902-420-9287
450 Cowie Hill Road
P.O. Box 8388 RPO CSC
Halifax, Nova Scotia
Canada B3K 5M1

January 30, 2025

The regular meeting of the Halifax Water Board will be held virtually on Thursday, January 30, 2025, beginning at 9:00 a.m. Visit www.halifaxwater.ca to register to attend the public portion of the meeting.

AGENDA

In Camera Reports

1C Approval of Minutes of the In-Camera Meetings.

Motion: That the Halifax Water Board approve the In-Camera minutes of November 28, 2024, and the special In Camera meeting of January 13, 2025.

2C Business Arising from Minutes

3C Security Matter

4C Operational Matter

5C Governance Matter

Regular Reports

1. a) Ratification of In-Camera Motions

Motion: That the Halifax Water Board ratify the In-Camera Motions.

b) Approval of the order of business and approval of additions and deletions

Motion: That the Halifax Water Board approve the order of business and approve additions and deletions.

2. Approval of minutes of the Regular meeting held on November 28, 2024

Motion: That the Halifax Water Board approve the minutes of the November 28, 2024, regular meeting.

3. Business arising from minutes.
   a) None

Financial Reports

4.1 Operating results as of November 30, 2024

4.2 Capital expenditures as of November 30, 2024

4.3 Proposed 2025/26 Operating Budget

Motion: That the Halifax Water Board approve the attached 2025/26 Operating Budget, inclusive of the proposed 2025/26 budget for unregulated activities.

4.4 Proposed 2025/26 Capital Budget

Motion: That the Halifax Water Board approve the proposed 2025/26 Capital Budget at a total value of $132,996,000 as detailed in the attached Schedule 1.

4.5 HRWC Employees' Pension Plan - Recommendations with Respect to Assumptions for the Actuarial Valuation as at January 1, 2025

Motion: That the Halifax Water Board approve the assumptions as presented for the actuarial valuation as at January 1, 2025.

Capital Reports

5.1 Windsor Street Exchange – Verbal Update

5.2 Mill Cove WWTF Expansion & Upgrade – Revised Funding Approval - $11,970,000

Motion: That the Halifax Water Board approve additional funding in the amount of $1,970,000 for a revised total of $11,970,000 to complete Phases 1 through 3 of the Mill Cove WWTF Upgrade and Expansion project.

Other Business

6. Update on Boil Water Advisory

7. Item 1-I - Operational Performance Information Report – Update to Fluoride Status Reporting

8. Proposed Dates for 2025/26 Board Meetings:

- May 9, 2025 (Workshop)
- June 19, 2025
- September 25, 2025
- November 27, 2025
- December 12, 2025 (Workshop)
- January 29, 2026
- March 26, 2026

Information Reports

1-I Operational Performance Information Report
2-I HRM Master Trust Investment Performance Q3 2024
3-I Halifax Water Compliance Statement – Quarterly Certification
4-I Enterprise Risk Management Program - Report to the Board
5-I Fluoridation in Drinking Water at Halifax Water

Lorna Skinner
Governance Coordination Assistant

Halifax Water Board Meeting Minutes	
Date: November 28, 2024	**Meeting Time: 10:10 a.m.**
Attendees:	Commissioner Colleen Rollings, Chair
	Commissioner Cathy Deagle Gammon, Vice Chair
	Commissioner John MacPherson
	Commissioner Nancy MacLellan
	Commissioner Trish Purdy
	Commissioner Patty Cuttell
	Commissioner Cathie O'Toole
Regrets:	
Staff:	Kenda MacKenzie, Acting General Manager & CEO
	Louis de Montbrun, Director, Corporate Services/CFO
	Liana Rintoul, General Counsel
	Josh DeYoung, Director, Capital Engineering & Infrastructure
	John Eisnor, Director, Operations
	Wendy Krkosek, Acting Director, Regulatory Services
	Jeff Myrick, Manager of Communications and Public Affairs
	Heather Britten, Quality Assurance Officer
	Jonathan MacDonald, Manager, Water Infrastructure Planning
	Aaron Boudreau, Project Engineer II, Municipal Engineering
	Lorna Skinner, Governance Coordination Assistant, Regulatory Affairs and Governance Department

Regular Reports	
1.a) RATIFICATION OF IN CAMERA MOTIONS	
Discussion Notes	**MOVED BY Commissioner Cuttell, seconded by Commissioner Deagle Gammon that the Halifax Water Board ratify the In-Camera motions.**
Decision	**MOTION PUT AND PASSED.**
1b) APPROVAL OF THE ORDER OF BUSINESS AND APPROVAL OF ADDITIONS AND DELETIONS	
Discussion Notes	**MOVED BY Commissioner Deagle Gammon, seconded by Commissioner Cuttell that the Halifax Water Board approve the order of business and approve additions and deletions as amended.**
Decision	**MOTION PUT AND PASSED.**
2. APPROVAL OF MINUTES – September 26, 2024	
Discussion Notes	**MOVED BY Commissioner MacLellan, seconded by Commissioner MacPherson that the Halifax Water Board approve the minutes of the September 26, 2024, regular meeting.**
Decision	**MOTION PUT AND PASSED.**
3. BUSINESS ARISING FROM THE MINUTES	
Discussion Notes	**None**

Financial Reports	
4.1 OPERATING RESULTS AS OF SEPTEMBER 30, 2024	
Discussion Notes	An information report dated November 21, 2024, was submitted. Louis de Montbrun gave an overview of the operating results for the four months ended September 30, 2024. Mr. de Montbrun stated that after the results were presented to the Audit & Finance Committee, there were some minor corrections made to the report.
Decision	**N/A**
4.2 CAPITAL EXPENDITURES AS OF SEPTEMBER 30, 2024	
Discussion Notes	An information report dated November 19, 2024, was submitted. Louis de Montbrun updated the Board on the capital expenditures as of September 30, 2024.
Decision	**N/A**

4.3 PROPOSED 2025 HRWC EMPLOYEES' PENSION PLAN BUDGET	
Discussion Notes	A report dated November 19, 2024, was submitted. Louis de Montbrun stated that this matter is brought to the Board as the Commissioners also serve as the Trustees of the HRWC Employees' Pension Plan. Heather Britten gave a presentation on the proposed 2025 HRWC Employees' Pension Plan budget. **MOVED BY Commissioner Purdy, seconded by Commissioner Cuttell that the Halifax Water Board approve the Proposed 2025 Budget for the Halifax Water Employees' Pension Plan covering the period January 1, 2025, to December 31, 2025, as attached to Report Item #6 dated November 7, 2024.**
Decision	**MOTION PUT AND PASSED.**
4.4 OPERATING BUDGET PRELIMINARY (VERBAL)	
Discussion Notes	Louis de Montbrun gave an update on the operating budget planning process. An operating budget will be submitted to the Board in January. The results of the budget will be used as a basis for the upcoming rate application. Inflation continues to affect expenditures and debt to fund the capital program is expected to increase. A more fulsome report will be tabled at the Board workshop in December.
Decision	**N/A**
4.5 CAPITAL BUDGET PRELIMINARY (VERBAL)	
Discussion Notes	Josh DeYoung gave an update on the capital budget planning process. A capital budget will be submitted to the Board in January. This is the first year using new capital planning software to capture project intake and a candidate list for projects through years 1-5. There are ongoing meetings with engineering and accounting staff to right size delivery, balance resources and timelines, discuss current projects and review larger projects that require NSUARB approval. The capital budget will also be tabled for discussion at the December workshop.
Decision	**N/A**

Capital Reports	
5.1 LACEWOOD DRIVE TRANSMISSION MAIN LOOPING	
Discussion Notes	A report dated November 8, 2024, was submitted. Jonathan MacDonald gave a presentation on the Lacewood Drive transmission main extension. **MOVED BY Commissioner Purdy, seconded by Commissioner MacLellan that the Halifax Water Board approve the Lacewood Drive Transmission Main Extension (IMP Project #W02) at a total cost of $5,817,000.**
Decision	**MOTION PUT AND PASSED.**
5.2 SULLIVAN'S POND STORM SEWER REPLACEMENT – PHASE 2, PART II	
Discussion Notes	A reported dated November 6, 2024, was submitted. Andrew Snow gave a verbal update on the Sullivan's Pond Sewer Replacement – Phase 2, Part II. **MOVED BY Commissioner Deagle Gammon, seconded by Commissioner Purdy that the Halifax Water Board approve funding in the amount of $19,398,000 (including net HST) for the Sullivan's Pond Storm Sewer Replacement Phase 2 – Part II (Sawmill Creek) project.**
Decision	**MOTION PUT AND PASSED.**
5.3 MAIN STREET PUMPING STATION GOLFVIEW DRIVE PROJECT – ADDITIONAL FUNDING REQUEST	
Discussion Notes	A report dated November 14, 2024, was submitted. Josh DeYoung informed the Board that this project was approved as part of the capital budget; however, once the project was tendered, the costs increased to exceed the $5M threshold requiring Board approval. Aaron Boudreau gave a verbal update on the Main St. Pumping Station Golfview Drive Project. **MOVED BY Commissioner MacLellan, seconded by Commissioner Deagle Gammon that the Halifax Water Board approve additional funding of $550,000 for the Main Street Pump Station Golf View Dr project for a revised total project cost of $ 1,820,000, including net HST.**
Decision	**MOTION PUT AND PASSED.**

Other Business	
6. APPOINTMENT TO BOARD SUBCOMMITTEES	
Discussion Notes	The Chair welcomed Commissioner Trish Purdy to the Halifax Water Board of Commissioners. Commissioner Purdy is an HRM Councilor for District 4. The Chair also welcomed back Commissioners Cuttell and Deagle Gammon and thanked outgoing Commissioners Kent and Russell for their service to the Board. **MOVED BY Commissioner Deagle Gammon, seconded by Commissioner MacLellan that the Halifax Water Board approve the appointment of Commissioner Trish Purdy to the Environment Health & Safety Committee.**
Decision	**MOTION PUT AND PASSED.**

7. LAKE MAJOR WATER LEVEL UPDATE (VERBAL)	
Discussion Notes	Kenda MacKenzie gave a brief presentation and update on the low water levels of Lake Major. Halifax Water is investigating a temporary engineered solution which would involve damming portions of the lake and installing a temporary intake to reach the lower levels of the lake. Staff are currently seeking permits and approval from Nova Scotia Environment and Climate Change. A more permanent solution is also part of the overall Water Enhancement Program. Weekly updates will continue to be provided on the public Halifax Water website.
Decision	**N/A**

Next Meeting Date: January 30, 2025

Minutes taken by:
Lorna Skinner, Governance Coordination Assistant
Regulatory Affairs and Governance Department

ITEM #4.1

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Signed by: A65D6874EBC1467...
Louis de Montbrun, CPA, CA, Director of Corporate Services/CFO

APPROVED: Signed by: Kenda MacKenzie 0C084AC813794F6...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: **Financial Results for the Eight Months ended November 30, 2024**

ORIGIN

Financial information reporting.

BACKGROUND

At the January 16, 2025, meeting of the Halifax Water Audit and Finance Committee, the attached Financial Results as of November 30, 2024, report was reviewed and discussed. The Committee approved forwarding the report to the Halifax Water Board for their information.

DISCUSSION

No additional information was requested to be brought forward to the Halifax Water Board meeting following the discussion of the attached at the Committee meeting.

ATTACHMENT

1. Report to the Halifax Water Audit & Finance Committee dated January 16, 2024, entitled Item #8 – Financial Results for the Eight Months ended November 30, 2024.

ITEM #8

Halifax Water Audit & Finance Committee

January 16, 2025

TO: Chair and Members of the Halifax Regional Water Commission Audit and Finance Committee

SUBMITTED BY: Signed by: A65D6874EBC1467...
Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

DATE: January 10, 2025

SUBJECT: Financial Results for the eight (8) months ended November 30, 2024

ORIGIN

Financial information reporting.

DISCUSSION

Attached are the operating results for Halifax Water for the eight (8) months year ended November 30, 2024, with comparative figures for November 30, 2023.

The following discussion of the operating results reflect direct operating costs by department and allocations among water, wastewater and stormwater for common costs shared across all the services provided by Halifax Water.

Statement of Financial Position (NSUARB) – Page 3 of Attachment 1

Key indicators and balances from the Statement of Financial Position are provided in the following tables.

Table 1: Assets

November 30 (in thousands)	Notes	2024	2023	March 31 2024	From Prior Year $ Change	From Prior Year % Change
Assets						
Current						
Cash and cash equivalents	**A**	$ 86,950	$ 60,786	$ 44,021	$ 26,164	43.0%
Receivables						
Customer charges and contractual		22,539	21,713	21,546	826	3.8%
Unbilled service revenues	**B**	22,651	21,006	20,959	1,645	7.8%
Inventory		2,634	2,509	2,364	125	5.0%
Prepaids	**C**	1,692	2,151	1,735	(459)	(21.3%)
		136,466	108,165	90,625	28,301	26.2%
Utility plant in service		1,362,286	1,284,668	1,374,665	77,618	6.0%
Capital work in progress	**D**	181,738	131,736	114,374	50,002	38.0%
Total assets		1,680,490	1,524,569	1,579,664	155,921	10.2%
Regulatory deferral account		1,917	2,109	2,044	(192)	(9.1%)
Total assets and regulatory deferral account		**$ 1,682,407**	**$ 1,526,678**	**$ 1,581,708**	**$ 155,729**	**10.2%**

Notes related to Table 1:

A) *Cash and cash equivalents* have increased by $26.2 million from the prior year. The total balance of the Regional Development Charge (RDC) reserves, excluding deferred RDCs is $112.4 million.

B) *Unbilled service revenues* have increased $1.6 million due to the timing of billing cycles.

C) *Prepaids* has decreased $0.5 million due to the timing of invoices received on prepaid services.

D) The $50 million increase in *capital work in progress* relates to the expenditures on active capital projects as of November 30.

Table 2: Liabilities and Equity

November 30 (in thousands)	Notes	2024	2023	March 31 2024	From Prior Year $ Change	From Prior Year % Change
Liabilities						
Current						
Payables and accruals						
Trade	**A**	23,953	21,136	23,393	2,817	13.3%
Non-trade		4,670	3,596	5,579	1,074	29.9%
Interest on long term debt		639	543	3,062	96	17.7%
Halifax Regional Municipality	**B**	5,088	1,372	5,047	3,716	270.8%
Contractor and customer deposits		1,190	3,847	1,095	(2,657)	(69.1%)
Current portion of long term debt	**C**	32,881	56,933	39,832	(24,052)	(42.2%)
Unearned revenue	**D**	5,167	5,014	157	153	3.1%
		73,588	92,441	78,165	(18,853)	(20.4%)
Long term debt	**E**	260,046	179,446	196,622	80,600	44.9%
Deferred contributions		117,413	106,163	97,673	11,250	10.6%
Total liabilities		451,047	378,050	372,460	72,997	19.3%
Equity						
Accumulated capital surplus		1,220,553	1,103,642	1,195,016	116,911	10.6%
Accumulated operating surplus		4,879	26,293	9,233	(21,414)	(81.4%)
Operating surplus used to fund capital		12,380	12,380	12,380	0	0.0%
Deficiency of revenues over expenditures		(6,452)	6,313	(7,381)	(12,765)	(202.2%)
Total equity		1,231,360	1,148,628	1,209,248	82,732	7.2%
Total liabilities and equity		**$ 1,682,407**	**$ 1,526,678**	**$ 1,581,708**	**$ 155,729**	**10.2%**

Notes related to Table 2:

A) *Trade payables and accruals* have increased by $2.8 million from the prior year due to an increase in accounts payable processing over last year.

Payables and Accruals				
	2024/25 '000	2023/24 '000	$ Change	% Change
Trade payables	**$ 13,713**	$ 11,402	$ 2,311	20.3%
Trade accrued payables	**8,948**	8,883	65	0.7%
Accrued wastewater rebate	**1,292**	851	441	51.8%
	$ 23,953	$ 21,136	$ 2,817	13.3%

B) *Halifax Regional Municipality payable* has increased by $3.7 million from prior year as a result of the timing of payment of Stormwater Right of Water invoices which resulted in a net difference payable to HRM.

HRM Receivables and Payables				
	2024/25	2023/24		
	'000	'000	$ Change	% Change
Receivables	**$ 127**	$ 1,258	$ (1,131)	(89.9%)
RDC	**5,081**	3,310	1,771	53.5%
Payables	**(10,296)**	(5,940)	(4,356)	73.3%
	$ (5,088)	$ (1,372)	$ (3,716)	270.8%

C) *Current portion of long-term debt* has decreased $24.1 million due to the repayment of HRM debt in September 2024 and balloon payments in November 2024.

D) *Unearned revenue* is slightly higher than the prior year due to a timing difference and accruals in SW revenue billing and bulk water revenue.

E) Increase in *Long term debt* by $80.6 million due to the addition of new debt in November 2024.

Debt servicing ratio is a function of total interest and principal payments (including accrued amounts) plus the amortization of debt issue costs divided by total operating revenue per service. Debt servicing ratio by service as of November 30, 2024, is as follows:

Debt Servicing Ratio by Service		
	2024/25	2023/24
Water	**15.52%**	13.04%
Wastewater	**17.76%**	18.72%
Stormwater	**23.77%**	22.99%
Combined	**17.40%**	16.90%

The combined debt servicing ratio has increased from the prior year. Debt servicing ratios have increased for water and stormwater because of the addition of new debt and decreased for wastewater because of the repayment of HRM debt in September 2024. The combined debt servicing ratio of 17.40% is below the maximum 35.00% ratio allowed under the blanket guarantee agreement with Halifax.

Statement of Earnings (NSUARB) – Page 4 of Attachment 1

Table 3: Summarized Statement of Earnings (NSUARB)

Summarized Statement of Earnings								
		Budget	Actual	Actual	From Prior Year		Actual to Budget	
	Notes	**2024/25**	2024/25	2023/24				
		'000	'000	'000	$ Change	% Change	$ Change	% Change
Operating revenues		**$ 172,058**	$ 117,848	$ 114,401	$ 3,447	3.01%	$ (54,210)	(31.51%)
Operating expenditures		**150,858**	99,461	84,790	14,671	17.30%	(51,397)	(34.07%)
Earnings from operations before financial and other revenues and expenditures		**21,200**	18,387	29,611	(11,224)	(37.90%)	(2,813)	(13.27%)
Financial and other revenues		**998**	414	469	(55)	(11.73%)	(584)	(58.52%)
Financial and other expenditures		**40,902**	25,253	23,767	1,486	6.25%	(15,649)	(38.26%)
Loss for the year	**A**	**$ (18,704)**	$ (6,452)	$ 6,313	$ (12,765)	(202.20%)	$ 12,252	(65.50%)

Notes related to Table 3:

A) The *Loss for the year* of $6.5 million is a decrease of $12.8 million over the prior year *earnings*. The following is a discussion of factors influencing the change.

Table 4: Operating Revenues:

Operating Revenues								
		Budget	**Actual**	Actual	From Prior Year		Actual to Budget	
	Notes	**2024/25**	**2024/25**	2023/24				
		'000	**'000**	'000	$ Change	% Change	$ Change	% Change
Consumption revenue	**B**	**$ 111,434**	**$ 77,914**	$ 75,095	$ 2,819	3.75%	$ (33,520)	(30.08%)
Base charge revenue		**34,356**	**23,044**	23,048	(4)	(0.02%)	(11,312)	(32.93%)
Wastewater rebate		**(1,628)**	**(1,401)**	(1,136)	(265)	23.33%	227	(13.94%)
Metered sales total		**144,162**	**99,557**	97,007	2,550	2.63%	$ (44,605)	(30.94%)
Stormwater site generated charge	**C**	**8,864**	**5,289**	4,879	410	8.40%	(3,575)	(40.33%)
Stormwater right of way		**6,515**	**4,344**	4,344	-	0.00%	(2,171)	(33.32%)
Public fire protection		**8,083**	**5,389**	5,389	-	0.00%	(2,694)	(33.33%)
Private fire protection		**1,721**	**1,142**	1,099	43	3.91%	(579)	(33.64%)
Other operating revenue		**2,713**	**2,127**	1,683	444	26.38%	(586)	(21.60%)
Operating revenue total	**A**	**$ 172,058**	**$ 117,848**	$ 114,401	$ 3,447	3.01%	$ (54,210)	(31.51%)

Notes related to Table 4:

Operating revenues are presented above, broken down by type:

A) *Operating revenues* have increased $3.4 million as compared to the previous year.

B) *Consumption revenue* has increased $2.8 million over the prior year partially due to an increase in total water consumption of 1.4%.

Consumption by Customer Class (m³)				
	2024/25	2023/24	m³ Change	% Change
Commercial	**4,739,305**	4,876,584	(137,279)	(2.8%)
Industrial	**1,201,311**	1,203,323	(2,012)	(0.2%)
Institutional	**2,581,387**	2,672,518	(91,131)	(3.4%)
Multi-residential	**5,532,541**	5,354,782	177,759	3.3%
Residential	**8,845,413**	8,481,030	364,383	4.3%
	22,899,957	22,588,238	311,719	1.4%

C) *Stormwater site generated charge revenue* is $0.4 million higher due to a change in the accrual for unbilled revenue as compared to the prior year.

Table 5: Operating expenditures:

Operating Expenditures								
		Budget	**Actual**	Actual	From Prior Year		Actual to Budget	
	Notes	**2024/25**	**2024/25**	2023/24	$ Change	% Change	$ Change	% Change
		'000	**'000**	'000				
Water supply and treatment		**$ 13,661**	**$ 9,591**	$ 9,414	$ 177	1.87%	$ (4,070)	(29.79%)
Water transmission and distribution	**B**	**14,066**	**9,424**	8,048	1,377	17.10%	(4,642)	(33.00%)
Wastewater collection		**14,346**	**9,683**	9,420	263	2.79%	(4,663)	(32.50%)
Stormwater collection	**D**	**5,816**	**4,200**	3,222	977	30.34%	(1,616)	(27.79%)
Wastewater treatment	**C**	**26,368**	**16,616**	15,311	1,305	8.52%	(9,752)	(36.98%)
Engineering and technology services	**E**	**17,757**	**12,173**	8,928	3,245	36.34%	(5,584)	(31.45%)
Regulatory services		**5,922**	**3,400**	3,173	227	7.11%	(2,522)	(42.59%)
Customer services		**4,507**	**2,987**	2,931	56	1.91%	(1,520)	(33.73%)
Corporate services		**3,743**	**2,496**	2,229	266	11.95%	(1,247)	(33.32%)
Administration services		**10,267**	**3,448**	2,891	557	19.27%	(6,819)	(66.42%)
Depreciation and amortization	**F**	**34,405**	**25,443**	19,223	6,221	32.36%	(8,962)	(26.05%)
Total operating expenditures	**A**	**$ 150,858**	**$ 99,461**	$ 84,790	$ 14,671	17.30%	$ (51,397)	(34.07%)

Notes related to Table 5:

A) *Operating expenditures* of $99.5 million are $14.7 million higher than the prior year.

B) *Water transmission and distribution* expenditures have increased $1.4 million from prior year due to an increase in costs of electricity, vehicle cost allocation, hired equipment, road and street repairs, contract services, wages, materials and supplies, and traffic control services.

C) *Wastewater treatment* expenditures have increased $1.3 million from prior year due mainly to an increase in electricity, equipment repairs and biosolid treatment costs.

D) *Stormwater collection* expenditures have increased $1.0 million from prior year due to an increase in contract services and traffic control which was caused by an increase in ditching work required for recently acquired stormwater infrastructure through the boundary expansion.

E) *Engineering and technology services* expenditures have increased $3.2 million from prior year due to an increase in computer software and licenses, network equipment, and salaries.

F) *Depreciation and amortization* increased $6.2 million over prior year because of additions to assets including capitalization of the Cayenta ERP system and other new assets added in the prior year.

Table 6: Financial and other revenues:

Financial and other revenues								
		Budget	Actual	Actual	From Prior Year		Actual to Budget	
	Notes	2024/25 '000	2024/25 '000	2023/24 '000	$ Change	% Change	$ Remaining	% Remaining
Interest		$ 383	$ 65	$ 136	$ (71)	(52.21%)	$ (318)	(83.03%)
Other		615	349	287	62	21.60%	(266)	(43.25%)
Total financial and other revenues	A	$ 998	$ 414	$ 423	$ (9)	(2.13%)	$ (584)	(58.52%)

Notes related to Table 6:

A) *Financial and other revenues* have decreased from prior year due to lower interest rates resulting in less revenue earned on cash balances.

Table 7: Financial and other expenditures:

Financial and other expenditures								
		Budget	Actual	Actual	From Prior Year		Actual to Budget	
	Notes	2024/25 '000	2024/25 '000	2023/24 '000	$ Change	% Change	$ Remaining	% Remaining
Interest on long term debt		9,375	5,684	4,371	1,313	30.04%	(3,691)	(39.37%)
Repayment on long term debt		24,077	14,665	14,815	(150)	(1.01%)	(9,412)	(39.09%)
Amortization of debt discount		244	161	145	16	11.03%	(83)	(34.02%)
Dividend/grant in lieu of taxes		7,031	4,651	4,403	248	5.63%	(2,380)	(33.85%)
Other		175	92	33	59	178.79%	(83)	(47.43%)
Total financial and other expenditures	A	$ 40,902	$ 25,253	$ 23,767	$ 1,486	6.25%	$ (15,649)	(38.26%)

Notes related to Table 7:

A) *Financial and other expenditures* have increased $1.5 million when compared to prior year due to an increase in interest on new debt.

Table 8: Operating Results by Service:

Operating Results by Service	Budget 2024/25 '000	Actual 2024/25 '000	Actual 2023/24 '000	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Change	Actual to Budget % Change
Water	**$ (9,233)**	$ (7,263)	$ (509)	$ (6,754)	1326.92%	$ 1,970	(21.34%)
Wastewater	**(6,996)**	2,727	4,195	(1,468)	(34.99%)	9,723	(138.98%)
Stormwater	**(2,475)**	(1,916)	(82)	(1,834)	2236.59%	559	(22.59%)
Loss	**$ (18,704)**	$ (6,452)	$ 3,604	$ (10,056)	(279.02%)	$ 12,252	(65.50%)

The results in Table 8 are explained in more detail in Tables 9 to 11.

Table 9: Operating Results by Service – Water:

Operating Results by Service - Water	Notes	Budget 2024/25 '000	Actual 2024/25 '000	Actual 2023/24 '000	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Change	Actual to Budget % Change
Operating revenues	**A**	**$ 65,479**	**$ 45,096**	$ 43,662	$ 1,434	3.28%	$ (20,383)	(31.13%)
Operating expenditures	**B**	**58,189**	**41,715**	35,062	6,653	18.97%	(16,474)	(28.31%)
Earnings from operations		**7,290**	**3,381**	8,600	(5,219)	(60.69%)	(3,909)	(53.62%)
Financial and other revenues		**830**	**416**	398	18	4.52%	(414)	(49.88%)
Financial and other expenditures	**C**	**17,353**	**11,060**	9,507	1,553	16.34%	(6,293)	(36.26%)
Loss for the year		**$ (9,233)**	**$ (7,263)**	$ (509)	$ (6,754)	1326.92%	$ 1,970	(21.34%)

Water services loss of $7.3 million has increased from the prior year loss by $6.8 million due to the following factors:

A) Increase in *operating revenues* of $1.4 million due to an increase in consumption as previously discussed under Notes to Table 4.

B) Increase in *operating expenditures* of $6.7 million due to higher costs in water transmission and distribution, engineering and technology services, and depreciation and amortization.

C) Increase in *financial and other expenditures* due to increasing interest rates on long term debt and a higher dividend/grant in lieu of taxes. Repayment of long term debt will be higher in future months with the new debt received in November and the results will more closely align with budget.

Table 10: Operating Results by Service – Wastewater:

Operating Results by Service - Wastewater								
		Budget	Actual	Actual	From Prior Year		Actual to Budget	
	Notes	2024/25 '000	2024/25 '000	2023/24 '000	$ Change	% Change	$ Change	% Change
Operating revenues	A	$ 90,952	$ 62,939	$ 61,415	$ 1,524	2.48%	$ (28,013)	(30.80%)
Operating expenditures	B	78,542	48,613	45,314	3,299	7.28%	(29,929)	(38.11%)
Earnings (loss) from operations		12,410	14,326	16,101	(1,775)	(11.02%)	1,916	15.44%
Financial and other revenues		296	143	117	26	22.22%	(153)	(51.69%)
Financial and other expenditures	C	19,702	11,742	12,023	(281)	(2.34%)	(7,960)	(40.40%)
Earnings (loss) for the year	D	$ (6,996)	$ 2,727	$ 4,195	$ (1,468)	(34.99%)	$ 9,723	(138.98%)

Wastewater services earnings of $2.7 million has decreased $1.5 million over prior year due to the following factors:

A) *Operating revenues* increase of $1.5 million is attributable primarily due to an increase in consumption as previously discussed under Notes to Table 4

B) *Operating expenditures* increase of $3.3 million is attributable primarily due to an increase in depreciation and amortization because of additions to assets as previously discussed under Notes to Table 5. Depreciation will increase in future months as more new assets are capitalized.

C) *Financial and other expenditures* decrease of $0.3 million due to lower repayment of long term debt following the final payment on a large debt issue payable to HRM to finance wastewater assets. Repayments will be higher in future months with the new debt received in November.

Table 11: Operating Results by Service – Stormwater:

Operating Results by Service - Stormwater								
		Budget	Actual	Actual	From Prior Year		Actual to Budget	
	Notes	2024/25 '000	2024/25 '000	2023/24 '000	$ Change	% Change	$ Change	% Change
Operating revenues	A	$ 15,627	$ 9,813	$ 9,324	$ 489	5.24%	$ (5,814)	(37.20%)
Operating expenditures	B	14,127	9,133	7,123	2,010	28.22%	(4,994)	(35.35%)
Loss from operations		1,500	680	2,201	(1,521)	(69.10%)	(820)	(54.67%)
Financial and other revenues	C	(128)	(145)	(46)	(99)	215.22%	(17)	13.28%
Financial and other expenditures	D	3,847	2,451	2,237	214	9.57%	(1,396)	(36.29%)
Loss for the year	E	$ (2,475)	$ (1,916)	$ (82)	$ (1,834)	2236.59%	$ 559	(22.59%)

Stormwater services loss of $1.9 million is $1.8 million greater than the prior year loss. The following factors influenced the results:

A) Increase of $1.1 million in *operating revenues* from prior year due to an increase in the amount accrued for unbilled service.

B) Increase of $2.0 million in *operating expenditures* from prior year due to an increase in contract services, traffic control, ditching, catch basin cleaning and hired equipment as previously discussed in Notes to Table 5.

C) Change in Financial and other revenues is the result of higher allocation of the interest cost as the stormwater service has a larger accumulated loss than in the prior year.

D) Increase in financial and other expenditures due to increasing interest rates on long term debt and principal payments for new debt.

E) The lower operating revenues and higher operating expenditures results in a current loss for the year of $1.9 million. Revenues will continue to accumulate while expenses are expected to be lower in the winter months and result in a loss that is more closely aligned with budget.

Results under NSUARB Handbook as compared to International Financial Reporting Standards

As a rate regulated utility, the Accounting Standards Board (AcSB) requires Halifax Water to report financial results using IFRS. The NSUARB requires Halifax Water to report in accordance with the NSUARB Handbook. The differences between IFRS and the NSUARB Handbook include Non-cash pension expense, principal payments of long term debt, depreciation expense on contributed assets, various depreciation adjustments and other comprehensive income gain.

Attachments

Attachment 1: Financial results for the eight months ended November 30, 2024.

Report prepared by: Signed by: Michelle Bennett 0293B54B1309429...

Michelle Bennett, BComm
A/Manager of Accounting (782) 641-5972

HALIFAX WATER
UNAUDITED STATEMENT OF FINANCIAL POSITION - IFRS
November 30, 2024 (in thousands)

November 30 (in thousands)	2024	2023	March 31 2024	From Prior Year $ Change	From Prior Year % Change
Assets					
Current					
Cash and cash equivalents	$ 86,950	$ 60,785	$ 44,021	$ 26,165	43.0%
Receivables					
Customer charges and contractual	22,539	20,392	21,546	2,147	10.5%
Unbilled service revenues	22,651	21,006	20,959	1,645	7.8%
Inventory	2,634	2,515	2,364	119	4.7%
Prepaids	1,692	2,151	1,735	(459)	(21.3%)
	136,466	106,849	90,625	29,617	27.7%
Intangible assets	34,622	22,807	35,989	11,815	51.8%
Capital work in progress	181,738	131,728	114,374	50,010	38.0%
Utility plant in service	1,284,641	1,274,171	1,297,942	10,470	0.8%
Total assets	1,637,467	1,535,555	1,538,930	101,912	6.6%
Regulatory deferral account	1,917	2,109	2,045	(192)	(9.1%)
Total assets and regulatory deferral account	**$ 1,639,384**	**$ 1,537,664**	**$ 1,540,975**	**$ 101,720**	**6.6%**
Liabilities					
Current					
Payables and accruals					
Trade	23,953	21,139	23,393	2,814	13.3%
Non-trade	4,670	3,596	5,579	1,074	29.9%
Interest on long term debt	639	604	3,062	35	5.8%
Contractor and customer deposits	1,190	1,599	1,095	(409)	(25.6%)
Current portion of deferred contributed capital	19,260	37,672	19,260	(18,412)	(48.9%)
Current portion of long term debt	32,881	56,933	39,832	(24,052)	(42.2%)
Unearned revenue	5,167	5,014	157	153	3.1%
	87,760	126,557	102,282	(38,797)	(30.7%)
Deferred contributed capital	935,049	908,181	928,048	26,868	3.0%
Long term debt	260,046	179,448	196,622	80,598	44.9%
Employee benefit obligation	3,168	12,458	2,353	(9,290)	(74.6%)
Total liabilities	1,286,023	1,226,644	1,229,305	59,379	4.8%
Equity					
Accumulated other comprehensive loss	60,395	51,651	60,395	8,744	16.9%
Accumulated surplus	292,966	259,369	251,275	33,597	13.0%
Total equity	353,361	311,020	311,670	42,341	13.6%
Total liabilities and equity	**$ 1,639,384**	**$ 1,537,664**	**$ 1,540,975**	**$ 101,720**	**6.6%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS AND COMPREHENSIVE EARNINGS - ALL SERVICES - IFRS
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Remaining	Actual to Budget % Remaining
Operating revenues								
Water	$ 38,039	$ 36,700	$ 54,832	69.37%	$ 1,339	3.65%	$ (16,793)	(30.63%)
Wastewater	61,518	60,307	89,330	68.87%	1,211	2.01%	(27,812)	(31.13%)
Stormwater	9,633	9,223	15,379	62.64%	410	4.45%	(5,746)	(37.36%)
Public fire protection	5,389	5,389	8,083	66.67%	0	0.00%	(2,694)	(33.33%)
Private fire protection	1,142	1,099	1,721	66.36%	43	3.91%	(579)	(33.64%)
Other operating revenue	2,127	1,683	2,713	78.40%	444	26.38%	(586)	(21.60%)
	117,848	**114,401**	**172,058**	**68.49%**	**3,447**	**3.01%**	**(54,210)**	**(31.51%)**
Operating expenditures								
Water supply and treatment	9,591	9,414	13,661	70.21%	177	1.88%	(4,070)	(29.79%)
Water transmission and distribution	9,424	8,048	14,066	67.00%	1,376	17.10%	(4,642)	(33.00%)
Wastewater collection	9,683	9,420	14,346	67.50%	263	2.79%	(4,663)	(32.50%)
Stormwater collection	4,200	3,222	5,816	72.21%	978	30.35%	(1,616)	(27.79%)
Wastewater treatment	16,616	15,311	26,368	63.02%	1,305	8.52%	(9,752)	(36.98%)
Engineering and technology services	12,173	8,928	17,757	68.55%	3,245	36.35%	(5,584)	(31.45%)
Regulatory compliance services	3,400	3,173	5,922	57.41%	227	7.15%	(2,522)	(42.59%)
Customer services	2,987	2,931	4,507	66.27%	56	1.91%	(1,520)	(33.73%)
Corporate services	2,496	2,229	3,743	66.68%	267	11.98%	(1,247)	(33.32%)
Administration services	3,448	2,891	10,267	33.58%	557	19.27%	(6,819)	(66.42%)
Pension services	956	4,354	2,890	33.08%	(3,398)	(78.04%)	(1,934)	(66.92%)
Depreciation and amortization	38,060	45,558	53,665	70.92%	(7,498)	(16.46%)	(15,605)	(29.08%)
	113,034	**115,479**	**173,008**	**65.33%**	**(2,445)**	**(2.12%)**	**(59,974)**	**(34.67%)**
Earnings (loss) from operations before financial and other revenues and expenditures	**4,814**	**(1,078)**	**(950)**	**(506.74%)**	**5,892**	**(546.57%)**	**5,764**	**(606.74%)**
Financial and other revenues								
Interest	65	136	383	16.97%	(71)	(52.21%)	(318)	(83.03%)
Amortization of contributed capital	9,803	12,568	19,260	50.90%	(2,765)	(22.00%)	(9,457)	(49.10%)
Other	349	333	615	56.75%	16	4.80%	(266)	(43.25%)
	10,217	**13,037**	**20,258**	**50.43%**	**(2,820)**	**(21.63%)**	**(10,041)**	**(49.57%)**
Financial and other expenditures								
Interest	0	0	0	0.00%	0	0.00%	0	0.00%
Interest on long term debt	5,684	4,371	9,375	60.63%	1,313	30.04%	(3,691)	(39.37%)
Amortization of debt discount	161	145	244	65.98%	16	11.03%	(83)	(34.02%)
Dividend/grant in lieu of taxes	4,651	4,403	7,031	66.15%	248	5.63%	(2,380)	(33.85%)
Other	91	32	175	52.00%	59	184.38%	(84)	(48.00%)
	10,587	**8,951**	**16,825**	**62.92%**	**1,636**	**18.28%**	**(6,238)**	**(37.08%)**
Earnings for the year before other comprehensive earnings	**$ 4,444**	**$ 3,008**	**$ 2,483**	**178.98%**	**$ 1,436**	**47.74%**	0 **$ 1,961**	0.00% **78.98%**
Other comprehensive earnings	0	0	0	0.00%	0	0.00%	0 0 0	0.00% 0.00% 0.00%
Total comprehensive earnings for the year	**$ 4,444**	**$ 3,008**	**$ 2,483**	**178.98%**	**$ 1,436**	**47.74%**	**$ 1,961**	**78.98%**

HALIFAX WATER
UNAUDITED STATEMENT OF FINANCIAL POSITION - NSUARB
November 30, 2024 (in thousands)

November 30 (in thousands)	2024	2023	March 31 2024	From Prior Year $ Change	From Prior Year % Change
Assets					
Current					
Cash and cash equivalents	$ 86,950	$ 60,786	$ 44,021	$ 26,164	43.0%
Receivables					
Customer charges and contractual	22,539	21,713	21,546	826	3.8%
Unbilled service revenues	22,651	21,006	20,959	1,645	7.8%
Inventory	2,634	2,509	2,364	125	5.0%
Prepaids	1,692	2,151	1,735	(459)	(21.3%)
	136,466	108,165	90,625	28,301	26.2%
Utility plant in service	1,362,286	1,284,668	1,374,665	77,618	6.0%
Capital work in progress	181,738	131,736	114,374	50,002	38.0%
Total assets	1,680,490	1,524,569	1,579,664	155,921	10.2%
Regulatory deferral account	1,917	2,109	2,044	(192)	(9.1%)
Total assets and regulatory deferral account	**$ 1,682,407**	**$ 1,526,678**	**$ 1,581,708**	**$ 155,729**	**10.2%**
Liabilities					
Current					
Payables and accruals					
Trade	23,953	21,136	23,393	2,817	13.3%
Non-trade	4,670	3,596	5,579	1,074	29.9%
Interest on long term debt	639	543	3,062	96	17.7%
Halifax Regional Municipality	5,088	1,372	5,047	3,716	270.8%
Contractor and customer deposits	1,190	3,847	1,095	(2,657)	(69.1%)
Current portion of long term debt	32,881	56,933	39,832	(24,052)	(42.2%)
Unearned revenue	5,167	5,014	157	153	3.1%
	73,588	92,441	78,165	(18,853)	(20.4%)
Long term debt	260,046	179,446	196,622	80,600	44.9%
Deferred contributions	117,413	106,163	97,673	11,250	10.6%
Total liabilities	451,047	378,050	372,460	72,997	19.3%
Equity					
Accumulated capital surplus	1,220,553	1,103,642	1,195,016	116,911	10.6%
Accumulated operating surplus	4,879	26,293	9,233	(21,414)	(81.4%)
Operating surplus used to fund capital	12,380	12,380	12,380	0	0.0%
Deficiency of revenues over expenditures	(6,452)	6,313	(7,381)	(12,765)	(202.2%)
Total equity	1,231,360	1,148,628	1,209,248	82,732	7.2%
Total liabilities and equity	**$ 1,682,407**	**$ 1,526,678**	**$ 1,581,708**	**$ 155,729**	**10.2%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - ALL SERVICES - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Remaining	Actual to Budget % Remaining
Operating revenues								
Water	$ 38,039	$ 36,700	$ 54,832	69.37%	$ 1,339	3.65%	$ (16,793)	(30.63%)
Wastewater	61,518	60,307	89,330	68.87%	1,211	2.01%	(27,812)	(31.13%)
Stormwater site generated service	5,289	4,879	8,864	59.67%	410	8.40%	(3,575)	(40.33%)
Stormwater right of way service	4,344	4,344	6,515	66.68%	0	0.00%	(2,171)	(33.32%)
Fire protection (public and private)	6,531	6,488	9,804	66.62%	43	0.66%	(3,273)	(33.38%)
Other services and fees	1,282	1,041	1,551	82.66%	241	23.15%	(269)	(17.34%)
Late payment and other connection fees	350	270	639	54.77%	80	29.63%	(289)	(45.23%)
Miscellaneous	495	372	523	94.65%	123	33.06%	(28)	(5.35%)
	117,848	**114,401**	**172,058**	**68.49%**	**3,447**	**3.01%**	**(54,210)**	**(31.51%)**
Operating expenditures								
Water supply and treatment	9,591	9,414	13,661	70.21%	177	1.88%	(4,070)	(29.79%)
Water transmission and distribution	9,424	8,048	14,066	67.00%	1,376	17.10%	(4,642)	(33.00%)
Wastewater collection	9,683	9,420	14,346	67.50%	263	2.79%	(4,663)	(32.50%)
Stormwater collection	4,200	3,222	5,816	72.21%	978	30.35%	(1,616)	(27.79%)
Wastewater treatment	16,616	15,311	26,368	63.02%	1,305	8.52%	(9,752)	(36.98%)
Engineering and technology services	12,173	8,928	17,757	68.55%	3,245	36.35%	(5,584)	(31.45%)
Regulatory compliance services	3,400	3,173	5,922	57.41%	227	7.15%	(2,522)	(42.59%)
Customer services	2,987	2,931	4,507	66.27%	56	1.91%	(1,520)	(33.73%)
Corporate services	2,496	2,229	3,743	66.68%	267	11.98%	(1,247)	(33.32%)
Administration services	3,448	2,891	10,267	33.58%	557	19.27%	(6,819)	(66.42%)
Depreciation and amortization	25,443	19,223	34,405	73.95%	6,220	32.36%	(8,962)	(26.05%)
	99,461	**84,790**	**150,858**	**65.93%**	**14,671**	**17.30%**	**(51,397)**	**(34.07%)**
Earnings from operations before financial and other revenues and expenditures	**18,387**	**29,611**	**21,200**	**86.73%**	**(11,224)**	**(37.90%)**	**(2,813)**	**(13.27%)**
Financial and other revenues								
Interest	65	136	383	16.97%	(71)	(52.21%)	(318)	(83.03%)
Other	349	287	615	56.75%	62	21.60%	(266)	(43.25%)
	414	**423**	**998**	**41.48%**	**(9)**	**(2.13%)**	**(584)**	**(58.52%)**
Financial and other expenditures								
Interest on long term debt	5,684	4,371	9,375	60.63%	1,313	30.04%	(3,691)	(39.37%)
Repayment on long term debt	14,665	14,815	24,077	60.91%	(150)	(1.01%)	(9,412)	(39.09%)
Amortization of debt discount	161	145	244	65.98%	16	11.03%	(83)	(34.02%)
Dividend/grant in lieu of taxes	4,651	4,403	7,031	66.15%	248	5.63%	(2,380)	(33.85%)
Other	92	33	175	52.57%	59	178.79%	(83)	(47.43%)
	25,253	**23,767**	**40,902**	**61.74%**	**1,486**	**6.25%**	**(15,649)**	**(38.26%)**
Earnings (loss) for the year	**$ (6,452)**	**$ 6,267**	**$ (18,704)**	**34.50%**	**$ (12,719)**	**(202.95%)**	**$ 12,252**	**(65.50%)**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WATER - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE		APR 1/24 MAR 31/25	ACTUAL YEAR TO DATE	From Prior Year		Actual to Budget	
	THIS YEAR '000	LAST YEAR '000	BUDGET '000	as % of BUDGET	$ Change	% Change	$ Remaining	% Remaining
Operating revenues - Water								
Water	$ 38,039	$ 36,700	$ 54,832	69.37%	$ 1,339	3.65%	$ (16,793)	(30.63%)
Public fire protection	5,389	5,389	8,083	66.67%	0	0.00%	(2,694)	(33.33%)
Private fire protection	1,142	1,099	1,721	66.36%	43	3.91%	(579)	(33.64%)
Bulk water stations	165	171	369	44.72%	(6)	(3.51%)	(204)	(55.28%)
Late payment and other connection fees	115	90	205	56.10%	25	27.78%	(90)	(43.90%)
Miscellaneous	246	213	269	91.45%	33	15.49%	(23)	(8.55%)
	45,096	**43,662**	**65,479**	**68.87%**	**1,434**	**3.28%**	**(20,383)**	**(31.13%)**
Operating expenditures - Water								
Water supply and treatment	9,591	9,414	13,661	70.21%	177	1.88%	(4,070)	(29.79%)
Water transmission and distribution	9,424	8,048	14,066	67.00%	1,376	17.10%	(4,642)	(33.00%)
Engineering and technology services	5,634	3,409	6,412	87.87%	2,225	65.27%	(778)	(12.13%)
Regulatory compliance services	1,363	941	1,647	82.76%	422	44.85%	(284)	(17.24%)
Customer services	1,523	1,617	2,299	66.25%	(94)	(5.81%)	(776)	(33.75%)
Corporate services	1,273	1,242	1,909	66.68%	31	2.50%	(636)	(33.32%)
Administration services	1,719	1,600	5,236	32.83%	119	7.44%	(3,517)	(67.17%)
Depreciation and amortization	11,188	8,791	12,959	86.33%	2,397	27.27%	(1,771)	(13.67%)
	41,715	**35,062**	**58,189**	**71.69%**	**6,653**	**18.97%**	**(16,474)**	**(28.31%)**
Earnings from operations before financial and other revenues and expenditures	**3,381**	**8,600**	**7,290**	**46.38%**	**(5,219)**	**(60.69%)**	**(3,909)**	**(53.62%)**
Financial and other revenues								
Interest	133	133	372	35.75%	0	0.00%	(239)	(64.25%)
Other	283	265	458	61.79%	18	6.79%	(175)	(38.21%)
	416	**398**	**830**	**50.12%**	**18**	**4.52%**	**(414)**	**(49.88%)**
Financial and other expenditures								
Interest on long term debt	2,405	1,635	4,109	58.53%	770	47.09%	(1,704)	(41.47%)
Repayment on long term debt	4,529	4,000	6,997	64.73%	529	13.23%	(2,468)	(35.27%)
Amortization of debt discount	66	57	112	58.93%	9	15.79%	(46)	(41.07%)
Dividend/grant in lieu of taxes	3,975	3,785	6,005	66.19%	190	5.02%	(2,030)	(33.81%)
Other	85	30	130	65.38%	55	183.33%	(45)	(34.62%)
	11,060	**9,507**	**17,353**	**63.74%**	**1,553**	**16.34%**	**(6,293)**	**(36.26%)**
Loss for the year	**$ (7,263)**	**$ (509)**	**$ (9,233)**	**78.66%**	**$ (6,754)**	**1326.92%**	**$ 1,970**	**(21.34%)**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WASTEWATER - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Remaining	Actual to Budget % Remaining
Operating revenues - Wastewater								
Wastewater	$ 61,518	$ 60,307	$ 89,330	68.87%	$ 1,211	2.01%	$ (27,812)	(31.13%)
Leachate and other contract revenue	364	388	507	71.79%	(24)	(6.19%)	(143)	(28.21%)
Septage tipping fees	608	409	570	106.67%	199	48.66%	38	6.67%
Overstrength surcharge	106	0	0	0.00%	106	0.00%	106	0.00%
Airplane effluent	39	73	105	37.14%	(34)	(46.58%)	(66)	(62.86%)
Late payment and other connection fees	187	151	253	73.91%	36	23.84%	(66)	(26.09%)
Miscellaneous	117	87	187	62.57%	30	34.48%	(70)	(37.43%)
	62,939	**61,415**	**90,952**	**69.20%**	**1,524**	**2.48%**	**(28,013)**	**(30.80%)**
Operating expenditures - Wastewater								
Wastewater collection	9,683	9,420	14,346	67.50%	263	2.79%	(4,663)	(32.50%)
Wastewater treatment	16,616	15,311	26,368	63.02%	1,305	8.52%	(9,752)	(36.98%)
Engineering and technology services	5,320	4,570	9,335	56.99%	750	16.41%	(4,015)	(43.01%)
Regulatory compliance services	951	1,026	1,889	50.34%	(75)	(7.31%)	(938)	(49.66%)
Customer services	1,350	1,204	2,029	66.54%	146	12.13%	(679)	(33.46%)
Corporate services	1,101	888	1,651	66.69%	213	23.99%	(550)	(33.31%)
Administration services	1,548	1,165	4,528	34.19%	383	32.88%	(2,980)	(65.81%)
Depreciation and amortization	12,044	11,730	18,396	65.47%	314	2.68%	(6,352)	(34.53%)
	48,613	**45,314**	**78,542**	**61.89%**	**3,299**	**7.28%**	**(29,929)**	**(38.11%)**
Earnings from operations before financial and other revenues and expenditures	**14,326**	**16,101**	**12,410**	**115.44%**	**(1,775)**	**(11.02%)**	**1,916**	**15.44%**
Financial and other revenues								
Interest	77	49	139	55.40%	28	57.14%	(62)	(44.60%)
Other	66	68	157	42.04%	(2)	(2.94%)	(91)	(57.96%)
	143	**117**	**296**	**48.31%**	**26**	**22.22%**	**(153)**	**(51.69%)**
Financial and other expenditures								
Interest on long term debt	2,555	2,245	4,122	61.98%	310	13.81%	(1,567)	(38.02%)
Repayment on long term debt	8,545	9,178	14,587	58.58%	(633)	(6.90%)	(6,042)	(41.42%)
Amortization of debt discount	77	72	104	74.04%	5	6.94%	(27)	(25.96%)
Dividend/grant in lieu of taxes	558	525	844	66.11%	33	6.29%	(286)	(33.89%)
Other	7	3	45	15.56%	4	133.33%	(38)	(84.44%)
	11,742	**12,023**	**19,702**	**59.60%**	**(281)**	**(2.34%)**	**(7,960)**	**(40.40%)**
Earnings (loss) for the year	**$ 2,727**	**$ 4,195**	**$ (6,996)**	**(38.98%)**	**$ (1,468)**	**(34.99%)**	**$ 9,723**	**(138.98%)**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - STORMWATER - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Remaining	Actual to Budget % Remaining
Operating revenues - Stormwater								
Stormwater site generated service	$ 5,289	$ 4,879	$ 8,864	59.67%	$ 410	8.40%	$ (3,575)	(40.33%)
Stormwater right of way service	4,344	4,344	6,515	66.68%	0	0.00%	(2,171)	(33.32%)
Late payment and other connection fees	48	29	181	26.52%	19	65.52%	(133)	(73.48%)
Miscellaneous	132	72	67	197.01%	60	83.33%	65	97.01%
	9,813	**9,324**	**15,627**	**62.80%**	**489**	**5.24%**	**(5,814)**	**(37.20%)**
Operating expenditures - Stormwater								
Stormwater collection	4,200	3,222	5,816	72.21%	978	30.35%	(1,616)	(27.79%)
Engineering and technology services	1,219	949	2,010	60.65%	270	28.45%	(791)	(39.35%)
Regulatory compliance services	1,086	1,206	2,386	45.52%	(120)	(9.95%)	(1,300)	(54.48%)
Customer services	114	110	179	63.69%	4	3.64%	(65)	(36.31%)
Corporate services	122	99	183	66.67%	23	23.23%	(61)	(33.33%)
Administration services	181	126	503	35.98%	55	43.65%	(322)	(64.02%)
Depreciation and amortization	2,211	1,411	3,050	72.49%	800	56.70%	(839)	(27.51%)
	9,133	**7,123**	**14,127**	**64.65%**	**2,010**	**28.22%**	**(4,994)**	**(35.35%)**
Earnings from operations before financial and other revenues and expenditures	**680**	**2,201**	**1,500**	**45.33%**	**(1,521)**	**(69.10%)**	**(820)**	**(54.67%)**
Financial and other revenues								
Interest	(145)	(46)	(128)	113.28%	(99)	215.22%	(17)	13.28%
	(145)	**(46)**	**(128)**	**113.28%**	**(99)**	**215.22%**	**(17)**	**13.28%**
Financial and other expenditures								
Interest on long term debt	724	491	1,144	63.29%	233	47.45%	(420)	(36.71%)
Repayment on long term debt	1,591	1,637	2,493	63.82%	(46)	(2.81%)	(902)	(36.18%)
Amortization of debt discount	18	16	28	64.29%	2	12.50%	(10)	(35.71%)
Dividend/grant in lieu of taxes	118	93	182	64.84%	25	26.88%	(64)	(35.16%)
	2,451	**2,237**	**3,847**	**63.71%**	**214**	**9.57%**	**(1,396)**	**(36.29%)**
Earnings (loss) for the year	**$ (1,916)**	**$ (82)**	**$ (2,475)**	**77.41%**	**$ (1,834)**	**2236.59%**	**$ 559**	**(22.59%)**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	ACTUAL YEAR TO DATE LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	From Prior Year % Change	Actual to Budget $ Remaining	Actual to Budget % Remaining
REGULATED ACTIVITIES								
Operating revenues								
Water	$ 38,039	$ 36,700	$ 54,832	69.37%	$ 1,339	3.65%	$ (16,793)	(30.63%)
Wastewater	61,518	60,307	89,330	68.87%	1,211	2.01%	(27,812)	(31.13%)
Stormwater	9,633	9,223	15,379	62.64%	410	4.45%	(5,746)	(37.36%)
Public fire protection	5,389	5,389	8,083	66.67%	0	0.00%	(2,694)	(33.33%)
Private fire protection	1,142	1,099	1,721	66.36%	43	3.91%	(579)	(33.64%)
Miscellaneous	1,116	813	1,531	72.89%	303	37.27%	(415)	(27.11%)
	116,837	**113,531**	**170,876**	**68.38%**	**3,306**	**2.91%**	**(54,039)**	**(31.62%)**
Operating expenditures								
Water supply and treatment	9,589	9,409	13,661	70.19%	180	1.91%	(4,072)	(29.81%)
Water transmission and distribution	9,424	8,048	14,066	67.00%	1,376	17.10%	(4,642)	(33.00%)
Wastewater collection	9,654	9,379	14,285	67.58%	275	2.93%	(4,631)	(32.42%)
Stormwater collection	4,200	3,222	5,816	72.21%	978	30.35%	(1,616)	(27.79%)
Wastewater treatment	16,053	14,761	25,571	62.78%	1,292	8.75%	(9,518)	(37.22%)
Engineering and technology services	12,173	8,928	17,757	68.55%	3,245	36.35%	(5,584)	(31.45%)
Regulatory compliance services	3,400	3,173	5,922	57.41%	227	7.15%	(2,522)	(42.59%)
Customer services	2,957	2,945	4,467	66.20%	12	0.41%	(1,510)	(33.80%)
Corporate services	2,484	2,225	3,730	66.60%	259	11.64%	(1,246)	(33.40%)
Administration services	3,374	2,858	10,130	33.31%	516	18.05%	(6,756)	(66.69%)
Depreciation and amortization	25,430	21,918	34,371	73.99%	3,512	16.02%	(8,941)	(26.01%)
	98,738	**86,866**	**149,776**	**65.92%**	**11,872**	**13.67%**	**(51,038)**	**(34.08%)**
Earnings from operations before financial and other revenues and expenditures	**18,099**	**26,665**	**21,100**	**85.78%**	**(8,566)**	**(32.12%)**	**(3,001)**	**(14.22%)**
Financial and other revenues								
Interest	210	182	511	41.10%	28	15.38%	(301)	(58.90%)
Other	14	6	28	50.00%	8	133.33%	(14)	(50.00%)
	224	**188**	**539**	**41.56%**	**36**	**19.15%**	**(315)**	**(58.44%)**
Financial and other expenditures								
Interest	0	0	0	0.00%	0	0.00%	0	0.00%
Interest on long term debt	5,684	4,371	9,375	60.63%	1,313	30.04%	(3,691)	(39.37%)
Repayment on long term debt	14,665	14,815	24,077	60.91%	(150)	(1.01%)	(9,412)	(39.09%)
Amortization of debt discount	161	145	244	65.98%	16	11.03%	(83)	(34.02%)
Dividend/grant in lieu of taxes	4,651	4,403	7,031	66.15%	248	5.63%	(2,380)	(33.85%)
	25,161	**23,734**	**40,727**	**61.78%**	**1,427**	**6.01%**	**(15,566)**	**(38.22%)**
Earnings (loss) for the year - Regulated	**$ (6,838)**	**$ 3,119**	**$ (19,088)**	**35.82%**	**$ (9,957)**	**(319.24%)**	**$ 12,250**	**(64.18%)**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB
APRIL 1, 2024 - NOVEMBER 30, 2024 (8 MONTHS)
ACTUAL YEAR TO DATE COMPLETE: 66.67%

	ACTUAL YEAR TO DATE THIS YEAR '000	LAST YEAR '000	APR 1/24 MAR 31/25 BUDGET '000	ACTUAL YEAR TO DATE as % of BUDGET	From Prior Year $ Change	% Change	Actual to Budget 33	% Remaining
UNREGULATED ACTIVITIES								
Operating revenues								
Septage tipping fees	$ 608	$ 409	$ 570	106.67%	$ 199	48.66%	$ 38	6.67%
Leachate and other contract revenue	364	388	507	71.79%	(24)	(6.19%)	(143)	(28.21%)
Airplane effluent	39	73	105	37.14%	(34)	(46.58%)	(66)	(62.86%)
Miscellaneous	0	0	0	0.00%	0	0.00%	0	0.00%
	1,011	**870**	**1,182**	**85.53%**	**141**	**16.21%**	**(171)**	**(14.47%)**
Operating expenditures								
Water supply and treatment	2	5	0	0.00%	(3)	(60.00%)	2	0.00%
Wastewater treatment	563	550	797	70.64%	13	2.36%	(234)	(29.36%)
Wastewater collection	29	41	61	47.54%	(12)	(29.27%)	(32)	(52.46%)
Sponsorships and donations	31	(9)	80	38.75%	40	(444.44%)	(49)	(61.25%)
Corporate services	12	4	13	92.31%	8	200.00%	(1)	(7.69%)
Administration services	74	28	97	76.29%	46	164.29%	(23)	(23.71%)
Depreciation and amortization	13	14	34	38.24%	(1)	(7.14%)	(21)	(61.76%)
	724	**633**	**1,082**	**66.91%**	**91**	**14.38%**	**(358)**	**(33.09%)**
Earnings from operations before financial and other revenues and expenditures	**287**	**237**	**100**	**287.00%**	**50**	**21.10%**	**187**	**187.00%**
Financial and other revenues								
Other - leases and rentals	193	178	368	52.45%	15	8.43%	(175)	(47.55%)
Other - energy projects	142	149	219	64.84%	(7)	(4.70%)	(77)	(35.16%)
	335	**327**	**587**	**57.07%**	**8**	**2.45%**	**(252)**	**(42.93%)**
Financial and other expenditures								
Other	92	33	175	52.57%	59	178.79%	(83)	(47.43%)
	92	**33**	**175**	**52.57%**	**59**	**178.79%**	**(83)**	**(47.43%)**
Earnings for the year - Unregulated	**$ 530**	**$ 531**	**$ 512**	**103.52%**	**$ (1)**	**(0.19%)**	**$ 18**	**3.52%**
Total earnings (loss) for the year (Regulated and Unregulated)	**$ (6,308)**	**$ 3,650**	**$ (18,576)**	**33.96%**	**$ (9,958)**	**(272.82%)**	**$ 12,268**	**(66.04%)**

ITEM #4.2

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY:
Signed by:
A65D6074EBC1467...
Louis de Montbrun, CPA, CA, Director of Corporate Services/CFO

DocuSigned by:
0BC19787707F488...
Josh DeYoung, P.Eng., Director, Engineering & Capital Infrastructure

APPROVED:
Signed by:
Kenda MacKenzie
0C084AC815794F8...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: **Capital Expenditures for the eight months ended November 30, 2024**

ORIGIN

Financial information reporting.

BACKGROUND

At the January 16, 2025, meeting of the Halifax Water Audit and Finance Committee, the attached Capital Expenditures as of November 30, 2024, report was reviewed and discussed. The Committee approved forwarding the report to the Halifax Water Board for their information.

DISCUSSION

At the Audit and Finance Committee a request was made to add the percentage of the 2024/25 budget that has been spent to date. Unfortunately, the financial system is not configured to provide information in this manner. The system tracks the funds approved in each budget year and records the expenditures in the year spent. For projects that have funds budgeted in previous years and the current year, it is not possible to determine if the expenditures made in the current year relate to the previous years' budgets or the current year's budget. In future, as the new project management software is enhanced and operationalized, the requested information may be available.

ATTACHMENT

1. Report to the Halifax Water Audit & Finance Committee dated January 16, 2024, entitled Item #10 – Capital Expenditures for the Eight Months ended November 30, 2024.

ITEM #10

Halifax Water Audit and Finance Committee

January 16, 2025

TO: Chair and Members of the Halifax Regional Water Commission Audit and Finance Committee

SUBMITTED BY:

Signed by:
A65D6874EBC1467...

Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

DocuSigned by:
8BC13707787F486...

Josh DeYoung, P.Eng.
Director, Engineering & Capital Infrastructure

APPROVED:

Signed by:
Kenda MacKenzie
0C084AC815794F6...

Kenda MacKenzie, P.Eng.
Acting Chief Executive Officer and General Manager

DATE: January 16, 2025

SUBJECT: **Capital Expenditures for the eight months ended November 30, 2024**

ORIGIN

The Corporate Balanced Scorecard (CBS) identifies the percentage of current year capital budget spent by the end of the fiscal year as a critical success factor and sets a target of 70-80%. There is an additional CBS target of $135 million in capital spend during the year.

RECOMMENDATION

It is recommended the Audit and Finance Committee forward the Capital Expenditures for the eight months ended November 30, 2024, to the Halifax Water Board for their information.

BACKGROUND

The Halifax Regional Water Commission (Halifax Water) Board reviews financial information throughout the year. Halifax Water's 2019 *Integrated Resource Plan* (IRP) identifies a 30-year

capital investment plan valued at $2.7 Billion (net present value - 2019). In relation to the IRP, the capital budget program focuses on providing required infrastructure for asset renewal, regulatory compliance, and growth. The IRP calls for delivery of an average of $135 million in capital projects per year. Halifax Water's annual capital budget, and capability to deliver capital projects, has not yet reached this level.

DISCUSSION

Below is the breakdown by asset class and project status of the expenditures for the eight months ended November 30, 2024. The Total Budget Available of $358.4 million represents total approved budgets as at the end of November 30, 2024. Halifax Water has spent $189.8 million to date on active projects, $112.7 million incurred prior to April 1, 2024, and expenditures of $77.0 million in the current fiscal year. This results in a Remaining Budget Available as of November 30, 2024, of $168.7 million.

The total capital budget remaining to be spent at November 30, 2024 is $168.7 million.

The average capital spend per month compared to prior year has increased from $4.8 million to $9.6 million.

Capital Expenditure Report

Budget Category	Total Budget Available	Expenditures to March 31, 2024	Expenditures April 1, 2024 to November 30, 2024	Total Expenditures to November 30, 2024	Remaining Budget Available as of November 30, 2024	Total Expenditures to November 30, 2024 as a Percentage of Total Budget Available
Active						
Water	$108,177,160	$41,297,364	$20,507,424	$61,804,788	$46,372,372	57.13%
Wastewater	127,659,248	34,103,123	$22,414,871	56,517,994	$71,141,254	44.27%
Stormwater	27,235,130	9,682,314	$7,574,407	17,256,721	$9,978,409	63.36%
Corporate	94,319,077	27,646,935	$26,528,725	54,175,660	$40,143,417	57.44%
District Energy	1,030,000	0	$0	0	$1,030,000	0.00%
	$358,420,615	$112,729,736	$77,025,427	$189,755,163	$168,665,452	52.94%

The achievement of annual targets for the current fiscal year will be significantly influenced by the timing of several major projects. The NSUARB has granted approval for the Burnside Operations Centre, enabling the project team to commence construction in the spring of 2025. The procurement process for the Biosolids Processing Facility is currently underway, with an application currently before the NSUARB. The Fairview Cove Trunk Sewer is anticipated to be tendered in 2025, contingent upon the finalization of land agreements with the relevant parties. Similarly, the Highway 118 water main crossing is projected to be tendered in 2025. The Mill Cove WWTF Upgrades project is presently undergoing a NSUARB approval process for design fees. The timing of these projects in achieving their respective milestones will have a substantial/ impact on capital expenditures for the current fiscal year.

Report prepared by: Signed by: Michelle Bennett 0293B54B1309429...

Michelle Bennett, Manager of Accounting, (782)-641-5972

ITEM # 4.3

Halifax Water Board

January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Signed by: A65D6874EBC1407...
Louis de Montbrun, CPA, CA Director, Corporate Services/CFO

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F8...
Kenda MacKenzie, P.Eng., General Manager & CEO

DATE: January 24, 2025

SUBJECT: **Revised 2025/26 Operating Budget**

ORIGIN

Financial information reporting.

RECOMMENDATION

It is recommended the Halifax Water Board approve the attached 2025/26 Operating Budget, inclusive of the proposed 2025/26 budget for unregulated activities.

BACKGROUND

At the January 16, 2025, meeting of the Halifax Water Audit and Finance Committee (the Committee), the attached 2025/26 Operating Budget, was reviewed and discussed.

DISCUSSION

No additional information was requested to be brought forward to the Halifax Water Board meeting following the discussion of the attached at the Committee meeting.

Upon review, it was determined that wastewater rebates were not reflected in the Wastewater Service budget, resulting in an overstatement of revenue. Inclusion of the wastewater rebates increased the wastewater deficit by $1.8M.

The revised operating budget is reflected in the table below.

Summarized Statement of Earnings

	Notes	Approved Budget 2023/24 '000	Approved Budget 2024/25 '000	Proposed Budget 2025/26 '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues		**168,897**	**172,059**	**174,618**	2,559	1.49%
Operating expenditures		**135,956**	**150,835**	**169,005**	18,170	12.05%
Earnings from operations before financial and other revenues and expenditures		**32,941**	**21,224**	**5,613**	(15,612)	(278.16%)
Financial and other revenues						
Interest		**324**	**511**	**468**	(43)	(8.44%)
Other		**627**	**615**	**617**	2	0.41%
		951	**1,126**	**1,085**	(41)	(3.61%)
Financial and other expenditures						
Interest		**0**	**128**	**323**	195	152.23%
Interest on long term debt		**7,051**	**9,375**	**12,291**	2,916	31.10%
Repayment on long term debt		**22,191**	**24,078**	**20,514**	(3,564)	(14.80%)
Amortization of debt discount		**202**	**245**	**279**	34	13.87%
Dividend/grant in lieu of taxes		**6,589**	**7,031**	**7,236**	205	2.91%
Other		**175**	**175**	**130**	(45)	(25.68%)
		36,208	**41,033**	**40,773**	(260)	(0.63%)
Loss for the year	A	**$ (2,316)**	**$ (18,683)**	**$ (34,075)**	$ (15,393)	82.39%

ATTACHMENT

1. Revised 2025/26 Operating Budget
2. Audit and Finance Report, Item #6, dated January 16, 2025

Report Prepared by:

Signed by:
Fabio Alonso
0026008315C7474...

Fabio Frassani Alonso, MBA, Manager, Finance

Financial Reviewed by:

Signed by:
A65D6874EBC1487...

Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - ALL SERVICES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.51%
Wastewater	89,512	56,889	89,330	90,770	1,440	1.61%
Stormwater site generated service	8,676	4,716	8,864	8,865	2	0.02%
Stormwater right of way service	6,520	3,801	6,515	6,515	0	0.00%
Fire protection (public and private)	9,781	5,718	9,804	9,794	(10)	(0.10%)
Other services and fees	1,486	1,161	1,551	1,340	(210)	(13.57%)
Late payment and other connection fees	580	320	640	589	(51)	(7.98%)
Miscellaneous	486	459	524	534	11	2.02%
	171,979	**107,740**	**172,059**	**174,618**	**2,559**	**1.49%**
Operating expenditures						
Water supply and treatment	14,786	8,043	13,662	16,146	2,484	18.18%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.22%
Wastewater collection	14,554	8,302	14,344	15,530	1,186	8.27%
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.77%
Wastewater treatment	24,782	13,855	26,368	28,640	2,273	8.62%
Engineering and technology services	16,052	11,863	17,757	5,813	(11,944)	(67.26%)
Regulatory compliance services	5,532	2,999	5,922	5,360	(562)	(9.49%)
Customer services	4,630	2,629	4,507	5,186	679	15.07%
Corporate services	3,115	2,186	3,743	20,880	17,137	457.79%
Administration services	6,264	3,137	10,240	7,647	(2,593)	(25.32%)
Depreciation and amortization	34,087	22,320	34,406	39,924	5,518	16.04%
	143,326	**86,767**	**150,835**	**169,005**	**18,170**	**12.05%**
Earnings from operations before financial and other revenues and expenditures	**28,654**	**20,973**	**21,224**	**5,613**	**(15,612)**	**(73.56%)**
Financial and other revenues						
Interest	411	193	511	468	(43)	(8.44%)
Other	488	308	615	617	2	0.41%
	899	**501**	**1,126**	**1,085**	**(41)**	**(3.61%)**
Financial and other expenditures						
Interest	103	133	128	323	195	152.23%
Interest on long term debt	7,277	5,044	9,375	12,291	2,916	31.10%
Repayment on long term debt	22,603	12,984	24,078	20,514	(3,564)	(14.80%)
Amortization of debt discount	222	138	245	279	34	13.87%
Dividend/grant in lieu of taxes	6,589	4,065	7,031	7,236	205	2.91%
Other	140	80	175	130	(45)	(25.68%)
	36,934	**22,444**	**41,033**	**40,773**	**(260)**	**(0.63%)**
Earnings (loss) for the year	**$ (7,381)**	**$ (970)**	**$ (18,683)**	**$ (34,075)**	**$ (15,393)**	**82.39%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Water						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.5%
Public fire protection	8,083	4,715	8,083	8,083	0	0.0%
Private fire protection	1,698	1,003	1,721	1,711	(10)	(0.6%)
Bulk water stations	257	146	369	340	(29)	(7.8%)
Late payment and other connection fees	191	103	205	202	(3)	(1.6%)
Miscellaneous	187	227	269	234	(34)	(12.8%)
	65,355	**40,872**	**65,480**	**66,781**	**1,301**	**2.0%**
Operating expenditures - Water						
Water supply and treatment	14,786	8,043	13,662	16,146	2,484	18.2%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.2%
Engineering and capital infrastructure services	6,003	5,973	6,410	2,017	(4,394)	(68.5%)
Health, safety and Environment	2,052	1,235	1,647	1,576	(71)	(4.3%)
Customer services	2,380	1,341	2,299	2,645	346	15.1%
Corporate and technology services	1,588	1,115	1,909	10,236	8,327	436.2%
Administration services	3,179	1,553	5,223	3,900	(1,322)	(25.3%)
Depreciation and amortization	13,212	9,820	12,959	15,127	2,167	16.7%
	56,970	**36,953**	**58,176**	**68,557**	**10,381**	**17.8%**
Earnings from operations before financial and other revenues and expenditures	**8,385**	**3,918**	**7,304**	**(1,776)**	**(9,079)**	**(124.3%)**
Financial and other revenues						
Interest	300	122	372	295	(77)	(20.6%)
Other	392	251	458	477	19	4.1%
	691	**373**	**830**	**772**	**(58)**	**(7.0%)**
Financial and other expenditures						
Interest on long term debt	2,833	2,098	4,109	5,484	1,376	33.5%
Repayment on long term debt	6,164	3,901	6,997	8,303	1,306	18.7%
Amortization of debt discount	88	56	112	119	7	6.1%
Dividend/grant in lieu of taxes	5,824	3,474	6,005	6,158	153	2.5%
Other	129	75	130	115	(15)	(11.5%)
	15,037	**9,604**	**17,353**	**20,179**	**2,826**	**16.3%**
Loss for the year	**$ (5,960)**	**$ (5,313)**	**$ (9,219)**	**$ (21,183)**	**$ (11,963)**	**129.8%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WASTEWATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Wastewater						
Wastewater	$ 89,512	$ 56,889	$ 89,330	90,770	$ 1,440	1.6%
Leachate and other contract revenue	551	354	507	323	(183)	(36.2%)
Septage tipping fees	577	537	570	572	2	0.4%
Overstrength surcharge	7	85	0	0	0	0.0%
Airplane effluent	94	39	105	105	0	0.0%
Late payment and other connection fees	309	169	253	207	(46)	(18.2%)
Miscellaneous	184	107	187	232	45	24.0%
	91,233	**58,179**	**90,952**	**92,210**	**1,258**	**1.4%**
Operating expenditures - Wastewater						
Wastewater collection	14,554	8,302	14,344	15,530	1,186	8.3%
Wastewater treatment	24,782	13,855	26,368	28,640	2,273	8.6%
Engineering and technology services	8,281	4,775	9,337	2,823	(6,514)	(69.8%)
Regulatory compliance services	1,604	823	1,889	1,763	(125)	(6.6%)
Customer services	2,062	1,177	2,030	2,338	309	15.2%
Corporate services	1,373	964	1,651	9,793	8,142	493.2%
Administration services	2,779	1,415	4,516	3,372	(1,144)	(25.3%)
Depreciation and amortization	17,809	10,544	18,396	20,850	2,453	13.3%
	73,245	**41,856**	**78,530**	**85,110**	**6,580**	**8.4%**
Earnings from operations before financial and other revenues and expenditures	**17,989**	**16,324**	**12,422**	**7,099**	**(5,322)**	**(42.8%)**
Financial and other revenues						
Interest	112	71	139	172	33	24.1%
Other	96	57	157	140	(16)	(10.4%)
	208	**128**	**296**	**313**	**17**	**5.8%**
Financial and other expenditures						
Interest on long term debt	3,581	2,315	4,122	5,287	1,165	28.3%
Repayment on long term debt	13,954	7,686	14,587	9,942	(4,645)	(31.8%)
Amortization of debt discount	110	67	104	126	21	20.3%
Dividend/grant in lieu of taxes	630	488	844	898	54	6.4%
Other	11	6	45	15	(30)	(66.7%)
	18,286	**10,561**	**19,703**	**16,267**	**(3,436)**	**(17.4%)**
Earnings (loss) for the year	**$ (89)**	**$ 5,891**	**$ (6,986)**	**$ (8,855)**	**$ (1,869)**	**26.8%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - STORMWATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Stormwater						
Stormwater site generated service	$ 8,676	$ 4,716	$ 8,864	$ 8,865	$ 2	0.0%
Stormwater right of way service	6,520	3,801	6,515	6,515	0	0.0%
Late payment and other connection fees	80	47	181	180	(2)	(0.9%)
Miscellaneous	115	125	67	67	0	0.0%
	15,391	**8,689**	**15,627**	**15,627**	**0**	**0.0%**
Operating expenditures - Stormwater						
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.8%
Engineering and technology services	1,769	1,115	2,010	973	(1,037)	(51.6%)
Regulatory compliance services	1,876	941	2,386	2,020	(366)	(15.3%)
Customer services	189	111	179	203	24	13.5%
Corporate services	153	107	183	851	668	364.0%
Administration services	305	168	502	375	(127)	(25.3%)
Depreciation and amortization	3,065	1,956	3,050	3,948	898	29.4%
	13,112	**7,958**	**14,129**	**15,339**	**1,210**	**8.6%**
Earnings from operations before financial and other revenues and expenditures	**2,279**	**731**	**1,499**	**289**	**(1,210)**	**(80.7%)**
Financial and other expenditures						
Interest	103	133	128	323	195	152.2%
Interest on long term debt	862	631	1,144	1,520	376	32.8%
Repayment on long term debt	2,486	1,396	2,493	2,269	(224)	(9.0%)
Amortization of debt discount	24	16	28	34	6	20.9%
Dividend/grant in lieu of taxes	135	103	182	180	(2)	(1.2%)
	3,611	**2,279**	**3,976**	**4,327**	**350**	**8.8%**
Earnings (loss) for the year	**$ (1,331)**	**$ (1,548)**	**$ (2,478)**	**$ (4,038)**	**$ (1,560)**	**63.0%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
REGULATED ACTIVITIES						
Operating revenues						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.5%
Wastewater	89,512	56,889	89,330	90,770	1,440	1.6%
Stormwater	15,196	8,516	15,379	15,381	2	0.0%
Public fire protection	8,083	4,715	8,083	8,083	0	0.0%
Private fire protection	1,698	1,003	1,721	1,711	(10)	-0.6%
Miscellaneous	1,331	1,010	1,532	1,463	(69)	-4.5%
	170,758	**106,810**	**170,878**	**173,618**	**2,740**	**1.6%**
Operating expenditures						
Water supply and treatment	14,781	8,041	13,662	16,146	2,484	18.2%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.2%
Wastewater collection	14,499	8,277	14,283	15,468	1,185	8.3%
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.8%
Wastewater treatment	23,888	13,407	25,571	27,725	2,155	8.4%
Engineering and technology services	16,052	11,863	17,757	5,813	(11,944)	-67.3%
Regulatory compliance services	5,532	2,999	5,922	5,360	(562)	-9.5%
Customer services	4,627	2,602	4,467	5,146	679	15.2%
Corporate services	3,095	2,175	3,730	20,867	17,137	459.4%
Administration services	6,132	3,071	10,103	7,510	(2,593)	-25.7%
Depreciation and amortization	34,067	22,308	34,371	39,887	5,515	16.0%
	142,198	**86,177**	**149,753**	**167,801**	**18,049**	**12.1%**
Earnings from operations before financial and other revenues and expenditures	**28,560**	**20,633**	**21,125**	**5,816**	**(15,309)**	**-72.5%**
Financial and other revenues						
Interest	411	193	511	468	(43)	-8.4%
Other	11	12	28	17	(11)	-38.3%
	422	**206**	**539**	**485**	**(54)**	**-10.0%**
Financial and other expenditures						
Interest	103	133	128	323	195	152.2%
Interest on long term debt	7,277	5,044	9,375	12,291	2,916	31.1%
Repayment on long term debt	22,603	12,984	24,078	20,514	(3,564)	-14.8%
Amortization of debt discount	222	138	245	279	34	13.9%
Dividend/grant in lieu of taxes	6,589	4,065	7,031	7,236	205	2.9%
	36,794	**22,364**	**40,858**	**40,643**	**(215)**	**-0.5%**
Earnings (loss) for the year - Regulated	**$ (7,812)**	**$ (1,525)**	**$ (19,193)**	**$ (34,341)**	**$ (15,148)**	**78.9%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
UNREGULATED ACTIVITIES						
Operating revenues						
Septage tipping fees	$ 577	$ 537	$ 570	$ 572	$ 2	0.4%
Leachate and other contract revenue	551	354	507	323	(183)	-36.2%
Airplane effluent	94	39	105	105	0	0.0%
	1,222	**930**	**1,182**	**1,000**	**(181)**	**-15.4%**
Operating expenditures						
Water supply and treatment	4	2	0	0	0	0.0%
Wastewater treatment	894	449	797	915	118	14.8%
Wastewater collection	55	25	61	62	1	1.7%
Sponsorships and donations	14	27	80	80	0	0.0%
Corporate services	19	10	13	13	0	0.0%
Administration services	121	65	97	97	0	0.0%
Depreciation and amortization	20	12	34	37	3	7.4%
	1,127	**590**	**1,083**	**1,204**	**121**	**11.2%**
Earnings from operations before financial and other revenues and expenditures	**94**	**340**	**99**	**(204)**	**(303)**	**-305.4%**
Financial and other revenues						
Other - leases and rentals	266	170	368	365	(3)	-0.7%
Other - energy projects	210	125	219	235	16	7.3%
	477	**296**	**587**	**600**	**13**	**2.3%**
Financial and other expenditures						
Other	140	80	175	130	(45)	-25.7%
	140	**80**	**175**	**130**	**(45)**	**-25.7%**
Earnings for the year - Unregulated	**$ 431**	**$ 555**	**$ 511**	**$ 266**	**$ (245)**	**-47.9%**
Total earnings (loss) for the year (Regulated and Unregulated)	**$ (7,381)**	**$ (970)**	**$ (18,683)**	**$ (34,075)**	**$ (15,393)**	**82.4%**

TO: Chair and Members of the Halifax Regional Water Commission Audit and Finance Committee

SUBMITTED BY: Signed by:
A65D8874EBC1407...
Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

APPROVED BY: Signed by:
Kenda MacKenzie
0C084AC813794F6...
Kenda MacKenzie, P.Eng.
Acting General Manager & CEO

DATE: January 10, 2025

SUBJECT: **Proposed 2025/26 Operating Budget**

ORIGIN

The Halifax Regional Water Commission Board of Commissioners (the "Board") approves Halifax Water's 2025/26 Operating Budget.

RECOMMENDATION

It is recommended the Audit and Finance Committee recommend the Board approve the attached proposed 2025/26 Operating Budget, inclusive of the proposed 2024/25 budget for unregulated activities.

BACKGROUND

The purpose of the 2025/26 Operating Budget is to outline the revenue and expenditures required to provide the services as highlighted in Halifax Water's 2025/26 Annual Business Plan.

DISCUSSION

Table 1 below outlines the operating budget for 2025/26 which shows a projected deficit of $32.2 million. The budget reflects requirements to maintain current levels of service,

deliver projects already in progress or approved, and address any changing environmental or regulatory requirements. The 2025/26 Operating Budget is prepared on a modified accrual basis to provide broader information for decision making and be reflective of reporting under the Nova Scotia Utility and Review Board Water (NSUARB) Utility Accounting and Reporting Handbook (the Handbook), which is used in determining revenue requirements for rate making purposes.

Table 1:

	Approved Budget 2024/25 '000	Proposed Budget 2025/26 '000	From 2024/25 Budget $ Change	% Change
Operating revenues	**$ 172,059**	**$ 176,485**	$ 4,426	2.57%
Operating expenditures	**150,835**	**169,005**	18,170	12.05%
Earnings from operations before financial and other revenues and expenditures	**21,224**	**7,480**	(13,744)	(183.75%)
Financial and other revenues				
Interest	**511**	**468**	(43)	(8.44%)
Other	**615**	**617**	2	0.41%
	1,126	**1,085**	(41)	(3.61%)
Financial and other expenditures				
Interest	**128**	**323**	195	152.23%
Interest on long term debt	**9,375**	**12,291**	2,916	31.10%
Repayment on long term debt	**24,078**	**20,514**	(3,564)	(14.80%)
Amortization of debt discount	**245**	**279**	34	13.87%
Dividend/grant in lieu of taxes	**7,031**	**7,236**	205	2.91%
Other	**175**	**130**	(45)	(25.68%)
	41,033	**40,773**	(260)	(0.63%)
Loss for the year	**$ (18,683)**	**$ (32,208)**	$ (13,525)	72.39%

Halifax Water faces financial pressure associated with renewal of assets, increases in customers and infrastructure due to growth in the municipality, and compliance with regulatory requirements. Additions to utility plant in service result in increased costs associated with depreciation, debt servicing, and incremental costs to operate and maintain the assets.

Continuing to build organizational capacity to deliver programs and capital projects envisioned in the Integrated Resource Plan, along with cybersecurity demands requires additional staffing for departments within the utility, reflected by the request to add 33 new positions in 2025/26.

Operating Revenues

Halifax Water's main revenue sources are derived from rate-regulated activities, with approximately 73% of water and wastewater revenues coming from

consumption/discharge rates and 27% from base charges. The 2025/26 Operating Budget is based on regulated rates and charges approved by the NSUARB effective April 1, 2023. Base charges for both water and wastewater have remained unchanged since April 1, 2023. The water consumption rate is $1.128 per cubic meter and the wastewater discharge rate is $2.259 per cubic meter. Stormwater rates for site related flow charge for non-residential property customers is $0.173 per square meter and remain unchanged since 2023/24.

There are no increases in rates built into the 2025/26 operating budget, a 2% increase in total consumption was used to budget revenue compared to a 1% increase in the prior year. New customer connections are estimated at 565 for both water services and wastewater services, based on 5 years' historic trend.

The remainder of Halifax Water's revenues are from miscellaneous fees, financial and other revenues, and unregulated activities.

Operating Expenditures

The main cost drivers in Halifax Water's operating budget are salaries and benefits, energy, chemicals, depreciation, and debt servicing. Key assumptions in each of these areas are outlined below:

Salaries and benefits

- Salary rate increases:
  Increases for unionized staff have been budgeted, based on collective agreements signed on November 1, 2023, and valid until October 31, 2027. For non-union staff the increase has been historically based on CPI, performance and movement along salary scales. In addition, every three years, Halifax Water compares its salaries to the general market. The market review is in progress.

- Changes to full-time equivalents (FTE):
  The budget for 2025/26 includes an increase of 33 new positions, equivalent to 23 FTEs, as not all positions will be filled by April 1, 2025. The net impact of the new FTEs is $2.0 million in 2025/26. The impact on the Operating Budget is estimated at $1.0 million (excluding benefits) and $1.0 million of the total cost has been assigned to capital projects.

Table 2:

The impact to each business unit is illustrated below:

	New Positions	New Full-time Equivalents	% of Total FTEs	Salary Increase	Allocated to Capital	Net Increase to Operating
Corporate Services	12	9	38%	817,000	$ (652,000)	$ 165,000
Engineering Services	7	5	23%	483,000	$ (222,000)	$ 261,000
Administration Services	4	3	12%	199,000	$ -	$ 199,000
Health, Safety & Environment	3	2	9%	162,000	$ (127,000)	$ 35,000
Wastewater / Stormwater	3	2	9%	163,000	$ -	$ 163,000
Water	4	2	10%	205,000	$ -	$ 205,000
	33	**23**		**$ 2,029,000**	**$ (1,001,000)**	**$ 1,028,000**

New Corporate Services positions include 5 positions that will replace external contractors, 4 positions dedicated to cybersecurity, 2 new positions to support the ERP, a Junior Finance consultant, and a Procurement contract administrator.

New Engineering positions include 3 engineers, 3 technologists and an approvals coordinator.

New Administration Services positions include 2 positions in HR, 1 Technical administrator and a paralegal.

New Health Safety and Environment positions include 1 climate change program manager and 2 coordinators.

New Wastewater/Stormwater positions include 1 lead operator and 2 supervisors.

New Water Operations positions include2 supervisors, a lead operator and 1 millwright.

<u>Energy:</u>

Assumptions regarding electricity, furnace oil and natural gas rate increases are outlined below.

- Electricity 5.00%
- Furnace Oil 15.00%
- Natural Gas 5.00%

Chemical Costs:

Chemicals are tendered annually in January for optimal pricing. Chemical rate increases of 5.0% are budgeted for 2025/26.

Depreciation:

Depreciation is an integral funding source to support asset renewal and regulatory compliance requirements. Depreciation is budgeted at $39.9 million, an increase of $5.5 million over the 2024/25 budget, and calculated on water, wastewater, and stormwater assets.

In the 2022 rate application, Halifax Water proposed to begin to include 1% of the depreciation expense of contributed water and wastewater assets and to increase the depreciation expense on contributed stormwater assets by 1% to 26%. This change was accepted by the NSUARB in their decision, but suggested Halifax Water review again to consider whether a more aggressive approach could be used. Halifax Water has not included this increase in the depreciation in the proposed 2025/26 budget.

As Halifax Water proceeds through the rate application process, the NSUARB may instruct Halifax Water to include this increase in the budget.

Debt Servicing:

New debt principal and interest payments are budgeted to support the additions to utility plant in service. The amount and timing of any increases in debt servicing are contingent upon the completion of projects, financing rates, and cash flow requirements. Debt servicing is projected to be $33.0 million in 2025/26 compared to $33.7 million in 2024/25. This is reflective of the decreasing financing rates available through the Province of Nova Scotia and a reduction in the annual principal repayment of $5.5M to the municipality related to the purchase of wastewater assets for the Halifax Harbour Solutions project.

Halifax Water's capital financing strategy is designed to maintain a debt service ratio of 35% or less. The debt service ratio based on the 2025/26 Operating Budget is 18.75%.

Other Expenditures:

Expenditures such as electricity and chemicals, which are subject to greater cost volatility, have been given special attention due to the dependence placed on these commodities. For other expenditures carrying a high dollar value, such as contract services and

materials/supplies, there is an element of judgement, as these expenditures are contingent upon other factors such as:

- Service expectations,
- Regulatory requirements and compliance,
- Maintenance and renewal of infrastructure.

Water Service

Water operations of the proposed 2025/26 Operating Budget attached, reporting a loss for the year of $21.1 million (from $9.2 million in 2024/25).

Operating revenues for 2024/25 total $66.8 million, representing an increase of $1.3 million or 2.0% compared to 2024/25. The increase is attributed to an expected increase in consumption and the projected increase in new customers.

Operating expenditure for 2025/26 total $68.6 million, representing an increase of $10.4 million or 17.8% compared to 2024/25. The increase is driven by the following:

- Supply and treatment costs have increased $2.5 million mainly due to increases in salaries & benefits, chemical costs and contract services.
- Transmission and distribution costs have increased by $2.5 million due in part to salaries and benefits, and contract services.
- Depreciation has increased by $2.0 million reflected to projected additions to utility plant in service of $45 million.
- Engineering, Technology and Corporate Services: Starting in fiscal 2025/26, all technology service-related cost centres (refer to COS Manual) are grouped under Corporate Services. Combined costs for those areas have increased by $3 million, mainly due to salaries.

Financial and other revenues are comparable to the prior year. Financial and other expenditures report an increase of $2.8 million or 16.3% due to an increase in debt servicing costs and an increase in the dividend/grant in lieu of taxes paid to the Halifax Regional Municipality.

Wastewater Service

Wastewater operations proposed 2025/26 Operating Budget, reporting a loss for the year of $7.0 million, identical to 2024/25.

Operating revenues for 2025/26 total $94.0 million, representing an increase of $3.1 million or 3.4% compared to 2024/25. The increase is attributed to an expected increase in discharge and the projected increase of 565 new customers in 2025/26.

Operating expenditures in 2025/26 total $85.1 million, representing an increase of $6.6 million or 8.4% compared to 2024/25. The increase is driven by the following:

1. Wastewater collection costs have increased by $1.4 million, however, wastewater and stormwater collection share the same staffing pool therefore the two areas should be compared together. Overall, the total increase is driven by increases in salaries and benefits, electricity, and additional cost in traffic control services.
2. Wastewater treatment costs have increased $2.1 million and are due to increases in salaries, chemical costs, contract services, and electricity.
3. Depreciation is reporting an increase of $1.1 million due to $34 million projected additions to utility plant in service.
4. Similar to Water, all technology service-related costs centers are now grouped under Corporate Services, starting in fiscal 25/26. Combined costs (allocated from Water) have risen by $1 million, primarily due to salaries.

Financial and other revenues are comparable to the prior year. Financial and other expenditures report a decrease of $3.4 million or 17.4% due mostly to the loan repayment for Halifax Harbour project.

Stormwater Service

Stormwater operations proposed on the 2025/26 Operating Budget, reporting a loss of $4.0 million.

Operating revenues for 2025/26 total $15.6 million, representing no change from the prior year. While there were some gains in the number of customers, those were offset by decreases in impervious area.

Operating expenditure in 2025/26 total $15.3 million, representing an increase of $1.2 million or 8.6% compared to 2024/25. The increase is driven by the following:

- Stormwater collection costs have increased by $1.1 million, mainly due to salaries, additional chemicals for biosolids loading and increases dewatering.
- Depreciation is reporting an increase of $0.4 million due to projected additions to utility plant in service.
- Similar to other services, allocations from combined costs centers under Corporate Services have risen, primarily due to salaries.

Financial revenues are comparable to the prior year. Financial and other expenditures report an increase of $0.5 million or 13.6% due to an increase in debt servicing costs and an increase in the dividend/grant in lieu of taxes.

Unregulated Activities

Unregulated activities of the proposed 2025/26 Operating Budget attached, reporting a budget surplus of $0.2 million.

Unregulated revenues can be used to fund rate-regulated activities and applied against unregulated expenditures. Revenues from unregulated activities for 2025/26 are budgeted at $1.0 million, which is comparable to the prior year. Revenues are derived primarily from septage tipping fees and external contracts. These contracts include the operation and maintenance of the Leachate Treatment Facility at Otter Lake, plus several other smaller HRM facilities including, the Upper Sackville Recreation Center, and the Harrietsfield Recreation Center and Nova Scotia Health's Twin Oaks-The Birches facility.

Unregulated operating expenditure for 2025/26 increased by $0.1M compared to 2024/25. Included in unregulated operating expenditures are sponsorships and donations, which are treated as unregulated in nature because of a 2012 NSUARB Rate Decision. For 2025/26, these expenditures are budgeted at $80,000 and consist of:

- Help to Others (H2O) Program $ 40,000
- Sponsorships and Donations $ 40,000

The H2O (Help to Others) Program was established to provide financial assistance to residents who require financial assistance with their water bill. The program is funded by Halifax Water and its employees and administered by the Salvation Army Halifax Water employees participate in the program through tax deductible contributions, which are matched by Halifax Water.

Sponsorships and Donations includes scholarship funding of $25,000 and the remainder to be used for initiatives chosen through the year such as sponsoring events and organizations.

Accumulated Surplus (Deficit)

The accumulated operating deficit, based on the NSUARB Water Utility Accounting and Reporting Handbook, at March 31, 2026, is projected to be $41.1 million, which consists of the accumulated operating surplus for the 2023/24 fiscal year, budgeted results for 2024/25, and a budgeted deficit of $32.2 million for 2025/26. Table 3 below summarizes the continuity of the accumulated surplus (deficit) by service.

Table 3:

Accumulated Operating Surplus (Deficit) - NSUARB (in thousands)				
	Total	Water	Wastewater	Stormwater
2023/24 Fiscal Year				
Balance, beginning of year	17,165	16,636	6,525	(5,996)
Loss for the year	(7,380)	(5,960)	(89)	(1,331)
Surplus (deficit), end of the year	9,785	10,676	6,435	(7,327)
2024/25 Fiscal Year				
Balance, beginning of year	9,785	10,676	6,435	(7,327)
Loss for the year	(18,683)	(9,219)	(6,986)	(2,478)
Surplus (deficit), end of the year	(8,898)	1,457	(551)	(9,805)
2025/26 Fiscal Year				
Balance, beginning of year	(8,898)	1,457	(551)	(9,805)
Loss for the year	(32,208)	(21,183)	(6,988)	(4,038)
Surplus (deficit), end of the year	(41,106)	(19,726)	(7,539)	(13,842)

Halifax Water targets to maintain a minimum accumulated operating surplus of 3% of total expenditures to mitigate risk. Accumulated operating surplus' can be used to offset operating losses, or to fund future additions to utility plant in service, subject to NSUARB approval. Based on the projected financial position as at March 31, 2026, without an increase in rates there will be a projected accumulated deficit of $41.1 million.

The operating budget will form the basis of a general rate application which is planned to be filed within the next few months. The rate application will utilize the approved budget and the approved cost of service methodology, to develop rates that would cover the full costs of operating the utility.

BUDGET IMPLICATIONS

The combined operations of Water, Wastewater and Stormwater report a budgeted deficit of $32.2 million in 2025/26.

ALTERNATIVES

The Board could direct staff to revise the proposed 2025/26 Operating Budget.

ATTACHMENT

Proposed 2025/26 Operating Budget

Report Prepared by: Signed by: Fabio Alonso 0926008315C7474...

Fabio Frassani Alonso, MBA
Manager, Finance (902) 399-4668

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - ALL SERVICES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.51%
Wastewater	89,512	56,889	89,330	92,638	3,308	3.70%
Stormwater site generated service	8,676	4,716	8,864	8,865	2	0.02%
Stormwater right of way service	6,520	3,801	6,515	6,515	0	0.00%
Fire protection (public and private)	9,781	5,718	9,804	9,794	(10)	(0.10%)
Other services and fees	1,486	1,161	1,551	1,340	(210)	(13.57%)
Late payment and other connection fees	580	320	640	588	(51)	(8.04%)
Miscellaneous	486	459	524	534	11	2.02%
	171,979	**107,740**	**172,059**	**176,485**	**4,426**	**2.57%**
Operating expenditures						
Water supply and treatment	14,786	8,043	13,662	16,146	2,484	18.18%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.22%
Wastewater collection	14,554	8,302	14,344	15,530	1,186	8.27%
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.77%
Wastewater treatment	24,782	13,855	26,368	28,640	2,273	8.62%
Engineering and technology services	16,052	11,863	17,757	5,813	(11,944)	(67.26%)
Regulatory compliance services	5,532	2,999	5,922	5,360	(562)	(9.49%)
Customer services	4,630	2,629	4,507	5,186	679	15.07%
Corporate services	3,115	2,186	3,743	20,880	17,137	457.79%
Administration services	6,264	3,137	10,240	7,647	(2,593)	(25.32%)
Depreciation and amortization	34,087	22,320	34,406	39,924	5,518	16.04%
	143,326	**86,767**	**150,835**	**169,005**	**18,170**	**12.05%**
Earnings from operations before financial and other revenues and expenditures	**28,654**	**20,973**	**21,224**	**7,480**	**(13,744)**	**(64.76%)**
Financial and other revenues						
Interest	411	193	511	468	(43)	(8.44%)
Other	488	308	615	617	2	0.41%
	899	**501**	**1,126**	**1,085**	**(41)**	**(3.61%)**
Financial and other expenditures						
Interest	103	133	128	323	195	152.23%
Interest on long term debt	7,277	5,044	9,375	12,291	2,916	31.10%
Repayment on long term debt	22,603	12,984	24,078	20,514	(3,564)	(14.80%)
Amortization of debt discount	222	138	245	279	34	13.87%
Dividend/grant in lieu of taxes	6,589	4,065	7,031	7,236	205	2.91%
Other	140	80	175	130	(45)	(25.68%)
	36,934	**22,444**	**41,033**	**40,773**	**(260)**	**(0.63%)**
Earnings (loss) for the year	**$ (7,381)**	**$ (970)**	**$ (18,683)**	**$ (32,208)**	**$ (13,525)**	**72.39%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Water						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.5%
Public fire protection	8,083	4,715	8,083	8,083	0	0.0%
Private fire protection	1,698	1,003	1,721	1,711	(10)	(0.6%)
Bulk water stations	257	146	369	340	(29)	(7.8%)
Late payment and other connection fees	191	103	205	202	(3)	(1.6%)
Miscellaneous	187	227	269	234	(34)	(12.8%)
	65,355	**40,872**	**65,480**	**66,781**	**1,301**	**2.0%**
Operating expenditures - Water						
Water supply and treatment	14,786	8,043	13,662	16,146	2,484	18.2%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.2%
Engineering and capital infrastructure services	6,003	5,973	6,410	2,017	(4,394)	(68.5%)
Health, safety and Environment	2,052	1,235	1,647	1,576	(71)	(4.3%)
Customer services	2,380	1,341	2,299	2,645	346	15.1%
Corporate and technology services	1,588	1,115	1,909	10,236	8,327	436.2%
Administration services	3,179	1,553	5,223	3,900	(1,322)	(25.3%)
Depreciation and amortization	13,212	9,820	12,959	15,127	2,167	16.7%
	56,970	**36,953**	**58,176**	**68,557**	**10,381**	**17.8%**
Earnings from operations before financial and other revenues and expenditures	**8,385**	**3,918**	**7,304**	**(1,776)**	**(9,079)**	**(124.3%)**
Financial and other revenues						
Interest	300	122	372	295	(77)	(20.6%)
Other	392	251	458	477	19	4.1%
	691	**373**	**830**	**772**	**(58)**	**(7.0%)**
Financial and other expenditures						
Interest on long term debt	2,833	2,098	4,109	5,484	1,376	33.5%
Repayment on long term debt	6,164	3,901	6,997	8,303	1,306	18.7%
Amortization of debt discount	88	56	112	119	7	6.1%
Dividend/grant in lieu of taxes	5,824	3,474	6,005	6,158	153	2.5%
Other	129	75	130	115	(15)	(11.5%)
	15,037	**9,604**	**17,353**	**20,179**	**2,826**	**16.3%**
Loss for the year	**$ (5,960)**	**$ (5,313)**	**$ (9,219)**	**$ (21,183)**	**$ (11,963)**	**129.8%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - WASTEWATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Wastewater						
Wastewater	$ 89,512	$ 56,889	$ 89,330	92,638	$ 3,308	3.7%
Leachate and other contract revenue	551	354	507	323	(183)	(36.2%)
Septage tipping fees	577	537	570	572	2	0.4%
Overstrength surcharge	7	85	0	0	0	0.0%
Airplane effluent	94	39	105	105	0	0.0%
Late payment and other connection fees	309	169	253	207	(47)	(18.4%)
Miscellaneous	184	107	187	232	45	24.0%
	91,233	**58,179**	**90,952**	**94,077**	**3,125**	**3.4%**
Operating expenditures - Wastewater						
Wastewater collection	14,554	8,302	14,344	15,530	1,186	8.3%
Wastewater treatment	24,782	13,855	26,368	28,640	2,273	8.6%
Engineering and technology services	8,281	4,775	9,337	2,823	(6,514)	(69.8%)
Regulatory compliance services	1,604	823	1,889	1,763	(125)	(6.6%)
Customer services	2,062	1,177	2,030	2,338	309	15.2%
Corporate services	1,373	964	1,651	9,793	8,142	493.2%
Administration services	2,779	1,415	4,516	3,372	(1,144)	(25.3%)
Depreciation and amortization	17,809	10,544	18,396	20,850	2,453	13.3%
	73,245	**41,856**	**78,530**	**85,110**	**6,580**	**8.4%**
Earnings from operations before financial and other revenues and expenditures	**17,989**	**16,324**	**12,422**	**8,967**	**(3,455)**	**(27.8%)**
Financial and other revenues						
Interest	112	71	139	172	33	24.1%
Other	96	57	157	140	(16)	(10.4%)
	208	**128**	**296**	**313**	**17**	**5.8%**
Financial and other expenditures						
Interest on long term debt	3,581	2,315	4,122	5,287	1,165	28.3%
Repayment on long term debt	13,954	7,686	14,587	9,942	(4,645)	(31.8%)
Amortization of debt discount	110	67	104	126	21	20.3%
Dividend/grant in lieu of taxes	630	488	844	898	54	6.4%
Other	11	6	45	15	(30)	(66.7%)
	18,286	**10,561**	**19,703**	**16,267**	**(3,436)**	**(17.4%)**
Earnings (loss) for the year	**$ (89)**	**$ 5,891**	**$ (6,986)**	**$ (6,988)**	**$ (2)**	**0.0%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - STORMWATER - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
Operating revenues - Stormwater						
Stormwater site generated service	$ 8,676	$ 4,716	$ 8,864	$ 8,865	$ 2	0.0%
Stormwater right of way service	6,520	3,801	6,515	6,515	0	0.0%
Late payment and other connection fees	80	47	181	180	(2)	(0.9%)
Miscellaneous	115	125	67	67	0	0.0%
	15,391	**8,689**	**15,627**	**15,627**	**0**	**0.0%**
Operating expenditures - Stormwater						
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.8%
Engineering and technology services	1,769	1,115	2,010	973	(1,037)	(51.6%)
Regulatory compliance services	1,876	941	2,386	2,020	(366)	(15.3%)
Customer services	189	111	179	203	24	13.5%
Corporate services	153	107	183	851	668	364.0%
Administration services	305	168	502	375	(127)	(25.3%)
Depreciation and amortization	3,065	1,956	3,050	3,948	898	29.4%
	13,112	**7,958**	**14,129**	**15,339**	**1,210**	**8.6%**
Earnings from operations before financial and other revenues and expenditures	**2,279**	**731**	**1,499**	**289**	**(1,210)**	**(80.7%)**
Financial and other expenditures						
Interest	103	133	128	323	195	152.2%
Interest on long term debt	862	631	1,144	1,520	376	32.8%
Repayment on long term debt	2,486	1,396	2,493	2,269	(224)	(9.0%)
Amortization of debt discount	24	16	28	34	6	20.9%
Dividend/grant in lieu of taxes	135	103	182	180	(2)	(1.2%)
	3,611	**2,279**	**3,976**	**4,327**	**350**	**8.8%**
Earnings (loss) for the year	**$ (1,331)**	**$ (1,548)**	**$ (2,478)**	**$ (4,038)**	**$ (1,560)**	**63.0%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
REGULATED ACTIVITIES						
Operating revenues						
Water	$ 54,938	$ 34,677	$ 54,832	$ 56,210	$ 1,378	2.5%
Wastewater	89,512	56,889	89,330	92,638	3,308	3.7%
Stormwater	15,196	8,516	15,379	15,381	2	0.0%
Public fire protection	8,083	4,715	8,083	8,083	0	0.0%
Private fire protection	1,698	1,003	1,721	1,711	(10)	-0.6%
Miscellaneous	1,331	1,010	1,532	1,463	(70)	-4.6%
	170,758	**106,810**	**170,878**	**175,485**	**4,608**	**2.7%**
Operating expenditures						
Water supply and treatment	14,781	8,041	13,662	16,146	2,484	18.2%
Water transmission and distribution	13,769	7,873	14,066	16,910	2,844	20.2%
Wastewater collection	14,499	8,277	14,283	15,468	1,185	8.3%
Stormwater collection	5,755	3,560	5,819	6,969	1,150	19.8%
Wastewater treatment	23,888	13,407	25,571	27,725	2,155	8.4%
Engineering and technology services	16,052	11,863	17,757	5,813	(11,944)	-67.3%
Regulatory compliance services	5,532	2,999	5,922	5,360	(562)	-9.5%
Customer services	4,627	2,602	4,467	5,146	679	15.2%
Corporate services	3,095	2,175	3,730	20,867	17,137	459.4%
Administration services	6,132	3,071	10,103	7,510	(2,593)	-25.7%
Depreciation and amortization	34,067	22,308	34,371	39,887	5,515	16.0%
	142,198	**86,177**	**149,753**	**167,801**	**18,049**	**12.1%**
Earnings from operations before financial and other revenues and expenditures	**28,560**	**20,633**	**21,125**	**7,684**	**(13,441)**	**-63.6%**
Financial and other revenues						
Interest	411	193	511	468	(43)	-8.4%
Other	11	12	28	17	(11)	-38.3%
	422	**206**	**539**	**485**	**(54)**	**-10.0%**
Financial and other expenditures						
Interest	103	133	128	323	195	152.2%
Interest on long term debt	7,277	5,044	9,375	12,291	2,916	31.1%
Repayment on long term debt	22,603	12,984	24,078	20,514	(3,564)	-14.8%
Amortization of debt discount	222	138	245	279	34	13.9%
Dividend/grant in lieu of taxes	6,589	4,065	7,031	7,236	205	2.9%
	36,794	**22,364**	**40,858**	**40,643**	**(215)**	**-0.5%**
Earnings (loss) for the year - Regulated	**$ (7,812)**	**$ (1,525)**	**$ (19,193)**	**$ (32,474)**	**$ (13,281)**	**69.2%**

HALIFAX WATER
UNAUDITED STATEMENT OF EARNINGS - REGULATED AND UNREGULATED ACTIVITIES - NSUARB

	APR 1/23 MAR 31/24 ACTUAL '000	APR 1/24 OCT 31/24 YTD ACTUAL '000	APR 1/24 MAR 31/25 BUDGET '000	APR 1/25 MAR 31/26 BUDGET '000	From 2024/25 Budget $ Change	From 2024/25 Budget % Change
UNREGULATED ACTIVITIES						
Operating revenues						
Septage tipping fees	$ 577	$ 537	$ 570	$ 572	$ 2	0.4%
Leachate and other contract revenue	551	354	507	323	(183)	-36.2%
Airplane effluent	94	39	105	105	0	0.0%
	1,222	**930**	**1,182**	**1,000**	**(181)**	**-15.4%**
Operating expenditures						
Water supply and treatment	4	2	0	0	0	0.0%
Wastewater treatment	894	449	797	915	118	14.8%
Wastewater collection	55	25	61	62	1	1.7%
Sponsorships and donations	14	27	80	80	0	0.0%
Corporate services	19	10	13	13	0	0.0%
Administration services	121	65	97	97	0	0.0%
Depreciation and amortization	20	12	34	37	3	7.4%
	1,127	**590**	**1,083**	**1,204**	**121**	**11.2%**
Earnings from operations before financial and other revenues and expenditures	**94**	**340**	**99**	**(204)**	**(303)**	**-305.4%**
Financial and other revenues						
Other - leases and rentals	266	170	368	365	(3)	-0.7%
Other - energy projects	210	125	219	235	16	7.3%
	477	**296**	**587**	**600**	**13**	**2.3%**
Financial and other expenditures						
Other	140	80	175	130	(45)	-25.7%
	140	**80**	**175**	**130**	**(45)**	**-25.7%**
Earnings for the year - Unregulated	**$ 431**	**$ 555**	**$ 511**	**$ 266**	**$ (245)**	**-47.9%**
Total earnings (loss) for the year (Regulated and Unregulated)	**$ (7,381)**	**$ (970)**	**$ (18,683)**	**$ (32,208)**	**$ (13,525)**	**72.4%**

ITEM #4.4

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: DocuSigned by: 0BC19767707F488...
Josh DeYoung, P.Eng., Director, Engineering & Capital Infrastructure

APPROVED: Signed by: Kenda MacKenzie 0C084AC813794F6...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: Proposed 2025/26 Capital Budget

ORIGIN

Financial information reporting.

RECOMMENDATION

It is recommended the Halifax Water Board approve the proposed 2025/26 Capital Budget at a total value of $132,996,000 as detailed in the attached Schedule 1.

BACKGROUND

At the January 16, 2025, meeting of the Halifax Water Audit and Finance Committee, the attached Proposed 2025/26 Capital Budget was reviewed and discussed. The Committee approved forwarding the report to the Halifax Water Board for their information.

DISCUSSION

No additional information was requested to be brought forward to the Halifax Water Board meeting following the discussion of the attached at the Committee meeting.

ATTACHMENT

1. Report to the Halifax Water Audit & Finance Committee dated January 7, 2024, entitled Item #7 –Proposed 2025/26 Capital Budget.

ITEM #7

Halifax Water Audit and Finance Committee

January 16, 2025

TO: Chair and Members of the Halifax Regional Water Commission Audit and Finance Committee

SUBMITTED BY: DocuSigned by: 0BC1976770 7E488...

Josh DeYoung, P. Eng.

Director, Engineering & Capital Infrastructure

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794E6...

Kenda MacKenzie, P.Eng., Acting CEO & General Manager

DATE: January 7, 2025

SUBJECT: **Proposed 2025/26 Capital Budget**

ORIGIN

Staff compilation of the annual capital budget.

RECOMMENDATION

It is recommended that the Halifax Water Audit and Finance Committee recommend that the Halifax Water Board approve the proposed 2025/26 capital budget at a total value of $132,996,000 as detailed in the attached Schedule 1.

BACKGROUND

Halifax Water's Integrated Resource Plan (IRP) considers the utility's long-term infrastructure needs based on asset renewal, growth, and regulatory compliance drivers. The IRP, with a 30-year capital reinvestment plan valued at $4.05 billion ($2.69 billion – 2019 net present value), provides guidance on developing the annual capital budget. The proposed 2025/26 capital budget helps the utility continue to provide cost-effective and efficient services focused on long-term service sustainability.

DISCUSSION

The capital budget for the fiscal year April 1, 2025 to March 31, 2026 is attached in Schedule 1. It includes projects within the Water, Wastewater, and Stormwater service areas with a total value of $132,996,000. There are no planned expenditures for the District Energy service area for 2025/26.

Staff use the IRP average capital expenditure of $135M as a guide to compiling year 1 (2025/26) capital budget needs. Other influences include information gleaned from Halifax Water's condition assessment program, and Operational or health and safety considerations. The proposed 2025/26 capital budget aligns closely with the average IRP capital expenditure rate. Broken down by driver, 87.3% is allocated to asset renewal projects, 4.1% to growth projects, and 8.7% to regulatory compliance projects.

The capital budget was developed with the following considerations:

- Reviewing carryover projects from previous years and confirming the resource impacts and available project delivery capacity
- Determining the need for and timing of external commitments and approvals including funding approval process, agreements with other external agencies and interested parties
- Assessing previous years' approved funding and amounts remaining for continuing projects and programs and adjusting Year 1 (2025/26) needs as appropriate
- Reviewing staff resources, ongoing workloads, and capacity to take on additional projects
- Confirming and reprioritizing projects for the upcoming year
- Continuing to fine-tune the project intake process and limiting the number of insufficiently scoped items included for the capital budget

The proposed 2025/26 capital budget of $132,996,000 is a reduction compared to the 2024/25 budget of $152,497,000 and a significant reduction from what was identified for Year 2 (2025/26) of the previous 5-Year capital plan (2024/25 to 2028/29) that showed a projected spend of $367,719,000. As part of the annual budget process, each fall staff reassess project and funding needs to reaffirm what will be requested for the upcoming Year 1 capital budget. With thought given to the utility's capacity to deliver, the number of ongoing carryover assignments, typical capital spend rate annually, and timing of approvals, staff developed a reduced annual budget for 2025/26. There are significant capital expenditures identified for future years that will need to be reassessed as each annual budget cycle proceeds.

The IRP Update project will further confirm nearer term capital investment needs. However, the project has not yet started as staff await the funding approval from the Nova Scotia Utility and Review Board (NSUARB). Based on the delayed start, the IRP Update will likely be sufficiently advanced to inform the 2027/28 capital budget.

Staff have continued to put effort into improving efficiency for delivering the capital budget. Activities that support this continuous improvement effort are outlined in Table 1.

Table 1 – Enhancements to capital delivery capabilities

Item	Description
Institutional Capacity Assessment (ICA)	The Institutional Capacity Assessment (ICA) commenced in January 2024. The prime objective was to assess the utility's ability to deliver the recommended IRP annual level of spend on capital projects. The project continues with an expected completion date of March 31, 2025.
Capital Project Management and Information System (CPMIS)	This is a phased configuration of the capital project management and information system (CPMIS). Release 1.0 went live April 2024 with a primary focus on capital planning. Training of approximately 25 users went live in August leading up to the 2025/26 annual capital budget development cycle. This is the first year that the capital budget submission has been generated using the new software.
Engineering Practices Project (EPP)	The engineering practices project (EPP) involved establishing an updated current state understanding of the capital delivery process. This work will aid in requirements traceability in the upcoming configuration of the CPMIS software for release 2.0 on capital project delivery.
Ongoing recruitment of engineering personnel	Eight (8) additions to staff were identified in the 2024/25 fiscal year; five (5) positions have been filled and the remaining three (3) are in progress.

A summary of the 2025/26 capital expenditures by infrastructure system is provided in Table 2.

Table 2 – Summary of capital expenditures by infrastructure system

Program Category	Amount (1,000s)
TOTAL – District Energy	$0
TOTAL – Stormwater	$29,144
TOTAL – Wastewater	$51,409
TOTAL – Water	$52,442
TOTAL CAPITAL FUNDING [1]	$132,996

1. Rounded to nearest 1,000.

Funding of corporate projects is allocated to the impacted infrastructure system (i.e., stormwater, wastewater, water) at each project level. Typically, corporate projects follow a 10% stormwater, 40% wastewater, 50% water allocation; however, some project splits vary depending on system impacted.

For the 2025/26 capital budget, there are twenty-nine (29) projects/programs over $1M totaling $63.3M in 2025/26 and as shown in Attachment 2.

Projects that need funding approvals for planned expenditures over $5M may also be subject to hearings at the NSUARB. Early identification of those projects with the NSUARB may help with project timeline planning and to expedite the approval process.

BUDGET IMPLICATIONS

The funding plan and sources for the proposed 2025/26 capital budget is provided in Table 3.

Table 3 – 2025/26 capital budget funding sources by infrastructure system

Funding Source	District Energy	Stormwater	Wastewater	Water	Totals
Depreciation / Debt	$0	$25,753	$46,681	$49,380	$123,814
Regional Development Charge	$0	$0	$2,486	$3,062	$5,548
External Funding	$0	$3,391	$242	$0	$3,634
Capital Cost Contributions	$0	$0	$0	$0	$0
SUB-TOTAL	$0	$29,144	$51,409	$52,442	$132,996

1. Funding for Corporate Projects is allocated to the core asset systems (water, wastewater, stormwater).

The proposed 2025/26 capital budget considers additional resource capacity added in the last two years, experience gained from construction pricing and supply chain pressures since 2020, and the IRP annual average spend rate.

ATTACHMENTS

1. 2025/26 Capital Budget
2. 2025/26 Projects Over $1M

Report Prepared by:

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Senior Manager, Asset Management & Capital Planning

Financial Reviewed by:

Signed by:
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Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

Capital Budget Summary by Program 2025/26

Attachment 1

Program Category	Program Sub Category	All $ in 000s Program Costs
Corporate	Corporate - Asset Management	7,015
Corporate	Corporate - Equipment	300
Corporate	Corporate - Facility Projects	2,850
Corporate	Corporate - Fleet	5,608
Corporate	Corporate - Information & Technology	25,777
Corporate	TOTAL	41,550
Stormwater	Stormwater - Culverts/Ditches	7,925
Stormwater	Stormwater - Pipes	16,836
Stormwater	Stormwater - Structures	50
Stormwater	TOTAL	24,811
Wastewater	Wastewater - Collection System	13,211
Wastewater	Wastewater - Equipment	305
Wastewater	Wastewater - Forcemains	550
Wastewater	Wastewater - Structures	7,227
Wastewater	Wastewater - Treatment Facility	9,755
Wastewater	Wastewater - Trunk Sewers	530
Wastewater	TOTAL	31,578
Water	Water - Distribution	14,749
Water	Water - Equipment	165
Water	Water - Land	125
Water	Water - Security	25
Water	Water - Structures	4,630
Water	Water - Transmission	6,977
Water	Water - Treatment Facilities	8,384
Water	TOTAL	35,055
	GRAND TOTAL	132,996

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Corporate	Corporate - Asset Management			
Corporate	Corporate - Asset Management	4.0000359	AMP Continuous Improvement	125
Corporate	Corporate - Asset Management	4.0000163	Annual Asset Management Plan Update	20
Corporate	Corporate - Asset Management	4.0000156	Asset Management Program Roadmap Update – Implementation	250
Corporate	Corporate - Asset Management	2.0000043	Corporate Flow Monitoring Program	2,300
Corporate	Corporate - Asset Management	4.0000308	Growth Servicing Strategy	75
Corporate	Corporate - Asset Management	4.0000170	Integrated Resource Plan Update	1,970
Corporate	Corporate - Asset Management	4.0000168	Model Enhancements	30
Corporate	Corporate - Asset Management	4.0000358	Sewer Inspection Program Review - Target State	350
Corporate	Corporate - Asset Management	2.0001074	SSO and CSO Management Program	760
Corporate	Corporate - Asset Management	1.0000254	Storm Sewer Condition Assessment	305
Corporate	Corporate - Asset Management	2.0000872	Wastewater Sewer Condition Assessment	705
Corporate	Corporate - Asset Management	3.0000644	Water Efficiency Strategy	80
Corporate	Corporate - Asset Management	4.0000318	Water Survey of Can Hydro Monitoring	45
Corporate	**Corporate - Asset Management**	**Total**		**7,015**
Corporate	Corporate - Equipment			
Corporate	Corporate - Equipment	4.0000154	Customer Meters - New and Replacement	300
Corporate	**Corporate - Equipment**	**Total**		**300**
Corporate	Corporate - Facility Projects			
Corporate	Corporate - Facility Projects	4.0000077	Building Capital Improvements	750
Corporate	Corporate - Facility Projects	4.0000187	Burnside Operations Centre	1,900
Corporate	Corporate - Facility Projects	4.0000009	Security Upgrade Program (water and wastewater)	200
Corporate	**Corporate - Facility Projects**	**Total**		**2,850**
Corporate	Corporate - Fleet			
Corporate	Corporate - Fleet	4.0000315	Fleet Upgrade Program SW	778
Corporate	Corporate - Fleet	4.0000007	Fleet Upgrade Program W	1,718
Corporate	Corporate - Fleet	4.0000316	Fleet Upgrade Program WW	3,112
Corporate	**Corporate - Fleet**	**Total**		**5,608**
Corporate	Corporate - Information & Technology			
Corporate	Corporate - Information & Technology	4.0000327	3rd party Risk Management Program	150
Corporate	Corporate - Information & Technology	4.0000193	AMI Communications Upgrade	180
Corporate	Corporate - Information & Technology	4.0000341	Architectural Service Delivery	200
Corporate	Corporate - Information & Technology	4.0000336	Artificial Intelligence (Cyber Security)	330
Corporate	Corporate - Information & Technology	4.0000365	Automated Equalized Overtime	500
Corporate	Corporate - Information & Technology	4.0000269	Automated Test Tools	500
Corporate	Corporate - Information & Technology	4.0000352	Automations & Integrations for Business Units	500
Corporate	Corporate - Information & Technology	4.0000339	Booster Stations Operational Transition	500
Corporate	Corporate - Information & Technology	4.0000263	Business Continuity Management	350
Corporate	Corporate - Information & Technology	4.0000295	CAD/BIM	150
Corporate	Corporate - Information & Technology	4.0000356	Capital Delivery Upgrades – EPP	700
Corporate	Corporate - Information & Technology	4.0000355	Capital Delivery Upgrades - I&T	500
Corporate	Corporate - Information & Technology	4.0000354	Capital Planning Upgrades	250
Corporate	Corporate - Information & Technology	4.0000347	Central Event Management	700
Corporate	Corporate - Information & Technology	4.0000189	Central Spread Spectrum Radio Network Replacement Program	250
Corporate	Corporate - Information & Technology	4.0000105	CMMS/GIS Upgrades	150
Corporate	Corporate - Information & Technology	4.0000348	Consumption & Demand Management	500
Corporate	Corporate - Information & Technology	4.0000319	Customer Calling Software Enhancements	200
Corporate	Corporate - Information & Technology	4.0000322	Customer Portal Enhancements	200
Corporate	Corporate - Information & Technology	4.0000337	Customer Workorder Tracking	600
Corporate	Corporate - Information & Technology	4.0000324	Cyber Awareness Program Enhancements	410
Corporate	Corporate - Information & Technology	4.0000326	Cyber Security Metrics	250
Corporate	Corporate - Information & Technology	4.0000335	Cyber Security Roadmap	36
Corporate	Corporate - Information & Technology	4.0000283	Digital Twin - Virtual Facility Tours	300
Corporate	Corporate - Information & Technology	4.0000360	DR Enhancements	830
Corporate	Corporate - Information & Technology	4.0000342	EA Collaboration Platform Rollout	350
Corporate	Corporate - Information & Technology	4.0000343	EA Software Rollout	300
Corporate	Corporate - Information & Technology	4.0000219	EE - Electrical Safety Program	500
Corporate	Corporate - Information & Technology	4.0000218	EE- ITSM Process	250
Corporate	Corporate - Information & Technology	4.0000261	Electrical Planned Maintenance Program	800
Corporate	Corporate - Information & Technology	4.0000297	Emergency Management Office	50
Corporate	Corporate - Information & Technology	4.0000228	Enterprise Architecture	450
Corporate	Corporate - Information & Technology	4.0000262	Enterprise Risk Management	300
Corporate	Corporate - Information & Technology	4.0000206	ERP Upgrades	200

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Corporate	Corporate - Information & Technology	4.0000338	Gas Monitor Review	500
Corporate	Corporate - Information & Technology	4.0000255	General IT System Upgrades	500
Corporate	Corporate - Information & Technology	4.0000353	Generative AI	500
Corporate	Corporate - Information & Technology	4.0000040	GIS Data Program	250
Corporate	Corporate - Information & Technology	4.0000340	GIS Schema Changes	100
Corporate	Corporate - Information & Technology	4.0000363	Information Services R&D	300
Corporate	Corporate - Information & Technology	4.0000323	IR Enhancements	200
Corporate	Corporate - Information & Technology	4.0000284	IS Equipment Replacement	800
Corporate	Corporate - Information & Technology	4.0000349	Linear Asset Management	500
Corporate	Corporate - Information & Technology	4.0000331	MSSP Enhancements	375
Corporate	Corporate - Information & Technology	4.0000361	NAC Enhancements	375
Corporate	Corporate - Information & Technology	4.0000332	Network Enhancements	630
Corporate	Corporate - Information & Technology	4.0000012	Network Upgrades	400
Corporate	Corporate - Information & Technology	4.0000334	OnDemand Assessment	75
Corporate	Corporate - Information & Technology	4.0000330	OT DR Enhancements	340
Corporate	Corporate - Information & Technology	4.0000321	OT Enhancements	575
Corporate	Corporate - Information & Technology	4.0000328	OT Network Enhancements	300
Corporate	Corporate - Information & Technology	4.0000333	OT Server Replacement	175
Corporate	Corporate - Information & Technology	4.0000320	OT Standards & Specifications	300
Corporate	Corporate - Information & Technology	4.0000288	PASS Project	500
Corporate	Corporate - Information & Technology	4.0000192	PI System Enhancements	250
Corporate	Corporate - Information & Technology	4.0000357	PMO Strategy & Transformation	700
Corporate	Corporate - Information & Technology	4.0000309	Pollution Prevention Inspection	300
Corporate	Corporate - Information & Technology	4.0000351	Power BI Reports	500
Corporate	Corporate - Information & Technology	4.0000310	Property Management	400
Corporate	Corporate - Information & Technology	4.0000362	Record Drawings for Closed Work Orders 25/26	50
Corporate	Corporate - Information & Technology	4.0000364	Records Management Project	600
Corporate	Corporate - Information & Technology	4.0000306	SCADA Alarm Management	150
Corporate	Corporate - Information & Technology	4.0000350	Scaling Data Governance	500
Corporate	Corporate - Information & Technology	4.0000345	Service Delivery Efficiency	250
Corporate	Corporate - Information & Technology	4.0000010	Service Gap Project	150
Corporate	Corporate - Information & Technology	4.0000155	Stormwater Billing Imagery Acquisition and Analysis	150
Corporate	Corporate - Information & Technology	4.0000232	Strategic Planning Business Cases	350
Corporate	Corporate - Information & Technology	4.0000344	Technical Knowledge Hub	300
Corporate	Corporate - Information & Technology	4.0000311	Technical Services Capital Tools	80
Corporate	Corporate - Information & Technology	4.0000346	Technology Change Management	250
Corporate	Corporate - Information & Technology	4.0000329	TRA Remediation	350
Corporate	Corporate - Information & Technology	4.0000239	TS Work Tracking	50
Corporate	Corporate - Information & Technology	4.0000325	TUM	266
Corporate	**Corporate - Information & Technology**	**Total**		**25,777**
Corporate	**TOTAL**			**41,550**

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Stormwater	Stormwater - Culverts/Ditches			
Stormwater	Stormwater - Culverts/Ditches	1.0000351	Cole Harbour Road @ Bissett Run Culvert Replacement	100
Stormwater	Stormwater - Culverts/Ditches	1.0000279	Cross Culvert Replacement Program - Field Investigation & Operations Replacements	100
Stormwater	Stormwater - Culverts/Ditches	1.0000288	Cross Road Culvert Replacement Program - Engineering Design	100
Stormwater	Stormwater - Culverts/Ditches	1.0000348	Culvert Replacement - 1 Fergusons Cove Road	25
Stormwater	Stormwater - Culverts/Ditches	1.0000344	Culvert Replacement - 109 Fergusons Cove Road	25
Stormwater	Stormwater - Culverts/Ditches	1.0000347	Culvert Replacement - 1165 Purcells Cove Road	25
Stormwater	Stormwater - Culverts/Ditches	1.0000339	Culvert Replacement - 1302 Waverley Road	75
Stormwater	Stormwater - Culverts/Ditches	1.0000338	Culvert Replacement - 1322 Waverley Road	75
Stormwater	Stormwater - Culverts/Ditches	1.0000343	Culvert Replacement - 139 Fergusons Cove Road	370
Stormwater	Stormwater - Culverts/Ditches	1.0000327	Culvert Replacement - 15 Village Crescent	537
Stormwater	Stormwater - Culverts/Ditches	1.0000326	Culvert Replacement - 154 Kaye Street	572
Stormwater	Stormwater - Culverts/Ditches	1.0000336	Culvert Replacement - 179 Thomas Street	25
Stormwater	Stormwater - Culverts/Ditches	1.0000324	Culvert Replacement - 2120 Hammonds Plains Road	50
Stormwater	Stormwater - Culverts/Ditches	1.0000337	Culvert Replacement - 215 Thomas Street	25
Stormwater	Stormwater - Culverts/Ditches	1.0000340	Culvert Replacement - 2405 Lawrencetown Road	35
Stormwater	Stormwater - Culverts/Ditches	1.0000335	Culvert Replacement - 2884 Lawrencetown Road	188
Stormwater	Stormwater - Culverts/Ditches	1.0000329	Culvert Replacement - 29 Carlheath Drive	75
Stormwater	Stormwater - Culverts/Ditches	1.0000341	Culvert Replacement - 34 Kent Drive	226
Stormwater	Stormwater - Culverts/Ditches	1.0000330	Culvert Replacement - 4132 Highway #2	626
Stormwater	Stormwater - Culverts/Ditches	1.0000328	Culvert Replacement - 519 Old Sackville Road	584
Stormwater	Stormwater - Culverts/Ditches	1.0000345	Culvert Replacement - 6 Iris Avenue	50
Stormwater	Stormwater - Culverts/Ditches	1.0000346	Culvert Replacement - 61 Pinetree Crescent	25
Stormwater	Stormwater - Culverts/Ditches	1.0000332	Culvert Replacement - 71 Concord Avenue	540
Stormwater	Stormwater - Culverts/Ditches	1.0000331	Culvert Replacement - 76 Richardson Drive	540
Stormwater	Stormwater - Culverts/Ditches	1.0000333	Culvert Replacement - Glendale Drive @ Metropolitan Avenue	100
Stormwater	Stormwater - Culverts/Ditches	1.0000334	Culvert Replacement - Glendale Drive @ Raymond Drive	109
Stormwater	Stormwater - Culverts/Ditches	1.0000313	Culvert Replacement - Highway 2, near civic 2774	317
Stormwater	Stormwater - Culverts/Ditches	1.0000325	Culvert Replacement - Miller Lake Road @ Highway #2	356
Stormwater	Stormwater - Culverts/Ditches	1.0000104	Driveway Culvert Replacement Program	2,000
Stormwater	Stormwater - Culverts/Ditches	1.0000342	Hammonds Plains Road (Stillwater Lake area)	50
Stormwater	**Stormwater - Culverts/Ditches**	**Total**		**7,925**
Stormwater	Stormwater - Pipes			
Stormwater	Stormwater - Pipes	1.0000355	Catchbasin Leads Replacement Program	150
Stormwater	Stormwater - Pipes	1.0000103	Catchbasin Renewals SW Program	60
Stormwater	Stormwater - Pipes	1.0000350	Farrell Street Storm Sewer Replacement	2,500
Stormwater	Stormwater - Pipes	1.0000038	Integrated Stormwater Projects - Program	1,000
Stormwater	Stormwater - Pipes	1.0000135	Lateral Replacements SW Program	18
Stormwater	Stormwater - Pipes	1.0000102	Manhole Renewals SW Program	20
Stormwater	Stormwater - Pipes	1.0000322	Moore Road Stormwater Renewal	50
Stormwater	Stormwater - Pipes	1.0000352	Oathill Lake Outfall Pipe Structural Lining	250
Stormwater	Stormwater - Pipes	1.0000034	Raymond Street / Lakecrest Drive - Storm Sewer Replacement	1,847
Stormwater	Stormwater - Pipes	1.0000354	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Part 1 - Irishtown Rd to Harbour (Additional Funding)	2,262
Stormwater	Stormwater - Pipes	1.0000145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Part 2 - Irishtown Rd to Harbour	6,056
Stormwater	Stormwater - Pipes	1.0000321	Tobin Run Stormwater Renewal	1,026
Stormwater	Stormwater - Pipes	1.0000349	Windsor Street Exchange Redevelopment - Stormwater Infrastructure - Construction	1,000
Stormwater	Stormwater - Pipes	2.0001133	Windsor Street Exchange Redevelopment - Stormwater Infrastructure - Design	597
Stormwater	**Stormwater - Pipes**	**Total**		**16,836**
Stormwater	Stormwater - Structures			
Stormwater	Stormwater - Structures	1.0000353	Flood List Access Improvements	50
Stormwater	**Stormwater - Structures**	**Total**		**50**
Stormwater	**TOTAL**			**24,811**

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Wastewater	Wastewater - Collection System			
Wastewater	Wastewater - Collection System	2.0001196	Bedford RDII Reduction Program FMZ02 & 03	50
Wastewater	Wastewater - Collection System	2.0000835	Canal Street Separation	531
Wastewater	Wastewater - Collection System	2.0001198	Cole Harbour RDII Reduction Program	50
Wastewater	Wastewater - Collection System	2.0000834	Ellenvale Area RDII Reduction Program FMZ27	100
Wastewater	Wastewater - Collection System	2.0001195	Fairview, Clayton Park and Bridgeview RDII Reduction Program	50
Wastewater	Wastewater - Collection System	2.0001028	Herring Cove Road Wastewater Stormwater Renewal - HRM Integrated Project	100
Wastewater	Wastewater - Collection System	2.0000052	Integrated Wastewater Projects - Program	1,600
Wastewater	Wastewater - Collection System	2.0000358	Lateral Replacements WW (non-tree roots)	1,350
Wastewater	Wastewater - Collection System	2.0000563	Lateral Replacements WW (tree roots)	450
Wastewater	Wastewater - Collection System	2.0000357	Manhole Renewals WW	60
Wastewater	Wastewater - Collection System	2.0000852	Maynard Lake and Clement Street Wetland Separation	250
Wastewater	Wastewater - Collection System	2.0000833	Mill Cove RDII Reduction Program FMZ10 - Bedford Common	50
Wastewater	Wastewater - Collection System	2.0001141	Park Avenue CSO Sewer Separation	100
Wastewater	Wastewater - Collection System	2.0001200	Private I&I Program Incentives	40
Wastewater	Wastewater - Collection System	2.0001071	Raymond Street / Lakecrest Drive - Sanitary Sewer Replacement	469
Wastewater	Wastewater - Collection System	2.0001073	Spring Garden Road Sewer Separation Pocket	250
Wastewater	Wastewater - Collection System	2.0001036	Wastewater Reservicing - Hollis Street	50
Wastewater	Wastewater - Collection System	2.0000168	Wastewater System - Trenchless Rehabilitation Program	4,000
Wastewater	Wastewater - Collection System	2.0000223	Wet Weather Management Program	400
Wastewater	Wastewater - Collection System	2.0001130	Windmill Road Functional Study	250
Wastewater	Wastewater - Collection System	2.0001182	Windsor Street Exchange Redevelopment - Wastewater Infrastructure - Construction	1,000
Wastewater	Wastewater - Collection System	2.0000905	Windsor Street Exchange Redevelopment - Wastewater Infrastructure - Design	411
Wastewater	Wastewater - Collection System	2.0001197	Woodside RDII Reduction Program	50
Wastewater	Wastewater - Collection System	2.0000837	Wyse Road Separation Phase 2	200
Wastewater	Wastewater - Collection System	2.0000836	Wyse Road Sewer Separation	300
Wastewater	Wastewater - Collection System	2.0001137	Young Avenue CN Bridge - Sewer Replacement	50
Wastewater	Wastewater - Collection System	2.0000982	Young Street Pocket - Sewer Separation - Route to Harbour	1,000
Wastewater	**Wastewater - Collection System**	**Total**		**13,211**
Wastewater	Wastewater - Equipment			
Wastewater	Wastewater - Equipment	2.0001038	FOG software	50
Wastewater	Wastewater - Equipment	2.0000161	I&I Reduction Program Flow Meters and Related Equipment	30
Wastewater	Wastewater - Equipment	2.0000451	Miscellaneous Equipment Replacement	120
Wastewater	Wastewater - Equipment	2.0001029	Wet Well Wizard	105
Wastewater	**Wastewater - Equipment**	**Total**		**305**
Wastewater	Wastewater - Forcemains			
Wastewater	Wastewater - Forcemains	2.0001189	Bluewater Road PS Elimination	50
Wastewater	Wastewater - Forcemains	2.0001117	Eastern Passage Gravity Pressure Sewer - Cleanout Manhole Replacement	500
Wastewater	**Wastewater - Forcemains**	**Total**		**550**
Wastewater	Wastewater - Structures			
Wastewater	Wastewater - Structures	2.0001199	Duffus Street PS - Pump Hoist System Upgrades	100
Wastewater	Wastewater - Structures	2.0001030	Duffus Street Pumping Station - Mechanical & Electrical Upgrades	1,200
Wastewater	Wastewater - Structures	2.0000420	Emergency Pumping Station Pump Replacements	650
Wastewater	Wastewater - Structures	2.0001132	Fairfield Holding Tank Capacity Assessment	150
Wastewater	Wastewater - Structures	2.0001032	Pier A Pumping Station - Mechanical Upgrades	3,100
Wastewater	Wastewater - Structures	2.0001135	PS Control Panel / Electrical Replacement Program	300
Wastewater	Wastewater - Structures	2.0001194	Pump Station Hatch Replacements	150
Wastewater	Wastewater - Structures	2.0001122	Quigley's Corner PS Relocation	252
Wastewater	Wastewater - Structures	2.0001136	Sackville Street Tangent Drop Repair	750
Wastewater	Wastewater - Structures	2.0001119	South East Passage PS Upgrade	300
Wastewater	Wastewater - Structures	2.0000444	Wastewater Pumping Station Component Replacement Program - Central Region	275
Wastewater	**Wastewater - Structures**	**Total**		**7,227**
Wastewater	Wastewater - Treatment Facility			
Wastewater	Wastewater - Treatment Facility	2.0001174	Aerotech WWTF - Centrifuge Pump Refurbishment	40
Wastewater	Wastewater - Treatment Facility	2.0001175	Aerotech WWTF - Heated Storage Area	100
Wastewater	Wastewater - Treatment Facility	2.0001103	Aerotech WWTF - Lagoon Cleaning and Rehabilitation	500
Wastewater	Wastewater - Treatment Facility	2.0001185	Biosolids Processing Facility - Biofilter Post Replacement	70
Wastewater	Wastewater - Treatment Facility	2.0001184	Biosolids Processing Facility - Compressor Replacement	60
Wastewater	Wastewater - Treatment Facility	2.0000919	Biosolids Processing Facility - Gas Sensor Upgrade Program	15
Wastewater	Wastewater - Treatment Facility	2.0001186	Biosolids Processing Facility - Liner Replacement	70
Wastewater	Wastewater - Treatment Facility	2.0001183	Biosolids Processing Facility - Live bottom Bin #2 Floor Rebuild	50
Wastewater	Wastewater - Treatment Facility	2.0001187	Biosolids Processing Facility - Serpentix Track Rebuild	30
Wastewater	Wastewater - Treatment Facility	2.0001087	Dartmouth WWTF - Outfall Liner and Multiport Diffuser Repair	625
Wastewater	Wastewater - Treatment Facility	2.0000876	Dartmouth WWTF - Raw Water Pump Refurbishment Program	70
Wastewater	Wastewater - Treatment Facility	2.0001152	Dartmouth WWTF - Chemical Piping Replacement	100
Wastewater	Wastewater - Treatment Facility	2.0001150	Dartmouth WWTF - Gate Controller Comms Replacement	35

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Wastewater	Wastewater - Treatment Facility	2.0001151	Dartmouth WWTF - MCC Refurbishment	100
Wastewater	Wastewater - Treatment Facility	2.0001047	Dartmouth WWTF - OCS - Refurbishment - Canisters & Components	50
Wastewater	Wastewater - Treatment Facility	2.0001159	Eastern Passage WWTF - Aeration Tank pH Probes	35
Wastewater	Wastewater - Treatment Facility	2.0000666	Eastern Passage WWTF - Asset Renewal Program	225
Wastewater	Wastewater - Treatment Facility	2.0000907	Eastern Passage WWTF - Centrifuge Rebuild	60
Wastewater	Wastewater - Treatment Facility	2.0001162	Eastern Passage WWTF - Generator Transfer Switch Replacement Scoping	15
Wastewater	Wastewater - Treatment Facility	2.0001158	Eastern Passage WWTF - Polymer System Replacement	300
Wastewater	Wastewater - Treatment Facility	2.0001095	Eastern Passage WWTF - Primary Clarifier Refurbishment Program	80
Wastewater	Wastewater - Treatment Facility	2.0001163	Eastern Passage WWTF - Primary Pipe Gallery MAU Replacement	250
Wastewater	Wastewater - Treatment Facility	2.0001098	Eastern Passage WWTF - Pump Replacement Program	100
Wastewater	Wastewater - Treatment Facility	2.0001160	Eastern Passage WWTF - Spectrophotometer	15
Wastewater	Wastewater - Treatment Facility	2.0001161	Eastern Passage WWTF - UV Building Heat Recovery Unit Replacement	225
Wastewater	Wastewater - Treatment Facility	2.0000522	Emergency WWTF Equipment Replacements	650
Wastewater	Wastewater - Treatment Facility	2.0001179	Fall River WWTF - Influent pH Sensors	20
Wastewater	Wastewater - Treatment Facility	2.0001107	Fall River WWTF - Replace EQ Pumps	30
Wastewater	Wastewater - Treatment Facility	2.0001124	Frame WWTF - Access Road to Waverley Road	800
Wastewater	Wastewater - Treatment Facility	2.0001109	Frame WWTF - Generator with ATS	100
Wastewater	Wastewater - Treatment Facility	2.0001178	Frame WWTF - Process Building - Phase 1 Scoping	15
Wastewater	Wastewater - Treatment Facility	2.0001149	Halifax WWTF - Aerial Lift	25
Wastewater	Wastewater - Treatment Facility	2.0001147	Halifax WWTF - Densadeg Cover Replacement	75
Wastewater	Wastewater - Treatment Facility	2.0001191	Halifax WWTF - Dewatering Sludge Feed Pump Replacement	250
Wastewater	Wastewater - Treatment Facility	2.0001143	Halifax WWTF - Fire Alarm System Replacement	60
Wastewater	Wastewater - Treatment Facility	2.0001145	Halifax WWTF - Floor Regrade - Lower Level	50
Wastewater	Wastewater - Treatment Facility	2.0001123	Halifax WWTF - Main Isolation Gate Replacement	100
Wastewater	Wastewater - Treatment Facility	2.0001146	Halifax WWTF - Masonry Repairs - Lower Level	75
Wastewater	Wastewater - Treatment Facility	2.0001126	Halifax WWTF - Polymer System Upgrade	450
Wastewater	Wastewater - Treatment Facility	2.0000765	Halifax WWTF - Raw Water Pump Replacement	700
Wastewater	Wastewater - Treatment Facility	2.0001144	Halifax WWTF - Upper Floor Hoist Way Cover Replacement	70
Wastewater	Wastewater - Treatment Facility	2.0001148	Halifax WWTF - UV Area Access Door	50
Wastewater	Wastewater - Treatment Facility	2.0001155	Herring Cove WWTF - Compactor Access Platform	30
Wastewater	Wastewater - Treatment Facility	2.0001051	Herring Cove WWTF - Epoxy Coat Floor	15
Wastewater	Wastewater - Treatment Facility	2.0001156	Herring Cove WWTF - Generator Rebuild	50
Wastewater	Wastewater - Treatment Facility	2.0001153	Herring Cove WWTF - Grit System Refurbishment	50
Wastewater	Wastewater - Treatment Facility	2.0001157	Herring Cove WWTF - Phoneline and Comms Replacement	25
Wastewater	Wastewater - Treatment Facility	2.0001154	Herring Cove WWTF - Waste Oil Storage/Boiler Replacement - Phase 1 Scoping	50
Wastewater	Wastewater - Treatment Facility	2.0001078	HHSP WWTFs - Raw Water Pump Variable Frequency Drive (VFD's)	130
Wastewater	Wastewater - Treatment Facility	2.0001142	HHSP WWTFs Control Room Upgrades	75
Wastewater	Wastewater - Treatment Facility	2.0001140	HHSP WWTFs Distributed Control System Upgrades	350
Wastewater	Wastewater - Treatment Facility	2.0001181	Middle Musquodoboit WWTF - Flow Meter	20
Wastewater	Wastewater - Treatment Facility	2.0001108	Middle Musquodoboit WWTF – Replace WWTF LS Control Panel and SCADA Panel	25
Wastewater	Wastewater - Treatment Facility	2.0000505	Mill Cove WWTF - Asset Renewal Program	125
Wastewater	Wastewater - Treatment Facility	2.0001111	North Preston WWTF - Replace Factory Talks with VTScada- Phase 1 Scoping	25
Wastewater	Wastewater - Treatment Facility	2.0001168	Timberlea WWTF - SCADA Critical Replacements	50
Wastewater	Wastewater - Treatment Facility	2.0001167	Timberlea WWTF - Alum Tank Refurbishment	25
Wastewater	Wastewater - Treatment Facility	2.0001165	Timberlea WWTF - Digester Refurbishment	100
Wastewater	Wastewater - Treatment Facility	2.0001173	Timberlea WWTF - Generator Capacity Review Phase 1 Scoping	25
Wastewater	Wastewater - Treatment Facility	2.0001171	Timberlea WWTF - Headworks Scrubber Replacement	50
Wastewater	Wastewater - Treatment Facility	2.0001172	Timberlea WWTF - Hoist Way & Lower Level Equipment Access	25
Wastewater	Wastewater - Treatment Facility	2.0001166	Timberlea WWTF - RBC Cover Replacement	120
Wastewater	Wastewater - Treatment Facility	2.0001169	Timberlea WWTF - Roadway Refurbishment	50
Wastewater	Wastewater - Treatment Facility	2.0001170	Timberlea WWTF - Roof Repairs	25
Wastewater	Wastewater - Treatment Facility	2.0001180	Uplands WWTF - Auto Fine Screen Distribution Arm Replacement	35
Wastewater	Wastewater - Treatment Facility	2.0000668	WWTF - Research Program Pilot Plant	250
Wastewater	Wastewater - Treatment Facility	2.0001139	WWTFs - Building Automation System (BAS) Software Upgrade	65
Wastewater	Wastewater - Treatment Facility	2.0001023	WWTFs - Critical Electrical Equipment Refurbishment Program	300
Wastewater	Wastewater - Treatment Facility	2.0001081	WWTFs - Critical Spare Parts Program	300
Wastewater	Wastewater - Treatment Facility	2.0000056	WWTFs - Plant Optimization Program	175
Wastewater	Wastewater - Treatment Facility	2.0001138	WWTFs UV Disinfection System Refurbishment Program	450
Wastewater	**Wastewater - Treatment Facility**	**Total**		**9,755**
Wastewater	Wastewater - Trunk Sewers			
Wastewater	Wastewater - Trunk Sewers	2.0001131	Herring Cove Road Sewershed Infrastructure Study	530
Wastewater	**Wastewater - Trunk Sewers**	**Total**		**530**
Wastewater	**TOTAL**			**31,578**

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Water	Water - Distribution			
Water	Water - Distribution	3.0000068	~ Hydrants Renewals	75
Water	Water - Distribution	3.0000069	~ Service Lines Renewals	75
Water	Water - Distribution	3.0000067	~ Valves Renewals	425
Water	Water - Distribution	3.0000294	Automated Flushing Program	75
Water	Water - Distribution	3.0000772	Fire Flow Study	50
Water	Water - Distribution	3.0000022	Integrated Water Projects - Program	8,000
Water	Water - Distribution	3.0000390	Lead Service Line Replacement Program	2,300
Water	Water - Distribution	3.0000688	Little Salmon River Bridge Watermain Replacement	140
Water	Water - Distribution	3.0000782	Pressure Monitoring - Critical Locations	100
Water	Water - Distribution	3.0000699	Raymond St / Lakecrest Drive Storm Sewer Replacement - Watermain	1,243
Water	Water - Distribution	3.0000696	Tower Road CN Bridge - Watermain Replacement	290
Water	Water - Distribution	3.0000787	Windsor Street Exchange Redevelopment - Water Infrastructure - Construction	1,000
Water	Water - Distribution	3.0000704	Windsor Street Exchange Redevelopment - Water Infrastructure - Design	926
Water	Water - Distribution	3.0000746	Young Avenue CN Bridge - Watermain Replacement	50
Water	**Water - Distribution**	**Total**		**14,749**
Water	Water - Equipment			
Water	Water - Equipment	3.0000785	Central Valve Maintenance Trailer	85
Water	Water - Equipment	3.0000101	Miscellaneous Equipment Replacement (Water)	60
Water	Water - Equipment	3.0000738	Water Quality Lab Infrastructure	20
Water	**Water - Equipment**	**Total**		**165**
Water	Water - Land			
Water	Water - Land	3.0000033	Watershed Land Acquisition	125
Water	**Water - Land**	**Total**		**125**
Water	Water - Security			
Water	Water - Security	3.0000791	Middle Musquodoboit Reservoir Fence	25
Water	**Water - Security**	**Total**		**25**
Water	Water - Structures			
Water	Water - Structures	3.0000589	Aerotech Booster Station Replacement	183
Water	Water - Structures	3.0000623	Booster Station - Building Envelope - Capital Upgrade Program	30
Water	Water - Structures	3.0000784	Bulk Fill Station Driveway Paving	25
Water	Water - Structures	3.0000601	Control Chamber Valve Replacement Program	125
Water	Water - Structures	3.0000774	Cowie Hill Booster Station - Pump replacement and upgrades	250
Water	Water - Structures	3.0000263	District Metered Areas (DMA) Program	100
Water	Water - Structures	3.0000705	Esson Road PRV Replacement	285
Water	Water - Structures	3.0000789	Fall River Rechlorination Station	50
Water	Water - Structures	3.0000779	Geizer 123 Dump Valve Chamber CSE Retrofit	280
Water	Water - Structures	3.0000453	Geizer 123 Reservoir Rehabilition	300
Water	Water - Structures	3.0000606	Highway #7 Booster Station - Fire Pump Replacement	452
Water	Water - Structures	3.0000762	Lake Major Dam - DFO Offsetting - Follow Up Monitoring (2025)	30
Water	Water - Structures	3.0000710	Lennox Drive PRV Chamber - CSE Retrofit and Upgrade	280
Water	Water - Structures	3.0000580	Lyle Emergency Booster Station Upgrades	150
Water	Water - Structures	3.0000379	New Aerotech Reservoir	200
Water	Water - Structures	3.0000776	North Preston Booster Station Roof Replacement	40
Water	Water - Structures	3.0000792	Park Avenue Depot - HVAC Upgrades	25
Water	Water - Structures	3.0000651	Riverside Drive PRV Chamber Replacement	50
Water	Water - Structures	3.0000698	Robie Control Chamber Upgrades	1,300
Water	Water - Structures	3.0000454	Robie Street Reservoir Rehabilitation	300
Water	Water - Structures	3.0000788	Rockmanor Booster Station Pump Replacement	150
Water	Water - Structures	3.0000771	Water Chamber Laser Scanning	25
Water	**Water - Structures**	**Total**		**4,630**
Water	Water - Transmission			
Water	Water - Transmission	3.0000703	Bedford Connector Realignment - Sandy Lake	150
Water	Water - Transmission	3.0000042	Critical Valve Replacement Program	50
Water	Water - Transmission	3.0000554	North End Feeder Replacement ***	2,000
Water	Water - Transmission	3.0000553	Peninsula Intermediate Looping - Quinpool Road to Young St (Connaught-Chebucto 2025)	2,900
Water	Water - Transmission	3.0000660	Peninsula Low North Transmission Main Replacement - Maritime Life and CN Crossing	150
Water	Water - Transmission	3.0000775	Peninsula Low Transmission Main Replacement near Windsor & Young	100
Water	Water - Transmission	3.0000436	Pockwock Transmission Main Twinning - WSP to Hammonds Plain Road	200
Water	Water - Transmission	3.0000761	Port Wallace CCC Water Main Oversizing - Benefit to Existing	65
Water	Water - Transmission	3.0000587	Prince Albert Road Transmission Main / PRV Replacement	752
Water	Water - Transmission	3.0000752	Quinpool Road Transmission Main Upgrades - Quinn St to Beech Street (W6.1 and 6.2)	200
Water	Water - Transmission	3.0000743	Spruce Hill Transmission Main Replacement	210
Water	Water - Transmission	3.0000773	Windmill Road Transmission Main Upgrades	200
Water	**Water - Transmission**	**Total**		**6,977**

Halifax Water

Capital Budget by Project
2025/26

Attachment 1

Program Category	Program Sub Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Water	Water - Treatment Facilities			
Water	Water - Treatment Facilities	3.0000489	Bennery Lake WSP - Manganese Removal Strategy	400
Water	Water - Treatment Facilities	3.0000757	Bennery Lake WSP - Replace Process Residual Sludge Pumps	30
Water	Water - Treatment Facilities	3.0000799	Collins Park Signs	60
Water	Water - Treatment Facilities	3.0000680	JD Kline WSP - Lime System Renewal	260
Water	Water - Treatment Facilities	3.0000610	JD Kline WSP - Low lift pump station - WSEP JDK-800.35	655
Water	Water - Treatment Facilities	3.0000795	JD Kline WSP - New Dry Polymer System	200
Water	Water - Treatment Facilities	3.0000796	JD Kline WSP - New Low Lift Generator	200
Water	Water - Treatment Facilities	3.0000797	JD Kline WSP - New Plant Generator Installation	1,400
Water	Water - Treatment Facilities	3.0000768	JD Kline WSP - Pumping Station - Raw Water Valve Actuators Replacement Phase 2 - Pipe 5 & 4	720
Water	Water - Treatment Facilities	3.0000798	JD Kline WSP - Third Backwash Pump	1,200
Water	Water - Treatment Facilities	3.0000621	Lake Major WSP - Filter upgrades - WSEP MAJ-800.45	734
Water	Water - Treatment Facilities	3.0000781	Lemont Lake Dam Stabilization	100
Water	Water - Treatment Facilities	3.0000764	Pilot Plant - Lake Major Water Supply Plant	950
Water	Water - Treatment Facilities	4.0000366	Pilot Project for Ecological Maintenance Flow determination	100
Water	Water - Treatment Facilities	3.0000758	Pockwock Dam Replacement	500
Water	Water - Treatment Facilities	3.0000691	Pump and Equipment Overhauls Program for WSPs	350
Water	Water - Treatment Facilities	3.0000740	Receiving Environment Assessment - Bomont	25
Water	Water - Treatment Facilities	3.0000731	Small Systems - Filter Column Replacement Program	20
Water	Water - Treatment Facilities	3.0000754	Water Supply Plants Asset Renewal and Emergency Repairs	350
Water	Water - Treatment Facilities	3.0000690	WSP Plants - Instrumentation and Controls Equipment Program	130
Water	**Water - Treatment Facilities**	**Total**		**8,384**
Water	**TOTAL**			**35,055**
		GRAND TOTAL		**132,996**

Capital Budget 2025/26
Capital Projects Over $1M

Attachment 2

Program Category	Project Code	Project Name	All $ in 000s Y1 2025/26
Corporate			
Corporate	4.0000187	Burnside Operations Centre	1,900
Corporate	2.0000043	Corporate Flow Monitoring Program	2,300
Corporate	4.0000007	Fleet Upgrade Program W	1,718
Corporate	4.0000316	Fleet Upgrade Program WW	3,112
Corporate	4.0000170	Integrated Resource Plan Update	1,970
Stormwater			
Stormwater	1.0000104	Driveway Culvert Replacement Program	2,000
Stormwater	1.0000350	Farrell Street Storm Sewer Replacement	2,500
Stormwater	1.0000038	Integrated Stormwater Projects - Program	1,000
Stormwater	1.0000034	Raymond Street / Lakecrest Drive - Storm Sewer Replacement	1,847
Stormwater	1.0000354	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Part 1 - Irishtown Rd to Harbour (Additional Funding)	2,262
Stormwater	1.0000145	Sullivan's Pond Storm Sewer System Replacement - Phase 2 Part 2 - Irishtown Rd to Harbour	6,056
Stormwater	1.0000321	Tobin Run Stormwater Renewal	1,026
Stormwater	1.0000349	Windsor Street Exchange Redevelopment - Stormwater Infrastructure - Construction	1,000
Wastewater			
Wastewater	2.0001030	Duffus Street Pumping Station - Mechanical & Electrical Upgrades	1,200
Wastewater	2.0000052	Integrated Wastewater Projects - Program	1,600
Wastewater	2.0000358	Lateral Replacements WW (non-tree roots)	1,350
Wastewater	2.0001032	Pier A Pumping Station - Mechanical Upgrades	3,100
Wastewater	2.0000168	Wastewater System - Trenchless Rehabilitation Program	4,000
Wastewater	2.0001182	Windsor Street Exchange Redevelopment - Wastewater Infrastructure - Construction	1,000
Wastewater	2.0000982	Young Street Pocket - Sewer Separation - Route to Harbour	1,000
Water			
Water	3.0000022	Integrated Water Projects - Program	8,000
Water	3.0000797	JD Kline WSP - New Plant Generator Installation	1,400
Water	3.0000798	JD Kline WSP - Third Backwash Pump	1,200
Water	3.0000390	Lead Service Line Replacement Program	2,300
Water	3.0000554	North End Feeder Replacement ***	2,000
Water	3.0000553	Peninsula Intermediate Looping - Quinpool Road to Young St (Connaught-Chebucto 2025)	2,900
Water	3.0000699	Raymond St / Lakecrest Drive Storm Sewer Replacement - Watermain	1,243
Water	3.0000698	Robie Control Chamber Upgrades	1,300
Water	3.0000787	Windsor Street Exchange Redevelopment - Water Infrastructure - Construction	1,000
GRAND TOTAL - Projects Over $1M			63,284

ITEM #5.2

Halifax Water Board

January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: DocuSigned by: 0BC10767767F488...
Josh DeYoung, P.Eng., Director, Engineering & Capital Infrastructure

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 10, 2025

SUBJECT: **Mill Cove WWTF Expansion & Upgrade – Detailed Design Engineering Fees – Additional Funding Request – Revised Total Project Cost $11,970,000**

ORIGIN

Halifax Water 2023/24 Capital Budget

RECOMMENDATION

It is recommended that the Halifax Water Board approve additional funding in the amount of $1,970,000 for a revised total of $11,970,000 to complete Phases 1 through 3 of the Mill Cove WWTF Upgrade and Expansion project.

BACKGROUND

On January 25, 2024, the Halifax Water Board approved $10,000,000 in funding for Phases 1 through 3 of the Mill Cove WWTF Upgrade and Expansion project (Attachment 1). Following this approval, Halifax Water submitted a funding application to the Nova Scotia Utility and Review Board (NSUARB). The NSUARB did not approve the request for the $10,000,000 to complete concept validation, preliminary design, equipment preselection and detailed engineering. Instead, the Board requested the Utility's analysis of project procurement options and selection of a preferred approach. The decision from the NSUARB dated July 11, 2024, is provided as Attachment 2. Their key finding is highlighted in italics below:

"The Board directs Halifax Water to file its procurement strategies report with the Board when complete. Once filed, the Board will then consider applications for approval of the project. The Board notes that it expects the Halifax Water procurement strategies report to be thorough and fulsome, outlining the pros

and cons of each approach, potential cost savings and schedule savings with each approach, and presenting a fully justified rationale for recommending the preferred approach."

DISCUSSION

Halifax Water, in collaboration with the consulting team, has conducted a detailed comparative analysis of various procurement and project delivery methodologies. Based on the specific requirements of the Mill Cove WWTF project, Halifax Water recommends that the Construction Manager at Risk (CMAR) methodology be utilized. This approach engages a construction team early in the design process, allowing for improved risk control during construction and valuable input into the design from a constructor's perspective, resulting in an improved design. This analysis report is provided as Attachment 3.

The CMAR approach incurs an upfront cost to involve the Construction Manager during the design phase. Halifax Water has allocated $2,000,000 for this purpose, necessitating a revision of the overall budget for Phases 1-3 of the project, as shown in Table 1 below. The procurement of the Construction Manager will be conducted through an open public procurement process. Due to the early involvement of the Construction Manager, the design contingency has been reduced from 30% to 20%. While there is an initial expense associated with engaging a Construction Manager at Risk (CMAR), this approach can ultimately reduce construction risks and lower overall project costs.

Table 1: Funding Comparison (Original Application vs. Revised Total Project Cost)

Item	Description	Original Project	Revised Project Cost	Notes
1	Phase 1 & 2 : CDR Validation, Pre-selection and Preliminary Design	$ 694,317.00	$ 694,317.00	
1.1	Change Order - Additional Scope	$ -	$ 85,000.00	For development of a detailed procurement strategies report, initiate portion of Geotech work, prepare hydraulic model. This portion of Geotech and hydraulic model work deducted from overall fee of Phase 3.
2	Phase 3: Detailed Design Engineering	$ 6,500,000.00	$ 6,939,420.00	Proposal revised by CBCL on completion of preliminary design report and with assumption of executing project via CMAR
	Sub-Total	**$ 7,194,317.00**	**$ 7,718,737.00**	
3	Design Development Contingency	$ 2,158,295.10	$ 1,543,747.40	Contingency decreased from 30% to 20% for revised project column
	Sub-Total	**$ 9,352,612.10**	**$ 9,262,484.40**	
4	Phase 3: CMAR Allowance	$ -	$ 2,000,000.00	CMAR allowance during design phase
	Sub-Total	**$ 9,352,612.10**	**$ 11,262,484.40**	
5	Net HST (4.286 % on Items 1, 1.1,2,3 and 4)	$ 400,852.95	$ 482,710.08	
6	Overheads (1%)	$ 93,526.12	$ 112,624.84	
7	HW Staff and Project Management (1%)	$ 93,526.12	$ 112,624.84	
	TOTAL	**$ 9,940,517**	**$ 11,970,444**	

A project timeline is provided in the figure below.

BUDGET IMPLICATIONS

Funding in the amount of $1,000,000 is available within the 2023/24 Capital Budget under *Wastewater - Treatment Facilities – 2.817 - Mill Cove WWTF – Process Upgrades – Preliminary Engineering*.

Funding in the amount of $9,000,000 is available within the 2023/24 Capital Budget under *Wastewater - Treatment Facilities – 2.1055 Mill Cove WWTF Plant Upgrade – Design and Contract Admin*.

Funding in the amount of $1,970,000 will be identified in future capital budgets.

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”.

RISK

A detailed risk register has been developed for this project and will be updated at regular intervals as the project goes through various milestones. However, the high-level risks include the overall capital project costs, challenging project site constraints, operational risks during construction, limited contractors, competing projects within the capital budget and community interested party support.

ALTERNATIVES

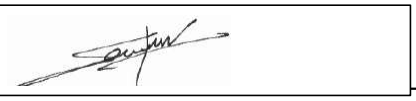
Deferring the project to future years.

The existing infrastructure is exceeding current Average Day Flow (ADF) design capacity, does not meet proposed environmental risks identified in the Environmental Risk Assessment (ERA). This plant upgrade is also required to meet the needs of growth identified in the Integrated Resource Plan and several assets have exceeded their useful life expectancy. Deferral is not recommended.

ATTACHMENTS

1. Attachment 1 - Item 7.1 - Mill Cove Wastewater Treatment Facility Upgrade - Funding Approval – January 25, 2024
2. Attachment 2 - NSUARB Decision Letter dated July 11, 2024
3. Attachment 3 – Project Delivery Methodology Report

Report Prepared by:



Sanjeev Tagra, MASc, P.Eng., Senior Manager, Strategic Projects

Financial Reviewed by:

Signed by:
A65D6874EBC1467...

Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

ITEM #8.1
Halifax Water Board
January 25, 2024

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Digitally signed by Reid Campbell Date: 2024.01.17 12:58:09 -04'00'

Reid Campbell, M.Eng., P.Eng.
Director, Engineering & Technology Services

APPROVED: Tareq Al-Zabet Digitally signed by Tareq Al-Zabet Date: 2024.01.18 14:35:21 -04'00'

Tareq Al-Zabet, Ph.D., CRSP, P.Geo, CEO & General Manager

DATE: Thursday, January 25, 2024

SUBJECT: **Mill Cove WWTF Expansion & Upgrade – Detailed Design Engineering Fees**

ORIGIN

Halifax Water 2023/24 Capital Budget.

RECOMMENDATIONS

It is recommended that the Halifax Water Board approve funding in the amount of $10,000,000 for completing Phases 1 through 3 of the Mill Cove WWTF Upgrade and Expansion project.

BACKGROUND

The central wastewater collection system is a separated system that serves the Sackville and Bedford areas that discharges to the Mill Cove WWTF (MCWWTF). The facility, located at 205 Waterfront Drive, Bedford, then discharges to the west shore of Bedford Basin. The facility has an average daily flow design capacity of 28.4 MLD and is the largest secondary wastewater treatment plant owned by Halifax Water. The facility is situated on a 4.3-acre parcel of land bound on all sides by condominium complexes, a CN Rail easement, DeWolf Park, and property owned by Sobey's Inc. and a parking lot owned by Develop Nova Scotia (Figure 1).

Figure 1: MCWWTF property boundaries

The MCWWTF was constructed in the early 1970s to provide secondary treatment for the community. Two expansions have occurred increasing capacity and upgrading treatment levels with the most significant upgrade occurring in 1995 providing the removal of carbonaceous BOD (biochemical oxygen demand) and TSS (total suspended solids) before discharging to Bedford Basin. Since the 1995 upgrade, the plant's configuration has remained mostly unchanged, except for a few minor modifications in 2010, 2013, and 2018. These modifications included updates to the piping, dewatering centrifuge technology, disinfection system, odour control scrubber and installation of a new outfall.

The current plant is designed to achieve effluent concentrations of Carbonaceous Biochemical Oxygen Demand – ($CBOD_5$) and TSS of 25 milligrams per litre (mg/L). In 2017, Nova Scotia Environment (NSE) required an Escherichia coliform (*E. coli*) limit of 200 count /100 millilitres

(ml) as well as a requirement for the effluent to be non-acutely lethal (as defined by the Fisheries Act) which now is included in the requirements outlined in the current Approval to Operate.

The federal Fisheries Act established requirements in the Wastewater Systems Effluent Regulations (WSER SOR/2012-139) setting minimal municipal effluent quality standards nationwide for suspended solids (SS), carbonaceous biochemical oxygen-demanding material (cBOD), total residual chlorine, and un-ionized ammonia ($NH_{3,\,aq}$). Nova Scotia Environment and Climate Change have endorsed these regulations for applicable facilities and are aligning operational approvals to ensure facilities meet or exceed these regulations based on Environmental Risk Assessment (ERA) filed when requesting approvals for expansions or upgrades.

In 2019, a site-specific Environmental Risk Assessment (ERA) was undertaken for the MCWWTF by Dillion Consulting. The ERA was based on the Canadian Council of Ministers of the Environment (CCME), 2009 Canada-wide strategy for the Management of Municipal Wastewater Effluent (the Canada-wide strategy). The ERA evaluated effluent discharge requirements associated with the design capacity of existing facility. The ERA process is part of a risk management approach that focused on defining WWTF allowable effluent concentrations which are protective of the receiving environment and human health. Components of the Canada-wide strategy included an initial characterization of effluent, determination of Environmental Quality Objectives (EQOs) required in supporting sensitive designated use of the water, determination of corresponding Effluent Discharge Objectives (EDOs), and identification of compliance monitoring requirements. This report was finalized in 2020 and is used as the basis of design requirements for the future facility upgrades as the recommended EDO were more stringent than those listed on current operational permits and those listed under the federal WSER regulations, trigging the need to address current and future environmental regulations moving forward.

The Infrastructure Master Plan (IMP) completed in 2019 highlighted the need for further expansion of the treatment facility to accommodate the ongoing growth in the sewershed area to meet the service strategy for the Central Region. IMP analysis results pertaining to the MCWWTF indicated that the facility was operating at approximately 90% of its rated capacity of 28.4MLD. However, projections for the average daily flow (ADF) in 2046 suggested a future estimated rate of 37.1 MLD would be required.

Considering the projected growth rates and the impact on the receiving water and sewershed boundaries, as well as the site-specific effluent discharge objectives that were established from the ERA it was determined that it was necessary to proceed with a capital upgrade project that would address growth, asset renewal, and regulatory compliance objectives identified in the Environmental Risk Assessment (ERA), WSER regulations and IMP initiatives to the year 2046. Planning for the expansion began immediately with internal efforts focused on data collection, development of design parameters, and process selection.

DISCUSSION

As indicated in the discussion section above, the need to accommodate growth, to address the site-specific needs identified in the ERA and to comply with the 2046 requirement of the WSER regulations, necessitated that the plant be upgraded. In 2019, Halifax Water evaluated alternatives to meet the project's specific needs and developed a Conceptual Design Report (CDR) for the upgrade and expansion project. Through an extensive process evaluation effort, a preferred strategy was identified. The report included a high-level analysis of the design flows and loading, process modeling simulations, and process sizing to allow spatial arrangement/integration with existing processes on site. Opinions of probable costs of the five (5) treatment technologies reviewed were established along with operation and maintenance costs. Finally, a preferred design concept was proposed recommending the implementation of a membrane bioreactor retrofit concept. The CDR was filed with the Nova Scotia Utility and Review Board (NSUARB) and subsequent discussions, presentations and correspondences were exchanged with the NSUARB Counsel Consultants (BCC) related to the report. The result was that the BCC's requested a third-party validation of the CDR to ensure the outcomes and recommendations were sound.

A consecutive negotiation, public procurement process was initiated to select a prime consultant for the project. The consecutive negotiation process allowed Halifax Water to obtain firm pricing for the first two phases and establish a basis for negotiation for future phases. The Request for Proposals was structured to allow for firms to provide a comprehensive design team and expertise capable of undertaking engineering services through the four phases of the project that included:

Phase 1: Concept Validation
Phase 2: Preliminary Design & Equipment Pre-selection
Phase 3: Detailed Design
Phase 4: Construction and & Engineering Services

CBCL-Stantec team was successful in this procurement process and were subsequently contracted for this project in June 2023 at a cost of $ 694,317 plus HST for the first two phases.

The Phase 1 Validation of the Conceptual Design draft was finalized in November 2023. The key report findings indicated that the technology and approach outlined in the CDR was the preferred upgrade/expansion option for Mill Cove and was reasonable considering the objectives and site constraints. Additional refinement of several key aspects will be finalized in the predesign report due in February 2024. The report was filed with the BCC's ahead of a December 4th, 2023, meeting to discuss the validation report as well as the next phase of the project. The BCC's agreed with the assessment of the findings and appropriateness of the MBR treatment concept recommendation in the CDR allowing the project to advance to Phase 2 provided some outstanding concerns identified by the Board Consultants would be addressed as part of the preliminary design currently underway.

Halifax Water staff has established a stage gating committee, comprised of some members of the executive to provide governance and oversight to projects executed by the Strategic Projects

business unit. The committee met for the first time on January 8, 2024, to review the project. The project was approved to proceed through gate 2 to the Plan & Design stage.

A proposed fee and time task matrix outlining the estimated detailed engineering (Phase 3) fees was provided by the consultant team at a cost of $6,500,000 plus HST. This value based on the project definition to date and is subject to further negotiation as scope is developed. through preliminary design and equipment preselection. Should the negotiated fee for Phase 3 be less than the $6,500,000 cost, the balance will be used to offset the cost of Phase 4 – Constructions and Engineering Construction Services in future budgets. Once detailed design is nearing completion, and the construction cost is better defined, Halifax Water staff will return to the Halifax Water Board seeking approval of funding for Phase 4. Table 1 includes a breakdown of the anticipated project costs for engineering services to produce tender ready package with a project timeline associated with engineering design is provided in Figure 2.

Table 1: Breakdown of Engineering Design Project Fees

Item	Description	Cost
1	Phase 1 & 2: CDR Validation, Pre-selection and Preliminary Design	$ 694,317
2	Phase 3: Detailed Design Engineering (Opinion of probable cost)	$ 6,500,000
3	Design Development Contingency (30%)	$ 2,158,295
4	HW Staff and Project Management (1%)	$ 93,526
5	Overheads (1%)	$ 93,526
6	Net HST (4.286 % on Items 1, 2 and 3)	$ 400,853
	TOTAL	$ 9,940,517
	Rounded TOTAL	$ 10,000,000

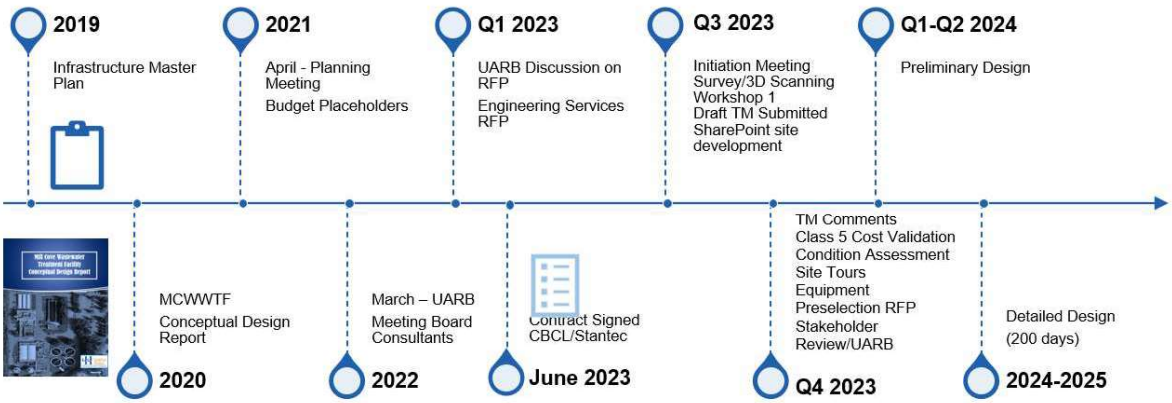


Figure 2: MCWWTF Project Timeline

BUDGET IMPLICATIONS

Funding in the amount of $1,000,000 was available within the 2023/24 Capital Budget under *Wastewater - Treatment Facilities – 2.817 - Mill Cove WWTF – Process Upgrades – Preliminary Engineering.*

Funding in the amount of $9,000,000 is available within the 2023/24 Capital Budget under *Wastewater - Treatment Facilities – 2.1055 Mill Cove WWTF Plant Upgrade – Design and Contract Admin.*

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 "Firm regulatory requirement", "Required to ensure infrastructure system safety and integrity" and "Directly supports the implementation of the Asset Management program".

RISKS

The project team is working with the ERM Program Manager to develop a risk register and risk management plan for this project. Current projects risk identified include the overall capital project costs, project procurement strategies, challenging project site constraints, operational risks during construction, limited contractors, competing projects within the capital budget and community stakeholder support.

ALTERNATIVES

Deferring the project to future years.

The existing infrastructure is exceeding current ADF design capacity, does not meet proposed environmental risks identified in the ERA, is required to meet the needs of growth identified in the IMP and several assets are exceeding their useful life expectancy. Deferral is not recommended.

Report Prepared by: Digitally signed by Chris Fahie Date: 2024.01.17 11:35:27 -04'00'

Chris Fahie, P.Eng., MASc
Manager of Process Engineering, Strategic Projects

Financial Reviewed by: Digitally signed by Louis de Montbrun Date: 2024.01.17 15:20:53 -04'00'

Louis de Montbrun, CPA, CA
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July 11, 2024

mackenk@halifaxwater.ca

Kenda MacKenzie, P. Eng.
Acting General Manager
Halifax Regional Water Commission
450 Cowie Hill Road
Halifax, NS B3K 5M1

Dear Ms. MacKenzie:

M11606 - Halifax Regional Water Commission - Mill Cove WWTF Expansion & Upgrade Project

Halifax Water applied to the Board on March 13, 2024, for approval of a capital funding request for the Mill Cove Wastewater Treatment Facility (WWTF) Expansion & Upgrade project, for an estimated total project cost of $10 million, to complete concept validation, preliminary design, equipment pre-selection and detailed engineering.

The panel assigned to this matter is Roland A. Deveau, K.C., Vice Chair; Steven M. Murphy, MBA, P.Eng., Member; and Jennifer L. Nicholson, CPA, CA, Member.

The Board conducted this proceeding by way of a paper hearing process, but the Board reserved the right to convert it to an oral hearing if circumstances warranted. Halifax Water responded to Information Requests (IRs) from William E. Brown, PE and James Goldstein, the Board Counsel consultants, and Board staff on April 30, 2024, and to a second set of IRs from Board staff on June 4, 2024. The Consumer Advocate intervened in the matter but did not ask IRs or provide any comments. The Board Counsel consultants did not file any evidence. Accordingly, further IRs were not required. On July 4, 2024, Halifax Water and the Consumer Advocate indicated they would not be providing written submissions.

Background

In February 2023, Halifax Water issued a public Request for Proposals (RFP) to prospective proponents for the Mill Cove WWTF Upgrade & Expansion – Prime Consultant. The objective of the RFP was to solicit engineering services proposals based on proponents' relevant qualifications, technical expertise and demonstrated ability to meet the requirements listed in the RFP. That included:

Phase 1: Concept Validation;
Phase 2: Preliminary Design & Equipment Pre-selection;
Phase 3: Detailed Design; and
Phase 4: Construction & Engineering Services.

The successful proponent was a team of CBCL-Stantec (consultants), who were subsequently contracted for this project in June 2023 at a cost of $694,317 plus HST for Phases 1 and 2.

The consultants completed the Phase 1 - Conceptual Validation Report in November 2023. The key report findings indicated that the technology and approach outlined in the Conceptual Design Report was the preferred upgrade/expansion option for Mill Cove and was reasonable considering the objectives and site constraints. Pre-design is underway and delivery of the pre-design report is anticipated for mid-2024.

The Phase 1 – Conceptual Validation Report was shared with the Board Counsel consultants ahead of a December 4, 2023, meeting to discuss the validation report, as well as the next phase of the project. The Board Counsel consultants agreed with the assessment of the findings and appropriateness of the membrane biological reactor (MBR) treatment concept recommendation in the Conceptual Design Report, and the project advanced to Phase 2, which was to address the outstanding concerns identified by the Board Counsel consultants as part of the preliminary design.

In January 2024, Halifax Water requested a proposal from CBCL-Stantec for detailed design services (Phase 3) associated with the Mill Cove WWTF Upgrade & Expansion as per the terms outlined in the original RFP, based on a Class 5 estimated capital cost of approximately $143.5 million. The consultant estimated the detailed engineering (Phase 3) fees at $6.5 million plus HST for work commencing in June 2024 and extending to June 2025.

Halifax Water stated that this proposed cost is based on the project definition to date and is subject to further negotiation as scope is developed through preliminary design and equipment preselection. It said that if the negotiated fee for Phase 3 is less than $6.5 million, the balance will be used to offset the cost of Phase 4 – Construction & Engineering Services, in future budgets. Halifax Water said it will seek Board approval of funding for Phase 4 of the project once detailed design is nearing completion, and the construction cost is better defined.

Halifax Water stated that an alternative to approving the requested funding is to defer the project to future years. However, the existing Mill Cove WWTF infrastructure is exceeding current average daily flow (ADF) design capacity, does not meet proposed environmental risks identified in the Environmental Risk Assessment, is required to meet the needs of growth identified in the Infrastructure Master Plan (IMP), and several assets are exceeding their useful life expectancy. Thus, Halifax Water does not recommend deferral of the project.

Findings

In response to NSUARB IR-14a), Halifax Water stated: "…Halifax Water anticipates that the costs of engineering detailed design will be similar, independent of the selected procurement strategy." However, for other reasons noted by Halifax Water, the Board does not necessarily agree. First, in response to NSUARB IR-9c), the Utility stated: "The actual engineering cost for individual projects will depend on the project complexity, location of engineering, available skill level, previous experience with the technology and many other additional factors." Then, in response to NSUARB IR-11a), Halifax Water stated:

> The selected construction procurement approach influences design engineering strategies by affecting the level of collaboration, risk allocation, project timeline, quality, performance and bidding environment. Understanding these and having direct experience in several different procurement strategies allows Halifax Water to select a procurement strategy that aligns with project goals, optimizing both design and construction costs.
>
> … Each of the construction procurement approaches significantly affects various cost components of the project related to design and construction to risk allocation and project duration and each provide various pros and cons depending on project goals and restraints.
>
> [Exhibit H-4, p. 2 of 4]

The Board, therefore, finds that the selection of a particular project procurement methodology (whether it is design-bid-build, design-build, construction management, Integrated Project Delivery (IPD), or any other alternative methodology) could have a significant effect on engineering services cost. Further, as noted in Halifax Water's response to NSUARB IR-9c): "The Mill Cove WWTF Upgrade and Expansion project is above-average complexity and non-standard design with brownfield development requiring staged construction to ensure the facility remains operational." Based on this response, the Board believes the Mill Cove project will be at least as (and likely even more) complex, and under the same type of construction market conditions, as Halifax Water's proposed Burnside Operations Centre. Given the rationale that Halifax Water used to proceed with an IPD procurement for the proposed Burnside Centre, the Board would expect that an alternative project delivery approach (rather than traditional design-bid-build) will be given serious consideration for the Mill Cove project.

Therefore, at this time, the Board is not prepared to approve Halifax Water's request for approval of $10 million to complete concept validation, preliminary design, equipment preselection and detailed engineering for the Mill Cove WWTF Expansion and Upgrade project. Instead, the Board will wait for completion of the Utility's analysis of project procurement options and selection of a preferred approach. The Board directs Halifax Water to file its procurement strategies report with the Board when complete. Once filed, the Board will then consider applications for approval of the project. The Board notes that it expects the Halifax Water procurement strategies report to be thorough and fulsome, outlining the pros and cons of each approach, potential cost savings and schedule savings with each approach, and presenting a fully justified rationale for recommending the preferred approach.

At this point, Halifax Water has indicated that work on the project is currently proceeding with Phases 1 and 2, which involves concept design validation, equipment pre-selection and

preliminary design. The expected cost for this work, as identified in the Halifax Water's application, is less than $1 million. As such, Board approval is not currently required for this work (although the cost of the work will ultimately need to be included in a future project approval application).

Yours truly,

Roland A. Deveau, K.C.
Vice Chair

Steven M. Murphy, MBA, P.Eng.
Member

Jennifer L. Nicholson, CPA, CA
Member

c. William L. Mahody, K.C., Board Counsel
David J. Roberts, Consumer Advocate

Halifax Water

Mill Cove WWTF

Project Delivery Approaches

Report

November 2024

CBCL

Stantec

02	Final	EZ	08-Nov-2024	MA
01	Draft Final	EZ	20-Sep-2024	MA
00	Draft Report	EZ	21-Aug-2024	MA
Rev.	Issue	Reviewed By:	Date	Issued By:

Project No. 230835.00

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1 Introduction

1.1 Purpose

The purpose of this Technical Memo (TM) is to outline the project construction plan to upgrade the Mill Cove WWTF with MBR Technology. Initiation of The Plan at the preliminary level is important to provide the necessary information, for Halifax Water to make informed decisions for future project phases. This initial version of The Plan will be a living document that will be further refined in coordination with Halifax Water during Detailed Design.

1.2 Report Outline

The major topics addressed in this TM include:

- **Project Overview** of plant upgrade scope, cost, and schedule.
- **Key Considerations** - Risk Issues to consider when evaluating and selecting the preferred delivery and procurement methods.
- **Project Delivery Methods** – Evaluate project delivery models typically used for municipal infrastructure in Canada and recommend preferred delivery method.
- **Construction Manager Selection** - Key considerations to defining the terms and scope of work for the Construction Manager (CM) for the project.
- **Lessons Learned** - A workshop was held with City of Calgary, AB (Wed July 17, 2024) and discussions were held with Clark County Water Reclamation District to learn from their experience.
- **Conclusion** – Recommended preferred project delivery model and key findings.

2 Project Overview & Construction Risks

2.1 Plant Upgrade Scope

The planned upgrade will be a complex undertaking, generally described as follows. A comprehensive explanation is provided in the Preliminary Design Report. The Proposed Design Concept for the plant upgrades is illustrated in Figure 2.1.

- **Expansion of North Primary Clarifiers –** Two new primary clarifiers will be added to the existing three north primary clarifier bank to provide enough primary clarification as a result of demolishing the south primary clarifiers to construct the new MBR building (discussed further in the following sections). The number of new additional primary clarifiers will be confirmed/determined during the detailed design phase.
- **Flow Splitting to Fine Screens –** The primary effluent will flow by gravity to a new fine screening facility. The existing primary effluent channel will be extended to direct the primary effluent to the new screening facility.
- **New Fine Screening –** The primary effluent will require enhanced screening using 2 mm screens to protect the Ultra-Filtration (UF) membrane cassettes from fouling with small plastics and fibrous materials.
- **New Fine Bubble Diffused Aeration Tanks –** The existing high purity oxygen system will be replaced with Fine Bubble Diffused Aeration (FBDA) within three new aeration bioreactor trains. The scope of work will generally include:
  a. New aeration/bioreactor tanks.
  b. New blowers.
  c. New air supply/distribution piping.
  d. New in-tank FBDA grids.
  e. System controls.
- **New MBR Facility –** A new MBR facility will be constructed. The scope of work will generally include the construction of:
  a. New Mixed Liquor Suspended Solids (MLSS) channel that connects the bioreactors to the UF membrane tanks.
  b. New Recycled Activated Sludge (RAS) flow splitter chamber to return the activated sludge from the MBR units to the bioreactors.
  c. New MBR building.
  d. New permeate piping to transfer treated effluent to the existing UV disinfection system.
  e. Construction of new electrical/PLC/control within the MBR building.

- **New Sludge Handling System –** The existing two-stage anaerobic digestion system will be demolished and replaced with a new solids handling system. The scope of work will generally include:
  a. New Rotary Drum Thickeners (RDT) for Waste Activated Sludge (WAS) thickening.
  b. New blend tank to receive/mix primary sludge and thickened WAS (TWAS).
  c. New centrifuges for blended primary sludge and TWAS dewatering.
- **New Odour Control –** A new odour control system will be added to treat foul air collected from the odour producing treatment process units. Re-use of existing activated carbon odour control system will be evaluated during the detailed design phase.

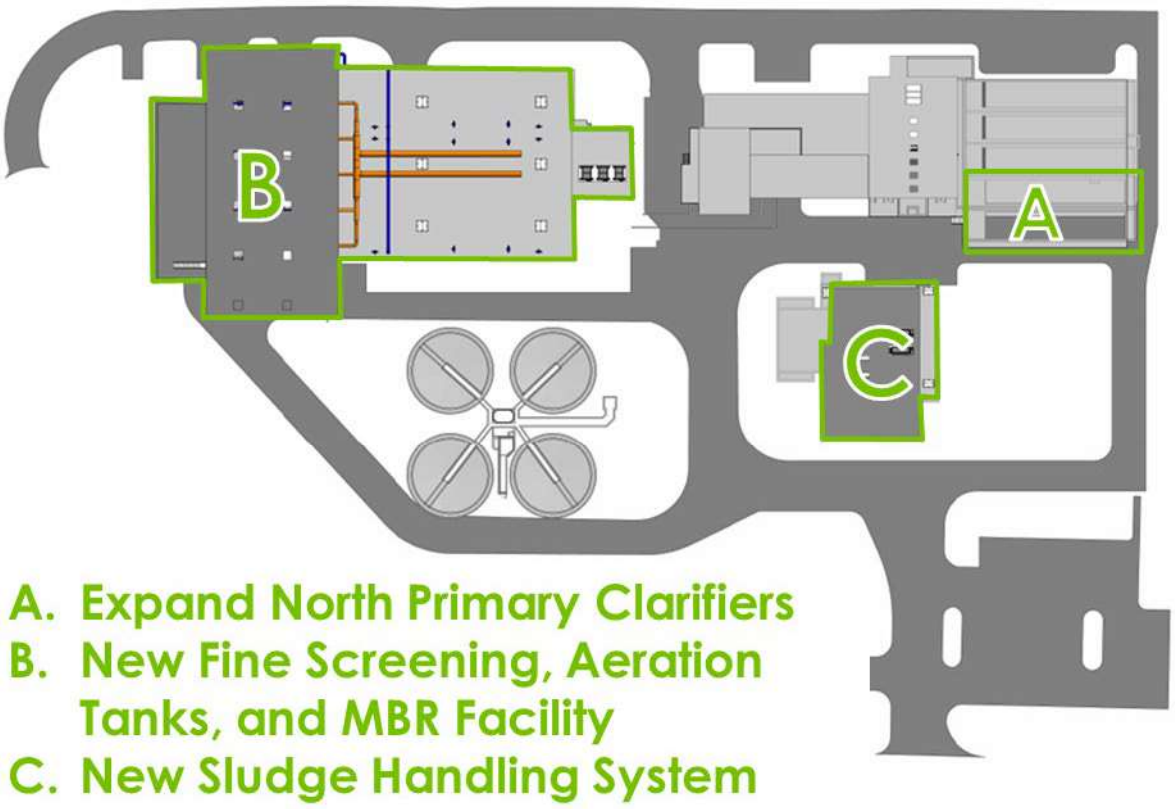


Figure 2.1: Proposed Design Concept for Plant Upgrades

The project also includes a substantial amount of demolition and refurbishment of existing plant infrastructure. The major components included in the refurbishment work include the demolition of the existing anaerobic digesters, the replacement of the existing headworks and primary clarification equipment, interior modifications to the existing process building, and exterior refurbishment of all the remaining building assets.

2.2 Cost

The preliminary level Opinion of Probable Cost estimate for upgrading the Mill Cove WWTF with MBR technology is summarized in Table 2.1. A detailed summary is provided in the Preliminary Design Report.

Table 2.1: Opinion of Probable Cost

Item	Description	Cost Range [1,2] 37.2 MLD MBR Low	Average	High
Sub-Total Cost (Construction)		**$ 75,900,000**	**$ 92,600,000**	**$ 110,500,000**
20	Engineering [3]	$ 6,072,000	$ 7,408,000	$ 8,840,000
21	CM/CA [3]	$ 5,313,000	$ 6,482,000	$ 7,735,000
Sub-Total Cost (Construction + Additional Costs)[3]		$ 87,285,000	$ 106,490,000	$ 127,075,000
22	Contingency [3]	$ 21,821,000	$ 26,623,000	$ 31,769,000
Sub-Total Cost (Construction + Additional Costs+Contingency)[3]		$ 109,106,000	$ 133,113,000	$ 158,844,000
23	Net HST [3]	$ 4,676,000	$ 5,705,000	$ 6,808,000
24	Overhead [3]	$ 1,091,000	$ 1,331,000	$ 1,588,000
25	Labour/Wages [3]	$ 759,000	$ 926,000	$ 1,105,000
Total Cost		**$ 115,632,000**	**$ 141,075,000**	**$ 168,345,000**

The opinion of probable costs is based upon the following:

1. Class 4 Level (Preliminary Design Cost Estimate, High Complexity) with anticipated accuracy range of (+/-) 15%, based upon AACE International Recommended Practice No. 18R-97.
2. All costs are based upon 2024 Year $s. Future inflation impact not included.
3. Additional cost components (Engineering, Professional Fees, Construction Management / Construction Administration (CM/CA) based upon Halifax Water Cost Estimation Framework Technical Memo (Jan 2020). These will be confirmed before start of Detailed Design work phase.
4. Cost of imported specialty equipment from the US, is based upon US Currency exchange rate of $1 USD = $1.37 CAD.
5. Uncertain construction market conditions given the extended duration (up to 7 years) of the design and construction schedule poses significant cost risk.

2.3 Construction Schedule & Staging

The construction of the Mill Cove WWTF upgrade will be a complex undertaking with complicated staging of demolition and new construction. The project duration to construction completion could take in upwards of six (6) years. Construction staging milestones are outlined in Table 2.2. A detailed schedule is provided in the Preliminary Design Report.

Table 2.2: Construction Staging Milestones

Milestones	Description	Timing
1	Demolish the Biosolids Facility	Q1 2026
2	Expand North Primary Clarifiers	Q1 2026 to Q2 2026
3	Demolish South Primary Clarifiers	Q3 2026
4	Construct Primary Effluent Screen Building, Aeration Tanks (2 of 3), MBR Building, and Sub-Station	Q4 2026 to Q4 2028
5	Demolish HPO Reactors and North Secondary Clarifiers	Q1 2029
6	Construct 3rd Aeration Tank	Q2 to Q4 2029
7	Construct new Sludge Thickening/Dewatering Facility	Q2 2029 to Q2 2030
8	Refurbish Administration and Headworks Buildings	Q3 2029 to Q1 2030
9	Site Improvements and Roadway Realignment	Q2 2030 to Q3 2030

2.4 Construction Delivery Risk Issues

Upgrading the Mill Cove WWTF upgrade will be a complex undertaking with complicated staging of demolition and new construction, potentially in upwards of seven (7) years of construction duration. Project delivery would need to address wide ranging risk issues of which would include the following and potentially others to be identified during Detailed Design.

- **Maintaining Plant Operation** – Given the complex staging of demolition and construction, there is significant risk of jeopardizing plant operation and degrading effluent quality.
- **Coordination with Plant Operation** – Plant operation will take precedence. As such construction staging and demolition will need to coordinate with plant operation, which could cause delays and potentially rework.
- **Managing Wet Weather Peak Flow Events** – Plant operation will continue to struggle managing excessive peak flow event during wet weather events. Plant construction activity could be disrupted during these events, resulting in delay, rework, and extra costs.
- **Prequalification of GCs and Major Trades** – Given the magnitude and complexity of the plant upgrade, GCs and major trades will need to have suitable experience to successfully deliver this project.
- **Future Volatility of Market Economic Conditions** – Material and labour costs for the construction sector are expected to continue increasing over the foreseeable future, given the many infrastructure projects currently underway with more being planned. This will pose significant cost escalation risk to Bidders, as such fixed fee bid prices will inevitably be inflated to offset this risk.

- **Challenging Site Conditions** – The site is confined, geotechnical soil conditions are poor, and groundwater dewatering needs pose significant unforeseen risks during construction. Bidders will add cost premiums and escalate their prices to offset these risks.
- **Maintaining Project Schedule** – Given the long construction duration and complexity of the project, the potential of scheduling delays is significant. For this magnitude of the project, the GCs overhead carrying costs could be in the $150K to $300K per month range ($1.8M to $3.6M per year). As such, project schedule delays could result in substantial extra costs.
- **Complex Demolition** – Given the congestion and close proximity of existing buildings and structures, demolition activity poses significant risk to damaging these buildings and structures. Special planning and precautions will be required during construction which will be difficult for Bidders to predict, as such they will inevitably add contingency premiums and thereby inflate bid prices.
- **Air and Noise Impacting Neighbouring Properties** – Given the magnitude of demolition and construction over a long construction duration period, the risk of impacting neighbouring properties will be significant. This will impact construction activity, potentially resulting in delay, rework, and extra costs.
- **Construction Warranty** – Given the long construction duration, new major equipment will be installed and potentially operating beyond the manufacturer's standard warranty period, before construction is completed. The impact will be difficult for Bidders to predict, as such they will inevitably add contingency premiums and thereby inflate bid prices.

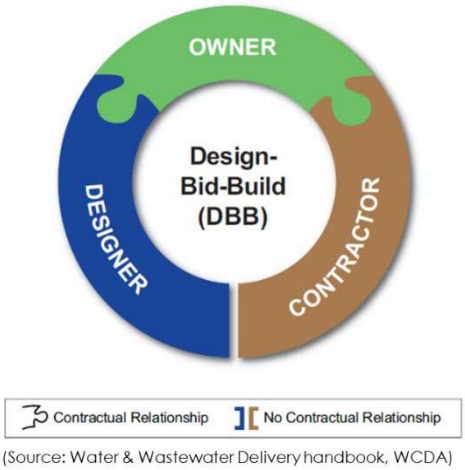
3 Project Delivery Methods

3.1 Project Delivery Models

There are different contract delivery models to deliver infrastructure projects. The advantages and disadvantages of each model, in context to municipal wastewater treatment projects in Canada, are explained herein.

3.1.1 Design-Bid-Build (DBB)

Design-bid-build is the most common project delivery approach used in the municipal sector for wide ranging infrastructure types. Generally, consists of a design team (Engineer) and general contractor (GC) working directly for the Owner under separate contracts. The Engineer, working with the Owner, completes the design and prepares the construction contract bid documents (i.e., specifications, drawings, etc.). A tender is issued to invite bids from GCs to construct the project. The Owner and Engineer evaluate the tender bids and typically award the construction contract to the lowest bidder. After the construction contract is agreed upon, the GC can start construction. DBB is not considered a collaborative delivery model.



(Source: Water & Wastewater Delivery handbook, WCDA)

Advantages:

- Long history with proven project delivery and management tools.
- Competitive bidding normally will lower project construction cost.
- Owner transfers risk to the GC to construct the project.
- Reduced conflict of interest because both Engineer and GC have separate contracts with the Owner.
- Cost certainty.

Disadvantages:

- Current market conditions (inflation; cost escalation uncertainty) pose excessive risk on Bidders. Some might not bid and thereby reduce competition. Others will add high-cost premiums. Recent tender bid prices for major projects were substantially higher than budgeted.

- Compared to other alternatives described herein, DBB does not allow the opportunity for GCs to collaborate during the design, to reduce construction risks and identify potential cost saving opportunities.
- Risk of change orders, delays, and additional cost claims by GC.

3.1.2 Design Build (DB)

Design-Build (DB) is more common in the US than Canada, for municipal infrastructure projects. The Owner has a single contract with an integrated team, of a contractor and designer, for design and construction services. Typically, the contractor leads the design-build team, and the Engineer is subcontracted to the GC. In contrast to DBB and Construction Manager at Risk (CMAR), DB offers a single point of responsibility for both design and construction performance.

There are variations of DB, each with their unique features: Progressive Design-Build (PDB), Fixed-Price Design-Build (FPDB), and Design-Build-Operate (DBO).

(Source: Water & Wastewater Delivery handbook, WCDA)

- PDB - the owner works with the design-builder to develop the design (60% to 90% completion). This enables the owner to remain directly involved in the design process to ensure the final design meets their requirements. Also, the Owner benefits with better certainty to forecast a project's overall cost. When the design is sufficiently complete, the design-builder prepares a contract price proposal. If the Owner accepts the proposal, the design-builder completes the design and construction.
- FPDB – This best applies for projects with well defined requirements and scope of work to enable bidders to accurately predict the project cost and submit a proposal for the Owner to consider. If accepted, the Owner and design-builder enter into agreement, for design and construction services. The design-builder assumes the risk of delivering the project for the fixed price, and the Owner benefits from the cost certainty. In contrast to PDB, the Owner has less involvement to develop the design.
- DBO – This includes the same attributes referenced above, but also adds O&M of the completed facility for a set term. The Owner benefits from transfer risk and responsibility of O&M to the DBO team.

Advantages:

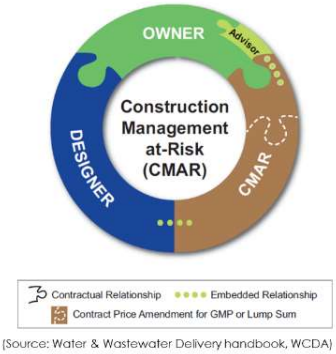
- Owner transfers risk to the design-build team, for both design and construction.
- Owner benefits from cost certainty, since the design-builder assumes the risk of delivering the project for the fixed price.
- Faster project delivery schedule.

Disadvantages:

- DB contracts are not common in Canada for municipal infrastructure projects, as such less proven history of project delivery and management tools, compared to DBB.
- Current market conditions (inflation; cost escalation uncertainty) pose excessive risk on Bidders, which will cause them to add high-cost premiums for market risks.

3.1.3 Construction Management at Risk (CMAR)

CMAR is a collaborative delivery method. The Owner retains a design engineer and CMAR firm under two (2) separate contracts. CMAR is similar to DBB but provides better collaboration between the engineer and contractor. Typically, the Owner contracts first selects the Engineer to undertake the preliminary design (up to 30% design completion) and then engages the CMAR firm to provide input during the detailed design phase on constructability aspects of the site layout, risk identification, technical requirements, construction execution approaches, general arrangements, and early cost estimates and schedule factors. By involving the contractor during design, this will better identify cost and schedule efficiencies for construction, which is especially important for complex projects with budget and scheduling risks.



(Source: Water & Wastewater Delivery handbook, WCDA)

Advantages:

- Owner is involved in the design process to ensure the final design meets their requirements; similar to DBB; better than DB.
- Better collaboration between designer and contractor. By engaging the contractor in the design process, will reduce construction risks and identify potential cost saving opportunities.
- Better aligns risk responsibility between Owner, designer, and contractor.
- Owner benefits from cost certainty, since construction manager assumes the risk of delivering the project for the Guaranteed Maximum Price (GMP).

Disadvantages:

- Lacks single point of responsibility for design and construction, in contrast to DB.
- Although currently prominent in the US, CMAR contracts are not common in Canada for municipal infrastructure projects. Therefore, there is less proven history of project delivery and management tools, when compared to DBB.

3.1.4 Integrated Project Delivery (IPD)

IPD is a relatively new model for the municipal infrastructure sector in Canada. The Owner, design and contractor share liability, responsibility, risk and reward, through one (1) common contract. This model is the most innovative and collaborative approach to deliver projects. When combined with lean construction principles, project costs are lower, and schedule is faster. The Owner is involved in the design process to ensure the final design meets their requirements. The design and construction teams are incentivized, through rewards and penalties, to deliver the project successfully.

Advantages:

- Owner is involved in the design process to ensure the final design meets their requirements; similar to DBB and CMAR; better than DB.
- Better collaboration between Owner, designer, and contractor to improve quality, reduce cost and risk, and fast-track schedule.
- Better aligns risk responsibility between Owner, designer, and contractor.
- Owner benefits from cost certainty, since the designer and contractor are penalized for budget overrun.

Disadvantages:

- There is a steep learning curve for partners who lack experience with IPD approach.
- IPD contracts are gaining popularity in Canada on municipal projects. The municipalities and utilities still have a steep learning curve to execute projects through this methodology.

3.2 Comparison Overview

A side-by-side comparison overview of project delivery models is summarized in Table 3.1.

Table 3.1: Comparison of Project Delivery Models

Design-Bid-Build (DBB)	Construction Management at Risk (CMAR)	Design-Build (DB) Progressive (PDB), Fixed Fee (FFDB), Operate (OPD)	Integrated Project Delivery (IPD)
Owner responsible for scope and unforeseen conditions	Owner responsible for scope and unforeseen conditions	Owner responsible for scope and unforeseen conditions	Owner responsible for scope and unforeseen conditions
Owner "owns" performance issues	Owner "owns" performance issues, but mitigates challenges early	Design-builder takes responsibility for performance	Partners share responsibility for performance
Well-understood risk allocation (history of change orders)	Existing risk allocation managed with early contractor involvement	Appropriate risk transfer (performance, schedule, permits)	Appropriate risk transfer (performance, schedule, permits)
Specifications based	Specifications based with input	Performance based	Specifications based with input
Predictable schedule (linear and usually longer)	Accelerated schedule; concurrent procurements	Potentially fastest delivery; concurrent design/construction	Accelerated schedule; concurrent procurements
Proven and familiar, but known challenges to success	Design-build "lite" — familiar yet introduces collaboration	Proven but not as familiar in Canada; ensures collaboration	New in Canada. Unfamiliar. Ensures collaboration
Multiple contracts and separate deliverables	Multiple contracts; coordinated deliverables	Single contract; single-point responsibility	Common contract; shared responsibility
Multiple procurements	Multiple procurements	Single procurement	Single procurement
Existing procurement process	Adapt existing process	New procurement process	New procurement process
Traditional roles	Traditional roles/untraditional times	New roles	New roles

Source: Water & Wastewater Delivery Handbook, WCDA

4 Project Delivery Method Evaluation

The following project delivery methods were evaluated, in order to recommend the preferred method for the proposed Mill Cove WWTP upgrade and expansion. The advantages and disadvantages of these methods are explained in Section 3:

- Design-Bid-Build (DBB).
- Construction Manager at Risk (CMAR).
- Design-Build (DB) options: Progressive Design-Build (PDB) and Fixed-Price Design-Build (FPDB).
- Integrated Project Delivery (IPD).

4.1 Project Success Factors

The following factors were considered, to evaluate and determine the preferred delivery method:

- **Plant Operation During Construction** – The Proposed Plant Upgrade, as explained in Section 2.1, will be a complex undertaking with complicated staging of demolition and new construction. Construction activity poses high risk of jeopardizing plant operation. Operational focus is important during design and construction.
- **Cost Certainty** – Confirming construction cost early during the design is preferred.
- **Proven** - History with proven project delivery and management tools, for municipal infrastructure projects in Canada.
- **Project Schedule** – The project duration to construction completion could take in upwards of six (6) years. Construction staging milestones are outlined in Section 2.3. A detailed schedule is provided in the Preliminary Design Report. The plant currently operates near its rated capacity and significant population growth is expected in the 5-Year Horizon. As such, faster construction completion is preferred.
- **Risk Transfer** – Halifax Water is sensitive to risk and transferring risk is preferred.
- **Collaboration** – The degree of interaction between Halifax Water, Engineer, and Contractor working together to deliver a successful project and best satisfies Halifax Water's objectives.
- **Market Conditions** – Post Covid, the construction market for municipal infrastructure, as explained in Section 2.5, has experienced high risk uncertainty and cost escalation. Contractors, trades, and equipment vendors have expressed concern bidding on complex projects with long construction schedules. Attracting the most qualified personnel and proponents onto the project is preferred.

4.2 Risk Issues

The construction delivery and current market risk issues are explained in Section 3.

4.3 Evaluation

The project delivery methods were evaluated against the Project Success Factors, as summarized in Table 5.1. The scoring methodology is based upon five (5) point range, where the most favourable is five (5) points and least favourable is one (1) point. These scores are then multiplied by a weighting factor that addresses the relative importance of each success factor to Halifax Water.

4.4 Preferred Delivery Method

Based on the evaluation (Table 4.1), CMAR ranked most favourable to address all of the project success factors for this project. It should be noted that this ranking is particular to this project and its features that align well with the CMAR method including:

- High level of influence for Halifax Water during design.
- Contractor involvement in budget confirmation.
- Maintaining operation during construction.
- Requirement for coordinating and phasing contracts to achieve schedule.
- Attraction of qualified proponents due to utilizing industry preferred delivery method.

Other projects of similar value may nor contain these features and, therefore, a similar evaluation applied to those projects could return a different result.

Table 4.1: Evaluation of Project Delivery Models

Project Success Factors	Relative Importance to HW	Design-Bid-Build	CMAR	Progressive DB	Fixed Price DB	Integrated Project Delivery
Plant Operation during Construction	High Score Weight = 0.3	Unfavourable. Contractor is not involved during design to address construction risks. Changes during construction could result in cost extras Score = 2 Weighted score = 0.6	Most favourable. Contractor is involved early to influence the design, and Halifax Water retains decision-making control throughout construction Score = 5 Weighted Score = 1.5	Moderate. Although Contractor is involved during predesign to establish scope, there is potential extra cost risks of changes during construction to accommodate plant operations Score = 3 Weighted Score = 0.9	Unfavourable. DB Team has decision making control during design and construction and any changes to accommodate plant operations could result in cost extras Score = 1 Weighted Score = .3	Favourable. Similar to CMAR, except Halifax Water shares decision making control with project partners Score = 4 Weighted Score = 1.2
Cost Certainty	High Score Weight = 0.3	Unfavourable. Construction cost confirmed the latest, after design. Score = 1 Weighted Score = 0.3	Favourable. Similar to Progressive DB, construction cost confirmed at 50% design completion. Score = 3 Weighted Score = 0.9	Favourable. Construction cost is confirmed early in design (30% completion). Score = 4 Weighted Score = 1.2	Most favourable. Construction cost confirmed the soonest; at bid close, before design start. Score = 5 Weighted Score = 1.5	Moderate. Construction cost confirmed at completion of Validation work phase, which take a year. Score = 2 Weighted Score = 0.6
Proven	Medium Score Weight = 0.1	Most favourable. Long history with proven project delivery and management tools Score = 5 Weighted Score = 0.5	Favourable. Gaining acceptance in Canada, for complex municipal infrastructure. City of Calgary set precedence. Score = 4 Weighted Score = 0.4	Moderate. DB contracts are uncommon in Canada for municipal infrastructure projects, as such less proven history of project delivery and management tools, compared to DBB. Score = 3 Weighted Score = 0.3	Moderate. Similar as Progressive DB. Score = 1 Weighted Score = 0.1	Unfavourable. IPD contracts for municipal infrastructure projects are uncommon in North America. Score = 2 Weighted Score = 0.2
Project Schedule	Medium Score Weight = 0.1	Unfavourable. Longest schedule Score = 1 Weighted Score = 0.1	Favourable. Construction start can be advanced earlier than Progressive DB (10% Design Completion), such as demolition work. Score = 4 Weighted Score = 0.4	Favourable. Similar to CMAR, although construction start until 30% design completion, when Guaranteed Maximum Price (GMP) is agreed to. Score = 3 Weighted Score = 0.3	Most favourable. Design and construction start can be fast-tracked. Score = 5 Weighted Score = 0.5	Unfavourable. Longer schedule than CMAR and DB because of Validation Period (1 Year duration) Score = 2 Weighted Score = 0.2
Risk Transfer	Low-Medium Score weight = 0.05	Unfavourable. Risk transfer to GC is contractually defined later, after design completion. Halifax Water assumes risk of design/operation/construction impacts Score = 1 Weighted Score = 0.05	Favourable. Shared risk transfer between Halifax Water and CM contractually defined earlier than progressive DB. Score = 4 Weighted Score = 0.2	Favourable. Similar to CMAR, except moderately longer timeline because contract negotiations predicated by GMP development. Score = 3 Weighted Score = 0.15	Most favourable. Risk transfer to DB Team contractually defined at project start. Score = 5 Weighted Score = 0.25	Risk transfer shared among project partners, but is defined after Validation Period, later than CMAR and DB. Score = 2 Weighted Score = 0.1
Collaboration	Medium Score Weight = 0.1	Unfavourable. Contractor is not involved during design to address construction risks. Changes during construction could result in cost extras Score = 2 Weighted Score = 0.2	Favourable. Similar to Progressive BD, except offers the advantage of phasing construction contracts and thereby enable extended opportunity for Halifax Water to interact with CM, prior to each construction phase Score = 4 Weighted Score = 0.4	Favourable. Halifax Water is involved early design process to ensure the final design meets their requirements, except this is a single construction delivery contract, after which Halifax Water would have limited interaction with project delivery. Score = 3 Weighted Score = 0.3	Unfavourable. DB Teams assume complete control for design and construction. Halifax Water would have the least amount of input, compared to other models Score = 1 Weighted Score = 0.1	Most favourable. Validation period allows the greatest opportunity for project partners, to work together, defining the project scope, developing design, and construction delivery. Score = 5 Weighted Score = 0.5
Market Conditions	Low-Medium Score Weight = 0.05	Unfavourable. Compared to other models, Contractor is at highest risk to changing market conditions. This could deter contractors, trades, vendors from bidding; Reducing competition; Resulting in higher construction cost Score = 1 Weighted Score = 0.05	Favourable. Similar to IPD, risk and uncertainty of changing market conditions is shared between Halifax Water and CM (in contrast to all project partners, for IPD model) Score = 4 Weighted Score = 0.2	Favourable. Similar to CMAR, arguably DB Teams assume more responsibility for market risk that they can't control, which could increase construction cost. Score = 3 Weighted Score = 0.15	Unfavourable. Similar to DBB Score = 2 Weighted Score = 0.1	Most favourable. Risk and uncertainty of changing market conditions is better defined and shared among all project partners Score = 5 Weighted Score = 0.25
Overall Weighted Score		**Unfavourable Weighted Score = 1.8**	**Most favourable Weighted Score = 4**	**Favourable Weighted Score = 3.3**	**Unfavourable Weighted Score = 2.85**	**Favourable Weighted Score = 3.05**

5 Construction Manager Selection

5.1 Key Considerations

Key considerations to defining the terms and scope of work for the Construction Manager (CM) for the project are initially outlined in this section including:

- Project schedule and sequencing of work.
- Type of CM Contract (CM at Risk, CM as agent).
- Fee and incentive structures for the CM.
- Recommended approach and fee structure for CM Self Performed Work.
- Guidelines for CM tendering of sub-trade and supplier contracts.
- Strategy for Pre-Qualification of Construction Management firms.
- Major risk items and mitigations in relation to the CM contract.

CBCL/Stantec (Engineer) recommends defining the major objectives of the CM strategy early in Detailed Design, through a collaborative approach between the Halifax Water and their Engineer. The CM strategy should then be fine-tuned through the completion of the Request for Proposal (RFP) process.

5.2 CM Defined Schedule & Sequencing of Work

As part of their scope of work for the Pre-Construction phase of the project, the Construction Manager will work with the Halifax Water and Engineer to develop and maintain a project schedule that considers sequencing of the construction phases to balance project priorities with cash flow availability.

In developing their initial project schedule and overall budget for the project, the CM will consider multiple infrastructure staging and cost scenarios. These will range from completing the construction project in staged fashion based on the currently allocated cash flows, to completing the construction based on having critical component completed by the scheduled completion date (Year 2028), to completing the constructed works on a schedule that minimizes lowest capital cost. These will be reviewed by the Halifax Water and their Engineer, to determine a preferred schedule and sequencing of the work.

5.3 Type of Construction Manager Selection

Two (2) alternative approaches for the Construction Management Contracts are explained herein. These are simplified definitions but do address the primary differentiator of the two approaches.

Construction Manager as Agent: The CM would become an Agent for the Halifax Water and act in the owner's interest. All contracts would be signed between the Halifax Water and the Sub-Trades or Suppliers. With a CM as Agent approach, all conflicts, sub-trade failures and subsequent liabilities would be at the Halifax Water's risk.

Construction Manager at Risk: The CM would hold all Sub-Trade and Supplier contracts. With the CM at Risk approach, the liabilities are between the sub-trades, suppliers, and the CM.

Both alternatives provide for CM involvement in the pre-construction phase to the schedule, budget and constructability items. The main differentiator is risk held by the Halifax Water and responsibility over subcontractors. The CM-Agent model puts all subcontractor risk (schedule, cost, performance) on Halifax Water; while CM-Risk puts subcontractor risk on the CM.

CBCL/Stantec recommends that Halifax Water adopt the Construction Management at Risk approach.

5.4 Construction Management Selection Process

A single submission with a two-stage evaluation process is recommended for selection of the CM. The purpose is to receive a submission that can be single response that will allow for elimination of bidders with poor qualifications prior to the technical evaluation such that Halifax Water can mitigate the potential of unqualified submissions being considered. The second stage will include a technical evaluation that will include aspects of ensuring that qualified CMAR proponents are providing their services at a competitive price.

Evaluation Stage 1: Qualifications - This stage will determine the CM firms eligible for Evaluation Stage 2 Technical Evaluation, for CM services on this project. Qualifications selection of CM firms to be based on review of mandatory and evaluated criteria, such as:

- Company experience.
- Company resources.
- Construction performance.
- Approach to Owners and Engineers.
- Experience of project team members.
- Track record for delivering similar projects.
- Financial capacity.

Evaluation Stage 2: Technical Evaluation Process – Halifax Water with support from their Engineer, will evaluate the qualified firms determine in Stage 1 against Technical Evaluation criteria, including:

- Overall project scope of work.
- CM services to be provided through each project phase.

- Project schedule and opinion of probable cost.
- Terms and conditions of the CM contract.
- Fee structure (Value for Service).
- Evaluation criteria for selection.
- Draft CM agreement and supplementary condition.

Construction Management Selection Timeline - To maximize the value return of the CM, CBCL/Stantec recommends the CM be retained early in detailed design and fully integrated into the team for the detailed design phase. Based on current industry practice, this is typically around the 30% design stage.

5.5 Description OF CM Services During Phases of the Project

Below is only a highlighted list of the key services to be provided. A long list of all scope and expectations will be developed under the RFP.

Pre-Construction (Design) Services to include (but not necessarily be limited to):

- Participate in Team Value Engineering Reviews.
- Provide appropriate expert personnel to the Design Team to develop construction budgets, schedules, subcontract sequencing, constructability and risk reviews.
- Maintain master budget and schedules.
- Develop Guaranteed Maximum Price (GMP) submissions.
- Assist in identifying design priorities (critical path items).
- Carry out equipment pre-selection / procurement packages.
- Obtain required development and building permits on behalf of Halifax Water.
- Develop the Performance Monitoring Baseline by which construction status will be evaluated. Halifax Water and Engineer to review and approve.

Construction Services to include (but not necessarily be limited to):

- Tender and evaluate all supplier and sub-trade packages. Packages in excess of a predetermined dollar value (value to be confirmed) to be signed off by Halifax Water and their Engineer.
- The CM will be responsible for pre-qualifying sub-trades to ensure only capable participants are contracted.
- Plan, coordinate and administer work of sub trades, sub-contractors and equipment pre-selection/procurement packages.
- Self-perform work (see later in document for further discussion).
- Provide monthly project status updates to track performance against the Performance Monitoring Baseline (cost, cash flow and schedule).
- Provide and coordinate temporary facilities to accommodate construction.
- Maintain a full time Safety Program and Officer on site.

- Provide a Quality Control Program and employ and supervise all testing agencies required (Halifax Water may at its own cost, employ an outside testing agency to verify test results).
- Develop and implement an Environmental Management Program.
- Develop and implement a site security plan.
- Develop training, startup and commissioning programs.

Post Construction Services to include (but not necessarily be limited to):

- Develop O&M Manuals.
- Implement the Training, Performance Testing, Startup and Commissioning Programs.
- Provide redline as-built drawings.
- Provide support to Halifax Water through warranty period.

5.6 Role of Halifax Water & Engineer (In Conjunction with CM)

Key responsibilities of Halifax Water and their Engineer are as follows, to compliment the CM role and responsibilities as outlined in the section above.

Role of Halifax Water:

- Develop, approve, and issue of RFPQ and RFP packages for CM selection.
- Review and approval CM firm responses and selection of CM design firm.
- Provide input and final approval on all major design considerations raised through the CM constructability and risk reviews.
- Ensure a continuous flow of information between the end user group, the Engineer and the Construction Manager.
- Provide final approvals on capital expenditures and budget adjustments including subcontract and supplier packages.
- Provide final approval of all schedules and adjustments to these schedules.
- Provide approval of all progress billings.
- Provide approval of scope or design changes.

Role of The Engineer:

- Support Halifax Water in the development of the RFPQ and RFP packages.
- Participate in the evaluation of both the RFPQ and RFP submissions and recommendation for both.
- Complete design drawings and specifications.
- Pre-Construction other project costs (OPC) and schedules as a parallel estimating/schedule step to the CM as a best practice to successfully navigate GMP negotiations.
- Oversee (as agent to Halifax Water) the Construction Manager in their duties.
- Oversee of quality and timeliness of the construction work.

- Work with the Construction Manager on a daily basis to ensure all tendering and procurement guidelines are adhered to.
- Review & approve all subcontract and supplier packages.

5.7 Construction Management Fee Structure

There are several possibilities for setting up the fee structure for CM contractors' services (lump-sum, monthly, incentive, etc.). CBCL/Stantec recommends Halifax Water adopt a fee structure including all CM costs to the end of the contract excluding self-performing work (discussed later). This type of fee structure implicitly incentivizes the CM to complete the work in a timely fashion as their fees are fixed and their resources are otherwise tied up if the construction progresses slower than planned. Further, the major objectives of Halifax Water and the CM are aligned.

Construction Management Fee to include:

- Principals and Directors.
- Construction Manager's Project Manager.
- Site supervisor.
- Contract coordinators.
- Schedulers and document control coordinators.
- Estimators.
- Office management and administration.
- Finance / accounting.
- Procurement staff.
- Safety personnel.
- Quality Control inspectors.
- Commissioning personnel for contractor tasks.
- Cost estimating, cost control and value analysis personnel.
- Office equipment (communication devices, computers, fax machines, reprographic equipment, and telephones).
- All office consumables, software and IT support and services.
- All photocopying and reproduction of drawings and specifications.
- Furnishings.
- Insurances that are required to be provided by the Construction Manager.
- Safety equipment and clothing.
- Cell phone charges.
- Vehicles, trucks and all associated running costs.
- Maintenance of site offices as described in the Contract.
- Any other costs of operating and maintaining a construction management practice.
- Profit.

Additional CM Costs:
To reduce cost risks to Halifax Water due to scheduling delays beyond the CM's control, Stantec recommends that a clause be included in the contract such that," … If, through scope or design changes, the construction extends more than 3 calendar months beyond the Contract Schedule Date the Construction Manager will be paid $_____/ for each month …"

Method of Determining Cost Structure for Self-Performed Work:
By definition, this will be for work performed by the Construction Manager's internal forces. We anticipate this work could consist of poured in place concrete and common use site infrastructure.

The scope of these packages will be determined by Halifax Water, their Engineer and Construction Manager in coordination through the Pre-Construction phase. The Construction Manager will submit an estimated cost for Self-Performed Work Package. The Engineer will evaluate the bid against the OPC for this work, using a 3rd party validation by an Independent Cost Consultant. A margin of difference may be defined in the RFP to identify what deviation may constitute approval of self-performed work.

Halifax Water and their Engineer would negotiate a lump sum price with the CM for each Self Performed Work Package. Failing this, the CM would be required to obtain competitive subcontractor pricing.

Although the CM would be the sole contractor pricing this work, Stantec recommends they obtain competitive pricing for a large portion of the components. For example, they can tender the supply of the concrete per cubic meter to the major concrete suppliers. The reinforcing steel could be tendered as supplied and placed.

The risk on the Self Performed pricing is mitigated thru competitive tendering of components wherever practical and possible.

Method of Tendering Sub-Contractor & Supplier Services:
Stantec recommends the RFP defines how the CM intends to Tender and Award Sub-Trade and Supplier Contracts. These will need to abide by guidelines for them to work within, such as:

- All major sub-trade and supplier tenders are to be reviewed by the Engineer prior to issuing.
- There will need to be, whenever possible and practical, a minimum of 3? (number to be confirmed) qualified bidders for each tender.
- All evaluations are to be reviewed by the Engineer and all awards exceeding a predetermined dollar value (value to be confirmed) will need Halifax Water's approval prior to award.

5.8 CMAR Considerations

CMAR is a valuable and proven delivery model. Table 5.1 presents a number of key considerations and approach regarding the use of CM; this high-level summary is based on best practices and lessons learned as experienced and developed by CBCL/Stantec, through 295 CMAR projects.

Table 5.1: Construction Management Considerations & Approach

Considerations	Approach
Cost of self-performed work due to single source pricing	• Quantify, wherever possible and practical, the components of the work and have the CM obtain competitive pricing for these items. • Early development of a transparent open book pricing strategy for self-performed work. • Have a third party verify quantities and pricing. • Maintain the option that Halifax Water can insist on a competitive price for the work package.
Risk management	• CM as Agent will expose Halifax Water to direct contract claims and issues. The CM at Risk approach eliminates the direct exposure to the Sub-Trades and Suppliers issues. • Shutdown and Tie-in sequencing vetted in design with operations and maintenance to align with ongoing and scheduled activities. • Commissioning team involved in design to establish a commissioning strategy for bringing the treatment processes online. • Clarity of risk and contingency pricing and release mechanism for these; and who controls this budget.
Late appointment of the CM will reduce the effectiveness of the CM in Schedule and Cost issues.	• Insure the RFPQ and RFP processes are expedited to meet the project schedule. • Bring Construction Manager on-board by end of 30% design for active engagement throughout detailed design.
CM provides sufficient manpower to effectively complete the job.	• Contractor to provide an organizational chart for their services including a manhour breakdown. To be required as part of the RFP submission and evaluation process.
Ensuring a qualified CM firm is selected for the job.	• Criteria upon which you select your Construction Manager is one of the most defining moments in this project's success. • Complete an RFPQ process to short list qualified firms based on relevant experience, proposed team member experience and financial capabilities; it is especially important that this evaluation be based on the individuals proposed and not only the firms. • Maintain an oversight role in CM procurement (Subs & Equipment) to balance quality and cost.
Foster a collaborative team environment	• Thoughtful setup of your RFP will enable you to select a partner based on the people with the right experience, collaborative style and attitude. • Consider colocation of core team; including client, operations, contractor and designers. • Clear interface plan. This includes roles, responsibilities, communications, expectations and partnering. • Facilitate a collaborative approach with emphases on reducing time required for decision making cycle using value-for-money assessment against live cost/schedule models. • This item is critical to the projects success and will likely be one of the most difficult to accomplish. Have active oversight in place to review team health and be ready to coach and possibly replace team members that have difficultly operating in this style of project delivery team.
Incent contractor towards timely completion of the job	• Consider incentive options in development of RFP. • Strong Construction Services Personnel & robust auditing process to confirm all billing is aligned to the contract.
Successful negotiation of the GMP	• Early development and maintenance of dual estimates (one by the Engineer or 3rd party and the other by the CM) coordinated for alignment prior to GMP to mitigate common off-ramp pitfall of CMAR approach. • Manage risk & risk budget allocation with early identification of issues and frequent checks of issue resolution. • Established GMP documentation and negotiation process. • Cost checks along the way to balance market volatility and time. • How well the fixed CM markup is defined ensures competitive pricing and avoids disagreements at time of GMP negotiations.
Getting value from the constructability review process	• Clear understanding of scope & design through Bi-weekly reviews in 3D/BIM platform for Engineering, Constructability, Risk and Operability/Maintainability
Meeting schedule	• Identify early works construction and equipment procurement packages for accelerated schedule, design integration and life-cycle based selection. • Early organization of design packages based on constructability plan with multiple contracts to facilitate interface and integration with operations and start-up/commissioning strategy. • Permitting & Approvals liaison committee including Owner, Engineer and Contractor. • Where and how off ramps to the contract are defined, these are critical to ensure Halifax Water remains protected and that we always have a proactive backup plan to execution of this project on-time.
Transparency and demonstrated value	• Documenting performance metrics in the design phase for use during the construction period such as schedule and cost indexes and reimbursable cost reporting. • A robust auditing process to confirm all billing is fair and aligned to the contract; there can be thousands of line items and accompany reimbursable invoices appended to monthly reports as part of open book reporting. • Clarify Halifax Water's role in subcontracted work packages and equipment to ensure transparency and agreed to selection criteria (e.g., we recommend Halifax Water maintain a role (with veto power) in this process, so you have influence, and final say over subcontract selection to ensure quality products and subs).

6 Lessons Learned

6.1 Current Construction Market Issues

The construction industry in Atlantic Canada and more specifically, Halifax, has been subject to similar inflationary conditions resulting from labor shortages, supply chain issues, and contractor demand as has been identified throughout Canada and North America. Traditionally, most wastewater treatment facilities were constructed using the design-bid-build process and were generally less than $75 million in 2024 dollars. These projects were completed pre-pandemic and included treatment plant expansions and upgrades similar in complexity to the Mill Cove project and were located in Summerside and Charlottetown, PE; Fredericton and Saint John, NB, and Truro, NS.

Alternative project delivery methods have also been utilized to deliver treatment projects including the Harbour Solutions Project (HRM – DB), the Eastern Passage Wastewater Treatment Plant Expansion (HW – DB), and the TransAqua Upgrade to Biological Treatment (Greater Moncton – CM). Collaborative delivery is relatively new but is currently being utilized on the Burnside Operations Center for Halifax Water (IPD). Some of the key impressions made by the Halifax projects are summarized below.

- **Harbour Solutions Project** – this project was a typical fixed price design build where the owner had input into performance specifications and little else. It was relatively successful in relation to budget and schedule; however, the quality of the end project (particularly the treatment facilities) was below Halifax Waters typical standard. Halifax Water has not repeated the process utilized for this project in any subsequent projects.
- **Eastern Passage Wastewater Treatment Plant Expansion** – this project was also fixed price design build but with modified bid documents to include a technical score designed to reward quality submissions and reduce the reliance on cost as the main proponent selector. While this approach did allow the selection of the proponent whose submission most closely resembled Halifax Waters standard, it did not provide any schedule or budget advantage. Significant post bid negotiations increased the project cost and lengthened the schedule further lowering Halifax Water opinion of this project delivery method.
- **Burnside Operations Center (BOC) –** this is Halifax Waters first integrated project delivery (IPD) project. Although Halifax water sees potential in this method and are excited to deliver the project through this methodology, they would still like to gauge the success of the project as the project advances and the building is delivered.

For the projects discussed in this section, the drivers that resulted in the selection of one project delivery method over another are inconsistent and poorly documented (apart from BOC). For the DBB projects the main drivers were client and consultant familiarity with the DBB approach, a well-established construction industry developed to support DBB projects, and a track record of reasonably successful project implementation. The projects that did not proceed utilizing the DBB approach were generally subjected to either a funding requirement, other political pressures, or directly follow up a DBB project that had some fairly major issues.

The current landscape has been evolving over the past few years as the demand for construction related resources continues to grow. With the competition for these resources at what appears to be at a multi generational high, attracting quality construction resources to projects takes some additional effort and planning. While most projects within Atlantic Canada are suffering from the inflationary effects that include low numbers of bidders, some projects are effectively failing due to receiving one or no bids. Within HRM and HW, only one bid was received for various large infrastructure projects.

With the compliance and development pressures driving the Mill Cove project, selecting the most advantageous delivery approach is a necessity. Chapter 5 provided a comprehensive review of the key considerations for the Mill Cove Project and how they interacted with various project delivery methods. The following sections provide further discussion related to the selected implementation method (CMAR).

6.2 CMAR Case Studies

The consultant team of CBCL/Stantec has discussed two projects similar in scope to the Mill Cove project with stakeholders closely involved in those projects. The results of those discussions are provided in the following sections.

6.2.1 Bonnybrook WWTP (Calgary AB)

A workshop was held with City of Calgary, AB (Wed July 17, 2024) to learn from their experience. The selection of a CMAR delivery model for the Bonnybrook WWTP (Calgary Alberta) expansion project provided numerous benefits, particularly related to contractor input during design and the coordination of construction activities on site. The division of the project into separate work packages has given the team flexibility to prioritize key infrastructure that is required to meet the needs of Calgary's growing population, while postponing non-critical scopes to defer expenditures during the current economic downturn. Construction of the Bonnybrook Plant D Expansion project began in 2016 and is expected to be complete in 2025.

When initiating the Bonnybrook WWTP project, the City of Calgary questioned 'What project delivery approach is best suited for this project?' Lessons learned are explained herein.

6.2.1.1 Project Overview

The Bonnybrook WWTP project is a $1B capital expansion, of an operational wastewater treatment plant. The project consisted of retrofitting existing infrastructure as well as constructing new large-scale infrastructure for both the liquid and solid streams at the plant. The project included dozens of contracts for major scopes of work, hundreds of tie-ins to the operating facility and required a multitude of permits and approvals.

Due to the size, complexity, and tight implementation timeline of the project, the City of Calgary divided the project into several smaller work packages. Reasons for this included optimizing scheduling of the various project elements, limiting disruption to facility operations, mitigating space constraints and leveraging resources to the greatest extent possible. This approach would result in cost and time savings for the project. Also, by dividing the project into smaller work packages, the City wanted to provide more opportunities for more local vendors and contractors to participate in the project.

6.2.1.2 Drivers for Alternative Project Delivery (APD)

Traditionally, major construction projects in the water & wastewater industry are delivered through a design-bid-build (DBB) method. The municipality procures the engineer and contractor separately, to complete the design and construction phases of the project. More frequently, Alternative Project Delivery (APD) methods are being considered to save time and/or costs. But there are trade-offs, such as reduced control or change in risk, so the pros and cons of each APD method needs to be weighed for specific projects. There are wide ranging variables to consider, and they can differ between municipalities and their projects, as such it is important for the municipality to determine what is most important for them. For the Bonnybrook WWTP project, several workshops were held with various City stakeholder teams to assemble a consensus on which drivers were of greatest importance.

The team considered the following factors, to evaluate and determine the preferred APD for their project:

- How rigid is the project schedule?
- Is funding available and does it align with the desired schedule?
- What market conditions are expected at the time of tender?
- Will the project be able to attract the most qualified personnel and proponents onto the project?
- Do we foresee the potential need for any major scope changes as the project progresses?
- Is there a need to design and construct portions of the project sooner or can we wait until the entire design is complete and tender as one or more lump sum packages?
- How can we, as a team maximize the potential direct and indirect economic impacts that can be generated by this project (i.e., benefit to local business)?

Not all APD methods are the same. They differ and accomplish different goals. As such, it is important to prioritize the drivers that are most important to the municipality and their project. For the Bonnybrook WWTP project, the workshops identified the following as being most important drivers:

- Qualifications-based selection of contractors.
- Shortened project schedule.
- Work sequencing of multiple construction contracts.
- Integration with operations on an active WWTP site.
- Constructability input through design.
- Flexibility to align scope with project affordability goals.
- Early negotiation of pricing.
- Risk allocation control.
- Major equipment procurement schedule.
- Transfer facility operational risk.
- Alternative financing options.

6.2.1.3 Alternative Project Delivery Methods

City of Calgary evaluated five (5) APD methods. Each method has advantages and disadvantages that the team evaluated prior to creating a short-list for the project. Of the five project delivery methods initially considered, three were eliminated because they severely limited the City's control over the project.

Two (2) APD methods were identified as suitable. Refer to Table 6.1.

Table 6.1: Evaluation of APD Methods

Delivery Method	Suitable	Comments
Design-Bid-Build (DBB)	Yes	Current City standard. Has been successful on many projects in the past
Design-Build (DB)	No	Risk due to limited ability to influence design to integrate with the existing wastewater infrastructure at the Bonnybrook WWTP.
Construction Management At Risk (CMAR)	Yes	Good applicability, however, would require new procurement processes to be established.
Public-Private Partnership (PPP or P3)	No	Evaluation completed through Building Canada Fund tool determined project was not a good fit for this delivery model. P3 Favors DBO model which may have risks as outlined below.
Design-Build-Operate (DBO)	No	High risk due to loss of owner control of design and operations. Risk to integrate private sector operations/maintenance into existing plant.

6.2.1.4 Preferred Delivery Approach

After the project drivers and applicable APD methods were identified, an assessment was performed to determine which APD method was most appropriate for the project. An evaluation matrix was developed to compare the two shortlisted APD methods (DBB and CMAR) through collaboration with City stakeholder groups these were prioritized and weighted.

The evaluation matrix was based on six primary criteria:

- Ability to meet schedule.
- Work Sequencing of multiple contracts.
- Cost certainty & future market risk.
- Resource availability.
- Scope flexibility to City affordability and cash flow.
- Coordination of construction, engineering and operations.

Selection of the preferred delivery approach was largely based on the prioritized driver of schedule vs. cost certainty and available cash flow such that:

- Preferential consideration be given to Construction Management at Risk (CMAR), if the priority driver was deemed to be meeting the tight timeline; whereas:
- The Design-Bid-Build (DBB) approach was preferential if the primary driver is for cost certainty, protection from future market fluctuation and need to delay cash flow expenditure beyond upcoming budget cycles. The DBB approach however did require that the project schedule be extended by a year or more.

Based on the results of the evaluation and subsequent workshop discussions, the Construction Management at Risk (CMAR) method was selected, for the following reasons and benefits specific to this project:

- Ability to fast-track construction.
- Collaborative design and construction process (City-Engineer-Contractor).
- Contractors involved early to provide constructability & risk management during design phase.
- Early cost feedback to assist with aligning scope to City budget and cash flow.
- Cost and qualifications-based selection of contractors provides more control over selection process and ideally a higher quality end product.
- Single point of accountability for coordination of multiple construction contracts, equipment procurement contracts and interface with ongoing plant operations.

6.2.2 Flamingo Road WRC (Las Vegas, NV)

In 2013, the Clark County Water Reclamation District (District) completed the Integrated Facilities Master Plan, which identified improvements to the Flaming Water Resources Center (FWRC) for the 150 MGD (570MLD) and 180 (685 MLD) MGD average annual flow (AAF) expansions. In 2019, the District concluded a Basis of Design Report (2019 BODR), which evaluated their existing east and west campus treatment process units and defined specific projects for implementation. It established the preliminary basis of design and related criteria for the new and modified services for the 150 MGD (570 MLD) expansion.

This $0.5 Billion expansion focused on three major areas: headworks, secondary treatment, and solids processing facilities. A vital part of the District's expansion is the $233 Million Project No. 19007, FWRC Secondary Treatment Aeration Basins and Clarifiers (150 MGD Expansion; 570 MLD), a new West Secondary complex. This complex will complement existing biological treatment systems at the existing North Secondary and South Secondary Treatment (NST and SST) Facilities. Project 19007 will bring an additional 25 MGD (95 MLD) AAF capability, and a future project will add three identical aeration basins and clarifier trains to the WST for supplemental capacity in support of a combined 50 MGD (190 MLD) AAF.

The District selected the Construction Manager at Risk (CMAR) project delivery method for this project, which consisted of two phases with two separate CMAR contracts: Preconstruction Services and Construction Services. During Preconstruction Services, the CMAR, Stantec, and the District coordinated closely to address design, constructability, and cost. The CMAR ultimately developed a Guaranteed Maximum Price (GMP) based on the reconciliation of the District's independent Opinion of Probable Construction Costs (OPCC) developed at the 60%, 90%, and 100% submittals.

6.2.2.1 Project Overview

The WST will employ a secondary process with biological nutrient removal, including nitrification, partial denitrification, and biological phosphorus removal. Three new aeration basins and three new secondary clarifiers will be constructed to meet treatment requirements, complete with all associated equipment and design features. Main design elements include: three new 2.0-MG &7,600 m^3) aeration basins; three 140-foot (43m) secondary clarifiers; a new 6,500-square-foot (65 m^2) blower building that uses four 800-HP, dual-core turbo blowers with capacities of 12,900 standard cubic feet per minute; electrical services; an electrical building, RAS/WAS/MLR/scum drain pumping facilities; and yard pumping ranging from six to 96 inches in diameter. Other new features include:

- Mixed Liquor (ML) diversion channels and gates to permit greater discharge flexibility coupled with return activated sludge (RAS) interties.
- Centralizing of RAS, waste activated sludge (WAS), dewatering, and scum pumping into a single pump station to facilitate maintenance and accessibility.
- Tunnels and ramps for small-vehicle access to the piping galleries, pump station and top deck.

- Additional elements in Train No. 17 to allow process testing and optimization.
- New WST Operator Control Room to support operations and maintenance activities.

The project is being constructed concurrently with 19005 FWRC Preliminary and Primary Treatment Improvements. Both projects are constructing pipelines that are parallel and nearby. Project No. 19005 is constructing switchgear SWGR-6; the electrical tie-in at the switchgear is being coordinated between the two projects. The WST requires tying into three existing structures: the PEPS facility, the secondary effluent structure, and the Sludge Thickening Building No. 2. Interconnection with potable water and reuse water systems will also be necessary. All tie-ins were planned and coordinated with the contractor plant operations staff for shutdowns, bypassing, and sequencing.

Due to the poor quality of the original ground in the planned construction area, compression techniques were used to improve allowable bearing pressures and reduce aeration basin, clarifier and building foundation cost and to control future settlement. From May 2021 through approximately June 2022, an earth fill was placed over the WST site to induce soil consolidation, completed as part of the District's Project No. 19010. Preloading was completed before Notice to Proceed is issued to the CMAR for Project No. 19007.

6.2.2.2 Drivers for Alternative Project Delivery (APD)

The District uses both traditional Design Bid Build (DBB) and CMAR for implementation of their CIP projects. For this 150 MGD (570 MLD) expansion, the District elected to use the CMAR delivery model for projects in the East Campus. This collaborative delivery approach presents the following benefits for this project:

- Qualifications-Based Selection of Contractors.
- Effective coordination between two major CMAR projects in the same site.
- Implementation of common on-site concrete batch plant serving three major projects.
- Early coordination on tie-ins involving multiple projects.
- Early coordination with site preloading construction and removal.
- Contractor reviews and engagement during design.
- Early contractor engagement on design of complex secondary effluent tie-in.
- Early coordination with Operation and Maintenance Staff through Reliability Centered Design effort.
- Cost management through independent OPCCs through the duration of the project and Value Engineering.
- Risk management with owner, contractor, and designer engagement through duration of the project.
- Team partnering through design and construction.

6.3 Discussion of Project Cost Implications

By reviewing projects that have selected CMAR for implementation, some common elements related to cost can be identified. These items generally include some potential for cost reductions associated with:

- Design Collaboration.
- Change Orders.
- Disputes.
- Delays / Extended Schedules.

These items are fairly common to most collaborative delivery options and result from a comparison of the collaborative model against the traditional design bid build (DBB) model. The decision to proceed with CMAR for the Mill Cove WWTF Expansion requires additional quantification of the cost implications of moving away from DBB to the CMAR process. This effort is summarized in the following sections.

In addition to the above factors, there are costs that can be identified related to collaborative delivery options that are not required for DBB projects. The easiest ones to quantify are the engineering costs and CMAR fees related to including the CMAR in the design process. Other, less quantifiable items include those related to the difficulty in determining the validity of the Guaranteed Maximum Price (GMP) and costs related to overlapping design and construction activities particularly during early work packages.

The comparison of project delivery options in Table 4.1 included the evaluation of 'market conditions' as one of the project success factors. This factor is related to project cost in that options that are expected to reduce the level of competition or transfer undue risk to the Contractor are known to introduce additional construction cost. However, these costs are not quantified against the additional fees that the CMAR (or other collaborative partner in alternative collaborative models) will introduce to the project. Therefore, the following sections have been developed to further discuss where the potential for cost differences exist and their potential magnitude.

6.3.1 Design Collaboration

Competitive bidding (DBB) can result in all bids being over the Owner's budget for the project. From that point, options to bring the project back into budget can be costly and time-consuming. This can include activities such as value engineering (VE) or re-scoping/redesign of project elements prior to negotiating or re-tendering the project. This issue becomes even more extreme if there are limited bidders. While the additional costs related to re-scoping/redesign for a project of this magnitude are likely in the $0.5 – $1.0 M range, the impact on costs due to lack of competition are considerably higher. Given the magnitude of the project even a 10-20% premium would equate to $15 – $30 M.

CMAR can provide a higher degree of cost certainty through collaborative budget development with contractors, and the use of a Guaranteed Maximum Price (GMP), which

transfers the risk of cost overruns to the builder. The building of the GMP through the CMAR process can result in some increase in design development fees and an increase in construction cost above what the DBB pre-tender estimate might be for the same project. However, the magnitude of this increase is comparatively small and its only a perceived increase as the increase is only realized if the DBB bid is within the pre-tender opinion of probable cost.

6.3.2 Change Orders

The Design-Bid-Build process requires a heavy reliance on the quality and accuracy of the designer-produced construction documents. Any ambiguity, errors, or omissions in any of the drawings, even small details, leave the Owner exposed to additional cost in the form of change orders. Conversely, CMAR incentivizes trade experts to contribute to the constructability of the building, clarity of the drawings, and even the longevity of the materials and methods used. Design-phase teamwork also allows project teams to tackle critical Owner challenges—think tight move-in deadlines or construction phasing—as a single, highly connected group. Although impossible to quantify the reduction in overall costs as the decreased change order costs are arguably included in the CMAR GMP, the non-competitive costing of change orders could definitely have an impact. With change order for DBB typically being in the range of 5% of the overall cost of the project, there is potential for this item to have a cost impact of to $6.0 - $8.0 M on a $150 M project.

6.3.3 Disputes

The typical DBB project contains an established, well-documented relationship between Owner, Designer, and Contractor. This underlying contract structure can set up adversarial positions, with each group vying to protect itself while keeping other stakeholders in check. CMAR and other collaborative approaches revise this relationship to create alignment that can reduce disputes. The CMAR contractual arrangement can help establish a strong working relationship between Owner, Designer, and the rest of the construction workforce. This can ultimately save time and consequently money in resolving disputes. This is a relatively minor savings considering designer and CMAR fees however can become much more significant if the disputes end up introducing construction delays, as described in the following section.

6.3.4 Delays / Extended Schedules

All of the above risks can result in delay to the project schedule. This can result in project cost increases should these delays be determined to be outside of the DBB contractor control. Using CMAR is one of the best ways to eliminate these risks. Opportunities to package overlapping scopes of work can allow construction to start early and compress the overall delivery timeline. In the development of the opinion of probable cost for this project we have estimated contractor overhead costs of approximately $100,000 per month. Utilizing this as a conservative indicator of potential delay costs, and as a potential savings for well coordinated construction phasing, provides some quantification of this item.

6.3.5 Direct CMAR Related Costs

The added cost during design to procure CMAR services and then integrate the CMAR into the design is not well documented. In other CMAR projects of similar value and complexity, CBCL/Stantec has experienced pre-construction fees in the $1.5 -2.5M range. The CMAR fee for work during construction is typically in the order of 5% of construction cost. However, this is not an additional project cost as it is not above and beyond what a general contractor would include for similar services.

The additional engineering costs attributed to including the CMAR in the design process could equate to 3.0-3.5% of overall fees for a large project. In comparison to other costs, this is relatively minor, perhaps in the order of $0.1 – $0.24 M. During construction, there can also be some additional fees related to reviewing contractor progress payments against work completed, as well as auditing of allowable expenses. This additional cost could be in the order of $0.5 to $0.75M resulting in an estimate of additional fees in the order of $0.6 - $1.0 M.

Another non-quantifiable cost sometimes affiliated with CMAR relates to the fact that the final GMP, can be difficult to independently verify. This is somewhat valid, as the cost of a complex construction project is inherently difficult to model. A multitude of competing factors, most outside Owner control, will influence the GMP. Therefore, it is important that the Owner select both a consultant and CMAR that have the ability to:

- Maintain an open book budget with complete documentation of all project costs.
- Generate competitive, best value bids from qualified subcontractors.
- Organize and transparently share all subcontractor bids.

6.4 Evaluation of Project Cost Implications

The items above provide some quantification of potential cost differences between CMAR and DBB. Most of these equate to less than 1% of the overall project cost. The estimate is provided as a range and includes additional cost components (Engineering, Professional Fees, Construction Management /Construction Administration (CM/CA) based upon Halifax Water Cost Estimation Framework Technical Memo (Jan 2020) equating to a total of 15% of the construction costs. While some of the cost impacts discussed above are not specifically identified in the estimate, it is unlikely that performing the project as CMAR as opposed to DBB will change the estimate in any substantive manner.

It should be noted that the prime consideration for utilizing CMAR as opposed to DBB is the avoidance of potential cost increases related to securing qualified resources to perform the work, and reduce the risk of cost escalation related to not utilizing construction expertise in the development of the project phasing. Therefore, considering the relative magnitude of these cost impacts (CMAR costs vs Cost Escalation) we believe that executing this project utilizing CMAR will result in a lower overall project cost than if it were pursued utilizing DBB.

7 Conclusion

The comparison of the project delivery approaches, weighted evaluation matrix, and subsequent review of lessons learned from other projects has resulted in a recommendation for utilizing the CMAR delivery model for the Mill Cove WWTF Expansion and Upgrade project. The CMAR delivery model is recommended because of its advantages of project schedule, project complexity, scope flexibility as well as Contractor participation in the design process to contribute to phasing, constructability, scheduling, and site coordination with operations. With risk of execution allocated to the Construction Manager, this will bring in cost certainty for Halifax Water.
Recommendations for execution of the project utilizing the CMAR approach include:

1. Halifax adopt the Construction Management at Risk project delivery methodology.
2. Apply Best Practices for CMAR Approach: Build a Strong CMAR Team; Robust Decision-Making Process; and Navigating a Successful GMP Negotiation. Key practices for each are summarized in Figure 8.1.
3. Retain the CM early in detailed design and fully integrate them into the team for the detailed design phase, to maximize the value return of the CM.
4. Define the major objectives of the CM strategy early in Detailed Design, through a collaborative approach between Halifax Water and their Engineer. The CM strategy should then be fine-tuned through the completion of the Request for Proposal (RFP) process for the CM.
5. Adopt a fee structure for all CM costs to the end of the contract.
6. To reduce cost risks to Halifax Water due to scheduling delays, include a clause in the CM contract such as," … If, through scope or design changes, the construction extends more than 3 calendar months beyond the Contract Schedule Date the Construction Manager will be paid $_____/ for each month".
7. In the RFP, define how the CM will Tender and Award Sub-Trade and Supplier Contracts. These will need to abide by guidelines, explained in Section 5.
8. Negotiate a lump sum price with the CM for each Self Performed Work Package. Require CM to obtain competitive subcontractor pricing. Although the CM would be the sole contractor pricing this work, CBCL/Stantec recommends they obtain competitive pricing for a large portion of the components.

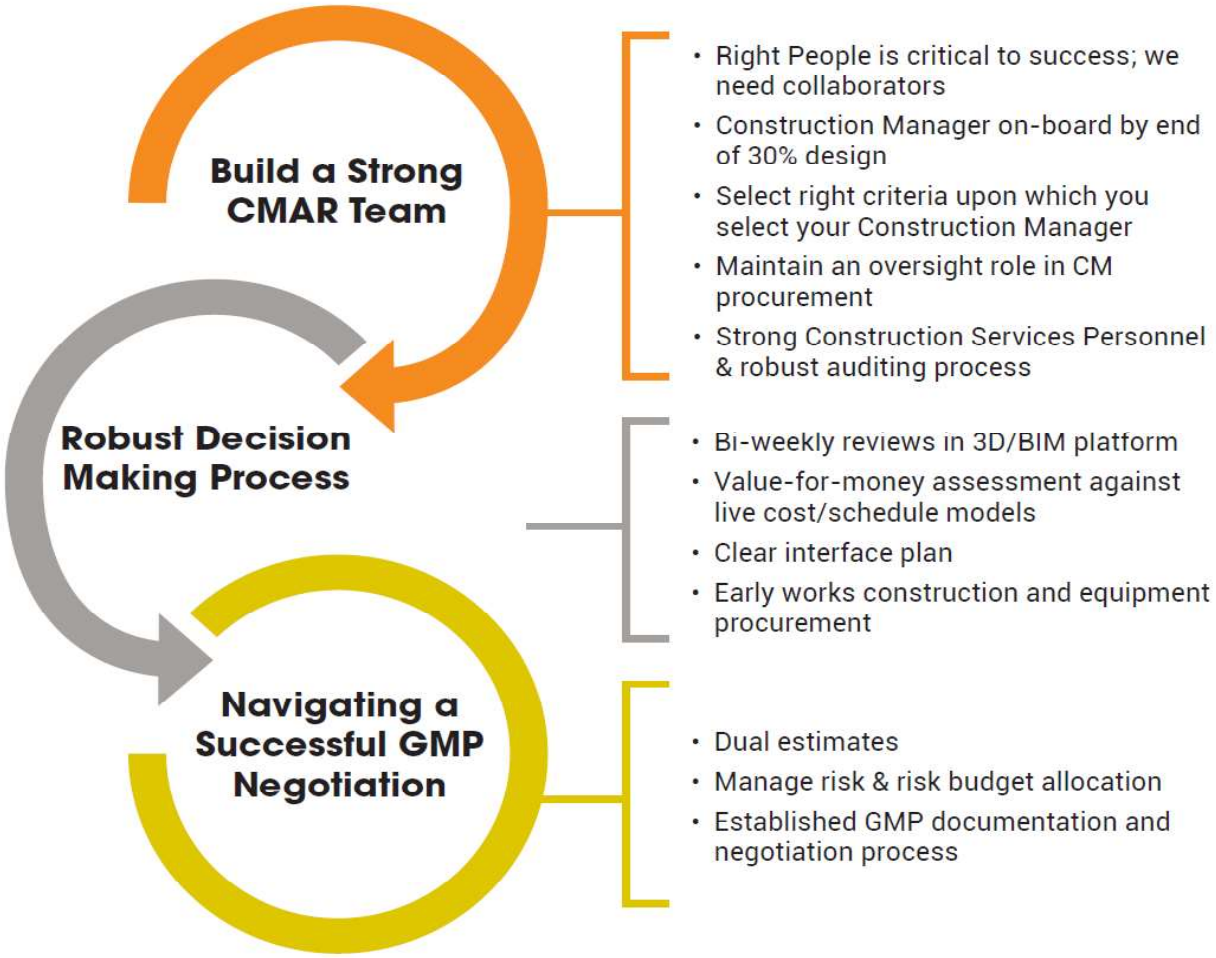


Figure 8.1: Best Practice for CMAR Approach

ITEM #1-I

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY:

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Wendy Krkosek, Ph.D., P.Eng., Acting Director, Regulatory Services

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Ashley Kendell, CPHR., Director, People & Culture

APPROVED:

Signed by:
Kenda MacKenzie
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Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 17, 2025

SUBJECT: **Operational Performance Information Report**

ORIGIN

Regular update.

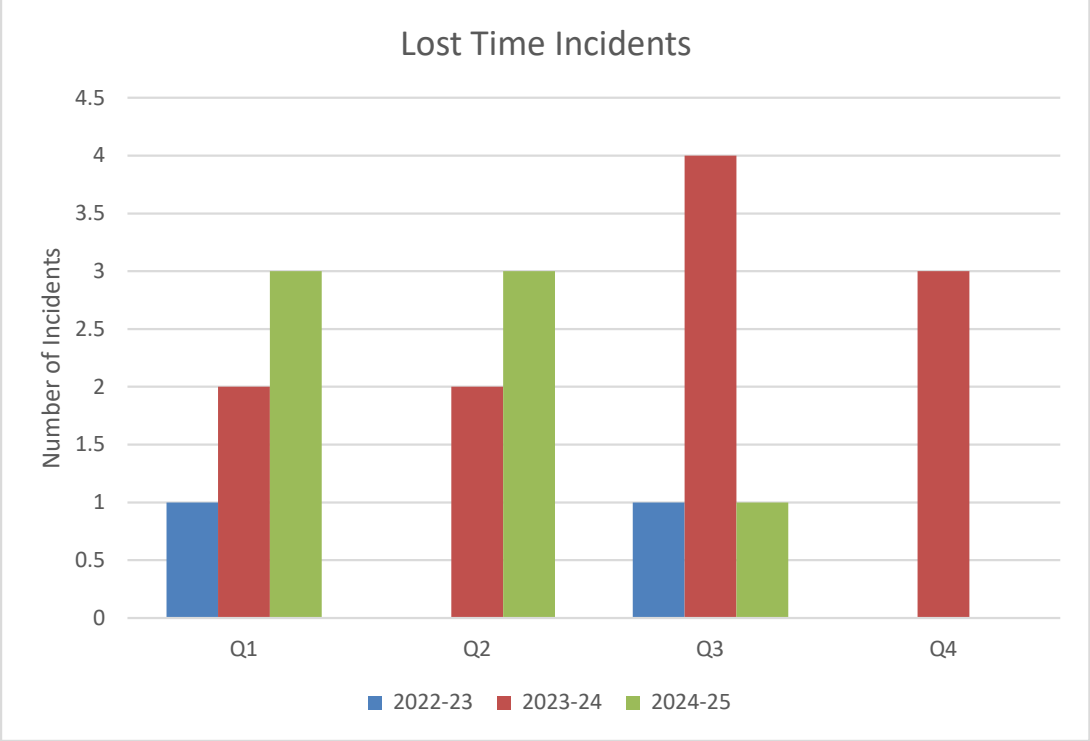
This report provides a high level overview of operational performance for the utility. The safety statistics results are first, followed by indicators and statistics for water and wastewater.

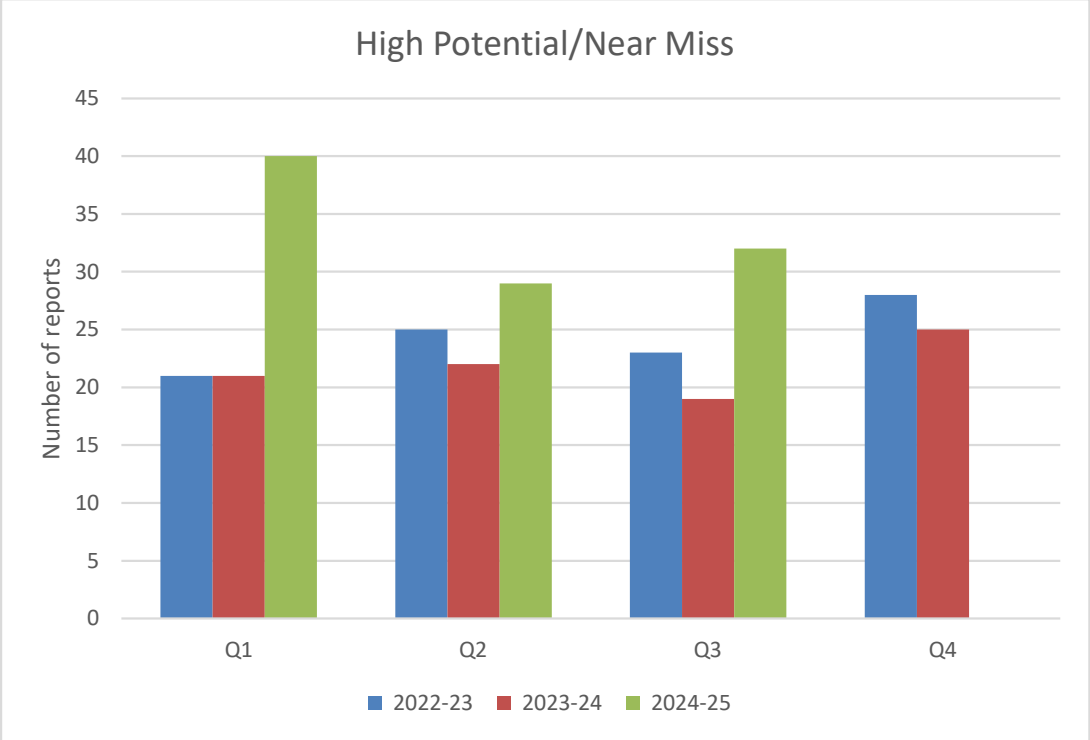
SAFETY STATISTICS – Q3 – October 1, 2024, to December 31, 2024

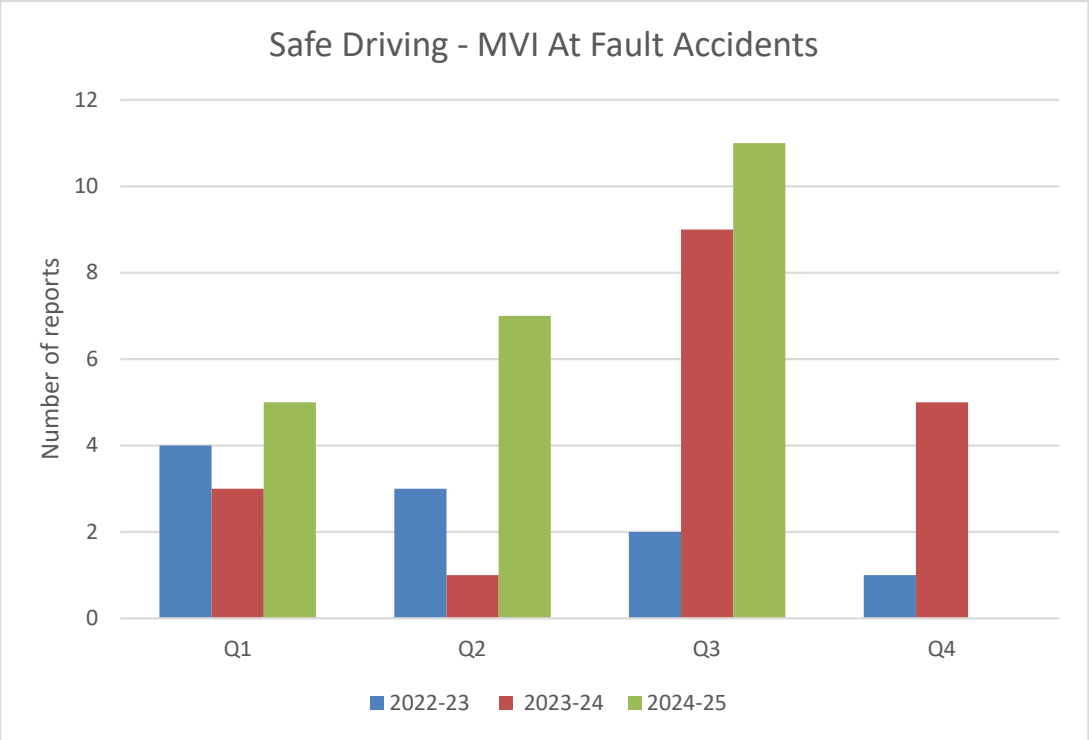
Organizational Metrics	Q3 Oct 1 to Dec 31	CBS Target 2024-25
Lost Time Incident Reporting (LTIR) (Lost Time Cases x 200,000 / Total Employee Hours Worked) YTD	2.03	2.5
Safe Driving (Total number of at fault traffic accidents per 1,000,000 km driven)	15	4
Workplace inspections conducted	82	Score
Safety Talks conducted (reported at the end of each quarter)	73%	85%
High Potential/Near Miss	32	N/A
Employees on accommodation (new/total) Employees on gradual return to work (non-WCB new/total)	0/7 0/0	N/A
WCB claims (new/total)	5/9	N/A
Work refusals	0	N/A
Incidents with written compliance orders	0	0-2
Employees trained or recertified before due date	144	85%
• Courses Taken	383	N/A

* Percentage Data generated at year end due to variants in system data (ie. multiple certifications required for one employee)

TRENDS FOR SAFETY STATISTICS

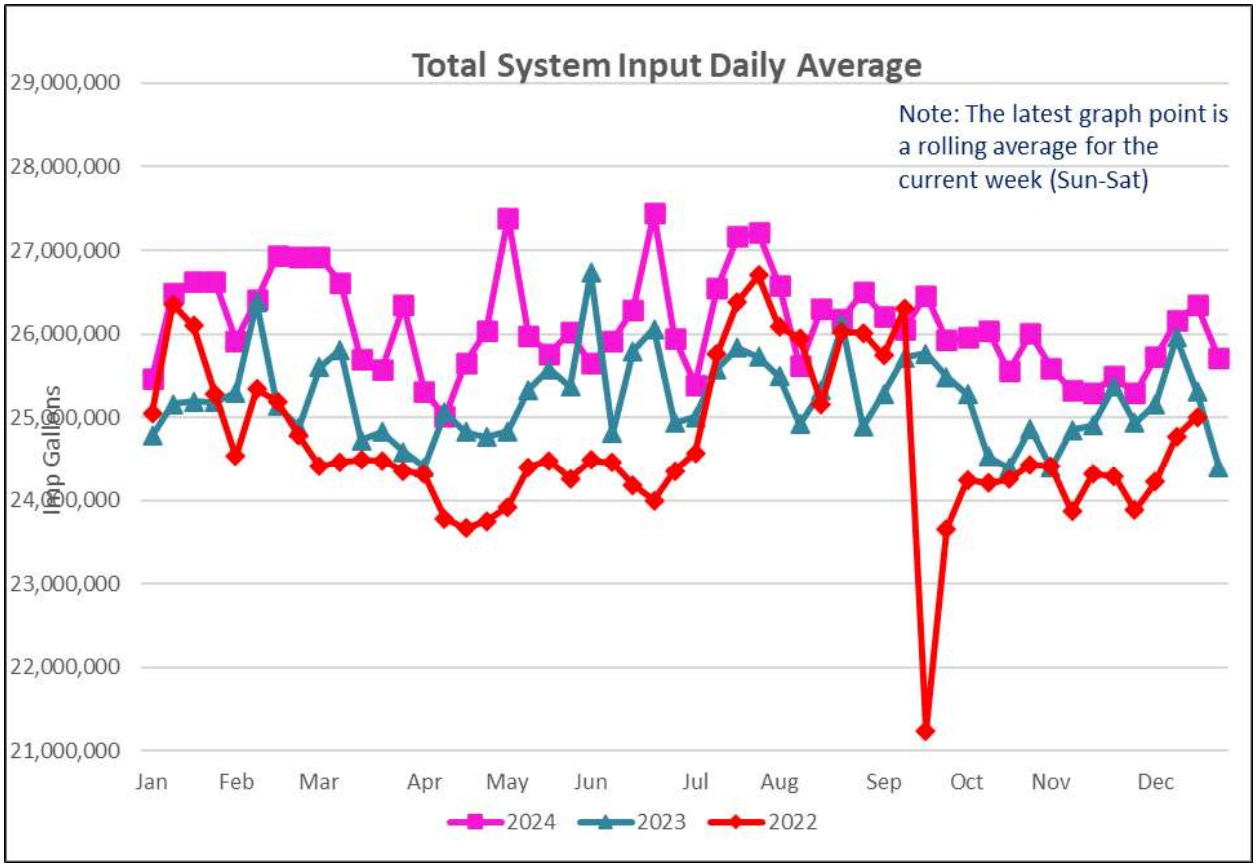






Take at fault accidents, divide by kms driven from GeoTab, then add 4% - allowed for 3-5% difference for vehicles that do not report all the time (lag time), then multiply by 1 million.

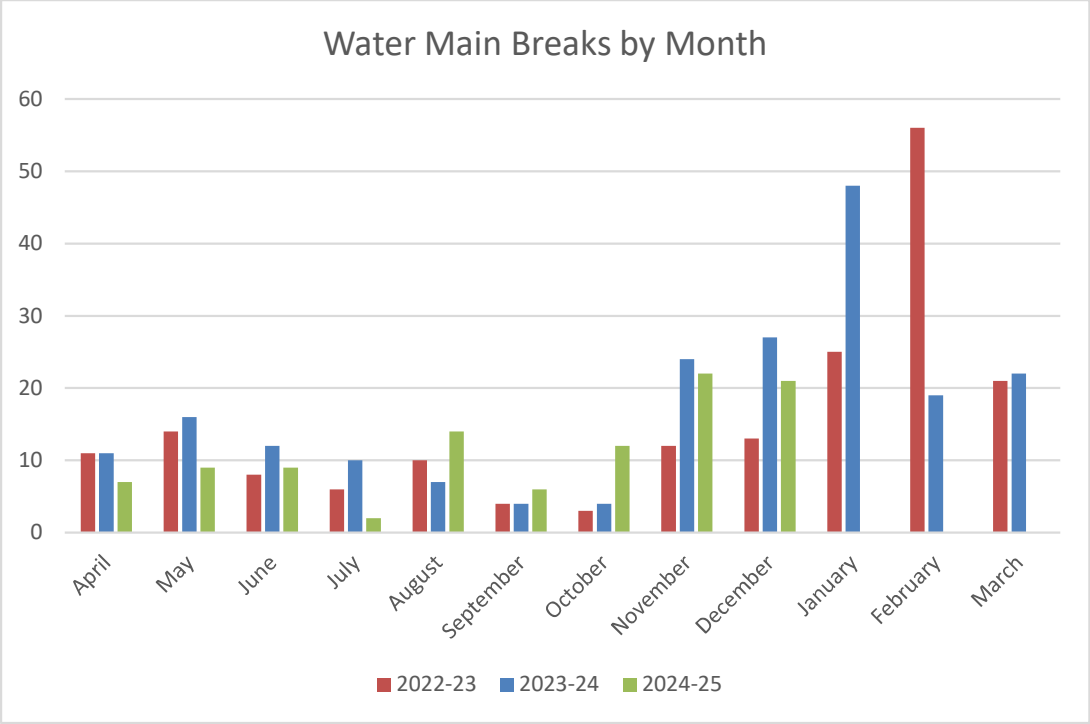
AVERAGE DAILY WATER PRODUCTION

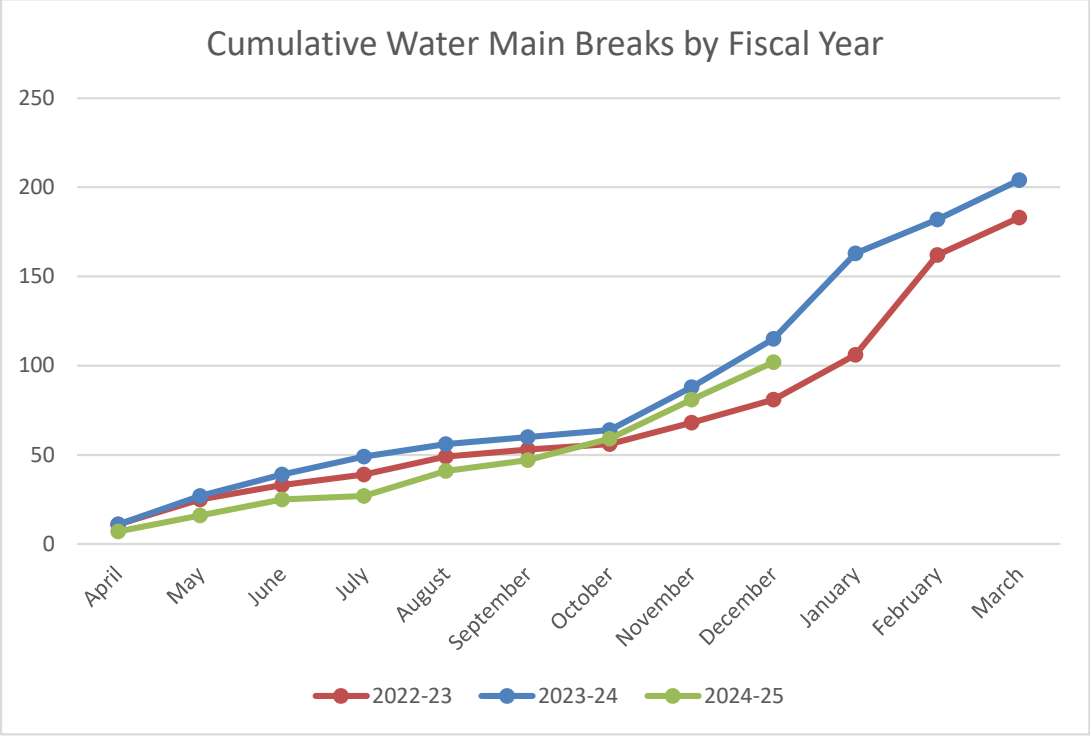


* The decrease from the end of September/beginning of October 2022 is due to the system being out for a significant amount of time during Fiona resulting in data gaps.

Water Accountability
Losses per Service Connection/Day (International Water Association Standard)
Period Ending: December 2024
Q3 Real Losses: 242 CBS Target: 160 - 170

REGIONAL WATER MAIN BREAK/LEAK DATA





COMPLIANCE SUMMARY

Water Safety Plan Objectives 2024-2025 Q3				
Objective	Total Sites	% Sites Achieving Target	All Sites: 90th Percentile < 15 µg/L	CBSC Awarded Points
Disinfection	63	100%	---	20
Total Trihalomethanes	26	100%	---	20
Haloacetic Acids	23	100%	---	20
Particle Removal	5	100%	---	20
Corrosion Control	107	---	2.2	20
Summary Total				100

Score: 100/100

Bacteriological Results (% Samples absent of Total Coliforms): 99.96%

Fluoridation was reinstated at JDK WSP on December 12, 2024. Fluoridation remains off at Lake Major WSP.

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 Monthly Compliance Summary

Wastewater Treatment Facility	October-24								November-24								December-24								Toxicity
	$CBOD_5$ (mg/L)		TSS (mg/L)		E. coli (counts/ 100mL)		pH		$CBOD_5$ (mg/L)		TSS (mg/L)		E. coli (counts/ 100mL)		pH		$CBOD_5$ (mg/L)		TSS (mg/L)		E. coli (counts/ 100mL)		pH		
	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	
Halifax	67	59	50	23	5000	107,991	6-9	6.9	67	48	50	23	5000	0	6-9	6.8	67	32	50	35	5000	0	6-9	6.7	N/A*
Dartmouth	50	49	40	20	5000	3,499	6-9	6.7	50	52	40	36	5000	0	6-9	6.8	50	30	40	27	5000	0	6-9	6.8	N/A*
Herring Cove	50	33	40	24	5000	30	6-9	6.8	50	28	40	25	5000	0	6-9	6.8	50	17	40	20	5000	0	6-9	6.6	N/A*
Eastern Passage	25	6	25	6	200	88	6-9	7.1	25	5	25	7	200	0	6-9	7.1	25	8	25	9	200	0	6-9	6.9	N/A*
Mill Cove	25	25	25	20	200	48	6-9	6.4	25	22	25	24	200	22	6-9	6.5	25	14	25	20	200	17	6-9	6.4	N/A*

*Acute toxicity reduction to annual granted by NSECC for Herring Cove, Eastern Passage and Mill Cove, reflecting WSER. Removal of acute toxicity sampling requirement for Dartmouth and Halifax, reflecting WSER Transitional Authorizations.

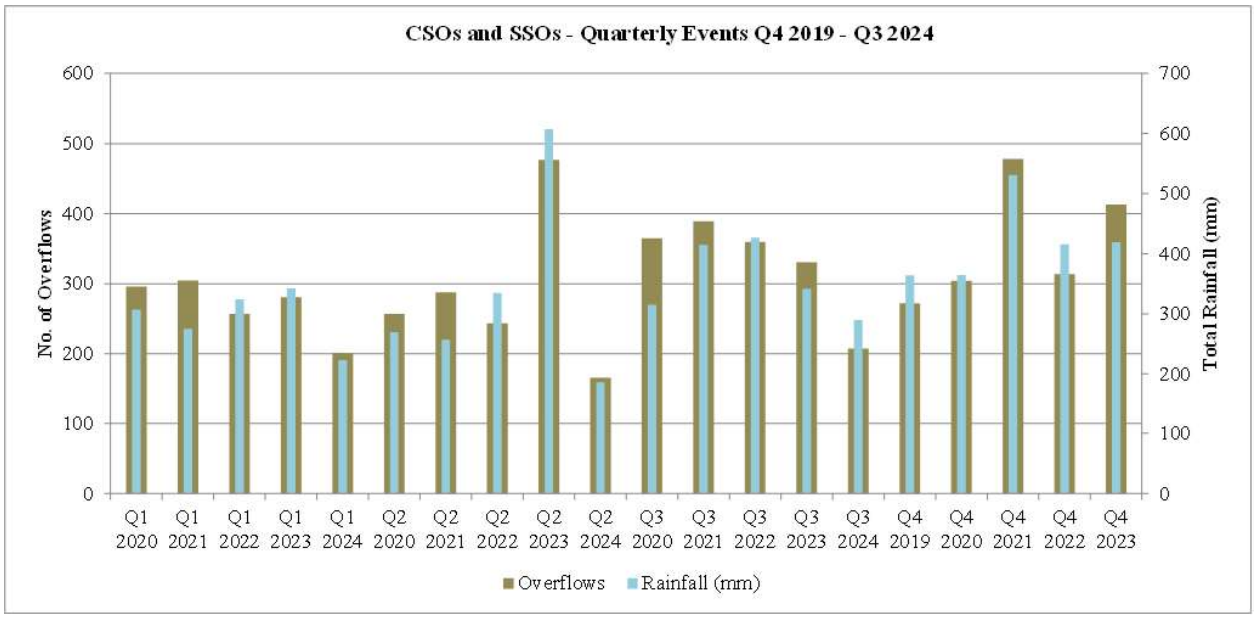
Wastewater Treatment Facility Quarterly Compliance Summary
October, November, and December 2024

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
	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg	NSECC Limit	Avg	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg.	NSECC Limit	Avg	
Springfield	20	5	20	14	200	82	6-9	7.2	-		-		-		-		-
Frame	20	2	20	1	200	10	6-9	7.5	-		-		-		-		-
Middle Musq.	20	7	20	13	200	39	6-9	7.4	-		-		-		-		-
Uplands	20	8	20	6	200	100	6-9	7.0	-		-		-		-		-
Aerotech	5	2	5	1	200	10	6-9	7.2	5.7 W 1.2 S	0.1	0.13	0.03	-		6.5	7.4	Not acutely lethal
North Preston	10	4	10	5	200	10	6-9	6.9	3	0.2	1.5	0.5	-		-		-
Lockview	20	5	20	5	200	616	6.5-9	6.7	8.0 S	1.0	1.2 S	1.0	-		-		-
Steeves (Wellington)	20	2	20	1	200	10	6.5-9	7.4	14.4 S	0.1	1.0 S	0.1	-		-		-
BLT	15	4	20	12	200	12	6-9	7.1	5 W 3 S	3	3 W 1 S	1	0.02 *	0.10	-		N/A**

NOTES & ACRONYMS:
$CBOD_5$ - Carbonaceous 5-Day Biochemical Oxygen Demand
TSS - Total Suspended Solids
* TRC - Total Residual Chlorine - Bureau Veritas can only measure 0.10 mg/L residual; results of 0.1 mg/L are compliant
**Acute toxicity reduction to annual granted by NSECC for BLT
BDL - Below Detection Limit
W / S - Winter / Summer compliance limits
NSECC requires monthly averages be less than the NSECC Compliance Limit for each parameter at Dartmouth, E'n Passage, Halifax, Herring Cove, Mill Cove
NSECC requires quarterly averages be less than the NSECC Compliance Limit for each parameter at Aerotech, Lockview, Middle Musquodoboit, Frame, BLT, Uplands and Springfield Lake
NSECC requires annual averages be less than the NSECC Compliance Limit for each parameter at North Preston and Steeves

LEGEND
NSECC Compliant
NSECC Non-Compliant

NON-COMPLIANCE EXPLANATIONS:
Halifax WWTF: Low precipitation yielded low influent flow and high TDS. Also observed high conductivity. Resulted in dosing diffilculties and carry-forward solids.
Dartmouth WWTF: High influent cBOD resulting from low influent flows. Also, wet weather events causing dosing challenges and unsettleable floc.
Lockview WWTF: Unexpected high E.coli results. Corrective actions undertaken in each of three months to improve results.



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 five overflows in Q3 beginning on days when there was no recorded rainfall, as follows:

1. October 29: The CSO at Skokomul St PS & CSO was due to planned maintenance at this location. A Temporary Bypass Authorization was approved by ECCC.

2. November 24: The CSO at Skokomul St PS & CSO was due rain on the previous day.

3. November 25: The CSO at Lyle St CSO was due to a combination of rain on the previous day and a blockage caused by debris.

4. November 26: The CSO at Wallace St CSO was due to a blockage caused by debris.

5. December 6: The SSO at Mill Cove Surge Tank was due to excessive flows in the system from rain on the previous day.

ITEM #2-I

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Signed by: A65D6874EDC1467... Louis de Montbrun, CPA, CA, Director of Corporate Services/CFO

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6... Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: **Halifax Regional Municipality Master Trust Investment Performance, Third Quarter, 2024**

ORIGIN

Financial information reporting.

BACKGROUND

At the January 16, 2025, meeting of the Halifax Water Audit and Finance Committee, the attached Halifax Regional Municipality Master Trust Investment Performance, Third Quarter, 2024, report was reviewed and discussed. The Committee approved forwarding the report to the Halifax Water Board for their information.

DISCUSSION

No additional information was requested to be brought forward to the Halifax Water Board meeting following the discussion of the attached at the Committee meeting.

ATTACHMENT

1. Report to the Halifax Water Audit & Finance Committee dated January 7, 2024, entitled Item #9 – Halifax Regional Municipality Master Trust Investment Performance, Third Quarter, 2024.

ITEM #9

Halifax Water Audit & Finance Committee
January 16, 2025

TO: Chair and Members of the Halifax Regional Water Commission Audit and Finance Committee

SUBMITTED BY: Signed by: A65D6874EBC1467...
Louis de Montbrun, CPA, CA, Director, Corporate Services / CFO

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6...
Kenda MacKenzie, P.Eng., Acting CEO & General Manager

DATE: January 7, 2025

SUBJECT: **Halifax Regional Municipality Master Trust Investment Performance, Third Quarter, 2024**

ORIGIN

The Halifax Regional Municipality Master Trust (the "Master Trust") investment performance is reported to the Halifax Regional Water Commission Board as Trustees of the Halifax Regional Water Commission Employees' Pension Plan periodically throughout the year.

BACKGROUND

None

DISCUSSION

The table below and the attached Investment Report provide a performance update for the Third Quarter of 2024 (January to September) for the Master Trust, of which Halifax Regional Water Commission Employees' Pension Plan (the "Plan") is a part. The fair value of the investment in the Master Trust is determined and updated at year-end, and the Plan's share in the Master Trust at December 31, 2023 was 6.62%, totaling $189.4 million.

The Master Trust earned 3.60% in the Third Quarter, which underperformed the Third Quarter policy benchmark of 4.48% by 0.88%. The return for the 1-year period ended September 30, 2024, was 14.82%, underperforming the 1-year policy benchmark of 19.15% by 4.34%. Other historical returns are provided in Table 1 below.

Table 1 – Returns

	Current Quarter (Jul - Sep)	1-Year	3 - Year Annualized	4 - Year Annualized	Inception To Date
Fund Return	3.60%	14.82%	8.02%	9.18%	7.36%
Policy Benchmark	4.48%	19.15%	7.63%	7.86%	6.01%
Excess Return	-0.88%	-4.34%	0.39%	1.33%	1.35%

The total fund returns are subject to investment management fees and plan expenses.

As at September 30, 2024, the Master Trust was in compliance with the Statement of Investment Policies and Procedures (SIP&P).

ATTACHMENT

Attachment 1 – HRM Master Trust Investment Performance Q3 2024

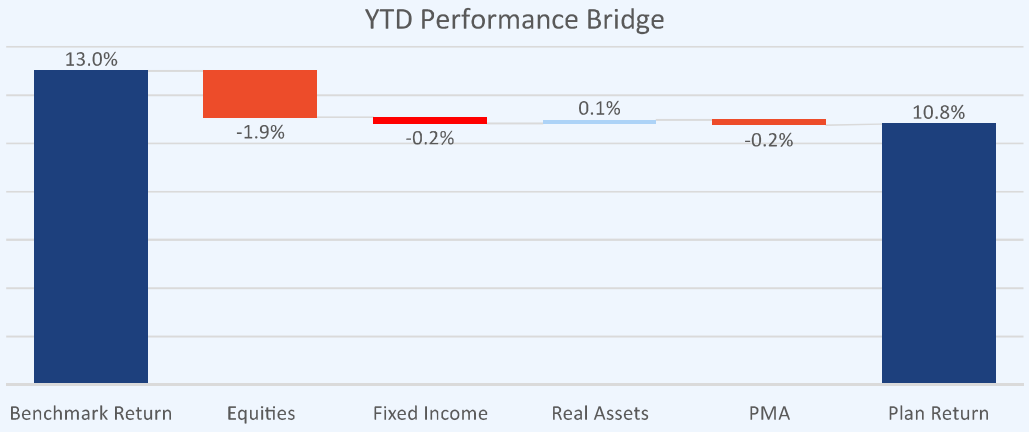
Attachment 2 – HRM Master Trust Investment Risk & Analytical Services Q3 2024

Report Prepared By: Signed by: Heather Britten 7F50B0451C60405...
Heather Britten, Quality Assurance Officer

Plan Performance

Total Plan Performance

	Q3	YTD	1 Year	5 Year	10 Year
Total Plan	3.6%	10.8%	14.8%	8.6%	8.2%
Benchmark	4.5%	13.0%	19.2%	7.5%	6.7%
Value Add	-0.9%	-2.2%	-4.4%	1.1%	1.5%



Note: Bridge returns for each asset class are the relative asset allocation and relative security selection returns. HRM Operating account, and residual effects are included within fixed income for total performance purposes.
Note: Total Plan Benchmark and breakdown is provided in the Appendix

NORTHERN TRUST

Consent Agenda Item No. 1

HRM Master Trust

Investment Risk & Analytical Services

September 30, 2024

Table of Contents

SECTION 1

HRM Master Trust

Investment Risk & Analytical Services

September 30, 2024

Market Overview

IMPORTANT INFORMATION

Indexes used: Bloomberg Barclays (BBC) 1-3 Month UST (Cash); BBC Municipal (Muni); BBC Aggregate (Inv. Grade); BBC TIPS (TIPS); BBC High Yield 2% Capped (High Yield); JP Morgan GBI-EM Global Diversified (Em. Markets Fixed Income); MSCI U.S. Equities IMI (U.S. Equities); MSCI World ex-U.S. IMI (Dev. ex-U.S. Equities); MSCI Emerging Market Equities IMI (Em. Markets Equities); S&P Global Natural Resources (Natural Resources); MSCI ACWI IMI Core Real Estate (Global Real Estate); S&P Global Infrastructure (Global Listed Infrastructure).

IMPORTANT INFORMATION. The information is not intended for distribution or use by any person in any jurisdiction where such distribution would be contrary to local law or regulation. Northern Trust and its affiliates may have positions in and may effect transactions in the markets, contracts and related investments different than described in this information. This information is obtained from sources believed to be reliable, and its accuracy and completeness are not guaranteed. Information does not constitute a recommendation of any investment strategy, is not intended as investment advice and does not take into account all the circumstances of each investor. Opinions and forecasts discussed are those of the author, do not necessarily reflect the views of Northern Trust and are subject to change without notice.

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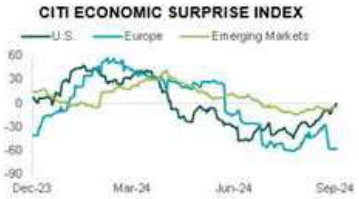
Past performance is no guarantee of future results. Performance returns and the principal value of an investment will fluctuate. Performance returns contained herein are subject to revision by Northern Trust. Comparative indices shown are provided as an indication of the performance of a particular segment of the capital markets and/or alternative strategies in general. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. For additional information on fees, please refer to Part 2a of the Form ADV or consult a Northern Trust representative.

Northern Trust Asset Management is composed of Northern Trust Investments, Inc. Northern Trust Global Investments Limited, Northern Trust Fund Managers (Ireland) Limited, Northern Trust Global Investments Japan, K.K, NT Global Advisors, Inc., 50 South Capital Advisors, LLC, Belvedere Advisors LLC, Northern Trust Asset Management Australia Pty Ltd, and investment personnel of The Northern Trust Company of Hong Kong Limited and The Northern Trust Company.

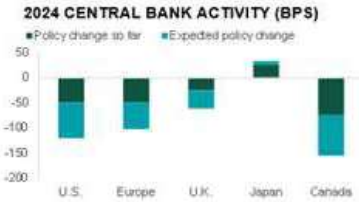
U.S. Economic Resilience Continues

The U.S. economy kept on-track for a soft landing despite some moderation in labor market activity. 2Q GDP growth printed at 3.0% and the overall consumer backdrop remains firm. Outside the U.S., the Europe growth outlook softened with ongoing challenges in core economies such as Germany and France. Amid mounting growth concerns, China announced major monetary and fiscal support for its economy across a number of avenues (rate cuts, mortgage relief, equity market facilities, etc.) in late September.



The Fed Pause is Over

Major developed market central banks remain focused on cutting rates as they balance slowing growth with moderating but still-above target inflation. While most of its peers led off with 25-bp cuts, the Fed opted for a 50-bp move. Investors digested this well – helped by Fed messaging on proactively cutting to help maintain a solid labor market as risks around its dual mandate have come into better balance. Similar to the recent past, the Bank of Japan (BOJ) remains on a different trajectory as it looks to gradually raise rates.



Short-Lived Soft Patches

3Q saw two notable financial market rough patches followed by quick recoveries. In early August, concerns surfaced around U.S. growth and the unwind of yen carry trades following the BOJ's late-July rate hike. This led to a rapid 20%-plus correction in Japan equities and a 6% drawdown for the S&P 500. Additional U.S. growth concerns led to a rough start for U.S. equities (-4%) in the first week of September. On a more positive note, China equities surged in the last week of September following the stimulus news.

Broader Equity Market Gains

Equity market returns broadened in 3Q with ongoing gains even as market leadership shifted notably versus the first half of 2024. Small caps led large caps and more defensive parts of the market outperformed cyclical and tech-related areas. For the S&P 500, eight out of eleven sectors outperformed the index with utilities and real estate leading the way. Broader earnings growth has been a key pillar of all this with companies outside of the Magnificent 7 contributing nearly half of 2Q S&P 500 earnings growth.

MARKET EVENTS

JULY	AUGUST	SEPTEMBER
9 Fed Chair Powell refrains from delivering major guidance in his Congressional testimonies, but he does signal a bit more attentiveness to downside growth risks.	2 The U.S. unemployment rate rises to 4.3% and triggers the Sahm Rule. The softer than expected labor report adds to equity market weakness coinciding with the carry trade unwind.	6 In the August U.S. jobs report, nonfarm payroll gains come in below consensus again. However, the unemployment rate ticks down to 4.2%.
11 U.S. core Consumer Price Index (CPI) eases more than expected. The month-over-month (m/m) increase is 0.1% versus 0.2% the prior month and 0.3% the month before that.	7 The Bank of Japan (BOJ) seemingly seeks to reassure markets as deputy governor Uchida says the BOJ will not raise rates in unstable markets.	12 The European Central Bank cuts its key policy rate by 25 bps. This is its second rate cut of the year.
12 Second quarter earnings season kicks off with JPMorgan (JPM), Wells Fargo (WFC) and Citigroup (C). S&P 500 earnings growth finishes slightly better than expected on a y/y basis.	14 U.S. core CPI decelerates to 3.2% y/y from 3.3%. Excluding shelter, core CPI is flat for the third month in a row.	18 The Fed lowers its policy rate by 50 bps. Fed messaging focuses on more confidence in moderating inflation and proactively adjusting policy to help maintain a solid labor market.
21 Four months prior to the 2024 presidential election, U.S. President Joe Biden drops out of the race and endorses Vice President Kamala Harris.	23 At Jackson Hole, Chair Powell's speech notes that "the time has come for policy to adjust" and points to higher downside labor market risks.	24 The People's Bank of China announces that it will increase stimulus in a broad manner. China equities gain 5.2% on the day.
31 The Bank of Japan delivers a 15-basis point (bp) rate hike and outlines a tapering plan, leading to an unwind of yen carry trades and equity volatility.	28 Despite Nvidia (NVDA) beating earnings expectations, its results are not as impressive as recent quarters and NVDA declines 6.4% on the day after.	26 The Politburo holds a surprise meeting to announce further fiscal support in China. China equities rise another 6.2% on the day.

MARKET OVERVIEW - THIRD QUARTER 2024

PROVIDED BY NORTHERN TRUST ASSET MANAGEMENT

BROADER GAINS

Positive macro forces prevail. It was an eventful quarter where the macro backdrop ultimately shaped up positively. A handful of underwhelming U.S. data releases garnered negative investor reactions, including softer U.S. labor and manufacturing data. However, patches of cooler activity appeared to represent no more than speed bumps on the path to a soft landing as growth remained solid overall. With inflation continuing to approach more normal levels, the Fed kicked off its rate cutting cycle with a 50-basis point cut. The Fed is among many global central banks who have embarked on rate cutting campaigns. Out of 111 central banks across the world, 37 more are cutting their policy rate than hiking it. An exception is the Bank of Japan, which raised its policy rate by 15 bps during the quarter. This gave way to an unwind of yen carry trades and an episode of sharp market volatility that ultimately settled. In China, growth developments underwhelmed until the Politburo announced stronger-than-expected stimulus. While pledged support may not be sufficient for a sustained turnaround, the strong market reaction suggests it is a step in the right direction. Drowned out in the more positive macro events was risk of a broader conflict in the Middle East. From an economic standpoint, this risk was largely contained during the quarter. However, escalation odds rose heading into quarter-end. The situation will be under close surveillance alongside the U.S. Presidential Election heading into the last quarter of this year.

Strong third quarter for financial markets. Financial market returns were robust with mid-single-digit gains or higher in a number of major asset classes. Steadily declining interest rates supported fixed income returns in addition to a healthy credit backdrop – leading to roughly similar returns across investment grade and high yield. Equity markets were helped by wider support across both regions and sectors versus some recent quarters of more narrow U.S. megacap-tech driven gains. The major non-U.S. regions modestly led the U.S. in dollar terms. Emerging markets received a late-September boost from China, while non-U.S. developed market returns benefited from a weaker U.S. dollar with more muted returns on a local currency basis. U.S. equity market breadth improved with a number of pockets of the market performing well. For instance, small caps outperformed large caps while more defensive sectors led versus cyclical and tech-related sectors. The Magnificent 7 group was still positive – but accounted for less than a tenth of the S&P 500's 3Q gain. The U.S. earnings backdrop remains constructive with less reliance on the Magnificent 7 and more sectors overall posting double-digit earnings growth. Divergence in the real asset space continued with double-digit gains in real estate and listed infrastructure. Both asset classes responded favorably to declining interest rates. This contrasted with a tougher quarter (albeit still positive) for natural resources given a relatively soft commodities backdrop and a nearly 20% decline in crude oil prices.

THIRD QUARTER 2024 TOTAL RETURNS (%)

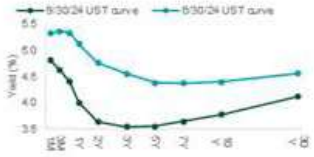
The 60/40 portfolio's return ranks 25th out of the past 140 quarters due to solid gains across both equities and fixed income.

Source: Northern Trust Asset Management, Bloomberg. NR: Natural Resources; GRE: Global Real Estate; GLI: Global Listed Infrastructure. Indexes are gross of fees. Past performance is not indicative or a guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

Interest Rates

The 2-year and 10-year Treasury yield finished down 111 and 62 basis points (bps), respectively. The more sizeable moves on the front end of the curve were enough to bring the 10-year / 2-year spread out of negative territory. The curve had been inverted for over two years – the longest stretch in over 40 years. The balance of easing inflation and softer employment data prompted the Fed to initiate its rate cutting campaign with a 50-bp rate cut. Most central banks are now cutting rates, with markets expecting more to come.

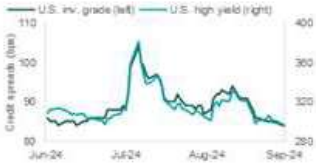
U.S. TREASURY YIELD CURVE



Credit Markets

Credit spreads sharply widened surrounding the unwind of yen carry trades and disappointing U.S. jobs data. They widened again in early September amid additional U.S. growth concerns. Both instances were short-lived. Periods of spread widening were generally followed by more sizeable reversions back toward historical lows. Investment grade (IG) spreads ended 2 bps tighter and high yield (HY) spreads tightened 14 bps. HY (+5.3%) returned slightly more than IG (+5.2%) with lower-quality credits outperforming within both segments.

CREDIT SPREADS



Equities

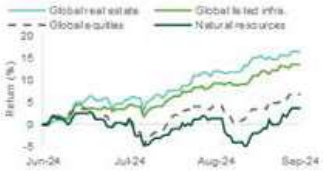
Bouts of equity weakness ended the quarter as no more than temporary corrections typically experienced in bull markets. Underpinned by positive economic growth and solid corporate fundamentals, global equities tacked on another 6.7%, bringing their year-to-date gain to 18.2%. There was a reversal of year-to-date leadership trends across regions, styles and sizes. For example, the U.S. trailed international, growth trailed value, and large caps trailed small. However, even said laggards posted solid returns – an ode to the broader nature of equity gains.

REGIONAL EQUITY INDICES

Real Assets

It was a very strong quarter for global real estate (+16.3%) and listed infrastructure (+13.4%). Real estate was down on the year heading into the quarter. The asset class enjoyed a strong reversal with tailwinds from slowing-but-intact economic growth and lower interest rates. The office sector was particularly strong. Infrastructure benefited from similar tailwinds and continued to build on momentum from potential AI-driven demand. Natural resources increased 3.6% but continued to lag with oil prices down around 17%.

REAL ASSET INDICES



Investment Hierarchy

Account/Group	Ending Market Value CAD	Ending Weight	% Rate of Return								
			One Month	Three Months	Year to Date	One Year	Three Years	Four Years	Ten Years	Inception to Date	Inception Date
HRM Master Trust	**3,154,475,209**	**100.00**	**1.79**	**3.60**	**10.81**	**14.82**	**8.02**	**9.18**	**8.22**	**7.36**	**09/30/1999**
HRM Policy Benchmark			*1.84*	*4.48*	*12.95*	*19.15*	*7.63*	*7.86*	*6.71*	*6.01*	*09/30/1999*
Excess Return			*-0.05*	*-0.88*	*-2.14*	*-4.34*	*0.39*	*1.33*	*1.51*	*1.35*	*09/30/1999*
HRM Total Equity	**1,559,266,584**	**49.43**	**2.05**	**4.63**	**16.56**	**23.10**	**7.46**	**10.62**	**-**	**8.69**	**12/31/2015**
HRM Total Equity Benchmark			*2.69*	*6.17*	*20.47*	*30.40*	*9.68*	*12.61*	*-*	*10.18*	*12/31/2015*
Excess Return			*-0.63*	*-1.53*	*-3.91*	*-7.30*	*-2.22*	*-1.99*	*-*	*-1.48*	*12/31/2015*
HRM Cdn Equity	**112,243,977**	**3.56**	**2.83**	**8.42**	**14.95**	**25.42**	**8.93**	**13.26**	**5.54**	**5.58**	**03/31/2006**
S&P/TSX Composite			*3.15*	*10.54*	*17.24*	*26.74*	*9.52*	*13.87*	*8.09*	*6.89*	*03/31/2006*
Excess Return			*-0.33*	*-2.13*	*-2.29*	*-1.32*	*-0.59*	*-0.61*	*-2.55*	*-1.30*	*03/31/2006*
Blackrock	**42,588,526**	**1.35**	**3.15**	**10.54**	**17.20**	**27.53**	**9.75**	**14.13**	**8.30**	**9.01**	**12/31/2003**
S&P/TSX Composite			*3.15*	*10.54*	*17.24*	*26.74*	*9.52*	*13.87*	*8.09*	*8.33*	*12/31/2003*
Excess Return			*-0.00*	*-0.00*	*-0.03*	*0.80*	*0.24*	*0.26*	*0.21*	*0.68*	*12/31/2003*
EdgePoint	**66,631,149**	**2.11**	**3.08**	**7.81**	**-**	**-**	**-**	**-**	**-**	**9.01**	**03/14/2024**
P2P Holdings	**3,024,302**	**0.10**	**-7.05**	**-12.04**	**-2.26**	**16.93**	**-0.48**	**3.18**	**-**	**-22.10**	**02/03/2017**
S&P/TSX Composite			*3.15*	*10.54*	*17.24*	*26.74*	*9.52*	*13.87*	*-*	*9.20*	*02/03/2017*
Excess Return			*-10.20*	*-22.58*	*-19.50*	*-9.81*	*-9.99*	*-10.69*	*-*	*-31.30*	*02/03/2017*
Transition Account	**0**	**0.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**02/25/2021**
HRM Global Equity	**989,038,734**	**31.35**	**1.84**	**5.40**	**20.85**	**31.24**	**-**	**-**	**-**	**22.45**	**12/31/2022**
HRM Custom Global Equity Index			*1.93*	*5.55*	*19.90*	*30.28*	*-*	*-*	*-*	*22.32*	*12/31/2022*
Excess Return			*-0.09*	*-0.14*	*0.95*	*0.96*	*-*	*-*	*-*	*0.13*	*12/31/2022*
AB EDHEC	**174,940,278**	**5.55**	**1.65**	**5.18**	**18.33**	**27.89**	**9.96**	**12.71**	**-**	**9.56**	**12/31/2015**
MSCI World ND			*2.07*	*5.01*	*21.77*	*32.32*	*11.44*	*14.03*	*-*	*11.22*	*12/31/2015*
Excess Return			*-0.42*	*0.17*	*-3.45*	*-4.43*	*-1.48*	*-1.33*	*-*	*-1.66*	*12/31/2015*
Blackrock Global Alpha Advanta	**174,245,873**	**5.52**	**2.58**	**4.24**	**25.42**	**38.82**	**15.49**	**-**	**-**	**15.13**	**05/25/2021**
MSCI ACWI ND			*2.57*	*5.26*	*21.57*	*31.65*	*10.43*	*-*	*-*	*11.15*	*05/25/2021*
Excess Return			*0.01*	*-1.02*	*3.84*	*7.16*	*5.06*	*-*	*-*	*3.98*	*05/25/2021*
Blackrock MSCI Small Cap	**51,217,440**	**1.62**	**1.68**	**7.65**	**13.38**	**24.82**	**4.58**	**-**	**-**	**6.02**	**05/19/2021**
MS Wld Small Cap Net Index			*2.11*	*8.00*	*13.74*	*24.77*	*4.41*	*-*	*-*	*5.71*	*05/19/2021*
Excess Return			*-0.44*	*-0.35*	*-0.36*	*0.05*	*0.17*	*-*	*-*	*0.30*	*05/19/2021*
Blackrock MSCI World Passive	**176,837,455**	**5.61**	**2.10**	**5.08**	**22.08**	**32.80**	**11.87**	**-**	**-**	**13.65**	**05/12/2021**
MSCI World ND			*2.07*	*5.01*	*21.77*	*32.32*	*11.44*	*-*	*-*	*13.22*	*05/12/2021*
Excess Return			*0.03*	*0.07*	*0.30*	*0.48*	*0.43*	*-*	*-*	*0.42*	*05/12/2021*
Global Alpha	**61,012,707**	**1.93**	**2.25**	**8.28**	**19.57**	**29.18**	**-**	**-**	**-**	**7.68**	**03/09/2022**
MS Wld Small Cap Net Index			*2.11*	*8.00*	*13.74*	*24.77*	*-*	*-*	*-*	*8.40*	*03/09/2022*
Excess Return			*0.14*	*0.28*	*5.83*	*4.41*	*-*	*-*	*-*	*-0.72*	*03/09/2022*

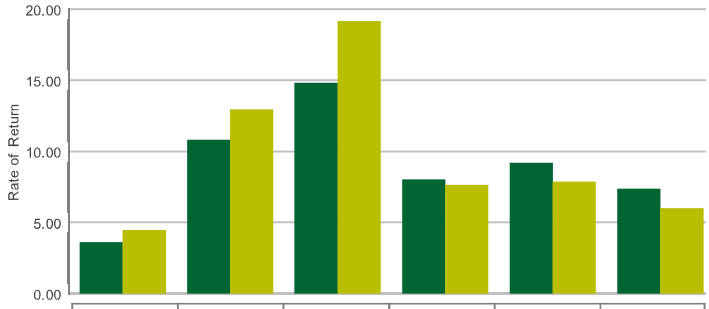
Account/Group	Ending Market Value CAD	Ending Weight	% Rate of Return								
			One Month	Three Months	Year to Date	One Year	Three Years	Four Years	Ten Years	Inception to Date	Inception Date
Marathon International Equity	**83,200,980**	**2.64**	**2.43**	**6.95**	**17.01**	**24.71**	**7.18**	**-**	**-**	**7.26**	**05/28/2021**
MSCI EAFE ND			*1.16*	*5.90*	*15.76*	*24.67*	*7.77*	*-*	*-*	*7.86*	*05/28/2021*
Excess Return			*1.27*	*1.05*	*1.25*	*0.04*	*-0.58*	*-*	*-*	*-0.59*	*05/28/2021*
Mawer International Equity	**89,912,539**	**2.85**	**0.32**	**7.04**	**16.96**	**26.94**	**5.59**	**-**	**-**	**6.21**	**02/28/2021**
MSCI ACWI ex USA ND			*2.94*	*6.69*	*17.01*	*25.26*	*6.39*	*-*	*-*	*6.39*	*02/28/2021*
Excess Return			*-2.62*	*0.35*	*-0.05*	*1.68*	*-0.80*	*-*	*-*	*-0.18*	*02/28/2021*
Wellington US Equity	**177,671,462**	**5.63**	**1.48**	**3.81**	**25.13**	**34.72**	**14.47**	**18.50**	**14.27**	**14.73**	**04/30/2011**
HRM US Equity			*2.38*	*4.54*	*25.07*	*36.25*	*14.09*	*17.75*	*13.33*	*13.53*	*04/30/2011*
Excess Return			*-0.90*	*-0.73*	*0.06*	*-1.53*	*0.38*	*0.76*	*0.94*	*1.20*	*04/30/2011*
HRM Emerging Markets	**113,794,226**	**3.61**	**8.38**	**8.40**	**15.79**	**20.21**	**1.92**	**2.60**	**5.55**	**5.59**	**09/30/2010**
MSCI Emerging Markets ND			*6.93*	*7.34*	*19.73*	*25.95*	*2.58*	*4.88*	*6.02*	*5.14*	*09/30/2010*
Excess Return			*1.45*	*1.06*	*-3.94*	*-5.75*	*-0.66*	*-2.28*	*-0.47*	*0.45*	*09/30/2010*
CC&L Emerging Markets	**54,391,505**	**1.72**	**6.68**	**5.86**	**23.86**	**29.91**	**-**	**-**	**-**	**-**	**12/31/2022**
MSCI Emerging Markets ND			*6.93*	*7.34*	*19.73*	*25.95*	*-*	*-*	*-*	*15.13*	*12/31/2022*
Excess Return			*-0.25*	*-1.48*	*4.13*	*3.95*	*-*	*-*	*-*	*-*	*12/31/2022*
Trinetra Emerg Mrkts Grwth Fnd	**59,402,721**	**1.88**	**9.99**	**10.83**	**9.27**	**12.51**	**-0.24**	**0.31**	**-**	**3.27**	**08/31/2017**
MSCI Emerging Markets ND			*6.93*	*7.34*	*19.73*	*25.95*	*2.58*	*4.88*	*-*	*4.65*	*08/31/2017*
Excess Return			*3.06*	*3.49*	*-10.45*	*-13.44*	*-2.81*	*-4.57*	*-*	*-1.37*	*08/31/2017*
HRM Private Equity	**344,189,647**	**10.91**	**0.51**	**0.06**	**6.32**	**4.25**	**12.74**	**17.77**	**18.28**	**19.00**	**09/30/2011**
HRM PE Benchmark			*2.24*	*5.53*	*23.56*	*34.91*	*17.97*	*14.97*	*9.72*	*8.97*	*09/30/2011*
Excess Return			*-1.73*	*-5.47*	*-17.24*	*-30.66*	*-5.23*	*2.80*	*8.57*	*10.03*	*09/30/2011*
Private Equity	**344,189,647**	**10.91**	**0.51**	**0.06**	**6.32**	**4.25**	**12.74**	**17.77**	**18.28**	**19.00**	**09/30/2011**
HRM Total Fixed Income	**658,864,205**	**20.89**	**1.16**	**3.03**	**4.17**	**9.33**	**2.09**	**2.52**	**-**	**3.29**	**12/31/2015**
HRM FI Benchmark			*1.32*	*3.51*	*5.13*	*11.11*	*2.10*	*1.27*	*-*	*2.11*	*12/31/2015*
Excess Return			*-0.16*	*-0.48*	*-0.97*	*-1.79*	*-0.01*	*1.26*	*-*	*1.18*	*12/31/2015*
Cash and Cash Equivalents	**33,190,708**	**1.05**	**1.02**	**1.20**	**4.19**	**4.95**	**2.99**	**2.48**	**2.43**	**4.37**	**03/31/2009**
HRM Canadian 91 Day T-Bill			*0.35*	*1.22*	*3.80*	*5.23*	*-*	*-*	*-*	*-*	*03/31/2009*
Excess Return			*0.67*	*-0.02*	*0.39*	*-0.28*	*-*	*-*	*-*	*-*	*03/31/2009*
Lincluden CDOR	**33,190,708**	**1.05**	**1.02**	**1.20**	**4.19**	**4.95**	**3.76**	**2.47**	**2.03**	**1.98**	**12/31/2013**
Canadian 91 Day T-Bill (CAD)			*0.35*	*1.22*	*3.80*	*5.13*	*3.45*	*2.62*	*1.62*	*1.57*	*12/31/2013*
Excess Return			*0.67*	*-0.02*	*0.39*	*-0.18*	*0.30*	*-0.15*	*0.41*	*0.41*	*12/31/2013*
Global Credit	**75,399,959**	**2.39**	**0.97**	**3.23**	**5.30**	**9.45**	**-**	**-**	**-**	**3.91**	**03/31/2022**
Global Credit Custom Benchmark			*0.98*	*3.23*	*4.77*	*8.86*	*-*	*-*	*-*	*3.36*	*03/31/2022*
Excess Return			*-0.01*	*0.00*	*0.53*	*0.59*	*-*	*-*	*-*	*0.55*	*03/31/2022*

Account/Group	Ending Market Value CAD	Ending Weight	% Rate of Return								
			One Month	Three Months	Year to Date	One Year	Three Years	Four Years	Ten Years	Inception to Date	Inception Date
AB Global Credit	**75,399,959**	**2.39**	**0.97**	**3.23**	**5.30**	**9.45**	**2.21**	**2.57**	**2.97**	**5.01**	**03/31/2009**
Global Credit Custom Benchmark			*0.98*	*3.23*	*4.77*	*8.86*	-	-	-	-	*03/31/2009*
Excess Return			*-0.01*	*0.00*	*0.53*	*0.59*	-	-	-	-	*03/31/2009*
North American Credit	**229,074,095**	**7.26**	**1.19**	**2.44**	**5.88**	**10.07**	**4.24**	**6.76**	**-**	**6.28**	**12/31/2015**
HRM Custom Corporate Benchmark			*1.73*	*4.22*	*6.39*	*12.50*	*1.27*	*0.79*	-	*2.96*	*12/31/2015*
Excess Return			*-0.54*	*-1.79*	*-0.50*	*-2.43*	*2.97*	*5.97*	-	*3.32*	*12/31/2015*
Canso	**97,297,188**	**3.08**	**1.75**	**3.27**	**7.42**	**11.93**	**4.10**	**8.55**	**7.14**	**8.17**	**02/28/2010**
FTSE TMX Corporate Bond IDX			*2.12*	*4.67*	*5.88*	*13.96*	*1.49*	*0.95*	*3.12*	*3.88*	*02/28/2010*
Excess Return			*-0.38*	*-1.40*	*1.54*	*-2.03*	*2.61*	*7.60*	*4.02*	*4.29*	*02/28/2010*
HRM Corporate Debt	**131,776,907**	**4.18**	**0.78**	**1.78**	**4.60**	**8.51**	**4.55**	**4.31**	**5.99**	**6.30**	**01/31/2014**
FTSE TMX Short Corp BD IDX			*1.53*	*3.77*	*6.15*	*11.22*	*2.53*	*2.16*	*2.71*	*2.69*	*01/31/2014*
Excess Return			*-0.75*	*-1.98*	*-1.55*	*-2.71*	*2.02*	*2.15*	*3.28*	*3.62*	*01/31/2014*
Government Bonds	**218,908,640**	**6.94**	**1.73**	**4.89**	**3.92**	**12.61**	**-0.23**	**-1.04**	**-**	**1.80**	**12/31/2015**
FTSE TMX Government Univers			*1.83*	*4.66*	*3.72*	*12.53*	*-0.66*	*-1.58*	-	*1.44*	*12/31/2015*
Excess Return			*-0.11*	*0.23*	*0.20*	*0.08*	*0.43*	*0.54*	-	*0.35*	*12/31/2015*
Lincluden Gov't	**121,556,349**	**3.85**	**1.78**	**4.55**	**3.38**	**12.58**	**-0.21**	**-1.08**	**2.15**	**2.54**	**08/31/2013**
FTSE TMX Government Univers			*1.83*	*4.66*	*3.72*	*12.53*	*-0.66*	*-1.58*	*1.95*	*2.37*	*08/31/2013*
Excess Return			*-0.05*	*-0.11*	*-0.35*	*0.05*	*0.45*	*0.50*	*0.20*	*0.18*	*08/31/2013*
Wellington Bond Overlay	**97,352,291**	**3.09**	**1.66**	**5.33**	**4.61**	**12.65**	**-0.38**	**-1.08**	**2.50**	**2.45**	**08/31/2012**
FTSE TMX Government Univers			*1.83*	*4.66*	*3.72*	*12.53*	*-0.66*	*-1.58*	*1.95*	*1.99*	*08/31/2012*
Excess Return			*-0.17*	*0.67*	*0.89*	*0.12*	*0.28*	*0.50*	*0.55*	*0.45*	*08/31/2012*
Private Debt	**102,290,803**	**3.24**	**0.22**	**0.95**	**0.98**	**3.08**	**7.21**	**9.31**	**7.97**	**0.80**	**12/31/2011**
HRM PD Benchmark			*0.66*	*2.09*	*6.32*	*10.26*	*9.68*	*8.86*	*7.35*	*7.16*	*12/31/2011*
Excess Return			*-0.44*	*-1.14*	*-5.34*	*-7.18*	*-2.48*	*0.45*	*0.62*	*-6.36*	*12/31/2011*
Private Debt	**102,290,803**	**3.24**	**0.22**	**0.95**	**0.98**	**3.08**	**7.21**	**9.31**	**7.97**	**0.80**	**12/31/2011**
HRM Real Assets	**816,230,239**	**25.88**	**1.82**	**2.51**	**7.18**	**6.90**	**12.13**	**11.19**	**-**	**11.29**	**08/31/2020**
Rolling CPI 5 year + 5%			*0.68*	*2.08*	*6.42*	*8.63*	-	-	-	-	*08/31/2020*
Excess Return			*1.14*	*0.42*	*0.77*	*-1.74*	-	-	-	-	*08/31/2020*
Infrastructure	**381,547,841**	**12.10**	**1.97**	**3.02**	**9.35**	**11.76**	**14.87**	**13.31**	**10.37**	**18.09**	**06/30/2011**
HRM Infrastructure Index			*0.68*	*2.08*	*6.42*	*7.59*	*9.56*	*9.57*	*7.71*	*7.43*	*06/30/2011*
Excess Return			*1.29*	*0.94*	*2.94*	*4.18*	*5.31*	*3.75*	*2.67*	*10.66*	*06/30/2011*
Infrastructure	**381,547,841**	**12.10**	**1.97**	**3.02**	**9.35**	**11.76**	**14.87**	**13.31**	**10.37**	**18.09**	**06/30/2011**
Real Estate	**434,682,398**	**13.78**	**1.69**	**2.06**	**5.42**	**3.13**	**10.34**	**9.78**	**11.30**	**10.90**	**09/30/2011**
HRM Real Estate Index			*0.68*	*2.08*	*6.42*	*7.59*	*9.56*	*9.57*	*7.71*	*7.42*	*09/30/2011*
Excess Return			*1.01*	*-0.02*	*-1.00*	*-4.45*	*0.78*	*0.21*	*3.60*	*3.47*	*09/30/2011*
Real Estate	**434,682,398**	**13.78**	**1.69**	**2.06**	**5.42**	**3.13**	**10.34**	**9.78**	**11.30**	**10.90**	**09/30/2011**

Account/Group	Ending Market Value CAD	Ending Weight	% Rate of Return								
			One Month	Three Months	Year to Date	One Year	Three Years	Four Years	Ten Years	Inception to Date	Inception Date
Public Market Alternatives	**103,774,379**	**3.29**	**2.09**	**3.28**	**7.90**	**11.14**	**-**	**-**	**-**	**6.68**	**02/28/2022**
Canadian 91 Day T-Bill +3%			*0.59*	*1.97*	*6.12*	*8.38*	-	-	-	*7.81*	*02/28/2022*
Excess Return			*1.49*	*1.32*	*1.78*	*2.76*	-	-	-	*-1.13*	*02/28/2022*
Public Market Alternatives	**103,774,379**	**3.29**	**2.09**	**3.28**	**7.90**	**11.14**	**-**	**-**	**-**	**6.68**	**02/28/2022**
Canadian 91 Day T-Bill +3%			*0.59*	*1.97*	*6.12*	*8.38*	-	-	-	*7.81*	*02/28/2022*
Excess Return			*1.49*	*1.32*	*1.78*	*2.76*	-	-	-	*-1.13*	*02/28/2022*
HRM Operating	**16,339,803**	**0.52**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**12/31/2015**
Operating Account	**16,339,803**	**0.52**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**03/31/2004**

Executive Summary

HRM MASTER TRUST TOTAL FUND NET OF FEES



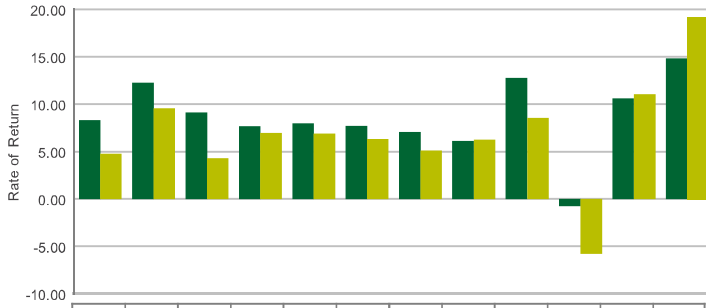
	Three Months	Year to Date	One Year	Three Years	Four Years	ITD
Fund	3.60	10.81	14.82	8.02	9.18	7.36
Index	4.48	12.95	19.15	7.63	7.86	6.01

Index: HRM Policy Benchmark

RISK STATISTICS	3 Mos	1 Yr	4 Yrs
Return	3.60	14.82	9.18
Index Return	4.48	19.15	7.86
Excess Return	-0.88	-4.34	1.33
Standard Deviation	-	3.17	4.81
Index Standard Deviation	-	4.42	5.82
Tracking Error	-	1.88	2.40
Information Ratio	-	-2.31	0.55
Sharpe Ratio	-	2.99	1.45
Index Sharpe Ratio	-	3.12	0.97
Jensen's Alpha	-	0.36	2.53
Relative Volatility (Beta)	-	0.67	0.76
R Squared	-	0.87	0.82
Beginning MV (in 000s)	3,051,195	2,760,482	2,272,820
Net Contributions (in 000s)	-6,169	-13,377	-60,351
Income (in 000s)	25,741	75,472	229,971
Appreciation (in 000s)	83,708	331,898	712,035
Ending MV (in 000s)	3,154,475	3,154,475	3,154,475

Index: HRM Policy Benchmark. Risk Free Index: JP Morgan 3 month Cash (CAD)
Category: Total Fund Net of Fees. Calculation Frequency: Monthly

HRM MASTER TRUST ROLLING YEARS TOTAL FUND NET OF FEES



	Sep '13	Sep '14	Sep '15	Sep '16	Sep '17	Sep '18	Sep '19	Sep '20	Sep '21	Sep '22	Sep '23	Sep '24
Fund	8.31	12.25	9.12	7.66	7.95	7.68	7.03	6.11	12.75	-0.77	10.62	14.82
Index	4.75	9.57	4.31	6.96	6.88	6.31	5.09	6.23	8.55	-5.76	11.02	19.15

Index: HRM Policy Benchmark

HRM MASTER TRUST ROLLING QUARTERS TOTAL FUND NET OF FEES

	Q4 '21	Q1 '22	Q2 '22	Q3 '22	Q4 '22	Q1 '23	Q2 '23	Q3 '23	Q4 '23	Q1 '24	Q2 '24	Q3 '24
3M R.Excess	2.15	-0.02	1.88	1.20	0.87	-0.46	-1.12	0.36	-1.78	-0.74	-0.33	-0.84
1Y R.Excess	4.77	4.04	5.09	5.29	3.97	3.52	0.47	-0.36	-2.97	-3.24	-2.47	-3.64

Index: HRM Policy Benchmark

Growth Over Time - Inception to Date

Risk Statistics

	One Year	Three Years	Four Years	Seven Years	Ten Years	ITD
Return	14.82	8.02	9.18	8.21	8.22	7.36
Index Return	19.15	7.63	7.86	7.00	6.71	6.01
Excess Return	-4.34	0.39	1.33	1.21	1.51	1.35
Relative Excess Return	-3.64	0.36	1.23	1.13	1.41	1.27
Internal Rate of Return	14.82	8.00	9.19	8.21	-	-
Index Internal Rate of Return	19.21	7.62	7.87	7.01	-	-
Risk-free Return	5.34	2.79	2.20	2.07	1.75	2.47
Standard Deviation	3.17	4.76	4.81	4.57	4.62	5.95
Index Standard Deviation	4.42	6.25	5.82	5.36	4.87	6.05
Tracking Error	1.88	2.65	2.40	2.25	2.26	1.84
Relative Tracking Error	1.84	2.62	2.38	2.22	2.24	1.84
Information Ratio	-2.31	0.15	0.55	0.54	0.67	0.73
Relative Information Ratio	-1.98	0.14	0.52	0.51	0.63	0.69
Sharpe Ratio	2.99	1.10	1.45	1.35	1.40	0.82
Index Sharpe Ratio	3.12	0.78	0.97	0.92	1.02	0.59
M Squared	18.57	9.64	10.66	9.28	8.57	7.44
Sortino Ratio	8.93	1.96	2.85	2.26	2.49	1.19
Index Sortino Ratio	9.35	1.37	1.79	1.53	1.74	0.82
Treynor Ratio	14.19	7.49	9.17	7.86	7.62	5.19
Jensen's Alpha	0.36	1.75	2.53	2.18	2.16	1.49
Relative Volatility (Beta)	0.67	0.70	0.76	0.78	0.85	0.94
R Squared	0.87	0.83	0.82	0.82	0.78	0.91
Up Market Capture Ratio	72.64	79.52	91.50	92.50	106.99	122.05
Down Market Capture Ratio	5.00	56.44	60.76	65.25	78.45	95.27

Index: **HRM Policy Benchmark** • Risk Free Index: **JP Morgan 3 month Cash (CAD)**• Category : **Total Fund Net of Fees.** Calculation Frequency: **Monthly**

SECTION 2

Appendix

Investment Risk & Analytical Services

September 30, 2024

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ITEM #3-I
Halifax Water Board
January 30, 2025

Halifax Water Compliance Statement
Quarterly Certification

For the period of October 1, 2024 to December 31, 2024

We hereby certify that the Halifax Regional Water Commission is current in making all statutory remittances for payroll taxes, Harmonized Sales Tax and other remittances as required under the laws of the Government of Canada and its Provinces (the significant remittances are noted in the appendix) and that all significant legal claims have been disclosed.

Signed by:
Kenda MacKenzie
0C084AC815794F6...

Kenda MacKenzie, P.Eng.
Acting CEO and General Manager

Signed by:
A65D6874EBC1467...

Louis de Montbrun, CPA, CA
Director, Corporate Services/CFO

Dated:

January 24, 2025

Halifax Water Compliance Statement
Quarterly Certification
Appendix I

Significant statutory remittances for payroll taxes, Harmonized Sales Tax and other remittances as required under the laws of the Government of Canada and its Provinces for the Halifax Regional Water Commission.

Statutory Payroll Remittances

- **Canada Revenue Agency (CRA) -** Statutory employee payroll deductions and employer related contributions for:
  - Income Tax
  - Canada Pension Plan (CPP)
  - Employment Insurance (EI)

- **Workers' Compensation Board of Nova Scotia (WCB)** – Employer remittance based on employee payroll

Other Payroll Remittances

- **Northern Trust -** Employee payroll deductions and employer contributions to Halifax Water and HRM defined benefit pension plans

- **Industrial Alliance** – employer and employee contributions to defined contribution pension plan

- **Medavie Blue Cross & SSQ** – employee payroll deductions and employer related contributions for Health & dental, LTD, and Life benefit coverage, and payroll deductions for AD&D

- **Canadian Union of Public Employees** – Employee payroll deductions of union dues
  - CUPE Local 227
  - CUPE Local 1431

HST and Other Remittances

- **Canada Revenue Agency (CRA) -** Harmonized Sales Tax (HST) is filed online and a refund issued as HST paid is greater than HST collected

- **Workers' Compensation Board of Nova Scotia (WCB)** – Remittance for sub-contractors

ITEM # 3-I
HRWC BOARD

Quarterly Remittance Certification

Appendix II

Period: **Oct-Dec** **2024/25**

Vendor	Vendor #	Items Remitted	Total remitted	Exceptions
Statutory Payroll Remittances				
CRA	174	Tax, CPP, EI, WCB	$4,619,041.61	
Other Payroll				
Northern Trust	1215	HW Pension Plan	$ 2,184,646.77	
Northern Trust	1216	HRM Pension Plan	$ 237,194.13	
Manulife Financial	1171	Bedford Pension Plan	$ 2,201.18	
Industrial Alliance	2971	DCPP	$ 12,368.04	
Medavie Blue Cross	340, 3101	Health, Dental, Life, LTD	$ 839,049.91	
SSQ Insurance	429	AD&D	$ 6,456.57	
CUPE	160	Union Dues 1431	$ 37,213.02	
CUPE	3517	Union Dues 227	$ 83,306.60	
HST and Other				
CRA	N/A	HST (refunds)	$ (4,607,022.46)	
Receiver General	210	WCB subcontractors	$ 222.38	

Other payroll items remitted in accordance with stated requirements:
United Way, Credit Union, Garnishments (WCB, CRA, Family Court, Sherriff's Office), Water for People, Salvation Army, Racially Visible Caucus

Exceptions, errors and/or late remittances

ITEM #4-I

Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Signed by: Wendy Krkosek C70B2696701442F...
Wendy Krkosek, P.Eng., Acting Director, Environment, Health & Safety

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: **Enterprise Risk Management Program**

ORIGIN

Enterprise Risk Management Reporting.

BACKGROUND

At the January 15, 2025, meeting of the Halifax Water Enterprise Risk Management Committee, the ERM Program was reviewed and discussed. This review included the ERM Report to the Board and the ERM Workshop Schedule. The Committee approved forwarding these reports to the Halifax Water Board for their information.

DISCUSSION

No additional information was requested to be brought forward to the Halifax Water Board meeting following the discussion of the attached at the Committee meeting.

ATTACHMENT

1. Reports to the Halifax Water Enterprise Risk Management Committee dated January 8, 2024, entitled Item #4 – ERM Risk Management Program.

ITEM 4

Halifax Water Enterprise Risk Management Committee

January 15, 2025

TO: Chair, and Members of the Halifax Regional Water Commission Enterprise Risk Management Committee

SUBMITTED BY: Signed by: Wendy Krkosek C70B2090701442F...

Wendy Krkosek, Ph. D, P. Eng.
Acting Director, Environment, Health, and Safety

APPROVED: Signed by: Kenda MacKenzie 0C084AC813794F6...

Kenda MacKenzie, P.Eng.
Acting Chief Executive Officer and General Manager

DATE: January 08, 2025

SUBJECT: **Enterprise Risk Management Report**

ORIGIN

Enterprise Risk Management (ERM) Policy & Framework and ERM Board Committee Business Cycle.

RECOMMENDATION

It is recommended that the ERM Committee endorse the ERM Report and forward to the Board for their information.

INTRODUCTION

The ERM report provides an overview of the key activities within the ERM Program in the last term and highlights milestones reached on delivering various aspects of the program. The report also itemizes next steps in the implementation journey and other initiatives that have been deployed towards adopting and promoting the risk management culture within Halifax Water.

ERM PROGRAM HIGHLIGHTS

ERM Framework Updates: The Enterprise Risk Management Framework has continuously been reviewed to further reflect Halifax water's risk management strategy. Some of the recent changes to the framework includes the introduction of an escalation process between the risk review tiers; this means that a risk that was identified as a T-III risk can be escalated to T-II and T-I accordingly using a consistent criterion.
The figure below is the process flow of the escalation tree and corresponding stakeholders involved.

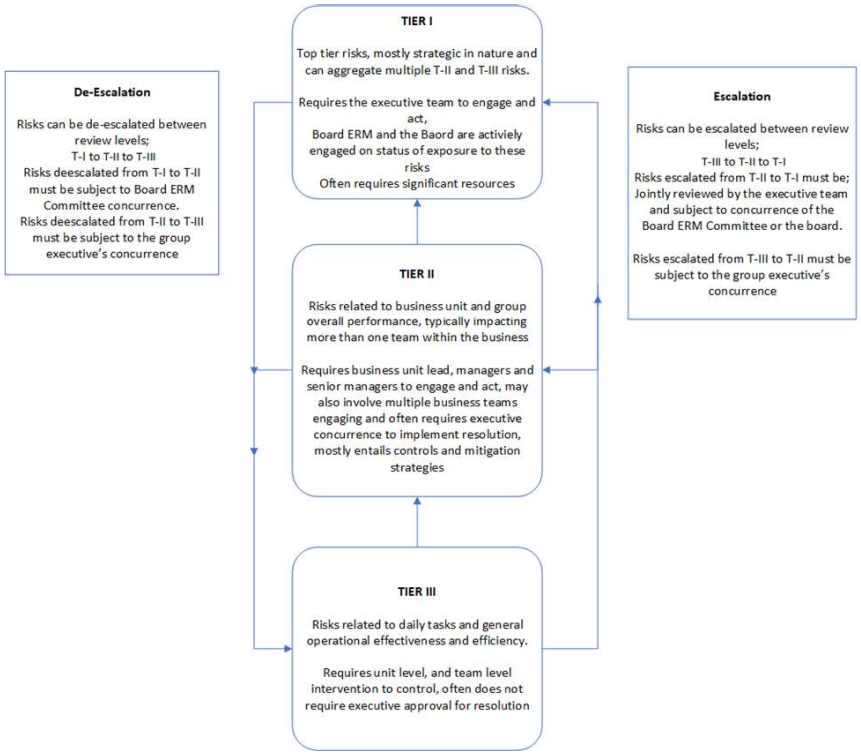


Figure 1: Halifax Water Risk Review Level Matrix and Escalation Criteria

Executive Management Risk & Control Assessment: In line with the adoption of the ERM Framework, the Halifax Water risk register documents have been reviewed individually by each group executive. The executive team has also jointly reviewed the Tier-I risk items and recommended proposed changes accordingly. The review process has also been operationalized as a key component that feeds into the ERM Board Committee sessions.

Enterprise-wide Risk and Control Self-Assessment; Following the review of the risk register document by the executives, the enterprise-wide risk and control assessment exercise also commenced within the period. The exercise is at its early stages and members of the ERM

steering committee have championed the process of ensuring the sessions are held with their corresponding groups. The exercise has introduced various new risks that were previously not documented in the risk register, these risks will also be reviewed along with existing items and risks that may require higher level insights and actions are presented for escalation accordingly.

Risk Profile and Program Updates; The risk profile report has now been operationalized as a key item to the Board ERM committee detailing the key areas of exposures and high-level insights into changes that have occurred between periods.

HRM MAG Audit on ERM & BCMS; In line with the Halifax Regional Municipality (HRM) Charter, the Municipal Auditor General completed an audit assessment of the HRM Enterprise Risk Management program In July 2024. The Halifax Water ERM Team has reviewed the observations and recommendations from the MAG to Evaluate Halifax Water's status in line with the observations and recommendations, assess our preparedness to a similar audit exercise; and identify areas of improvement where applicable.

Overall, the current approach for deploying the Halifax Water ERM program already addresses some of the key requirements of the audit, the next steps in deploying the ERM program also caters for other areas in the audit observations that are yet to be operationalized.

Cyber Security Program: The Cyber Program is generally on schedule and is executing as an integrated team of staff from Information Technology (IT) and Operations Technology (OT). The focus remains on the recommendations from the Municipal Auditor General (MAG) report and the priority recommendations from the Cyber Security Strategy. There are forty-seven recommendations from the MAG Audit. As of December 2024, 100% of MAG recommendations are either in progress or completed. There are 100 recommendations from the Cyber Security Strategy assessment and as of December 2024, 88% of recommendations are either in progress or completed.

In 2025, the focus is on key initiatives such as the implementation of an enhanced cyber security awareness training tool enterprise wide, conducting a threat risk assessment against the OT network, implementing network access control for the IT network, implementing network intrusion detection for the OT network, and the onboarding of a twenty-four hour by seven days a week security operations centre to continuously monitor our network for security issues.

The cyber program continues to enhance its Incident Response plans and playbooks and is conducting monthly tabletop exercise to rehearse cyber security incident response.

A comprehensive technology use manual has been developed to govern all technology use at the utility. It includes 68 key cyber security controls from the NIST CSF Standard, the most widely accepted standard for cyber security in critical infrastructure.

An implementation plan is currently under development to roll out these new policies, practices and standards over the next three years.

NEXT STEPS

The initial phase of the ERM program deployment has reached a stable point, various stakeholders are beginning to explore opportunities of integrating ERM into decision making at all levels of the organization. This provides a clear path for subsequent steps in the integration journey to commence, this includes:

1. Expanding the Enterprise-wide Risk and Control Self-Assessment Exercise
2. Operationalizing ERM actions and reporting across the governance structure.
3. Development & Monitoring of Key Risk Indicators
4. ERM Workshop Items at ERM Steering Committee Levels
5. Introducing the IMS framework for harmonizing and consistently deploying system and program standards

CONCLUSION

The ERM Program has been generally accepted at various levels of the organization, The program reached important milestones in the initial phase. The next steps will require additional efforts from all key stakeholders including the Executive team, staff members and the support of the board.

Report Prepared by: _____
Adedamola M. Akande, Enterprise Risk Management, Program Manager

ITEM 4

Halifax Water Enterprise Risk Management Committee

January 15, 2025

TO: Chair, and Members of the Halifax Regional Water Commission Enterprise Risk Management Committee

SUBMITTED BY: Signed by: Wendy Krkosek C70B2696701442F...
Wendy Krkosek, Ph. D, P. Eng.
Acting Director, Environment, Health, and Safety

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6...
Kenda MacKenzie, P.Eng.
Acting Chief Executive Officer and General Manager

DATE: January 08, 2025

SUBJECT: **ERM Board Committee Workshop Schedule 2025/2026**

ORIGIN

Enterprise Risk Management (ERM) Framework and ERM Board Committee Business Cycle.

RECOMMENDATION

It is recommended that the ERM Committee adopts the ERM Board Committee Workshop Schedule 2025/2026 and forward to the Board for their information.

BACKGROUND

The ERM Board Committee workshop schedule was actioned in January 2023, to include workshop topics in each meeting. The sessions were scheduled to provide the board with an overview of the corporate risk items. This schedule was adopted for 2024.

DISCUSSION

In line with operationalizing the ERM Framework, the workshop as a component of the ERM Board Committee meetings have evolved to reflect the changes in the review of the ERM Framework which introduces an escalation and de-escalation process for all risks in the Halifax

Water risk register. Following this review, the schedule for workshop sessions is subject to change based on escalation and de-escalation of risk items.

The ERM Board Committee Workshop Schedule 2025/2026 comprise all T-I risk items including existing T-I items and newly escalated T-I risk items within the last cycle.

ATTACHMENTS

Attachment 1: ERM Board Committee Workshop Schedule 2025/2026

Report Prepared by: Signed by: Adedamola Akande DD5C09D76026466...
Adedamola M. Akande, Enterprise Risk Management, Program Manager

Halifax Water

ERM Board Committee
January 8, 2025

2025/2026 ERM Board Committee Workshop Schedule

The following 2025/2026 ERM Board Committee Schedule outlines T-I risk items due for workshop presentation.

Meeting Date	T-I Risks Workshop Schedule
Mar-25	- Inadequate Short-Term Budgeting; Operating, Capital & Treasury Management - Labour Disruption
Jun-25	- Environmental Discharges Related to Utility Operations - Asset Management and Aging Infrastructure
Sep-25	- Health and Safety - Climate Change
Nov-25	- Capacity Constraints/Source Lake Recovery - Critical Infrastructure Failure
Jan-26	- Business Continuity - Fuel Shortage/Chemical Supply Chain

Note: The risk item on - Cybersecurity is also a T- I and is being presented as a standing report.

ITEM #5-I
Halifax Water Board
January 30, 2025

TO: Colleen Rollings, P.Eng., PMP., Chair and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Signed by: Wendy Krkosek C70B2696701442F...
Wendy Krkosek, P.Eng., Acting Director, Environment, Health & Safety

APPROVED: Signed by: Kenda MacKenzie 0C084AC815794F6...
Kenda MacKenzie, P.Eng., CEO & General Manager

DATE: January 22, 2025

SUBJECT: **Drinking Water Fluoridation at Halifax Water**

ORIGIN

The Halifax Water Board of Commissioners workshop on Fluoridation in Drinking Water (January 7, 2025) and the Environment Health and Safety Committee meetings (November 27, 2024, and January 16, 2025).

BACKGROUND

Like numerous other utilities across North America, fluoridation began in the 1950's at Halifax Water at the encouragement of the public health office. Halifax Water fluoridates water in the J.D. Kline Water Supply Plant (JDKWSP) and Lake Major Water Supply Plant (LMWSP). Fluoride is not added to any of Halifax Water's small systems.

In Nova Scotia, Fluoridation practice is regulated by Nova Scotia Environment and Climate Change (NSECC) through operating approvals and in keeping with the Guidelines for Canadian Drinking Water Quality published by Health Canada, which establishes the maximum acceptable concentration (MAC) in drinking water of 1.5 mg/L. Health Canada's recommended minimum concentration of fluoride in drinking water to provide optimal dental health benefits is 0.7 mg/L. The addition of fluoride is not a regulatory requirement, or mandatory, only the MAC of 1.5 mg/L is regulated by NSECC, meaning that drinking water providers can choose to fluoridate at levels up to 1.5 mg/L.

Halifax Water fluoridates based on recommendations from the Board of Commissioners as well as the Medical Office of Health (MOH). In 2014, the Halifax Water Board of Commissioners endorsed the addition of Fluoride for the LMWSP and JDKWSP (Attachment 1). This decision included support from the IWK, the Nova Scotia Dental Association and the Dalhousie University Faculty of Dentistry. Halifax Water fluoridates at the optimal concentration for dental health benefits (0.7 mg/L).

Fluoridation was paused temporarily at the JDKWSP in 2021 and again in 2023, and at the LMWSP in 2020. This was based on operational decisions due to independent equipment and maintenance issues on non-redundant systems at both water supply plants that had to be repaired or replaced. Halifax Water communicated all changes to fluoridation along with explanations, to NSECC as per requirements in the Approval to Operate as is done with any other change to the treatment process. Generally, NSECC directly engages public health on issues reported that may impact public health. In October 2024, through discussions with the Medical Officer of Health (MOH), it became apparent that public health representatives were unaware of reported changes to fluoridation at the JDKWSP and LMWSP. Halifax Water immediately engaged in fluoridation discussions with the MOH team and the Board of Commissioners. Fluoridation was resumed at the JDKWSP in December 2024 once repairs were complete and the system was recommissioned, and staff were properly trained in its use and handing. Fluoridation at the LMWSP is still interrupted due to the complexity of reinstatement.
The goal of this information report is to provide the Halifax Water Board of Commissioners with:

- An understanding of the regulatory context around fluoridation
- An update on fluoridation status at the JDKWSP and the LMWSP, including timelines on recent changes at each facility.
- Options for potential fluoride reinstatement, and
- Information to guide decisions on fluoride reinstatement.

DISCUSSION

Regulatory Context

According to Health Canada and other public health agencies, water fluoridation can reduce tooth decay in a community by providing frequent and consistent contact with low levels of fluoride. In 2010 Health Canada completed its review of the health risks associated with fluoride in drinking water. This review assessed all identified human health risks, considering new studies and approaches. Based on this review, Health Canada's Federal-Provincial-Territorial Committee on Drinking Water has established the guideline for fluoride in drinking water as a Maximum Acceptable Concentration (MAC) of 1.5 mg/L.

Although the MAC for fluoride in drinking water is 1.5 mg/L, the optimal concentration of fluoride in drinking water for dental health has been determined by Health Canada to be 0.7 mg/L for communities who wish to fluoridate, which is well below the MAC. This recommended optimal level of fluoride in drinking water takes into consideration all sources of exposure to fluoride, including foods and dental products. This concentration is Halifax Water's treatment objective when fluoridating water supplies.

Health Canada routinely reviews existing guidelines and develops new guidelines where appropriate for chemical and physical properties of drinking water. Health Canada is currently reviewing the Guidelines for Canadian Drinking Water Quality for fluoride.

Halifax Water is regulated by NSECC who require that the microbiological, physical, and chemical characteristics of a public drinking water supply do not exceed the MAC for substances listed in the most

recent version of Health Canada's Guidelines for Canadian Drinking Water Quality, as amended from time to time. The addition of fluoride is not a regulatory requirement, or mandatory in Nova Scotia. Fluoridation in Nova Scotia is regulated by NSECC through operating approvals for the MAC listed in the Guidelines for Canadian Drinking Water Quality published by Health Canada.

As described by NSECC: "*the fluoridation of drinking water supplies is a decision that is made by each municipality, in collaboration with the province. The decision may also be taken in consultation with residents. For communities wishing to fluoridate their water supply, the optimal concentration of fluoride in drinking water to promote dental health has been determined to be 0.7 mg/L. Health Canada has established the guideline for fluoride in drinking water as a MAC of 1.5 mg/L. Water containing fluoride at, or below, this MAC does not pose a risk to human health.*" (NSECC, n.d.)

Per NSECC Guidelines for Monitoring Public Drinking Water Supplies (Section 6.1 General Chemical and Physical Water Quality Parameters), the owner shall monitor for general chemical and physical water quality, for chemical and physical parameters with recommended limits in the Guidelines for Canadian Drinking Water Quality, including fluoride, with an MAC of 1.5 mg/L. The Guidelines also state that if a municipal water utility fluoridates their water, the owner shall monitor daily for fluoride concentrations at a location where the water enters the distribution system. An owner shall record fluoride measurements daily in a uniform manner and make the results available to NSECC upon request. Only measurements that exceed the MAC would trigger notification to NSECC, but Daily fluoride readings when fluoridating are included in Halifax Water's annual report to NSECC.

Fluoridation at Halifax Water

Like numerous other utilities across North America, fluoridation began in the 1950's at Halifax Water at the encouragement of the public health office. Halifax Water fluoridates water in the JDKWSP (Pockwock) and LMWSP systems (Figure 1). Fluoride is not added to any of the small systems including Bennery Lake, Five Islands, Silver Sands, Middle Musquodoboit, and Bomont water supply plants. There are times when some small systems obtain trucked water from either JDKWP or LMWSP in which case they would have a fluoridated water supply at those times.

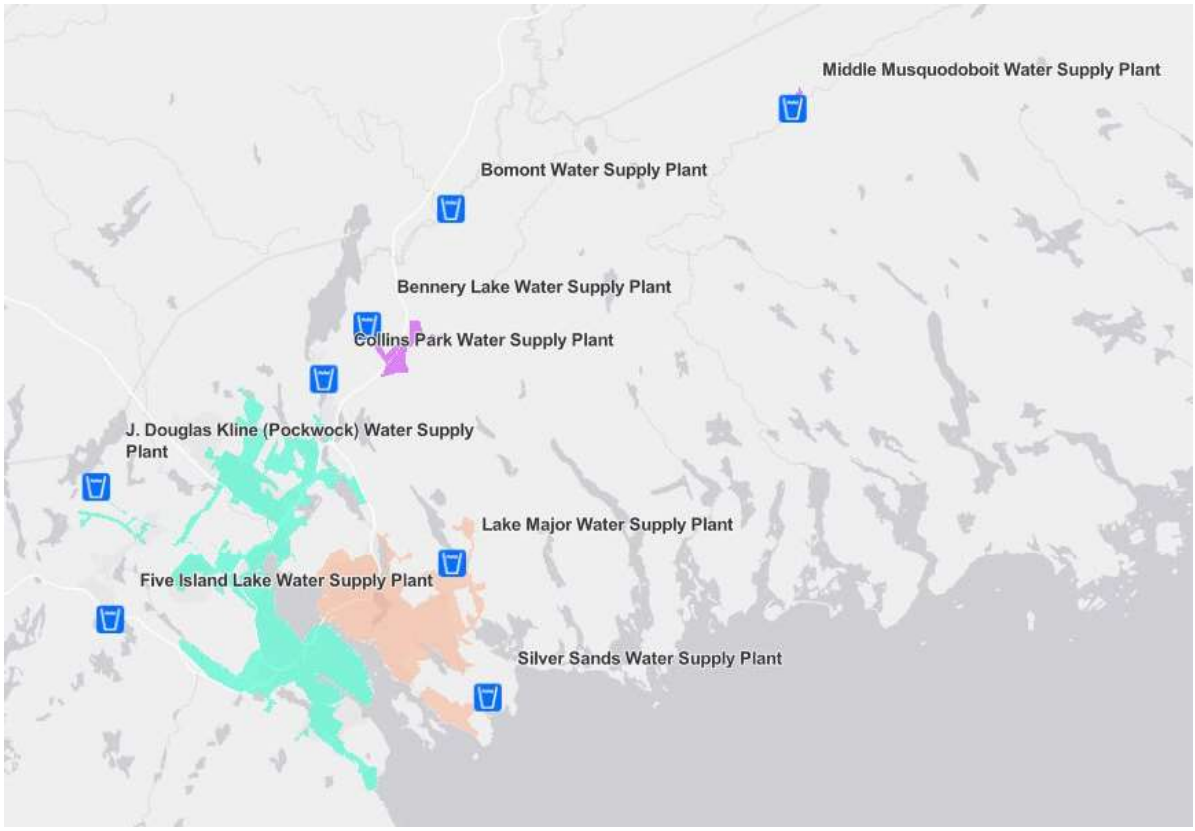


Figure 1. Map of Halifax Water's Water Supply Plants. Areas shaded green and orange represent areas serviced by the JDKWSP and LMWSP, respectively, which are the facilities that have fluoridation.

The fluoridation product Halifax Water uses, hydrofluorosilicic acid (HFS), in the drinking water system must meet the American Water Works Association standards, and National Sanitation Foundation (NSF)/American National Standards Institute (ANSI) Standard 60, which is a standard for additives to drinking water.

The addition of fluoride is not a requirement in Halifax Water Approvals to Operate, However, Halifax Water reports all changes in drinking water treatment, including fluoridation, to the NSECC when they occur, as required by its Approval to Operate permit. As fluoridation is not a regulatory requirement, Halifax Water does not have redundant fluoridation systems within the facilities, so when there is a maintenance or operational issue, the system must be shut down until the issue can be resolved, and the system recommissioned.

The decision to add fluoride at the JDKWSP and LMWSP was most recently revisited in 2014. At that time, the Halifax Water Board of Commissioners endorsed fluoridation based on support from the IWK, the Nova Scotia Dental Association, and the Dalhousie University Faculty of Dentistry. Most recently, fluoridation was interrupted from Summer 2021 until Summer 2022 and again from Spring 2023 until late fall 2024 at the JDKWSP, and since Spring 2020 at the LMWSP. These interruptions were based on

operational decisions due to independent equipment issues and maintenance issues on non-redundant systems at both water supply plants that had to be repaired or replaced.

Halifax Water communicated all changes to fluoridation along with explanations, to NSECC as per requirements in the Approval to Operate as we do with any other change to the treatment process. Halifax Water looks to agencies like NSECC and the MOH for direction on public notifications regarding water quality. Halifax Water communicates water quality issues and changes to treatment to NSECC. Generally, NSECC then engages with the MOH on changes or issues with water quality that may have a public health impact, either through an Environmental Health Consultant within ECC or directly. In October 2024, through discussions with the MOH, it became apparent that public health representatives were unaware of reported changes to fluoridation at the JDKWSP and LMWSP. Halifax Water and the MOH team immediately started conversations on this issue and are working to strengthen and clearly define communication pathways moving forward.

Fluoridation at the JDKWSP

Since August 2021, the fluoridation system at the JDKWSP has experienced intermittent leaks. Without proper safety precautions, fluoride can be dangerous to store and use, and with a lack of redundancy in fluoridation systems, the system is taken offline for repairs when needed, which can take days to months or even years depending on the scale of the issue. Most recently, leaks led to the system being taken offline in May 2023 for repairs. Additional leaks were found in September 2024, which delayed the process of resuming fluoridation. All leaks were fixed, the system was recommissioned, and Halifax Water resumed fluoridation at the JDKWSP as of December 12th, 2024. Table 1 below provides a summary of fluoridation timelines at the JDKWSP.

Table 1. Timeline of changes to fluoridation at the JDKWSP.

Date	Action	Description
August 2021	Fluoridation paused until further notice	• Upgrades to the fluoride storage tank as well as an equipment failure required Halifax Water to stop fluoridation until the issue was resolved. • This information was communicated to NSECC via email.
August 2021 to July 2022	Fluoride offline	
July 2022	Fluoridation resumed	• Fluoride addition resumed and changes were communicated to NSECC via email.
July 2022 to May 2023	Fluoride online	
May 2023	Fluoridation paused until further notice	• A leak occurred in the fluoride system. Fluoridation was once again paused until an investigation was completed of the fluoride system. This was communicated to NSECC via email.
September 2024	Fluoride remains offline	• Additional leaks were identified by Halifax Water staff, delaying the process of resuming fluoridation at the JDKWSP.
September to December 2024	Fluoride remains offline	• Work continues to repair leaks, verify equipment is operational through testing, and staff training.
December 2024	Fluoride online	

Fluoridation at the LMWSP

The interruption of fluoridation at Lake Major was an operational decision to address aging infrastructure and safety of the delivery system. In 2019, through asset renewal, the existing aluminum sulfate (alum) and fluoride chemical storage tanks at the LMWSP were slated for replacement since they were originally installed when the plant was constructed in 1998. Through this chemical storage upgrade project, a third alum tank was also requested to be added within the containment area in the space provided. At the time, the basis for an additional alum tank was primarily a function of plant capacity requirements, changes in water quality and subsequent alum consumption (Figure 2), combined with shipper/supplier arrangements. The 3rd alum tank would allow for larger bulk deliveries and reduce overall unit cost of chemical supply. Later that year, a tank inspection revealed nearly 30 years of remaining life on the tanks but noted stress on a flange on the fluoride tank. Therefore, it was decided to not proceed with tank replacement, and to only install the third alum tank adjacent to the existing tanks. During this period fluoridation was online.

In 2020, Halifax Water decided to revisit replacing the fluoride tank since an investigation on this tank showed that the stressed flange had cracked. As a result, fluoridation was paused at the LMWSP. As part of the fluoride tank replacement, Halifax Water reviewed alternative chemical options for providing fluoridation. The study indicated that hydrofluorosilicic acid (HFS), the chemical used since Lake Major was commissioned, was most suitable based on operational, health and safety, and capital cost considerations. The existing fluoride tank was decommissioned in December 2020.

The design of the replacement fluoride tank progressed from 2020 through to 2023. During this time there were project delays resulting from COVID restrictions and changes in project management where the fluoride tank replacement project was merged with other projects that required similar engineering work in order to reduce contracting and procurement efforts and costs. Before the design could be completed, record-setting rainfall events caused significant changes in lake water quality during Summer 2023. These changes resulted in nearly doubling the alum dose compared to 2022 levels (Figure 2) to provide sufficient treatment to meet treatment requirements and compliance obligations. This put a strain on the storage capacity of alum at the LMWSP which poses a significant risk to the treatment process. During that period, alum was being delivered every 2.5 days. This provides very little buffer room in the event of further water quality changes or supply chain disruptions.

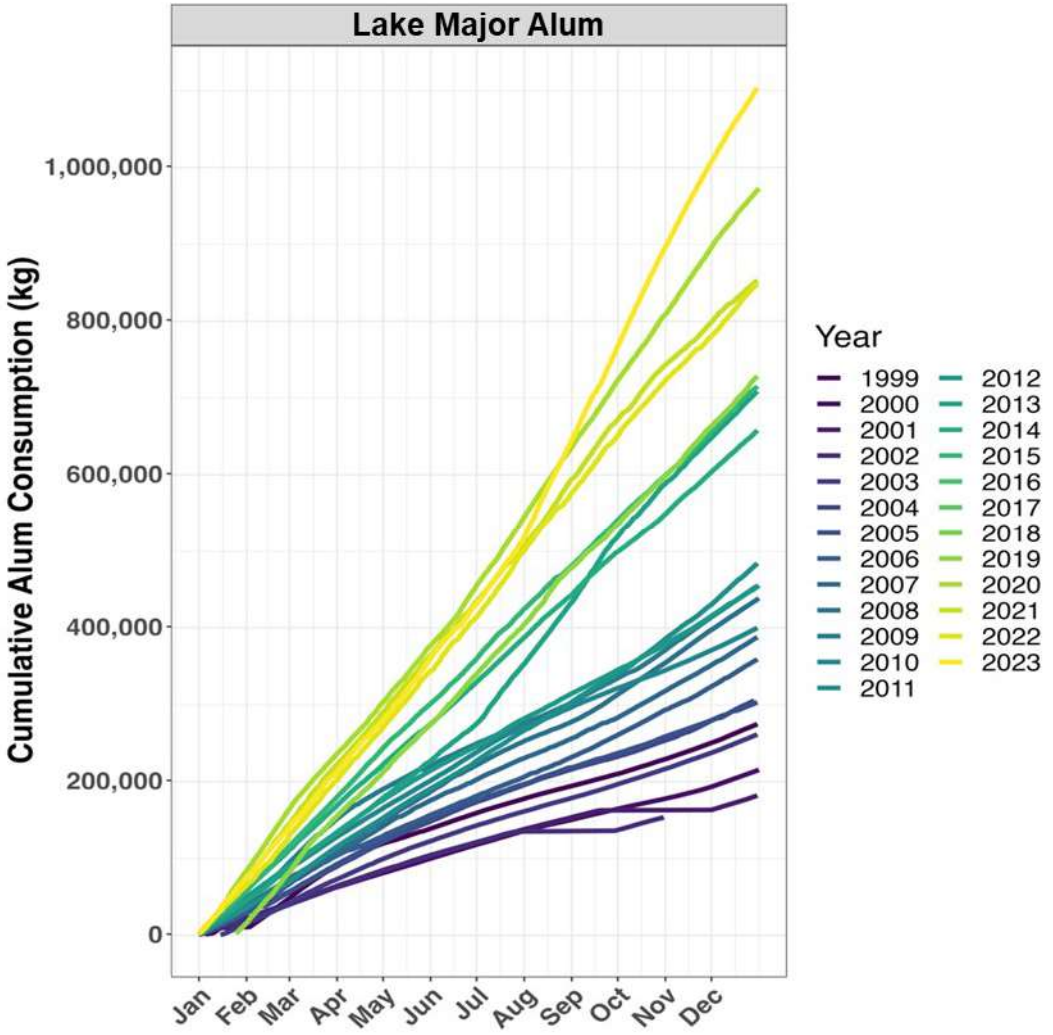


Figure 2. Historical cumulative alum consumption at the LMWSP.

At the time, the need for additional alum storage at the Lake Major facility was deemed a priority due to operational risk of non-compliance of finished water quality, and therefore the project to replace the fluoride tank was repurposed to add a fourth alum tank to ensure operational resilience. There is no room for a fourth tank adjacent to the three existing tanks. This means that the fourth alum tank would take the space allocated for the fluoride tank. This project has gone through the design phase, but the tank has not yet been installed.

As a result, there is now a space constraint at the supply plant as additional room is needed to accommodate more chemical storage tanks to ensure an uninterrupted supply of the alum required in the treatment process, in addition to the replacement fluoride tank and associated equipment. All four alum and the replacement fluoride tanks cannot be added within the existing footprint for chemical storage

due to space limitations at this facility, and the need for fluoride to be isolated from other chemicals. Table 2 below provides a summary of fluoridation timelines at the LMWSP.

Table 2. Timeline of changes to fluoridation at the LMWSP.

Date	Action	Description
2019	Fluoridation online	• Alum (2x) and fluoride (1x) tanks at Lake Major are vintage to facility, project initiated to investigate replacement requirements. • Water quality changes also require addition of a third alum tank • Existing tanks are inspected; 26 years remaining on alum tanks and 30 years on fluoride tank, however flange on fluoride tank shows stress.
February 2020	Fluoridation online	• Investigation determined flange on fluoride tank was cracked and integrity was jeopardized, Halifax Water decides to revisit fluoride tank replacement.
April to June 2020	Fluoridation paused until further notice	• Roof leak at facility caused some equipment damage and fluoride was turned off. Halifax Water makes operational decision to keep fluoride offline until tank is replaced. This information was communicated to NSECC via email.
June to December 2020	Fluoride remains offline	• Halifax water begins engineering work with consultant to decommission and remove fluoride tank and investigates other fluoridation chemicals that may have less occupational health and safety concerns, including sodium fluoride (NaF). • Halifax Water decides to continue with HFS instead if switching to NaF due to high capital cost and increased labour. • Halifax Water proceeds with engineering work for design of fluoride tank replacement. • Existing fluoride tank and associated equipment decommissioned.

Date	Action	Description
2021	Fluoride remains offline	• 90% drawings for fluoride tank replacement submitted for review. • COVID-19 restrictions in NS cause work suspensions and delay progress. • Fluoride tank replacement project merged with dedicated service water pumping project due to similar work (piping, valves, instrumentation) to reduce efforts for procurement and contracting.
2022	Fluoride remains offline	• Detailed design for fluoride tank replacement and dedicated service water project completed and prepared for tender.
2023	Fluoride remains offline	• Heavy rainfall and flood events cause significant changes to source water quality in Lake Major. Alum dosing nearly doubled to maintain finished water compliance and operational resilience. This put a strain on the storage capacity of alum. • Project direction changes from replacing fluoride tank to adding a 4th alum tank due to lake water quality changes and need for additional alum capacity to manage operational risk. Alum tank was deemed a priority over fluoride since alum was required to meet finished water regulatory requirements. • NSECC notified of this decision.
2024	Fluoride remains offline	• Raw water quality returns to normal in Summer. • Service water and alum tank upgrade project tendered, contract signed. • Halifax Water staff begin discussions with Nova Scotia Medical Office of Health on fluoridation status. • Staff discuss options to resume fluoridation.

Options for Reinstating Fluoridation at Lake Major

Halifax Water is assessing the options for reinstating fluoride while minimizing operational risk. Based on a preliminary analysis, there are three options with varying timelines, cost, and redundancy that have been identified for potential fluoride reinstatement as described below. Additional options may be determined as Halifax Water continues to discuss fluoride reinstatement in more detail. A summary of the options based on preliminary analysis is provided in Table 3 below. It should be noted that an in-depth engineering analysis on Option 2 is the next step to provide more accurate information on cost and timelines. The column on fluoride redundancy provides an assessment of whether it would be possible to include redundant fluoridation systems that would reduce the likelihood of fluoridation interruption in the future.

Table 3. Preliminary overview of options for reinstatement of Fluoride at the Lake Major WSP.

Options		Comments	Timeline	Approximate Cost	Fluoride Redundancy	Alum Redundancy
1	Pivot ongoing alum tank installation	Ongoing alum tank installation would be reconfigured for fluoride. As a result, this option creates risk in terms of operational resiliency and compliance during adverse raw water quality conditions.	~ 1 Year	< $500 K	No	No
2	Retrofit existing chemical storage area for orthophosphate and move orthophosphate to different part of the facility	Existing room for corrosion control (orthophosphate) chemicals would be reconfigured for fluoride, with orthophosphate being moved to a different location in the building, or in an external structure. This option allows for proceeding with the ongoing extra alum tank installation, reducing risk for non-compliance.	~ 2 Years	~ $1 M for fluoride retrofit, in addition to cost of extra alum tank from Option 1	Yes	Yes
3	Implement Fluoride as part of long-term upgrades	Fluoride would be incorporated into major long term capital upgrades at the facility through the Water Supply Enhancement Program.	>5-10 Years	~ $500 K	Yes	Yes

Option 1: Pivot ongoing alum tank installation

As described previously, Halifax Water has continued to plan for replacement of the fluoride tank. Significant changes to water quality in Summer 2023 resulted in the need for additional alum storage at the LMWSP and was deemed a priority since these impacts regulatory compliance and operational resiliency. Therefore, the project to replace the fluoride tank was repurposed to add a fourth alum tank. This project has gone through the design phase, but the tank has not yet been installed.

There is a space constraint as additional room is needed to accommodate more chemical storage tanks to ensure an uninterrupted supply of the alum required in the treatment process, as well as to reinstate fluoridation. The fourth alum tank and the replacement fluoride tank cannot be added within the existing footprint in this location of the facility due to space limitations and the need for fluoride to be isolated from other chemicals.

The installation of the fourth alum tank could be pivoted, and a replacement fluoride tank could be installed in its place (the location of the original fluoride tank that was previously decommissioned). However, this option would remove the ability to have more alum storage onsite and would increase risk for non-compliance in the event there are future water quality changes such as those experienced during Summer 2023. During that period, alum was being delivered every 2.5 days. This provides very little buffer room in the event of weather events or supply chain disruptions.

This is not the preferred option from an Enterprise Risk Management (ERM) perspective due to operational resilience and compliance risks. Further, this option does not provide any redundancy in the ability to add fluoride, and therefore fluoridation would likely be paused in the future if there were any maintenance requirements or repairs, which could range in time from weeks to years depending on the complexity.

The timeline to implementation for this option is approximately 1-year, and detailed design is complete. The cost to implementation would be <$500 K.

Option 2: Retrofit existing orthophosphate chemical storage area

Another option to implement fluoridation at the Lake Major WSP would be to move some of the existing chemical storage to make a designated space for fluoride infrastructure. Due to the hazardous nature of the fluoridation product (HFS), it should be stored in a designated area with adequate containment and ventilation. Fluoride is usually stored in its own room so that plant staff do not have more exposure to HFS than necessary.

Currently, the room where the corrosion control inhibitor, orthophosphate, is stored at the LMWSP is larger than necessary for the existing infrastructure. Discussions with a consultant identified that the orthophosphate tank and associated equipment could be moved to a different location in the existing building, and the orthophosphate room could be reconfigured for fluoride. This option would also allow for redundancy in the fluoride equipment if level of service is deemed to require redundancy, which would provide more resiliency toward continuously fluoridating in the future. With some minor modifications, the orthophosphate could be moved to the generator room, or it could be stored in an external structure.

Due to the nature of the chemicals, storing orthophosphate exterior to the main building would be less of a risk than storing fluoride externally.

This option would also allow Halifax Water to continue to proceed with the installation of the new alum tank described in Option 1, which would provide operational resilience and reduce risk of non-compliance during challenging raw water quality events. This is a preferred option from an ERM perspective to mitigate operational/resilience and compliance risks.

Based on preliminary discussions with a consultant, the timeline to implementation for this option is approximately 2 years. This option includes the ability to have redundancy for both fluoride and alum. The cost to implementation is estimated at approximately $1M for the fluoride system installation and moving the orthophosphate system. An in-depth engineering analysis on Option 2 is the next step to provide more accurate information on cost and timelines.

Option 3: Implement Fluoride as part of long-term upgrades

A third option for the reinstatement of fluoride at the LMWSP would be through inclusion of the system into larger upgrades at the facility through the Water Supply Enhancement Program. These upgrades are planned through a much larger long term capital project that would see significant updates to the intake and the entire treatment process. These upgrades are expected to occur over the next decade or more, and upgrades to the fluoride equipment as well as implementing redundancy in the fluoride infrastructure could be tied into this large capital project.

The timeline to implementation for this option is approximately 5 to 10-years more. The cost to implementation is estimated at approximately $500 K which would be tied to the larger capital project.

It should be noted that if option 2 were selected and the larger capital upgrades changed the configuration of the plant and chemical storage and delivery systems, the fluoride system may need to be moved to a new location at that time at an additional cost.

Considerations and Future Direction for Fluoridation

Fluoridation was last revisited by the Board of Commissioners in 2014, and a motion was passed to endorse the continuation of the practice of drinking water fluoridation. When fluoridation was endorsed in 2014, there was no establishment of levels of service and notification requirements, and since then Halifax Water continued to follow past practice, making operational decisions to interrupt fluoridation for maintenance and asset renewal purposed. All changes to fluoridation have been communicated to NSECC. Given that fluoridation was discussed over a decade ago at the Board level, Halifax Water is proposing to revisit the Board's endorsement on whether to fluoridate or not and will be presenting a Recommendation report at the March 2025 meeting. Table 4 below outlines some considerations to guide the decisions on fluoride reinstatement. If endorsement of fluoridation continues, both level of service and notification requirements will need to be clearly delineated.

Table 4. Considerations for continued fluoridation at Halifax Water.

Consideration	Comments
Fluoridation is not a regulatory requirement and is not mandated in Nova Scotia.	• Drinking water providers fluoridate based on recommendation and encouragement from public health professionals and municipalities. • Halifax Water customers currently pay for drinking water fluoridation, but not all customers receive fluoride. • If fluoridation were mandated, discussions on funding are necessary.
There are public health benefits to community water Fluoridation.	• Refer to information report prepared by MOH (Attachment 2).
Drinking water fluoridation is a cost-effective and equitable way to deliver fluoride to communities.	• The operational cost for fluoridation is $0.30 to $0.40 per Halifax Water customer annually plus any capital costs for maintenance and asset renewal. • Per capita annual benefit of water fluoridation ranges from $5.49 to $93.193 per dollar invested. Refer to information report prepared by MOH (Attachment 2).
There has been a recent shift in some communities away from Fluoridation.	• USEPA court case and recent events in the US have resulted in some communities ceasing fluoridation. • Montreal fluoridated since the 1950's but ceased fluoridation in 2024 after receiving a citizen petition that began in 2020. • New Glasgow fluoridated since the 1970's and announced that it would stop adding fluoride in 2024. • Studies indicate that fluoride cessation has had a negative impact on children's dental health (refer to information report prepared by MOH attached).
There is a split in community perceptions on Fluoridation.	• Until 2024, most Halifax Water customer tickets were inquiries about ceasing fluoridation.

	• In 2024, Halifax Water received 40 customer tickets on fluoridation, compared to <5 tickets in the previous 4 years. Since November 2024 there has been a split in opinion.
Historically Halifax Water only fluoridated the two large water supplies (JDKWSP and LMWSP).	• The cost of fluoridation is spread across all Halifax Water customers, but not all customers receive fluoridated water. • Capital cost to implement Fluoridation in all other Halifax Water systems would be significant and imposes operational challenges for smaller systems.
Depending on the level of service required for Fluoridation, redundancy in Fluoridation systems may be required.	• When there are issues with the fluoridation system it is shut down until repairs can be made. This can range from days to months and even years depending on the scale of the issue. • If it is determined that the level of service is that there are no interruptions in fluoridation, implementing redundancy in fluoridation would be required which would add costs to fluoridation systems.
Capital costs required to reinstate Fluoride at the LMWSP may require application to the UARB.	• Based on a preliminary assessment, some options for fluoride reinstatement at the LMWSP (described below) are over $1M and would require UARB approval. • The UARB process can take months and could impact the timing of reinstatement.
The liquid chemical used at Halifax Water for fluoridation is hazardous and poses occupational health and safety risks.	• HFS is a hazardous product that can release toxic gases and is highly corrosive, with acute health impacts. There are frequent leaks in fluoride storage and delivery equipment due to the corrosive nature of HFS, causing interruptions in fluoridation. • Large volumes are stored onsite at the facilities due to the low fluoride concentration in liquid form. • Due to the risk of using HFS, Halifax Water previously did an assessment of alternative fluoridation chemicals. Halifax Water decided to continue with HFS instead if switching to NAF due to high capital cost and increased labor requirements for operations.

ATTACHMENT

Attachment 1 – 2014 Board Report

Attachment 2 Fluoridation Information Package provided by the Medical Officer of Health

Halifax Water
Halifax Regional Water Commission

ITEM # 3A
HRWC Board
April 24, 2014

TO: Colleen Purcell, CA, Chair, and Members of the Halifax Regional Water Commission Board

SUBMITTED BY: Reid Campbell, P. Eng., Director of Water Services

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

DATE: April 17, 2014

SUBJECT: **Fluoridation of Drinking Water**

ORIGIN

Information report to the Halifax Water Board, dated March 27, 2014, on drinking water fluoridation practice.

RECOMMENDATION

It is recommended that the Halifax Water Board endorse the continuation of the practice of drinking water fluoridation, consistent with the above referenced submission to the Halifax Water Board, the Guidelines for Canadian Drinking Water Quality, and the position statement of the Nova Scotia Department of Health.

BACKGROUND

The issue of fluoridation of drinking water is one that is of concern to a segment of Halifax Water's customers and, therefore, generates a number of customer inquiries. Common customer concerns presented to Halifax Water relate to freedom of choice, safety and perceived lack of benefits of water fluoridation. There are also several well organized anti-fluoridation groups, all of which can cite authorities who are speaking out against fluoridation of drinking water. Conversely, public health authorities are unanimous in support of fluoridation of drinking water, as was indicated by the recent submission from the IWK, Dalhousie Faculty of Dentistry and the Nova Scotia Dental Association to the Halifax Water Board (Attachment 1).

In recent years, there has been an increase in fluoride inquiries in response to a number of municipal level drinking water fluoridation debates across the country and local publications and petitions by anti-

fluoridation supporters. To provide a context for these complaints, approximately 260 customer water quality complaints were recorded in 2013. Of the 260 complaints, 130 were related to geosmin, 50 were related to lead and 27 were attributed to fluoride.

Considering the level of concern among a segment of Halifax Water customers, the interest by public health authorities in continuing this practice, and public debates in other communities, it is appropriate that the Halifax Water Board consider its position on fluoridation at this time.

DISCUSSION

The addition of fluoride to drinking water has been found, by Health Canada, The Centers for Disease Control, the World Health Organization and other public health agencies, to be both a safe and effective public health measure. There is a scientific consensus in support of the addition of fluoride to drinking water for preventing tooth decay. Drinking water fluoridation is widely viewed as the most cost effective and equitable way to provide fluoride protection to a large number of people, despite the availability of other forms of fluoride such as toothpaste, mouth rinses, or professional fluoride treatment. The benefits of water fluoridation are available to everyone in the community and ensure access among vulnerable populations, such as those with limited socioeconomic resources who may not otherwise have access to preventive measures.

Halifax Water fluoridates water in the Pockwock (Halifax, Bedford, Sackville, Timberlea) and Lake Major (Dartmouth, Cole Harbour, Eastern Passage, North Preston) systems. Like numerous other utilities across North America, fluoride addition began in these systems in the 1950's at the encouragement of the Public Health Officer for the public health benefit of preventing and reducing dental caries. Halifax Water continues to practice drinking water fluoridation with full support from the Medical Officer of Health and Nova Scotia Environment.

Fluoridation of drinking water generates safety concerns by utility customers across North America. Halifax Water relies on the Guidelines for Canadian Drinking Water Quality (GCDWQ) as the authority to determine what is or is not safe for drinking water. Fluoridation practice is regulated by Nova Scotia Environment through operating approvals and the GCDWQ, published by Health Canada. Guideline development is supported by a diverse staff of public health professionals consisting of medical doctors, dentists and experts in epidemiology and toxicology. Health Canada considers all possible means of exposure (not just through drinking water) and after a public comment period, sets a limit for safe exposure through drinking water. This is a non-biased process that attempts to reach a decision while considering all available scientific evidence.

Health Canada, along with several other national public health agencies, has recently reviewed the issue of fluoride in drinking water and continues to support drinking water fluoridation as a safe and cost effective public health measure. The most recent guideline on fluoride reaffirmed a maximum acceptable concentration (MAC) of 1.5 mg/L and clearly states that the weight of evidence from all currently available studies does not support a link between exposure to fluoride in drinking water at 1.5 mg/L and any adverse health effects. In addition, the recommended concentration of fluoride in

drinking water to provide optimal dental health benefits was determined to be 0.7 mg/L, which is Halifax Water's treatment objective.

Halifax Water uses hydrofluosilicic acid, for drinking water fluoridation as part of the treatment process. The addition of fluoride costs approximately $150,000 annually, which is $0.42/person or $1.80/service connection. The fluoride we use in the drinking water system must meet American Water Works Association standards and more importantly National Sanitation Foundation (NSF)/ American National Standards Institute (ANSI) Standard 60, which is a health standard for additives to drinking water. The standard requires a toxicology review to determine that the product is safe at its maximum use level. Fluoride addition during the water treatment process is monitored carefully by water treatment plant operators, including daily quality control protocols to verify that the desired dose is being maintained.

Halifax Water responds to all water quality inquiries, including fluoride inquiries, received from concerned customers. All written inquiries are responded to in writing (a typical response letter is included (Attachment 2). In addition, Halifax Water also addresses specific customer fluoridation concerns or questions. Halifax Water also regularly publishes information pertaining to the fluoridation of drinking water in communications such as WaterTalk, mailouts and yearly publications such as the Annual Report and Stewardship Report. In fact, Halifax Water's upcoming Stewardship Report will contain an article titled "Drinking Water Fluoridation: You Ask, We Answer!" which addresses common customer concerns regarding drinking water fluoridation and is intended to provide accurate information on fluoridation practices for Halifax Water customers (Attachment 3).

Halifax Water communicates frequently with the Medical Officer of Health regarding common public health concerns related to drinking water quality, including fluoride. Persistent public health concerns related to drinking water quality are generally passed along to Environmental Health Consultants with the Nova Scotia Department of Health and Wellness and, if required, the Medical Officer of Health is engaged. The Medical Officer of Health has consistently stated that the addition of fluoride to drinking water has been found to be both a safe and effective public health measure. Nova Scotia Department of Health Protection and Promotion issued a position statement on drinking water fluoridation that reaffirmed the fluoridation of municipal drinking water as effective for the prevention of dental caries and that fluoridation at optimal levels does not cause adverse health effects.

Commissioners may be aware that Councillor Jennifer Watts recently identified two articles which implied negative health effects from fluoride in drinking water, and asked Halifax Water staff to consider anything relevant to current fluoridation practice in these articles. The prime article is an article in *The Lancet.* This article is not new research but is a discussion on substances that the authors have identified as potential neurotoxins, including fluoride, and the need for a framework in society to deal with these substances. The article references a study done in 2006 by the authors. Their conclusions related to fluoride were not based on original research but on a review of research done in China in 2006. The other article referenced by the Councillor is from a publication called *Natural News* which summarizes the same study contained in *The Lancet.*

What is of relevance to Halifax Water's position is that the referenced work was conducted in 2006, well in advance of Health Canada's most recent review of fluoride in 2010 and as such, the 2006 study

and its supporting research were available to Health Canada for their consideration when the fluoride guideline was last reviewed.

SUMMARY

Drinking water fluoridation is a safe and cost effective public health practice that is supported by all major health authorities in North America. To that end, Halifax Water continues to support the fluoridation of drinking water as a beneficial public health practice for decreasing dental cavities and protecting oral health.

BUDGET IMPLICATIONS

The cost of providing fluoridation in the Pockwock and Lake Major systems is approximately $155,000 per year in treatment chemicals, plus minor additional amounts for system preventative maintenance. All costs are included in current budgets and business plans.

ATTACHMENTS

Attachment 1: Fluoride Information Package
Attachment 2: Halifax Water Typical Fluoride Response

IWK Health Centre

DALHOUSIE UNIVERSITY
Inspiring Minds
Faculty of Dentistry

NSDA
Nova Scotia Dental Association

The IWK Health Centre | Faculty of Dentistry, Dalhousie University | Nova Scotia Dental Association

Fluoride Information Package

February 12, 2014

To Halifax Water Board of Commissioners

Colleen Purcell, CA, Chair	Councillor David Hendsbee, B.Comm
Councillor Russell Walker, Vice Chair	Councillor Barry Dalrymple
Mayor Mike Savage	Don Mason
Richard Butts, HRM CAO	Ken Meech

The Nova Scotia Dental Association, the IWK Health Centre and the Faculty of Dentistry, Dalhousie University are concerned that the oral health benefits of fluoridated public water may be in jeopardy in HRM, following a recent letter written to The Coast magazine by the Safe Water Halifax group. We are writing to you jointly to provide information on the oral health benefits of fluoride and offer to present to Council should there be future consideration of changing the current policy of fluoridating water.

Over the past few years, organized efforts have been made in two other Nova Scotia communities to cease the addition of fluoride to community water systems; in each of these cases, the arguments of dentistry and other health care providers in support of continued water fluoridation have been successful. In the event this becomes an issue raised within HRM in the future, the undersigned believe decision makers should have the best possible information about the oral health benefits of fluoridated drinking water.

Early childhood caries (ECC), is the most common chronic infectious disease of infants and toddlers. Recent studies show that like other areas of Canada there are high levels of this disease in Nova Scotia, particularly in non fluoridated areas. It causes children a great deal of pain and infection , yet is preventable with the assistance of community water fluoridation.

Attached is our Question and Answers document about community water fluoridation. Also included is the Nova Scotia Department of Health & Wellness' Position Statement on Water Fluoridation, as they firmly believe like we do, that fluoridated water is an important means of preventing dental decay – especially in children.

We would be pleased to answer any questions you might have or provide further information should the need arise.

Sincerely,

Dr. Ross Anderson
Chief of Dentistry, IWK Health Centre
Assistant Professor and Division Head, Paediatric Dentistry, Dalhousie University

Dr. Tara Chobotuk
Paediatrician, IWK Health Centre
Department of Paediatrics, Dalhousie University

Dr. Tom Boran
Dean, Faculty of Dentistry, Dalhousie University

Dr. Stuart MacDonald
President
Nova Scotia Dental Association

Spring 2014

Fluoride Health & Safety

Fluoride – is the fluoride used in CWF a drug, a nutrient, or something else?

Fluoridation chemicals are considered treatment additives in the drinking water treatment process.
These chemicals are the source of the mineral nutrient fluoride.
Fluoride is considered a non-essential nutrient beneficial to human health.
Fluorides used in CWF are not considered drugs by Health Canada.
Note: Fluoride in products such as toothpaste and dental rinse are considered drugs under the Food and Drugs Act and are regulated under the Natural Health Products Regulations.

Fluoridation chemicals – are they hazardous waste?

Fluoridation chemicals (i.e. hydrofluorosilic acid) are derived from the fertilizer industry and are considered a hazardous recyclable material.
Fluoridation chemicals certified for use in drinking water are considered treatment additives in the drinking water treatment process and are not classified as hazardous waste in Canada.

Fluoride dose – is the dose of fluoride controlled in CWF?

The concentration of fluoride in drinking water is 0.7mg F/L is based in part on the assumption that most people consume about 1 L of water per day for a daily intake of 0.7 mg F per day. This level is lower than the recommended national level to ensure safety, and significantly lower than the required maximum concentration in America.
Health Canada uses a population-based approach in risk assessment and established guidelines in the sub-population likely to be most affected – young children aged 22-26 months old.
In the recent Canadian Health Measures Survey, Health Canada states there is no data to suggest that exposure to fluoride at typical levels found in drinking water would result in adverse effects for those consuming larger quantities of waters.

Margin of safety – is the margin of safety for CWF sufficient to protect the most sensitive individuals in a community?

Margin of safety is not a concept that is routinely used in the development of the Guidelines for Canadian Drinking Water Quality according to Health Canada.
Skeletal fluorosis, the adverse health effect associated with fluoride, would occur at exposure levels that are greater than 10 times the Canadian optimal concentration for CWF (Health Canada Federal-Provincial-Territorial Committee on Drinking Water (CDW)).

Medical ethics – is it ethical to prescribe a "drug" without informed consent?

Governments and health professionals have a responsibility to make decisions that balance the best possible community health outcomes with individual choices.
Preventing problems before they occur is vital to good health. Adjusting the level of fluoride in drinking water to prevent dental decay can be compared to current practices of adding Vitamin D to milk to maintain healthy bones, folic acid to breakfast cereals to reduce the risk of babies being born with neural tube defects or iodine into salt for thyroid health, and public health measures such as smoking restrictions, compulsory seat belts and immunization.

Evidence base – is evidence supporting CWF of sufficient quality and strength?

The study designs used to evaluate CWF include 'before and after' studies, cross sectional studies, ecological studies, cohort (prospective and retrospective) studies and case-control studies.
Given the nature of CWF, it is not practical to conduct a randomized controlled trial (RCT) to evaluate CWF.

"The Great Fluoridation Gamble" – is enough known about the long term health effects of CWF?
Health Canada recognizes that exposure to fluoride for extended periods of time is linked to dental fluorosis and, at extremely high levels, skeletal fluorosis. However, based on a thorough review of the available relevant scientific literature, Health Canada states that the weight of evidence does not support any other adverse effects. (Canadian Health Measures Survey, http://www.hc-sc.gc.ca/hl-vs/pubs/oral-bucco/fact-fiche-oral-bucco-stat-eng.php)

CWF effect – what is the predominant CWF effect?
Although the predominant benefit of fluoride is post eruptive and topical, CWF does provide a pre-eruption systemic effect as well as post-eruption topical effect, since part of its excretion mechanism is in saliva.

Benefits - are the benefits of CWF presented in a balanced way?
Although the reductions in the prevalence and severity of tooth decay (DMFT, DMFS (adult teeth)) in the population have decreased with time, there has been a notable increase in dmft, dmfs (baby teeth) according to the Centre for Disease Control (2007). A recent study in Canada (CIHI) shows that cavities in baby teeth are the most common reason for day surgery in Canada and that majority of children treated are from non fluoridated communities. The prevention of tooth decay on a single tooth surface at the individual level contributes to significant savings at the population level.

Bottle-fed babies – are bottle-fed babies at risk?
Health Canada states that there is no evidence to support a link between the exposure to infant formula reconstituted with drinking water at the Canadian MAC (1.5 mg F/L) and moderate and severe forms of dental fluorosis in the population.

Children – do dental fluorosis levels indicated that children are overexposed to fluoride?
Although the prevalence of dental fluorosis has increased in the USA since the 1980s, the increases have been in the 'very mild' and 'mild' forms which are of a cosmetic and not a functional nature. The CHMS indicated that so few children have 'moderate' or 'severe' fluorosis that even combined, the prevalence is too low to allow reporting.

Bones – are bones protected from lifelong exposure to fluoride?
Health Canada states that the weight of evidence from all currently available studies does not support a link between exposure to drinking water at 1.5mg/L and any adverse health effects.

Bone cancer – is fluoride ingestion associated with bone cancer?
Health Canada states that the weight of evidence from all currently available studies does not support a link between exposure to drinking water at 1.5mg/L and any adverse health effects.

Preventing tooth decay – are there alternative ways of preventing tooth decay?
Although there are alternatives to CWF, none are as cost effective as CWF.
The local decision to use CWF as a primary preventive measure is a value judgment.

Benefit versus risk of harm – does the benefit of CWF outweigh the risks in 2014?
Communities that do not have CWF tend to have a higher prevalence of tooth decay.
There are however locations without CWF that are reporting caries levels similar to those with CWF.

Environmental health perspective vs Public health perspective – what is the difference between these perspectives of CWF?

An environmental health perspective tries to minimize environmental and chemical risks & focus on protection of all members of the community.

This perspective supports alternative primary prevention measures to CWF.

A public health perspective attempts to provide the greatest good for the greatest number of people & focus on the "average" person.

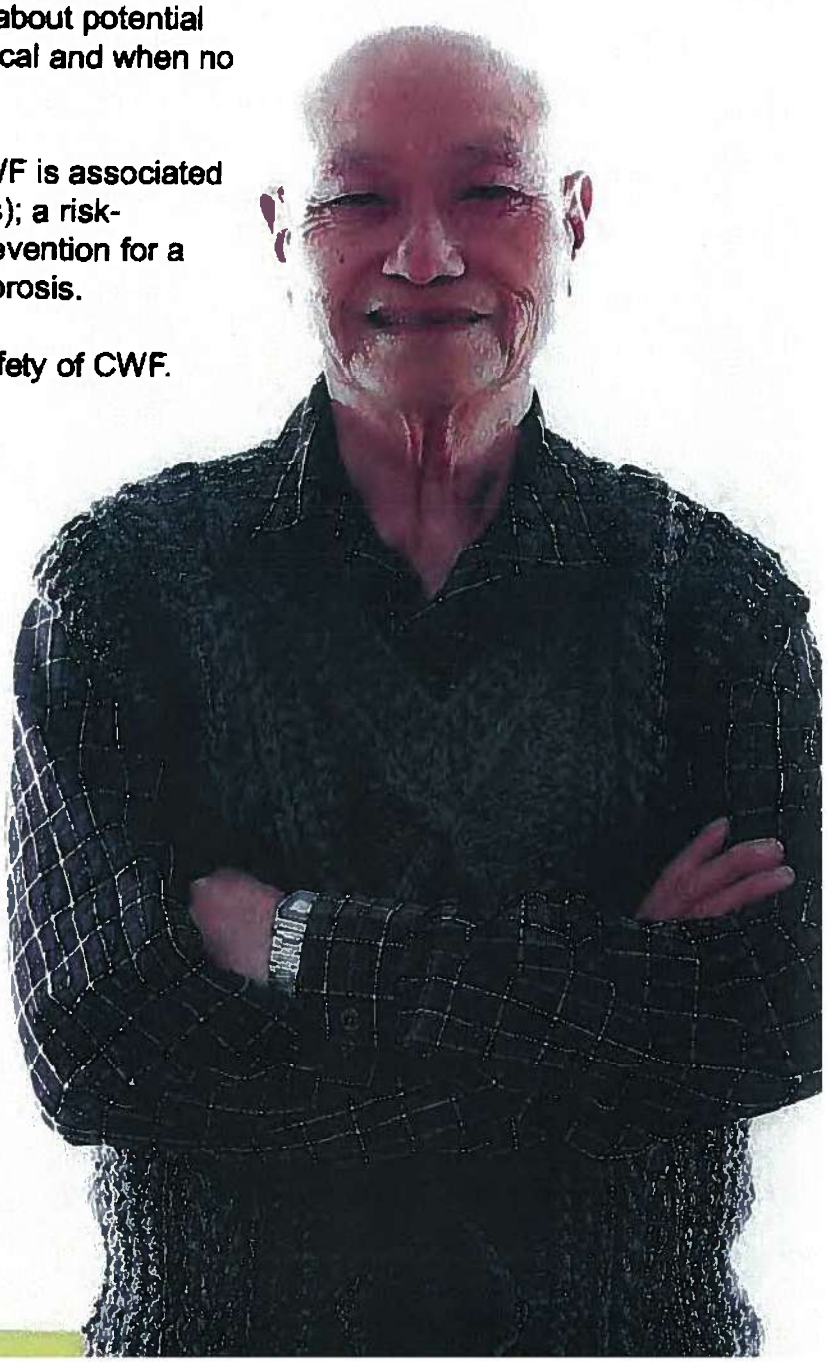
This perspective supports the practice of CWF as a primary prevention measure to reduce the risk of tooth decay in a community.

Precautionary Principle vs Risk- based approach – what is the difference between these approaches to CWF?

A precautionary approach to CWF considers alternative preventive measures with lower risks, or informs patients about potential risks, even when the risks may be only theoretical and when no credible evidence exists to suggest harm.

However, until credible evidence exists that CWF is associated with adverse events (other than dental fluorosis); a risk-based approach views the benefits of cavity prevention for a population as outweighing the risk of dental fluorosis.

The body of scientific evidence supports the safety of CWF.



What do municipalities need to know before embarking on a course of fluoride delivery?

The availability of fluorides from a variety of sources must be taken into account before embarking on a specific course of fluoride delivery to either populations or individual patients. This is particularly important for children whose overall fluoride intake should be taken into consideration to prevent the development of fluorosis. Communities considering water fluoridation are encouraged to review their individual circumstances carefully. Communities should evaluate overall exposure to fluoride giving attention to available data on the dental health of community members, the size of the group not likely exposed to adequate fluoride from other sources, the minimum level of fluoride required to be beneficial, the need for fluoride protection in all sub-segments of the populations while showing compassion for its most vulnerable members, and any other information which would be helpful in making this decision.

Spring 2014

Frequently Asked Questions:

General

What is fluoride?
Fluoride is a mineral found in soil, water (both fresh and salt) and various foods. While not essential to life, fluoride is considered to be a mineral nutrient beneficial to human health in safe doses.

How does fluoride prevent tooth decay?
Fluoride has a positive effect on oral health by making teeth more resistant to decay. Fluoride can also prevent or even reverse tooth decay that has started.

Where do I get the fluoride that prevents tooth decay?
For many Canadians, fluoride is in public drinking water, which provides protection to the entire community. Fluoride toothpastes and rinses are available for purchase, and dentists can provide professional fluoride products such as gels and varnish.

Dental Fluorosis

What is dental fluorosis?
Dental fluorosis is a change in the appearance of teeth. It is caused when higher than optimal amounts of fluoride is ingested in early childhood. In its mildest and most common form, it affects the look of the tooth with small white specks appearing on a child's teeth.

Is dental fluorosis a concern in Canada?
The Canadian Health Measures Survey 2007-2009 found that dental fluorosis is not an issue of concern for the vast majority of children (84%). Some children (16%) have mild forms of fluorosis that often go unnoticed by both the children and their parents.

Community Water Fluoridation

What is water fluoridation?
Water fluoridation is the process of adjusting the level of fluoride in a public drinking water supply to optimize the dental benefits of preventing tooth decay.

Why is fluoride added to the public drinking water if it is available in other ways?
Fluoride is added to public drinking water to protect all members of the community from tooth decay. Community water fluoridation is a safe and effective way of preventing tooth decay at a low cost.

Who watches the fluoride levels in the drinking water?
The Federal-Provincial-Territorial Committee on Drinking Water makes recommendations about the optimal level of fluoride in public drinking water to prevent tooth decay. The recommended level takes into account that Canadians receive fluoride from other sources such as food and beverages.

What does an "optimal" level of water fluoridation mean?
An optimal level of water fluoridation is achieved by adjusting the level of fluoride in the water to find the right balance between the benefit of preventing tooth decay and the risk of developing dental fluorosis.

Are there any health risks associated with water fluoridation?
With the exception of dental fluorosis, scientific studies have not found any credible link between water fluoridation and adverse health effects.

Fluoride Toothpaste

Should I be using fluoridated toothpaste with my child?

For children from birth to 3 years of age, the use of fluoridated toothpaste is determined by the level of risk of tooth decay. Parents should consult a health professional to determine whether their child up to 3 years of age is at risk of developing tooth decay. If such a risk exists, the child's teeth should be brushed by an adult using a minimal amount (a portion the size of a grain of rice) of fluoridated toothpaste. Use of fluoridated toothpaste in a small amount has been determined to achieve a balance between the benefits of fluoride and the risk of developing fluorosis. If the child is not considered to be at risk, the teeth should be brushed by an adult using a toothbrush moistened only with water.

For children from 3 to 6 years of age, only a small amount (a portion the size of a green pea) of fluoridated toothpaste should be used. Children in this age group should be assisted by an adult in brushing their teeth.

Why do young children need to be assisted or supervised with tooth brushing?

Young children tend to swallow toothpaste when they are brushing, which if it becomes a habit over a long period of time, could increase their exposure to fluoride and contribute to dental fluorosis. For this reason, children need to be assisted or supervised with tooth brushing. An adult needs to ensure that an appropriate amount of toothpaste is used, that the child spits out the toothpaste rather than swallows it, and that the teeth are cleaned effectively.

How do I know if my child is getting enough fluoride protection?

Your dentist is able to assess your child's risk of developing tooth decay and advise you of an appropriate level of fluoride protection.

Fluoride and Your Child

Fluoride is a mineral found in soil, water (both fresh and salt) and various foods. It has a positive effect on oral health by making teeth more resistant to decay. Fluoride can also prevent or even reverse tooth decay that has started.

Fluorides are used by communities as a public health measure to adjust the concentration of fluoride in drinking water to an optimum level (community water fluoridation); by individuals in the form of toothpastes, rinses, lozenges, chewable tablets, drops; and by the dental profession in the professional application of gels, foams and varnishes.

The availability of fluorides from a variety of sources must be taken into account before embarking on a specific course of fluoride delivery. This is particularly important for children under the age of 6, where exposure to more fluoride than is required to simply prevent dental caries can cause dental fluorosis. Provided that the total daily intake of fluoride is carefully monitored, fluoride is considered to be a most important health measure in maintaining oral health.

Dentists and other trained health care providers are able to assess your child's risk of developing tooth decay and advise you of an appropriate level of fluoride protection.

NOVA SCOTIA DEPARTMENT OF HEALTH AND WELLNESS

- POSITION STATEMENT ON WATER FLUORIDATION -

The Nova Scotia Department of Health and Wellness supports fluoridation of municipal drinking water supplies in Nova Scotian communities as a safe, effective and economical means of preventing dental caries in all age groups.

Fluorides are found naturally throughout the world. They are present to some extent in all food and water so that all humans ingest some fluoride on a daily basis. In optimal concentrations, fluoride protects the teeth from caries (cavities) without any known harmful effects.

Fluoride may be used by individuals in the form of toothpastes, rinses, etc. or applied professionally in the form of gels, foams or varnishes. Fluoridation of the drinking water supply at minimum levels required for efficacy ensures its benefits are equally available to all, regardless of socioeconomic circumstance.

The fluoridation of drinking water supplies is a well-accepted measure to protect public health and is strongly supported by scientific evidence. It continues to be endorsed by over 90 national and international professional health organizations including Health Canada, the Canadian and American Dental Associations, the Canadian Medical Association, the World Health Organization and the Food and Drug Administration of the United States.

An expert panel, commissioned by Health Canada to review the scientific studies available on fluoride and its possible effects on health made a number of recommendations to Health Canada, including:

- to decrease slightly the amount of fluoride that can be added to municipal drinking water,
- to encourage the availability and use of low-fluoride toothpaste by children, and
- to suggest to makers of infant formula to reduce levels of fluoride in their products

This report was submitted to the federal government in January of 2007, and made public in June, 2008 on Health Canada's website.

The current optimal fluoride concentration for caries prevention is .7 mg/L. Levels should be monitored and adjusted to ensure consistency in concentrations and avoid fluctuations.

The safety and efficacy of water fluoridation has been frequently studied and continues to be supported by current science. Canadian and international studies agree that water that was fluoridated at optimum levels does not cause adverse health effects.

Communities considering water fluoridation should review their individual circumstances, giving attention to the dental health of community members, the likely exposure to adequate fluoride from other sources, and existing natural fluoride levels before making the decision.
Requests for further information may be directed to your Public Health Dental Hygienist or to the provincial Chief Public Health Officer through the Department of Health Promotion and Protection.

Supporting Scientific Studies:

Findings and Recommendations of the Fluoride Expert Panel (January, 2007)
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2008-fluoride-fluorure/index-eng.php

National Health and Medical Research Council of Australia. 1999:
"Water Fluoridation at optimal levels continues to provide significant benefits in the prevention of dental caries for both deciduous (baby) and permanent (adult) teeth. It remains the most effective means of achieving community-wide exposure to the caries preventive effects of fluoride and should remain unchanged."

Oral Health in America: A Report of the Surgeon General. 2000:
"Community Water Fluoridation 'is 'safe and effective in preventing 'dental caries "in 'both children and adults,, Water fluoridation benefits all residents serviced by community water supplies regardless of their social or economic status
http://www.cdc.gov/fluoridation/fact_sheets/sg04.htm

Systematic Review of Water Fluoridation. UK/International study. 2000:
"Fluoridation of drinking water supplies does reduce caries prevalence, both as measured by the portion of children who are caries free and by the mean change in deft/DMFT Score." The deft Score determines the dental caries status for primary teeth decayed.
(d= decayed, e = extracted due to caries, f = filled t = teeth)
http://www.york.ac.uk/inst/crd/pdf/fluorid.pdf

Water Fluoridation. US Department of Health and Human Services Centers for Disease Control and Prevention. 2001
"Fluoride has contributed profoundly to the improved dental health of persons in the United States and other countries. Fluoride is needed regularly throughout life to protect teeth against tooth decay. To ensure additional gains in oral health, water fluoridation should be extended to additional communities."
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm

European Fluoridation Forum. 2002
"Water fluoridation has been very effective in improving the oral health of the Irish population, especially of children, but also of adults and the elderly"
...."The prevalence of dental decay is approximately 30-50% lower in fluoridated areas of the Republic of Ireland compared with non fluoridated areas in Northern Ireland."
http://www.dohc.ie/publications/pdf/fluoridation_forum.pdf?direct=1

Dr. Stuart MacDonald
President
Nova Scotia Dental Association

Dr. Tara Chobotuk
Paediatrician, IWK Health Centre
Department of Paediatrics, Dalhousie University

Dr. Ross Anderson
Chief of Dentistry, IWK Health Centre
Assistant Professor and Division Head,
Paediatric Dentistry, Dalhousie University

Dr. Tom Boran
Dean, Faculty of Dentistry,
Dalhousie University

Item #3A
HRWC Board
April 24, 2014

Attachment 2
Halifax Water Typical Fluoride Response

Thank you for writing regarding your concerns about fluoridation of drinking water. The issue of fluoridation of drinking water is certainly one that is of concern to a segment of our population and one where we continue to get questions from time to time.

Halifax Water fluoridates water in the Pockwock (Halifax, Bedford, Sackville, Timberlea) and Lake Major (Dartmouth, Cole Harbour, Eastern Passage, North Preston) systems. Like numerous other utilities across North America, fluoride addition began in these systems in the 1950's at the encouragement of the Public Health Officer for the public health benefit of preventing and reducing dental caries. Fluoridation practice is regulated by Nova Scotia Environment through operating approvals and the Guidelines for Canadian Drinking Water Quality (GCDWQ), published by Health Canada.

Fluoride is one of a number of drinking water parameters over which there are strong differences of opinion. There are several well organized anti-fluoridation groups, all of which can cite authorities who are speaking out against fluoridation of drinking water. Conversely, public health authorities are near unanimous in support of fluoridation of drinking water.

While Halifax Water conducts considerable water quality research, it is primarily focused on Halifax Water specific issues. Fluoride is an issue of broad national and North American wide concern. On issues such as this, Halifax Water relies on the Guidelines for Canadian Drinking Water Quality to determine what is or is not safe. The GCDWQ are prepared by Health Canada and used to varying degrees by each jurisdiction in Canada for regulatory purposes. The GCDWQ includes guidelines on approximately 140 parameters including over 80 chemical parameters. To set a guideline, the committee, representing each province and territory, and Health Canada, collects and considers the full body of scientific evidence on a parameter. The committee can and does commission additional research where the available body of research is found to be inconclusive or incomplete. The committee is supported by a diverse staff of public health professionals consisting of medical doctors and experts in epidemiology and toxicology. The committee also considers all possible means of exposure (not just through drinking water) and after a public comment period, sets a limit for safe exposure through drinking water. This is a non-biased process that attempts to reach a decision while considering all available scientific evidence. For that reason Halifax Water follows Health Canada and the advice of the Medical Officer of Health.

In December 2010, Health Canada completed a review of the issue of fluoride in drinking water and issued a new guideline on fluoride. The most recent guideline reaffirmed a Maximum Acceptable Concentration (MAC) of 1.5 mg/L and revised the optimum concentration for dental health protection slightly downward to 0.7 mg/L. Additionally, Health Canada reaffirmed that there is a public health benefit to fluoride in drinking water and that there is no apparent health

risk from consuming fluoride in drinking water at the concentrations found in municipal supplies. In recent years, several noted public health agencies have reviewed fluoride including the USEPA, the Centers for Disease Control and the World Health Organization and all have reached a similar conclusion as Health Canada.

The revised guideline can be viewed at the following link:
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2011-fluoride-fluorure/index-eng.php
Nova Scotia Department of Health Protection and Promotion issued a position statement on drinking water fluoridation. The position statement was developed based on the findings of an expert panel convened by Health Canada in 2007 on the same topic. Both documents reaffirmed the fluoridation of municipal drinking water as effective for the prevention of dental caries and that fluoridation at optimal levels does not cause adverse health effects. I have attached this statement for your review.

We monitor concentrations in the treated water on a daily basis to ensure that the target fluoride levels are being achieved at all times. Average fluoride levels in our treated water are reported on our webpage under the Typical Analysis link:
http://www.halifax.ca/hrwc/documents/Pockwock-LakeMajor20112012.pdf

I trust that the information provided in this email addresses your specific concerns. If you have additional questions, feel free to contact me.

Public Health Package:

Supporting Continued Water Fluoridation in Halifax Regional Municipality, including Resumption of Fluoridation at Lake Major Water Supply Plant

Contents:

(Click to jump to section)

nova scotia health
Public Health

Presented to Halifax Water Board of Commissionaires for their January 30, 2025 meeting.

Central Zone Public Health
7 Mellor Ave., Unit 5
Dartmouth, NS B3B 0E8

January 17, 2025

Halifax Water
450 Cowie Hill Rd.
Halifax, NS B3P 1P1

RE: Supporting Continued Water Fluoridation in Halifax Regional Municipality, including Resumption of Fluoridation at Lake Major Water Supply Plant

Dear Halifax Water Board of Commissioners,

In response to the recent interruption of water fluoridation at the Pockwock Lake and Lake Major water supply plants, Central Zone Public Health has been asked to submit recommendations to Halifax Water on the issue of community water fluoridation in Halifax Regional Municipality (HRM).

Central Zone Public Health, Nova Scotia Health and the Department of Health & Wellness, Public Health Branch strongly support the continued use of fluoride in HRM's water supply plants to help prevent tooth decay and promote oral health in residents. We were pleased to learn of the resumption of fluoride at Pockwock Lake Water Supply Plant in December 2024. We recognize the complications at the Lake Major Water Supply Plant are due to changes in the lake water quality and space constraints. **It is our strong recommendation that Halifax Water resume fluoridation at Lake Major Water Supply Plant as soon as it is operationally possible.**

Community water fluoridation is an important, safe and effective measure to improve oral health, which is essential to overall health and well-being at every age and stage of life. Adding fluoride to water is one of the most cost-effective and equitable public health interventions available, reaching everyone in a community regardless of their age, income or access to dental care services or supplies.

As you prepare to decide on next steps for fluoridation at the Lake Major Water Supply Plant, we invite you to review the supporting documents provided in this package.

Thank you for the opportunity to submit this package and show how community water fluoridation remains instrumental for our community. We look forward to continued collaboration and partnership with Halifax Water throughout this process and into the future.

Sincerely,

CRLBrown

Dr. Catherine Brown
Regional Medical Officer of Health, Central Zone Public Health
Nova Scotia Health

SRadford

Shelley Radford
Director, Central Zone Public Health
Nova Scotia Health

Halifax Water Board Of Commissioners
P.O. Box 8388, RPO CSC
Halifax NS
B3K 5M1

Jan. 2, 2025

Dear Halifax Water Board Of Commissioners,

RE: **Municipal water fluoridation in Halifax Regional Municipality and prevention of childhood dental caries**

I was pleased to hear that the Lake Pockwock facility has been able to resume the fluoridation of drinking water, and I am writing to confirm that I am in full support of the resumption of water fluoridation in the Dartmouth Lake Major catchment area as soon as possible. There is no doubt that lack of water fluoridation increases the rate of dental caries (cavities) for vulnerable populations.

As a pediatric dentist and the Chief of Dentistry at IWK Health, I manage this disease daily. Our referral numbers and waitlists for dental surgery under general anesthesia are a well-known problem and are reported regularly to the Department of Health and Wellness. Many of the children referred to our service will require the use of general anesthesia for their dental treatment due to their inability to cooperate or the extensive nature of their treatment needs.

At IWK Health, Dentistry uses more operating room time than any other surgical service, at approximately 30% of all hours. This is the case at most pediatric tertiary care hospitals across Canada. At IWK Health, we also have the greatest number of surgical "long waiters," children who have waited more than one year for their dental surgery. Most children in our system do not have surgery within recommended surgical access times, as defined by their "PCAT" (Pediatric Canadian Access Target) codes.

Without hesitation, I can predict that lack of water fluoridation will increase the presence of this disease, the number of referrals to our service and the need for dental treatment under general anesthesia.

Reducing surgical wait times has been identified as a priority in the Nova Scotia government's "Action for Health" plan and programs and policies that support water fluoridation would be a direct investment in that priority. IWK Health would strongly support any Halifax Water initiatives that would encourage the continuation or re-initiation of water fluoridation.

Sincerely,

Dr. Heather Dyment
Chief, Dentistry
IWK Health
heather.dyment@iwk.nshealth.ca

DALHOUSIE UNIVERSITY

IWK Health

Healthy Respectful Workplaces **Every Child Matters** **Black Lives Matter** **Better Futures**
Quality Care **Discover & Innovate** **Educate & Mentor** **Lead & Advocate**

Department of Pediatrics, Dalhousie University
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Dr. Andrew Lynk MD MSc. CTM FRCPC D.Litt (Hons)
Chief of Pediatrics IWK Health Centre Halifax Nova Scotia
Chair of Pediatrics & Associate Professor Dalhousie University

To: **The Halifax Water Commission** Jan 2nd, 2025

Re: HRM Community Water Fluoridation

Dear Commissioners,

I am writing in support of continued HRM community water fluoridation. When CWF follows recommended concentrations and processes, this is a safe and modestly effective way to prevent widespread dental caries across all populations of people. This public health intervention alleviates a lot of needless suffering, time lost from school and work, and makes better use of our healthcare resources.

Supporting evidence-based documents include:

1) Canadian Paediatric Society (2021): https://cps.ca/en/documents/position/early-childhood-caries

2) American Dental Association (2024): https://jada.ada.org/article/S0002-8177(24)00567-1/fulltext

Yours sincerely,

Andrew D. Lynk MD

DALHOUSIE UNIVERSITY

Wednesday, January 8, 2025

Halifax Water Board of Commissioners
450 Cowie Hill Road
Halifax, NS B3P 1P1

Dear Halifax Water Board of Commissioners,

RE: Community water fluoridation in Nova Scotia and prevention of tooth decay burden

We write to express our support for the immediate reinstatement of community water fluoridation at the Lake Major Water Supply Plant in Nova Scotia.

Community water fluoridation has been well-examined for over almost 80 years worldwide. Its benefits and safety have been confirmed. Fluoridation is the most effective and equitable way to prevent tooth decay and reduce oral health inequalities. In fact, the U.S. Centers for Disease Control and Prevention have designated community water fluoridation as one of the ten great public health achievements of the 20th Century. The World Health Organization proposes safe and optimal levels of community water fluoridation as a global target in the Global Strategy and Action Plan on Oral Health 2023-2030.

Tooth decay is one of the most common chronic diseases, affecting over 2.5 billion children and adults. Tooth decay causes pain, difficulty chewing and speaking, low self-esteem, social vulnerability, and missed school and workdays. By increasing hospital emergency visits, dental decay is costly to the healthcare system. The economic burden of tooth decay worldwide in 2015 was $245 billion/year. People living with socioeconomic challenges and those with limited or no access to dental services, fluoride products, and healthy food options are at higher risk for tooth decay. This group includes low-income racial and ethnic minorities, people in underserved communities, persons living with disabilities, and young children and older persons who depend on others for care.

Facts about tooth decay and fluorides:

- Tooth decay is a common chronic disease. Bacteria in the mouth produce acids from sugars and starches present in food. Acids damage teeth by eroding the protective enamel. Tooth decay is progressive; if left untreated, it leads to pain and infection, requiring time-consuming, expensive, and complex care.
- Fluoride, a mineral that occurs naturally, helps prevent tooth decay by strengthening tooth enamel against bacterial damage.
- Community water fluoridation (adjusted to 0.6-0.8 mg/L) optimizes the protective effect of fluoride; a 25-30% reduction in tooth decay is available to everyone who drinks fluoridated tap water.
- For every dollar invested in community water fluoridation, we can save $5 to $93/person in dental treatment costs depending on the population it serves. The larger the population, the greater the savings.

- Fluoridated toothpaste used twice daily enhances protection of tooth enamel by an additional 25-30% reduction in tooth decay.
- Well-conducted research shows no harm from community water fluoridation. Yet, since fluoridation's inception in 1945, it has been unjustifiably attacked. In the 1950s, people claimed it was a communist plot. In the 1970s, researchers claimed that fluoridation caused cancer. Currently, some researchers claim that fluoridation affects child IQ. All these claims are false. Fluoridation's safety has been demonstrated over almost 80 years.
- Dental fluorosis—a cosmetic condition affecting the appearance of tooth enamel. At 0.7mg of fluoride in water, the risk of fluorosis is very low.

At Dalhousie University's Faculty of Dentistry, we are committed to addressing tooth decay for all members of the public. We provide dental care to patients at a reduced cost, and some eligible persons are offered free dental care. However, our adult patients face long waitlists, and our institution bears significant financial strain. Vulnerable groups, such as disabled individuals and older persons experiencing frailty and dependency on others, often have little or no protection against tooth decay, as well as limited access to dental care. Our students and faculty members provide dental care to children at IWK Health. Many require complex and expensive procedures performed under general anesthesia in operating rooms. Such procedures occupy one-third of all surgical services provided at IWK Health. Treatment delays often exceed a year, leaving children to experience continued pain and infection during that interval.

Dental decay is preventable. Community water fluoridation is necessary to curb the burden of tooth decay and associated problems in our communities. Reducing the need for costly and complex treatment in operating rooms and offsetting emergency department visits for dental problems would result in tremendous time and cost savings for our healthcare system. It would also increase the availability of operating rooms for other non-dental surgeries, a priority in "Action for Health".

The Federal Government has allocated $13 billion over five years for dental treatment. Prevention is always better than treatment and less expensive, too.

As a Dental Public Health specialist and the Dean of Dentistry at Dalhousie University, we strongly recommend water fluoridation be a priority in Nova Scotia's Oral Health Action Plan and support government efforts to initiate, continue, and reinstate water fluoridation in communities throughout Nova Scotia

Sincerely,

Dr. Violet D'Souza, PhD, MS, MSc, BDS
Dental Public Health Specialist
Assistant Professor, Faculty of Dentistry
Dalhousie University
violet.dsouza@dal.ca

Dr. Ben Davis, BSc, DDS, FRCD(c), Dip OMFS
Dean, Faculty of Dentistry
Professor, Oral and Maxillofacial Sciences
Dalhousie University
benjamin.davis@dal.ca

CC: Dr. Robert Strang
Chief Medical Officer of Health, robert.strang@novascotia.ca

College of Dental Hygienists of Nova Scotia

202-1597 Bedford Hwy,
Bedford, Nova Scotia
B4A 1E7

T. 902.444.7241
www.cdhns.ca

January 14, 2024

Halifax Water Board of Commissioners
Halifax Water
450 Cowie Hill Rd
Halifax NS B3P 1P1

Dear Halifax Water Board of Commissioners,

Thank you for the opportunity to provide you with input regarding the importance of community water fluoridation. The College of Dental Hygienists of Nova Scotia (CDHNS) is the regulatory body responsible for regulating dental hygienists in Nova Scotia.

Dental hygienists are regulated, licenced health professionals who have a primary focus on oral disease prevention. As the dental hygiene regulator, we are committed to improving oral health for all Nova Scotians.

With this commitment in mind, the CDHNS strongly supports the continuation and implementation of community water fluoridation programs as an evidence-based, public health measure to prevent tooth decay and promote overall well-being. **As such, the CDHNS strongly supports the use of fluoride in Nova Scotia's water supply plants, including those within the Halifax Regional Municipality (HRM).**

Oral health is important to overall health and well-being at every age and stage of life. A healthy mouth allows a person to eat, speak, learn and socialize. It can also impact a person's self-esteem, confidence, and quality of life. Dental hygienists see firsthand the impact of tooth decay on children and adults, including seniors, in their communities.

Tooth decay continues to be the most common childhood preventable chronic disease in Canada, and it remains a significant oral health problem worldwide for both children and adults. In Canada, approximately 96% of adults have a history of dental caries, and nearly 57% of children aged 6 to 11 have experienced dental caries in their primary teeth.[1] This can impact children's growth and development, behaviour, and ability to learn, socialize and play.

Extensive scientific research and decades of practical application have demonstrated that community water fluoridation is a safe, effective, and equitable method to reduce the prevalence of dental caries. Numerous studies show that fluoridation reduces dental decay by approximately 25% in children and adults, regardless of age, socioeconomic status, or access to dental care.[2]

From a public health perspective, water fluoridation is cost-effective, saving communities money by reducing the need for restorative dental care. Furthermore, community water fluoridation promotes oral health equity by providing widespread protection against tooth decay, especially in underserved populations who may lack access to regular oral health care.[3]

As a regulatory body, we uphold the responsibility to advocate for scientifically validated practices that protect and improve public health. In this capacity, we encourage community leaders, policymakers, and other interested parties, to prioritize water fluoridation efforts to safeguard the oral health of current and future generations.

We welcome the opportunity to collaborate with you to further educate the public about the benefits of water fluoridation and to address any concerns based on misinformation or misconceptions. Please feel free to contact us at registrar@cdhns.ca.

Thank you for your dedication to fostering healthier Nova Scotian communities. We stand ready to support and advocate for initiatives that enhance public oral health through proven preventive measures such as community water fluoridation.

Sincerely,

Stacy Bryan

CDHNS Registrar

Footnotes

[1] Canadian Health Measures Survey (CHMS). (2007–2009). *Oral Health Statistics in Canada*. Statistics Canada.

[2] Centers for Disease Control and Prevention (CDC). (2018). *Community Water Fluoridation: Fluoridation Basics*. https://www.cdc.gov/fluoridation/index.html; **and** Griffin, S. O., Regnier, E., Griffin, P. M., & Huntley, V. (2007). *Effectiveness of fluoride in preventing caries in adults*. Journal of Dental Research, 86(5), 410-415. https://doi.org/10.1177/154405910708600504

[3] National Institute of Dental and Craniofacial Research (NIDCR). (2020). *Oral Health Disparities in the United States: The Need for Action*. https://www.nidcr.nih.gov/; **and** McLaren, L., & Singhal, S. (2016). *Does cessation of community water fluoridation lead to an increase in tooth decay? A systematic review.* BMC Oral Health, 16, 43. https://doi.org/10.1186/s12903-016-0203-z

Halifax Water Board Presentation | January 7, 2025

Why Public Health, IWK Health, and Partners Recommend Community Water Fluoridation

Dr Catherine Brown, MD MSc CCFP FRCPC
Regional Medical Officer of Health, Central Zone Public Health

Dr Heather Dyment, DDS Dip. Paed., FRCDC
Chief of Dentistry, IWK Health

nova scotia health Public Health

IWK Health

Purpose

- To highlight the individual health, population health, and equity benefits of community water fluoridation (CWF) in Halifax
- To better understand the recent evidence and its limits around potential risks of CWF
- To increase knowledge on the impacts and costs of ceasing CWF

Recommendation

Central Zone Public Health strongly supports:

- **Continued use of fluoride in Halifax's water supply plants** to help prevent tooth decay and promote oral health in the residents of Halifax Regional Municipality

- **Reinstating fluoride with minimum delay to Lake Major water supply plant**, while acknowledging the need to minimize operational risks related to source water quality

nova scotia health | Public Health

Other Organizations Who Endorse CWF

CWF is endorsed by more than 90 provincial, national, and international professional organizations, associations, and governments

In Nova Scotia, this includes:

- IWK Health – Department of Dentistry
- Dalhousie University – Faculty of Dentistry
- Nova Scotia Health – Public Health
- Department of Health & Wellness – Public Health Branch
- Nova Scotia Dental Association
- College of Dental Hygienists of Nova Scotia

Learn more:
[The State of Community Water Fluoridation across Canada - Canada.ca]

Why Community Water Fluoridation?

- **Preventative Approach**: It's the most impactful tool to prevent tooth decay before treatment is required
- **Equitable**: It improves oral health for everyone, regardless of age, income, or access to dental care services & supplies
- **Regulated and Monitored**: To ensure optimal fluoride levels always maintained
- **Safe**: Decades of research support safety
- **Cost-Effective**: Every dollar spent on CWF saves $5.49 to $93.19

Learn more:
The State of Community Water Fluoridation across Canada - Canada.ca

Why is fluoride important for oral health?

Fluoride is a mineral that is found naturally in water, soil, plants, and food, and is added to various dental products. **It strengthens teeth and prevents tooth decay.**

Fluoride prevents tooth decay in two ways:

1. **Topically**: Outside of teeth come in direct contact with fluoride in drinking water making teeth stronger
2. **Systemically**: When fluoridated water is consumed, fluoride is made available inside the body to become part of tooth's structure while it is still developing

Evidence shows that receiving fluoride in both ways leads to greater benefits in reducing tooth decay

Learn more:
Fluoride: Topical and Systemic Supplements | American Dental Association

IWK Health

Why does dental decay matter?

Dental decay can be invasive in a person and their family's daily life due to:

- Pain
- Infection
- Sleep disturbances – cascading impacts on growth and development
- Lost time at work & school
- Damage to developing adult teeth structure/alignment

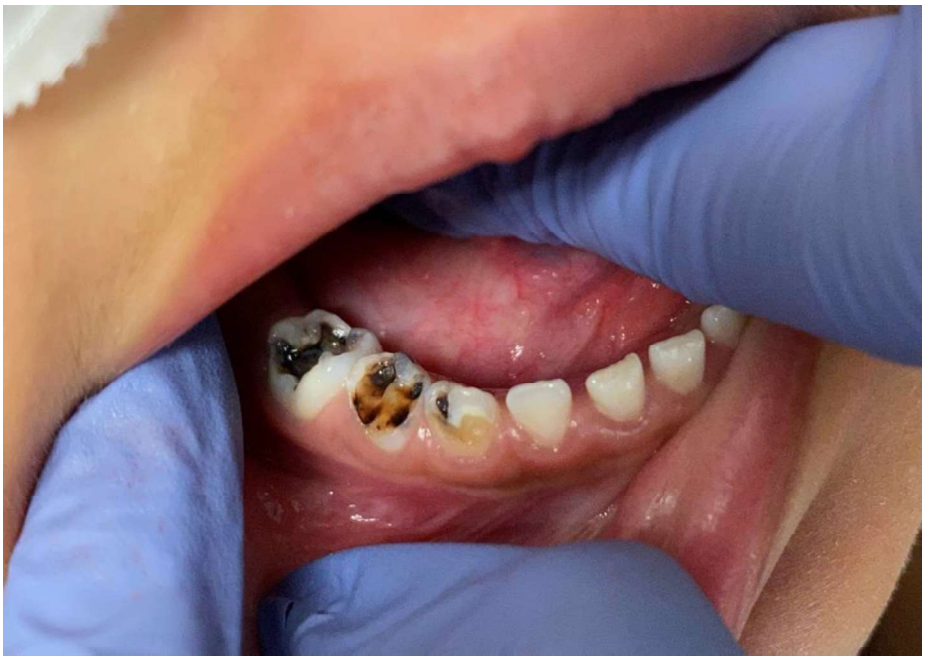
Learn more:
Oral health for adults - Canada.ca
Oral health for children - Canada.ca
Canadian Dental Association

IWK Health

What does dental decay look like?

IWK Health

What does dental decay look like?



IWK Health

Dental Infection – Cellulitis

IWK Health

Dental Infection – Cellulitis

IWK Health

IWK Health: Use of Operating Room

IWK Health

The Shocking Statistics…

- Dental procedures are the **most common reason** preschool children require general anesthesia
- **Over 30% of pediatric day surgical time** in Canada is consumed by dental treatment

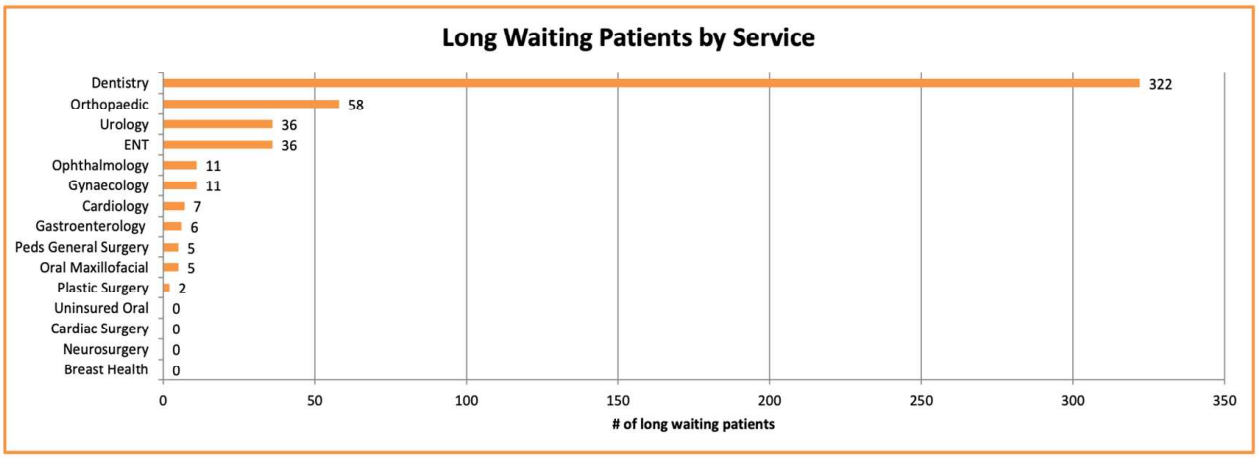
Learn more:
CIHI | Treatment of Preventable Dental Cavities in Preschoolers

Current IWK Health Dentistry Situation

- Average **number of referrals/year** for last 3 fiscal years = **1,464**
- Approximately **85%** of all patient referred require the use of general anaesthesia for treatment
- Predict need to complete **1,244 cases/year**
- Average **number of operating room cases/year** for last 3 fiscal years = **884**

IWK Health

IWK Dentistry Surgical "Long Waiters" Over one year wait – Oct. 2024



IWK Health

A story from the operating room: Jan 2, 2025

- Simon – 8-year-old boy living in Dartmouth in the Lake Major water supply catchment area
- Referred by family dentist in January 2024
- Seen for consultation May 2024 and placed on Operating Room waiting list
- At the time of consultation, **all teeth were restorable**
- Phone call with pain, November 2024 : re-triaged
- At the time of treatment, Jan 2, 2025: **required removal of 4 permanent molars**

IWK Health

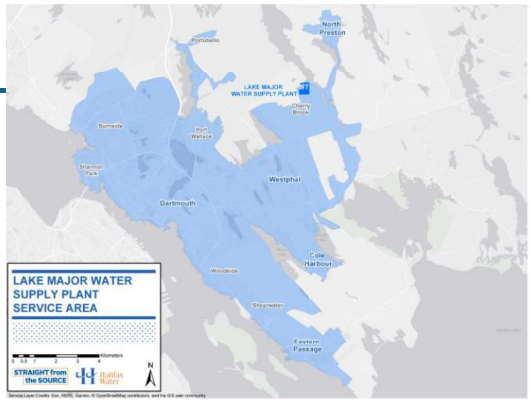
CWF is equitable

- Canadians living with low-income are almost **twice as likely** to suffer from poor oral health compared to high income Canadians
- Water fluoridation is a **cost-effective measure** to narrow the gap when it comes to oral health and tooth decay
- CWF **benefits all residents in a community**, regardless of age, socioeconomic status, education, oral hygiene practices, employment or access to routine dental care, making it a truly equitable public health practice

Learn more:
Position statement on Community Water Fluoridation - Canada.ca
The State of Community Water Fluoridation across Canada - Canada.ca

nova scotia health | Public Health

Who lives in the Lake Major Water Supply Plant Service Area?



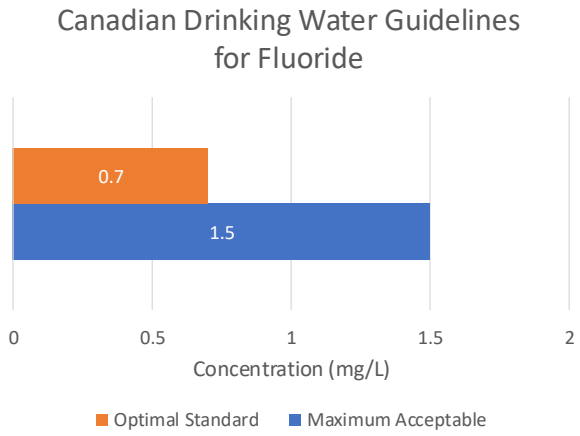
- **Lake Major serves 118,000 people** in the communities of Dartmouth, Burnside, Cole Harbour, Westphal, North Preston, and Eastern Passage
  - Includes two prominent historic African Nova Scotian communities, **North Preston** and **Cherry Brook**
- Many communities served by the Lake Major plant face overlapping challenges like **income inequality, racism, discrimination and food insecurity**
  - They also experience higher rates of cancer, diabetes, heart disease, respiratory issues, and skin conditions due to water and air pollution
- **These are the communities that experience the greatest benefit from CWF**

Learn more:
Environmental Racism and Climate Change: Determinants of Health in Mi'kmaw and African Nova Scotian Communities - Canadian Climate Institute
Water Service Advisory - Dartmouth & Area Water Supply Upgrades | Halifax Water

CWF is regulated and monitored

- The Guidelines for Canadian Drinking Water Quality has established the maximum acceptable concentration of fluoride in drinking water at 1.5 mg/L
- Health Canada set optimal standard for CWF at 0.7mg/L, less than half of the maximum level
  - This accounts for fluoride coming from other sources (e.g., access to dental treatments, toothpaste, mouth rinses, etc.)
- **In NS, municipal water supply plants that offer CWF test drinking water daily to ensure optimal fluoride levels are maintained**

Learn more:
Guidelines for Canadian Drinking Water Quality: Fluoride Guideline Technical Document
NS Treatment Standards for Municipal Drinking Water Systems



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CWF is safe

- Decades of extensive research has shown that CWF is safe when optimal fluoride concentrations (0.7 mg/L), less than half of the regulated level, are maintained

- Repeated exposure to fluoride at higher levels than Canada's regulated maximum (1.5 mg/L) has been associated with potential risks. Daily monitoring prevents this from occurring in Nova Scotia

- NSH Public Health and many others (including Health Canada) closely monitor new research on water fluoridation to inform recommendations
  - Emerging evidence is not strong enough to change water fluoridation guidelines

Learn more:
Fluoride and Oral Health - Canada.ca

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What does current evidence show about excess fluoride and cognitive development?

Recent systematic reviews have found an association (not cause and effect) between high fluoride exposure (>1.5 mg/L) and lowered IQ in children:

- Included research came from different study populations (e.g., China, India, Iran, New Zealand, Mexico, Canada), and the fluoride exposure was double or greater than the optimal level for water fluoridation in Nova Scotia and Canada
- The evidence is mixed: most studies found some evidence of an association, with some studies showing no association
- More research is needed to better understand this relationship

Evidence does <u>not</u> support a link between decreased IQ and water fluoridated at optimal levels using current guidelines in Canada

Learn more:
Systematic review of epidemiological and toxicological evidence on health effects of fluoride in drinking water
NTP Monograph: State of the Science Concerning Fluoride Exposure and Neurodevelopment and Cognition

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What was the California Federal Court Ruling?

What is it?

- A lawsuit filed by anti-fluoride advocates regarding the potential risks of fluoride in drinking water

What do we need to know?

- The Court ruled in September 2024 that the Environmental Protection Agency (EPA) must review the United States' current guidelines to ensure levels do not pose an unreasonable risk of neurodevelopmental effects in children
- The EPA's current Maximum Contaminant Level (enforceable standard) is 4.0 mg/L, and the EPA's secondary standard (non-enforceable guideline) is 2.0 mg/L
  - Both are above Health Canada's Maximum Acceptable Concentration level of 1.5 mg/L
- The US Department of Health and Human Service's recommended optimal water fluoridation level is 0.7 mg/L (same as Health Canada)
- The ruling does not indicate that fluoride is harmful to public health at optimal levels
- The ruling does not specify the kind of action that should be taken by the EPA
- *U.S. Toxic Substances and Control Act* requires only an association (not causation) be demonstrated to be considered a potential hazard

Learn more:

US Environmental Protection Agency : Questions and Answers on Fluoride
Food & Water Watch, Inc et al. v Environmental Protection Agency et al.
U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries - PMC

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What does current evidence show about excess fluoride and dental fluorosis?

Dental fluorosis is a cosmetic issue that affects the tooth enamel, leading to white flecks or brown pitting

- Mild and moderate dental fluorosis is not associated with any health or oral health concerns
- Current evidence indicates that repeat exposure to high concentrations of fluoride (above the maximum level of 1.5 mg/L) continues to be associated with an increased risk of moderate and severe dental fluorosis

Dental fluorosis is uncommon in Canada

- Canadian Health Measures Survey found only 16% of children have mild forms of fluorosis

Evidence continues to show the benefits of water fluoridation still outweigh the small risk of mild dental fluorosis at the regulated fluoride level

Learn more:

Systematic review of epidemiological and toxicological evidence on health effects of fluoride in drinking water

Canadian Health Measures Survey - Report on Oral Health Component

Expert Panel Meeting on the Health Effects of Fluoride in Drinking Water: Summary report

What does current evidence show about excess fluoride and other health effects?

The 2024 Health Canada commissioned systematic review looked at more than 30 other health endpoints such as:

- Bone cancer, hip fracture, cancer, high blood pressure, heart attacks, diabetes, childhood obesity, thyroid function, and more

The review concluded that current evidence does not support an association or was insufficient to determine existence of a relationship between fluoride and additional health effects

Evidence does not support a link between other adverse health effects and water fluoridated at optimal levels using current guidelines in Canada

Learn more:
Systematic review of epidemiological and toxicological evidence on health effects of fluoride in drinking water

CWF is cost-effective

Dental services are expensive

- In 2018, the cost of dental services was estimated to be approximately $17 billion in Canada, about $461 per Canadian

Several reports indicate **CWF yields a high return on investment**

- Canadian Agency for Drugs and Technologies in Health (CADTH) estimates 20-year savings of approximately $20.35 per dollar invested in CWF for continuing fluoride in a large urban municipality in Canada

Learn more:
Community Water Fluoridation Programs: A Health Technology Assessment — Budget Impact Analysis. Ottawa: CADTH; 2019 Feb. (CADTH technology review; no. 13).

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CADTH Budget Impact Analysis (2019)

"In communities that are currently deciding whether to continue CWF, ***CWF cessation was found to be more costly under a societal perspective compared with CWF continuation, even if this requires retrofitting existing CWF facilities.***

Specifically, any cost savings from CWF cessation were found to be exhausted by the third year as medical, productivity loss, and transportation costs associated with increased caries incidence accumulated. ***For a large urban municipality, CWF cessation would cost more than $110 million than continuing the status quo of fluoridating municipal waters****."*

Learn more:
Community Water Fluoridation Programs: A Health Technology Assessment — Budget Impact Analysis. Ottawa: CADTH; 2019 Feb. (CADTH technology review; no. 13).

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Cautionary Tale of CWF Cessation in Calgary

City of Calgary ceased CWF in 2011 after the previous fluoride infrastructure reached the end of its lifecycle and was decommissioned and removed. At the same time, CWF continued in Edmonton

Multiple comparison studies between Calgary and Edmonton have shown:

- Fluoride cessation negatively impacted children's dental health in Calgary
- At least 25% more tooth decay was seen, with more burden in kids living in families with low-income
- Significant increase in dental cost and surgery under general anesthetic

In light of these outcomes, and with public support, the City of Calgary is now working toward reintroducing fluoride to its water supply

Learn more:
Fluoride in Calgary's water

Key Takeaways

- Community water fluoridation improves oral health and supports the overall health of a community
- Community water fluoridation remains a safe, cost effective, and equitable public health practice and an important tool in protecting and maintaining the health and well-being of Nova Scotians
- Halifax Water can continue to create significant and lasting impacts in our communities through ongoing investment in CWF systems, creating generations of healthier residents

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Thank you!

We welcome any questions and discussion

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Dr. Heather Dyment – IWK Dentistry
Heather.Dyment@iwk.nshealth.ca

Additional Resources on CWF

Government of Canada – Guidelines & Reports

- Guidelines for Canadian Drinking Water Quality: Fluoride Guideline Technical Document
- Position statement on Community Water Fluoridation - Canada.ca
- State of Community Water Fluoridation across Canada
- Ethics Consultation Report - Ethical Considerations in Community Water Fluoridation
- Expert panel meeting on the health effects of fluoride in drinking water: Summary report - Canada.ca

Government of Canada – Additional Resources on Oral Health & Fluoride

- Fluoride and Oral Health - Canada.ca
- Oral health for adults - Canada.ca
- Oral health for children - Canada.ca
- Fact sheet - Community water fluoridation - Canada.ca

Additional Resources on CWF

Nova Scotia

- Oral Health | Nova Scotia Health
- NS Treatment Standards for Municipal Drinking Water Systems

Canadian Dental & Dental Hygienist Association

- Canadian Dental Association – Position on Water Fluoridation
- CDHA Advocacy – Community Water Fluoridation
- Oral Health Reports – Nova Scotia Dental Association
- Understanding Fluoride – Nova Scotia Dental Association
- Canadian Dental Association – Your Oral Health

Additional Resources on CWF

International Organizations

- World Health Organization - Fluoride in drinking-water
- Community Water Fluoridation Recommendations | Fluoridation | CDC
- Community Water Fluoridation Frequently Asked Questions | Fluoridation | CDC
- Cavities: Community Water Fluoridation | The Community Guide

CADTH & CIHI Reports

- Community Water Fluoridation Programs: A Health Technology Assessment — Budget Impact Analysis. Ottawa: CADTH; 2019 Feb. (CADTH technology review; no. 13).
- Treatment of Preventable Dental Cavities in Preschoolers: A Focus on Day Surgery Under General Anesthesia

Key Research Studies on CWF

Key Technical Reports and Systematic Reviews

- Taher, M. K., Momoli, F., Go, J., Hagiwara, S., Ramoju, S., Hu, X., … Krewski, D. (2024). Systematic review of epidemiological and toxicological evidence on health effects of fluoride in drinking water. *Critical Reviews in Toxicology*, *54*(1), 2–34. Available at: https://doi.org/10.1080/10408444.2023.2295338
- Health Canada (2024). Expert panel meeting on the health effects of fluoride in drinking water: Summary report. Available at: https://publications.gc.ca/collections/collection_2024/sc-hc/H144-120-2024-eng.pdf
- National Toxicology Program. (2024). NTP monograph on the state of the science concerning fluoride exposure and neurodevelopment and cognition: A systematic review. NTP Monograph (8). Available at: https://ntp.niehs.nih.gov/publications/monographs/mgraph08

Key Research Studies on CWF

Cessation of CWF in Calgary Alberta

- McLaren L, Patterson S, Thawer S, Faris P, McNeil D, Potestio M, Shwart L. (2016). Measuring the short-term impact of fluoridation cessation on dental caries in Grade 2 children using tooth surface indices. *Community Dent Oral Epidemiol.* 44: 274–282. Available at: https://doi.org/10.1111/cdoe.12215
- McLaren L, Patterson S, Thawer S, Faris P, McNeil D, Potestio M. (2017). Fluoridation cessation: More science from Alberta. *Community Dent Oral Epidemiol.* 45: 503–505. Available at: https://doi.org/10.1111/cdoe.12346
- McLaren L, Patterson SK, Faris P, et al. (2022). Fluoridation cessation and children's dental caries: A 7-year follow-up evaluation of Grade 2 school children in Calgary and Edmonton, Canada. *Community Dent Oral Epidemiol.* 50: 391–403. Available at: https://doi.org/10.1111/cdoe.12685
- McLaren, L., Patterson, S.K., Faris, P., et al. (2022). Fluoridation cessation and oral health equity: a 7-year post-cessation study of Grade 2 schoolchildren in Alberta, Canada. *Can J Public Health* 113, 955–968. Available at: https://doi.org/10.17269/s41997-022-00654-4
- Yazdanbakhsh, E., Bohlouli, B., Patterson, S. et al. (2024). Community water fluoride cessation and rate of caries-related pediatric dental treatments under general anesthesia in Alberta, Canada. *Can J Public Health* **115**, 305–314. Available at: https://doi.org/10.17269/s41997-024-00858-w

Fluoride and Community Water Fluoridation

These Frequently Asked Questions help to address common concerns and questions regarding fluoride and community water fluoridation in Nova Scotia.

Why is oral health important?
Oral health is important to overall health and well-being at every age and stage of life. A healthy mouth allows a person to eat, speak, learn and socialize without discomfort or embarrassment.

Tooth decay is the most common childhood chronic disease in Canada that can be prevented. 57% of Canadian children have cavities, which can lead to unnecessary infection, pain, and tooth loss. This can impact children's growth and development, behaviour, and ability to learn, socialize and play.

What is fluoride?
Fluoride is a mineral that strengthens teeth, making them more resistant to decay. Fluoride is naturally occurring in water, soil, plants and food, and is added to various dental products.

How does fluoride prevent tooth decay?
Fluoride can prevent tooth decay in two ways:

- When fluoride in drinking water is consumed it becomes part of the tooth's structure as it develops. Fluoride strengthens all layers of the tooth, creating stronger teeth for life.
- When teeth come in contact with fluoride in drinking water, the tooth enamel is strengthened on the surface. This type of fluoride protection is also available through dental products such as fluoride toothpaste and mouth rinse as well as fluoride treatments, such as fluoride varnish.

Evidence shows that receiving different types of fluoride is safe and offers the greatest benefits for oral health.

What is water fluoridation?
Almost all water contains some naturally occurring level of fluoride. Community water fluoridation is the process of adjusting that amount of fluoride in our drinking water to a level recommended for preventing cavities.

What are the benefits of water fluoridation?
Studies continue to show the importance of water fluoridation in preventing and reducing tooth decay. This is true even with improvements in access to dental care, personal dental practices and increased availability of fluoride through other sources, such as fluoride toothpaste.

While water fluoridation benefits everyone in a community, it is especially important for children and groups that experience higher rates of tooth decay and poorer oral health.

Why does Nova Scotia Health Public Health support water fluoridation?
Water fluoridation is one of the most effective public health measures that can be taken to reduce tooth decay because it reaches everyone in a community regardless of their age, income or access to dental care.

Nova Scotia Health (NSH) Public Health recommends community water fluoridation alongside more than 90 other provincial, national, and international professional organizations, associations and governments because it supported by evidence to be an important, safe, and effective measure to improve the oral health of Nova Scotians.

Do all communities in Nova Scotia have access to water fluoridation?
In 2022, about 50.4% of people in Nova Scotia had access to water with the recommended level of fluoride through a community water system. While all water contains some fluoride naturally, most water supplies in Nova Scotia do not have enough to help prevent tooth decay. Food is also not a major source of fluoride in Canada.

What amount of fluoride in water is considered optimal for oral health?
Health Canada recommends that communities fluoridate water to 0.7 milligrams per litre (mg/L) to achieve the benefits of cavity prevention. This level considers the other ways that people commonly receive fluoride, such as through fluoride toothpaste and treatments received at the dentist.

The level set for water fluoridation in Canada of 0.7mg/L is less than half the maximum level of 1.5mg/L that has been established by Health Canada and the World Health Organization.

What about recent reports on water fluoridation and IQ in children?
Recent reports have been published that look at fluoride levels above the maximum 1.5 mg/L and developmental outcomes in children, including IQ scores.

The evidence in the reports is not conclusive and do not show high fluoride causes lower IQs in children. In these studies, high fluoride levels are defined as greater than 1.5 mg/L, which is about double the standard for drinking water in Canada and Nova Scotia of 0.7 mg/L.

NSH Public Health continues to monitor ongoing scientific research on fluoride, community water fluoridation and health.

What is dental fluorosis?
Repeat exposure to high levels of fluoride (above the maximum level of 1.5 mg/L) has been shown to increase risk for dental fluorosis. Dental fluorosis is a cosmetic issue that affects the tooth enamel, and makes teeth appear to have white flecks or brown pitting.

Dental fluorosis is very uncommon in Canada and not a concern for most children. Some children have mild cases of fluorosis that often go unnoticed and present no long-term health problems.

How do we know that the fluoride in drinking water in Nova Scotia municipalities remains below 1.5 mg/L?
Municipalities that adjust the fluoride in drinking water are required to test their water supply daily to make sure recommended levels are maintained at 0.7 mg/L, or half the maximum level set by Health Canada of 1.5 mg/L.

Why does NSH Public Health offer a school-based fluoride varnish program?
High levels of early childhood cavities and limited of access to dental care are major concerns in our province.

School-based fluoride programs are offered in many areas across Canada because they are a safe and effective way to deliver additional topical fluoride to children to help prevent tooth decay. NSH Public Health offers a Fluoride Varnish Program in pre-primary to grade 6 students in select communities that would benefit most from an additional layer of protection.

School-based fluoride programs compliment other ways children receive fluoride, such as through their dental provider and water fluoridation. Children benefit from access to multiple sources and applications of fluoride and can safely receive up to six applications of fluoride varnish a year.

Community Water Fluoridation

Community water fluoridation is recommended as an important, safe and effective measure to improve the oral health of Nova Scotians.

The Facts

- **Oral health** is essential to overall health and well-being at every age and stage of life. A healthy mouth allows a person to eat, speak, learn and socialize without discomfort or embarrassment.
- **Tooth decay** is the most common chronic condition of childhood. It can lead to unnecessary pain or suffering, infection, tooth loss, or costly restorative treatment. In school-aged children, poor oral health outcomes are associated with lower school attendance and performance.
- **Populations** that experience the most tooth decay are also those who have the greatest difficulty accessing oral health care.
- **Fluoride** is a mineral that strengthens teeth, making them more resistant to decay. It is naturally occurring in water, soil, plants and food, and is added to various dental products.
- **Community water fluoridation** is the process of adjusting the amount of naturally occurring fluoride in drinking water supplies to achieve a level that is optimal for oral health.
- **Communities** with access to fluoridated water report lower rates of tooth decay.
- **NSH Public Health** recommends water fluoridation based on a collection of credible science, expert knowledge, and community experience.

How It Works

Community water fluoridation delivers two kinds of fluoride protection against tooth decay:

1) **Topical**: when the outside of teeth come in direct contact with the fluoride in drinking water.
2) **Systemic**: when fluoridated water is consumed, fluoride is made available inside the body to become part of the tooth's structure while it is still developing.

Community water fluoridation is endorsed by more than 90 provincial, national and international professional organizations, associations and governments.

NSH Public Health Supports Community Water Fluoridation

1 It is universal and accessible.

Community water fluoridation reaches everyone in a community regardless of their age, income or access to dental care services or supplies.

2 It improves oral health for everyone.

Community water fluoridation improves oral health outcomes across populations and age groups. It is especially beneficial for those that experience greater rates of tooth decay.

3 It is a preventative approach.

Community water fluoridation delivers fluoride protection to the entire community, helping to prevent tooth decay before treatment is required. Investing in prevention is beneficial for individuals, communities, and the health care system.

4 It is regulated and monitored.

Drinking water supplies are regularly tested to ensure that optimal fluoride levels are always maintained. This level is set by Health Canada and accounts for exposure to fluoride from other common sources.

5 It contributes to healthy, vibrant communities.

Improving oral health contributes to the overall health of a community. Community water fluoridation is part of creating places where people live, learn, work and play that support and promote health - now and into the future.

Additional Resources

Nova Scotia Health - Oral Health | Nova Scotia Health (nshealth.ca)

Health Canada – Community Water Fluoridation

Public Health Agency of Canada – Position Statement on Community Water Fluoridation

Nova Scotia Dental Association – Understanding Fluoride

Please contact your local Public Health office for more information.

www.nshealth.ca/public-health

January 8, 2025

Tooth Decay and Fluorides

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Background

Tooth decay is the most common chronic disease worldwide. It is an infectious disease caused by decay-causing bacteria. We are not born with these tooth decay-causing bacteria; rather, they are transmitted through the transfer of saliva. These bacteria produce acids using the sugars and starches present in the food. Acids damage teeth by eroding the protective enamel. Decay-causing bacteria is often transmitted from caregiver to child. The most common reason young children (1–4-year-olds) in Canada undergo day surgery under general anesthesia is to treat tooth decay.

Tooth decay affects everyone, but variably. More severe decay is experienced by those with lower levels of education and income, limited access to professional dental care, inadequate oral hygiene, and lack of community water fluoridation. Tooth decay is a significant burden to the health and quality of life of children, frail older persons, and people with disabilities.

Tooth decay causes pain and chewing difficulty. If not treated, decay progresses, leading to infection deep in the teeth, gums, and jaw; this condition often requires antibiotic treatment and extensive and costly dental treatment. People with extensive tooth decay often visit emergency departments, where dental treatment is not provided, but pain and infections are managed. Also, tooth decay can lead to low self-esteem, behavioural problems, challenges sleeping, interference with school and work attendance, and decreased school and work performance. In summary, tooth decay affects the growth and development of children.

Although tooth decay is largely preventable, it is widely experienced. According to the 2007-2009 Canadian Health Measures survey report[1]:

- 57% of 6-11-year-olds have or have had tooth decay
- 59% of 12-19-year-olds have or have had tooth decay
- The average number of teeth affected by tooth decay in children aged 6-19-years old is 2.5
- 96% of adults have or have had tooth decay

Access to dental care*

- 17% of Canadians avoided going to a dental professional in the past year because of the cost.
- 16% of Canadians avoided having the full range of recommended treatment due to the cost in the past year.
- 62% of Canadians have private dental insurance, 32% of Canadians do not have dental insurance, and 6% have public dental insurance (limited services)

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* *These statistics may change with the Canadian Dental Care Plan (CDCP); however, financial and non-financial barriers to care remain despite the new public insurance plan.*

Despite the newly implemented Canadian Dental Care Plan, inequalities in oral health status and access to care will persist, especially for those who are frail older and disabled persons, those living in long-term care facilities, and those who depend on a caregiver.

Tooth decay burden and its prevention

Tooth decay is an expensive disease not only because of treatment cost but also because of the productivity losses it causes (absenteeism – lost work and school days, lost wages) and emergency visits for non-traumatic dental problems. Each year, more than 40 million hours of productivity are lost in Canada because people miss work due to dental problems and treatment. This results in a potential loss of over $1 billion/year in productivity[2]. In Nova Scotia, dental cavities in young children are a big concern. Severe tooth decay can cause chronic mouth pain, difficulty eating and learning, and social vulnerability[3]. Hundreds of children visit the Halifax IWK emergency room yearly for nontraumatic dental problems and face substantial wait times for treatment – weeks to months. Approximately 30% of the IWK day's surgical time is spent treating tooth decay.

It should be noted that a filling in a permanent tooth is the start of a life-long saga of dental treatment. Each filling has a life of 10 to 12 years, then must be replaced. Over time, as fillings are replaced, the process becomes more complicated and can eventually lead to treatments like root canals, crowns, or even losing the tooth. These treatments can be costly over a person's lifetime.

Tooth decay can be prevented by reducing the intake of sugary foods and beverages, diet modification (reducing sugar and starch intake and frequency), maintaining adequate oral hygiene, and making the teeth more resistant to acid. However, making dietary modifications and maintaining adequate oral hygiene can be challenging, especially for those with low health literacy, low income, or those living in areas where healthy food choices are scarce. Therefore, making the teeth resistant to acid through fluoride use is one of the best possible options. Community water fluoridation benefits a large number of people and requires little effort from individuals[4].

Fluoride

Fluoride is a naturally occurring mineral that provides protection against tooth decay. If present during tooth formation (the first 8 years of life), fluoride is incorporated into tooth crystals to form a more acid-resistant enamel. Once the teeth are formed, fluoride strengthens the enamel by making the outer layer more resistant to acid in the mouth. Swallowed fluoride is absorbed and secreted in the saliva, providing a constant supply of fluoride (in small amounts) to the teeth, helping to protect against acid exposure and repair (remineralization).

1. Community Water Fluoridation:

Community water fluoridation is adjusting the naturally occurring fluoride concentration in drinking water to 0.7mg/L. This level effectively prevents tooth decay and is approximately half the acceptable concentration (1.5 mg/L) in Canada. Fluoride is a mineral, not a medication. Topping up the existing naturally occurring fluoride level to the recommended amount in water is similar to adding vitamin D to milk or iodine to salt. Community water fluoridation has been used in Canada and worldwide for almost 80 years[5]. It is the most effective, cost-saving intervention to prevent tooth decay. For every dollar invested in community water fluoridation,

$5 to $93 per person is saved in dental treatment costs[6], depending on the population size. The larger the population size, the lower the cost. For example, every dollar invested in fluoridating water for a community with 1000 or more people can save $20 in avoided dental and medical costs[7].

Community water fluoridation is the single most effective public health intervention to prevent tooth decay. Initial research in the 1960s demonstrated that community water fluoridation reduced tooth decay by 50–70% in permanent teeth[8]. Once the benefits of community water fluoridation were confirmed, fluoride was added to other products such as fluoride toothpaste, rinses, supplements, and fluoride gels and varnishes. Even with these fluoride products and professional fluoride applications, community water fluoridation can provide an additional 25% protection against tooth decay[9]. For many people, it is the only protection against tooth decay, especially for those who don't have access to fluoride products (like toothpaste, gels, or mouth rinses) or dental care—particularly children from low-income households, as well as disabled and frail older persons.

It is important to note that the people who benefit the most from community water fluoridation are those who face the greatest barriers to getting a healthy diet and dental care. They include low-income people, racial and ethnic minorities, people in underserved communities, persons living with disabilities, as well as young children and older persons who depend on others for care.

Many studies conducted over the last several decades confirm the benefits and safety of community water fluoridation. Below are some examples:

Evidence of the benefits of community water fluoridation:

a. A natural experiment in Canada: Stamm and colleagues (1990) compared decay in dental roots in older persons living in two cities in Ontario, Canada. Woodstock had 0.2 mg of fluoride, while Stratford had 1.6 mg of fluoride in its groundwater. The residents of both cities were similar except for the fluoride content in the water. Woodstock residents had 21% more decayed roots compared to the residents of the Stratford community [10].
b. Iowa (U.S) observation: Hunt and colleagues (1988) examined tooth decay in older persons (≥65 years) living in fluoridated and non-fluoridated areas of Iowa. Those living in fluoridated areas had significantly fewer decayed roots than those living in non-fluoridated areas[11], confirming that community water fluoridation protected people from root decay.
c. Calgary fluoridation cessation: The short-term (2 years) and long-term impacts (7 years) of stopping community water fluoridation were investigated when Calgary stopped community water fluoridation in 2011. Compared to children in Edmonton (which continued community water fluoridation), Calgary children had 16% more tooth decay, extractions due to decay, and fillings [12]. The higher decay rate occurred despite Calgary parents reporting that they did more of everything to reduce dental decay, such as using fluoridated toothpaste, taking their child to an oral health provider, and having a healthy diet rich in fruits and vegetables.
d. Calgary fluoridation cessation: Yazdanbakhsh and colleagues compared tooth decay-related dental treatments under general anesthesia for children under 12 years in Calgary (where community water was ceased in 2011) and Edmonton (where community water fluoridation continued) [13]. They found that the rates of tooth decay-related treatments in Edmonton stayed relatively constant but rose in Calgary, especially for children under 6 years.

e. Australia: Crocombe and colleagues (2015) investigated tooth decay among those born between 1960-1990 and lived in Australia. They reported that those who had a higher level of lifetime exposure to fluoride through community water fluoridation had less tooth decay [14].
f. Australia: Another study (2010) examined tooth decay in Australian children aged 5–15 years. Children living in areas where the water fluoride was less than 0.3mg had more tooth decay (34% in baby teeth and 27% in permanent teeth) than children living in optimally community water fluoridation areas (0.7 ppm)[15].

Possible harms of community water fluoridation

Fluorosis: Community water fluoridation contains only 0.7mg/L fluoride, less than one part of fluoride in a million parts of water. The risk of fluorosis from drinking fluoridated community water at a 0.7 mg/L fluoride level is rare. A mild form of fluorosis (white specks on the teeth) is suspected to be caused by children swallowing large amounts of fluoride toothpaste[16]. Even if fluorosis occurs, it is mild or very mild, with a slight change in appearance, such as white spots[17], a mere cosmetic condition with no effect on the structural integrity of the teeth. Very high fluoride levels in drinking water in China and India (up to 20 mg/L) have caused tooth and bone fluorosis, known as severe fluorosis.

Misinformation about community water fluoridation

Since the widespread adoption of community water fluoridation, numerous false and misleading claims about the practice have been circulated. These range from assertions that fluoride is a toxic poison linked to cancer to fears about its potential to lower IQ levels.

Some researchers claimed that community water fluoridation might be harmful, particularly in lowering IQ levels among preschool-age children. These claims are false because the studies upon which they are based are invalid[18]. First, the studies attempted to measure fetal fluoride exposure by measuring the pregnant woman's spot urine, which has been known since at least 2011 to be an invalid measure for assessing an individual's chronic fluoride exposure[19]. The measurement of IQ was also invalid because different raters were used in every city, and the authors provided no validation checks. There are also concerns about the way they analyzed their data. Hence, the claim that fluoridation affects IQ is without foundation.

No effect of IQ: Researchers examined the children born between 1972 and 1973 in New Zealand and followed 95% of them for 38 years. They found no difference in the IQ of people who lived in community water fluoridated areas and non-community water fluoridated areas, regardless of whether they used fluoride toothpaste or took fluoride tablets (before 5 years of age)[20].

The concentrated fluoride that is diluted into water supplies is potentially dangerous, and like other chemicals such as chlorine, must be handled with caution by trained operators. The equipment used is designed with various fail-safe systems, and the concentration in the water is tested multiple times a day to ensure its safety. Some opponents assert that the fluoride used is an industrial chemical that is a waste product of fertilizer production. It is better understood as a 'by-product,' and its origin is irrelevant to safety: this convenient source of fluoride does not have contaminants that are of any importance when the fluoride is diluted to less than one part in a million parts of water.

Community water fluoridation is endorsed by a wide range of respected national and international health organizations, including the World Health Organization (WHO), World

Dental Federation (FDI), U.S. Centers for Disease Control and Prevention (CDC), American Medical Association (AMA), American Dental Association (ADA) the Canadian Medical Association (CMA), Canadian Dental Association (CDA), the Canadian Cancer Society, and Nova Scotia Dental Association (NSDA).

In summary, community water fluoridation is a safe, cost-saving, cost-effective, and equitable intervention to prevent tooth decay. It reaches every household irrespective of socioeconomic status. To benefit, people need only to drink tap water. The U.S. Centre for Disease Control (CDC) considers community water fluoridation as one of the ten great public health achievements of the 20th Century.

2. Fluoride Toothpastes:

Most toothpastes in Canada contain fluoride. In over-the-counter fluoride toothpaste, fluoride concentrations vary from 1000-1500 ppm[21]. Maximum protection from toothpaste comes when teeth are brushed twice a day using toothpaste with a fluoride content of 1000 ppm or above[22].

The amount of toothpaste matters. Children under 3 years of age should use an amount equivalent to a grain of rice, while those aged 3 years and older should use the size of a pea. Using more than these amounts does not provide greater protection. Children should be supervised while brushing with fluoride toothpaste to prevent swallowing.

Brushing with fluoride toothpaste causes a transient increase in fluoride concentration in saliva, which can enhance remineralization of teeth surfaces. Fluoride is taken directly into dental plaque and demineralized enamel. The fluoride concentration in saliva returns to baseline levels within 1 to 2 hours of brushing with fluoride toothpaste. Therefore, the protection that they offer is only partial. Furthermore, their effect is limited because individuals' compliance is required, given that toothpaste must be purchased (cost) and used regularly. Caregivers' brushing of teeth with fluoridated toothpaste is critical for young children and disabled and frail older persons who depend on caregivers. Often, caregivers are overwhelmed and do not provide tooth brushing.

3. Fluoride Rinses:

Fluoride rinses are effective in preventing tooth decay in both children and older persons[23]. They should be used for at-risk individuals based on the level of tooth decay risk. They contain higher fluoride content; therefore, they should not be swallowed. They are not recommended for children under 6 years of age[24] and people with swallowing difficulties.

4. Fluoride Varnishes and Gels:

Fluoride varnishes and gels are professionally applied by dental professionals. Varnishes provide 37-43% prevention[25] while gels provide 26-28% protection against tooth decay if applied at least twice a year[26]. More frequent applications are required when the risk of tooth decay is greater.

While fluoride applications are important, they are additional preventive measures for preventing tooth decay, in addition to community water fluoridation. They are more expensive than water fluoridation and require people to have access to dental care services. Therefore, people who have no access to dental care services will not receive this protection (e.g., long-term care residents, those who have no dental benefits or are underinsured and cannot pay out of pocket for dental services).

Conclusion:

Community water fluoridation is a valuable method of helping communities to care for everyone, especially the most disadvantaged people in the community. Fluoridation provides a great benefit that lasts life-long, so the benefits of better oral health and significant cost savings are likely greater than estimated in short-term studies.

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