

## NOVA SCOTIA REGULATORY AND APPEALS BOARD

**Operations and Maintenance Audit**

**Date:** July 8, 2025  
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**Subject:** Operations and Maintenance Audit of Water Infrastructure Owned and Operated by the Halifax Regional Water Commission

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## 1.0 INTRODUCTION

The purpose of this Terms of Reference is to outline the objectives, scope, deliverables, and procedures for conducting an Operations and Maintenance (O&M) Audit of the infrastructure owned and operated by the Halifax Regional Water Commission (HRWC), or Halifax Water. This audit is commissioned in accordance with the regulatory requirements set forth by the Nova Scotia Regulatory and Appeals Board (NSRAB), which has the general supervision of non-energy public utilities and may make any necessary examinations and inquiries of utility operations to ensure that public services are being provided efficiently, effectively, and in compliance with relevant legislation.

This audit has been identified in relation to Matter No. M11894 "Halifax Regional Water Commission – J.D. Kline Water Supply Plant (JDKWSP) Disinfection Interruption," and as requested by Premier Tim Houston in their letter to Mr. Stephen McGrath dated January 23, 2025, to "investigate Halifax Water to identify weaknesses and suggest ways to restore competence and confidence in the organization."

## 2.0 PROJECT BACKGROUND

Halifax Water is the regional utility responsible for providing water, wastewater, and stormwater services to the Halifax Regional Municipality (HRM). It plays a critical role in managing water resources, maintaining infrastructure, ensuring environmental protection, and providing reliable services to the residents and businesses of HRM. Its primary responsibilities related to water infrastructure include:

1. Drinking water supply and distribution.
2. Wastewater collection and treatment.
3. Stormwater management.
4. Infrastructure maintenance and improvement.
5. Regulatory compliance and environmental protection.
6. Customer service.
7. Long-term planning and sustainability.
8. Public engagement and education.

The NSRAB plays a crucial role in regulating non-energy utilities across the province, ensuring that essential services like water are provided fairly, reliably, and efficiently. Regulating the provision of water and in Halifax Water's case wastewater services so they are operated safely, sustainably, and at fair rates. Through its oversight, the NSRAB helps maintain public confidence in the fair operation of non-energy utility services in Nova Scotia.

The O&M Audit will be conducted in alignment with the NSRAB's mandate to identify opportunities for improvement, assess compliance with applicable regulations, and provide recommendations for optimized O&M practices at Halifax Water.

### **2.1 Matter No. M11894 Halifax Regional Water Commission - J.D. Kline Water Supply Plant Disinfection Interruption**

As summarized in Halifax Water's March 2025 report "J.D. Kline Water Supply Plant Disinfection Interruption (January 2025) Final After Incident Review and Root Cause Analysis", Halifax Water experienced two interruptions to primary chlorine disinfection at the JDKWSP, one on the afternoon of July 1, 2024, resulting from an internal electrical issue and another in the late evening of January 20, 2025, following a planned Nova Scotia Power outage resulting in a loss of utility power. Both incidents resulted in Boil Water Advisories.

Halifax Water has noted their commitment to improvements and has since released a competitive Request for Proposals to complete an Operational Resiliency Review at the JDKWSP that will include:

1. Single-points-of-failure and other risks.
2. Risk assessment and criticality rating.
3. Risk reduction plan.

### **2.2 Drinking Water Infrastructure**

Halifax Water operates several water treatment facilities that provide safe and clean drinking water to the residents of HRM.

The two primary treatment facilities include:

1. Lake Major Water Supply Plant (Lake Major).
2. J.D. Kline Water Treatment Plant (Pockwock Lake).

Other surface water treatment facilities include:

1. Bennery Lake Water Treatment Plant (Bennery Lake).
2. Bomont Water Treatment Plant (Shubenacadie River).
3. Collins Park Water Treatment Plant (Lake Fletcher).
4. Middle Musquodoboit Water Treatment Plant (Musquodoboit River).

Halifax Water also operates the following groundwater supplies:

1. Five Island Lake Water Treatment Plant (Groundwater).
2. Silver Sands Water Treatment Plant (Groundwater).

## 2.3 Wastewater Treatment Infrastructure

Halifax Water operates several wastewater treatment facilities within the HRM. These facilities play a crucial role in treating and managing the wastewater generated by residents, businesses, and industries to ensure it meets environmental standards before being discharged into the environment. Below is a list of the primary wastewater treatment plants operated by Halifax Water:

3. Halifax Wastewater Treatment Facility (WWTF)
4. Dartmouth WWTF.
5. Mill Cove WWTF.
6. Herring Cove WWTF.
7. Eastern Passage WWTF.
8. Aerotech Park WWTF.
9. Lakeside/Timberlea WWTF.

Other smaller WWTF are listed below:

1. Uplands Park WWTF.
2. Springfield Lake WWTF.
3. Middle Musquodoboit WWTF.
4. Wellington WWTF.
5. Fall River WWTF.
6. Frame Subdivision (Waverly) WWTF.
7. North Preston WWTF.

## 2.4 Stormwater

Halifax Water provides stormwater services within the Halifax Water Stormwater Service Boundary, which aligns with the HRM's Urban Service Boundary. This boundary encompasses various communities, including areas such as Boutiliers Point, Ingramport, Head of St. Margarets Bay, Lewis Lake, Hubley, Upper Tantallon, East Preston, Lake Echo, Mineville, and Lawrencetown.

## 3.0 OBJECTIVES OF THE AUDIT

The main objectives of this audit requested by the NSRAB are:

- To assess the current overall operations and maintenance practices of Halifax Water to determine they comply with applicable local, provincial, federal, and environmental regulations, which is not intended to be a legal review, but an engineering level review.
- To evaluate the efficiency and effectiveness of water and wastewater infrastructure operations and maintenance practices, and to identify potential improvements.
- To confirm that infrastructure is being maintained in a manner that minimizes risks to public health, safety, and environmental sustainability.

- To provide the NSRAB, Halifax Water, and the public with an assessment of the efficiency and effectiveness of Halifax Water's operations, management methods, governance, organization, practices, and procedures and to identify potential improvements.
- To provide actionable recommendations for optimizing operational and maintenance procedures to enhance service reliability.
- To provide NSRAB and Halifax Water with recommendations that can be used to work towards increasing and improving consumer confidence.

## 4.0 SCOPE OF THE AUDIT

The audit will focus on the following key areas:

### 4.1 Review of Operational Practices

- Organizational Structure Review:
  - » Assess the current organizational governance structure of Halifax Water's Water, Wastewater, and Stormwater Services Department as it relates to alignment with strategic objectives, operational efficiency, regulatory compliance, and service delivery goals.
- Site Inspections and Assessments:
  - » Conduct site visits to key facilities (e.g., water treatment plants, wastewater treatment plants, pump stations) to observe and evaluate current operational and maintenance practices. Site inspections are proposed to be initially conducted at the following larger treatment facilities but could be expanded to other facilities as needed:
    - Lake Major Water Supply Plant (Lake Major).
    - J.D. Kline Water Treatment Plant (Pockwock Lake).
    - Bennery Lake Water Treatment Plant (Bennery Lake).
    - Halifax WWTF.
    - Dartmouth WWTF.
    - Mill Cove Water Treatment Facility.
    - Herring Cove WWTF.
    - Lakeside/Timberlea WWTF.
- Review of Standard Operating Procedures:
  - » Assess the adequacy and effectiveness and complexity of existing Standard Operating Procedures, training programs, staffing levels and practices, communication plans, etc.
- Operational Efficiency:
  - » Evaluate operational processes, equipment performance, and identify opportunities for improving system reliability.
- Alarm Management:
  - » Review alarm priority and management practices.

## 4.2 Maintenance Practices Review

- Preventive and Corrective Maintenance Assessment:
  - » Review the adequacy and effectiveness of preventive maintenance schedules, and assess the response times and procedures for corrective maintenance.
- Asset Management:
  - » Assess the effectiveness, efficiency, and compliance of asset management systems, policies, and procedures with the industry's best practices and regulatory standards. This includes evaluation of asset lifecycle planning, condition assessment methodologies, risk management, maintenance strategies, data management systems, and capital investment planning.
- Spare Parts Management:
  - » Evaluate the adequacy of spare parts inventory management and stock levels, confirming that critical parts are available to minimize downtime during maintenance activities.

## 4.3 Risk Management and Emergency Preparedness

- Risk Assessment:
  - » Conduct a risk assessment to identify vulnerabilities in infrastructure and operations that may pose risks to public health, safety, or environmental integrity.
- Emergency Preparedness Evaluation:
  - » Review and assess Halifax Water's emergency preparedness and response plans for planned maintenance/outages, natural disasters, equipment failure, or other unforeseen events that could disrupt service delivery.
- Communication Management:
  - » Review communication protocols as related to general situational awareness for both planned/unplanned service disruptions along with lessons learned from past planned communications related to water and wastewater.

## 5.0 METHODOLOGY

The audit will follow the methodology outlined below to provide a comprehensive and transparent review of the O&M practices:

1. **Data Collection:** The audit team will collect relevant data, including O&M records, performance reports, regulatory compliance documents, and maintenance logs.
2. **Site Inspections:** On-site inspections and facility visits will be conducted to observe operations and maintenance activities in real-time, allowing the audit team to assess current practices and identify any gaps or inefficiencies.
3. **Interviews:** Interviews with key personnel, including operators, maintenance staff, and management, will be conducted to gather qualitative insights into operational challenges and areas for improvement.
4. **Performance Benchmarking:** Key performance indicators will be evaluated against industry standards and regulatory requirements to identify areas where HRM's O&M may be lacking.

5. **Data Analysis:** Collected data will be analyzed to identify trends, inefficiencies, and potential risks, allowing the audit team to provide evidence-based recommendations.

## 6.0 DELIVERABLES

The following deliverables will be produced as part of the O&M audit:

1. **Audit Report:** A detailed report outlining the audit methodology, findings, and recommendations for improvements in operations, maintenance practices, and regulatory compliance. Report will be issued in Draft for stakeholder review and comments. A Final report will be issued.
2. **Executive Summary:** A concise summary of the audit findings, key issues, and high-priority recommendations.
3. **Operational Efficiency and Maintenance Recommendations:** A report with specific recommendations for enhancing operational performance and improving maintenance practices.
4. **Risk Management Assessment:** A document outlining the results of the risk assessment and emergency preparedness review.

## 7.0 PROJECT TIMELINE

The audit will be completed in the following phases:

Table 1 [Project Timeline](#)

Task	Deliverable	Estimated Duration
Task 1: Preliminary Assessment	Data Collection, Site Inspections, and Interviews	8 Weeks
Task 2: Data Analysis and Compliance Review	Regulatory Compliance and Performance Review	6 Weeks
Task 3: Operational and Maintenance Review	Findings and Recommendations on O&M Practices	9 Weeks
Task 4: Final Report <sup>(1)</sup>	Final Audit Report	6 Weeks
Total Estimated Duration		24 Weeks
<sup>(1)</sup> After filing the Final Report, additional assistance may be needed as requested by the NSRAB.		

## 8.0 ROLES AND RESPONSIBILITIES

- **Carollo Engineers:** The consulting firm will be responsible for data/documentation requests, conducting the audit, compiling findings, and providing recommendations. The firm will also present the final report to the NSRAB.
- **Halifax Water:** The municipality will provide access to facilities, relevant documentation, and staff for interviews and data collection. The municipality will also support coordination of site visits and ensure timely access to necessary resources.
- **NSRAB:** The NSRAB will provide oversight to ensure that the audit process aligns with regulatory standards and review the final audit report.

## 9.0 ASSUMPTIONS

- The audit will assess current practices and operations, and will not include physical repairs or infrastructure replacements.
- Halifax will ensure that all necessary data and documentation are available to the audit team in a timely manner. This will be facilitated by the NSRAB.
- Any changes to the scope of work will be subject to review and approval by both the consultant and the NSRAB.
- Halifax Water shall arrange for access to and make all provisions for Carollo Engineers to enter upon public and private property as required for Carollo Engineers to perform services hereunder.
- Carollo Engineers makes no warranty that Halifax Water's actual project costs, financial aspects, economic feasibility, schedules, and/or quantities or quality realized will not vary from Carollo Engineers' opinions, analyses, projections, or estimates.
- The services to be performed by Carollo Engineers are intended solely for the benefit of THE NSRAB. No person or entity not a signatory to the agreement shall be entitled to rely on Carollo Engineers' performance of its services hereunder, and no right to assert a claim against Carollo Engineers by assignment of indemnity rights or otherwise shall accrue to a third party as a result of the agreement or the performance of Carollo Engineers' services hereunder.

## 10.0 CONCLUSION

This Terms of Reference is intended to provide a clear framework for conducting a comprehensive O&M Audit of selected water and wastewater infrastructure operated by Halifax Water.