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**Subject:** 2019 Annual Water and Wastewater Quality Management System Update

**Report to:** Public Works Committee

**Report date:** Tuesday, December 3, 2019

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## Recommendations

1. That Report PW 67-2019 **BE RECEIVED** for information as the Water and Wastewater Quality Management System (QMS) – Annual Update;
2. That the 2019 Water QMS Internal Audit Report, the 2019 Water QMS External Audit Report, and the 2019 Wastewater QMS Internal Audit Report **BE RECEIVED** for information;
3. That the Water Quality Management System Operational Plan and the Wastewater Quality Management System Operational Plan **BE APPROVED** and **ENDORSED**; and
4. That the Regional Chair and Regional Clerk **BE AUTHORIZED** to sign the Operational Plans on behalf of Council as evidence of Council's endorsement.

## Key Facts

- The purpose of this report is to provide a summary outlining the main processes and work performed internally to support the Water-Wastewater Division's Water QMS, as required under the *Drinking Water Quality Management Standard* (the *Standard*), and the Wastewater QMS.
- The *Standard* is created under the *Safe Drinking Water Act, 2002* and requires Drinking Water System Owners to implement and maintain an accredited QMS. Niagara Region has maintained accreditation to this Standard since 2009.
- Niagara Region is not legally mandated to implement a QMS for wastewater services, however, the division has elected to do so as a due diligence measure.
- The previous term of Regional Council requested that internal and external audit reports relating to the Water QMS and Wastewater QMS be provided for information.
- The Water QMS and the Wastewater QMS Operational Plans were previously endorsed by Council on March 28, 2019 under PW 19-2019, Drinking Water Compliance and Water Wastewater Quality Management System Endorsement. Since that time, the Operational Plans have been updated to reflect staffing changes in key QMS roles (Top Management, QMS Representative) and are thus presented again today for re-endorsement.

## Financial Considerations

A total of approximately \$29,500 (including non-recoverable HST) in quality management system program costs have been incurred in 2019 to-date. Costs include maintenance and support fees for software used in support of the QMS, and consulting fees for an off-site external accreditation audit of the Water QMS. These costs were included in the 2019 approved operating budget for Water Operations.

An allocation of approximately \$33,000 has been included in the proposed 2020 operating budget.

## Analysis

This annual update summarizes the outcomes of significant quality management activities that are conducted in support of the Water QMS and Wastewater QMS, as well as internal and/or external changes that may impact either QMS.

### Water QMS

The *Safe Drinking Water Act, 2002* mandates the development, implementation, and accreditation of a drinking water quality management system as a condition of issuance of a municipal drinking water licence. Niagara Region holds five municipal drinking water licences, one for each of its drinking water systems; thus, we are legally required to maintain accreditation of our Water QMS.

### *Roles and Responsibilities – Water QMS*

Water QMS roles, as described in this report and documented in the Water QMS Operational Plan, are assigned in Table 1.

**Table 1: Roles and Responsibilities – Water QMS**

Role	Assignment
System Owner	Niagara Region (represented by Regional Council)
Operating Authority	Niagara Region (represented by staff of the Water and Wastewater Services Division)
Top Management	Commissioner of Public Works Director, Water and Wastewater Services Division Associate Director, Water Operations & Maintenance Associate Director, Water-Wastewater Engineering Associate Director, Water-Wastewater Integrated Systems Associate Director, Water-Wastewater Asset Management

Role	Assignment
QMS Representatives	Water-Wastewater Quality Management Specialist, reporting to Manager, Water Quality & Compliance ( <i>primary</i> ) Water-Wastewater Quality Management Specialist, reporting to Manager, Wastewater Quality & Compliance ( <i>backup</i> )

### *Owner Roles and Responsibilities – Water QMS*

An owner endorsement of the Water QMS Operational Plan is a requirement of our Water QMS accreditation. The Water QMS Operational Plan was endorsed by the current term of Regional Council on March 28, 2019 under PW 19-2019, Drinking Water Compliance and Water Wastewater Quality Management System Endorsement.

As Owners of Niagara Region's drinking water systems, Regional Council has specific responsibilities as defined within the *Safe Drinking Water Act, 2002*. A significant one of these is the "Standard of Care" clause (section 19 of the *Act*); the clause requires Councillors to "exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation" and to "act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the municipal drinking water system".

### *Internal Audits of the Water QMS*

The Water QMS is subject to annual internal audits by water and wastewater staff. All internal auditors have completed applicable training led by a qualified and competent trainer. Through the audit process, internal auditors assess conformance of the division's Water QMS with Ontario's *Drinking Water Quality Management Standard* and with divisional policies and procedures.

Three processes were selected for internal auditing:

- Emergency management;
- Preventive maintenance;
- Sampling, testing and monitoring of raw, process, and treated water.

The division's internal audits are more rigorous and thorough than the external audit process, and the number and detail of audit findings demonstrates this. The internal audit findings include 12 non-conformances, 7 potential non-conformances/opportunities for improvement, and 22 best practices. These findings are detailed in the Water QMS Internal Audit Report (Appendix 1 to this report).

### *External Audits of the Water QMS*

The Water QMS is also subject to external auditing by a third-party auditor as a means to achieve and maintain accreditation to the Standard. Accreditation of the Water QMS is a condition of the Region's Municipal Drinking Water Licences: without continued accreditation, these licences would be revoked.

An off-site surveillance audit was conducted in May 2019 to confirm that the Water QMS adequately addresses the requirements of all 21 elements of the Standard. This audit also marked an upgrade to version 2.0 of the Standard, released by the then-Ministry of the Environment and Climate Change (now, the Ministry of the Environment, Conservation, and Parks) in February 2017. The Water QMS External Audit Report (Appendix 2) provides details of the external auditor's findings. The auditor recommended that Niagara Region maintain its accreditation as a Drinking Water System Operating Authority, with no non-conformances or opportunities for improvement identified.

### *Water QMS Risk Assessment*

An internal risk assessment is required every 36 months for each of Niagara Region's water systems, with complementary risk assessment reviews to be completed at 12 and 24 months between the assessments. The last full risk assessment for the Water QMS was completed in 2018, with a review completed in 2019.

The following high-scoring risks were identified during the 2019 review:

- *Failure of raw water intake (Rosehill Water Treatment Plant):* This was identified as a risk due to the age of the intake pipe, which was installed in 1960. The intake shows signs of age-related failure. An environmental assessment has been initiated to replace the intake, with plans to extend it further into Lake Erie.
- *Sodium bisulphite systems (Decew Falls Water Treatment Plant and Grimsby Water Treatment Plant):* This was identified as a risk due to ongoing issues with the performance of the sodium bisulphite dosing systems at the two subject treatment plants. Sodium bisulphite is used to dechlorinate process waste streams before they are discharged to the environment. There is a potential for chlorinated water to be discharged to the environment if the dosing system fails; such an event could have environmental impacts in the receiving water body and/or compliance impacts for Niagara Region. **It is important to note that the sodium bisulphite systems treat waste streams only; thus, they do not impact the safety of treated drinking water.** Since completion of the 2019 risk assessment review, the system at the Grimsby Water Treatment Plant has been improved and is functioning as intended. The system at the Decew Water Treatment Plant continues to be examined, with some improvements planned.

The Region's "critical control points", representing critical process steps, remain unchanged following the 2018 risk assessment. The critical control points include:

- Coagulant feed
- Filter effluent turbidity
- Disinfectant feed
- Primary disinfection
- Secondary disinfection

Risks associated with these critical control points are all low-scoring, as they are well-controlled with existing preventive measures and monitoring/response procedures.

#### *Water QMS Management Review*

Water QMS Top Management and the QMS Representative meet twice per year to complete a QMS Management Review as required by the *Standard*. At these meetings, Top Management reviews the status of the QMS and identifies corrective actions and continual improvement opportunities to enhance the QMS and associated operations.

Part 1 of the 2019 Management Review was completed on May 31, 2019; Part 2 was scheduled to be completed on November 28, 2019.

Action items identified at the Management Review meetings are summarized in Table 2.

**Table 2: Management Review Meetings and Results**

Review Meeting	Date	Results
Part 1 – 2018	Jun. 4, 2018	Four action items: <ul style="list-style-type: none"><li>- Health and safety</li><li>- Water quality</li><li>- Staff suggestions</li><li>- Resources for QMS</li></ul>
Part 2 – 2018	Dec. 10, 2018	Five action items: <ul style="list-style-type: none"><li>- Water quality</li><li>- Emergency management (2)</li><li>- Changes impacting QMS (2)</li></ul>
Part 1 – 2019	May 31, 2019	Four action items: <ul style="list-style-type: none"><li>- Infrastructure review</li><li>- Emergency management</li><li>- Continual improvement (2)</li></ul>
Part 2 – 2019	Nov. 28, 2019	<i>To be reported in 2020 QMS Update to PWC</i>

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### *Changes Impacting the Water QMS*

Version 2.0 of the *Drinking Water Quality Management Standard* was released on April 6, 2017; significant revisions to the *Standard* were previously presented in Report PW 52-2017, *Water and Wastewater Quality Management Systems – Update*. Conformance with Version 2.0 of the Standard is required by year-end 2019 and was achieved in May 2019 with completion of the annual Water QMS external audit.

### Wastewater QMS

The Water-Wastewater Services Division has opted to develop and implement a Wastewater QMS as a due diligence exercise. The benefits of the Wastewater QMS are numerous and include documentation of policies and procedures, a formalized risk assessment program, incorporation of compliance requirements into standard operating procedures, and an audit program that promotes continual improvement of quality management practices.

### *Roles and Responsibilities – Wastewater QMS*

Wastewater QMS roles, as described in this report and documented in the Wastewater QMS Operational Plan, are assigned in Table 3.

**Table 3: Roles and Responsibilities – Wastewater QMS**

<b>Role</b>	<b>Assignment</b>
System Owner	Niagara Region (represented by Regional Council)
Operating Authority	Niagara Region (represented by staff of the Water and Wastewater Services Division)
Top Management	Commissioner of Public Works Director, Water and Wastewater Services Division Associate Director, Wastewater Operations & Maintenance Associate Director, Water-Wastewater Engineering Associate Director, Water-Wastewater Integrated Systems Associate Director, Water-Wastewater Asset Management
QMS Representatives	Water-Wastewater Quality Management Specialist, reporting to Manager, Wastewater Quality & Compliance ( <i>primary</i> ) Water-Wastewater Quality Management Specialist, reporting to Manager, Water Quality & Compliance ( <i>backup</i> )

### *Internal Audits of the Wastewater QMS*

Like the Water QMS, the Wastewater QMS is also subject to annual internal audits by water and wastewater staff. All internal auditors have completed applicable training led by a qualified and competent trainer. Through the audit process, internal auditors assess conformance of the division's Water QMS with Ontario's *Drinking Water Quality Management Standard* (as modified to suit wastewater operations) and with divisional policies and procedures.

The following audits were undertaken in 2019:

- Audit of the process for bypass, spill, and overflow notification and reporting;
- Element-specific audits to examine processes relating to Owner/Top Management commitment and endorsement; QMS Representative responsibilities; infrastructure review; infrastructure maintenance, rehabilitation, and renewal; equipment calibration; emergency management; internal auditing; management review; and continual improvement.

The internal audit findings include 23 non-conformances and 29 potential non-conformances/opportunities for improvement. These findings are detailed in the Wastewater QMS Internal Audit Report (Appendix 3 to this report). Best practice identification has not been undertaken in Wastewater QMS audits to-date, but will be included in future audits.

### *External Audits of the Wastewater QMS*

There is no accreditation requirement in place for the Wastewater QMS, thus, there is no corresponding program in place for external auditing of the Wastewater QMS.

### *Wastewater QMS Risk Assessment*

An internal risk assessment is completed every 36 months for each of Niagara Region's wastewater systems, with complementary risk assessment reviews to be completed at approximately 12 and 24 months between the assessments. The last full risk assessment for the Wastewater QMS was completed in fall 2018.

A total of 102 high-risk items were identified during the 2018 review. This significant number of high-scoring risks is reflective of the region's massive inventory of wastewater assets (12 treatment facilities, a biosolids treatment facility, and 112 sewage pumping stations) and the critical need for infrastructure improvement in wastewater operations. Seventy (70) of the 102 high-scoring items from the risk assessment will be mitigated through ongoing or upcoming capital projects, further highlighting the need for capital improvements to wastewater system infrastructure.

The 2019 risk assessment review is currently in progress; results will be reported in the 2020 Quality Management System update report to Public Works Committee.

#### *Wastewater QMS Management Review*

Wastewater QMS Top Management and the QMS Representative meet twice per year to complete a QMS Management Review as required by the *Standard*. At these meetings, Top Management reviews the status of the QMS and identifies corrective actions and continual improvement opportunities to enhance the QMS and associated operations.

Part 1 of the 2019 Management Review was completed on March 27, 2019; Part 2 is scheduled to be completed on November 12, 2019.

Action items identified at the Management Review meetings are summarized in Table 4.

**Table 4: Management Review Meetings and Results**

Review Meeting	Date	Results
Part 1 – 2018	Feb. 6, 2018	Five action items: <ul style="list-style-type: none"><li>- Risk assessment</li><li>- Maintenance (2)</li><li>- Infrastructure review</li><li>- Continual improvement</li></ul>
Part 2 – 2018	Oct. 19, 2018	Three action items: <ul style="list-style-type: none"><li>- Wastewater compliance</li><li>- Continual improvement</li><li>- Changes impacting QMS</li></ul>
Part 1 – 2019	Mar. 27, 2019	Four action items: <ul style="list-style-type: none"><li>- Wastewater compliance</li><li>- Staff suggestions/customer complaints</li><li>- Emergency management</li><li>- Continual improvement</li></ul>
Part 2 – 2019	Nov. 12, 2019	<i>To be reported in 2020 QMS Update to PWC</i>

#### *Changes Impacting the Wastewater QMS*

The Ministry of the Environment, Conservation, and Parks (MECP) has indicated that a quality management standard will be developed for wastewater systems. Unlike the *Drinking Water Quality Management Standard*, conformance and accreditation to the *Wastewater Management Standard* will be voluntary. Development of the *Wastewater*



*Management Standard* is industry-driven and is still in very early stages; as such, there is no forecasted date for its publication.

### Governmental Partners

Drinking water system Operating Authority staff work closely with the MECP to ensure that comments and concerns related to current and future drafts of the *Drinking Water Quality Management Standard* have been considered. When changes are made to the *Standard*, they are incorporated into the Region's Water QMS and are also considered for incorporation into the Wastewater QMS as relevant and/or feasible.

Water and Wastewater Operating Authority staff meet quarterly with Area Municipal counterparts to share resources, experiences, and best practices pertaining to water and wastewater quality management and compliance.

### Public and/or Service Users

The Water QMS Policy, Water QMS accreditation information, and Wastewater QMS Policy are available to the public and service users via the Niagara Region's external website.

The most current approved versions of Operational Plans are available upon request to a Water-Wastewater Quality Management Specialist ([rachel.whyte@niagararegion.ca](mailto:rachel.whyte@niagararegion.ca) or [michelle.max@niagararegion.ca](mailto:michelle.max@niagararegion.ca)).

### Updates to the Water and Wastewater QMS Operational Plans

The Water QMS Operational Plan and Wastewater QMS Operational Plan were revised in early 2019 and were re-endorsed by the new term of Regional Council on March 28, 2019 under Report PW 19-2019, Drinking Water Compliance and Water-Wastewater Quality Management System Endorsement. Water-Wastewater Services has since undergone a divisional reorganization, including the creation of two new positions that directly impact the Water QMS and Wastewater QMS:

- The new **Associate Director, Asset Management** has been identified as a member of Top Management for both the Water and Wastewater QMS. Top Management is identified as "a group of people at the highest management level within an Operating Authority that makes decisions respecting the QMS and recommendations to the Owner respecting the subject systems".
- A **Water-Wastewater Quality Management Specialist** has been added to the staff complement, reporting to the Manager, Quality and Compliance – Wastewater. This Quality Management Specialist acts as the primary QMS Representative for the Wastewater QMS and fulfills the specific responsibilities for the Wastewater QMS as outlined in the Wastewater QMS Operational Plan.

The Quality Management Specialist (Wastewater) also replaces the Water Compliance Specialist as the alternate QMS Representative for the Water QMS.

The Operational Plans have been revised to incorporate these changes to key QMS roles. Accompanying this report, Public Works Committee members have received copies of the Operational Plans for approval and endorsement as follows:

- Niagara Region's Water Quality Management System Operational Plan (included as Appendix 4);
- Niagara Region's Wastewater Quality Management System Operational Plan (included as Appendix 5).

For the Water QMS, endorsement of Niagara Region's Operational Plan is a requirement for accreditation to the *Drinking Water Quality Management Standard*.

## **Alternatives Reviewed**

The Ministry of the Environment, Conservation, and Parks has appointed two accreditation bodies under Part IV of the Safe Drinking Water Act, 2002. Niagara Region appointed QMI-SAI Global for Water QMS accreditation services in 2013.

## **Relationship to Council Strategic Priorities**

Niagara Region's Water and Wastewater Quality Management Systems, and associated audit processes, relate directly to Council's Strategic Priority 4.1 of committing to "high quality, efficient and coordinated core services". The Water QMS and Wastewater QMS are used to drive continual improvement within the Water and Wastewater Services Division; they increase accountability by defining clear roles and responsibilities for divisional staff, and they increase data accessibility through documented standard operating procedures and associated record-keeping practices.

The Water QMS and Wastewater QMS also relate to Council's Strategic Priority 4.2 of committing to "enhanced communication". The continued accreditation of the Region's Water QMS provides residents with assurance that their drinking water is safe and that the associated systems are managed with competence and diligence.

## **Other Pertinent Reports**

- PWA 109-2008, DWQMS Update (October 29, 2008).
- PW 52-2017, Water and Wastewater Quality Management Systems – Update (November 28, 2017).
- PW 19-2019, Drinking Water Compliance and Water Wastewater Quality Management System Endorsement (March 28, 2019).

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