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Knight Bridge Drive at Buckingham Drive	$81,000	$81,000	6/6/2018
Allenby Drive near civic 34	$83,000	$83,000	6/6/2018
Allenby Dr near civic 2	$83,000	$83,000	6/6/2018
Minna Drive near civic 6	$85,000	$85,000	6/6/2018
St. Margarets Bay Road near civic 2916	$91,000	$91,000	6/6/2018
Stella Crt near civic 1	$76,000	$76,000	10/18/2018
Ramar Dr near civic 6	$93,000	$93,000	8/13/2018
St. Margarets Bay Road near Second Chain Lake	$91,000	$91,000	6/6/2018
Ross Road near civic 241	$74,000	$74,000	6/6/2018
Clarence Avenue at Howard Ave	$76,000	$76,000	8/13/2018
Clarence Avenue near Morris Avenue	$69,000	$69,000	8/13/2018
Braeside Ave near civic 2	$105,000	$105,000	6/6/2018
Cow Bay Road near civic 1174	$76,000	$76,000	5/14/2018
Shore Rd near civic 1796	$88,000	$88,000	8/13/2018
Hines Road near civic 195	$82,000	$82,000	6/6/2018
Ritcey Cres near civic 1	$90,000	$90,000	8/13/2018
Orchard Dr near civic 32	$88,000	$88,000	8/13/2018
Culvert Replacement Program 2019/20) Design Phase	$60,000	$60,000	10/22/2018
Miller Lake Road Stormwater Sewer Upgrade	$28,000	$0	10/22/2018
Various Culvert Replacement Projects: 1) Stella Court at Kingswood Drive $27K; 2) Bristol Avenue near Civic 47 $25K; 3) Buckingham Drive near 115 $27K; 4) Kingswood Drive near civic 370 - $5K; 5) Sherwood Drive near civic 15 $26K	$150,000	$0	10/18/2018
Pipes			
Doyle Street Storm Sewer	$250,000	$250,000	8/30/2018
Integrated Stormwater Projects - Program	$1,442,000	$1,442,000	4/5/2018
Manhole Renewals SW	$21,000	$21,000	4/23/2018
Catchbasin Renewals SW	$50,000	$50,000	4/23/2018
Lateral Replacements SW	$15,000	$15,000	4/23/2018
Drainage Remediation Program - Survey/Studies			
White Birch Drive SW IP 2017/18 (additional funding $100,000)	$100,000	$0	5/1/2018
Chalamont Drive SW IP 2018/19	$50,000	$0	5/1/2018
Structures			
Culvert Replacement Program Engineering Services	$249,000	$0	9/21/2018
Structure			
Ellenvale Run Retaining Wall System - Replacement	$2,525,000	$2,525,000	7/9/2018
Ellenvale Run Retaining Wall System Structure 2017/18 (additional funding from2018/19)	$846,000	$0	7/9/2018
Celtic Drive Storm Sewer Renewal - Construction	$200,000	$0	8/13/2018

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Culvert/Ditches			
Rhondora Drive Cross Culvert Replacement and Ditching Project	$57,500	$0	3/19/2018
Stormwater Total	**$9,101,500**	**$7,065,500**	
Corporate			
Asset Management			
Integrated Resource Plan Update	$500,000	$500,000	9/12/2018
Sewer Condition Assessment	$170,000	$170,000	9/6/2018
Storm Sewer Condition Assessment	$110,000	$110,000	9/6/2018
Driveway Culvert Data Collection Program	$80,000	$80,000	3/22/2018
Corporate Flow Monitoring Program	$1,700,000	$1,700,000	4/16/2018
Hydraulic Water Model Build	$50,000	$50,000	10/16/2018
450 - 455 Cowie Hill Road Office Space Additional work stations	$25,000	$0	4/25/2018
Facility			
East/Central Regional Operational Facility			
Building Capital Improvements	$100,000	$100,000	11/15/2018
Fleet			
Fleet Upgrade Program - stormwater	$271,000	$271,000	4/23/2018
Fleet Upgrade Program - wastewater	$1,084,000	$1,084,000	4/23/2018
Fleet Upgrade Program - water	$755,000	$755,000	4/23/2018
GIS			
GIS Application Support Program			
Dashboard Replacement	$200,000	$200,000	11/20/2018
Data Governance			
GIS Upgrade/Cityworks Upgrade	$350,000	$350,000	7/17/2018
Desktop Progression Plan	$100,000	$100,000	11/29/2018
GIS Data Build - Services			
CAD Drawing Database	$30,000	$30,000	11/13/2018
2018/19 GIS Data Program	$250,000	$0	7/12/2018
Information Technology			
Desktop Computer Replacement Program	$290,000	$290,000	4/23/2018
Network Infrastructure Upgrades	$220,000	$220,000	4/23/2018
Document Management Program			
Computerized Maintenance Management System Enhancements			
SharePoint Implementation			
AMI/ARM Meter System Upgrades	$9,730,000	$9,730,000	4/28/2016
SAP Rate Structure Support	$220,000	$220,000	7/26/2018
Asset Registry Build	$100,000	$50,000	4/6/2018
Halifax Water Website	$500,000	$500,000	5/4/2018
Wi-Fi Design and Build			
Cayenta Optimization			

Category	Sum of Total	Net Impact on 2018/2019	Final Approval
Intranet			
Permit Approvals			
Stormwater Billing Support			
Analytics and Dashboards	$240,000	$100,000	6/28/2018
Portfolio and Project Lifecycle (50,000 + 330,000) Portfolio and Project Lifecycle Project Execution of Project	$380,000	$380,000	4/16/2018
Host Static Website Project (2016/17)	$100,000	$0	5/4/2018
IT Foundations ($71,000) Helpdesk Replacement Project - Planning Phase($45,500) IT Infrastructure Project - Planning Phase Funding Increase ($85,500)	$2,000,000	$2,000,000	5/30/2018
Telephony	$120,000	$120,000	7/23/2018
Payroll Replacement Project	$220,000	$0	7/26/2018
SCADA & Other Equipment			
GPS Units - Replacement	$42,000	$42,000	2/28/2018
Large and New Customer Meters	$460,000	$460,000	4/23/2018
GNSS Receiver for Asset Management Data Collection	$8,000	$8,000	4/6/2018
Corporate Total	**$20,405,000**	**$19,620,000**	
Grand Total	**$73,350,092**	**$58,691,000**	

Item 3-I

09-Jan-19

FINANCIAL REPORT

Consolidated balance of the four operating accounts maintained by the Commission as of:	9-Jan-19	$62,112,763
Rate of interest on the above balance - Investment Rate of Return	0.179%	$62,112,762.99

ITEM # 4-I
HRWC Board
November 29, 2018

TO: Ray Ritcey**,** Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, Director, Corporate Services/CFO

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng, General Manager

DATE: November 15, 2018

SUBJECT: **2018/19 Q2 Cost Containment**

INFORMATION REPORT

ORIGIN

The Cost Containment Process (Item #6) as approved by the Halifax Regional Water Commission (HRWC) Board, October 3, 2013.

April 14, 2015, NSUARB Decision- HRWC General Rate Application (M06540).

BACKGROUND

The process for cost containment as approved by the HRWC Board on October 3, 2013, called for the implementation of a number of recommended actions that would assist HRWC in addressing the Nova Scotia Utility and Review Board's (NSUARB) request for a more rigorous approach to cost containment as an organization. One key recommendation was the establishment of a reporting structure whereby, "*on a quarterly basis, the monthly financial report of the HRWC Board will also include an update on Cost Containment Initiatives*".

In the Decision on the 2015 Rate Hearing, the NSUARB directed HRWC to file annual reports on its efforts to contain operating costs of the utility, with this report to be filed no later than June 30 of each year. Within the Decision, the NSUARB expressed its appreciation in receiving HRWC's first cost containment report, and HRWC's initiatives to contain its operating costs.

DISCUSSION

A Summary Report-Cost Containment Initiatives for 2018/19 is attached, with updated information as at November 15, 2018. This report shows the cost containment initiatives effecting operations for 2018/19 as a result of new initiatives implemented thus far during the year, along with amounts of an ongoing nature from fiscal years 2013/14 to 2016/17 inclusive. The inclusion of initiatives and amounts from prior years reflects an intentional focus on sustainable results over the long term. The projected cost savings thus far for 2018/19 is $5.2 million as outlined by category in Figure #1 below:

Figure #1

Procurement Strategies	**$980,654**	**19%**
Human Resource Strategies	**$2,478,075**	**48%**
Information Technology (IT) Strategies	**$108,700**	**2%**
Facilities/ Process Strategies	**$1,459,916**	**28%**
Reduce Paper and Printing Costs	**$37,479**	**1%**
Technology and Business Process Changes	**$135,138**	**3%**
	$5,199,961	

As shown above, cost containment initiatives are impacted most in the areas of Human Resource, Facilities/ Process and Procurement Strategies. Under Human Resource Strategies, the effects of pension plan re-design initiated in 2015/16 is one of the main contributors to cost containment savings in the current year. Annual savings related to pension plan re-design approximates $1.7 million, which represents 69% of the savings within Human Resource Strategies and 33% of the total projected cost savings for 2018/19. Employer contributions on pensionable earnings decreased in 2016 from 12.95% to 9.85%, with employees experiencing a similar decrease from 12.95% to 10.65%. In addition, special payments made by the HRWC to fund the unfunded liability of the pension plan were reduced from $3.0 million to $0.8 million on an annual basis. Savings of $20.2 million for the employer was projected over a 14 year period, with a 50% likelihood the plan would be fully funded within 10 years.

Facilities/ Process Strategies contain initiatives of varying nature, however one of the main contributors in this category is Halifax Water's Energy Efficiency Program. Projects under this program account for approximately $0.7 million of projected savings for the current year, representing 49% of savings within the category and 14% of the total projected savings for 2018/19.

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 2018/19 where savings related to chemical purchasing amounted to an estimated $0.4 million.

New cost containment initiatives implemented during the 2018/19 fiscal year resulted in cost savings amounting to $0.1 million. These initiatives are highlighted for ease of reference on the Summary Report-Cost Containment Initiatives attached. Cost savings resulting from these new initiatives fall within the following categories, ranked in order of cost savings:

- Facilities/ Process Strategies $52 thousand
- Procurement Strategies $27 thousand
- Technology & Business Process Changes $23 thousand
- Reduce Paper & Printing Costs $10 thousand
- Human Resource Strategies $10 thousand.

BUDGET IMPLICATIONS

Available information on cost containment initiatives were taken into consideration when the 2018/19 budgets were developed. Initiatives that impact future fiscal periods (not annual or one-time occurrences only) will be incorporated into budget cycles and processes of these future periods.

ATTACHMENTS

Summary Report – Cost Containment Initiatives

Report Prepared by: *Original Signed By:*
Allan Campbell, B.Comm., CPA, CMA
Manager, Finance, (902) 490-4288

Halifax Water
Summary Report - Cost Containment Initiatives
2018/ 2019

ITEM # 4-I
HRWC Board
November 29, 2018
ATTACHMENT 15-Nov-18

#	Initiative	Comments	Year Initiated	2018/19 Cost Savings
1	**General Budget Strategies**			
	Sub-total			$0
2	**Procurement Strategies**			
	Insurance adjustment services - sole source relationship over a 10 year period	HW participated in a joint tender with HRM. Costs will be approximately 20% lower.	2013/14	$5,460
	Standardized uniforms and clothing	Issuance of a bulk tender; centralization of purchasing and distribution function; possible policy change to "as required" rather than a quota system	2013/14	$20,000
	Standardized boots	Issuance of a bulk tender; centralization of purchasing and distribution function; possible policy change to "as required" rather than a quota system	2013/14	$5,000
	Mobile devices - switched supplier and carrier	HW participated in a joint tender with HRM	2013/14	$51,624
	Customer account collections	Coordination of collection services related to closed customer accounts in conjunction with the Provincial Public Procurement Act, rather than outsourcing to private organizations	2014/15	$10,000
	Lab Testing	Savings as a result of contract tendering	2013/14	$60,000
	NSPI rate reclassification	Eastern Passage WWTF	2014/15	$16,000
	NSPI rate reclassification	Duffus Street Pumping Station	2015/16	$15,000
	Chemical purchasing	Able to purchase a corrosion inhibitor with a higher concentration of active ingredient, thus foregoing additional costs that would have resulted under current dosage requirements	2015/16	$400,000
	Replacement of wireless headsets for CCC staff	Wireless headsets were not performing as expected, therefore a switch was made to wired headsets which resulted in savings on a per unit cost basis, and also savings regarding the frequency and cost of replacement associated with the wired headsets.	2015/16	$1,500
	Mobile devices - switched supplier and carrier	HW leveraged the mobility contract of the Province of Nova Scotia	2016/17	$48,000
	Garbage collection - JD Kline Plant	An RFP was put out to consolidate the garbage collection, which resulted in a cost savings with respect to internal man-hours and use of HW vehicles.	2016/17	$1,370
	Utilizing HW staff to setup excavations sites	Using trained HW staff as TWS for job sites, unless outside traffic control personal are required	2016/17	$50,000
	RFP for biosolids transport	As a result of a recent RFP, the is expected to be an approximate 33% cost reduction related to transporting biosolids from the Halifax, Dartmouth,Herring Cove and Eastern Passage WWTP	2017/18	$220,000
	Traffic control	Using trained HW staff for the purposes of traffic control while working on HW excavations sites will result in cost savings of $750/day. This is based on an 8 hour day, including setup costs typically paid to the contractor.	2017/18	$50,000
	Insourcing (Lead Line Replacement Program)	The ability to perform in-house communications/graphic design work saved significant time and cost for internal staff, which would have been required to engage outside firms to perform the same work.	2018/19	$17,500
	Insourcing (Halifax Water's Annual Report)	The ability to perform in-house graphic design work versus contracting this work outside created savings with respect to the 2018 report of approximately $100/page. Recurring annual savings will fluxuate depending on the size of the report in subsequent years.	2018/19	$9,200
	Sub-total			$980,654
3	**Human Resource Strategies**			
	Corporate ID Badges	updating the corporate ID badges to be deferred from the 2013/14 fiscal year to 2014/15 for existing employees	2013/14	$3,200
	Heavy Truck and Equipment Service	the addition of a new Heavy Equipment Technician provides in-house maintenance service capabilities for the HW fleet.	2013/14	$100,000
	Beeper Pay	Elimination of an inconsistency between Water and Wastewater Services, as Water Services staff do not receive beeper pay. This involves 10 non-union staff in total.	2013/14	$75,000
	Annual service awards banquet	Changed the venue and the cost of the meal	2014/15	$15,000
	Accessing on-line training opportunities	More use of on-line training versus the traditional methods, including WHMIS and TDG renewals	2014/15	$2,241
	Background Checks	Out-sourced background checks to a new contractor.	2015/16	$654
	Workload, labour force assessment	A reduction in number of staff in Development Approvals. The volume of work did not warrant 6 planning technologists, and as a result this number has been reduced to 4.	2015/16	$140,000

	Pension plan re-design	Through the collective bargaining process, HW was able to negotiate pension plan re-design to make the plan more sustainable. It is estimated the employer's share contributions will decrease from the current 12.95% to 9.85% effective January 1, 2015.	2015/16	$1,700,000
	Re-structuring within the organization to create a new "Corporate Services" sector	January 1, 2016 saw the elimination of two (2) full time positions and a re-design of several other jobs.	2015/16	$35,000
	Workload, labour force assessment	January 1, 2016 saw the elimination the administrative assistant within Regulatory Services.	2015/16	$57,000
	Workload, labour force assessment	November, 2016 saw the elimination of a Compliance Sampling position as a result of a reduction in sampling requirements.	2016/17	$81,966
	Hiring at Lake Major plant	Summer student not hired	2016/17	$9,800
	Overtime reductions	Overtime has been reduced at the Harbour Solutions Plants with respect to sick leaves, vacation, etc. when weather conditions allow and operational needs are met. Also, Halifax WWTP staff are responding to after hours calls at the Dartmouth and Herring Cove facilities in an effort to minimize the need for overtime call-outs.	2016/17	$40,000
	Change in benefit provider	The selection of a new benefit provider for life and LTD resulted in significant cost savings over the next three (3) years…2018-2021	2017/18	$125,000
	Hiring deferment (Engineering - Wastewater Infrastructure)	As a result of maternity leave, staff resourcing was compared against project demands for 2018 and it was decided the position would not be backfilled.	2017/18	$83,333
	Hiring deferment (Pockwock Water Treatment Plant)	a summer student was not hired in 2018 at the Pockwock WTP as it was not feasible to have them onsite with all the capital work being carried out at the plant	2018/19	$9,880
		Sub-total		$2,478,075
4	**Information Technology (IT) Strategies**			
	Xerox managed print solutions	Rationalization and replacement of photocopiers and printers	2013/14	$20,000
	Network	Change in cost model by Eastlink, giving HW the new pricing	2013/14	$80,000
	Telephone land lines	Rationalization of services and eliminate duplication of resources as required	2013/14	$8,700
		Sub-total		$108,700
5	**Facilities/ Process Strategies**			
	Chlorine Utilization - Pockwock	Discontinuation of the pre-chlorination process	2013/14	$40,000
	Lab Testing	Price benefits from purchasing product from a different source mainly affecting the Harbour Solution Plants	2013/14	$105,000
	Pumper Truck Utilization	pilot project to be scheduled initially for stormwater customers only as a test	2013/14	$130,000
	Waste oil boiler system - Herring Cove WWTF	new system to allow the use of waste oil from Metro Transit as an alternative heating source	2014/15	$13,250
	System sampling for HPC's	sampling was reduced from weekly to monthly	2014/15	$8,025
	NSE system assessments	Assessment reports are being completed in-house rather that being outsourced	2014/15	$25,000
	Decommissioning of the Bedford South pumping station	The developer driven system expansion will permit the use of gravity and pressure reduction rather than the pumping station	2014/15	$15,000
	Lighting upgrades - Bennery Lake WSP		2014/15	$4,793
	Insulation upgrades - Bennery Lake WSP		2014/15	$36,000
	Lighting upgrades - Eastern Passage WWTF		2014/15	$7,880
	Lighting upgrades - Dartmouth WWTF		2014/15	$22,542
	Lighting upgrades - Herring Cove WWTF		2014/15	$13,744
	Lighting upgrades - Halifax WWTF		2014/15	$29,845
	Lighting upgrades - Aerotech BPF		2014/15	$19,109
	HVAC upgrades - Eastern Passage WWTF		2014/15	$20,711
	HVAC upgrades - Roach's Pond pumping station		2014/15	$13,500
	MCC 190 cooling and heat recovery - Halifax WWTF		2014/15	$13,164
	Aeration system upgrades - Eastern Passage WWTF		2014/15	$76,382
	Orchard Park in-line turbine project		2014/15	$31,494
	Wind farm - Pockwock WSP		2014/15	$130,399
	Biogas CHP system - Mill Cove		2014/15	$86,000
	Disposal of water treatment plant solid residual material	A new location for the disposal of the residual material was found	2014/15	$36,000
	Advanced investigative tool for leaks and structural condition of pipes	The current program has been halted as a cost containment initiative and as a result of the information received.	2014/15	$150,000
	E-delivery	Transitioning from traditional billing methods to e-delivery	2014/15	$20,000
	Change in Recycling Pickups	By changing the schedule for recycling pickups from bi-weekly to every three (3) weeks, the anticipated annual savings will range from $2,500 to $2,700.	2015/16	$2,700

Highway #7 Booster Station Upgrade	Expected energy savings	2015/16	$14,300
Dartmouth WWTF - UV Channel Isolation	Expected energy savings	2015/16	$59,460
Halifax WWTF - Fixed Compressed Air Leaks	Expected energy savings	2015/16	$2,293
Halifax WWTF - UV Channel Isolation	Expected energy savings	2015/16	$62,115
Herring Cove WWTF - MCC 190 Cooling/Heat Recovery	Expected energy savings	2015/16	$8,496
Herring Cove WWTF - Ventilation Air Heat Recovery	Expected energy savings	2015/16	$28,300
Sampling	Using internal staff at the Mill Cove facility to perform the required daily sampling at the facility, rather than the compliance staff, limiting their site visits to once a week.	2015/16	$4,160
Staff utilization	Using trained HW staff for traffic control on HW job sites unless contractors are required.	2015/16	$50,000
Process alternative	A centrifuge was rented for the Mill Cove WWTF (with the option to purchase) on a trial basis to dewater liquid sludge that typically would be transported to the Aerotech WWTF. The transport of the liquid sludge resulted overtime costs, as well as reducing the time available for HW truck to service other facilities. This process assisted the Aerotech in reaching its compliance goals and reduced overtime costs by an estimated 50%. This equipment will enable HW proceed with a digester clean out project, which would otherwise be sub-contracted at a cost of $200,000.	2015/16	$40,000
Process change	It was decided that flanges for meter sizes greater than 2" would be the responsibility of the customer, since when meters are replaced, the flanges are not replaced.	2015/16	$4,854
Halifax WWTF - Ventilation Air Heat Recovery System	Implemented October, 2016	2016/17	$32,300
Tools developed internally	Tools developed internally to install new operating nuts on buried valves. Previously nuts were lost on buried valves resulting in a need to excavate the valve and install new nuts. Cost savings are achieved regarding excavation and reinstatement.	2016/17	$20,000
Spruce Hill transmission main	Two long term leaks were discovered in the transmission main resulting in cost savings from the perspective of water loss control.	2016/17	$3,000
Utilization of industrial water	A new filter system was installed at the Eastern Passage WWTP that provides the capability to use the current industrial water system rather than potable water to deliver water to the polymer feed systems.	2016/17	$26,000
Cost reductions (material transport)	Modifications to the screening/grit skip eliminated the need to purchase 2 new screening compactors, which also resulted in the amount of material transported of approximately 28 metric tonnes.	2017/18	$2,000
Servicing oxygen monitors in-house	Technical Service staff have been trained by the manufacturer to service the fleet of personal gas monitors in-house, specifically the replacement of the oxygen sensor. These monitors, 165 in total, are used by all operation and treatment departments throughout the organization.	2018/19	$30,000
Pumping Station Starters (4160V)	The pumping station starters were upgraded to vacuum starters, thus eliminating the need for annual servicing of the starters to be outsourced. Any maintenance can now be handled by in-house industrial electricians.	2018/19	$1,500
Automated Flushing Stations	Automated flushing stations are now used to ensure the proper chorine residuals are achieved in all areas of the transmission and distribution system. Previously this operation was performed manually on a daily basis from approximately June to September. As a result labour and vehicle costs have been reduced accordingly.	2018/19	$8,000
Corrosion Sampling	Corrosion sampling in the distribution system was reduced from bi-weekly to monthly in June, 2018, since enough baseline data has been collected and there are no immediate plans to change corrosion control in the near future.	2018/19	$12,600
	Sub-total		$1,459,916

6 Reduce Paper and Printing Costs

Electronic HRWC Board Packages	Send Board packages out electronically rather than issuing hard copies	2013/14	$7,500
Paperless Office within the HR Department	Creating electronic workflow	2013/14	$4,804
Stewardship Report	The Stewardship Report will be published electronically only, with no hard copies	2013/14	$3,000
Changes to document archiving	Transitioning file storage from outside contractor to public resources	2013/14	$3,175
Changes to document archiving	Transitioning file storage from outside contractor to public resources	2016/17	$9,000
Cost reduction associated with off-site storage	There has been an effort to reduce the number of boxes (documents) stored in facilities such as Iron Mountain, by sorting and purging documents in accordance with the document retention policy of the Commission.	2018/19	$10,000
	Sub-total		$37,479

Halifax Water
Summary Report - Cost Containment Initiatives
2018/ 2019

7 Technology and Business Process Changes

Workload, labour force assessment	Through the utilization of technology, such as a Customer Relationship Management (CRM) system, a budgeted addition (customer service representative) has been removed.	2015/16	$47,605
Workload, labour force assessment	Re-structuring by management within the AMI project as a result of technological efficiencies anticipated.	2015/16	$64,533
2018 Canadian Biosolids & Residuals Conference	Halifax Water hosted this conference in Halifax, September 12-18, 2018 as part of its unregulated business, and did so in conjunction with the ACWWA and NEBRA. As host Halifax Water is entitled to 50% of the net profit from the conference.	2018/19	$23,000
	Sub-total		$135,138
			$5,199,961

Halifax Water
Halifax Regional Water Commission

ITEM # 5-I
HRWC Board
November 29, 2018

TO: Ray Ritcey, Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA, CGA, ICD.D
Director, Corporate Services
Allan Campbell, B.Comm, CPA, CMA, Manager, Finance

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P. Eng., General Manager

DATE: November 16, 2018

SUBJECT: **Halifax Regional Water Commission Employees' Pension Plan Financial Report – 3rd Quarter (Q3), 2018**

INFORMATION REPORT

ORIGIN

Financial reporting for the Halifax Regional Water Commission Employees' Pension Plan (hereinafter called the "Plan").

BACKGROUND

The Board is required to review the periodic (quarterly) financial results of the Plan throughout the year.

DISCUSSION

The attached statement of changes in net assets available for benefits (Appendix A) outlines the annual budget for the Plan and actual financial performance to Q3 (January 1 to September 30, 2018). Favourable or unfavourable variances reported compare actual results to prorated budget amounts (75% = 9 months/12 months), which serves as a

benchmark for the nine (9) month period in 2018. Yearend audited results for 2016 and 2017 are shown for comparative purposes.

As shown on the statement of changes in net assets available for benefits, net assets available for benefits have increased by $5.6 million for the nine (9) month period ending September 30, 2018. The annual budget for 2018 forecasted an increase in net assets available of $10.3 million. Actual results for the period of $5.6 million compared to the benchmark of $7.7 million results in an unfavourable variance in the amount of $2.1 million.

The annual budget forecasted revenue of $8.8 million. Revenue for the period totaled $4.0 million, which when compared to the benchmark of $6.6 million results in an unfavourable variance of $2.5 million. Revenue is affected largely by the performance of the HRM Master Trust, and change tends to be more volatile compared to contributions and expenses of the Plan. This variance is attributed directly to the fact the actual increase in the fair value of the investment assets was lower than expected. The increase for the period totaled $2.1 million compared to the benchmark of $4.9 million, a difference of $2.9 million or 58%. Investment income for the period performed above expectations, showing a favorable variance of $0.3 million or 19%.

Contributions of $4.6 million are tracking as expected, showing a small, unfavourable variance of $65.9 thousand.

Expenses of $3.0 million for the period are lower than the benchmark of $3.5 million resulting in a favourable variance of $0.5 million or 14%. The main contributor to this favourable variance is termination benefit payments of $56.7 thousand for the year to date, which came in considerably lower than the benchmark of $525.0 thousand. The remainder of the variance is due to the timing of administrative expenses, which totaled $71.1 thousand for the period compared to the benchmark of $132.7 thousand.

SERVICE STANDARDS

The administrator has begun to track and report on Regulatory Filing Requirements, Administrative Reporting Requirements and Service Standards for actuarial calculation requests. The reports for Regulatory Filing Requirements and Administrative Reporting Requirements are attached as Appendix B and Appendix C respectively, and document administrative compliance within the various levels of reporting for the period.

Service Standard results to September 30th, 2018 have been attached as Appendix D. The intent of the Service Standards Report is to set a standard number of days for which calculations can be provided to Members when actuarial calculations are requested. The service standard includes both estimated number of days required by the current actuarial services provider, Eckler Partners Ltd., as well as estimated Halifax Water staff time.

The overall results outlined for Q3 as reported in Appendix D show, out of 6 Member requests, none were delivered within the standard days proposed under the threshold limits. Response time of the actuary was inconsistent throughout the period ranging from 11 – 32 days compared to the benchmark of 11 days for the categories reported. For the actuary, average service days for Retirement Estimates and Termination Estimates (standard) were 13.3 days and 21.7 days respectively. Likewise for administrative staff, response time ranged from 10 - 37 days compared to the benchmark of 7 days for the categories reported, with an average response time of 25.3 days for Retirement Estimates, and 14.0 days for Termination Estimates (standard).

Results will continue to be monitored and evaluated over the coming months to obtain a larger data sample with standards being adjusted if necessary, to reflect the realities and special circumstances factoring into processing Member requests.

ATTACHMENTS

APPENDIX A – Financial Report:
Statement of changes in net assets available for benefits, for the nine (9) month period ended September 30, 2018

APPENDIX B – Regulatory Filing Requirements – 2018

APPENDIX C – Administrative Reporting Requirements – 2018

APPENDIX D – Service Standards Report - 2018

Report Prepared by: *Original Signed By:*
Michelle Bennett, B.Comm, Accountant 902-490-5242
Heather Britten, B.Comm, Quality Assurance Officer 902-490-1895

Halifax Regional Water Commission Employees' Pension Plan
Statement of changes in net assets available for benefits
For the nine (9) month period ended
Benchmark *75%*

	September 30, 2018						
				Variance			
			Prorated	Actual versus Prorated Budget			
	2018		Budget	Favourable (Unfavourable)		Actual	Actual
	Budget	Actual	75%	$	%	2017	2016
Revenue[1]							
Net investment income:							
Total investment income	$2,340,000	$2,084,241	*$1,755,000*	*$329,241*	*19%*	$2,622,024	$2,389,377
Investment manager fees	($166,000)	($113,986)	*-$124,500*	*$10,514*	*-8%*	($146,420)	($138,922)
Increase (decrease) in the fair value of investment assets	$6,590,000	$2,060,827	*$4,942,500*	*-$2,881,673*	*-58%*	$8,712,459	$4,056,258
	$8,764,000	**$4,031,083**	*$6,573,000*	*-$2,541,917*	*-39%*	**$11,188,063**	**$6,306,713**
Contributions[2]							
Participants:							
Current service (inc AVC's)	$2,801,000	$2,068,443	*$2,100,750*	*-$32,307*	*-2%*	$2,665,078	$2,484,448
Sponsors:							
Current service (inc LTD)	$2,548,000	$1,877,292	*$1,911,000*	*-$33,708*	*-2%*	$2,422,527	$2,265,591
Unfunded liability	$825,000	$618,905	*$618,750*	*$155*	*0%*	$825,200	$825,200
	$6,174,000	**$4,564,640**	*$4,630,500*	*-$65,860*	*-1%*	**$5,912,805**	**$5,575,239**
Expenses[3]							
Benefit payments:							
Benefit payments	$3,754,000	$2,866,867	*$2,815,500*	*-$51,367*	*-2%*	$3,738,659	$3,536,894
Termination payments	$700,000	$56,716	*$525,000*	*$468,284*	*89%*	$314,591	$992,572
Death benefit payments	$0	$0	*$0*	*$0*	*n/a*	$242,767	$509,236
Administrative:							
Actuarial & consulting fees	$100,000	$16,112	*$75,000*	*$58,888*	*79%*	$67,394	$128,676
Audit & accounting fees	$9,000	$0	*$6,750*	*$6,750*	*100%*	$9,283	$15,999
Bank custodian fees	$22,000	$24,662	*$16,500*	*-$8,162*	*-49%*	$20,132	$26,511
Insurance	$9,000	$0	*$6,750*	*$6,750*	*100%*	$8,347	$7,950
Miscellaneous	$15,000	$12,471	*$11,250*	*-$1,221*	*-11%*	$18,965	$14,433
Professional fees	$15,000	$8,440	*$11,250*	*$2,810*	*25%*	$14,623	$12,845
Registration fees	$2,000	$0	*$1,500*	*$1,500*	*100%*	$2,221	$2,158
Training (Trustees/ Administration/ Pension Committee)	$5,000	$0	*$3,750*	*$3,750*	*100%*	$0	$1,127
	$4,631,000	**$2,985,268**	*$3,473,250*	*$487,982*	*14%*	**$4,436,982**	**$5,248,400**
Increase (decrease) in net assets available for benefits	**$10,307,000**	**$5,610,455**	*$7,730,250*	*-$2,119,795*	*-27%*	**$12,663,886**	**$6,633,551**
Net assets available for benefits, beginning of period	**$112,657,705**	**$119,731,881**				**$107,067,995**	**$100,434,444**
Increase (decrease) in net assets available for benefits	**$10,307,000**	**$5,610,455**				**$12,663,886**	**$6,633,551**
Net assets available for benefits, end of period	**$122,964,705**	**$125,342,337**				**$119,731,881**	**$107,067,995**

For the purposes of this statement, expenses are reported on a cash basis. Comparative years are reported on an accrual basis as that is how they are reported on the financial statements.

Halifax Regional Water Commission Employees' Pension Plan
Administrative Reporting Requirements - 2018
as at September 16, 2018

	Report	Filing Deadline/ Recurrance	Date last filed/ Performed		Comments
1	Pensioners' Payroll	Monthly	November 1, 2018		Pensioners are paid the 1st of each month; no exceptions to report for 2018
2	Contributions to the Trustee	Monthly	November 7, 2018	DB Plan	Remittances due to Northern Trust within 30 days of monthend; no exceptions to report for 2018.
			October 24, 2018	DC Plan	Remittances due to Industrial Alliance within 30 days of monthend; no exceptions to report for 2018.
			n/a	Notional Agreement*	
2	Pension Plan Financial Statements	Quarterly	September 17, 2018	DB Plan	2nd Quarter (January - June 2018)
			n/a	DC Plan	Quarterly statements are not prepared for the DC Plan. A financial report is prepared by Industrial Alliance and that report is filed with the AIR to the regulator.
			n/a	Notional Agreement*	Financial statements not required.
3	Investment Performance Review & Compliance with SIP&P	Quarterly	September 17, 2018	DB Plan	2nd Quarter (January - June 2018) Report prepared quarterly by administration staff for the HW Board of Directors, in conjunction with the quarterly HRM Pension Plan Committee meeting documentation.
4	Annual Pension Statements to Members	June 30th	June 18, 2018	DB Plan	
			June 18, 2018	DC Plan	Statements issued annually in conjuction with the DB Plan statements, commencing in 2018. Members also have access to online, real-time reporting.
			June 18, 2018	Notional Agreement*	Statements issued annually in conjuction with the DB Plan statements, commencing in 2018.
5	Fiduciary Liability Insurance	Annually	November 15, 2018	DB Plan	Reviewed and renewed annually by administration staff. The policy period expires November 30 each year.

* Notional Agreements were implemented during 2017 with an effective date for January 1, 2017. Notional Agreements are not registered therefore not subject to reporting requirements to a regulatory body.

Halifax Regional Water Commission Employees' Pension Plan
Service Standards Report - 2018

Quarter 3 (as at November 16, 2018)			Eckler				HW Staff				
Transaction	**Standard**		**Total # Completed**	**# Past Standard**	**% with Standard**	**Average Service Days**	**Total # Completed**	**# Past Standard**	**% with Standard**	**Average Service Days**	**Total Average Service Days**
Retirement Estimates	18	Business Days	3	3	0%	13.3	3	3	0%	25.3	38.7
Marriage Breakdown Calculations	28	Business Days	0	0	#DIV/0!	#DIV/0!	0	0	#DIV/0!	#DIV/0!	#DIV/0!
Post-Retirement Death Letter	10	Business Days	0	0	#DIV/0!	#DIV/0!	0	0	#DIV/0!	#DIV/0!	#DIV/0!
Pre-Retirement Death Benefit	28	Business Days	0	0	#DIV/0!	#DIV/0!	0	0	#DIV/0!	#DIV/0!	#DIV/0!
Termination Estimates/ Calculations											
- Standard	18	Business Days	3	3	0%	21.7	3	3	0%	14.0	35.7
- Non Standard (incl RTAs)	28	Business Days	0	0	#DIV/0!	#DIV/0!	0	0	#DIV/0!	#DIV/0!	#DIV/0!
Volume-Weighted Average			**6**	**6**	**0%**	**#DIV/0!**	**6**	**6**	**0%**	**#DIV/0!**	

	Total # Completed	**# Past Standard**	**% within Standard**
Combined Volume-Weighted Average	**6**	**6**	**0.0%**

ITEM #6-I
HRWC Board

Nov. 29, 2018

TO: Ray Ritcey, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: *Original Signed By:*
Cathie O'Toole, MBA, CPA/CGA, ICD.D
Director of Corporate Services

APPROVED: *Original Signed By:*
Carl Yates, M.A.Sc., P.Eng., General Manager

DATE: November 29, 2018

SUBJECT: **Stormwater Billing Update**

INFORMATION REPORT

ORIGIN

March 7, 2018, Halifax Council – Item 1 2018/19 Budget Committee Meeting.
June 21, 2018 Halifax Water Board Report – Item 10I Stormwater Billing Update

BACKGROUND

Stormwater charges have been in place since July 2013. There are two distinct components of the charge – the Site Related Flow Charge and the Right of Way Charge. The utility has approximately 98,000 stormwater customers and the vast majority pay their bill for service rendered. However, there are roughly 4% or 3,800 accounts with unpaid stormwater bills. Some customers have now accumulated 4 years of charges.

DISCUSSION

In an effort to collect the outstanding charges with respect to stormwater service, Halifax Water is taking next steps to effect payment. Stormwater charges are lienable charges, and the HRWC Act provides Halifax municipality with the authority to establish the lien when Halifax Water determines that an account has arrears or has become uncollectible. Among the stormwater only account holders, approximately 3800 accounts have unpaid stormwater bills. As of March 31, 2018, the outstanding revenue (stormwater only

accounts) is approximately $1.1 million, and roughly 40% are municipality revenues (ROW charge) and 60% are Halifax Water revenues.

The utility has been working with the municipality to arrange for the transfer of outstanding accounts to the municipality for collection. Some properties have been sold or transferred in the past four years. Outstanding revenues related to those properties will be written off as bad debt. The utility and municipality conducted an exercise to verify property ownership changes to identify the accounts for write-off and to verify the business process to be followed when applying a lien on a property as part of the collection process.

Additionally, accounts for properties owned by the Provincial or Federal levels of government have been removed as collection will have to be pursued through a different mechanism.

Originally, the collection and lien process was scheduled for the summer of 2018, however the municipality requested a delay until after the due date of the final 2018 tax bill (October 31st).

Starting the week of November 26, 2018, Halifax Water will be sending out 2,233 letters to customers with outstanding stormwater accounts informing them that if the bill is not paid within two weeks, the account is being transferred to the municipality. After the two-week period, the unpaid account list is transferred to the municipality and the municipality pays Halifax Water for the total sum. The amount that would be transferred is $701,508.73, if no customers pay within the two week period. The municipality then assumes collection responsibility and starting Monday December 10th, would send a final collection bill to outstanding accounts, and after that any unpaid amounts will appear on the property tax account as a lien. This will protect the municipality and utility from future loss of revenue and will ensure eventual collection.

BUDGET IMPLICATIONS

Halifax Water budgets for bad debt expense. The actual bad debt expense in 2018/19 may be higher than budget as a result of the property ownership investigation noted above or if it appears that the amounts owing for provincial and federal properties are not collectible.

If the outstanding stormwater charges are not collected, it results in increased expense for other rate payers, which would be viewed as an inequity under the Public Utilities Act.

Report Prepared by: *Original Signed By:*
Cathie O'Toole, MBA, CPA/CGA, ICD.D
Director of Corporate Services, 490-3685